ALASKA FUR SEAL INVESTIGATIONS: REPORT OF STUDIES ON THE PRIBILOF ISLANDS IN 1952

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Scheffer was on St. Paul Island from 8 to 25 August, and Kenyon from 13 September to 5 October. Because of the pressing importance of pelagic studies in the North Pacific Ocean during the spring and summer of 1952, little attention was paid to the Pribilof Islands. The main accomplishments there included the tagging of 20,000 seal pups, routine counts of dead pups, recovery of tagged animals, sampling of the kills, and cooperation with Dr. O. Wilford Olsen in his study of hookworm. In conformity with the alphabetical arrangement of the research files in the Seattle office, the work accomplished on St. Paul Island in 1952 is described below:

Anatomy, miscellaneous. As a step toward obtaining a descriptive anatomy of the Alaska fur seal, experiments were made in preserving seals in the field by embalming. A male and a female pup, and a male and a female subadult were embalmed. They were shipped to Seattle, boxed in straw, on

the September Penguin and were forwarded on 9 October to the General Biological Supply House to be injected with colored masses. They will subsequently be dissected; probably by Robert B. Chiasson of the University of Arizona.

The brain and brain stem of a bachelor and a pup were embalmed for shipment to Dr. Edward J. Mahoney, Boston University School of Medicine, who is interested in the central nervous system of marine mammals.

The respiratory tracts of several fur seals and sea-lions were collected for Dr. Pearl M. Zeek, Cincinnati General Hospital, who is describing the peculiar double trachea in marine mammals.

The hearts of several fur seals and sea-lions were preserved for study by Dr. Robert J. Johnson, University of Washington School of Medicine.

The kidneys of several fur seals and sea-lions were preserved for study by Dr. Heinrich F. Wolf, New York City.

A bachelor seal was preserved by freezing, to be studied in serial sections in the Seattle lab during the winter.

Growth and measurements. In order to fill in certain gaps in information on growth rate of cows, the following tagged specimens were killed and measured: 4 four-year olds, 7 five-year olds, 1 seven-year old, and 1 eleven-year old.

The specimens also served as important additions to the collection of known-age teeth. In cooperation with the Dental School of the University of Washington, studies of the annular growth-ridges of seal teeth are in progress. A report by Richard M. Laws, a British biologist working with elephant seals, suggests that cross sections of teeth may provide a clue to the ages of very old seals.[1] With the present method in use on the Pribilofs, the age of seals can rarely be estimated beyond 10 years.

Marking seals: Recoveries 1952. Because of the urgency of other research duties, the biologists were unable to study the return of marked seals in 1952 as carefully as they should have. The following data were obtained on the killing fields by the island managers:

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1 A New Method of Age Determination for Mammals. Nature, 169:972-974, 1 photo, 7 June 1952.

Number of tagged male seals recovered, summer of 1952.

	Series A 5-year	Series B 4-year	Series C 3-year	Total
St. Paul rookeries				
Reef-Gorbatch		50	28	78
Polovina	3	355	315	673
NE Point	2	123	535	660
Tolstoi-Lukanin	4	111	140	255
Zapadni	1	116	172	289
TOTAL	10	755	1190	1955
St. George rookeries				
Zapadni		11	25	36
East		10	14	24
North		9	18	27
Staraya-Artil			7	7
TOTAL		30	64	94
Both islands				
	10	785	1254	2049

In addition, a 5-year old cow bearing an "A" tag was accidentally killed on East rookery.

Analysis of the length-age relationships of the tagged seals will be made at a later date.

Tagged 1952. Between 18 and 26 September pup tagging was done on St. Paul Island by 14 Aleut crewmen and one biologist. "Hasco" cattle ear tags of stainless steel of the E series and numbered 1 to 20,000 were used. Each tag was fastened to the base of the right front flipper and, as a double-check, the tip of the first digit of the right hind flipper was sliced off with a sharp knife.

During the latter part of September the pups are large and difficult to handle. Future tagging operations should be started during the last week in August.

Rookery	Tag numbers	Number of pups tagged
Polovina	1 to 9,200	9,200
NE Point	9,201 to 13,200	4,000
Little Zapadni	13,201 to 14,000	800
Gorbatch	14,001 to 20,000	6,000
		20,000
	Less 19 spoiled tags	- 19
		19,981
	Less 2 tags removed from dead pups	- 2
	Total tagged pups	19,979

Migration. From tag returns it has been shown that a few American seals fraternize with Asiatic seals in the coastal waters of Japan and on the Commander Islands.[1] The thought may be pursued that, if intermingling exists, racial distinctions between eastern and western seals are probably insignificant. To test this point, Wilke compared statistically the skull measurements of seals taken near Japan and seals taken near Sitka, Alaska. He found no significant differences. However, Japanese and Canadian biologists have (orally) criticized the Sitka sample on the grounds that it contains seals of unknown birthplace. While this is true, of course, the probability is very high that any females wintering at Sitka are of the Pribilof herd.

A new statistical comparison was called for, however, and a fresh sample of American seal skulls, this time from the Pribilof Islands, was taken. On 29 and 30 September, Kenyon and a crew of four drove several hundred seals from Polovina Sands hauling ground to a nearby field. Here they selected 49 fully adult cows and shot them in the necks. For each cow, the length and weight were taken and the skull and genital tract were preserved by freezing. (The skins were salted for the 1953 harvest.) When the skulls arrive in Seattle on the November Penguin, they will be cleaned, measured, and compared with representative Japanese coast material.

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1 "Pelagic Fur Seal Research off Japan in 1950," Ford Wilke. FWS Leaflet WL-338, January 1952.

Mortality. Dead fur seal pups were counted on Polovina rookery by Scheffer, O. W. Olsen, Lavrenty Stepetin and John Stepetin. The totals, compared with those from last year are:

	Dead pups 15 Aug. 1951	Dead pups 19 Aug. 1952
Polovina	6,402	3,200
Polovina Cliffs	5,580	2,954
TOTAL	11,982	6,154

Mortality on Polovina in 1952, expressed as the round figure 6,200, was equal to 12 per cent of the newborn young. This value is derived from an estimate of 51,425 pups born on Polovina in 1949, plus the assumption that the pup crop has not changed materially in the past three years.[1]

A count of dead pups was made on 19 August 1952 on the NE Point study plot, but because the counting crew did not understand exactly where the beach-side boundary was located, their figures are not comparable with those of 1951.

On 15 September a count of dead pups was made by Kenyon on the study area at NE Point and the boundary lines of the area were repainted. The dead pups on this area totaled 370. The count on the same area on 16 August 1951 was

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1 See Table 5 in "A Population Study of the Alaska Fur Seal Herd," 5 July 1951.

430. Undoubtedly the 1951 count would have been slightly higher, perhaps 1 or 2 per cent, by mid-September. However, by mid-August the mortality due to hookworm is usually well past its peak. Thus the results of the 1951 and 1952 counts are comparable, and the counts show a decrease of about 14 per cent.

The sex of 400 dead pups was ascertained and a 50-50 distribution was found:

	No. males	No. females
Polovina beach	39	61
Polovina slope	46	54
NE Point study plot	111	89
TOTAL	196	204

In the severe winter of 1949-1950, the emaciated bodies of about 700 silver pups (yearlings) washed up on Oregon and Washington beaches. Speculation was aroused as to total effect of this cold winter upon the 1949 class of seals. However, 3-year males appeared in their usual numbers on the killing fields in 1952. The percentage of true 3-year olds in the kill was in line with the percentages of the previous two years (see figure on page 11). One is forced to conclude that the effect of the cold winter was local.

Pelage. The skin of a chocolate-phase pup was preserved for study on 8 August (BDM no. 450).

The pelts of two five-year cows killed for growth studies will be tanned as leather, without the hair, to show the texture of seal skin and the arrangement of the follicles.

Reproduction. Of thirteen known-age females killed, the following had delivered a pup a few weeks previously:

	Number of seals	Number recently delivered	Percent recently delivered
Age 4	4	3	75
Age 5	7	5	71
Age 7	1	1	100
Age 11	1	1	100

There are puzzling discrepancies in the breeding success of the primapara (4th year female) in various samples taken between 1945 and 1952. These are thought to be a result of non-representative sampling. The matter will be discussed at length in a forthcoming report of pelagic investigations.

The sample of 49 cows described under "Migration" is expected to provide additional information on reproductive success. This sample differs from the 100-cow kills from Polovina in two previous years, in that it was taken from the

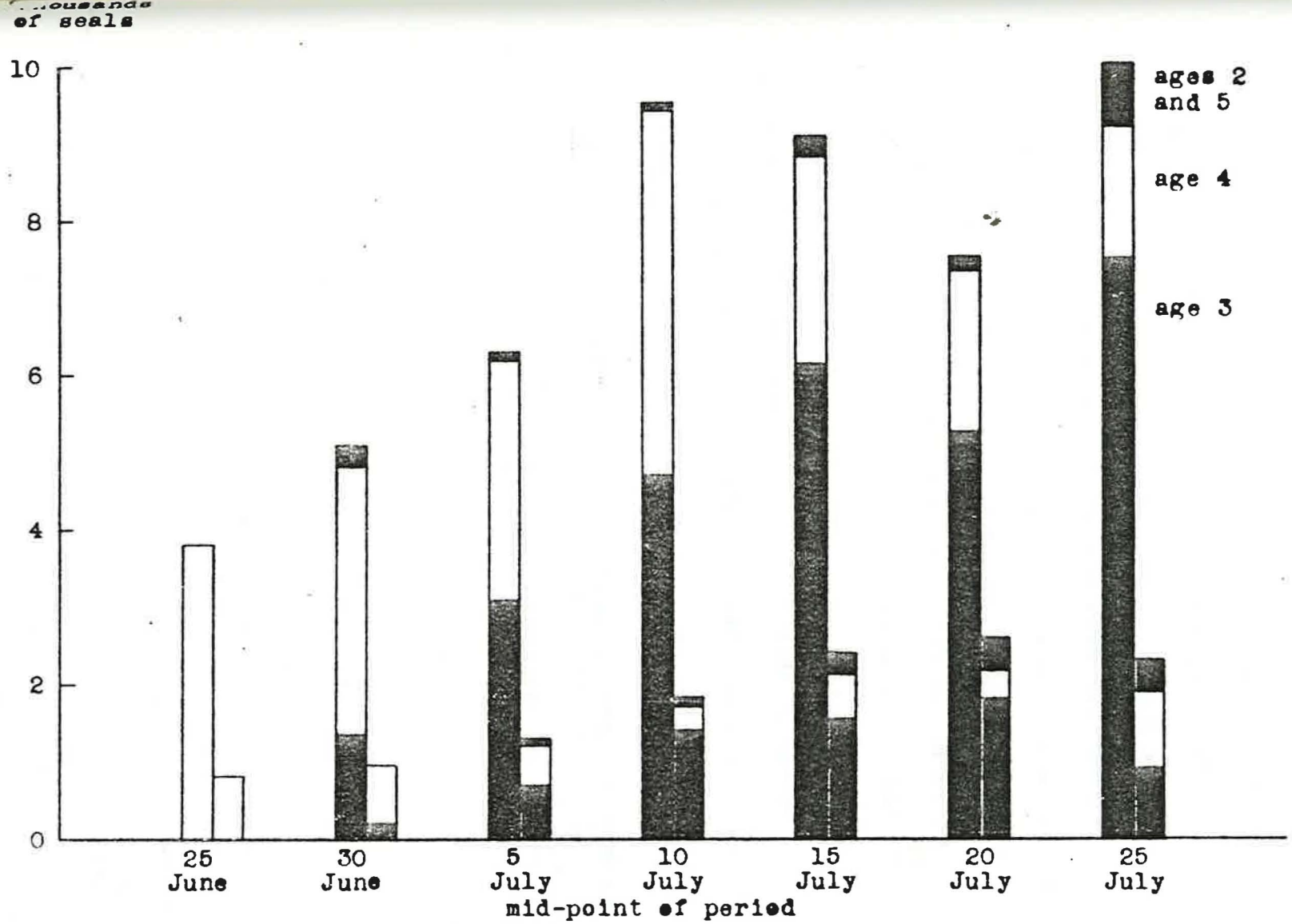
hauling ground rather than the rookery. It will not be surprising if the 1952 sample shows a higher percentage of non-breeding animals.

Sealing, commercial. The three biologists immediately concerned with the Alaska fur seal investigation have been formulating a plan for a proposed 15-year experimental harvest. Among its features will be (a) a yearly quota, (b) an increased kill of females and large bachelors, and (c) a continuous study of population trends. So far, nothing has been set down in writing.

(Please see figure, p. 11.) With respect to timing, total numbers, and age composition, the return of killable seals in 1952 followed a familiar pattern. On St. Paul, though, there was a slight drop in the kill for the next-to-last round and a compensating rise in the last. The age composition of the kill in each of the past three years as estimated from tooth-ridge counts is shown below:

	St. Paul				St. George			
	Percentage of seals killed				Percentage of seals killed			
	2-yr.	3-yr.	4-yr.	5-yr.	2-yr.	3-yr.	4-yr.	5-yr.
1950	1	61	37	1	--	--	--	--
1951	0	51	47	2	3	56	37	4
1952*	2	58	38	2	9	58	32	1

* lacking data for the first 8 out of 36 kills on St. Paul and the first 10 out of 37 kills on St. George



Numbers and estimated ages of male seals killed on the Pribilof Islands in 1952 by 5-day periods. (St. Paul at left, St. George at right; small kills previous to 23 June not shown; ages for first period not estimated.)

If tooth samples had been taken in the early part of the season of 1952, the percentage of 4-year olds would have increased, due to the fact that the 4-year olds arrive, on the average, about ten days ahead of the threes.

For most of the tooth samples taken on St. Paul in 1952, the field length of the seal was also recorded. Thus, for the first time, comparative data are available on (a) length in inches as measured by the scaler and (b) age as estimated from tooth-ridge counts. And it is now possible to state with conviction that the tooth-ridge technique is accurate to within 1 or 2 per cent insofar as separating 2-, 3-, 4- and 5-year old males is concerned.

Body length (field length) in inches	Age in years, from tooth-ridge counts 2	3	4	5	Total seals in each length class, regardless of age
38	1				1
39	2		1		3
40	3	7	1		11
41	6	48	6		60
42	2	78	10		90
43		83	32		115
44		68	48	2	118
45		27	54	3	84
46		15	17		32
47			11	3	14
48			3		3
49					
50				1	1
Total seals in each age class, regardless of length	14	326	183	9	532

The traditional method of reporting ages of seals killed is based on length standards established in the years 1914-1917 on branded seals of known age. Applying these standards to the present sample of 532 seals, one can make the following comparisons on a percentage basis:

	2-year olds	3-year olds	4-year olds	5-year olds
Composition of kill as estimated from body lengths	2.8	87.8	9.4	
Composition of kill as estimated from tooth-ridge counts	2.6	61.3	34.4	1.7

In other words, the present-day method of measuring seals on the killing fields apparently gives a reasonably accurate value for 2-year olds but is grossly inaccurate for 3-year olds and older. This is not a new discovery. Measurements of tagged seals recovered since 1944 have shown repeatedly that the 1914-1917 age-length standards no longer apply. The writers recommend, not that the measuring of seals be abandoned (for it has certain merits), but that the practice of reporting the age breakdown of the kill be discontinued. If the need is felt for a breakdown, it should be on the basis of tooth samples. Or it might be based on a re-worded version of the present standards, using "Group 3" for the present 41-45 inch class, and so on.

The technique of analyzing kills by means of tooth-ridge counts is still being developed. When the analyses have been carried out for another ten years or so, the data are expected to shed light on annual fluctuations in mortality and in time of arrival of bachelor seals.

(Incidentally, it is desirable to start the sealing season on the 18th or the 23rd of June each year so that the statistics of the kill will be on a uniform basis. The biologists have found it convenient to study the kill by 5-day periods with midpoints 20 and 25 June; 5, 10, 15, 20, and 25 July. Whether the start be made on the 18th or the 23rd is unimportant. The date can be varied from year to year depending upon the weather. The important point is not to start in the middle of a standard 5-day study period.)

ALASKA FUR SEAL INVESTIGATIONS

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