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WALRUS STUDY PROJECT ✓

1980 FIELD COLLECTION REPORT

DIOMEDE, ALASKA.

Timothy E. Smith ✓

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Introduction

In the spring of 1980 Diomede was one of five villages selected for a study of the Pacific walrus population through collection and analysis of specimen material from animals killed by subsistence hunters. A second objective of the field program was to monitor current harvest patterns in some of the most important walrus hunting areas.

Diomede is one of the more isolated villages in Alaska. Because of the absence of an airfield on the island, fixed-wing aircraft landings are limited to the period of sea ice cover from late November to mid-May. The human population located at the village site formerly known as Ignaluk numbers approximately 125. The geography of the Bering Strait makes Diomede a highly strategic location for intercepting the seasonal movements of marine mammals in the spring and fall. The relatively narrow pass funnels the north-south migrations resulting in large concentrations during certain times of the year. The unique location of the area also exposes it to the extreme effects of ice movements, climate and current which can severely limit hunting activities.

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Methods

This year's specimen collection project on Diomedes was basically a continuation of a program which has been carried on since 1976 by personnel of the Alaska Department of Fish and Game and similar to walrus studies done there previously by various investigators. Upon our arrival on the island a public meeting was held to outline the details of the operation this year. An assistant was hired by Kawerak to handle the payments.

Collection and labeling materials were distributed to the boat captains individually. Since there were only 6 crews it was quite easy to maintain contact with them. The boat captains proved to be very good at collecting and accurately labelling specimens. When there was any doubt as to the reliability of the labelling of specimen sets they were returned to the collector. Those specimens which were accepted are believed to have been properly grouped and marked.

Harvest information was recorded as hunting took place either by direct observation or by reports from the hunters.

Whenever possible, the thickness of skin and underlying fat of the dead walrus was measured in the field by the investigator or by boat captains. The animal was placed on its back and a short incision made over the sternum. Both the total thickness and the thickness of the blubber were recorded in most cases.

Tusk measurements were taken from a number of animals. Those made by the investigator were of both tusks. Many of the boat captains measured only the longest tusk and these are recorded separately.

Results

Specimens were collected from 304 walruses. The breakdown of parts is as follows:

Teeth	299 sets
Ovaries	105 pairs
Stomach contents	15

A number of unusual items found in walrus and ugruk stomachs were also collected and preserved. I personally examined 121 walruses and collected specimens from 72 of them. The records of individual specimens are shown on Form #1. Ringed seals, Ugruk and Belugas were hunted at every opportunity. Ugruk were particularly sought after. The known kill of these species is shown on Table (1).

The weight of the stomach contents from adult male walruses went as high as 66 kg. Two species of clams appeared to make up over 80% of the diet of those individuals which had food in their stomachs. 194 walrus stomachs were examined and found to be empty. However the finding of empty stomachs does not necessarily mean that the animals had not been feeding. Large quantities of fecal material on the ice floes where walrus were taken and other evidence indicated that in many cases they had been on the ice long enough for complete digestion to have taken place.

Blubber thickness measurements are shown on Table (2). Skin thickness was not significantly different at the sternum between males and females so that one measurement from surface to muscle could suffice. Females had the largest accumulations of subcutaneous fat. Pregnant or lactating females had as much as 75mm of blubber over the sternum and much more at other locations on the body. Organ fat was correspondingly high in these individuals. Males averaged lower blubber thickness values than females (27mm - males, 39mm - females). One adult male had only 4mm of blubber and this appeared to be mostly connective tissue. The tusks of this animal were quite large indicating advanced age.

Tusk measurements are shown in Table (3). These can be correlated to ages determined from analysis of cementum annuli of lower canines collected from the same animal. Measurements for numbers 93-118, Table (3) appear to be typical. It is not known whether these are actual values or the individual taking the measurements used a slightly different method.

A total of 709 adult walruses were killed during the study period. Since the sea ice had moved north, far from the island by June 23, it is doubtful that many more would have been taken afterwards.

Walrus hunting as it is pursued on Diomedes is fairly labor intensive, 40653 man hours were expended in boat hunting or 57.3 man hours for each walrus killed.

Discussion

Little Diomedes society is extremely marine mammal oriented. The pursuit of marine mammals and preparation of their products dominates the spring time activities of the people. Hunting is still a highly respected

Table 1

Observed harvest and loss rates of Phocid seals and Belugas. May and June 1980.
Little Diomedes Island.

Date	Ringed Seal		Ugruk		Beluga	
	Sunk	Retrieved	Sunk	Retrieved	Sunk	Retrieved
Prior to 5-6						7-8
5-10						1♀ w/fetus
5-11			1			
5-12		1			2	1♀
5-13				2		
5-14		1		2		
5-22	15	8	4	2		
5-23	17	10	5	1		
5-24		2		1		
5-26			3			
5-27			1			
5-29				3		
6-3				2♀ 1♂		
6-5		2		2		
6-7				1		
6-14		1				
Totals	32*	25*	14*	17	2*	9-10

*Minimum estimates

Table 2

Thickness in MM of skin and subcutaneous fat of walruses killed near Little Diomedé Island. May and June 1980. Measurement taken at the sternum.

<u>Male</u>				<u>Female</u>			
No.	Skin	Blubber	Total	No.	Skin	Blubber	Total
DW-176-80	14	22	36	DW-002-80	16	33	49
DW-177-80	25	33	58	DW-003-80	19	52	71
DW-180-80	18	23	41	DW-004-80	20	30	50
DW-181-80	24	16	40	DW-005-80	16	57	73
DW-183-80	15	27	42	DW-006-80	17	34	51
DW-184-80	14	28	42	DW-009-80	22	27	49
DW-186-80	13	28	41	DW-045-80	--	38	--
DW-187-80	14	25	39	DW-085-80	14	27	41
DW-188-80	18	16	34	DW-087-80	17	28	45
DW-189-80	24	22	46	DW-088-80	12	47	59
DW-190-80	28	23	51	DW-090-80	15	37	52
DW-192-80	15	25	40	DW-127-80	--	60	--
DW-193-80	17	35	52	DW-128-80	--	44	--
DW-194-80	25	14	39	DW-129-80	--	40	--
DW-195-80	31	4	35	DW-131-80	--	50	--
DW-198-80	28	35	63	DW-132-80	--	40	--
DW-199-80	24	45	69	DW-134-80	--	75	--
DW-201-80	24	33	57	DW-135-80	--	35	--
DW-279-80	16	29	45	DW-138-80	20	60	80
DW-280-80	11	20	31	DW-139-80	24	36	60
DW-298-80	21	41	62	DW-140-80	26	49	75
DW-299-80	21	60	81	DW-141-80	20	51	71
				DW-142-80	15	21	36
				DW-143-80	18	65	83
				DW-144-80	19	40	59
				DW-145-80	22	36	58
				DW-147-80	20	46	66
				DW-151-80	18	40	58
				DW-152-80	21	45	67
				DW-153-80	23	44	67
				DW-154-80	23	36	59
				DW-155-80	24	49	73
				DW-156-80	26	56	82
				DW-157-80	--	34	--
				DW-158-80	21	52	73
				DW-159-80	27	52	79
				DW-161-80	19	35	54
				DW-162-80	24	48	72
				DW-163-80	23	46	69
				DW-164-80	24	36	60
				DW-165-80	23	44	67
				DW-167-80	21	50	71
				DW-168-80	25	50	75
				DW-169-80	16	55	71
				DW-170-80	23	40	63
				DW-171-80	26	52	78
				DW-172-80	22	44	66

Table 2 (cont.)

<u>Male</u>				<u>Female</u>			
No.	Skin	Blubber	Total	No.	Skin	Blubber	Total
				DW-173-80	20	50	70
				DW-174-80	26	31	57
				DW-175-80	21	26	47
				DW-206-80	--	38	--
				DW-228-80	13	22	35
				DW-229-80	16	47	63
				DW-230-80	22	24	46
				DW-231-80	14	38	52
				DW-232-80	14	25	39
				DW-234-80	18	33	51
				DW-235-80	13	25	38
				DW-237-80	11	31	42
				DW-238-80	10	34	44
				DW-239-80	--	31	--
				DW-240-80	18	54	72
				DW-241-80	13	27	40
				DW-243-80	10	29	39
				DW-244-80	22	19	41
				DW-245-80	12	34	46
				DW-246-80	20	45	65
				DW-247-80	13	32	45
				DW-248-80	16	46	62
				DW-249-80	9	39	48
				DW-250-80	13	22	35
				DW-251-80	15	34	49
				DW-252-80	13	36	49
				DW-253-80	12	41	53
				DW-254-80	10	26	36
				DW-255-80	15	37	52
				DW-256-80	11	24	35
				DW-257-80	12	31	43
				DW-258-80	15	34	49
				DW-259-80	19	23	42
				DW-260-80	19	26	45
				DW-261-80	10	55	65
				DW-262-80	28	22	50
				DW-263-80	23	33	56
				DW-264-80	25	36	61
				DW-265-80	22	47	69
				DW-266-80	21	51	72
				DW-267-80	22	35	57
				DW-268-80	21	50	71
				DW-269-80	25	32	57
				DW-270-80	23	45	68
				DW-271-80	23	42	65
				DW-272-80	26	44	70

Table 2 (cont.)

<u>Male</u>				<u>Female</u>			
No.	Skin	Blubber	Total	No.	Skin	Blubber	Total
				DW-273-80	22	49	71
				DW-274-80	22	43	65
				DW-275-80	--	25	--
				DW-282-80	22	46	68
				DW-284-80	23	36	59
				DW-285-80	23	33	56
				DW-286-80	24	51	75
				DW-287-80	18	29	47
				DW-288-80	22	44	66
				DW-289-80	22	37	59
				DW-290-80	23	43	66
				DW-291-80	22	41	63
				DW-292-80	25	42	67
				DW-293-80	17	40	57
				DW-294-80	23	48	71
				DW-296-80	19	44	63
				DW-297-80	21	31	52
				DW-300-80	18	35	53
				DW-301-80	25	51	76
				DW-304-80	16	12	28
					12	30	42
					15	36	51
					15	37	52
					14	21	36
					16	52	68
					17	33	50
					12	30	42
					19	25	44
					15	26	41
\bar{x}	20	27	47	\bar{x}	19	39	57
Range	11-31	4-60	31-81	Range	9-28	12-75	28-83

Table 3

Measurements in CM of the tusks of walrus taken near Little Diomed Island, May and June 1980. Length is from the gum line to the tip. Circumference is at the gum line. Measurements in the left hand column were made by T. Smith. Those in which values for the longest tusk only are given, were supplied, by the hunters.

No.	Right		Left		Longest Only		No.			
	L	Circ.	L	Circ.	L. cm	Circ.				
84	♀	41	14	40	14	55.9	20.3	93	♂	
85	♀	29	11	30	11.5	50.8	20.3	94	♂	
86	♀	45	16.4	44.5	16	48.3	19	95	♂	
87	♀	40.5	14.7	40	15	48	20.3	96	♂	
88	♀	42	13.5	42	13.7	53	22.9	97	♂	
89	♀	40.5	13.8	39.5	14	59.7	21.6	99	♂	
90	♀	41	14.3	40	14.4	50.8	21.0	100	♂	
91	♀	32	14	32	14.5	51.4	18.4	101	♂	
92	♀	42	13.5	41	14.2	48.3	20.3	102	♂	
						61.6	24.8	103	♂	
						50.8	19.7	104	♂	
						48.3	22.9	105	♂	
						55.9	22.2	106	♂	
						45.7	17.8	107	♂	
						38.1	21.6	108	♂	
						47.6	19.0	109	♂	
						57.2	21.6	110	♂	
						58.4	22.2	111	♂	
						55.9	22.9	112	♂	
						50.8	20.3	113	♂	
						49.5	19.0	114	♂	
						34.3	13.3	116	♀	
						61.0	15.2	♀	118	♀
176	♂	43	20	41	20	44	11	♀	289	
177	♂	62	15	60	15	42	12	♀	290	
178	♂	34	16	40	15.5	51	12.5	♀	291	
179	♂	48	21.5	47	21.5	44	12.5	♀	292	
180	♂	35	17	35	7.5	38	10	♀	293	
182	♂	47	18	44	18	35	11.5	♀	294	
183	♂	48.5	14	50	14.5	20	8.5	♀	295	
184	♂	25	17	44	20.4	25	9	♀	296	
187	♂	51	20	51	19	45	11.5	♀	297	
188	♂	38	18	37	18.5	36	12	♀	298	
189	♂	53	23	53	23.3	43	15	♀	299	
190	♂	46	20	52	20	44	12	o	300	
191	♂	46	20	43	20.5	28	8	♀	301	
192	♂	30.5	15	29	15					
193	♂	33	18.5	36	17.5					
195	♂	55	25.5	55	20					
196	♂	43.5	17	43	17.5					
228	♀	33	15	33	15					
229	♀	29	12.5	28	12.5					
231	♀	49	14.5	50	15					
232	♀	44	13.5	43	13.5					
234	♀	31	12	30	12					
235	♀	33	15	34	16.5					

Table 3 (Cont.)

No.	Right		Left		Longest Only		No.
	L	Circ.	L	Circ.	L.cm	Circ.	
119 ♀					45.7	12.1	
120 ♀					54.6	15.2	
121 ♀					45.7	15.2	
127 ♀					17.8		
128 ♀					36.8		
129 ♀					40.6		
130 ♀					38.1		
131 ♀					39.4		
134 ♀					22.9		
136 ♂					50.8		
137 ♂					16.5		
197 ♀	35.5	15	34	14.6			
198 ♂					33	15	
199 ♂					28	10.5	
200 ♂					35	14.5	
201 ♂					33	13	
202 ♂					15	7	
203 ♂					18	8	
204 ♂					13	7	
205 ♂					13.5	9	
259 ♀	34	13.2	35	13.5	43	12	♀ 261
260 ♀	31	13.1	32	14	24	9	♀ 262
278 ♂	35	16.5	37	16.8	34	12	♀ 263
228 ♀	33	15	33	15			
229 ♀	29	12.5	28	12.5			
231 ♀	49	14.5	50	15			
232 ♀	44	13.5	43	13.5			
234 ♀	31	12	30	12			
235 ♀	33	15	34	16.5			
237 ♀			36	14			
238 ♀	30	15.4	31	16.5			
239 ♀	29.5	13	28	13			
240 ♀	39	15.5	37.5	16			
241 ♀	40	15	40	15.5			
243 ♀	44	17	46	17.5			
245 ♀	37	13.5	37	13.5			
246 ♀			38.5	14			
247 ♀	45.3	16.5	44	16.5			
249 ♀	44	17	43	16.5			
252 ♀	51	14.3	51	14.5			
253 ♀	39	13	34	13			
254 ♀	44	13.5	45	14.3			
256 ♀	43	16	49	16			
257 ♀	37	16	35	15.5			
259 ♀	34	13.2	35	13.5			
270 ♀	31	13.1	32	14			
279 ♂	54.6	21.0	58.4	21.6	14	7.5	♀ 264
303 ♀			33	14	41	10	♀ 265
304 ♀	25	13.5	26	14	37	11	♀ 266

Table 3 (Cont.)

No.	Right		Left		Longest Only		No.	
	L	Circ.	L	Circ.	L.cm	Circ.		
					28	10	♀	267
					39	11.5	♀	268
					17	9	♀	269
					15	6	♀	270
					36	12	♀	271
					29	8.5	♀	272
					39	12	♀	273
					36	12.3	♀	274
					41.9	14.6	♀	275
					53.3		♂	276
					48.3		♂	277
					35.6	15.2	♂	280
					47.0	12.7	♀	281
					38	11.5	♀	282
					20	16	♂	283
					38	9	♂	284
					20	8	♀	285
					42	12.5	♀	286
					30	10	♀	287
					43	12	♀	288

occupation for men. Hunters were out on every day except when weather prevented travel. When hunting along open leads, there were men on the ice around the clock. Boat crews also went out at practically any time of day or night.

During the study period, marine mammal meat and other parts were estimated to fill 80% to 90% of the nutritional requirements of the village. The practice of preserving meat in underground cold storage and by various other methods indicates that meat taken in the spring continues to play a major role throughout the year. On Diomedede there is no substitute food source available.

The village is relatively cash poor and there are few salaried jobs. Walrus provide the basis for the Diomedede economy. All the the men carve ivory and the majority of women and young people as well. Raw ivory and carved ivory items are used as a medium of exchange at the native store, bingo games and even at movies. The value of uncarved ivory is set at \$20/pound within the village. The native store provides credit at this rate and makes ivory available to village carvers who are not able to obtain enough for their own needs.

Hunting methods varied through the season. In the first part of May a rather unique condition existed in that the Bering Strait was jammed with solid ice all the way across, in a line which passed just south of the Diomedede Islands. The sea south of this line was nearly clear of ice. Marine mammals unable to continue northward moved back and forth along the ice edge. Boats were launched from the south end of the island and pulled up on the ice nearby. Hunters stood by their boats and waited for game. This accounts for the large numbers of Belugas

When pack ice closed in from the south so that boats could no longer be used, hunting was done on foot along open leads. Seals or ugruk were most commonly taken in this way but walrus were occasionally seen.

When the pack ice opened up and large numbers of walruses began moving into the area, hunting was done primarily from boats. Six boats were in use at this time; five walrus skin covered craft and one 18 foot aluminum boat. Fairly large crews were carried even in the aluminum boat. The large crew size was partly a function of the number of hunters in the village but also provided the necessary manpower to handle the boats and the heavy animals.

Walruses were occasionally shot in the water and harpooned but this was not preferred because of the difficulty of getting them out of the water and onto the ice for butchering.

Shooting of animals hauled out on ice floes was by far the most efficient method. Walruses on the ice would generally remain even though approached closely.

Loss rates of animals struck on the ice averaged between 10% and 20% depending upon such factors as the skill of the hunters and the number of walruses on the floe.

Salvage of meat was variable. Ugruk and belugas were butchered on the ice and all but a very small quantity of internal organs were taken back to town. In the first part of the season, walruses were treated in the same manner but as quantities of stored meat increased and distances

travelled for hunting became greater, the hunters became more and more selective in the parts they saved. Hearts, livers and flippers were highly preferred. Skins of lactating females were commonly taken for use as boat skins and for the blubber. Seals and walrus calves were always brought in whole. The skeletal meat of females was taken in greater proportion to that of males.

Although tremendous quantities of walrus meat were brought in during the study period it is obvious from the numbers of animals taken that not all of the usable tissue was salvaged.

Blubber thickness measurements Table (2) were taken as an indicator of general physical condition. Although some individuals were seen to be emaciated, overall the group of animals which were examined appeared to be quite healthy. The number of individuals in poor condition does not seem excessive for a sample of this size. Particularly from a population which is not heavily harvested. Individuals having the least fat reserves were most frequently older animals or ones carrying old bullet wounds, damage from polar bear attack or wounds inflicted by other walrus.

Infection of the tusks and other teeth, sometimes resulting from gunshot wounds, was also related to impoverished fat stores.

The Collection Program

Diomedé hunters were for the most part very cooperative and willing to take part in the collection program. The \$4,063.00 paid for specimens

was a significant addition to the cash flow within the village. This source of income came at a time when other sources were extremely scarce and required outlays for gasoline, oil and hunting supplies were at their peak. It was unfortunate that this year, funds budgeted for purchasing specimens ran out on June 9. During the last two weeks of the study period, specimens could only be obtained by voluntary contributions. The composition of walrus groups which moved past the island later in the season was much different than in those seen early in the spring. The proportion of males being much higher as the migration progressed. In the future the collection budget should be more open ended to sample a broader segment of the population.

Because of the difficulty of travelling to and from the island. The amount of gear carried by the field investigator should be kept at a minimum. If the program is to continue, equipment should be left at Diomedea for the next year.

Conclusion

The walrus study program on Diomedea this spring can be considered to have been a success. Aside from the acquisition of specimen material and harvest information. The contact with subsistence hunters is of value for public relations purposes. Management of marine mammal stocks will be much more effective with the cooperation of the primary users.

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