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Summary of Field Activities, Summer 1974

White Whale and Narwhal Studies

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I. White Whales at Somerset Island.

After a short stay in Resolute (July 4-6), the Polar Continental Shelf Project Twin Otter provided our transportation to Cunningham Inlet, Somerset Island, where we set up camp on July 6. However, the inlet was still frozen and we awaited the arrival of the beluga herd.

1. Aerial Surveys

On July 8 and 10, we conducted aerial surveys of the north coast of Somerset Island, from Pressure Point to Port Leopold. The aircraft used was a Bell 206B helicopter, on charter to P.C.S.P. from Dominion Pegasus Helicopters. On July 8, the survey revealed 10-12 belugas in Barrow Strait adjacent to the floe edge of Cunningham Inlet, and 71 adults and 8 large calves were counted along the coast between the inlet and Pressure Point. From Cunningham Inlet to Garnier Bay, 84 white whales were counted, including a group of 60 adjacent to the river delta systems east of Garnier Bay. Several larger grey calves were noted.

The July 10 aerial survey produced a count of 65 white whales between Cunningham Inlet and Port Leopold. Belugas were observed to be increasing in number at the mouth of Cunningham Inlet.

2. Cunningham Inlet Study.

The purpose of our expedition to Cunningham Inlet, Somerset Island, was to study a population of white whales which annually spend a part of the summer in the mouth of the Cunningham River and adjacent inlet, with a view to determining the importance of the river delta to this population.

By July 21, the ice of the inlet had broken sufficiently to allow about 20 whales to reach the river mouth. A gradual increase in number was thereafter observed, culminating in an estimated 1000 whales on August 7. On July 24, we erected a 20 ft high upright aluminum observation scaffold in the river shallows, on the west side of the delta, adjacent to the area

where whales were concentrated at high tide. Since the distribution of the whales was greatly influenced by daily tidal fluctuation, we conducted systematic tower observations at each of the 2 daily high tides, at which times the whales were concentrated in the river mouth and in proximity to the tower. Observations from a 400 ft hill at the southwest corner of the inlet provided information on the distribution and movements of the whales at the 2 daily low tides. In addition, stream and air temperature and river current speed were measured at the high-tide observations, usually in the vicinity of the observation tower. We were also able to conduct underwater photography of belugas near the tower.

At high tide, whales were concentrated in the river mouth to a considerable distance upstream, with fewer whales (and lower density) in the adjacent inlet head. The low tide observations indicated that most whales were concentrated at the head of the inlet adjacent to the delta, with a few whales remaining in the extreme downstream portion of the river mouth and a considerable number dispersing along the western shallows of the inlet from its head to Barrow Strait. Occasionally whales occurred along the east coast or in the central part of the inlet.

In addition to these small-scale movements, large-scale movements were noted on July 30 and August 8, when at the evening low tide all (or nearly all) whales left the inlet and returned to the delta the following day. Numerous large ice pans were observed in Barrow Strait on these occasions, and we surmised that the whales' large-scale movements were actually migrations to feed among the ice floes in the strait. The only direct evidence of feeding activity is derived from an immature female stranded in the delta on July 26, and whose stomach contained a small amount of crustaceans sampled on July 29.

We later learned that the whales had left Cunningham Inlet by August 20, and that only 20-30 whales were present when Geological Survey of Canada seismic experiments commenced on August 16 in the inlet.

In particular, we were interested in the importance of the river mouth as a calving site for this population. Although we have no direct evidence of calving, we did observe an increasing number of small light grey-brown neonatal calves. However, the total population was increasing simultaneously, so it is not known whether the new recruits migrated into the delta from Barrow Strait or were actually born there. This question could be more fully resolved by means of aerial surveys for neonates along the floe edge prior to break-up of Cunningham Inlet fast ice and by means of sequential aerial photography of the delta at high tide throughout the summer season, to document the seasonal numerical increase of neonates and their possibly increasing representation in the population.

The question of possible feeding activity could be investigated more closely by strategic netting for food (fish) species availability and by a controlled culling of some of the belugas in the inlet after their

return from Barrow Strait. Depending on the sample size, this harvest would complement the life-history information provided by sequential aerial photography, in addition to providing feeding data. On both the small and large-scale migrations, the whales could be followed by boat or aircraft in order to observe their behaviour outside the inlet. Dr. Arthur Mansfield has suggested that other possibly suitable high Arctic estuaries could be surveyed for beluga herds, using fixed-wing aircraft, after an initial examination of aerial photographs for potential calving estuaries.

As to the importance of the river delta to this large whale population, it is possible that the river mouth provides thermal protection to neonates, which lack the insulative blubber of older animals. The surface temperature of the river mouth near the tower varied only a little and averaged 45°F. It is also possible that the delta's shallowness assists parturition and initial surfacing of the newborn calf, although the reduced salinity of the delta waters would decrease the buoyancy of neonates. However, we observed neonates supported by their mothers and surfacing with no apparent difficulty. The question of the importance of the arctic estuarine environment to beluga populations has not been fully resolved. In view of the possible development of gas and oil fields in the high Arctic in the near future, these beluga concentrations should be identified and examined with respect to their ecological significance and their sensitivity to environmental disturbances.

II. Aerial Survey of Southwest Devon Island Coast.

On August 9 we returned to Resolute, and on August 10 we conducted aerial surveys of the southwest Devon Island coastline, particularly the coastlines of Maxwell and Radstock Bays. The aircraft used was the P.C.S.P. Twin Otter CF-ASS. No whales were observed in Maxwell Bay; however, 465 were counted in the offshore shallows between Cape Hurd and Gascoyne Inlet, with the greatest number observed near the mouth of Radstock Bay. Most of these whales comprised a few large groups which were moving eastward along the south coast of Devon Island.

III. Aerial Survey - Resolute to Pond Inlet.

This survey was carried out August 12 from a Twin Otter which we chartered from Kenting Aviation in Resolute. A low overcast and patches of dense fog and snowfall reduced visibility considerably, although from the survey altitude of 1000 ft marine mammals were easily observed. No whales were noticed between Resolute and Garnier Bay, but just to the east of Garnier Bay, in the shallows offshore a stream delta complex, we spotted

about 100 belugas swimming westward.

The Admiralty Inlet survey consisted of 3 flight transects: central, east coast, and west coast. All flights extended from the approximate latitude of Arctic Bay to Iglorsuit Island. This survey produced counts of 2 white belugas, 11 narwhal calves, and 172 other narwhal. They occurred mainly along the west coast from Turner Cliffs to Kakiak Point and near the centre of the inlet from Stephens Headland to Cape Cunningham.

Coastal surveys of Koluktoo Bay, Milne Inlet, and part of Eclipse Sound revealed a count of 168 narwhal plus at least 5 calves. Narwhal were observed mainly near Pisiktarfik Island and Athole Point, north of Ragged Island and Cape Hatt, and near Bruce Head (Koluktoo Bay), where we estimated 130 narwhal of diverse age and sex composition.

The survey terminated at Pond Inlet, northern Baffin Island.

IV. Narwhal - Kaunuk Hunting Area.

After a nine day delay in Pond Inlet, we arrived at the Kaunuk hunting area, located on the west coast of Eclipse Sound, northwest of Pisiktarfik Island. Sam Ransom, the N.W.T. game officer for northern Baffin Island, provided transportation in his 40 ft whaleboat, the Nassiq. We camped near the northernmost of the 2 hunting camps, accompanied by Wayne Vogl and Malcolm Winsby of the University of British Columbia, who were studying the anatomy of the thoracic retial arterial system of the narwhal.

On August 24 we were unexpectedly joined by Stef Stefansson and Bob Martin of the Freshwater Institute in Winnipeg. They were conducting ecological studies in Strathcona Sound, Admiralty Inlet, and had come to Kaunuk to obtain organ and tissue samples from narwhal for heavy metal analysis. From their helicopter they had observed many narwhal in Koluktoo Bay and near Alfred Point. Stefansson returned to Arctic Bay on August 27.

On August 22, Seeanna Attagootak caught a female narwhal near camp. We obtained the ovaries and measurements of this animal, and we will receive the 2 buried teeth (tugalosa) later from the U.B.C. team, since they required the entire anterior portion of the carcass for further anatomical study in the laboratory.

On August 27, a large group of narwhal, consisting mainly of young males, was sighted in shallow offshore waters adjacent to our camp, heading north along the coast. Two canoes with a total of 5 hunters pursued this group of whales, and the total catch was 7 young males with short tusks, 1 old male with a long broken tusk, and one pregnant female. Two of the

young males and the old male were caught and hauled up about 3 miles north of camp whereas all the others were killed and flensed near our camp. However, one of these young males sank in shallow water and was not recovered until August 29, too late for samples to be obtained. Otherwise, reproductive organs, buried teeth, and body measurements were obtained from all the whales, except the foetus of the pregnant female which was retained by the U.B.C. group for anatomical study.

Also on August 27, 4 females were killed near Alfred Point by hunters from Charlie Inurak's camp to the south. These were examined and flensed on August 29. Three of the females were pregnant with small foetuses. Two tugalosas and both ovaries were obtained from each female, and in addition all of the foetuses were preserved.

This small sample of the Inuit catch provides evidence for sex and age segregation of individuals within the summering population of narwhal. From the catch composition, it appears that 2 groups of whales were in the vicinity of Kaunuk on August 27, one a group of mainly young males to the north, and the other a group of mainly pregnant females to the south. It is possible that these animals were beginning their northward migration to Lancaster Sound. There may have been other groups present as well.

The hunters seem content to await the return northward migration of the narwhal along the west coast of Milne Inlet and Eclipse Sound. When narwhal are sighted near the shore, canoes are launched and the narwhal are pursued by the hunters. It is advantageous to the hunter to stay seaward of the narwhal in shallow water, for when the whale dives it can be seen underwater and readily followed in the canoe. When the narwhal surfaces within effective firing range, it is shot, and at a subsequent surfacing, if within range, it is harpooned. The steel harpoon has a line and seal-skin float attached. A second shot, if necessary, dispatches the harpooned whale. A skilled hunter normally requires only 2 or 3 shots for each whale. Only one animal sank outright, and it was recovered from the shallow water 2 days later.

The dead whales were then hauled ashore and flensed, all muktuk and much of the dorsal meat being utilized. The muktuk was removed in 2 giant sheets, one from either side of the body. The underlying blubber was discarded (except a little for kudliks) and the meat was removed, for human and canine consumption and possibly for caching as bait for winter traplines.

Our observations of the Kaunuk narwhal hunt suggest that the Inuit hunters practice little or no selectivity in shooting whales, due to the fact that in the heat of the chase the tusk of a whale that breaches only for a few seconds cannot be seen, given the premise that today's hunt is primarily for the ivory, now \$19.00 per pound to the hunter. This

lack of selectivity results in an unbiased Inuit harvest, and any sample heterogeneity would reflect the behavioural and distribution patterns of the animals. Therefore, females are certain to be included in the catch, and it is therefore possible to derive life-history and biological information on narwhal from the Inuit harvest.

The narwhal harvested at Kaunuk were utilized to a greater extent than we had expected. Most or all of the muktuk from these animals was shipped to the Pond Inlet freezer facilities for local consumption.

The Nassiq brought us back to Pond Inlet on August 30 and on September 3 we found ourselves back in Montreal!

Further details and data can be found in the expedition diaries and in the appropriate field notebooks.