

# **NORTH SLOPE BOROUGH RESEARCH: EXAMINATIONS OF BOWHEAD STOMACH CONTENTS AND LOCAL BOAT SURVEYS**

December 2008 Annual Report

J. Craig George and Gay Sheffield

North Slope Borough, Department of Wildlife Management and  
Alaska Department of Fish and Game

January 15, 2009

## ***Background***

Studies of the bowhead whale area at Barrow have been ongoing for three years beginning with the National Science Foundation's (NSF) SNACs program. Examinations of bowhead stomach contents have been underway for over 30 years, beginning in the 1970s under NOAA-NMML and since 1981 by the North Slope Borough (NSB). Currently MMS is funding a multi-year bowhead whale feeding study (BOWFEST) via NMML. Its purpose is to expand and continue the feeding ecology research begun under the NSF. Information from this study will be used by the Minerals Management Service (MMS) for pre- and post-lease analysis and documentation under the National Environmental Policy Act (NEPA) for Beaufort Sea and Chukchi Sea Lease Sales.

The following report reports on the North Slope Borough (NSB) Department of Wildlife Management's and Alaska Department of Fish and Game (ADFG) activities with the BOWFEST study during 2007 through spring 2008. The NSB and ADFG work includes sampling stomachs of landed whales, boat based surveys, project coordination, logistical assistance, and boat-based observations of feeding whales.

## ***Objectives***

1. Gather distribution data on bowhead whales in the study area (Barrow to Cape Simpson and offshore ~20 km) via local boat-based surveys before the official "field season" starts on 15 August.
2. Document bowhead whale prey amounts and types in the stomachs of whales landed during the subsistence hunt of bowhead whales at Barrow and Kaktovik.
3. Document locations and basic behavior of feeding whales from a boat-based platform.

## ***Results***

### **Local Boat-Based Bowhead Whale Surveys**

Local whale hunters (Eugene Brower, Billy Okpeaha, Henry Elavgak, Zachariah Ahmakak, Lewis Brower) were hired to locate bowhead whales, determine their behavior, assist with deploying acoustic oceanographic instruments, and other projects as assigned.

In all a total of 18 surveys were conducted from 15 August to 13 September. Six of the 18 surveys were hunting forays conducted by hunters associated with project, prior to the official start (15 August) of the study (Figure 1; Table 1 and 2). These surveys were included because reliable GPS tracks existed and the hunters were confident about their recollection of bowhead sightings. With the inclusion of earlier hunting forays, the surveys spanned from 20 July to 13 September 2008. [In the July and early August surveys only sightings of bowhead whales were documented.]

During the period from 20 July to 13 September, a total of 48 bowhead whales were seen plus 6 additional “possible” bowhead sightings which may have been gray whales<sup>1</sup>. Gray whales were the most common whale seen with 54 recorded sightings however this is a minimum as not all gray whales were recorded. Essentially all gray whales were seen west of 156 W longitude. Other sightings include: two possible minke whales, two walrus, and four swimming polar bears (a single animal and a sow with 2 cubs) were seen in the survey area. Seal were generally ubiquitous through the area and not consistently recorded.

Sea ice was mostly absent in the study area after 15 August. The sea ice in the area earlier appeared to consist of entirely first-year ice, no multiyear ice was seen.

Table 1. Preliminary tally of whale, walrus and polar bear sightings during local boat surveys during fall 2008.

<b>Species</b>	<b>Number seen</b>
Polar Bear	4
Bowhead	48
Bowhead and or Gray	6
Gray	54
Minke?	2
Unidentified Whale	2
Walrus	2

|

Table 2. Table of sighting surveys and effort for 2008.

<b>Survey-ID</b>	<b>LENGTH (km)</b>
20JULY-LB	139.4
23JULY-BO	101.7
3AUG-CG	40.5
5AUG-EB	16.5
8AUG-LB	258
16AUG-BO	133.8
16AUG-CG	33.3
18AUG-BO	100.6
19AUG-BO	162
20AUG-BO	90.2
22AUG-LB	165.3
8SEPT BO	77.3
8SEPT-EB	101
8SEPT-CG	139
9SEPT-BO	136.5
10SEP-EB	113.5
13SEP-EB	126.8
<b>Total</b>	<b>1936.2</b>

Prior to the official start up of the study, two bowheads were reported [by Billy Okpeaha] north of Point Barrow in late July but then nearly a month past before bowheads were seen again on 28 August (Figure 1). We are fairly confident based on our surveys and limited aerial surveys, that very few bowheads were present in the western BOWFEST study area between late July and late August. Following that, relatively low numbers of bowheads were seen scattered around the BOWFEST study area. The largest whales were seen north of Point Barrow in deep water. Most bowhead whales appeared to be migrating west through the study area during late August and early September, but a few feeding groups were noted (Figure 2).

By the third week of September, large numbers of bowheads were seen in the vicinity of the Tapkaluk Islands and Cooper Island during tagging operations on 20 and 23 September. During these operations, Harry Brower commented they were “500 whales” in the area on 23 September that appeared to be feeding. Whale tagging was possible at this late date because the start of fall whaling was delayed until 4 October (2008). The longstanding agreement with the Barrow Whaling Captain’s Association has been to cease tagging and other research operations one week prior to the fall hunt.

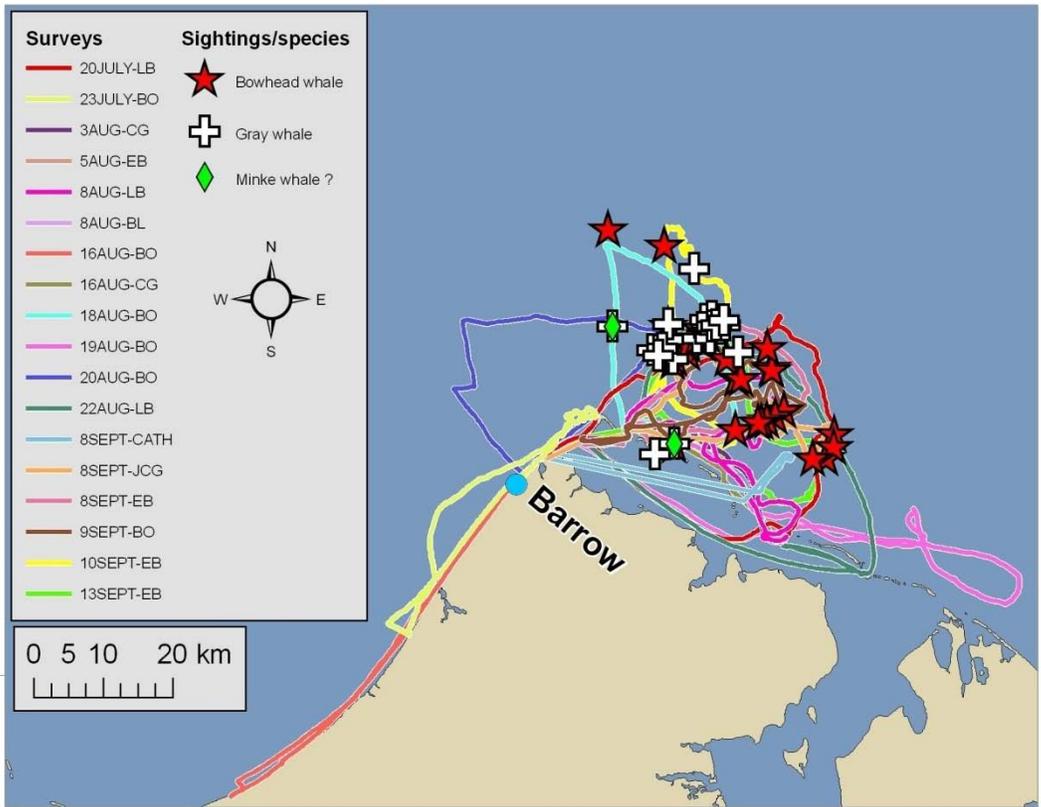


Figure 1. Locations of sightings of cetaceans seen during local boat-based surveys and effort tracks (graphics provided by John Citta).



Figure 2. A small group of bowhead whales feeding north of Cooper Island (photo by Henry Elavgak).

This study has shown the utility of using local boat-based surveys and local knowledge to locate bowheads, determine their behavior, and to deploy small scientific instruments in nearshore Arctic waters. Positive aspects of this approach include: 1) hunters are familiar with the region and distribution of marine mammals, 2) they understand the local waters and safety hazards, 3) they can refer to a large body of traditional knowledge to interpret their observations, and data from earlier hunting forays are available, 4) and the costs are modest compared with aircraft and large vessel charter.

Limitations include: 1) the use of small boats (< 9 m) confines surveys to nearshore areas (< ~25 miles offshore), 2) space for scientific equipment is limited, and 3) personnel space is limited. Improvements and modifications for future surveys might include: 1) structured transects, 2) revised data collection techniques, and 3) enhanced GPS data-capture approaches.

### **Submitted Papers**

A manuscript has been prepared and submitted to Journal *Arctic* describing the initial results from the original NSF funded bowhead whale feeding research at Barrow Alaska in 2005 and 2006. It has been tentatively accepted pending revision. Sue Moore is taking the lead. This paper will provide excellent background information for the current BOWFEST project. The paper reference:

Moore, S.E., George, J.C., Sheffield, G., Bacon, J., and Ashjian, C.J. and the SNACS Team. *In Prep*. Bowhead whale distribution and feeding near Barrow, Alaska during late summer, 2005-06. Submitted to *Arctic*.

### **Satellite Tagging**

The DWM and BOWFEST team participated along with Lori Quakenbush and local whale hunters in the satellite tagging efforts. Three Barrow residents are currently on the tagging permit: Harry Brower, Craig George, Lewis Brower and Robert Suydam. The result was a very successful season with 14 tags deployed at Barrow in October 2008.

### **Stomach Examinations**

Bowhead whale stomachs of landed whales were examined during 2008 from the spring and autumn whale hunt at Barrow and the autumn hunt at Kaktovik (see Table 3). Tissues samples were also collected from these animals (Table 4). Preliminary analysis of autumn suggests that bowhead stomachs contained mainly copepods at Kaktovik and euphausiid-like prey at Barrow. Whale 08B11 was unusual in that the stomach was full of almost fresh euphausiid-like prey with very little associated fluid (Figure 3).

Based on NSB-DWM field notes, one (11%) of nine whales harvested near Barrow during April-May were feeding (Table 5). However, at least 81% of the eleven bowhead whales examined during October were feeding (one fall whale stomach was not examined) (Table 5). At Kaktovik, one whale harvested and examined during September was feeding, one whale was not feeding, and one whale was nursing.



Figure 3. Photo of the stomach from whale 08B11, this stomach was unusual in that the stomach contained fresh undigested euphausiid-like prey with very little fluid.

In Kaktovik, field notes of the condition of each stomach examined revealed:

- 08KK1: Stomach contained approximately 12 liters of milk. Sample collected.
- 08KK2: Stomach cut open accidentally during butchering. Approximately 48 liters of a watery red liquid containing undigested copepods and several amphipods were spilled. Sample collected.
- 08KK3: Stomach contained several liters of frothy clotted material, no prey items were present. Sample collected.

Currently, frozen stomach samples from 21 whales harvested during 2008 near Barrow and Nuiqsut were received, and are currently archived at the ADF&G Nome office. Further work in the laboratory will provide details on the types of invertebrate prey consumed.

An analysis of stomach contents from all whales landed since 2001 is underway by Sheffield and colleagues. The last comprehensive summary of the feeding habits of bowhead whales was published in Lowry et al. (2004) for whales landed between 1978-2000.

Table 3. Bowhead whales harvested near Barrow, Kaktovik, and Nuiqsut during 2008.

ID Number	Village	Date	Sex	Total Length (m)	Stomach
08B1	Barrow	Apr. 27	F	8.7	Examined
08B2	Barrow	Apr. 28	M	8.8	Examined
08B3	Barrow	May 7	M	9.2	Examined
08B4	Barrow	May 7	F	8.7	Examined
08B5	Barrow	May 8	F	9.2	Examined
08B6	Barrow	May 8	M	8.6	Examined
08B7	Barrow	May 8	M	9.2	Examined
08B8	Barrow	May 10	F	8.4	Examined
08B9	Barrow	May 11	M	8.4	Examined
08B10	Barrow	Oct 5	M	12.4	Examined
08B11	Barrow	Oct 6	F	8.9	Examined
08B12	Barrow	Oct 6	M	9.3	Examined
08B13	Barrow	Oct 9	M	10.6	Examined
08B14	Barrow	Oct 9	F	13.6	Examined
08B15	Barrow	Oct 9	M	12.7	Examined
08B16	Barrow	Oct 14	F	8.1	Examined
08B17	Barrow	Oct 14	M	9.0	Not examined
08B18	Barrow	Oct 14	F	8.3	Examined
08B19	Barrow	Oct 19	F	8.2	Examined
08B20	Barrow	Oct 22	F	8.7	Examined
08B21	Barrow	Oct 23	M	8.3	Examined
08KK1	Kaktovik	Sep. 6	M	7.2	Examined
08KK2	Kaktovik	Sep. 7	M	12.8	Examined
08KK3	Kaktovik	Sep. 13	M	9.8	Examined
08N1	Nuiqsut	Sep. 5	F	9.9	Examined
08N2	Nuiqsut	Sep. 6	F	9.0	Examined
08N3	Nuiqsut	Sep. 8	F	8.8	Examined
08N4	Nuiqsut	Sep. 9	F	10.7	Examined

Table 4. Tissues collected from bowhead whales harvested near Kaktovik during September 2008 and the recipient of those tissues.

	08KK1	08KK2	08KK3
Stomach contents	ADF&G; NSB-DWM	ADF&G; NSB-DWM	ADF&G; NSB-DWM
Blood	NSB-DWM	NSB-DWM	NSB-DWM
Blubber	NSB-DWM	NSB-DWM	NSB-DWM
Tongue	NSB-DWM	-	NSB-DWM
Kidney	NSB-DWM	NSB-DWM	NSB-DWM
Liver	NSB-DWM	NSB-DWM	NSB-DWM
Spleen	NSB-DWM	NSB-DWM	NSB-DWM
Muscle	NSB-DWM	NSB-DWM	NSB-DWM
Lung	NSB-DWM	NSB-DWM	NSB-DWM
Eyeball(s)	NSB-DWM	NSB-DWM	NSB-DWM
Testis	-	NSB-DWM	NSB-DWM
Heart	NSB-DWM	NSB-DWM	NSB-DWM
Bladder	-	NSB-DWM	-
Skin	NSB-DWM	NSB-DWM	NSB-DWM
Body fat	NSB-DWM	NSB-DWM	-
Intestine	NSB-DWM	NSB-DWM	NSB-DWM
Baleen	NSB-DWM	NSB-DWM	NSB-DWM

NSB-DWM = North Slope Borough, Department of Wildlife Management (Barrow)  
 ADF&G = Alaska Department of Fish and Game (Nome)

Table 5. Status of bowheads harvested near Barrow (spring) and Kaktovik (fall) during 2008 and examined for evidence of feeding. Feeding status based on field notes pending laboratory analysis is indicated by \*. Sample sizes are indicated in parentheses.

	Barrow – spring	Barrow – fall	Kaktovik – fall
	n=9	n=11	n=3
Feeding	11% (1)	81% (9)	33% (1)
Not feeding	78% (7)	-	33% (1)
Uncertain	11% (1)	18% (2)	-
Nursing	-	-	33% (1)
Unexamined		(1)	

<sup>i</sup> Note, literally hundreds of bowhead were seen in late September during satellite tagging exercises.

## References

Lowry, L. F., G. Sheffield, and J. C. George. 2004. Bowhead whale feeding in the Alaskan Beaufort Sea, based on stomach contents analyses. *J. CETACEAN RES. MANAGE.* 6(3):215–223.