

The 1976 Catch of Bowhead Whales, *Balaena mysticetus*, by Alaskan Eskimos

WILLMAN M. MARQUETTE

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 and then in the eastern Canadian Arctic as well as in the Sea of Okhotsk. Commercial whaling for bowheads began in the Chukchi and later 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, Calif., and Seattle, Wash., respectively, returning that autumn with some whale products. Some of the Arctic Alaska 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 Convention for the Regulation of Whaling of 1931; the International Convention for the Regulation of Whaling since 1946; and, subsequently, by the U.S. Marine Mammal Protection Act of 1972 and the U.S. Endangered Species Act of 1973. However, aboriginal whaling is still allowed.

The bowhead whale, also known as the Greenland right whale, Arctic right whale, and the great polar whale, is a large cetacean that grows to about 18.3 m (60 feet) in length. It is black or dark gray, often marked with white on the chin and underside. Instead of teeth its

mouth contains about 600 baleen plates that strain from the water the zooplankton upon which it feeds. It has a very large head, approximately one-third the length of the body; because the skull is long and narrow and because in profile the upper jaw is almost semicircular and bow-shaped, early Yankee whalers in the western Arctic called it the bowhead whale.

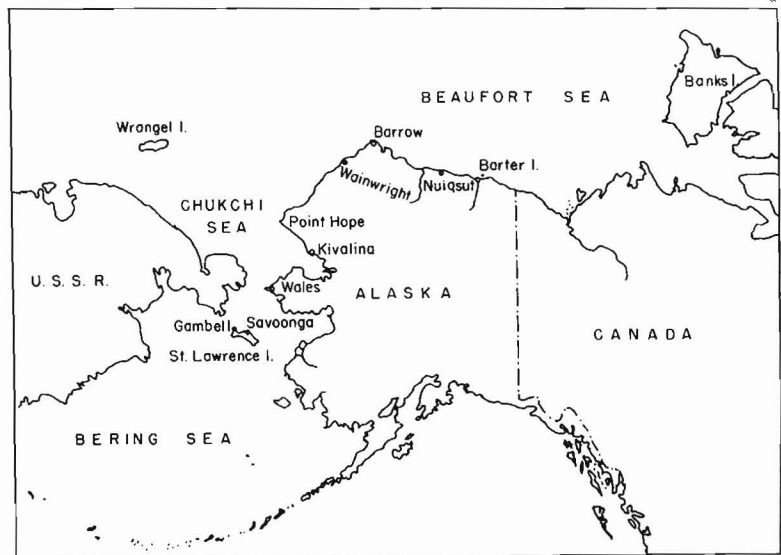
The bowhead whale of the western Arctic inhabits waters extending from the Bering Sea in the winter to the northern Chukchi and Beaufort Seas in the summer. The animal is found along the loose edges of the ice pack and

moves northward as the ice recedes in the spring and southward as it extends in the winter. The bowhead's spring migration route passes between St. Lawrence Island and the Chukchi Peninsula, through Bering Strait and along the northwest Alaskan coast, then through the Beaufort Sea to the Banks Island region and the MacKenzie River delta. In autumn, the whales migrate westward along the north coast of Alaska to the vicinity of Wrangel Island, where they turn southward along the coast of the U.S.S.R. to the northern Bering Sea.

During its spring migration, the bowhead is usually seen singly or in pairs, often in the company of belugas or white whales, *Delphinapterus leucas*. During its autumn migration these animals are frequently seen in groups that may contain up to 50 members.

Historically, coastal Eskimos established their villages at locations where points of land provided access to the bowheads during their migrations. The hunters of several villages participated in the spring hunt, but because the

Figure 1.—Map of bowhead whale study area.



whales cross the Chukchi Sea to the coast of the U.S.S.R. in autumn, residents of only a few villages along the north coast of Alaska hunted them at that time. Residents of Gambell and Savoonga on St. Lawrence Island and the mainland villages of Wales, Kivalina, Point Hope, Wainwright, and Barrow engaged in spring whaling. Ice conditions east of Barrow did not permit spring whaling by residents of Nuiqsut or Kaktovik (on Barter Island), but these people and the Barrow whalers participated in the autumn hunt. The locations of Alaskan whaling are shown in Figure 1.

The hunting of bowhead whales for subsistence has been a vital part of Eskimo life for at least 3,500 years (Oswalt, 1967). Present day whaling is conducted by the Eskimos of St. Lawrence Island, the Siberian coast, and the Arctic Alaskan coast using a combination of traditional and modern equipment and techniques.

Because of its isolation in the Arctic environment, the bowhead whale has been subject to little biological research. An expanding Eskimo harvest of this species and the impending development of the oil resources of the Alaskan continental shelf have an unknown effect on the survival of the bowhead whale population. Reliable information on the natural history, numbers of animals, and migratory patterns is incomplete for proper evaluation of the effects of the Eskimo harvest and oil exploration.

RESEARCH OBJECTIVES AND METHODS

The current research objectives of the National Marine Fisheries Service (NMFS) are to determine the status of the bowhead whale, the impact of the Eskimo fishery on population size, and the effects of oil exploration and exploitation upon this species.

Observers monitor the harvest during the spring whaling season at Point Hope and Barrow from about 20 April to 7 June and during the autumn whaling season at Barrow from about 15 September to 30 October. They visit the whaling camps as often as possible and

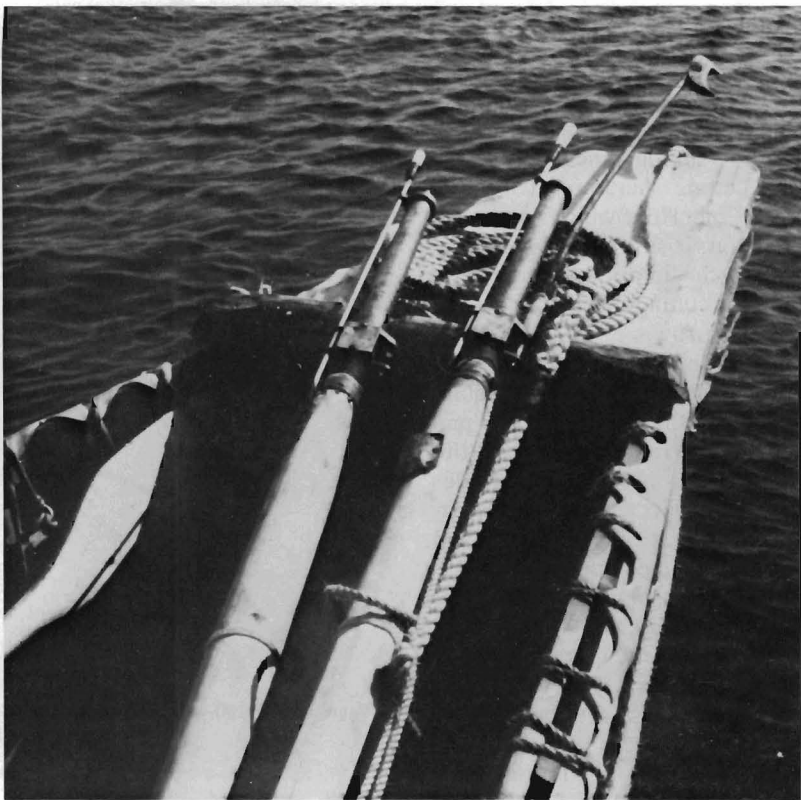


Figure 2.—Two darting guns in position in the bow of the skin boat are ready for instant use. One gun has a harpoon attached that is secured to a float by a line about 61 m (200 feet) in length.

gather information on the number of bowheads sighted, killed and recovered, and struck but subsequently lost. When a whale is taken, the biologists attempt to obtain measurements, collect specimen material for sex and age determination, and take photographs. In addition, they observe whaling methods and equipment as a first step toward determining if it is possible to reduce the number of whales struck but not recovered.

In 1976, NMFS research was expanded with funding from the Outer Continental Shelf Environmental Assessment Program (OCSEAP) to determine the abundance, distribution, and movement of bowhead whales. (OCSEAP is a NOAA program funded by the Bureau of Land Management, U.S. Department of the Interior.) Aerial surveys were conducted to study offshore distribution and migration; ice-based observation stations were established to carry out 24-hour counts on

the number of whales using near-shore leads during the spring migration. Although data collected by the OCSEAP study are contained in periodic reports published by that program (Fiscus et al., 1976; Braham and Krogman¹), information pertinent to the harvest is included in this report.

ESKIMO WHALING METHODS

The methods used by present-day Alaskan Eskimos to take whales has evolved from ancestral hunts and from the adoption of commercial whaling gear and methods introduced by Yankee whalers in the last century (Fig. 2-6). Van Stone (1958) described the

¹Braham, H. W., and B. D. Krogman. 1977. Population biology of the bowhead (*Balaena mysticetus*) and beluga (*Delphinapterus leucas*) whales in the Bering, Chukchi, and Beaufort Seas. Unpubl. rep., 29 p. Natl. Mar. Fish. Serv., Northwest and Alaska Fisheries Center, Seattle, Wash.

era of commercial bowhead whaling in Alaskan waters. The most recent description of the development of current Eskimo whaling methods is that of Durham (1973). Van Stone (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. A similar, though much simplified, method of marking and cutting shares from whales is used at Barrow.

A description of whaling crews and current whaling methods and equipment employed in the fishery was presented in previous reports on the Eskimo harvest of bowhead whales (Marquette, 1976; Fiscus and Marquette²). The cost of maintaining and replacing whaling equipment, which is becoming increasingly expensive, is borne primarily by the whaling captains. Whaling gear used by the 14 crews at Point Hope is listed in Table 1.

Four new umiaks (skin boats) were constructed during the 1975-76 winter and used for spring whaling at Point Hope in 1976. One umiak was constructed at Kotzebue and transported to Point Hope in early spring by snowmobile and sled, a 4-day trip. Although all umiaks are of the same general dimensions and appearance, slight variations in materials and construction techniques make each boat distinctive.

In 1976 the price of a shoulder gun at the Point Hope store was \$647, darting guns were \$367.05 each, and a harpoon cost \$33.25. At least three villagers own block and tackle sets capable of hauling whales out of the water onto the ice for butchering. Because the lines of one set were old and weak and broke frequently during use, much time was spent repairing them, which slowed the butchering process considerably. Each set of block and tackle is valued at about \$1,500, and use of his equipment to remove a whale from the water entitles the owner to a share of that animal.

²Fiscus, C. H., and W. M. Marquette. 1975. National Marine Fisheries Service field studies relating to the bowhead whale harvest in Alaska 1974. Unpubl. rep., 23 p. Natl. Mar. Fish. Serv., Northwest and Alaska Fisheries Center, Seattle, Wash.



Figure 3.—An 100-year old shoulder gun. Guns of a similar type, with slight modification, are used today to kill bowhead whales.

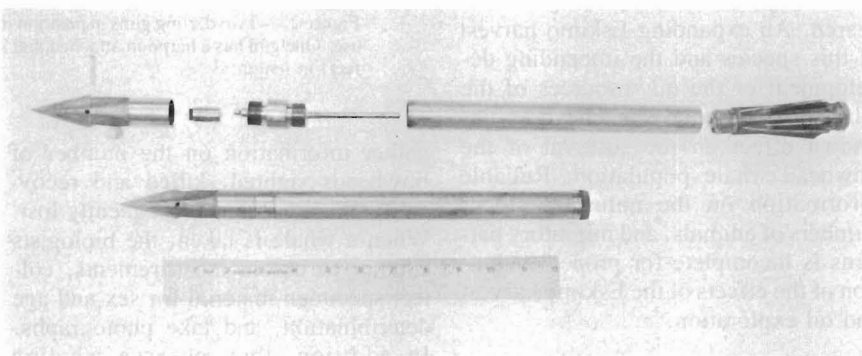


Figure 4.—Expanded view of bomb used in shoulder guns. Bomb fired from darting gun (bottom) is identical except it is about 8 cm (3 inches) shorter because flight-vanes are not needed.

In Barrow, large plastic floats (38-51 cm; 15-20 inches) that are attached to the harpoon lines to mark the whale's location were selling for \$42.50, and the small floats (30-36 cm; 12-14 inches) that are attached by a line to the darting guns to keep them from sinking were priced at \$16.75 each. At least two individuals own block and tackle sets.

UTILIZATION OF WHALES

The whales were pulled from the

water when possible with a block 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 loss when the ice shifted (Fig. 7, 8).

Most of the meat, muktuk (skin with

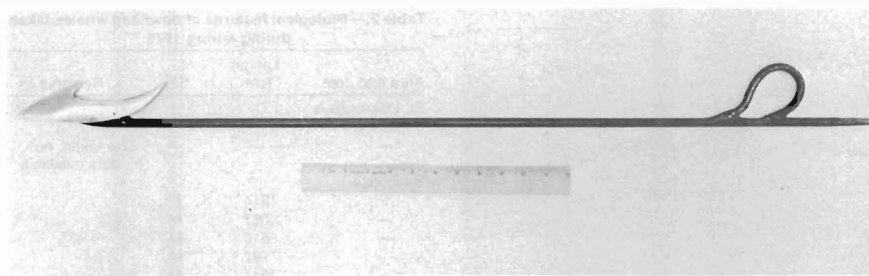


Figure 5.—Harpoon with toggle-head in position for thrusting into whale.

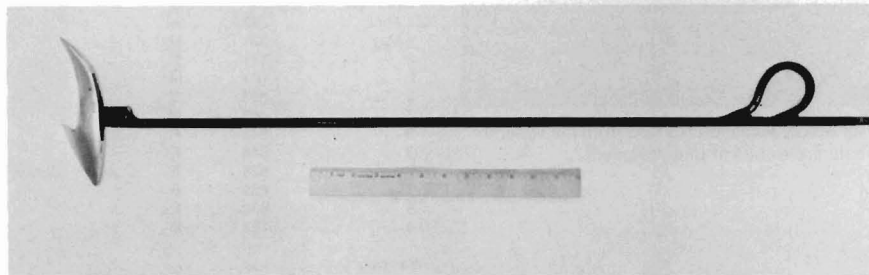


Figure 6.—Harpoon head rotated to position illustrated as result of tension caused by attached line and float, after harpoon has entered body of the whale. The toggle-head greatly reduces chance that the harpoon may be pulled out, perhaps resulting in loss of the whale.

Table 1.—Type of equipment used by whaling crews at Point Hope, Alaska, spring 1976. Each horizontal line refers to the equipment of one crew. Bottom line is total equipment.

Boat (umiak)	Outboard motor	Shoulder gun	Darting gun		Floats		
			With harpoon	Without harpoon	Large plastic	Small plastic	Sealskin
1	0	1	1	0	0	1	1
1	0	1	1	1	0	1	1
1	0	2	1	1	1	1	0
1	1	2	1	² 1	1	1	0
1	0	0	1	1	1	1	0
1	0	0	1	1	1	1	0
1	1	2	1	1	1	1	0
1	0	1	1	1	1	1	0
1	0	1	1	1	1	1	0
1	1	0	1	1	1	1	0
1	0	1	1	1	1	1	0
1	1	0	1	1	1	1	0
1	0	1	1	1	1	1	0
1	1	1	1	1	1	1	0
1	0	0	1	1	1	1	0
14	4	13	14	12	12	14	2

¹Lost taking whale on 3 May, replacement purchased.

²Lost taking whale on 3 May.

equal thickness of blubber), and blubber were removed from the butchering site immediately after the whale was cut up. Occasionally, however, several days elapsed before all shares were removed. Remains of the backbone, some 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 were taken to the village. 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 most of the whale, in-

cluding the meat, muktuk, baleen, gum tissue (mamaak), flukes, flippers, brain, tongue, intestines, heart, kidneys, epithelium of the liver, the tympanic bullae, and frequently the stomach (Carroll, 1976).

Whales taken several days after death are called stinkers. The muktuk (skin and blubber), flukes, flippers, and baleen of a stinker can be salvaged, but the remainder must be discarded as inedible. Normally, the crew responsible for the death of a stinker can be identified from marks on the harpoon or from bomb particles embedded in the whale. If so, the crew that recovers the animal shares the carcass with the crew that killed it. Otherwise, a stinker belongs to the recovering crew.

SPRING WHALING

Whaling Villages

St. Lawrence Island

The 1976 whaling season began on St. Lawrence Island about 1 April and ended about 20 May. Some 19 crews from Gambell and at least 3 crews from Savoonga actively whaled during the spring. The first whale harvested by St. Lawrence Island crews was taken 21 April. One bowhead was taken by Gambell whalers, and seven whales were reported taken by Savoonga crews (Table 2). One of the latter was a stinker. Five additional whales were reported struck but lost off St. Lawrence Island. The bowhead whaling season here ends when conditions become favorable for walrus, *Odobenus rosmarus*, hunting, and, although whaling gear is carried in the boats, few bowheads are taken after the hunting of walrus has begun. The people of Gambell and Savoonga share their whale catch each year.

One whaling captain from Savoonga reported that during the whaling season he believed that most of the whales passed north in the morning, between the hours of 0500 and 0800, and that only a few traveled north throughout the day. He also reported that an unusually large number of bowheads was observed migrating northward in the spring of 1976.



Figure 7.—Skin-deep cuts are made by a skilled flensor before whale is removed from the water to indicate how specific sections of the whale are to be cut and removed.



Figure 8.—Two large whales pulled onto the ice for butchering.

Wales

Two crews were active during the spring of 1976 at the village of Wales. No whales were taken, and none was struck and lost. The period of whaling approximated that of Point Hope, although the exact dates are not known.

Kivalina

Three crews actively whaled at Kivalina during the spring of 1976. Whales were neither taken nor struck. The period of whaling at Kivalina ap-

proximated that of Point Hope, although the exact dates are not known.

Point Hope

The whaling season began 10 April and ended 28 May when the ice became unsafe. NMFS observers were stationed in the village from 28 April until 1 June to monitor the harvest.

Fourteen whaling crews at Point Hope took 12 whales in 1976, and biological information was collected by NMFS observers from 11 (Table 2).

Table 2.—Biological features of bowhead whales taken during spring 1976.

Area and date	Length (cm)	Sex	Remarks
St. Lawrence Is.- Gambell	—	—	One taken, no data available
Savoonga	—	—	—
—	'914	F	—
—	11,067	M	—
—	'610	M	—
—	'762	M	—
—	'914	M	—
—	'853	M	—
—	—	—	One taken, no data available
Kivalina	—	—	None taken
Point Hope	—	—	—
23 April	'792	—	—
1 May	1,021	M	—
2	1,321	F	—
2	1,120	M	—
2	853	F	—
3	1,468	M	—
3	846	F	—
3	848	F	—
6	825	F	Ingutuk ² Stinker ³
7	889	F	—
9	808	F	—
14	762	M	—
Wainwright	—	—	—
—	—	—	One taken, no data available
4 June	—	—	—
4	—	—	—
Barrow	—	—	—
2 May	4750	M	—
5	1,144	M	—
6	796	—	—
6	1,136	—	—
6	750	F	—
9	1,235	M	Stinker
11	980	M	Stinker
12	1,370	M	Stinker
14	1,070	M	Stinker
15	1,100	M	—
15	4685	F	—
17	854	F	Ingutuk
19	1,158	F	Stinker

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

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

³Whales recovered several days after death are called stinkers.

⁴Length based on measuring segments of butchered whale.

Eight of the whales were young animals less than 8.9 m (29 feet, 2 inches) in length, and four were older animals 10.2 m (33 feet, 6 inches) or over in length. The largest whale taken at Point Hope was 14.7 m (48 feet, 2 inches) in length. Although no whales were reported killed and lost at Point Hope, 12 were struck and lost there.

During the 1976 season 235 bowhead whales were sighted at Point Hope (Table 3). 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

Table 3.—Sightings of bowhead whales, spring 1976.

Date	Location		Date	Location	
	Point Hope	Barrow ¹		Point Hope	Barrow ¹
April 10-23	15	0	14	5	5
24	—	0	16	3	29
25	—	5	17	3	35
26	—	0			
27	—	0	18	0	61
28	24	0	19	0	1
29	0	17	20	0	0
30	25	17	21	3	4
May 1			22	3	19
2	107	20	23	6	0
3	7	9	24	0	9
4	5	2	25	0	1
5	0	0	26	0	6
6	7	20	27	0	0
7	13	35	28	0	0
8	8	9	29	0	0
9	0	5	30	0	0
10	9	2	31	0	1
11	0	1	June		
12	0	0	1	0	1
13	0	0	2	—	1
	12	28	Totals	235	357

¹Data from Fiscus et al., 1976. (Corrected figures provided by H. Braham, pers. commun.)

²Observed from aircraft on flight from Barrow to Point Hope.

crew members and not reported, the 235 sightings represent a minimum number of bowheads seen at Point Hope.

Wainwright

Eight whaling crews were reported to be active during the spring of 1976 at the village of Wainwright. Three whales were taken but information was not received on animals that may have been struck and lost. The whaling period at Wainwright approximates that of Barrow.

Barrow

The whaling season began about 20 April 1976 and ended 2 June when the ice became unsafe for travel. Two NMFS harvest monitoring observers were stationed at the Naval Arctic Research Laboratory (NARL), Barrow, from 22 April to 3 June. In addition, an OCSEAP crew of four was stationed on the ice at the edge of the lead to make observations of bowhead whales and other marine mammals throughout the whaling season.

The number of whaling crews actively engaged in whaling varied almost daily, but approximately 36 of them operated at Barrow some time during the season. Thirteen whales were taken

and recovered during the spring season. Five of the 13 whales recovered were stinkers, the highest number recorded during a single season since NMFS began monitoring the harvest. In addition, 18 were reported struck and lost, and 7 more were killed and lost. Two additional bowheads may have been killed and lost, which would bring the total to 22. The latter two were sighted from the air by OCSEAP scientists (H. Braham, Marine Mammal Division, Northwest and Alaska Fisheries Center, NMFS, NOAA, Seattle, WA 98115, pers. commun.). One dead whale was sighted 24 May floating among the ice floes 46 km (28.5 miles) south of Barrow and about 28-37 km (17-23 miles) offshore. On 22 May, the aerial crew observed 34 polar bears, *Ursus maritimus*, on the ice feeding upon what appeared to be a whale carcass under the ice, judging from the amount of debris in the area and the size of the stained area on the ice.

Some data were obtained on each of the butchered whales (Table 2). Body lengths of the whales taken ranged from 6.8 to 13.7 m (22 feet, 6 inches to 45 feet). Six of the whales were young animals less than 9.8 m (32 feet, 2 inches) in length, and seven were older animals 10.7 m (35 feet, 1 inch) or more in length. The largest whale taken at Barrow was 13.7 m (45 feet) in length.

We collected information on Point Hope and Barrow and indirectly learned of whaling activities at other villages from various sources. John J. Burns, Alaska Department of Fish and Game, Nome, and Milstead C. Zahn, NMFS, Alaska Region, Juneau, supplied information from St. Lawrence Island. Toby Anungazuk, Alaska Department of Fish and Game, Wales, supplied information about whaling at that village. Clinton Swan provided information on whaling at Kivalina.

Whaling Effort

More crews were engaged in bowhead whaling in 1976 than in 1975. The number increased from 13 to 14 at Point Hope, from 4 to 8 at Wainwright, and from 30 to 36 at Barrow. Although a large number of crews are outfitted with

Table 4.—Whaling effort at Point Hope, Alaska, spring 1976.

Date	Number of crews on lead	Remarks
April 28	0	Lead closed
29	0	Lead closed
30	14	Lead opened at 1200 hours
May 1	14	Lead open
2	14	Lead open
3	14	Lead open
4	14	Lead open
5	14	Lead open
6	10	Lead open, several miles wide
7	12	Lead open, several miles wide
8	13	Lead open, several miles wide
9	14	Lead open, all crews off ice 2400 hours, windy
10	0	Lead open, windy and rough
11	8	Lead open, windy and rough
12	10	Lead open
13	14	Lead open
14	12	Lead open
15	6	Most of lead closed, open on East end
16	3	Most of lead closed, open on East end, raining
17	4	Most of lead closed, open on East end, raining
18	0	Lead open, windy and rough, ice dangerous
19	0	Lead open, windy and rough, ice dangerous
20	0	Lead open, windy and rough, ice dangerous
21	7	Lead open
22	13	Lead open
23	13	Lead open
24	1	Lead open, windy and rough
25	0	Lead open, windy and rough
26	0	Lead closed
27	3	Scattered openings
28	2	Lead open, windy and rough
29	0	Lead open, windy, strong current, ice dangerous
30	0	Lead open, windy, strong current, ice dangerous
31	0	Lead open, windy, strong current, ice dangerous
June 1	0	End of season

whaling gear, the number that actively engage in whaling throughout the season is significantly smaller. At Kivalina only three crews were reported to have whaled in the spring of 1976, two less than reported for 1975. Two crews were actively whaling at Wales, and 23 were reported to be on St. Lawrence Island in 1976, a figure similar to that of 1975. At least 86 crews were, therefore, engaged in whaling in the spring of 1976.

Since the number of crews hunting at the lead varies daily, we maintain a record of their activities throughout the season in an attempt to evaluate hunting effort (Tables 4 and 5). In 1976, Point Hope crews were at the lead 23 days (66 percent of the time) from 28 April to 1 June. At Barrow, crews were at the lead

31 days (72 percent of the time) from 22 April to 3 June. Weather conditions at Barrow during this period are presented in Table 6.

Whaling effort of the crews at the two villages was evaluated by examining the number of crew-days required to take a whale. Expressed as the number of crews that whaled each day, Point Hope crews whaled a total of 229 crew-days for an average of 6.5 crews per day, and Barrow crews whaled 314 crew-days, an average of 7.3 crews per day during the season. Since 12 whales were taken at Point Hope, 19.1 crew-days were required for each whale recovered. At Barrow, 24.2 crew-days were required to take each of 13 whales during the spring harvest. A comparison of crew-days required to take whales indicates that the Point Hope whalers expended slightly less effort to take whales than the whalers at Barrow. Whaling effort required to take whales during a season may indicate differential effects of the climate, ice, and ocean currents on the ability of the whalers to kill and recover bowhead whales.

Although the total number of crews engaged in whaling in the spring of 1976 at Barrow was large, the number that participated at every opportunity throughout the season averaged close to 11. A daily count of active crews was not obtained because camps were scattered along 40 km (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, and the most productive hunting occurred during May.

Other Mammals

In addition to bowhead whales, the following species of mammals were observed or reported in 1976 at Point Hope during the spring whaling season: belukha; bearded seal, *Erignathus barbatus*; largha seal, *Phoca largha*; ringed seal, *Phoca hispida*; polar bear; and walrus.

Belukha were observed from 28 April to 22 May at Point Hope. At least two noticeable waves of these animals migrated past the whaling camps. The first occurred from late April to 5 May

Table 5.—Whaling effort at Barrow, Alaska, spring 1976.

Date	Number of crews on lead	Remarks
April		
22	3	Lead opening and closing
23	6	Lead closed
24	0	Lead closed
25	0	Lead closed
26	10	Lead closed
27	0	Lead closed
28	0	Lead closed
29	7	Lead open
30	13	Lead open
May		
1	15	South lead closed, north lead open
2	10	North lead open, windy and rough
3	13	Lead open, ice dangerous
4	0	Lead open, ice dangerous
5	20	Lead open
6	22	Lead open, windy and rough
7	0	Lead open, windy and rough
8	20	Lead freezing over
9	0	Lead closed
10	0	Lead closed
11	0	Lead closed
12	0	Lead closed
13	10	Variable openings
14	15	Variable openings
15	28	Lead open
16	27	Lead open
17	27	Lead open
18	20	Lead closing
19	10	Scattered openings
20	5	Scattered openings
21	5	Scattered openings
22	5	Scattered openings
23	5	Scattered openings
24	5	Scattered openings
25	2	Scattered openings
26	2	Lead closing
27	2	Lead closed
28	2	Lead closed
29	0	Lead closed
30	1	Ice breaking up
31	1	Ice dangerous
June		
1	2	Ice dangerous
2	1	Ice dangerous
3	0	Season ended

Table 6.—Weather data at Barrow, Alaska, spring 1976.

Date	Temperature (°F)			Average wind velocity (mph)	Wind direction (degrees)
	Max.	Min.	Avg.		
April					
22	10	-9	1	6.8	090
23	11	5	8	5.3	340
24	10	6	8	8.2	090
25	16	5	10	9.0	100
26	18	4	11	8.2	090
27	15	-1	7	6.1	250
28	14	12	1	9.6	140
29	19	-6	7	14.3	100
30	23	10	17	12.5	090
May					
1	23	9	16	11.6	080
2	25	15	20	13.2	060
3	28	15	22	18.7	070
4	30	22	26	16.5	070
5	30	16	23	6.3	200
6	27	14	21	13.6	060
7	16	9	13	15.8	060
8	14	6	10	8.6	020
9	13	2	8	8.2	060
10	10	1	6	7.2	060
11	9	3	6	5.7	060
12	14	9	12	11.3	070
13	15	4	10	14.0	070
14	13	4	9	12.5	060
15	15	10	13	12.9	090
16	21	13	17	15.2	080
17	16	9	13	15.6	070
18	11	8	10	12.5	080
19	11	7	9	7.6	290
20	17	10	14	5.4	090
21	15	11	13	10.2	090
22	20	11	16	14.6	080
23	23	19	21	12.1	080
24	27	23	25	12.3	030
25	30	23	27	11.2	020
26	29	19	24	12.4	230
27	25	13	19	9.3	220
28	30	22	26	11.2	020
29	30	25	28	14.0	010
30	35	28	32	11.6	070
31	34	26	30	11.9	110
June					
1	34	23	28	10.0	080

and the second from 8 to 16 May. A third wave may have occurred in late May. Belukha sighted and taken at Point Hope are given in Table 7.

Although they are prized for food, the whalers do not actively pursue belukha during the bowhead whaling season because they frequently sink quickly and require considerable effort to recover. A belukha harvest at this time is incidental to the bowhead whale fishery. Rifles are normally used to kill the animals and those that sink are recovered with a grapple. 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.

Other species killed at Point Hope during the spring of 1976 (Table 8) included 77 ringed seals and 1 largha seal. Two bearded seals were sighted but not killed. A dead floating walrus was found drifting in the lead by the whalers but was not taken. Two polar bears were sighted from an aircraft on a flight from Barrow to Point Hope.

At Barrow, other species killed included two belukha (Table 7), one of which sank and was lost, and four polar bears (Table 9). A total of 328 belukha was sighted: 19 on 16 May, 101 on 18 May, and 208 on 22 May (Table 7). Sightings of belukha at Barrow varied considerably, perhaps due to weather and ice conditions that made observa-

tions difficult. Belukha may utilize leads that are farther out than the near-shore leads frequented by whalers, as indicated by OCSEAP surveys (Fiscus et al., 1976; footnote 1). In addition to 34 polar bears counted feeding upon a large carcass frozen in the ice north of Barrow, other marine mammals observed during aerial surveys of the northeastern Chukchi and western Beaufort Seas by OCSEAP observers from 30 April to 20 June are reported by Fiscus et al. (1976).

At Wales, three belukha were reported taken by two crews during the spring season (Table 7).

Narwhals, *Monodon monoceros*, have been reported as occasional visitors to Alaskan waters (Geist et al., 1960). An experienced whaling captain at Barrow reported that he sighted a single narwhal in a pod of belukha on 15 May west of the village.

An unconfirmed occurrence of a narwhal stranding on the coast near Point Hope a few years ago was noted in a recent report (Marquette³). It was subsequently established that John Bockstoce had investigated the stranding in April 1972 and he has kindly permitted publication of the details. The carcass of the narwhal, a male, was found beached in late October 1971 about 8 km (5 miles) north of Point Hope, by a village resident. He reported that its body was about 2.75 to 3 m (9 to 10 feet) long, with a tusk of about 1 m (39 inches) in length. The narwhal had apparently died from a bullet wound at the base of the cranium. The tusk was removed by the finder and was later sold to a visitor to the village.

A resident of Barrow stated that he sighted killer, *Orcinus orca*, and gray, *Eschrichtius robustus*, whales while traveling to Wainwright by boat during the first week of September. Killer whales apparently appear occasionally in Alaskan arctic waters. Bee and Hall

³Marquette, W. M. 1977. The 1976 catch of bowhead whales (*Balaena mysticetus*) by Alaskan Eskimos, with a review of the fishery, 1973-1976, and a biological summary of the species. Unpubl. rep., 80 p. Natl. Mar. Fish. Serv., Northwest and Alaska Fisheries Center, Seattle, Wash.

Table 7.—Belukha taken or observed at whaling villages in Alaska during spring, 1976.

Location and date	Number sighted	Killed and recovered	Killed but lost	Remarks
Point Hope				
28 April	321	0	0	Observed from aircraft on flight from Barrow to Point Hope
1 May	26	0	0	
2	1	1	0	
3	150	1	0	
5	10	0	0	
6	1	0	0	
7	1	1	0	
8	15	0	0	
9	4	4	0	
11	100	0	0	
13	250	0	0	
14	1	1	0	Male 423 cm long. skull taken for Marine Mammal Division collection
16	12	0	0	
17	1	0	0	
22	35	0	0	
Total	928	8	0	
Barrow ¹				
16 May	19	0	0	
18	101	0	1	Sank
22	208	1	0	
Total	328	1	1	
Wales				
	3	3		
Total	3	3		

¹Data combined for harvest and OCSEAP crews.

(1956) noted three records (one near Icy Cape and two near Barrow) of these whales in the area. Banfield (1974) stated that they are rare visitors to the Beaufort Sea.

Two incidents of killer whales attacking other cetaceans were reported by Eskimos in 1976. In August 1975, four Point Hope residents on a boat a short distance south of the village observed seven killer whales attacking a young gray whale. They reported that the largest killer whale held the gray by the tail while the others attacked various areas of the gray's body. After a short time the killer whales appeared to abandon the gray, which was almost motionless and bleeding profusely. After remaining almost lifeless for several minutes the gray began to feebly swim away when the killer whales suddenly reappeared and attacked it again. The gray soon sank from sight and presumably died. At Barrow, three residents witnessed three or four killer whales attacking an unidentified cetacean off the coast of that village during the summer of 1976.

AUTUMN WHALING

Barrow

The beginning of the autumn whaling season coincides with the westward migration of bowheads past Barrow to wintering grounds in the Bering Sea. In 1976 the whaling season began 26 August, which was unusually early for Barrow, and ended 8 October when the formation of new ice prevented further travel by boat. Weather data for Barrow during this period are given in Table 10. The pack ice remained approximately 104.6 km (65 miles) off the north coast of Alaska during the autumn whaling season. An NMFS observer was stationed at NARL from 11 September to 14 October.

Autumn whaling differs in several ways from spring whaling. Wood or aluminum boats, from 5.49 to 7.62 m (18 to 25 feet) in length, are used instead of skin-covered boats. The crews often must venture several miles out to sea to locate the whales. The boats are powered by large outboard or inboard

Table 8.—Mammals other than whales taken or observed at Point Hope, Alaska, spring 1976.

Species	Date	Number sighted ¹	Number killed	Sex	Length	Remarks
Ringed seal	24 Feb.-7 Mar.		1	M		
	24 Feb.-7 Mar.		1	M		
	24 Feb.-7 Mar.		1			
	7-19 Mar.		1	M	118.6	
	12-19 April		1			
	12-19		1	M		
	12-19		1	M		
	12-19		1	M		
	16-21		1	F		
	16-21		1	M		
	16-21		1	M		
	16-21		1	M		
	16-21		1			
	16-21		1	M		
	16-21		1	M		
	16-21		1	M		
	16-21		1	M		
	16-21		1	M		
	16-21		1	M		
	16-21		1	M		
	16-21		1	M		
	16-23		1	M		
	16-23		1	M		
	16-27		1	M		
	18 Apr.-2 May		7			
	24-27 April		2	M		
	24-30		1	M		
	25		1	M		
	30		1	M		
	1 May		1	M	126.9	
	1		10			
	6		10			
	13		1	M	123.7	
13		1	M	126.0		
16		1	M	117.4		
17		3				
27		5	M			
27		1	F			
27		1	F	126.6		
27		1	M	106.6		
27		1	F	106.1		
27		1	F	102.6		
27		1	M	120.8		
27		1	M	108.3		
27		1	F	101.2		
27		1	F	107.0		
27		1	M	112.2		
27		1	M	112.5		
Bearded seal	1 May	1	0			
	31	1	0			
Largha seal	1 May	1	1			
Polar bear	28 Apr.	2	0			Observed from aircraft on flight from Barrow to Point Hope
Walrus	12 May	1	0			Found floating in lead, not taken
		(dead)				

¹Information on total number of ringed seals sighted was not obtained. Information on ringed seal was obtained by Glenn Seaman, Fairbanks, Alaska, during cooperative studies with Alaska Department of Fish and Game.

motors; noise made by these motors apparently does not frighten the animals in the autumn as it does during the spring hunt, according to reports by the whalers. As in the spring, darting and shoulder guns are used in the autumn to kill the whales. However, since the migrating whales are usually hunted in the open sea during the autumn, they are unable to escape easily by swimming under nearby ice floes as they frequently do in the spring. The whalers are therefore able to pursue them for a longer time until they are killed.

Twelve crews engaged in autumn whaling at Barrow killed and recovered 10 whales. An 11th whale was killed but abandoned because of rough seas and an insufficient number of boats to assist in safely towing the carcass to shore some 46 km (25 miles) away. The whalers reported that most of the whales were taken about 37 km (23 miles) north of Point Barrow. From 15 to 32 hours were required to tow the whales to shore near the village. Data obtained on whales that were killed and recovered are presented in Table 11.

Table 9.—Mammals other than whales killed or observed at Barrow, Alaska, spring 1976.

Species	Date	Number sighted	Number taken
Polar bear	14 May	1	0
	31	1	1
	31	1	1
	31	1	1
	31	1	1
		5	4

Table 10.—Weather data at Barrow, Alaska, during autumn whaling season 1976.

Date	Temperature (°F)			Avg. wind velocity (mph)	Wind direction (degrees)
	Max.	Min.	Avg.		
Aug.					
26	46	34	40	14.2	090
27	41	33	37	10.6	080
28	42	33	38	6.0	100
29	48	33	41	5.8	120
30	43	36	40	6.0	150
31	51	35	43	6.5	100
Sept.					
1	37	34	36	4.4	330
2	37	31	34	4.2	310
3	33	30	32	7.8	300
4	36	28	32	8.6	260
5	35	26	31	6.7	190
6	37	31	34	8.9	160
7	44	33	39	11.1	180
8	34	31	33	9.3	020
9	36	33	35	5.4	070
10	38	32	35	8.7	120
11	48	33	41	13.5	120
12	34	30	32	11.8	100
13	33	31	32	11.4	080
14	36	32	34	17.3	070
15	35	33	34	13.9	060
16	35	32	34	6.9	060
17	35	31	33	10.4	100
18	35	30	33	12.4	100
19	33	29	31	8.3	080
20	31	23	27	9.2	080
21	46	31	39	15.2	190
22	39	32	36	10.4	230
23	34	29	32	14.9	060
24	31	27	29	14.6	070
25	30	27	29	14.9	070
26	33	30	32	7.8	050
27	32	28	30	9.3	080
28	31	27	29	18.5	040
29	29	22	26	19.9	050
30	22	18	20	19.5	070
Oct.					
1	24	19	22	18.1	080
2	27	18	23	15.2	090
3	26	23	25	15.2	040
4	25	23	24	16.4	040
5	27	23	25	18.4	070
6	28	22	25	15.1	070
7	28	21	25	7.7	070
8	26	21	24	14.6	230
9	24	4	14	16.6	240
10	19	0	10	15.5	220

Although the whalers prefer to kill the small whales that are reported to follow the earlier migrating large animals, the 10 whales taken this autumn were all large and measured from 13.20 to 17.30 m (43 feet, 4 inches to 56 feet, 9 inches) in length. This year is the first in

Table 11.—Biological features of bowhead whales taken during autumn 1976 by Alaskan Eskimos.

Area and date	Length (cm)	Sex	Remarks
Barrow			
28 Aug.	1,650	M	
30	1,630	M	
3 Sept.	1,620	M	
3	1,650	M	
3	1,730	F	131-cm fetus collected Ingutuvak ²
10	1,600	F	
20	1,430	F	
20	1,408	M	
20	1,525	M	
21			Lost due to high seas
7 Oct.	1,320	M	
Kaktovik			
20 Sept.	1,371	M	
27	1,914		
Nuiqsut			None taken

¹Length estimated by natives.

²Whales that are especially fat and longer than the Ingutuk are designated by the Eskimos as Ingutuvak.

Table 12.—Alaskan Eskimo bowhead whaling data, 1976.

Season/Location	Number recovered	Number killed and lost	Number struck and lost
Spring			
Gambell	1	0	0
Savoonga	7	0	5
Wales	0	0	0
Kivalina	0	0	0
Point Hope	12	0	12
Wainwright	3	0	0
Barrow	13	7	18
Autumn			
Barrow	10	1	0
Nuiqsut	0	0	0
Kaktovik	2	0	0
Total	48	8	35

which bowheads have been reported taken in August at Barrow.

Nuiqsut

Three crews actively whaled during the autumn of 1976 at the village of Nuiqsut. A fourth crew could not join the hunt because of a malfunctioning motor. Whales were not taken, and in-

formation was not received on animals that may have been struck but lost.

Kaktovik

Seven whaling crews were active during the autumn of 1976 at the village of Kaktovik on Barter Island. Two bowheads were killed by Kaktovik crews, but information was not received on whales that may have been struck and lost.

SUMMARY

Details concerning the bowhead hunt in 1976 are give in Table 12. The fact that a whale is struck and lost does not necessarily mean that it has been fatally injured. Some whales harpooned with the darting gun escape when the line breaks, and others hit with a missile from the darting or shoulder gun escape if the bomb fails to explode. Some of the animals may die and some may recover.

In 1976, 35 whales were reported struck and lost and 8 were reported killed and lost for a total of 43 struck and lost. It should be noted, however, that since these data are obtained from statements made by the whalers, or rarely from the observations of investigators, they represent a minimum known number of animals struck and lost.

At the two villages (Point Hope and Barrow) where NMFS observers were stationed in the spring of 1976, 25 whales were killed and recovered—compared with 37 struck and lost. At Barrow 25 whales were struck and lost, of which 7 were reported killed and lost. Since 13 whales were killed and recovered, almost two animals were struck and lost for each one recovered. At Point Hope 24 whales were struck, of which 12 were killed and recovered and 12 were struck and lost. The Point Hope data are considered reasonably

complete, whereas those for Barrow are incomplete due to the greater geographic dispersion of whalers in the locality.

ACKNOWLEDGMENTS

The support of the Naval Arctic Research Laboratory, Barrow, Alaska, made it possible for us to observe and collect information on whaling at Barrow and Point Hope. Weather data for Barrow were provided by the NOAA Weather Service facility located at that village. The following people participated in the field work in collections of the data: Gordon H. Jarrell, John R. Patee, and Glenn A. Seaman.

LITERATURE CITED

- Banfield, A. W. F. 1974. The mammals of Canada. Univ. Toronto Press, Canada, 438 p.
- Bee, J. W., and E. R. Hall. 1956. Mammals of northern Alaska on the Arctic Slope. Univ. Kans., Mus. Nat. Hist., Misc. Publ. 8, 309 p.
- Bower, W. T., and H. D. Aller. 1917. Alaska fisheries and fur industries in 1916. Rep. U.S. Comm. Fish. 1916. Append. II (doc. 838), 118 p.
- Carroll, G. M. 1976. Utilization of the bowhead whale. Mar. Fish. Rev. 38(8):18-21.
- Durham, F. E. 1973. Ancient and current methods of taking the bowhead whale. Univ. Alaska Sea Grant Prog., Anchorage, Sea Grant Rep. 73-9, 15 p.
- Fiscus, C. H., H. W. Braham, and W. M. Marquette. 1976. Distribution and abundance of bowhead and belukha whales in the Beaufort and Chukchi Seas. In Environmental assessment of the Alaskan Continental Shelf, Vol. 1 Principal investigators' reports, April-June 1976, p. 68-84. U.S. Dep. Commer., Natl. Oceanic Atmos. Admin., Environ. Res. Lab., Boulder, Colo.
- Geist, O. W., J. L. Buckley, and R. H. Manville. 1960. Alaskan records of the narwhal. J. Mammal. 41(2):250-253.
- Marquette, W. M. 1976. Bowhead whale field studies in Alaska, 1975. Mar. Fish. Rev. 38(8):9-17.
- Oswalt, W. H. 1967. Alaskan Eskimos. Chandler Publ. Co., San Franc., 297 p.
- VanStone, J. W. 1958. Commercial whaling in the Arctic Ocean. Pac. Northwest Q. 49:1-10.
- . 1962. Point Hope. An Eskimo village in transition. Univ. Wash. Press, Seattle, 117 p.

MFR Paper 1354. From Marine Fisheries Review, Vol. 40, No. 11, November 1978. Copies of this paper, in limited numbers, are available from D822, User Services Branch, Environmental Science Information Center, NOAA, Rockville, MD 20852. Copies of Marine Fisheries Review are available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402 for \$1.10 each.