FIELD REPORT FOR VESSEL OPERATIONS IN COOK INLET, ALASKA, JULY 1995

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INTRODUCTION

The National Marine Mammal Laboratory (NMML) in cooperation with the National Marine Fisheries Service - Alaska Region (NMFS-AKR), Alaska Beluga Whale Commission (ABWC), and the Cook Inlet Marine Mammal Council (CIMMC) conducted population studies on beluga whales in Cook Inlet in the summer of 1995. NMFS-AKR and CIMMC provided boats and personnel, and the ABWC provided funding. The overall objective of the research was to determine an abundance estimate for the Cook Inlet beluga whales. The research plan consisted of three parts: an aerial survey (see Rugh *et al.*), a dive behavior study using satellite-linked dive recorders, and a surfacing behavior study using VHF radio transmitters attached via suction cups. Efforts to satellite tag beluga whales were made from July 18 to July 31, 1995. Radio tagging work was conducted from August 2 to August 7, 1995. The vessel work in Cook Inlet included four boats: a 15-foot inflatable Zodiac (NMFS), an 18-foot inflatable Avon (NMFS), a 20-foot wooden boat (native owned), and an 18-foot aluminum boat (native owned).

OBJECTIVES

The objectives of the 1995 vessel field study were to:

- complete a time-at-depth study of beluga whales using satellite-linked dive recorders.
- determine patterns of movements in the late summer using satellite-linked dive recorders.
- gather breathing rate data using VHF radio tags to determine correction factor parameters for aerial counts

DIVE BEHAVIOR STUDY (SATELLITE TAGS)

Methods

Dr. Thomas Smith of Eco Marine Corporation was contracted to lead the beluga capture and attachment of satellite tags. Dr. Smith has considerable experience capturing, handling and satellite tagging beluga whales in the Canadian Arctic. Techniques for satellite tagging were modified from those used by Dr. Smith. In the clear water of the Canadian Arctic, it was possible to drive a whale into shallow water near a beach using a small inflatable boat. When the whale

entered water approximately three feet deep, one person would jump into the water with a hoop net to place over the head of the whale while another would jump in and secure a rope around the whale's tail. Once secured in this manner, it was possible to attach a satellite tag to the animal. Our tagging operations took place near the mouth of the Big Susitna River (northern Cook Inlet), where large numbers of beluga whales can predictably be found in the summer. There is an extensive tidal flat that becomes a series of exposed mud flats and channels at low tide. On the rising tide, the mud flats are flooded, creating a wide shallow area that ranges in depth from one to 20 feet. Whales have been observed to move up toward the river mouths on the rising tide, often through very shallow water. The Zodiac was the designated capture boat, with a driver and two jumpers. All boats (three or four on any particular day) were used to herd a group of whales onto the shallow flats during a rising tide, and isolate an individual. The Avon was designated as the support boat that would supply the capture boat with the tagging materials once a whale was secure.

Results

No whales were captured for satellite tagging. A total of 30.3 hours were spent on the water over six days (Table 1). This work was conducted under Permit No. 957 issued to the National Marine Mammal Laboratory to allow satellite tagging of beluga whales and incidental harassment to whales during tagging operations. No whales were taken by tagging, and 114 were taken by inadvertent harassment.

Discussion

The procedure used in the Canadian Arctic did not work in Cook Inlet for several reasons. The Cook Inlet waters near the Big Susitna River mouth are very turbid, completely obscuring the bottom features and the whales while underwater. The depth of the water was a critical factor in the decision to jump with the hoop net. The person jumping with the net needed to dig their heels into the bottom to be able to stop the whale. If the water depth was greater than about four feet, a firm hold would not be possible and a dangerous situation could occur for both the whale and the jumper. But because the water was so opaque, it was not possible to know how deep the water was at any given moment. When the whales are in waters that are five feet or less, they begin to create a bow wake that is easy to follow. This wake did indicate when the whales were in relatively shallow water, but the size of the wake varied with the size of the whale and the water conditions, and the difference between four and five feet could have been critical for the success and safety of a capture. In addition, the tidal fluctuations in Cook Inlet are very extreme, and the water depth changes very quickly (1 foot every 10 minutes during flood and ebb tides). If a capture was made in a depth of four feet on a rising tide, the water depth would reach seven feet in less than half an hour, increasing the difficulty of the tagging operation. During our capture attempts, two jumps were made but were not successful.

Another problem encountered was that the whales did not come as far up onto the mud flats on a rising tide as expected. A field camp was used from July 22 to July 31 on an island in the middle of the Big Susitna delta. Being located in the vicinity of the whales (rather than based out of Anchorage) had advantages such as knowing the weather conditions firsthand and locating whales from camp. The whales were known to swim past the camp into shallow areas at the mouth of the river (and sometimes up the river itself). The plan was to wait for a group to pass

by the camp, and then start up the boats and herd the whales into shallow areas. But, during the time we were in camp, only once did a group pass by. Therefore, being located at the camp did not give us the advantage of being able to come up behind the whales as expected. Basing operations at the camp also limited time spent on the water because mud flats separated the island from the main channel of the inlet during low tide and the low ends of ebb and flood. Operations were often terminated to avoid stranding boats on mudflats on the way back to camp.

Researchers encountered similar problems capturing beluga whales for satellite tagging in the turbid waters of the Mackenzie Delta in 1994 (T. Smith, pers. comm.). In 1995, they deployed a different strategy using nets and were very successful (25 beluga whales captured in two weeks). This method involved five or six small boats, including two Zodiacs and one 20-22 ft boat with the capability of deploying a net off the stern. All boats were used to herd a single whale or small group of whales into shallow water, where the larger boat quickly deployed a seine net to encircle a targeted whale. The Zodiacs were used to approach the whale, tie on a tail rope and tow it to an area shallow enough for handlers to enter the water. A hoop net was then placed over the head of the animal and the seine net removed. The tag could then be attached easily in approximately two feet of water. We plan to use this method in Cook Inlet in 1996 or 1997.

SURFACING BEHAVIOR STUDY (SUCTION CUP ATTACHED RADIO TAGS)

Methods

Operations for radio tagging beluga whales began on August 3 and were based out of Anchorage. As in 1994, the radio tags were attached with a suction cup using a long pole. When whales were found in shallow waters, the boat driver isolated an individual by following its wake while the tagger stood in the bow of the boat waiting for the whale to surface. If the whale surfaced close enough to the bow, the tagger thrust the pole toward the back of the whale, placing the suction cup and attached tag as high on the back of the whale as possible. Signals from the radio tag could then be recorded and monitored using receiving equipment from the boat. We began by using three boats (two tagging and one to monitor radio signals) but discovered that only two were necessary (Table 1). Each boat carried a driver, a recorder, a tagger, and receiving equipment. In this way, two whales could be tagged and monitored independently.

Results and Discussion

A total of 27.7 hours were spent on the water over four days (Table 1). Weather and time constraints limited time on the water, but three whales were tagged successfully for a total of 5.75 hours of recorded signals. As in the last half of the 1994 season (mid June), we had trouble with the attachment of the suction cup on some whales. A tag would be apparently attached by suction, but would fall off within one to two surfacings. This may be a design flaw in the suction cup, or may be caused by molting skin on the whale. Because the longest attachments were achieved in early June 1994 (6+ hours), we believe that suction cup tagging in late May and early June may be advantageous relative to July.

This work was conducted under Permit No. 897, issued to the National Marine Mammal Laboratory to allow tagging of beluga whales and incidental harassment during the tagging operation. Four whales were tagged with a VHF radio using a suction cup attachment and 80 were harassed.

No whales were taken under Permit No. 961, issued to the National Marine Mammal Laboratory to allow biopsy sampling of beluga whales. No biopsy sampling was conducted in 1995.

REFERENCES

Rugh, D. J., K. E. W. Shelden, R. P. Angliss, D. P. DeMaster, and B. Mahoney. 1995. Aerial surveys of belugas in Cook Inlet, Alaska, July 1995. Annual rept. To Alaska Beluga Whale Commission.

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Table 1. Participating vessels and number of hours spent on the water during the 1995 beluga whale study. Vessels included: V1=NMML Zodiac, V2=AKR Avon, V3=Denty Owen's wooden boat, and V4=Art Nuglene's aluminum boat. Comments include: A=Whales did not move past camp, and W=Weather day,

Dates	Vessels	Hours on the water	Comments
July 18	V1, V2, V3, V4	9.5	Based in Anchorage
July 19	-	0	W
July 20	V1, V2, V3, V4	5	
July 21	-	0	W
July 22	V1, V4,	1	Moved into camp
July 23	V1, V2, V3, V4	3.25 (V1, V3, V4); 2 (V2)	
July 24	V4	1	A, W (evening); transit from camp to Anchorage
July 25	V1, V2, V3, V4	3.5 (V2); 2 (V1, V3); 1 (V4)	V2 - supply run, V4 - transit from Anchorage to camp
July 26	V1, V2, V3, V4	4 (V1, V3, V4); 2 (V2)	V2 - personnel transfer
July 27	V2	1	A, W; transit from Anchorage to camp
July 28	V1, V2, V4	2	W (afternoon and evening)
July 29	V3, V4	1	A; transit from camp to Anchorage (V4), and Anchorage to camp (V3)
July 30	V1, V2, V3	3 (V2); 5 (V1, V3)	V2 worked in morning, then transited to Anchorage
July 31	V1, V2, V3, V4	4 (V2); 7 (V1, V3); 1.5 (V4)	V2 transited from Anchorage and back for morning work; V4 transited from Anchorage in evening
August 1	V1, V3, V4	4	W, Moved from camp back to Anchorage
August 2	-	0	W
August 3	V2, V3, V4	6	Did not use V1 for suction cup tagging
August 4	-	0	W
August 5	V2, V3, V4	6.5	
August 6	V2, V4	8.42	
August 7	V2, V4	6.75	
August 8	-	0	W
August 9	-	0	W