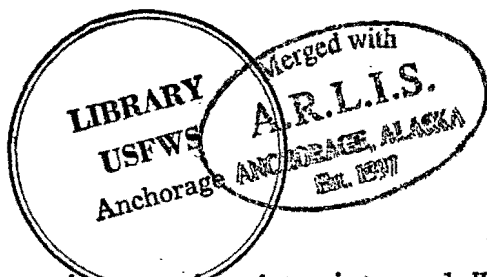


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Progress Report: 1984 Walrus
Harvest, Health, and Welfare Study at
Gambell, Alaska



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Charles B. Johnson
Marine Mammal Project
U.S. Fish and Wildlife Service
1011 East Tudor Road
Anchorage, Alaska 99503

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INTRODUCTION

The spring harvest of Pacific walrus (*Odobenus rosmarus divergens*) was monitored for the fifth consecutive year by the U.S. Fish and Wildlife Service (USFWS). This year in Gambell, Alaska on St. Lawrence Island, the Eskimo Walrus Commission (EWC) cooperated in the data collection. The USFWS was given management responsibility over the Pacific Walrus by the Marine Mammal Protection Act of 1972. Monitoring the native harvests of walrus is one part of the management program. Objectives of the harvest monitoring program are:

1. To record number, sex, and age of harvested walrus,
2. To collect a sample of walrus teeth for age determination,
3. To collect samples of tissues for heavy-metal and organo-chlorine contamination,
4. To record other marine mammals and birds taken during spring hunts.

The Gambell harvest was monitored from 24 April through 8 June. A biological technician, Rick Johnson, was under contract with the USFWS and a native village monitor, Edna Apatiki, worked under contract with the USFWS and EWC. Edna Apatiki will continue researching traditional aspects of the walrus harvest throughout the remainder of the year.

STUDY AREA

Gambell, Alaska is a Siberian Yupik Eskimo village of 450 to 500 people. It is situated on the northwest cape of St. Lawrence Island 45 miles (72.5 km) from Siberia. The spring tidal currents are strong and change from north to south twice every day. The winds are frequently above 10 mph (16 km/hr) and blow from all directions. The wind and tides help break-up the ice pack which commonly keeps other protected shores ice-locked much later. Two beaches are available for boat landings, one on the north side and one to the west. The west beach is the first to become ice-free and allow access to the sea. Whaling boats are launched from the west beach. The north beach opens up later in the spring, but is preferred because wave action is commonly less. Wind, fog, ice-locked beaches, and rough water are the primary limits on the hunting in Gambell.

METHODS

Harvest Data

Crews returning from walrus hunting were met at the beach and assisted in unloading and pulling the boats up on the beach. The number of male, female, and calf walrus was recorded as the boat was unloaded. The numbers of seals and different bird species were also recorded. The direction of the hunt, distance, number of walrus seen, and water and ice conditions were recorded when possible. However, the arrival of several boats at once prevented gathering all the above information. Questioning about wounded and lost walrus antagonized hunters and only served to reduce cooperation. The difficulty of determining the number of wounded and lost animals when a

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herd is being fired upon makes such a number of questionable value.

Departure and arrival times of hunters were recorded when possible. Due to the extreme spread of departure times and the variable time spent hunting, it was impossible to observe all boats departing and arriving. When a boat was missed, the captain was contacted at home to determine his catch.

Specimen Collection

No stomach contents or reproductive tracts were collected during the 1984 program. One hundred and fifty pairs of lower canines were to be collected from hunters for age determination. Tooth purchases were limited to 3 pair per boat per day to spread the collection throughout the season and allow all the captains a chance to sell teeth. Teeth were purchased at \$8 per pair with an additional \$2 paid to the Gambell Native Store for handling receipts. Signs were placed in the Gambell Native Store and Post Office to announce any changes in sample collection.

Sets of blubber, kidney, liver, and teeth were collected from individual walrus for contaminant analysis. All but the pairs of teeth were collected gratis. Hunters were asked to place the tissues in plastic bags to prevent gas and oil contamination. Specimens were carefully trimmed of all outside surfaces, wrapped in aluminum foil, labeled in plastic bags, and frozen in a home freezer.

Boat Captains Meeting

Several attempts were made to schedule a meeting with the Gambell Boat Captains' Association through its current president. The mayor scheduled the meeting for 10 May but postponed the meeting when the weather cleared and hunters departed. The meeting was held 11 May. About 20 captains attended despite the 5 hour advance notice. Results from past U.S. and Soviet harvest reports, aerial and ice-edge surveys, reproductive tract and food habits analyses, and contaminant analyses were presented. The current monitoring program was explained and the need for biological research was emphasized.

In addition to the boat captains meeting, captains and hunters were contacted opportunistically to explain the current program. Visiting captains at their homes was essential to establishing a rapport.

Data Analysis

Tests of proportional change of sex and age classes between years of the walrus harvests were performed with a chi-square test of independence from BMDP Statistical Software (Dixon et al 1981). A test of independence of all 4 years (1981-1984) was conducted first, followed by pair-wise tests of 1984 data with the other 3 years.

Hunting effort was calculated for all trips in which walrus were sought. Therefore, hunts were included during which no walrus were recovered. Seal and bird hunting trips were excluded. Nonetheless, some time was spent hunting seals and birds during walrus hunts. Therefore, the hunting effort is somewhat inflated. Man-hours for each trip were summed for all walrus hunts in which departure and arrival times were recorded and then divided

by the total number of walrus recovered.

RESULTS AND DISCUSSION

The recorded harvest between 25 April and 8 June in Gambell was 1499 walrus (Table 1). There were 373 "adult" males, 528 "adult" females, 405 calves, and 193 of unknown sex. "Adult" refers to animals older than calves yet not necessarily sexually mature. This was the largest harvest recorded in Gambell in the last 5 years and perhaps in recent history. Several factors influenced the high harvest. The last two of three strikes on bowhead whales (Balaena mysticetus) was lost 26 April and walrus hunting commenced 29 April. Although this was 2 weeks earlier than the walrus hunt in 1983 (Sease 1983), it was a week or more later than the hunts in 1982 (Malloy 1982) and 1981 (Lourie 1981). However, not catching a whale certainly motivated the hunters to bring in more walrus meat. There were 26 days during the 1984 monitoring period when walrus were captured as opposed to 20 days in 1983 and 19 days in 1982. Ice and wind conditions were such that hunters had greater access to walrus than the previous 3 years. During the 1982 and 1983 monitoring periods, there were only 2 days each year on which more than 100 walrus were retrieved. During the 1984 monitoring session, the catch exceeded 100 walrus on 6 days (Table 2). The hunters were reporting large herds and good ice conditions. Small amounts of ice persisted until 1 June which was the last day 15 or more walrus were retrieved. The shore ice on the north beach held fast until 2 June. It seemed that thick ice capable of supporting walrus persisted a week longer in 1984 than the previous 3 seasons.

Proportionately more females and calves were caught during the 1984 monitoring session than during 1981 (chi-square 16.34, 2 df) or during 1983 (chi-square 23.48, 2 df, Table 3). More male walrus were taken than expected during the 1984 season when compared to 1982 (chi-square 8.23, 2 df). The distribution of hunting days relative to the walrus migration probably explains the differences in sex composition between years. There were fewer hunting days at the end of May and the beginning of June during 1982 than 1983 or 1984 (Malloy 1982, Sease 1983). This year there were more hunting days in April and early May than during 1983. Female and calf walrus are the first to migrate and tend to stay with thicker ice (Fay 1982). Male walrus migrate later and were taken in greater numbers by Gambell hunters during the end of May and beginning of June. Female and calf walrus are preferred for their meat in Gambell and are taken in large numbers early in the hunting season.

The recorded harvest of other marine mammals consisted of 145 bearded seals (Erignathus barbatus), 32 ringed seals (Pusa hispida), 9 spotted seals (Phoca largha), and 7 ribbon seals (Phoca fasciata) (Table 4). In addition, 10 polar bears (Thalarctos maritimus) were shot during the monitoring period. No whales were captured although several gray whales (Eschrichtius robustus) were hunted.

No accurate count was made of bird species harvested. Thick-billed murres (Uria lomvia) and crested auklets (Aethia cristatella) were the most prevalent species taken. All species of eiders and common murres (Uria aalge) were regularly taken. Two yellow-billed loons (Gavia adamsii) were retrieved by one boat. In addition, one crew collected gull eggs from the cliffs at Southwest Cape on 30 May. Bird hunting was usually reserved for

Table 1. Sex and age composition of 1981-1984 spring walrus harvests at Gambell, Alaska.

Date	Walrus				Total
	Males	Females	Calves	Unknown sex	
1981	345 35.9%	373 38.8%	243 25.3%	0 0%	961
1982	211 22.4%	404 42.9%	298 31.6%	29 3%	942
1983	249 38.8%	203 31.6%	190 29.6%	0 0%	642
1984	373 24.9%	528 35.2%	405 27.0%	193 12.9%	1499

Table 2. Observed sex and age distribution of walrus captured by date during the spring walrus hunt at Gambell, Alaska, 1984.

Date	Males	Females	Calves	Unknown sex	Total
29 April	0	0	0	1	1
2 May	20	11	8	4	43
3	5	5	2	4	16
5	0	11	13	0	24
6	0	0	0	5	5
9	1	1	1	0	3
10	12	100	110	0	222
14	3	27	25	12	67
15	4	55	34	0	93
16	10	75	85	12	182
17	2	2	0	0	4
20	58	101	72	11	242
21	0	7	9	12	28
22	0	0	1	0	1
24	29	10	9	4	52
25	43	47	24	23	137
26	31	22	4	0	57
27	67	30	7	6	110
28	39	18	0	74	131
30	23	5	0	6	34
31	1	0	0	10	11
1 June	9	1	1	5	16
2	10	0	0	2	12
3	4	0	0	0	4
5	1	0	0	0	1
6	1	0	0	2	3
total	373	528	405	193	1499

Table 3. Observed, expected, and chi-square values of tests for independence between year and sex of walrus captured during the spring harvests of 1981-1984 at Gambell, Alaska.

<u>1981-1984</u>									
Date	Males		Females		Calves		Chi-square	DF	P-value
	Obs	Exp	Obs	Exp	Obs	Exp			
1981	345	296.2	373	379.2	243	285.6	66.463	6	p<.001
1982	211	281.4	404	360.2	298	271.4			
1983	249	197.9	203	253.3	190	190.8			
1984	373	402.5	528	515.3	405	388.2			

<u>1981 vs. 1984</u>									
Date	Males		Females		Calves		Chi-square	DF	P-value
	Obs	Exp	Obs	Exp	Obs	Exp			
1981	345	304.1	373	382.1	243	274.8	16.34	2	p<.001
1984	373	412.9	528	518.9	405	373.2			

<u>1982 vs. 1984</u>									
Date	Males		Females		Calves		Chi-square	DF	P-value
	Obs	Exp	Obs	Exp	Obs	Exp			
1982	211	240.0	404	383.6	298	289.4	8.22	2	p=.016
1984	373	343.0	528	548.4	405	413.6			

<u>1983 vs. 1984</u>									
Date	Males		Females		Calves		Chi-square	DF	P-value
	Obs	Exp	Obs	Exp	Obs	Exp			
1983	249	204.8	203	241.0	190	196.2	23.50	2	p<.001
1984	373	416.2	528	490.0	405	398.8			

Table 4. Recorded capture of seals and polar bears during the spring walrus harvest at Gambell, Alaska, 1984.

Date	Seals				Polar bears
	Bearded	Ringed	Spotted	Ribbon	
2 May	15	3	0	0	0
3	16	4	0	0	0
5	4	2	0	0	0
9	0	0	1	0	0
10	12	0	0	0	1
14	7	0	0	0	0
15	4	2	0	0	0
16	10	0	0	0	0
20	23	1	0	0	1
21	0	0	0	0	1
24	1	1	0	0	0
25	2	1	0	2	3
26	3	1	0	0	1
27	17	2	0	2	3
28	9	1	0	0	0
30	6	4	3	0	0
31	1	0	0	0	0
1 June	11	2	1	0	0
2	3	2	1	0	0
3	1	5	0	1	0
6	0	1	4	0	0
total	145	32	9	7	10

the return trip after a walrus hunt, or was sometimes the sole intent of hunting trips at the end of May and during June.

Pairs of canine teeth were collected from 192 walrus. By 17 May 145 pairs of teeth were purchased of which less than 20% were from male walrus. A sign was placed in the Post Office and Gambell Native Store to announce that only male walrus teeth would be purchased. On 20 May 37 pairs of male walrus teeth were purchased. Another sign was posted announcing the termination of tooth purchases which was less than enthusiastically received. Only pairs of teeth accompanied by contaminant specimens were purchased after 21 May.

Seven complete sets of blubber, kidney, and liver samples were collected for contaminant analysis from 1 male and 6 female walrus. Blubber samples were collected from 3 additional females. Blubber thickness was measured in the sternal area of 7 females. The range was 44mm to 95mm with an average of 61mm. Generally, the hunters reported that the walrus caught were fat and healthy. There were only a few reports of thin, unhealthy animals.

Hunting effort was calculated for only 138 hunting trips. Since game other than walrus was hunted during these trips any figure overestimates actual effort. It was very difficult to get accurate departure times for each crew. The staggered starting times and long duration of the hunts would require 24 hour observation to get both departure and arrival information. Better hunting conditions prevailed during the 1984 spring hunt than during 1982 in terms of hunting effort. During 138 hunts, 794 walrus were captured in 5076.5 man-hours. The mean number of man-hours per walrus captured was 6.39. During the 1982 monitoring program, hunting effort per walrus was 8.9 man-hours and during 1981 it was 2.3 man-hours (Lourie 1981, Malloy 1982).

The mean duration of a hunting trip was 9.5 hours. An average of 3.85 men went hunting each trip and recovered an average of 5.75 walrus per hunt. The number of walrus caught per trip was higher and the hunting effort was lower than the 1982 spring hunt.

Most of the boats used for walrus hunting were 18 foot (5.8 m) aluminum skiffs with 50 to 55 hp motors. One 18 foot skiff was operated with two 35 hp motors. One wooden skiff was in use and Leonard Nowpatabok continued to use his walrus-skin boat.

Recovery of marine mammal parts varied with species, hunting crew, and date. Early in the spring hunt female walrus with calves were available and highly preferred. Calves were generally eviscerated but otherwise brought back intact. Calves were butchered later and hung to dry. Flippers, intestines, heart, breast, blubber, ribs, and other meat were usually retrieved from female walrus. Full stomachs were prized for the clams they held. All tusks from animals older than calves, many teeth, and all oosiks (baculums) were kept. Large female hides were sought for covering whaling boats. Little meat other than heart and liver was

salvaged from male walrus because of its disagreeable flavor. By the end of May, a smaller proportion of meat was recovered from the walrus taken. This corresponded with the time when males replaced females in the harvest. I also heard reports of a shortage of freezer space, since the community freezer was out of commission. All boats returned with some meat. Most seals, with the exception of adult bearded seals, were brought to the village whole and butchered on the beach. Most of the meat and hides from seals were used. Young and fetal seals were particularly sought for their soft fur for use in clothing.

Only one carnivorous male walrus was captured this year. The hunters claim that these "seal eaters" were orphaned at a young age before learning to forage and, therefore turned to eating meat.

During the 1983 program, John Sease trapped over 100 voles in one afternoon and evening (Sease 1983). During the 1984 season, these voles were again very abundant. No trapping was attempted, but tunnels covered the vegetated ground near the old houses and numerous voles were observed soon after the snow thawed.

Only a fraction of the bird species observed during 1983 were observed during 1984 (Appendix A). About 20 birdwatchers spent the last week of May in Gambell. The birdwatchers were not welcomed by many of the villagers. The Eskimos don't understand why people spend so much time and money to look at birds that they live with. There was also suspicion that the outsiders were picking up artifacts and taking photos of people and activities without permission.

Suggestions for Future Programs

My principal suggestion for the next monitoring season is to provide some continuity. The hunters don't accept a new monitor every year and it is easy for them to intimidate a newcomer with their many demands and cool reception. The monitor is in an awkward position receiving complaints about the program without any power to change the program. Often the monitor doesn't have the background to answer questions about the intent of management programs. Supervisors should meet with the boat captains prior to the whaling season to explain the program and answer questions about applications of the data and prices for specimens.

Each monitor should be prepared by supervisors for some hostility and non-cooperation. This should include expectations of the monitor in hostile situations and suggestions on how to handle such circumstances. A little history of past problems, of clans that are antagonistic, and of clans that are friendly would be helpful. A cultural indoctrination would be beneficial. It takes patience, flexibility, and a sociable nature to succeed as a monitor. The job requires more of social than biological skills and monitors should be prepared for such an experience.

Every effort should be made to provide the monitor with complete and current information. The contaminant data are an example of incomplete information. The data given to the monitors was not current and no interpretation of the contamination levels was available. The village desires this information yet the monitor can't explain what the data mean in terms of safe consumption. This situation makes it difficult to collect

samples because the hunters don't see results.

The captains meeting should be scheduled as early as possible. Mid-afternoons or early evenings are good times on days when there is no hunting. The president of the Boat Captains Association should be involved, but if that fails (as it did for me), the mayor can be contacted to schedule use of the Community Hall. Signs should be placed in the Gambell Native Store and Post Office. A list of boat captains is provided in Appendix B.

The village monitor, Edna Apatiki, was very proficient at the task of collecting the data. She has worked with the program for 3 years and is a real asset. She has some problems with the program such as new inexperienced monitors every year, apparently irrelevant data on the data form, and unresponsiveness of the USFWS to requests for equipment and program changes. Edna will not work as a monitor next year if she can get a teaching position and she will be difficult to replace. Some effort should be made to entice her to continue and it would be good to bring her to Anchorage to initiate next years program.

Although my suggestions sound critical, I must say that I enjoyed my time in Gambell and it was a good experience. It is a difficult job and requires a great deal of flexibility. I also realize that the task of administering this program is very expensive and difficult. However, more effort is needed for public relations with the hunters to keep them involved and prevent loss of the cooperation that the management of marine mammals depends upon.

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