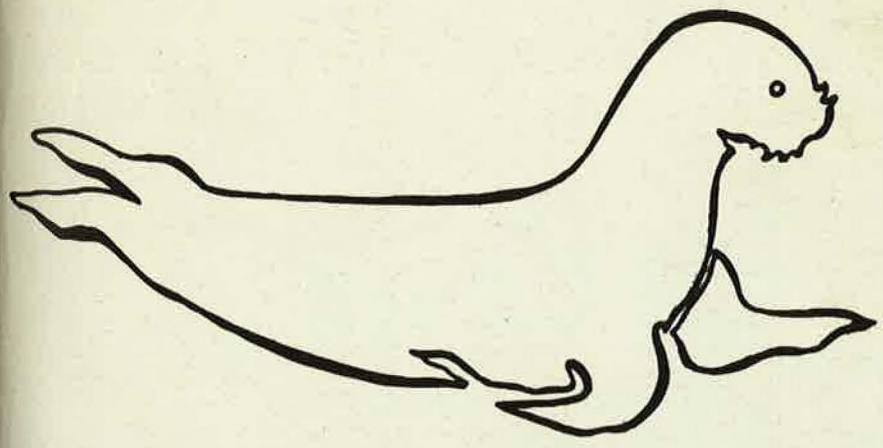
Alaska

FUR SEAL

INVESTIGATIONS



PRIBILOF ISLANDS, ALASKA

1956

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ALASKA FUR SEAL INVESTIGATIONS

PRIBILOF ISLANDS, ALASKA

Report of Field Activities

June - September 1956

By Staff

Branch of Wildlife Research
Fish and Wildlife Service
Seattle, Washington.

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I. Introduction

A. Objectives:

The goal of fur seal management became clearly apparent during the development and final casting of ideas at the North Pacific Fur Seal Conference in 1955-56. The prime objective of management is to attain maximum sustained productivity. Research will be designed to indicate the kind of management practices which will result in achieving the prime objective. Directing of research toward this end will not restrict it to a narrow unimaginative channel because most biological facts about fur seals are useful and necessary for intelligent management. A large part of the effort will, however, be expended upon those aspects which are indispensable for an understanding of the current composition and condition of the Pribilof seal herd.

Calculations based on biological knowledge of fur seals make it possible to estimate the herd size at the point of maximum sustained yield. Because basic data are subject to varying interpretations, the condition of the herd must be carefully watched as population changes are made which will bring the herd toward the calculated point of maximum sustained yield.

Concurrently with the collection of data, which will constitute indices of population size, composition and condition, other lines of research should be extended. For example, it is apparent that more knowledge of seal mortality, causes and effects, is needed to judge the benefits, if any,

from a reduced herd size. A thorough understanding of the mortality rate of each age class would be of great value. Positive age determination of seals in the older age group (10 plus) may lead to improved overall productivity through more precise control of the female kill.

B. Personnel and facilities

Positive action has been started to fulfill the need for biological information. The research staff has been increased in size and now includes 5 permanent employees. New, larger, and better equipped office and laboratory space has been obtained at Sand Point Naval Air Station in Seattle.

The 1956 studies on the Pribilofs were carried on during the period from 30 May to 2 October on St. Paul and St. George Islands. Biologists participating in the program were Ford Wilke, Biologist in charge, Carl Abegglen and Alton Roppel. Three biological aids were employed for the field season: Dean Biesmeyer from the University of Montana, Frank McGilvrey from Oregon State College, and Mark Freed from Pacific Lutheran College. McGilvrey spent the killing season period on St. George Island and was relieved by Biesmeyer on 25 August. Local residents Lavrenty Stepetin and George Rukevishnikoff assisted on St. Paul Island and resident assistance was also furnished on St. George Island. Lavrenty Stepetin, particularly, is an experienced, capable and reliable worker.

New laboratory and office facilities were occupied at the beginning of the season with the transfer of equipment, material and library from

the old laboratory and from the Government house.

The biologists express their sincere appreciation of the cooperation given them by the Pribilof Island management through Mr. Clarence L. Olson, General Manager, and Mr. Clarence Anderson and Mr. Dan Benson, St. Paul and St. George Island managers, respectively.

Research facilities were greatly improved with the change of laboratory location to quarters in the new warehouse building. The research staff is proud of their new home and find that their work is both more efficient and more pleasant. Figures 1-4 are photographs of some exterior and interior views.

Figure 1. New warehouse building on St. Paul Island occupied in 1956. Fur seal research facilities provided in portion of first floor.

Figure 2. Front entrance to research laboratory. Try pot is reminder of St. Paul Islands early history.

Figure 3. View of biological laboratory in new warehouse building, St. Paul Island.

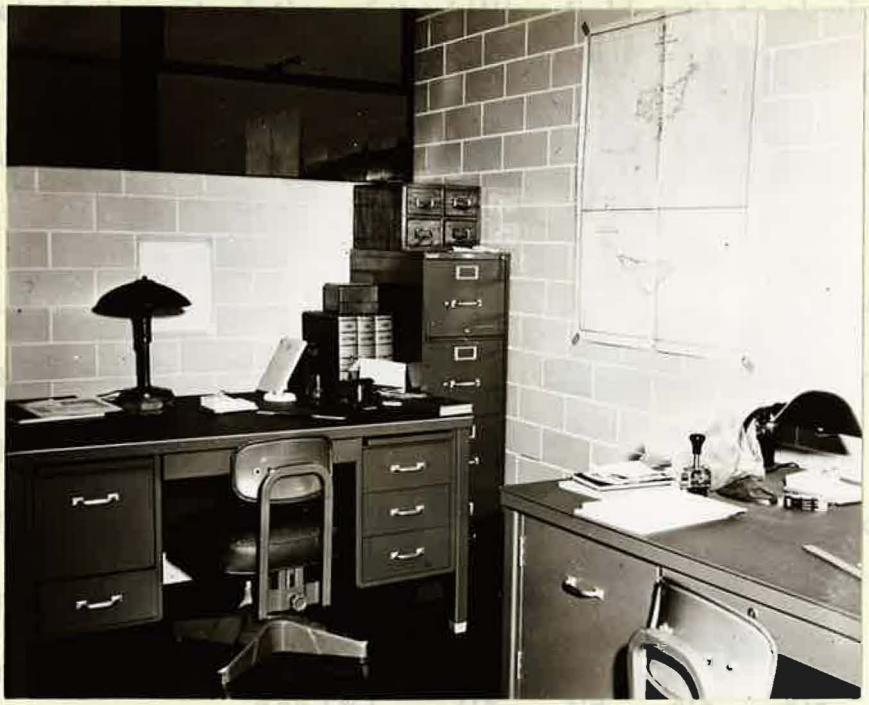

Figure 4. Biological laboratory office, St. Paul Island.

II. Population

A. Age classification:

The 2 percent sample taken for age classification in previous years was increased to a maximum of 20 percent on occasion in 1956. The enlarged sample size was the result of field testing the reliability of the smaller samples. Two to five percent samples were obtained by collecting one tooth sample from every other row. This sample was taken from the same column of animals in each case. Sampling by this method was based on the premise that seal placement in each tally (row of 10 animals) is randomized.

Dependent upon the clubbing or size of animals, large animals may tend to be concentrated on one of the sides or may be bulked toward the center. The physical characteristics of the killing field such as sloping or rough ground could contribute to a possible bias. Consideration of the possible weakness in the method prompted a check to be made on 15 July.

The normal 5 percent sampling method was used and comparison made with two other 5 percent samples taken in same manner in different locations. Sample No. 1 was taken on one side, No. 2 on the opposite side and No. 3 taken from the center. A total of 34 samples were taken from each of the ends and 33 were taken in the center.

Results of the sampling:

Age (%)	2's	3's	4's	5's
End No. 1		44.1	44.1	11.8
End No. 2	2.9	29.4	67.6	
Center 3		30.3	48.4	21.2

A further check was made using two concurrent 10 percent samples. One sample was taken from each tally row as the sampler progressed back and forth across the ten columns of carcasses. The check samples were taken by starting from the opposite side, continuing across the first line of samples, then returning. The sample and check sample thus formed a series of X's stacked upon each other. Figure 5 illustrates the method used. This 10 percent sample together with a 10 percent check sample was continued for one full round, 17-21 July inclusive. The agreement between the two samples in all cases was considered close enough to warrant continued use of the 10 percent crossover method of sampling and it was used throughout the balance of the season. Current information was provided the General Manager on the number of males of each age in the daily kill.

A marked change in male age composition was noted in the St. Paul Island kill. This is illustrated by the following table in which cumulative figures of males, ages 3 and 4 are set apart by comparable dates for the years 1954, 1955 and 1956.

Four year old males were predominant in 1956 from 27 June through 1 August; this is approximately three weeks longer than the 4 year predominance in 1954 and 1955. Both 1954 and 1955 had nearly twice the number of 3 year males as 4 year males at the end of the season. Percentage-wise, 1955 had 62 percent 3 year-old and 36 percent 4 year-old males. In 1954, 65 percent of the total kill was 3 year and 31 percent was 4 year animals.

Row sampling method

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Crossover sampling method

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Figure 5. Sampling methods, fur seal kill Pribilof Islands

Table 1. Cumulative number of male seals killed

	1954		1955		1956	
	3's	4's	3's	4's	3's	4's
1 July	3367	3952	1574	1962	1079	3056
6	5075	6258	3341	3643	2671	7060
11	9643	9667	5929	6248	6145	12677
16	15106	11561	10416	8999	9808	17954
21	22198	13301	15358	11648	14589	22159
26	30598	14995	21717	15638	20726	25999
31	32352[1]	15365[1]	30733[2]	18083[2]	26590	28560
15 Aug.					38290	31448

1 Sealing ended 27 July

2 Sealing ended 31 July

The percent of age composition at kill levels of 10, 20, 30, and 50,000 male seals for the years 1954, 1955 and 1956 is shown in the following table. Dates are those when the cumulative total kill reached the nearest thousand.

Reasons for the major change in age composition for 1956 are not entirely known. Several factors may have played important roles in the change. The possibility exists of an exceptional age class in both numbers and survival, and increased size of animals taken by raising the upper limits of the killing range.

Table 2. Percent age composition of male seals at comparable kill levels

Kill level	Date	Age 3 year Percent	Age 4 year Percent
	1954		
10,000	4 July	44	54
20,000	11 July	49	49
30,000	18 July	56	41
50,000	27 July	65	31
	1955		
10,000	9 July	50	48
20,000	16 July	54	44
30,000	22 July	56	42
50,000	31 July	62	36
	1956		
10,000	6 July	24	64
20,000	11 July	30	62
30,000	16 July	33	60
50,000	26 July	41	52

The report, Alaska Fur Seal Investigations, Pribilof Islands, Alaska, 1955, states in comparing the 1954 and 1955 seasons, that the only readily apparent difference was the coldness and lateness of the 1955 spring and summer and some delay in arrival of cows and births of pups. Studies of Dr. O. W. Olsen and Carl Dixon indicate a constantly

decreasing number of hookworm larvae in the soil throughout the summer, so that a few days delay in the peak of pup births combined with lessened number of hookworm larvae may conceivably result in a decreased pup mortality. The age class of 1952 which provided the 1955 3 year old animals, and 1956 4 year old animals may have been in circumstances as just described.

The 1955 season was extended four days to harvest more animals, the majority taken being 3 year males. There was no decline in numbers of 3 year males being taken at the finish of the season. This observation was made and generally was conceded to be the basis for an expected larger take of 4 year males in 1956. The harvest of 4 year males was much larger than expected. It is the additional number of animals in this classification which must be labeled. It is possible that the size limitations on the kill field were enlarged allowing larger, and correspondingly, older animals to be taken. Before any definite answers can be given it is proposed to study the management kill records covering 1956 and previous seasons.

B. Tag recoveries:

Following standard procedure, tagged seals were killed on St. Paul only if they fell within the commercially desirable size range. The sealing crew of St. George, however, was instructed to disregard size and kill all tagged animals appearing in the drives. Since tagging had

not previously been conducted on St. George, such tag recoveries would give some measure of the amount of straying from St. Paul. Table 3 shows the tag returns in a summarized form; 337 tag lost seals are included in the table. The 3 and 4-year age classes of both sexes were the major contributors since they are most numerous in the kill and have suffered the least tag loss. Our belief that straying is confined to immature animals is upheld by these data.

Table 3. Tag recoveries from male and female seals, in commercial kill, by age, St. Paul and St. George Islands, 1956

		St. Paul		St. George		
series	Age	male	female	male	female	Total
U.S.A.	15		4			4
No letter	11		1			1
A	9		21			21
B	8		70		1	71
CS	7		65	1		66
D	5	7	11	1		19
E	4	1425	263	94	2	1784
F	3	622	41	80	1	744
G	2	42	4	21		67
Total		2096	480	197	4	2777

As in previous years the commercial kill seals were individually examined for a tag or check mark as used in identifying those animals that had lost their tags. As each tag was recovered, its number together with the field length and sex of the animal was recorded. The same procedure applied to tag lost seals. On St. Paul this work was assigned to Dean Biesemeyer, biological aid, and Lavrenty Stepetin, an assistant from the village. Biologist Frank McGilvrey conducted the work on St. George. He was assisted by a St. George resident.

Following each daily kill the tag numbers were checked against those recorded in the field notes. Rookery of recovery, rookery of tagging, date, and age were added to the killing field data for each seal and the complete information was recorded on Keysort punch cards.

The authorization to kill a substantial number of females this year made possible a good collection of known-age teeth from this sex through recovery of tagged known age animals. As a result, tooth ridge counts of canine teeth from untagged females were improved in accuracy, especially those 6 years old and older. Material is now available for beginning work on the problem of aging females over 10 years old.

Although a good job was done in recovering tags it was felt that somewhat less crowded conditions at the killing site would have allowed a more accurate examination of the animals, especially in the search for those with check marks. In order to provide this much needed time during future sealing operations it is suggested that the splitters be

requested to remain one row behind the clubbers. This modification of the normal routine would not only be helpful but essential when returns from 50,000 to 100,000 tagged animals are expected.

Detailed information derived from tag recoveries is to be found in tables 4 and 5 and from additional appendix tables. Their application to the making of population estimates will be shown in a report which will be completed in the spring.

Figure 6. Brands or tatoos of unknown origin found on foreflippers of fur seals on St. Paul Island in 1956.

In Figure 6 is shown a kind of brand or tatoo mark found on the foreflippers of seals during the 1956 season. Only the figures "0" and

Table 4. Recovery location of tagged seals in commercial kill, 1956

Rookery of tagging	Rookery of recovery NEP	TOL	L-K	ZAP	REEF	POL	St. G.	Total
	G-Series - 2-yr-old seals, males							
NEP	4		1	1		1	6	13
TOL	1	1	1	2			5	10
L-K			1				3	4
ZAP				7		1	3	11
REEF	1	1	2	3	7	3	3	20
POL	1					2	1	4
T.L.	1							1
Total	8	2	5	13	7	7	21	63
	F-Series - 3-yr-old seals, males							
NEP	71	8	3	14		15	19	130
TOL	10	14	6	25	3	10	10	78
L-K	6	1	6	6	1	6	3	29
ZAP	16	9	5	79	2	17	9	137
REEF	35	16	11	46	27	19	25	179
POL	30	2	3	11	1	48	10	105
T.L.	11	2	3	13	1	10	4	44
Total	179	52	37	194	35	125	80	702

Table 4. Recovery location of tagged seals in commercial kill, 1956 (con.)

Rookery of tagging	Rookery of recovery NEP	TOL	L-K	ZAP	REEF	POL	St. G.	Total
E-Series - 4-yr-old seals, males								
NEP	210	14	4	15	1	43	17	304
TOL								
L-K								
ZAP	1	5	3	22	1	3	2	37
REEF	39	66	17	87	59	31	31	330
POL	123	32	20	34	5	384	35	633
T.L.	55	26	1	39	11	74	9	215
Total	428	143	45	197	77	535	94	1519
D-Series - 5-yr-old seals, males								
POL	2			1		4	1	8

Notes:

1. No tagging done in 1950.

2. One CS series (7-yr-old seal) tagged on NEP, St. Paul recovered on St. George.

3. Percent recovery of male seals on rookery of tagging

Age	Percent
2	35
3	35
4	44
5	50

Table 5. Recovery location of tagged seals in commercial kill, 1956

Rookery of tagging	Rookery of recovery							
	NEP	TOL	L-K	ZAP	REEF	POL	St. G.	Total
G-Series - 2-yr-old seals, females								
TOL		1						1
REEF		1		1	1			3
Total		2		1	1			4
F-Series - 3-yr-old seals, females								
NEP	1							1
TOL		3		1				4
L-K								
ZAP	1			2				3
REEF		1		1	11		1	14
POL	1					15		16
T.L.	1	2			1			4
Total	4	6		4	12	15	1	42
E-Series - 4-yr-old seals, females								
NEP	18					2		20
TOL								
L-K								
ZAP		1		1		1		3
REEF		2		2	34			38
POL	10	1		1	1	130	2	145
T.L.	7	2			13	37		59
Total	35	6		4	48	170	2	265

Table 5. Recovery location of tagged seals in commercial kill, 1956 (con.)

Rookery of tagging	Rookery of recovery							
	NEP	TOL	L-K	ZAP	REEF	POL	St. G.	Total
D-Series - 5-yr-old seals, females								
POL	1					10		11
CS-Series - 7-yr-old seals, females								
NEP	9				1	1		11
REEF	2	3		3	9			17
POL		1				36		37
Total	11	4		3	10	37		65
B-Series - 8-yr-old seals, females								
NEP								
TOL								
L-K								
ZAP				3				3
REEF		1		3	10	3		17
POL	1			1		45		47
T.L.				1		2	1	4
Total	1	1		8	10	50	1	71

Table 5. Recovery location of tagged seals in commercial kill, 1956 (con.)

Rookery of tagging	Rookery of recovery						
	NEP	TOL	L-K	ZAP	REEF	POL	St. G.	Total
A-Series - 9-yr-old seals, females								
NEP	3							3
TOL		1		1				2
L-K								
ZAP				1				1
REEF					3			3
POL						3		3
T. L.	3					6		9
Total	6	1		2	3	9		21
No letter series - 11-yr-old seals, females								
TOL				1				1
U. S. A. series - 15-yr-old seals, females								
NEP								
TOL								
L-K								
ZAP								
REEF					3			3
POL								
T. L.					1			1
Total					4			4
Grand total	58	20		23	88	291	4	484

"8" were noticed. No such marks were found in previous years. Because it was not made clear to the men recovering tags that the marks could have any statistical meaning an accurate count was not kept. Also, the vagueness of some of the marks made it uncertain whether they were really brands or not. Roughly 50 such marks were noticed. Photographs were supplied the Fish and Wildlife Service in Washington, D. C. for the purpose of asking other nations if they had knowledge of the origin of the marks.

C. Homing tendency:

The male sex has been necessarily emphasized in past land research on the various aspects of fur seal biology since females were not subject to harvest. In 1956, however, observations on homing tendency in females as well as males were made possible through tag recoveries from the 26,977 females included in the kill.

The standard procedure of cropping only young males does not permit tag recoveries from members of this sex above 5 years of age. And, although tag recoveries from most of the female year classes are somewhat inadequate for discussion at the present time, they will become increasingly valuable as future returns are obtained. However, some general comparisons may be made now.

In a group comparison using age classes 3 and 4 there is an apparent sexual difference in homing tendency, by rookery and by age. Tag recoveries from these age groups indicate that 88 percent of the females were

attracted to their rookery of birth as opposed to a figure of 47 percent for the males. A brief glance at all age classes shows that 87 percent of the females separated to their home rookeries while only 46 percent of the males appeared to do so. Since the sex ratio at birth and consequently at the time of tagging is 1:1, it is apparent that other factors are operating to account for this sexual difference in homing tendency.

At least two factors can be considered. First, is the age difference in sexual maturity for it is known that female fur seals mature earlier in life than males and homing tendency intensifies with age. Secondly, over-crowding on some rookeries undoubtedly produces a negative effect on homing tendency where immature males are concerned. Breeding bulls will not allow young males to enter a rookery although they welcome the appearance of females. A related factor is found in the fact that most of the young females return after the harem social structure has broken down.

Sexual maturity as a factor

Studies in the reproductive section of this report show that all 3-year-old females and 89 percent of the 4-year-olds sampled from the kill were nulliparous. On the basis of these findings, it is clear that only a small proportion of females breed at age 3 and none at age 2. Sexual maturity approached major proportions in the 4-year-olds, however, for 59 percent of the 5-year-old females gave birth to pups in 1956. This, of course, means that 41 percent of these females still remained nulliparous at age 4.

It follows then that either a significant maturity differential within a given age class or crowded rookery conditions, or both, preclude impregnation of many females.

Overcrowding as a factor

Should sexual maturity be only a minor factor affecting homing tendency at these age levels, it can logically be supposed that congested rookeries play an important part. In the exact sense of the word, overcrowding in itself does not affect homing tendency. More specifically, harem bulls display a vigorous aggressiveness toward even sexually immature males attempting to reach inland areas or hauling grounds. At the same time, young females are allowed to penetrate the harem areas.

These conditions can especially be observed on Reef rookeries, the largest on St. Paul Island. This group of rookeries contributed only 9 percent of the total male kill of 75,736 animals in 1956. In contrast, Reef yielded 28 percent of 18,433 females harvested.

Thus, many males of killable size are obliged to seek hauling grounds adjacent to other rookeries when, as on Reef rookeries, they are confronted with limited access to inland hauling grounds. Of 529 Reef-tagged males recovered, only 93 or 18 percent appeared in the kill on this rookery. By contrast, this rookery produced 75 percent of the total Reef-tagged females recovered. Comparable data for the other

rookeries are presented below in Table 6.

Table 6. Homing tendency of male and female seals, by rookery of recovery, based on tag recoveries from the commercial kill, St. Paul and St. George Islands, 1956.

Rookery of tagging	Male seals			Female seals		
	Total recoveries	Recovered home rookery number	Recovered home rookery percent	Total recoveries	Recovered home rookery number	Recovered home rookery percent
NEP	448	285	64	35	31	88
TOL	88	15	17	8	5	62
L-K	33	7	21	-	-	-
ZAP	185	108	58	10	7	70
REEF	529	93	18	95	71	75
POL	750	438	58	259	239	92
			Mean			Mean
Total	2033	946	46	407	353	87

D. Tagging:

The current series of seal pup taggings began in 1941 when 10,000 were tagged and branded with a hot iron on St. Paul Island. Half of these tags applied were monel metal (0.6 x 8 x 69 mm) and half were stainless steel (0.5 x 11 x 81 mm). Two of the monel tags were recovered in 1956, 15 years after they were attached. The hot-iron brands on these animals were also evident. In 1945, 1,000 seals were tagged with larger monel tags (Style 19M, National Band and Tag Company, Newport, Kentucky,

0.9 x 9.5 x 101 mm). A single tag recovered in 1956 after 11 years of use showed some wear, but it was still in good condition and probably would have remained attached for several more years.

The 20,000 seal pups tagged in each of the years 1947 and 1948 were marked with a sheep-ear tag of monel (0.7 x 8 x 69 mm). Those applied in 1948 wore rather rapidly. Although some are still being recovered (71 among the females taken in 1956), there is probably a steady loss of tags that wear through at the bend.

The tags applied in 1941, 1947, and 1948 did not have a raised guard which protected and locked the point after it penetrated the flipper and was bent over to hold the tag in place. The larger cattle ear-tag used in 1945, 1949, and thereafter has such a raised guard. This tag is more conspicuous, and generally superior for seal tagging.

Twenty-thousand seals were tagged in 1949 across the first and second digits of the left hindflippers. Tags applied in this manner hold very solidly when the seals are small but as they grow, the bones of the imprisoned phalanges are damaged or the clinched tag bursts open and drops off. Few, if any, will remain attached on mature males because of their great increase in size.

After 1949 all tags have been attached to the rear edge of one of the front flippers. These include:

Number	Date	Location	Check mark
1,000	1951	left front flipper	None
20,000	1952	right front flipper	tip of outer digit right hand flipper removed
10,000	1953	left front flipper	tip of left front flipper removed
10,000	1954	right front flipper	right front flipper notched, leading edge
50,000	1955	left front flipper	tip of outer digit left hind flipper removed
50,000	1956	right front flipper	tip of right front flipper removed

The tags now are applied with the clinched point upward. The advantage of having the point in a position where the success of the clinch can be quickly checked outweighs the danger of greater wear to the stamped numbers which may result from a position against the ground. A request is being made to have the number stamped on the same side as the clinch guard in future puchases of tags. It is now standard practice to further identify each tagged animal by a clipped flipper tip or digit, punch mark, or notch. Both tags and check marks will usually be put on a front flipper because they are easier to locate during sealing operations.

In 1956, as in 1955, 50,000 tags were used and these were alloted to each rookery according to the proportion of harem bulls counted on that rookery. An innovation in 1956 was that 20 percent of the tags, or 10,000, were applied on St. George Island. This, the first tagging done on St. George Island, is intended to show the movement of seals from St. George

to St. Paul Island and also the relative migration of St. Paul and St. George seals to waters off Asia and to Asian breeding islands.

Mr. Clarence Olson, General Manager of the Pribilof Islands, arranged for the same crew which carried on the fall sealing on St. Paul Island to do the seal tagging. This was, in general, an experienced crew with a good balance of mature, responsible men. As a result, the tagging on St. Paul was done rapidly but at the same time efficiently, in that there was only a small loss of tags through clinching failures or carelessness. It was discovered by Lavrenty Stepetin that fully clinched tags could be pulled open and re-clinched successfully. A worthwhile number of such tags were salvaged and used. Previously, clinched tags were considered hopeless for further use.

Tagging 40,000 seal pups on St. Paul Island required 5 half-days and 4 full days for thirty workmen. As usual the 30 men were divided into two crews of 15 men. The three biologists participating in the work, shifted from crew to crew during the operation according to need. Each crew manned a barricade with two tagging tables. Crews consist of:

1 pod watcher	2 hold-down men
2 taggers	4 pup catchers
2 tag loaders	1 barricade guard and relief catcher
2 check markers (clipping or notching flippers)	1 foreman and general relief man

The 10,000 seal pups on St. George were tagged by one crew in four days. Although the personnel on St. George was inexperienced they carried on the tagging without any special difficulties and at a very satisfactory rate.

A schedule of tagging locations is shown in Table 7.

Table 7. Pribilof Island tagging locations

St. Paul Island

Rookery	Date	Percent	Tag numbers	Number seals tagged
Polovina & Polovina Cliffs	4 & 7 September	8.8	10,001 - 14,400	4,400
Little Polovina	7 September	2.4	14,401 - 15,600	1,200
Gorbatch, Reef & Ardiguen	5, 7, 8, 9 September	21.6	15,601 - 26,400	10,800
Morjovi & Vostochni	10 & 11 September	18.4	26,401 - 35,600	9,200
Tolstoi	11 & 12 September	9.6	35,601 - 40,400	4,800
Lukanin & Kitovi	13 September	5.6	40,401 - 43,200	2,800
Zapadni	11 September	8.0	43,201 - 47,200	4,000
Little Zapadni & Zapadni Reef	12 September	5.6	47,201 - 50,000	2,800
				40,000

St. George Island

Staraya Artil	10 September	3.6	1 - 1,800	1,800
Zapadni	11 September	4.8	1,801 - 4,200	2,400
North Rookery	12 September	7.4	4,201 - 7,900	3,700
East Rookery	13 September	4.2	7,901 - 10,000	2,100
				50,000

All tags applied in 1956 have the series designation "I" stamped ahead of the number. Tags were attached to rear edge of the right front flipper near the junction of the fur and the bare skin and 1/2 to 3/4" of the tip of the same flipper was cut off to permit identification of individuals which have lost their tags (Fig. 7).

E. Bull counts:

There are two classes of bulls: harem and idle. A harem bull is defined as one that holds one or more cows through the breeding season. An idle bull is generally considered a sub-adult or one that lacks size and courage enough to establish a harem through replacement of a harem bull by physical force. Both groups, however, are conspicuous on the rookeries because of their large size. Because of the relative ease with which they can be enumerated, the bulls provide a valuable index to the population trend of the herd as a whole.

With some variation since 1911, the ratio of idle to harem bulls has increased from about 1 to 4 to a present ratio of 1 to 1. The results of the 1956 bull counts conducted on St. Paul Island by Mr. Clarence L. Olson, General Manager, are listed in Table 8. The bull census was not taken on St. George Island this year due to a shortage of experienced personnel.

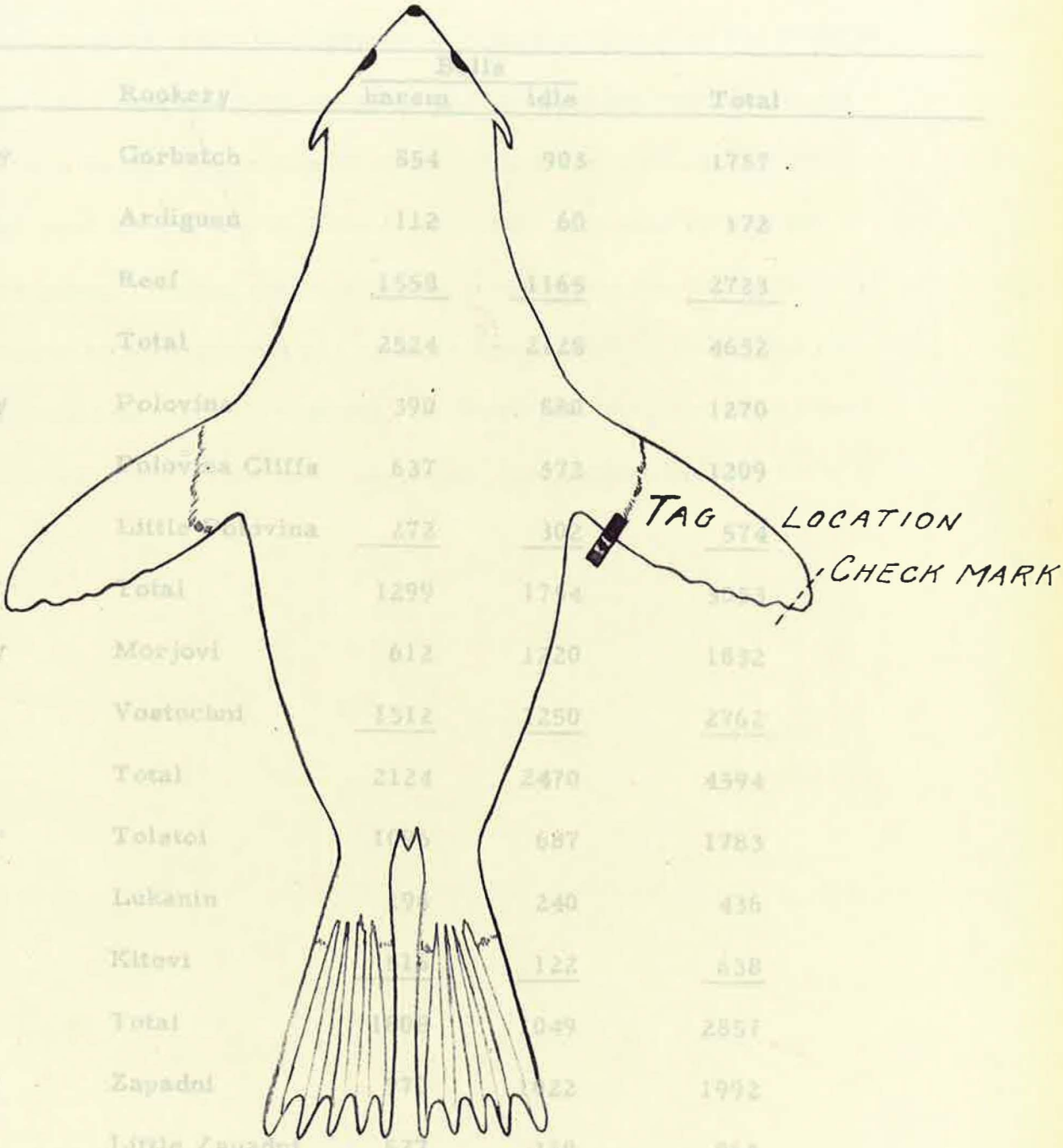


Figure 7. Tag and check mark locations used in 1956.

Table 8. Harem and idle bull counts, by rookery, St. Paul Island, 1956.

Date	Rookery	Bulls		Total
		harem	idle	
10 July	Gorbatch	854	903	1757
	Ardiguen	112	60	172
	Reef	1558	1165	2723
	Total	2524	2128	4652
11 July	Polovina	390	880	1270
	Polovina Cliffs	637	572	1209
	Little Polovina	272	302	574
	Total	1299	1754	3053
12 July	Morjovi	612	1220	1832
	Vostochni	1512	1250	2762
	Total	2124	2470	4594
13 July	Tolstoi	1096	687	1783
	Lukanin	196	240	436
	Kitovi	516	122	638
	Total	1808	1049	2857
14 July	Zapadni	970	1022	1992
	Little Zapadni	527	338	865
	Zapadni Reef	132	255	387
	Total	1629	1615	3244
	Grand total	9384	9016	18400

Responsibility for conducting the annual bull surveys has in the past been assigned to the Management officials in charge of the Pribilof Islands. The count has been made by the General Manager in recent years. At a recent conference of people concerned with management of the fur seal herd it was decided to shift this responsibility to the research group. During the next two or three years the counts will be made jointly by Management and research personnel in order that the transition may be made as smoothly as possible. Mr. Clarence Olson will train biologists in the methods he has used during the past decade.

III. Reproduction

A. Summary of previous studies:

Information on fur seal reproduction through 1955 consisted of data obtained from the examination of over 2,800 female genital tracts and accompanying tooth ridge counts to determine age.

Reproduction in females starts between their third and fifth year. Up to one third become impregnated in their third year and bear their first pup at age four.

Another third are impregnated in the fourth year and all but about 15 percent breed in the fifth year. The average pregnancy rate among females 4 years and older is 73 percent among seals taken on the Pribilof Islands, 65 percent for those in waters off North America and 80 percent for seals taken in waters off Japan.[1]

In 1956 information on the reproductive condition of the female seal was obtained by extensive sampling. Genital tracts and canine teeth from 4,640 females were examined and 484 tagged females were recovered.

B. Current results:

The 1956 season was set up as an experimental one for harvesting females. Prior to the sealing operation two periods were established for the taking of skins, the first extending from 27 June to 15 August and the second beginning in September and continuing until the continued take of skins would be impractical because of poor condition of pelage.

[1] Taken from, United States memorandum on current knowledge of the biology of the fur seal, Bio. Com/5 Dec. 3, 1955, North Pacific Fur Seal Conference.

Unknown factors:

In recent years the commercial season has not extended beyond 31 July. Thus the 1956 season was 15 days longer than any since 1944 when the killing continued to 8 August. Instructions were issued this season to take all available females that were over the minimum size limit in addition to all bachelors within the proper size range. It was unknown at the time what conditions would be encountered during the season to make a large female kill possible or impossible. As in previous years very few females were encountered in the early rounds of killing. Two attempts at harem raids were conducted, the 1st and 6th of July, with a total of 813 females taken. A steady increase in the number of females taken by round was evidenced with the rounds beginning in late July. The final four rounds, starting 27 July and ending 15 August, accounted for 17,275 of the total 18,433 females taken prior to the September killings. The increased availability of females during that period was very apparent. The influx of younger animals from the sea was added to the females available from the degeneration of harems at this time. The first portion of the commercial season ended at this point with sealing scheduled to begin 4 September.

During the interim, three samples of females totaling 59 animals were taken. It was noted that after 15 August, the number of female skins that could have been taken would have been governed only by manpower on

the island, not by availability of seals. Previous commitments by the Island management made it impossible to continue sealing until 4 September. A five day round in September was completed, then the commercial killing was terminated because of the condition of the pelage. During the fall season there was greater evidence of a mixing of the sexes than had been noted during early August. This caused some slowdown in the actual field process as males were avoided as much as possible. Sample killings of 20 females every five days were continued through the balance of September with an increasing number of skins rejected because of pelage condition.

Information secured from samples is assumed to be applicable to the entire female population. However, unless otherwise noted, all references, figures, charts and diagrams will be concerned with the actual sample figures.

A rough estimate of the daily female kill was made from the appearance of the large holding pods of animals, and from questioning the native foremen. This gave a working figure which could be adjusted during the actual take of animals. An overall 10 percent sample was set as a goal for the season. Final sample figures showed a season total of 4,640 females examined for gross reproductive condition, or 19 percent; approximately 500 ovaries were examined by dissection. The early take of females from harem drives were all parous with the majority being multiparous. Age and reproductive condition were shown to be closely correlated as the season progressed; more and more younger

animals appeared, and the pregnancy ratio dropped accordingly. Tables 9 and 10 give a summary of reproductive condition for St. Paul Island and St. George Island, respectively. Our findings show that a minor percentage of pregnant females were 4 years old. The percent of pregnancy increased with age, with maximum percent at age 7 and a decrease in ages 8 and older. It should be noted that the relatively high percentage of births attributed to age class 10 plus is spread over a wide range of ages. It is not known how rapidly the reproductive rate drops during these years as a method for aging the older females has not yet been developed.

Two major reproductive conditions were apparent in the female population. Animals were either nulliparous or multiparous; this is graphically shown in figure 8, "Reproductive condition of females by 5 day rounds, St. Paul Island, 1956". Primiparous animals made up a minor category. Figure 9, "Percent pregnancy of seals by age, St. Paul Island, 1956", gives a concise picture of the findings during the 1956 season. A further break down in the parous and non-parous groups has been made by age. The trend of a marked decrease in percent, from ages three to ten plus in nullipara animals, is reflected conversely in multipara animals, both multipara pregnant and multipara non-pregnant. Females taken before 1 August were incidental to the final figures on 15 August. The harem drives on St. Paul Island and on St. George Island, contributed the largest number of females in the period preceding 1 August.

Table 9.

Summary of reproductive condition[1] of females sampled from commercial kill, by age, St. Paul Island, 27 June to 15 August, 1956

Reproductive condition	Age 2	3	4	5	6	7	8	9	10	10+	Total
Nullipara											
number	1	173	554	221	52	10	7	1	1	1	1021
percent	100	100	89	41	13	4	3	1	1		34
Primipara											
Pregnant											
number			52	193	97	20	7	1			370
percent			8	36	24	8	3	1			12
Non-pregnant											
number			3	5	18	8	4				38
percent			1	1	4	3	2				1
Multipara											
Pregnant											
number			9	113	205	181	120	72	34	218	952
percent			2	21	50	68	58	62	51	36	32
Non-pregnant											
number			1	8	37	46	69	42	31	397	631
percent				1	9	17	34	36	48	64	21
Total	1	173	619	540	409	265	207	116	66	616	3012
Percent		6	20	18	14	9	7	4	2	20	

All females

	number	percent
Pregnant	1322	44
Non-pregnant	1690	56
Total	3012	

Primipara and multipara females

	number	percent
Pregnant	1322	66
Non-pregnant	669	34
Total	1991	

Sample size in percent of total kill: 16

[1] Determined by examination of genital tracts.

Table 10.

Summary of reproductive condition[1] of females sampled from commercial kill, by age, St. George Island, Alaska, 27 June to 15 August, 1956

Reproductive condition	Age 3	4	5	6	7	8	9	10	10+	Total
Nullipara										
number	14	106	57	10	5	1				193
percent	100	88	47	12	9	1				26
Primipara										
Pregnant										
number		14	56	39	9	3	1		2	124
percent		12	46	45	15	5	2		1	17
Non-pregnant										
number			1				1			2
percent			1				2			
Multipara										
Pregnant										
number			8	31	41	40	25	20	108	273
percent			6	36	68	67	62	69	52	37
Non-pregnant										
number				6	5	16	13	9	98	147
percent				7	8	27	33	31	47	20
Total	14	120	122	86	60	60	40	29	208	739
Percent	2	16	17	12	8	8	5	4	28	

All females

	number	percent
Pregnant	397	54
Non-pregnant	342	46
Total	739	

Primipara and Multipara females

	number	percent
Pregnant	397	73
Non-pregnant	149	27
Total	546	

Sample size in percent of total kill: 17

[1] Determined by examination of genital tracts

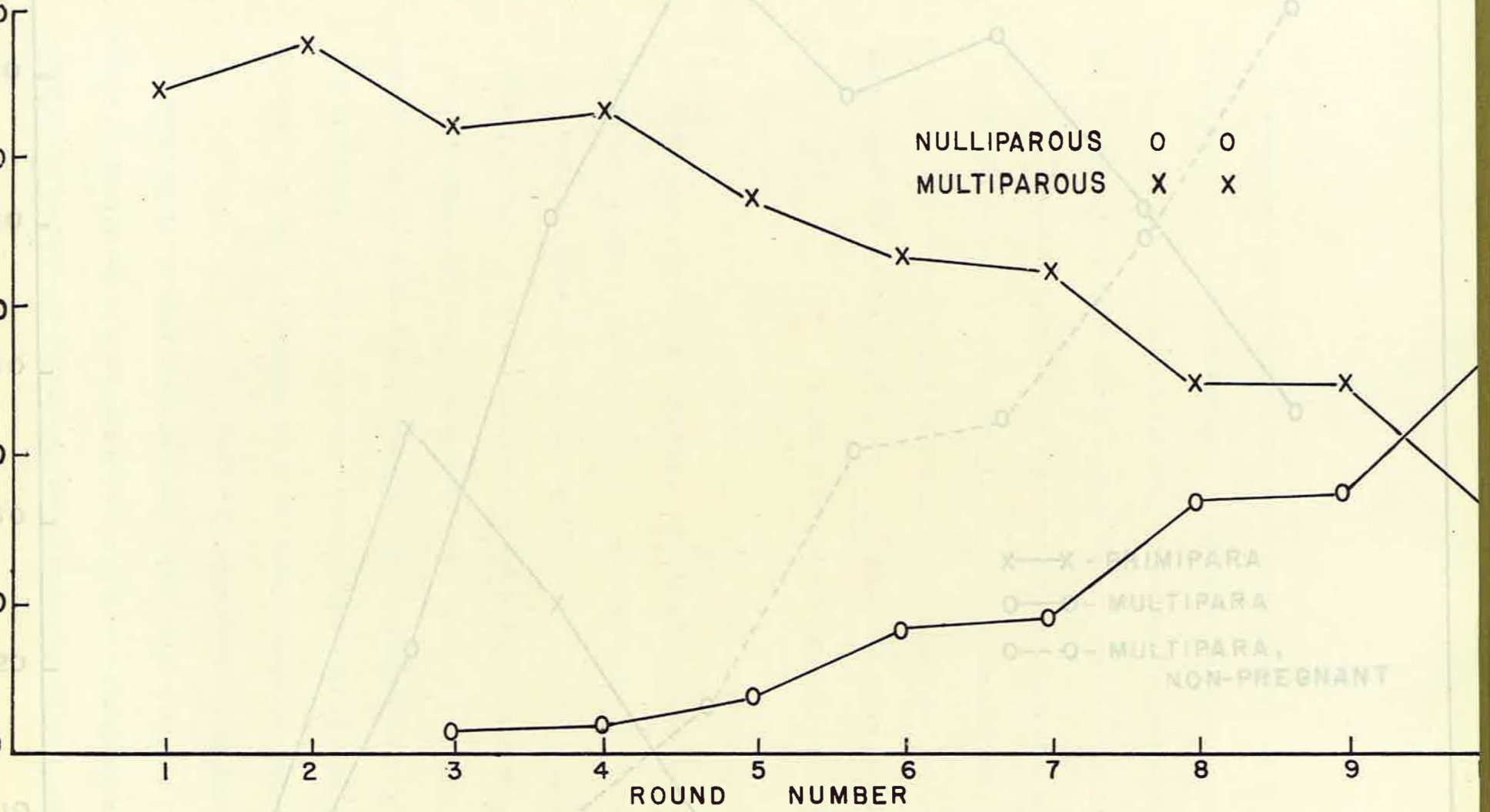
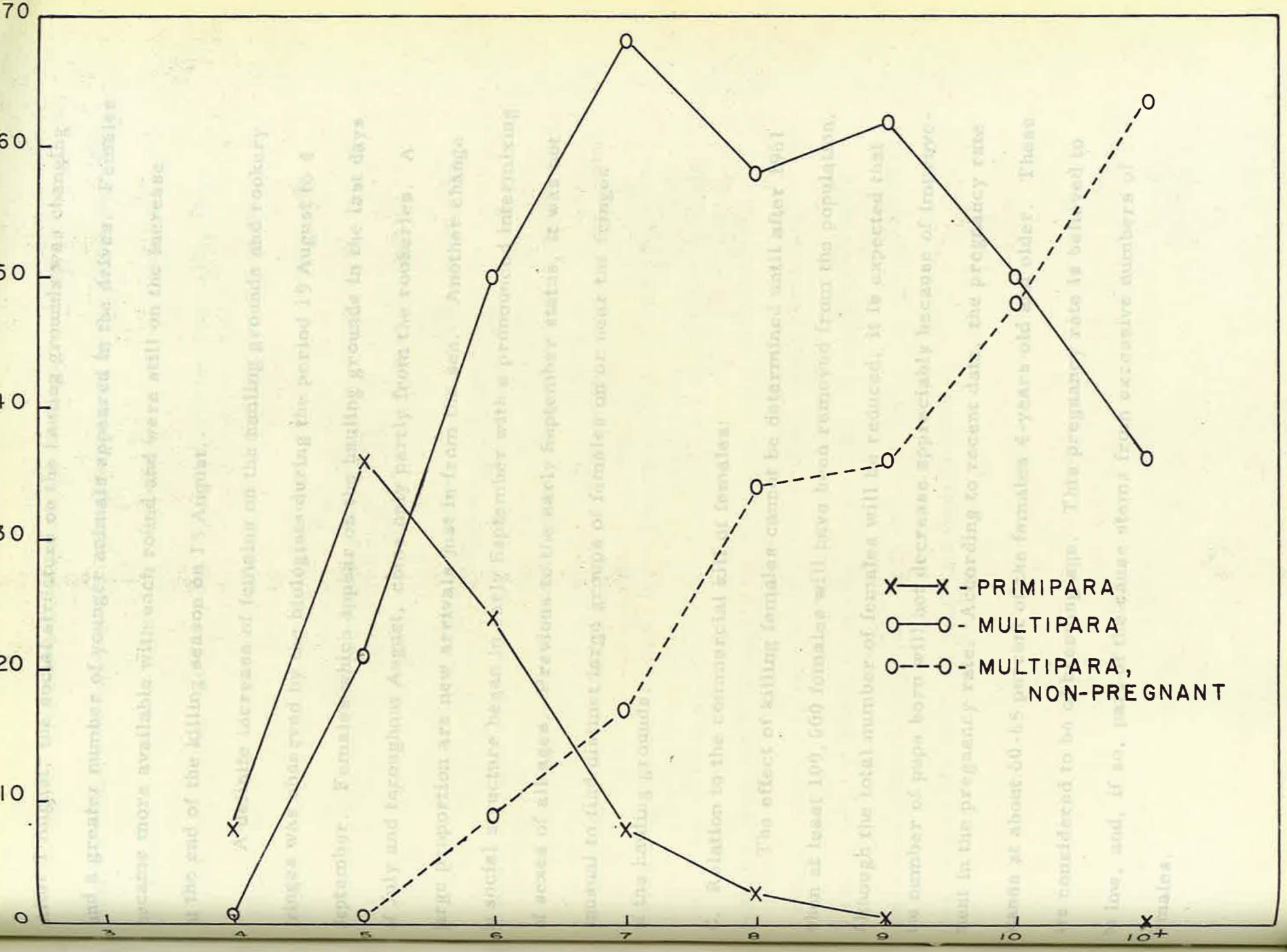


Figure 8. --Reproductive condition of females by 5-day rounds, St. Paul Island, Alaska, 27 June to 15 August, 1956.


70
60
50
40
30
20
10
0
3
4
5
6
7
8
9
10
10+
X—X - PRIMIPARA
O—O - MULTIPARA
O--O - MULTIPARA, NON-PREGNANT

After 1 August, the social structure on the hauling grounds was changing and a greater number of younger animals appeared in the drives. Females became more available with each round and were still on the increase at the end of the killing season on 15 August.

A definite increase of females on the hauling grounds and rookery fringes was observed by the biologists during the period 15 August to 4 September. Females which appear on the hauling grounds in the last days of July and throughout August, come only partly from the rookeries. A large proportion are new arrivals just in from the sea. Another change in social structure began in early September with a pronounced intermixing of sexes of all ages. Previous to the early September status, it was not unusual to find distinct large groups of females on or near the fringes of the hauling grounds.

C. Relation to the commercial kill of females:

The effect of killing females cannot be determined until after 1961 when at least 100,000 females will have been removed from the population. Although the total number of females will be reduced, it is expected that the number of pups born will not decrease appreciably because of improvement in the pregnancy rate. According to recent data, the pregnancy rate stands at about 60-65 percent of the females 4-years old and older. These are considered to be of breeding age. This pregnancy rate is believed to be low, and, if so, part of the cause stems from excessive numbers of females.

A closely related reason for the apparent low production is an excess number of females in relation to the limited rookery area. Crowding will have a multiple effect; it limits the opportunity for breeding and limits the survival of the young that are born. An exact timetable for alleviation of crowding effects cannot be predicted. If a commercial kill of the expected size and age and sex composition continues to be available it can be assumed that the pregnancy rate has been improved by the reduced crowding. Corroborative evidence will be found by the examination of reproductive tracts. It is hoped that other effects, such as an improved survival rate, will accompany the change in pregnancy rate.

Some consideration should be given to the manner in which females are obtained. Very few of the female seals taken from the hauling grounds up to 15 August were definitely in nursing condition. Allowing for some error in recognizing nursing females, the number is still very low. It appears that parous females are not frequently found on hauling grounds as long as their pup is still alive. The net effect on the population is approximately the same, regardless of the status of the females taken. However, a generally cleaner, more efficient, and safer operation results when females are taken only from hauling grounds.

IV. Mortality

A. Dead pup counts:

1. Total count

A five-six man crew made the dead pup census on St. Paul Island between 20 August and 26 August. A two man crew covered St. George in four days, 17-20 August. The total count for both islands was ~~120,637~~ 119,505, including a 5 percent addition to allow for dead pups missed. Table 11 gives the 1956 dead pup count by rookery for the Pribilof Islands.

An improved device for marking dead pups was used during the count. It consisted of a quart polyethylene bottle with a 1/4" hole bored in the screw top. This bottle was mounted, top down, on an aluminum tube, with a thumbscrew type hose clamp. Breakage was avoided by using the plastic bottle; quick exchange was made possible by the thumbscrew clamp. A supply of extra bottles was filled in the village making it unnecessary to delay operations for refills in the field.

Table 11 also gives a comparison of the St. Paul Island dead pup counts for the years 1954, 1955, and 1956. A decided increase in the overall mortality occurred this season. All rookeries except Ardiguen, Reef and Tolstoi showed a large percentage increase over 1955.

2. Sample area counts

Permanent study areas were marked off during the latter part of August to form the basis of an annual census of dead pups by sampling,

Table 11. Dead pup counts, Pribilof Islands, Alaska, 1954-1956

St. Paul Island Rookery	1954	1955	1956	Percent change between years 1954&55	1954&56	1955&56	$\frac{1954+55}{2}$ & 56
Northeast Point							
Morjovi	8,049	5,571	10,278	-30.7	+27.7	+84.5	+50.9
Vostochni	25,233	14,473	20,498	-42.6	-18.8	+41.6	+ 3.2
Polovina							
Little Polovina	3,852	2,782	4,443	-27.7	+15.3	+59.7	+33.9
Polovina Cliffs	6,413	5,964	8,637	- 7.0	+34.7	+44.8	+39.6
Polovina	6,459	4,660	7,463	-27.8	+15.5	+60.2	+34.2
Reef							
Ardiguen	282	387	364	+37.2	+29.1	- 6.0	+ 9.0
Gorbatch	4,900	4,789	6,291	- 2.3	+28.4	+31.4	+29.9
Reef	12,959	15,145	14,399	+16.9	+11.1	- 4.9	+ 2.5
Sivutch	---	---	---	---	---	---	---
Kitovi-Lukanin-Tolstoi							
Kitovi	1,669	2,610	2,892	+56.4	+73.3	+10.8	+35.1
Lukanin	1,129	1,129	1,718	---	+52.2	+52.2	+52.2
Tolstoi	7,552	6,489	6,789	-14.0	-10.1	+ 4.6	- 3.3
Zapadni							
Little Zapadni	4,979	3,555	4,611	-28.6	- 7.4	+29.7	+ 8.1
Zapadni Reef	2,278	1,383	1,674	-39.3	-26.5	+21.0	- 8.5
Zapadni	10,424	6,607	8,650	-36.6	-17.0	+30.9	+ 1.6
Actual total	96,178	75,544	98,707				
Add 5 percent	4,809	3,777	4,935				
Estimated total	100,987	79,321	103,642				
Change in mortality				-21.5	+ 2.6	+30.7	+15.0
St. George Island							
	10,139	---	15,863	= estimated			

Summary 1956

Pribilof Islands	114,570
Add 5 percent	5,728
Estimated total	120,298

for correct total see Report of Standing Sci. Com 1964

rather than by a complete count on all rookeries. Signs were placed on all corners of the areas and midway between corners where needed to follow a boundary (fig. 10). They were made from red cedar and attached with brass "U" bolts to 6' galvanized pipe set in concrete. When catwalk framing served as a boundary, signs were fastened to it with brass wood screws.

Figure 10. Signs erected to permanently mark boundaries of areas for seal pup mortality counts.

The signs were dipped into hot linseed oil, drained overnight and the routed letters then filled with yellow paint. Fifty signs were installed covering all rookeries except Kitovi-Lukanin, Zapadni-Reef and Ardiguen. It was felt that these latter locations were not suited to sampling because of their small size; the entire rookeries were designated as study areas.

Two areas were set up on the Northeast point rookery, one each on Morjovi and Vostochni. One area was marked for each of the Polovina rookeries, Little Polovina, Polovina Cliffs and Polovina. One area on Gorbatch and two on Reef rookery were outlined, and one area each designated on Tolstoi, Little Zapadni and Zapadni rookeries. Results of study area counts are listed in Table 12. Approximately thirty percent of the total dead pups counted were from study areas. The new permanent study areas were enlarged to nearly twice the size of the former areas.

Table 12. Dead pup counts, study areas
St. Paul Island, Alaska 1956

Rookery	
Northeast Point Rookeries	
Morjovi study area	4316
Vostochni study area	4217
Polovina Rookeries	
Little Polovina study area	2296
Polovina	4237
Reef rookeries	
Gorbatch	2081
Reef Area 1 (north)	1632
Area 2 (south)	2725
Kitovi, Lukanin, Tolstoi	
Tolstoi	3550
Zapadni Rookeries	
Little Zapadni	1806
Zapadni	4441

The counts on the former sample areas did not adequately reflect the mortality fluctuation which occurred over the total rookery area.

B. Soil treatment:

Continuation of the hookworm program was carried on by treating the Polovina spray area (approximately three acres) with a solution made with 5 percent cresylic acid disinfectant (phenol coeffecient -9), to which was added a commercial wetting agent, Tenlo "400" (Griffin Chemical Company). The proportion of wetting agent in the solution was .03 percent. This solution was applied at the rate of one pint per square foot, with a small spray boom designed by Dr. O. W. Olsen. The boom received the solution through a 1-1/4 inch discharge hose, pressure being supplied by a gasoline driven pump.

C. Recent mortality trends:

Gross comparison by actual count of dead pups between a 15,000 sq. ft. plot on Northeast Point rookery, and the Polovina spray area, is set forth in Table 13. For the period of time, 1953-1956 inclusive, annual counts made at each location have been compared. Fluctuations shown by comparisons between years on any specific plot are large enough to indicate influence of some fairly decisive factor. However, there is a striking similarity between the variations of the separate plots, when compared for any given year.

The significance, if any, of the close correlation of mortality changes between these two areas, which are dissimilar in several ways, is uncertain at this time.

Table 13. Dead pup studies St. Paul Island, Alaska, 1951-1956

I. Northeast Point

II. Polovina spray area

I. Comparative counts on 15,000 square feet at Northeast Point Rookery.

1951	1952	1953	1954	1955	1956
430	---	325	420	293	365

Percent change between years:

1954 & 1955	-30.2
1954 & 1956	-13.1
1955 & 1956	+24.6
$\frac{1954+1955}{2}$ & 1956	+ 2.2

II. Polovina spray area.

1954	1955	1956
4,959	3,312	4,237

Percent change between years:

1954 & 1955	-33.2
1954 & 1956	-14.6
1955 & 1956	+27.9
$\frac{1954+1955}{2}$ & 1956	+ 2.4

The two areas in question are not of comparable size, they are not located on the same rookery, nor did they receive the same treatment. However, comparison between the total dead pup counts on both rookeries for the like period, 1954, 1955, and 1956, shows the same general trend in mortality. It would be expected from the results of testing various compounds (report of O. W. Olsen and Carl Dixon 1951-1955) that a significant difference would be manifested between the two sample areas. The treated area on Polovina would be expected to show a decline in mortality over that shown by the untreated sample area on Northeast Point rookery. Instead, the fluctuations in mortality appear to take place independently of any treatment the area received. The trend since 1953 suggests that the mortality rate has stopped the steep upward climb which characterized it during the 1940's and is now fluctuating about a level which is adjusted to the present population under existing conditions. If no man-created change in herd size takes place, it might be expected that the annual island pup mortality would vary between 75,000 and 125,000 with, perhaps, a small increase as the total population size struggles slowly upward.

The decision, reached from the foregoing results, has been to suspend large scale soil treatment experiments as part of the mortality studies, and to seek an ecological approach to the mortality problem. This is based on the lack of conclusive evidence of any reduced pup mortality as a result of soil treatment. The present research staff suggests that the investigations be concentrated on the basic problem of discovering the

factors leading to pup mortality. It is hoped to obtain the services of a competent pathologist to study the various causes of mortality during the summer of 1957.

V. Other wildlife species

A. Reindeer

On 31 August a party consisting of Carl Abegglen, Frank McGilvrey, Lavrenty Stepetin, Alton Roppel, George Rukevishnikoff, and Ford Wilke made a count of the reindeer on St. Paul Island. As the result of our search the total is believed to be 160, plus or minus 5 animals.

The island from Zapadni to Rush Hill was examined in the morning. A group of about 150 was found in the valley below Ridge Wall. Repeated counts ranged from 124 to 153 depending on the spread of the animals and the topography. Most of the counts were between 140 and 150. The tendency is to undercount rather than overcount because some animals are nearly always hidden. It is believed, therefore, that 150 is a reasonable figure for this group. The group of 150 contained 10 white or Holstein-colored deer and at least 24 large antlered deer, presumably mature males.

In the afternoon the part of the island between Lake Hill, Bogoslov, Cone Hill, North Hill, and Rush Hill was examined. A second band of thirteen was found between Low Hill and Bogoslov. This band was predominantly large animals. One skeleton of a mature deer which had died during the past winter or spring was found. Older skulls with antlers were fairly numerous.

The group of reindeer (7 males, 24 females) which were released in 1951 have roamed undisturbed since then. No culling or other attempts at management have been made. It is likely that the sexes are now approximately equal in number. It is often stated that with such an abundance of

males there will be excessive fighting and losses, not only of males but also of some females. Whether or not this is true and how it applies to St. Paul Island is outside our knowledge. However, winter food is definitely one of the critical factors in the survival and growth of the herd. Any males in addition to those needed for breeding are surplus and unless removed are a handicap to the remainder of the herd. A productive herd cannot be attained so long as scarce food goes toward the support of an unnecessary number of males. It would be desirable to carry fawns over one winter to allow them to reach a worthwhile size for harvesting. The minimum age of animals removed from the herd would then be about 18 months. In addition to a proper balance of sexes there is a total number that can be carried by a given size of range. A range management official has stated that 250 reindeer would be a desirable maximum for the St. Paul Island herd.

In a wintering herd of 250 reindeer the ideal age composition might be about:

38 male fawns
38 female fawns
30 adult males
144 adult females
250

Part of the fawns will be surplus, part will replace breeding stock, and part will be lost through mortality.

Palmer (1944)[1] stated that the population density of caribou within their range is 5 to 10 animals to the square mile. It is reasonable to conclude that the whole 45 square mile area of St. Paul Island is not available to reindeer considering the following:

1. There are extensive sand dune areas on which the predominant vegetation is beach rye grass not used by reindeer.

2. That almost bare scoria slopes and lava flows remove another sizable area from forage production.

3. That parts of the heath have been denuded by reindeer pawing up lichens and prostrate willows during the winter.

4. That no large growths of lichens which are considered essential for winter forage in the maintenance of reindeer remain on St. Paul.

The maximum of 250 reindeer seems reasonable in view of the above conditions.

Practical considerations will determine whether or not the time and effort and expense can be devoted to the reindeer herd which would be required to maintain both a desirable sex balance and maximum number. Holding the herd at a given numerical level may be all that can be practically achieved. One consideration is that the old corral will require extensive repair work before it will be usable for roundups. Another is that the annual value of the meat might not be more than $1300 to $1800 assuming that fifty to seventy 85 pound carcasses worth $.35 per pound are obtained.

[1] Palmer, L. J. 1944. Food requirements of some Alaskan game mammals. Jour. Mamm. 25:49-54.

If a roundup is not feasible then harvest with rifles is the alternative method. As a small scale method under rigid control, it has some value. Such controls would include the issuance of a permit to the hunter, and the assignment of responsible guides to each hunter to insure, insofar as possible, that animals of the proper sex were taken; that they were not wounded through carelessness, and that there was no waste. The permits should be staggered over the fall months to avoid having many hunters in the field at one time.

Close control of the population composition will not be possible unless all the animals can be corralled and examined. During previous roundups, not more than half of the total number of animals were captured. If this situation continued, males could be removed as desired from the segment of the herd captured and enough females taken to hold the herd at the desired level. Assuming that (1) half the herd is captured and (2) the sex ratio among both captured and free animals is equal, the following might occur:

First year: Population = 300, including 50 fawns

Captured (including 25 fawns)		Free (including 25 fawns)	
Males	Females	Males	Females
75	75	75	75

63 removed, 12 male fawns released

Result: Wintering population = 87 males
150 females
237

ar: Population = 237 less 10 percent mortality =
213 + 75 fawns = 288

ptured (including 35 fawns) Free (including 35 fawns)

ales	Females	Males	Females
57	87	57	87

removed, 12 male fawns released

esult: wintering population = 69 males
174 females
243

r: Population = 243 less 10 percent mortality = 219 + 85 fawns

ptured (including 42 fawns) Free (including 43 fawns)

ales	Females	Males	Females
53	99	53	99

males removed

esult: wintering population = 56 males including 21 fawns
198 females including 43 fawns
254

is theoretically possible to maintain good control of the herd
gh only half of it is captured each year. Success would depend
reasonably even distribution of sexes between the part of the
ured and that part remaining free. There is no reason to believe
l not be the case. Some lack of efficiency might result from the
emove a number of male fawns.

:

rgely through the efforts of Karl W. Kenyon some semblance

of conservative methods are being applied to wild fowl hunting on the Pribilof Islands. It is now the general practice to delay the start of kittiwake hunting until after 15 September. It is extremely important in the hunting of colonial sea birds to avoid killing them until after the chicks have left the nest and are able to care for themselves. Thereafter, many will be lost through natural causes so moderate hunting will probably do little harm to the population.

Most of the bird colonies on St. Paul Island are exposed to hunting but some of those on St. George are relatively inaccessible. The colonies on Otter Island are seldom molested. It is our belief that Otter Island has its greatest value as a biological sanctuary.

Hunting on the Pribilof Islands has developed into a sport in place of an essential method of getting food (figure 11). Because of its sport status

Figure 11. Hunting kittiwakes near East Landing, St. Paul Island in late September, 1956.

there should be no hesitation about effecting regulations which will give whatever protection is necessary to the hunted species before privileges are accorded hunters.

A conservation problem exists only in connection with the resident colonial birds, particularly the red-legged kittiwake, which has a very limited breeding range. The Pribilofs are not an important resting or feeding area for migratory species. Such hunting of migrants as occurs has little influence on their welfare.

Appendix Table A.

Age classification[1] of males in commercial kill, St. Paul Island, Alaska, 27 June to 15 August, 1956

Date	Rookery	Males killed	Tooth sample size	Percent in each age class[2]				Estimated number killed from age class			
				2	3	4	5	2	3	4	5
27 June	NEP	773	57		33	58	9		255	448	70
28	TLK	843	45		29	67	4		244	565	34
29	ZAP	1549	78		21	63	14		325	976	217
30	REEF	307	16		19	69	12		58	212	37
1 July	POL	1156	66		17	74	8		197	855	92
Round total		4628	262						1079	3056	450
2 July	NEP	744	36		19	67	14		141	499	104
3	TLK	1772	85		19	63	18		337	1116	319
4	ZAP	1266	62		42	52	6		532	658	76
5	REEF	492	24		12	71	17		59	349	84
6	POL	2093	101		25	66	9		523	1382	188
Round total		6367	308						1592	4004	771
7 July	NEP	1993	89	1	28	70	1	20	558	1395	20
8	TLK	1274	62	2	32	64	2	25	408	816	25
9	ZAP	4051	191	1	46	50	3	40	1863	2026	122
10	REEF	695	36		30	53	17		209	368	118
11	POL	1557	74		28	65	7		436	1012	109
Round total		9570	452					85	3474	5617	394

Appendix Table A.

Age classification[1] of males in commercial kill, St. Paul Island, Alaska
27 June to 15 August, 1956 (con.)

Date	Rookery	Males killed	Tooth sample size	Percent in each age class[2]				Estimated number killed from age class			
				2	3	4	5	2	3	4	5
12 July	NEP	2265	116	1	30	67	2	23	680	1517	45
13	TLK	1720	81		32	58	10		550	998	172
14	ZAP	2968	142	2	49	46	2	59	1455	1365	59
15	REEF	687	101	1	35	53	11	7	240	364	76
16	POL	1845	93	2	40	56	2	37	738	1033	37
Round total		9485	533					126	3663	5277	389
17 July	NEP	1929	359	2	45	48	5	39	868	926	96
18	TLK	2119	417	2	51	44	3	42	1081	932	64
19	ZAP	2147	426	1	57	38	4	21	1224	816	86
20	REEF	1197	237	1	45	44	10	12	539	527	119
21	POL	2182	438	1	49	46	4	22	1069	1004	87
Round total		9574	1877					136	4781	4205	452
22 July	NEP	3371	330	1	56	40	3	34	1888	1348	101
23	TLK	1540	142	1	59	38	2	15	909	585	31
24	ZAP	3257	302	3	65	29	3	98	2117	944	98
25	REEF	866	79		42	57	1		364	493	9
26	POL	1342	120		64	35	1		859	470	13
Round total		10376	973					147	6137	3840	252

Appendix Table A.

Age classification [1] of males in commercial kill, St. Paul Island, Alaska, 27 June to 15 August, 1956 (con.)

Date	Rookery	Males killed	Tooth sample size	Percent in each age class [2] 2	3	4	5	Estimated number killed from age class 2	3	4	5
27 July	NEP	3419	334	2	65	32	1	69	2222	1094	34
28	TLK	758	77	1	60	35	4	8	455	265	30
29	ZAP	2439	214	2	73	23	2	49	1780	561	49
30	REEF	974	91	7	63	27	3	68	614	263	29
31	POL	1183	117	-	67	32	1	-	793	378	12
Round total		8773	833					194	5864	2561	154
1 August	NEP	2539	245	5	75	19	1	127	1904	483	25
2	TLK	887	76	4	67	25	4	35	595	222	35
3	ZAP	1945	198	5	80	15	-	97	1556	292	-
4	REEF	471	44	7	64	25	2	33	302	118	9
5	POL	992	90	4	76	18	2	40	754	178	20
Round total		6834	653					332	5111	1293	89
6 August	NEP	1799	183	9	76	13	2	162	1367	234	36
7	TLK	888	102	8	72	19	1	71	639	169	9
8	ZAP	1312	128	15	69	13	3	197	905	171	39
9	REEF	281	62	21	66	11	2	59	185	31	6
10	POL	1138	93	20	62	18	-	228	705	205	-
Round total		5418	568					717	3801	810	90

Appendix Table A.

Age classification[1] of males in commercial kill, St. Paul Island, Alaska, 27 June to 15 August, 1956 (con.)

Date	Rookery	Males killed	Tooth sample size	Percent in each age class[2] 2	3	4	5	Estimated number killed from age class 2	3	4	5
11 August	NEP	1707	211	20	64	16	-	341	1093	273	-
12	TLK	631	81	18	57	25	-	114	360	157	-
13	ZAP	970	120	24	63	12	1	233	611	116	10
14	REEF	558	122	37	45	17	1	206	251	95	6
15	POL	845	59	27	56	17	-	228	473	144	-
Round total		4711	593					1122	2788	785	16
Season total		75736	7052	4	51	42	4	2859	38290	31448	3057

1/ Age based on tooth ridge counts and tag recoveries.

2/ Where applicable, 6-year-old seals were included in the calculations but excluded from the table since they numbered only 5 for the season.

Appendix Table B.
Cumulative age classification of males in commercial kill,
St. Paul Island, Alaska
27 June to 15 August, 1956

Date	Rookery	Estimated number males killed from age class				Cumulative total males killed	Cumulative percent males killed from age class			
		2	3	4	5		2	3	4	5
27 June	NEP	-	255	448	70	773	-	33	58	9
28	TLK	-	499	1013	104	1616	-	31	63	6
29	ZAP	-	824	1989	321	3165	-	26	63	10
30	REEF	-	882	2201	358	3472	-	25	63	10
1 July	POL	-	1079	3056	450	4628	-	23	66	10
2	NEP	-	1220	3555	554	5372	-	23	66	10
3	TLK	-	1557	4671	873	7144	-	22	65	12
4	ZAP	-	2089	5329	949	8410	-	25	63	11
5	REEF	-	2148	5678	1033	8902	-	24	64	11
6	POL	-	2671	7060	1221	10995	-	24	64	11
7	NEP	20	3229	8455	1241	12988	-	25	65	10
8	TLK	45	3637	9271	1266	14262	-	26	65	9
9	ZAP	85	5500	11297	1388	18313	-	30	62	7
10	REEF	-	5709	11665	1506	19008	-	30	61	8
11	POL	-	6145	12677	1615	20565	-	30	62	8
12	NEP	108	6825	14194	1660	22830	-	30	62	7
13	TLK	-	7375	15192	1832	24550	-	30	62	7
14	ZAP	167	8830	16557	1891	27518	1	32	60	7
15	REEF	174	9070	16921	1967	28205	1	32	60	7
16	POL	211	9808	17954	2004	30050	1	33	60	6

Appendix Table B.
Cumulative age classification of males in commercial kill,
St. Paul Island, Alaska
27 June to 15 August, 1956 (con.)

Date	Rookery	Estimated number males killed from age class 2	3	4	5	Cumulative total males killed	Cumulative percent males killed from age class 2	3	4	5
17 July	NEP	250	10676	18880	2100	31979	1	33	59	6
18	TLK	292	11757	19812	2164	34098	1	34	58	6
19	ZAP	313	12981	20628	2250	36245	1	36	57	6
20	REEF	325	13520	21155	2369	37442	1	36	56	6
21	POL	347	14589	22159	2456	39624	1	37	56	6
22	NEP	381	16477	23507	2557	42995	1	38	55	6
23	TLK	396	17386	24092	2588	44535	1	39	54	6
24	ZAP	494	19503	25036	2686	47792	1	41	52	6
25	REEF	-	19867	25529	2695	48658	-	41	52	6
26	POL	-	20726	25999	2708	50000	-	41	52	5
27	NEP	563	22948	27093	2742	53419	1	43	51	5
28	TLK	571	23403	27358	2772	54177	1	43	50	5
29	ZAP	620	25183	27919	2821	56616	1	44	49	5
30	REEF	688	25797	28182	2850	57590	1	45	49	5
31	POL	-	26590	28560	2862	58773	-	45	48	5
1 August	NEP	815	28494	29043	2887	61312	1	46	47	5
2	TLK	850	29089	29265	2922	62199	1	47	47	5

Appendix Table B.
Cumulative age classification of males in commercial kill,
St. Paul Island, Alaska,
27 June to 15 August, 1956 (con.)

Date	Rookery	Estimated number males killed from age class 2	3	4	5	Cumulative total males killed	Cumulative percent males killed from age class 2	3	4	5
3 August	ZAP	947	30645	29557	-	64144	1	48	46	-
4	REEF	980	30947	29675	2931	64615	2	48	46	4
5	POL	1020	31701	29853	2951	65607	2	48	46	4
6	NEP	1182	33068	30087	2987	67406	2	49	45	4
7	TLK	1253	33707	30256	2996	68294	2	49	44	4
8	ZAP	1450	34612	30427	3035	69606	2	50	44	4
9	REEF	1509	34797	30458	3041	69887	2	50	44	4
10	POL	1737	35502	30663	-	71025	2	50	43	
11	NEP	2078	36595	30936	-	72732	3	50	42	-
12	TLK	2192	36955	31093	-	73363	3	50	42	-
13	ZAP	2425	37566	31209	3051	74333	3	50	42	4
14	REEF	2631	37817	31304	3057	74891	4	50	42	4
15	POL	2859	38290	31448	-	75736	4	51	42	-
Total		2859	38290	31448	3057	75736 1/				

1/ Eighty two 6-year-olds are included.

Appendix Table C.
Results of field testing of male tooth samples
St. Paul Island, Alaska, 1956

Date	Rookery	Collection location of sample	Males killed	Tooth sample size	Percent of kill	Percent and number in age class 2	3	4	5
	Test of 5 percent sample from ends and center row								
15 July	Reef-Gorbatch	End	687	34	5	-	15	15	4
		Percent in age				-	44	44	12
		Center	687	33	5	-	10	16	7
		Percent in age				-	30	48	22
		End	687	34	5	1	10	23	-
		Percent in age				3	29	68	-
	Greatest percent variance					3	15	24	22
	Least percent variance					3	1	4	10
	Test of 10 percent crossover sampling method								
17 July	NEP	1	1929	185	10	4	88	87	6
		Percent in age				2	48	47	3
		2	1929	174	10	3	75	86	10
		Percent in age				2	43	49	6
		Percent variance					5	2	3
18 July	TLK	1	2119	208	10	3	98	99	8
		Percent in age				1	47	48	4
		2	2119	209	10	3	116	84	6
		Percent in age				2	55	40	3

Appendix Table C.
St. Paul Island, Alaska, 1956
Results of field testing of male tooth samples (con.)

Date	Rookery	Tooth sample	Males killed	Tooth sample size	Percent of kill	Percent and number in age class 2	3	4	5
19 July	ZAP	1	2147	221	11	3	121	89	8
			Percent in age			1	55	40	4
		2	2147	205	10	-	123	74	8
			Percent in age			-	60	36	4
			Percent variance			1	5	4	-
20 July	Reef-Gorbatch	1	1197	117	10	-	51	55	11
			Percent in age			-	44	47	9
		2	1197	120	10	1	56	50	13
			Percent in age			1	47	42	10
			Percent variance			1	3	5	1
21 July	POL	1	2182	222	10	-	118	98	6
			Percent in age			0	53	44	3
		2	2182	216	10	2	99	105	10
			Percent in age			1	46	48	5
			Percent variance			1	7	4	2
		Combining the 5-day round							
17-21 July	All	1	9574	953	10	10	476	428	39
			Percent in age			1	50	45	4
		2	9574	924	10	9	469	399	47
			Percent in age			1	51	43	5
			Percent variance			-	1	2	1

Appendix Table D.
Field length of tagged 3 year old male seals by time of recovery
Pribilof Islands, 1956

Date	Length in inches											
	38	39	40	41	42	43	44	45	46	47	Missing lengths	Total
27 June				1		1	1		1			4
28	1	1	1		1							4
29				1	3	3						7
30		1		1	1							3
1 July				3		2	1					6
Total	1	2	1	6	5	6	2		1			24
2 July					2		1					3
3			1	1	2	3						7
4				3		4						7
5				1	1		1					3
6				3			3	1	2			9
Total			1	8	5	7	5	1	2			29
7 July			1		4	3	1					9
8				2	2	4	1					9
9			1	4	10	4	2	1				22
10				1	1							2
11				3	1	2						6
Total			2	10	18	13	4	1				48

Appendix Table D.
Field length of tagged 3 year old male seals by time of recovery
Pribilof Islands, 1956 (con.)

Date	Length in inches											
	38	39	40	41	42	43	44	45	46	47	Missing lengths	Total
12 July				2	1	6	6	2	1			18
13			2	3	1	3						10
14			1	5	4	4	3	1		1		19
15					1							1
16				1	5	4	2	5				17
Total			3	11	12	17	11	9	1	1		65
17 July			1	1	5	5						12
18			1	2	6	4	1					14
19			1	10	10	9	1			1		32
20			2	3	1	2		1				9
21				6	10	6	5					27
Total			5	22	32	26	7	1		1		94
22 July			2	8	8	12	2	1				33
23				4	1	11						16
24			1	7	14	14	7	3				46
25				3		3	1					7
26			1	4	6	6	3		1			21
Total			4	26	29	46	13	4	1			123

Appendix Table D.

Field length of tagged 3 year old male seals by time of recovery
Pribilof Islands, 1956 (con.)

Date	Length in inches 38	39	40	41	42	43	44	45	46	47	Missing lengths	Total
27 July			1	2	9	15	6					33
28				1		2						3
29			3	5	4	11	9	1	1			34
30				2		3	1					6
31			1		7	4	3				1	16
Total			5	10	20	35	19	1	1		1	92
1 August				2	9	17	5	4				37
2				2		2	4	1				9
3				3	8	4	5	2				22
4				1	1	2	1					5
5				3	5	3	3	2	1			17
Total				11	23	28	18	9	1			90
6 August				1	8	4	4	2				19
7				1	5	3	2					11
8				4	4	10	6	2	1			27
9				2	1	4						7
10					4	5	3	2				14
Total				8	22	26	15	6	1			78

Appendix Table D.
Field length of tagged 3 year old male seals by time of recovery
Pribilof Islands, 1956 (con.)

	Length in inches											
Date	38	39	40	41	42	43	44	45	46	47	Missing lengths	Total
11 August					8	10	6	2				26
12				2	1	3	3	2				11
13					1	6	2	1				10
14					1	2	3					6
15				1	2	2	1					6
Total				3	13	23	15	5				59
Grand total	1	2	21	115	179	227	109	37	8	2	1	702

Appendix Table E.
Field length of tagged 4 year old male seals by time of recovery
Pribilof Islands, 1956

Date	Length in inches											
	40	41	42	43	44	45	46	47	48	49	Missing lengths	Total
27 June				2	5	13	4	3				27
28	1		1	7	8	4	3			1		25
29			1	4	4	9	1	1				20
30				1	1	1		2				5
1 July		1	5	9	22	15	4	2				58
Total	1	1	7	23	40	42	12	8		1		135
2 July		3	3	3	11	3	2	3	1			29
3			4	13	13	11	2					43
4	1		2	4	6	7	5	1	3			29
5					2	2	2					6
6		2	5	17	29	26	19	7	2			107
Total	1	5	14	37	61	49	30	11	6			214
7 July			1	9	19	32	6	9	2			78
8			1	6	6	7	3	1				24
9		2	3	19	15	17	4	2				62
10 1/			1	1	2	2	3	1				11
11		2	15	18	31	11	6	1				84
Total		4	21	53	73	69	22	14	2			259

1/ 1-52 inch male

Appendix Table E.
Field length of tagged 4 year old male seals by time of recovery
Pribilof Islands, 1956 (con.)

Date	Length in inches											
	40	41	42	43	44	45	46	47	48	49	Missing lengths	Total
12 July			2	13	13	16	15	6	1	1		67
13			2	10	10	4	3					29
14 [1/]		1	2	7	11	7	5	3	1			38
15		1		4	4	1						10
16	1	1	3	10	20	26	18	9	4			92
Total	1	3	9	44	58	54	41	18	6	1		236
17 July	1	2	6	11	17	15	3		1			56
18	1	1	1	4	9	9	1					26
19			2	4	7	6	4	1		1		25
20		1	1	2	8	5	1					18
21		2	3	24	24	25	6	2	1	1		88
Total	2	6	13	45	65	60	15	3	2	2		213
22 July			4	19	24	22	4		1			74
23			1	6	6	5	1	1				20
24				2	11	13	7	1				34
25			1	4	6	3						14
26			1	3	13	13	10			1		41
Total			7	34	60	56	22	2	1	1		183

1/ 1-51 inch male

Appendix Table E.
Field length of tagged 4 year old male seals by time of recovery
Pribilof Islands, 1956 (con.)

Date	Length in inches 40	41	42	43	44	45	46	47	48	49	Missing lengths	Total
27 July		1	2	8	15	28	4	2				60
28				2	1	3						6
29				3	3	6	2	2	1			17
30			1	3	3	3		1		1		12
31		1		8	10	9	7	1				36
Total		2	3	24	32	49	13	6	1	1		131
1 August			2	2	3	13		2				22
2			1		2	3	1		1			8
3				2		1	1					4
4					1	4	1					6
5		2	1	3	8	11				1		26
Total		2	4	7	14	32	3	2	1	1		66
6 August			1	2	11	8						22
7				2	1	1	1					5
8				2	1	1						4
9												
10				2		3	2	1			1	9
Total			1	8	13	13	3	1			1	40

Appendix Table E.
Field length of tagged 4 year old male seals by time of recovery
Pribilof Islands, 1956 (con.)

Date	Length in inches											
	40	41	42	43	44	45	46	47	48	49	Missing lengths	Total
11 August					3	7		1				11
12			1	2	3	1			1			8
13					3		2	2				7
14			2	1	1	1	2					7
15				1	2	6						9
Total			3	4	12	15	4	3	1			42
Grand total	5	23	82	279	428	439	165	68	20	7		1519

Appendix Table F.
Length classes of tagged 3-year-old male seals by rookery of recovery
Pribilof Islands, 1956

Length in Inches	Rookery of recovery								
	Tolstoi	Lukanin-Kitovi	Zapadni	Reef	Polovina	North-east point	Total	St. George	Grand total
38	1						1		1
39	1			1			2		2
40	5		5	2	2	4	18	3	21
41	7	8	32	8	22	16	93	22	115
42	9	8	50	8	34	50	159	20	179
43	19	16	66	13	34	69	217	10	227
44	7	4	28	3	19	28	89	20	109
45	3	1	9		10	11	34	3	37
46			2		3	1	6	2	8
47			2				2		2
Length missing					1		1		1
Total	52	37	194	35	125	179	624	80	702

Appendix Table G.
Length classes of tagged 4-year-old male seals by rookery of recovery
Pribilof Islands, 1956

Length in inches	Rookery of recovery								
	Tolstoi	Lukanin Kitovi	Zapadni	Reef	Polovina	North-east point	Total	St. George	Gran tota
40	2					1	3	2	5
41	1		3	2	11	6	23		23
42	8	3	9	4	33	20	77	5	82
43	35	16	45	16	93	66	271	8	279
44	46	12	46	25	153	118	400	28	428
45	38	10	57	20	143	153	421	18	439
46	9	3	23	7	70	36	148	17	165
47	2		10	3	22	23	60	8	68
48	2		4		6	5	17	3	20
49		1			3		4	3	7
50									
51								1	1
52								1	1
Length missing					1		1		1
Total	143	45	197	77	535	428	1425	94	1519

Appendix Table H.
Field length of tagged 3 year old female seals by time of recovery
Pribilof Islands, 1956

Date	Length in inches							Total
	37	38	39	40	41	42	43	
8 August		1				1		2
9				1	1			2
10				1			1	2
11					2	1		3
12					3			3
13				1				1
14	1		1	2		1	1	6
15				4	4	1	1	10
4 Sept.					3	1		4
5				2	1			3
6					1			1
7				1	1		1	3
8			1		1			2
Total	1	1	2	12	17	5	4	42

Appendix Table I.
Field length of tagged 4 year old female seals by time of recovery
Pribilof Islands, 1956

Date	Length in inches									Length missing	Total
	40	41	42	43	44	45	46	47	48		
6 July						2		1			3
19				1							1
30		1									1
1 August	1		2								3
4			1								1
5	1		2	1							4
6		3	1	4	2						10
7			1	1							2
8					1						1
9			2	1							3
10	1	1	1	4	1	1				1	10
11		3	7	8	4						22
12				1	1						2
14	1	7	14	9	3						34
15	5	20	38	48	18	1	1				131
4 Sept.	3	2	2	2							9
5	5	3	11	2	2						23
7		2									2
8	1	1	1								3
Total	18	43	83	82	32	4	1	1		1	265

Appendix Table J.
Length classes of tagged 3 year old female seals by rookery of recovery
Pribilof Islands, 1956

Length in inches	Rookery of recovery								
	Tolstoi	Lukanin-Kitovi	Zapadni	Reef	Polovina	North-east point	Total	St. George	Gra tota
37				1			1		1
38								1	1
39			1	1			2		2
40	1		1	3	7		12		12
41	4		1	4	5	3	17		17
42			1	2	1	1	5		5
43	1			1	2		4		4
Total	6		4	12	15	4	41	1	42

Appendix Table K.

Length classes of tagged 4 year old female seals by rookery of recovery
Pribilof Islands, 1956

Length in inches	Rookery of recovery								Grand total
	Tolstoi	Lukanin Kitovi	Zapadni	Reef	Polovina	North-east point	Total	St. George	
40			1	4	11	1	17	1	18
41	2		1	10	24	6	43		43
42	1		1	19	52	10	83		83
43	2			12	56	12	82	1	83
44	1		1	3	21	6	32		32
45					3		3		3
46					1		1		1
47					1		1		1
Lengths missing					1		1		1
Total	6		4	48	170	35	263	2	265

Appendix Table L.
Vibrissal color of females sampled from commercial kill, by length, St. Paul Island, 27 June to 15 August, 1956

Length in inches		Vibrissal color			
		black	black & white	white	Total
37	number	2			2
	percent	-			-
38	number	1			1
	percent	-			-
39	number	5			5
	percent	1			-
40	number	49	7	2	58
	percent	6	1	-	2
41	number	143	65	9	217
	percent	19	8	1	7
42	number	225	148	50	423
	percent	30	19	3	14
43	number	187	227	148	562
	percent	25	29	10	19
44	number	95	181	311	587
	percent	13	23	21	20
45	number	28	114	338	480
	percent	4	15	23	16
46	number	11	31	315	357
	percent	2	4	21	12
47	number	1	9	171	181
	percent	-	1	12	6
48	number		3	90	93
	percent		-	6	3
49	number			22	22
	percent			2	1
50	number			9	9
	percent			1	-
51	number			6	6
	percent			-	-
52	number			1	1
	percent			-	-
	Total	747	785	1472	3004
	Percent	25	26	49	

Appendix Table M.

Vibrissal color of females sampled from commercial kill, by length, St. George Island, 27 June to 15 August, 1956

Length in inches		Vibrissal color: black	black & white	white	Total
38	number	1			1
	percent	2			-
39	number				
	percent				
40	number	8	9		17
	percent	12	4		2
41	number	17	12	4	33
	percent	25	5	1	4
42	number	17	65	11	93
	percent	25	26	3	13
43	number	10	44	17	71
	percent	15	17	4	9
44	number	10	51	55	116
	percent	15	20	13	16
45	number	1	40	82	123
	percent	2	16	19	17
46	number	2	22	72	96
	percent	2	9	17	13
47	number	1	7	85	93
	percent	2	3	20	13
48	number		1	57	58
	percent			14	8
49	number		1	28	29
	percent			7	4
50	number			5	5
	percent			1	1
51	number			3	3
	percent			1	-
	Total	67	252	419	739
	Percent	9	34	57	

Appendix Table N.

Vibrissal color of females sampled from commercial kill, by age, Pribilof Islands, 27 June to 15 August, 1956

Vibrissal color	Age 3	4	5	6	7	8	9	10	10+	Total
St. Paul										
Black [1/]										
number	166	389	151	36	3	1		1	1	749
percent	96	63	28	9	1	1		1	-	25
Black and white										
number	7	222	322	175	47	7	6	1	2	789
percent	4	36	60	43	18	3	5	1	-	26
White										
number		8	67	198	215	199	110	64	613	1474
percent		1	12	48	81	96	95	98	100	49
Total	173	619	540	409	265	207	116	66	616	3012
Percent	6	20	18	14	9	7	4	2	20	
St. George										
Black										
number	14	42	10	-	1	-	-	-	-	67
percent	100	35	8	-	2	-	-	-	-	9
Black and white										
number	-	75	96	53	19	3	1	2	3	252
percent	-	63	79	62	31	5	2	7	2	34
White										
number	-	3	16	33	40	57	39	27	205	420
percent	-	2	13	38	67	95	98	93	98	57
Total	14	120	122	86	60	60	40	29	208	739
Percent	2	16	17	12	8	8	5	4	28	

1/ One 2-year-old seal with black vibrissae included in total.

Appendix Table O.

Length of females sampled from commercial kill, by age, St. Paul Island, 27 June to 15 August, 1956

Length in inches		Age 3	4	5	6	7	8	9	10	10+	Total
37 [1]	number	1									2
	percent	1									-
38	number				1						1
	percent				-						-
39	number	5									5
	percent	3									-
40	number	41	12	4	1						58
	percent	23	2	1	-						2
41	number	69	100	34	7	3		1	2	1	217
	percent	40	16	7	2	1		1	3	-	7
42	number	41	214	101	38	15	3	1	1	9	423
	percent	23	35	19	9	6	1	1	2	1	14
43	number	12	182	176	91	40	21	10	5	25	562
	percent	7	29	33	22	15	10	9	7	4	19
44	number	3	88	126	128	76	55	29	10	72	587
	percent	2	14	23	32	29	27	25	15	12	20
45	number	1	18	67	93	78	50	29	14	130	480
	percent	1	3	12	23	29	24	25	21	21	16
46	number		3	22	35	34	47	24	17	175	357
	percent		1	4	9	13	23	20	26	29	12
47	number			5	9	15	20	16	12	104	181
	percent			1	2	6	10	14	18	17	6
48	number			2	3	3	8	6	4	67	93
	percent			-	1	1	4	5	6	11	3
49	number					1	3		1	17	22
	percent						1		2	3	1
50	number									9	9
	percent									1	-
51	number									6	6
	percent									1	-
52	number									1	1
	percent										
	Total	173	617	537	406	265	207	116	66	616	3004
	Percent	6	20	18	14	9	7	4	2	20	

1/ One 2-year-old included in total.

Appendix Table P.
Length of females sampled from commercial kill, by age,
St. George Island, 27 June to 15 August, 1956

Length in inches		Age 3	4	5	6	7	8	9	10	10+	Total
38	number	1									1
	percent	7									-
39	number										
	percent										
40	number	5	11	1							17
	percent	36	9	1							2
41	number	6	14	11	2						33
	percent	43	12	9	3						4
42	number	2	48	27	7	4	2	1	1	1	93
	percent	14	40	22	8	7	3	2	4	-	13
43	number		23	27	11	3	2	1		4	71
	percent		19	22	13	5	3	2		2	9
44	number		22	27	21	12	14	4	2	14	116
	percent		18	22	24	20	23	10	6	7	16
45	number		1	17	29	17	15	14	9	21	123
	percent		1	14	34	28	25	36	31	10	17
46	number		1	9	9	13	14	7	3	40	96
	percent		1	7	10	22	23	18	10	19	13
47	number			3	6	7	6	5	7	59	93
	percent			3	7	12	11	13	24	29	13
48	number				1	2	7	5	6	37	58
	percent				1	3	12	13	21	18	8
49	number					2		2	1	24	29
	percent					3		6	4	12	4
50	number									5	5
	percent									2	1
51	number									3	3
	percent									1	-
	Total	14	120	122	86	60	60	39	29	208	738
	Percent	2	16	17	12	8	8	5	4	28	

Appendix Table Q.
Length-age relationship of female seals in samples taken 4-8 September, 1956 on St. Paul Island

Tagged females

Age	Length in inches 35	38	39	40	41	42	43	44	45	46	47	Total
2	1	1	1									3
3				3	7	1	1					12
4				7	7	15	3	3				35
5							1					1
6												
7								3	2	3		8
8							2	1	2		1	6
9												
10												
10+										1		1
Total	1	1	1	10	14	16	7	7	4	4	1	66
Percent	2	2	2	15	21	24	10	10	6	6	2	

Appendix Table Q.
Length-age relationship of female seals in samples taken 4-8 September, 1956 on St. Paul Island (con.)

Untagged females

Age	Length in inches													
	37	38	39	40	41	42	43	44	45	46	47	48	49	Total
2	2	4	10	6	2				1					25
3		1	5	26	26	14	2	2						76
4				7	27	34	24	14	1		1			108
5				1	6	19	25	21	7	1				80
6						3	10	11	18	4	1			47
7						2	2	4	11	2	1	1		23
8						1	1	6	6	4	1			19
9						1	1	2	3	2	1	1		11
10									4	1	2		1	8
10+ 1/							5	3	9	9	13	6	2	47 1/
Total	2	5	15	40	61	74	70	63	60	23	20	8	3	444 1/
Percent	1	1	3	9	14	16	16	14	13	5	4	2	1	

1/ Plus two (1%) 51 inch seals = 49-10+ females and a total of 446 of all ages.

Appendix Table R.
Length-age relationship of female seals in samples taken 4-8 September, 1956 on St. George Island

Age	Length in inches											
	40	41	42	43	44	45	46	47	48	49	50	Total
2												
3	1	1	1									3
4	2	4	8	8	4	1	1					28
5		3	8	6	11	10	2	1	1			42
6		3	3	7	10	2	3	4				32
7		1	2	4	5	4	4	1	3			24
8		1		3	6	4	4	1				19
9				2	3	5	8		2			20
10				1	2	2	5	5	1			16
10+ [2]				3	6	15	24	11	13	8	1	82
Total	3	12	23	34	47	43	51	23	20	8	1	266
Percent	1	4	9	13	18	16	19	9	8	3	-	

[1] Age determined from tooth ridge counts.

[2] Plus one 52 inch female.

1/ Appendix Table S.
Age analysis of females and number of pelts rejected in fall kill, St. Paul Island, Alaska, 4-8 September, 1956

Date	Females killed	Age 2	3	4	5	6	7	8	9	10	10+	Pelts rejected
4 September												
number	519	36	130	119	52	36	16	26	10		94	101
percent		7	25	23	10	7	3	5	2		18	20
5 September												
number	520	5	58	167	99	62	36	52		10	31	50
percent		1	11	32	19	12	7	10		2	6	10
6 September												
number	399	20	36	116	104	51	20	20	4		28	36
percent		5	9	29	26	13	5	5	1		7	9
7 September												
number	479	29	86	134	58	38	38	5	19	14	58	97
percent		6	18	28	12	8	8	1	4	3	12	20
8 September												
number	426	38	93	111	55	26	30	17	17	13	26	85
percent		9	22	26	13	6	7	4	4	3	6	20
Total	2343	128	403	647	368	213	140	120	50	37	237	369
Percent		5	17	28	16	9	6	5	2	2	10	16

1/ Age based on tooth ridge counts and tag recoveries on females sampled from kill as listed in Table AA.

1/ Appendix Table T.
Age analysis of females and number of pelts rejected in fall kill, St. George Island, Alaska, 4-8 September, 1956

Date	Females killed	Age 3	4	5	6	7	8	9	10	10+	Pelts rejected
4 September											
number	476		52	91	62	33	19	33	81	105	12
percent			11	19	13	7	4	7	17	22	2
5 September											
number	967	29	174	203	107	77	77	39	19	242	89
percent		3	18	21	11	8	8	4	2	25	9
6 September											
number	108			10	25	15		10	4	44	7
percent				9	23	14		9	4	41	6
7 September											
number	455		9	59	59	27	27	78	27	169	50
percent			2	13	13	6	6	17	6	37	11
8 September											
number	458		37	37	37	64	55	27	18	183	76
percent			8	8	8	14	12	6	4	40	16
Total	2464	29	272	400	290	216	178	186	149	744	234
Percent		1	11	16	12	9	7	7	6	31	10

1/ Age based on tooth ridge counts on females sampled from kill as listed in Table GG.

Appendix Table U.
Reproductive condition of female seals sampled from commercial kill, by date and age, St. Paul Island, 27 June to 15 August, 1956

	Age									
	3	4	5	6	7	8	9	10	10+	Total
27 June										
Primipara										
pregnant			1							1
29 June										
Multipara										
pregnant				1			1			2
1 July										
Primipara										
pregnant		1	7	2						10
Multipara										
pregnant		2	19	34	19	15	5	1	2	97
2 July										
Multipara										
pregnant			2	1						3
3 July										
Primipara										
pregnant		1								1
Multipara										
pregnant			2	1	1			1		5
4 July										
Multipara										
pregnant				1						1
6 July										
Primipara										
pregnant		2	6			1				9
Multipara										
pregnant		1	19	24	43	20	13	5	21	146
non-pregnant					2				1	3
7 July										
Multipara										
pregnant			7	8	1					16
8 July										
Multipara										
pregnant			1	2	1				1	5
non-pregnant									1	1
9 July										
Primipara										
pregnant		1	2							3
Multipara										
pregnant			1	3	3	2			2	11
non-pregnant									1	1

Appendix Table U.
Reproductive condition of female seals sampled from commercial kill, by date and age, St. Paul Island, 27 June to 15 August, 1956 (con.)

	Age									
	3	4	5	6	7	8	9	10	10+	Total
11 July										
Nullipara		1								1
Primipara										
pregnant			1	1						2
12 July										
Multipara										
pregnant			6	3	1				1	11
non-pregnant				2						2
13 July										
Multipara										
pregnant				4						4
14 July										
Primipara										
pregnant		1		1						2
Multipara										
pregnant		1	5	9	3	3	1		4	26
15 July										
Nullipara		1								1
16 July										
Nullipara			1							1
Primipara										
pregnant				3						3
Multipara										
pregnant			1		1					2
non-pregnant							1		1	2
17 July										
Nullipara				1						1
Primipara										
pregnant				1						1
Multipara										
pregnant			5	5	2				3	15
non-pregnant									1	1
18 July										
Nullipara					1					1
Multipara										
pregnant			1	5	1				2	9
non-pregnant									1	1

Appendix Table U.
Reproductive condition of female seals sampled from commercial kill, by date and age, St. Paul Island, 27 June to 15 August, 1956 (con.)

	Age									
	3	4	5	6	7	8	9	10	10+	Total
19 July										
Primipara										
pregnant		2			1					3
Multipara										
pregnant				3	1					4
non-pregnant									1	1
20 July										
Multipara										
pregnant		1	1	1						3
non-pregnant			1						2	3
21 July										
Nullipara		2	1							3
Primipara										
pregnant			6		1					7
Multipara										
pregnant			4	3	2				1	10
non-pregnant									1	1
22 July										
Nullipara		4	7	1						12
Primipara										
pregnant		1	7	2	1					11
Multipara										
pregnant		1	3	7	6				3	20
non-pregnant				1					4	5
23 July										
Primipara										
pregnant		1	2	1						4
Multipara										
pregnant				3	1				1	5
24 July										
Nullipara		5	4	1		1				11
Primipara										
pregnant			5	1	1					7
Multipara										
pregnant		2	6	3	7	4	4	2	10	38
non-pregnant			2	3	2	1	1		18	27
25 July										
Primipara										
pregnant			2							2
Multipara										
non-pregnant									1	1

Appendix Table U.
Reproductive condition of female seals sampled from commercial kill, by date and age, St. Paul Island, 27 June to 15 August, 1956 (con.)

	Age									
	3	4	5	6	7	8	9	10	10+	Total
26 July										
Nullipara		2	1							3
Multipara										
pregnant			1		1	1				3
non-pregnant					2					2
27 July										
Nullipara	2	8	3	1	1					15
Primipara										
pregnant		1	5							6
Multipara										
pregnant			6	9	2	2		1	7	27
non-pregnant			2	1		4		2	19	28
28 July										
Nullipara		3	2							5
Primipara										
pregnant		1	4	4						9
Multipara										
pregnant				4	1			1	1	7
non-pregnant				2	4	1	1	1	5	14
29 July										
Nullipara	2	3	2	1						8
Primipara										
pregnant		1	6	4						11
non-pregnant				1						1
Multipara										
pregnant				8	3	2	2		7	22
non-pregnant				2		4	2		32	40
30 July										
Nullipara		9	5	1						15
Primipara										
pregnant			5	11	1					17
non-pregnant			1							1
Multipara										
pregnant			2	1	1	7	2		11	24
non-pregnant				1	5	6	1	3	29	45
31 July										
Nullipara	2	11	6	3			1			23
Primipara										
pregnant		1	3	3						7
Multipara										
pregnant									4	4
non-pregnant					1	1			7	9

Appendix Table U.
Reproductive condition of female seals sampled from commercial kill, by date and age, St. Paul Island, 27 June to 15 August, 1956 (con.)

	Age									
	3	4	5	6	7	8	9	10	10+	Total
1 August										
Nullipara	2	23	14	3						42
Primipara										
pregnant		1	5	2	1					9
non-pregnant		1								1
Multipara										
pregnant			1	4	6	3		2	2	18
non-pregnant					1		1	2	7	11
2 August										
Nullipara	3	8	3	2						16
Primipara										
pregnant		1	3	1						5
non-pregnant			1							1
Multipara										
pregnant				2		2	1		3	8
non-pregnant					1	3	1		5	10
3 August										
Nullipara	1	8	9	2						20
Primipara										
pregnant		1	2	6	2	1	1			13
non-pregnant				2	1	1				4
Multipara										
pregnant				5	2	7	4	2	7	27
non-pregnant				2	3	5	3	4	15	32
4 August 1/										
Nullipara	2	8	8	1				1		21
Primipara										
pregnant		3	8	7						18
non-pregnant				1		1				2
Multipara										
pregnant			4	6	4	4	5	5	14	42
non-pregnant				4		2			26	32
5 August										
Nullipara	3	24	12	1	1					41
Primipara										
pregnant		2	8	4						14
non-pregnant					1					1
Multipara										
pregnant			1		3	5	1		4	14
non-pregnant						2	1		9	12

1/ One 2-year-old nullipara included in total.

Appendix Table U.
Reproductive condition of female seals sampled from commercial kill, by date and age, St. Paul Island, 27 June to 15 August, 1956 (con.)

	Age									
	3	4	5	6	7	8	9	10	10+	Total
6 August										
Nullipara	7	29	7	6	1	1				51
Primipara										
pregnant		2	10	5	1	3				21
non-pregnant			1	3	2					6
Multipara										
pregnant			1	3	5	8	6	3	13	39
non-pregnant		1			5	8	5	3	45	67
7 August										
Nullipara	4	21	8	4		1				38
Primipara										
pregnant		5	8	7	1					21
Multipara										
pregnant			1	2	5	1		2	12	23
non-pregnant							5		28	33
8 August										
Nullipara	8	35	18	3	3					67
Primipara										
pregnant		1	11							12
non-pregnant				2	1	1				4
Multipara										
pregnant		1		6	4	1	4	3	17	36
non-pregnant				2	3	4	4	3	30	46
9 August										
Nullipara	7	15	7	4		2				35
Primipara										
pregnant		2	5	5	3	1				16
non-pregnant			1	1						2
Multipara										
pregnant			1	7		4	4	3	14	33
non-pregnant				3		4	1	3	14	25
10 August										
Nullipara	15	35	7	3						60
Primipara										
pregnant		2	10	8	1					21
non-pregnant				2	1					3
Multipara										
pregnant			1	4	8	3	3	1	7	27
non-pregnant			1	1		3	2	1	18	26

Appendix Table U.
Reproductive condition of female seals sampled from commercial kill, by date and age, St. Paul Island, 27 June to 15 August, 1956 (con.)

	Age									
	3	4	5	6	7	8	9	10	10+	Total
11 August										
Nullipara	23	67	31	1		1				123
Primipara										
pregnant		2	11	6	3					22
non-pregnant			1	1						2
Multipara										
pregnant			3	7	9	2	3		12	36
non-pregnant			1	4	6	5	8	2	23	49
12 August										
Nullipara	13	28	15	5	2	1			1	65
Primipara										
pregnant		2	7	5	1					15
non-pregnant				1						1
Multipara										
pregnant			1	2	4	1	3		7	18
non-pregnant			1	1	3	6		1	20	32
13 August										
Nullipara	16	20	15	1						52
Primipara										
pregnant		1	9	3						13
non-pregnant				1						1
Multipara										
pregnant			5	3	3	5	2		10	28
non-pregnant				4	4		3	2	14	27
14 August										
Nullipara	30	51	15	4						100
Primipara										
pregnant		5	18	2	1					26
non-pregnant				1	2					3
Multipara										
pregnant			1	7	7	6	5	2	14	42
non-pregnant				3	3	4	2	3	13	28
15 August										
Nullipara	33	133	20	3	1					190
Primipara										
pregnant		8	16	2	1	1				28
non-pregnant		2		2		1				5
Multipara										
pregnant			1	4	20	12	3		1	41
non-pregnant				1	1	6		1	5	14

Appendix Table V.
Reproductive condition of female seals sampled from commercial kill, by rounds and age, St. Paul Island, 1956 (con.)

	Age										
	3	4	5	6	7	8	9	10	10+	Total	Percent
27 June-1 July											
Primipara											
Pregnant											
number		1	8	2						11	10
percent		33	30	5							
Multipara											
Pregnant											
number		2	19	35	19	15	6		3	99	90
percent		67	70	95	100	100	100		100		
Total		3	27	37	19	15	6		3	110	
2-6 July											
Primipara											
Pregnant											
number		3	6			1				10	6
percent		75	21			5					
Multipara											
Pregnant											
number		1	23	27	44	20	13	6	21	155	92
percent		25	79	100	96	95	100	100	95		
Non-pregnant											
number					2				1	3	2
percent					4				5		
Total		4	29	27	46	21	13	6	22	168	
7-11 July											
Nullipara											
number		1								1	3
percent		50									
Primipara											
Pregnant											
number		1	3	1						5	12
percent		50	25	7							
Multipara											
Pregnant											
number			9	13	5	2			3	32	80
percent			75	93	100	100			60		
Non-pregnant											
number									2	2	5
percent									40		
Total		2	12	14	5	2			5	40	

Appendix Table V.
Reproductive condition of female seals sampled from commercial kill, by rounds and age, St. Paul Island, 1956 (con.)

	Age										
	3	4	5	6	7	8	9	10	10+	Total	Percent
12-16 July											
Nullipara											
number		1	1							2	4
percent		33.3	8								
Primipara											
Pregnant											
number		1		4						5	9
percent		33.3		18							
Multipara											
Pregnant											
number		1	12	16	5	3	1		5	43	79
percent		33.3	92	73	100	100	50		83		
Non-pregnant											
number				2			1		1	4	8
percent				9			50		17		
Total		3	13	22	5	3	2		6	54	
17-21 July											
Nullipara											
number		2	1	1	1					5	8
percent		40	5	5	11						
Primipara											
Pregnant											
number		2	6	1	2					11	17
percent		40	32	5	22						
Multipara											
Pregnant											
number		1	11	17	6				6	41	64
percent		20	58	90	67				50		
Non-pregnant											
number			1						6	7	11
percent			5						50		
Total		5	19	19	9				12	64	
22-26 July											
Nullipara											
number		11	12	2		1				26	17
percent		69	30	9		14					
Primipara											
Pregnant											
number		2	16	4	2					24	16
percent		12	40	17	10						

Appendix Table V.
Reproductive condition of female seals sampled from commercial kill, by rounds and age, St. Paul Island, 1956 (con.)

	Age										
	3	4	5	6	7	8	9	10	10+	Total	Percent
22-26 July (con.)											
Multipara											
Pregnant											
number		3	10	13	15	5	4	2	14	66	44
percent		19	25	57	71	72	80	100	38		
Non-pregnant											
number			2	4	4	1	1		23	35	23
percent			5	17	19	14	20		62		
Total		16	40	23	21	7	5	2	37	151	
27-31 July											
Nullipara											
number	6	34	18	6	1		1			66	19
percent	100	89	35	11	5		12				
Primipara											
Pregnant											
number		4	23	22	1					50	15
percent		11	44	38	5						
Non-pregnant											
number			1	1						2	1
percent			2	2							
Multipara											
Pregnant											
number			8	22	8	10	4	2	30	84	25
percent			15	38	40	38	44	25	25		
Non-pregnant											
number			2	6	10	16	4	6	92	136	40
percent			4	11	50	62	44	75	75		
Total	6	38	52	57	20	26	9	8	122	338	
1-5 August											
Nullipara											
number	11	71	46	9	1			1		140	34
percent	100	89	58	16	3			6			
Primipara											
Pregnant											
number		8	26	20	3	1	1			59	14
percent		10	33	36	12	3	6				
Non-pregnant											
number		1	1	3	2	2				9	2
percent		1	1	6	8	6					

Appendix Table V.
Reproductive condition of female seals sampled from commercial kill, by rounds and age, St. Paul Island, 1956 (con.)

	Age									1	
	3	4	5	6	7	8	9	10	10+	Total	Percent
1-5 August (con.)											
Multipara											
Pregnant											
number			6	17	15	21	11	9	30	109	26
percent			8	31	58	58	61	56	33		
Non-pregnant											
number				6	5	12	6	6	62	97	24
percent				11	19	33	33	38	67		
Total	11	80	79	55	26	36	18	16	92	414	

1 Total includes 1 nulliparous 2-yr-old female.

6-10 August											
Nullipara											
number	41	135	47	20	4	4				251	35
percent	100	91	48	25	9	9					
Primipara											
Pregnant											
number		12	44	25	6	4				91	13
percent		8	45	31	14	9					
Non-pregnant											
number			2	8	4	1				15	2
percent			2	10	9	2					
Multipara											
Pregnant											
number		1	4	22	22	17	17	12	63	158	22
percent		0.5	4	27	50	38	50	55	32		
Non-pregnant											
number		1	1	6	8	19	17	10	135	197	28
percent		0.5	1	7	18	42	50	45	68		
Total	41	149	98	81	44	45	34	22	198	712	
11-15 August											
Nullipara											
number	115	299	96	14	3	2			1	530	55
percent	100	94	56	19	4	4			1		

Appendix Table V.
Reproductive condition of female seals sampled from commercial kill by rounds and age, St. Paul Island, 1956 (con.)

	Age										
	3	4	5	6	7	8	9	10	10+	Total	Percent
11-15 August (con.)											
Primipara											
Pregnant											
number		18	61	18	6	1				104	11
percent		5	36	24	8	2					
Non-pregnant											
number		2	1	6	2	1				12	1
percent		1	1	8	3	2					
Multipara											
Pregnant											
number			11	23	43	26	16	2	44	165	17
percent			6	31	61	51	55	18	37		
Non-pregnant											
number			2	13	17	21	13	9	75	150	16
percent			1	18	24	41	45	82	62		
Total	115	319	171	74	71	51	29	11	120	961	

Appendix Table W.
Projected reproductive condition of total female kill by round, based upon daily samples
St. Paul Island, 1956

Date	Nullipara	Primipara		Multipara		Cumulative All females	
		Pregnant	Non-preg.	Pregnant	Non-preg.	Preg.	Non-preg.
1 July		13		174		187	
6		32		594	12	813	12
11	1	6		32	2	851	15
16	1	3		52	6	906	22
21	5	11		43	8	960	35
26	29	33		66	40	1059	104
31	105	83	5	153	241	1295	455
5 August	551	285	32	571	516	2151	1554
10	1421	527	75	917	1073	3595	4123
15	5872	577	738	1890	1643	6062	12376
Total	7985	1570	850	4492	3541	6062	12376
Percent	43	13		44		33	67

Appendix Table X.
Reproductive condition of females sampled from commercial kill, by length, St. Paul Island, 27 June to 15 August, 1956

Length in inches		Nullipara	Primipara pregnant	Primipara non-preg.	Multipara pregnant	Multipara non-preg.	Total
37	number	2					2
	percent	-					
38	number				1		1
	percent				-		
39	number	5					5
	percent	-					
40	number	54	2		2		58
	percent	5	-		-		2
41	number	170	28		17	2	217
	percent	17	7		2	-	7
42	number	267	75	3	66	12	423
	percent	27	20	8	7	2	14
43	number	266	117	7	144	28	562
	percent	27	32	18	15	4	19
44	number	160	89	8	239	91	587
	percent	16	24	21	25	14	20
45	number	74	40	13	209	144	480
	percent	7	11	34	22	23	16
46	number	14	13	6	150	174	357
	percent	1	4	16	16	28	12
47	number	4	3		81	93	181
	percent		1		10	15	6
48	number		3	1	29	60	93
	percent		1	3	3	10	3
49	number	1			4	17	22
	percent	-			-	3	1
50	number				3	6	9
	percent				-	1	-
51	number				3	3	6
	percent				-	-	-
52	number					1	1
	percent					-	-
	Total	1017	370	38	948	631	3004
	Percent	34	12	1	32	21	

Appendix Table Y.
Cornu of pregnancy among females from commercial kill, St. Paul Island, 1956

	Age								
	4	5	6	7	8	9	10	10+	Total
Primipara	52	193	97	20	7	1			370
Postpartum									
right cornu number	23	94	48	7	1	1			174
left cornu number	27	88	45	11	5				176
Pregnant									
right cornu number	1	4	1	1					7
left cornu number	1	7	3	1	1				13
Multipara	9	112	205	181	120	72	34	218	951
Postpartum									
right cornu number	7	60	102	100	52	34	19	113	487
left cornu number	2	49	93	77	57	34	14	104	430
Pregnant									
right cornu number		2	3	2	6	1		1	15
left cornu number		1	7	2	5	3	1		19

Appendix Table Z.
Reproductive condition of females in experimental kills, by age and number of pelts rejected, St. Paul Island, 20, 25 and 30 August and 13, 18 and 23 September, 1956[1]

Reproductive condition	Rookery	Age 2	3	4	5	6	7	8	9	10	10+	Total	Pelts rejecte
20 August	ZAP												
Nullipara			1	4	1							6	
Primipara													
pregnant						1					2	3	
non-pregnant													
Multipara													
pregnant						2	3				6	11	
Total			1	4	1	3	3				8	20	none
25 August	REEF												
Nullipara			4	4	1							9	
Primipara													
pregnant				1	4	1						6	
non-pregnant													
Multipara													
pregnant											1	1	
non-pregnant									1	1	1	3	
Total			4	5	5	1			1	1	2	19	none
30 August	NEP												
Nullipara		1	3	5	1							10	
Primipara													
pregnant					3	3	1					7	
non-pregnant													
Multipara													
pregnant					1			1				2	
non-pregnant											1	1	
Total		1	3	5	5	3	1	1			1	20	2

Appendix Table Z.
Reproductive condition of females in experimental kills, by age and number of pelts rejected, St. Paul Island, 20, 25 and 30 August and 13, 18 and 23 September, 1956[1] (con.)

Reproductive condition	Rookery	Age 2	3	4	5	6	7	8	9	10	10+	Total	Pelts rejected
13 September	POL												
Nullipara			1	6	1	1						9	
Primipara													
pregnant					3	3	2					8	
non-pregnant													
Multipara													
pregnant						2	1				1	4	
non-pregnant													
Total			1	6	4	6	3				1	21	6
18 September	NEP												
Nullipara			2	2	1							5	
Primipara													
pregnant				1	2		2					5	
non-pregnant													
Multipara													
pregnant						1	2	1	2		3	9	
non-pregnant										1		1	
Total			2	3	3	1	4	1	2	1	3	20	8
23 September	TOL												
Nullipara			3	3	5							11	
Primipara													
pregnant													
non-pregnant													
Multipara													
pregnant						1						1	
Total			3	3	5	1						12	3

Appendix Table Z.

Summary of reproductive condition [1] of females in experimental kills, by age and number of pelts rejected, St. Paul Island, 20, 25, and 30 August and 13, 18 and 23 September, 1956 (con.)

Reproductive condition	Age										Total	Total pelts rejected
	2	3	4	5	6	7	8	9	10	10+		
Nullipara												
number	4	14	26	5	1						50	
percent	100	100	93	28	7						45	
Primipara												
Pregnant												
number			2	12	8	5				2	29	
percent			7	67	53	46				13	26	
Non-pregnant												
number												
percent												
Multipara												
Pregnant												
number				1	6	6	2	2		11	28	
percent				5	40	54	100	67		74	25	
Non-pregnant												
number								1	2	2	5	
percent								33	100	13	4	
Total	4	14	28	18	15	11	2	3	2	15	112	19
Percent	4	12	25	16	13	10	2	3	2	13		

All females	number	percent
Pregnant	57	51
Non-pregnant	55	49
Total	112	

Primipara and multipara females	number	percent
Pregnant	57	92
Non-pregnant	5	8
	62	

1/ Determined by examination of genital tracts.

Appendix Table AA.

Daily reproductive condition 1/ of females sampled from commercial kill, by age, St. Paul Island, Alaska, 4-8 September, 1956

Reproductive condition	Rookery	Age 2	3	4	5	6	7	8	9	10	10+	Total
4 September	REEF											
Nullipara		7	26	22	5	1						61
Primipara												
Pregnant				2	6	4	1	1				14
Non-pregnant												
Multipara												
Pregnant						2	2	4	2		13	23
Non-pregnant						1					6	7
	Total	7	26	24	11	8	3	5	2		19	105
Sample size in percent of daily kill: 20												
5 September	POL											
Nullipara		1	11	31	6	1	1					51
Primipara												
Pregnant			1	4	13	2	2	1				23
Non-pregnant												
Multipara												
Pregnant					1	8	5	9		2	2	27
Non-pregnant						2		1			4	7
	Total	1	12	35	20	13	8	11		2	6	108
Sample size in percent of daily kill: 21												

1/ Determined by examination of genital tracts.

Appendix Table AA.

Daily reproductive condition 1/ of females sampled from commercial kill, by age, St. Paul Island, Alaska, 4-8 September, 1956 (con.)

Reproductive condition	Rookery	Age 2	3	4	5	6	7	8	9	10	10+	Total
6 September	NEP											
Nullipara		4	8	23	7							42
Primipara												
Pregnant				3	14	3		1				21
Non-pregnant												
Multipara												
Pregnant					2	8	4	3			3	20
Non-pregnant									1		3	4
	Total	4	8	26	23	11	4	4	1		6	87
Sample size in percent of daily kill: 22												
7 September	TOL											
Nullipara		7	20	29	6		3					65
Primipara												
Pregnant				2	7	2						11
Non-pregnant					1	1	1					3
Multipara												
Pregnant						6	5	1	3		6	21
Non-pregnant									1	3	7	11
	Total	7	20	31	14	9	9	1	4	3	13	111
Sample size in percent of daily kill; 23												

1/ Determined by examination of genital tracts.

Appendix Table AA.

Daily reproductive condition 1/ of females sampled from commercial kill, by age, St. Paul Island, Alaska, 4-8 September, 1956 (con.)

Reproductive condition	Rookery	Age 2	3	4	5	6	7	8	9	10	10+	Total
8 September	ZAP											
Nullipara		9	22	24	7	1	2	1				66
Primipara												
Pregnant				3	6	4	1					14
Non-pregnant												
Multipara												
Pregnant						1	3	3	2	1	2	12
Non-pregnant							1		2	2	4	9
	Total	9	22	27	13	6	7	4	4	3	6	101

Sample size in percent of daily kill: 24.

1/ Determined by examination of genital tracts.

Appendix Table BB.

Gross reproductive condition 1/ of females sampled from commercial kill, by age, St. Paul Island, Alaska, 4-8 September, 1956

Reproductive condition	Age 2	3	4	5	6	7	8	9	10	10+	Total
Nullipara											
number	28	87	129	31	3	6	1				285
percent	100	99	90	38	6	19	4				56
Primipara											
Pregnant											
number		1	14	46	15	4	3				83
percent		1	10	57	32	12	12				16
Non-pregnant											
number				1	1	1					3
percent				1	3	4					1
Multipara											
Pregnant											
number				3	25	19	20	7	3	26	103
percent				4	53	61	80	64	38	52	20
Non-pregnant											
number					3	1	1	4	5	24	38
percent					6	4	4	36	62	48	7
Total	28	88	143	81	47	31	25	11	8	50	512
Percent	5	17	28	16	9	6	5	2	2	10	

All females	number	percent
Pregnant	186	36
Non-pregnant	326	64
Total	512	

Primipara and Multipara females	number	percent
Pregnant	186	82
Non-pregnant	41	18
Total	227	

Sample size in percent of total kill: 22

1/ Determined by examination of genital tracts

Appendix Table CC,

Reproductive condition of female seals sampled from commercial kill, by date and age, St. George Island, 27 June to 15 August, 1956

	Age									
	3	4	5	6	7	8	9	10	10+	Total
27 June										
Multipara										
pregnant					1				1	2
3 July										
Primipara										
pregnant		2	3	2	1					8
Multipara										
pregnant			1	1	8	5		3	4	22
non-pregnant						1			2	3
5 July										
Primipara										
pregnant			2	1						3
Multipara										
pregnant				2	1	2	2	1		8
6 July										
Primipara										
pregnant		1								1
7 July										
Primipara										
pregnant		1								1
8 July										
Nullipara					1					1
Primipara										
pregnant			3	4	1				2	10
Multipara										
pregnant					3				2	5
10 July										
Primipara										
pregnant			1							1
11 July										
Nullipara					1					1
Primipara										
pregnant			1	1						2
Multipara										
pregnant				1					1	2
12 July										
Primipara										
pregnant		1								1
Multipara										
pregnant				1						1
13 July										
Primipara										
pregnant				1						1

Appendix Table CC.
Reproductive condition of female seals sampled from commercial kill, by date and age, St. George Island, 27 June to 15 August, 1956 (con.)

	Age									
	3	4	5	6	7	8	9	10	10+	Total
14 July										
Primipara										
pregnant			2	3		1				6
Multipara										
non-pregnant									3	3
15 July										
Primipara										
pregnant							1			1
16 July										
Primipara										
pregnant		1	4	5						10
Multipara										
pregnant				1	2	1	2	1	4	11
non-pregnant							1			1
17 July										
Primipara										
pregnant			1							1
18 July										
Multipara										
pregnant					1			1		2
non-pregnant				1					1	2
19 July										
Nullipara		1								1
Primipara										
pregnant					1					1
Multipara										
pregnant					1					1
non-pregnant									2	2
20 July										
Nullipara			1							1
Primipara										
pregnant		1	5							6
Multipara										
pregnant				1	3	1	1		1	7
non-pregnant									5	5
21 July										
Primipara										
pregnant				1						1
22 July										
Primipara										
pregnant			2							2
Multipara										
pregnant					1					1
non-pregnant									1	1

Appendix Table CC.

Reproductive condition of female seals sampled from commercial kill, by date and age, St. George Island, 27 June to 15 August, 1956 (con.)

	Age									
	3	4	5	6	7	8	9	10	10+	Total
23 July										
Nullipara			1							1
Multipara										
pregnant			1							1
24 July										
Nullipara		3	3	1						7
Primipara										
pregnant			2		1					3
Multipara										
pregnant					1	1			3	5
non-pregnant									2	2
25 July										
Multipara										
pregnant				1						1
26 July										
Nullipara		1								1
Multipara										
pregnant				1	2				5	8
27 July										
Primipara										
pregnant			2							2
Multipara										
pregnant					3	3	1		9	16
non-pregnant							1	2	1	4
28 July										
Nullipara		5	3							8
Multipara										
pregnant				3	2	4	2	1	3	15
non-pregnant				1	1	1			2	5
29 July										
Primipara										
pregnant			3	3						6
Multipara										
pregnant			1	1	1	1	1		7	12
non-pregnant						1	1	1	9	12
30 July										
Nullipara		3								3
Primipara										
pregnant			1	1	1					3
Multipara										
pregnant			1		2	4		1	6	14
non-pregnant									6	6

Appendix Table CC.

Reproductive condition of female seals sampled from commercial kill, by date and age, St. George Island, 27 June to 15 August, 1956 (con.)

	Age									
	3	4	5	6	7	8	9	10	10+	Total
31 July										
Nullipara			2							2
Primipara										
pregnant			1							1
Multipara										
pregnant				4		1	2		8	15
non-pregnant						1	3		6	10
1 August										
Nullipara		2	2	1						5
Primipara										
pregnant			1	1		2				4
Multipara										
pregnant				1			1		6	8
non-pregnant					1	2			5	8
2 August										
Nullipara		5	3							8
Primipara										
pregnant		2	2	1	1					6
Multipara										
pregnant					1	1			4	6
non-pregnant						1	3	1	1	6
3 August										
Nullipara		4	2		1					7
Primipara										
pregnant				3						3
non-pregnant							1			1
Multipara										
pregnant				3		4		5	11	23
non-pregnant				1	1	1	1	2	13	19
4 August										
Nullipara		4	3							7
Primipara										
pregnant		1	1	2	1					5
Multipara										
pregnant				1		1	1		6	9
non-pregnant						1			6	7
5 August										
Nullipara	1	8	3	3						15
Primipara										
pregnant			1	2						3
Multipara										
pregnant			1		2	1	1	1		6
non-pregnant						1	2		1	4

Appendix Table CC.
Reproductive condition of female seals sampled from commercial kill, by date and age, St. George Island, 27 June to 15 August, 1956 (con.)

	Age									
	3	4	5	6	7	8	9	10	10+	Total
6 August										
Nullipara	1		2	1						4
Primipara										
pregnant			1	1	1					3
Multipara										
pregnant				1	1		3	1	2	8
non-pregnant				1		1		1	1	4
7 August										
Nullipara	1	7	2							10
Primipara										
pregnant			3	3						6
Multipara										
pregnant			2			2	2		1	7
non-pregnant						2			5	7
8 August										
Nullipara	3	10	4		1	1				19
Primipara										
pregnant			2	1						3
Multipara										
pregnant				1	1	1	1	1	2	7
non-pregnant				1			1		1	3
9 August										
Nullipara	1	7	5		1					14
Primipara										
pregnant		2	2	1						5
non-pregnant			1							1
Multipara										
pregnant								1	2	3
non-pregnant						1		1	1	3
10 August										
Nullipara	2	5	5							12
Primipara										
pregnant			4	1						5
Multipara										
pregnant				1	1		2		3	7
non-pregnant					1	1			5	7
11 August										
Nullipara	1	5	3							9
Primipara										
pregnant		1	2							3
Multipara										
pregnant			1	2	1	2		1	4	11
non-pregnant				1				1	5	7

Appendix Table CC.

Reproductive condition of female seals sampled from commercial kill, by date and age, St. George Island, 27 June to 15 August, 1956 (con.)

	Age									
	3	4	5	6	7	8	9	10	10+	Total
12 August										
Nullipara		8	2	1						11
Primipara										
pregnant			1							1
Multipara										
pregnant				1	1	1		1	4	8
non-pregnant									2	2
13 August										
Nullipara	2	10	7	2						21
Multipara										
pregnant						1	2		4	7
non-pregnant					1	1			2	4
14 August										
Nullipara		9	1							10
Primipara										
pregnant			2	1						3
Multipara										
pregnant				1		1	1	1	3	7
non-pregnant									5	5
15 August										
Nullipara	2	9	3	1						15
Primipara										
pregnant		1	1		1					3
Multipara										
pregnant				2	1	2			2	7
non-pregnant									5	5

Appendix Table DD.
Reproductive condition of female seals sampled from commercial kill, by rounds and age, St. George Island, 1956

	Age										
	3	4	5	6	7	8	9	10	10+	Total	Percent
27 June-1 July											
Multipara											
Pregnant											
number					1				1	2	100
percent					100				100		
Total					1				1	2	
2-6 July											
Primipara											
Pregnant											
number		3	5	3	1					12	26
percent		100	83	50	10						
Multipara											
Pregnant											
number			1	3	9	7	2	4	4	30	67
percent			17	50	90	88	100	100	67		
Non-pregnant											
number						1			2	3	7
percent						12			33		
Total		3	6	6	10	8	2	4	6	45	
7-11 July											
Nullipara											
number					2					2	9
percent					33						
Primipara											
Pregnant											
number		1	5	5	1				2	14	61
percent		100	100	83	17				40		
Multipara											
Pregnant											
number				1	3				3	7	30
percent				17	50				60		
Total		1	5	6	6				5	23	

Appendix Table DD.
Reproductive condition of female seals sampled from commercial kill, by rounds and age, St. George Island, 1956 (con.)

	Age										
	3	4	5	6	7	8	9	10	10+	Total	Percent
12-16 July											
Primipara											
Pregnant											
number		2	6	9		1	1			19	54
percent		100	100	82		50	25				
Multipara											
Pregnant											
number				2	2	1	2	1	4	12	34
percent				18	100	50	50	100	57		
Non-pregnant											
number							1		3	4	12
percent							25		43		
Total		2	6	11	2	2	4	1	7	35	
17-21 July											
Nullipara											
number		1	1							2	7
percent		50	14								
Primipara											
Pregnant											
number		1	6	1	1					9	30
percent		50	86	33	17						
Multipara											
Pregnant											
number				1	5	1	1	1	1	10	33
percent				33	83	100	100	100	11		
Non-pregnant											
number				1					8	9	30
percent				34					89		
Total	1	2	7	3	6	1	1	1	9	30	
22-26 July											
Nullipara											
number		4	4	1						9	27
percent		100	44	33							
Primipara											
Pregnant											
number			4		1					5	15
percent			44		20						

Appendix Table DD.
Reproductive condition of female seals sampled from commercial kill, by rounds and age, St. George Island, 1956 (con.)

	Age										
	3	4	5	6	7	8	9	10	10+	Total	Percent
22-26 July (con.)											
Multipara											
Pregnant											
number			1	2	4	1			8	16	49
percent			12	67	80	100			73		
Non-pregnant											
number									3	3	9
percent									27		
Total		4	9	3	5	1			11	33	
27-31 July											
Nullipara											
number		8	5							13	10
percent		100	36								
Primipara											
Pregnant											
number			7	4	1					12	8
percent			50	31	10						
Multipara											
Pregnant											
number			2	8	8	13	6	2	33	72	54
percent			14	62	80	81	54	40	58		
Non-pregnant											
number				1	1	3	5	3	24	37	28
percent				7	10	19	46	60	42		
Total		8	14	13	10	16	11	5	57	134	
1-5 August											
Nullipara											
number	1	23	13	4	1					42	26
percent	100	88	68	21	12						
Primipara											
Pregnant											
number		3	5	9	2	2				21	13
percent		12	26	47	25	13					
Non-pregnant											
number							1			1	1
percent							10				

Appendix Table DD.
Reproductive condition of female seals sampled from commercial kill, by rounds and age, St. George Island, 1956 (con.)

	Age										
	3	4	5	6	7	8	9	10	10+	Total	Percent
1-5 August (con.)											
Multipara											
Pregnant											
number			1	5	3	7	3	6	27	52	32
percent			6	26	38	47	30	67	51		
Non-pregnant											
number				1	2	6	6	3	26	44	28
percent				6	25	40	60	33	49		
Total	1	26	19	19	8	15	10	9	53	160	
6-10 August											
Nullipara											
number	8	29	18	1	2	1				59	43
percent	100	94	54	8	29	11					
Primipara											
Pregnant											
number		2	12	7	1					22	16
percent		6	36	54	14						
Non-pregnant											
number			1							1	1
percent			3								
Multipara											
Pregnant											
number			2	3	3	3	8	3	10	32	23
percent			7	23	43	33	89	60	43		
Non-pregnant											
number				2	1	5	1	2	13	24	17
percent				15	14	56	11	40	57		
Total	8	31	33	13	7	9	9	5	23	138	
11-15 August											
Nullipara											
number	5	41	16	4						66	47
percent	100	95	70	34							
Primipara											
Pregnant											
number		2	6	1	1					10	8
percent		5	26	8	20						

Appendix Table DD.
Reproductive condition of female seals sampled from commercial kill, by rounds and age, St. George Island, 1956 (con.)

	3	4	5	6	7	8	9	10	10+	Total	Percent
11-15 August (con.)											
Multipara											
Pregnant											
number			1	6	3	7	3	3	17	40	29
percent			4	50	60	88	100	75	47		
Non-pregnant											
number				1	1	1		1	19	23	16
percent				8	20	12		25	53		
Total	5	43	23	12	5	8	3	4	36	139	

Appendix Table EE.
Projected reproductive condition of total female kill by round, based upon daily samples, St. George Island, 1956

Date	Nullipara	Primipara		Multipara		Cumulative	
		Pregnant	Non-preg.	Pregnant	Non-preg.	Preg.	Non-preg.
1 July				2		2	
6		62		170	21	234	21
11	11	104		53		391	32
16		100		101	13	592	45
21	2	10		11	11	613	58
26	9	5		20	3	638	70
31	36	41		243	130	922	236
5 August	147	69	3	174	141	1165	527
10	342	118	2	180	135	1463	1006
15	919	117		468	278	2048	2203
Total	1466	626	5	1422	732	2048	2203
Percent	34	15		51		48	52

Appendix Table FF.
Reproductive condition of females sampled from commercial kill, by length, St. George Island, 27 June to 15 August, 1956

Length in inches		Nullipara	Primipara		Multipara		Total
			pregnant	non-preg.	pregnant	non-preg.	
38	number	1					1
	percent	1					-
39	number						
	percent						
40	number	15	2				17
	percent	7	1				2
41	number	26	6		1		33
	percent	13	5		1		4
42	number	57	27		9		93
	percent	29	22		3		13
43	number	34	22	1	12	2	71
	percent	18	18	50	4	1	9
44	number	34	26		42	14	116
	percent	18	21		15	10	16
45	number	16	22		63	22	123
	percent	8	18		23	15	17
46	number	8	12	1	51	24	96
	percent	4	10	50	19	17	13
47	number	1	7		45	40	93
	percent	1	5		16	27	13
48	number				36	22	58
	percent				13	15	8
49	number	1			12	16	29
	percent	1			4	11	4
50	number				1	4	5
	percent				1	3	1
51	number				1	2	3
	percent				1	1	-
	Total	193	124	2	273	146	738
	Percent	26	17	-	37	20	

Appendix Table GG.

Cornu of pregnancy among females from commercial kill,
St. George Island, 1956

	Age								
	4	5	6	7	8	9	10	10+	Total
Primipara	14	56	39	9	3	1		2	124
Postpartum									
right cornu									
number	5	32	19	6	2	1		1	66
left cornu									
number	9	24	20	3	1			1	58
Multipara		8	31	41	40	25	20	108	273
Postpartum									
right cornu									
number		4	17	14	21	10	13	57	136
left cornu									
number		4	14	27	19	15	7	50	136
Pregnant									
right cornu									
number								1	1

Appendix Table HH.

Daily reproductive condition[1] of females sampled from commercial kill, by age, St. George Island, Alaska, 4-8 September, 1956

Reproductive condition	Rookery	Age 3	4	5	6	7	8	9	10	10+	Total
4 September	ZAP										
Nullipara			3	6	1	1					11
Primipara											
Pregnant			2	2	2						6
Non-pregnant				1	1						2
Multipara											
Pregnant					2	2	1	2	6	5	18
Non-pregnant							1	1	2	5	9
	Total		5	9	6	3	2	3	8	10	46
Sample size in percent of daily kill: 10											
5 September	NORTH										
Nullipara		3	14	4	6		2				29
Primipara											
Pregnant			4	15	4	2	1	1		1	28
Non-pregnant						5					5
Multipara											
Pregnant				2	1	1	3	3	2	15	27
Non-pregnant							2			9	11
	Total	3	18	21	11	8	8	4	2	25	100
Sample size in percent of daily kill: 10											

1 Determined by examination of genital tracts.

Appendix Table HH.

Daily reproductive condition[1] of females sampled from commercial kill, by age, St. George Island, Alaska, 4-8 September, 1956 (con.)

Reproductive condition	Rookery	Age 3	4	5	6	7	8	9	10	10+	Total
6 September	EAST										
Nullipara				1	1						2
Primipara											
Pregnant					1						1
Non-pregnant											
Multipara											
Pregnant				1	3	3		2	1	9	19
Non-pregnant											
	Total			2	5	3		2	1	9	22
Sample size in percent of daily kill: 20											
7 September	ST. ARTIL										
Nullipara				3							3
Primipara											
Pregnant			1	2	2						5
Non-pregnant											
Multipara											
Pregnant				1	4	3	3	8	3	16	38
Non-pregnant										2	2
	Total		1	6	6	3	3	8	3	18	48
Sample size in percent of daily kill: 10											

1 Determined by examination of genital tracts.

Appendix Table HH.

Daily reproductive condition[1] of females sampled from commercial kill, by age, St. George Island, Alaska, 4-8 September, 1956 (con.)

Reproductive condition	Rookery	Age 3	4	5	6	7	8	9	10	10+	Total
8 September	NORTH										
Nullipara			2	1							3
Primipara											
Pregnant			2	3	2	3	3				13
Non-pregnant											
Multipara											
Pregnant					2	4	3	3	2	19	33
Non-pregnant										1	1
	Total		4	4	4	7	6	3	2	20	50

Sample size in percent of daily kill: 11

1 Determined by examination of genital tracts.

Appendix Table II.

Gross reproductive condition[1] of females sampled from commercial kill, by age, St. George Island, Alaska, 4-8 September, 1956

Reproductive condition	Age 2	3	4	5	6	7	8	9	10	10+	Total
Nullipara											
number		3	19	15	8	1	2				48
percent		100	68	36	25	4	10				18
Primipara											
Pregnant											
number			9	22	11	5	4	1		1	53
percent			32	52	34	21	21	5		1	20
Non-pregnant											
number				1	1	5					7
percent				2	3	21					2
Multipara											
Pregnant											
number				4	12	13	10	18	14	64	135
percent				10	38	54	53	90	88	78	51
Non-pregnant											
number							3	1	2	17	23
percent							16	5	12	21	9
Totals		3	28	42	32	24	19	20	16	82	266
Percent		1	10	16	12	9	7	8	6	31	

All females	number	percent
Pregnant	188	71
Non-pregnant	78	29
Total	266	

Primipara and Multipara females	number	percent
Pregnant	188	86
Non-pregnant	30	14
	218	

Sample size in percent of total kill: 11

1 Determined by examination of genital tracts.

Appendix Table JJ.
Reproductive condition of females sampled from commercial kill, by vibrissal color, Pribilof Islands, 27 June to 15 August, 1956

	Nullipara	Primipara pregnant	Primipara non-preg.	Multipara pregnant	Multipara non-preg.	Total
St. Paul						
Black						
number	611	88	6	43	1	749
percent	60	24	16	4	-	25
Black and white						
number	362	200	10	198	19	789
percent	35	54	26	21	3	26
White						
number	48	82	22	711	611	1474
percent	5	22	58	75	97	49
Total	1021	370	38	952	631	3012
Percent	34	12	1	32	21	
St. George						
Black						
number	61	6				67
percent	32	5				9
Black and white						
number	121	97	1	29	4	252
percent	63	78	50	11	3	34
White						
number	11	21	1	244	143	420
percent	5	17	50	89	97	57
Total	193	124	2	273	147	739
Percent	26	17	-	37	20	

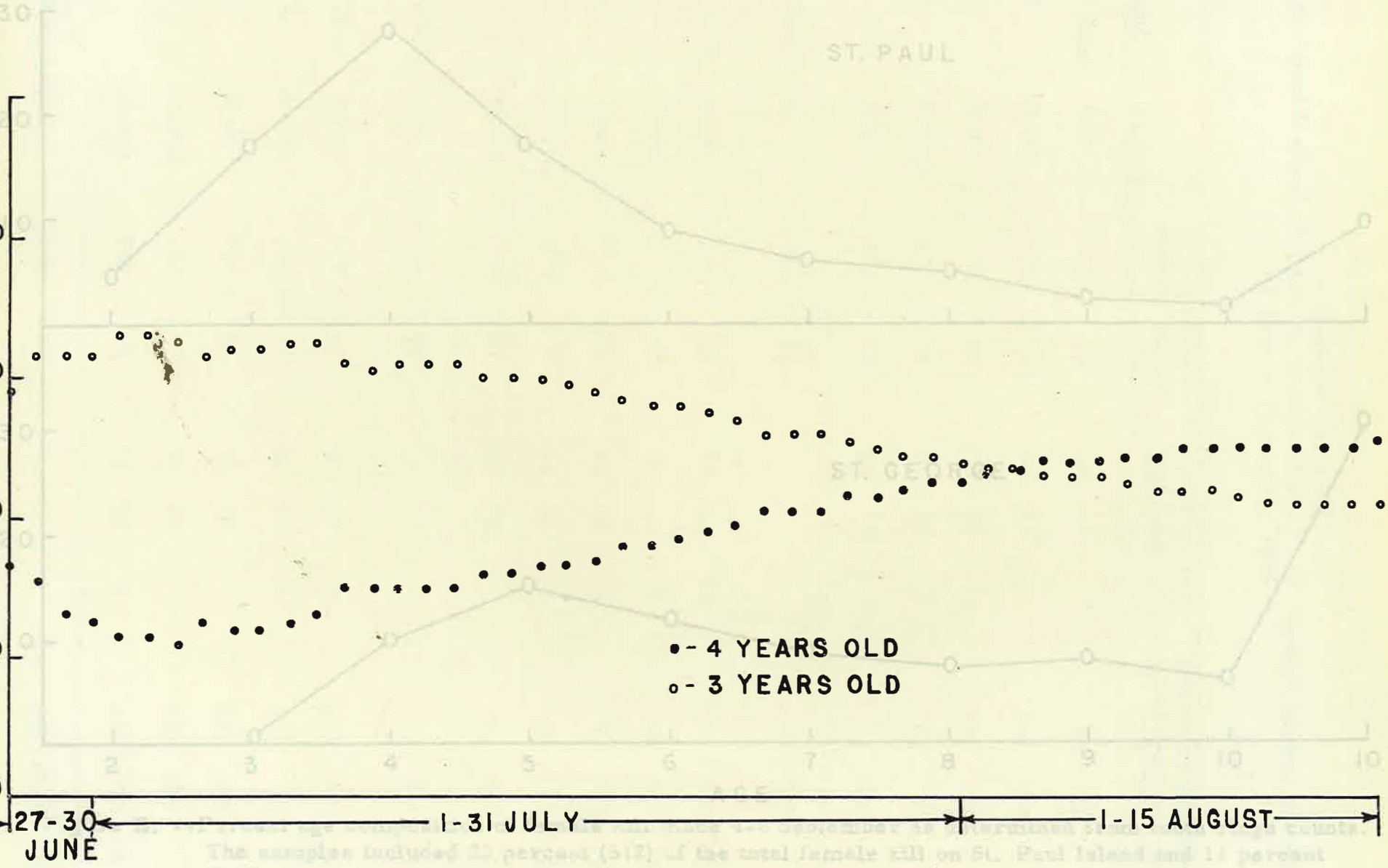


Figure A. --Cumulative percent 3 and 4 year old male seals in commercial kill, St. Paul Island, 1956

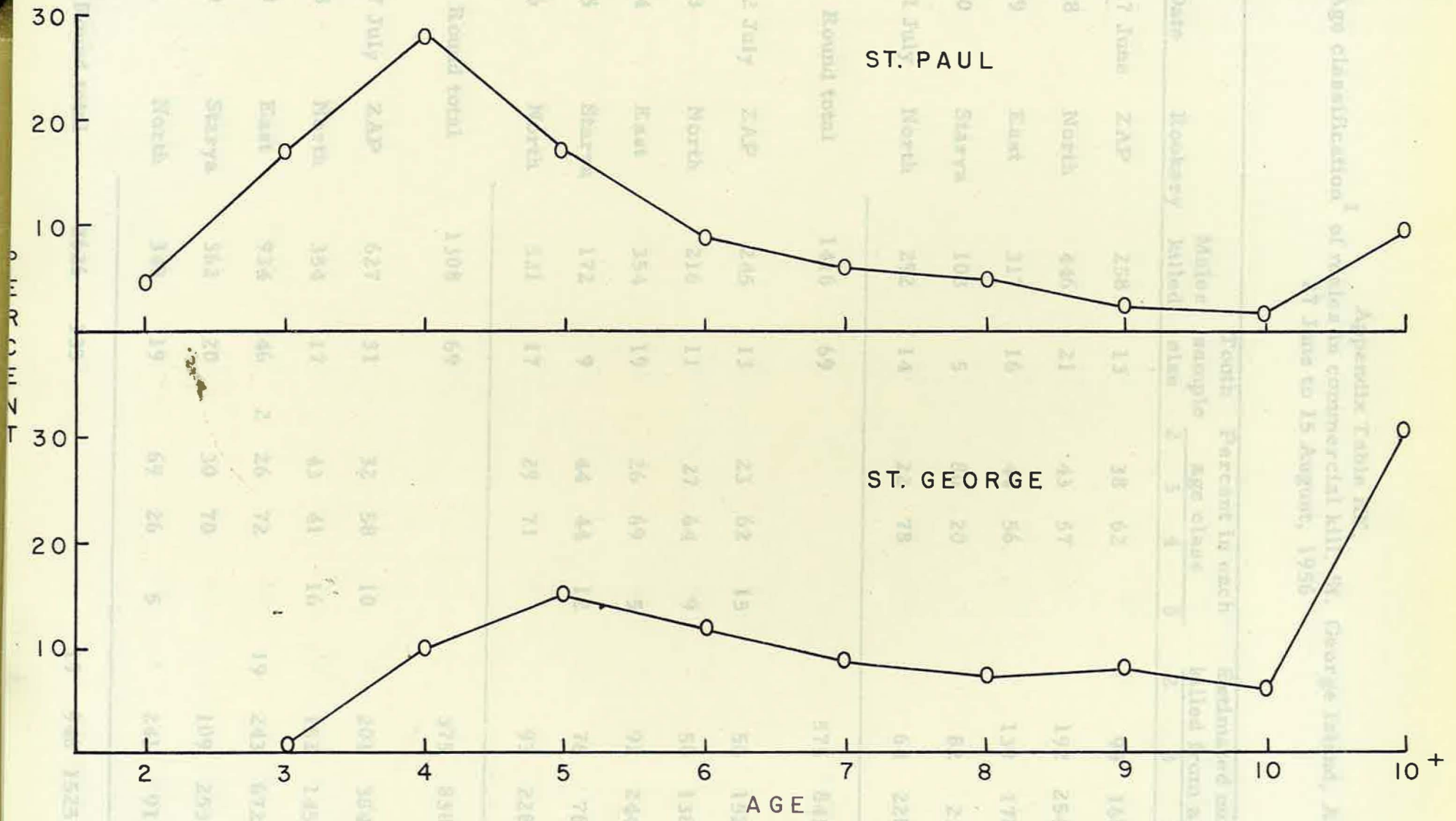


Figure B. --Percent age composition of female kill made 4-8 September as determined from tooth ridge counts. The samples included 22 percent (512) of the total female kill on St. Paul Island and 11 percent (266) of the kill on St. George Island, Alaska.

Appendix Table KK.

Age classification[1] of males in commercial kill, St. George Island, Alaska, 27 June to 15 August, 1956

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
27 June	ZAP	258	13		38	62			98	160	
28	North	446	21		43	57			192	254	
29	East	317	16		44	56			139	178	
30	Starya	103	5		80	20			82	21	
1 July	North	292	14		22	78			64	228	
Round total		1416	69						575	841	
2 July	ZAP	245	13		23	62	15		56	152	37
3	North	216	11		27	64	9		58	138	20
4	East	354	19		26	69	5		92	244	18
5	Starya	172	9		44	44	12		76	76	20
6	North	321	17		29	71			93	228	
Round total		1308	69						375	838	95
7 July	ZAP	627	31		32	58	10		201	364	62
8	North	354	17		43	41	16		152	145	57
9	East	934	46	2	26	72		19	243	672	
10	Starya	362	20		30	70			109	253	
11	North	349	19		69	26	5		241	91	17
Round total		2626	133					19	946	1525	136

Appendix Table KK.

Age classification[1] of males in commercial kill, St. George Island, Alaska 27 June to 15 August, 1956 (con.)

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
12 July	ZAP	720	36		50	42	8		360	302	58
13	North	225	11		64	36			144	81	
14	East	931	41		37	58	5		344	540	47
15	Starya	260	11		46	54			120	140	
16	North	326	18		39	56	5		127	182	17
Round total		2462	117						1095	1245	122
17 July	ZAP	877	42		31	62	7		272	544	61
18	North	287	[illegible]		43	57			123	164	
19	East	791	161	2	57	40	1	16	451	316	8
20	Starya	360	73	1	59	37	3	4	212	133	11
21	North	542	110	2	54	43	1	11	293	233	5
Round total		2857	446					31	1351	1390	85
22 July	ZAP	539	56	2	66	29	3	11	356	156	16
23	North	351	35	6	49	43	2	21	172	151	7
24	East	1274	127	2	74	24		25	943	306	
25	Starya	477	47		57	43			272	205	
26	North	382	40		70	28	2		267	107	8
Round total		3023	305					57	2010	925	31

Appendix Table KK.

Age classification[1] of males in commercial kill, St. George Island, Alaska 27 June to 15 August, 1956 (con.)

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
27 July	ZAP	656	71	4	66	26	4	26	433	171	26
28	North	358	37	9	68	23		33	243	82	
29	East	1171	111	4	51	37	8	47	597	433	94
30	Starya	321	43	2	72	26		7	231	83	
31	North	266	40	2	78	18	2	5	208	48	5
Round total		2772	302					118	1712	817	125
1 August	ZAP	345	41	12	59	27	2	41	204	93	7
2	North	160	19	5	74	21		8	118	34	
3	East	534	67	8	70	22		43	374	117	
4	Starya	347	53	6	83	11		21	288	38	
5	North	193	25	4	72	24		8	139	46	
Round total		1579	205					121	1123	328	7
6 August	ZAP	111	14		50	36	14		56	40	15
7	North	157	61	5	57	35	3	8	89	55	5
8	East	345	57	2	75	21	2	7	259	72	7
9	Starya	198	22	14	68	14	4	27	136	27	8
10	North	176	36	8	58	28	6	14	102	49	11
Round total		987	190					56	642	243	46

Appendix Table KK.

Age classification[1] of males in commercial kill, St. George Island, Alaska, 27 June to 15 August, 1956 (con.)

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
11 August	ZAP	214	37	11	57	29	3	24	122	62	6
12	North	167	37	8	59	30	3	13	99	50	5
13	East	453	95	12	67	20	1	54	304	91	4
14	Starya	120	28	11	57	29	3	13	68	35	4
15	North	216	74	4	70	24	2	9	151	52	4
Round total		1170	271					113	744	290	23
Season total		20200	2107	3	52	42	3	515	10573	8442	670

1 Age based on tooth ridge counts and tag recoveries.

Appendix Table LL.
Cumulative age classification of males in commercial kill,
St. George Island, Alaska
27 June to 15 August, 1956

Date	Rookery	Estimated number males killed from age class				Cumulative total males killed	Cumulative percent males killed from age class			
		2	3	4	5		2	3	4	5
27 June	ZAP	-	98	160	-	258	-	38	62	-
28	North	-	290	414	-	704	-	41	59	-
29	East	-	429	592	-	1021	-	42	58	-
30	Starya	-	511	613	-	1124	-	46	54	-
1 July	North	-	575	841	-	1416	-	41	59	-
2	ZAP	-	631	993	37	1661	-	38	60	2
3	North	-	689	1131	57	1877	-	37	60	3
4	East	-	781	1375	75	2231	-	35	62	3
5	Starya	-	857	1451	95	2403	-	36	60	4
6	North	-	950	1679	-	2724	-	35	62	3
7	ZAP	-	1151	2043	157	3351	-	34	61	5
8	North	-	1303	2188	214	3705	-	35	59	6
9	East	19	1546	2860	-	4639	-	33	62	5
10	Starya	-	1655	3113	-	5001	-	33	62	5
11	North	-	1896	3204	231	5350	-	35	60	5
12	ZAP	-	2256	3506	289	6070	-	37	58	5
13	North	-	2400	3587	-	6295	-	38	57	5
14	East	-	2744	4127	336	7226	-	38	57	5
15	Starya	-	2864	4267	-	7486	-	38	57	5

Appendix Table LL.
Cumulative age classification of males in commercial kill,
St. George Island, Alaska
27 June to 15 August, 1956 (con.)

Date	Rookery	Estimated number males killed from age class 2	3	4	5	Cumulative total males killed	Cumulative percent males killed from age class 2	3	4	5
16 July	North	-	2991	4449	353	7812	-	38	57	5
17	ZAP	-	3263	4993	414	8689	-	38	57	5
18	North	-	3386	5157	-	8976	-	38	57	5
19	East	35	3837	5473	422	9767	-	39	56	5
20	Starya	39	4049	5606	433	10127	-	40	55	5
21	North	50	4342	5839	438	10669	-	41	55	4
22	ZAP	61	4698	5995	454	11208	-	42	54	4
23	North	82	4870	6146	461	11559	1	42	53	4
24	East	107	5813	6452	-	12833	1	45	50	4
25	Starya	-	6085	6657	-	13310	1	46	50	3
26	North	-	6352	6764	469	13692	1	46	50	3
27	ZAP	133	6785	6935	495	14348	1	47	49	3
28	North	166	7028	7017	-	14706	1	48	48	3
29	East	213	7625	7450	589	15877	1	48	47	4
30	Starya	220	7856	7533	-	16198	1	48	47	4
31	North	225	8064	7581	594	16464	1	49	46	4
1 August	ZAP	266	8268	7674	601	16809	2	49	45	4
2	North	274	8386	7708	-	16969	2	49	45	4

Appendix Table LL.
Cumulative age classification of males in commercial kill, St. George Island, Alaska 27 June to 15 August, 1956 (con.)

Date	Rookery	Estimated number males killed from age class 2	3	4	5	Cumulative total males killed	Cumulative percent males killed from age class 2	3	4	5
3 August	East	317	8760	7825	-	17503	2	50	45	3
4	Starya	338	9048	7863	-	17850	2	51	44	3
5	North	346	9187	7909	-	18043	2	51	44	3
6	ZAP	-	9243	7949	616	18154	2	51	44	3
7	North	354	9332	8004	621	18311	2	51	44	3
8	East	361	9591	8076	628	18656	2	51	44	3
9	Starya	388	9727	8103	636	18854	2	52	43	3
10	North	402	9829	8152	647	19030	2	52	43	3
11	ZAP	426	9951	8214	653	19244	2	52	43	3
12	North	439	10050	8264	658	19411	2	52	43	3
13	East	493	10354	8355	662	19864	2	52	43	3
14	Starya	506	10422	8390	666	19984	3	52	42	3
15	North	515	10573	8442	670	20200	3	52	42	3
Total		515	10573	8442	670	20200	3	52	42	3

Appendix Table MM.
Number pregnant and non-pregnant among seals 4 or more years old and 5 or more years old

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+	
				preg.	non-preg.		preg.	non-preg.
27 June	1	1	1	1		1	1	
28	1							
29	2	2	2	2		2	2	
30								
1 July	183	107	107	107		104	104	
2	2	3	3	3		3	3	
3	5	6	6	6		5	5	
4	1	1	1	1		1	1	
5								
6	630	158	158	155	3	155	152	3
7	16	16	16	16		16	16	
8	6	6	6	5	1	6	5	1
9	14	15	15	14	1	14	13	1
10								
11	4	3	3	2	1	2	2	
12	17	13	13	11	2	13	11	2
13	4	4	4	4		4	4	
14	32	28	28	28		26	26	
15		1	1		1			
16	7	8	8	5	3	8	5	3
17	17	18	18	16	2	18	16	2
18	10	11	11	9	2	11	9	2
19	8	8	8	7	1	6	5	1
20	6	6	6	3	3	5	2	3
21	24	21	21	17	4	19	17	2
22	58	48	48	31	17	42	29	13
23	9	9	9	9		8	8	
24	90	83	83	45	38	76	43	33
25	3	3	3	2	1	3	2	1
26	8	8	8	3	5	6	3	3
27	156	76	74	33	41	65	32	33
28	35	35	35	16	19	31	14	17
29	136	82	80	33	47	76	32	44
30	214	102	102	41	61	93	41	52
31	46	43	41	11	30	29	10	19

Appendix Table MM.
Number pregnant and non-pregnant among seals 4 or more years old and 5 or more years old (con.)

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+	
				preg.	non-preg.		preg.	non-preg.
1 August	359	81	79	27	52	54	26	28
2	41	40	37	13	24	28	12	16
3	492	96	95	40	55	86	39	47
4	937	115	113	60	53	102	57	45
5	126	82	79	28	51	53	26	27
6	854	184	177	60	117	146	58	88
7	643	115	111	44	67	85	39	46
8	910	165	157	48	109	121	47	74
9	907	111	104	49	55	87	47	40
10	699	137	122	48	74	85	46	39
11	2760	232	209	58	151	140	56	84
12	780	131	118	33	85	88	31	57
13	1199	121	105	41	64	84	40	44
14	3119	199	169	68	101	113	63	50
15	2862	278	245	69	176	102	61	41
Total	18433	3012	2839	1322	1517	2222	1261	961

Appendix Table NN.
Age classification of females in commercial kill,
St. Paul Island, 27 June to 15 August 1956

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+	3	4	5	6	7	8	9	10	10+	3	4	5	6	7	8	9	10	10+
27 June	NEP	1	1				1									100									1							
28	TLK	1																														
29	ZAP	2	2					1			1						50				50					1				1		
30	REEF																															
1 July	POL	183	107			3	26	36	19	15	5	1	2		3	24	34	18	14	4	11	2		5	44	62	33	26	7	2	4
Round total		187	110			3	27	37	19	15	6	1	2											5	45	63	33	26	8	2	4
2 July	NEP	2	3				2	1								67	33								1	1						
3	TLK	5	6			1	2	1	1			1			17	32	17	17			17			1	1	1	1			1		
4	ZAP	1	1					1									100									1						
5	REEF																															
6	POL	630	158			3	25	24	45	21	13	5	22		2	16	15	29	13	8	3	14		13	101	94	183	82	50	19	88
Round total		638	168			4	29	27	46	21	13	6	22											14	103	97	184	82	50	20	88
7 July	NEP	16	16				7	8	1							44	50	6							7	8	1					
8	TLK	6	6				1	2	1				2			17	33	17				33			1	2	1				2	
9	ZAP	14	15		1	3	3	3	2			3		7	20	20	20	13			20		1	3	3	3	1			3		
10	REEF																															
11	POL	4	3		1	1	1							33	34	33							1	2	1							
Round total		40	40		2	12	14	5	2			5											2	13	14	5	1			5		
12 July	NEP	17	13				6	5	1				1			46	38	8				8			8	7	1				1	
13	TLK	4	4					4									100									4						
14	ZAP	32	28		2	5	10	3	3	1		4		7	18	36	11	11	3		14		1	6	12	4	4	1		4		
15	REEF	1	1		1									100									1									
16	POL	7	8				2	3	1		1		1			26	38	12		12		12			2	2	1		1		1	
Round total		60	54		3	13	22	5	3	2		6											2	16	25	6	4	2		6		
17 July	NEP	17	18				5	7	2				4			28	39	11				22			5	6	2				4	
18	TLK	10	11				1	5	2				3			9	45	18				28			1	4	2				3	
19	ZAP	8	8		2			3	2				1		25		37	25				13		2		3	2				1	
20	REEF	6	6		1	2	1						2		17	33	17					33		1	2	1					2	
21	POL	24	21		2	11	3	3					2		10	52	14	14				10		2	12	4	4				2	
Round total		65	64		5	19	19	9					12											5	20	18	10				12	

Appendix Table NN.
Age classification of females in commercial kill,
St. Paul Island, 27 June to 15 August 1956 (con.)

Date	Rookery	Females killed	Daily sample	2	3	4	5	6	7	8	9	10	10+
22 July	NEP	58	48			6	17	11	7				7
23	TLK	9	9			1	2	4	1				1
24	ZAP	90	83			7	17	8	10	6	5	2	28
25	REEF	3	3				2						1
26	POL	8	8			2	2		3	1			
Round total		168	151			16	40	23	21	7	5	2	37
27 July	NEP	156	76		2	9	16	11	3	6		3	26
28	TLK	35	35			4	6	10	5	1	1	2	6
29	ZAP	136	82		2	4	8	16	3	6	4		39
30	REEF	214	102			9	13	14	7	13	3	3	40
31	POL	46	43		2	12	9	6	1	1	1		11
Round total		587	338		6	38	52	57	19	27	9	8	122
1 August	NEP	359	81		2	25	20	9	8	3	1	4	9
2	TLK	41	40		3	9	7	5	1	5	2		8
3	ZAP	492	96		1	9	11	17	8	14	8	6	22
4	REEF	937	115	1	2	11	20	19	4	7	5	6	40
5	POL	126	82		3	26	21	5	5	7	2		13
Round total		1955	414	1	11	80	79	55	26	36	18	16	92
6 August	NEP	854	184		7	32	19	17	14	20	11	6	58
7	TLK	643	115		4	26	17	13	6	2	5	2	40
8	ZAP	910	165		8	37	29	13	11	6	8	6	47
9	REEF	907	111		7	17	14	20	3	11	5	6	28
10	POL	699	137		15	37	19	18	10	6	5	2	25
Round total		4013	712		41	149	98	81	44	45	34	22	198
11 August	NEP	2760	232		23	69	47	19	18	8	11	2	35
12	TLK	780	131		13	30	24	14	10	8	3	1	28
13	ZAP	1199	121		16	21	29	12	7	5	5	2	24
14	REEF	3119	199		30	56	34	17	13	10	7	5	27
15	POL	2862	278		33	143	37	12	23	20	3	1	6
Round total		10720	961		115	319	171	74	71	51	29	11	120
Season total		18433	3012	1	173	619	540	409	265	207	116	66	616

Date	Rookery	Percent in each age class of sample									Estimated number killed from each age class								
		3	4	5	6	7	8	9	10	10+	3	4	5	6	7	8	9	10	10+
22 July	NEP		12	35	23	15				15		7	20	13	9				9
23	TLK		11	22	45	11				11		1	2	4	1				1
24	ZAP		8	20	10	12	7	6	3	34		7	18	9	11	6	5	3	31
25	REEF			67						33			2						1
26	POL		25	25		37	13					2	2		3	1			
Round total												17	44	26	24	7	5	3	42
27 July	NEP	3	12	21	14	4	8		4	34	5	19	33	22	6	12		6	53
28	TLK		11	17	29	14	3	3	6	17		4	6	10	5	1	1	2	6
29	ZAP	2	5	10	19	4	7	5		48	3	7	14	26	5	9	7		65
30	REEF		9	13	13	7	13	3	3	39		19	28	28	15	28	6	6	84
31	POL	5	28	21	14	2	2	2		26	2	13	10	6	1	1	1		12
Round total											10	62	91	92	32	51	15	14	220
1 August	NEP	2	31	25	11	10	4	1	5	11	7	111	90	40	36	14	4	18	39
2	TLK	8	22	18	12	3	12	5		20	3	9	8	5	1	5	2		8
3	ZAP	1	9	11	18	8	15	8	7	23	5	44	54	89	39	74	39	34	114
4	REEF	2	10	17	16	3	6	5	6	35	19	94	159	150	28	56	47	56	328
5	POL	4	32	26	6	6	8	2		16	5	40	33	8	8	10	2		20
Round total											39	298	344	292	112	159	94	108	509
6 August	NEP	4	17	10	9	8	11	6	3	32	34	145	86	77	68	94	51	26	273
7	TLK	3	23	15	11	5	2	4	2	35	19	148	96	71	32	13	26	13	225
8	ZAP	5	22	17	8	7	4	5	4	28	46	200	155	73	64	36	45	36	255
9	REEF	6	15	13	18	3	10	4	6	25	54	136	118	163	27	91	37	54	227
10	POL	11	27	14	13	7	4	4	2	18	77	189	98	91	49	28	28	14	125
Round total											230	818	553	475	240	262	187	143	1105
11 August	NEP	10	30	20	8	8	3	5	1	15	276	828	552	221	221	83	138	27	414
12	TLK	10	23	18	11	8	6	2	1	21	78	179	140	86	62	47	16	8	164
13	ZAP	13	17	24	10	6	4	4	2	20	156	204	288	120	72	48	47	24	240
14	REEF	15	28	17	8	7	5	3	3	14	468	873	530	249	218	156	94	94	437
15	POL	12	52	13	5	8	7	1		2	344	1488	372	143	229	200	29		57
Round total											1322	3572	1882	819	802	534	324	153	1312
Season total											1601	4795	3111	1921	1448	1126	685	443	3303

Appendix Table OO.
Cumulative age classification of females in commercial kill, by day,
St. Paul Island, Alaska, 27 June to 15 August, 1956

Date	Rookery	Number killed from age class								Total killed	Percent killed from age class								
		3	4	5	6	7	8	9	10	10+		3	4	5	6	7	8	9	10	10+
27 June	NEP			1							1			100						
28	TLK			1							1			100						
29	ZAP			1	1			1			3			34	33			33		
30	REEF			1	1			1			3			34	33			33		
1 July	POL		5	45	63	33	26	8	2	4	186		3	24	34	18	14	4	1	2
2	NEP		5	46	64	33	26	8	2	4	188		3	24	34	18	14	4	1	2
3	TLK		6	47	65	34	26	8	3	4	193		3	24	34	18	13	4	2	2
4	ZAP		6	47	66	34	26	8	3	4	194		3	24	34	18	13	4	2	2
5	REEF		6	47	66	34	26	8	3	4	194		3	24	34	18	13	4	2	2
6	POL		19	148	160	217	108	58	22	92	824		2	18	20	26	13	7	3	11
7	NEP		19	155	168	218	108	58	22	92	840		2	18	20	26	13	7	3	11
8	TLK		19	156	170	219	108	58	22	94	846		2	18	20	26	13	7	3	11
9	ZAP		20	159	173	222	109	58	22	97	860		2	19	20	26	13	7	2	11
10	REEF		20	159	173	222	109	58	22	97	860		2	19	20	26	13	7	2	11
11	POL		21	161	174	222	109	58	22	97	864		2	19	20	26	13	7	2	11
12	NEP		21	169	181	223	109	58	22	98	881		2	19	21	25	12	7	3	11
13	TLK		21	169	185	223	109	58	22	98	885		2	19	21	25	12	7	3	11
14	ZAP		22	175	197	227	113	59	22	102	917		2	19	22	25	12	7	2	11
15	REEF		23	175	197	227	113	59	22	102	918		2	19	22	25	12	7	2	11
16	POL		23	177	199	228	113	60	22	103	925		2	19	22	25	12	7	2	11
17	NEP		23	182	205	230	113	60	22	107	942		3	19	22	25	12	6	2	11
18	TLK		23	183	209	232	113	60	22	110	952		3	19	22	24	12	6	2	12
19	ZAP		25	183	212	234	113	60	22	111	0		3	19	22	24	12	6	2	12
20	REEF		26	185	213	234	113	60	22	113	966		3	19	22	24	12	6	2	12
21	POL		28	197	217	238	113	60	22	115	990		3	20	22	24	11	6	2	12
22	NEP		35	217	230	247	113	60	22	124	1048		3	21	22	23	11	6	2	12
23	TLK		36	219	234	248	113	60	22	125	1057		3	21	22	23	11	6	2	12
24	ZAP		43	237	243	259	119	65	25	156	1147		4	21	21	23	10	6	2	13
25	REEF		43	239	243	259	119	65	25	157	1150		4	21	21	23	10	6	2	13
26	POL		45	241	243	262	120	65	25	157	1158		4	21	21	23	10	6	2	13
27	NEP	5	64	274	265	268	132	65	31	210	1314		5	21	20	21	10	5	2	16
28	TLK	5	68	280	275	273	133	66	33	216	1349		5	21	20	21	10	5	2	16
29	ZAP	8	75	294	301	278	142	73	33	281	1485		5	20	20	19	10	5	2	19
30	REEF	8	94	322	329	293	170	79	39	365	1699		6	19	19	18	10	5	2	21
31	POL	10	107	332	335	294	171	80	39	377	1745		6	19	19	17	10	5	2	22
1 August	NEP	17	218	422	375	330	185	84	57	416	2104	1	10	20	18	15	9	4	3	20
2	TLK	20	227	430	380	331	190	86	57	424	2145	1	10	20	18	15	9	4	3	20
3	ZAP	25	271	484	469	370	264	125	91	538	2637	1	10	18	18	14	10	5	4	20

Appendix Table OO.
Cumulative age classification of females in commercial kill, by day,
St. Paul Island, Alaska, 27 June to 15 August, 1956 (con.)

Date	Rookery	Number killed from age class									Total killed	Percent killed from age class								
		3	4	5	6	7	8	9	10	10+		3	4	5	6	7	8	9	10	10+
4 August	REEF	44	365	643	619	398	320	172	147	866	3574	1	10	18	18	11	9	5	4	24
5	POL	49	405	676	627	406	330	174	147	886	3700	1	11	18	17	11	9	5	4	24
6	NEP	83	550	762	704	474	424	225	173	1159	4554	2	12	17	16	10	9	5	4	25
7	TLK	102	698	858	775	506	437	251	186	1384	5197	2	13	16	15	10	8	5	4	27
8	ZAP	148	898	1013	848	570	473	296	222	1639	6107	2	15	16	14	9	8	5	4	27
9	REEF	202	1034	1131	1011	597	564	333	276	1866	7014	3	15	16	14	8	8	5	4	27
10	POL	279	1223	1229	1102	646	592	361	290	1991	7713	4	16	16	14	8	7	5	4	26
11	NEP	555	2051	1781	1323	867	675	499	317	2405	10473	5	20	17	13	8	6	5	3	23
12	TLK	633	2230	1921	1409	929	722	515	325	2569	11253	6	20	17	13	8	6	4	3	23
13	ZAP	789	2434	2209	1529	1001	770	562	349	2809	12452	6	20	18	12	8	6	4	3	23
14	REEF	1257	3307	2739	1778	1219	926	656	443	3246	15571	8	21	18	11	8	6	4	3	21
15	POL	1601	4795	3111	1921	1448	1126	685	443	3303	18433	9	26	17	10	8	6	4	2	18