PROGRESS REPORT: 1983 Walrus Harvest, Health, and Welfare Study at Little Diomede, Alaska

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Key words: Pacific Walrus
Marine Mammals

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Abstract

Little Diomede was one of five western Alaska villages for the fourth consecutive year where the U. S. Fish and Wildlife Service conducted a Pacific walrus (Odobenus rosmarus divergens) harvest, health, and welfare study. A documented harvest of 166 walruses, during the spring study period, was a marked decrease from spring harvests over the three previous years. Analysis of annuli cementum deposits on lower canine teeth from 45 females and 74 males indicated a mean age of 11.3 and 19.7 years respectively. Samples of liver, kidney, and blubber collected from 22 walrus currently await laboratory testing for contaminant levels. A mean blubber thickness of 45.7mm was determined from measurements taken over the sternum of 65 walrus. The documented harvest of other marine mammals was one beluga whale (Delphinapterus leucas), 18 bearded (Erignathus barbatus), 9 spotted (Phoca largha), and 31 ringed seals (Pusa hispida).

INTRODUCTION

Pacific walrus (Odobenus rosmarus divergens) harvest information, scientific data, and specimens were acquired annually from the five leading walrus harvesting villages by the Fish and Wildlife Service (FWS). Little Diomede consistently harvests large numbers of walrus each spring. Monitoring village harvests is presently the most efficient method to determine accurate harvest mortality and to acquire information and specimens necessary to evaluate the health and welfare of the Pacific walrus.

Data on the number, sex, and age of walruses harvested were collected each spring. Teeth were collected to determine the age distribution from a sample of walruses harvested. Determination of the number and sex of walruses harvested was accomplished by direct observation or questioning hunters upon their return. Samples of walrus liver, kidney and blubber were collected to obtain information concerning the level of heavy metals and organochlorine contaminants prior to projected oil and gas development in the Bering and Chukchi Seas.

Tissue samples will be analyzed at Patuxent Wildlife Research Center, Laurel, Maryland. Blubber thickness was measured whenever possible and recorded with corresponding teeth.

I thank the Diomede boat captains and hunters for their cooperation in supplying specimens and harvest data during the 1983 monitoring period and Peter Akvaluk for allowing me to accompany his crew during several hunting trips.

METHODS

Harvest Data

Harvest data were acquired by questioning boat captains, crew members, or by direct observation. In most cases harvest data and specimens were collected on the beach. On several occasions I accompanied a crew. Acquisition of data from other crews posed no problem while accompanying a hunting crew. Other crews returning before the return of the biologist would inform the biologist of their harvest upon arrival or at a later time. All acquired harvest data were recorded on data forms. A form was completed for each crew hunting attempt.

Teeth Collection

The two canine teeth from the lower jaw were purchased from hunters offering them for sale. Teeth payments were contracted through the village store. After inspection for broken or chipped teeth hunters were given a receipt reimbursible for cash or merchandise at the store. Hunters were paid at the rate of $8.00/pair of teeth. Four dollars was paid if only one tooth from a walrus was brought in or if only one tooth was whole. At the close of the monitoring period the village store was reimbursed at the rate of $10.00/pair of teeth.

Even though I was sometimes present at a kill site or beaching of a killed walrus, teeth were in all cases extracted by the hunter. Each tooth was removed from the jaw by bracing the lower jaw with a foot and striking the other side below the tooth to be removed with the head of an ax or a hammer. Teeth extract with varing degrees of difficulty. Occasionally teeth break, in which case they were no longer of value. Thus I prefer that hunters remove the teeth.

Contaminant Tissue Samples

Approximately 300 to 1000 gram portions each of liver, kidney, and blubber from a single animal were brought to me by the boat captains or retrieved myself when in the kill site area. Upon removal from the animal, samples were tagged and stored in a plastic bag. The samples were then frozen before extracting a core sample. Core samples were removed after freezing due to ease of handling and trimming. Samples were brought in voluntarily with a pair of teeth, which were paid for as previously described.

Blubber Thickness Measurements

In most cases, thickness of blubber was measured by the boat captain or a crew member. Only six measurements were taken personally. As with the contaminant tissue samples, blubber thickness was requested on a voluntary basis. Teeth were purchased with each measurement.

Boat captains were instructed to cut a short, 5-6 cm, incision over the sternum, insert a wood tongue depressor into the incision and mark the blubber/skin level. Unfortunately plastic tags were sometimes substituted to mark the level of blubber; probably because they were short enough to fit in the tooth bags. The tags are flexible and if bent while marking will yield an inflated measurement.

RESULTS AND DISCUSSION

Harvest Data

The spring walrus harvest at Diomede showed a sharp decline relative to previous spring harvests (Table 1) and was characterized by sluggish activity early in the season. From the day of arrival on Diomede, April 30, 1983, till May 24, 1983, when the first boat was transported to the south end of the island, no walrus hunting was attempted. Only 166 walruses were harvested between 27 May and 24 June. One hundred and sixty represented adults and juveniles with an age range of four to thirty years (Figure 1). The other six (3.6%) were calves. Of adult and juvenile animals 114 (68.7%) were males, 46 (27.7%) were females (Table 1).

A lead first opened to allow hunting by boat on 24 May, at the south end of Little Diomede. The first boat was launched on 24 May, and hunting walrus continued from the south end till the village beach became ice free on 11

June. One or more boat crews hunted during all but four days between 24 May and 11 June inclusive. During this time 89 walrus were harvested. Crews launched boats from the village beach on seven days and harvested 77 walrus between 12 June and 24 June (Table 2, Figure 2).

Hunters believed the low harvest resulted from late ice breakup restricting hunting to a narrow lead through 6 June.

Prior to 6 June, very little ice edge and, as a consequence, few walrus were accessible to hunting. Wind and ocean currents control the movement of ice through the Bering Strait and most likely influence breakup of shore-fast ice around and between the Diomede islands. Wind and current can scatter ice by periodically changing direction. Scattered ice allows hunters to maneuver via leads within the main ice floe. If winds remain constant from the south, the ice may flow rapidly through the strait. North winds may cause ice to become congested within the strait as a massive, tightly packed ice floe with few or no open leads. Walrus within or on the wrong side of the floe were not accessible. Tightly packed ice surrounding the Diomede Islands prevented boat launching early in the season, and prohibited successful walrus hunting until well into the first week of June. Continuous north wind during the month of May appeared to be the major factor depressing spring harvests (Appendix 1). The direction and strength of ocean currents probably influence ice movement and state as strongly as wind.

Each walrus harvested required 32.8 man-hours, compared to 19.6 man-hours expended during 1982. However, total man-hours expended, 5,256, was less than 50% of the time spent hunting during the 1982 monitoring period, 10,689 hours. Two primary factors explain the decrease in hunting time. First, many hunters worked for cash wages in the village, thus hunting was restricted to weekends during a part of the season. Second, two skin boat captains did not begin hunting until the village beach became ice free. The large effort and cash expense combined with a low return when boats and equipment are transported long distances to open water were given as reasons. Changes may occur during more productive hunting years.

Rain, snow and fog had little influence on the harvest. Fog caused the termination of one hunting effort. Rough seas became a factor limiting hunting only after most of the ice moved north through the Bering Strait. Five hunting days were lost due to rough seas. On one occassion rough seas combined to occur with rain and snow.

Information concerning walrus wounded and sunk was not actively sought. This information was recorded if direct observation of the loss occurred or if volunteered.

Thirteen walrus were known to have sunk after being wounded. Three were males, six were females, one was a calf, and three were unknown sex. All were wounded in the water except one male which rolled off the ice edge into the water, sinking before it could be retrieved.

Teeth Collection

A pair of lower canine teeth or a single canine tooth from the lower jaw were collected from 119 walruses. Pairs of teeth were collected from 109 walrus. Single teeth were collected from ten. Of 119 walrus, 45 were females, mean age of 11.3 years, and 74 were males, mean age of 19.7 years (Figure 1).

Tissue Samples

Samples of liver, kidney, and blubber tissue were collected from 18 walrus. Liver and kidney samples were collected from three walrus and a liver sample from one (Table 3). Samples were acquired from 10 males and 12 females.

Ten sets of tissue samples were to be collected prior to 1 June, and 10 sets after 1 June. The attempt intended to distinguish between animals representing the Bristol Bay wintering herd and the herd which winters southwest of St. Lawrence Island. Correlation of contaminant loading between animals taken early in spring migration at St. Lawrence Island and Nome was to be attempted. Walrus hunting at Diomede began later than expected. One sample set was collected on 27 May. All others were collected after 1 June (Table 2).

Blubber Thickness Measurements

Blubber measurements were recorded for 86 walruses. Hunters used plastic tags for 21 of the measurements. Plastic tags were flexible and bent easily and measurements recorded were consistently higher, ranging between 68 and 81 mm. Plastic tag measurements were not presented in this report but remain available on data forms. Of 65 measurements, 34 were from females, mean thickness of 45.2 mm, and 31 were from males, mean thickness of 46.3 mm (Table 4). Mean thickness for both sexes was 45.7 mm. Measurements taken by so many different people who lack a understanding for consistency are understandably questionable.

Incidental Observations

Bearded seals (Erignathus barbatus), ringed seals (Pusa hispida), and spotted seals (Phoca largha), were harvested throughout the monitoring period (Appendix 2).

One beluga whale (Delphinapterus leucas) was harvested on 14 May. Gray whales (Eschrichtius robustus) were shot at but were not pursued on two occasions. A gray whale which was white in coloration with no other visible coloration was

observed by the biologist. The white whale was the largest of three gray whales swimming north on the east side of Little Diomede. The sighting was also witnessed by four local Eskimo hunters, all had not previously seen a white gray whale.

Common eiders (Somateria mollissima), pelagic cormorants (Phalacroeorax pelagicus), common murres (Uria aalge), least auklets (Aethia pusilla), black turnstones (Arenaria melanocephala), and dovekies (Alle alle) were harvested during one or more hunting trips. No particular species were harvested in large numbers. Dovekies are rare in western Alaska. One crew brought two in requesting identification, exclaiming they had not previously seen a bird with the Dovekie color pattern. Children killed one other Dovekie while birding on the island.

Table 1. Comparative summary of the walruses harvested by Diomede hunters during the spring monitoring periods, 1980 to 1983.

Year	Males	Females	Calves	Unk. Sex	Totals
1980	229	437	16	27	709
% of Total	32.3%	61.6%	2.3%	3.8%	
% of Adults	33.0%	63.1%		3.9%	
1981	458	304	36	10	808
% of Total	56.7%	37.6%	4.5%	1.2%	
% of Adults	59.3%	39.4%		1.3%	
1982	162	315	35	46	558
% of Total	29.0%	56.5%	6.3%	8.2%	
% of Adults	31.0%	60.2%		8.8%	
1983	114	46	6		166
% of Total	68.7%	27.7%	3.6%		
% of Adults	71.3%	28.7%			

Table 2. Daily walrus harvest and teeth collection program during the 1983 monitoring period. The number of teeth represent number of walrus teeth were collected from. No hunting occurred on the days not listed.

Date	# of Crews	# of Walrus Harvested M	F	C	Teeth	Liver	Kidney	Blubber
5-24	1							
5-25	1							
5-26	2							
5-27	1	1			1	1	1	
5-28	5		2	1				
5-29	1							
5-30	2							
6-02	3	1	8	1	9	5	5	5
6-03	4	1	19		20	1	1	1
6-05	5		1		1			
6-06	4	1			1			
6-07	2	1			1			
6-09*	3	48	1	1	41	7	7	7
6-10**	1							
6-11	1							
6-12	5	5	5		9	1	1	1
6-14	5	2	1		3			
6-16	4	3			2	2	1	1
6-17	1							
6-18	5	1	7	1	7	2	2	
6-20	1							
6-23***			1		1	1	1	1
6-24	6	50	1	2	23	2	2	2

* Crews stayed out for 3 days: 9, 10, and 11 June. All walruses harvested during these three days were taken by the crews which began hunting on 9 June.

** Crews stayed out for 2 days. No walruses were harvested.

*** One walrus harvested from the village beach.

Table 3. Tissue samples collected during the 1983 spring harvest at Little Diomede.

Walrus No.	Sex	Liver	Kidney	Blubber	Age	1983
DW-01-83	M	X	X		19	5-27
DW-03-83	F	X	X	X	09	6-02
DW-04-83	F	X	X	X	15	6-02
DW-05-83	F	X	X	X	14	6-02
DW-06-83	F	X	X	X	10	6-02
DW-07-83	F	X	X	X	14	6-02
DW-29-83	F	X*	X	X	13	6-03
DW-34-83	M	X	X	X	18	6-09
DW-35-83	M	X	X	X	15	6-09
DW-36-83	M	X	X	X	22	6-09
DW-37-83	M	X	X	X	24	6-09
DW-56-83	F	X	X	X	10	6-09
DW-57-83	F	X	X	X	13	6-09
DW-59-83	M	X	X	X	15	6-09
DW-75-83	F	X	X	X	08	6-12
DW-87-83	M	X	X	X	15	6-16
DW-88-83	M	X			09	6-16
DW-89-83	F	X	X		08	6-18
DW-90-83	F	X	X		14	6-18
DW-95-83	F	X	X	X	11	6-23
DW-96-83	M	X**	X	X	07	6-24
DW-97-83	M	X***	X	X	22	6-24

* Liver appeared white on edges and ends of lobes.

** Small white spots on most of livers surface.

*** Liver has bumpy, slightly corrugated, non-smooth green surface.

Table 4. Walrus blubber measurements taken during the 1983 monitoring period.

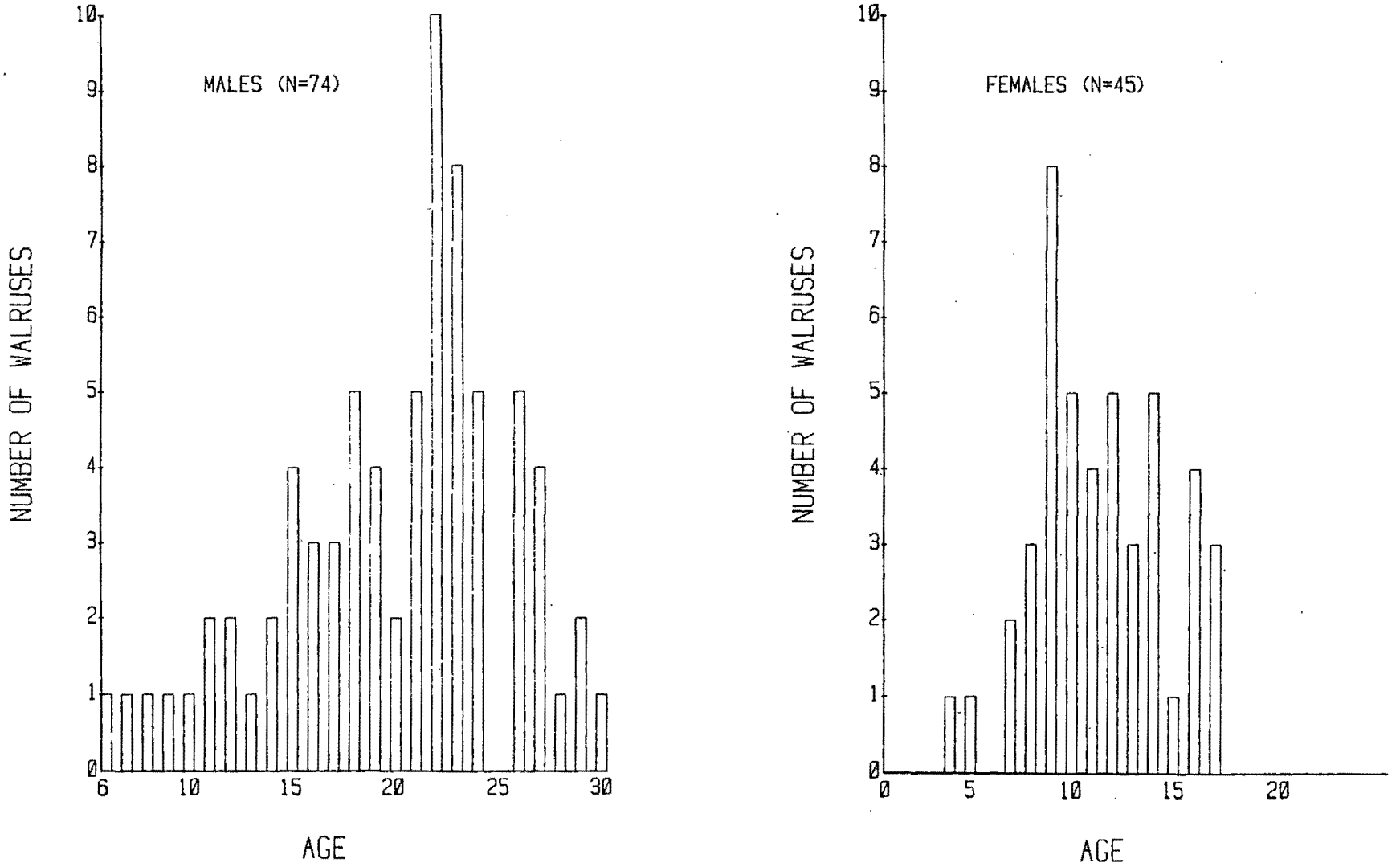
Walrus No.	Sex	Age	Blubber (mm)	Hide (mm)	1983
DW-03-83	F	09	53	17	6-02
DW-04-83	F	15	35	18	6-02
DW-05-83	F	14	71	10	6-02
DW-06-83	F	10	49	11	6-02
DW-07-83	F	14	40**	22	6-02
DW-08-83	F	14	63*		6-02
DW-09-83	F	17	56*		6-02
DW-10-83	F	10	64*		6-02
DW-11-83	F	10	42		6-03
DW-12-83	F	12	53		6-03
DW-13-83	F	11	41		6-03
DW-15-83	F	08	29		6-03
DW-16-83	F	12	47		6-03
DW-17-83	F	11	49		6-03
DW-18-83	F	12	51		6-03
DW-19-83	F	09	37		6-03
DW-20-83	F	12	50		6-03
DW-21-83	F	16	41		6-03
DW-22-83	F	09	40		6-03
DW-23-83	F	13	42		6-03
DW-24-83	F	17	40		6-03
DW-25-83	F	09	49		6-03
DW-26-83	F	16	50		6-03
DW-27-83	F	10	47		6-03
DW-29-83	F	13	32**	12	6-03
DW-30-83	F	16	61		6-03
DW-31-83	F	14	30		6-05
DW-56-83	F	10	46	18	6-09
DW-57-83	F	13	39	15	6-09
DW-86-83	F	07	25		6-14
DW-89-83	F	08	43		6-18
DW-90-83	F	14	49		6-18
DW-99-83	F	11	44**	09	6-24
DW-100-83	F		30**	11	6-24
DW-14-83	M	26	38		6-03
DW-33-83	M	30	45		6-07
DW-34-83	M	18	40	16	6-09
DW-35-83	M	15	36	18	6-09
DW-36-83	M	22	58	20	6-09
DW-37-83	M	24	48	24	6-09
DW-58-83	M	23	54	6-09	6-09
DW-59-83	M	15	50		6-09
DW-60-83	M	27	50		6-09
DW-61-83	M	27	52		6-09
DW-62-83	M	26	50		6-09
DW-63-83	M	19	50		6-09
DW-64-83	M	21	48		6-09

Table 4 (cont.). Walrus blubber measurements taken during the 1983 monitoring period.

Walrus No.	Sex	Age	Blubber (mm)	Hide (mm)	1983
DW-65-83	M	22	60		6-09
DW-66-83	M	22	42		6-09
DW-67-83	M	28	43		6-09
DW-68-83	M	18	41		6-09
DW-69-83	M	21	53		6-09
DW-70-83	M	12	52		6-09
DW-71-83	M	23	48		6-09
DW-72-83	M	26	48		6-09
DW-73-83	M	22	47		6-09
DW-74-83	M	26	60		6-09
DW-84-83	M	17	50		6-14
DW-85-83	M	10	44		6-14
DW-87-83	M	15	44		6-16
DW-88-83	M	09	38		6-16
DW-94-83	M	14	50	17	6-18
DW-96-83	M	07	25**	06	6-24
DW-97-83	M	22	35**	24	6-24
DW-101-83	M	16	35		6-24

* Hide and blubber combined in 1 measurement.
** Measurements taken by the biologist.

FIG. 1 AGE DISTRIBUTION OF WALRUSES, LITTLE DIOMEDE, 1983



Appendix A. Daily wind speed and direction. Measurements were taken using the BIA Schools Heathkit weather computer.

Date	Direction	Speed	Date	Direction	Speed
May			June		
1	NE	4G44	1	S	22G49
2	NNE	5G26	2	SSW	18G35
3	ENE	16G24	3	SSW	6G22
4	ENE	21G42	4	SSW	15G35
5	NE	29G43	5	S	12G43
6	NNE	29G47	6	SSW	12G28
7	ENE	27G45	7	SSW	4G21
8	ENE	23G40	8	ENE	18G32
9	NE	25G37	9	NE	17G32
10	E	9G37	10		
11	ENE	17G34	11		
12	ENE	17G32	12	NE	14G36
13	NE	19G31	13	NE	29G43
14	NE	27G40	14	SW	14G37
15	ENE	19--	15	SSW	20G30
16	ENE	27G43	16	NNE	29G40
17	ENE	28G47	17	NE	14G37
18	NE	18G38	18	NE	8G25
19	NE	21G32	19	SW	15G24
20	NE	23G41	20	SSW	20G29
21	ENE	22G34	21	ENE	30G41
22	ENE	26G38	22	NE	22G43
23	ENE	28G47	23	ENE	24G39
24	NE	19G39	24	NE	27--
25	S	8G31	25	NE	6G22
26	SSW	8G31			
27	NE	8G31			
28	ENE	4G22			
29	NE	11G23			
30	E	8G42			
31	E	20G34			

Appendix B. Seals and whales retrieved during the 1983 spring monitoring period.

Specie	Number Harvested	Number Known Lost
Belukha	1	0
Bearded Seal	18	6
Spotted Seal	9	1*
Ringed Seal	31	0

* Returned to sea because of sickly appearance and sluggish escape behavior.

Appendix C. List of active boat captains and type of boat used.

Boat Captain	Type	Length
Orville Ahkinga*	Skin	25-30
Phillip Ahkinga	Aluminum	18
Peter Ahkvaluk	Aluminum	18
Glenn Iyahuk**	Skin	30+
Tommy Menadelook*	Skin	30+
Andrew Milligrock	Aluminum	18
Pat Omiak (Iyapana)	Aluminum	18
Roger Ozanna***	Aluminum and Skin	16 & 30+
Dennis Soolook****	Aluminum	18

* Did not begin hunting until village beach became ice free.
** Hunted with Peter Ahkvaluk until new skins were attached to boat.
*** Used aluminum boat until new skins were attached to skin boat.
**** Broken leg: took boat out only twice.

Appendix D. USFWS expenses at Little Diomede.

Payment to:

Diomede Student Council
Apartment rental, 57 days @ $20/day.....$1,140.00

Diomede Boat Captains
109 Pairs and 10 individual walrus teeth
@ $8/pair and $4/individual tooth.....$912.00

Diomede Native Store
Cash payment contract for teeth
@ $2/pair and $1/tooth.....$228.00

Peter Ahkvaluk
Transportation to Wales, Alaska.....$70.00

Total.....$2,350.00

MERK/nav/23Sept83/1724g