Dupl.

ALASKA DEPARTMENT OF FISH AND GAME
JUNEAU, ALASKA

STATE OF ALASKA
Walter J. Hickel, Governor

DEPARTMENT OF FISH AND GAME
Augie F. Reetz, Commissioner

DIVISION OF GAME
Loren W. Croxton, Director
Don H. Strode, Federal Aid Coordinator

See P. 4
Seal Rpt

MARINE MAMMAL REPORT

by

John J. Burns

Volume IX
Annual Project Segment Report
Federal Aid in Wildlife Restoration
Project W-14-R-2 and 3, Work Plan F

(Printed March, 1968)

WORK PLAN SEGMENT REPORT

FEDERAL AID IN WILDLIFE RESTORATION

STATE: Alaska

PROJECT NO: W-14-R-2 and 3 TITLE: Marine Mammal Investigations

WORK PLAN: F TITLE: Walrus and Seals

JOB NOS: 1 and TITLE: Walrus Biology and Populations

2 TITLE: Walrus Harvest and Utilization

PERIOD COVERED: January 1, 1967 to December 31, 1967

ABSTRACT

The retrieved harvest of walrus in Alaska during 1967 was 1,317 animals. Of these 1,162 (88.2%) were males, 132 (10.1%) were females and 23 (1.7%) were calves of either sex. The total kill, including hunting loss was 2,313. Walrus hunting during the year was generally below average, with the exception of Little Diomede Island.

Potential value of the annual harvest is estimated at $383,945.

Lower canine teeth were obtained from 719 of 869 males taken throughout the Bering Strait area during the spring season. Analysis will be completed during the coming report period.

Aerial Surveys on April 20 and May 6 revealed that around the latter date the frequency of birth is high; that females prefer to give birth on the ice rather than in the water; that the association of cows into nursery herds begins prior to parturition; that cows remain in groups even during the period of their own delivery; and that there appears to be a preference for certain ice conditions.

RECOMMENDATIONS

The present bag limit of five adult female walrus per hunter, per year, should remain in effect. Efforts should be continued to improve hunting techniques at all villages where walrus are taken. If at all possible, the exchange of current management and biological information with Soviet investigators should be encouraged.

WORK PLAN SEGMENT REPORT

FEDERAL AID IN WILDLIFE RESTORATION

STATE: Alaska

PROJECT NO: W-14-R-2 and 3 TITLE: Marine Mammal Investigations

WORK PLAN: F TITLE: Walrus and Seals

JOB NOS: 1 and TITLE: Walrus Biology and Population

2 TITLE: Walrus Harvest and Utilization

PERIOD COVERED: January 1, 1967 to December 31, 1967

OBJECTIVES

Objectives of the work undertaken during this report period included continued assessment of walrus population status and trend; observation of present hunting effort, success, harvest composition, utilization and value; enforcement of the current regulations pertaining to walrus; investigation of factors affecting distribution, movements and social organization of walrus herds; investigation of walrus behavior and other aspects of walrus biology that would contribute to a more complete understanding of their natural history.

PROCEDURES

Lower canine teeth were collected from essentially all the male walrus taken in the Bering Strait Area during the spring hunting season. Our attempts to access population status and trend over a long period of time necessitate periodic sampling of the harvest to determine age composition, in combination with aerial surveys over Bering Sea. This extensive sampling is undertaken at five year intervals; the last two collections being made in 1962 and 1967. An aerial survey by the U. S. Fish and Wildlife Service is scheduled for April 1968.

Assistants on Jobs F-1, 2 and 3 during this report period included Vernon Slwooko a resident of Gambell; J. Scott Grundy who worked on Little Diomede Island from April 20 to June 22; C. M. Shanahan who worked at Savoonga from April 15 to June 13; and Edward Muktoyuk who worked on various phases of these projects throughout the year. In addition to the villages mentioned above, Edward Muktoyuk and I worked at Nome, King Island, Barrow and Wainwright.

The able cooperation of residents from numerous villages was an important factor in the acquisition of specimens and data.

Lower canine teeth were obtained from 719 of the 813 male walrus taken during the spring in northern Bering Sea. Teeth of the few cows from which reproductive tracts were collected were also obtained.

All teeth were longitudinally cross sectioned by Ed Muktoyuk. Sections are being examined with the aid of a low magnification binocular microscope. Either direct or refracted light is used depending upon which is the most satisfactory with individual cross sections. In most instances tooth sections do not require polishing. It was found that the cementum "layers" are more distinct when sections are allowed to soak for several days before being examined. A mixture of 70 percent alcohol and xylol is used.

For a more complete discussion of cementum layers as a means of determining age in walrus see Fay (1955), Harbo (1961) and Burns (1965).

Collections of female reproductive tracts was restricted to animals of specific interest and included four pregnant females taken on March 30, one sexually immature female taken on March 17, three pregnant animals taken on June 1, and a sexually immature animal taken on June 10.

Aerial surveys of the southeastern approach to Bering Strait, made on April 20 and May 6, provided information concerning ice conditions and the distribution of walrus in the area at that time.

Department personnel stationed at the traditionally productive hunting sites recorded the magnitude and sex composition of the harvest and enforced the game regulations. In addition they recorded general observations, determined utili-

zation of the harvest, and accumulated information concerning various measures of hunting effort and success.

Magnitude and composition of the harvest at the less productive hunting sites was determined by correspondence with resident clergymen, teachers, village leaders, and by personal contact with villagers during their frequent travels through Nome. We are especially indebted to Peter Tagarook of Wainwright and Max Brewer of Barrow.

FINDINGS

Sea ice conditions that prevailed during late winter and spring had a direct bearing on hunter success and the species composition of the marine mammal harvest. In turn, hunter success determined the kinds and quantity of data and specimens acquired. The following general comments apply as an introduction for this and the following report about seals (Job F-3).

The winter of 1966-67 was unusual as far as weather conditions in northern Bering Sea were concerned. Temperatures were mild and storms were frequent. Prevailing winds were generally out of the south (SE to SW) and snowfall was heavy. These conditions affected the ice cover in several ways: the terminus of pack ice did not reach as far south as in most years; heavy snow fall and mild temperatures prevented the formation of thick ice; strong winds and currents prevented the formation of large floes; and the spring retreat of the ice occurred earlier.

These conditions resulted in the presence of the various pinnipeds far to the north of where they usually occur during the late winter and early spring. As examples, in most years the concentrated movement of walrus nursery herds past western St. Lawrence Island occurs between May 5 and 25. These herds reach Bering Strait usually between May 25 and June 10.

By early April 1967, the nursery herds had already passed north of St. Lawrence Island and most had passed through Bering Strait by early May.

Ribbon and harbor seals which occupy the area along the southern terminus of the ice pack were abundant throughout northeastern Bering Sea by April 20. An aerial survey on that date revealed concentrations of these seals throughout the southeastern approach to Bering Strait. They were particularly numerous around King Island.

The unusual distribution of pinnipeds had a direct bearing on the harvest of various species. During April through June walrus hunting was relatively poor at most places, and particularly bad at Gambell. Hunters at Little Diomede had good success although the number of walrus available to them was less than usual. It appears that because of the limited number of walrus available at Diomede, hunters were less selective and many young walrus were taken.

The spring harvest of bearded seals was also less than usual.

Because of their abundance, substantial numbers of ribbon and harbor seals were taken at all locations in the northern Bering Sea area. It was the general consensus at all villages that even in the memory of the oldest hunters, they had not seen nor taken as many ribbon seals in previous years. Accordingly, we obtained a large amount of specimens and data. These studies will be discussed in the segment report for Job F-3.

The total annual harvest of walrus during 1967 was 1,317 animals. Included in this retrieved kill were 1,162 bulls (88.2%), 132 cows (10.1%) and 23 calves of either sex (1.7%).

Total annual kill including walrus retrieved, killed and sunk, obviously fatally wounded and orphaned calves was estimated at 2,313 (Table 1).

Seasonal harvests and comments concerning conditions that prevailed are indicated below.

Winter Harvest - January through mid-April 1967

Hunting success during January and February was poor due to inaccessibility of walrus even though they were in the vicinity of St. Lawrence Island. Only a few animals were taken during these months. However, during March the success improved due to the early northward migration. Approximately 15 walrus were taken by hunters from Gambell, on March 30. The early migration--at a time when conditions were not very favorable for hunters--resulted in a reduced harvest during the winter season, as well as during the spring.

This was the first winter that King Island has been completely abandoned, and no walrus were taken. The harvest at successful hunting sites was as follows:

Village or Area	Total Winter Harvest	Males	Females	Calves
Diomede	3	2	1	0
Gambell	23	14	9	0
Savoonga	31	31	0	0
Northeast Cape	3	3	0	0
Other Areas	10	10	0	0
TOTALS	70	60	10	0

This winter harvest of 70 walrus was composed of 86 percent males and 14 percent females. Although pregnant cows were killed, none that were accompanied by calves were taken.

Spring Harvest - mid-April through June 1967

During the spring hunting period a combination of factors including the northward retreat of the pack ice, extensive areas of open water, favorable weather and movement of walrus past the villages usually enables the hunters to make their largest catches. However, since the main concentrations of walrus were already through Bering Strait by the time optimum hunting conditions prevailed, the harvest at most villages was below average. The exceptions were Little Diomede Island and Shishmaref.

Hunters at Little Diomede Island were able to locate herds in the restricted passage between the island and Cape Prince of Wales on the Seward Peninsula. As at all the hunting sites in northern Bering Sea, nursery herds passed before boats had access to them so the harvest obtained was composed primarily of bulls. Accordingly, hunting loss was reduced as few calves were orphaned.

Walrus are not normally available to hunters from Shishmaref although ice conditions were such that they occurred near that village during June of this year.

Three boats from Nome hunted at King Island during late May and June. By the time they reached the island only a few scattered herds of bulls were passing north. The harvest at King Island was relatively small and composed mainly of bulls.

Savoonga hunters were only moderately successful and as usual at this site most of the animals killed were bulls.

The 1967 spring harvest was as follows:

Village or Area	Total Spring Harvest	Males	Females	Calves
Kuskokwim Area	30	30	0	0
Norton Sound	7	7	0	0
Gambell	30	22	4	4
Savoonga	182	163	11	8
Northeast Cape	17	17	0	0
King Island	129	111	14	4
Diomede Island	572	499	68	5
Wales	4	1	2	1
Shishmaref	23	19	3	1
TOTALS	994	869	102	23

It is significant that 87.4 percent of the spring harvest was bulls. The proportion of cows (10.3%) and calves of either sex (2.3%) was unusually low. Hunters from one village, Little Diomede Island, took 58 percent of all the walrus harvested during the spring.

Summer Harvest - July through September 1967

Walrus hunting success in northern Alaska during the summer period was very poor. I was at Wainwright from July 7 to July 15 during which time no walrus were taken. Ice was present near Wainwright until late July, but it was obviously not suitable for seals and walrus to haul out upon. As far as we could see during aircraft flights between Barrow and Wainwright on both July 7 and 15, the ice was compact but unusually fragmented and rough. According to local hunters, the condition which made it unfavorable for use by pinnipeds was that it was unusually "dirty" and brown in color. This coloration resulted from the presence of wind blown silt, and vast numbers of diatoms. Apparently during the stormy winter and spring the excessive fragmentation and turning over of the ice exposed the various forms of life attached to the undersides. Almost all of the seals taken during my stay at Wainwright were killed in the water.

Some walrus were taken at both Barrow and Wainwright during early August. Dr. Max Brewer provided the harvest information for Barrow, and Peter Tagarook for Wainwright.

The 1967 summer harvest was as follows:

Village	Total Summer Harvest	Males	Females	Calves
Point Hope	3	3	0	0
Wainwright	47	47	0	0
Barrow	55	53	2	0
TOTALS	105	103	2	0

At present there are no hunters residing at Point Lay or Icy Cape.

The summer harvest was composed of 98.1 percent males and 1.9 percent females.

Fall Harvest - October through December 1967

As usual, the fall harvest was rather sporadic as walrus move south in widely distributed small herds, over a long period of time (essentially all fall).

During November it was estimated that between 2,000 and 3,000 walrus again hauled out on the east side of Big Diomede Island. Few of the swimming animals were available to hunters from Little Diomede as they were on the Soviet side of the International Date Line.

The total fall harvest, including a few early arrivals at St. Lawrence Island, is indicated below:

Village	Total Fall Harvest	Males	Females	Calves
Diomede	18	15	3	0
Gambell	31	22	9	0
Savoonga	86	80	6	0
Northeast Cape	5	5	0	0
Other Areas	8	8	0	0
TOTALS	148	130	18	0

This harvest consisted of 87.8 percent bulls and 12.2 percent cows. No one returned to King Island for the winter and accordingly no walrus were killed there.

Hunting Effort During the Spring Season

Various measures of hunting effort and success have been used in an attempt to determine such things as the long term trends in availability of walrus to hunters, changes in hunting effort and dependence of people on the marine mammal resource, and differences in availability of walrus due to the limitations imposed by weather and ice conditions.

At Savoonga during the spring of 1967 there were a total of 21 boats which could have been used to hunt walrus. However, the maximum number of boats out on any one day was 18, manned by 86 men. The spring harvest of 182 walrus at Savoonga amounted to roughly 2.1 walrus per resident hunter. Five walrus taken by trophy hunters are included in the Savoonga total as men from this village guided the hunters and also salvaged the meat.

A complete breakdown of the spring harvest of marine mammals at Savoonga is as follows: 182 walrus (163 males, 11 females and 8 calves); 73 bearded seals (23 males, 24 females and 26 of undetermined sex); 353 ribbon seals (194 males, 77 females and 82 of undetermined sex); 121 spotted seals (58 males, 50 females and 13 of undetermined sex); and 87 ringed seals. No records were kept concerning sex composition of the latter. For the total spring harvest, effort expended was 10.4 boat hours per walrus, 47.8 man hours per walrus, 2.3 boat hours per animal (seals and walrus); and 10.7 man hours per animal.

Records kept by Vernon Slwooko at Gambell included only the days that hunting occurred, the number of boats out, and the harvest of all marine mammals.

Eighteen boats hunted at Gambell and took a total of 30 walrus (22 males, 4 females and 4 calves of either sex), 54 bearded seals and 752 "other seals" including ribbon, spotted and ringed. The majority of "other seals" were ribbon seals. Approximately 85 men hunted at Gambell. The harvest amounted to .35 walrus per man or 9.8 animals of all species per man.

Three large skin boats hunted at King Island, manned by a total of 28 hunters. Their main objective was to hunt walrus and few seals were taken although they were available in considerable numbers. In addition to the harvest of 129 walrus (4.6 walrus per man), seven bearded seals, twelve ribbon seals, six spotted seals and one ringed seal were taken. At King

Island the hunting effort expended produced one walrus each .50 boat hours, or one animal (walrus and seals combined) each .42 boat hours.

Hunters at Little Diomede Island were by far the most successful, and took 572 walrus during the spring hunting season. Five boats were available for walrus hunting but four was the maximum out on any given day. As the spring break-up progressed and more extensive areas of open water developed, most of the hunters employed three large Umiaks; the two smaller ones being used only in close proximity to the island.

There were 25 full time hunters, and an additional five boys (under 16) that occasionally went out. If the figure of 25 hunters is used, the spring harvest amounted to 22.9 walrus per man. Using the larger figure of 30 hunters, the walrus harvest amounted to 19.1 walrus per man. In addition to walrus, 217 seals were reported taken including 41 bearded seals (15 males and 26 females) and 176 "other seals". The latter included ringed, ribbon and harbor (spotted) seals.

For the total spring harvest at Diomede, effort expended was 1.39 boat hours per walrus, 9.2 man hours per walrus, 1.0 boat hours per animal (walrus and seals) and 6.7 man hours per animal.

The four villages discussed in detail took a total of 913 walrus during the important spring hunting season. Comparative hunting effort and success at these villages from 1961 through 1967 is presented in Table 2.

Utilization of the Harvest

To a great extent utilization of the walrus harvest depends upon 1) the needs of a particular village where animals are taken; 2) number of walrus harvested; and 3) field conditions at the time animals are killed. In general, utilization of the harvest remains high until the meat requirements of the village are met. Hunters usually continue taking walrus after this point is reached, but the emphasis is changed from that of procuring meat, to augmenting the cash income by obtaining ivory. With the exception of Wainwright, walrus are hunted until they are no longer available. Utilization decreases as the retrieved kill increases.

Since the 1967 harvest was a relatively poor one, utilization was generally good at most locations. The exceptions were King and Diomede Islands where the harvest greatly exceeded the number of animals necessary to sustain the inhabitants.

Briefly, utilization of the 1967 harvest was as follows: in the Kuskokwim area, Norton Sound, Gambell, Wales, Shishmaref, Point Hope, Wainwright and Barrow, 85 to 95 percent; at Savoonga and Northeast Cape, 75 to 85 percent; at King Island, 4 to 6 percent; and at Little Diomede Island, 7 to 10 percent.

Despite the relatively small number of animals taken at King Island, utilization was low because the hunters residing in Nome were unable to transport any large amount of meat by skin boat to the mainland.

Value of the 1967 Harvest

The potential value of the 1967 walrus harvest was calculated in the same manner as outlined in previous Segment Reports (Burns, 1963; 1965; 1966). It is based on the following values set forth by Fay (1958) and Harbo (1961):

Tusks of adult females valued at $10.00 per pair.
Tusks of adult males valued at $24.00 per pair.
Tusks, carved, either sex, valued at $125.00 per pair.
Bacula valued at $7.00 each.
Walrus meat valued at $ .10 per pound.
Skins of female walrus valued at $20.00 each.

Skins from adult bulls are in demand and the present price is about $75.00 each. However, with the exception of about 60 hides sold by hunters from Savoonga, few were salvaged for commercial sale. The potential commercial value of bull walrus skins is included in this segment report.

The estimated values of the component parts of the 1967 walrus harvest are presented in Table 3. The greatest potential value of the harvest was calculated to have been $383,945.

Biological Studies

To date, the 719 pairs of teeth collected during the

spring season have not all been examined. Analysis of the age composition data will be completed during the spring of 1968. Information concerning size of the walrus population and population trend will be based on harvest composition data alone, and will also be considered in conjunction with estimates based on extensive aerial surveys. An aerial survey will be made by the U. S. Fish and Wildlife Service in cooperation with the Department of Fish and Game, during April 1968.

The limited aerial surveys of April 20 and May 6, 1967 provided additional information about the period of birth and social interaction among pregnant and post parturient female walrus.

Flights on both of these days were made at an altitude of 300-400 feet, over the drifting pack ice from Sledge Island to King Island and thence to Little Diomede Island. Concentrations of walrus were found in the vicinity of the Diomede Islands. On both flights herds were widely circled at the survey altitude to determine composition. Herds containing females were then directly approached at an altitude of 50 to 100 feet, for closer observation and picture taking.

On April 20, no calves were seen in any of the herds observed. Also, there were no visible blood stains on the ice which would indicate recent parturition. Some births are known to occur prior to this date but it was not evident in these animals.

Almost all of the small herds observed on May 6 were composed predominently of females; many of which had recently given birth and one that was in the process of doing so. Blood stained areas were visible adjacent to, but not where the females were resting. Calves were difficult to spot until the cows were disturbed and forced to shift positions.

One female, slightly removed from a herd of about 25 adults was resting near a fresh blood stain. She did not move until the aircraft was directly above her, and it was then obvious that she was still attached to and dragging some bloody tissue. No calf was seen. Other cows in this group had recently given birth as evidenced by other blood stains and presence of new born calves.

Ice floes selected by these females were relatively large, thick and covered with snow. They were not necessarily

flat. The animals rested on a smooth area adjacent to the water, and apparently withdrew from the rest of the herd to give birth. After giving birth they rejoined the group. The distribution of blood stains indicated that each cow chose an area of clean snow on which to calve; in some cases this was in the rough ice. Snow covered ice probably affords several advantages to both the cow and new born calf as opposed to young, snow free ice. At any rate, the older floes were the ones on which the cows and calves were found. Bulls seemed to be less discriminant, sometimes resting on young ice which was almost awash.

The survey of May 6th showed that this is a period during which the frequency of births is high; that females probably prefer to give birth on the ice rather than in the water; that the association of cows into nursery herds begins prior to parturition; and that the cows remain in groups even during the period of their own delivery.

One instance of death attributed to an unsuccessful birth was reported by hunters at Diomede Island. On June 2 a dead cow was found by one of the hunting parties. There were no obvious wounds but some placental tissue was protruding from the vagina. The fetus was still in the uterus. The cow was partially decomposed and had been dead for some time.

Of the nine female reproductive tracts collected, one was from a sexually immature cow, five years of age. The ovaries of this animal contained no sizable follicles even though she was taken during the late part of the normal breeding period (March 17). Four females also taken during mid-March were supporting fetuses. The remaining four females were taken during June. Of these, one was post parturient although no calf was observed when it was killed, and the other three were pregnant. One of these pregnant females, taken on June 1 had a well developed implantation site. This is the earliest date that implantation has been recorded. Kenyon (1958) recorded implantation on June 10, and Brooks (1954) and Fay (1955; 1960) concluded that the main period of implantation is between mid-June and mid-July. Material collected during the past several years in Bering Strait and at Wainwright indicates that mid-June is the time of implantation in most cases.

Table 1. Retrieved and Total Kill of Walrus in Alaska During 1967.*

Location	Walrus Retrieved	Known Composition of Harvest** Males No.	Males %	Females No.	Females %	Calves No.	Calves %	Percent Hunting Loss	Total Kill
Kuskokwim Area	30	30	(100.0)	0	(0)	0	(0)	40	50
Norton Sound	7	7	(100.0)	0	(0)	0	(0)	40	12
Gambell	84	58	(69.0)	22	(26.2)	4	(4.8)	40	140
Savoonga	299	274	(91.6)	17	(5.7)	8	(2.7)	50	598
Northeast Cape	25	25	(100.0)	0	(0)	0	(0)	50	50
King Island	129	111	(86.0)	14	(10.9)	4	(3.1)	50	258
Wales	4	1	(25.0)	2	(50.0)	1	(25.0)	40	7
Diomede	593	516	(87.1)	72	(12.1)	5	(0.8)	40	988
Shishmaref	23	19	(82.6)	3	(13.0)	1	(4.4)	40	38
Point Hope	3	3	(100.0)	0	(0)	0	(0)	20	4
Wainwright	47	47	(100.0)	0	(0)	0	(0)	20	59
Barrow	55	53	(96.4)	2	(3.6)	0	(0)	30	79
Other Areas	18	18	(100.0)	0	(0)	0	(0)	40	30
TOTALS	1,317	1,162	(88.2)	132	(10.1)	23	(1.7)	43%	2,313

* Does not include the kill of walrus in Bristol Bay; estimated at 30 to 50 adult males.

** The columns "Males" and "Females" include all age groups with the exception of calves of the year.

Table 2. Comparative Hunting Effort and Success During the Spring Walrus Hunting Season in Alaska from 1961 through 1967.[1]

Measure of Effort	Year	Gambell	Savoonga	King Island	Diomede Island
No. Hunting Days	1961	13 of 35	-----	-----	18 of 26
	1962	19 of 33	11 of 28	-----	8 of 16
	1963	14 of 20	-----	-----	11 of 37
	1964	27 of 48	-----	13 of 48	21 of 51
	1965	25 of 42	-----	6 of 18	16 of 28
	1966	19 of 39	31 of 61	-----	24 of 43
	1967	30 of 50	29 of 59	5 of 12	33 of 59
Boat Hours	1961	910	---	---	399
	1962	947	537	---	140
	1963	810	---	---	320
	1964	1,714	---	199	502
	1965	2,157	---	93	408
	1966	---	2,397	---	538
	1967	---	1,894	65	795
Boat Hours per Walrus Retrieved	1961	5.10	----	----	.75
	1962	4.62	1.80	----	.58
	1963	4.74	----	----	1.20
	1964	29.55	----	1.14	17.31
	1965	5.74	----	.46	2.33
	1966	----	5.30	.40 to .80[2]	1.13
	1967	----	10.41	.50	1.39

1) Data include only those hours expended and walrus taken while an observer was at the respective villages.

2) Determined by conversations with boat captins regarding success of daily hunts.

Table 3. Potential Value of the 1967 Walrus Harvest in Alaska.

Location	Harvest			Value of Ivory				Value of Skins		Greatest Potential Value
	Males	Females	Calves	Raw	Carved	Bacula	Meat*	Males	Females	
Kuskokwim Area	30	0	0	$ 720	$ 3,750	$ 210	$ 3,000	$ 2,250	$ 0	$ 9,210
Norton Sound	7	0	0	168	875	49	700	525	0	2,149
Gambell	58	22	4	1,612	10,000	406	7,146	4,350	440	22,342
Savoonga	274	17	8	6,746	36,375	1,918	28,472	20,550	340	87,655
Northeast Cape	25	0	0	600	3,125	175	2,500	1,875	0	7,675
King Island	111	14	4	2,804	15,625	777	11,966	8,325	280	36,973
Wales	1	2	1	44	375	7	227	75	40	724
Diomede	516	72	5	13,104	73,500	3,612	55,953	38,700	1,440	173,205
Shishmaref	19	3	1	486	2,750	133	2,087	1,425	60	6,455
Point Hope	3	0	0	72	375	21	300	225	0	921
Wainwright	47	0	0	1,128	5,875	329	4,700	3,525	0	14,429
Barrow	53	2	0	1,292	6,875	371	5,420	3,975	40	16,681
Other Areas	18	0	0	432	2,250	126	1,800	1,350	0	5,526
TOTALS	1,162	132	23	$29,208	$161,750	$8,134	$124,271	$87,150	$2,640	$383,945

* Utilizable weight is calculated on the basis of 1,000 lbs. for adult males, 600 for adult females and 65 for claves.

LITERATURE CITED

Brooks, J. W. 1964. A contribution to the life history and ecology of the Pacific walrus. Spec. Rept. No. 1, Alaska Coop. Wildl. Res. Unit. 103 pp.

Burns, J. J. 1963. Walrus harvest and utilization. Marine Mammal Invest., Fed. Aid Compl. Rept., Alaska Dept. of Fish and Game. v. III, p. 9-27. (Mimeo)

_____. 1965. The walrus in Alaska. Alaska Dept. of Fish and Game, Juneau. 48 pp.

_____. 1966 Walrus biology and populations. Marine Mammal Invest., Fed. Aid Compl. Rept., Alaska Dept. of Fish and Game. v. VIII, p. 1-12. (mimeo)

Fay, F. H. 1955. The Pacific walrus; spatial ecology, life history and population. Univ. British Columbia, Ph.D. Thesis, unpubl. M. S.

_____. 1958. Pacific walrus investigations on St. Lawrence Is., Alaska. Arctic Health Research Center, U. S. Public Health Serv., Anchorage. 54 pp. (mimeo)

_____. 1960. Investigations of the Pacific walrus. Terminal rept., Proj. 26. March 1960. The Arctic Inst. N. A. 72 pp. (unpubl.)

Harbo, S. J., Jr. 1960. Walrus harvest and utilization. Marine Mammal Invest., Fed. Aid Compl. Rept., Alaska Dept. of Fish and Game. v. I, 16 pp. (mimeo)

WORK PLAN SEGMENT REPORT

FEDERAL AID IN WILDLIFE RESTORATION

STATE: Alaska

PROJECT NO: W-14-R-2 and 3 TITLE: Marine Mammal Investigations

WORK PLAN: F TITLE: Walrus and Seals

JOB NO: 3 TITLE: Seal Biology and Harvest

PERIOD COVERED: January 1, 1967 to December 31, 1967

ABSTRACT

The total harvest of hair seals in Alaskan waters north of Cape Constantine, during 1967, was estimated at approximately 13,000 animals. The known harvest, determined from bounty records was 11,125 seals.

Weather and ice conditions during the late winter and spring of this year were responsible for the unusual availability of ribbon seals. Specimens and data were obtained from 776 seals of which 340 were ribbon, 221 spotted, 165 bearded and 59 ringed seals. The material from these animals has not all been examined to date.

Soviet seal hunters were active in northeastern Bering Sea during the spring hunting season. Sightings of Soviet hunters, comments concerning their observed activities, and their outlook on exploitation of seals as indicated in recent literature are included in this report.

RECOMMENDATIONS

Present regulations of no closed season and no limit should be continued in this area. Efforts should be made to determine the harvest and total kill of all marine mammals in the Bering and Chukchi Seas, taken by both American and Soviet hunters. Work should continue on the various aspects of life history of each species, and the tagging program should be continued.

WORK PLAN SEGMENT REPORT

FEDERAL AID IN WILDLIFE RESTORATION

STATE: Alaska

PROJECT NO: W-14-R-2 and 3 TITLE: Marine Mammal Investigations

WORK PLAN: F TITLE: Walrus and Seals

JOB NO: 3 TITLE: Seal Biology and Harvest

PERIOD COVERED: January 1, 1967 to December 31, 1967

OBJECTIVES

The objectives of work conducted during this report period were to investigate the various aspects of reproduction in the ringed, spotted and ribbon seals; to investigate the interspecific relationships among all of the pinnipeds of the northern Bering and Chukchi Seas; to attempt to identify the environmental conditions affecting abundance and distribution of pinnipeds in this area; to continue obtaining information about life-histories of the various species; and to obtain current information about the magnitude, composition and characteristics of the seal harvest in northwest Alaska as part of a continuing effort to determine status and trend of this resource.

PROCEDURES

Since the major part of bearded seal investigations were completed during early 1967, emphasis was changed to other species, mainly ribbon and harbor seals. Due to the unusual weather and ice conditions prevailing last spring, large amounts of data and specimens were obtained. The various aspects of reproduction are being studied by examination of reproductive material, and correlation of findings with age determinations. Body weights and measurements will provide a knowledge of growth rates, size at sexual and at physical maturity, yield of meat and oil, etc. Skulls were collected to investigate taxonomy and taxonomic relationships between the various species. Claws and teeth were obtained to correlate age determinations with other findings, and also to investigate various aspects

of population dynamics. Skin samples will provide an understanding of moult. In addition, such things as food habits, distribution, migration, behavior, and parasites are being studied.

Interspecific relationships among all the seals of this area are being investigated both by comparison of biological findings and by observation of live seals in their natural environment.

Two aerial surveys, on April 20 and May 6, provided an insight into the distribution and abundance of seals during the spring, and the ice conditions which various species seem to prefer.

Magnitude and composition of the annual harvest was determined from bounty records and observation in various villages where Department personnel were working.

Analysis of bounty records, reported in this segment report, was done by Bob Pegau. Other workers that assisted on this project are indicated in the previous report.

Since the emphasis of spring field work is directed toward the walrus investigations, data and material from seals was obtained only as time allowed. The amount of information acquired during 1967 reflects the diligence and hard work of all assistants on these projects.

Specimens obtained during previous years had mostly been saved for examination at a later date. Much of this older material, especially female reproductive tracts, was examined during 1967.

During the past spring field season, specimens and supporting data were obtained from 776 seals. Of this total 340 were ribbon seals, 221 spotted seals, 156 bearded seals and 59 ringed seals.

FINDINGS

The only finding that can be reported at this time is the harvest of hair seals in western Alaska during 1967. Only those hair seals taken along the coast and from the islands

lying between Cape Constantine and Demarcation Point were eligible for bounty.

During 1967 the total reported harvest of hair seals in this area was 11,125 animals (see Table 1). The estimated total harvest was approximately 13, 000 seals.

Little can be reported at this time in the way of biological findings since much of the examination and analysis remains to be done. To date, all female reproductive tracts have been examined. Bacula have been cleaned, weighed and measured. Most of the seal stomachs have been examined for identification of food items. Data concerning lengths and weights has been compiled and most of the skulls have been cleaned.

The remaining tasks including age determinations, gross and histological examination of tests, examination of pelage samples and correlation of data will be completed during the next report period. Work on taxonomy will have to be accomplished as time allows.

Soviet Exploitation of Seals in the Bering Sea

Commercial exploitation of seal stocks in the Bering Sea by Soviet hunters has been going on for a long period of time. However, since 1961 commercial exploitation has greatly increased, and sealing vessels have moved into waters east of 175° W. longitude. The main hunting effort is directed toward ribbon seals, with bearded seals second and harbor seals last.

According to Krylov, et al. (1964) the fat is used for margarine, medicines, cosmetics and soaps, as well as weatherproof materials, linoleum, oilcloth, lubricants and detergents. The skins are used for chromium treated leather, chamois, shoe soles and fur pelts. Meat is used for animal food (primarily mink) and fertilizer.

In Provideniya Gulf and the Chukchi Regions, marine mammals provide 60 percent of the "local economics " (60 percent of the income?) , Krylov, et al. (1964).

Obviously, the various species of hair seals are a very important resource.

Table 1. The Reported Harvest of Hair Seals in Northwest Alaska During 1967, as Indicated by Bounty Records.[1]

Village	Number of Hunters	Harvest of Seals by Season[2] Jan - Mar	April - June	July - Sept.	Oct - Dec	Exact Season Unknown	Total Harvest
Manokotak	3	9	19	0	10	0	38
Quinhagak	2	0	21	0	0	0	21
Eek	3	0	25	0	0	0	25
Kekoryuk	28	149	470	0	46	3	668
Chevak	7	38	80	24	0	0	142
Hooper Bay	36	43	557	49	34	0	683
Scammon Bay	6	0	0	27	38	14	79
Stebbins	5	7	39	0	8	12	66
St. Michael	1	3	0	0	0	0	3
Unalakleet	1	0	29	0	0	0	29
Shaktoolik	6	72	14	0	14	0	100
Koyuk	1	0	8	10	0	0	18
Elim	5	54	158	0	8	0	220
Golovin	2	0	29	0	0	12	41
Wt. Mountain	1	0	0	8	0	0	8
Savoonga	44	283	857	85	156	55	1,436
Gambell	39	223	456	5	161	461	1,306
Nome	28	38	251	17	0	135	441
Northeast Cape	1	0	0	0	0	20	20
Teller	8	0	86	96	179	34	395
Brevig Mission	10	0	132	31	41	128	332
Wales	11	0	84	3	0	447	534
Diomede	9	0	210	0	0	17	227
Shishmaref	31	408	1,338	236	276	393	2,651
Deering	2	50	0	0	0	0	50
Kotzebue	4	19	86	0	0	0	105
Noatak	2	0	11	6	0	0	17
Kivalina	8	28	51	0	0	103	182
Point Hope	27	578	320	23	9	50	980
Wainwright	26	0	55	134	4	24	277
Barrow	3	23	0	8	0	0	31
TOTALS	359	2,025	5,386	822	984	1,908	11,125

[1]The total harvest of seals in northwest Alaska approximated 13,000 animals. Discrepancy between recorded and total harvest results from failure of hunters to submit scalps for bounty -- especially bearded seals. Also, it was thought that the bounty may be abolished so scalps were not saved. As examples, the reported harvests from Eek, Scammon Bay, Stebbins, Unalakleet, Northeast Cape, Kotzebue, Wainwright and Barrow are far below the actual harvests. Barter Island bountied no seals although hunters there are active.

[2]The term "seals" applies to all species of hair seals found in this region.

According to Tikhomirov and Kosygin (1966) the Soviet commercial hunters operating from vessels harvest between 12,000 and 15,000 seals per year in the Bering Sea. The desired harvest is 20,000 seals per year. This recommended harvest does not include the kill made by shore based hunters all along the Siberian Coast. Although this is purely speculation, if the shore based Siberian hunters harvest approximately the same number of seals as Alaskans do, then the annual harvest of seals in the Bering Sea is roughly as follows:

13,000 to 17,000 per year by Alaskans
12,000 to 15,000 per year by Soviet sealing vessels
13,000 to 17,000 per year by Soviet coastal hunters
38,000 to 49,000 seals per year.

It is obvious that immediate steps should be taken to encourage the exchange of biological and management information so that a rational system of exploitation can be developed. At the present time there is concern that some species are already being overexploited.

During May and June of 1967 there were several sightings of Soviet seal hunters near various villages.

Each Soviet hunting "schooner" has five or six power launches which do the actual hunting. These launches are radio equipped, and manned by an engineer, a helmsman and a shooter (Krylov, et. al., 1964).

Most of the sightings reported were of hunting launches.

The following is a list of locations and dates that Soviet seal hunters were sighed during the spring hunting season:

Location	Date	Comments
Gambell	May 14	Hunting launch, 9 to 10 mi SSW of village. Personal contact by Gambell hunters, traded cigarettes and seals. Soviets traded a spotted for a ribbon seal.
Savoonga	May 15	Hunting launch observed at distance. Numerous ribbon and bearded seal carcasses found.

Location	Date	Comments
Savoonga	May 23	Saw two scooners and one launch. Personal contact. Savoonga men traded bread for yeast and .308 caliber ammo. One Russian spoke English and indicated they came from Vladavostok. Launch contained bearded and ribbon seal skins.
	May 24	Two launches observed 4 to 5 hours N of Savoonga. Personal contact. Traded cigarettes. Took photos. Launch loaded with ribbon and young bearded seal skins. Three men in crew.
King Island	June 3 and 4	Large schooner 20 mi. NW of Island.
Diomede	June 7	Three launches hunting near island. Closest was 300 to 400 yards from SE corner of island during P.M.
	June 8	Several launches in vicinity of the island. Schooner visible to the S.W.
	June 19	Large vessel similar to schooner moving east about 15 mi. N. of island.

No doubt the prevailing weather conditions that resulted in the abundance of seals in Northeastern Bering Sea forced the Soviet hunters to operate in that area.

Shustov (1967) in his very recent paper indicated that the disproportionately high Soviet harvest of ribbon seals is due to the ease with which these seals can be approached and killed. He feels that spotted seals are equally as abundant as ribbon seals, and that more effort should be made to increase the harvest of the former, mainly in the region east of the Pribilof Islands.

It is hoped that at some time in the near future there will be channels through which biological and harvest information can be exchanged with our Soviet colleagues.

LITERATURE CITED

Krylov, V. I., G. A. Fedoseev, and A. P. Shustov. 1964. Pinnipeds of the far east. Food Industries, Moscow. 58 pp.

Shustov, A. P. 1967. On the question of the rational utilization of Bering Sea pinniped resources. Problemy Severa. 11:182-185.

Tikhomirov, E. A., and G. M. Kosygin. 1966. Soviet exploitation of seals in the Bering Sea. Rybnoye Khozyaystoo. 9:25-28. Abstr. from Polar Record. 1967 13(87): 793-94.

PREPARED AND SUBMITTED BY:

John J. Burns
Study Leader

APPROVED BY:

Don H. Strode
Federal Aid Coordinator

Loren W. Croxton, Director
Division of Game