

Subsistence harvest of bowhead whales (*Balaena mysticetus*) by Alaskan Eskimos during 2006

Robert Suydam¹, John C. George¹, Cheryl Rosa¹, Brian Person¹, Cyd Hanns¹, Gay Sheffield², and Josh Bacon¹

¹ Department of Wildlife Management, North Slope Borough, Box 69, Barrow, AK 99723 USA

² Alaska Department of Fish and Game, 1300 College Rd., Fairbanks, AK 99701 USA

Contact email: robert.suydam@north-slope.org

ABSTRACT

In 2006, 39 bowhead whales (*Balaena mysticetus*) were struck during the Alaskan subsistence hunt resulting in 31 animals landed. The efficiency (# landed / # struck) of the hunt was 79.5%, which is similar to the average during 1996-2005 (mean = 79%, *SD* = 8%). Of the landed whales, 21 were males and 10 were females. Of the females, only one was presumably mature (>13.4m in length) and she was not discernibly pregnant; however, the animal was harvested in a remote village and was not closely examined by biologists. The average number of whales landed in the 10 previous years was 41.8 (*SD* = 6.8). Thus, the number of landed whales in 2006 was lower than recent years. Challenging sea ice and weather conditions in the spring precluded 6 of the 8 spring-hunting villages from landing any whales. The spring harvest was the lowest recorded in the last 35 years and only the villages of Wainwright and Barrow were able to land a total of five whales during the spring hunt. Fall harvests in the Beaufort Sea villages (Kaktovik, Nuiqsut and Barrow) were consistent with past years. In the Bering Sea, the St. Lawrence Island villages of Savoonga and Gambell were not able to land any whales during the winter as they have in recent years.

KEYWORDS: ARCTIC; *BALAENA MYSTICETUS*; BOWHEAD WHALE; STATISTICS; WHALING-ABORIGINAL

INTRODUCTION

The subsistence harvest of bowhead whales (*Balaena mysticetus*) provides important subsistence needs for several Native communities in northern and western Alaska and eastern Chukotka (Russia). The Alaska Eskimo Whaling Commission (AEWC) locally manages the harvest through an agreement with the National Oceanic and Atmospheric Administration (NOAA). The level of allowable harvest is determined under a quota system in compliance with the International Whaling Commission (IWC 1980; Gambell 1982). The quota is based on the nutritional and cultural needs of Alaskan Eskimos as well as on estimates of the size and growth of the Bering-Chukchi-Beaufort seas stock of bowhead whales (Donovan, 1982; Braund, 1992).

The subsistence hunt typically takes place in spring and autumn as whales migrate between the Bering and Beaufort seas. Hunters on St. Lawrence Island may take whales during the winter as well. These hunts are subjected to considerable environmental interference from weather (wind speed and direction, fog, and temperature), stability of landfast ice, and sea ice concentration and type. The success of the hunt is greatly affected by these factors and shows considerable variation by year and location.

Since 1981, the North Slope Borough Department of Wildlife Management has gathered basic data on landed whales in several communities, especially Barrow, and has assisted the AEWC in compiling statistics on landed whales from outlying villages (Albert, 1988). The objectives of this paper were to

document: (1) the number, location (village), and dates of landed and struck-and-lost bowhead whales in 2006 in Alaska, (2) the estimated fate of struck and lost bowhead whales, (3) basic morphometric data and the sex composition of the harvest, (4) the hunting efficiency of the harvest, and (5) report relevant additional observations, such as hunting conditions, unusual pathology, etc.

METHODS

Harvest data on sex, length, dates, and fate of struck and lost whales for all whaling villages were obtained from the AEW. Biologists recorded similar information for most whales taken at Barrow and Kaktovik. Biologists also collected tissue samples and detailed morphometric data.

We estimate the approximate animal age and reproductive status based on several published criteria. Females with a total body length greater than 13.4 m in length are considered to be sexually mature (George *et al.* 2004). Previously, we assumed sexual maturity at a total length of 14.2 m for females (Tarpley and Hillmann 1999). Additional data and analysis has refined this length to 13.4 m, although females shorter than this can be pregnant and females greater in length can be immature (George *et al.* 2004). Males with a total body length greater than 13 m are considered to be sexually mature (O'Hara *et al.* 2002).

RESULTS AND DISCUSSION

In 2006, 39 whales were struck during the Alaskan subsistence hunt. The total number of whales landed ($n = 31$) in 2006 was slightly less than the average number of whales landed (per year) over the previous 10 years (1996-2005: mean = 41.8 whales, $SD = 6.8$).

Hunting conditions during spring 2006 were very challenging. Ice and weather conditions prevented hunters from six villages (Savoonga, Gambell, Little Diomed, Wales, Kivalina, and Point Hope) from landing a whale. Only crews at Wainwright and Barrow successfully landed whales (5 total) during the spring migration (Table 1). Wainwright crews took the first whale of the season on 10 May and another on 11 May. At Barrow, three whales were taken between 11 and 18 May. For comparison, over the past 10 years (1996 to 2005) Barrow has averaged 10.2 ($SD = 5.9$) whales landed during the spring.

During 1973-2006, the average number of whales landed in the spring harvest was 10.9 whales/year for all villages combined (Figure 1). For the past 10 years (1996-2005, a period with a stable annual harvest quota), an average of 20.4 ($SD = 8.8$) whales were landed in spring in all villages. During recent years, several of the Bering and Chukchi seas communities (Gambell, Savoonga, Diomed, Kivalina, Pt. Hope) were unable to harvest whales due to environmental conditions (Suydam and George, 2004). However, the very low harvest during spring 2006 was quite unusual. Despite considerable effort, 2006 was the lowest spring harvest since at least 1973, even lower than during the late 1970s and early 1980s when harvest quotas limited the hunt.

The success of the spring hunt is sensitive to environmental conditions (George *et al.*, 2003), and is quite vulnerable to effects from climate change. The environmental conditions that contributed to poor hunting during 2006 included: high winds, poor visibility, and hazardous or unsuitable sea ice conditions (e.g., ice choked leads; Suydam and George, 2004). Figure 2 provides an example of the ice-choked leads that created difficult and dangerous whaling conditions near Wainwright and Barrow. In the Bering Sea, the lack of stable ice cover combined with high winds precluded successful whaling on St. Lawrence Island.

Twenty-six whales were landed during autumn migration by three villages (Barrow, Kaktovik, and Nuiqsut; Table 1). At Kaktovik hunters landed three whales during the first two weeks of September, and Nuiqsut landed four whales during 13-18 September 2006. Both villages had suitable weather for hunting. At Barrow, the autumn hunt occurred during eight days of good weather during late September and early October when 19 whales were landed.

Overall, of the eight whales that were struck and lost in 2006, five had a poor chance of survival, and two whales had an unknown chance of survival. The estimates of survival are based on the hunting Captain's

assessment (Table 2). The efficiency of the hunt (# landed / # struck) in 2006 was 79.5%, which is similar to the average level of efficiency over the past 10 years (1996-2005: mean = 79%, *SD* = 8%).

Twenty-one (68%) of the 31 landed whales were males. The longest male was 14.4 m and the shortest was 6.3 m. Four males were presumably sexually mature, based on length measurements (O'Hara *et al.* 2002). Confirmation of reproductive status is pending results of histological and hormonal analyses of a subset of those whales. The smallest male landed was determined to be a calf. It had milk in its stomach and very short baleen (32 cm). A bowhead that is less than 7.5 m in length and baleen less than 60 cm is characteristic of a calf (George and Suydam, 2006).

Ten (32%) of the landed whales were females. The longest female was 19.2 m in length and the shortest was 8.5 m. Based on length (> 13.4 m; George *et al.* 2004), only one of the females landed in 2006 was estimated to be sexually mature. Because this mature female was landed in a remote village, biologists did not closely assess this animal's reproductive condition but she was not discernibly pregnant.

ACKNOWLEDGEMENTS

We thank the Alaska Eskimo Whaling Commission and local hunters for providing data on landed and struck but lost bowhead whales. We especially thank the Captains' associations and hunters from Barrow and Kaktovik for their support and providing us access to whales for examinations and sampling. Rita Acker, Cindy Bailey, Lara Dehn, Robin Mongoyak, Noah Ashley, Leslie Pierce, John Reynolds, Hans Thewissen, Dana Wetzel, and others assisted with data and sample collection in Barrow. Dolores Vinas, April Brower, Emily Frantz, Ambrose Leavitt and Benny Akootchook provided logistical support. The North Slope Borough and the Alaska Department and Fish and Game provided financial support. Finally we thank Edward Itta (Mayor of the North Slope Borough) and Taqulik Hepa (Director of the North Slope Borough Department of Wildlife Management) for their encouragement and support.

REFERENCES

- Albert, T.F. 1988. The role of the North Slope Borough in arctic environmental research. *Arctic Res. of the U.S.* (2): 17-23.
- Braund, S.R. 1992. Traditional Alaska Eskimo whaling and the bowhead quota. *Arctic Research* 6(Fall):37-42.
- Donovan, G.P. (ed.). 1982. Report of the International Whaling Commission (Special Issue 4). Aboriginal Subsistence Whaling (with special reference to the Alaska and Greenland fisheries). International Whaling Commission, Cambridge. 86pp.
- Gambell, R. 1982. The bowhead whale problem and the International Whaling Commission. *Rep. int. Whal. Commn. (Special Issue 4)*:1-6.
- George, J.C., Follmann, E., Zeh, J., Suydam, R., Sousa, M., Tarpley, R., and Koski, B. 2004. Inferences from bowhead whale corpora data, age estimates, length at sexual maturity and ovulation rates. Paper SC/56/BRG8 presented to the Scientific Committee of the International Whaling Commission.
- George, J.C. and R.S. Suydam. 2006. Length estimates of bowhead whale (*Balaena mysticetus*) calves. Paper SC/58/BRG23 presented to the Scientific Committee of the International Whaling Commission.
- George, J. C., S. Braund, H. Brower, Jr. C. Nicolson, and T. M. O'Hara. 2003. Some observations on the influence of environmental conditions on the success of hunting bowhead whales off Barrow, Alaska. In: *Indigenous ways to the Present: Native whaling in the Western Arctic*. Studies in whaling No. 6. Canadian Circumpolar Institute (CCI) Press, Alberta Canada. 432 pp.
- International Whaling Commission. 1980. Report of the Special Meeting on North Pacific Sperm Whale Assessments, Cronulla, November 1977. *Rep. int. Whal. Commn. (Special Issue 2)*:1-10.

O'Hara, T.M., George, J.C., Tarpley, R. J., Burek, K, and Suydam, R.S. 2002. Sexual maturation in male bowhead whales (*Balaena mysticetus*) of the Bering Sea stock. *Journal of Cetacean Research and Management* 4(2):143-148.

Suydam, R.S. and J.C. George, 2004 Subsistence harvest of bowhead whales (*Balaena mysticetus*) by Alaskan Eskimos, 1974 to 2003. Paper SC/56/BRG12 presented to the Scientific Committee of the International Whaling Commission.

Tarpley, R.J. and Hillmann, D.J. 1999. Observations on ovary morphology, fetal size and functional correlates in the bowhead whale *Balaena mysticetus*. Report to the Department of Wildlife Management, North Slope Borough, Box 69, Barrow, AK from Department of Veterinary Anatomy, College of Veterinary Medicine, Texas A&M University, College Station, TX. 276 pages.

Table 1. Village, whale identification number, date landed, length (meters) and sex of bowhead whales landed by Alaskan Eskimos during the 2006 subsistence hunt. Note: The Alaska Eskimo Whaling Commission reports to the U.S. National Marine Fisheries Service the date a whale is struck and not the date the whale is landed, as we do here.

Village	Whale ID#	Date Landed	Length (m)	Sex
Barrow	06B1	5/11/2006	9.2	M
	06B2	5/11/2006	9.1	M
	06B3	5/18/2006	8.4	M
	06B4	9/25/2006	8.6	M
	06B5	9/25/2006	8.8	M
	06B6	9/25/2006	13.3	M
	06B7	9/26/2006	8.9	M
	06B8	9/26/2006	10.3	M
	06B9	9/28/2006	7.8	M
	06B10 ¹	9/29/2006	6.3	M
	06B11	9/29/2006	9.3	M
	06B12	9/29/2006	8.8	F
	06B13	9/30/2006	8.9	F
	06B14	9/30/2006	8.5	F
	06B15	9/30/2006	10.1	F
	06B16	10/1/2006	9.4	M
	06B17	10/1/2006	10.5	M
	06B18	10/1/2006	14.4	M
	06B19	10/2/2006	9.5	F
	06B20	10/2/2006	9.6	M
	06B21	10/2/2006	12.8	M
	06B22 ²	10/3/2006	12.0	M
Wainwright	06WW1	5/10/2006	12.5	F
	06WW2	5/11/2006	19.2	F
Kaktovik	06KK1 ³	9/5/2006	13.2	M
	06KK2	9/7/2006	10.1	F
	06KK3	9/16/2006	13.7	M
Nuiqsut	06N1	9/13/2006	13.0	F
	06N2	9/14/2006	8.8	M
	06N3	9/15/2006	9.5	M
	06N4	9/18/2006	10.4	F

¹ This whale was landed and then determined to be a calf. It had milk in its stomach and had very short baleen (32 cm).

² "Stinker", struck on 25 September 2006.

³ Struck on 4 September but landed on 5 September 2006

Table 2. Number of landed bowhead whales and estimated fates of whales struck and lost during the 2006 subsistence harvest by Alaska Eskimos¹.

Village	Landed	Struck & Lost	Total Struck	Estimated Fate ²
Barrow	22	5	27	3p, 2u
Kaktovik	3	2	5	2p
Little Diomedede	0	1	1	u
Nuiqsut	4	0	4	
Wainwright	2	0	2	
Totals	31	8	39	5p, 3u

¹ Data provided by the Alaska Eskimo Whaling Commission

² Whaling captain's estimate of chance of survival of bowheads that were struck and lost: p=poor, u=unknown.

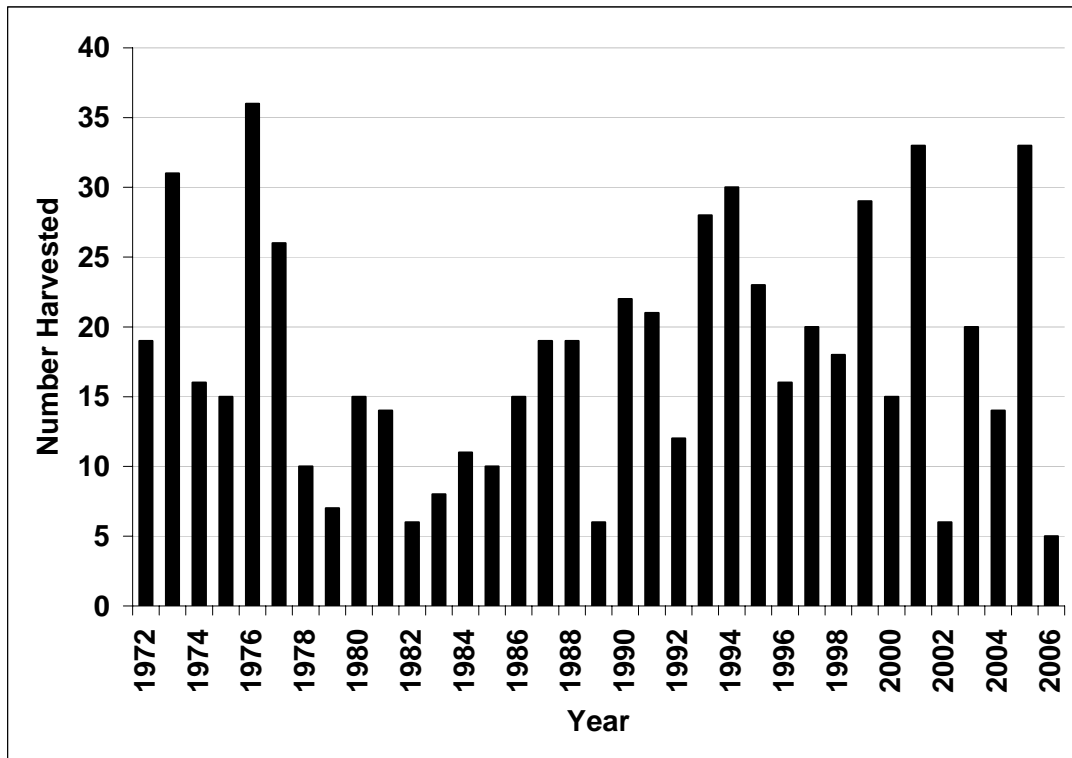


Figure 1. Number of whales landed in spring by Alaskan Eskimos (1972-2006). The spring harvest of five whales is the lowest in this 35-year record.

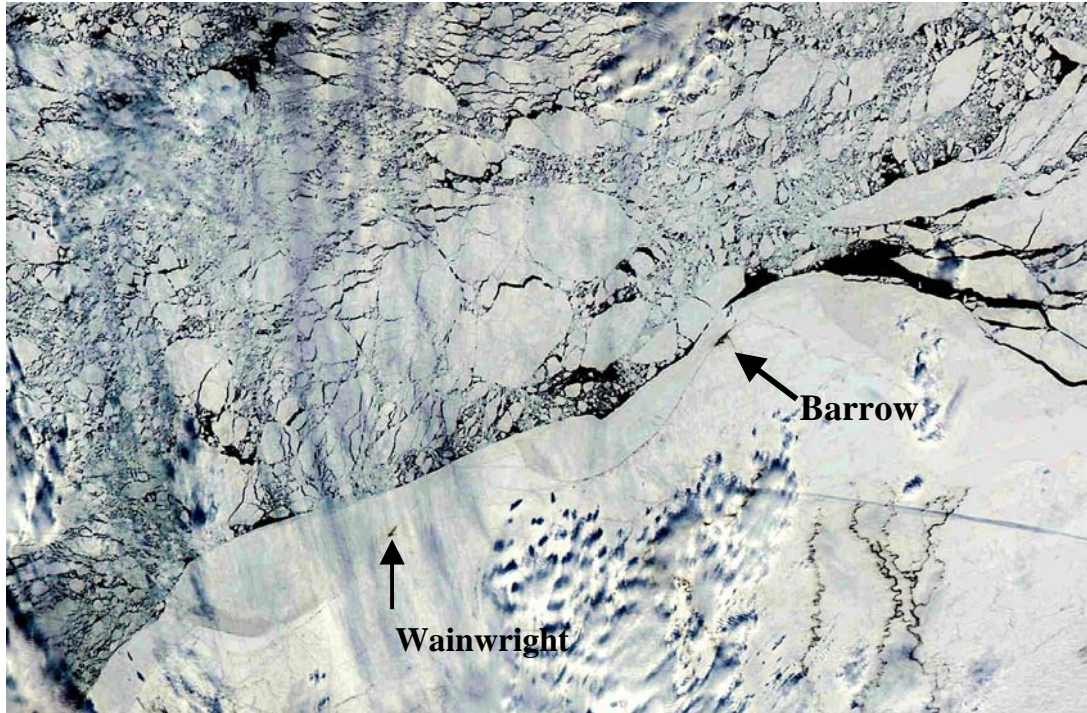


Figure 2. MODIS satellite image from 14 May 2006, during the peak period of the hunt and bowhead migration for Chukchi villages, showing the ice-choked spring lead systems at Barrow and Wainwright.