

NORTHWEST FISHERIES CENTER
PROCESSED REPORT

NATIONAL MARINE FISHERIES SERVICE FIELD STUDIES

RELATING TO THE BOWHEAD WHALE HARVEST

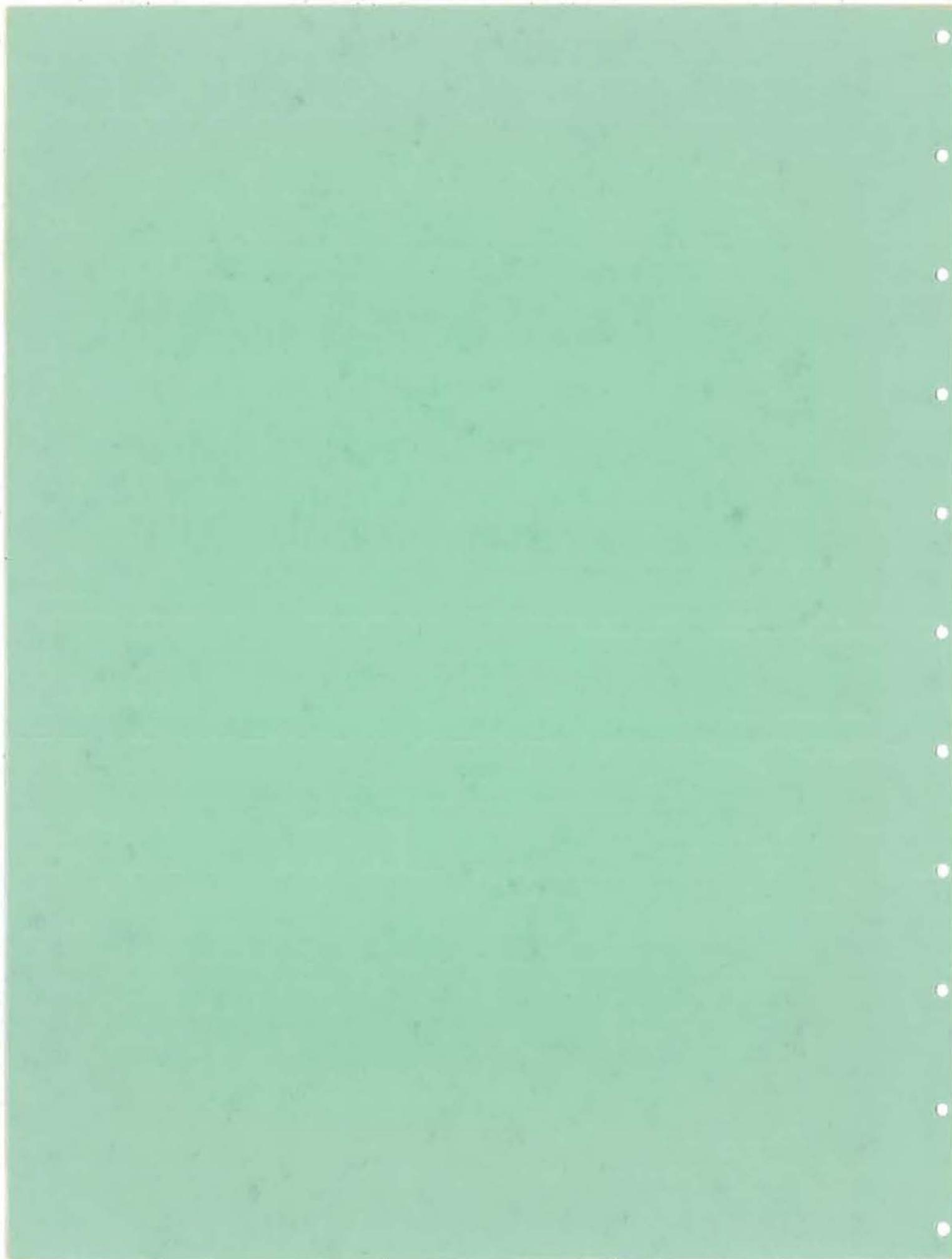
IN ALASKA, 1975

By

Willman M. Marquette

National Marine Fisheries Service
Northwest Fisheries Center
Marine Mammal Division
Naval Support Activity, Bldg. 192
Seattle, Washington 98115

March 1976



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INTRODUCTION

The bowhead whale, Balaena mysticetus, is found in Arctic and northern subarctic waters. Its numbers were greatly reduced over a period of about 300 years, initially in the European Arctic, then in the eastern Canadian Arctic and the Okhotsk Sea. Commercial whaling for bowheads began in the Chukchi and later in the Beaufort Seas during the mid-1800's; the last reported voyage occurred in 1916 (Bower and Aller, 1917) when the steamer Herman and the auxiliary whaling schooner Belvedere sailed north in the spring from San Francisco and Seattle, respectively, returning that autumn with some whale products. Some of the Arctic Alaskan trading companies continued to deal in whalebone for a few more years into the early 1920's. These animals have been completely protected from commercial whaling by the International Convention for the Regulation of Whaling since 1947, and subsequently, by the Marine Mammal Protection Act (MMPA) of 1972 and the Endangered Species Act (ESA) of 1973.

Two sections (Numbers 1 and 3) of the Schedule to the International Whaling Convention of 1946, revised 1975, are applicable to the harvest of bowhead whales by aborigines. Number 1 (1) includes Balaena mysticetus, the bowhead, in the definition of "right whale." Number 3 (b, c) classifies right whales as a Protection Stock which is defined as follows: "A Protection Stock is a stock which is below 10 percent of MSY stock level. There shall be no commercial whaling on species or stocks whilst they are classified as Protection Stocks." Number 3 (7) specifies that "... the taking of gray or right whales by aborigines or a Contracting Government on behalf of aborigines is permitted but only when the meat and products of such whales are to be used exclusively for local consumption by the aborigines." The MMPA (Sec. 101b) provides that any Indian, Aleut, or Eskimo "who dwells on the coast of the North Pacific Ocean or the Arctic Ocean" may take bowhead whales for subsistence or for the purpose of creating authentic articles of handicraft, if not accomplished in a wasteful manner. The ESA (Sec. 10, b, 3e) allows Alaskan Indians, Aleuts, and Eskimos the same privileges as does the MMPA. If, however, the taking of an endangered species affects it "materially and negatively," the ESA allows the Secretary (of Commerce) to prescribe protective regulations for that species.

The first studies on bowhead whales by a member of the staff of the Marine Mammal Division (MMD), then the Marine Mammal Biological Laboratory, were carried out by Dale W. Rice (1974) in 1961 and 1962. In 1973, through a contract with the University of Southern California, the National Marine Fisheries Service (NMFS) through the MMD of the Northwest Fisheries Center (NWFC) supported Dr. Floyd Durham's studies of the bowhead whale, which he had begun in 1961.

The principal objective of the current research is to determine the status of the bowhead whale stock of the Bering, Chukchi, and Beaufort Seas. A biologist and several biological aids were stationed at the two most important whaling villages (Point Hope and Barrow) during the 1974 and 1975 spring whaling seasons. They visited the whaling camps as often as possible and gathered information on the number of bowheads sighted, killed and recovered, and struck but subsequently lost. When a whale was taken, the biologists attempted to obtain measurements, collect specimen material, and take photographs. In addition, they made observations of whaling methods and equipment employed as a first step toward determining if it is possible to reduce the number of whales struck but not recovered.

The biologist and aids participating in the field work in 1975 were: Willman M. Marquette, Fisheries Biologist (Research), National Marine Fisheries Service, Northwest Fisheries Center, Marine Mammal Division; Geoffrey M. Carroll, John R. Patee, and Michael R. Busby, Biological Aids (Fisheries). Carroll, Patee, and Busby are students at the University of Alaska, Fairbanks.

Residents of the two St. Lawrence Island villages (Gambell and Savoonga), Kivalina, Point Hope, Wainwright, and Barrow engaged in spring whaling. Ice conditions east of Barrow do not permit spring whaling by residents of Nuiqsut or Barter Island (Kaktovik), however, these people participate in the autumn hunt as do the Barrow whalers. The locations of Alaskan whaling villages or areas are shown in Figure 1.

SPRING WHALING

Whaling Villages

We collected information at Point Hope and Barrow and indirectly learned of whaling activities at other villages from various sources.

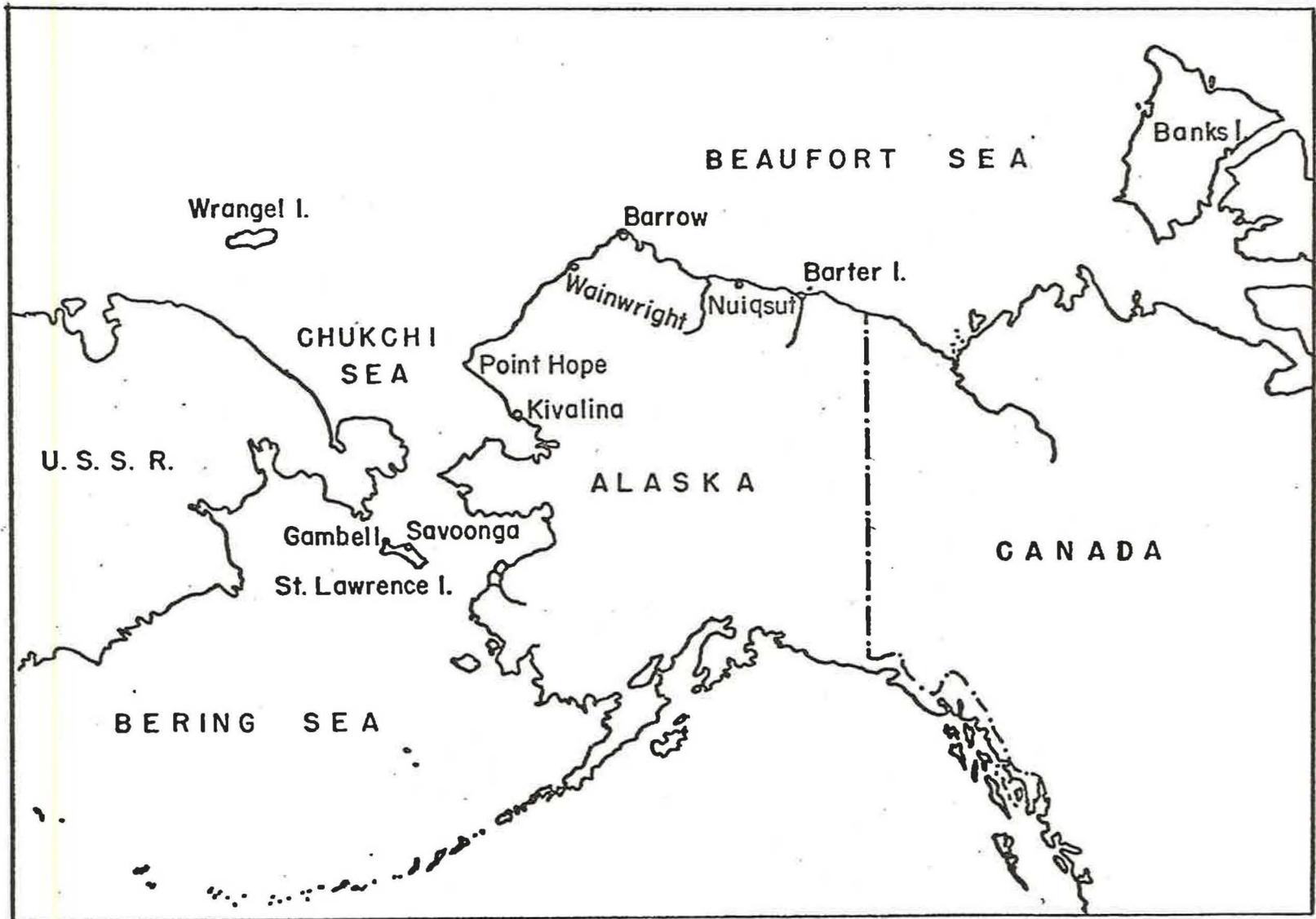


Figure 1.--Map of Bowhead whale study area.

Dr. James A. Estes, U.S. Fish and Wildlife Service, Anchorage; Dr. Francis H. Fay, University of Alaska, Fairbanks; and Mr. Thomas J. Eley, Jr., Alaska Department of Fish and Game, Fairbanks, supplied information from St. Lawrence Island. The Reverend Clinton Swan of Kivalina provided information on whaling at that village.

St. Lawrence Island: The whaling season was begun on St. Lawrence Island about 25 April and ended approximately 30 May. Nineteen crews from Gambell were active in whaling during this period. Two bowheads were killed by Gambell crews. One of these animals was a male 12.8 m (42 feet) in length; the sex of the other whale, which was large, could not be determined because the animal sank and was lost when the harpoon line parted. Whaling effort at Savoonga in 1975 was at least double that of 1974 (when two crews were reported actively whaling). Three additional whales were reported struck but lost off St. Lawrence Island. The bowhead whaling season here ends when conditions become favorable for walrus hunting, and although whaling gear is carried in the boats, few whales are taken at this time. The people of Gambell and Savoonga share their whale catch each year.

Mr. Eley reported that during spring whaling at St. Lawrence Island, 15 bowhead whales were sighted 7 May heading north, a few were seen 9 May, and 1 was reported 24 May about 48 km west of Gambell, also swimming north.

Kivalina: The period of whaling at Kivalina approximated that of Pt. Hope, although the exact dates are not known. Five crews actively whaled at Kivalina during the spring of 1975. Whales were neither taken nor struck.

Point Hope: The whaling season was begun 19 April and ended 1 June when the ice became unsafe. NMFS observers were stationed in the village from 30 April until 3 June to monitor the harvest.

Thirteen whaling crews at Point Hope in 1975 killed four whales (Table 1) and biological information was collected by an NMFS observer from two. Two of the whales were young animals less than 8.5 m (27 feet, 9 inches) in length and two were older animals estimated by the Eskimos to be about 11 m (36 feet) or over in length.

Table 1. --Biological features of bowhead whales taken during spring 1975

Area and date	Length (meters)	Sex	Remarks
<u>St. Lawrence Island-</u>			
<u>Gambell</u>			
7 May	12.8	M	
<u>Point Hope</u>			
24 April	$\frac{1}{1}$ 11.0	-	Ingutuk ^{2/}
26 April	$\frac{1}{1}$ 6.0	-	
10 May	$\frac{1}{1}$ 8.5	F	Ingutuk
15 May	$\frac{1}{-}$ 11.6	M	
<u>Barrow</u>			
5 May	8.0	F	
9 May	6.9	M	
13 May	9.3	F	
14 May	$\frac{1}{1}$ 8.0	-	
15 May	8.5	M	
16 May	16.2	F	
20 May	7.8	F	
21 May	11.1	F	
23 May	7.2	-	
31 May	14.0	M	Stinker ^{3/}

1/ Estimate of length in feet was provided by the Eskimos.

2/ Some whales that are especially fat are designated as Ingutuk by the Eskimos.

3/ See text for description. Shot on 21 May but not recovered until 31 May.

During the 1975 season 132 bowhead whales were sighted at Point Hope (Table 2), 128 by whaling crews or observers on the ice, and 4 from an aircraft that flew over open leads near Cape Lisburne, about 50 miles north of the village. Bowheads taken by the whalers were included in the total and every effort was made to eliminate duplicate reports of sightings. Because other whales may have been seen by crew members and not reported, the 132 sightings represent a minimum number of bowheads seen at Point Hope.

Wainwright: Four whaling crews were active during the spring of 1975 at the village of Wainwright. Whales were not taken, and information was not received on whales that may have been struck but lost. The whaling period at Wainwright approximates that of Barrow.

Barrow: The whaling season was begun 21 April and ended 4 June when the ice became unsafe for travel. Two observers were stationed at the Naval Arctic Research Laboratory (NARL), Barrow, from 22 April to 6 June, except for the period 30 April to 5 May when only one observer was present.

The number of whaling crews actively engaged in whaling varied almost daily, but approximately 30 crews were so occupied at Barrow some time during the season. Ten of eleven whales killed at Barrow during the spring season were recovered, and one was lost when it sank and broke the harpoon line. Some data were obtained on each of the butchered whales (Table 1). Length of the whales taken ranged from 6.0 to 16.2 m (22 feet 8 inches to 53 feet 2 inches). The last whale recovered at Barrow had been struck with a lance-bomb 21 May but it escaped and died and was recovered 31 May. Whales taken several days after death are called stinkers. The muktuk (skin and blubber), flukes, and baleen of a stinker can be salvaged but the remainder is discarded. Usually the crew that killed a stinker is identified by marks on the harpoon or bomb particles embedded in the whale and the crew that recovers the animal shares the carcass with the crew that killed it. Otherwise, a stinker belongs to the crew that recovered it.

Whaling Methods

The method presently used by Alaskan Eskimos to take whales has evolved from ancestral methods and the adoption of commercial whaling gear and methods introduced by Yankee whalers in the last century. VanStone (1958) has described the era of commercial bowhead whaling in Alaskan waters. The most recent description of the development of current Eskimo whaling methods is that of Durham (1974).

Table 2. --Sightings of bowhead whales, spring 1975

Date	Location	
	Point Hope	Barrow
April		
20-26	27	11
27	0	0
28	0	0
29	0	0
30	4	0
May		
1	0	0
2	2	0
3	0	0
4	0	0
5	0	3
6	1	1
7	0	15
8	0	0
9	7	3
10	22	1
11	1	0
12	0	0
13	0	3
14	18	1
15	2	6
16	12	6
17	15	0
18	3	3
19	2	0
20	1	1
21	0	3
22	0	0
23	0	6
24	4	0
25	1	0
26	5	0
27	$\frac{1}{1}$	0
28	$\frac{1}{3}$	0
29	0	0
30	0	0
31	1	0
Total	132	63

1 / Two separate sightings, a pair (large whale with calf) and a single large whale.

VanStone (1962) describes the traditional method of marking and cutting shares from a whale carcass at Point Hope, which, with some modification, is still in use there. A similar though much simplified method of marking and cutting shares from whales is used at Barrow. The three papers cited above provide background material on Alaskan bowhead whaling and the methods used to capture and cut up whales.

A detailed description of the whaling crews, whaling methods, and equipment employed in the fishery was presented in the report of the bowhead harvest in 1974 (Fiscus and Marquette, 1975^{1/}). Details on umiaks (skin boats) in use at Point Hope are given in Table 3. These boats averaged 6.9 m in length and 1.6 m in width (22 feet 6 inches by 5 feet 4 inches). Umiaks measured at Barrow in 1974 averaged 7 m in length and 1.7 m in width (23 feet by 5 feet 7 inches). Two of the skin boats used in 1975 at Point Hope were newly constructed and measured 6.4 and 6.8 m (20 feet 11 inches and 22 feet 4 inches) in length and 1.5 and 1.6 m (4 feet 10 inches and 5 feet 2 inches) in width. Some of the whaling captains stated that as the umiaks age they widen at the gunwales amidships. Whaling gear for the 13 crews at Point Hope is listed in Table 4.

At Point Hope only two individuals own heavy blocks and tackle capable of hauling whales out of the water onto the ice for butchering. Each set of this gear is valued at about \$1,000. When this equipment is used to remove a whale from the water, the owner is entitled to a share of that animal. At least two individuals own blocks and tackle at Barrow.

The fact that a whale is struck and lost does not necessarily mean that it later dies. Some whales harpooned with the darting gun escape when the line breaks, and others hit with a missile from the shoulder gun escape if the bomb fails to explode. An unknown number of these animals may later die and some may recover. We have endeavored to collect data on all whales taken and on those struck but lost in an effort to obtain information related to mortality occurring as a result of the Eskimo harvest.

Several factors contribute to the problem of striking a whale and failure to recover it. In this respect, the effect of equipment used by the Eskimos to take whales was presented in the report for 1974.

^{1/} Fiscus, Clifford H., and Willman M. Marquette. 1975. National Marine Fisheries Service field studies relating to the bowhead whale harvest in Alaska, 1974. Nat. Mar. Fish. Serv., Northwest Fish. Cen., Seattle, Wash. Processed, 23 p.

Table 3. --Measurements of boats used by whaling crews
at Point Hope, Alaska, spring 1975

Length (M)	Width (M)	Remarks
7.20	1.56	Umiak
6.37	1.48	Umiak, new
7.20	1.75	Umiak
6.10	1.73	Umiak
4.90	1.61	Aluminum
6.80	1.57	Umiak, new
7.00	1.63	Umiak
7.39	1.68	Umiak
6.90	1.52	Umiak
6.95	1.65	Umiak
6.71	1.52	Umiak
7.35	1.63	Umiak
6.45	1.68	Umiak

Table 4. --Type of equipment used by whaling crews at Point Hope, spring 1975. Each horizontal line refers to the equipment of one crew.

	Boats		Outboard motor	Shoulder gun	Darting gun		Floats			Crossbow	Harpoon
	Umiak	Metal			With harpoon	Without harpoon	Large plastic	Small plastic	Sealskin		
	1	-	-	2	1	-	1	1	-	-	-
	1	-	-	-	1	1	1	1	-	-	-
	1	-	1	2	1	-	1	1	1	-	-
	1	-	1	2	1	-	1	1	-	-	-
	-	1	-	-	1	1	1	1	-	-	-
	1	-	-	-	1	<u>1/1</u>	1	1	1	-	-
	1	-	-	<u>2/2</u>	1	2	1	1	-	1	-
	1	-	1	2	1	1	1	1	-	-	1
	1	-	-	1	1	1	1	1	-	-	-
	1	-	-	1	1	-	1	1	-	-	-
	1	-	1	-	1	1	1	1	-	-	-
	1	-	-	1	1	1	1	1	-	-	-
	1	-	1	-	1	1	1	1	1	-	-
Total	12	1	5	13	13	10	13	13	3	1	1

1/ Lost overboard from umiak at beginning of season.

2/ Both lost through young ice at beginning of season.

Another factor contributing to the struck but lost problem is increasing numbers of whalers. During the past few years, an increasing number of men have become financially able to purchase whaling gear, a factor that can be expected to cause an increase in the number of whales struck and lost.

Fewer whales were reported struck and lost at Barrow than at Point Hope in 1975. One of eleven bowheads killed by Barrow crews sank and could not be recovered. An incomplete count indicated a minimum of 10 animals struck and lost. Point Hope crews killed 4 whales and struck but lost 13. The Point Hope data are considered reasonably complete, whereas that for Barrow is incomplete.

Whaling Effort

The number of crews engaged in bowhead whaling increased in 1975 compared to those that were active in 1974. The number of crews increased from 10 to 13 at Point Hope, and from 21 to 30 at Barrow. Our observations at Barrow have shown that although a large number of crews may be outfitted with whaling gear, the number that actively engage in whaling throughout the season is significantly smaller. Reports received from scientists who visited St. Lawrence Island indicate that 8 crews were observed whaling there in 1974 compared to 23 crews in 1975. The information on whaling activities in 1974, however, was obtained after the season had ended and may not be as complete as the data obtained throughout most of the season in 1975. Further study is needed, therefore, before any trend in the whaling activity off St. Lawrence Island can be established.

The number of crews hunting at the lead varied during the season. In an attempt to evaluate hunting effort, we maintained a record of crew activities throughout the season (Tables 5 and 6). In 1975, Point Hope crews were at the lead 27 days (81.8% of the time) from 30 April to 1 June. At Barrow, crews were at the lead 37 days (86.0% of the time) from 22 April to 3 June. Whalers return to shore or to fast ice when leads close or the ice becomes unsafe.

Although the number of crews engaged in whaling in the spring of 1975 at Barrow was large, the number that actively engaged in whaling at every opportunity throughout the season averaged close to 14. A daily count of active crews was not obtained because their camps were scattered along some 25 miles of lead and not all could be reached during a single day. The whaling season lasted about a month and a half at Point Hope and Barrow with the most productive **hunting** occurring during May.

Table 5. --Whaling effort at Point Hope, Alaska, spring 1975

Date	Number of crews on lead	Remarks
April		
30	5	Lead open, strong north wind, water rough.
May		
1	2	Lead open, all crews went out in evening when wind subsided.
2	13	Lead open and very wide.
3	9	Lead open but all crews went ashore at end of day as wind continued strong, ice not safe.
4	0	Lead open, miles wide, windy but too rough to whale.
5	8	Lead open, crews began going out at noon, at 1800 hours eight crews were out.
6	5	Lead closing, south wind.
7	8	Lead closed.
8	11	Lead closed.
9	11	Lead opening on west end.
10	11	Lead open, getting wide.
11	13	Lead open.
12	13	Lead closed at noon by current.
13	11	Lead open.
14	13	Lead open.
15	7	Lead open, but windy and rough.
16	6	Lead open, but windy and rough.
17	4	Lead open, windy and rough.
18	2	Lead open, windy and rough.
19	2	Lead closed.
20	12	Lead open.
21	13	Lead open, 3 crews off ice at evening.
22	12	Lead open, 1 crew went out in morning, 2 in afternoon.
23	0	Lead began closing 0800 hours, closed by noon.
24	0	Lead closed.
25	7	Lead opening on west end.
26	12	Lead open, one crew off ice in evening.
27	12	Lead open, two crews off ice in afternoon.
28	0	Lead open but ice dangerous because of current.
29	0	Lead open, ice dangerous.
30	2	Lead open, ice dangerous.
31	5	Lead open, 2 crews out in morning, one out at 1600 hours, 2 out at 1900 hours.
June		
1	0	Lead open but ice dangerous, 3 crews off ice at noon, 2 off at 1700 hours, season has ended.

Table 6. --Whaling effort and weather data at Barrow, Alaska, spring 1975

Date	Number of crews on lead	Average temperature (F°)	Average wind velocity (Mph)	Wind direction (degrees)
April				
22	2	12	10.0	280
23	4	5	13.0	270
24	5	-5	9.0	220
25	5	-3	17.0	050
26	15	5	17.0	010
27	15	7	10.0	330
28	6	7	6.0	150
29	3	4	10.0	230
30	$\frac{1}{0}$	-1	10.0	230
May				
1	$\frac{1}{0}$	6	11.4	050
2	19	9	12.4	070
3	21	15	13.6	070
4	21	21	12.9	070
5	21	21	10.0	190
6	22	17	5.5	190
7	23	15	6.6	070
8	20	23	-	130
9	21	22	8.3	070
10	21	24	14.9	070
11	$\frac{1}{0}$	27	22.1	060
12	$\frac{2}{4}$	16	18.9	080
13	18	15	18.0	080
14	19	17	13.4	090
15	20	14	10.2	040
16	17	20	10.3	300
17	12	15	5.6	340
18	17	18	5.7	040
19	17	19	-	270
20	17	16	10.2	100
21	17	17	10.5	080
22	17	16	6.1	060
23	17	15	8.4	110
24	$\frac{3}{12}$	15	11.6	120

See end of table for footnotes.

Table 6. --Whaling effort and weather data at Barrow, Alaska,
spring 1975--Continued

Date	Number of crews on lead	Average temperature (F °)	Average wind velocity (Mph)	Wind direction (degrees)
May				
25	15	19	6.2	080
26	0	20	17.8	070
27	0	-	-	-
28	5	-	-	-
29	11	-	-	-
30	10	-	-	-
31	10	-	-	-
June				
1	7	--	-	-
2	0	-	-	-
3	<u>4</u> /3	-	-	-
4	0	-	-	-
5	0	-	-	-
6	0	-	-	-

1/ Lead closed.

2/ Strong winds, crews moved back to safe ice.

3/ Lead partly closed.

4/ Crews out in the morning, back off ice in evening.

Utilization

The whales were pulled from the water when possible by means of blocks and tackle and then butchered. Thin ice required partial butchering of the animal before it could be hauled from the water, a situation that greatly increased the time spent on this aspect of whaling. Accordingly, the butchering process required from as few as 3 to as many as 30 hours. Parts removed from the animal were taken ashore as soon as possible to prevent their loss when the ice shifted.

Most meat and muktuk (skin and blubber) were removed from the butchering site immediately after the whale was cut up. Occasionally, however, several days elapsed before all parties hauled off their shares. Remains of the backbone, some ribs and internal organs, and the skull (at Barrow) were generally left on the site. Usually, fewer parts of the whale were left on the ice at Point Hope than at Barrow. At Point Hope, the skull was returned to the sea after the tympanic bullae and lower jawbones were removed, and the latter taken to the village for use during the spring whale feast. At Barrow, the skull (tympanic bullae removed), including jawbones, was usually left at the butchering site. At some butchering sites, mostly at Barrow, blubber was left on the ice. Before the snowmobile era, surplus blubber was used for dog feed. The Eskimo utilizes the meat, muktuk, baleen, gum tissue (mamaak), flukes, flippers, brains, tongue, intestines, heart, kidneys, epithelium of the liver, and the tympanic bullae. A report on utilization of the bowhead whale is appended to this report.

Migration

The Eskimos of Point Hope and Barrow recognize three distinct runs of whales past their villages. Whales making up the first two runs are usually small animals of both sexes, and many of them are the size that Durham^{2/} would call yearlings. Durham reports that yearling bowhead whales range in length from 6.7 to 7.9 m (22 to 26 feet).

^{2/} Durham, Floyd E. 1972. Biology of the bowhead whale (Balaena mysticetus L.) in the western Arctic. University of Southern California, Los Angeles, California. Unpublished manuscript.



An 11.1 m (36.5 ft) whale pulled up on the ice where butchering has just begun.



Butchering of the whale has almost been completed. All portions of the whale are divided up among the crews that assisted in taking it, including the baleen that the workmen are beginning to cut from the upper jaw.

A seal-skin covered whaling boat (Umiak) is being transported back from the edge of the lead because of incoming ice.



Whales making up the third run include large males and females with calves. According to Durham^{3/} as many as four runs (or waves) of bowheads occur; the first run passes Point Hope in early April and Barrow in late April, which in some years may pass unnoticed due to ice conditions that prevent the whalers from going out; two runs pass Barrow in May; and the 4th run, which includes large males and females with calves, passes Barrow in early June.

Three distinct runs of the bowhead occurred at Point Hope in the spring of 1974. In 1975, only two runs were noted, probably because during late May several open leads existed far offshore from Point Hope, within which the whales may have traveled instead of migrating through the near-shore lead. The first run occurred 20-30 April and the second 10-17 May. Two distinct runs were all that were observed at Barrow this spring, but as at Point Hope additional runs could have moved through large open leads far offshore.

The above data are weak and more information must be gathered on migration waves before definite conclusions can be drawn. Certainly, the bowhead is dependent on leads or recently fractured ice containing thin spots through which it can surface for air. Leads far offshore obviously allow whales to migrate unobserved.

Many species of marine mammals migrate in series of waves from wintering to summering grounds. Rice and Wolman (1971) describe the seasonal migratory cycle of the gray whale, Eschrichtius robustus, which exhibits temporal segregation by age, sex, and reproductive status. Similar segregation has been reported among humpback whales, Megaptera novaeangliae, by Dawbin (1966).

Other Mammals and Birds

In addition to bowhead whales the following species of mammals were observed or reported in 1975 at Point Hope during the spring whaling season:

^{3/} Durham, Floyd E. 1973. Census and spring migration studies on the bowhead whale in the western Arctic in 1973. National Marine Fisheries Service, Seattle, Washington 98115. Unpublished manuscript.

Belukha	<u>Delphinapterus leucas</u>
Bearded seal	<u>Erignathus barbatus</u>
Polar bear	<u>Ursus maritimus</u>
Ringed seal	<u>Phoca hispida</u>
Walrus	<u>Odobenus rosmarus</u>
Wolverine	<u>Gulo luscus</u>

Although belukha were occasionally observed from 30 April to 1 June, three noticeable waves of these animals migrated past Point Hope whaling camps--the first prior to 30 April, the second 10-15 May, and a third from 22 to 26 May. Belukha sighted and taken at Point Hope are given in Table 7. The Eskimos at Point Hope did not actively pursue belukha during the bowhead whaling season because they sink quickly and require considerable effort to recover, although they are prized for food. A belukha harvest at this time is incidental to the bowhead whale fishery. Rifles are normally used to kill the animals. It is difficult to obtain data on the belukha because these animals are butchered immediately after they are killed, a process that requires but a few minutes to complete after the animal is hauled onto the ice. Crew members at times eat some of the meat at the whaling camp, but usually take their shares directly home. Measurements were obtained of a lactating female killed 27 May, but her calf was not taken. The technique used to butcher these animals at Point Hope is illustrated in the accompanying photograph.

Other species killed at the Point Hope lead during the spring whaling season were 17 ringed seals (including 2 juveniles), 1 walrus, 3 polar bears, and 2 wolverines (Table 8). In addition, one ringed seal and two bearded seals were sighted.

Eider ducks, initially the King Eider, Somateria spectabilis, and later the Pacific Eider, S. molissima v-nigra, began to pass up the lead in considerable numbers beginning about 8 May and were regularly taken at the camps, especially when the lead was closed or strong winds made whaling impractical.

Other species of mammals killed at Barrow included 17 ringed seals and 1 polar bear. In addition, sightings of 10 ringed seals were recorded. Reports were not received of belukha or walrus being seen or taken during our stay at Barrow.

King and Pacific Eider ducks are abundant at Barrow and are taken in numbers throughout their migratory period by the whalers.

The belukha, or white whale, accompany bowhead on their spring migration and are frequently taken by the Eskimos. Three belukha have suddenly surfaced in front of a whaling crew.



A whaling crew towing a dead belukha to their camp site where it will be butchered.

As soon as the belukha has been pulled up on the ice, it is butchered and divided among the members of the whaling crew.



Table 7. --Belukha taken and sighted at Point Hope, Alaska,
spring 1975

Date	Number sighted	Number taken	Remarks
Prior to 30 April	1	1	
30 April	100	0	Observed from aircraft over leads off Cape Lisburne.
Prior to 2 May	<u>1</u> /1	0	
May			
2	7	7	One was female with fetus.
10	25	0	
13	30	0	
14	20	0	
15	11	0	
22	15	0	
23	12	0	
26	15	2	
27	7	3	A 3.15 m female was taken, but not calf with it.
Total	244	13	

1/ All following observations made from ice edge of lead.

Table 8. --Mammal species other than whales taken or observed
at Point Hope, Alaska, spring 1975

Species	Date	Number sighted	Number taken	Remarks
Ringed seal	2 May	1	1	
	Prior to 8 May	2	2	
	8 May	1	1	
	16 May	1	1	
	19 May	1	1	Male, 129 cm.
	19 May	2	2	
	19 May	1	0	
	20 May	2	2	
	21 May	2	2	
	25 May	1	1	Male, 104 cm.
	28 May	1	1	
	28 May	1	1	Juvenile
	28 May	1	1	Juvenile
	28 May	1	1	Male, 98 cm.
Bearded seal	13 May	1	0	
	19 May	1	0	
Walrus	20-26 April	1	1	Large bull
Polar bear	20-26 April	1	1	
	20-26 April	1	1	
	6 May	1	1	
Wolverine	20-26 April	1	1	
	6 May	1	1	

AUTUMN WHALING

Only one crew actively whaled at Barrow in the autumn. A camp was maintained at Point Barrow from 17 to 25 September. Whaling during most of this period was impossible because of severe ice conditions. The crew sighted one bowhead 17 September and killed a 2-year-old polar bear ^{4/} 25 September.

Two crews whaled at Kaktovik, Barter Island, but whales were not taken. One small bowhead was seen at the beginning of the season, which began about 7 September.

One crew from Nuiqsut was reported to be whaling, but whales were not sighted.

SUMMARY

The number of bowheads taken, known killed but lost, and known struck but lost in 1975 were:

<u>Location</u>	<u>Season</u>	<u>Bowheads butchered</u>	<u>Killed but lost</u>	<u>Struck but lost</u>
Gambell	Spring	1	1	3
Savoonga	Spring	0	0	0
Kivalina	Spring	0	0	0
Point Hope	Spring	4	0	13
Wainwright	Spring	-	-	-
Barrow	Spring	10	1	10
Barrow	Autumn	0	0	0
Nuiqsut	Autumn	0	0	0
Kaktovik	Autumn	0	0	0
Total		15	2	26

^{4/} Harry Reynolds, Alaska Department of Fish and Game, Barrow, determined the age of the polar bear.

ACKNOWLEDGMENTS

The support of the Naval Arctic Research Laboratory, Barrow, Alaska, is gratefully acknowledged. The use of the NARL cabin at Point Hope and logistic support made it possible for us to observe and collect information on whaling in that area. The use of NARL facilities and the expertise of the staff at Barrow were essential for our studies there. Mr. Clifford H. Fiscus supervised the project and reviewed the manuscript.

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APPENDIX I

UTILIZATION OF THE BOWHEAD WHALE

By

Geoffry M. Carroll

INTRODUCTION

The hunting of bowhead whales has been a very important part of Eskimo life since before 1800 B. C. (Oswalt, 1967, p. 43). Prior to the introduction of manufactured products to these people by commercial whalers and traders, the entire whale was used in one form or another to make tools, weapons, homes, and toys. With the passage of time, however, whale products have gradually been replaced by manufactured goods. This paper describes how the use of various whale parts has changed through the years.

Food

The most important parts of the whale have always been the meat and muktuk (layer of blubber with skin attached). Together, the meat and muktuk provide a large percentage of the food supply for the Eskimos of several whaling villages during a successful whaling year. The meat is a major source of protein and B vitamins, and the muktuk provides vitamins D and A and calories which are needed in large quantities to stay warm in the arctic (Davidson, 1972, p. 11-12). Both parts are eaten raw, frozen, boiled, or fried. The meat is sometimes made into "mekiqag" by placing it in a warm place and slow-cooking it in its own juices for a few weeks (Anonymous, 1967, p. 6, col. 2). This product is always served at whaling celebrations. Whale meat and muktuk are used in trading and are highly prized by Eskimos all over northern Alaska and Canada (Anonymous, 1967, p. 4, col. 3). An estimated 10,000 Eskimos and Indians outside the whaling communities supplement their diet with whale meat (Davidson, 1972, p. 13).

Other edible parts of the bowhead are the liver, brain, heart, and kidney. The small intestine is turned inside out, cleaned and eaten during the spring whaling celebration, the white gum material from around the base of the baleen is eaten raw, and clumps of blood from around the heart are sometimes consumed, but usually fed to the dogs (Robert Brower, pers. comm.).

Less desirable whale parts were once a very important source of dog food. Each animal consumed about 800 pounds of meat annually (Foote, 1965, p. 4), so a great deal of hunting effort was required to maintain a team of sled dogs. A successful whaling season solved the problem for most of the year, but because snow machines have largely replaced the dog teams, much less meat and blubber are now used for animal food.

Heat and Light

Blubber has been traditionally rendered into oil through autolysis, by cutting it into small pieces, scoring it with a knife, and putting it into barrels (Davidson, 1972, p. 13). The oil was used mostly as a fuel in soapstone and sandstone lamps with sphagnum moss wicks to heat and light igloos (Murdoch, 1885, p. 62). It was also used as a dip for foods (Nelson, 1889, p. 73), cooking oil (Anonymous, 1968, p. 5, col. 1) and, when mixed with red ochre, as a dye (Oswalt, 1967, p. 173). Because of its value as a fuel, whale and seal oil were also used by coastal Eskimos to barter with inland people for caribou and wolverine skins (Oswalt, 1967, p. 132).

Commercial Products

During the commercial whaling period, blubber was rendered into oil by heating and sold for use in lamps, for tanning leather and preparing wool cloth, and for manufacturing soap, candles, paints, varnishes, and lubrication oils (VanStone, 1958, p. 1; 1962, p. 21). One large bowhead yields up to 275 barrels of oil (Scammon, 1874).

Baleen has lost its importance as a raw material for the making of practical items (it is used in artwork), but its qualities of flexibility and formability once allowed it to be used in an almost endless variety of ways.

During the period of commercial whaling, the taking of baleen to be processed into corset stays, buttons, parasols, umbrellas, women's hats, upholstery, frameworks for trunks and suitcases, fishing rods, buggy whips, and carriage wheels and springs was a profitable business (VanStone, 1958, p. 1). Each whale contained several hundred pounds of baleen which sold for \$2 per pound in 1880 and \$4.90 per pound in 1905, making a large whale worth up to \$10,000. Values such as these led to an increase in the number of whalers and a corresponding reduction in the number of whales. In 1885, 441,400 pounds of baleen from the

Arctic were marketed and in 1887 and 1889, 561, 694 and 219, 400 pounds, respectively, were sold. By 1905, only 38, 200 pounds were taken despite a price of nearly \$5 per pound (VanStone, 1962, p. 24). Baleen was replaced by other products shortly thereafter and the market eliminated.

Eskimo Implements

The Eskimos cut baleen into strips, then braided and tied them into lines (Murdoch, 1885, p. 76) which remained strong through prolonged use in saltwater (Davidson, 1972, p. 15). Because of this strength, baleen was a good material for fishlines (Oswalt, 1967, p. 124) and boat and sled lashings (Ray, 1885, p. 27). Baleen strips were also woven around the prongs of a caribou antler to make a scoop for removing ice from ice fishing holes (Murdoch, 1885, p. 79). Baleen lines were used to make gill nets for catching whitefish (Oswalt, 1967, p. 27), to tie sinkers onto the nets (NARL Museum Display), to hold the mouth of dip nets open (Nelson, 1969, p. 148), and as a mesh and support for crab traps (Oswalt, 1967, p. 140).

Baleen was also used to make containers. Cups, dishes, and dippers were made by bending baleen around a wooden base, and buckets were made by sewing overlapped pieces of baleen together to make the sides (Murdoch, 1885, p. 62).

Walking sticks had baskets like those on ski poles which were made of strips of baleen wrapped so as to form a circle (NARL Museum Display). Sleds, made by sewing several pieces of baleen together side by side, were easily carried while hunting and were used to drag seals or materials back to the village (Bandi, 1969, p. 11). Sleds of this type are still used on St. Lawrence Island.

Baleen had many practical uses such as knife blades for cutting blubber (Murdoch, 1885, p. 67), rivets in many implements such as shovels, knives, picks, and harpoons (Murdoch, 1885, p. 67), and as insoles in shoes (Oswalt, 1967, p. 140). Strips of baleen were also used to hold lids on boxes (Murdoch, 1885, p. 67), and windows were made of the translucent membrane of seal entrail stretched by a piece of baleen (Murdoch, 1885, p. 67).

Whalebone was also used extensively because it was strong and easily workable (Oswalt, 1967, p. 152). The ribs of young whales, particularly ingutuks, made good, versatile sled runners because of their hardness and lack of pitting peculiar to the ribs of older whales.

Sled runners made of whale ribs slid easily over tundra, ice, or snow (Sonnenfeld, 1956, p. 489). Jawbones have been used as sled runners (Ray, 1885, p. 27) and also as umiak keels to prevent wear while these boats are being dragged over the ice during spring whaling (Sonnenfeld, 1956, p. 489). The jaw bones and ribs were used as frames in building sod igloos (Sonnenfeld, 1956, p. 489).

Whalebones were used in making the heads of mauls, handles for knives, the foreshafts of darts thrown with a darting board, the handles and blades of an adze, the blade of flint flakers, shafts of flensing knives, sinew shuttles, weaving tools, needle cases, pipe bowls, water ladles, braces to protect the arm from the snap of a bow string, and net weights.

Hand clubs were made from a short blunt piece of bone, and a piece of whale rib lashed to a shaft made a mattock. The handle and blade of an adze could be made from whalebone, and the scapula or shoulder blade was used to make snow shovels (Murdoch, 1885, p. 79). Harpoon heads were sometimes made from whalebones (Larsen and Rainey, 1940, p. 69). In Point Hope, jawbones were used to support burial scaffolds (Davidson, 1972, p. 16), and to form a palisade around the cemetery.

Animal Traps and Spears

The flexibility of baleen was a quality useful for taking wolves and bears. Spring-baits were made by sharpening both ends of a 6-inch piece of baleen, wetting it, then tying it folded into lengths of 1-1/2 to 2 inches until it dried. The baleen was then placed inside a piece of fish skin or blubber and after an animal had ingested it the moisture and body heat caused the folded baleen to straighten and pierce the stomach wall (Murdoch, 1885, p. 77).

Nooses made of baleen were used to trap ground squirrels as they passed through their tunnels (Nelson, 1889, p. 118) and also birds when they returned to their nests (Murdoch, 1885, p. 77).

Fox traps were made by placing pieces of baleen over holes in the ice or snow and covering them with snow. Bait was placed on one side and a drift fence constructed so that the fox had to pass over the trap. In doing so, the fox fell through and was impaled on caribou antlers that had been placed in the bottom of the hole. In another version of this trap, strips of baleen were placed on the ice with their ends radiating inward to cover a large hole. When the fox fell through, the baleen snapped back into position and the trap was automatically readied for another animal (Nelson, 1969, p. 182).

Baleen prongs with spurs on them were attached to the tips of fish spears so that when the sharp middle prong entered the fish, the flexible baleen pieces slid by, and the spurs became extended and kept the fish from sliding off (Murdoch, 1885, p. 67). Bow shafts were sometimes made with baleen (Bandi, 1969, p. 11).

Toys

Many toys were made from baleen because of its flexibility. A marionette made from a fox skin supported by a piece of baleen down the back was worked with strings so that it would dart its head at a toy leming (Murdoch, 1885, p. 67). Baleen was also used to make a doll's arms so that when pushed, this toy would beat a drum or paddle a canoe (Murdoch, 1885, p. 67). In addition, baleen was used to make a device used by boys to snap pebbles at targets and to sew liver membrane onto drums (Murdoch, 1885, p. 67).

Arts and Crafts

Baleen is now used almost exclusively in arts and crafts. Bracelets, baskets, miniature boots, sleds, and baleen etchings are most frequently made. Baleen is also used as inlay material in ivory, whalebone, and driftwood art objects (Davidson, 1972, p. 16). The price of these items is rising rapidly. In 1974, a 5-inch high baleen basket with an ivory carving attached sold for \$80 to \$120 and, in 1975, \$150 to \$200.

Whalebone is now used in making such art objects as bears, birds, whales, and seals, and artifacts are often reproduced from this material.

Summary

The bowhead whales' value as food has not changed, even though a wide variety of domestic meat is now available to the Eskimo. As manufactured goods, more convenient to use, have become increasingly abundant in the Arctic, however, traditional uses of the bowhead whale have disappeared. Bone has been replaced by metals and baleen by rope and plastics. Driftwood, petroleum products, electricity, and (at Barrow) natural gas have replaced whale oil as heating fuels. Blubber is occasionally burned in camp stoves and ceremonial fires (Ed Wightman, pers. comm.), and, is still used in whaling tent fires at Point Hope. In 1950, the people of Point Hope sent 40 drums of whale oil to Seattle in an attempt to develop a market for the product, but to no avail (VanStone, 1962, p. 144).

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NOT FOR PUBLICATION

SUPPLEMENT

TO

NATIONAL MARINE FISHERIES SERVICE FIELD STUDIES

RELATING TO THE BOWHEAD WHALE HARVEST

IN ALASKA, 1975

By

Willman M. Marquette

Note: Information in this supplement is subject to restricted distribution and is not to be published.

Bowhead Whale Itinerary, Spring 1975

- 22 April G. Carroll and J. R. Patee departed Fairbanks for Barrow.
- 25 April W. Marquette departed Seattle for Fairbanks.
M. Busby E. O. D. Fairbanks.
- 26 April Busby and Marquette departed Fairbanks for Barrow.
- 30 April Busby, Carroll, Marquette, and Patee departed Barrow for Point Hope on NARL R4D aircraft. Patee returned to Barrow with aircraft.
- 3 May Carroll departed Point Hope on Wien Airline for Anchorage to await morning flight to Barrow.
- 4 May Carroll departed Anchorage for Barrow, but plane was unable to land and returned to overnight at Fairbanks.
- 5 May Carroll departed Fairbanks for Barrow.
- 3 June Busby and Marquette departed Point Hope on NARL R4D aircraft for Barrow.
- 6 June Busby departed Barrow for Fairbanks and terminated C. O. B.
Marquette departed Barrow for Seattle.
- 7 June Carroll and Patee departed Barrow for Fairbanks.

Table S-1. --List of whaling captains who had crews engaged in spring whaling, 1975

St. Lawrence Island (Gambell)

1.	Aningayou, Stephen	11.
2.	Iyakitan, Daniel	12.
3.	Kaningok, Willard	13.
4.	Oozeve, Alex	14.
5.	Slwooko, Vernon	15.
6.	Ungott, Donald	16.
7.		17.
8.		18.
9.		19.
10.		

St. Lawrence Island (Savoonga)

1.		3.
2.		4.

Kivalina

1.	Hawley, Ray	4.	Swan, Milton
2.	Knox, Oran	5.	Swan, Oscar
3.	Swan, Clinton		

Point Hope

1.	Attungana, Elijah	8.	Lane, Amos
2.	Attungana, Henry	9.	Nashookpuk, Henry
3.	Frankson, Darold	10.	Rock, Elijah
4.	Frankson, Joe	11.	Tingnook, John
5.	Hank, Nicholas	12.	Towksjhea, Joe
6.	Koonuk, Herbert	13.	Tuzroyluke, Seymour
7.	Koonook, Luke		

Wainwright

1.		3.
2.		4.

Barrow

1.	Adams, Whitlam	7.	Brower, Arnold, Sr.
2.	Ahmaokak, Lawrence	8.	Brower, David
3.	Ahsogeak, Horace	9.	Brower, Harry
4.	Ahvakana, Nelson	10.	Brower, Robert, Jr.
5.	Aiken, Robert	11.	Brower, Thomas
6.	Aveoganna, Ralph	12.	Hopson, Alfred, Jr.

Table S-1. --List of whaling captains who had crews engaged in
spring whaling, 1975--Continued

Barrow	
13. Itta, Ben	22. Okakok, Bert
14. Kalayuak, Raymond	23. Oyagak, Roxy
15. Kaleak, William	24. Panigeo, Bert
16. Leavitt, Alfred	25. Panigeo, Joseph
17. Leavitt, Daniel	26. Panigeo, Wyman
18. Leavitt, Luther	27. Panningona, Thomas
19. Matumeak, James	28. Patkotak, Simeon
20. Neakok, Nate	29. Soloman, Merle
21. Nusunginya, Percy	30. Tukle, Joash

Table S-2. --Reports from various sources on the numbers of bowhead whales taken, known killed but lost, and known struck but lost on St. Lawrence Island in 1975.

Source	Date	Crew	Killed and butchered	Killed But lost	Struck but lost
GAMBELL					
Slwookoo, Grace (1)	23 April	Kaningok, Willard	-	-	1
	23 April	Oozeve, Alex	-	-	1
	23 April	Iyakitan, Daniel	-	1	-
Eley, Thomas J., Jr. (2)	7 May	Ungott, Donald	1	-	-
Fay, Francis H. (3)	23 April	-----	-	1	-
	7 May	-----	1	-	-
Alaska Magazine (4)		Ungott, Donald	1	-	-
Estes, James A. (5)	7 May	-----	1	1	-
SAVOONGA					
Estes, James A. (5)	---	-----	-	-	3
Fay, Francis H. (3)	---	-----	-	0	0

1. Correspondent, Tundra Times, 7 May, 1975, page 9.
2. Alaska Department of Fish and Game, Fairbanks, Personal Communication, 24 September 1975.
3. Institute of Marine Science, University of Alaska, Fairbanks, Pers. Comm., 21 October 1975.
4. September 1975, page 21.
5. U. S. Fish and Wildlife Service, Div. Coop. Res., Anchorage, Pers. Comm., 23 May 1975.

Table S-3. --Bowhead whales taken during spring 1975

Date	Captain	Length (M.)	Sex	Remarks
St. Lawrence Island (Gambell)				
7 May	Ungott, Donald	12.8	M	
Point Hope				
24 April	Koonuk, Herbert	$\frac{1}{11.0}$	--	Ingutuk ^{2/}
26 April	Tuzroyluke, Seymour	$\frac{1}{6.0}$	--	
10 May	Tuzroyluke, Seymour	8.5	F	Ingutuk
15 May	Frankson, Joe	$\frac{1}{11.6}$	M	
Barrow				
5 May	Tukle, Joash	8.0	F	
9 May	Itta, Ben	6.9	M	
13 May	Leavitt, Alfred	$\frac{1}{9.3}$	F	
14 May	Brower, Arnold	$\frac{1}{8.0}$	--	
15 May	Brower, Harry	8.5	M	
16 May	Patkotak, Simeon	16.2	F	
20 May	Adams, Whitlam	7.8	F	
21 May	Brower, Harry	11.1	F	
23 May	Tukle, Joash	7.2	--	
31 May	Tukle, Joash	14.0	M	Stinker ^{3/}

^{1/} Estimate of length in feet was provided by Eskimos.

^{2/} Some whales that are especially fat are designated as Ingutuk by the Eskimos.

^{3/} See text for description. Shot on 21 May but not recovered until 31 May.

Table S-4. --Measurements of boats used by whaling crews at
Point Hope, Alaska, spring 1975

Crew	Length (M.)	Width (M.)	Remarks
Attungana, Elijah	7.20	1.56	Umiak
Attungana, Henry	6.37	1.48	Umiak, new
Frankson, Darold	6.10	1.73	Umiak
Frankson, Joe	7.20	1.75	Umiak
Hank, Nicholas	4.90	1.61	Aluminum
Koonuk, Herbert	6.80	1.57	Umiak, new
Koonook, Luke	7.00	1.63	Umiak
Lane, Amos	7.39	1.68	Umiak
Nashookpuk, Henry	6.90	1.52	Umiak
Rock, Elijah	6.95	1.65	Umiak
Tingnook, John	6.71	1.52	Umiak
Towksjhea, Joe	7.35	1.63	Umiak
Tuzroyluke, Seymour	6.45	1.68	Umiak

Table S-5. --Belukha harvested at Point Hope, Alaska, spring 1975

Date	Crew	Number taken	Remarks
Prior to 30 April	--	1	
2 May	Frankson, J.	2	One was female with fetus
2 May	Koonook, L.	1	
2 May	Lane, A.	2	
2 May	Towksjhea, J.	2	
26 May	Koonook, L.	1	
26 May	Lane, A.	1	
27 May	Koonook, L.	1	
27 May	Lane, A.	1	
27 May	Nashookpuk, H.	1	A 3.15 m female, calf with it was not taken.
		—	
Total		13	

Table S-6. --Mammal species other than whales taken or observed at Point Hope, Alaska, spring 1975

Species	Date	Crew	Number sighted	Number taken	Remarks	
Ringed seal	2 May	Koonuk, H.	1	1		
	Prior to					
	8 May	Rock, E.	2	2		
	8 May	Attungana, H.	1	1		
	16 May	Attungana, E.	1	1		
	19 May	Lane, A.	1	1	Male, 129 cm.	
	19 May	Lane, A.	2	2		
	19 May	Lane, A.	1	0		
	20 May	Attungana, E.	2	2		
	21 May	Towksjhea, J.	2	2		
	25 May	Attungana, E.	1	1	Male, 104 cm.	
	28 May	Towksjhea, J.	1	1		
	28 May	Towksjhea, J.	1	1	Juvenile	
	28 May	Lane, A.	1	1	Juvenile	
	28 May	Lane, A.	1	1	Male, 98 cm.	
	Bearded seal	13 May	Rock, E.	1	0	
		19 May	Lane, A.	1	0	
Walrus	20-26 April	Attungana, E.	1	1	Large bull	
Polar Bear	20-26 April	Attungana, E.	1	1		
	20-26 April	Rock, E.	1	1		
	6 May	Frankson, D.	1	1		
Wolverine	20-26 April	Attungana, E.	1	1		
	6 May	Koonook, L.	1	1		

