

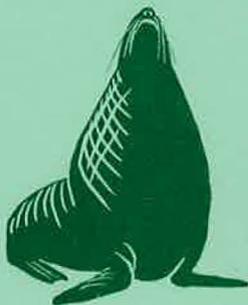
FUR SEAL INVESTIGATIONS PRIBILOF ISLANDS, ALASKA

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FUR SEAL INVESTIGATIONS
PRIBILOF ISLANDS, ALASKA

Report of Field Activities

June - November 1961

United States Fish and Wildlife Service
Bureau of Commercial Fisheries
Marine Mammal Biological Laboratory
Seattle 15, Washington

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21 December 1961



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FUR SEAL INVESTIGATIONS

PRIBILOF ISLANDS, ALASKA

1961

SUMMARY

Males

1. The 82,196⁷ males killed during the 1961 season was exceeded only by the kills in 1941, 1943, and 1956. The 1958 year class contributed 54,871 males or approximately 67 percent of the total male kill.

2. No change has been detected in the return of males that is known to be a result of the removal of females.

3. A trial kill forecast for 1962 on St. Paul Island, based on regression lines plotted from kills to 31 July for 1955 to 1959 and on kills of 2- and 3-year-old males in 1961, is as follows: 18,000 3-year-old males by 31 July and 30,000 by 5 August; 17,500 4-year-old males by 31 July and 26,000 by 5 August. Mean annual temperature and year-class-return relationship for St. Paul Island indicates that 47,600 to 57,600 males from the 1959 year class will survive to 1962. A minimum kill of 11,000 4-year-olds is predicted by this method for St. Paul Island in 1962.

4. The number of bulls counted increased slightly, from 12,799 harem and 13,037 idle in 1960 to 14,006 harem and 14,280 idle in 1961.

Females

1. Despite the 182,339 females which have been killed from 1956 to 1961 and coincidental natural mortality, the female herd is estimated to be larger than necessary for optimum production.

2. From 2 July to 15 August 1961, 14,122 females were killed; an additional 29,727 females were killed in September.

3. Age composition and reproductive condition were comparable for both islands as determined by females sampled from the kill. The predominant age in 1961 was age 4; this is in contrast to the apparent scarcity of age-3 animals in 1960. The 4-year-old females in 1961 had a 3 percent pregnancy rate, lower than the 12 percent average for 1956-60. Females age 8 and older, in the fall kill, had pregnancy rates comparable to United States pelagic samples of identical ages.

Tag Recoveries and Tagging

1. A total of 5,285 tagged seals and 2,215 with check marks only were recovered. Increased Soviet tagging was reflected by recovery of eight Soviet tagged seals.

2. Fifty thousand seal pups were tagged on the left fore-flipper in 1961 and a "V"-notch check mark was cut into the leading edge near the tip of each tagged flipper.

3. Experimental yearling tagging was started in October 1961 to determine its feasibility. If successful it will provide a basis for estimating fur seal mortality to age 1 and from age 1 to ages 3 and 4. Two sampling techniques for determining the tag ratio among pups were tried. The ratio completes data needed to estimate pup production soon after tagging.

4. Relating the age composition of the seal collection made off Japan to the size of the kill on the Pribilof Islands supplements other kill forecast information.

5. The 1958 double tagging recoveries indicate that it is extremely unlikely that animals that have lost their tags are overlooked. The probability that both tags were lost was 3 percent; the probability was 67 percent that neither tag was lost.

Mortality

1. The 1961 pup mortality count of 71,011 was slightly higher than the 1960 count.

Seal Pup Weights

1. The mean weight of 1,200 pups weighed in 1961 equaled the mean weight of pups weighed in 1957, a year class with slightly below average survival.

Related and Cooperative Studies

1. Significant advances were made in research on the life cycle of the hookworm, particularly the mode of infection.

2. Cooperative studies by W. J. L. Sladen on the Pribilof Islands have increased knowledge in the medical and zoological areas of fur seal research.

INTRODUCTION

The Pribilof fur seal herd has twice demonstrated its resilience by recovering from excessive exploitation. About 40 years were required, in its most recent recovery, for the herd to increase from about 200,000 to a near peak population estimated at 1,500,000. Relatively simple management consisting of protecting females and killing a selected group of males on land was sufficient to permit herd recovery. The steady increase in the number of skins harvested, until about 1940, satisfied responsible officials that management, and consequently research, was adequate.

Abrogation of the Fur Seal Convention of 1911 stimulated a research effort that was interrupted by war. In the late 1940's failure of the kill to keep up with the former growth rate resulted in investigations which became oriented into a population study. Additional impetus was given population dynamics research by the Interim Convention on Conservation of North Pacific Fur Seals with its emphasis on maximum sustainable productivity.

At a high population level the size of the annual kill is no longer predictable by former management methods. Management planning is plagued by the low and high year classes which have not been identified far enough in advance to make coordinated preparation possible.

The harvesting of females and processing of their skins have become problems now that females are being taken in an attempt to bring the Pribilof herd to a productive level.

Progress has been made in the main problem areas of population dynamics, forecasting year-class size, mortality factors, including disease, and management of females, but a great amount remains to be done. The understanding needed will come, in some cases, only through collecting a sustained series of pertinent data. Forecasts, mortality studies, and management of females are so closely related to population dynamics as to be scarcely separable from it.

Personnel

The 1961 field season studies began 7 June with the arrival on St. Paul Island of Eugene Lyons and Rex Thomas. Lyons is

studying the biology of the hookworm (Uncinaria lucasi) under the direction of Dr. O. Wilford Olsen, University of Colorado. This was the third year of contract research by the University of Colorado in a renewed study of the hookworm of fur seals. Thomas, a temporary employee, assisted Lyons with the initial phases of the work. Dr. Olsen arrived 16 June. Temporary fishery aids, Thomas Juelson, Donald Siedelman, Jack Melland, and Robert Rost, arrived on St. Paul Island 26 June. Biologist in charge, Carl Abegglen, arrived on St. Paul Island on the Service vessel Penguin 29 June. Charles Scattergood, temporary fishery aid, arrived 3 July. Juelson arrived on St. George Island 3 July to carry on the research program there. Laboratory Director Ford Wilke, and biologists Alton Roppel, Karl Niggol, and Karl Kenyon (Bureau of Sport Fisheries and Wildlife) arrived 5 July and departed in the evening for the Commander Islands aboard the Soviet ship M/V Orel (Eagle). Ancel Johnson, staff biometrician, and Dr. Victor B. Scheffer, staff biologist, arrived on St. Paul Island 10 July. Scheffer arrived on St. George Island 10 July to collect pelage samples. Richard Peterson, a graduate student doing independent research on behavior of fur seals, was given a temporary appointment effective 5 September. Peterson's appointment helped fill the vacancy caused by Thomas O'Brien's untimely death 24 June. Dr. Olsen departed St. Paul Island 10 July. Wilke, Roppel, Niggol, and Kenyon returned to St. Paul Island 26 July after visiting the Commander Islands (USSR). Niggol departed for Seattle 27 July; Wilke and Kenyon left for Seattle 31 July. Scheffer returned to St. Paul Island 3 August and departed for Seattle 10 August. Abegglen departed St. Paul Island 28 August aboard the U. S. Navy supply vessel Union. Roppel, Johnson, Rost, Siedelman, Scattergood, Melland, and Juelson left St. Paul Island 6 September. Lyons left on 6 November and Peterson on 27 November.

A program review of research operations was conducted by Mr. John Hodges, Chief, Branch of Resource Management, Washington, D. C. during his stay from 24 July to 7 August.

Dr. W. J. L. Sladen, Johns Hopkins University, continued his study of respiratory virus epidemics in polar communities. During 1961, Sladen made numerous observations and collections of wandering birds on St. Paul Island. Assisting Sladen were Daniel Kooyman, a medical student, and Richard Peterson, a Sc. D. student.

Drs. William G. Reeder and W. I. Welker from the University of Wisconsin visited on St. Paul Island from 17 to 24 July. Reeder and Welker collected brain, skeletal and whole body specimens of seals, sea lions, and a walrus.

Dr. Laurence Irving, Public Health Service, and two assistants, Leonard J. Peyton and Cordell Bahn, did physiological studies of diving and heat economy in fur seals from 3 to 17 August.

The Interim Convention on Conservation of North Pacific Fur Seals provided for an exchange of scientific personnel between the member countries. In 1960 the exchange between the United States and the Soviet Union did not become effective until after most research and sealing activities had been completed. In 1961 exchange personnel arrived in time to observe sealing operations and research activities. Soviet representatives to the Pribilof Islands were P. G. Nikulin, P. F. Popov, and L. V. Kostin. Nikulin and Kostin were on St. Paul Island during the 1960 exchange.

The research staff appreciates the assistance and cooperation given them by Mr. Howard Baltzo, Program Director; Mr. Roy Hurd, St. Paul Island Manager; and Mr. Bertel Johnson, St. George Island Manager.

POPULATION

Males

Age Classification

Following the method of sampling established in 1956, 7,501 upper, right, male canine teeth on St. Paul Island and 2,094 on St. George Island were taken for age determination. Sampling was carried on throughout the male kill from 2 July to 15 August.

The 1961 kill of 3-year-old male seals exceeded the largest previous kill (1953) of the same age class by approximately 9,000. The most productive year class to date was 1952, which contributed 83,000 males to the commercial kill (table 1). The 1958 year class has contributed 60,395 males through age 3. This quantity, when compared to 42,011 2- and 3-year-old males taken from the 1952 year class, implies that the herd produced a superyear class in 1958. However, the 1955 season ended 31 July with a total of 30,733 3-year-old males taken on St. Paul Island. The 29,523 3-year-old males taken by 31 July 1961 on St. Paul Island is not significantly different from the number taken in 1955. Tables 2 and 3 show the male age composition for 1954-61 and cumulative numbers of males killed from 1955 to 1961, St. Paul Island.

Table 1. --Kill of male seals, by year class, on Pribilof Islands, Alaska

Year class	Age when killed				Total	Age when killed				Total	Grand total ^{1/}
	2	3	4	5		2	3	4	5		
		<u>St. Paul Island</u>					<u>St. George Island</u>				
1947	-	30110	23697	854	54661	-	7043	3731	123	10897	65558
1948	486	25714	19995	103	46298	114	5546	3926	22	9608	55906
1949	-	29697	12326	249	42272	303	7116	2570	280	10269	52541
1950	855	40656	15365	332	57208	1104	8475	4793	147	14519	71727
1951	1384	32350	18083	3057	54874	288	7907	5310	681	14186	69060
1952	1735	30733	31410	675	64553	545	8998	8459	506	18508	83061
1953	839	38312	8855	54	48060	295	10611	3330	100	14336	62396
1954	2918	23473	5599	554	32544	535	6651	2779	162	10127	42671
1955	1015	27863	10555	115	39548	555	7246	2825	260	10886	50434
1956	885	10671	2762	532	14850	171	2251	1387	218	4027	18877
1957 ^{2/}	2590	24283	15344	-	42217	242	5098	4492	-	9832	52049
1958 ^{2/}	1977	48458	-	-	50435	431	9413	-	-	9844	60279
1959 ^{2/}	2820	-	-	-	-	891	-	-	-	-	-

^{1/} Does not include Pribilof seals taken at sea or on Asian islands, nor 4,476 not classified as to age.

^{2/} Incomplete returns.

Table 2. --Percent age composition of male kill at various levels, St. Paul Island, 1964-61

Date	Kill level	Age	
		3 <u>Percent</u>	4 <u>Percent</u>
1954 4 July	10,000	44	54
11 "	20,000	49	49
18 "	30,000	56	41
27 "	50,000	65	31
1955 9 July	10,000	50	48
16 "	20,000	54	44
22 "	30,000	56	42
31 "	50,000	62	36
1956 6 July	10,000	24	64
11 "	20,000	30	62
16 "	30,000	33	60
26 "	50,000	41	52
1957 13 July	10,000	53	41
24 "	20,000	63	33
6 August	30,000	68	27
10 "	34,055	69	26
1958 10 July	10,000	74	26
18 "	20,000	78	22
28 "	30,000	80	19
31 "	33,325	82	17
1959 14 July	10,000	38	57
26 "	20,000	44	51
31 "	20,649	46	47
1960 22 July	10,000	81	16
1 August	20,000	83	12
7 "	28,819	84	10
1961 9 July	10,000	61	37
18 "	20,000	62	37
24 "	30,000	66	32
2 August	50,000	70	27

Table 3. -- Cumulative number of male seals killed, St. Paul Island, 1955-61^{1/}

Date	1955		1956		1957		1958		1959		1960		1961	
							Age							
	3	4	3	4	3	4	3	4	3	4	3	4	3	4
July														
1	1574	1962	1079	3056	1360	1071	1991	732	584	1474	699	368		
6	3341	3643	2671	7060	2994	2161	3988	1383	1364	3028	1751	676	4119	2315
11	5929	6248	6145	12677	4507	3296	8038	2658	2625	4665	3274	988	6770	4316
16	10416	8999	9808	17954	6777	4651	12917	3912	4189	6425	5529	1385	9993	6021
21	15358	11648	14589	22159	9380	5602	17688	4839	6096	7949	7904	1717	15492	8302
26	21707	15638	20726	25999	13350	6784	22661	5279	8327	9721	10978	1968	22609	10851
31	30733	18083	26590	28560	16804	7547	27216	5556	10203	10446	15312	2347	29523	12488
August														
5			31701	29853	19823	8196					21610	2657	38908	14072
10			35502	30663	23473	8855					24201	2757	43629	14780
15			38290	31448									48458	15344

^{1/} Sealing began 2 July in 1961, 27 June all other years.

1955 Male kill ended 31 July
 1956 " " " 15 August
 1957 " " " 10 "
 1958 " " " 31 July
 1959 " " " " "
 1960 " " " 7 August
 1961 " " " 15 "

Between 1 and 15 August 1961, 19,000 additional age-3 males were taken on St. Paul Island. A 2-inch increase in the maximum length limit, from 45-3/4" to 47-3/4", allowed about 7,000 additional males to be killed on both islands.

The St. George Island 3-year-old male kill of 9,413 was exceeded only by the 1956 kill of 10,611. The 1952 year class contributed 8,998 3-year-old males by 31 July 1955, compared to 5,334 age-3 males taken from the 1958 year class by 31 July 1961.

Age-3 males dominated the kill, contributing 72 and 63 percent, respectively, on St. Paul and St. George Islands. St. George Island males were older because of a slight variation in the selection practised. The dominance of 3-year-old males resulted from a strong year class. In 1960 a moderate-sized 3-year-old class was accompanied by a very weak 4-year-old class. As a result 3-year-old seals, although modest in numbers, formed an unusually large proportion of the kill.

The female kills of 1956, 1957, and 1958 have not had a detectable effect upon the returns of 3-year-old males; the returns of 3's in 1960 and 1961 were as large or larger than in many previous years. It is still unknown whether the removal of females has or has not been beneficial.

The percent cumulative male kill, by round, age, and island is shown in figure 1.

The maximum 3-year-old kill prediction for 1961 on St. Paul Island was 34,500 by 7 August. For 31 July the prediction was 19,000. Actual kill was 29,523 by 31 July and 40,172 by 7 August. Predictions were based on returns of 2-year-old seals from 1955 to 1959.

An estimate by Dr. D. G. Chapman from population-return and dead-pup count relationships indicated a 3-year-old return of 49,300 (Chapman, appendix B [In Abegglen, C. E., A. Y. Roppel, and F. Wilke, Alaska Fur Seal Investigations, Pribilof Islands, Alaska, 1960]). He judged this to be too high.

The maximum predicted kill of 4-year-olds was 13,500 by 6 August and the minimum was 5,500 by 31 July. Actual kill was 12,488 by 31 July and 14,216 by 6 August. Three-year-old returns from 1955 to 1959 formed the basis for predictions of 4-year-olds.

Chapman estimated 20,600 4-year-olds would be killed.

The estimate of 49,300 for the kill of 3-year-olds, which was considered too high, and the actual kill of 48,458 on St. Paul Island were remarkably close. A strong element of chance entered this prediction since the closing date of male killing was not predetermined and an increase in the size of animals taken was complicated by a superior growth rate. The dead-pup count return relationship was the dominant source of the estimate.

The 3-year-old kill for 1960 led to an excellent prediction for 4-year-olds from a regression line plotted from 1955 to 1959 data. Further trials will be needed to establish the reliability of the method.

Figure 2 shows that the peak kill occurred during round 8 (no killing done in round 1). This is 10 days later than the average of the 5 years from 1955 to 1959 (Wilke, 1955; Abegglen *et al.*, 1956-59). In 1956 when killing extended to 15 August the peak was reached at round 6, followed by a decline. In 1961 a peak was also followed by a mild decline, but the kill climbed to a new peak in round 8. The kill in 1956 was composed of 51 percent 3-year-olds which arrive late and 42 percent 4-year-olds which arrive early; in 1961 the kill was 72 percent 3-year-olds and 23 percent 4-year-olds. The age of seals that dominate the kill probably has the major influence on the date of peak kills. The steady increase in the number of idle bulls indicates ample escapement in the past 10 years.

Forecasts

The number of 2- and 3-year-old male seals returning to St. Paul Island in 1961 was used to predict the kill for 1962, using the method described in the 1960 report. The kill of 2-year-old males in 1961 by 31 July was 695 and the total at the peak of the 2-year-old male kill, 5 August, was 1,513. The predicted returns from these figures are 18,000 and 30,000 age-3 males, respectively (fig. 3). The predicted 4-year-old male kill is 17,500 by 31 July and 26,000 by 5 August (fig. 4). These figures are based on a kill of 29,523 age 3 males through 31 July and 38,908 age-3 males through 5 August 1961. No special confidence is placed in these predictions. They are given as a step in the possible refinement of the method.

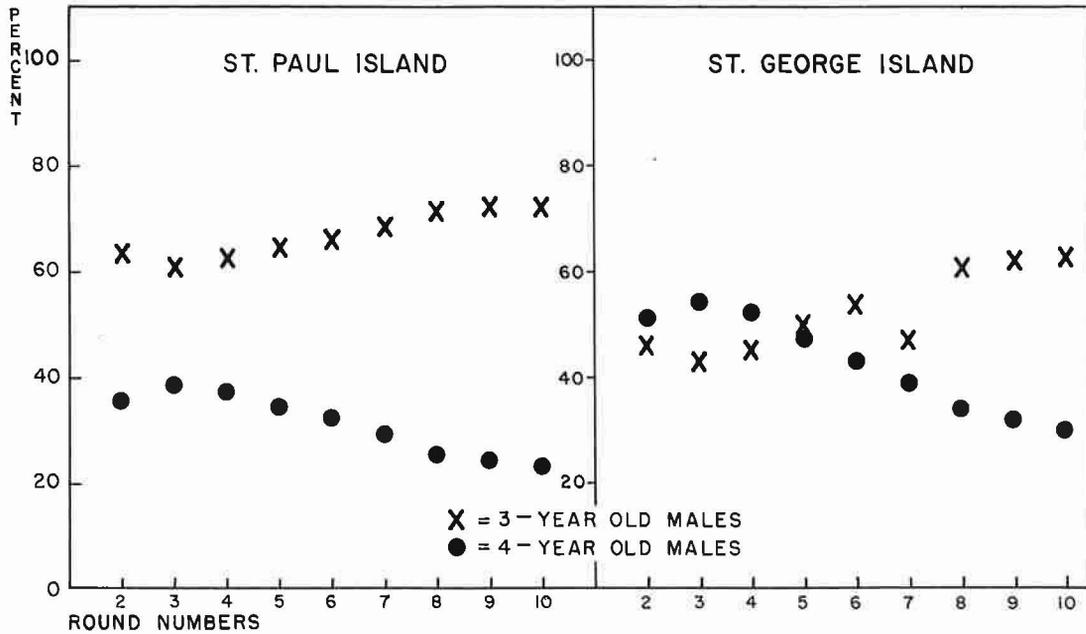


Figure 1. --Percent 3- and 4-year-old male seals in cumulative kill by island and round, Pribilof Islands, Alaska, 1961.



Figure 2. --Cumulative kill of male seals by age and round, St. Paul Island.

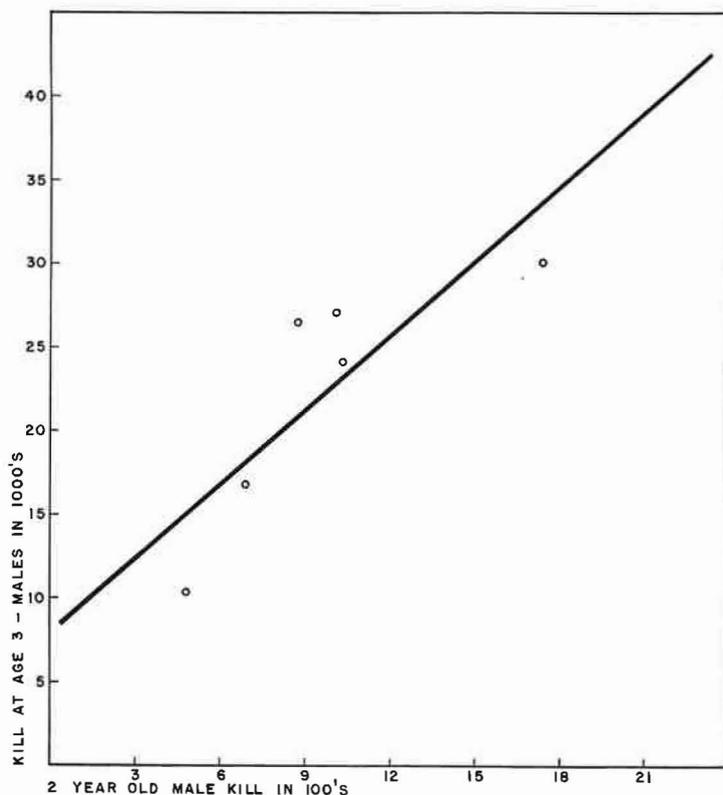


Figure 3. --Return of males at age 3 vs. previous year's kill at age 2, St. Paul Island.

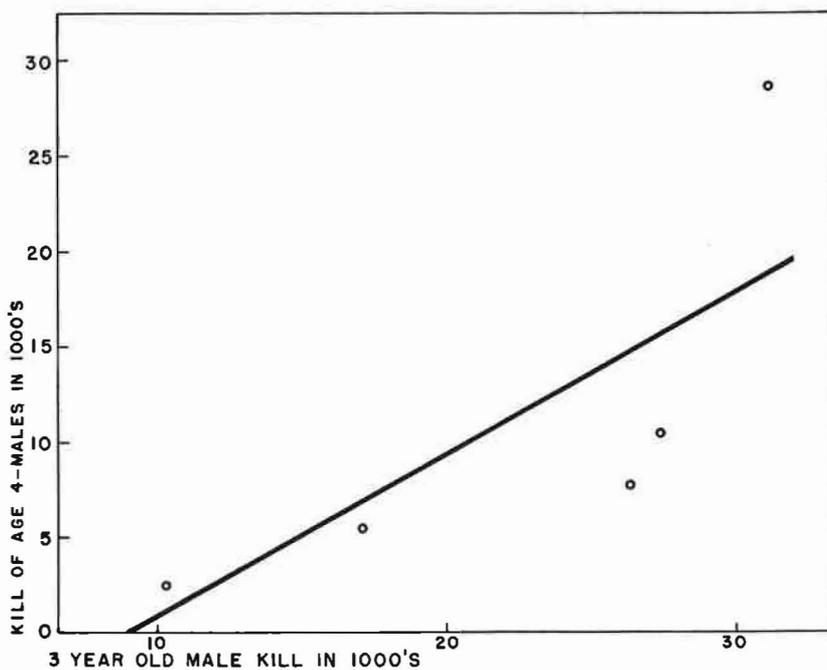


Figure 4. --Return of males at age 4 vs. previous year's kill at age 3, St. Paul Island.

Another approach to prediction of returns was suggested by study of the relationship of weather and pup mortality. A significant inverse correlation has been established (Abegglen *et al.*, 1960) between average air temperature for the 12-month period preceding 30 June and the number of pups of a year class that die on land after 30 June, $r = -0.853$. A less significant relationship exists between land mortality and return of a year class.

Total mortality, and ultimately the returns, may not be accurately reflected by land mortality, although a measure of this mortality may be indicative of future returns.

If there is the chance of continued mortality at sea from the debilitating effects of hookworms, then there is the possibility of a relationship between temperature and return of a year class. The return totals (kill) of each of eight year classes were plotted against the average air temperature for a 12-month period. Table 4 shows the relationship between actual returns and limits of predictable returns.

Table 4. --Actual and predictable returns for St. Paul Island male seals

Year class	Average air temperature 12-month period	Actual return	Predictable limits
1950	35.47	57,208	51,000 - 62,000
1951	35.57	55,000	54,000 - 64,000
1952	35.77	64,553	56,000 - 65,000
1953	33.54	48,000	30,000 - 39,000
1954	33.01	32,544	24,000 - 33,000
1955	33.61	39,548	31,000 - 40,000
1956	32.10	14,850	14,000 - 25,000
1957	34.29	43,000	38,000 - 47,000

The values were plotted as a graph and a prediction for the return of males to St. Paul Island in 1962 was made (fig. 5). Based upon this method, a minimum of 11,000 4-year-old males should return. A total return from the 1959 year class of between 50,500 and 60,500 is predicted, less the observed kill to date of 2,820. Thus 47,600 to 57,600 3-year-old males should return in 1962. These will be taken as 3- and 4-year-old seals and part will escape.

Bull Counts

Current bull counts are, at best, a count and estimate by one or two individuals of the number of harem and idle bulls on land at a given time. Intensive behavior and other studies are necessary for an understanding of the interrelationships between harem and idle bulls and the social position each occupies in relation to the breeding-age females. The age structure and number of bulls on land and at sea and the annual recruitment needed for their replacement are important but difficult questions to answer.

The 1961 bull counts are given in table 5 by island and by rookery. All bull counts, since 1910, are presented in appendix table 38.

Total harem bulls on the Pribilof Islands increased by 9.4 percent of the 1960 count; St. Paul Island showed an increase of 8.9 percent and St. George Island, 11.4 percent.

Idle bulls increased by 9.5 percent of the 1960 count, bringing the 1961 total to the level of 1959. Idle bulls on St. George Island decreased 5.4 percent of the 1960 count; those on St. Paul increased 13.3 percent.

Females

Introduction

The productivity of the Pribilof seal herd and the dependability of the harvest of sealskins from it are apparently closely tied to the size of the adult female population. From 1956 through 1961, records were established for recent times for an extremely low return of males (from the 1956 year class) and a high return (from the 1958 year class). These records occurred during the period of experimental population manipulation, but the poor survival of the 1956 year class could not have been influenced by any manipulation attempt. Almost the same can be said for the excellent return of the 1958 year class. Any benefits to the 1958 year class as a direct result of removing about 75,000 females during 1956 and 1957 are too small for measurement, if they exist. Chapman (appendix B, [In Abegglen et al., 1960]) calculated that the commercial kill of females has had little effect on actual herd reduction. The main factor in any reduction that may have occurred has been natural

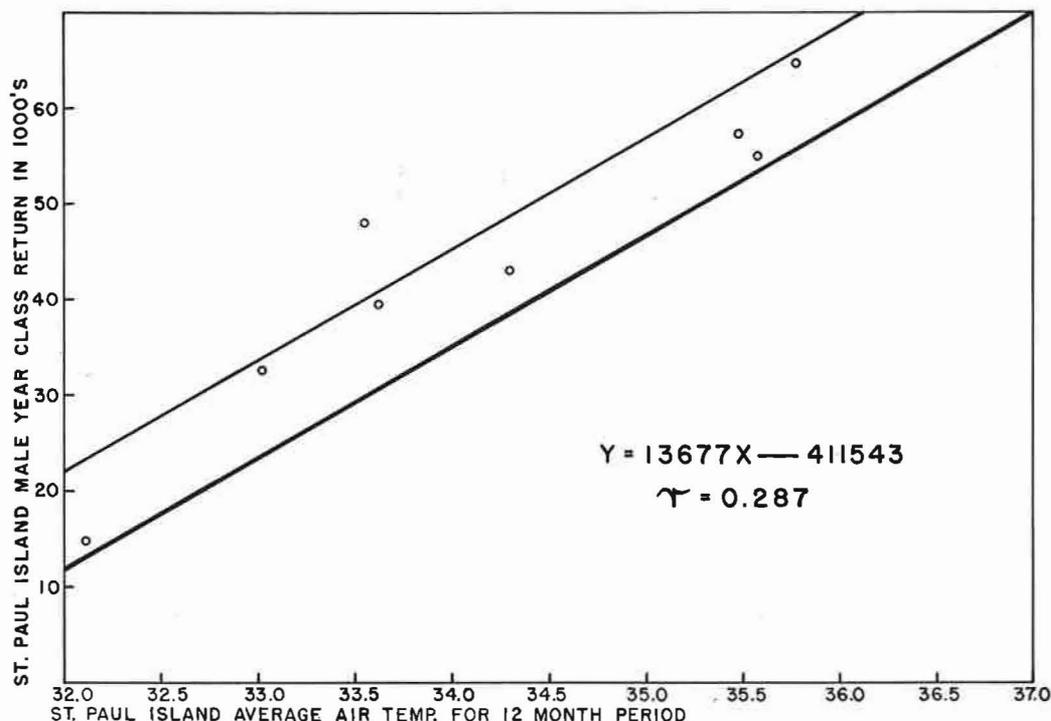


Figure 5. --Temperature and return relationship.

mortality. A total of 182,339 females have been killed during the 6-year period. In spite of this loss together with that occurring through natural causes the female herd is estimated to be larger than the level calculated to be necessary for optimum production.

The evolution of a plan for killing females is still in process. The initial 1956 kill was to determine how, when, and in what numbers females could be taken on land. A minimum but no maximum length was set on the taking of females in 1956; 27,599 were killed. Under the same conditions, 47,413 females were killed in 1957. Portions of harem areas on three rookeries were used as sources of females in 1957. A high percentage of the skins from producing females taken from both harem and hauling grounds were found to be of low quality. Excessive numbers of large, scarred skins were avoided in 1958 by the requirement that the length limits set for males, 41 to 45-3/4 inches,

Table 5. --Harem and idle bull count, by rookery,
Pribilof Islands, Alaska, 1961

Date	Rookery	Bulls		Total
		harem	idle	
<u>St. Paul Island</u>				
10 July	Gorbatch	842	952	1,794
	Ardiguen	153	88	241
	Reef	1,825	1,856	3,681
	Total	2,820	2,896	5,716
11 July	Polovina	341	932	1,273
	Polovina Cliffs	870	735	1,605
	Little Polovina	356	742	1,098
	Total	1,567	2,409	3,976
12 July	Morjovi	878	1,534	2,412
	Vostochni	1,898	1,877	3,775
	Total	2,776	3,411	6,187
13 July	Tolstoi	1,149	902	2,051
	Lukanin	231	231	462
	Kitovi	609	314	923
	Total	1,989	1,447	3,436
14 July	Zapadni	1,068	906	1,974
	Little Zapadni	666	437	1,103
	Zapadni Reef	277	285	562
	Total	2,011	1,628	3,639
St. Paul Island total		11,163	11,791	22,954
<u>St. George Island</u>				
11 July	Staraya Artil	375	502	877
12 July	East Reef	169	408	577
	East Cliff	366	46	412
	Total	535	454	989
13 July	North	1,235	861	2,096
14 July	Zapadni	363	512	875
	South	335	160	495
	Total	698	672	1,370
St. George Island total		2,843	2,489	5,332
Pribilof Islands total		14,006	14,280	28,286

were also to be observed in taking females. None of the 31,102 females taken in 1958 were from harems. The 1959 sealing instructions planned for a kill of 50,000 females, with as many as possible to be less than 46 inches in length. However, the limited number of 3-, 4-, and 5-year-old females available through 20 August resulted in a kill of 28,064. Calculations prior to the 1960 season suggested a choice of two levels at which to continue the killing of females. The lower level suggested a continuing surplus of 17,500 females and the higher level, 30,000 surplus females (Abegglen *et al.*, 1959). A kill of 17,500 females was planned. By mid-July, however, lack of males in expected numbers caused a decision to discontinue the female kill except for 350 per day following the termination of male killing. This small kill provided continuity of research data.

From 1956 to 1960, 31,100 genital tracts and accompanying canine teeth have been examined for reproduction and age data. Little year-to-year variation in pregnancy rates appeared among 3-, 4-, and 5-year-old females, the largest age classes sampled. Depending upon the source, pregnancy rates varied considerably from sample to sample within older age classes. Samples from active harem females usually have a pregnancy rate of over 99 percent. The most productive age is about 7.

Plans for the 1961 season included the killing of 43,750 females. As many as possible were to be killed prior to 20 August, with the remainder to be taken during a fall kill of females. At the end of the summer season on 15 August, 14,122 females had been killed.

The fall killing season began 31 August on both islands. The quota was completed on St. George Island by 7 September, and on St. Paul Island by 14 September. A total of 29,727 females were taken on both islands during the fall kill. Biologists sampled the St. Paul Island kill for age and reproductive condition through 5 September and thereafter for age only. Through the assistance of Island Manager Johnson, Innokenty C. Lestenkof collected tooth samples for age classification, recovered tags, and noted check marks during the fall kill of females on St. George Island.

Methods Used in Current Studies of Females

The number of females killed makes it impossible to collect data from each animal. Hence, the female kill is sampled in about the same manner as the male kill except that the sample size has been increased to compensate for the increase in the number of age groups represented. The reproductive condition of females in the sample is determined by gross examination of the uterine horns and ovaries. Females are initially aged by counting the surface annuli for ages 1-10 and a single group older than 10 called 10+. Extension of the age classification is done by exposing the internal growth layers through sectioning of teeth in the 10+ age group. Teeth of females classified as ages 8, 9, and 10 are also sectioned to verify or correct the original external reading. The United States is cooperating with Canada in a histological study of female genital tracts. The behavior of fur seals, a study begun some years earlier by cooperating research workers, was resumed in 1961. A separate report will be made on this study.

Age Classification

Females usually do not become available on hauling grounds until after 1 August. In 1961, 96 percent of the females killed during the regular season were taken from 1-15 August. The most abundant single age group was age 4 (18 percent), followed by the collective age group classified as 10+ (28 percent). The dominance of age 4 is in contrast to the apparent scarcity of age 3 animals in 1960. The age compositions of the female kill for both islands are listed in appendix tables 6, 7, 8, and 9. Because age composition is uniform for the summer and fall kills on both islands, the data for 1961 have been combined in table 6, showing percent age composition of females sampled from the commercial kill. A shift in the predominant age group younger than 10+ has taken place in each year listed, presumably reflecting the strength of an individual year class. Table 7 shows the number of females killed, by age and year class.

It has not been determined if the age distribution of the female kill is representative of the entire female herd.

Reproduction

Gross reproductive condition was determined for a sample of 2,840 females on St. Paul Island and 1,500 females on St. George Island. The annual variations in pregnancy rates, by age and island,

Table 6. --Percent age composition of females sampled from commercial kill

Year and island	Age									
	2	3	4	5	6	7	8	9	10	10+
<u>1958</u>										
St. Paul	2	37	29	13	11	3	1	1	2	1
St. George	1	20	22	17	13	9	4	3	2	9
<u>1959</u>										
St. Paul	1	6	25	14	11	12	6	4	4	17
St. George	-	6	20	14	10	13	7	6	5	19
<u>1960</u>										
St. Paul	1	8	14	23	14	9	8	7	4	12
St. George	-	3	9	20	12	8	10	9	5	24
<u>1961</u>										
St. Paul	1	10	16	10	11	6	6	7	5	28
St. George	1	11	15	10	10	7	6	7	6	27

are given in table 8. The difference in the productivity of each age has probably been within the range of sampling error.

The similarity of the samples from both islands in age composition and in reproductive condition indicates (1) that the killing methods are comparable, and (2) the stocks from which the kills were made are comparable.

The greatest difference between 1961 data and previous data is in the 4- and 5-year age groups. Age-4 females in the 1961 kill were the least productive of that age since commercial kills of females began. Pregnancy rates of age-4 females in the growing Asian herds are markedly higher. No change in the productivity of age-4 females has yet occurred which can be related to the attempts to manipulate the population on the Pribilof Islands. Tables 9 and 10 summarize the reproductive condition of female samples from St. Paul Island and St. George Island, respectively. Figures 6 and 7 show the reproductive condition of female seals by round and age for both islands.

Table 7. --Year class contributions to kill, by age^{1/},
of female seals on the Pribilof Islands

Year class	Age									
	1	2	3	4	5	6	7	8	9	10
1938	-	-	-	-	-	-	-	-	-	-
1939	-	-	-	-	-	-	-	-	-	17
1940	-	-	-	-	-	-	-	-	8	15
1941	-	-	-	-	-	-	-	16	7	15
1942	-	-	-	-	-	-	15	13	7	39
1943	-	-	-	-	-	12	8	10	41	36
1944	-	-	-	-	3	11	9	57	43	10
1945	-	-	-	4	4	8	45	43	11	27
1946	-	-	-	4	4	60	54	11	38	762
1947	-	1	-	1	37	84	46	48	1136	1773
1948	-	-	-	84	75	94	77	1766	3120	678
1949	-	-	30	34	161	118	2155	3550	559	1172
1950	-	10	17	92	210	2949	4031	654	1289	345
1951	4	-	8	85	4618	6343	1328	1958	492	2292
1952	-	-	16	6422	11465	3408	3515	526	3127	-
1953	-	1	2132	5806	4056	2958	493	2843	-	-
1954	-	132	1150	8493	3771	683	3057	-	-	-
1955	-	11	11468	7285	1047	4810	-	-	-	-
1956	-	601	2072	614	4520	-	-	-	-	-
1957	150	281	352	6912	-	-	-	-	-	-
1958	76	79	4651	-	-	-	-	-	-	-
1959	27	508	-	-	-	-	-	-	-	-
1960	120	-	-	-	-	-	-	-	-	-

^{1/} Includes pelagic kill of United States and Canada, 1958-61.

37,316 females, age 10+, taken in addition to above.

The reproductive condition of the fall sample is summarized in table 11. The increase in pregnancy rates of females age 8 and older may be due to sampling error. However, these high pregnancy rates are consistent with the United States pelagic samples of identical age groups.

Table 8. -- Annual variation in pregnancy rates, by age

Age	St. Paul Island						St. George Island					
	1956	1957	1958	1959	1960	1961	1956	1957	1958	1959	1960	1961
	<u>Percent pregnant</u>											
4	10	13	6	15	12	3	12	5	10	22	15	2
5	57	53	48	59	56	42	52	36	43	62	56	38
6	74	78	65	61	72	64	81	58	61	66	59	66
7	76	81	72	57	66	67	83	64	56	69	52	64
8	61	75	65	54	57	59	72	62	65	75	59	61
9	63	73	68	43	66	58	64	57	60	61	51	59
10	51	74	61	48	51	58	69	46	64	60	67	59
10+	36	51	35	39	49	41	53	51	45	51	45	48

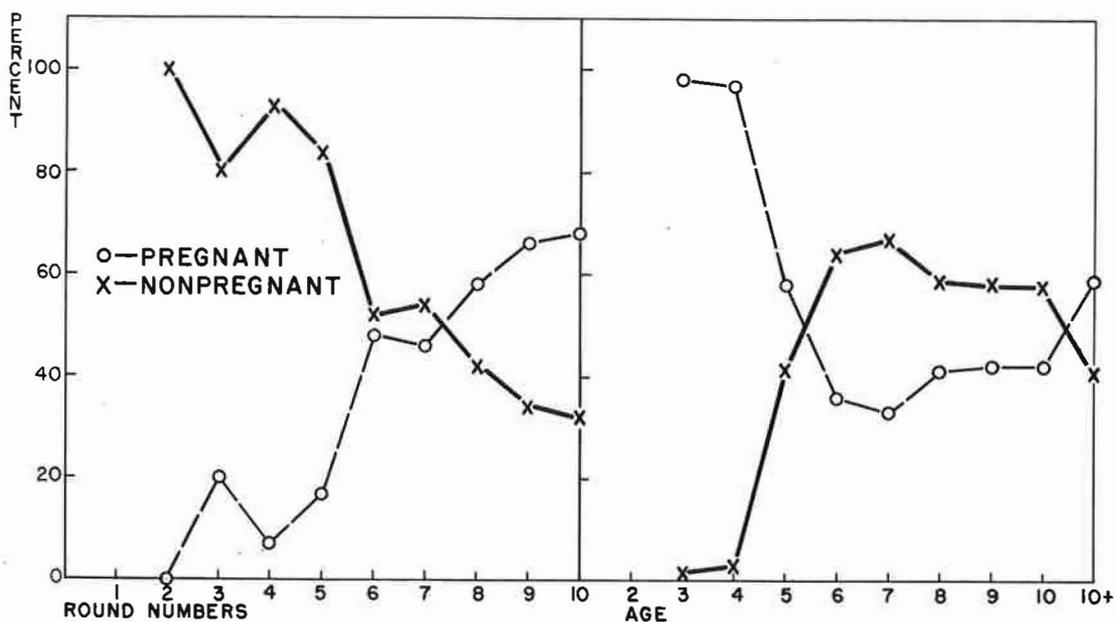


Figure 6. --Reproductive condition of female seals sampled from commercial kill by round and age, St. Paul Island, 1961.

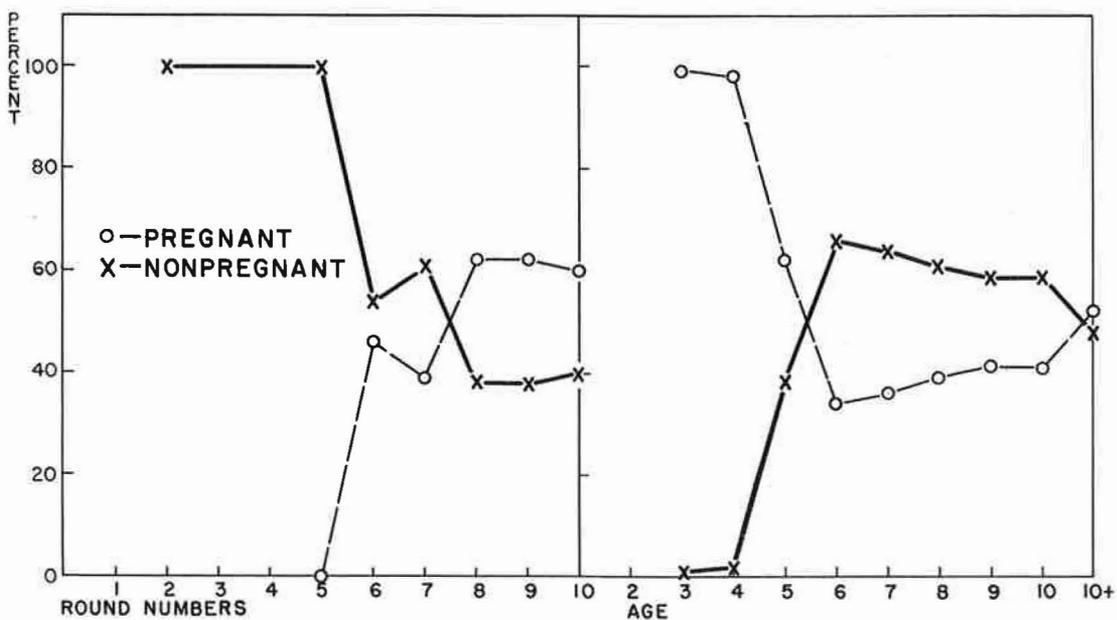


Figure 7. --Reproductive condition of female seals sampled from commercial kill by round and age, St. George Island, 1961.

Table 9. --Summary of reproductive condition of female seals sampled from commercial kill by age, St. Paul Island, 1961

Reproductive condition	Age										Total
	2	3	4	5	6	7	8	9	10	10+	
<u>Pregnant</u>											
<u>Primipara</u>											
number	-	2	9	80	117	42	15	12	5	17	299
percent	-	1	2	34	44	29	12	7	4	2	12
<u>Multipara</u>											
number	-	2	2	19	54	56	62	81	62	292	630
percent	-	1	1	8	20	38	47	51	54	39	26
<u>Total pregnant</u>											
number	-	4	11	99	171	98	77	93	67	309	929
percent	-	2	3	42	64	67	59	58	58	41	38
<u>Nonpregnant</u>											
<u>Nullipara</u>											
number	6	223	395	121	46	10	1	4	-	7	813
percent	100	98	97	51	17	7	1	3	-	1	33
<u>Primipara</u>											
number	-	-	1	7	18	5	6	2	4	6	49
percent	-	-	-	3	7	3	5	1	3	1	2
<u>Multipara</u>											
number	-	-	-	8	31	34	46	60	44	426	649
percent	-	-	-	4	12	23	35	38	39	57	27
<u>Total nonpregnant</u>											
number	6	223	396	136	95	49	53	66	48	439	1511
percent	100	98	97	58	36	33	41	42	42	59	62
Grand total	6	227	407	235	266	147	130	159	115	748	2440
Percent	-	9	17	10	11	6	5	6	5	31	

Sample size in percent of kill: 23

Table 10. --Summary of reproductive condition of female seals sampled from commercial kill by age, St. George Island, 1961

Reproductive condition	Age										Total
	2	3	4	5	6	7	8	9	10	10+	
<u>Pregnant</u>											
<u>Primipara</u>											
number	-	1	4	53	54	12	5	1	-	1	131
percent	-	1	2	34	31	11	7	1	-	-	9
<u>Multipara</u>											
number	-	-	-	6	61	57	40	63	57	204	488
percent	-	-	-	4	35	53	54	58	59	48	32
<u>Total pregnant</u>											
number	-	1	4	59	115	69	45	64	57	205	619
percent	-	1	2	38	66	64	61	59	59	48	41
<u>Nonpregnant</u>											
<u>Nullipara</u>											
number	2	119	228	91	32	11	2	2	-	-	487
percent	100	99	98	58	18	10	3	2	-	-	32
<u>Primipara</u>											
number	-	-	-	3	10	7	3	-	-	1	24
percent	-	-	-	2	6	6	4	-	-	-	2
<u>Multipara</u>											
number	-	-	-	3	18	21	24	43	40	221	370
percent	-	-	-	2	10	20	32	39	41	52	25
<u>Total nonpregnant</u>											
number	2	119	228	97	60	39	29	45	40	222	881
percent	100	99	98	62	34	36	39	41	41	52	59
Grand total	2	120	232	156	175	108	74	109	97	427	1500
Percent	-	8	16	10	12	7	5	7	6	29	

Sample size in percent of kill: 41

Table 11. --Summary of reproductive condition of female seals sampled from the fall kill, by age, St. Paul Island, 31 August and 1 September 1961

Reproductive condition	Age										Total
	2	3	4	5	6	7	8	9	10	10+	
<u>Pregnant</u>											
Primipara											
number	-	-	-	9	13	5	1	-	-	1	29
percent	-	-	-	>21	25	18	4	-	-	1	7
Multipara											
number	-	1	-	9	17	15	20	15	8	50	135
percent	-	1	-	>21	33	53	74	71	80	71	34
Total pregnant											
number	-	1	-	18	30	20	21	15	8	51	164
percent	-	1	-	43	58	71	78	71	80	72	41
<u>Nonpregnant</u>											
Nullipara											
number	8	69	71	22	11	3	1	-	1	-	186
percent	100	99	100	52	21	11	4	-	10	-	46
Primipara											
number	-	-	-	2	6	-	-	-	-	-	8
percent	-	-	-	5	11	-	-	-	-	-	2
Multipara											
number	-	-	-	-	5	5	5	6	1	20	42
percent	-	-	-	-	10	18	18	29	10	28	11
Total nonpregnant											
number	8	69	71	24	22	8	6	6	2	20	236
percent	100	99	100	57	42	29	22	29	20	28	59
Grand total	8	70	71	42	52	28	27	21	10	71	400
Percent	2	18	18	11	13	7	6	5	2	18	

Tag Recoveries and Tagging

Tag Recoveries

Table 12 lists 1961 tag recoveries by sex, age, and island. Tagged seals were killed only if they were within the length limits prescribed for killable seals. A total of 5,285 tags were recovered, and 2,215 check marks from animals that had lost their tags were recorded. Canine teeth were collected from four 20-year-old females bearing tags of the USA series attached in 1941.

As shown in table 13, eight Soviet-tagged males were taken in the Pribilof Islands commercial kill in 1961. Large-scale tagging of pups was first conducted on the Soviet seal islands in 1958. Figure 8 compares American and Soviet tags currently being used.

Tagging--Pups

Fifty-thousand tags of the N-series were attached to pups in 1961. Of these, 40,000 were used on St. Paul Island and 10,000 on St. George Island. Tags were allotted to each rookery according to the proportion of harem bulls counted on that rookery. The rookeries and number of pups tagged on each are listed in table 14. A record of pups tagged on the Pribilof Islands since 1941 is given in appendix table 37.

Tagging was completed during the period 16-21 August on St. Paul Island and 17-20 August on St. George Island. All tags used in 1961 were of the specifications outlined in the 1960 report of field activities (Abegglen *et al.*, 1960). Each was attached to the rear edge of the left fore flipper where fur meets bare skin. The 1961 check mark consisted of a "V" notch cut into the leading edge of the left fore flipper near the tip. Tag and check mark locations of fur seal pups tagged since 1947 are shown in figure 9.

Tagging--Yearlings

Trial tagging of yearlings was begun on St. Paul Island in 1961 to determine the feasibility of this approach in providing the basis for estimating fur seal mortality to age 1 and from age 1 to age 3. It is presently believed that most mortality occurs among the pups during their first winter at sea. Dr. D. G. Chapman has calculated that an estimate of mortality could be obtained from the tagging of 5,000 yearlings. This assumes that mortality is heavy

Table 12. -- Summary of tagged and tag-lost seals recovered by sex and age, Pribilof Islands, Alaska, 1961

Series	Age	Tagged seals			Tag-lost seals			Grand total
		St. Paul	St. George	combined total	St. Paul	St. George	combined total	
<u>Regular kill</u>								
<u>Male</u>								
L	2	97	35	132	47	8	55	187
K	3	2,523	456	2,979	918	153	1,071	4,050
J	4	900	208	1,108	639	113	752	1,860
I	5	24	5	29	17	3	20	49
H	6	2	-	2	2	-	2	4
G	7	-	-	-	1	-	1	1
Total		3,546	704	4,250	1,624	277	1,901	6,151
<u>Female</u>								
L	2	3	-	3	2	-	2	5
K	3	43	4	47	24	8	32	79
J	4	62	9	71	62	8	70	141
I	5	37	16	53	15	3	18	71
H	6	75	-	75	13	1	14	89
G	7	11	-	11	20	7	27	38
F	8	3	-	3	4	-	4	7
E	9	33	1	34	4	-	4	38
D	10	5	-	5	-	-	-	5
CS	12	8	-	8	-	-	-	8
B	13	21	-	21	-	-	-	21
A	14	1	-	1	2	-	2	3
USA	20	3	-	3	-	-	-	3
Total		305	30	335	146	27	173	508
<u>Fall kill</u>								
<u>Male</u>								
L	2	7	-	7	-	-	-	7
K	3	15	-	15	2	-	2	17
J	4	2	-	2	-	-	-	2
Total		24	-	24	2	-	2	26
<u>Female</u>								
L	2	14	4	18	6	2	8	26
K	3	114	27	141	8	16	24	165
J	4	126	25	151	45	22	67	218
I	5	75	16	91	14	2	16	107
H	6	151	-	151	13	-	13	164
G	7	19	-	19	-	2	2	21
F	8	8	-	8	4	2	6	14
E	9	60	-	60	2	-	2	62
D	10	2	-	2	-	-	-	2
CS	12	8	-	8	-	-	-	8
B	13	25	-	25	-	-	-	25
A	14	1	-	1	1	-	1	2
USA	20	1	-	1	-	-	-	1
Total		604	72	676	93	46	139	815

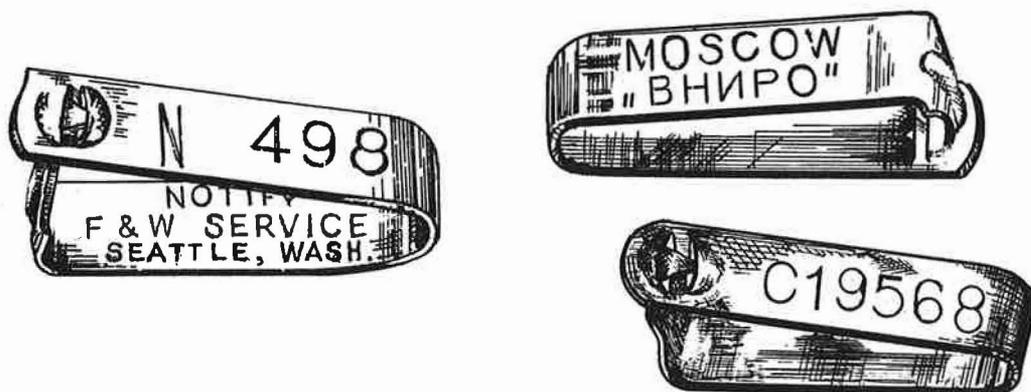


Figure 8. --American and Soviet tags currently in use.

Table 13. --Soviet tags recovered on Pribilof Islands, Alaska, 1961

Tag number	Sex	Age	Date	Rookery of recovery	Length (cm.)	Weight (kg.)
C 18114	male	2	16 July	POL	104.0	18.6
C 19568	"	2	14 Sept.	NEP	-	-
A 714	"	3	7 July	"	105.0	26.8
A 1865	"	3	4 Aug.	REEF	112.0	26.6
B 152	"	3	14 July	EAST (St. George)	-	-
B 2049	"	3	8 Aug.	ZAP	103.5	21.8
B 3547	"	3	24 July	"	-	-
B 4085	"	3	23 "	TOL	117.0'	29.8

Table 14. --Seal tagging on the Pribilof Islands, Alaska, 1961

Date	Rookery	Percent	Number and series allotment	Tags spoiled	Number seals tagged
<u>St. Paul Island</u>					
<u>August</u>					
19	Reef	25.2	10,100		
			N17201-27300	26	10,074
16 and 21	Polovina	10.8	4,300		
			N27300-31600	3	4,297
21	Little Polovina	3.3	1,300		
			N31601-32900	1	1,299
20 and 21	Northeast Point	25.0	10,000		
			N32900-42900	20	9,980
17	Tolstoi	10.2	4,100		
			N42901-47000	7	4,093
18	Lukanin-Kitovi	7.5	3,000		
			N47001-50000	-	3,000
17 and 18	Zapadni	9.5	3,800		
			N10001-13800	9	3,791
18 and 21	Zapadni Reef and Little Zapadni	8.5	3,400		
			N13801-17200	1	3,399
		Total		67	39,933
<u>St. George Island</u>					
<u>August</u>					
20	Zapadni	25.0	2,500		
			N 1-2500	2	2,498
20	North	43.0	4,300		
			N5701-10000	6	4,294
21	Staraya	13.0	1,300		
			N2501-3800	1	1,299
21	East	19.0	1,900		
			N3801-5700	3	1,897
		Total		12	9,988
		Grand total		79	49,921

during the first year of life and much less in the second and third years. Continuing heavy mortality would nullify the possibility of a satisfactory estimate from 5,000 tagged yearlings. Lacking precise information as to the availability of yearlings and the time necessary for tagging a given number, a tentative goal of 2,000 was set for 1961. A further complication arises in that yearlings cannot be identified with certainty. The age of seals tagged as yearlings will be corrected when canine teeth are taken from these animals as they appear in the commercial kill.

Richard S. Peterson supervised a crew of 12 men assigned to the tagging project. Seven surveys preliminary to tagging indicated that sufficient numbers of yearlings would be present on the rookeries by mid-October.

Tagging of yearlings was done on 5 days in October and early November. Subsequent surveys indicated that very few yearlings were present on the rookeries after early November.

Seven hundred forty seals were double-tagged with duplicate M-series tags bearing serial numbers between M-1 and M1100.

One additional tag was applied to each of 10 yearlings (in the above group of 740) bearing M-series tags applied to them as pups in 1960. The rookeries and numbers of seals selected for yearling tagging are given in table 15.

Table 15. --Number of seals selected for yearling tagging, both sexes, St. Paul Island, 19 October-2 November 1961

Rookery	Number
Zapadni	208
Little Zapadni	79
Reef	161
Vostochni	156
Polovina Cliffs	133
Irish Hauling Ground	3

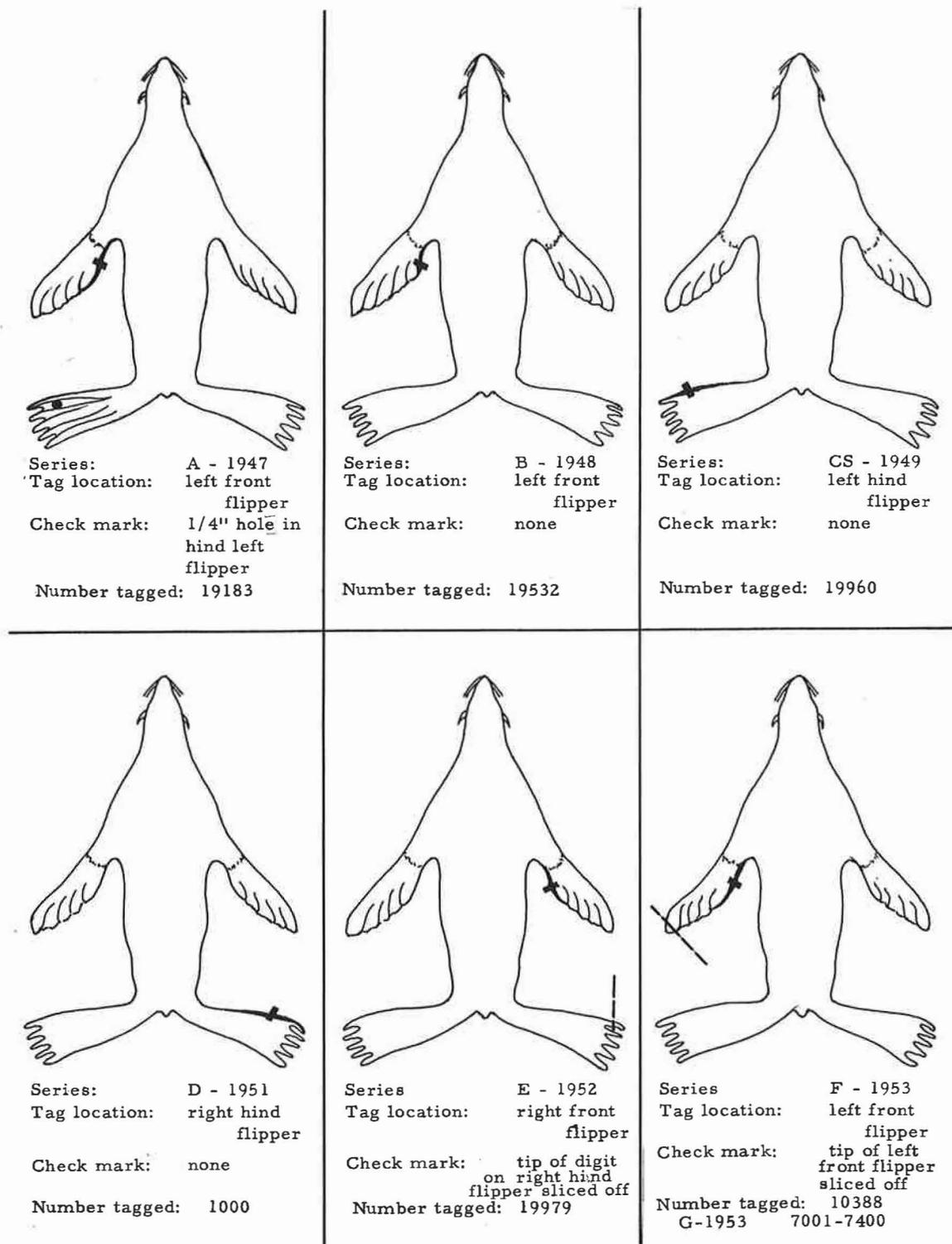
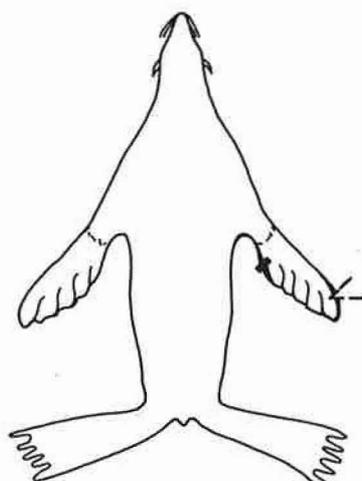
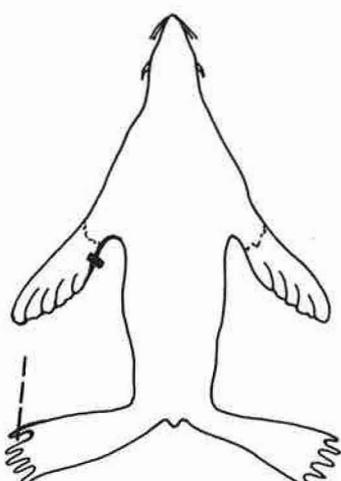


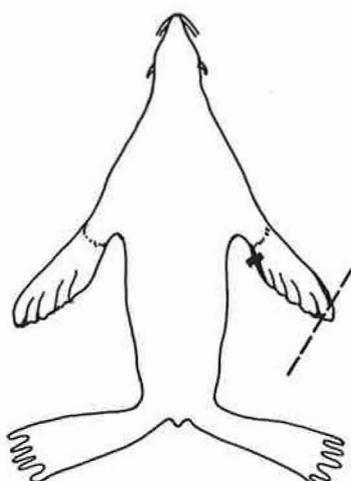
Figure 9. --Tag and check-mark locations, fur seal pup tagging, Pribilof Islands, Alaska, 1947-61.



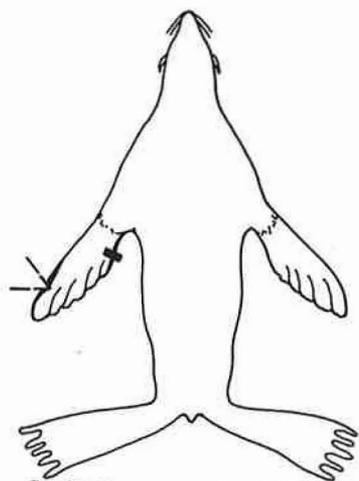
Series: G - 1954
Tag location: right front flipper
Check mark: "V" notch on right front flipper
Number tagged: 10000



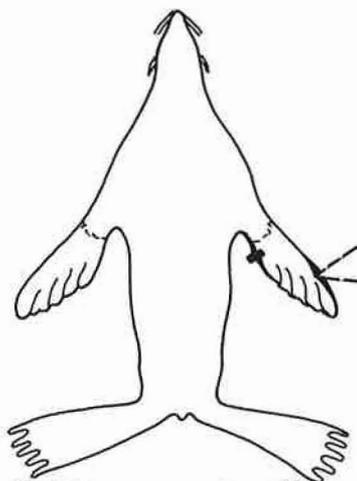
Series: H - 1955
Tag location: left front flipper
Check mark: tip of digit on left hind flipper sliced off
Number tagged: 49,870
H-1955 1-10000
No letter 10001-50000



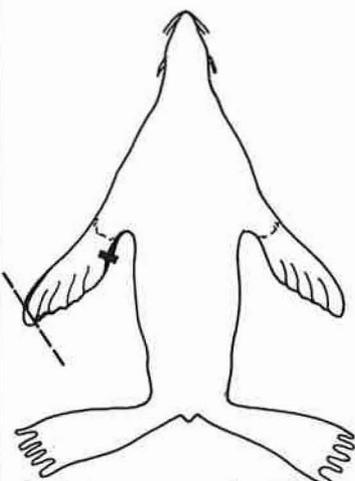
Series: I - 1956
Tag location: right front flipper
Check mark: tip of right front flipper sliced off
Number tagged: 49794



Series: J - 1957
Tag location: left front flipper
Check mark: "V" notch on left front flipper
Number tagged: 49842

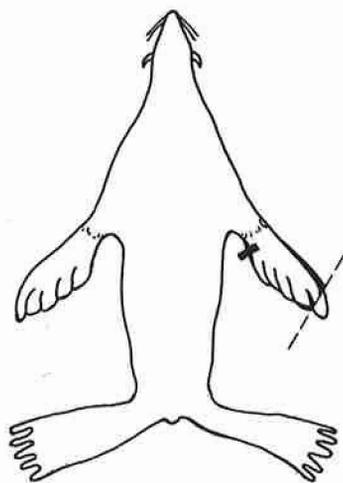


Series: K - 1958
Tag location: right front flipper
Check mark: "V" notch on right front flipper
Number tagged: 49917

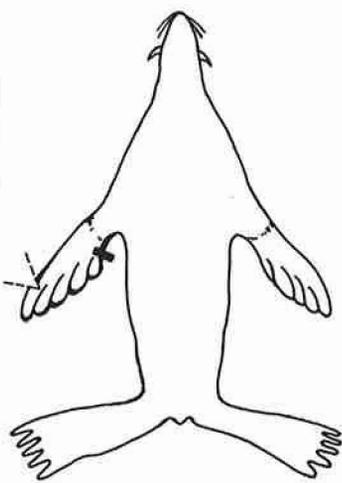


Series: L - 1959
Tag location: left front flipper
Check mark: tip of left front flipper sliced off
Number tagged: 49881

Figure 9. -- Tag and check-mark locations, fur seal pup tagging, Pribilof Islands, Alaska, 1947-61 (con.).



Series: M - 1960
Tag location: right front flipper
Check mark: tip of right front flipper sliced off
Number tagged: 59,981



Series: N - 1961
Tag location: left front flipper
Check mark: "V" notch on left front flipper
Number tagged: 49,921

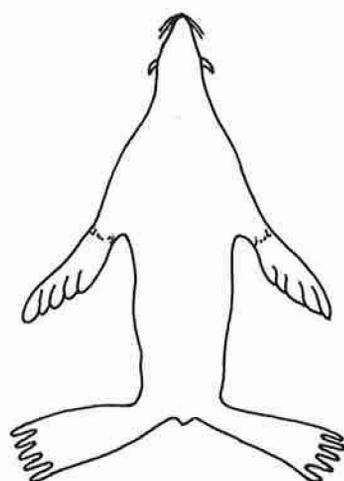
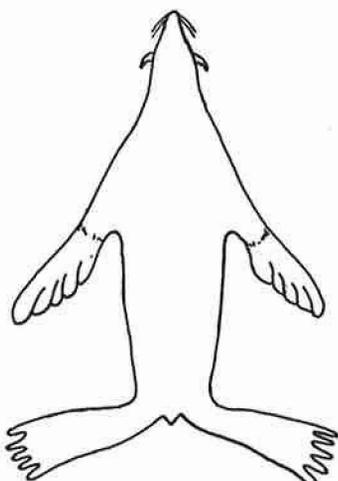
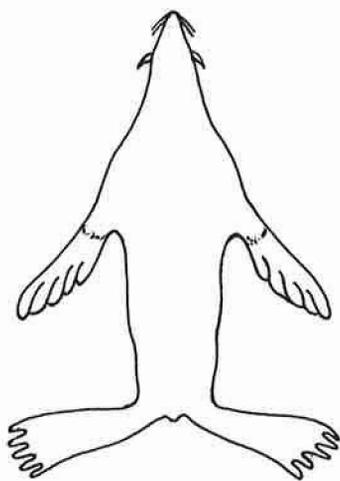
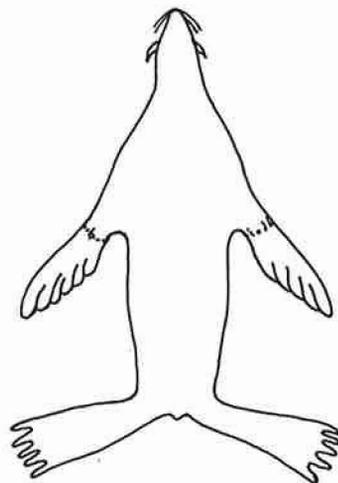


Figure 9. --Tag and check-mark locations, fur seal pup tagging, Pribilof Islands, Alaska, 1947-61 (con.).

Methods. --All seals on a given section of the rookery were surrounded by the crew. Animals tentatively presumed to be yearlings were extracted from the resulting pod by means of nooses attached to 8-foot poles. Final selection as yearlings was based on a combination of estimated size and pelage characteristics. Since the silver pelage of known-age yearlings was found variable, size was considered first in separating yearlings from seals of other ages.

Animals selected as yearlings were dragged to the tagging area still attached to the nooses. Each animal was held against the ground with a notched beam over the neck while the sex was determined and two identical tags attached, one to each fore flipper. The seal was then lifted by the nape of the neck and dropped into a barrel for weighing. The noose was removed as soon as the animal was secure under the notched beam, but, as the weighing equipment could not be shifted easily, seals were often dragged considerable distances by the nooses. Double tagging replaced the use of check marks.

Results. --The weight and sex of 740 seals selected and tagged as yearlings, together with the weight and sex of 14 yearlings bearing M-series tags or the corresponding check mark, are given in table 16.

Table 16. --Frequency distribution of weights of yearlings, by sex, St. Paul Island, September-November 1961

Weight (kg.)	<u>Selected as yearlings</u>		<u>M-series tagged yearlings</u>	
	males	females	males	females
Not weighed	-	2	-	-
12	-	4	-	1
13	-	8	1	1
14	2	16	-	-
15	11	42	1	-
16	20	84	5	-
17	24	119	-	1
18	23	134	2	-
19	17	96	-	-
20	24	64	1	-
21	7	17	-	1
22	7	10	-	-
23	3	3	-	-
24	1	1	-	-
25	-	1	-	-
Total	139	601	10	4

Discussion. --With the knowledge of yearlings' habits and experience in tagging gained this season, it is possible that the number tagged can be considerably increased over that reported here.

The data thus far collected point to the possibility that a number of small 2-year-old females were tagged as yearlings. Sex ratios among different groups of seals varied widely. Of 23 known-age yearlings observed, 4 or 7.6 percent were females. The success of this attempt to identify yearlings on the basis of estimated size obviously cannot be evaluated accurately until these animals pass through the commercial kill. A more thorough analysis and discussion of these results will be filed in a separate report.

Appraisal of Problems Involved in Tagging and Tag Recoveries

Several factors that could bias population estimates were outlined in the 1959 report of field activities (Abegglen et al.). An evaluation of these factors was presented in the 1960 report of field activities (Abegglen et al.). Following are additional results developed from data collected in 1961 and from observations.

Quality of tags. --Tags used in 1960 and 1961 have been less than satisfactory, especially when compared to good quality tags furnished in previous years by the same manufacturer. Numerous clinching failures, rough edges, uncut points, and shallow stampings have been brought to the attention of the manufacturer as a means of bringing the product up to former standards. Minor modification of the tagging pliers will also be made.

Effects of tagging. --The tags appear to be reasonably well placed in their attachment to the flipper each year. However, some of the resulting punctures unavoidably become infected, with edema sometimes stiffening the flipper and adjoining pectoral region. Some infection, though localized at the puncture point, has been observed on many seals older than pups. Mortality resulting from tagging is difficult, if not impossible, to measure.

Quality of check marks. --The veining chisels used for making the "V" notch check mark are unsatisfactory. The cutting edge is difficult to maintain because of the abrasive action of sand and because of the necessity of cutting into the tagging table after passing through the flipper. A search will be made for a tool capable of producing a uniform mark large enough to be easily recognizable.

Tag-lost animals. --Carcasses were re-examined on St. Paul Island in order to find tags and check marks overlooked by the tag recovery men. Check marks are the major recovery problem; less than 0.5 percent of the available tags have been overlooked. A comparison of recovered and overlooked check marks is made in table 17 for the years 1960 and 1961.

Table 17. --Check marks overlooked compared to the number available, 3- and 4-year-old male seals, St. Paul Island, 1960-61

Year	Check marks available	Check marks overlooked	Percent overlooked
1960	492	78	15.8
1961	1,624	498	30.7

A similar comparison between recoveries of "V" notch check marks and the slice type will be possible when L-series 3-year-old seals from the 1959 year class return in 1962. Fourteen or 29.8 percent of 47 available L-series (slice) were overlooked in 1961.

Fall Pup Sampling

Fall sampling of the pup population to obtain a tag ratio that can be used to estimate the pup population began in 1960 and was continued in 1961. The sampling technique was tried on a small scale in 1960 to determine the feasibility of fall sampling and to get an estimate of the number of samples necessary to arrive at a satisfactory estimate of the pup population (Chapman, appendix B [In Abegglen *et al.*, 1960]). The same method was used on a somewhat larger scale during the 1961 field season and a modification of the method, using larger samples, was used to sample pups on all St. Paul Island rookeries.

The pup sampling method is similar to transect methods commonly used in the biological field. In one modification of the method, tagged and untagged pups were counted and recorded in groups of 25 at sampling sites located along transects. This technique was used on three rookeries in 1961. The other modification was similar, except 100 or more pups were collected into a pod at sampling sites along the transect and then a sample of 100 pups was driven from the pod between two observers and the tag ratio recorded.

This technique was used to sample the pups on all St. Paul Island rookeries. The sampling transects were located at the water's edge, where pups were concentrated, and ran the entire length of the rookery. A second transect was located inland from and parallel to the first transect on the rookeries where the pups were more widely distributed. The distance between sampling sites on the transects was determined by the length of the transects and the number of samples to be taken on a rookery. The total number of samples necessary was determined from the sampling done in 1960 and the samples were allocated to rookeries on the basis of the harem bull count. The transects and sample sites were not permanently located.

A comparison of the two techniques shows that each has one distinct advantage over the other. A large number of pups, about 500 per man hour, can be sampled using the method with 25 pups sampled per site. The main disadvantage of this method is the possibility of observer error, as a single observer must keep a record of tagged, untagged, and the total number of pups at a sampling site. The other method, where pods of pups can be held, observer error is at a minimum, but only 200 pups can be sampled per man hour. The uneven distribution of the tagged pups make it difficult to get representative samples using either of the methods.

Estimates of the pup crop, with confidence limits, and a further comparison of the two methods of sampling are presented in appendix A, pages 68-72.

The Relation of Age Composition of the Seal Collection Made Off Japan to the Size of the Kill on the Pribilof Islands

The age distribution of seals taken pelagically should reflect the relative abundance of year classes represented. If this relationship is reliable then the age distribution from the pelagic samples should be useful for predicting later returns of year classes to the Pribilof and other islands. At present, the pelagic data collected off Japan are more suitable for checking this relationship than the pelagic collection from the eastern Pacific. Seals have been taken in considerable numbers from the same area off Japan for 4 years.

The recovery of United States tags from seals taken off Japan shows that more males than females of Pribilof origin intermingle with Asian seals in this region. Therefore, the age distribution of male seals in the pelagic kill should be a better indicator of the size of a year class from the Pribilof Islands than would be the age distribution of females.

The percentage contribution of the 1-, 2-, and 3-year-old males to the total kill of males in the Japanese pelagic samples for 1952 (Taylor, Fujinaga, and Wilke, 1955), and 1958 through 1960 (Tokai Regional Fisheries Research Laboratory. Report of Japanese fur seal research. 1958-60) has been examined for possible relationship to the total land kill of males from the year classes represented (table 18). The limited amount of data available do not permit a reliable appraisal of the method. Prediction by this method cannot be accurate because there is no way of measuring the effect an increase or decrease in recruitment from a year class from the Asian seal herd has on the percent contribution of an age class in the pelagic sample.

Table 18. --Contribution of age classes to the male kill from the Japanese pelagic collections, 1952, and 1958 through 1960, and the total commercial kill from the corresponding year classes

Age when taken at sea	Year taken at sea	Percent contribution to male kill at sea	Total commercial kill from year class
1	1952	9.6	69,097
1	1958	4.2	47,557
1	1959	9.6	48,458 ^{1/}
1	1960	4.6	-
2	1952	41.1	71,809
2	1958	32.9	18,664
2	1959	31.4	47,557
2	1960	40.1	48,458 ^{1/}
3	1952	31.5	52,239
3	1958	47.5	50,440
3	1959	27.9	18,664
3	1960	37.7	47,557

^{1/} Kill of year class not complete.

A rough relationship, suggested by the data, between the age distribution in the pelagic collection and the return to rookery islands is useful only as a supplement to other information.

Pending development of better forecast methods, an estimate based on a combination of all current suggestive data such as land pup mortality, growth data, kill of 2-year-old seals, and size of pup crop may indicate, at least, a small or large return.

Results of Double Tagging

Five thousand pups were double tagged on Zapadni Rookery during the 1958 field season. Tags were recovered from 425 of the double-tagged males during the 1961 field season. The recovery data are as follows:

<u>Condition</u>	<u>Number</u>	<u>Probability of occurrence</u>
No loss (two tags)	285	0.67
Loss - left	87	0.20
Loss - right	53	0.13
Loss - right or left	-	0.16
Loss - right and left	-	0.03

The probability of the loss of a tag according to the double-tagging data (0.16) is less than the probability observed from the entire male kill during 1960 and 1961, 0.27 each year. The probability of tag loss for Zapadni Rookery was 0.29 in 1960 and 0.25 in 1961, which is also higher than that found from the double-tagging data. The probability for separate rookeries ranged from 0.22 to 0.32 and from 0.14 to 0.33 for 1960 and 1961, respectively.

There is no apparent reason for the comparatively large difference between the probability of tag loss from the two separate sources of data. Possibly the difference is merely the result of sampling variability. The double-tagging data do indicate that it is extremely unlikely that animals that have lost their tags are overlooked.

Homing Tendency

Homing tendency of tagged male and female seals is shown in table 19 by rookery and in table 20 by age.

Table 19. --Homing tendency of male and female seals,
by rookery, Pribilof Islands, Alaska, 1961

Rookery of tagging	Males			Females		
	Total recoveries	Recovered home rookery number	percent	Recovered home rookery recoveries	number	percent
			<u>St. Paul</u>			
NEP	809	587	72	269	250	93
TOL	383	91	24	70	47	67
L-K	270	40	15	20	1	5
ZAP-1	791	542	68	156	125	80
REEF	755	135	18	98	7	7
POL	552	293	53	282	242	86
			<u>Mean</u>			<u>Mean</u>
Total	3560	1688	47	895	672	75
			<u>St. George</u>			
ZAP-2	124	58	47	32	22	69
NOR	281	132	47	35	21	60
EAST	174	88	50	23	20	87
STAR	111	27	24	26	23	88
			<u>Mean</u>			<u>Mean</u>
Total	690	305	44	116	86	74

Seal-pup Weights

Objective

In 1961, as in the preceding 4 years, live seal pups were weighed on St. Paul Island. Mean weight changes in pups from year to year may show a correlation with the survival of a year class to ages 3 and 4.

Pup weighing follows tagging on St. Paul Island. Consequently, many tagged pups are included among the pups that are weighed.

Table 20. --Homing tendency of male and female seals, by age, Pribilof Islands, Alaska, 1961

Males				Females			
Age	Total recoveries	Recovered home rookery		Age	Total recoveries	Recovered home rookery	
		number	percent			number	percent
2	132	54	41	2	21	14	67
3	2979	1364	46	3	188	142	76
4	1108	561	51	4	222	179	81
5	29	13	45	5	144	104	72
6	2	1	50	6	226	167	74
				7	30	17	57
				8	11	8	73
				9	94	71	75
				10	7	7	100
				12	16	9	56
				13	46	25	54
				14	2	2	100
				20	4	3	75

Recovery of the survivors in the commercial kill will provide direct information on growth from age 2 or 3 months to the age when killed. Appendix table 36 lists the tag numbers and corresponding weights as pups.

Tagged males and females from the commercial kill were weighed to determine whether a correlation exists between mean pup weights and weights of the same year class at various ages.

Procedure

Pup weighing was done on 29 and 30 August, using methods and equipment described previously (Abegglen *et al.*, 1959). A total of 1,200 pups were weighed, 300 each on Northeast Point, Polovina, Zapadni Reef, and Reef rookeries.

Results

Of the 1,200 pups weighed in 1961, 47 percent were males and 53 percent were females. The mean weight of the 1961 sample

was 11.9 percent less than that of the 1,200 pups weighed in 1960. It equaled the mean weight of pups weighed in 1957, a year class of comparatively poor survival. Males ranged in weight from 4.2 to 14.8 kg.; the weights of females fell within the limits of 4.0 to 11.8 kg. Table 21 lists mean weights, by rookery and sex, for tagged and untagged pups. Table 22 compares the average weights of pups for the years 1957-61.

Table 21. --Seal-pup weights, St. Paul Island, 1961

Rookery	Number		Mean weight (kg.)	
	male	female	male	female
<u>Tagged pups</u>				
NEP	6	7	9.5	7.3
POL	-	1	-	-
ZAP-REEF	105	70	7.9	7.4
REEF	75	89	7.9	7.0
Total	186	167	8.0	7.2
<u>Untagged pups</u>				
NEP	138	149	8.5	7.3
POL	141	158	8.7	8.0
ZAP-REEF	48	77	8.4	10.0
REEF	54	82	8.1	7.7
Total	381	466	8.5	8.0
<u>All pups</u>				
NEP	144	156	8.6	7.3
POL	141	159	8.7	8.0
ZAP-REEF	153	147	8.1	8.8
REEF	129	171	8.0	7.3
Total	567	633	8.3	7.8

The mean weight of tagged pups has varied from 93 to 96 percent of the mean weight of untagged pups since weighing began in 1957. It is unknown whether this difference is temporary or is a long-term slowing of the growth rate. A slower growth rate might cause a low survival of tagged pups at sea, with the ultimate effect of raising population estimates.

Table 22. --Seal-pup weights, 1957-61

Group	Sample size					Mean weight (kg.)				
	1957	1958	1959	1960	1961	1957	1958	1959	1960	1961
<u>Males</u>										
tagged	262	-	182	211	186	7.9	-	9.0	9.2	8.0
untagged	391	-	444	372	381	8.7	-	9.4	9.8	8.5
combined	653	127	626	583	567	8.4	11.4	9.3	9.6	8.3
<u>Females</u>										
tagged	196	-	188	254	167	7.4	-	8.0	8.4	7.2
untagged	351	-	386	363	466	7.7	-	8.1	9.1	8.0
combined	547	121	574	617	633	7.6	9.9	8.1	8.8	7.8
<u>Both sexes</u>										
tagged	458	-	370	465	353	7.7	-	8.5	8.8	7.6
untagged	742	-	830	735	847	8.2	-	8.8	9.4	8.2
combined	1200	248	1200	1200	1200	8.0	10.7	8.7	9.2	8.1

MORTALITY

Research to date has dealt almost exclusively with land mortality because it is much less difficult to measure than ocean mortality and is a necessary part of population estimates of pups. However, mortality at sea is of greater importance. A tagging program for yearling seals begun experimentally in 1961 will, if successful, separate mortality occurring during the first year at sea from that occurring during the second and third years. This information will be obtained when seals tagged as pups and as yearlings are taken in the commercial kill.

Annual counts of dead pups on all rookeries have been made each year since 1949 (partial counts were made in 1949 and 1952) on the Pribilof Islands, appendix table 39. The highest and lowest pup mortality, 119,505 and 37,740, were recorded in 1956 and 1958, respectively. Fluctuations of this magnitude, approximately 83,000, presumably are typical of populations at or near their peak.

Dead-pup counts have been made in recent years near the end of August or in early September. This allows sufficient time for most land mortality to occur. Death of pups resulting from the kill of harem females is delayed at least 3 weeks after the females are killed (Abegglen et al., 1957). Some additional pup mortality was

created by the 1961 fall kill of females; this is estimated to be about 12,000.

Dead-pup Counts

Total Counts

Pup mortality in 1961 decreased by 8 percent of the 1960 count on St. Paul Island and increased by 15 percent on St. George Island. Counts for both islands are given in table 23.

Each year, 5 percent has been added to the total number of dead pups counted as an allowance for those pups overlooked. It was determined from a check made in 1960 that the 5 percent figure is fairly accurate.

The tag recoveries from dead pups washed ashore along the Pacific Coast during the years 1948-61 (table 24) are not known to be an indicator of the amount of ocean mortality and are not listed as a measure of this mortality.

Sample-area Counts, St. Paul Island

The sample-area counts were continued in 1961 as a part of the regular dead-pup count (table 25). The results show that, if necessary, the sample-area counts can be used to calculate the total number of dead pups (table 26).

The relationship of sample area counts to their respective rookery counts is shown in table 27 for the period 1956-61.

Factors Influencing Mortality

Weather

Data obtained in 1961 suggest that seal pups are infected with hookworms through nursing. Infection directly from the soil is not essential, as was formerly believed, but has not been eliminated as a means of infection. This means that, either (1) the infection of females from the soil takes place annually on land prior to delivery of their pups, or (2) there is a carry-over of infection in the females from one season to the next. Perhaps both occur. Infection on land

Table 23. --Dead-pup counts, Pribilof Islands, Alaska,
1961

Rookery	Number
<u>St. Paul Island</u>	
Northeast Point	
Morjovi	5,259
Vostochni	10,173
Polovina	
Little Polovina	2,415
Polovina Cliffs	4,576
Polovina	2,499
Reef	
Ardiguen	411
Gorbatch	3,550
Reef	10,047
Sivutch	-
Kitovi, Lukanin, Tolstoi	
Kitovi	2,215
Lukanin	1,294
Tolstoi	4,761
Zapadni	
Little Zapadni	3,047
Zapadni Reef	1,291
Zapadni	6,329
Counted total	57,867
5 percent addition	2,893
Estimated total	60,760
<u>St. George Island</u>	
North	3,883
Zapadni	2,019
East	1,347
Staraya Artil	2,514
Counted total	9,763
5 percent addition	488
Estimated total	10,251
<u>Summary - 1961</u>	
Pribilof Islands counted total	67,630
5 percent addition	3,381
Estimated total	71,011

Table 24. --Tag recoveries from dead pups or yearlings reported by beachcombers along the Pacific Coast, 1948-61

Year recovered	Tag series	Number
1948	A	4
1949	B	2
1950	CS	1
1953	E	1
1954	F	18
1955	G	8
1956	H	3
1957	I	3
1958	J	21
1959	K	24
1960	L	11
1961	M	21

Table 25. --Dead-pup counts, study areas, St. Paul Island, 1961

Rookery	Number
Northeast Point	
Morjovi	2,359
Vostochni	2,337
Polovina	
Little Polovina	1,183
Polovina	1,901
Polovina Cliffs	2,882
Reef	
Gorbatch	1,070
Reef, area 1 (north)	1,008
Reef, area 2 (south)	1,827
Kitovi, Lukanin, Tolstoi	
Tolstoi	1,923
Zapadni	
Little Zapadni	982
Zapadni	3,143
Total	20,615

Table 26. --A comparison of total and sample-area dead-pup counts, St. Paul Island, 1956-61

Year	1956	1957	1958	1959	1960	1961
Total count	98,707	61,662	31,187	39,964	62,828	57,867
Sample-area count	31,301	19,729	11,802	14,125	20,374	20,615
Sample-area count in percent of total	31.7	32.0	37.8	35.3	32.4	35.6

Table 27. --Percent of complete rookery dead-pup counts represented by study-area counts, St. Paul Island, 1956-61

Rookery	1956	1957	1958	1959	1960	1961
				Percent		
Morjovi	42.0	33.1	29.8	30.8	45.1	44.8
Vostochni	20.6	25.1	14.4	29.0	22.7	23.0
Little Polovina	51.6	55.5	61.3	56.0	51.4	49.0
Polovina	26.3	36.6	48.5	42.3	65.7	67.6
Gorbatch	33.1	31.0	68.8	38.6	30.0	30.1
Reef	30.2	25.6	46.3	31.0	26.7	28.2
Tolstoi	52.3	43.8	48.4	44.9	35.9	40.4
Little Zapadni	39.2	28.3	30.0	31.6	30.7	32.2
Zapadni	51.3	52.2	50.9	47.7	51.5	49.7

just before the birth of pups is most consistent with the apparent weather-mortality relationship. Results of hookworm research in 1961 are discussed more fully in the section of this report devoted to related studies.

The new knowledge about the path of infection does not invalidate the hypothesis that high mean temperatures may accelerate development of the hookworm larvae and result in peak abundance of the parasite in its infectious stage prior to the arrival of pregnant females on the islands or that low mean temperatures may delay larval development enough to coincide with the arrival of large numbers of pregnant females. The latter condition would result in more frequent and severe infections and higher subsequent mortality.

The negative relationship of temperature and mortality shown in figure 10 continued in 1961 with an increase in mean temperature and a corresponding slight decrease in pup mortality. The coefficient of correlation for the period 1950-60 is -0.853; this is significant at the 1 percent level (Abegglen et al., 1960).

Other Factors

The significance of diseases, other than parasitism, on the pup survival of any given year is not yet known. In 1958, Dr. L. P. Doyle failed to isolate any disease that was associated with high mortality. Dr. W. J. L. Sladen isolated staphylococci and Clostridium perfringens from fur seals in 1961.

RELATED STUDIES

Live-pup Counts

Live-pup counts were made on 5 August on selected areas of Tolstoi and Kitovi Rookeries (Abegglen et al., 1959). Counts made during 3 years are compared in table 28.

Table 28. --Live-pup counts, 1959-61

Year	<u>Rookery areas</u>		
	<u>Tolstoi</u> White Cross to No. 16	<u>Kitovi</u> Amphitheater Blind to No. 13	
1959	702	1218	979
1960	405	1211	1072
1961	558	1048	942

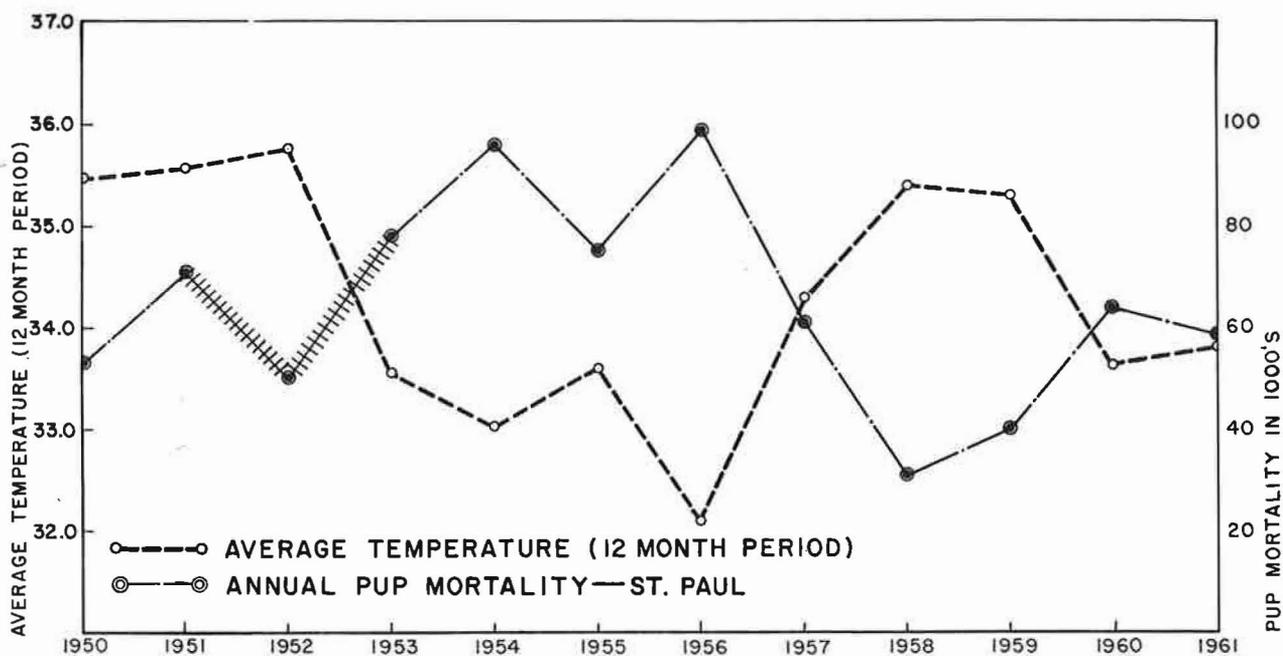


Figure 10. --Average temperature and annual pup mortality, St. Paul Island.

Crowding of the pups and the necessity of making the counts when the harem bulls are still active make counting difficult. The rookery area covered is small when compared to the total. The correlation of the counts with the population trend has not yet been determined.

Hookworm Studies

Studies in 1961 were concentrated on the mode of infection of seal pups by hookworms. Results showed that hookworms have a tissue phase and an intestinal phase in fur seals. In the tissue phase, free living third stage larvae from the soil penetrate the seal's skin and concentrate as advanced third stage larvae in the belly blubber and mammary tissue of seals of all ages. The intestinal phase occurs in pups which acquire the parasites by ingesting milk containing advanced third stage larvae. The larvae develop into mature hookworms in the intestine. Death of the host animal often results.

Evidence supporting the mode of infection described is as follows: (1) advanced third stage hookworm larvae were found in belly blubber of pups of various ages and in older seals; (2) advanced third stage hookworm larvae from the stomachs of very young, naturally infected pups appeared similar, morphologically, to those obtained from belly blubber and mammary tissues; (3) earlier studies indicated that Caesarean pups are not infected at birth; (4) infections established experimentally in Caesarean pups resulted in: (a) appearance of mature hookworms in their intestines after oral administration of advanced third stage larvae obtained from belly blubber and mammary tissue of pregnant cows, (b) tissue infections in two of three pups after hatched third stage larvae were placed on their flippers as demonstrated by recovery of advanced third stage larvae from belly blubber, (c) infection of two pups by a captive lactating female which infected her own pup and infection of one pup by a second female which did not infect her own pup.

Superinfections were achieved in two pups. One received the initial infection by nursing and the other was infected by oral administration of advanced third stage larvae from belly blubber and mammary tissue of pregnant females; the second exposure of both pups was to advanced third stage larvae from belly blubber and mammary tissue of pregnant females. Four days after the second exposure both pups were killed and mature and immature hookworms were recovered from their intestines.

Natural infection of pups with adult hookworms apparently occurs through nursing. An abbreviated account of the life cycle is as follows: (1) eggs in the soil hatch and third stage larvae penetrate the skin of seals, presumably of all ages, going to the belly blubber and mammary glands (this is the tissue phase in pups and older seals); (2) pups acquire parasitic third stage larvae by nursing and these develop to adults in the intestine (this is the intestinal phase that occurs in young pups only); (3) hookworm eggs are passed in the feces of infected pups in about 2 weeks; (4) eggs hatch in the soil early in the fall. Pups lose their intestinal infections at a maximum of 4 months of age.

Probably a large proportion of the pups born each year suffer both tissue and intestinal hookworm infections. Variation in the number of third-stage larvae ingested could account for the

fact that some pups die while others do not. Corresponding variations in degree of tissue infection among the females should also exist. By controlling larval development, weather may regulate the degree of infection among females on an annual or cumulative basis. Either situation could cause the extremes in pup mortality exhibited in recent years.

Advanced third-stage larvae of the same type infecting fur seals were found in the belly blubber of two Steller sea lions.

Samples of rookery soil were examined throughout the summer of 1961 for larvae. The earliest date of recovery was late in August; thereafter they increased in number. Larvae in large numbers have not been found before this time during the past 3 years. Examinations made prior to 1959 showed large numbers of larvae in rookery soil early in June, disappearance during August, and re-appearance in early September.

Female Skins

A sample of 248 skins from tagged females was collected in August 1958 and marked with special fiber tags giving the age and length of each animal. Fifty-nine of the skins had an additional number on the tag which related the age and length of the animal to reproductive condition. Following processing of the entire sample, the Fouke Fur Company sent to the Marine Mammal Biological Laboratory a report listing the finished grade and size of each skin. The report showed that sample females 40-43 inches in length graded 55.1 percent regular, and that those 40-45 inches in length graded 47.8 percent regular. The 40-45 inch group was 75.8 percent of the entire sample. Twenty-four percent of the sample consisted of females 46 inches and longer. In the total 1958 female kill only 14 percent exceeded the 45-inch length limit. Known-age females of all lengths and ages were included in the 1958 sample, therefore causing the sample to be biased toward older and longer females. The Fouke Fur Company report was interpreted to mean that smaller females were suitable for processing in the usual way.

In 1961, the Fouke Fur Company requested 100 skins each of 2-, 3-, 4-, and 5-year-old known-age female seals to test further the feasibility of processing small female skins by regular methods.

A total of 121 skins, or 83 percent of those available, were tagged for the study. Appendix table 35 lists the sample by age, length, and reproductive condition. In 1958, 317 tagged 3-year-old females were killed by 15 August, but in 1961 only 67 tagged 3-year-old females were killed by the same date. Both the 1958 and 1961 samples contained only females actually carrying a tag. Those identifiable only by check marks were not used.

Pelage Studies

The seasonal study of molt as described in Abegglen et al., 1960, is continuing. About 500 samples from all months of the year except November have been prepared as study specimens and nearly all have been examined once. November specimens, collected in 1961 by R. S. Peterson, have not been examined. A report is planned for the spring of 1962.

The investigator spent 6 weeks on the Pribilof Islands in July and August 1961 collecting pelage samples for this study and for a related one: physical characteristics of the belly fur of female sealskins. By means of a template placed on the back and belly of freshly killed animals, 10 cm squares of skin and pelage were obtained. These will provide a basis for fiber population-by-area studies. The investigator also examined, in late July and August, several hundred freshly blubbered skins, tail trimmings, and masks, in an effort to find a quick indicator of molt. It was concluded that methods now in use, namely, examination of the flesh side for pigment flecking and examination of the pelage side for "peepy" hairs can scarcely be improved upon. Fouke Fur Company graders selected, in late October 1961, six bachelor skins "representative of [advanced molt] which makes them unsuitable for processing." These were tanned entire and were distributed to St. Paul Island, St. George Island, and the Marine Mammal Biological Laboratory to serve as standards of critical molt.

Dentition Studies

A manuscript entitled "Dentition of the Alaska Fur Seal" was completed on 1 January 1961. It was held, pending the addition of certain information which was anticipated as follows:

1. Results of studies by Peter Bokstrom (D. D. S.) and James Takano (D. D. S.) on fetal fur seals. These findings were deposited in the University of Washington library in March 1961 as theses (M. S. in Dentistry); Bokstrom's on maxillary and Takano's on mandibular dentition.

2. Results of a study, in cooperation with the University of Washington Dental School, on the dentition of very small fetuses. It was learned in 1960 that calcification of the milk teeth begins in the fetus of less than 5% mean newborn weight, a remarkably early stage. Specimens of this size first became available during the spring pelagic sealing in 1961. On 5 June 1961, 10 specimens representing a male and a female in each weight category from 1 to 5% mean newborn weight were delivered to Bertram S. Kraus (Ph. D.) of the Dental School and are now being studied by one of his students.

3. Preliminary results of studies by Kinziro Kubota (M. D.) of Tokyo University. Through the kindness of Dr. Kubota, copies of certain parts of his report were brought to Seattle in January 1961 by delegates to the Fourth North Pacific Fur Seal Conference.

4. Measurements of tooth height in full-grown male and female seals. These were obtained from five of each sex on the Pribilof Islands in the summer of 1961.

Food Habits

Instances of early feeding by fur seal pups on marine forms were noted by Eugene Lyons in October 1961. C. H. Fiscus identified the following stomach contents:

- Specimen No. 1, collected 6 October 1961
 - Sandfish (Trichodon trichodon)
 - Walleye Pollock (Theragra chalcogrammus)
 - Molluscs (shell fragments)
 - Sea weed (fragment)
- Specimen No. 2, collected 6 October 1961
 - Amphipoda, Gammaridea
- Specimen No. 3, collected 13 October 1961
 - Amphipoda, Gammaridea
- Specimen No. 4, collected 27 October 1961
 - Smelt, Osmeridae

Knowledge of primary marine species utilized by fur seal pups during and immediately following the transition from milk to marine food is important. Of equal importance is the time involved for the transition and any physical or physiological changes accompanying the transition.

OTHER WILDLIFE SPECIES

Sea Lions

Sea lion pups were not tagged on Walrus Island in 1961. A total of 630 sea lion pups have been tagged on Walrus Island, 100 in 1959 and 530 in 1960.

Whales

A little piked or minke whale (Balaenoptera acutorostrata) was found in the surf near North Point, St. Paul Island, 3 September 1961. Its length was estimated to be 25 feet.

Walrus

Five adult walruses (Odobenus rosmarus divergens) were known to have drifted ashore on Pribilof Island beaches during 1961.

Sea Otter

Maxim Buterin, a resident of St. Paul Island, reported sighting a sea otter off Zapadni Rookery in June. During late July, Karl Kenyon surveyed the waters within binocular range off Reef rookeries, Southwest Point, and Northeast Point. None of the seven sea otters transplanted from Amchitka Island in 1959 were observed.

Reindeer

Several counts of the reindeer on St. Paul Island were made during the year, some partial and some complete. A count made in June by W. J. L. Sladen totaled 530 animals. Through the cooperation of Captain Waesche, commanding officer of the Coast Guard vessel Northwind, the herd was photographed from a helicopter on 7 August. The reindeer were found resting just west of North Hill.

Photographs were taken during three passes at altitudes ranging from 400 to 450 feet before the deer began to run. A count of 521 animals was made from the photograph given as figure 11.

In the fall of 1960 and the spring of 1961, the reindeer corral was removed from Kaminista and reconstructed around Lake Hill Lake about 25 feet from the water. The entrance was located in a saddle on the northwest side of the lake. An unsuccessful attempt at driving the reindeer into the corral was made on 22 September. Later the same day the herd entered Lake Hill Lake and about half were corralled. They were released because of a prejudice about taking reindeer during the breeding season. The deer refused to enter the corral on 30 November.



Figure 11. -- Reindeer herd, St. Paul Island, 7 August 1961.

COOPERATIVE STUDIES

The following summaries of work done by cooperators were prepared by the cooperator or from information furnished by him.

Dr. and Mrs. W. J. L. Sladen continued their study of upper respiratory infections (URI) in the human communities on St. Paul and St. George Islands. They also made a large collection of sera from fur seals during the commercial kill, a smaller collection of bird sera and various collections of other material for bacterial and viral analysis at Johns Hopkins University and elsewhere. Examinations of the sera are revealing some interesting potential pathogens. For example, hemolytic beta-streptococci of three different groups have been isolated from seals' upper respiratory passages and from infected lesions, particularly of the eyes and ears. Drs. Meyer and Eddie of San Francisco have reported titers of from 1:4++++ to 1:128++++ in about 80 percent of seal sera so far tested by complement fixation in presence of psittacosis antigen. Dr. Karl Johnson at National Institute of Health has found that complement fixation antibodies to two URI viruses found in man appear to be present in some of the seals' sera so far tested. During the summer of 1961, Daniel Kooyman, senior medical student, and Richard S. Peterson, Sc.D. student, assisted the Sladens in investigating potential zoonoses, especially concerning fur seals. Much of the pathology in the death of seal pups on the Pribilof Islands has been attributed to hookworms. Jellison and Milner have described Salmonellosis in seal pups but no other pathological agents have been reported up to now. In Dr. Sladen's opinion, this is a very practical field for research and the St. Paul medical laboratory could cope well with the collection of virus material for studies in the virus laboratory at Johns Hopkins and elsewhere, as well as with the bacteria.

Further investigations of avian zoonoses may also prove of value. The Pribilofs are in a unique situation geographically. Of some 140 bird species known to have occurred on the Pribilofs, only 24 are known to breed, while over 80 species on the island list are transients or accidental visitors and over 20 of these

are Eurasian. During 1961 Sladen collected one duck and one shore bird new to North America (Mergus albellus, Smew and Tringa erythropus, Spotted Redshank), two birds which had been seen once before in North America (Anser fabalis serratirostris, Bean Goose, and Larus ridibundus sibiricus, Siberian Black-headed Gull), and other birds seen but a few times before (Tringa glareola, Wood Sandpiper; Aythya fuligula, Tufted Duck; Anas formosa, Baikal Teal). These are all of Eurasian origin and breed in Northeast Asia. The regular migrants also pass through on their way to or from Japan, Hawaii, South America, Australia, East Russia, and Alaska. The local breeders are mostly birds which nest in closely packed colonies along the cliffs. The collection of external parasites and sera should prove of value.

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Physiological studies of the diving and economy of heat in fur seals by Laurence Irving, assisted by Leonard Peyton and Cordell Bahn, showed that young fur seal pups swim awkwardly on the surface. They can dive for 2 minutes. During a dive the heart slows to intervals of 3 seconds between beats. Adults dive safely for 5 to 6 minutes, their hearts slowing to intervals of 4 to 6 seconds between beats. This bradycardia is common among diving animals. Harbor seals (Phoca vitulina) dive longer and deeper and show a more pronounced bradycardia. The swimming and diving abilities of fur seal pups develop as the pups grow until they are ready to depart in November for life at sea with the adults.

The natal fur of fur seal pups easily wets to the skin and they become cold. The underfur of adults is not wettable and keeps the skin on their bodies constantly warm. Collectively, the flippers have nearly three times the surface of the body and, being bare, become cool in water, thereby saving heat. In warm air the flippers warm, thereby losing heat. They may rapidly change temperature 25°, whereas the skin on the body changes only 3° to 4°. The lability of temperature on the flippers gives them a large function in regulating the loss of bodily heat in the very different thermal conditions found in water and on land. In this variability of temperature the extremities of fur seals do not differ essentially from land animals and even man, but the large extent of the bare flippers demonstrates their importance in heat regulation.

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William G. Reeder and Wallace I. Welker of the University of Wisconsin were on St. Paul Island 12-20 July. As members of an ecological survey party working in the Kodiak Island region, they were collecting fresh marine mammal specimens for comparative and identification purposes. Their collection from St. Paul Island consisted of the following:

Brains: One adult male fur seal, two adult female fur seals, one fur seal pup, and one adult male sea lion.

Total body: One adult female.

Skeleton: One male and one female fur seal, one male sea lion, one blue fox, and one partial walrus skeleton.

Dr. Reeder, of the Zoology Department at Wisconsin, will examine the skeletal material and dissect the total body specimen; Dr. Welker, of the Department of Physiology, will examine the brain material microscopically.

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Livers and hearts of fur seals taken pelagically through February 1961 were collected for Dr. Thomas Richardson, Chemist, Food Technology Department, Bureau of Commercial Fisheries, University of California, Davis, California. He studied cell mitochondria and compared cells of mammals living exclusively on a marine diet with cells of other mammals and with those of fish. The purpose of the study was to gain information and insight in the metabolism of fatty acids. This would provide knowledge about the storage qualities of fish and possible nutritional effects of unsaturated fatty acids. The analyses of fatty acids of mitochondria from the hearts and livers of marine birds and fur seals and the livers of various fish were completed with the following results:

The fatty acid patterns of mitochondria from heart and livers from the same source in most respects were similar. However, a difference in distribution of linoleic acid indicated a 2- to 4-fold advantage for heart over liver in pelican, cormorant, grebe, and seal mitochondria. The primary differences in fatty acids from mitochondria of birds and seals were in the total amount of fatty acids and in the distribution of esters of searic, linoleic, and arachidonic fatty acids. Generally, fish mitochondria were low in essential fatty acids, especially linoleic. The approximate total quantities of polyunsaturated fatty acids were 30, 36, and 41 percent, respectively, for fish, birds and fur seals. It would seem, from the low levels of essential fatty acids in fish oil, that animals on a diet of fish would accumulate higher quantities of arachidonate and linoleate into the vital metabolic machinery.

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Appendix A
PRELIMINARY REPORT ON THE POPULATION ANALYSIS OF
THE PRIBILOF FUR SEAL HERD

Douglas G. Chapman
1 December 1961

This report is preliminary in two senses. First, it is based on preliminary data which may be subject to trivial modifications when final compilations are made. Second, some of the secondary analyses have not yet been completed, e. g. , stratified estimates, analysis of the biological measurements of tagged animals, analysis of tag returns from females, etc.

SUMMARY

1. The best estimate of the number of pups born on the Pribilof Islands in 1957 is 712,000, while for 1958 it is 752,000. These estimates are based upon tags recovered from males in the commercial kill.
2. An unusual loss of tags appears to have occurred between 1960 and 1961 in the J-series (1957 year class). No such heavy tag loss between ages 3 and 4 has been observed since the A-series tag recoveries in 1950 and 1951. No reason for this is apparent.
3. The estimate of the 1961 fall pup population on St. Paul Island from tag ratios obtained during the fall pup-sampling program is 275,000. The confidence interval is 229,000 to 320,000. This is inconsistent with the most recent year-class estimate derived from commercial kill tag recoveries where an estimated 565,000 pups were born on St. Paul Island in 1958.
4. Additional study is needed on the fall pup-sampling program to validate it as a tool in the research program. In particular, samples should be limited to 25 animals but more samples should be taken over a longer period.
5. The best prediction of the 1962 male kill on St. Paul Island is 58,000, made up of 44,000 3-year-olds, 11,000 4-year-olds, and 3,000 of other ages. These figures assume a severe

cropping as accomplished in 1961 by extending the male kill season into August and increasing the length limits. The predicted total kill for both islands is 72,500.

6. The returns in 1961 are consistent with the population-return equation obtained in the Population Dynamics study reported on by Chapman, appendix B (In Abegglen et al., 1960).

Tag Loss Analysis

The estimate of the 1957 and 1958 year classes is obtained by treating the two islands as a single unit as in 1960 (Chapman, appendix B [In Abegglen et al., 1960]). First, however, it is necessary to analyze the tag to tag-lost ratios to determine the need for corrections. Table 1 shows the data on tag and tag-lost recoveries while table 2 shows the results of several chi-square tests on this data.

Table 1. --Tag-lost to tagged ratio

Year class	Sex	Recovery location and year	Tag lost	Tagged	Ratio	
1957	M	St. Paul Island	1960	461	1221	.38
	M	St. George "	1960	48	257	.19
	M	St. Paul Island	1961	639	900	.71
	M	St. George "	1961	113	208	.54
1958	M	St. Paul Island	1961	918	2523	.36
	M	St. George "	1961	153	456	.34

Two comments should be made about table 2. First, the recoveries of 4-year-old tag-lost animals on St. George Island were again proportionately lower than on St. Paul Island. While the chi-square test just failed to be significant at the 5 percent level, and since it showed the same directional difference as in 1960, an adjustment for tag loss made in 1960 was made again in 1961. In other words, it is assumed that some tag-lost animals

Table 2. --Various comparisons of tag-lost to tagged ratio

Comparison	Chi-square	Significance (P)
St. Paul Island vs. St. George Island 1961 recoveries of 1957 year class (4-year-olds)	4.78	.06
St. Paul Island vs. St. George Island 1961 recoveries of 1958 year class (3-year-olds)	.64	.45
1960 vs. 1961 recoveries from 1957 year class on St. Paul Island, i. e. 3-year-old vs. 4-year-old recoveries	65.4	<.001
1960 vs. 1961 recoveries from 1957 year class on St. George Island, i. e., 3-year-old vs. 4-year-old recoveries	30.0	<.001
1960 recoveries from 1957 year class vs. 1961 recoveries from 1958 year class on St. Paul Island, i. e., 3-year-old recoveries from successive year classes	.27	.62

of the 1957 year class were overlooked on St. George Island. The St. Paul Island ratio was used to adjust the number of tag-lost animals recovered on St. George Island in 1961 from 113 to 148.

The second comment pertains to the two large chi-square values obtained in comparing the tag-lost ratio at age 3 and 4 from the 1957 year class for St. Paul and St. George Islands. Apparently there has been a severe loss of tags from these animals during the year. A loss of this magnitude between ages 3 and 4 has not been observed since the A-series tag recoveries in 1950 and 1951.

Population Estimates

The usual Peterson estimates for the population of the two islands at the time of tagging together with the data on which they are based are shown in table 3.

Table 3. --Estimates of the fall pup population on the Pribilof Islands, Alaska, 1957-59

Year class	Number tagged (t)	Year of recoveries	Number killed (n)	Number of tag recoveries (s)	Population estimate
1957	49,842	1959, 1960	32,213	2,184 ^{1/}	734,848
	"	1961	19,636	1,875 ^{2/}	521,731
	"	1959, 1960, 1961 combined	51,849	4,059	636,542
1958	49,917	1961	57,871	4,067	710,141
		1960, 1961 combined	60,279	4,216	713,554
1959	49,881	1961	3,711	181 ^{3/}	1,017,374

^{1/} The value of (s) used for 1959 is that given in table 3^{*}; the value for 1960 is that on p. 145 of Chapman, appendix B (In Abegglen et al., 1960) which included an adjustment for tag-lost animals overlooked on St. George Island.

^{2/} An adjustment has been made as indicated above.

^{3/} Adjusted for overlooked tag-lost animals on St. George Island. The actual recoveries are: St. Paul Island, tagged 86, tag-lost 43; St. George Island, tagged 35, tag-lost 8. The adjusted figures for St. George Island tag-lost is 17.

* Table 3 of preliminary Interim Report tables, July 1961.

Concerning table 3, the large difference between estimates of the 1957 year class based upon tag recoveries from 3- and 4-year-old males is disturbing. A difference of this magnitude has not been

observed before where the estimates were derived from large numbers of male tag recoveries, approximately 2,000 in each case. Some of the estimates based upon tags recovered from males and females have differed widely, but in these cases the number of tags recovered from females has been small. The 1958 fall population estimate based upon more than 4,000 tag recoveries is similar to the earlier estimate of the 1957 year class and many of the recent year classes.

Fall estimates (i. e. , at the time of tagging) of the pup population are combined with the dead-pup counts to arrive at total pup populations as shown in table 4. The 1959 estimate could not be given any weight since it was based upon recoveries from 2-year-old males only. Therefore it is not included.

Table 4. --Pup population estimates and dead-pup counts, 1947-58 year classes, Pribilof Islands, Alaska

Year class	Population at time of tagging	Dead-pup count		Total pup population
		St. Paul Island	St. George Island ^{1/}	
1947	498,000	-	-	-
1948	532,000	60,000	-	592,000
1949	550,000	-	-	-
1950	-	55,000	(8,000)	-
1951	484,000	76,000	(10,000)	570,000
1952	529,000	(77,000) ^{2/}	(10,000)	616,000
1953	704,000	83,000	(8,000)	795,000
1954	727,000	101,000	10,000	838,000
1955	778,000	79,000	(11,000)	868,000
1956	872,000	104,000	16,000	992,000
1957	637,000	65,000	10,000	712,000
1958	714,000	33,000	5,000	752,000

^{1/} St. George Island dead-pup counts in parentheses were estimated from St. Paul Island counts.

^{2/} The 1952 St. Paul Island dead-pup count was estimated by interpolation from dead-pup ratios in 1951 and 1953.

The estimated reduction between 1956 and 1958 of 158,000 pups born is partly accounted for by the kill of 75,000 females in 1956 and 1957. Whether the remainder is a real reduction due to the other causes or is merely due to sampling errors of estimation cannot be discerned.

To estimate the separate populations for these years on St. Paul and St. George Islands, the harem bull counts of the respective years are used. The results are shown in table 5.

Table 5. -- Fall pup population estimates, by island, 1957-58

Island	Harem bull count	Percent of Pribilof Islands total	Pup population estimate
		<u>1957</u>	
St. Paul	9,562	.798	508,000
St. George	2,427	.202	129,000
		<u>1958</u>	
St. Paul	9,970	.792	565,000
St. George	2,619	.208	148,000

Estimate of the 1961 Pup Population From Fall Sampling of Pups

Sampling of pups in the fall to obtain a tagged to untagged ratio was designed to provide an immediate estimate of the year class, i. e., the pup population as of late August on the Pribilof Islands. An immediate estimate would be useful both in evaluating the effect of changes in the female kill and in predicting the kill of males in subsequent years.

However, pup sampling will yield a valid estimate only if randomization of the sampling scheme replaces mixing of tagged and untagged pups which does not occur on land. This possibility seemed sufficiently promising after trials on two small rookeries in 1960. Consequently, all rookeries on St. Paul Island were sampled in 1961, the results of which are analyzed as follows:

1. For each sample observation an estimate p_i of the proportion of tagged pups is calculated.

2. The mean of the p_i , viz. \bar{p} , is determined for each rookery.

3. The estimated population of each rookery is then t/\bar{p} , where t is the number of tags applied on that rookery.

The results of the calculations are shown in table 6.

Table 6. -- Estimate of the 1961 fall pup population on St. Paul Island

Rookery	Mean proportion tagged in samples	Number tagged	Estimated number of pups alive at time of tagging
Northeast Point			
Morjovi	.2517	6,950	27,612
Vostochni	.1506	2,983	19,807
Polovina			
Little Polovina ^{1/}	.1726	1,292	7,486
Polovina	.1977	4,280	21,649
Reef			
Reef	.0732	4,960	69,246
Gorbatch	.3017	4,965	16,457
Tolstoi	.1164	4,048	34,777
Lukanin-Kitovi	.1344	2,965	22,061
Zapadni			
Zapadni	.0974	3,697	37,957
Little Zapadni	.0300	394	13,133
Zapadni Reef	.4983	2,925	5,850
Total			274,549

^{1/} Including the samples taken 21 October 1961.

The estimate (274,549) from pup sampling is lower than any estimate for St. Paul Island based on tag recoveries from the commercial kill, though one estimate based on a few tag recoveries from females has been lower than 274,549. However, before attempting to discuss the meaning of this it is necessary to evaluate the sampling error involved. Because of the nature of the estimate this is rather difficult. The estimate developed here is based upon the fact that on Zapadni, Gorbach, and Little Polovina rookeries, separate samples were taken on different days. The three paired estimates and the resulting variance estimates are shown in table 7.

Table 7. -- Estimation of variance of fall sample estimates for three St. Paul Island rookeries, 1961

Rookery	First population estimate (sample size 100)	Second population estimate (sample size 25)	Third population estimate (sample size 25)	Variance
Zapadni	30,081 (24) ^{1/}	41,133 (81) ^{1/}	-	61,073,350
Gorbach	21,401 (25) ^{1/}	14,967 (58) ^{1/}	-	20,698,178
Little Polovina	7,556 (10) ^{1/}	9,086 (27) ^{1/}	6,502 (32) ^{1/}	1,684,643
Pooled variance				21,285,203
Pooled standard deviation				4,614

^{1/} Number in parentheses refers to number of samples taken.

Assuming this estimate applies to all 11 rookeries for which separate estimates are given in table 5, the standard deviation of the sum is $(\sqrt{11})(4,614) = 15,303$. Hence, a conservative confidence interval for the 1961 fall pup population on St. Paul Island is $274,549 \pm 3(15,303)$ or 228,640 to 320,458. It is evident that this estimate is inconsistent with the estimate of the St. Paul Island 1958 pup population based upon tag recoveries from 3-year-old males.

That estimate was 565,000 (table 5). The sampling error of such estimates has been estimated at $\pm 50,000$. In 1958, 1959, and 1960, 50,750 females age 3 and older were killed which would mean a reduction in the number of pups born of about 30,000 (the pregnancy rate of all females age 3 and older is estimated to be .6). This leaves a discrepancy of about 200,000 which is much too large to be accounted for by the reduced returns from the 1954, 1955, and 1956 year classes.

Before condemning the 1961 fall pup-sampling estimate as unsatisfactory, it is of interest to point out that the estimate is not inconsistent with the return of males in recent years. Assuming that males and females return in equal numbers at age 3, then the 1961 estimate is consistent with a female adult mortality rate between .1 and .2 and a pregnancy rate of .6 as estimated for females age 3 and older.

However, the assumption of equal survival of males and females has been inconsistent with the tagging estimates since 1951 and 1952. Hence, the contrary has been the working basis of the population dynamics analysis for the herd.

In conclusion, it appears that the fall pup-sampling program needs additional study. It is pertinent to note that the variances of the samples which involved groups of 100 do not differ significantly from samples of 25 (table 8).

Table 8. --Comparison of variances from large and small samples, St. Paul Island, 1961

Rookery	Samples of 100 (26-27 August)	Samples of 25 (28 August)
Gorbach	.0760	.0823
Little Polovina	.0176	.0259
		.0230 ^{1/}
Zapadni	.0060	.0167
Weighted average	.0379	.0382

^{1/} Late sample taken 21 October.

It seems desirable, therefore, to restrict sampling to groups of 25 pups and also to take more samples of this size and extend them over as long a period as is feasible within the overall research program.

Forecast of Male Returns in 1962, St. Paul Island

A prediction of male returns at ages 3 and 4 provides the basis for predicting the male kill in 1962. Because it is comparatively easy to predict, the return of 4-year-olds from the 1958 year class is considered first. The predicted total return from the 1958 year class was:

(a) 82,300 based on the dead-pup count

(b) 29,100 based on population estimates from 2-year-old tag recoveries in 1960.

The estimate of 82,300 remains unchanged while the other estimate can now be based upon a much better estimate of the 1958 pup population. The estimate is also calculated from the formula:

$$N_m = .0234E^{3/2} - .0008E^2$$

where

E = fall population estimate (1,000's)

N_m = male returns at age 3

The 1958 value of E (fall pup population on St. Paul Island in 1958) is 565 which indicates a return (N_m) equal to 59,000. The kill from this year class to date has been 1,977 at age 2 and 48,458 at age 3, or a total of 50,435. This leaves a balance of 8,565.

To finally estimate the 4-year-old kill in 1962 it is necessary to predict the over-winter mortality and the 1962 escapement. Before this is done another approach is considered in estimating the number of males left from the 1958 year class on St. Paul Island at the end of 1961. This is the escapement calculated by the usual

methods. For example, the post-season escapement is calculated by estimating the "tail" of the (normal) curve of the kill by rounds (5-day periods). The through-the-season escapement (undersized animals) is estimated by fitting a normal curve to the length distribution of the kill and again estimating the "tail" of this distribution below the accepted lower length limit. The difficulties in this latter procedure have been pointed out before and must be re-emphasized in view of the unreliability of the field-length measurements shown in the 1960 study of the lengths of tagged animals.

Moreover, the escapement estimates are subject to large fluctuations, the two most conspicuous being that of 1955 and of 1960. The 1955 estimate did not indicate a large escapement of 3-year-olds which must have occurred to support the large kill of 4-year-olds in 1956. In contrast, the 1960 estimate suggested a large escapement of 3-year-olds (31,700) which did not materialize in the 1961 kill of 4-year-olds. Nevertheless, the procedure provides an independent check upon other estimates. By the methods outlined, the post-season escapement (St. Paul Island) is 14 percent and the through-the-season escapement of undersized animals (St. Paul Island) is 6 percent; therefore, the kill in 1961 represents $100(1-.14)(1-.06)$ or 81 percent of the 1957 year-class returns. The 1961 kill of 3-year-olds on St. Paul Island (to 15 August) was 48,458, therefore:

The estimated return of the 1958 year class = 59,825

The estimated escapement of the 1958 year class
in 1961 = 11,367

The figure of 59,825 agrees with the estimate from the population-return equation (59,000). However, the escapement estimate has appeared to be an underestimate and on the basis of 1956 analysis has been increased by 17 percent. With this adjustment we have:

The estimated return of the 1958 year class (adjusted)
= 61,757

The estimated escapement of the 1958 year class in
1961 (adjusted) = 13,299

Since these figures agree so well but disagree with the total year-class estimate from the dead-pup count, the latter is disregarded. It should be noted that the 1958 count was outside the range of the counts from 1950 to 1957 from which the relationship was computed. There was, therefore, grave doubt in using the 1958 count. These were noted in Chapman, appendix B (In Abegglen et al., 1960).

Allowing a 10 percent over-winter mortality and an escape-ment of from 5 to 20 percent, depending upon the length of the killing season and the upper length limit, the results in table 9 are obtained.

Table 9. --Estimates of the 1958 year-class size and 4-year-old kill of males in 1962

Method	Estimated size of year class	Estimated kill in 1962
Population-return equation $N_m = .0234E^{3/2} - .0008E^2$	59,000	6,200 - 7,300
Estimate of 1961 3-year-old escapement	61,700	9,600 - 11,400
Average		7,900 - 9,400

Three methods can be used to predict the return of 3-year-old males in 1962:

- (1) The population-return equation
- (2) The relationship between dead-pup counts and return of males
- (3) An index based on the 2-year-old kill from the 1959 year class in 1961.

Method (1) depends upon the availability of an estimate of the pup population for the year class in question but the available estimate for the 1959 year class appears to be unsatisfactory. Therefore, this method is not used here.

Proceeding with method (2), a new relationship can be computed using the now available 1957 year-class information and the 1958 data. For the total returns from the 1958 year class, the average (60,000) of the estimates shown in table 9 is used. The basic data are shown in table 10.

Table 10. --Dead-pup counts and return of males

Year class	Dead-pup count	Estimated return of the year class ^{1/}
1950	56,000	63,000
1951	74,000	60,000
1953	82,000	50,000
1954	101,000	33,000
1955	79,000	41,000
1956	104,000	16,000
1957	65,000	45,000
1958	33,000	60,000 ^{2/}

^{1/} Returns as of age 3, this also represents a slight change from table 13, Chapman, appendix B (In Abegglen et al., 1960) where returns were adjusted to age 4.

^{2/} Estimated--see body of text above.

If a straight line is fitted to this data the result is:

$$N_m = 90.5 - .556D$$

where

N_m = estimated return of males at age 3 (1,000's)

D = dead-pup count (1,000's)

Because the relationship is obviously not linear at the extremes, it seems desirable to try a slightly more complex relationship. Although proceeding too far with such limited data is questionable, a quadratic relationship seems promising and not unreasonable

from a theoretical point of view. The fitted quadratic relationship which will be used in estimation is:

$$N_m = 43.5 = .84D - .01D^2.$$

From this equation the following estimates are obtained:

1959 year class $D = 42$, $N_m = 61$ (thousand)

1960 year class $D = 66$, $N_m = 55$ (thousand)

The linear relationship would predict a higher return from the 1959 year class and a slightly lower return from the 1960 year class. The standard error of each forecast is 9.5.

An alternative approach (method 3) can be based upon the 2-year-old kill. The 2-year-old kill is, however, only incidental to the harvest of 3- and 4-year-olds and will vary depending upon the length of kill season, survival of the age class, and the timing of the return of 2-year-olds. It might appear that an adjustment may be made for some of these factors by considering the relationship between the kill of 2- and 3-year-old males. However, a number of possibilities in this direction proved unsuccessful.

The best prediction of several tried was based upon the 2-year-old kill in the final round (5 days) of July. This variable, together with several others that were studied is shown in table 11.

Table 11. --Two-year-old kill and return of males

Year class	Kill of 2-year-olds in last round of July	Kill of 3-year-olds from preceding year class in last round of July	Kill of 2-year-olds from year class through 31 July	Kill of 3-year-olds from preceding year class through 31 July	Total return of males from year class
1952	721	8,197	1,735	32,350	69,000
1953	380	6,157	839	30,733	50,000
1954	194	5,864	688	26,590	33,000
1955	230	3,454	375	16,804	41,000
1956	271	4,555	499	27,216	18,000
1957	625	1,876	1,075	10,203	45,000
1958	382	4,334	652	15,312	60,000 (estimated)

The linear equation relating return of males and kill of 2-year-olds in the last round (5 days) of July is:

$$N_m = 22.1 + 5.8k$$

where

k = kill in hundreds.

For 1961, $k = 3.43$, thus, the return of males from the 1959 year class is estimated as 42.0 with a standard error of 14.5.

These results and the estimated kill are summarized in table 12. Two extremes are considered: (1) the male kill terminating 31 July which would imply about 60 percent of the returns are taken as 3-year-olds; (2) the male kill continuing to 15 August when approximately 80 percent are taken as 3-year-olds. The upper length limit will also influence the fraction of animals killed at age 3.

Table 12. --Estimates of the 1959 year-class size and 3-year-old kill in 1962

Method	Estimated size of year class	Standard error of forecast	Estimated kill in 1962 by	
			31 July	15 August
Dead-pup count	61,000	9,500	36,600	48,800
2-year-old kill in last round in July	42,000	14,500	25,200	33,600
Combined (weighted)	55,300	8,000	33,200	44,200
Confidence interval (approximate 95%)	39,000-72,000		23,000-43,000	31,000-57,000

Assuming that an increase in the upper length limit and an extended season will again prevail to permit a fairly severe cropping as occurred in 1961, the best prediction of the 1962 male kill is a total of 58,000 made up of 44,000 3-year-olds and 11,000 4-year-olds, and 3,000 of other ages. The confidence limits for the number of 3-year-olds are quite wide. However, the different methods yield

predictions in closer agreement than was the case in 1960 (i. e. , predictions for 1961). The 1960 prediction of 40,000 that would be taken in 1961 during a normal season (ending 31 July) was in excellent agreement with the 42,011 3- and 4-year-olds actually taken by that date. The agreement was, however, to a large extent fortuitous, since the exact age composition of the kill was quite different from that forecasted. The predicted composition was 20,000 3-year-olds and 20,000 4-year-olds; the actual composition was 29,523 3-year-olds and 12,488 4-year-olds.

Finally, the total kill on the Pribilof Islands is estimated in the usual way, i. e. , assuming that the St. Paul Island kill is 80 percent of the total. This yields an estimate of 14,500 for St. George Island or 72,500 for the 1962 male kill on both islands. While this estimate is 10,000 below the 1961 kill, it is much higher than any other since 1956.

Appendix B

Appendix table 1

Age classification of male seals in commercial kill,
St. Paul Island, 2 July to 15 August 1961

Date	Rookery	Males killed	Tooth sample size	Percent in each age class				Estimated number killed from age class			
				2	3	4	5	2	3	4	5
2 July	NEP	1,647	167	1	68	30	1	16	1,120	494	17
3	TLK	174	19	-	68	32	-	-	118	56	-
4	ZAP	3,061	316	1	64	35	-	30	1,960	1,071	-
5	REEF	324	34	-	41	56	3	-	133	181	10
6	POL	1,314	129	-	60	39	1	-	788	513	13
Round total		6,520	665	-	-	-	-	46	4,119	2,315	40
7 July	NEP	1,506	149	1	51	47	1	15	768	708	15
8	TLK	159	16	-	44	56	-	-	70	89	-
9	ZAP	2,264	212	1	63	35	1	23	1,426	792	23
10	REEF	221	19	-	42	53	5	-	93	117	11
11	POL	589	58	-	50	50	-	-	294	295	-
Round total		4,739	454	-	-	-	-	38	2,651	2,001	49
12 July	NEP	1,225	123	-	56	43	1	-	686	527	12
13	TLK	199	20	-	40	60	-	-	80	119	-
14	ZAP	2,499	250	-	75	25	-	-	1,874	625	-
15	REEF	300	30	-	63	37	-	-	189	111	-
16	POL	717	71	-	55	45	-	-	394	323	-
Round total		4,940	494	-	-	-	-	-	3,223	1,705	12
17 July	NEP	1,817	183	-	64	33	3	-	1,163	600	54
18	TLK	628	67	-	63	36	1	-	396	226	6
19	ZAP	3,527	355	1	74	24	1	36	2,610	846	35
20	REEF	484	50	2	60	36	2	10	290	174	10
21	POL	1,553	155	1	67	28	4	16	1,040	435	62
Round total		8,009	810	-	-	-	-	62	5,499	2,281	167
22 July	NEP	3,132 ^{1/}	318	1	68	30	<1	31	2,130	940	16
23	TLK	1,188	126	1	70	28	1	12	832	332	12
24	ZAP	4,032	398	3	78	19	-	121	3,145	766	-
25	REEF	556	55	-	62	34	4	-	345	189	22
26	POL	1,039	103	4	64	31	1	42	665	322	10
Round total		9,947 ^{1/}	1,000	-	-	-	-	206	7,117	2,549	60
27 July	NEP	3,124	313	5	77	17	1	156	2,406	531	31
28	TLK	999	105	2	73	25	-	20	729	250	-
29	ZAP	2,407	242	5	80	14	1	120	1,926	337	24
30	REEF	772	78	4	65	31	-	31	502	239	-
31	POL	1,647	175	1	82	17	-	16	1,351	280	-
Round total		8,949	913	-	-	-	-	343	6,914	1,637	55
1 August	NEP	4,339	479	8	78	13	1	347	3,385	564	43
2	TLK	1,849	196	6	82	11	1	111	1,516	203	19
3	ZAP	2,879	318	9	77	13	1	259	2,217	374	29
4	REEF	1,214	132	7	75	18	-	85	910	219	-
5	POL	1,597	180	1	85	14	-	16	1,357	224	-
Round total		11,878	1,305	-	-	-	-	818	9,385	1,584	91
6 August	NEP	900	101	6	78	16	-	54	702	144	-
7	TLK	686	111	3	82	14	1	21	562	96	7
8	ZAP	3,134	415	9	79	11	1	282	2,476	345	31
9	REEF	301	48	11	79	6	4	33	238	18	12
10	POL	953	151	11	78	11	-	105	743	105	-
Round total		5,974	826	-	-	-	-	495	4,721	708	50
11 August	NEP	2,332	340	13	77	10	-	303	1,796	233	-
12	TLK	673	152	8	82	10	-	54	552	67	-
13	ZAP	2,041	265	15	77	8	-	306	1,572	163	-
14	REEF	128	32	3	78	13	6	4	99	17	8
15	POL	1,039	245	14	78	8	-	145	810	84	-
Round total		6,213	1,034	-	-	-	-	812	4,829	564	8
Season total		67,169	7,501	-	-	-	-	2,820	48,458	15,344	532

^{1/} Includes 15 1-year-old seals taken 22 July.

Appendix table 2

Cumulative age classification of male seals in commercial kill, by day, St. Paul Island, 2 July to 15 August 1961

Date	Rookery	Estimated kill from each age class				Total kill	Percent kill from each age class			
		2	3	4	5		2	3	4	5
2 July	NEP	16	1,120	494	17	1,647	1	68	30	1
3	TLK	16	1,238	550	17	1,821	1	68	30	1
4	ZAP	46	3,198	1,621	17	4,882	1	65	33	1
5	REEF	46	3,331	1,802	27	5,206	1	64	34	1
6	POL	46	4,119	2,315	40	6,520	1	63	35	1
7	NEP	61	4,887	3,023	55	8,026	1	60	38	1
8	TLK	61	4,957	3,112	55	8,185	1	60	38	1
9	ZAP	84	6,383	3,904	78	10,449	1	61	37	1
10	REEF	84	6,476	4,021	89	10,670	1	61	37	1
11	POL	84	6,770	4,316	89	11,259	1	60	38	1
12	NEP	84	7,456	4,843	101	12,484	1	60	38	1
13	TLK	84	7,536	4,962	101	12,683	1	59	39	1
14	ZAP	84	9,410	5,587	101	15,182	1	62	36	1
15	REEF	84	9,599	5,698	101	15,482	1	62	36	1
16	POL	84	9,993	6,021	101	16,199	<1	62	37	<1
17	NEP	84	11,156	6,621	155	18,016	<1	62	37	<1
18	TLK	84	11,552	6,847	161	18,644	<1	62	37	<1
19	ZAP	120	14,162	7,693	196	22,171	<1	64	35	<1
20	REEF	130	14,452	7,867	206	22,655	<1	64	35	<1
21	POL	146	15,492	8,302	268	24,208 ^{1/}	1	64	34	1
22	NEP	177	17,622	9,242	284	27,340 ^{1/}	1	64	34	1
23	TLK	189	18,454	9,574	296	28,528	1	65	33	1
24	ZAP	310	21,599	10,340	296	32,560	1	66	32	1
25	REEF	310	21,944	10,529	318	33,116	1	66	32	1
26	POL	352	22,609	10,851	328	34,155	1	66	32	1
27	NEP	508	25,015	11,382	359	37,279	1	67	31	1
28	TLK	528	25,744	11,632	359	38,278	1	67	31	1
29	ZAP	648	27,670	11,969	383	40,685	2	68	29	1
30	REEF	679	28,172	12,208	383	41,457	2	68	29	1
31	POL	695	29,523	12,488	383	43,104	2	68	29	1
1 August	NEP	1,042	32,908	13,052	426	47,443	2	69	28	1
2	TLK	1,153	34,424	13,255	445	49,292	2	70	27	1
3	ZAP	1,412	36,641	13,629	474	52,171	3	70	26	1
4	REEF	1,497	37,551	13,848	474	53,385	3	70	26	1
5	POL	1,513	38,908	14,072	474	54,982	3	71	25	1
6	NEP	1,567	39,610	14,216	474	55,882	3	71	25	1
7	TLK	1,588	40,172	14,312	481	56,568	3	71	25	1
8	ZAP	1,870	42,648	14,657	512	59,702	3	71	25	1
9	REEF	1,903	42,886	14,675	524	60,003	3	72	24	1
10	POL	2,008	43,629	14,780	524	60,956	3	72	24	1
11	NEP	2,311	45,425	15,013	524	63,288	4	72	23	1
12	TLK	2,365	45,977	15,080	524	63,961	4	72	23	1
13	ZAP	2,671	47,549	15,243	524	66,002	4	72	23	1
14	REEF	2,675	47,648	15,260	532	66,130	4	72	23	1
15	POL	2,820	48,458	15,344	532	67,169	4	72	23	1

^{1/} Includes 15 1-year-old seals taken 22 July.

Appendix table 3

Age classification of male seals in commercial kill,
St. George Island, 2 July to 15 August 1961

Date	Rookery	Males killed	Tooth sample size	Percent in each age class					Estimated number killed from age class				
				2	3	4	5	6	2	3	4	5	6
2 July	ZAP	285	29	-	38	59	3	-	-	108	168	9	-
3	NOR	694	69	3	48	46	3	-	21	333	319	21	-
4	EAST	382	42	-	50	48	2	-	-	191	183	8	-
5	STAR	108	22	-	36	59	5	-	-	39	64	5	-
6	NOR	178	36	-	47	53	-	-	-	84	94	-	-
Round total		1,647	198	-	-	-	-	-	21	755	828	43	-
7 July	ZAP	118	24	-	12	75	13	-	-	14	89	15	-
8	NOR	165	29	-	28	69	3	-	-	46	114	5	-
9	EAST	289	37	-	41	57	-	2	-	119	165	-	5
10	STAR	72	15	-	20	73	7	-	-	14	53	5	-
11	NOR	260	28	-	54	46	-	-	-	140	120	-	-
Round total		904	133	-	-	-	-	-	-	333	541	25	5
12 July	ZAP	221	41	-	59	39	2	-	-	130	86	5	-
13	NOR	174	37	3	35	62	-	-	5	61	108	-	-
14	EAST	269	27	-	56	41	3	-	-	151	110	8	-
15	STAR	51	13	-	38	62	-	-	-	19	32	-	-
16	NOR	221	23	-	44	52	-	4	-	97	115	-	9
Round total		936	141	-	-	-	-	-	5	458	451	13	9
17 July	ZAP	324	34	-	53	47	-	-	-	172	152	-	-
18	NOR	198	20	5	55	40	-	-	10	109	79	-	-
19	EAST	403	41	-	68	32	-	-	-	274	129	-	-
20	STAR	133	16	-	44	56	-	-	-	59	74	-	-
21	NOR	551	61	-	69	31	-	-	-	380	171	-	-
Round total		1,609	172	-	-	-	-	-	10	994	605	-	-
22 July	ZAP	243	27	-	41	52	7	-	-	100	126	17	-
23	NOR	405	41	-	54	44	2	-	-	219	178	8	-
24	EAST	800	80	4	77	15	4	-	32	616	120	32	-
25	STAR	263	52	4	56	38	2	-	11	147	100	5	-
26	NOR	601	60	2	60	38	-	-	12	361	228	-	-
Round total		2,312	260	-	-	-	-	-	55	1,443	752	62	-
27 July	ZAP	376	36	3	50	44	3	-	11	188	166	11	-
28	NOR	216	22	-	91	9	-	-	-	197	19	-	-
29	EAST	739	76	4	72	21	3	-	30	532	155	22	-
30	STAR	167	57	5	49	41	5	-	8	82	69	8	-
31	NOR	451	49	-	78	22	-	-	-	352	99	-	-
Round total		1,949	240	-	-	-	-	-	49	1,351	508	41	-
1 August	ZAP	355	55	4	74	18	4	-	14	263	64	14	-
2	NOR	317	37	5	68	27	-	-	16	215	86	-	-
3	EAST	1,277	141	15	70	15	-	-	191	894	192	-	-
4	STAR	234	48	10	77	13	-	-	23	180	31	-	-
5	NOR	456	48	2	88	8	2	-	9	401	37	9	-
Round total		2,639	329	-	-	-	-	-	253	1,953	410	23	-
6 August	ZAP	109	61	11	72	15	2	-	12	79	16	2	-
7	NOR	166	57	-	77	21	2	-	-	128	35	3	-
8	EAST	264	37	24	65	11	-	-	63	172	29	-	-
9	STAR	285	65	11	66	21	2	-	31	188	60	6	-
10	NOR	775	83	20	75	5	-	-	155	581	39	-	-
Round total		1,599	303	-	-	-	-	-	261	1,148	179	11	-
11 August	ZAP	496	104	16	67	17	-	-	80	332	84	-	-
12	NOR	139	38	11	63	26	-	-	15	88	36	-	-
13	EAST	305	43	7	79	14	-	-	21	241	43	-	-
14	STAR	327	90	30	63	7	-	-	98	206	23	-	-
15	NOR	166	43	14	67	19	-	-	23	111	32	-	-
Round total		1,433	318	-	-	-	-	-	237	978	218	-	-
Season total		15,028	2,094	-	-	-	-	-	891	9,413	4,492	218	14

Appendix table 4

Cumulative age classification of male seals in commercial kill, by day, St. George Island, 2 July to 15 August 1961

Date	Rookery	Estimated kill from each age class					Total kill	Percent kill from each age class				
		2	3	4	5	6		2	3	4	5	6
2 July	ZAP	-	108	168	9	-	285	-	38	59	3	-
3	NOR	21	441	487	30	-	979	2	45	50	3	-
4	EAST	21	632	670	38	-	1,361	2	46	49	3	-
5	STAR	21	671	734	43	-	1,469	1	46	50	3	-
6	NOR	21	755	828	43	-	1,647	1	46	51	2	-
7	ZAP	21	769	917	58	-	1,765	1	44	52	3	-
8	NOR	21	815	1,031	63	-	1,930	1	42	54	3	-
9	EAST	21	934	1,196	63	5	2,219	1	42	54	3	-
10	STAR	21	948	1,249	68	5	2,291	1	41	55	3	-
11	NOR	21	1,088	1,369	68	5	2,551	1	43	54	2	-
12	ZAP	21	1,218	1,455	73	5	2,772	1	44	53	2	-
13	NOR	26	1,279	1,563	73	5	2,946	1	44	53	2	-
14	EAST	26	1,430	1,673	81	5	3,215	1	44	52	3	-
15	STAR	26	1,449	1,705	81	5	3,266	1	44	53	2	-
16	NOR	26	1,546	1,820	81	14	3,487	1	45	52	2	-
17	ZAP	26	1,718	1,972	81	14	3,811	1	45	52	2	-
18	NOR	36	1,827	2,051	81	14	4,009	1	46	51	2	-
19	EAST	36	2,101	2,180	81	14	4,412	1	48	49	2	-
20	STAR	36	2,160	2,254	81	14	4,545	1	48	49	2	-
21	NOR	36	2,540	2,425	81	14	5,096	1	50	47	2	-
22	ZAP	36	2,640	2,551	98	14	5,339	1	49	48	2	-
23	NOR	36	2,859	2,729	106	14	5,744	-	50	48	2	-
24	EAST	68	3,475	2,849	138	14	6,544	1	53	44	2	-
25	STAR	79	3,622	2,949	143	14	6,807	1	53	44	2	-
26	NOR	91	3,983	3,177	143	14	7,408	1	54	43	2	-
27	ZAP	102	4,171	3,343	154	14	7,784	1	54	43	2	-
28	NOR	102	4,368	3,362	154	14	8,000	1	55	42	2	-
29	EAST	132	4,900	3,517	176	14	8,739	2	56	40	2	-
30	STAR	140	4,982	3,586	184	14	8,906	2	56	40	2	-
31	NOR	140	5,334	3,685	184	14	9,357	2	57	39	2	-
1 August	ZAP	154	5,597	3,749	198	14	9,712	2	58	38	2	-
2	NOR	170	5,812	3,835	198	14	10,029	2	58	38	2	-
3	EAST	361	6,706	4,027	198	14	11,306	3	59	36	2	-
4	STAR	384	6,886	4,058	198	14	11,540	3	60	35	2	-
5	NOR	393	7,287	4,095	207	14	11,996	3	61	34	2	-
6	ZAP	405	7,366	4,111	209	14	12,105	3	61	34	2	-
7	NOR	405	7,494	4,146	217	14	12,271	3	61	34	2	-
8	EAST	468	7,666	4,175	212	14	12,535	4	61	33	2	-
9	STAR	499	7,854	4,235	218	14	12,820	4	61	33	2	-
10	NOR	654	8,435	4,274	218	14	13,595	4	62	32	2	-
11	ZAP	734	8,767	4,358	218	14	14,091	5	62	31	2	-
12	NOR	749	8,855	4,394	218	14	14,230	5	62	31	2	-
13	EAST	770	9,096	4,437	218	14	14,535	5	63	31	1	-
14	STAR	868	9,302	4,460	218	14	14,862	6	63	30	1	-
15	NOR	891	9,413	4,492	218	14	15,028	6	63	30	1	-

Appendix table 5

Age composition, male kill, Tolstoi and Lukanin-Kitovi, 1959-61, St. Paul Island

Rookery	Age	Round											Total	
		1	2	3	4	5	6	7	8	9	10	11		
														<u>1959 Kill</u>
TOL		125	294	130	122	279	241	347	9	66	36	182	1831	
L-K		73	62	118	120	87	149	148	-	-	-	-	757	
Total		198	356	248	242	366	390	495	9	66	36	182	2588	
														<u>Age Composition</u>
TOL	2	-	-	-	5	8	5	45	2	44	36	108	253	
	3	31	76	38	35	106	106	226	4	15	-	47	684	
	4	82	218	87	77	165	125	76	2	7	-	27	866	
	5	12	-	5	5	-	5	-	1	-	-	-	28	
L-K	2	-	-	-	5	3	3	19	-	-	-	-	30	
	3	18	16	34	35	33	66	96	-	-	-	-	298	
	4	48	46	79	75	51	77	33	-	-	-	-	409	
	5	7	-	5	5	-	3	-	-	-	-	-	20	
														<u>1960 Kill</u>
TOL		103	107	51	346	304	717	183	370	763	39	-	2983	
L-K		6	17	29	18	47	75	235	397	274	-	-	1098	
Total		109	124	80	364	351	792	418	767	1037	39	-	4081	
														<u>Age Composition</u>
TOL	2	-	-	-	7	15	14	15	26	76	24	-	177	
	3	52	89	51	284	265	653	148	329	672	15	-	2558	
	4	43	18	-	55	24	50	20	15	15	-	-	240	
	5	8	-	-	-	-	-	-	-	-	-	-	8	
L-K	2	-	-	-	-	2	2	19	28	27	-	-	78	
	3	3	14	29	15	41	68	190	353	241	-	-	954	
	4	2	3	-	3	4	5	26	16	6	-	-	65	
	5	1	-	-	-	-	-	-	-	-	-	-	1	
														<u>1961 Kill</u>
TOL		-	103	108	104	528	586	723	1362	370	673	-	4557	
L-K		-	71	51	95	100	602	276	487	316	-	-	1998	
Total		-	174	159	199	628	1188	999	1849	686	673	-	6555	
														<u>Age Composition</u>
TOL	2	-	-	-	-	-	6	14	82	11	54	-	167	
	3	-	70	48	42	333	410	528	1116	303	552	-	3402	
	4	-	33	60	62	190	164	181	150	52	67	-	959	
	5	-	-	-	-	5	6	-	14	4	-	-	29	
L-K	2	-	-	-	-	-	6	6	29	10	-	-	51	
	3	-	48	22	38	63	421	201	399	259	-	-	1451	
	4	-	23	29	57	36	169	69	54	44	-	-	481	
	5	-	-	-	-	1	6	-	5	3	-	-	15	

Age composition determined from combined Tolstoi, Lukanin-Kitovi samples for each kill at Tolstoi, Lukanin-Kitovi.

Appendix table 7

Cumulative age classification of female seals in commercial kill, by day,
St. Paul Island, 2 July to 15 August 1961

Date	Rookery	Estimated number killed from age class										Total killed	Percent killed from age class									
		2	3	4	5	6	7	8	9	10	10+		2	3	4	5	6	7	8	9	10	10+
July																						
2	NEP	-	-	-	-	-	1	-	-	-	1	2	-	-	-	-	50	-	-	-	50	
4	ZAP	-	-	-	1	2	1	1	-	-	2	7	-	-	-	14	29	14	14	-	29	
6	POL	-	-	-	1	4	1	1	-	-	2	9	-	-	-	11	45	11	11	-	22	
9	ZAP	-	-	-	1	6	1	1	-	-	4	13	-	-	-	8	46	8	8	-	30	
11	POL	-	-	-	1	7	1	2	-	-	4	15	-	-	-	7	47	7	13	-	26	
12	NEP	-	-	-	1	7	3	2	-	-	4	17	-	-	-	6	40	18	12	-	24	
13	TOL	-	-	-	2	7	3	2	-	-	4	18	-	-	-	11	39	17	11	-	22	
14	ZAP	-	-	-	3	8	3	2	-	-	6	22	-	-	-	14	36	14	9	-	27	
16	POL	-	-	-	5	10	4	3	-	-	8	30	-	-	-	17	33	13	10	-	27	
17	NEP	-	-	-	5	12	8	4	1	1	10	41	-	-	-	12	29	20	10	2	25	
18	TOL	-	-	-	6	12	8	4	1	1	12	44	-	-	-	14	27	18	9	2	28	
19	ZAP	-	-	2	6	14	8	6	1	1	18	56	-	-	4	11	25	14	11	2	31	
21	POL	-	-	2	9	18	10	6	2	2	19	68	-	-	3	13	26	15	9	3	28	
22	NEP	-	-	7	12	21	11	8	2	3	28	92	-	-	8	13	23	12	9	2	31	
23	TOL	-	-	9	14	26	14	11	5	8	44	131	-	-	7	11	20	10	8	4	34	
24	ZAP	-	1	12	15	29	15	11	6	9	54	152	-	1	8	10	19	10	7	4	36	
25	REEF	-	1	12	15	29	16	11	7	9	57	157	-	1	8	10	18	10	7	5	36	
26	POL	-	1	13	17	29	18	11	7	9	57	162	-	1	8	10	18	11	7	5	35	
27	NEP	-	1	15	22	34	23	13	12	10	77	207	-	1	7	11	16	11	6	6	37	
28	TOL	-	1	16	24	37	26	15	13	11	81	224	-	1	7	11	16	11	7	6	36	
29	ZAP	-	1	18	27	38	26	15	14	13	90	242	-	1	7	11	16	11	6	6	37	
30	REEF	-	1	18	28	39	26	15	15	13	93	248	-	1	7	11	16	11	6	6	38	
31	POL	-	5	27	35	49	29	21	21	21	123	331	-	2	8	8	15	9	6	6	37	
August																						
1	NEP	-	13	69	65	83	63	55	68	63	366	845	-	2	8	8	10	7	6	8	43	
2	TOL	-	18	74	77	85	71	61	74	66	433	959	-	2	8	8	9	8	7	8	45	
3	ZAP	-	33	107	100	108	85	76	91	80	572	1252	-	3	8	8	9	7	6	7	46	
4	REEF	-	46	121	103	114	90	78	98	87	611	1348	-	4	9	8	8	7	6	7	45	
5	POL	-	51	149	113	144	105	93	115	95	682	1547	-	3	10	7	9	7	6	8	44	
6	NEP	2	55	185	126	157	118	104	122	104	732	1705	-	3	11	8	9	7	6	7	43	
7	TOL	2	98	216	149	206	149	140	171	140	890	2149	-	4	10	7	9	7	7	8	41	
8	ZAP	2	238	461	263	337	208	216	212	175	1232	3344	-	7	14	8	10	6	7	6	37	
9	REEF	2	272	504	263	354	217	229	225	188	1305	3559	-	8	14	7	10	6	7	6	37	
10	POL	2	437	757	387	442	238	265	318	224	1496	4566	-	10	16	8	10	5	6	7	33	
11	NEP	2	551	998	529	612	337	379	432	295	1850	5985	-	9	17	9	10	6	6	7	31	
12	TOL	2	626	1154	657	745	424	414	507	365	2105	6999	-	9	17	9	11	6	6	7	30	
13	ZAP	15	786	1327	761	836	480	453	546	413	2283	7900	-	10	17	9	11	6	6	7	29	
14	REEF	15	855	1427	784	913	496	469	561	421	2345	8286	-	10	17	10	11	6	6	7	28	
15	POL	35	1119	2006	1068	1167	577	500	703	441	2883	10499	-	11	19	10	11	5	5	7	28	

Appendix table 9

Cumulative age classification of female seals in commercial kill, by day,
St. George Island, 2 July to 15 August 1961

Date	Rookery	Estimated number killed from age class										Total killed	Percent killed from age class									
		2	3	4	5	6	7	8	9	10	10+		2	3	4	5	6	7	8	9	10	10+
2-3 July		No females killed																				
4 July	EAST	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	100	-	-
5-18 July		No females killed										1	100									
July																						
19	EAST	-	-	-	1	-	-	-	2	-	-	3	-	-	-	33	-	-	-	67	-	-
20	STAR	-	-	-	1	-	-	-	2	-	-	3	-	-	-	33	-	-	-	67	-	-
21	NOR	-	-	-	1	-	-	-	2	-	1	4	-	-	-	25	-	-	-	50	-	25
22	ZAP	-	-	-	1	-	-	-	2	-	1	4	-	-	-	25	-	-	-	50	-	25
23	NOR	-	2	-	1	2	-	-	2	2	1	10	-	20	-	10	20	-	-	20	20	10
24	EAST	-	2	-	1	2	-	-	2	2	8	17	-	12	-	6	12	-	-	12	11	47
25	STAR	-	2	-	3	4	-	-	2	2	10	23	-	9	-	13	17	-	-	8	9	44
26	NOR	-	2	2	4	5	1	-	2	2	13	31	-	7	6	13	16	3	-	7	6	42
27	ZAP	-	2	2	4	5	1	-	2	2	14	32	-	6	6	12	16	3	-	6	7	44
28	NOR	-	2	2	4	5	1	-	2	2	14	32	-	6	6	12	16	3	-	7	6	44
29	EAST	-	2	4	4	8	1	1	3	2	26	51	-	4	8	8	15	2	2	6	4	51
30	STAR	-	3	9	13	29	17	15	17	15	59	177	-	2	5	7	16	10	9	10	8	33
31	NOR	-	3	15	17	35	17	18	21	16	68	210	-	2	7	8	16	8	9	10	8	32
August																						
1	ZAP	-	6	18	21	51	22	21	35	25	97	296	-	2	6	7	17	7	8	12	8	33
2	NOR	-	12	33	27	58	27	22	36	27	118	360	-	3	9	8	16	8	6	10	7	33
3	EAST	-	26	51	39	68	30	25	43	38	143	463	-	6	11	8	15	6	6	9	8	31
4	STAR	-	32	65	48	80	42	27	53	44	165	556	-	6	11	9	14	8	5	9	8	30
5	NOR	-	44	88	68	92	50	32	59	48	195	676	-	7	13	10	13	7	5	9	7	29
6	ZAP	-	44	92	72	94	57	35	65	50	218	727	-	6	12	10	13	8	5	9	7	30
7	NOR	-	49	107	79	105	63	38	72	51	231	795	-	6	14	10	13	8	5	9	6	29
8	EAST	-	51	113	89	124	70	46	81	65	262	901	-	6	12	10	14	8	5	9	7	29
9	STAR	-	69	173	107	175	88	88	132	93	438	1363	-	5	13	8	12	7	7	9	7	32
10	NOR	2	128	223	128	210	93	97	139	100	478	1598	-	8	14	8	13	6	6	9	6	30
11	ZAP	2	149	310	188	243	126	130	188	154	652	2142	-	7	15	9	11	6	6	9	7	30
12	NOR	2	180	360	219	271	157	137	198	179	752	2455	-	7	15	9	11	7	6	8	7	30
13	EAST	2	195	412	246	284	178	149	206	189	787	2648	-	7	16	9	10	7	6	8	7	30
14	STAR	8	246	526	322	348	235	162	238	202	997	3284	-	8	16	10	11	7	5	7	6	30
15	NOR	8	297	587	373	375	242	182	248	229	1082	3623	-	8	16	11	10	7	5	7	6	30

Appendix table 10

Age classification of females in fall kill, St. Paul Island,
31 August and 1, 5-8, 11-14 September 1961

Date	Rookery	Females killed	Daily sample	Number in each age class of sample										Percent in each age class of sample										Estimated number killed from each age class																				
				2	3	4	5	6	7	8	9	10	10+	2	3	4	5	6	7	8	9	10	10+	2	3	4	5	6	7	8	9	10	10+											
Aug.																																												
31	ZAP	1,522	191	6	54	39	16	22	12	8	4	6	24	3	28	21	8	12	6	4	2	3	13	46	426	319	122	183	91	61	30	46	198											
Sept.																																												
1	ZAP	1,918	209	2	16	32	26	30	16	19	17	4	47	1	8	15	12	14	8	9	8	2	23	19	153	288	230	269	153	173	153	39	441											
5	POL	2,030	201	1	11	34	17	22	19	14	17	13	53	1	6	17	8	11	9	7	8	7	26	20	122	345	162	224	183	142	162	142	528											
6	POL	2,474	242	-	17	21	25	12	11	22	28	16	90	-	7	9	10	5	4	9	12	7	37	-	173	223	247	124	99	223	297	173	915											
7	NEP	3,115	314	3	20	47	24	40	23	23	21	17	96	1	6	15	8	13	7	7	7	5	31	31	187	467	249	405	218	218	218	156	966											
8	NEP	2,510	242	3	21	28	27	35	19	23	25	11	50	1	9	12	12	14	8	9	10	4	21	25	226	301	301	352	201	226	251	100	527											
11	TOL	2,979	288	5	31	38	30	32	20	12	18	11	91	2	11	13	10	11	7	4	6	4	32	60	328	387	298	328	208	119	179	119	953											
12	ZAP	2,388	239	4	41	36	23	21	9	8	13	9	75	2	17	15	10	9	4	3	5	4	31	47	406	358	239	215	96	72	119	96	740											
13	ZAP	631	60	2	2	11	8	5	6	4	6	4	12	3	3	18	14	8	10	7	10	7	20	19	19	114	88	51	63	44	63	44	126											
13	POL	391	36	1	5	5	2	4	3	3	1	3	9	3	14	14	6	11	8	8	3	8	25	12	55	55	23	43	31	31	12	31	98											
13	NEP	864	82	-	1	7	10	7	4	8	6	6	33	-	1	9	12	9	5	10	7	7	40	-	9	78	104	78	43	86	60	60	346											
14	NEP	3,765	363	5	36	51	40	41	32	29	17	13	99	1	10	14	11	11	9	8	5	4	27	38	376	527	414	414	339	301	188	151	1017											
Total		24,587	2,467	32	255	349	248	271	174	173	173	113	679											317	2480	3462	2477	2686	1725	1696	1732	1157	6855											

Age classification of females in fall kill, St. George Island,
31 August and 1, 6, and 7 September 1961

Date	Rookery	Females killed	Daily sample	Number in each age class of sample										Percent in each age class of sample										Estimated number killed from each age class																				
				2	3	4	5	6	7	8	9	10	10+	2	3	4	5	6	7	8	9	10	10+	2	3	4	5	6	7	8	9	10	10+											
Aug.																																												
31	ZAP	1,261	122	2	13	10	13	14	4	11	8	7	40	2	11	8	11	11	3	9	6	6	33	25	139	100	139	139	38	113	76	76	416											
Sept.																																												
1	STAR	1,599	165	-	26	35	13	15	11	6	12	12	35	-	16	21	8	9	7	4	7	7	21	-	256	336	128	143	112	64	112	112	336											
6	NOR	1,654	166	3	15	18	19	19	17	15	12	7	41	2	9	11	11	11	10	9	7	5	25	33	149	182	182	182	165	149	116	83	413											
7	EAST	626	65	3	7	13	7	3	7	2	4	6	13	5	11	20	11	5	11	3	5	9	20	31	69	125	69	31	69	19	31	57	125											
Total		5,140	518	8	61	76	52	51	39	34	36	32	129											89	613	743	518	495	384	345	335	328	1290											

Appendix table 11

Cumulative age classification of females in fall kill, St. Paul Island,
31 August and 1, 5-8, 11-14 September 1961

Date	Rookery	Estimated number killed from age class										Total killed	Percent killed from age class									
		2	3	4	5	6	7	8	9	10	10+		2	3	4	5	6	7	8	9	10	10+
Aug.																						
31	ZAP	46	426	319	122	183	91	61	30	46	198	1,522	3	28	21	8	12	6	4	2	3	13
Sept.																						
1	ZAP	65	579	607	352	452	244	234	183	85	639	3,440	2	17	18	10	13	7	7	5	2	19
5	POL	85	701	952	514	676	427	376	345	227	1167	5,470	2	13	17	10	12	8	7	6	4	21
6	POL	85	874	1175	761	800	526	599	642	400	2082	7,944	1	11	15	10	10	7	7	8	5	26
7	NEP	116	1061	1642	1010	1205	744	817	860	556	3048	11,059	1	9	15	9	11	7	7	8	5	28
8	NEP	141	1287	1943	1311	1557	945	1043	1111	656	3575	13,569	1	9	14	10	12	7	8	8	5	26
11	TOL	201	1615	2330	1609	1885	1153	1162	1290	775	4528	16,548	1	10	14	10	11	7	7	8	5	27
12	ZAP	248	2021	2688	1848	2100	1249	1234	1409	871	5268	18,936	1	11	14	10	11	6	7	7	5	28
13	ZAP	267	2040	2802	1936	2151	1312	1278	1472	915	5394	19,567	1	10	1	10	11	7	6	8	5	28
13	POL	279	2095	2857	1959	2194	1343	1309	1484	946	5492	19,958	1	10	14	10	11	7	7	7	5	28
13	NEP	279	2104	2935	2063	2272	1386	1395	1544	1006	5838	20,822	1	10	14	10	11	7	7	7	5	28
14	NEP	317	2480	3462	2477	2686	1725	1696	1732	1157	6855	24,587	1	10	14	10	11	7	7	7	5	28

Cumulative age classification of females in fall kill, St. George Island,
31 August and 1, 6, 7 September 1961

Date	Rookery	Estimated number killed from age class										Total killed	Percent killed from age class									
		2	3	4	5	6	7	8	9	10	10+		2	3	4	5	6	7	8	9	10	10+
Aug.																						
31	ZAP	25	139	100	139	139	38	113	76	76	416	1,261	2	11	8	11	11	3	9	6	6	33
Sept.																						
1	STAR	25	395	436	267	282	150	177	188	188	752	2,860	1	14	15	9	10	5	6	7	7	26
6	NOR	58	544	618	449	464	315	326	304	271	1165	4,514	1	12	14	10	10	7	7	7	6	26
7	EAST	89	613	743	518	495	384	345	335	328	1290	5,140	2	12	14	10	10	7	7	7	6	25

Appendix table 12

Length of female seals sampled from commercial kill,
by age, St. Paul Island, 1961

Length in inches	Age										Total	
	2	3	4	5	6	7	8	9	10	10+		
38 number	1	2	-	-	-	-	-	-	-	-	-	3
percent	34	66	-	-	-	-	-	-	-	-	-	-
39 number	7	10	-	-	-	-	-	-	-	-	-	17
percent	41	59	-	-	-	-	-	-	-	-	-	1
40 number	4	35	2	1	-	-	-	-	-	-	1	43
percent	9	81	5	2	-	-	-	-	-	-	3	2
41 number	2	81	40	4	3	2	2	1	1	-	1	136
percent	1	60	30	3	2	1	1	1	1	-	1	5
42 number	-	77	82	28	6	5	3	1	1	3	2	207
percent	-	37	40	14	3	2	1	1	1	1	1	7
43 number	-	62	133	46	39	13	4	8	4	4	7	316
percent	-	20	42	15	12	4	1	3	1	1	2	11
44 number	-	19	108	63	51	19	23	17	14	27	27	341
percent	-	6	32	18	15	5	7	5	4	8	8	12
45 number	-	6	62	51	70	40	25	18	17	65	65	354
percent	-	2	18	14	20	11	7	5	5	18	18	12
46 number	-	2	34	42	52	33	26	42	21	94	94	346
percent	-	1	10	12	15	9	8	12	6	27	27	12
47 number	-	1	6	15	40	23	19	18	17	105	105	244
percent	-	1	3	6	16	10	8	7	7	42	42	9
48 number	-	-	6	18	36	20	30	30	18	138	138	296
percent	-	-	2	6	12	7	10	10	6	47	47	10
49 number	-	1	4	8	13	11	8	19	10	104	104	178
percent	-	1	2	4	7	6	4	11	6	59	59	6
50 number	-	-	-	-	6	6	11	13	15	130	130	181
percent	-	-	-	-	3	3	6	7	8	73	73	6
51 number	-	-	-	-	1	1	3	6	1	31	31	43
percent	-	-	-	-	2	2	7	14	2	73	73	2
52 number	-	1	1	-	1	2	3	5	2	58	58	73
percent	-	1	1	-	1	3	4	7	3	80	80	3
53 number	-	-	-	1	-	-	-	1	1	21	21	24
percent	-	-	-	4	-	-	-	4	4	88	88	1
54 number	-	-	-	-	-	-	-	1	1	18	18	20
percent	-	-	-	-	-	-	-	5	5	90	90	1
55 number	-	-	-	-	-	-	-	-	1	9	9	10
percent	-	-	-	-	-	-	-	-	10	90	90	-
56 number	-	-	-	-	-	-	-	-	-	6	6	6
percent	-	-	-	-	-	-	-	-	-	100	100	-
57 number	-	-	-	-	-	-	-	-	-	2	2	2
percent	-	-	-	-	-	-	-	-	-	100	100	-
Total	14	297	478	277	318	175	157	180	125	819	2,840	
Percent	1	10	17	10	11	6	6	6	4	29		

Appendix table 13

Length of female seals sampled from commercial kill,
by age, St. George Island, 1961

Length in inches	Age										Total	
	2	3	4	5	6	7	8	9	10	10+		
38 number	-	1	-	-	-	-	-	-	-	-	-	1
percent	-	100	-	-	-	-	-	-	-	-	-	-
39 number	-	1	1	-	-	-	-	-	-	-	-	2
percent	-	50	50	-	-	-	-	-	-	-	-	-
40 number	-	16	8	-	-	-	-	-	-	-	-	24
percent	-	66	34	-	-	-	-	-	-	-	-	2
41 number	2	46	33	3	1	1	-	2	-	-	-	88
percent	2	52	38	4	1	1	-	2	-	-	-	6
42 number	-	35	73	21	16	4	-	3	1	2	-	155
percent	-	22	47	14	10	3	-	2	1	1	1	10
43 number	-	11	61	47	18	9	4	9	3	11	-	173
percent	-	6	35	27	11	5	3	5	2	6	-	11
44 number	-	7	37	36	49	31	15	19	13	28	-	235
percent	-	3	16	15	21	13	6	8	5	13	-	16
45 number	-	1	16	35	45	37	19	30	28	75	-	286
percent	-	-	6	12	16	13	7	10	10	26	-	19
46 number	-	1	3	9	33	11	22	19	27	110	-	235
percent	-	1	1	4	14	5	9	8	11	47	-	16
47 number	-	1	-	4	9	11	11	23	19	96	-	174
percent	-	1	-	2	5	6	6	13	11	56	-	12
48 number	-	-	-	1	3	3	1	4	3	56	-	71
percent	-	-	-	1	4	4	1	6	4	80	-	5
49 number	-	-	-	-	-	1	2	-	2	37	-	42
percent	-	-	-	-	-	2	5	-	5	88	-	3
50 number	-	-	-	-	-	-	-	-	1	7	-	8
percent	-	-	-	-	-	-	-	-	12	88	-	-
51 number	-	-	-	-	1	-	-	-	-	4	-	5
percent	-	-	-	-	20	-	-	-	-	80	-	-
56 number	-	-	-	-	-	-	-	-	-	1	-	1
percent	-	-	-	-	-	-	-	-	-	100	-	-
Total	2	120	232	156	175	108	74	109	97	427	-	1,500
Percent	-	8	16	10	12	7	5	7	6	29	-	-

Appendix table 14

Reproductive condition of female seals sampled from commercial kill,
by age, date, and round, St. Paul Island, 2 July to 15 August 1961

	Age										Total
	2	3	4	5	6	7	8	9	10	10+	
<u>2 July</u>											
Pregnant multipara	-	-	-	-	-	1	-	-	-	1	2
<u>4 July</u>											
Pregnant primipara	-	-	-	1	-	-	-	-	-	-	1
multipara	-	-	-	-	2	-	1	-	-	1	4
<u>6 July</u>											
Pregnant primipara	-	-	-	-	2	-	-	-	-	-	2
Pregnant primipara	-	-	-	1	2	-	-	-	-	-	3
multipara	-	-	-	-	2	1	1	-	-	2	6
Round 2 total	-	-	-	1	4	1	1	-	-	2	9
<u>9 July</u>											
Pregnant primipara	-	-	-	-	1	-	1	-	-	-	2
Nonpregnant nullipara	-	-	-	-	-	-	-	-	-	1	1
<u>11 July</u>											
Pregnant primipara	-	-	-	-	1	-	-	-	-	-	1
Pregnant primipara	-	-	-	-	2	-	1	-	-	-	3
Nonpregnant nullipara	-	-	-	-	-	-	-	-	-	1	1
Round 3 total	-	-	-	-	2	-	1	-	-	1	4
<u>12 July</u>											
Pregnant primipara	-	-	-	-	-	2	-	-	-	-	2
<u>13 July</u>											
Pregnant primipara	-	-	-	1	-	-	-	-	-	-	1
<u>14 July</u>											
Pregnant primipara	-	-	-	1	1	-	-	-	-	2	4
<u>16 July</u>											
Pregnant primipara	-	-	-	1	1	1	-	-	-	-	3
multipara	-	-	-	-	-	-	1	-	-	2	3
Nonpregnant nullipara	-	-	-	-	1	-	-	-	-	-	1
Pregnant primipara	-	-	-	3	2	3	-	-	-	2	10
multipara	-	-	-	-	-	-	1	-	-	2	3
Nonpregnant nullipara	-	-	-	-	1	-	-	-	-	-	1
Round 4 total	-	-	-	3	3	3	1	-	-	4	14
<u>17 July</u>											
Pregnant primipara	-	-	-	-	2	4	1	1	1	4	13
multipara	-	-	-	1	-	-	-	-	-	-	1

Appendix table 14 (con.)

Reproductive condition of female seals sampled from commercial kill,
by age, date, and round, St. Paul Island, 2 July to 15 August 1961

	Age										Total
	2	3	4	5	6	7	8	9	10	10+	
<u>19 July</u>											
Pregnant											
primipara	-	-	1	-	1	-	2	-	-	2	6
multipara	-	-	-	-	-	-	-	-	-	1	1
Nonpregnant											
nullipara	-	-	1	-	-	-	-	-	-	2	3
<u>21 July</u>											
Pregnant											
primipara	-	-	-	1	4	2	-	1	1	-	9
Nonpregnant											
nullipara	-	-	-	2	-	-	-	-	-	-	2
multipara	-	-	-	-	-	-	-	-	-	1	1
Pregnant											
primipara	-	-	1	1	7	6	3	2	2	6	28
multipara	-	-	-	1	-	-	-	-	-	1	2
Nonpregnant											
nullipara	-	-	1	2	-	-	-	-	-	2	5
multipara	-	-	-	-	-	-	-	-	-	1	1
Round 5 total	-	-	2	4	7	6	3	2	2	10	36
<u>22 July</u>											
Pregnant											
primipara	-	-	-	2	-	1	1	-	1	2	7
multipara	-	-	1	-	-	-	-	-	-	3	4
Nonpregnant											
nullipara	-	-	4	-	2	-	-	-	-	-	6
multipara	-	-	-	1	1	-	1	-	-	3	6
<u>23 July</u>											
Pregnant											
primipara	-	-	-	2	3	1	-	-	-	-	6
multipara	-	-	-	-	1	2	2	2	4	6	17
Nonpregnant											
nullipara	-	-	2	-	-	-	-	-	-	-	2
multipara	-	-	-	-	1	-	1	1	1	10	14
<u>24 July</u>											
Pregnant											
primipara	-	-	-	1	2	-	-	1	1	1	6
multipara	-	-	-	-	-	1	-	-	-	1	2
Nonpregnant											
nullipara	-	1	3	-	-	-	-	-	-	-	4
primipara	-	-	-	-	1	-	-	-	-	-	1
multipara	-	-	-	-	-	-	-	-	-	8	8
<u>25 July</u>											
Pregnant											
primipara	-	-	-	-	-	-	-	1	-	-	1
multipara	-	-	-	-	-	1	-	-	-	1	2
Nonpregnant											
multipara	-	-	-	-	-	-	-	-	-	1	1
<u>26 July</u>											
Pregnant											
primipara	-	-	-	1	-	1	-	-	-	-	2
Nonpregnant											
nullipara	-	-	1	1	-	-	-	-	-	-	2

Appendix table 14 (con.)

Reproductive condition of female seals sampled from commercial kill,
by age, date, and round, St. Paul Island, 2 July to 15 August 1961

	Age										Total
	2	3	4	5	6	7	8	9	10	10+	
Pregnant											
primipara	-	-	-	6	5	3	1	2	2	3	22
multipara	-	-	1	-	1	4	2	2	4	11	25
Nonpregnant											
nullipara	-	1	10	1	2	-	-	-	-	-	14
primipara	-	-	-	-	1	-	-	-	-	-	1
multipara	-	-	-	1	2	-	2	1	1	22	29
Round 6 total	-	1	11	8	11	7	5	5	7	36	91
<u>27 July</u>											
Pregnant											
primipara	-	-	-	3	2	3	-	-	-	1	9
multipara	-	-	-	1	2	2	2	4	1	9	21
Nonpregnant											
multipara	-	-	-	1	1	-	-	1	-	10	13
<u>28 July</u>											
Pregnant											
primipara	-	-	-	1	2	1	-	-	-	-	4
multipara	-	-	-	-	1	2	1	1	1	1	7
Nonpregnant											
nullipara	-	-	1	1	-	-	-	-	-	-	2
multipara	-	-	-	-	-	-	1	-	-	2	3
<u>29 July</u>											
Pregnant											
primipara	-	-	-	3	1	-	-	-	-	-	4
multipara	-	-	-	-	-	-	-	1	2	6	9
Nonpregnant											
nullipara	-	-	2	-	-	-	-	-	-	-	2
multipara	-	-	-	-	-	-	-	-	-	2	2
<u>30 July</u>											
Pregnant											
multipara	-	-	-	1	1	-	-	-	-	3	5
Nonpregnant											
multipara	-	-	-	-	-	-	-	1	-	-	1
<u>31 July</u>											
Pregnant											
primipara	-	-	1	3	1	1	-	-	-	-	6
multipara	-	-	-	-	1	-	2	1	3	4	11
Nonpregnant											
nullipara	-	3	5	1	2	-	-	-	-	-	11
multipara	-	-	-	1	3	1	2	3	2	16	28
Pregnant											
primipara	-	-	1	10	6	5	-	-	-	1	23
multipara	-	-	-	2	5	4	5	7	7	23	53
Nonpregnant											
nullipara	-	3	10	2	2	-	-	-	-	-	17
multipara	-	-	-	2	4	1	3	5	2	30	47
Round 7 total	-	3	11	16	17	10	8	12	9	54	140
<u>1 August</u>											
Pregnant											
primipara	-	-	-	4	4	1	1	1	-	1	12
multipara	-	-	-	-	1	5	6	5	5	21	43
Nonpregnant											
nullipara	-	2	10	3	2	1	0	1	0	1	20
primipara	-	-	-	-	-	-	1	-	1	-	2
multipara	-	-	-	-	1	1	-	4	4	34	44

Appendix table 14 (con.)

Reproductive condition of female seals sampled from commercial kill,
by age, date, and round, St. Paul Island, 2 July to 15 August 1961

	Age										Total
	2	3	4	5	6	7	8	9	10	10+	
<u>2 August</u>											
Pregnant											
primipara	-	-	1	2	-	1	-	-	-	-	4
multipara	-	-	-	-	1	1	2	4	-	18	26
Nonpregnant											
nullipara	-	3	2	4	-	2	-	-	-	-	11
primipara	-	-	-	-	-	1	1	-	-	2	4
multipara	-	-	-	1	-	-	1	-	2	21	25
<u>3 August</u>											
Pregnant											
primipara	-	-	-	4	7	-	1	-	-	1	13
multipara	-	-	-	1	2	5	4	1	2	27	42
Nonpregnant											
nullipara	-	8	17	6	1	-	-	-	-	-	32
primipara	-	-	-	-	-	1	-	-	1	-	2
multipara	-	-	-	1	2	1	3	8	4	44	63
<u>4 August</u>											
Pregnant											
primipara	-	1	-	-	1	1	-	-	-	-	3
multipara	-	-	-	1	1	2	1	-	3	9	17
Nonpregnant											
nullipara	-	7	9	1	1	-	-	-	-	-	18
multipara	-	-	-	-	1	-	-	4	1	15	21
<u>5 August</u>											
Pregnant											
primipara	-	-	-	2	7	1	3	-	-	-	13
multipara	-	-	-	-	4	3	1	6	2	12	28
Nonpregnant											
nullipara	-	2	11	2	-	-	-	-	-	1	16
multipara	-	-	-	-	1	2	2	1	1	15	22
<u>Round 8 total</u>											
Pregnant											
primipara	-	1	1	12	19	4	5	1	-	2	45
multipara	-	-	-	2	9	16	14	16	12	87	156
Nonpregnant											
nullipara	-	22	49	16	4	3	-	1	-	2	97
primipara	-	-	-	-	-	2	2	-	2	2	8
multipara	-	-	-	2	5	4	6	17	12	129	175
<u>6 August</u>											
Pregnant											
primipara	-	-	1	1	1	1	1	-	-	-	5
multipara	-	-	-	-	2	2	2	2	3	11	22
Nonpregnant											
nullipara	1	2	15	5	3	2	-	-	-	1	29
multipara	-	-	-	-	-	1	2	1	1	10	15
<u>7 August</u>											
Pregnant											
primipara	-	-	-	1	2	3	1	2	-	-	9
multipara	-	-	-	1	1	1	2	8	2	12	27
Nonpregnant											
nullipara	-	7	7	3	4	1	-	-	-	-	22
primipara	-	-	-	-	4	-	-	-	-	-	4
multipara	-	-	-	-	-	2	5	1	6	23	37

Appendix table 14 (con.)

Reproductive condition of female seals sampled from commercial kill,
by age, date, and round, St. Paul Island, 2 July to 15 August 1961

	Age										Total
	2	3	4	5	6	7	8	9	10	10+	
<u>8 August</u>											
Pregnant											
primipara	-	-	3	12	16	5	-	1	-	1	38
multipara	-	-	-	3	8	4	10	4	5	41	75
Nonpregnant											
nullipara	-	44	68	13	6	-	-	1	-	-	132
primipara	-	-	-	4	1	1	1	1	-	1	9
multipara	-	-	-	1	7	7	11	5	5	56	92
<u>9 August</u>											
Pregnant											
multipara	-	1	-	-	1	1	3	1	2	9	18
Nonpregnant											
nullipara	-	7	10	-	2	-	-	-	-	-	19
multipara	-	-	-	-	1	1	-	2	1	8	13
<u>10 August</u>											
Pregnant											
primipara	-	-	2	6	10	-	1	2	1	-	22
multipara	-	-	-	-	3	4	5	9	4	16	41
Nonpregnant											
nullipara	-	32	47	18	4	-	-	-	-	-	101
primipara	-	-	-	-	-	-	-	-	-	1	1
multipara	-	-	-	-	-	-	1	7	2	20	30
Pregnant											
primipara	-	-	6	20	29	9	3	5	1	1	74
multipara	-	1	-	4	15	12	22	24	16	89	183
Nonpregnant											
nullipara	1	92	147	39	19	3	-	1	-	1	303
primipara	-	-	-	4	5	1	1	1	-	2	14
multipara	-	-	-	1	8	11	19	16	15	117	187
Round 9 total	1	93	153	68	76	36	45	47	32	210	761
<u>11 August</u>											
Pregnant											
primipara	-	-	-	7	10	4	-	1	-	1	23
multipara	-	-	1	2	6	6	6	12	9	18	60
Nonpregnant											
nullipara	-	22	42	16	4	1	-	-	-	1	86
primipara	-	-	-	-	6	-	2	-	1	-	9
multipara	-	-	-	1	4	6	11	7	3	43	75
<u>12 August</u>											
Pregnant											
primipara	-	-	-	4	13	3	1	1	-	-	22
multipara	-	-	-	2	5	4	3	7	5	16	42
Nonpregnant											
nullipara	-	13	27	15	3	3	-	-	-	-	61
primipara	-	-	-	1	2	1	1	-	-	1	6
multipara	-	-	-	-	-	4	1	5	7	27	44
<u>13 August</u>											
Pregnant											
primipara	-	1	-	8	5	3	1	-	-	-	18
multipara	-	-	-	3	3	6	4	3	6	16	41
Nonpregnant											
nullipara	3	36	39	11	5	-	-	-	-	-	94
primipara	-	-	1	1	1	-	-	1	1	-	5
multipara	-	-	-	1	7	4	4	5	4	25	50

Appendix table 14 (con.)

Reproductive condition of female seals sampled from commercial kill,
by age, date, and round, St. Paul Island, 2 July to 15 August 1961

	Age										Total
	2	3	4	5	6	7	8	9	10	10+	
<u>14 August</u>											
Pregnant											
primipara	-	-	-	2	5	-	-	-	-	1	8
multipara	-	-	-	-	2	-	1	1	1	2	7
Nonpregnant											
nullipara	-	9	13	1	1	-	1	-	-	-	25
primipara	-	-	-	-	1	1	-	-	-	-	2
multipara	-	-	-	-	1	1	-	1	-	5	8
<u>15 August</u>											
Pregnant											
primipara	-	-	-	6	12	2	-	-	-	-	20
multipara	-	1	-	3	6	3	3	9	2	25	52
Nonpregnant											
nullipara	2	25	57	18	5	-	-	2	-	-	109
primipara	-	-	-	1	2	-	-	-	-	1	4
multipara	-	-	-	-	-	3	-	3	-	27	33
Pregnant											
primipara	-	1	-	27	45	12	2	2	-	2	91
multipara	-	1	1	10	22	19	17	32	23	77	202
Nonpregnant											
nullipara	5	105	178	61	18	4	1	2	-	1	375
primipara	-	-	1	3	12	2	3	1	2	2	26
multipara	-	-	-	2	12	18	16	21	14	127	210
Round 10 total	5	107	180	103	109	55	39	58	39	209	904

Reproductive condition of female seals sampled from fall kill,
by age, date, and round, St. Paul Island, 2 July to 15 August 1961

	Age										Total
	2	3	4	5	6	7	8	9	10	10+	
<u>31 August</u>											
Pregnant											
primipara	-	-	-	3	9	2	1	-	-	-	15
multipara	-	1	-	-	2	6	6	3	5	12	35
Nonpregnant											
nullipara	6	53	39	12	7	2	-	-	-	-	119
primipara	-	-	-	1	3	-	-	-	-	-	4
multipara	-	-	-	-	1	2	1	1	1	12	18
<u>1 September</u>											
Pregnant											
primipara	-	-	-	6	4	3	-	-	-	1	14
multipara	-	-	-	9	15	9	14	12	3	38	100
Nonpregnant											
nullipara	2	16	32	10	4	1	1	-	1	-	67
primipara	-	-	-	1	3	-	-	-	-	-	4
multipara	-	-	-	-	4	3	4	5	-	8	24
Pregnant											
primipara	-	-	-	9	13	5	1	-	-	1	29
multipara	-	1	-	9	17	15	20	15	8	50	135
Nonpregnant											
nullipara	8	69	71	22	11	3	1	-	1	-	186
primipara	-	-	-	2	6	-	-	-	-	-	8
multipara	-	-	-	-	5	5	5	6	1	20	42
Total fall	8	70	71	42	52	28	27	21	10	71	400

Appendix table 15 (con.)

Reproductive condition of female seals sampled from commercial kill,
by age, date, and round, St. George Island, 2 July to 15 August 1961

	Age										Total
	2	3	4	5	6	7	8	9	10	10+	
<u>30 July</u>											
Pregnant											
primipara	-	-	-	5	8	3	1	-	-	-	17
multipara	-	-	-	1	6	5	7	7	3	15	44
Nonpregnant											
nullipara	-	1	4	1	1	1	-	-	-	-	8
primipara	-	-	-	-	-	1	-	-	-	-	1
multipara	-	-	-	-	1	2	2	3	6	9	23
<u>31 July</u>											
Pregnant											
primipara	-	-	-	3	3	-	-	-	-	-	6
multipara	-	-	-	-	2	-	1	4	1	6	14
Nonpregnant											
nullipara	-	-	6	1	1	-	-	-	-	-	8
multipara	-	-	-	-	-	-	2	-	-	2	4
Pregnant											
primipara	-	-	-	8	12	3	1	-	-	-	24
multipara	-	-	-	1	9	5	9	12	4	24	64
Nonpregnant											
nullipara	-	1	12	2	2	1	-	-	-	-	18
primipara	-	-	-	-	1	1	-	-	-	-	2
multipara	-	-	-	-	1	2	4	3	6	20	36
Round 7 total	-	1	12	11	25	12	14	15	10	44	144
<u>1 August</u>											
Pregnant											
primipara	-	-	-	3	4	-	1	-	-	-	8
multipara	-	-	-	-	7	4	-	5	4	12	32
Nonpregnant											
nullipara	-	3	3	1	-	-	-	-	-	-	7
primipara	-	-	-	-	2	-	-	-	-	-	2
multipara	-	-	-	-	2	1	2	8	4	15	32
<u>2 August</u>											
Pregnant											
primipara	-	-	-	-	3	-	-	-	-	-	3
multipara	-	-	-	-	2	4	1	1	2	9	19
Nonpregnant											
nullipara	-	6	15	6	1	1	-	-	-	-	29
multipara	-	-	-	-	1	-	-	-	-	12	13
<u>3 August</u>											
Pregnant											
primipara	-	-	-	1	3	-	1	-	-	-	5
multipara	-	-	-	1	2	2	1	2	6	8	22
Nonpregnant											
nullipara	-	13	15	7	2	-	-	-	-	-	37
primipara	-	-	-	-	1	-	-	-	-	-	1
multipara	-	-	-	2	1	1	1	4	4	13	26
<u>4 August</u>											
Pregnant											
primipara	-	1	-	5	3	-	-	-	-	1	10
multipara	-	-	-	-	4	7	1	6	5	8	31
Nonpregnant											
nullipara	-	4	13	4	2	2	-	-	-	-	25
primipara	-	-	-	-	1	-	-	-	-	-	1
multipara	-	-	-	-	1	2	1	4	1	11	20

Appendix table 15 (con.)

Reproductive condition of female seals sampled from commercial kill,
by age, date, and round, St. George Island, 2 July to 15 August 1961

	Age										Total
	2	3	4	5	6	7	8	9	10	10+	
<u>5 August</u>											
Pregnant											
primipara	-	-	1	2	2	1	-	-	-	-	6
multipara	-	-	-	1	3	2	3	1	2	12	24
Nonpregnant											
nullipara	-	9	17	12	4	1	-	1	-	-	44
primipara	-	-	-	1	-	1	-	-	-	-	2
multipara	-	-	-	-	-	2	1	3	1	12	19
Pregnant											
primipara	-	1	1	11	15	1	2	-	-	1	32
multipara	-	-	-	2	18	19	6	15	19	49	128
Nonpregnant											
nullipara	-	35	63	30	9	4	-	1	-	-	142
primipara	-	-	-	1	4	1	-	-	-	-	6
multipara	-	-	-	2	5	6	5	19	10	63	110
Round 8 total	-	36	64	46	51	31	13	35	29	113	418
<u>6 August</u>											
Pregnant											
primipara	-	-	-	1	-	-	-	-	-	-	1
multipara	-	-	-	-	-	4	1	2	1	7	15
Nonpregnant											
nullipara	-	-	4	3	1	-	-	-	-	-	8
multipara	-	-	-	-	1	3	2	4	1	15	26
<u>7 August</u>											
Pregnant											
primipara	-	-	-	3	3	-	1	-	-	-	7
multipara	-	-	-	1	4	4	1	6	1	6	23
Nonpregnant											
nullipara	-	5	14	2	2	-	-	-	-	-	23
multipara	-	-	-	1	1	2	1	1	-	6	12
<u>8 August</u>											
Pregnant											
primipara	-	-	-	2	8	1	-	-	-	-	11
multipara	-	-	-	-	3	4	3	2	8	12	32
Nonpregnant											
nullipara	-	2	6	6	4	-	1	-	-	-	19
primipara	-	-	-	-	2	-	1	-	-	-	3
multipara	-	-	-	-	-	1	2	5	4	15	27
<u>9 August</u>											
Pregnant											
primipara	-	-	-	1	2	-	-	-	-	-	3
multipara	-	-	-	-	7	1	5	5	1	15	34
Nonpregnant											
nullipara	-	4	12	3	-	2	1	1	-	-	23
primipara	-	-	-	-	-	-	1	-	-	-	1
multipara	-	-	-	-	1	1	1	4	5	20	32
<u>10 August</u>											
Pregnant											
primipara	-	-	-	3	3	1	-	-	-	-	7
multipara	-	-	-	-	4	-	2	2	2	7	17
Nonpregnant											
nullipara	1	25	21	6	6	1	-	-	-	-	60
primipara	-	-	-	-	1	-	-	-	-	-	1
multipara	-	-	-	-	1	-	2	1	1	10	15

Appendix table 15 (con.)

Reproductive condition of female seals sampled from commercial kill,
by age, date, and round, St. George Island, 2 July to 15 August 1961

	Age										Total
	2	3	4	5	6	7	8	9	10	10+	
Pregnant											
primipara	-	-	-	10	16	2	1	-	-	-	29
multipara	-	-	-	1	18	13	12	17	13	47	121
Nonpregnant											
nullipara	1	36	57	20	13	3	2	1	-	-	133
primipara	-	-	-	-	3	-	2	-	-	-	5
multipara	-	-	-	1	4	7	8	15	11	66	112
Round 9 total	1	36	57	32	54	25	25	33	24	113	400
<u>11 August</u>											
Pregnant											
primipara	-	-	1	5	1	-	-	1	-	-	8
multipara	-	-	-	1	4	6	3	5	8	15	42
Nonpregnant											
nullipara	-	4	15	4	-	-	-	-	-	-	23
primipara	-	-	-	1	-	-	1	-	-	-	2
multipara	-	-	-	-	1	-	2	3	2	17	25
<u>12 August</u>											
Pregnant											
primipara	-	-	1	6	2	3	-	-	-	-	12
multipara	-	-	-	1	2	6	1	3	4	16	33
Nonpregnant											
nullipara	-	10	15	3	1	-	-	-	-	-	29
primipara	-	-	-	-	1	1	-	-	-	-	2
multipara	-	-	-	-	3	-	1	-	4	16	24
<u>13 August</u>											
Pregnant											
primipara	-	-	-	4	2	-	1	-	-	-	7
multipara	-	-	-	-	2	3	5	2	4	10	26
Nonpregnant											
nullipara	-	8	27	10	2	3	-	-	-	-	50
primipara	-	-	-	-	-	2	-	-	-	-	2
multipara	-	-	-	-	1	3	-	2	1	8	15
<u>14 August</u>											
Pregnant											
primipara	-	-	1	2	4	2	-	-	-	-	9
multipara	-	-	-	-	4	4	1	4	1	22	36
Nonpregnant											
nullipara	1	9	18	10	2	-	-	-	-	-	40
primipara	-	-	-	1	-	2	-	-	-	-	3
multipara	-	-	-	-	1	2	1	1	1	14	20
<u>15 August</u>											
Pregnant											
primipara	-	-	-	4	1	1	-	-	-	-	6
multipara	-	-	-	-	2	-	3	3	4	13	25
Nonpregnant											
nullipara	-	15	19	11	2	-	-	-	-	-	47
primipara	-	-	-	-	1	-	-	-	-	1	2
multipara	-	-	-	-	2	1	3	-	4	12	22
Pregnant											
primipara	-	-	3	21	10	6	1	1	-	-	42
multipara	-	-	-	2	14	19	13	17	21	76	162
Nonpregnant											
nullipara	1	46	94	38	7	3	-	-	-	-	189
primipara	-	-	-	2	2	5	1	-	-	1	11
multipara	-	-	-	-	8	6	7	6	12	67	106
Round 10 total	1	46	97	63	41	39	22	24	33	144	510

Appendix table 16

Number pregnant and nonpregnant among female seals 4 or more years old and 5 or more years old, St. Paul Island, 1961

Date	Daily kill	Daily sample	Daily sample less 2 & 3 yr. olds		Ages 4-10+		Daily sample less 2, 3, & 4 yr. olds		Ages 5-10+	
			pregnant	non-pregnant	pregnant	non-pregnant	pregnant	non-pregnant		
July										
2	2	2	2	2	-	2	2	-		
3	-	-	-	-	-	-	-	-		
4	5	5	5	5	-	5	5	-		
5	-	-	-	-	-	-	-	-		
6	2	2	2	2	-	2	2	-		
7	-	-	-	-	-	-	-	-		
8	-	-	-	-	-	-	-	-		
9	4	3	3	2	1	3	2	1		
10	-	-	-	-	-	-	-	-		
11	2	1	1	1	-	1	1	-		
12	2	2	2	2	-	2	2	-		
13	1	1	1	1	-	1	1	-		
14	4	4	4	4	-	4	4	-		
15	-	-	-	-	-	-	-	-		
16	8	7	7	6	1	7	6	1		
17 ^{1/}	10	11	11	11	-	11	11	-		
18	3	3	3	3	-	3	3	-		
19	12	10	10	7	3	8	6	2		
20	-	-	-	-	-	-	-	-		
21	12	12	12	9	3	12	9	3		
22	24	23	23	11	12	18	10	8		
23 ^{1/}	38	39	39	23	16	37	23	14		
24 ^{1/}	19	21	20	8	12	17	8	9		
25	5	4	4	3	1	4	3	1		
26	5	4	4	2	2	3	2	1		
27	45	45	45	30	15	43	30	13		
28	17	16	16	11	5	15	11	4		
29	18	17	17	13	4	15	13	2		
30	6	6	6	5	1	6	5	1		
31	83	56	53	17	36	47	16	31		
August										
1	514	121	119	55	64	109	55	54		
2	114	70	67	30	37	64	29	35		
3	293	152	144	55	89	127	55	72		
4	96	59	51	19	32	42	19	23		
5	199	79	77	41	36	66	41	25		
6	158	71	68	27	41	52	26	26		
7	444	99	92	36	56	85	36	49		
8	1195	346	302	113	189	231	110	121		
9	215	50	42	17	25	32	17	15		
10	1007	195	163	63	100	114	61	53		
11	1419	253	231	83	148	188	82	106		
12	1014	175	162	64	98	135	64	71		
13	901	208	168	58	110	128	58	70		
14	386	50	41	15	26	28	15	13		
15	2213	218	190	71	119	133	71	62		
<u>Fall kill</u>										
31	1522	191	131	49	82	92	49	43		
September										
1	1918	209	191	114	77	159	114	45		
Total	13,935	2,840	2,529	1,088	1,441	2,051	1,077	974		

^{1/} Four females in sample not noted in kill.

Appendix table 17

Number pregnant and nonpregnant among female seals 4 or more years old and 5 or more years old, St. George Island, 1961

Date	Daily kill	Daily sample	Daily sample less 2 & 3 yr. olds	Ages 4-10+		Daily sample less 2, 3, & 4 yr. olds	Ages 5-10+	
				pregnant	non-pregnant		pregnant	non-pregnant
July								
2-3	No females killed							
4	1	1	1	1	-	1	1	-
5-18	No females killed							
19	2	2	2	2	-	2	2	-
20	-	-	-	-	-	-	-	-
21	1	1	1	1	-	1	1	-
22	-	-	-	-	-	-	-	-
23	6	3	2	-	2	2	-	2
24	7	7	7	4	3	7	4	3
25	6	6	6	4	2	6	4	2
26	8	8	8	5	3	6	5	1
27	1	1	1	-	1	1	-	1
28	-	-	-	-	-	-	-	-
29	19	18	18	7	11	16	7	9
30	126	93	92	61	31	88	61	27
31	33	32	32	20	12	26	20	6
August								
1	86	81	78	40	38	75	40	35
2	64	64	58	22	36	43	22	21
3	103	91	78	27	51	63	27	36
4	93	87	82	40	42	69	40	29
5	120	95	86	30	56	68	29	39
6	51	50	50	16	34	46	16	30
7	68	65	60	30	30	46	30	16
8	106	92	90	43	47	84	43	41
9	462	93	89	37	52	77	37	40
10	235	100	74	24	50	53	24	29
11	544	100	96	50	46	80	49	31
12	313	100	90	45	45	74	44	30
13	193	100	92	33	59	65	33	32
14	636	108	98	45	53	79	44	35
15	339	102	87	31	56	68	31	37
Total	3,623	1,500	1,378	618	760	1,146	614	532

Appendix table 18
 Reproductive condition of female seals sampled from
 commercial and fall kills, by length, St. Paul Island, 1961

Length in inches	Pregnant		Nonpregnant			Total
	primi- para	multi- para	nulli- para	primi- para	multi- para	
38 number	-	-	3	-	-	3
percent	-	-	100	-	-	-
39 number	-	-	17	-	-	17
percent	-	-	100	-	-	1
40 number	-	1	42	-	-	43
percent	-	2	98	-	-	2
41 number	7	2	126	-	1	136
percent	5	1	93	-	1	5
42 number	24	9	171	-	3	207
percent	12	4	83	-	1	7
43 number	42	32	222	7	13	316
percent	14	10	70	2	4	11
44 number	53	73	177	7	31	341
percent	16	21	52	2	9	12
45 number	83	92	114	7	58	354
percent	23	26	32	2	17	12
46 number	49	132	65	9	91	346
percent	14	38	19	3	26	12
47 number	30	103	21	8	82	244
percent	12	42	9	3	34	9
48 number	27	109	25	10	125	296
percent	9	37	8	3	43	10
49 number	9	71	13	4	81	178
percent	5	40	7	2	46	6
50 number	4	76	2	3	96	181
percent	2	42	1	2	53	6
51 number	-	21	-	-	22	43
percent	-	49	-	-	51	2
52 number	-	26	-	1	46	73
percent	-	36	-	1	63	3
53 number	-	8	1	1	14	24
percent	-	34	4	4	58	1
54 number	-	5	-	-	15	20
percent	-	25	-	-	75	1
55 number	-	3	-	-	7	10
percent	-	30	-	-	70	-
56 number	-	1	-	-	5	6
percent	-	17	-	-	83	-
57 number	-	1	-	-	1	2
percent	-	50	-	-	50	-
Total	328	765	999	57	691	2,840
Percent	12	27	35	2	24	

Appendix table 19
 Reproductive condition of female seals sampled from
 commercial kill, by length, St. George Island, 1961^{1/}

Length in inches	Pregnant		Nonpregnant			Total
	primi- para	multi- para	nulli- para	primi- para	multi- para	
38 number	-	-	1	-	-	1
percent	-	-	100	-	-	-
39 number	-	-	2	-	-	2
percent	-	-	100	-	-	-
40 number	-	-	24	-	-	24
percent	-	-	100	-	-	2
41 number	1	-	83	2	2	88
percent	1	-	95	2	2	6
42 number	13	10	125	1	6	155
percent	8	7	80	1	4	10
43 number	23	27	103	4	16	173
percent	13	16	60	2	9	11
44 number	37	89	73	4	32	235
percent	16	38	31	2	13	16
45 number	34	113	51	5	83	286
percent	12	40	18	1	29	19
46 number	14	116	16	6	83	235
percent	6	49	7	3	35	16
47 number	7	76	7	1	83	174
percent	4	44	4	1	47	12
48 number	2	33	2	1	33	71
percent	3	46	3	2	46	5
49 number	-	21	-	-	21	42
percent	-	50	-	-	50	3
50 number	-	2	-	-	6	8
percent	-	25	-	-	75	-
51 number	-	1	-	-	4	5
percent	-	20	-	-	80	-
56 number	-	-	-	-	1	1
percent	-	-	-	-	100	-
Total	131	488	487	24	370	1,500
Percent	9	32	32	2	25	

^{1/} No examinations made for reproductive condition during fall female kill on St. George Island.

Appendix table 20

Recovery location of tagged seals in commercial kill, Pribilof Islands, 1961

Rookery of tagging	Rookery of recovery												Grand total
	St. Paul Island						St. George Island						
	ZAP-1	TOL	L-K	REEF	POL	NEP	total	ZAP-2	NOR	EAST	STAR	total	
<u>L-series - 2-year-old seals, males</u>													
ZAP-1	14	2	1	-	-	2	19	1	3	2	2	8	27
TOL	3	2	-	-	-	-	5	-	1	-	-	1	6
L-K	2	1	-	-	-	-	3	-	-	1	-	1	4
REEF	5	2	1	-	-	4	12	-	2	1	-	3	15
POL	5	-	-	-	16	5	26	1	1	2	2	6	32
NEP	3	1	-	-	3	14	21	1	-	-	-	1	22
NOR	2	-	1	-	-	5	8	1	3	-	4	8	16
EAST	-	-	-	-	-	1	1	-	1	5	-	6	7
STAR	-	-	1	-	-	-	1	-	-	-	-	-	1
ZAP-2	-	-	-	-	-	1	1	-	-	1	-	1	2
Tags lost	19	1	-	3	11	13	47	-	5	2	1	8	55
Total	53	9	4	3	30	45	144	4	16	14	9	43	187
<u>K-series - 3-year-old seals, males</u>													
ZAP-1	411	41	6	9	28	69	564	8	7	14	2	31	595
TOL	125	53	3	2	22	46	251	3	2	7	3	15	266
L-K	27	15	29	6	30	51	158	3	5	12	3	23	181
REEF	214	60	12	98	34	79	497	7	13	13	7	40	537
POL	34	12	4	5	188	113	356	5	8	10	1	24	380
NEP	65	9	2	5	58	388	527	9	12	15	3	39	566
NOR	27	5	2	3	9	26	72	8	93	18	2	121	193
EAST	20	2	2	-	8	15	47	2	12	62	1	77	124
STAR	10	5	-	1	4	11	31	4	17	9	18	48	79
ZAP-2	11	2	-	-	4	3	20	24	7	3	4	38	58
Tags lost	318	99	11	60	129	301	918	31	64	38	20	153	1071
Total	1262	303	71	189	514	1102	3441	104	240	201	64	609	4050
<u>J-series - 4-year-old seals, males</u>													
ZAP-1	117	9	-	-	9	16	151	6	3	7	-	16	167
TOL	47	35	1	-	6	15	104	-	3	2	-	5	109
L-K	13	4	11	1	19	24	72	2	3	6	-	11	83
REEF	93	17	1	36	14	24	185	1	8	4	-	13	198
POL	5	1	1	1	86	33	127	1	4	1	-	6	133
NEP	12	3	-	1	11	181	208	1	3	3	-	7	215
NOR	5	-	-	-	2	10	17	3	35	8	7	53	70
EAST	4	-	-	-	6	4	14	2	5	20	1	28	42
STAR	2	-	-	-	2	1	5	-	10	6	9	25	30
ZAP-2	7	1	1	2	4	2	17	31	7	5	1	44	61
Tags lost	209	48	9	48	127	198	639	22	44	33	14	113	752
Total	514	118	24	89	286	508	1539	69	125	95	32	321	1860
<u>I-series - 5-year-old seals, males</u>													
ZAP-1	-	2	-	-	-	-	2	-	-	-	-	-	2
TOL	-	1	-	-	-	1	2	-	-	-	-	-	2
L-K	1	-	-	1	-	-	2	-	-	-	-	-	2
REEF	3	-	-	1	-	1	5	-	-	-	-	-	5
POL	-	-	-	-	2	4	6	-	-	-	-	-	6
NEP	-	-	-	-	1	4	5	-	-	-	-	-	5
NOR	-	-	-	-	1	-	1	-	1	-	-	1	2
EAST	-	-	-	-	-	-	-	-	-	1	-	1	1
STAR	-	1	-	-	-	-	1	-	-	-	-	-	1
ZAP-2	-	-	-	-	-	-	-	3	-	-	-	3	3
Tags lost	6	1	-	-	4	6	17	-	2	1	-	3	20
Total	10	5	-	2	8	16	41	3	3	2	-	8	49
<u>H-series - 6-year-old seals, males</u>													
POL	-	-	-	-	1	-	1	-	-	-	-	-	1
NEP	1	-	-	-	-	-	1	-	-	-	-	-	1
Tags lost	-	1	-	-	-	1	2	-	-	-	-	-	2
Total	1	1	-	-	1	1	4	-	-	-	-	-	4

Appendix table 20 (con.)

Recovery location of tagged seals in commercial kill, Pribilof Islands, 1961

Rookery of tagging	Rookery of recovery											Grand total	
	St. Paul Island						St. George Island						
	ZAP-1	TOL	L-K	REEF	POL	NEP	total	ZAP-2	NOR	EAST	STAR	total	
<u>G-series - 7-year-old seals, males</u>													
Tags lost	1	-	-	-	-	-	1	-	-	-	-	-	1
<u>L-series - 2-year-old seals, females</u>													
TOL	1	-	-	-	-	-	1	-	-	-	-	-	1
POL	-	-	-	-	2	-	2	-	-	-	-	-	2
Tags lost	1	-	-	-	1	-	2	-	-	-	-	-	2
Total	2	-	-	-	3	-	5	-	-	-	-	-	5
<u>K-series - 3-year-old seals, females</u>													
ZAP-1	4	1	-	-	-	-	5	-	-	-	-	-	5
TOL	-	3	-	-	-	-	3	-	-	-	-	-	3
L-K	-	-	-	-	1	-	1	-	-	-	-	-	1
REEF	2	1	-	2	1	-	6	-	-	1	-	1	7
POL	-	-	-	-	23	-	23	-	-	-	-	-	23
NEP	-	-	-	-	-	3	3	-	-	-	-	-	3
NOR	-	-	-	-	-	-	-	-	1	-	1	2	2
STAR	-	1	-	-	-	1	2	-	-	-	1	1	3
Tags lost	2	-	-	6	13	3	24	1	3	1	3	8	32
Total	8	6	-	8	38	7	67	1	4	2	5	12	79
<u>J-series - 4-year-old seals, females</u>													
ZAP-1	16	-	-	-	-	-	16	-	-	-	-	-	16
TOL	3	6	-	-	-	-	9	-	-	-	-	-	9
L-K	1	-	-	-	1	-	2	-	-	-	-	-	2
REEF	2	1	-	2	1	1	7	-	-	-	-	-	7
POL	-	1	-	-	15	-	16	-	-	-	-	-	16
NEP	-	-	-	-	-	10	10	-	-	1	-	1	11
NOR	-	-	-	-	-	1	1	-	2	-	-	2	3
EAST	-	-	-	-	-	-	-	-	-	2	-	2	2
STAR	-	-	-	-	-	-	-	-	-	-	3	3	3
ZAP-2	-	-	-	-	1	-	1	1	-	-	-	1	2
Tags lost	8	9	2	6	25	12	62	2	4	-	2	8	70
Total	30	17	2	8	43	24	124	3	6	3	5	17	141
<u>I-series - 5-year-old seals, females</u>													
ZAP-1	8	2	-	-	-	-	10	-	-	-	-	-	10
TOL	3	2	-	-	-	-	5	-	-	-	-	-	5
L-K	-	-	-	-	1	-	1	-	-	-	-	-	1
REEF	-	1	-	-	-	-	1	-	-	-	-	-	1
POL	1	-	-	-	13	-	14	-	-	-	-	-	14
NEP	-	-	-	-	2	2	4	-	-	-	-	-	4
NOR	-	-	-	-	1	1	2	-	1	-	1	2	4
EAST	-	-	-	-	-	-	-	-	-	3	-	3	3
STAR	-	-	-	-	-	-	-	-	-	-	5	5	5
ZAP-2	-	-	-	-	-	-	-	5	-	1	-	6	6
Tags lost	2	3	-	-	4	6	15	2	-	1	-	3	18
Total	14	8	-	-	21	9	52	7	1	5	6	19	71
<u>H-series - 6-year-old seals, females</u>													
ZAP-1	20	4	-	-	-	-	24	-	-	-	-	-	24
TOL	2	7	-	-	1	-	10	-	-	-	-	-	10
L-K	-	-	1	-	1	-	2	-	-	-	-	-	2
REEF	6	-	-	3	1	-	10	-	-	-	-	-	10
POL	-	-	-	-	11	2	13	-	-	-	-	-	13
NEP	-	1	-	-	-	15	16	-	-	-	-	-	16
Tags lost	1	1	-	2	5	4	13	1	-	-	-	1	14
Total	29	13	1	5	19	21	88	1	-	-	-	1	89

Appendix table 20 (con.)

Recovery location of tagged seals in commercial kill, Pribilof Islands, 1961

Rookery of tagging	Rookery of recovery											Grand total	
	St. Paul Island						St. George Island				total		
	ZAP-1	TOL	L-K	REEF	POL	NEP	ZAP-2	NOR	EAST	STAR			
<u>G-series - 7-year-old seals, females</u>													
ZAP-1	2	-	-	-	-	-	2	-	-	-	-	-	2
TOL	-	2	-	-	-	1	3	-	-	-	-	-	3
L-K	-	-	-	-	-	2	2	-	-	-	-	-	2
REEF	-	2	-	-	-	-	2	-	-	-	-	-	2
POL	-	-	-	-	2	-	2	-	-	-	-	-	2
Tags lost	7	3	-	1	6	3	20	-	3	1	3	7	27
Total	9	7	-	1	8	6	31	-	3	1	3	7	38
<u>F-series - 8-year-old seals, females</u>													
ZAP-1	1	1	-	-	-	-	2	-	-	-	-	-	2
NEP	-	-	-	-	-	1	1	-	-	-	-	-	1
Tags lost	2	1	-	-	-	1	4	-	-	-	-	-	4
Total	3	2	-	-	-	2	7	-	-	-	-	-	7
<u>E-series - 9-year-old seals, females</u>													
ZAP-1	-	2	-	-	-	-	2	-	-	-	-	-	2
REEF	2	2	-	-	-	-	4	-	-	-	-	-	4
POL	-	-	-	-	19	3	22	-	1	-	-	1	23
NEP	-	-	-	-	1	4	5	-	-	-	-	-	5
Tags lost	-	-	-	-	3	1	4	-	-	-	-	-	4
Total	2	4	-	-	23	8	37	-	1	-	-	1	38
<u>D-series - 10-year-old seals, females</u>													
POL	-	-	-	-	5	-	5	-	-	-	-	-	5
<u>CS-series - 12-year-old seals, females</u>													
REEF	-	-	1	-	-	-	1	-	-	-	-	-	1
NEP	-	-	-	-	4	3	7	-	-	-	-	-	7
Total	-	-	1	-	4	3	8	-	-	-	-	-	8
<u>B-series - 13-year-old seals, females</u>													
POL	1	1	-	-	16	1	19	-	-	-	-	-	19
NEP	-	-	-	-	1	1	2	-	-	-	-	-	2
Total	1	1	-	-	17	2	21	-	-	-	-	-	21
<u>A-series - 14-year-old seals, females</u>													
POL	-	-	-	-	1	-	1	-	-	-	-	-	1
Tags lost	1	-	-	-	-	1	2	-	-	-	-	-	2
Total	1	-	-	-	1	1	3	-	-	-	-	-	3
<u>USA-series - 20-year-old seals, females</u>													
REEF	-	1	-	-	-	-	1	-	-	-	-	-	1
NEP	-	-	-	-	-	2	2	-	-	-	-	-	2
Total	-	1	-	-	-	2	3	-	-	-	-	-	3

Appendix table 21

Recovery location of tagged seals in fall kill, Pribilof Islands, 1961

Rookery of tagging	Rookery of recovery											Grand total	
	St. Paul Island						St. George Island						
	ZAP-1	TOL	L-K	REEF	POL	NEP	total	ZAP-2	NOR	EAST	STAR		total
<u>2-year-old seals, females</u>													
ZAP-1	5	-	-	-	-	1	6	-	-	-	-	-	6
REEF	1	1	-	-	-	-	2	-	-	-	-	-	2
POL	1	-	-	-	1	-	2	1	-	-	-	1	3
NEP	1	-	-	-	-	3	4	-	-	-	-	-	4
NOR	-	-	-	-	-	-	-	-	2	-	-	2	2
EAST	-	-	-	-	-	-	-	-	-	1	-	1	1
Tags lost	1	2	-	-	1	2	6	-	-	1	1	2	8
Total	9	3	-	-	2	6	20	1	2	2	1	6	26
<u>3-year-old seals, females</u>													
ZAP-1	21	3	-	-	-	-	24	-	-	-	-	-	24
TOL	3	3	-	-	-	1	7	-	1	-	1	2	9
L-K	-	1	-	-	1	-	2	-	-	1	-	1	3
REEF	5	2	-	-	1	2	10	-	-	-	-	-	10
POL	2	-	-	-	18	1	21	-	-	-	-	-	21
NEP	-	3	-	-	-	42	45	-	-	1	-	1	46
NOR	1	-	-	-	1	1	3	-	5	-	1	6	9
EAST	-	-	-	-	-	-	-	-	-	5	-	5	5
STAR	-	-	-	-	-	-	-	-	-	-	4	4	4
ZAP-2	-	1	-	-	-	1	2	7	-	-	1	8	10
Tags lost	4	2	-	-	2	-	8	7	5	1	3	16	24
Total	36	15	-	-	23	48	122	14	11	8	10	43	165
<u>4-year-old seals, females</u>													
ZAP-1	13	5	-	-	-	-	18	-	-	-	-	-	18
TOL	-	5	-	-	-	-	5	-	-	-	-	-	5
L-K	1	1	-	-	1	-	3	-	-	-	-	-	3
REEF	7	3	-	-	-	-	10	-	-	-	-	-	10
POL	-	-	-	-	28	2	30	-	-	-	-	-	30
NEP	1	-	-	-	-	52	53	-	-	-	-	-	53
NOR	-	-	-	-	-	1	1	-	8	-	1	9	10
EAST	2	-	-	-	-	-	2	-	-	6	-	6	8
STAR	-	-	-	-	-	-	-	-	-	-	6	6	6
ZAP-2	3	1	-	-	-	-	4	4	-	-	-	4	8
Tags lost	24	2	-	-	13	6	45	5	6	5	6	22	67
Total	51	17	-	-	42	61	171	9	14	11	13	47	218
<u>5-year-old seals, females</u>													
ZAP-1	6	3	-	-	1	1	11	-	-	-	-	-	11
TOL	1	7	-	-	-	-	8	-	-	-	-	-	8
REEF	5	3	-	-	1	1	10	-	-	-	-	-	10
POL	-	-	-	-	10	2	12	-	-	-	-	-	12
NEP	2	-	-	-	-	28	30	-	-	-	-	-	30
NOR	-	-	-	-	-	2	2	-	2	-	1	3	5
EAST	-	-	-	-	-	1	1	-	-	3	-	3	4
STAR	-	-	-	-	-	1	1	-	-	-	4	4	5
ZAP-2	-	-	-	-	-	-	-	5	1	-	-	6	6
Tags lost	4	1	-	-	-	9	14	-	2	-	-	2	16
Total	18	14	-	-	12	45	89	5	5	3	5	18	107
<u>6-year-old seals, females</u>													
ZAP-1	23	4	-	-	-	2	29	-	-	-	-	-	29
TOL	1	12	-	-	2	1	16	-	-	-	-	-	16
L-K	-	2	-	-	2	1	5	-	-	-	-	-	5
REEF	8	8	-	-	1	5	22	-	-	-	-	-	22
POL	1	-	-	-	18	3	22	-	-	-	-	-	22
NEP	-	-	-	-	-	57	57	-	-	-	-	-	57
Tags lost	4	2	-	-	4	3	13	-	-	-	-	-	13
Total	37	28	-	-	27	72	164	-	-	-	-	-	164

Appendix table 21 (con.)

Recovery location of tagged seals in fall kill, Pribilof Islands, 1961

Rookery of tagging	Rookery of recovery												Grand total
	St. Paul Island						St. George Island						
	ZAP-1	TOL	L-K	REEF	POL	NEP	total	ZAP-2	NOR	EAST	STAR	total	
<u>7-year-old seals, females</u>													
ZAP-1	-	-	-	-	-	1	1	-	-	-	-	-	1
TOL	1	-	-	-	-	-	1	-	-	-	-	-	1
REEF	1	2	-	-	-	-	3	-	-	-	-	-	3
POL	-	-	-	-	1	2	3	-	-	-	-	-	3
NEP	1	-	-	-	-	10	11	-	-	-	-	-	11
Tags lost	-	-	-	-	-	-	-	1	1	-	-	-	2
Total	3	2	-	-	1	13	19	1	1	-	-	2	21
<u>8-year-old seals, females</u>													
ZAP-1	2	-	-	-	-	-	2	-	-	-	-	-	2
L-K	-	-	-	-	-	1	1	-	-	-	-	-	1
POL	-	-	-	-	2	1	3	-	-	-	-	-	3
NEP	-	-	-	-	-	2	2	-	-	-	-	-	2
Tags lost	1	1	-	-	1	1	4	1	-	-	1	2	6
Total	3	1	-	-	3	5	12	1	-	-	1	2	14
<u>9-year-old seals, females</u>													
ZAP-1	3	-	-	-	-	-	3	-	-	-	-	-	3
REEF	3	2	-	-	-	-	5	-	-	-	-	-	5
POL	-	1	-	-	35	6	42	-	-	-	-	-	42
NEP	-	-	-	-	-	10	10	-	-	-	-	-	10
Tags lost	1	-	-	-	1	-	2	-	-	-	-	-	2
Total	7	3	-	-	36	16	62	-	-	-	-	-	62
<u>10-year-old seals, females</u>													
POL	-	-	-	-	2	-	2	-	-	-	-	-	2
<u>12-year-old seals, females</u>													
REEF	-	1	-	-	-	-	1	-	-	-	-	-	1
POL	-	-	-	-	2	-	2	-	-	-	-	-	2
NEP	-	1	-	-	-	4	5	-	-	-	-	-	5
Total	-	2	-	-	2	4	8	-	-	-	-	-	8
<u>13-year-old seals, females</u>													
REEF	1	1	-	-	-	-	2	-	-	-	-	-	2
POL	1	-	-	-	18	4	23	-	-	-	-	-	23
Total	2	1	-	-	18	4	25	-	-	-	-	-	25
<u>14-year-old seals, females</u>													
ZAP-1	1	-	-	-	-	-	1	-	-	-	-	-	1
Tags lost	1	-	-	-	-	-	1	-	-	-	-	-	1
Total	2	-	-	-	-	-	2	-	-	-	-	-	2
<u>20-year-old seals, females</u>													
NEP	-	-	-	-	-	1	1	-	-	-	-	-	1

Appendix table 22

Recovery location of tagged seals in commercial kill, by round, Pribilof Islands, 1961

Rookery of tagging	Rookery of recovery											Grand total	
	St. Paul Island						St. George Island						
	ZAP-1	TOL	L-K	REEF	POL	NEP	total	ZAP-2	NOR	EAST	STAR	total	
<u>Round 2 - 2-year-old seals, males</u>													
Tags lost	1	-	-	-	1	1	3	-	1	-	-	1	4
<u>Round 3 - 2-year-old seals, males</u>													
REEF	-	-	1	-	-	-	1	-	-	-	-	-	1
POL	-	-	-	-	-	1	1	-	-	-	-	-	1
Total	-	-	1	-	-	1	2	-	-	-	-	-	2
<u>Round 4 - 2-year-old seals, males</u>													
POL	-	-	-	-	1	-	1	-	-	-	-	-	1
Tags lost	1	-	-	-	-	1	2	-	-	-	-	-	2
Total	1	-	-	-	1	1	3	-	-	-	-	-	3
<u>Round 5 - 2-year-old seals, males</u>													
ZAP-1	1	-	-	-	-	-	1	-	-	-	-	-	1
POL	-	-	-	-	1	-	1	-	-	-	-	-	1
NEP	-	-	-	-	1	-	1	-	-	-	-	-	1
Tags lost	1	-	-	1	-	-	2	-	-	1	-	1	3
Total	2	-	-	1	2	-	5	-	-	1	-	1	6
<u>Round 6 - 2-year-old seals, males</u>													
ZAP-1	2	-	-	-	-	1	3	-	-	-	-	-	3
REEF	-	-	-	-	-	1	1	-	-	-	-	-	1
POL	1	-	-	-	2	-	3	-	-	-	-	-	3
NEP	-	-	-	-	-	1	1	-	-	-	-	-	1
NOR	1	-	-	-	-	-	1	-	-	-	-	-	1
EAST	-	-	-	-	-	-	-	-	-	1	-	1	1
STAR	-	-	1	-	-	-	1	-	-	-	-	-	1
Tags lost	3	-	-	-	-	3	6	-	-	-	-	-	6
Total	7	-	1	-	2	6	16	-	-	1	-	1	17
<u>Round 7 - 2-year-old seals, males</u>													
ZAP-1	1	-	-	-	-	-	1	-	-	-	-	-	1
L-K	-	-	-	-	-	-	-	-	-	-	-	-	-
REEF	-	-	-	-	-	-	-	-	-	1	-	1	1
POL	-	-	-	-	-	-	-	-	-	-	-	-	-
NEP	-	-	-	-	-	2	2	-	-	-	-	-	2
NOR	-	-	-	-	-	2	2	1	-	-	-	1	3
EAST	-	-	-	-	-	-	-	-	-	-	-	-	-
ZAP-2	-	-	-	-	-	-	-	-	-	-	-	-	-
Tags lost	1	-	-	2	1	2	6	-	-	-	-	-	6
Total	2	-	-	2	1	6	11	1	-	1	-	2	13
<u>Round 8 - 2-year-old seals, males</u>													
ZAP-1	4	1	-	-	-	1	6	-	1	1	-	2	8
TOL	1	2	-	-	-	-	3	-	-	-	-	-	3
L-K	1	1	-	-	-	-	2	-	-	1	-	1	3
REEF	-	1	-	-	-	-	1	-	-	-	-	-	1
POL	1	-	-	-	3	1	5	1	-	1	1	3	8
NEP	-	1	-	-	-	2	3	1	-	-	-	1	4
NOR	1	-	-	-	-	-	1	-	1	-	-	1	2
EAST	-	-	-	-	-	-	-	-	-	2	-	2	2
ZAP-2	-	-	-	-	-	-	-	-	-	1	-	1	1
Tags lost	4	-	-	-	-	2	6	-	-	1	1	2	8
Total	12	6	-	-	3	6	27	2	2	7	2	13	40

Appendix table 22 (con.)

Recovery location of tagged seals in commercial kill, by round, Pribilof Islands, 1961

Rookery of tagging	Rookery of recovery												Grand total
	St. Paul Island							St. George Island					
	ZAP-1	TOL	L-K	REEF	POL	NEP	total	ZAP-2	NOR	EAST	STAR	total	
<u>Round 9 - 2-year-old seals, males</u>													
ZAP-1	6	-	1	-	-	-	7	-	2	1	-	3	10
TOL	1	-	-	-	-	-	1	-	-	-	-	-	1
L-K	1	-	-	-	-	-	1	-	-	-	-	-	1
REEF	5	-	-	-	-	1	6	-	2	-	-	2	8
POL	1	-	-	-	5	-	6	1	-	1	-	2	8
NEP	3	-	-	-	1	1	5	1	-	-	-	1	6
NOR	-	-	1	-	-	-	1	-	-	-	-	-	1
EAST	-	-	-	-	-	-	-	-	-	-	-	-	-
Tags lost	3	-	-	-	5	2	10	-	3	-	-	3	13
Total	20	-	2	-	11	4	37	2	7	2	-	11	48
<u>Round 10 - 2-year-old seals, males</u>													
ZAP-1	-	1	-	-	-	-	1	1	-	-	2	3	4
TOL	1	-	-	-	-	-	1	-	1	-	-	1	2
REEF	-	1	-	-	-	2	3	-	-	-	-	-	3
POL	2	-	-	-	4	3	9	-	1	-	1	2	11
NEP	-	-	-	-	1	8	9	-	-	-	-	-	9
NOR	-	-	-	-	-	3	3	-	2	-	4	6	9
EAST	-	-	-	-	-	1	1	-	-	1	-	1	2
ZAP-2	-	-	-	-	-	1	1	-	-	-	-	-	1
Tags lost	5	1	-	-	4	2	12	-	1	-	-	1	13
Total	8	3	-	-	9	20	40	1	5	1	7	14	54
<u>Round 2 - 3-year-old seals, males</u>													
ZAP-1	36	-	-	-	2	7	45	2	1	1	-	4	49
TOL	10	2	-	-	2	-	14	1	-	-	-	1	15
L-K	2	1	-	-	5	4	12	-	1	-	1	2	14
REEF	34	-	-	1	6	2	43	2	3	-	-	5	48
POL	3	-	-	1	14	10	28	-	2	1	-	3	31
NEP	4	-	-	-	8	31	43	1	-	-	1	2	45
NOR	2	-	-	1	1	1	5	-	6	4	-	10	15
EAST	2	-	1	-	2	1	6	-	1	3	-	4	10
STAR	1	-	-	-	-	1	2	-	3	-	-	3	5
ZAP-2	2	-	-	-	-	-	2	1	1	-	-	2	4
Tags lost	21	2	1	-	11	11	46	-	3	1	-	4	50
Total	117	5	2	3	51	68	246	7	21	10	2	40	286
<u>Round 3 - 3-year-old seals, males</u>													
ZAP-1	24	-	-	-	-	-	24	-	-	2	-	2	26
TOL	12	-	-	-	2	3	17	-	-	1	-	1	18
L-K	1	1	1	-	1	3	7	-	1	-	-	1	8
REEF	13	1	-	5	2	7	28	-	-	-	-	-	28
POL	2	-	-	-	5	2	9	-	-	-	-	-	9
NEP	6	-	-	-	7	17	30	-	-	-	-	-	30
NOR	2	-	-	-	1	1	4	-	1	1	-	2	6
EAST	-	-	-	-	1	1	2	-	2	2	-	4	6
STAR	1	-	-	-	-	-	1	-	1	-	2	3	4
ZAP-2	-	-	-	-	-	-	-	2	-	-	-	2	2
Tags lost	29	-	1	1	3	14	48	1	2	2	3	8	56
Total	90	2	2	6	22	48	170	3	7	8	5	23	193

Appendix table 22 (con.)

Recovery location of tagged seals in commercial kill, by round, Pribilof Islands, 1961

Rookery of tagging	Rookery of recovery											Grand total
	St. Paul Island						St. George Island					
	ZAP-1	TOL	L-K	REEF	POL	NEP	total	ZAP-2	NOR	EAST	STAR	total
<u>Round 4 - 3-year-old seals, males</u>												
ZAP-1	21	1	1	1	-	4	28	1	-	1	-	30
TOL	9	1	-	-	2	3	15	1	-	-	1	17
L-K	3	-	1	-	1	-	5	-	-	-	-	5
REEF	17	1	-	7	3	4	32	1	-	-	-	33
POL	5	-	-	-	9	9	23	-	-	-	-	23
NEP	7	-	-	-	5	19	31	1	1	-	-	33
NOR	-	-	-	-	-	1	1	-	8	1	-	10
EAST	4	-	-	-	-	2	6	-	1	5	-	12
STAR	1	-	-	-	-	-	1	-	1	-	-	2
ZAP-2	1	-	-	-	-	-	1	1	-	-	-	2
Tags lost	18	-	1	3	11	13	46	6	4	2	-	58
Total	86	3	3	11	31	55	189	11	15	9	1	225
<u>Round 5 - 3-year-old seals, males</u>												
ZAP-1	42	-	-	1	8	3	54	1	1	-	-	57
TOL	15	3	-	-	6	1	25	-	-	-	-	25
L-K	1	1	2	-	3	6	13	1	1	-	-	15
REEF	35	7	-	6	7	6	61	-	-	1	-	62
POL	1	1	-	-	28	12	42	1	-	-	-	43
NEP	6	1	-	-	5	22	34	1	-	2	-	37
NOR	3	-	-	-	2	-	5	1	7	1	-	14
EAST	-	1	-	-	2	1	4	-	3	5	-	12
STAR	3	-	-	1	1	1	6	-	3	1	1	11
ZAP-2	1	1	-	-	1	-	3	1	3	-	-	7
Tags lost	50	9	-	1	22	22	104	2	6	1	2	115
Total	157	24	2	9	85	74	351	8	24	12	3	398
<u>Round 6 - 3-year-old seals, males</u>												
ZAP-1	64	7	3	-	2	15	91	2	1	-	-	94
TOL	22	-	3	-	2	12	39	-	-	2	-	41
L-K	5	1	10	2	1	8	27	-	-	4	1	32
REEF	27	7	6	8	3	12	63	2	5	2	1	73
POL	5	4	1	-	16	14	40	-	1	4	-	45
NEP	14	-	1	-	5	62	82	2	3	3	-	90
NOR	2	1	1	-	1	5	10	-	9	4	-	23
EAST	5	-	-	-	1	3	9	-	1	11	1	22
STAR	2	1	-	-	-	1	4	-	4	1	-	9
ZAP-2	1	-	-	-	-	-	1	5	-	-	-	6
Tags lost	45	21	-	10	9	44	129	1	12	5	2	149
Total	192	42	25	20	40	176	495	12	36	36	5	584
<u>Round 7 - 3-year-old seals, males</u>												
ZAP-1	45	6	-	2	4	7	64	-	-	3	-	67
TOL	11	11	-	-	1	6	29	-	-	2	1	32
L-K	4	1	6	-	5	10	26	2	-	2	-	30
REEF	16	11	3	14	1	13	58	-	2	5	1	66
POL	3	1	2	2	36	22	66	2	2	1	-	71
NEP	6	1	-	1	11	66	85	-	1	4	-	90
NOR	1	2	-	-	3	7	13	1	17	1	1	33
EAST	2	-	-	-	1	1	4	-	1	12	-	17
STAR	1	2	-	-	-	2	5	1	1	2	1	10
ZAP-2	-	-	-	-	2	1	3	3	-	-	-	6
Tags lost	48	16	3	17	25	56	165	4	11	6	1	187
Total	137	51	14	36	89	191	518	13	35	38	5	609
<u>Round 8 - 3-year-old seals, males</u>												
ZAP-1	73	18	-	4	7	14	116	1	1	6	1	125
TOL	14	24	-	2	3	10	53	1	-	2	1	57
L-K	2	9	-	3	6	8	28	-	-	6	1	35
REEF	17	22	-	39	6	24	108	1	-	3	2	114
POL	7	3	-	2	43	26	81	2	1	3	1	88
NEP	9	7	-	4	10	96	126	1	4	3	1	135
NOR	3	1	-	2	1	8	15	3	18	5	1	42
EAST	2	-	-	-	-	1	3	-	-	20	-	23
STAR	-	2	-	-	1	2	5	-	1	4	5	15
ZAP-2	1	1	-	-	-	1	3	3	-	3	1	10
Tags lost	40	32	-	23	25	74	194	2	8	13	6	223
Total	168	119	-	79	102	264	732	14	33	68	20	867

Appendix table 22 (con.)

Recovery location of tagged seals in commercial kill, by round, Pribilof Islands, 1961

Rookery of tagging	Rookery of recovery											Grand total	
	St. Paul Island						St. George Island						
	ZAP-1	TOL	L-K	REEF	POL	NEP	total	ZAP-2	NOR	EAST	STAR	total	
<u>Round 9 - 3-year-old seals, males</u>													
ZAP-1	66	2	2	1	3	5	79	-	1	-	1	2	81
TOL	17	7	-	-	1	4	29	-	2	-	-	2	31
L-K	3	1	9	-	4	6	23	-	2	-	-	2	25
REEF	43	1	3	14	2	3	66	-	2	1	2	5	71
POL	6	-	1	-	20	6	33	-	2	1	-	3	36
NEP	8	-	1	-	3	18	30	1	3	1	1	6	36
NOR	8	-	1	-	-	-	9	1	18	1	-	20	29
EAST	3	-	1	-	-	1	5	1	3	2	-	6	11
STAR	-	-	-	-	-	1	1	-	3	-	6	9	10
ZAP-2	3	-	-	-	1	-	4	2	3	-	2	7	11
Tags lost	46	12	5	5	14	21	103	4	12	4	2	22	125
Total	203	23	23	20	48	65	382	9	51	10	14	84	466
<u>Round 10 - 3-year-old seals, males</u>													
ZAP-1	40	7	-	-	2	14	63	1	2	-	-	3	66
TOL	15	5	-	-	3	7	30	-	-	-	-	-	30
L-K	6	-	-	1	4	6	17	-	-	-	-	-	17
REEF	12	10	-	4	4	8	38	1	1	1	1	4	42
POL	2	3	-	-	17	12	34	-	-	-	-	-	34
NEP	5	-	-	-	4	57	66	2	-	2	-	4	70
NOR	6	1	-	-	-	3	10	2	9	-	-	11	21
EAST	2	1	-	-	1	4	8	1	-	2	-	3	11
STAR	1	-	-	-	2	3	6	3	-	1	3	7	13
ZAP-2	2	-	-	-	-	1	3	6	-	-	1	7	10
Tags lost	21	7	-	-	9	46	83	11	6	4	4	25	108
Total	112	34	-	5	46	161	358	27	18	10	9	64	422
<u>Round 2 - 4-year-old seals, males</u>													
ZAP-1	18	-	-	-	1	1	20	-	1	-	-	1	21
TOL	9	1	-	-	3	-	13	-	-	1	-	1	14
L-K	-	-	1	-	7	2	10	-	-	-	-	2	12
REEF	16	-	-	3	2	6	27	-	3	1	-	4	31
POL	2	-	-	-	14	2	18	1	2	-	-	3	21
NEP	3	-	-	-	2	23	28	-	-	2	-	2	30
NOR	2	-	-	-	-	2	4	-	7	2	1	10	14
EAST	-	-	-	-	3	1	4	2	-	-	-	2	6
STAR	1	-	-	-	1	-	2	-	1	-	-	1	3
ZAP-2	2	-	1	-	2	-	5	4	3	1	-	8	13
Tags lost	27	1	-	4	21	15	68	2	9	2	2	15	83
Total	80	2	2	7	56	52	199	9	26	11	3	49	248
<u>Round 3 - 4-year-old seals, males</u>													
ZAP-1	10	2	-	-	2	2	16	-	-	-	-	-	16
TOL	9	2	-	-	-	-	11	-	-	-	-	-	11
L-K	1	-	3	-	2	1	7	-	1	-	-	1	8
REEF	9	1	-	1	2	1	14	-	-	-	-	-	14
POL	-	-	-	-	6	2	8	-	-	-	-	-	8
NEP	1	-	-	-	3	23	27	1	1	-	-	2	29
NOR	-	-	-	-	-	3	3	-	4	1	-	5	8
EAST	-	-	-	-	1	-	1	-	-	5	-	5	6
STAR	-	-	-	-	-	-	-	-	2	1	-	3	3
ZAP-2	1	-	-	-	1	-	2	5	-	1	-	6	8
Tags lost	27	2	2	3	4	24	62	1	3	5	1	10	72
Total	58	7	5	4	21	56	151	7	11	13	1	32	183
<u>Round 4 - 4-year-old seals, males</u>													
ZAP-1	13	-	-	-	2	3	18	5	-	-	-	5	23
TOL	4	1	-	-	1	-	6	-	1	-	-	1	7
L-K	4	-	2	-	1	2	9	-	-	-	-	-	9
REEF	17	-	-	5	2	-	24	-	1	-	-	1	25
POL	1	-	-	-	9	7	17	-	-	1	-	1	18
NEP	1	-	-	-	2	20	23	-	-	-	-	-	23
NOR	-	-	-	-	1	-	1	-	4	1	-	5	6
EAST	-	-	-	-	-	-	-	-	1	2	-	3	3
STAR	-	-	-	-	-	-	-	-	-	-	1	1	1
ZAP-2	1	-	-	-	-	1	2	-	1	-	-	1	3
Tags lost	18	1	-	1	12	20	52	-	7	1	-	8	60
Total	59	2	2	6	30	53	152	5	15	5	1	26	178

Appendix table 22 (con.)

Recovery location of tagged seals in commercial kill, by round, Pribilof Islands, 1961

Rookery of tagging	Rookery of recovery												Grand total
	St. Paul Island						St. George Island						
	ZAP-1	TOL	L-K	REEF	POL	NEP	total	ZAP-2	NOR	EAST	STAR	total	
<u>Round 5 - 4-year-old seals, males</u>													
ZAP-1	18	1	-	-	1	-	20	-	-	1	-	1	21
TOL	4	4	-	-	1	2	11	-	-	-	-	-	11
L-K	1	-	1	1	1	4	8	1	-	1	-	2	10
REEF	20	3	-	8	1	1	33	-	1	1	-	2	35
POL	-	-	-	1	8	3	12	-	-	-	-	-	12
NEP	4	1	-	-	-	23	28	-	1	1	-	2	30
NOR	1	-	-	-	-	1	2	-	6	1	-	7	9
EAST	-	-	-	-	-	1	1	-	1	1	-	2	3
STAR	-	-	-	-	1	-	1	-	5	-	-	5	6
ZAP-2	-	-	-	-	-	-	-	3	1	-	-	4	4
Tags lost	36	8	2	6	23	12	87	5	7	3	1	16	103
Total	84	17	3	16	36	47	203	9	22	9	1	41	244
<u>Round 6 - 4-year-old seals, males</u>													
ZAP-1	14	1	-	-	1	5	21	1	1	-	-	2	23
TOL	7	5	1	-	-	3	16	-	2	1	-	3	19
L-K	5	-	1	-	3	3	12	-	1	1	-	2	14
REEF	14	1	-	3	2	3	23	-	1	-	-	1	24
POL	-	-	-	-	10	5	15	-	-	-	-	-	15
NEP	2	2	-	-	-	34	38	-	-	-	-	-	38
NOR	1	-	-	-	1	2	4	-	4	1	1	6	10
EAST	-	-	-	-	1	-	1	-	2	4	1	7	8
STAR	-	-	-	-	-	1	1	-	-	1	3	4	5
ZAP-2	-	-	-	-	-	1	1	2	1	-	-	3	4
Tags lost	35	13	-	6	16	50	120	3	11	8	1	23	143
Total	78	22	2	9	34	107	252	6	23	16	6	51	303
<u>Round 7 - 4-year-old seals, males</u>													
ZAP-1	16	1	-	-	2	-	19	-	1	4	-	5	24
TOL	5	4	-	-	1	6	16	-	-	-	-	-	16
L-K	-	3	2	-	1	8	14	-	1	1	-	2	16
REEF	6	3	1	3	2	4	19	-	1	-	-	1	20
POL	1	-	-	-	11	6	18	-	-	-	-	-	18
NEP	-	-	-	1	3	18	22	-	-	-	-	-	22
NOR	-	-	-	-	-	1	1	2	6	1	1	10	11
EAST	1	-	-	-	1	-	2	-	1	2	-	3	5
STAR	1	-	-	-	-	-	1	-	1	1	3	5	6
ZAP-2	1	-	-	-	1	-	2	6	-	-	-	6	8
Tags lost	21	6	2	16	21	21	87	2	1	3	-	6	93
Total	52	17	5	20	43	64	201	11	12	12	4	38	239
<u>Round 8 - 4-year-old seals, males</u>													
ZAP-1	15	4	-	-	-	2	21	-	-	2	-	2	23
TOL	3	12	-	-	-	2	17	-	-	-	-	-	17
L-K	1	1	-	-	3	2	7	1	-	1	-	2	9
REEF	6	7	-	8	2	5	28	-	-	1	-	1	29
POL	-	-	-	-	12	7	19	-	-	-	-	-	19
NEP	-	-	-	-	1	31	32	-	1	-	-	1	33
NOR	-	-	-	-	-	-	-	1	2	1	1	5	5
EAST	2	-	-	-	-	1	3	-	-	3	-	3	6
STAR	-	-	-	-	-	-	-	-	-	3	-	3	3
ZAP-2	-	1	-	2	-	-	3	7	-	2	-	9	12
Tags lost	14	9	-	9	12	26	70	1	1	8	4	14	84
Total	41	34	-	19	30	76	200	10	4	21	5	40	240
<u>Round 9 - 4-year-old seals, males</u>													
ZAP-1	7	-	-	-	-	1	8	-	-	-	-	-	8
TOL	6	4	-	-	-	1	11	-	-	-	-	-	11
L-K	1	-	1	-	1	-	3	-	-	-	-	-	3
REEF	2	1	-	5	1	1	10	-	1	-	-	1	11
POL	-	1	1	-	9	-	11	-	2	-	-	2	13
NEP	1	-	-	-	-	4	5	-	-	-	-	-	5
NOR	1	-	-	-	-	1	2	-	2	-	2	4	6
EAST	1	-	-	-	-	-	1	-	-	1	-	1	2
STAR	-	-	-	-	-	-	-	-	1	-	1	2	2
ZAP-2	2	-	-	-	-	-	2	9	-	-	-	9	11
Tags lost	24	5	3	3	10	10	55	2	4	3	-	9	64
Total	45	11	5	8	21	18	108	11	10	4	3	28	136

Appendix table 22 (con.)

Recovery location of tagged seals in commercial kill, by round, Pribilof Islands, 1961

Rookery of tagging	Rookery of recovery											Grand total
	St. Paul Island						St. George Island					
	ZAP-1	TOL	L-K	REEF	POL	NEP	total	ZAP-2	NOR	EAST	STAR	total
<u>Round 10 - 4-year-old seals, males</u>												
ZAP-1	6	-	-	-	-	2	8	-	-	-	-	8
TOL	-	2	-	-	-	1	3	-	-	-	-	3
L-K	-	-	-	-	-	2	2	-	-	-	-	2
REEF	3	1	-	-	-	3	7	1	-	1	-	9
POL	1	-	-	-	7	1	9	-	-	-	-	9
NEP	-	-	-	-	-	5	5	-	-	-	-	5
NOR	-	-	-	-	-	-	-	-	-	1	1	2
EAST	-	-	-	-	-	1	1	-	2	-	-	3
STAR	-	-	-	-	-	-	-	-	-	1	1	2
ZAP-2	-	-	-	-	-	-	-	2	1	1	1	5
Tags lost	7	3	-	-	8	20	38	6	1	-	5	12
Total	17	6	-	-	15	35	73	9	2	4	8	23
<u>Round 2 - 5-year-old seals, males</u>												
NOR	-	-	-	-	-	-	-	-	1	-	-	1
EAST	-	-	-	-	-	-	-	-	-	1	-	1
Tags lost	-	-	-	-	1	-	1	-	1	-	-	2
Total	-	-	-	-	1	-	1	-	2	1	-	4
<u>Round 3 - 5-year-old seals, males</u>												
TOL	-	1	-	-	-	-	1	-	-	-	-	1
L-K	-	-	-	1	-	-	1	-	-	-	-	1
REEF	1	-	-	-	-	-	1	-	-	-	-	1
POL	-	-	-	-	-	1	1	-	-	-	-	1
NEP	-	-	-	-	-	1	1	-	-	-	-	1
Total	1	1	-	1	-	2	5	-	-	-	-	5
<u>Round 4 - 5-year-old seals, males</u>												
Tags lost	1	-	-	-	-	-	1	-	1	-	-	2
<u>Round 5 - 5-year-old seals, males</u>												
REEF	2	-	-	-	-	-	2	-	-	-	-	2
NEP	-	-	-	-	-	1	1	-	-	-	-	1
STAR	-	1	-	-	-	-	1	-	-	-	-	1
ZAP-2	-	-	-	-	-	-	-	1	-	-	-	1
Tags lost	2	-	-	-	-	-	2	-	-	-	-	2
Total	4	1	-	-	-	1	6	1	-	-	-	7
<u>Round 6 - 5-year-old seals, males</u>												
TOL	-	-	-	-	-	1	1	-	-	-	-	1
NEP	-	-	-	-	1	1	2	-	-	-	-	2
NOR	-	-	-	-	1	1	1	-	-	-	-	1
ZAP-2	-	-	-	-	-	-	-	1	-	-	-	1
Tags lost	1	-	-	-	1	1	3	-	1	-	-	4
Total	1	-	-	-	3	3	7	1	1	-	-	9
<u>Round 7 - 5-year-old seals, males</u>												
ZAP-1	-	1	-	-	-	-	1	-	-	-	-	1
POL	-	-	-	-	1	-	1	-	-	-	-	1
Tags lost	-	-	-	-	2	-	2	-	-	-	-	2
Total	-	1	-	-	1	2	4	-	-	-	-	4
<u>Round 8 - 5-year-old seals, males</u>												
REEF	-	-	-	-	-	1	1	-	-	-	-	1
POL	-	-	-	-	-	3	3	-	-	-	-	3
NEP	-	-	-	-	-	1	1	-	-	-	-	1
Tags lost	2	-	-	-	-	1	3	-	-	-	-	3
Total	2	-	-	-	-	6	8	-	-	-	-	8
<u>Round 9 - 5-year-old seals, males</u>												
REEF	-	-	-	1	-	-	1	-	-	-	-	1
ZAP-2	-	-	-	-	-	-	-	-	-	-	-	-
Tags lost	-	1	-	-	1	2	4	-	-	-	-	4
Total	-	1	-	1	1	2	5	-	-	-	-	5

Appendix table 22 (con.)

Recovery location of tagged seals in commercial kill, by round, Pribilof Islands, 1961

Rookery of tagging	Rookery of recovery												Grand total
	St. Paul Island						St. George Island						
	ZAP-1	TOL	L-K	REEF	POL	NEP	total	ZAP-2	NOR	EAST	STAR	total	
<u>Round 10 - 5-year-old seals, males</u>													
ZAP-1	-	1	-	-	-	-	1	-	-	-	-	-	1
L-K	1	-	-	-	-	-	1	-	-	-	-	-	1
POL	-	-	-	-	1	-	1	-	-	-	-	-	1
ZAP-2	-	-	-	-	-	-	-	1	-	-	-	-	1
Tags lost	-	-	-	-	1	-	1	-	-	-	-	-	1
Total	1	1	1	1	2	-	4	1	-	-	-	1	5
<u>Round 8 - 6-year-old seals, males</u>													
NEP	1	-	-	-	-	-	1	-	-	-	-	-	1
<u>Round 9 - 6-year-old seals, males</u>													
POL	-	-	-	-	1	-	1	-	-	-	-	-	1
Tags lost	-	1	-	-	-	1	2	-	-	-	-	-	2
Total	-	1	-	-	1	1	3	-	-	-	-	-	3
<u>Round 9 - 7-year-old seals, males</u>													
Tags lost	1	-	-	-	-	-	1	-	-	-	-	-	1
<u>Round 9 - 2-year-old seals, females</u>													
Tags lost	1	-	-	-	-	-	1	-	-	-	-	-	1
<u>Round 10 - 2-year-old seals, females</u>													
TOL	1	-	-	-	-	-	1	-	-	-	-	-	1
POL	-	-	-	-	2	-	2	-	-	-	-	-	2
Tags lost	-	-	-	-	1	-	1	-	-	-	-	-	1
Total	1	-	-	-	3	-	4	-	-	-	-	-	4
<u>Round 8 - 3-year-old seals, females</u>													
REEF	-	-	-	-	-	-	-	-	-	1	-	1	1
POL	-	-	-	-	12	-	12	-	-	-	-	-	12
NOR	-	-	-	-	-	-	-	-	1	-	-	1	1
Total	-	-	-	-	12	-	12	-	1	1	-	2	14
<u>Round 9 - 3-year-old seals, females</u>													
ZAP-1	3	-	-	-	-	-	3	-	-	-	-	-	3
TOL	-	1	-	-	-	-	1	-	-	-	-	-	1
REEF	-	1	-	-	-	-	1	-	-	-	-	-	1
POL	-	-	-	-	4	-	4	-	-	-	-	-	4
STAR	-	1	-	-	-	-	1	-	-	-	-	-	1
Tags lost	-	-	-	5	6	1	12	-	2	-	-	2	14
Total	3	3	-	5	10	1	22	-	2	-	-	2	24
<u>Round 10 - 3-year-old seals, females</u>													
ZAP-1	1	1	-	-	-	-	2	-	-	-	-	-	2
TOL	-	2	-	-	-	-	2	-	-	-	-	-	2
L-K	-	-	-	-	1	-	1	-	-	-	-	-	1
REEF	2	-	-	2	1	-	5	-	-	-	-	-	5
POL	-	-	-	-	7	-	7	-	-	-	-	-	7
NEP	-	-	-	-	-	3	3	-	-	-	-	-	3
NOR	-	-	-	-	-	-	-	-	-	-	1	1	1
STAR	-	-	-	-	-	1	1	-	-	-	1	1	2
Tags lost	2	-	-	1	7	2	12	1	1	1	3	6	18
Total	5	3	-	3	16	6	33	1	1	1	5	8	41

Appendix table 22 (con.)

Recovery location of tagged seals in commercial kill, by round, Pribilof Islands, 1961

Rookery of tagging	Rookery of recovery												Grand total
	St. Paul Island						St. George Island						
	ZAP-1	TOL	L-K	REEF	POL	NEP	total	ZAP-2	NOR	EAST	STAR	total	
<u>Round 7 - 4-year-old seals, females</u>													
Tags lost	-	1	-	-	-	-	1	-	-	-	-	-	1
<u>Round 8 - 4-year-old seals, females</u>													
L-K	1	-	-	-	-	-	1	-	-	-	-	-	1
POL	-	1	-	-	1	-	2	-	-	-	-	-	2
NEP	-	-	-	-	-	1	1	-	-	-	-	-	1
NOR	-	-	-	-	-	-	-	-	1	-	-	-	1
EAST	-	-	-	-	-	-	-	-	-	1	-	-	1
Tags lost	1	-	-	2	1	1	5	-	1	-	-	-	6
Total	2	1	-	2	2	2	9	-	2	1	-	3	12
<u>Round 9 - 4-year-old seals, females</u>													
ZAP-1	12	-	-	-	-	-	12	-	-	-	-	-	12
REEF	1	-	-	1	-	1	3	-	-	-	-	-	3
POL	-	-	-	-	3	-	3	-	-	-	-	-	3
NEP	-	-	-	-	-	1	1	-	-	-	-	-	1
NOR	-	-	-	-	-	-	-	-	1	-	-	-	1
EAST	-	-	-	-	-	-	-	-	-	1	-	-	1
STAR	-	-	-	-	-	-	-	-	-	-	1	1	1
Tags lost	4	-	2	2	11	2	21	-	-	-	1	1	22
Total	17	-	2	3	14	4	40	-	1	1	2	4	44
<u>Round 10 - 4-year-old seals, females</u>													
ZAP-1	4	-	-	-	-	-	4	-	-	-	-	-	4
TOL	3	6	-	-	-	-	9	-	-	-	-	-	9
L-K	-	-	-	-	1	-	1	-	-	-	-	-	1
REEF	1	1	-	1	1	-	4	-	-	-	-	-	4
POL	-	-	-	-	11	-	11	-	-	-	-	-	11
NEP	-	-	-	-	-	8	8	-	-	1	-	1	9
NOR	-	-	-	-	-	1	1	-	-	-	-	-	1
STAR	-	-	-	-	-	-	-	-	-	-	2	2	2
ZAP-2	-	-	-	-	1	-	1	1	-	-	-	-	2
Tags lost	3	8	-	2	13	9	35	2	3	-	1	6	41
Total	11	15	-	3	27	18	74	3	3	1	3	10	84
<u>Round 6 - 5-year-old seals, females</u>													
POL	-	-	-	-	1	-	1	-	-	-	-	-	1
STAR	-	-	-	-	-	-	-	-	-	-	1	1	1
Total	-	-	-	-	1	-	1	-	-	-	1	1	2
<u>Round 7 - 5-year-old seals, females</u>													
Tags lost	-	-	-	-	1	-	1	-	-	-	-	-	1
<u>Round 8 - 5-year-old seals, females</u>													
NOR	-	-	-	-	-	-	-	-	1	-	-	1	1
EAST	-	-	-	-	-	-	-	-	-	1	-	1	1
ZAP-2	-	-	-	-	-	-	-	-	-	1	-	1	1
Tags lost	-	1	-	-	-	-	1	1	-	1	-	2	3
Total	-	1	-	-	-	-	1	1	1	3	-	5	6
<u>Round 9 - 5-year-old seals, females</u>													
ZAP-1	7	1	-	-	-	-	8	-	-	-	-	-	8
TOL	2	1	-	-	-	-	3	-	-	-	-	-	3
REEF	-	1	-	-	-	-	1	-	-	-	-	-	1
POL	1	-	-	-	5	-	6	-	-	-	-	-	6
NOR	-	-	-	-	-	-	-	-	-	-	1	1	1
EAST	-	-	-	-	-	-	-	-	-	1	-	1	1
Tags lost	-	-	-	-	2	1	3	-	-	-	-	-	3
Total	10	3	-	-	7	1	21	-	-	1	1	2	23

Appendix table 22 (con.)

Recovery location of tagged seals in commercial kill, by round, Pribilof Islands, 1961

Rookery of tagging	Rookery of recovery											Grand total
	St. Paul Island						St. George Island				total	
	ZAP-1	TOL	L-K	REEF	POL	NEP	ZAP-2	NOR	EAST	STAR		
<u>Round 10 - 5-year-old seals, females</u>												
ZAP-1	1	1	-	-	-	-	-	-	-	-	-	2
TOL	1	1	-	-	-	-	-	-	-	-	-	2
L-K	-	-	-	-	1	-	-	-	-	-	-	1
POL	-	-	-	-	7	-	-	-	-	-	-	7
NEP	-	-	-	-	2	2	-	-	-	-	-	4
NOR	-	-	-	-	1	1	-	-	-	-	-	2
EAST	-	-	-	-	-	-	-	-	1	-	1	1
STAR	-	-	-	-	-	-	-	-	-	4	4	4
ZAP-2	-	-	-	-	-	-	5	-	-	-	-	5
Tags lost	2	2	-	-	1	5	1	-	-	-	1	11
Total	4	4	-	-	12	8	6	-	1	4	11	39
<u>Round 6 - 6-year-old seals, females</u>												
ZAP-1	1	-	-	-	-	-	1	-	-	-	-	1
<u>Round 7 - 6-year-old seals, females</u>												
NEP	-	-	-	-	-	1	1	-	-	-	-	1
<u>Round 8 - 6-year-old seals, females</u>												
ZAP-1	2	-	-	-	-	-	2	-	-	-	-	2
POL	-	-	-	-	3	-	3	-	-	-	-	3
NEP	-	-	-	-	-	2	2	-	-	-	-	2
Total	2	-	-	-	3	2	7	-	-	-	-	7
<u>Round 9 - 6-year-old seals, females</u>												
ZAP-1	12	1	-	-	-	-	13	-	-	-	-	13
TOL	1	2	-	-	-	-	3	-	-	-	-	3
L-K	-	-	1	-	1	-	2	-	-	-	-	2
REEF	5	-	-	1	1	-	7	-	-	-	-	7
POL	-	-	-	-	-	1	1	-	-	-	-	1
Tags lost	-	-	-	-	2	-	2	-	-	-	-	2
Total	18	3	1	1	4	1	28	-	-	-	-	28
<u>Round 10 - 6-year-old seals, females</u>												
ZAP-1	5	3	-	-	-	-	8	-	-	-	-	8
TOL	1	5	-	-	1	-	7	-	-	-	-	7
REEF	1	-	-	2	-	-	3	-	-	-	-	3
POL	-	-	-	-	7	1	8	-	-	-	-	8
NEP	-	1	-	-	-	12	13	-	-	-	-	13
Tags lost	1	1	-	2	3	4	11	1	-	-	1	12
Total	8	10	-	4	11	17	50	1	-	-	1	51
<u>Round 7 - 7-year-old seals, females</u>												
Tags lost	-	-	-	-	2	-	2	-	-	-	-	2
<u>Round 8 - 7-year-old seals, females</u>												
ZAP-1	1	-	-	-	-	-	1	-	-	-	-	1
L-K	-	-	-	-	-	1	1	-	-	-	-	1
Tags lost	-	-	-	-	-	-	-	1	-	-	1	1
Total	1	-	-	-	-	1	2	-	1	-	1	3
<u>Round 9 - 7-year-old seals, females</u>												
ZAP-1	1	-	-	-	-	-	1	-	-	-	-	1
REEF	-	1	-	-	-	-	1	-	-	-	-	1
Tags lost	4	-	-	1	3	-	8	-	-	2	2	10
Total	5	1	-	1	3	-	10	-	-	2	2	12
<u>Round 10 - 7-year-old seals, females</u>												
TOL	-	2	-	-	-	1	3	-	-	-	-	3
L-K	-	-	-	-	-	1	1	-	-	-	-	1
REEF	-	1	-	-	-	-	1	-	-	-	-	1
POL	-	-	-	-	2	-	2	-	-	-	-	2
Tags lost	3	3	-	-	1	3	10	-	2	1	1	14
Total	3	6	-	-	3	5	17	-	2	1	1	21

Appendix table 22 (con.)

Recovery location of tagged seals in commercial kill, by round, Pribilof Islands, 1961

Rookery of tagging	Rookery of recovery											Grand total
	St. Paul Island						St. George Island					
	ZAP-1	TOL	L-K	REEF	POL	NEP	total	ZAP-2	NOR	EAST	STAR	total
<u>Round 6 - 8-year-old seals, females</u>												
ZAP-1		1	-	-	-	-	1	-	-	-	-	1
<u>Round 8 - 8-year-old seals, females</u>												
Tags lost	1	-	-	-	-	-	1	-	-	-	-	1
<u>Round 9 - 8-year-old seals, females</u>												
ZAP-1	1	-	-	-	-	-	1	-	-	-	-	1
Tags lost	1	-	-	-	-	-	1	-	-	-	-	1
Total	2	-	-	-	-	-	2	-	-	-	-	2
<u>Round 10 - 8-year-old seals, females</u>												
NEP	-	-	-	-	-	1	1	-	-	-	-	1
Tags lost	-	1	-	-	-	1	2	-	-	-	-	2
Total	-	1	-	-	-	2	3	-	-	-	-	3
<u>Round 8 - 9-year-old seals, females</u>												
POL	-	-	-	-	3	-	3	-	-	-	-	3
NEP	-	-	-	-	-	2	2	-	-	-	-	2
Total	-	-	-	-	3	2	5	-	-	-	-	5
<u>Round 9 - 9-year-old seals, females</u>												
ZAP-1	-	1	-	-	-	-	1	-	-	-	-	1
REEF	1	-	-	-	-	-	1	-	-	-	-	1
POL	-	-	-	-	6	-	6	-	1	-	-	7
NEP	-	-	-	-	1	-	1	-	-	-	-	1
Tags lost	-	-	-	-	2	-	2	-	-	-	-	2
Total	1	1	-	-	9	-	11	-	1	-	-	12
<u>Round 10 - 9-year-old seals, females</u>												
ZAP-1	-	1	-	-	-	-	1	-	-	-	-	1
REEF	1	2	-	-	-	-	3	-	-	-	-	3
POL	-	-	-	-	10	3	13	-	-	-	-	13
NEP	-	-	-	-	-	2	2	-	-	-	-	2
Tags lost	-	-	-	-	1	1	2	-	-	-	-	2
Total	1	3	-	-	11	6	21	-	-	-	-	21
<u>Round 8 - 10-year-old seals, females</u>												
POL	-	-	-	-	2	-	2	-	-	-	-	2
<u>Round 9 - 10-year-old seals, females</u>												
POL	-	-	-	-	2	-	2	-	-	-	-	2
<u>Round 10 - 10-year-old seals, females</u>												
POL	-	-	-	-	1	-	1	-	-	-	-	1
<u>Round 9 - 12-year-old seals, females</u>												
REEF	-	-	1	-	-	-	1	-	-	-	-	1
<u>Round 10 - 12-year-old seals, females</u>												
NEP	-	-	-	-	4	3	7	-	-	-	-	7
<u>Round 4 - 13-year-old seals, females</u>												
POL	-	-	-	-	1	-	1	-	-	-	-	1
<u>Round 8 - 13-year-old seals, females</u>												
POL	-	1	-	-	2	1	4	-	-	-	-	4

Appendix table 22 (con.)

Recovery location of tagged seals in commercial kill, by round Pribilof Islands, 1961

Rookery of tagging	Rookery of recovery												Grand total
	St. Paul Island						St. George Island						
	ZAP-1	TOL	L-K	REEF	POL	NEP	total	ZAP-2	NOR	EAST	STAR	total	
<u>Round 9 - 13-year-old seals, females</u>													
POL	1	-	-	-	4	-	5	-	-	-	-	-	5
<u>Round 10 - 13-year-old seals, females</u>													
POL	-	-	-	-	9	-	9	-	-	-	-	-	9
NEP	-	-	-	-	1	1	2	-	-	-	-	-	2
Total	-	-	-	-	10	1	11	-	-	-	-	-	11
<u>Round 8 - 14-year-old seals, females</u>													
Tags lost	1	-	-	-	-	1	2	-	-	-	-	-	2
<u>Round 9 - 14-year-old seals, females</u>													
POL	-	-	-	-	1	-	1	-	-	-	-	-	1
<u>Round 9 - 20-year-old seals, females</u>													
REEF	-	1	-	-	-	-	1	-	-	-	-	-	1
<u>Round 10 - 20-year-old seals, females</u>													
NEP	-	-	-	-	-	2	2	-	-	-	-	-	2

Appendix table 23

Length classes of tagged and tag-lost 3-year-old male seals,
by rookery of recovery and by round, Pribilof Islands, Alaska, 1961

Length in inches	Tags recovered											Tags lost												
	St. Paul					St. George					Grand total	St. Paul					St. George					Grand total		
	ZAP	TOL	L-K	REEF	POL	NEP	total	ZAP	NOR	EAST		STAR	total	ZAP	TOL	L-K	REEF	POL	NEP	total	ZAP		NOR	EAST
Round number 2																								
40	1	-	-	1	-	2	4	-	-	-	-	4	-	-	-	-	1	-	1	-	-	-	-	1
41	24	-	-	-	6	9	39	-	2	2	-	4	43	1	-	-	-	3	1	5	-	-	-	5
42	35	3	-	-	13	22	73	3	9	5	-	17	90	3	-	-	-	1	3	7	-	-	-	7
43	23	-	-	1	8	12	44	3	3	2	-	8	52	4	1	1	-	3	3	12	-	1	1	2
44	11	-	1	-	9	6	27	1	2	-	1	4	31	8	-	-	-	2	3	13	-	2	-	15
45	2	-	-	1	4	6	13	-	2	-	1	3	16	3	-	-	-	1	-	4	-	-	-	4
46	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-	-	-	-	1
47	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	2	-	-	-	2
48	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-	1
Total	96	3	1	3	40	57	200	7	18	9	2	36	236	21	2	1	-	11	11	46	-	3	1	50
Round number 3																								
40	6	-	-	-	1	-	7	-	-	1	-	1	8	3	-	-	-	-	3	-	-	-	-	3
41	3	-	-	1	4	4	12	1	2	1	2	6	18	2	-	-	-	1	3	-	1	-	1	2
42	19	-	1	3	4	6	33	-	2	-	2	2	35	5	-	1	-	2	3	11	1	1	2	15
43	12	2	-	1	4	15	34	1	1	1	-	3	37	3	-	-	-	7	10	-	-	1	1	11
44	14	-	-	-	3	6	23	-	1	1	-	2	25	11	-	-	-	2	13	-	-	-	-	13
45	5	-	-	-	3	1	9	-	1	-	-	1	10	4	-	-	1	1	-	6	-	-	-	6
46	2	-	-	-	-	2	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-
47	-	-	-	-	-	2	2	-	-	-	-	-	2	1	-	-	-	1	2	-	-	1	1	3
Total	61	2	1	5	19	34	122	2	5	6	2	15	137	29	-	1	1	3	14	48	1	2	2	56
Round number 4																								
40	1	1	-	2	1	-	5	-	1	-	-	1	6	-	-	-	-	-	-	-	-	-	-	-
41	11	-	-	-	2	5	18	1	2	1	1	5	23	1	-	-	1	-	2	1	-	-	-	3
42	20	-	1	2	8	11	42	-	3	4	-	7	49	-	-	1	2	2	5	2	2	1	5	10
43	23	2	1	1	4	9	40	1	2	1	-	4	44	4	-	1	3	6	14	3	1	1	-	19
44	5	-	-	1	4	12	22	2	-	1	-	3	25	2	-	1	-	2	2	7	-	-	-	7
45	5	-	-	2	1	5	13	1	-	-	-	1	14	4	-	-	-	2	2	8	-	1	-	9
46	2	-	-	-	-	2	-	2	-	-	-	2	4	2	-	-	-	-	2	-	-	-	-	2
47	1	-	-	-	-	-	1	-	1	-	-	1	2	1	-	-	-	-	1	2	-	-	-	2
48	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	1	3	-	-	-	-	3
50	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	1	3	-	-	-	-	3
Total	68	3	2	8	20	42	143	5	11	7	1	24	167	18	-	1	3	11	13	46	6	4	2	58
Round number 5																								
40	1	-	-	-	1	3	5	-	-	-	-	-	5	-	-	-	1	1	2	-	-	-	-	2
41	15	1	1	1	9	16	42	1	2	1	-	4	46	5	3	-	1	2	11	-	1	-	1	13
42	28	4	1	1	17	9	60	2	7	7	-	16	76	9	-	-	6	6	21	2	2	-	4	25
43	27	4	-	3	23	13	70	3	3	1	-	7	77	13	2	-	7	3	25	-	2	1	1	29
44	28	3	-	1	10	5	47	-	4	2	1	7	54	8	3	-	1	5	17	-	1	-	1	18
45	7	2	-	3	3	5	20	-	2	-	-	2	22	8	1	-	1	2	3	15	-	-	-	15
46	-	1	-	-	-	1	2	-	-	-	-	-	2	4	-	-	1	-	5	-	-	-	-	5
47	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	2	-	-	-	-	2
48	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	2	-	-	-	-	2
49	1	-	-	-	-	-	1	-	-	-	-	-	1	1	-	-	-	2	3	-	-	-	-	3
50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	1
Total	107	15	2	8	63	52	247	6	18	11	1	36	283	50	9	-	1	22	22	104	2	6	1	115
Round number 6																								
39	-	-	1	-	-	-	1	-	-	-	-	-	1	-	-	-	-	1	1	-	-	-	-	1
40	2	-	3	-	-	-	5	-	-	1	-	1	6	-	-	-	-	1	1	-	-	-	-	1
41	10	2	4	2	3	15	36	-	1	3	-	4	40	3	4	-	2	-	3	12	-	2	-	14
42	19	9	3	4	3	28	66	4	8	10	-	22	88	7	3	-	1	2	8	21	-	2	2	27
43	42	7	8	2	7	32	98	5	4	6	-	15	113	9	8	-	3	4	9	33	-	4	1	38
44	40	3	2	2	9	35	91	1	7	5	3	16	107	9	2	-	4	1	9	25	-	4	2	31
45	23	-	2	-	9	16	50	1	3	4	-	8	58	10	2	-	-	2	7	21	-	-	-	21
46	8	-	2	-	-	5	15	-	-	1	-	1	16	2	2	-	-	2	6	-	-	-	-	6
47	1	-	-	-	-	1	2	-	-	1	-	1	3	4	-	-	-	-	4	8	1	-	-	9
48	1	-	-	-	-	1	-	-	1	-	-	1	2	-	-	-	-	-	-	-	-	-	-	-
49	1	-	-	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
50	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-	-	-	-	1
Total	147	21	25	10	31	132	366	11	24	31	3	69	435	45	21	-	10	9	44	129	1	12	5	149

	89	35	11	19	64	135	353	9	49	87	18	163	516	48	16	3	17	25	56	165	4	19	19	7	49	214	
40	-	-	-	-	-	1	1	-	2	1	1	4	5	2	-	-	-	-	3	5	-	1	-	-	1	6	
41	13	-	-	1	12	22	48	2	9	11	1	23	71	3	1	-	2	2	4	12	-	1	3	2	6	18	
42	25	2	2	3	12	29	73	4	16	26	6	52	125	10	-	-	3	6	14	33	3	5	6	4	18	51	
43	29	12	4	7	15	48	115	1	10	18	7	36	151	14	3	-	7	8	16	48	1	7	5	1	14	62	
44	15	9	1	5	18	19	67	1	8	17	2	28	95	7	4	-	1	6	11	29	-	5	3	-	8	37	
45	6	9	1	1	5	11	33	-	4	12	1	17	50	7	1	2	1	2	6	19	-	-	1	-	1	20	
46	1	3	-	2	2	4	12	1	-	2	-	3	15	3	2	-	2	1	2	10	-	-	1	-	1	11	
47	-	-	2	-	-	-	2	-	-	-	-	-	2	2	4	1	-	-	-	7	-	-	-	-	-	7	
48	-	-	1	-	-	-	1	-	-	-	-	-	1	-	-	-	1	-	-	1	-	-	-	-	-	1	
49	-	-	-	-	-	1	1	-	-	-	-	-	1	-	1	-	-	-	-	1	-	-	-	-	-	1	
Total	89	35	11	19	64	135	353	9	49	87	18	163	516	48	16	3	17	25	56	165	4	19	19	7	49	214	
Round number 8																											
38	-	-	-	1	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	
39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
40	-	2	-	-	-	1	3	1	1	-	-	2	5	1	-	-	-	-	-	-	-	-	-	-	-	1	
41	8	14	-	3	2	4	31	2	5	-	3	10	41	5	3	-	4	1	3	16	-	-	1	-	1	17	
42	13	27	-	8	6	21	75	8	10	2	6	26	101	3	7	-	4	1	6	21	5	2	1	1	9	30	
43	34	15	-	17	18	46	130	3	11	1	2	17	147	10	11	-	6	5	15	47	-	4	1	1	6	53	
44	27	15	-	13	18	60	133	2	7	3	-	12	145	9	8	-	3	6	17	43	1	4	1	-	6	49	
45	26	7	-	13	19	32	97	1	5	-	-	6	103	5	2	-	3	3	15	28	-	2	-	-	2	30	
46	12	6	-	-	4	15	37	-	-	-	1	1	38	6	-	-	1	3	11	21	-	-	-	-	21		
47	5	1	-	1	5	6	18	-	-	-	-	-	18	1	-	1	3	3	8	-	-	-	-	-	8		
48	2	-	-	-	3	4	9	-	-	-	-	-	9	1	-	-	1	1	2	5	-	-	-	-	5		
49	1	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	2	1	3	-	-	-	-	3		
50	-	-	-	-	2	1	3	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-		
51	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-		
Total	128	87	-	56	77	190	538	17	39	6	12	74	612	40	32	-	23	25	74	194	6	12	4	2	24	218	
Round number 9																											
40	-	-	-	-	-	-	-	1	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	
41	6	-	1	-	2	3	12	-	2	-	1	3	15	1	-	-	-	2	-	3	-	2	-	3	5	8	
42	15	1	1	1	4	5	27	5	4	1	1	11	38	5	1	1	-	1	1	9	2	1	-	2	3	12	
43	34	1	8	4	4	13	64	5	3	4	-	12	76	8	1	1	2	5	6	23	5	2	-	1	8	31	
44	53	7	2	5	11	9	87	4	2	1	2	9	96	14	2	-	1	3	5	25	1	1	-	-	2	27	
45	28	2	3	3	6	8	50	-	-	-	1	5	12	3	1	1	3	3	23	3	1	2	-	-	6	29	
46	10	-	1	1	4	3	19	2	-	-	-	2	21	4	2	1	1	-	1	9	-	-	-	-	9		
47	5	-	-	-	2	1	8	-	-	-	-	-	8	2	1	-	-	-	4	7	-	1	-	-	8		
48	3	-	-	1	1	2	7	-	-	-	-	-	7	-	-	-	-	-	1	1	-	-	-	-	1		
49	3	-	2	-	-	-	5	-	-	-	-	-	5	-	1	-	-	-	1	-	-	-	-	-	1		
50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-	1		
51	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-		
Total	157	11	18	15	34	44	279	16	12	6	5	39	318	46	12	5	5	14	21	103	11	6	4	4	25	128	
Round number 10																											
40	2	-	-	-	-	-	2	-	-	-	-	-	2	-	-	-	-	-	1	1	-	-	-	-	-	1	
41	5	1	-	-	1	8	15	-	-	-	-	-	15	5	-	-	-	-	4	9	-	-	-	-	9		
42	19	4	-	1	3	18	45	-	-	-	-	-	45	2	-	-	-	-	8	10	-	-	-	-	10		
43	23	8	-	1	8	33	73	-	-	-	-	-	73	6	-	-	-	2	14	22	-	-	-	-	22		
44	23	3	-	2	13	29	70	-	-	-	-	-	70	4	3	-	-	3	10	20	-	-	-	-	20		
45	13	5	-	1	6	18	43	-	-	-	-	-	43	4	3	-	-	1	5	13	-	-	-	-	13		
46	3	2	-	-	3	7	15	-	-	-	-	-	15	-	1	-	-	2	1	4	-	-	-	-	4		
47	1	2	-	-	1	-	4	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-		
48	1	2	-	-	-	1	4	-	-	-	-	-	4	-	-	-	-	1	2	3	-	-	-	-	3		
49	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	1		
50	-	-	-	-	1	1	2	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-		
51	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
52	1	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-		
Total	91	27	-	5	37	115	275	-	-	-	-	-	275	21	7	-	-	9	46	83	-	-	-	-	-	83	
Grand total	944	204	60	129	385	801	2523	73	176	163	44	456	2979	318	99	11	60	129	301	918	31	64	38	20	153	1071	

	Round number 7																			
41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	1	-	-	-	-	4	5	-	2	1	-	3	8	-	-	-	2	2	6	-
43	5	1	-	-	3	2	11	-	1	2	2	5	16	5	-	-	1	8	6	20
44	7	2	-	2	14	11	36	4	3	8	2	17	53	6	2	2	2	1	14	1
45	11	-	2	2	2	10	27	5	6	4	1	16	43	5	1	-	2	4	6	18
46	7	3	1	-	1	8	20	-	1	1	-	2	22	2	1	-	4	5	1	13
47	-	3	-	-	2	4	9	1	1	4	-	6	15	-	1	-	3	-	2	6
48	-	-	-	-	-	1	1	-	-	-	-	-	1	1	1	-	1	1	5	-
49	-	2	-	-	-	3	5	-	-	1	-	1	6	-	-	-	2	-	-	2
50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
51	-	-	-	-	-	-	-	-	-	1	-	1	1	-	-	-	-	-	-	-
Total	31	11	3	4	22	43	114	10	14	22	5	51	165	21	6	2	16	21	21	87

	Round number 8																			
< 38	1	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-
39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	2
41	-	-	-	-	-	1	1	-	-	-	-	-	1	1	2	-	-	-	3	-
42	-	1	-	1	-	1	3	1	-	-	-	1	4	1	-	-	-	1	2	-
43	1	6	-	2	1	2	12	2	-	-	2	14	2	-	-	1	1	3	6	1
44	5	6	-	3	2	6	22	2	2	-	-	4	26	5	3	-	1	6	3	18
45	7	6	-	2	-	10	25	1	1	-	1	3	28	-	1	-	2	1	1	5
46	6	4	-	2	6	10	28	2	3	1	-	6	34	1	2	-	1	6	11	1
47	1	1	-	-	3	9	14	1	-	-	2	3	17	2	1	-	1	2	8	14
48	4	-	-	-	2	4	10	-	-	-	-	-	10	1	-	-	1	-	3	5
49	-	1	-	-	4	5	10	-	-	-	-	-	10	1	-	-	-	2	-	3
50	1	-	-	-	-	1	2	-	-	-	-	-	2	-	-	-	-	-	-	-
51	1	-	-	-	-	1	2	-	-	-	-	-	2	-	-	-	-	-	-	-
Total	27	25	-	10	18	50	130	9	6	1	3	19	149	14	9	-	9	12	26	70

	Round number 9																				
41	1	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	
42	-	-	-	-	-	-	-	-	-	-	1	1	1	3	-	-	-	1	1	4	-
43	-	-	-	-	1	-	1	-	-	-	-	-	1	5	-	-	-	3	3	11	
44	1	3	-	-	1	2	7	1	-	2	1	4	11	3	2	1	1	2	1	10	
45	5	1	2	-	2	1	11	1	1	1	1	4	15	4	-	-	-	3	7	3	
46	5	1	-	2	-	1	9	1	-	-	-	1	10	4	1	-	-	1	-	6	
47	5	1	-	-	2	-	8	-	-	1	-	1	9	2	1	-	-	1	4	-	
48	2	-	-	1	2	2	7	-	-	-	-	7	1	-	-	1	-	1	3	-	
49	-	-	-	1	1	1	3	-	-	-	-	3	2	-	-	-	1	-	3	-	
50	2	-	-	-	1	1	4	-	-	-	-	4	-	1	-	1	1	-	3	-	
51	-	-	-	-	1	-	1	-	-	-	-	1	-	-	-	1	1	-	2	-	
52	-	-	-	1	-	-	1	-	-	-	-	1	-	-	-	1	-	-	1	-	
Total	21	6	2	5	11	8	53	3	1	4	3	11	64	24	5	3	3	10	10	55	

	Round number 10																			
40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	-	-	-	-	1	-	1	-	-	-	-	-	1	-	-	-	-	1	1	2
43	-	-	-	-	3	3	-	-	-	-	-	3	1	1	-	-	2	3	7	7
44	4	-	-	-	-	1	5	-	-	-	-	5	1	1	-	-	6	6	8	-
45	-	-	-	-	2	3	5	-	-	-	-	5	1	-	-	-	5	5	6	-
46	3	2	-	-	1	1	7	-	-	-	-	7	1	-	-	-	2	4	7	-
47	-	-	-	-	-	2	2	-	-	-	-	2	1	-	-	-	-	-	1	-
48	-	-	-	-	1	3	4	-	-	-	-	4	2	1	-	-	-	-	3	-
49	1	1	-	-	-	-	2	-	-	-	-	2	-	-	-	-	-	-	-	-
50	1	-	-	-	1	1	3	-	-	-	-	3	-	-	-	-	1	1	2	-
51	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
52	1	-	-	-	1	-	2	-	-	-	-	2	-	-	-	-	-	-	-	-
53	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-
54	-	-	-	-	-	1	1	-	-	-	-	-	1	-	-	-	-	-	-	-
Total	10	3	-	-	7	15	35	-	-	-	-	35	7	3	-	-	8	20	38	-
Grand total	305	70	15	41	159	310	900	47	81	62	18	208	1108	209	48	9	48	127	198	639

Appendix table 26

Length classes of tagged and tag-lost 3-year-old female seals,
by rookery of recovery and by round, Pribilof Islands, Alaska, 1961

Length in inches	Tags recovered										Tags lost															
	St. Paul					St. George					Grand	St. Paul					St. George					Grand				
	ZAP	TOL	L-K	REEF	POL	NEP	total	ZAP	NOR	EAST	STAR	total	total	ZAP	TOL	L-K	REEF	POL	NEP	total	ZAP	NOR	EAST	STAR	total	total
Round number 7																										
44	-	-	-	-	-	-	-	-	1	1	-	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Round number 8																										
41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	2
42	-	-	-	-	2	-	2	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
43	-	-	-	-	2	-	2	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
44	-	-	-	-	3	-	3	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
45	-	-	-	-	1	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
46	-	-	-	-	3	-	3	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
47	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48	-	-	-	-	1	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	12	-	12	-	-	-	-	-	12	-	-	-	-	-	-	-	-	-	-	2	-	2
Round number 9																										
40	-	-	-	-	1	-	1	-	-	-	-	1	-	-	1	-	1	-	-	-	-	-	-	-	-	1
41	-	-	-	-	1	-	1	-	-	-	2	2	3	-	-	1	-	1	-	-	-	1	1	1	1	2
42	2	-	-	-	-	-	2	-	-	-	-	2	-	-	-	1	-	1	-	1	1	1	1	1	2	5
43	1	3	-	-	-	-	4	-	-	-	-	4	-	-	-	1	-	1	-	-	-	-	-	-	1	
44	-	-	-	-	2	-	2	-	-	-	-	2	-	-	-	3	-	3	-	-	-	-	-	-	3	
45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	2	-	-	-	-	-	-	2	
46	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	1	
47	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	1	
48	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
51	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	1	
Total	3	3	-	-	4	-	10	-	-	-	2	2	12	-	-	5	6	1	12	1	1	1	3	6	18	
Round number 10																										
41	-	1	-	1	1	2	5	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	1	2	-	1	7	-	11	-	-	-	-	11	-	-	-	-	-	-	-	-	-	-	-	-	-	
43	2	-	-	-	-	1	3	-	-	-	-	3	-	-	1	1	1	3	-	-	-	-	-	-	3	
44	-	-	-	-	1	1	2	-	-	-	-	2	2	-	-	1	-	3	-	-	-	-	-	-	3	
45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	3	-	-	-	-	-	-	3	
46	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	2	-	-	-	-	-	-	2	
47	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
48	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	1	
Total	3	3	-	2	9	4	21	-	-	-	-	21	2	-	-	1	7	2	12	-	-	-	-	-	12	
Grand total	6	6	-	2	25	4	43	-	1	1	2	4	47	2	-	6	13	3	24	1	3	1	3	8	32	
Fall kill																										
38	4	1	-	-	3	7	15	-	-	-	-	15	-	-	-	-	-	-	-	-	-	-	-	-	-	
39	8	-	-	-	2	6	16	-	-	-	-	16	-	-	-	-	-	-	-	-	1	-	-	1	1	
40	4	3	-	-	3	14	24	1	2	1	2	6	30	-	-	1	-	1	1	1	-	-	-	1	2	
41	7	4	-	-	7	14	32	1	2	3	2	8	40	1	1	-	3	3	-	-	-	1	4	7		
42	3	3	-	-	3	3	12	3	1	2	2	8	20	-	1	-	-	1	1	1	1	-	-	3	4	
43	4	2	-	-	2	1	9	1	1	1	-	3	12	1	-	-	1	1	2	-	-	1	4	5		
44	1	-	-	-	1	2	4	1	-	-	1	2	6	-	-	-	-	-	-	1	-	-	1	2		
45	-	-	-	-	-	1	1	-	-	-	-	1	1	-	-	-	-	1	1	-	-	-	-	1	2	
46	1	-	-	-	-	-	1	-	-	-	-	1	1	-	-	-	-	1	-	-	-	-	-	1	1	
Total	32	13	-	-	21	48	114	7	6	7	7	27	141	4	2	-	8	7	5	1	3	16	16	24		
Grand total	28	10	-	2	46	52	157	7	7	8	9	31	188	6	2	-	6	15	3	32	8	8	2	6	56	

Appendix table 27

Length classes of tagged and tag-lost 4-year-old female seals,
by rookery of recovery and by round, Pribilof Islands, Alaska, 1961

Length in inches	Tags recovered										Tags lost																
	St. Paul					St. George					Grand	St. Paul					St. George					Grand					
	ZAP	TOL	L-K	REEF	POL	NEP	total	ZAP	NOR	EAST	STAR	total	total	ZAP	TOL	L-K	REEF	POL	NEP	total	ZAP	NOR	EAST	STAR	total	total	
Round number 7																											
40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Round number 8																											
41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	1	1	-	-	1	1	4	-	1	1	1	3	7	1	-	-	2	1	1	5	-	-	-	1	1	6	-
Round number 9																											
39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	2	-	-	-	-	1	3	-	-	-	-	1	1	4	-	-	-	-	2	-	2	2	-	-	-	-	2
43	7	-	-	-	-	-	7	1	-	-	-	-	1	8	-	-	-	1	2	-	3	-	1	-	-	-	1
44	3	-	-	-	1	-	4	-	-	-	-	1	1	5	2	-	-	2	-	4	-	-	-	1	-	-	1
45	1	-	-	1	1	-	3	-	-	-	-	-	3	-	-	-	1	1	1	3	-	1	-	-	-	-	1
46	-	-	-	-	1	-	1	-	-	-	-	-	1	-	-	-	1	-	1	-	2	-	-	-	-	-	2
47	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	1	-	3	-	-	-	-	-	3
48	-	-	-	-	-	1	1	-	-	-	-	-	1	1	-	-	-	1	-	2	-	-	-	-	-	-	2
Total	13	-	-	1	3	2	19	1	-	1	2	4	23	4	-	2	2	11	2	21	2	3	-	1	6	27	
Round number 10																											
40	-	1	-	-	1	-	2	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	-	1	-	-	2	-	3	-	-	-	-	-	3	-	-	-	-	-	1	2	-	-	-	-	-	-	2
43	5	2	-	-	4	5	16	-	-	-	-	-	16	1	1	-	-	6	1	9	-	-	-	-	-	-	9
44	1	-	-	1	3	3	8	-	-	-	-	-	8	1	2	-	-	4	4	11	-	-	-	-	-	-	11
45	1	1	-	-	1	1	4	-	-	-	-	-	4	1	-	-	1	2	-	4	-	-	-	-	-	-	4
46	-	2	-	-	2	-	4	-	-	-	-	-	4	-	2	-	-	-	1	3	-	-	-	-	-	-	3
47	-	-	-	-	1	-	1	-	-	-	-	-	1	-	-	-	-	-	1	1	-	-	-	-	-	-	1
48	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	8	7	-	1	14	9	39	-	-	-	-	-	39	3	8	-	2	13	9	35	-	-	-	-	-	-	35
Grand total	22	8	-	2	18	12	62	1	2	3	3	9	71	8	9	2	6	25	12	62	2	4	-	2	8	70	
Fall kill																											
38	-	-	-	-	-	1	1	-	-	-	-	-	1	1	-	-	-	-	-	1	-	-	-	-	-	-	1
39	-	-	-	-	-	1	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	2	5	-	-	1	4	12	-	1	-	-	1	13	1	1	-	-	-	2	-	-	-	-	-	-	-	2
41	11	2	-	-	6	16	35	-	1	-	-	1	36	4	1	-	-	3	2	10	1	-	-	1	2	12	
42	1	4	-	-	4	15	24	2	1	3	2	8	32	2	-	-	-	1	-	3	1	2	2	-	-	5	
43	6	3	-	-	5	11	25	-	3	3	2	8	33	3	-	-	-	2	2	7	-	1	1	1	3	10	
44	3	1	-	-	5	4	13	1	2	-	-	3	16	3	-	-	-	5	-	8	2	2	-	-	1	5	
45	4	-	-	-	6	2	12	-	-	-	2	2	14	5	-	-	-	2	1	8	-	-	1	1	2	10	
46	-	-	-	-	1	-	1	1	-	-	1	2	3	3	-	-	-	-	1	4	1	-	-	-	1	2	
47	-	-	-	-	1	1	2	-	-	-	-	-	2	2	-	-	-	-	-	2	-	-	-	-	-	1	
48	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total	27	15	-	-	29	55	126	4	8	6	7	25	151	24	2	-	-	13	6	45	5	6	5	6	22	67	
Grand total	49	23	-	2	47	67	188	5	10	9	10	34	222	32	11	2	6	38	18	107	7	10	5	8	30	137	

Appendix table 29
Length of tagged 3-year-old male seals, by date of
recovery, St. Paul Island, 1961

Date	Length in inches											Total	
	≤39	40	41	42	43	44	45	46	47	48	49		≥50
July													
2	-	2	10	25	15	9	6	-	1	-	-	-	68
3	-	-	-	3	2	1	-	-	-	1	-	-	7
4	-	1	25	38	27	19	5	1	1	-	-	-	117
5	-	1	-	-	1	-	1	-	-	-	-	-	3
6	-	1	9	14	11	11	5	-	-	-	-	-	51
Total	-	5	44	80	56	40	17	1	2	1	-	-	246
July													
7	-	-	5	9	22	8	1	-	3	-	-	-	48
8	-	-	-	2	2	-	-	-	-	-	-	-	4
9	-	9	5	24	15	25	9	2	1	-	-	-	90
10	-	-	1	3	1	-	1	-	-	-	-	-	6
11	-	1	4	6	4	3	4	-	-	-	-	-	22
Total	-	10	15	44	44	36	15	2	4	-	-	-	170
July													
12	-	-	5	13	15	14	7	-	1	-	-	-	55
13	-	1	-	1	3	1	-	-	-	-	-	-	6
14	-	1	12	20	27	7	9	4	2	-	2	2	86
15	-	2	1	3	2	1	2	-	-	-	-	-	11
16	-	1	2	10	7	6	3	-	-	-	1	1	31
Total	-	5	20	47	54	29	21	4	3	-	3	3	189
July													
17	-	4	18	15	16	10	8	1	1	-	-	1	74
18	-	-	5	5	6	6	3	1	-	-	-	-	26
19	-	1	20	37	40	36	15	4	-	2	2	-	157
20	-	-	-	1	3	1	4	-	-	-	-	-	9
21	-	2	10	23	30	11	5	1	1	-	2	-	85
Total	-	7	53	81	95	64	35	7	2	2	4	1	351
July													
22	1	1	18	36	41	44	23	7	5	-	-	-	176
23	1	3	10	15	23	7	4	4	-	-	-	-	67
24	-	2	13	26	51	49	33	10	5	1	1	1	192
25	-	-	4	5	5	6	-	-	-	-	-	-	20
26	-	-	3	5	11	10	11	-	-	-	-	-	40
Total	2	6	48	87	131	116	71	21	10	1	1	1	495

Appendix table 29 (con.)
Length of tagged 3-year-old male seals, by date of
recovery, St. Paul Island, 1961

Date	Length in inches												Total
	≤39	40	41	42	43	44	45	46	47	48	49	≥50	
July													
27	-	4	26	43	64	30	17	6	-	-	1	-	191
28	-	-	1	4	19	14	13	5	7	1	1	-	65
29	-	2	16	35	43	22	13	4	2	-	-	-	137
30	-	-	3	6	14	6	2	4	-	1	-	-	36
31	-	-	14	18	23	24	7	3	-	-	-	-	89
Total	-	6	60	106	163	96	52	22	9	2	2	-	518
August													
1	-	1	7	27	61	77	47	26	9	6	1	2	264
2	-	2	17	34	26	23	9	6	2	-	-	-	119
3	-	1	13	16	44	36	31	18	5	3	1	-	168
4	1	-	7	12	23	16	16	1	2	1	-	-	79
5	-	-	3	7	23	24	22	7	8	4	2	2	102
Total	1	4	47	96	177	176	125	58	26	14	4	4	732
August													
6	-	-	3	6	19	14	11	4	5	3	-	-	65
7	-	-	1	4	11	11	9	4	1	-	3	2	46
8	-	-	7	20	42	67	40	14	7	3	3	-	203
9	-	-	-	1	6	6	4	2	-	1	-	-	20
10	-	-	4	5	9	14	9	4	2	1	-	-	48
Total	-	-	15	36	87	112	73	28	15	8	6	2	382
August													
11	-	1	12	26	47	39	23	8	-	3	1	1	161
12	-	-	1	4	8	6	8	3	2	2	-	-	34
13	-	2	10	21	29	27	17	3	1	1	-	1	112
14	-	-	-	1	1	2	1	-	-	-	-	-	5
15	-	-	1	3	10	16	7	5	1	1	1	1	46
Total	-	3	24	55	95	90	56	19	4	7	2	3	358
Season													
total	3	46	326	632	902	759	465	162	75	35	22	14	3441

Appendix table 30

Length of tagged 4-year-old male seals, by date of recovery
St. Paul Island, 1961

Date	Length in inches													Total
	≤40	41	42	43	44	45	46	47	48	49	50	51	>52	
July														
2	1	2	4	8	14	11	8	1	-	2	1	-	-	52
3	-	-	-	-	1	1	2	-	-	-	-	-	-	4
4	-	1	13	18	21	16	9	1	1	-	-	-	-	80
5	-	-	-	2	-	2	2	1	-	-	-	-	-	7
6	1	-	4	8	21	13	6	2	1	-	-	-	-	56
Total	2	3	21	36	57	43	27	5	2	2	1	-	-	199
July														
7	-	1	2	10	13	14	9	6	-	1	-	-	-	56
8	1	-	1	-	4	3	2	1	-	-	-	-	-	12
9	1	1	6	10	16	11	7	3	3	-	-	-	-	58
10	-	-	1	3	-	-	-	-	-	-	-	-	-	4
11	-	1	1	5	3	7	3	1	-	-	-	-	-	21
Total	2	3	11	28	36	35	21	11	3	1	-	-	-	151
July														
12	-	1	4	9	16	11	7	3	2	-	-	-	-	53
13	-	-	-	2	-	1	-	-	-	1	-	-	-	4
14	-	-	4	10	16	15	7	4	1	2	-	-	-	59
15	-	-	-	-	1	1	-	2	-	2	-	-	-	6
16	-	1	1	5	10	9	2	-	-	1	1	-	-	30
Total	-	2	9	26	43	37	16	9	3	6	1	-	-	152
July														
17	-	1	5	7	11	13	7	1	-	1	1	-	-	47
18	-	-	-	-	3	5	5	7	-	-	-	-	-	20
19	-	3	2	13	19	18	19	5	1	2	2	-	-	84
20	-	-	2	-	4	4	3	2	1	-	-	-	-	16
21	-	1	4	4	8	9	3	4	2	1	-	-	-	36
Total	-	5	13	24	45	49	37	19	4	4	3	-	-	203
July														
22	1	3	5	11	20	25	13	16	7	4	1	-	1	107
23	-	-	2	4	8	5	2	-	1	2	-	-	-	24
24	-	-	2	5	12	12	22	13	2	5	4	-	1	78
25	-	1	-	2	1	3	1	-	1	-	-	-	-	9
26	-	-	-	4	8	5	10	4	3	-	-	-	-	34
Total	1	4	9	26	49	50	48	33	14	11	5	-	2	252
July														
27	-	2	6	8	12	16	9	6	2	3	-	-	-	64
28	-	-	-	1	6	3	5	4	1	2	-	-	-	22
29	-	2	1	10	13	16	9	-	1	-	-	-	-	52
30	-	-	1	1	4	4	4	3	1	2	-	-	-	20
31	-	2	-	11	15	6	6	2	1	-	-	-	-	43
Total	-	6	8	31	50	45	33	15	6	7	-	-	-	201
August														
1	-	1	2	5	9	11	16	17	7	5	1	2	-	76
2	-	2	1	6	9	7	6	2	-	1	-	-	-	34
3	1	1	1	3	10	7	7	3	5	1	1	1	-	41
4	2	-	1	3	4	4	3	1	1	-	-	-	-	19
5	-	-	-	1	8	1	7	5	2	6	-	-	-	30
Total	3	4	5	18	40	30	39	28	15	13	2	3	-	200
August														
6	-	1	-	3	3	4	1	1	3	1	1	-	-	18
7	-	-	-	-	6	3	2	2	-	-	1	1	1	16
8	-	1	3	5	4	9	9	7	3	2	2	-	-	45
9	-	-	-	-	1	-	2	-	2	1	1	-	1	8
10	-	-	1	4	3	2	1	2	2	2	2	2	-	21
Total	-	2	4	12	17	18	15	12	10	6	7	3	2	108
August														
11	-	-	1	6	7	8	5	2	3	-	2	-	1	35
12	-	-	-	1	1	-	2	-	1	1	-	-	-	6
13	-	-	-	1	5	1	4	1	2	1	1	-	1	17
14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	1	-	2	2	-	2	3	-	1	-	2	-	2	15
Total	1	-	3	10	13	11	14	3	7	2	5	-	4	73
Season total														
Season total	9	29	83	211	350	318	250	135	64	52	24	6	8	1539

Appendix table 31
Length of tagged 3-year-old male seals, by date of
recovery, St. George Island, 1961

Date	Length in inches								Total
	40	41	42	43	44	45	46	≥47	
July									
2	-	-	3	3	1	-	-	-	7
3	-	1	7	2	3	2	-	-	15
4	-	2	5	3	-	-	-	-	10
5	-	-	-	-	1	1	-	-	2
6	-	1	2	2	1	-	-	-	6
Total	-	4	17	10	6	3	-	-	40
July									
7	-	1	1	1	-	-	-	-	3
8	-	-	1	1	-	-	-	-	2
9	1	1	2	2	1	-	-	1	8
10	-	3	2	-	-	-	-	-	5
11	-	3	-	-	1	1	-	-	5
Total	1	8	6	4	2	1	-	1	23
July									
12	-	2	2	4	2	1	-	-	11
13	-	1	4	1	-	1	1	-	8
14	-	1	5	2	1	-	-	-	9
15	-	1	-	-	-	-	-	-	1
16	1	1	1	2	-	-	1	1	7
Total	1	6	12	9	3	2	2	1	36
July									
17	-	1	4	3	-	-	-	-	8
18	-	1	1	1	2	-	-	-	5
19	-	1	7	2	2	-	-	-	12
20	-	1	-	1	1	-	-	-	3
21	-	2	8	4	3	2	-	-	19
Total	-	6	20	11	8	2	-	-	47
July									
22	-	-	4	5	1	1	-	1	12
23	-	-	2	3	1	-	-	-	6
24	1	3	12	7	7	4	1	1	36
25	-	-	2	-	3	-	-	-	5
26	-	3	8	5	10	3	-	1	30
Total	1	6	28	20	22	8	1	3	89

Appendix table 31 (con.)
Length of tagged 3-year-old male seals, by date of
recovery, St. George Island, 1961

Date	Length in inches								Total
	40	41	42	43	44	45	46	≥47	
July									
27	-	2	7	2	1	-	1	-	13
28	1	2	6	2	2	1	-	-	14
29	1	6	13	11	5	2	-	-	38
30	1	-	3	1	-	-	-	-	5
31	1	6	3	3	6	2	-	-	21
Total	4	16	32	19	14	5	1	-	91
August									
1	-	2	7	3	2	-	-	-	14
2	1	2	6	4	1	-	-	-	14
3	-	8	19	12	15	11	3	-	68
4	-	3	7	7	2	1	-	-	20
5	-	-	6	8	4	1	-	-	19
Total	1	15	45	34	24	13	3	-	135
August									
6	1	-	6	-	1	1	-	-	9
7	-	1	3	5	2	1	-	-	12
8	-	1	3	2	4	-	-	-	10
9	-	3	7	3	-	-	1	-	14
10	1	4	9	10	9	6	-	-	39
Total	2	9	28	20	16	8	1	-	84
August									
11	-	-	7	10	5	3	2	-	27
12	-	1	1	2	1	-	-	-	5
13	-	2	1	4	1	2	-	-	10
14	-	4	1	1	2	1	-	-	9
15	1	1	4	3	2	1	-	1	13
Total	1	8	14	20	11	7	2	1	64
Season									
total	11	78	202	147	106	49	10	6	609

Appendix table 32
Length of tagged 4-year-old male seals, by date of
recovery, St. George Island, 1961

Date	Length in inches								Total
	≤42	43	44	45	46	47	48	≥49	
July									
2	-	2	1	3	2	-	1	-	9
3	3	1	4	4	5	2	-	-	19
4	1	2	3	2	2	-	-	1	11
5	1	-	-	2	-	-	-	-	3
6	1	1	1	1	2	-	1	-	7
Total	6	6	9	12	11	2	2	1	49
July									
7	2	-	1	4	-	-	-	-	7
8	-	-	-	2	2	-	-	-	4
9	1	4	2	1	1	3	1	-	13
10	-	1	-	-	-	-	-	-	1
11	2	-	4	-	-	1	-	-	7
Total	5	5	7	7	3	4	1	-	32
July									
12	-	1	1	2	1	-	-	-	5
13	-	1	1	-	1	1	-	-	4
14	-	-	1	1	-	1	2	-	5
15	-	-	1	-	-	-	-	-	1
16	-	2	3	4	1	1	-	-	11
Total	-	4	7	7	3	3	2	-	26
July									
17	2	4	1	-	1	-	1	-	9
18	1	1	3	1	2	1	-	-	9
19	1	2	3	2	-	1	-	-	9
20	-	-	-	-	1	-	-	-	1
21	-	3	4	4	1	1	-	-	13
Total	4	10	11	7	5	3	1	-	41
July									
22	1	1	2	2	-	-	-	-	6
23	-	-	4	5	1	3	-	-	13
24	3	3	3	3	1	1	1	1	16
25	1	-	-	3	1	1	-	-	6
26	1	2	1	1	3	2	-	-	10
Total	6	6	10	14	6	7	1	1	51

Appendix table 32 (con.)
 Length of tagged 4-year-old male seals, by date of
 recovery, St. George Island, 1961

Date	Length in inches								Total
	≤42	43	44	45	46	47	48	≥49	
July									
27	-	-	4	5	1	-	-	-	10
28	1	-	-	1	-	-	-	-	2
29	2	1	5	2	-	2	-	-	12
30	-	2	1	1	-	-	-	-	4
31	-	1	1	5	2	1	-	-	10
Total	3	4	11	14	3	3	-	-	38
August									
1	1	2	3	1	1	2	-	-	10
2	1	-	1	-	-	-	-	-	2
3	-	1	5	7	2	3	-	3	21
4	-	2	2	1	-	-	-	-	5
5	-	-	1	-	1	-	-	-	2
Total	2	5	12	9	4	5	-	3	40
August									
6	-	-	1	1	2	-	-	-	4
7	-	1	1	1	1	-	-	-	4
8	-	1	1	-	2	-	-	-	4
9	-	-	-	1	-	2	-	-	3
10	-	-	3	1	2	-	-	-	6
Total	-	2	6	4	7	2	-	-	21
August									
11	-	1	2	4	2	-	-	-	9
12	-	-	-	1	-	-	-	-	1
13	-	-	2	1	-	1	-	-	4
14	1	1	2	3	1	-	-	-	8
15	-	-	-	-	-	-	1	-	1
Total	1	2	6	9	3	1	1	-	23
Season									
total	27	44	79	83	45	30	8	5	321

Appendix table 33
 Length of tagged 3-year-old female seals, by date
 of recovery, Pribilof Islands, Alaska, 1961

Date	Length in inches									Total
	40	41	42	43	44	45	46	47	≥48	
August										
3	-	-	-	-	1		-	-	-	1
5	-	-	2	2	4	1	3	-	1	13
Total	-	-	2	2	5	1	3	-	1	14
August										
6	-	-	-	1	-	-	-	-	-	1
7	-	-	-	3	-	-	-	-	-	3
8	-	-	2	1	-	-	-	-	-	3
9	-	1	-	-	-	2	1	-	1	5
10	2	3	1	-	5	-	-	1	-	12
Total	2	4	3	5	5	2	1	1	1	24
August										
11	-	2	1	2	1	1	-	-	-	7
12	-	1	2	-	-	-	-	-	-	3
13	-	-	2	2	2	-	-	-	-	6
14	-	4	3	1	-	-	-	-	-	8
15	-	1	8	1	2	2	2	-	1	17
Total	-	8	16	6	5	3	2	-	1	41
Season total	2	12	21	13	15	6	6	1	3	79

Appendix table 34
 Length of tagged 4-year-old female seals, by date
 of recovery, Pribilof Islands, Alaska, 1961

Date	Length in inches										Total	
	≤40	41	42	43	44	45	46	47	48	49		50
July												
28	-	-	-	-	-	-	1	-	-	-	-	1
August												
1	-	-	-	-	1	1	-	-	-	-	-	2
2	1	-	-	-	1	-	-	-	-	-	-	2
3	-	-	-	2	-	1	-	-	-	-	-	3
4	-	-	-	-	-	1	1	-	-	-	-	2
5	-	-	-	-	1	-	-	-	2	-	-	3
Total	1	-	-	2	3	3	1	-	2	-	-	12
August												
6	-	1	1	-	-	1	-	-	1	-	-	4
7	-	-	-	-	-	-	1	1	-	-	-	2
8	-	-	3	7	5	1	-	1	1	-	-	18
9	-	1	-	2	-	2	-	-	-	-	-	5
10	-	1	3	2	3	2	2	1	1	-	-	15
Total	-	3	7	11	8	6	3	3	3	-	-	44
August												
11	-	1	3	7	7	1	1	1	-	-	-	21
12	1	1	2	4	2	1	4	-	-	-	1	16
13	1	-	-	6	2	2	-	-	-	1	-	12
14	-	-	1	-	3	1	-	-	-	-	1	6
15	1	1	2	10	7	4	2	1	1	-	-	29
Total	3	3	8	27	21	9	7	2	1	1	2	84
Season												
total	4	6	15	40	32	18	12	5	6	1	2	141

Appendix table 35
 Known-age female seals tagged for Fouke Fur Company
 processing study, St. Paul Island, 1961

Tag number	Date	Age				Length (cm.)	Reproductive condition		
		2	3	4	5		nulli-para	primi-para	multi-para
	August								
3053	15	1	-	-	-	101.0	1	-	-
3088	13	1	-	-	-	100.0	1	-	-
3122	15	1	-	-	-	93.5	1	-	-
Total		3	-	-	-		3	-	-
3003	5	-	1	-	-	108.5	1	-	-
3006	7	-	1	-	-	105.0	1	-	-
3007	7	-	1	-	-	111.0	1	-	-
3013	8	-	1	-	-	113.0	1	-	-
3022	8	-	1	-	-	101.0	1	-	-
3032	8	-	1	-	-	111.0	1	-	-
3034	10	-	1	-	-	102.0	1	-	-
3035	10	-	1	-	-	101.0	1	-	-
3036	10	-	1	-	-	107.0	1	-	-
3041	10	-	1	-	-	96.0	1	-	-
3044	11	-	1	-	-	101.5	1	-	-
3057	12	-	1	-	-	113.0	1	-	-
3061	11	-	1	-	-	108.0	1	-	-
3062	11	-	1	-	-	116.0	1	-	-
3069	15	-	1	-	-	103.0	1	-	-
3075	13	-	1	-	-	103.0	1	-	-
3078	12	-	1	-	-	109.0	1	-	-
3082	12	-	1	-	-	108.0	1	-	-
3085	11	-	1	-	-	110.0	1	-	-
3087	14	-	1	-	-	98.0	1	-	-
3089	14	-	1	-	-	104.0	1	-	-
3091	13	-	1	-	-	105.0	1	-	-
3095	13	-	1	-	-	106.5	1	-	-
3101	15	-	1	-	-	101.0	1	-	-
3104	15	-	1	-	-	96.0	1	-	-
3106	15	-	1	-	-	98.5	1	-	-
3110	15	-	1	-	-	111.0	1	-	-
3112	15	-	1	-	-	109.5	1	-	-
3113	15	-	1	-	-	103.0	1	-	-
3114	15	-	1	-	-	104.0	1	-	-
Total		-	30	-	-		30	-	-

Appendix table 35 (con.)
 Known-age female seals tagged for Fouke Fur Company
 processing study, St. Paul Island, 1961

Tag number	Date	Age				Length (cm.)	Reproductive condition		
		2	3	4	5		nulli- para	primi- para	multi- para
	August								
3001	2	-	-	1	-	116.5	1	-	-
3002	5	-	-	1	-	119.0	1	-	-
3004	6	-	-	1	-	117.5	1	-	-
3005	6	-	-	1	-	110.0	1	-	-
3010	8	-	-	1	-	112.5	1	-	-
3014	8	-	-	1	-	115.5	1	-	-
3015	8	-	-	1	-	116.5	1	-	-
3016	8	-	-	1	-	106.5	1	-	-
3017	8	-	-	1	-	112.5	1	-	-
3018	8	-	-	1	-	110.5	1	-	-
3023	8	-	-	1	-	116.0	1	-	-
3025	9	-	-	1	-	113.0	1	-	-
3026	8	-	-	1	-	109.5	1	-	-
3027	8	-	-	1	-	104.0	1	-	-
3031	8	-	-	1	-	108.0	1	-	-
3039	10	-	-	1	-	108.0	1	-	-
3042	10	-	-	1	-	107.0	1	-	-
3043	10	-	-	1	-	112.0	1	-	-
3047	11	-	-	1	-	112.5	1	-	-
3048	11	-	-	1	-	110.0	1	-	-
3049	11	-	-	1	-	110.0	1	-	-
3050	11	-	-	1	-	112.5	1	-	-
3051	11	-	-	1	-	111.5	1	-	-
3054	15	-	-	1	-	107.5	1	-	-
3055	15	-	-	1	-	113.0	1	-	-
3058	12	-	-	1	-	118.0	1	-	-
3060	11	-	-	1	-	118.0	1	-	-
3063	11	-	-	1	-	113.0	1	-	-
3064	11	-	-	1	-	112.0	1	-	-
3065	11	-	-	1	-	106.0	1	-	-
3066	15	-	-	1	-	110.5	1	-	-
3067	15	-	-	1	-	116.0	1	-	-
3068	15	-	-	1	-	106.0	1	-	-
3073	15	-	-	1	-	116.5	1	-	-
3074	15	-	-	1	-	97.0	1	-	-
3076	12	-	-	1	-	111.0	1	-	-
Carried fwd.		-	-	36	-		36	-	-

Appendix table 35 (con.)
 Known-age female seals tagged for Fouke Fur Company
 processing study, St. Paul Island, 1961

Tag number	Date	Age				Length (cm.)	Reproductive condition		
		2	3	4	5		nulli-para	primi-para	multi-para
Brought forward		-	-	36	-		36	-	-
	<u>August</u>								
3077	12	-	-	1	-	121.0	1	-	-
3079	12	-	-	1	-	106.5	1	-	-
3080	12	-	-	1	-	111.5	1	-	-
3084	12	-	-	1	-	111.0	1	-	-
3086	14	-	-	1	-	111.5	1	-	-
3090	13	-	-	1	-	110.0	1	-	-
3092	13	-	-	1	-	110.0	1	-	-
3094	13	-	-	1	-	111.5	1	-	-
3097	13	-	-	1	-	120.5	1	-	-
3098	13	-	-	1	-	116.0	1	-	-
3099	13	-	-	1	-	113.5	1	-	-
3100	13	-	-	1	-	115.0	1	-	-
3105	15	-	-	1	-	113.0	1	-	-
3107	15	-	-	1	-	108.0	1	-	-
3108	15	-	-	1	-	117.0	1	-	-
3109	15	-	-	1	-	113.0	1	-	-
3124	15	-	-	1	-	107.0	1	-	-
3125	15	-	-	1	-	110.0	1	-	-
3126	15	-	-	1	-	106.0	1	-	-
Total		-	-	55	-		55	-	-
3008	7	-	-	-	1	118.0	1	-	-
3009	8	-	-	-	1	116.0	-	1	-
3011	8	-	-	-	1	118.0	1	-	-
3012	7	-	-	-	1	117.0	1	-	-
3019	8	-	-	-	1	116.5	-	NOP ^{1/}	-
3020	8	-	-	-	1	110.0	-	1	-
3021	8	-	-	-	1	113.5	1	-	-
3024	8	-	-	-	1	120.5	-	NOP	-
3028	8	-	-	-	1	108.0	-	1	-
3029	8	-	-	-	1	118.0	-	NOP	-
3030	8	-	-	-	1	116.0	1	-	-
3033	10	-	-	-	1	118.0	1	-	-
Carried fwd.		-	-	-	12		6	6	-

^{1/} NOP = nonpregnant, primipara

Appendix table 35 (con.)
 Known-age female seals tagged for Fouke Fur Company
 processing study, St. Paul Island, 1961

Tag number	Date	Age				Length (cm.)	Reproductive condition		
		2	3	4	5		nulli- para	primi- para	multi- para
Brought forward		-	-	-	12		6	6	-
	<u>August</u>								
3037	10	-	-	-	1	118.0	1	-	-
3038	10	-	-	-	1	114.0	-	1	-
3040	10	-	-	-	1	114.0	1	-	-
3045	11	-	-	-	1	115.5	-	1	-
3046	11	-	-	-	1	111.0	-	1	-
3052	11	-	-	-	1	118.5	-	1	-
3056	15	-	-	-	1	117.0	1	-	-
3059	12	-	-	-	1	110.0	1	-	-
3070	15	-	-	-	1	106.0	-	1	-
3071	15	-	-	-	1	111.0	-	1	-
3072	15	-	-	-	1	119.0	-	-	1
3081	12	-	-	-	1	121.0	1	-	-
3083	12	-	-	-	1	110.0	-	1	-
3093	13	-	-	-	1	108.5	1	-	-
3096	13	-	-	-	1	115.0	1	-	-
3102	15	-	-	-	1	119.0	1	-	-
3103	15	-	-	-	1	114.0	1	-	-
3111	15	-	-	-	1	114.0	1	-	-
3115	15	-	-	-	1	114.0	1	-	-
3117	15	-	-	-	1	112.0	1	-	-
3123	15	-	-	-	1	113.0	1	-	-
Total		-	-	-	33		19	13	1
Grand total		3	30	55	33		107	13	1
				121				121	

Appendix table 36

Tag numbers (N-series) and weights of live male and female fur seal pups, by rookery, St. Paul Island, 29 and 30 August 1961

Tag number	Weight (kg.)	Tag number	Weight (kg.)	Tag number	Weight (kg.)	Tag number	Weight (kg.)
<u>ZAPADNI - males</u>							
13852	6.8	14925	6.8	15331	5.4	15841	6.6
13854	8.6	14934	9.8	15379	9.2	15842	8.4
13873	7.4	14941	11.2	15411	7.2	15864	6.2
13887	10.0	14968	8.0	15430	6.0	15905	8.2
13913	4.8	14986	8.4	15445	8.0	15943	7.0
13975	6.2	15002	6.2	15447	10.6	15950	9.8
13980	7.4	15009	10.2	15451	9.4	16375	7.6
14015	8.4	15014	7.0	15455	7.6	16416	7.2
14041	7.0	15025	6.2	15478	6.2	16616	8.2
14068	7.6	15032	7.0	15484	9.2	16643	8.6
14132	6.4	15036	9.2	15533	7.4	16647	5.4
14148	10.2	15053	9.4	15569	9.4	16655	5.0
14151	6.6	15067	7.8	15605	9.0	16767	9.0
14182	6.4	15079	8.4	15624	9.0	17036	6.0
14196	9.0	15130	7.2	15649	9.4	17072	9.6
14338	5.8	15134	8.6	15671	6.0	17077	8.8
14339	7.0	15146	8.8	15673	8.8	17122	10.0
14349	8.2	15159	8.4	15686	8.2	17138	8.0
14363	10.4	15161	10.0	15733	6.2	17140	7.4
14375	7.0	15172	8.6	15752	5.6	17156	10.2
14399	10.8	15186	8.8	15762	5.2	17178	10.4
14492	7.6	15201	7.0	15765	7.4	17185	6.6
14543	7.0	15236	7.4	15768	7.0	17190	9.0
14577	10.6	15260	7.2	15786	9.2	17196	7.0
14636	7.0	15279	6.4	15790	7.8		
14890	9.2	15288	7.6	15796	9.4		
14906	6.4	15318	7.2	15817	13.0		
<u>ZAPADNI - females</u>							
13833	5.6	14640	8.4	15406	6.0	15709	7.6
13843	8.0	14651	5.6	15428	8.4	15813	7.6
13877	8.8	14653	5.2	15429	8.4	15815	6.8
13878	8.8	14691	6.6	15449	6.0	15866	7.8
13916	8.8	14900	8.4	15494	9.0	15975	4.6
13918	7.4	14930	7.8	15499	5.0	16292	9.0

Appendix table 36 (con.)

Tag numbers (N-series) and weights of live male and female fur seal pups, by rookery, St. Paul Island, 29 and 30 August 1961

Tag number	Weight (kg.)						
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ZAPADNI - females - (con.)

13948	8.4	15052	9.8	15505	8.2	17001	6.8
13990	7.0	15064	5.2	15540	6.4	17003	7.0
14056	10.4	15092	9.6	15558	9.0	17056	10.6
14097	7.8	15133	7.6	15578	7.6	17060	7.4
14106	9.2	15141	7.0	15588	9.6	17071	6.4
14248	5.0	15188	7.2	15591	5.6	17088	8.0
14265	8.0	15228	8.0	15598	8.6	17096	5.6
14266	5.2	15286	8.2	15610	7.6	17099	4.6
14383	6.0	15293	7.2	15623	9.6	17161	6.2
14431	6.4	15306	6.8	15628	5.8	17187	7.6
14525	8.6	15333	6.6	15685	7.6		
14632	7.2	15336	7.0	15696	7.8		

REEF - males

19035	9.0	20958	9.2	22364	10.6	23276	9.6
19050	7.0	20998	7.6	22548	7.8	23393	9.4
19401	4.4	21370	11.0	22562	6.8	23444	6.6
19476	8.2	21437	7.2	22573	6.8	23453	8.8
20038	5.6	21599	8.0	22645	8.4	23491	7.2
20054	8.4	21719	8.5	22703	5.2	23540	7.0
20139	10.2	21757	7.2	22739	7.6	23546	7.6
20155	6.8	21857	7.8	22784	7.8	23655	6.4
20171	9.6	21927	6.8	22786	11.6	23726	8.2
20333	6.2	22019	10.2	22797	9.0	23757	7.4
20426	8.6	22114	4.6	22801	6.0	24116	9.2
20474	7.2	22133	5.4	22804	6.2	24238	7.8
20478	9.8	22170	12.0	22810	8.2	24288	6.4
20643	9.0	22251	4.2	22878	6.2	24297	9.6
20714	9.2	22258	8.0	22893	10.6	24748	6.4
20744	8.2	22268	6.4	22901	8.8	24792	6.8
20808	7.8	22309	7.0	22917	9.8	24883	7.2
20833	8.6	22356	7.0	22930	9.0	24889	7.8
20920	9.8	22359	9.1	22975	7.2		

Appendix table 36 (con.)

Tag numbers (N-series) and weights of live male and female fur seal pups, by rookery, St. Paul Island, 29 and 30 August 1961

Tag number	Weight (kg.)	Tag number	Weight (kg.)	Tag number	Weight (kg.)	Tag number	Weight (kg.)
<u>REEF - females</u>							
18139	10.2	20713	8.2	22381	6.4	23372	8.8
19053	6.4	20791	9.0	22487	6.0	23386	6.8
19065	5.8	20799	9.8	22512	6.6	23493	7.0
19079	6.2	20828	4.4	22515	7.4	23512	7.4
19409	10.0	20909	7.6	22516	7.0	23527	5.4
19490	5.4	20938	7.0	22547	6.6	23561	9.4
20024	9.8	21434	9.6	22551	9.2	23580	7.2
20030	6.2	21560	8.0	22633	8.8	23716	7.4
20056	4.6	21671	10.2	22655	7.0	23734	6.8
20106	6.0	21732	6.0	22665	7.6	23781	6.2
20120	6.0	21858	8.4	22670	6.6	23825	7.2
20200	6.4	21899	7.6	22812	4.4	23919	4.4
20214	7.0	21982	5.0	22853	8.0	24027	7.8
20293	5.0	22002	6.4	23005	7.8	24078	5.0
20386	5.6	22003	6.0	23056	7.4	24134	4.8
20418	6.6	22014	11.0	23058	8.0	24778	6.2
20446	7.2	22032	7.0	23091	6.6	24831	4.6
20455	7.4	22149	6.2	23093	6.8	24832	5.8
20544	9.2	22237	8.2	23109	8.2	24879	8.0
20570	6.6	22261	5.6	23139	4.8	24893	5.8
20594	6.6	22273	6.6	23189	4.6		
20595	8.6	22297	5.8	23331	5.4		
20640	8.4	22379	9.0	23338	6.0		

NORTHEAST POINT

<u>males</u>		<u>females</u>	
33849	8.4	34093	6.4
34552	9.2	34100	7.4
34993	7.0	34505	7.4
36054	10.8	36639	8.2
37513	11.2	37514	5.8
37598	10.2	41172	7.2
		41206	9.0

POLOVINA

<u>females</u>	
30540	8.6

Appendix table 37

Record of fur seal pups tagged on Pribilof Islands, Alaska

Year	Series	St. Paul Island	St. George Island	Location of tag	Checkmarks
1941	USA 1-10000; USA 1-1000 and USA 5001-6000	10000 1000 1000		Front flipper ♂♂ right front and hind flippers; ♀♀ left front and hind flippers	Branded, nape of neck Double tagged, branded nape of neck
1945	10001-11000 (no letter prefix)	973		Left front flipper	None
1947	A 1-20000	19183		Left front flipper	1/4" hole between 1st and 2nd digits left hind flipper
1948	B 1-19673	19532		Left front flipper	None
1949	CS 1-20000	19963		Left hind flipper	None
1951	D 1-1000	1000		Right hind flipper	1/2 left ear on 100 tagged pups removed
1952	E 1-20000	19979		Right front flipper	Tip of 1st digit on right hind flipper sliced off
1953	F 1-10000	9990		Left front flipper	Tip of left front flipper sliced off
	G 7001-7400	398		" " "	" " " "
1954	G 1-7000	7000		Right front flipper	"V" notch near tip right front flipper
	G 7401-10400	3000		" " "	" " " " "
1955	H 1-10000 10001-50000 (no letter prefix)	49870		Left front flipper " " "	Tip of 1st digit on left hind flipper sliced off
1956	I 1-10000		9894	Right front flipper	Tip of right front flipper sliced off
	I 10001-50000	39900		" " "	" " " " "
1957	J 1-10000		9972	Left front flipper	"V" notch near tip left front flipper
	J 10001-50000	39870		" " "	" " " " " "
1958	K 1-10000		9994	Right front flipper	"V" notch near tip right front flipper
	K 10001-50000	39923		" " "	" " " " " "
	K 10001-15000	5000		Right and left front flippers	Double tagging plus check- mark
1959	L 1-10000		9980	Left front flipper	Tip of left front flipper sliced off
	L 10001-50000	39901		" " "	" " " " " "
1960	M 1-12000		11992	Right front flipper	Tip of right front flipper sliced off
	M 12001-60000	47989		" " "	" " " " " "
1961	N 1-10000		9988	Left front flipper	"V" notch near tip left front flipper
	N 10001-50000	39933		" " "	" " " " " "

Appendix table 38

Bull counts, Pribilof Islands, Alaska^{1/}

Year	St. Paul Island		St. George Island		Both islands	
	harem	idle	harem	idle	harem	idle
1911	1,090	258	266	71	1,356	329
1912	1,077	93	281	20	1,358	113
1913	1,142	77	261	28	1,403	105
1914	1,316	159	243	13	1,559	172
1915	1,789	546	362	127	2,151	673
1916	2,948	2,278	552	354	3,500	2,632
1917	4,166	2,341	684	365	4,850	2,706
1918	4,610	2,245	734	199	5,344	2,444
1919	4,573	2,158	585	81	5,158	2,239
1920	3,542	1,078	524	83	4,066	1,161
1921	3,443	711	466	36	3,909	747
1922	3,184	493	378	15	3,562	508
1923	3,051	303	361	9	3,412	312
1924	3,127	375	389	15	3,516	390
1925	3,103	283	423	28	3,526	311
1926	3,478	368	556	55	4,034	423
1927	3,916	846	727	126	4,643	972
1928	5,059	1,208	991	241	6,050	1,449
1929	5,998	1,339	1,189	294	7,187	1,633
1930	6,823	1,555	1,489	344	8,312	1,899
1931	7,557	1,519	1,676	369	9,233	1,888
1932	8,268	1,940	1,820	409	10,088	2,349
1933	8,334	1,933	1,879	408	10,213	2,341
1934	8,841	1,860	1,929	422	10,770	2,282
1935	9,444	2,082	2,103	453	11,547	2,535
1936	10,055	2,253	-	-	-	-
1937	10,689	2,516	2,411	515	13,100	3,031
1938	10,720	1,787	-	-	-	-
1939	9,122	2,616	1,858	357	10,980	2,973
1940	9,662	3,968	1,988	571	11,650	4,539
1941	10,089	5,059	1,942	396	12,031	5,455
1942	-	-	-	-	-	-
1943	10,948	3,523	2,107	330	13,055	3,853
1944	11,080	2,539	2,294	450	13,374	2,989
1945	10,750	4,055	2,434	750	13,184	4,805
1946	10,566	3,605	2,430	611	12,996	4,216
1947	10,160	3,331	1,808	479	11,968	3,810
1948	10,386	3,400	1,814	563	12,200	3,963
1949	9,554	2,976	1,746	552	11,300	3,528
1950	9,442	3,152	1,959	574	11,401	3,726
1951	9,434	3,581	1,825	549	11,259	4,130
1952	9,318	4,717	1,983	605	11,301	5,322
1953	9,848	5,912	2,285	826	12,133	6,738
1954	9,906	6,847	2,228	1,311	12,134	8,158
1955	9,034	8,650	2,130	1,902	11,164	10,552
1956	9,384	9,016	-	-	-	-
1957	9,562	10,060	2,423	2,693	11,985	12,753
1958	9,970	9,510	2,619	3,030	12,589	12,540
1959	10,003	11,485	2,527	2,699	12,530	14,184
1960	10,247	10,407	2,552	2,630	12,799	13,037
1961	11,163	11,791	2,842	2,489	14,006	14,280

^{1/} Counts listed follow Alaska fur seal industry reports, U. S. Bureau of Fisheries and U. S. Fish and Wildlife Service in spite of uncertainty about counts for Sivutch.

Appendix table 39

Dead pup counts by rookery, Pribilof Islands, Alaska

Rookery	1941	1948 ^{1/}	1949 ^{1/}	1950	1951	1952 ^{1/}	1953	1954	1955	1956	1957	1958	1959	1960	1961
St. Paul Island															
Morjovi	933	20600	2600	3000	3592		3764	8049	5571	10278	4253	2290	4560	6825	5259
Vostochni	7708		12966	13120	18450		19503	25233	14473	20498	12732	7247	7105	11333	10173
Little Polovina	292		1600	1740	2208		2211	3852	2782	4443	1695	975	1597	2427	2415
Polovina Cliffs	2356			3800	5580	2954	5451	6413	5964	8637	4425	1826	2586	3462	4576
Polovina			1779	5660	6402	3200	5036	6459	4660	7463	5432	2184	3311	5268	2499
Ardiguen	42			170	242		189	282	387	364	249	102	141	331	411
Gorbatch	896			2810	3559		3679	4900	4789	6291	3801	1655	2100	3168	3550
Reef	2269			9520	11007		13661	12959	15145	14399	11301	5550	6052	9664	10047
Kitovi			800	1160	1517		1695	1669	2610	2892	1588	608	882	2006	2215
Lukanin	404		635	770	712		1086	1129	1129	1718	870	324	631	1037	1294
Tolstoi	1623			4230	6033		6154	7552	6489	6789	5659	2823	3691	5237	4761
Little Zapadni	372			2120	2804		2446	4979	3555	4611	2325	1312	1691	4148	3047
Zapadni Reef	171		575	660	353		1116	2278	1383	1674	917	246	608	1472	1291
Zapadni	1284			4660	8204		12221	10424	6607	8650	6415	4045	5009	6450	6329
Counted total	18350			53420	70663		78212	96178	75544	98707	61662	31187	39964	62828	57867
Estimated															
oversight 5%	918			2671	3533		3911	4809	3777	4935	3083	1559	1998	2946	2893
Total	19268			56091	74196		82123	100987	79321	103642	64745	32746	41962	65774	60760
St. George Island															
North							3197	3776		6357	3942	1626	2653	3489	3883
East							846	1524		2203	1064	118	664	1112	1347
Staraya Artil							3353	2903		3806	2729	1552	1987	2000	2514
Zapadni							1272	1453		2742	1569	844	1633	1902	2019
Counted total							8668	9656		15108	9304	4756	6937	8503	9763
Estimated															
oversight 5%							433	483		755	465	238	347	425	488
Total							9101	10139		15863	9769	4994	7284	8928	10251

^{1/} Partial counts

No counts made in years 1942 through 1947