Annual Assessment of Subsistence Bowhead Whaling Near Cross Island, 2007: cANIMIDA Task 7 Annual Report

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This study was funded by the United States Department of the Interior, Minerals Management Service (MMS), Alaska Outer Continental Shelf Region, Anchorage, Alaska under Contract Numbers 1435-01-04-CT-32149 and M04PC00032, as part of the MMS Alaska Environmental Studies Program

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Executive Summary

This Task Order, funded by the Minerals Management Service (MMS) has as its broad objective the description of subsistence whaling as currently conducted near Cross Island by residents of Nuiqsut. This effort is designed to measure basic descriptive parameters of Cross Island whaling so that observed changes (if any) can be analyzed in relation to such factors as oil and gas activities, weather and ice conditions, or other variables. Special attention is devoted to geospatial information through the sharing of GIS information by participating whaling crews. Annual project reports are only for the purposes of reporting information collected, with no analysis of the information either as a self-contained database or in conjunction with the many pertinent external databases. As a second broad objective, the project is designed as a collaborative effort of MMS and its contractor, Applied Sociocultural Research (ASR), the subsistence whalers from Nuiqsut, and the Alaska Eskimo Whaling Commission (AEWC). The project will develop a system for collecting information that local whalers themselves can adopt, adapt, and maintain. This report documents the results of the fourth and last year of this component of the cANIMIDA project and will be continued as a stand-alone project for four additional seasons of data collection.

Three methods of information collection are employed – systematic observations, collection of daily vessel locational information from handheld GPS units, and whalers' self-reports and perceptions. Emphasis has been placed on such measures as:

- Number of crews actively whaling (observation)
- Size and composition of crews, and fluctuation over the whaling season (observation)
- Number of whales harvested (observation, self-report)
- Days spent whaling, and days prevented from whaling (weather, equipment failure or repair, etc.) (observation, self-report)
- Days suitable for whaling when whaling did not occur (observation, self-report)
- Subsistence activities occurring other than whaling (self-report, observation)
- Location of whale sightings and whale harvest (GPS, self-report)
- Location of whale searching (GPS, self-report)
- Local weather and ice conditions (observation,
- self-report)
- Bowhead whale behavior in the Cross Island area, and indicated differences from past experience (self-report)
- Changes in access or other issues related to the whale hunt, such as increased effort for the same (or reduced) harvest, increased risk, increased cost (self-report)

Five crews whaled from Cross Island in 2007. One of these was a newly formed crew with a captain who had whaled for many years as the co-captain of an existing crew. Three crews whaled with only one boat (although two of these crews also used a second boat for support tasks – to haul supplies, for example). The other two crews each used two boats for whaling (one of these crews had a third boat, but it was disabled on the way to Cross island and spent the season at West Dock). As in previous years, the starting date of the Cross Island whaling season depended primarily on weather conditions, reports of whale sightings near Cross Island, and the condition of the boats. The first crew left for Cross Island on 30 August and reported good scouting weather and presence of whales. This prompted the second crew to leave for Cross

Island on 31 August. The other three crews were finalizing preparations and were further delayed by two days of bad weather (1-2 September) before they could leave for Cross Island on 3 September. The researcher traveled with this last group and was therefore not present at Cross Island on the days that the first whale was landed (31 August) and a whale was struck and lost (3 September). Three of the five crews scouted for whales on 4 September, but due to the marginal weather conditions they did not scout very long and reported few whales or blows. Weather prevented any crews from scouting on 5 September. On 6 September conditions were worse than on 4 September and the two crews that attempted scouting spent less than two hours on the water and did not report seeing any whales or blows. All crews went out scouting on 7 September and a whale was taken relatively quickly in the morning. Once it was towed to Cross Island, the captains agreed that since conditions were still good for scouting they should take advantage of it, as the weather might worsen over the next few days. All crews, except the crew that had taken the whale that morning, went scouting in the afternoon. Their attempt was successful and another whale was landed in the afternoon. After it was towed in, the captains again conferred and decided that three landed whales (averaging over 40') were sufficient to meet the community's need and they did not need a fifth strike. It turned out that weather conditions on 8-9 September were not suitable for scouting, and 10 September was spent finishing butchering and packing. Conditions on 11 September were ideal for traveling and all crews left for Nuiqsut.

The weather station provided information on the weather conditions at the days that the crews went out scouting. This information confirms the generalizations from past seasons that the best whaling conditions are on days with little or no wind, especially if there is little or no ice cover to moderate sea conditions (as was the case in 2007). There were only three good scouting days during the 2007 whaling season, and two more marginal days (when some, but not all, crews went out scouting for whales). Barometric pressure trends were also good indicators of better days for scouting.

The whaling seasons for the five crews ranged in length from 9 to 13 days, counting travel days. The seasons for the individual crews were 9, 9, 9, 12, and 13 days. Weather and sea conditions during the 2007 season were different than in most previous years. Ice cover was mostly absent and winds were relatively strong, which in the absence of ice cover made scouting for whales difficult. However, whales were migrating relatively close to Cross Island so the whalers were able to find and strike whales when conditions were good for scouting. The combination of the proximity of whales to Cross island and a few days with favorable scouting conditions resulted in a relatively short whaling season of 13 days. This compares with the 21-day season in 2006 (Galginaitis 2007a) and the 27-day season in 2005 (Galginaitis 2006b).The researcher was not on Cross Island for the entire whaling season, but was able to collect GPS tracks and whaler accounts for all scouting days, although not from all boats. There was one new boat with a hard-topped cabin that interfered with the GPS satellite reception, so GPS tracks for this boat were incomplete. The number of boats scouting on any given day ranged from 2 to 7. Crews reported spotting whales on four of the five days when at least one boat went out scouting, but remarked that they observed the most whales on 7 September, 31 August, and 3 September. They saw only a few on 4 September and did not report seeing any on 6 September. The days with the best conditions for scouting (little wind, calmer seas) were those on which more whales were observed. It was believed that whales were probably present on all days, but simply more difficult to see on some days than others.

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Acronyms and Abbreviations Used in Tables, Text, and Appendices

Acronym or Abbreviation	Expanded Term or Reference
UA[1]	Ahkiviana Whaling Crew
BO[1]	Oyagak Whaling Crew
IAN	Aqargiun Whaling Crew
NAP[1]	Napageak Whaling Crew
NUK[1]	Nukapigak Whaling Crew
#	Number
ACS	Alaska Clean Seas
AEWC	Alaska Eskimo Whaling Commission
ANCSA	Alaska Native Claims Settlement Act
ANIMIDA	Arctic Nearshore Impact Monitoring in Development Area
BP	Barometric Pressure
BPXA	British Petroleum Exploration Alaska
cANIMIDA	continuation of ANIMIDA
CI	Cross Island
esp.	especially
F	Fahrenheit (temperature measurement)
ft	Feet
GIS	Geographical Information System
GPS	Geographic Positioning System
HAD	Human Activities Database
HCC	High Cloud Cover
HP	Horse Power
IHLC	Inupiat History, Language, and Culture Commission
IWC	International Whaling Commission
MFCI	Miles From Cross Island
mmddyy	Date Format – month/day/year
MMS	Minerals management Service
MPH	Miles Per Hour
N,S,E,W and combinations	Compass directions (north, south, east, west, northeast, etc)
NA	Not Applicable
NQT	Nuiqsut
NSB	North Slope Borough
NSB DW	North Slope Borough Department of Wildlife Management
OCS	Outer Continental Shelf
OWA	Oil/Whalers Agreement
TOT	Total Time (of individual boat trips)
UNK	Unknown
w/number or /number	With the specified number (of people)
WCA	Whaling Captains Association
WCC	Whaling Communication Center
WD	West Dock (Prudhoe Bay)
WF	Weather File (time series of weather station measurements)

[1]When crews use multiple boats, each boat is differentiated by a number after the crew designation (1-4)

Acknowledgments

This work would not have been possible without the assistance of a great number of people. Foremost among them must be the whalers and other residents of Nuiqsut. While it is unfair to single out individuals when all provided essential information and support in what is after all a communal and cooperative undertaking, I would be remiss if I did not explicitly thank those whaling captains and their crews who extended me the hospitality of their cabins. This is the report on my seventh field season on Cross Island, for which the Oyagak crew served as my hosts. Paul Kittick, as my host for the first year when the project was still an unknown quantity to the whalers, also has my utmost appreciation. Archie Ahkiviana agreed to be my host the second year, when Paul did not whale, and Billy Oyagak served as my host the third season, and they both also have my profound thanks. The late Thomas Napageak was my host for the fourth season, and the Ahkiviana crew again for the fifth and sixth seasons. I of course also thank the other crews who were out on Cross Island during the 2001-2007 seasons (Nukapigak, Aqargiun, and Ipalook), and David Pausanna for all the help he has given me over the phone and while I have been in Nuiqsut. I cannot begin to list the other residents of Nuiqsut who shared so much of their time and knowledge. Maggie Ahmaogak, Harry Brower, and Teresa Judkins of the AEWC have also been generous with their advice, support, and cooperation.

Industry has also provided a good deal of help in various forms, from advice to more concrete logistical support. Ray Jucubczak, Concie Rock, and Bill Streever at BPXA were especially notable in this regard, although several individuals at Alaska Clean Seas were also very helpful. BPXA also assisted with the transformation of the raw GPS track information into more usable GPS-based maps for the 2001-2003 data. Although these maps have since been replaced through more recent in-house software, their early assistance is much appreciated. More recently, other industry participants in the Conflict Avoidance Agreement have also provided logistical support, and BPXA has provided supplemental financial support for the Cross island research effort in conjunction with their annual application for permits for the Northstar production unit.

MMS, as the sponsor of the project, also deserves a formal "Thank you." Dick Prentki has been an ideal COTR, even though the course of the project has not always been smooth.

Lastly, the entities for which ASR performed this work as a subcontractor for the 2001-2003 field seasons, LGL Limited of Alaska and Batelle, must be thanked for their willingness to trust that the work would be accomplished with a minimum of oversight on their part. The budget for this limited task would not support a good deal of administrative overhead, and both worked with me to make it work. I am especially grateful to Dale Funk at LGL.

The above notwithstanding, all errors and shortcomings of this report are the responsibility of Michael Galginaitis and ASR. Please advise me of as many errors, misunderstandings, or confusing discussions as you find, so that whatever effort continues in this regard can bear as much fruit as possible. But again, none of this work would be possible without the cooperation and support of the Nuiqsut whalers, to whom I again give my most profound thanks.

Introduction and Objectives of the Task Order

This Task Order, funded by the Minerals Management Service (MMS) has as its broad objective the description of subsistence whaling as currently conducted near Cross Island by residents of Nuiqsut. It is the only socioeconomic component of the cANIMIDA program, which focuses more on physical science. While "traditional" subsistence whaling has been well documented in a number of locations, contemporary subsistence whaling is not as well documented, especially in terms of changes over time. This effort is designed to measure basic parameters of Cross Island whaling so that observed changes (if any) can in the future be analyzed in relation to such factors as oil and gas activities, weather and ice conditions, or other variables. Observations, and the narrative annual report summarizing them, will focus on descriptive measures of activities associated with whaling. Special attention is devoted to geospatial information through the sharing of GIS information by participating whaling crews. Project annual reports are only for the purposes of reporting information collected, with little analysis of the information either as a self-contained database or in conjunction with external databases. Among the many external databases of potential pertinence to the descriptive information collected under this task order are the Human Activities Database (HAD), although the database does not contain information later than 2000, and thus does not cover the time period of this project. Thus the HAD is primarily historical and is of most interest in terms of what information can be recovered about Nuiqsut whaling seasons prior to 2001. Of perhaps more potential utility for the more detailed information collected for this effort through the ANIMIDA and cANIMIDA projects are remote sensing information on ice cover or other geophysical parameters. Other linkages for potential future analysis (AEWC records of whale harvest, or untranscribed IHLC tapes, for example) also exist. Some of these may be discussed in the final synthetic report, in preparation in parallel with this fourth and last Annual Report for Cross Island work under the cANIMIDA project (Cross Island whaling documentation will continue as a stand-alone project through the 2011 season).

As a second broad objective, the project is designed as a collaborative effort among MMS (and its contractor, Applied Sociocultural Research), the subsistence whalers from Nuiqsut, and the Alaska Eskimo Whaling Commission (AEWC). Beyond the goal of multiple years of descriptive information on Cross Island subsistence whaling activities, the project was to develop a system for collecting such information that local whalers themselves could adopt, adapt, and maintain. The methodology has now been developed sufficiently, but the transition to local implementation of the program has been slow and is still in process.

This is the fourth field season for this task as part of the cANIMIDA project, but as discussed above the seventh field season for the overall program. Annual reports have been produced for the 2004, 2005, and 2006 (as well as the 2001-2003) field seasons. A more analytical report summarizing and analyzing the full seven years of data (2001-2007) is also in process.

An Overview of Contemporary Subsistence Whaling in Alaska

The Inupiat of the North Slope maintain a vital native culture -- with kinship, dependence on hunting wildlife resources, and a respectful relationship to the land as fundamental values. Hunting provides most of the meat consumed by Inupiat. Whaling not only provides a significant part of this food, but is also a key social organizational activity for North Slope Inupiat. Whaling

is also a central ideological idiom for the expression of key cultural values, and an important vehicle for the transmission of those values (Worl 1978, Rexford 1997). Subsistence whaling has been (and continues to be) a key focus for Inupiat and Yupik culture and society (Bering Straits area, Northern coastal Alaska) for at least 1,000 to 1,500 years (Dumond 1984, Krupnik and Stoker 1993, McCartney 1994). However, nothing more than a brief orientation to contemporary subsistence whaling in Alaska is attempted in this report, and references are illustrative, not exhaustive. This discussion provides only a general description of some key aspects of the organization of subsistence whaling, within the context of its management regime, that are important for an understanding of this project's methods and results. This discussion proceeds from the general to the more specific.

In Alaska, eleven coastal communities (Point Lay recently being allocated a quota of one bowhead whale per season) currently field whaling crews and are members of the Alaska Eskimo Whaling Commission (AEWC). The AEWC was formed in 1977 in direct response to the International Whaling Commission's (IWC) decision to ban the Alaskan subsistence bowhead whale hunt. The IWC had two main concerns – that the bowhead whale population was too small to sustain a regular harvest, and that subsistence hunting methods were too wasteful (too many animals were killed but then "lost"). As a result of a complicated series of negotiations, the United States and the AEWC convinced the IWC to allocate an initially small quota of bowheads that could be harvested in 1978. This quota is supported by a data collection program that measures and monitors the bowhead whale population, and the efficiency of the subsistence whaling harvest. This has resulted in an increased confidence in the robust size of the bowhead whale population and an incentive for the reduction of "struck and lost" whales (increase in the efficiency of the hunt) which has been quite successful. Because the bowhead population has been steadily increasing, along with the overall success rate of the hunt, the IWC has consistently increased the quota of animals available for harvest. Currently AEWC co-manages the Alaskan subsistence bowhead whale hunt with the National Oceanic and Atmospheric Administration, Department of Commerce, under a cooperative agreement between the two.

The AEWC is essentially a self-regulating body that has implemented management practices that protect the reproductive capability of the resource, increase whaling success and/or reduce waste, increase the safety of the hunt, and enforce individual accountability for not complying with these practices. For example, whales with calves cannot be taken. This not only maximizes the population's growth, but is also a safety rule, since Inupiat whalers know that female bowheads with calves are the most aggressive and dangerous animals to approach. The first strike on a whale in the fall must be made with a darting gun, so that a bomb is shot into the whale at the same time that a float is attached to the whale with a harpoon. Since not all whales are killed with the first strike, the float serves to both slow the whale down and to assist the whalers in following it. A research program to increase the efficiency of whaling bombs has been ongoing, with periodic workshops to disseminate information and new technology to the whalers (2005 was the first year that the penthrite bomb, often termed the "superbomb," was available to Nuiqsut whalers). Guidelines for the size of whales to be taken are suggested, since experience has shown that larger whales pose the potential for more wastage than smaller whales (they potentially take more time to tow and butcher, and time often is directly related to wastage). AEWC sanctions have been most severe for violation of the quota set for a given community or for striking a mother with a calf – the revocation of the right to go whaling for a specified

number of years. Other sorts of violations may result in fines or public censure. In short, the AEWC has constructed a flexible system that rewards its members for compliance with rules and practices that foster both AEWC and IWC goals, and potentially penalizes them for noncompliance. Few cases of noncompliance have occurred, and this management regime is consistently cited as one of the most successful examples of such management (Huntington 1992). The original decision documents for the 1978 IWC action (U.S. Department of Commerce 1977,1978) also contain much of interest.

The IWC sets an overall quota for the hunt, and the AEWC in turn allocates that quota among the whaling communities. Each whaling community is represented by a local Whaling Captains' Association (WCA) at the AEWC, and each local WCA is responsible for managing the hunt in its respective community. Nuiqsut initially received an allocation of one whale landed or one strike, whichever occurred first, for 1978. That is, a harpoon that penetrates a whale counts as a strike, regardless of whether the bomb explodes or not, or whether that animal is actually taken or not. Not all "struck and lost" whales necessarily die, but the conservative AEWC/NOAA management system assumes that they do. Nuiqsut's current allocation is four whales or four strikes. Unused strikes and quota can be transferred between communities, quota is now allocated in multi-year blocks, and there can be some "roll-over" of quota from one year to the next. Thus, the harvest in some years for any given community may be greater than the "normal" quota allocated, if a community's WCA requests and is granted one or more strikes over their "normal" quota allocation. Similarly, overall take per season can vary, depending on whaling conditions and use (or not) of any "roll-over" quota.

Subsistence whaling in Alaska occurs in the spring (generally April-May) and the fall (generally September-October), when the bowhead whale migration brings them reasonably close to the whaling communities. The conventional thinking is that in the spring, bowhead whales migrate north through the Bering Strait and then, in Alaskan waters, east of Point Barrow into Canadian waters, where they spend the summer (some also go west into Russian waters). In the fall they reverse this course. Spring whaling differs from fall whaling. In the spring whales are migrating through relatively narrow open leads in the ice whereas in the fall the icepack is farther offshore and the water is generally more open. Some years can be very different, however and there can be thick floating ice near Cross Island in the fall. The first years documented by this project, 2001-2004, were relatively ice-free, but in 2005 and 2006 floating pack ice confined Nuiqsut whalers for most (2005) or part (2006) of the whaling season. The latest documented season, 2007, was nearly ice-free. Spring leads do not open up close enough to Nuiqsut or Kaktovik to allow these communities to whale in the spring. In the fall, because whales are not confined by leads and generally so far offshore at those points, it is difficult in most years for whaling communities south of Barrow to whale (although Wainwright and especially St. Lawrence Island whalers have increasingly taken a few whales in the fall). Thus most whaling communities, located on the Bering and Chukchi Seas, whale in the spring. Barrow, located where the Chukchi and Beaufort Seas meet, whales in both the spring and the fall. Nuiqsut and Kaktovik whale only in the fall. Spring whalers have traditionally and historically used only skin boats (until recently), whereas fall whalers use more durable wood, aluminum, and fiberglass boats. This is related to three general seasonal differences: the greater need to avoid unnecessary noise in the spring, the harsher environmental conditions of fall whaling (rougher seas, more floating ice), and the greater need for speed in the fall to find and pursue whales in more open water. Recent changes

in spring whaling, especially in Barrow, have been described and discussed in Wohlforth (2004), and interested readers are referred to that source. This report discusses only Nuiqsut whaling, currently conducted from and near Cross Island in the fall.

The Historical Context of Cross Island Whaling

The present community of Nuiqsut has a relatively short history, having been resettled in 1973. However, Inupiat use and occupation of the Nuiqsut area has a very long history, which is the basis for Nuiqsut's status as a village recognized under the Alaska Native Claims Settlement Act (ANCSA). Nuiqsut is located about 12 miles inland on the Colville River (Figure 1), which is not a typical location for a whaling community. However, its residents trace their ancestry to people who whaled in the mid-Beaufort Sea (including near Cross Island) in the first half of the twentieth century, as well as prior to that time. Treatments of the complex and dynamic history of the North Slope region in general, and the Nuiqsut area in particular, can be found in Brown 1979, Galginaitis et al. 1984, Hoffman et al. 1988, Galginaitis 1990, and Long 1996. These sources are the basis for the information in this section. Figure 1 shows the location of Nuiqsut on the Colville River, and Cross Island in the Beaufort Sea, as well as typical routes between Nuiqsut and Cross Island and some significant landmarks in between. Cross Island is about 73 miles northeast of Nuiqsut "as the crow flies" and from 92 to 109 miles away by boat, depending on which channel of the Colville River can be used to reach the ocean. When the water level in the river is high, the more direct route can be used. When the water level is low, the more direct river channel is too shallow for most boats, so the longer route is used. Cross Island itself is about eleven miles offshore, but more importantly from a logistical point of view is ten miles from the Endicott causeway and fifteen miles from West Dock.

Prehistoric use of Cross Island has not been well documented or investigated archaeologically, but documentation for more recent use is quite extensive. Families who lived on and used Cross Island seasonally during the first half of the twentieth century included the Woods, Pausanna, Saavgaq, Ulaaq, Ahsoak, Ahgook, Ikpikuk, Ahvakana, Akpik, Sovalik, Kaigelak, Tigulak, Ahsogeak, Ahkivgak, Ekolook, and Ekowana (Smith 1980). Perhaps most important in terms of whaling was Taaqpak, who used Cross Island as a whaling base from the early twentieth century through the late 1940s. Documentation for whaling harvests near Cross Island is quite incomplete, but include accounts of whales taken near Cross Island in 1921, 1922, 1927, 1928, 1931, 1935, 1938 and 1940 (by Taaqpak and others – Carnahan 1979, Shapiro and Metzner 1979, Smith 1980). While few of today's active whalers learned directly from Taaqpak, many have learned from those who were on his crews (or from those who knew Taaqpak once or twice removed). Taaqpak maintained that Inupiat had hunted whales near Cross Island for centuries (Carnahan 1979:21-31). Thus whaling near Cross Island has a strong cultural continuity.

When Nuiqsut was resettled in 1973, many of the original settlers traveled from Barrow with the supplies necessary for their life in tents for a year or more. They used a variety of means – sleds towed by a small Cat (a tractor with tracks), snow machines, and weasels (another sort of tracked vehicle, of WW II vintage). One of these original founders took the first whale for Nuiqsut that fall, while on his way to Kaktovik to obtain some *muktuk* and meat to take back to the village. He and his crew had been looking for whales and had been out about six weeks. They had not

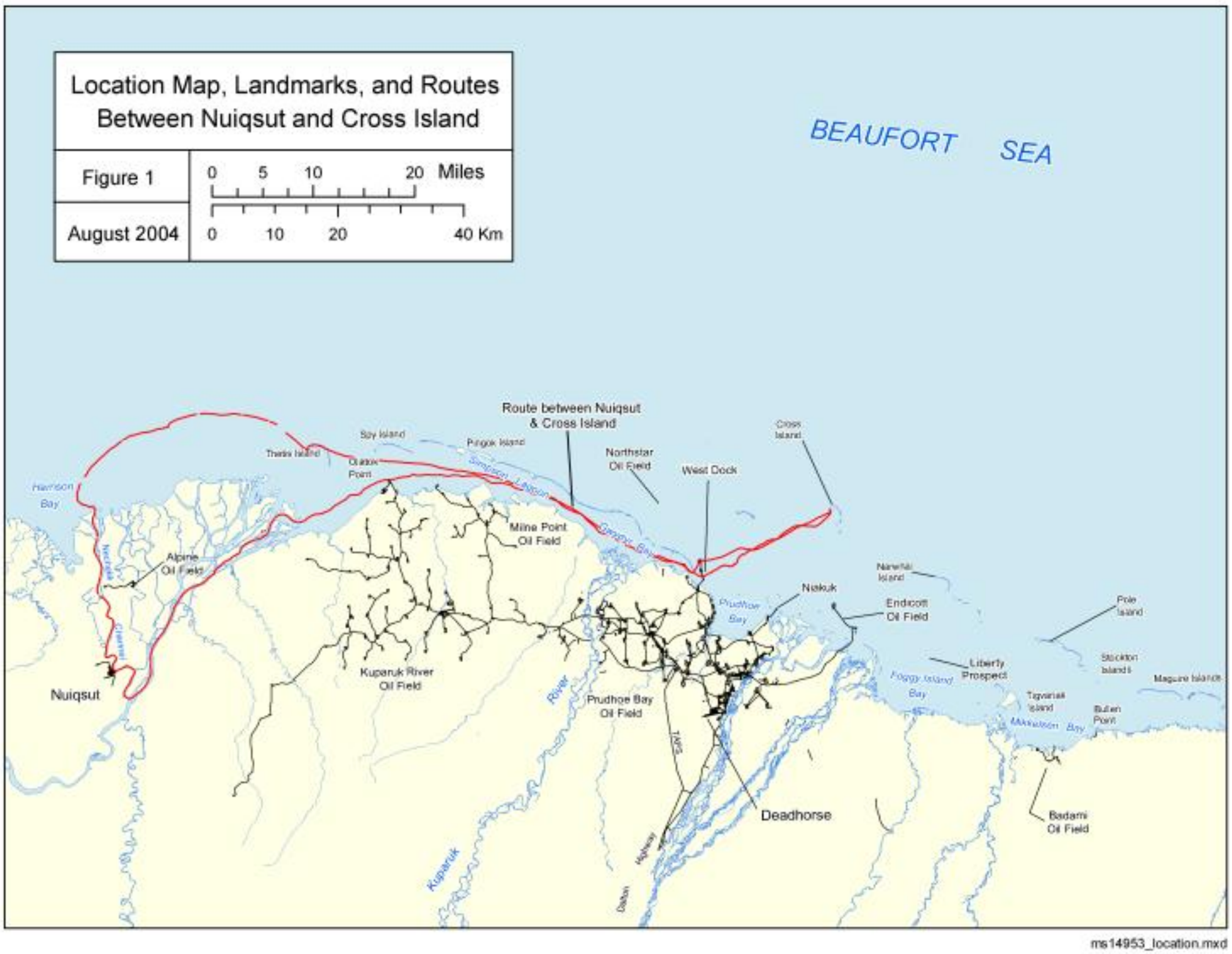

Location Map, Landmarks, and Routes
Between Nuiqsut and Cross Island
Figure 1
August 2004
0 5 10 20 Miles
0 10 20 40 Km
BEAUFORT SEA
Route between Nuiqsut
& Cross Island
Cross
Island
Northstar
Oil Field
West Dock
Milne Point
Oil Field
Alpine
Oil Field
Niakuk
Endicott
Oil Field
Pole
Island
Liberty
Prospect
Kuparuk River
Oil Field
Prudhoe Bay
Oil Field
Nuiqsut
Deadhorse
Badami
Oil Field
River
Kuparuk
ms14953_location.mxd

Plate 1: Nuiqsut and Cross Island Photographs

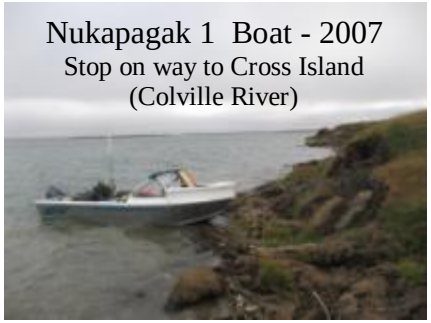

Napageak Boat, Oyagak 2 and Oyagak 1Boats - 2007


Nuiqsut, July 2003
(Similar in 2007)


Aqargiun Boat 2007, on way to Cross Island


Ipalook 1 Boat – 2007
(Ipalook 2 Boat not shown)


Nukapigak Whale, 2007
9/07/07, 37'3"


Nukapagak 1 Boat - 2007
Stop on way to Cross Island
(Colville River)


Cross Island form the top of Oyagak Cabin
9/05/06 (Similar in 2007)


Ipalook Whale, 2007
9/07/07, 49'0"


Nukapigak 2 Boat - 2007
(Nukapigak 3 not shown-twin to this boat)


Two Flags,
9/07/07

seen any whales in that time, although they had seen a great number of seals, which was about their only source of food after the third week of their trip. By the sixth week the whaling captain had concluded that they were too late – that the whales had either passed them by or were too far from the shore for them to find and successfully land. On the chance that Kaktovik whalers had been more successful (since communications were much more rudimentary in 1973 than currently, he did not know if Kaktovik had taken any whales or not), he decided to go to Kaktovik to obtain some *muktuk* and meat to take back to Nuiqsut. They then came upon a whale in the Brownlow Point/Flaxman Island area, in shallow water. They took this whale, butchered it, and returned to Nuiqsut with as much as possible. Several boats from Nuiqsut then made another trip to the harvest site to recover more of the *muktuk.*

Most of the six members of this 1973 crew are now active Nuiqsut whalers, and the captain, belying his age, was one of the most active Nuiqsut whalers until his recent death (2005). In the years immediately after 1973 relatively few crews whaled from Nuiqsut, with relatively infrequent success. Nuiqsut whalers regularly went to other communities in the spring to participate in spring whaling (a pattern that some continue up through the present), and sometimes in the fall, rather than whale in the mid-Beaufort Sea area. The next "Nuiqsut" whale was not taken until 1982, although crews whaled from various locations between 1973 and 1982 – Pingok Island, Narwhal Island, and Cross Island among them. A summary of whale harvest by Nuiqsut crews is presented in Table 1 below. Nuiqsut whalers attribute at least part of their relative lack of success in the 1970s and 1980s to interference from oil and gas exploration, as well as poor weather and ice conditions in some years, and a difficult logistical situation. These factors are also evident in the three years with the greatest incidence of "struck and lost" whales (1989-1991 or 1992). Nuiqsut whalers say that one reason they settled on Cross island as a logistical base is that it is to the east of Prudhoe Bay oil and gas activities, so that they could intercept whales before they are disturbed and influenced by those activities. Once Cross Island was established as a logistical center for Nuiqsut whaling, and Nuiqsut whalers gained experience there, harvest success became much more regular. Another factor in this increased success may be more moderate ice conditions since 1992 (although this may be countered by the greater effects of higher winds when ice cover is lacking).

Cross Island is a low sandy barrier island with an artificial higher area built from gravel. This higher area was constructed for past oil and gas exploratory drilling. Cross Island is about 3 miles long and 150 yards wide, and is constantly changing due to erosion and redeposition. Especially in the earlier years logistical support for whaling on Cross Island was very difficult. Whalers had to haul or find their own gas and water, and hunted and fished to provide most or all of their food. There was at most one cabin for however many people were whaling. Since the mid-1980s, with the advent of the Oil-Whalers Agreement (OWA) in 1986 between the oil industry and fall whalers (represented by the AEWC), logistical considerations have become somewhat easier. The current agreement is referred to as the "Conflict Avoidance Agreement" (CAA). The oil and gas industry (and especially BPXA) has been providing logistical support of various sorts to Nuiqsut whalers as a mitigation measure for potentially disrupting subsistence whaling by exploration, development, and/or production activities. With the increased interest in offshore exploration in the Beaufort Sea in 2005 and for the foreseeable future, other energy companies are also significant participants in the CAA, with Shell currently acting as the managing party for industry.

At the most basic level, the OWA/CAA provides for the constant communication between industry and the whalers about all of their respective ongoing activities, so that each can avoid interfering with the other. The mechanism for this mutual communication is the Whaling Communication Center (WCC – also referred to as the "Conflict Avoidance Communication Center", the "Oil/Whalers Communications Center", or "Com Center") in Deadhorse. The WCC operates during each fall whaling season and is staffed by bilingual radio operators. All industry and whaling vessels are required to report their activities to the WCC in real time (purpose, time left, time returned, significant events as they occur), and the WCC maintains a log of these reports which is archived by the AEWC. This provides a record of activities as they take place, and also documents to some extent the whaling activities. It also allows the WCC to advise industry of planned industry activities that may interfere with ongoing whaling, or to suggest windows of opportunity (when whaling is not taking place) when industry activity may have minimal potential effects. Unfortunately, vessel activity not associated with the oil and gas industry (for example,

Table 1: Recent Harvest of Bowhead Whales Near Cross Island

Year	Whales			Notes
	Quota	Landed	Struck & Lost	
1973	NA	1	0	
1982	1	1	0	
1986		1	0	
1987		1	0	
1989	2	2	2	Oil industry vessel disturbance noted
1990		0	1	Oil industry disturbance, also rough seas
1991	3	1	2	Poor weather, bad ice conditions
1992	3	2	1	
1993	3	3	0	Very favorable conditions
1995	4	4	0	
1996	4	2	0	
1997	4	3	1	
1998	4	4	1	
1999	4	3	0	
2000	4	4	0	Very favorable conditions
2001	4	3	0	Little ice, whales relatively distant and skittish
2002	4	4	1	Little ice, whales closer than in 2001
2003	4	4	0	Poor weather, whales close to Cross Island
2004	4	3	0	Poor weather, whales close to Cross Island
2005	4	1	0	Very poor weather, bad ice conditions, disruption
2006	4	4	0	Ice restrictions first half of season
2007	4	3	1	No ice, generally poor weather and rough sea conditions, whales close to Cross Island

Notes: Years of no harvest and no "struck and lost" are not listed. This does not imply that no whaling effort was made that year. "Quota" was not applicable in 1973.
Source: Compiled from AWC records, personal communications from Nuiqsut whalers, and field notes from the 2001-2006 whaling seasons

commercial barge traffic) need not coordinate with the WCC in the same way, so that this is not a totally effective mechanism for the mitigation of all such potential effects. Other sorts of logistical support have been supplied at least in part by industry. These have included low-cost connex units (converted into seasonal cabins on Cross Island); a winch to help haul whales up at Cross Island; assistance with a steadier supply of gasoline; a generator system to supply electricity to the cabins during the whaling season; diesel fuel (for the winch and generator); water and other supplies; help with transporting the butchered whale to Nuiqsut; at least limited phone service for one or two crews; help with mobilization and demobilization; and the assurance of available emergency assistance. Alaska Clean Seas (ACS) is the industry's contractor for much of this OWA support, as a small part of its overall responsibilities (which are mainly logistical and/or related to oil spill response). BPXA and ConocoPhillips provide most of the funding for ACS, but BPXA bears the majority of OWA-related costs since ConocoPhillips has little or no offshore interests. The AEWC does pay for some of the services provided under the OWA, but the amount and exact services are not reported. Neither industry nor the AEWC discloses the financial terms of the OWA.

Preparations for whaling, in one form or another, take place during the entire year. This report focuses on the activities during the harvest season. The final preparation of boats and equipment happens in August, and a meeting of the NWCA is conducted to set a date for the start of the hunting effort and to review the rules and regulations. Labor Day is the normative date for whaling crews to go to Cross Island, but it is not unusual for individual crews to go out earlier, especially if Labor Day is "late." In 2004, one crew (with two boats) went out August 15. This was considered extremely early by the other crews, but this captain was thinking that the migration of whales had been earlier in the last several years than it had historically been and that weather in early September had been increasingly marginal for whaling in the last several years. The combination of bad weather and mechanical problems did not allow him to fully test his conjectures. The few times that his crew went scouting in August they did not see any whales. Crews prefer to go out together or with multiple boats, for safety, so that two boats is usually the minimum number.

Once the crews are on Cross Island the focus is on whaling. Boats usually go scouting for whales on all possible days unless a whale was taken the prior day, in which case butchering usually has priority. However, this pattern may be changing, as Nuiqsut whalers increasingly seem willing to take more than one whale a day, or to allow some crews to go out to scout before a whale already landed has been fully butchered. When a whale is taken, it is towed to Cross Island, hauled up on the gravel beach, and butchered. Although some specific parts of the whale are distributed to specific individuals (one flipper to the harpooner, half the baleen to the captain, etc.), the butchered whale consists of three main parts. Select parts of the whale from the captain's share or "belt" near the middle of the whale ("*tavsi*") are sent to Nuiqsut via whaling boat the same or the next day "to feed the village". Occasionally it will be flown to Nuiqsut from West Dock, but will still be accompanied by a crew member to "run the flag" to the captain's house upon its arrival in Nuiqsut. The *tavsi* separates the rear of the whale (*uati*) from the front of the whale (*niniq*). The *uati* is the community share, and once it is removed from the whale it is processed by the crew that landed the whale, and served to the public at Thanksgiving, Christmas, and Nulukataq. The *niniq* is the crew share and once it is removed from the whale is divided equally among all the crews helping with that whale and then processed further by each crew. All of this meat, *muktuk*, organs, and baleen is packed into plastic fish totes (or heavy, reinforced, corrugated cardboard boxes in 2004-2006) and transported to West Dock and then to Nuiqsut (most recently via ACS barge to

West Dock and air freight to Nuiqsut). What is left of the whale is disposed of in the "bone yard." Once the quota is taken or conditions threaten to prevent returning to Nuiqsut (usually mid- to late-September), the whalers clean up the island, pack, and leave. Successful captains for that season will fly their flags during the trip back to Nuiqsut.

Nuiqsut whalers first used wood boats and relatively small motors. Although they remember these vessels with fondness, and long for the economy of those motors, they also remember that they were limited in terms of speed and towing capability. Currently Nuiqsut whalers all use aluminum or fiberglass boats, 17 to 24 feet long, with motors of 70 to 225 horsepower. It is possible that a 16-foot boat may be used as a whale boat on occasion, but it would not be considered a primary whaling boat. A few boats have cabins, but most are open. Boats typically scout for whales with a complement of three or four people, although some boat crews are as small as two and as big as eight. Although single boats do take whales on occasion, it is not encouraged and Nuiqsut boats almost always scout for whales in pairs, in case of mechanical break downs or other emergencies. Whaling crews with two or three boats are willing to whale on their own, but it is commonly agreed that five to seven boats is a preferable number to have available for whaling on a given day. More boats would be useful, and the availability of fewer boats decreases the efficiency, safety, and overall chance for success of the hunt.

Methodology

The data to be collected for this research will be discussed in terms of methods, with emphasis on the actual collection of descriptive information. In addition, it is important to address the issue of "hypothesis testing" in relation to the products of this research effort.

Hypothesis Testing

MMS explicitly required, as part of the proposal submission, the formulation of hypotheses related to potential changes in Cross Island subsistence whaling. These hypotheses can later be tested using the information collected by this research effort. Two major hypotheses were formulated:

- H1: Subsistence whaling activity and behaviors in the vicinity of Cross Island are significantly changed by offshore oil developments at Northstar and/or Liberty.
- H2: General subsistence activities on/near Cross Island are significantly changed by oil and gas activities associated with Northstar and/or Liberty.

These hypotheses are not stated in the "null hypothesis" format as such a formulation is counterintuitive to at least some of the local research participants and perhaps to the general public at-large. It will be necessary to express their implementation in the null hypothesis form for quantitative testing. It was explicitly recognized that the annual reports would not test or discuss these hypotheses. Such tests will require more data (longer time series) and more effort devoted to analysis, than is available for the Annual Reports, and will be part of the synthetic cANIMIDA final report (after the 2007 field season, and currently in process).

In summary, the hypotheses have been formulated as examples of possible relationships that are testable after concrete empirical (and ideally quantitative) measures of Cross Island whaling

related to those hypotheses have been systematically compiled as time-series data for a number of years. The hypotheses (and the measures to test them) thus guide the practical methods of collecting and archiving the information, to ensure that they will be useful for testing these hypotheses (as well as others as they are developed).

Descriptive Data Categories

The primary goal of data collection is the compilation of quantified measures of subsistence whaling behavior. Emphasis has been placed on such measures as:

- Number of crews actively whaling
- Size and composition of crews
- Fluctuations in active crew size and composition over the whaling season
- Number of whales harvested
- Days spent whaling
- Days prevented from whaling (weather, equipment failure or repair, etc.)
- Days suitable for whaling when whaling did not occur
- Subsistence activities occurring other than whaling
- Location of whale sightings and whale harvest
- Location of whale searching
- Local weather and ice conditions

These measures are a mixture of descriptive characteristics suggested by MMS and factors derived from or related to the perceptions of whalers on how and why whale behavior has changed, requiring that whalers change their behavior in hunting whales. For instance, size and composition of crews are fundamental descriptive characteristics that must have some relationship with the availability of whales. They also depend on the alternative (non-Cross Island) activities available to the crew members, such as alternative subsistence activities, wage labor opportunities, education, and so on. Because of the focus on Cross Island activities, information on the "full" range of factors that may be affecting the data collected was thus not compiled, but the range of possibilities was generally elicited from whalers during discussions of topics such as crew composition or crew recruitment. In this sense, these generally descriptive measures are thus also characteristics identified by Nuiqsut whalers as potentially significant and variable measures from year-to-year. The locations of whale sightings, harvests, and general whale searching behavior are all important in the examination of whether whales can be found in the same locations every season, or if this changes from year-to-year. If the latter, what causes such shifts in location is important. Nuiqsut whalers have experienced such variation and have suggested a number of factors to account for it. This project develops information to examine these questions about variation and changes in Cross Island whaling behavior. For instance, this information will allow for a preliminary (albeit rough) examination of "catch per unit effort" as well as factors associated with the distance whalers need to travel from Cross Island to whale.

Nuiqsut whalers generally agreed the suggested measures were significant and pertinent to the issues to be addressed. During the first field season (2001) Nuiqsut whalers also wanted to ensure that their more general perceptions and observations of whale behavior, and especially changes in whale behavior that had implications for hunting success or safety, were adequately noted. Such

perceptions are also the most likely way for Nuiqsut whalers to contribute to future hypothesis formation and testing. Thus, information categories were added to ensure that whalers' perceptions and observations were noted on:

- Bowhead whale behavior in the Cross Island area, and differences from past experience; and
- Changes in access or other issues related to the whale hunt, such as increased effort for the same (or reduced) harvest, increased risk, increased cost, and so on.

These aspects of the research assumed more importance after the 2005 whaling season. Whalers reported that commercial (non-whaling) vessel traffic interfered with their whaling activities. BP requested that the researcher present a report on these aspects of the Cross Island subsistence whaling season at the stakeholder meetings conducted to collect information during the annual agency permitting process for planned offshore activities. MMS, the sponsor of this project, determined that this was not a conflict of interest with the purposes of the research – and indeed, was a direct example of how the information from the project could be used for ongoing management decisions. Thus, the project results of the 2005 Cross Island subsistence whaling season were presented at the 2006 "Open Water" meetings in Anchorage on April 18, to an audience of stakeholders including at a minimum Government agencies, industry, whalers, scientists, and environmentalists. A similar presentation for the 2006 season was given to the Open Water meeting in April 2007, and for 2007 to the Open Water Meeting in April 2008.

The overall objective of the MMS Cross Island project is to describe Cross Island whaling using measures that document year-to-year variability in whaling and, when sufficient time series data are available, will allow tests of hypotheses on the causes of this variability. Concern about potential effects of oil and gas development on whaling is the prime motivation for the MMS project, but it is recognized that other factors can strongly affect Cross Island whaling and thus need to be considered as well. These other factors include weather and ice conditions, equipment problems, whalers' decisions, and non-industrial human activities. During the MMS-sponsored project, information is collected on level of hunting effort, including how many boats go out each day, crew size, how much time is spent on the water, lengths of trips in miles, and furthest point away from Cross Island during each trip. Information is also collected on the abundance and distribution of whales, including the number and location of whales observed and/or struck by the whalers. This information will be applied to internal MMS management leasing plans and decision, as well as stipulation requirements, and has also been recognized as important for the management decisions for other agencies.

Information on the level of hunting effort was collected by systematic observations by the researcher, who was on Cross Island for most of the whaling season in each of 2001–2007. This information was supplemented by conversations with all of the boat crews. Further information on the hunting effort, and on the abundance and distribution of whales, was obtained by issuing Garmin handheld GPS (Global Positioning System) units to all boats. The whalers were given instructions on how to record the GPS coordinates (track) of the boat's trip, and how to mark waypoints of significance, including whale sightings and strikes, sightings of vessels other than whaling vessels, and other pertinent observations. This information is then mapped, and is the basis for the Figures included in this report. It should be noted that whaling crews mark relatively few points when on the water, and the points they do mark represent the boat's position at the time a whale or group of whales was seen. These whales may be quite close or miles away.

This information was supplemented by subsequent conversations with each boat crew, while reviewing the mapped GPS information on a laptop computer with them. When reviewing tracks after their return, crew members would often identify locations where they saw whales, and these points were added to the GPS information. Some of these points were boat positions, and some were estimated positions of whales (and thus not on a boat track). Other points were reference coordinates and may represent past whale sightings, so they also may not be on boat tracks. Galginaitis did not accompany the whalers in their boats while they were hunting, since it is not permissible for any non-Native to participate actively in hunting marine mammals.

Consultation

Consultation for the seventh field season built upon and was coordinated with that for the six previous seasons, as described in previous annual reports, and overlapped with them considerably. These consultation efforts occurred in conjunction with efforts on behalf of several other ongoing or prospective projects. In addition to periodic phone calls (primarily to the Native Village of Nuiqsut, the City of Nuiqsut, and various whaling captains in Nuiqsut; and the AEWC and IHLC in Barrow), consultation efforts consisted of the following:

- January 12-18, 2007 trip to Nuiqsut to consult with the whalers about the draft 2006 annual report and to attend a NSB/Pioneer workshop on the coordination and improvement of subsistence-related research in the Nuiqsut area. There was also preliminary talk about the 2007 research plans, and some discussion of the possibility that the research would extend beyond the 2007 season.
- January 30 (and sometime during the week before) consultation with Edward Nukapigak in Anchorage about the draft annual 2006 report and some specifics of the 2006 whaling season. He also wanted to discuss future research possibilities on Cross Island.
- April 10, 2007 presentation on the 2006 subsistence whaling season at Cross Island. This was also used as an opportunity to talk to the AEWC and whalers present about the upcoming 2007 field season.
- June 13-20, 2007 trip to Nuiqsut for *Nulukataq* (Akiviana and Oyagak crews), to discuss past research seasons with the whalers, and to prepare for the 2007 field season.
- June 20-23, 2007 trip to Barrow for *Nulukataq* and to consult with AEWC personnel, as well as other resources located in Barrow.
- June 23-27, 2007 trip to Nuiqsut for *Nulukataq* (Aqarguin and Ipalook), to discuss past research seasons, and to prepare for the upcoming 2007 season.
- August 29 – September 15, 2007 trip to Nuiqsut and Cross Island (2007 field season). The crew that the researcher had planned to go out with had decided not to whale in 2007, so alternate arrangements had to be arranged at relatively short notice.
- April 18, 2008 presentation on the 2007 subsistence whaling season at Cross Island. This was also used as an opportunity to talk to the AEWC and whalers present about changes needed on the description of the 2007 season, as well as the possibility of a 2008 field season.

As in most prior years, the field arrangements were not totally firm until shortly before the season started. The captain who had agreed to host the researcher had decided not to whale in 2007, but had made arrangements for another captain to serve as host. This crew was one of the three that

went to Cross Island on 3 September, while the first two crews reached Cross Island on 30 August and 31 August.

Data Collection

The logistics of the 2007 field season were similar to those of previous years. As mentioned above, the researcher was not present on Cross Island for the entire season, as the crew he accompanied was among the last group of crews to reach Cross Island. This did not result in any information loss, as GPS tracks and other information were still collected (they were still in the memory of the GPS units). It would be preferable for the researcher to be present on Cross Island for the entire season, but in recent years it is the exception rather than the rule for all crews to travel to Cross Island on the same day. Given the realities of research on Cross Island, it may be necessary to plan for the contingency of the researcher not being on Cross Island for the first few days of the season, when only a few crews are there.

There were only five days in 2007 when whalers went scouting for whales. . There was a total of sixteen "boat-days" in 2007, but some boats made more than one scouting/whaling trip in a single day, so there were a total of twenty-one whaling trips. GPS tracks were collected for nineteen of these possible tracks. One missing track was due to the hard cabin top on one of the new boats put into service that year. This cabin interfered with the GPS signal, and resulted in some of the other tracks for this boat being only partial. To prevent this in the future, an external antenna has been obtained for the GPS units used for the project. The other missing track was for the second trip of the day for a boat that went out only to assist with towing in a whale. This boat appears to have taken a GPS unit, but the tracking feature had been turned off. Crews were reminded that they could use any GPS that they wished (and many prefer to use their personal GPS units with the tracking turned off), but that they should always take the project-supplied unit and turn it on. In addition, a few GPS tracks for "travel" days between Cross Island and Nuiqsut were obtained, but they were not given much priority in 2007.

The 2007 whaling seasons can be characterized fairly simply – there was little or no ice, few days with low wind and good sea conditions for whaling, and whales were encountered close to Cross Island. While overall conditions for whaling were not good, the whales were close enough to Cross Island so that the whalers were able to use their full quota of strikes on the few days when conditions were favorable. The overall result was a shorter season than in the recent past. There was one struck and lost whale, but this does not appear to have been due to adverse conditions. The three whales landed were all large by Nuiqsut standards, and this may indicate that the whalers were not as selective (in terms of preferring smaller-size whales) as in past years, but no whaler made a comment to that effect.

The first crew went to Cross Island on 30 August, in good conditions, and went scouting the next day with a single boat. They struck and landed a whale, and towed it to Cross Island. The second crew went to Cross Island on 31 August and arrived in time to meet the tow of this whale not far from Cross Island. While conditions had been favorable in the morning of 31 August, the wind came up in the afternoon (just after the whale was struck) and seas became quite rough. The next two days (1-2 September) were reported to be windy (20 to 25 mph) and used for butchering in any event. On 3 September conditions were reported to be worse than those of the morning of 31 August, but much better than the afternoon of 31 August. The first crew took their tavsi to West

Dock while the second crew went out scouting. The second crew struck a whale, and the first crew went to assist them, but this whale was eventually lost. Both crews continued to scout for whales, but made no more strikes. The other three crews used the good weather on 3 September to travel to Cross Island.

Conditions were marginal for scouting on 4 September, but three crews went out while two decided to stay in. Those two crews may have needed to get their bombs ready or finalize other preparations. Those crews that did go out had short trips of only 2 to 4 hours. Weather prevented any scouting activity on 5 September, and on 6 September only two crews went scouting, with trips of 1.5 to 2 hours. On 7 September, winds had abated and all five crews went scouting. A whale was struck and landed fairly early in the morning and was towed to Cross Island before noon. The captains met and agreed that those crews that wished to could go out to try to take a second whale in the afternoon, since conditions were good and they had been seeing many whales. Four crews went scouting in the afternoon and struck and landed another whale. The captains then called a cease fire, as the three whales landed averaged 40 feet. Butchering and packing occupied 8-10 September and all crews left Cross Island for Nuiqsut on 11 September.

Table 2 summarizes the whales struck by the Cross Island whalers in 2007 (a more detailed day-by-day presentation of daily whaling activity for the entire Cross Island whaling season is presented in Table 5 later in this report).

Three types of data were collected during the 2007 field season, as discussed above. These are GPS information; systematic observations of quantifiable measurements of various components of subsistence whaling activity; and whalers' observations on whale behavior (and especially changes in such behavior). This last sort of information is often accompanied by perceptions of possible causes for such changes and the implications such changes may have for subsistence whaling activities. Each is discussed in an appropriated section below.

Table 2: Summary Characteristics[1] of Whales Struck Near Cross Island, 2007

Date	Time Struck	Length	Sex	Whale ID	Miles from Cross Island	Bearing from Cross Island	Notes
8/31/07	16:25	34'5"	F	07N1	10.7	98° true	Napageak
9/03/07	11:48	UNK	UNK	NA	13.2	104° true	Aqargiun
9/07/07	7:00	37'3"	M	07N2	7.2	41° true	Nukapigak
9/07/07	15:21	49'0"	M	07N3	16.7	75° true	Ipalook

[1]All characteristics are from direct observations or GPS records made on the day of the activity, other than the WhaleID number. WhaleID numbers are assigned by the North Slope Borough Department of Wildlife Management (NSB DW). Times are approximate and are derived from the recorded GPS tracks and/or radio logs, combined with whalers' accounts, as are the distances from Cross Island.

GPS Data

All whalers participating in the research in 2007 had participated in the research in previous years. Thus, all crews whaling in 2007 were reasonably familiar with the goals and methods of the project, and in using a GPS unit. All crews had been issued GPS units previous years, but several required an additional unit either because of using an additional boat or the desire of the

researcher, based on the 2005-6 field seasons, to increase the number of GPS 60Map units gathering data. The tracks from these units had been of significantly greater quality than from prior units, and many whalers liked using that unit more than the others. Some whalers preferred the GPS V unit, which was comparable to the GPS 60MAP on most characteristics but had the advantage of a lower price (although slower data transfer speeds). Most of the new GPS units were Garmin GPS 60MAPs, and the rest were Garmin GPS Vs. Whalers were again instructed to record the locations of whale strikes, whale kills, or other subsistence activities or observations. Most boats had at least one crew member familiar with GPS units, and most boats used them as a matter of course. GPS tracks were recovered for most scouting/whaling trips (90 percent, 19 of 21 possible GPS tracks).

All crews were instructed to keep the "tracking" feature on, which recorded the path the boat traveled each time it went out. The cause of the two missing tracks was, as discussed above, signal interference from a new boat's hard-top cabin and the failure to use a GPS unit with the tracking feature turned on because the boat was in a hurry to get on to the water to help with a tow. The former will be rectified with the use of an external antenna. The latter may be unavoidable when crews are in a hurry, but can be minimized by reminders to take the project units along on all trips, and to turn them on even if the crews will not be using them. As in previous years, a few tracks were incomplete or composed of several separate tracks, most likely due to whalers turning the unit off and on, loss of battery power, or the unit losing its positional fix (unit memory limitations are no longer much of a problem). These problems did not occur with the frequency of previous years, however – due in part to the past experience of the crews with the project and in part to the use of more 60MAP and GPS V units than in the past. As for recent years, all boats were provided with a power cord so that the GPS units could be operated from the boat's electrical system, so that depleted batteries were not the problem they had been in the first two years of the project. However, not all boats were wired to use such cords. Also, all boats were provided with a boat-mounted holder for the GPS unit, so that the units would be readily available, secure, and not be mistakenly shielded from satellite signals due to being put in a pocket. Still, at times satellite coverage was spotty and reception was lost. Whalers were instructed how to mark points, and told to mark the points where whales were seen. Whalers were also asked to mark other events such as "blows," other animals (polar bears, seals, and so on) and key points in their trip (the ice edge between "open-water and the ice pack, places where weather conditions change, and so on). Positions where whales were seen, struck, or killed were marked by a number of crews, but were seldom if ever labeled and so required additional discussion with the crew and additional processing of the "track" file. Relatively few points were marked in 2007, but whalers were able to approximately locate many points while reviewing their tracks on the computer screen, and the researcher was able to make some fairly reliable conclusions about other whale event points from the GPS track characteristics. In any event, the process of increasing the incidence of marking significant points will require steady attention and constant encouragement.

The researcher visited each crew that had gone out scouting after they came back, in order to download the information from their GPS unit into his laptop computer. This ensured that the GPS units were always available to the crews should they decide to go out at short notice. This procedure also enabled the crews to immediately see where they had been that day with the mapping software, and allowed the crew an opportunity to discuss their trip with the researcher while it was very fresh in their minds. The utility of this information, as concretely represented on

the mapped tracks displayed by the computer, has been obvious to the whalers since the inception of the project and is one reason for the high degree of participation. An example of the combined tracks for one day of scouting can be seen in Figure 2. This is the track for 09/07/07, when seven boats went scouting in the morning and four or five in the afternoon. Two whales were landed.

Tracks for all days that boats went out scouting appear in electronic Appendix A on the CD-ROM attached to this report. The MMS Alaska OCS Region holds the processed GPS data files for all the tracks for the 2007 season.

Hunters were also asked to report other subsistence efforts and results, in terms of time spent, species, number, and location in terms of GPS coordinates. Little such activity was reported, and less than in 2006. This was probably due to the relatively poor weather and the relatively short duration of the 2007 season. Seals were seen, but not pursued, on the few days when crews went out scouting for whales. Polar bears were present, but did not present any potential problems until the final days of butchering. Few or no birds were harvested.

Daily boat report forms were used to capture the GPS and associated information. The form for the 2007 field season was the same as used for previous field seasons. A form is completed for each boat that goes out scouting or engages in some other significant whaling activity. Table 3 below presents as example of the form completed for the boat that landed the first whale on 09/07/07. Forms for the other two boats out scouting that day are not included in the body of this report, but appear, along with all the other boat report forms, in electronic appendix B on the CD-ROM attached to this report. Those boats not out scouting on any given day do not have a separate form completed for each of them, but rather have their activities and status summarized on a single form. On days when no boats go out scouting, all will be on one form. Table 4, as an example, contains the information for all the boats that did not go out scouting on 09/06/07, when only two crews decided to go out. For most days of the 2007 Cross Island subsistence whaling season, all boats will be treated on a single form, since scouting activity took place on only five days, and the season was fifteen days long. For the five days when scouting took place, some boats will have separate forms and a group of other boats will be treated on a single form. The forms are organized in Appendix B in terms of date rather than by crew as in most past reports. Figures of individual boat tracks for each day have not been produced, since this information is conveyed more economically in figures for each scouting day containing the tracks of all boats out scouting that day. A list of acronyms and abbreviations used is provided on page ix.

The information used in the Table 3 example was not chosen at random, but rather because it demonstrates some of the difficulties presented in the waypoint information reported in this (and previous) documents. Although instructed to mark waypoints whenever whales are spotted or where significant events take place, no crew in fact can mark all such points, for a variety of reasons.

Figure 2: Composite Scouting Tracks for a Single Day – 9/07/07

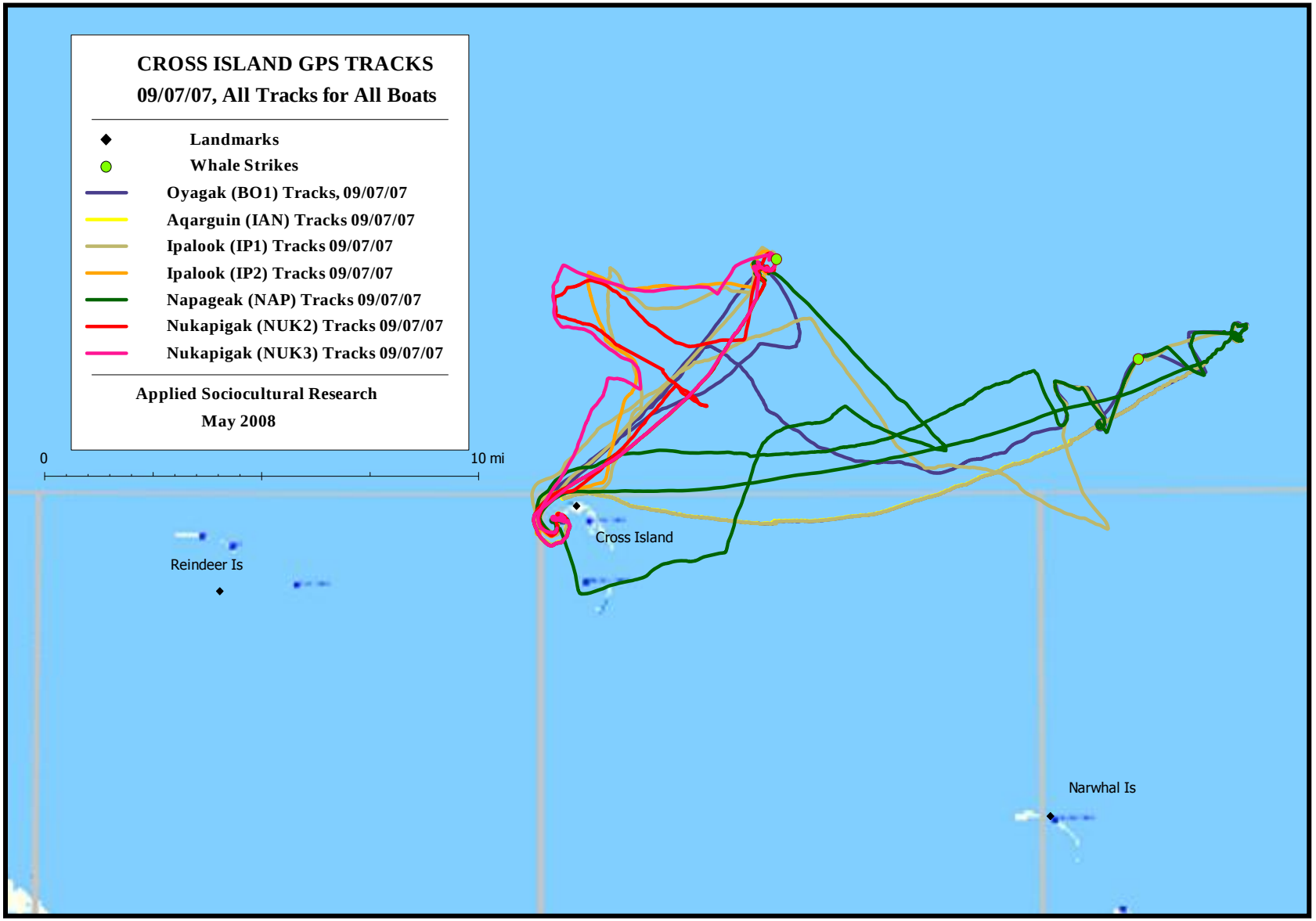


Table 3: Example Daily Boat Report Form

cANIMIDA Task 4 Data Collection Form, 2007 **Use one form for each vessel/day**

Date: 09/07/07 **Crew:** Napageak **GPS Type:** GPS60MAP

Vessel	Type	Length	HP Motor	# crew aboard/notes
NAP	fiberglass	21’	Honda 225	4

Two Scouting Trips for the day, this form just the second trip

Whaling today? Yes **If not, why not?**

Time departed: 12:37 **Time returned: 20:35**

Second trip: Trip time of 7 hour 58 minutes; roundtrip of 43.9, furthest point from Cross Island 16.7

Waypoints or Coordinates noted

Way Point #	Lat/Long	Time	Notes (if whale - # of animals, direction of travel, behavior)
nap_090707f	N70.53714 W147.51702	14:32	NAP reported they smelt the whale in this area
NAP_090707g	**N70.53801 W147.50011**	**14:38**	**NAP reported that they first saw the whale in this area**
nap_090707h	N70.52282 W147.43519	15:04	Apparent chase event
NAP_090707i	N70.50765 W147.43508	NA	"nap-herburt" - UNK significance
NAP_090707j	N70.54176 W147.39009	15:23	Chase event - IP1 strike or soon after
nap_090707k	N70.54181 W147.38973	15:23	Chase event - IP1 strike or soon after
nap_090707l	N70.54451 W147.36991	15:31	Whale seen again to the south by whalers, other whales seen to the North and "over there" (more to the NW - points m and n)
NAP_090707m	**N70.55796 W147.39737**	**15:31**	**Whales seen to the North of the chase**
NAP_090707n	**N70.58094 W147.36225**	**15:31**	**Whales seen to the North of the chase**
nap_090707o	N70.54871 W147.31363	15:47	Float put on same whale struck by IP1 @ 15:21
nap_090707p	N70.54671 W147.29746	16:02	Chase event
nap_090707q	N70.54850 W147.29619	17:14	Tow event (unknown significance)
nap_090707r	N70.56099 W147.27901	16:50	Plane observed to fly over after kill
nap_090707s	N70.47534 W147.23413		"nap-whale2" - whale to the South?
nap_090707t	N70.53970 W147.33082	17:36	NAP developed leak, pulled out of tow

Describe the day's activity (traveling, hours searching for whales)

Direction of initial search (and explanation):	E to where they had been seeing whales that morning
Time spent actively scouting/# people looking:	2:44; 1:28 assist/chase/kill; 0:20 prepare to tow; 3:26 tow
Time spent in travel/tow/assistance to other boats/on “break”:	

Notes: NAP boat headed east to where whales had been seen on previous days. Boats were more-or-less together when NAP smelled a whale (point “f”) and then were the first to spot it (point “g”). Point “I” is probably an indicator of NAP communication to IP1 that NAP had seen a whale. Point “h” was a chase event (probable whale resighting). NAP, IP1, and BO1 boats were all together chasing the whale at this point. Points “j” and “k” indicate chase events, probably soon after the IP1 first strike on the whale. The float had come off the whale, so the boats were looking for it. It was spotted to the S (point “l”, as were several other whales (points “m” and “n”). NAP put a float on the IP1 whale at point “o” and point “p” was some chase event (perhaps a bomb). NAP did not mark the kill sight as such. NAP saw a whale to the S of the kill (point “s”) and a plane that flew overhead shortly after the kill (point “r”). During the tow NAP developed a leak and had to leave the tow and head for Cross Island at high speed (point “t”).

Observations of Whaling Crew - weather, sea state, ice-conditions

Fog or clouds?	No	**Weather notes:**	Calmest day of the season, sea swells of 4 feet but “calm” seas		
Wind Direction:	shifting	**Wind speed and other notes:**	0-10 mph, BP 29.88 and steady (but a short peak)		
% Ice Coverage:	0	**Ice Type:**		**Other Notes:**	Wind for most/all whaling <5 mph
Wave Height:	small	**Other notes on sea conditions:**			

Other pertinent notes:	The best day for scouting for whales of the season, worse conditions predicted for the next day (both the official weather forecast and downward trend of local BP). This was the main reason the captains decided to try to land two whales (and did). Wind shifted around the compass. Whalers described seas as “calm” with 4 foot rollers.

Note: Cross Island weather observations are compiled in a separate file (weather station + observer)

Engaged in any other subsistence activities? No **If yes, describe below**

GPS track? Yes **GPS File Name:** NAP_090707b.gdb

If not, why not?

Table 4: Daily Boat Report Form for Boats Not Out Scouting

cANIMIDA Task 4 Data Collection Form, 2007 **Use one form for all non-scouting vessels/day**

Date: 09/07/07 **Crew:** Various **GPS Type:** NA

Vessel	Type	Length	HP Motor	# crew aboard/notes
BO2	aluminum	18'/19'	125 Mercury	Onshore due to conditions
NUK1	Aluminum	18'	115 Yamaha	Onshore at West Dock, disabled

Whaling today? No **If not, why not?** BO2 not suitable for conditions, NUK1 at West Dock

Time departed: **NA** **Time returned:** **NA**

Waypoints or Coordinates noted

Way Point #	Lat/Long	Time	Notes (if whale - # of animals, direction of travel, behavior)
NA			

Describe the day's activity (traveling, hours searching for whales)

Direction of initial search (and explanation):	NA
Time spent actively scouting/# people looking:	NA
Time spent in travel/tow/assistance to other boats/on "break":	NA
Notes:	

Observations of Whaling Crew - weather, sea state, ice-conditions

Fog or clouds?	No	**Weather notes:**	Calmest day of the season, sea swells of 4 feet but "calm" seas		
Wind Direction:	shifting	**Wind speed and other notes:**	0-10 mph, BP 29.88 and steady (but a short peak)		
% Ice Coverage:	0	**Ice Type:**		**Other Notes:**	Wind for most/all whaling <5 mph
Wave Height:	small	**Other notes on sea conditions:**			
Other pertinent notes:	The best day for scouting for whales of the season, worse conditions predicted for the next day (both the official weather forecast and downward trend of local BP). This was the main reason the captains decided to try to land two whales (and did). Wind shifted around the compass. Whalers described seas as "calm" with 4 foot rollers.				

Note: Cross Island weather observations are compiled in a separate file (weather station + observer)

Engaged in any other subsistence activities? No **If yes, describe below**

GPS track? NA **GPS File Name:**

If not, why not?

Whaling events happen so quickly that crew members are fully occupied with their duties and sometimes cannot divert their attention to mark a point (or perhaps even remember to do so). When points are marked, crews seldom take the time to assign them names, so that they are designated with "default" numbers. When waypoints are marked for whales, they still do not all necessarily represent the same thing. Waypoints indicating where a whale was struck or killed for the most part represent the immediate area where that event took place. Those indicating a whale sighting are less precise, showing the position of a boat when a whale was sighted. It may indicate a whale seen a short distance away, or the "blow" of a whale seen in the distance (up to 2 or 3 miles away). Also, a waypoint may represent one whale or multiple whales. For some tracks, there are no waypoints that the crew marked while they were on the water, but quite a few that they could approximate when they later reviewed the track with the researcher. Many of these points represent whale sightings, and are not necessarily any less precise than points marked on the water – but in most cases can be assumed to represent whales or blows seen at a greater distance than for a waypoint actually marked when on the water, or events that were not marked because people were too busy at the time to do so. In Table 3, for example, the Napageak crew marked where they first saw the whale eventually struck by the Ipalook crew (NAP_090707g), but also indicated after the fact where they had first been alerted (by smell) to the near presence of a whale (point "f"). Some chase events and other whale sightings were marked (points "I", "j", "m", "n") while others were pointed out after-the-fact while looking at the GPS track lines (points "h", "k", "l", "o" – "t").

Since most crews discussed most of their trips with the researcher, it has been possible to collect more waypoint information that is present in the raw GPS data files, but with a potential loss of precision. Crews remember how many whales they have seen on a trip (except in cases where blows were both distant and numerous), and generally where they were. When looking at the mapped tracks of their trip they are able to identify where they saw whales, so that an approximate waypoint can be generated. In most cases, sighting locations are associated with changes in a boat's direction. Such "generated" waypoints are differentiated from those actually marked by crews by using lowercase letters in their labels. Points for whales that are located "after the fact" may also represent estimated positions of the whale rather than the position of the boat when the whale was seen. These points are most likely less precise than boat positions, since they are not "anchored" by the GPS track lines from the boat's trip.

Some marked waypoints are also somewhat ambiguous in meaning, however, since the crew may assign one meaning or memory to a point when in fact it may have another. That is, especially when whales are harvested, whalers may misidentify the waypoints that they do mark. Given that crew members have little attention to spare in this situation, and that the waypoints themselves are usually only numbered, and that the crew may not remember exactly how many waypoints were marked (or if all attempts to mark points actually succeeded), such confusion can be expected. However, since whalers communicate with each other, the Com Center, and sometimes their Cross Island base station, by radio it is often possible to note when significant events take place by what is said on the radio and noting the time. When compared to the date stamps on waypoints these notes can then aid in the interpretation of what the waypoints actually represent. It should also be noted that the researcher is also a potential source of confusion, in that his understanding of a crew's description of their trip activities and events may in fact be in error – the researcher may misinterpret what the crew tells him. The data as presented is the

result of cross-checks using the information obtained from all sources (GPS, crew accounts, radio notes), and is the analyst's best attempt to interpret all the available information in the most mutually consistent manner possible. Not all ambiguities can necessarily be fully resolved.

Ambiguities of meaning influence the way in which the points can be used but not to the extent that they do not have any useful meaning. Whale sighting waypoints cannot be interpreted as point locations. Whale strike and kill locations can generally be interpreted as point locations, but not necessarily precise point locations. Boats are always moving and waypoints are seldom if ever marked at the precise time that a strike is made or a whale is killed.

Table 4 is an example of how the Daily Report Form was used to reduce the number of forms to complete for those days when not all boats went out scouting, as discussed above. Separate forms were still used to record information for those boats that did go out scouting on 09/06/07 (se appendix B). A single form was used for the eight boats, from four crews, that did not go out scouting that day. Note that two of these boats were from two crews that had single boats out scouting that day, and six boats were from the three crews that did not go out scouting at all that day. A rough indication of what else the crews did on those days (and if the boats were used for other purposes than scouting) is noted, but not in detail. Attempts were made to determine if weather, mechanical problems, or other obligations such as butchering was the major factor in a boat not going out scouting on any given day. For some days where multiple factors applied determining which was most important may not be possible.

Systematic Observations

Systematic observations were also transferred to the standardized recording forms (daily boat report forms). These observations are the basis for the summary tables that appear in the "Results" section, as well as the completed daily vessel activity forms. From these records it is possible to make a basic "census" of the crews on the island, and to track changes as people came to Cross Island and left. In addition, notes were made on which crews went out on each day. In most cases it was possible to note who went out in each boat. From these basic observations can be derived some of the most basic measures of subsistence whaling activity – number of active crews (and boats), size and composition of crews, fluctuations in crew size and composition, and days spent whaling. The GPS data provide systematic locational information for whaling activities. This information also was recorded on the daily boat report forms. Examples of the daily boat report forms appeared above as Tables 3 and 4. The complete series of forms is included electronically as Appendix A. A list of the acronyms and abbreviations used in these tables (and elsewhere in the report) is provided on page ix.

In addition, very basic weather observations were made (temperature, wind direction and strength, degree of fogginess or clarity, barometric pressure). A weather station was installed on Cross Island, with a remote data logger to record the information. The data logger functioned for the period 9/04/07 (4:58 PM) through 9/11/07 (7:56 AM), with readings every five minutes for temperature (outdoor and indoor), wind speed, wind direction, barometric pressure, and relative humidity (file CI2007WF.xls, also included electronically as Appendix C). There were short periods of data gaps, due to signal interference, instruments freezing up, or other factors.

Formerly, MMS maintained a weather station at Endicott, close enough to Cross Island to be pertinent. This data is no longer available in near real-time, but may be available from BP, who is now responsible for the Endicott weather station. Other potential sources of weather information and whaling activities are the communications logs of the Whaling Communications Center. Since the researcher could not go out in the boat while they scouted for whales, he had little ability to judge the degree of ice cover, although the Nuiqsut whalers did report their observations in a general way. There was no ice cover in 2007. The absence of ice increased the adverse effect of wind, and even on relatively calm days large swells made scouting somewhat difficult Ice observations are noted on the daily boat report forms. Information on ice cover may also be obtainable from remote sensing sources or the MMS aerial bowhead survey.

Whalers' Observations

Whalers would sometimes make observations on whale behavior or give their thoughts on how and why whale behavior in the Cross Island area was different in 2007 than it had been in the past. Much of this was recorded in the daily fieldnotes. Much is of limited immediate relevance to the central aims of this project, especially since weather conditions and the proximity of whales seemed to be the most important factors influencing whaling activity (and the whalers' observations). A summary of the most pertinent information is included in the "Results" section.

Results

Results are discussed in this section in terms of the quantitative observations designed as measures of subsistence whaling activity and the less quantifiable observations and perceptions of Nuiqsut whalers about whale behavior in 2007 as compared to previous years.

Quantitative Measures

The most basic summary of information, extracted from Table 5 and Figure 3, describes the primary characteristics of Cross Island subsistence whaling of most concern for MMS. In 2007, five crews from Nuiqsut whaled from Cross Island. One was a new crew, but formed by the former co-captain of another crew. All crews consisted predominately (some totally) of people with prior Cross Island whaling experience. Three crews each used one boat each for whaling, although two of these crews used a second boat for logistical help. The other two crews each used two boats for whaling. One of these crews had planned to whale with three boats, but one was disabled on the way to Cross Island and spent the season out of service at West Dock. Thus, there were seven boats capable of scouting on Cross island for the 2007 season. All seven boats only went out on one day, when two whales were landed and the quota was completed. The average number of boats out scouting on the five days when such activity took place was 3.2. On three of these days only two boats went scouting, and only 3 on another day. Two of these days were early in the season, when only two crews (and two whaling boats) were whaling on Cross Island. The two other days were marginal for whaling, with relatively high winds and correspondingly rough sea conditions.

The size and composition of the crews varies from year to year. In 2007 all crews displayed fairly direct kinship relationships among most members (a minimum of 67 percent of members, a maximum of 80 percent and perhaps 100 percent in one case). Most people in Nuiqsut can trace indirect kinship relationships with each other, but some are more directly related than others, and the core of most whaling crews consists of blood relatives and/or close in-laws, with the possible additions of more distant relatives and some friends. There were few female crew members on Cross Island in 2007 – two crews had one such member each. Both were of college-age. Two adult females had planned to go whaling, but circumstances prevented their doing so.

Of the 33 crew member, only 4 were "sub-adults" of high school age or younger, while 20 were "fully mature" adults (older than "college-age"). The remaining 9 were college-age individuals, in various stages of the transition to adulthood. Some are attending college, others have entry-level jobs and may have started families of their own, and some are still looking at

Table 5: Summary of Boat Activity, Cross Island Whaling, 2007

Date	Day	Crew Name and Boat Codes								
		Ipalook		Napageak[1]	Aqargiun	Nukapigak			Oyagak	
		IP1	IP2	NAP	IAN	NUK1	NUK2	NUK3	BO1	BO2
30-Aug	Thur	Still in Nuiqsut, Getting Ready		To CI w/5	In Nuiqsut	Still in Nuiqsut, Getting Ready			Still in Nuiqsut, Getting Ready	
31-Aug	Fri			SC w/5 HAR	To CI w/7 Assist w/4					
1-Sep	Sat			butcher	weather					
2-Sep	Sun			weather	weather					
3-Sep	Mon	To CI w/3	To CI w/2	To WD w/2 SC w/3	SC w/7 S&L	To CI w/2	To CI w/2	To CI w/3	To CI w/3	To CI w/4
4-Sep	Tue	SC w/5	disabled	SC w/5	SC w/5	at WD	weather	weather	weather	weather
5-Sep	Wed	weather	weather	weather	weather	at WD	weather	weather	weather	weather
6-Sep	Thur	SC w/4	disabled	SC w/5	weather	at WD	weather	weather	weather	weather
7-Sep	Fri	SC w/3 SC/HAR w/3	SC w/2	SC w/5 SC w/4	SC w/7 SC w/4	at WD	SC/HAR w/3	SC w/4 Assist w/2	SC w/4 SC w/3	disabled
8-Sep	Sat	butcher/ pack	butcher/ pack	butcher/ pack	butcher/ pack	at WD	butcher/ pack	butcher/ pack	butcher/ pack	butcher/ pack
9-Sep	Sun	butcher/ pack	butcher/ pack	butcher/ pack	butcher/ pack	at WD	butcher/ pack	butcher/ pack	butcher/ pack	butcher/ pack
10-Sep	Mon	butcher/ pack	butcher/ pack	butcher/ pack	butcher/ pack	at WD	butcher/ pack	butcher/ pack	butcher/ pack	butcher/ pack
11-Sep	Tue	To NQT w/5	To WD on barge	To NQT w/6	To NQT w/7	at WD	To WD w/4	To WD w/3	To NQT w/3	To NQT w/4

NOTES: [1]Napageak crew used two boats, but NAP2 served only a support function and never went scouting, nor was it ever used for a tow.

Figure 3: Cross Island Population and Scouting Activity, 2007

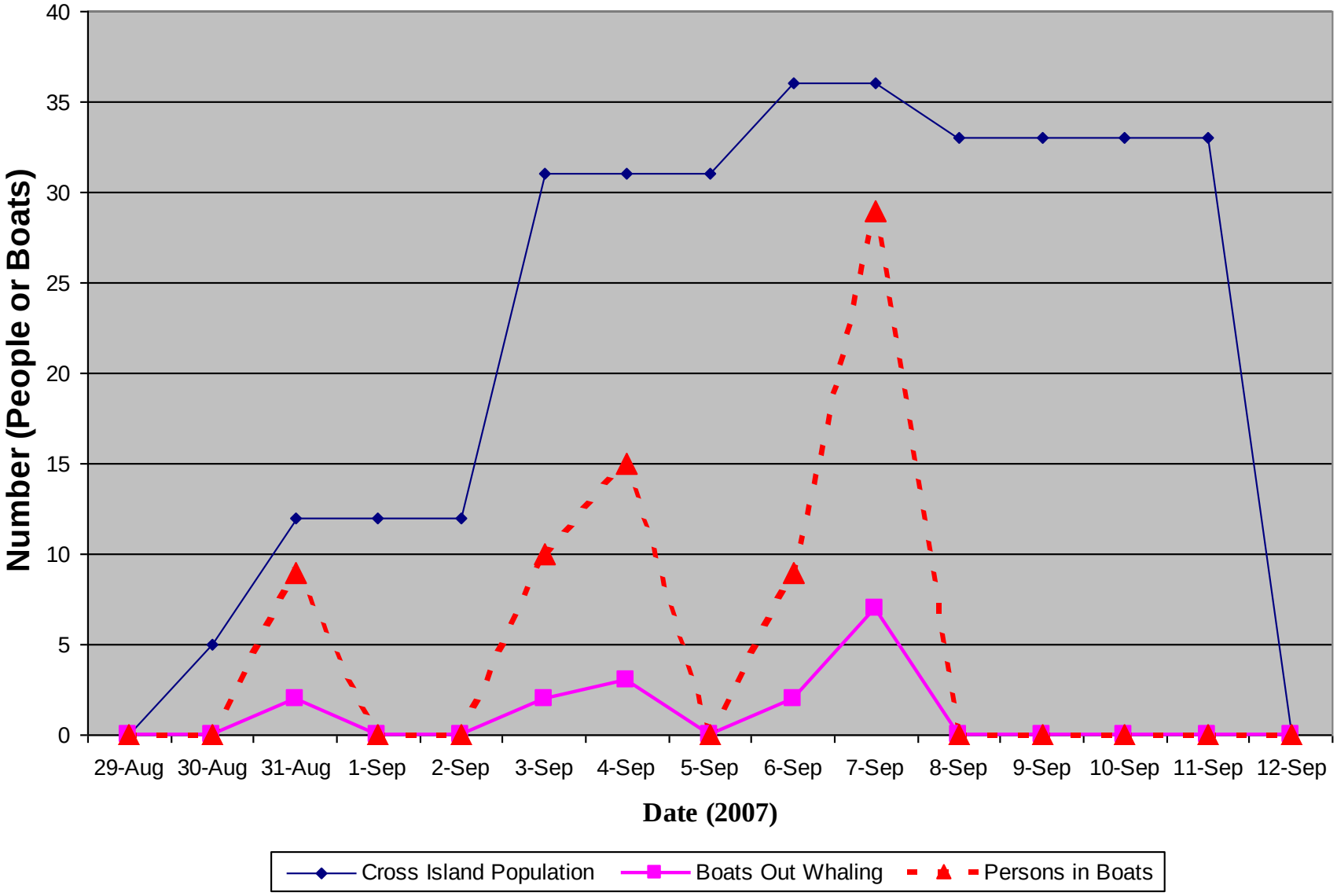


Plate 2: Butchering Photographs from the 2007 Season

Peeling *Muktuk*

Taking Intestines

Muktuk Crew Shares

Meat (2004 Season)

their options. Only one of the "sub-adult" crew members were younger than high school age, which is fewer than in previous years. Thus, only one crew had a crew member younger than a high school student. One crew had four high school/college age members. This was the only crew that did not have a majority of fully mature adults. Once all five crews were on Cross Island, the total number of crew members varied from 31 to 33 (with visitors on two days) or about 6 to 7 per crew, on average.

Crew Characteristics

All crews had a majority of adult members, broadly defined to include those of college-age, but differed in the age of the youngest member and the ratio of older to younger members. One crew four adult members and three high school/college age members. Another crew had three adult members and four college age members. One crew had six adults members and two college-age members. One crew had five adult members. The last crew had three or four adult members, one or two college-age members, and one pre-high school member. Kinship and kin relations were clearly important for the composition of all four crews, but differed in the way they were expressed in each crew.

Crews also differed in the number of people who actually manned the boat while whaling. There may have been a tendency for female crew members to go out scouting in the boat less often than male crew members – but the data are scanty. One crew with a female member went to Cross Island early in the season, went scouting five days, and the female crew member was in the boat for only one trip (although this was the first trip of the season, when this crew landed a whale). The other crew with a female crew member went to Cross Island later in the season, went scouting only one day, and the female crew member was in the boat. A whaling boat normally requires a minimum of three crew members – a driver, a harpooner, and a person in charge of the float – although boats will sometimes go out with only two crew members. A fourth crew member is sometimes assigned to the shoulder gun. Depending on conditions and intuition, a whaling captain may desire to take as few crew members as possible (to have a light, fast boat) or as many extra as possible (to have as many eyes watching for whales as possible).

As mentioned above, during the 2007 Cross Island whaling season there were only five days on which boats went scouting. There were a total of 16 "boat days" for the 2007 season, and since some boats made more than one trip a day, there were a total of 21 scouting trips. The average boat crew was 4.1 people. The two crews that went to Cross Island the earliest accounted for 11 of these trips, and used relatively large boat crews – one averaged 4.5 and the other 5.4 people in the boat. A third crew accounted for 5 of the 2007 scouting trips, with two boats. One boat had a average boat crew of 3.75 people (for 4 trips) and the other 2 people (for 1 trip). The last two crews accounted for the last 5 trips with 3 boats. These boats had average boat crews of 3, 3 and 3.5 people. Thus, for whatever reasons, crews that on Cross Island the longest (or the earliest) tended to have larger boat crews than those crews that were not on Cross Island as long (or came later in the season).

Whaling Days

During the 2007 whaling season there were 5 days when Nuiqsut whalers went scouting for whales. On one of these days, five boats made two scouting trips each, stopping back at Cross Island between such trips to refuel and to rest. Thus, there were a total of 16 "boat days" but a total of 21 total scouting trips in 2007 (Table 5). GPS tracks were collected for 19 of these or about 90 percent. In addition, there were two tracks that were only partial, as discussed above. The missing tracks are shaded more darkly in Table 5.

The whaling seasons for the five crews ranged in length from 9 (three crews) to 13 (one crew) days, counting travel days. The seasons for the individual crews were 9, 9, 9, 12, and 13 days. The whalers did not encounter any ice in 2007, a marked difference from 2006 and especially 2005. Weather conditions were much more adverse than in 2006, however, as is reflected by the low number of days (and total effort) the whalers spent on the water. The proximity of whales to Cross Island aided the whalers in completing their quota, although one whale was struck and lost.

One crew went out scouting for whales on 5 different days. One crew went out on four days, one on three days, and two on only one day. The researcher was not on Cross Island for the entire whaling season, arriving on the second "scouting" day of the season, but was able to collect GPS tracks and whaler accounts for all scouting days, although not from all boats. The number of boats scouting on any given day ranged from two to seven. Each crew devoted 2 days to travel to and from Cross Island. Various boats were disabled at times due to mechanical problems of various sorts, and weather prevented scouting on 3 days. Ice and sea conditions (especially "surf waves") limited scouting activities on 2 days when boats did go out scouting. Three days were devoted to butchering and packing activities.

Figure 4 displays all the boat tracks for the 2007 whaling season, color-coded to aid in the following discussion. Crews spotted whales on four of five scouting days, but reported seeing the most whales on 7 September, and a good number of whales on 31 August. A few whales were reported on 3 and 4 September, but none on 6 September.

The whalers did not reported observing barges when they were out scouting for whales. While a great deal of industry vessel activity was taking place, most of it was of a regular or scheduled nature in support of operations to the west of Cross Island. As has been stated in the past and is repeated in the Deadhorse Communication Center Call Log (2007), Nuiqsut whalers do not want vessel activity to the east of Cross island during the subsistence whaling season, but are much more tolerant of such activities to the west of Cross Island. In the one case where there was some question as to whether vessel traffic could proceed or not, the conflict avoidance process worked well and prevented any potential effects on whaling activities (requests from the *Stryker* on 4 September and 7 September, and from Bowhead Transportation, perhaps in concert with that from the *Stryker*, on 4 September). It should also be noted that more vessel traffic, from a wider geographical area, was documented in the Deadhorse Communication Center Call Log for 2007 than in previous years. This is another indication that the conflict avoidance agreement procedures are becoming more familiar to all the parties involved and may be working better to avoid potential conflicts.

Figure 4: Cross Island GPS Tracks, 2007 Season, by Day

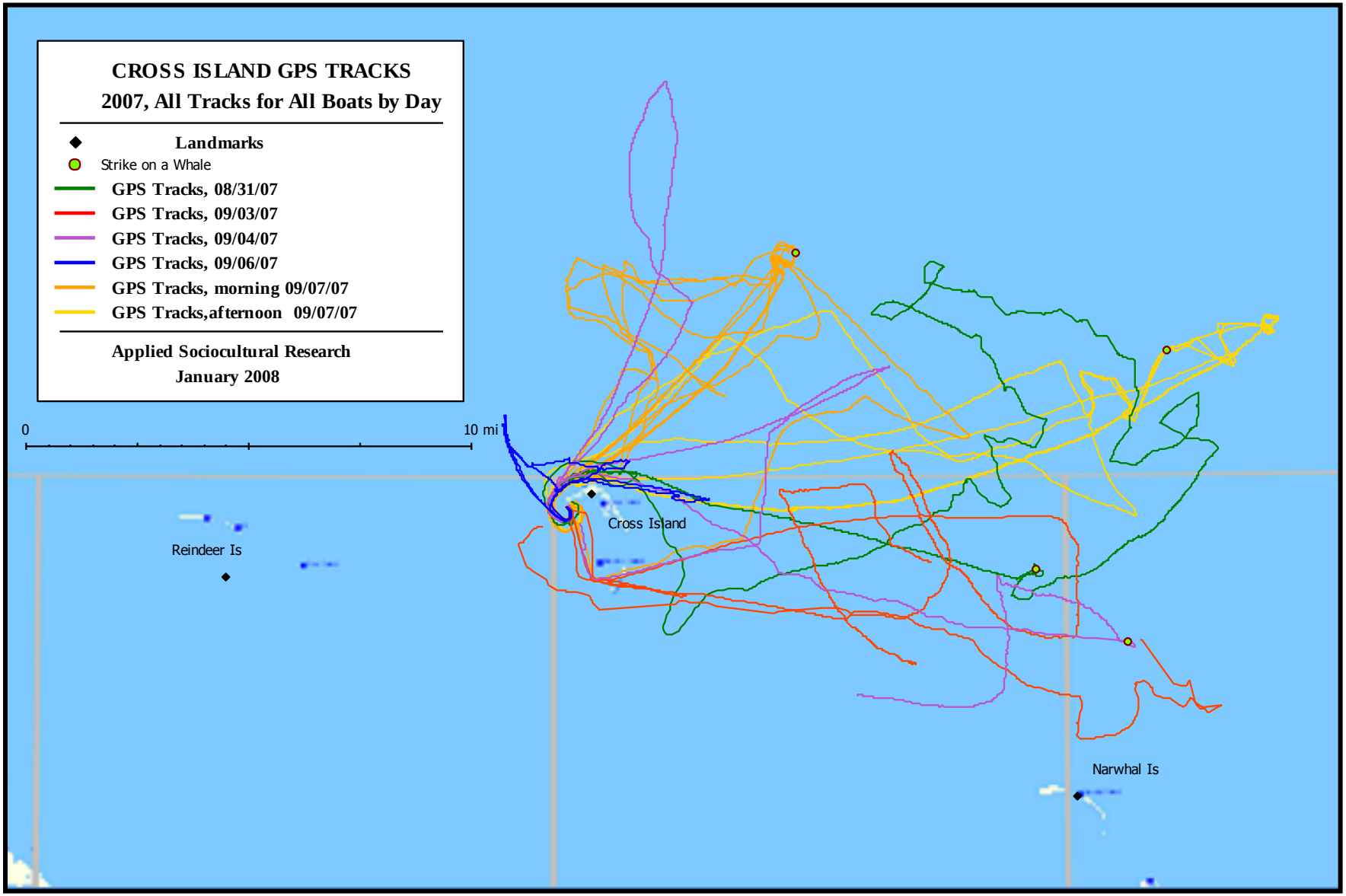


Table 6: Selected Measures of Cross Island Whaling, 2001-2007

Metric		Season						
Measure	Type	2001	2002	2003	2004[9]	2005[9]	2006	2007
Whales Taken/Whales Struck and Lost	count	3/0	4/1	4/0	3/0	1/0	4/0	3/1
Active Crews on Cross Island (maximum)	count	4	3	4	4	5	4	5
Scouting Boats on Cross Island (maximum)	count	7	9	10	8	8	7	9
Cross Island Population	average	27.7	26.6	20.4	18.9	29.8	29.2	26
Length of Season[1]	count	24	23	19	30	27	21	13
Weather Days	count	8-9	4	8	10	11-15	4	3
# days scouting[2]	count	12	15	7	12	9	10	5
# days whales seen[3]	count	9	9	7	6	7	8	4
Boats scouting/day	average	4.8	4.3	4.9	3.4	4.0	4.8	3.2
# boat days[4]	count	57	65	34	41	35	48	16
# boat trips (possible # of GPS tracks)[5]	count	59	67	39	45	48	53	21
Actual # of GPS tracks collected	count	49	52	34	43	48	51	19
Length of trip (miles)	average	83.9	64.3	37.2	45.3	60.7	60.8	30.1
Duration of trip (hours:minutes)	average	9:43	7:58	4:31	6:51	7:07	8:13	5:57
Furthest point from Cross Island (miles)	average	23.6	19.5	11.6	12.1	19.1	22.2	10.4
Strike distance from Cross Island (miles)[6]	average	19.5	13.4	9.3	9.7	25.9	17.0	12
Strike Direction from Cross Island –degrees[6,7]	average	64°	67°	56°	36°	82°	59°	80°
Boat Crew Size	average	3.9	3.6	2.9	3.6	4.4	4.3	4.3
Total Seasonal Boat Effort (Boat-Hours)[8]	sum	572.9	533.6	162.9	301.2	341.3	427.1	124.9
Boat-Hours/Strike	average	191.0	106.7	40.7	100.4	341.3	106.8	31.1

[1]Number of days with at least one crew on Cross Island - includes day of arrival at and departure from Cross Island.
[2]Number of days when at least one boat went out scouting for whales
[3]Number of days when at least one crew saw whales while scouting from a boat. Blows seen from Cross Island are not included in these totals.
[4]Each boat scouting for whales on any given day counts as one "boat day" – regardless of the duration of the trip or if whales are seen or not. Thus if 2 boats scout on one day and 4 boats scout on the next, the total for the two days would be 6 boat days.
[5]Some boats made more than one scouting trip on a single day
[6]Includes "struck and lost" whales in 2002 and 2007
[7]Due north is 0 (and 360) degrees, due east is 90 degrees – includes struck and lost as well as landed strikes
[8]Yearly total equals aggregate sum of duration of all whaling trips by all boats. Includes estimates for missing information.
[9]One crew went to Cross Island well before other crews, so total season measures may be misleading. See 2004 and 2005 Annual Reports.

Nuiqsut whalers have some generalized perceptions as to how industrial activities affect their hunt, based on their experiences of such activities. The proximity of onshore development facilitates the logistical support of Cross Island whaling, and Nuiqsut whalers make frequent supply runs (weather permitting) between Cross Island and West Dock. Logistical support and emergency assistance from industry are at times requested by the whalers. However, whalers perceive offshore oil and gas activities as potentially harmful to whaling, primarily because of noise and/or potential spills and accidents.

The quantitative measures for the 2007 season are displayed for comparative purposes with those from all prior documented seasons in Table 6 (above), but will not be discussed in any detail in this report. Perhaps the most important characteristics of the 2007 season were the lack of ice cover, the frequent presence of high winds (and rough sea conditions) and generally poor conditions for scouting for whales, and the close proximity of whales to Cross Island. Whalers spent relatively little time on the water, but managed to use their full quota of strikes (and landed three whales) during the limited periods of suitable conditions for whaling. Some comparisons of the 2007 Cross Island whaling season and previous seasons are briefly discussed in the sections below, but most such analysis will be deferred until the final synthetic report for the project. The number of days when boats went out scouting for whales, and days on which they saw whales, were the lowest documented for all seven seasons. Total effort expended on the water was also the lowest for all seven seasons, with only 2003 (with similar weather problems coupled with the close proximity of whales to Cross Island) being at all comparable. Similarly, the total length of the season (days spent on Cross Island) was the shortest of all seven documented seasons, with 2003 again being the season most comparable. Average length of trip in terms of miles was also the lowest for all season seasons, but in terms of average duration or time appears to have been closer to the median value. The furthest point reached from Cross Island during 2007 scouting trips was also the lowest value for the seven seasons documented for the project.

The "total effort" measure still requires some additional refinement and analysis, since it confounds a number of, in principle, "effort components" that can be differentiated from each other. Such components would include:

- transit time (at high speed en route to a search area or on the way back to Cross Island)
- scouting time (when actually looking for whales)
- following and chasing time (after finding a whale)
- towing time (after killing a whale)
- other miscellaneous activities (assistance to other boats, mechanical breakdown, rest breaks, and so on).

A detailed breakout of such separate activities is not easily done at present, although it is possible through close analysis of the GPS track information. Rough breakouts could perhaps be compiled with a reasonable level of effort, but more exact accounting (leading to perhaps person-hour levels of effort estimates) would require more effort. This topic will be addressed in the final synthetic report.

Some generalizations, based on all seven documented seasons, about the factors influencing decisions to go whaling are possible, although no systematic model can yet be developed. If the weather is suitable for successful scouting of whales (slight or no wind, slight or no chop, good visibility), all boats physically able to whale will go out. That is, crews go whaling in suitable weather and any deviation from that pattern has a specific explanation. Some captains will go out in more marginal weather than others, and such decisions are quite situational in nature. A crew that has not been out recently seems more likely to go out in marginal weather than those crews that have been out more recently. Crews that have not harvested whales seem more likely to go out whaling than those crews that have landed whales. A captain may call a "rest day" for a crew that has been working hard, especially if conditions are marginal. Trips on days with marginal weather conditions tend to be shorter than on days with better weather. After the harvest of a whale the butchering must usually reach a well-defined point before whaling can resume. For Nuiqsut whalers this is generally the next day for crews other than that which took the whale, and is often the next day for that crew as well. However, due to the experience of the last several seasons where weather has restricted the number of days with suitable conditions for whaling, Nuiqsut captains appear to be more willing to consider landing two whales on the same day. They also may allow most crews to try to land a second whale before butchering a whale already landed. This topic will be more fully discussed in the final report.

The weather factors that seem to be most directly related to when Nuiqsut whalers scout for whales are barometric pressure and wind speed (and to some extent direction). Barometric pressure changes relatively slowly, and whalers often scout when it is in transition, but good scouting conditions tend to correspond with high barometric pressure or times of transition. Figure 5 displays the barometric pressure at Cross Island for the 2007 whaling season, and the discussion below will relate barometric pressure to scouting activity. Nuiqsut whalers do not observe barometric pressure directly – or, at least did not do so until the start of this research and the appearance of a weather station on Cross Island. If the barometric pressure trend is available, whalers will take it into account when deciding whether to scout for whales or not. Since it is at best a rough predictive tool, however, and whalers know from experience that a (relatively brief – up to several hours) period of good scouting conditions can occur when the wind shifts directions, whalers will sometimes go out scouting even when the barometric pressure is falling. Nuiqsut whalers thus rely much more on their direct observations of the wind and their experience as to what the future wind conditions will likely be. Whalers prefer days with no wind, and winds up to 5 mph, or even 10 mph, are acceptable. Scouting can occur even with higher winds, given other circumstances. Wind speed for the 2007 Cross Island whaling season is displayed in Figure 6, with wind direction displayed in Figure 7. The following discussion will show that scouting activities correspond with periods of lower wind speeds. It should be noted that conditions on Cross Island are not necessarily the same as experienced when scouting for whales, but the general trends are often the same (complete weather file in electronic appendix). It should be noted that for 2007, weather conditions were a major factor for the whalers.

During the period of time for which weather measurements are available, scouting occurred on 9/04 and 9/06-07. The weather station was set up on 9/04, a scouting day, but the weather measurements indicate that the barometric pressure was at a near low and that the winds that day

were relatively high (Figures 5 and 6). Poor or marginal scouting conditions are supported by the observations that only three crews (and three boats) went scouting 9/04 and that boat trips were relatively short in duration, from 2.5 to 4.0 hours long. Barometric pressure increased a little, but winds remained about the same, for 9/05 and no crews went out scouting. Barometric pressure remained about the same or perhaps began to increase a bit, and winds may have started to calm a bit and become more changeable in direction, but only two crews (and two boats) tried to scout for whales on 9/06. They stayed out only 1.5 to 2 hours and saw no whales. For 9/07, barometric pressure was increasing and hit a peak for the period, winds decreased to near zero for a short part of the day, and wind direction became very variable (characteristic of periods of low wind). This is a day on which all five crews (and seven boats) went out scouting, and two whales were landed. In any event, barometric pressure was increasing on 9/06 and was highest on 9/07, when scouting occurred (Figure 5). Similarly, the highest wind speeds were recorded on days with no scouting activity (Figure 6), although scouting occurred on some days with relatively brisk winds. The one day when whales were landed, and the most boats went out, was the day with the calmest wind and the highest barometric pressure. For the two scouting days (8/31 and 9/03) prior to when the weather station was set up, one of the whaling captains reported that the wind was relatively low when they left to go scouting (perhaps 5 to 10 mph). The wind picked up on each of these days, however. Still, a whale was landed on 8/31, and a whale was struck but lost on 9/03. The captain reported that on the two days in between (9/01-02) that the wind was high (25 mph or more) and that they could not have gone out scouting.

Figure 5: Barometric Pressure at Cross Island, 9/04/07 – 9/11/07

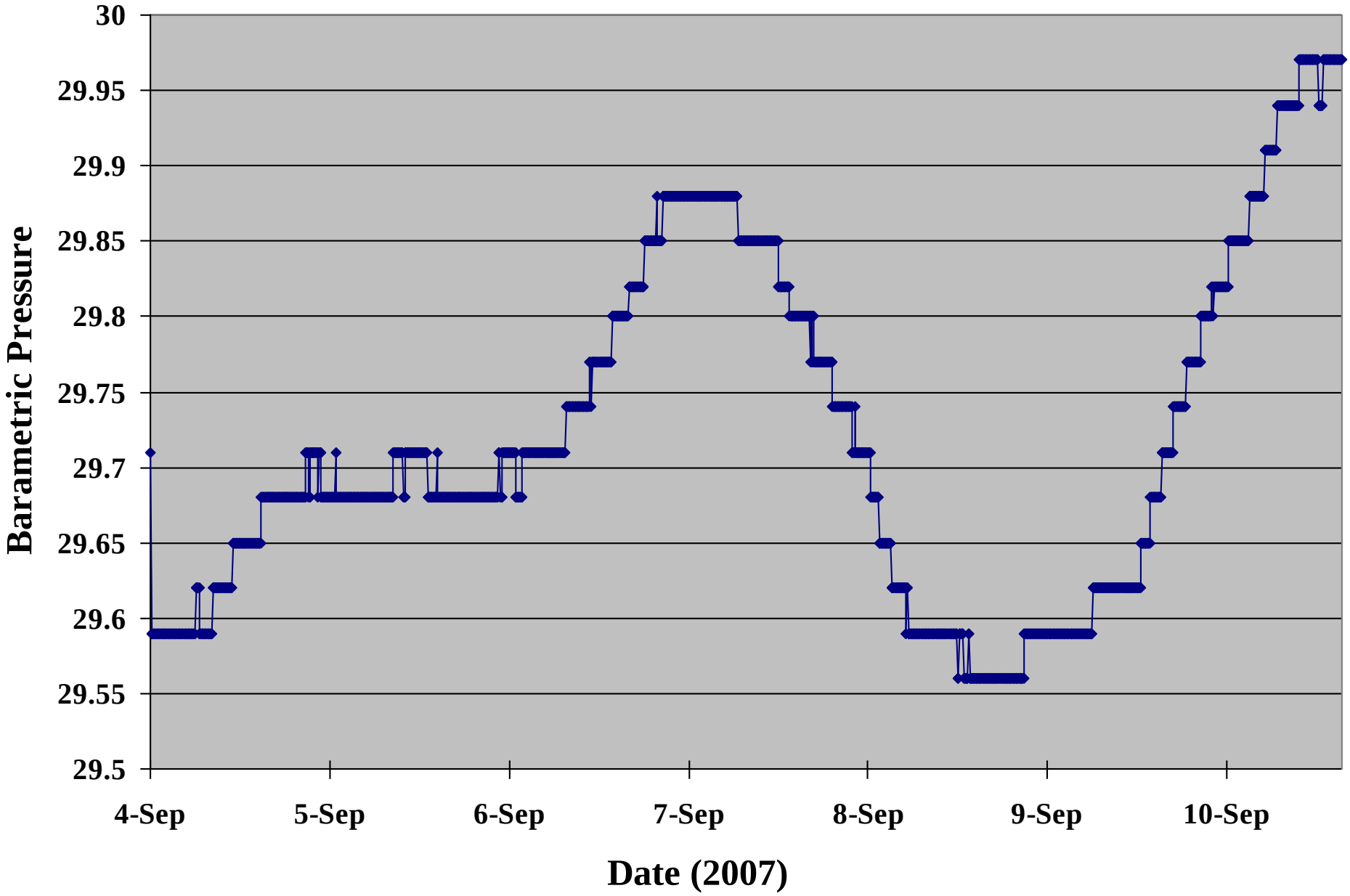


Figure 6: Wind Speed at Cross Island, 9/04/07 – 9/11/07

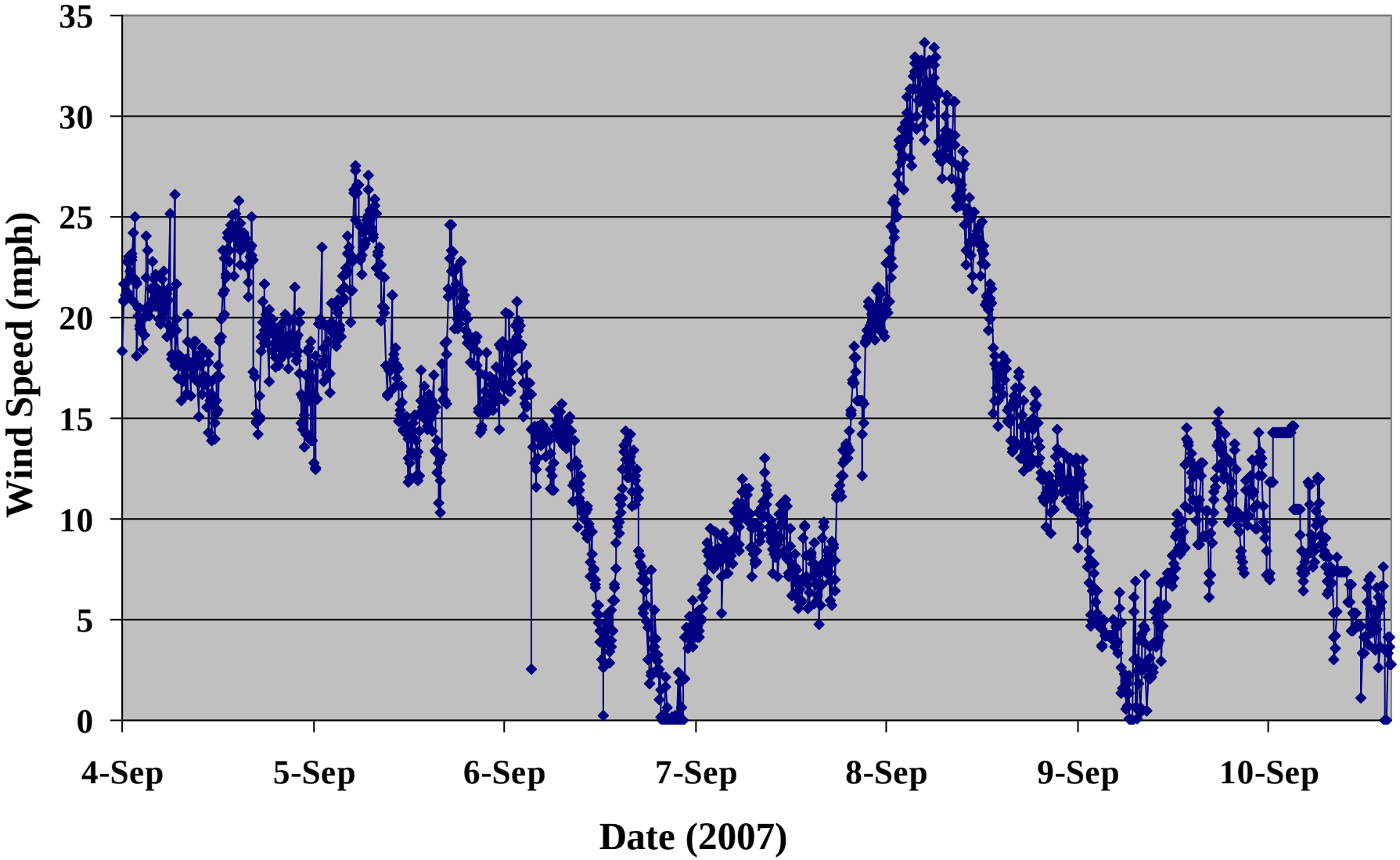
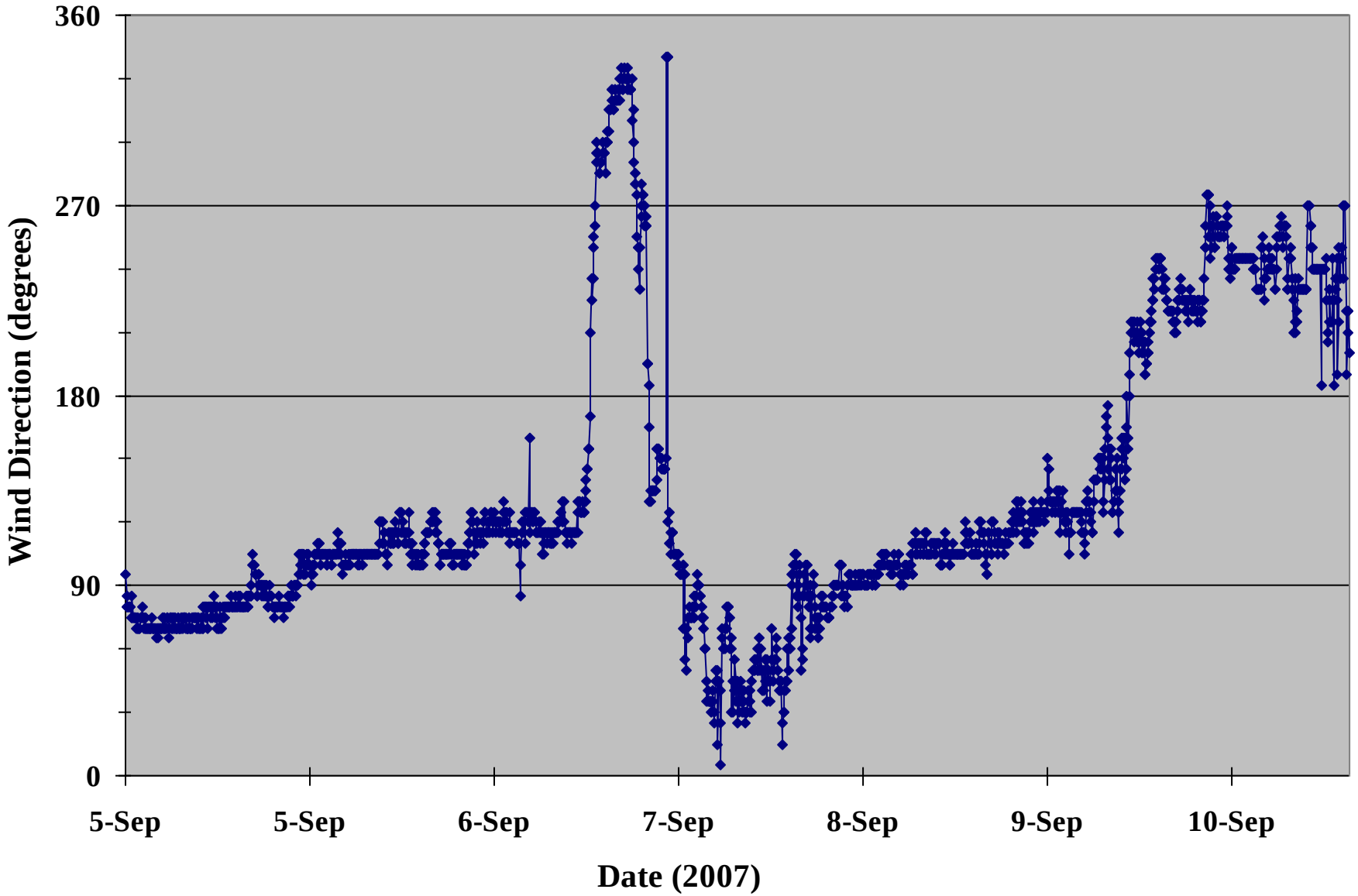


Figure 7: Wind Direction at Cross Island, 9/04/07 – 9/11/07



"Non-Whaling" Boat Activity

In addition to searching for whales, several Nuiqsut whaling vessels made trips between Cross Island and West Dock. Most commonly, trips are made for logistical reasons – to pick up supplies, needed parts, or to drop off and pick up crew members. Generally, after the harvest of a whale a certain portion of it is sent to Nuiqsut to "feed the village." In most cases the successful captain will designate one or more of his crew members to take one of his boats to Nuiqsut for this purpose. If conditions for boat travel are poor, the "fresh kill" may be taken to West Dock and flown to Nuiqsut – but will still be accompanied by the captain's flag and a crew member to run the flag to the captain's house.

This information collection effort focuses explicitly on Cross Island whaling activity. No attempt was made to systematically collect information on preparation, support, or other crew member activities that occurred elsewhere (primarily in Nuiqsut). Whaling support activities from non-Nuiqsut sources (mainly oil and gas industry support through Alaska Clean Seas barges) were quite evident, but mainly in terms of island infrastructure rather than the frequency of ACS barge activity. Only a limited number of ACS barges landed on Cross Island while the whalers were there, mainly to service the infrastructure supporting the whalers. ACS did of course use their barges to mobilize the Cross Island infrastructure before the first crew arrived, and demobilized this equipment on the day that the whalers left. Thus, compared to most previous years, there were comparatively few trips by ACS barges to Cross Island, but perhaps more than in 2006. Whalers made fairly frequent trips from Cross Island to West Dock, but these have not been counted or compared to previous years. Documentation of contacts and interactions through telephone, FAX, or non-whaling non-Nuiqsut vessel were not fully documented, and such information was only collected as contextual background.

GPS Information

All whaling crews agreed to carry and use GPS units. All track information is presented in the electronic appendices, with two examples from the 2007 season in the body of the report – Figures 2 (single day) and Figure 4 (composite of all tracks, by day). Figure 8 presents all GPS tracks for each project season, by year, for comparative purposes. A list of waypoints noted by the whalers is presented in Table 7. The level of information obtained varied from boat to boat, but for most boats and for all crews at least partial tracking information was obtained, along with the unlabeled points where whales were observed (or struck). In Table 5, as discussed above, the days that boats went out whaling are shaded. Dark shading indicates that a GPS track was not obtained for that day from that boat. Light shading indicates that a GPS track was obtained from that boat for that day. There were 16 different "boat days" (21 scouting trips, including two "whale tow only" trips) for which GPS tracks were possible. GPS tracks were collected for all 16 boat days (but only 19 of the total possible trips)- about 90 percent.

Figure 8: All Cross Island Whaling Tracks, 2001-2007, by Year

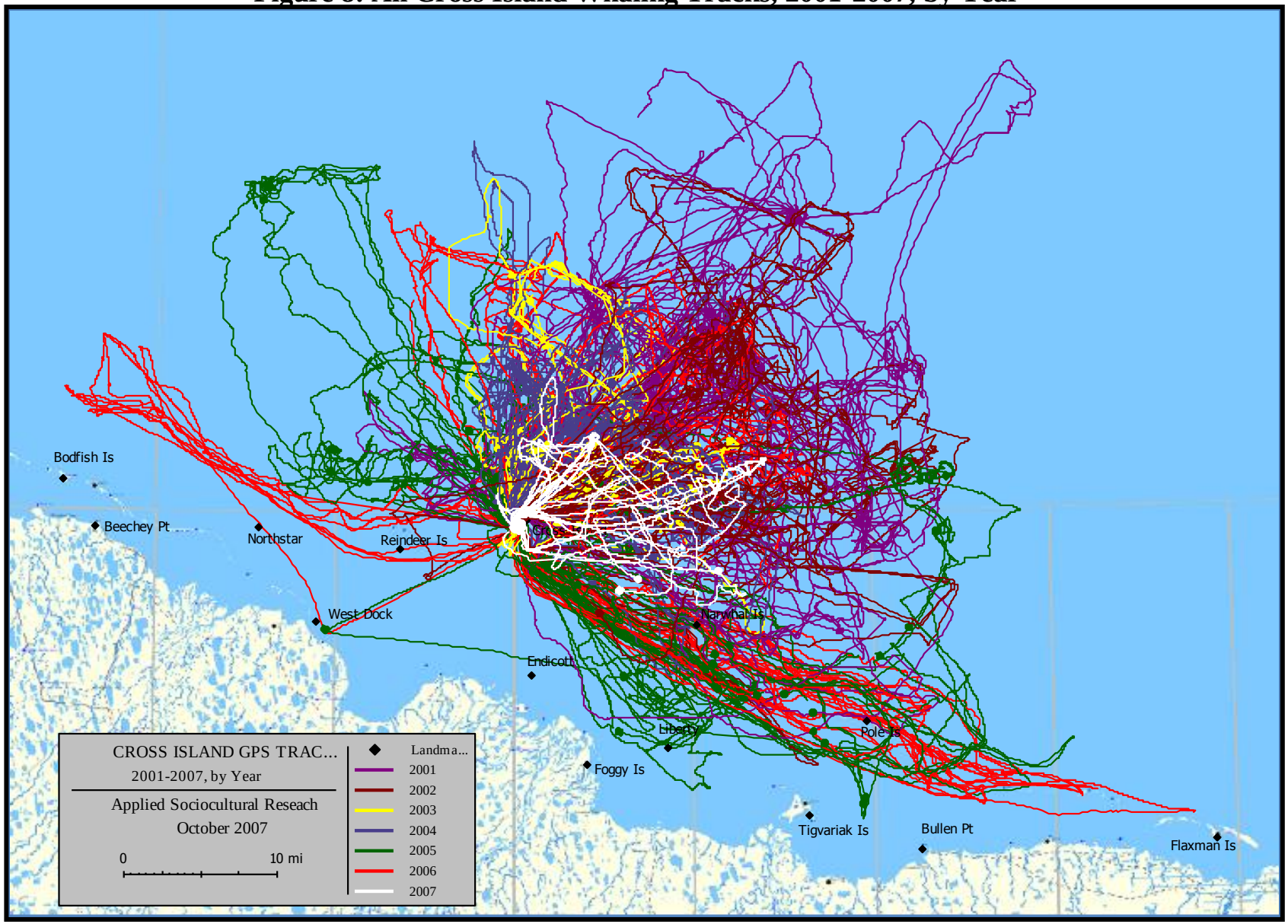


Table 7: All Waypoints Marked or Located, 2007 – Whale Sightings **BOLDED**, Strikes/Kills **RED**

Date	Crew	Way Point #	Lat/Long	Time	Notes	Type
08/31/07	**NAP**	**NAP_083107a**	**N70.49867 W147.59512**	**10:59**	**Com Center log indicates NAP1 saw two whales**	**Whale**
08/31/07	NAP	nap_083107b	N70.51199 W147.55670	11:42	Still chasing whales	Duplicate
08/31/07	NAP	nap_083107c	N70.50872 W147.35017	15:13	Lost track of whale seen at NAP083107a	chase
08/31/07	**NAP**	**nap_083107d**	**N70.46755 W147.49922**	**16:03**	**Saw 3 whales**	**Whale**
08/31/07	**NAP**	**nap_083107e**	**N70.47027 W147.52850**	**16:25**	**Apparent strike location of NAP whale**	**strike**
08/31/07	**NAP**	**nap_083107f**	**N70.46904 W147.53561**	**16:35**	**Apparent kill location of NAP whale**	**kill**
08/31/07	**NAP**	**NAP_083107g**	**N70.42852 W147.53822**	**16:13**	**Lots of whales/blows south of chase**	**Whale**
08/31/07	NAP	nap_083107h	N70.47188 W147.59742	17:30	Tow event (routine)	tow
08/31/07	NAP	nap_083107i	N70.48672 W147.76629	18:41	Tow event - almost cut whale loose (sea conditions)	tow
09/03/07	**IAN**	**IAN_090307a**	**N70.44600 W147.43870**	**11:48**	**Location of IAN S&L - 5 or 7 whales in the area**	**strike**
09/03/07	**IAN**	**ian_090307b**	**N70.47234 W147.62885**	**14:15**	**Where tracking picked up again, whale seen maybe 20 minutes prior**	**track**
09/03/07	**IAN**	**ian_090307c**	**N70.49686 W147.72914**	**14:57**	**Maybe a few whales up here**	**Whale**
09/03/07	IAN	ian_090307d	N70.43980 W147.65189	16:26	Turned back t Cross Island - crew wet	track
09/03/07	**NAP**	**NAP_090307a**	**N70.44225 W148.11693**	**9:15**	**Report whale 4.5 miles SW of CI (9:10 GPS time)**	**Whale**
09/03/07	NAP	nap_090307b	N70.44600 W147.43870	11:48	NAP point for IAN S&L	Duplicate
09/03/07	NAP	nap_090307c	N70.45438 W147.65494	13:56	Whales in the area, same area as IAN b&c	Duplicate
09/03/07	NAP	nap_090307d	N70.46685 W147.61605	14:15	Probably same whale area and whales	Duplicate
09/03/07	**NAP**	**nap_090307e**	**N70.50877 W147.66674**	**14:57**	**Maybe 2 whales in this area**	**Whale**
09/03/07	NAP	nap_090307f	N70.44884 W147.48982	16:26	Turns to head north, then west back to Cross Island	track
09/04/07	IP	IP1_090407a	N70.50029 W147.99072	7:06	UNK	UNK
09/04/07	**IP**	**IP1_090407b**	**N70.55732 W147.86143**	**7:35**	**Spot a whale**	**Whale**
09/04/07	**NAP**	**nap_090407a**	**N70.47866 W147.79716**	**7:36**	**Saw a blow to the North and headed up that way**	**Whale**
09/04/07	NAP	nap_090407b	N70.51513 W147.78534	7:53	Decided they had lost the blow (nap090407a) - never saw it again	track

Table 7: All Waypoints Marked or Located, 2007 (CONT.) – Whale Sightings **BOLDED**, Strikes/Kills **RED**

09/06/07	IP	ip1_090607a	N70.50554 W147.92252	10:21	Easternmost point of track - turned back	track
09/06/07	IP	ip1_090607b	N70.50548 W147.98085	10:32	May have seen something, but no report	track
09/06/07	IP	ip1_090607c	N70.50405 W148.01920	10:46	May have seen something, but no report	track
09/06/07	IP	ip1_090607d	N70.52075 W148.04444	11:11	Northernmost point of track - turned to return to CI	track
09/06/07	NAP	nap_090607a	N70.49322 W147.84563	10:15	Easternmost point of track - turned back	track
09/06/07	NAP	nap_090607b	N70.49636 W147.98919	10:32	May have seen something, but no report (circles in track) – more likely communication with IP1	track
09/06/07	NAP	nap_090607c	N70.51787 W148.04526	11:11	Northernmost point of track - turned to return to CI	track
09/07/07	BO	BO1_090707a	N70.54178 W147.39560	15:22	Chase event - BO1 position at time of IP1 strike	chase
09/07/07	BO	BO1_090707b	N70.55112 W147.29680	"16:24"	Points marked after whale flipped over and stopped and drifting, but before pronounced dead	chase
09/07/07	BO	BO1_090707c	N70.55122 W147.29611	16:27		chase
09/07/07	BO	BO1_090707d	N70.55124 W147.29595	16:27		chase
09/07/07	BO	BO1_090709e	N70.60576 W147.29060	NA	Whales to North of chase - duplicate of nap090707l	Duplicate
09/07/07	IAN	IAN_090707a	N70.49126 W147.98303	NA	Cross Island	track
09/07/07	**IAN**	**IAN_090707b**	**N70.50446 W147.96815**	**5:47**	**Whale sighting**	**Whale**
09/07/07	IAN	IAN_090707c	N70.53015 W147.92972	6:00	Whale sighting - not clear if the same one or not	Duplicate
09/07/07	IAN	IAN_090707d	N70.53288 W147.92732	6:03	Probable chase event - no report	chase
09/07/07	IAN	IAN_090707e	N70.57016 W147.78179	7:59	Preparing for tow or start of tow	tow
09/07/07	IP	ip1_090707a	N70.57109 W147.76189	7:07	coordinates for NUK2 strike	Duplicate
09/07/07	IP	IP1_090707b	N70.50651 W147.97562	12:50	UNK - reference point?	UNK
09/07/07	IP	IP1_090707c	N70.50651 W147.97562	12:50	UNK - reference point?	UNK
09/07/07	**IP**	**IP1_090707d**	**N70.54109 W147.39886**	**15:21**	**IP1 struck whale, float came off [GPS track location at time of report]**	**strike**
09/07/07	IP	IP1_090707e	N70.54217 W147.39000	15:21	IP1 coordinates reported for strike [not on any track, unclear why that is]	Duplicate
09/07/07	**IP**	IP1_090707f	**N70.55128 W147.29278**	**16:49**	**IP whale landed (kill location)**	**kill**
09/07/07	IP	IP1_090707g	N70.51488 W147.46671	19:17:00	Tow event - speed dropped to less than 1 mph (9/08)	tow
09/07/07	IP	IP1_090707h	N70.49787 W147.97113	0:34	tow event (near Cross Island)	tow
09/07/07	NAP	NAP_090707a	N70.47791 W147.85136	6:05	UNK	UNK
09/07/07	**NAP**	**nap_090707b**	**N70.52623 W147.69467**	**6:40**	**spots 2 whales @ 7.0 miles from Cross Island**	**Whale**
09/07/07	NAP	NAP_090707c	N70.51283 W147.60072	6:58	NAP saw whales, harpoon broke due to rough seas	Duplicate
09/07/07	NAP	NAP_090707d	N70.57108 W147.76188	NA	Coordinates from another boat, marked 7:10 (strike)	track

Table 7: All Waypoints Marked or Located, 2007 (CONT.) – Whale Sightings **BOLDED**, Strikes/Kills **RED**

09/07/07	NAP	nap_090707e	N70.57250 W147.78212	7:46	Chase event	chase
09/07/07	NAP	nap_090707f	N70.53714 W147.51702	14:32	NAP reported they smelt the whale in this area	Duplicate
09/07/07	**NAP**	**NAP_090707g**	**N70.53801 W147.50011**	**14:38**	**NAP reported that they first saw the whale in this area**	**Whale**
09/07/07	NAP	nap_090707h	N70.52282 W147.43519	15:04	Apparent chase event	chase
09/07/07	NAP	NAP_090707i	N70.50765 W147.43508	NA	"nap-herburt" - UNK significance	chase
09/07/07	NAP	NAP_090707j	N70.54176 W147.39009	15:23	Chase event - IP1 strike or soon after	chase
09/07/07	NAP	nap_090707k	N70.54181 W147.38973	15:23	Chase event - IP1 strike or soon after	chase
09/07/07	NAP	nap_090707l	N70.54451 W147.36991	15:31	Whale seen again to the south by whalers, other whales seen to the North and "over there" (more to the NW - points m and n)	chase
09/07/07	**NAP**	**NAP_090707m**	**N70.55796 W147.39737**	**15:31**	**Whales seen to the North of the chase**	**Whale**
09/07/07	**NAP**	**NAP_090707n**	**N70.58094 W147.36225**	**15:31**	**Whales seen to the North of the chase**	**Whale**
09/07/07	NAP	nap_090707o	N70.54871 W147.31363	15:47	Float put on same whale struck by IP1 @ 15:21	chase
09/07/07	NAP	nap_090707p	N70.54671 W147.29746	16:02	Chase event	chase
09/07/07	NAP	nap_090707q	N70.54850 W147.29619	17:14	Tow event (unknown significance)	tow
09/07/07	NAP	nap_090707r	N70.56099 W147.27901	16:50	Plane observed to fly over after kill	track
09/07/07	NAP	nap_090707s	N70.47534 W147.23413		"nap-whale2" - whale to the South?	UNK
09/07/07	NAP	nap_090707t	N70.53970 W147.33082	17:36	NAP developed leak, pulled out of tow	tow
09/07/07	**NUK**	**nuk2_090707a**	**N70.54796 W147.92500**	**6:15**	**NUK and IAN see a whale**	**Whale**
09/07/07	NUK	nuk2_090707b	N70.55178 W147.88229	6:48	Chase event, high speed	chase
09/07/07	NUK	nuk2_090707c	N70.54946 W147.79135	6:57	Chase event - high speed	chase
09/07/07	NUK	nuk2_090707d	N70.56100 W147.78572	6:58	Chase event - high speed	chase
09/07/07	**NUK**	**nuk2_090707e**	**N70.57304 W147.76089**	**7:05**	**Chase event (likely strike between this and preceding point, aprox. 7:00)**	**strike**
09/07/07	NUK	nuk2_090707f	N70.57108 W147.76188	7:06	Coordinates reported to Com Center for strike, time recorded by Com Center as 7:00 - possibly reported after the fact, with time and/or coordinates slightly inaccurate	Duplicate
09/07/07	NUK	nuk2_090707g	N70.56986 W147.76269	7:07	Chase event	chase
09/07/07	NUK	nuk2_090707h	N70.56976 W147.76560	7:10	Chase event	chase
09/07/07	**NUK**	**nuk2_090707i**	**N70.57042 W147.78182**	**7:56**	**NUK point for NUK whale**	**kill**
09/07/07	**NUK**	**nuk3_090707a**	**N70.57149 W147.97381**	**6:42**	**Saw a 2nd whale and turned toward it**	**Whale**

The two tracks (ten percent) that were not collected are accounted for by one case where a crew had the "tracking" function on their GPS unit turned off, as discussed above, and another where the hard top of the boat's cabin disrupted the ability of the GPS unit to receive the proper satellite signals. All GPS tracks collected have been transmitted to MMS in Garmin MapSource (*.gdb) and shape file (*.shp and associated files) formats, and are available to appropriate users.

Not all waypoints listed in Table 7 were actually marked by crews while they were out on the water. Some were described by crews during their reviews of GPS tracks. Waypoints that were marked by crews during their trips have labels with capital letters. Thus, not all whale sightings were marked, and not all unmarked whale sightings were later described to the researcher. The daily boat report forms may include some additional likely whale sightings that are not included in Table 7, but these additional points are based on whalers' general accounts, and no specific locational information. It is likely that not all whale sightings are included on the daily report forms, although most individual whales sighted are probably represented. Multiple sightings of the same whale were usually reported as such by most crews, but most crews only marked a single position for a whale unless they followed it for a significant period of time and/or struck it. Different crews may mark the position of the same whale, so the number of different whales observed may require an analysis of all points and tracks in relation to each other.

Waypoints are of three types – whale sightings/strikes, reference points (generally whales seen on previous days or by other boats), and "unknown significance". Whale sightings may have actually been marked by a crew, or may have been located on their track when reviewing it with the researcher at some point. Strike locations are relatively fixed, but sightings may be for a whale or blow located anywhere from 10 feet to several miles from the boat, and thus are less fixed in terms of position. Each waypoint number consists of three parts: BoatID (upper case for points marked while out on the water, lower case for points located while discussing the GPS track with the researcher), Date(mmddyy), and Sequence Number.

Other Subsistence Activities

Little non-whaling subsistence activity was documented on or near Cross Island during the 2007 whaling season, and probably less than in previous seasons. The 2007 was shorter in length than previous project seasons, and the weather was also quite poor. On those days when subsistence activity could have been possible, crews were whaling. Of course, a great deal of "non-whaling" subsistence activity took place throughout the year in order to support the whaling effort. Whalers did note that they had seen seals and birds, but generally did not mark these points. Polar bears were a concern, but mainly after the last two whales were landed, and were not as troublesome as in some past years. Whalers note that with less ice, there are fewer polar bears on Cross Island and more to the west, in the Olitok Point area.

Bearded seals and "regular" seals were seen while out scouting. No seals were taken. No harvest of birds was noted, and no fishing took place while the whalers were on Cross Island.

Nuiqsut Whalers' Observations and Perceptions of Whale Behavior in 2007

There was little ice to restrict the whalers in 2007, but weather and rough sea conditions limited the number of days on which they could go boating. When they did go scouting, they generally found whales close to Cross Island. They did not go as far from Cross Island as they had in previous years in any case. The limited number of days when they went scouting limited the observations they could make about whale behavior in 2007.

Observed Whale Feeding Behavior in 2007

There were no reports of whale feeding behavior during the 2007 Cross Island whaling season. This does not necessarily mean that feeding did not occur, or that Nuiqsut whalers did not observe it. However, it is an indicator that whale feeding activity was not very obvious in 2007. Possible explanations for the relative lack of observed whale feeding behavior, not mutually exclusive, are as follows:

- Whale feeding is not commonly observed (or at least not reported) by Nuiqsut whalers near Cross Island (only one incident during the previous five years);
- Few whales were observed on some days by whalers during the 2007 season;
- On some days when scouting was possible, swells and waves (due to wind) still made spotting and observing whales difficult;
- On some days when a relatively large number of whales were observed, most were seen only at a relatively large distance;
- A major part of the migration may have bypassed the area accessible to the whalers.

For the six years previous to 2007, only one observation of whale feeding was reported and recorded. This was a spectacular sighting of a whale feeding on the surface with its mouth open, about 7.8 miles (12.6 km) from Cross Island, bearing 34° true. The captain, a very experienced whaler, remarked that this was the first time he had seen this. This does not necessarily indicate that Nuiqsut whalers did not observe whale feeding behavior on other occasions in 2001–2007 when they were out scouting. However, it probably means that such observations were not common. If other sorts of feeding behavior had been observed during 2001–2007, they would probably have been reported.

Most feeding by bowhead whales is below the surface and difficult to recognize via surface observations; however, there have been some previous observations of bowheads feeding actively at the surface in the Canadian and Alaskan Beaufort Sea, with mouths open (Würsig et al. 1984, 1989; Richardson and Thomson [eds.] 2002). The first whale taken by a Nuiqsut crew, in 1973, was reported to have been feeding on the bottom near Flaxman Island. Some other whales landed at Cross Island have been found to have recently-consumed food in their stomachs (Lowry and Sheffield 2002; Lowry et al. 2004). One of the whales taken in 2006 was also reported to have had mud on its jaw, and one of the two stomachs that were examined was quite full (Galginaitis 2007a).

"Skittish" Whale Behavior During 2007

For the most part, Nuiqsut whalers reported that when they found whales in 2007, they were able to follow them. On days of marginal scouting conditions (4 September and 6 September especially), they saw fewer whales and they were more difficult to follow, A few whales were described as appearing to be "spooked" from the time the whalers first saw them. A "spooked" whale might be traveling faster, spending more time on the surface, and/or exhibiting a more erratic course than most migrating whales. Such a whale may also stay nearer the ice edge or floating ice (if there is any) than most migrating whales. Thus, spooked or skittish whales are more difficult to follow than other whales. Nuiqsut whalers are wary of approaching and striking such whales, even if they can catch up with them, since they are less predictable than other whales. In discussions with the whalers during the 2007 whaling season, whales were not often described as "spooked". The potential effects of noise on whale behavior is always a whaler concern, however.

General Offshore Distribution of Whales, 2007

Although whaling success was good for both 2006 and 2007, there were still relatively few days on which whalers were able to scout in open water and find a good number of whales (5 of 10 scouting days in 2006, 3 of 5 scouting days in 2007). Whales were found relatively far from Cross Island in 2006, mainly because of ice conditions in the view of the whalers (Galginaitis 2007a, 2007b). The whalers were unable to look for whales closer to Cross Island in any event because of the ice. In 2007, the whalers found whales relatively close to Cross Island and as such had no need to travel further offshore. There was little or no ice cover to contend with in 2007. Wind and sea conditions in 2007 would likely have made scouting for whales farther away from Cross Island more difficult and dangerous. The whalers could not determine, and would not hazard an opinion, as to the overall distribution of whales in 2007. They knew that the ones they were seeing were close to Cross Island, but did not know if they represented the bulk of the migration or not. On days when conditions were especially favorable for scouting (the first part of 31 August, most of 7 September), the crews out scouting reported seeing many whales and blows. On at least one trip between Cross Island and West Dock one crew reported spotting a whale. Whalers indicate that, in general, whales are found closer to Cross Island in years when there is little ice, and are farther out when there is more ice.

Non-Whaling Vessel Activity in 2007 and Expressed Whalers' Concerns

This Section summarizes the observations and concerns of Nuiqsut whalers in relation to the activities of vessels other than whaling vessels during the 2007 Cross Island whaling season. The inclusion of this information reflects the general concern that Nuiqsut whalers' have about the possibility of non-whaling vessel traffic disrupting or otherwise affecting their whaling activities. It is more specifically related to their experiences in 2005 and 2006, and their knowledge of industry plans for exploration and development in 2007.

In 2005, ice conditions and weather confined the whalers to the shore side of the ice (and the barrier islands) except for one day. This was the one day in 2005 when they saw a large number

of whales. They had seen non-whaling vessels on previous days, but on this one day were actually chasing whales when they encountered a non-whaling vessel that came into close proximity with at least one of the whaling vessels and disturbed the hunt. Although the whalers were successful in landing a different whale later in the day, after the non-whaling vessel had proceeded to the west, the whalers reported this encounter may have delayed the landing of a whale. It almost certainly contributed to their decision not to try to land two whales on this day.

Nuiqsut whalers thus were quite sensitive to the possibility of non-whaling vessels disturbing their hunt in 2006. Compounding this concern, ice conditions early in the 2006 season appeared to be a repeat of those in 2005 and the whalers observed non-whaling vessels (but few whales) on each of the first four days when they went out scouting inside of the barrier islands. Their concerns were alleviated somewhat once ice conditions moderated and they were able to reach open water beyond the barrier islands. They found numerous whales and landed their full quota of four, while not observing any more non-whaling vessels. Their concern with this potential problem was not dissipated, however. This was evident from their continued discussions among themselves and with the AEWC, and their sensitivity to any such vessel (or aircraft) activity taking place in the Cross Island area when whaling may be taking place. Documentation of these observations and concerns in 2006 is summarized in the 2006 Annual Report.

The 2007 whaling season was proceeded by a long and contentious negotiation between industry and the whalers to reach agreement on a Conflict Avoidance Agreement (CAA). The crux of the matter was the desire on the part of Shell to drill some preliminary wells on their Sivulliq prospect in Camden Bay, along with an aggressive seismic program in the Beaufort Sea. Nuiqsut whalers relate that drilling in Camden Bay (on the Hammerhead and Kuvlum prospects) in the mid-1980s and early-1990s deflected whales far away from Cross Island (Long 1996, Ahmaogak 2002), and feared that new drilling would do the same. As it turned out, Shell did no drilling in 2007 and industry seismic work complied with the standard requirements that had worked to avoid adverse effects on the whalers in the past. As discussed above, Nuiqsut whalers did not report any sort of industry or vessel interference with whaling activities in 2007, but retain their vigilance to guard against the possibility of such interference.

Planned Future Activities

As this is written, Annual Reports for all previous field seasons have been submitted to MMS and the draft final report is in preparation. Data for 2001-2007 has been sent to the Core Contractor for inclusion in the cANIMIDA database. MMS has funded the continuation of the Cross Island subsistence whaling monitoring effort, and the necessary actions to obtain the whalers consent and cooperation are underway. This will occur in conjunction with local review of the 2007 Annual and final draft reports. Plans for the 2008 field season are also under construction, but will remain tentative until it is clear that the whalers wish the research to continue. A tentative schedule for the next 10 months is, in summary:

- The most immediate task will be the kick-off meeting between ASR and the COR for the 2008-2011 Cross Island subsistence whaling monitoring project. This will be scheduled for some time prior to 6/20/08, but has not been scheduled as yet. Since one of the topics to be

discussed at this meeting is the Project Management Plan, ASR will need to extract and expand this document prior to this meeting.

- Work on the Field Manual for the continuation of the Cross Island monitoring project will also be one of the first tasks under the renewed contract.
- Consultation with the Nuiqsut whalers on the continuation of the Cross Island monitoring project is tentatively scheduled for June, along with consultation on the draft 2007 Annual Report and the preliminary form of the draft final report. This trip will also be used to try to recruit and train a field assistant, using the Field Manual (and the task of its revision) as a focus.
- Consultation with the Alaska Eskimo Whaling Commission on the continuation of the Cross Island monitoring project is tentatively scheduled for July, at their quarterly meeting in Anchorage. This would be in conjunction with a report on the results of the project so far (2001-2007). A letter has been sent to request a spot on their agenda, if the Commissioners are interested in either or both of these presentations, and it is anticipated that ASR will be extended an invitation to give these presentations to the AEWC.
- A draft of the final report is scheduled to be available in late August, but this will be a working draft. The final is not scheduled to be delivered until March 2009, due to the need to properly review it with the Nuiqsut whalers and other local stakeholders.
- Field work for the 2008 whaling season is tentatively scheduled for late August through September 2008.
- Cleaned data for the 2008 field season will be delivered to MMS within 6 weeks of the end of the 2008 field season.
- A North Slope consultation trip will be necessary sometime in early 2009 (Nuiqsut/Barrow).
- The 2008 draft Annual Report will be delivered to MMS no later than 3/20/09.

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Electronic Appendices (files that appear on accompanying CD-ROM)

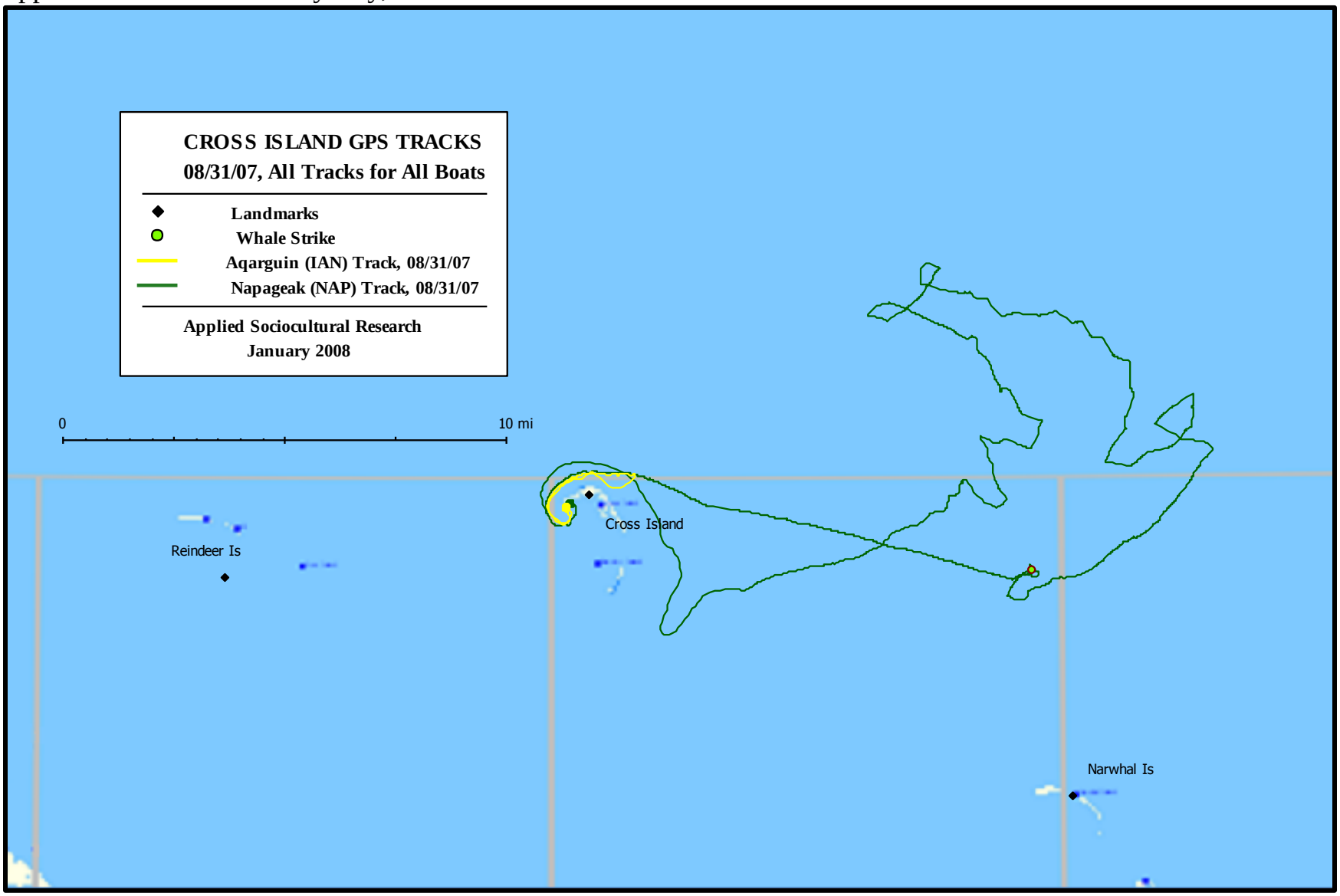
Annual Assessment of Subsistence Bowhead Whaling Near Cross Island, 2007 Annual Report (cANIMIDA Task 7) – PDF file "AnRpt2007.pdf"

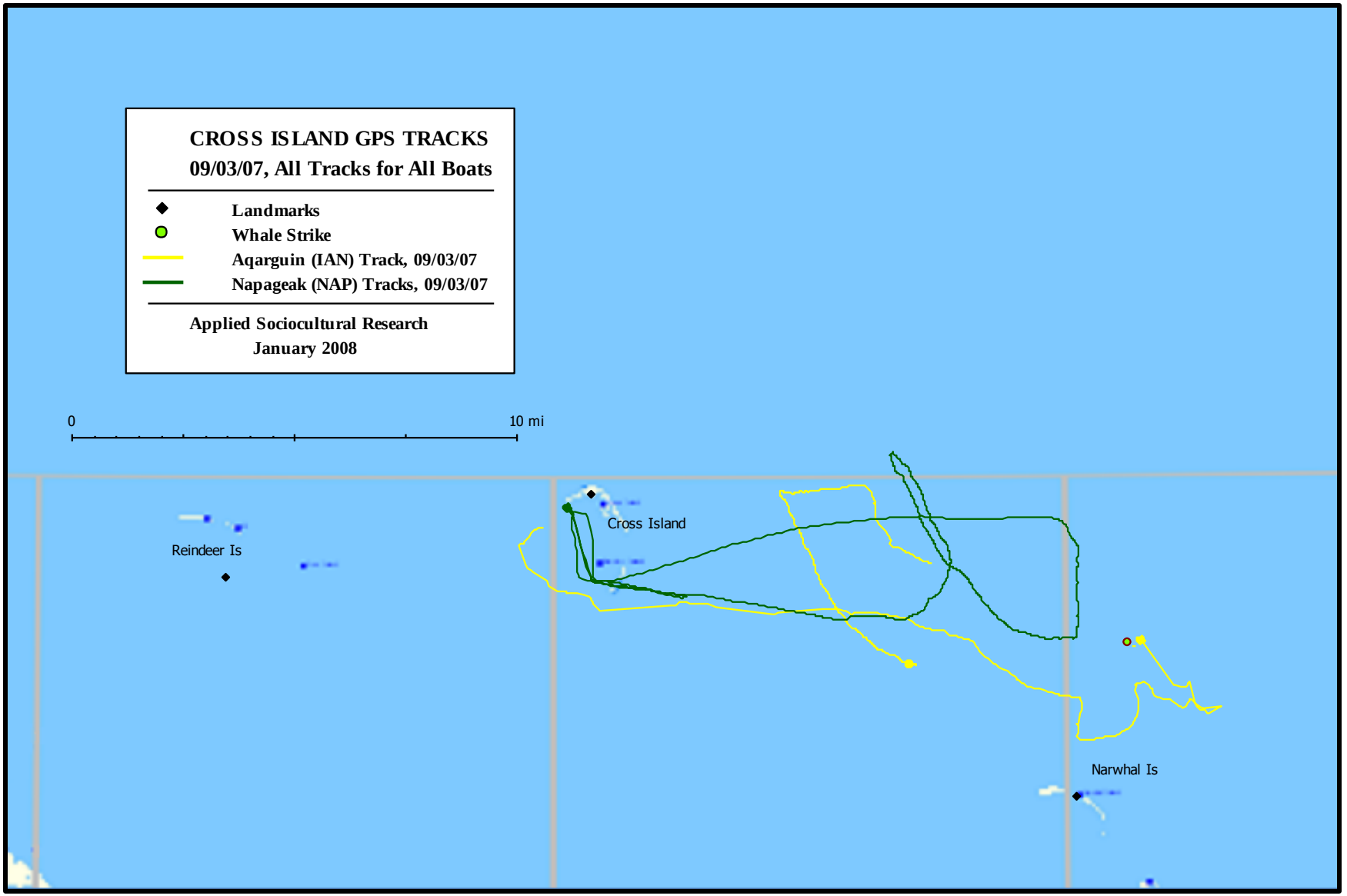
PDF format files containing displays of combined whale boat GPS tracks for all days in 2007 on which at least one boat went scouting for whales:
"AppendixA.pdf"

PDF format file containing all boat report forms for 2007:
"AppendixB.pdf"

Data Logger file from Cross Island weather station for 2007 in Excel format:
"AppendixC.xls".

Appendix A: GPS Tracks by Day, 2007




CROSS ISLAND GPS TRACKS
09/03/07, All Tracks for All Boats
Landmarks
Whale Strike
Aqarguin (IAN) Track, 09/03/07
Napageak (NAP) Tracks, 09/03/07
Applied Sociocultural Research
January 2008
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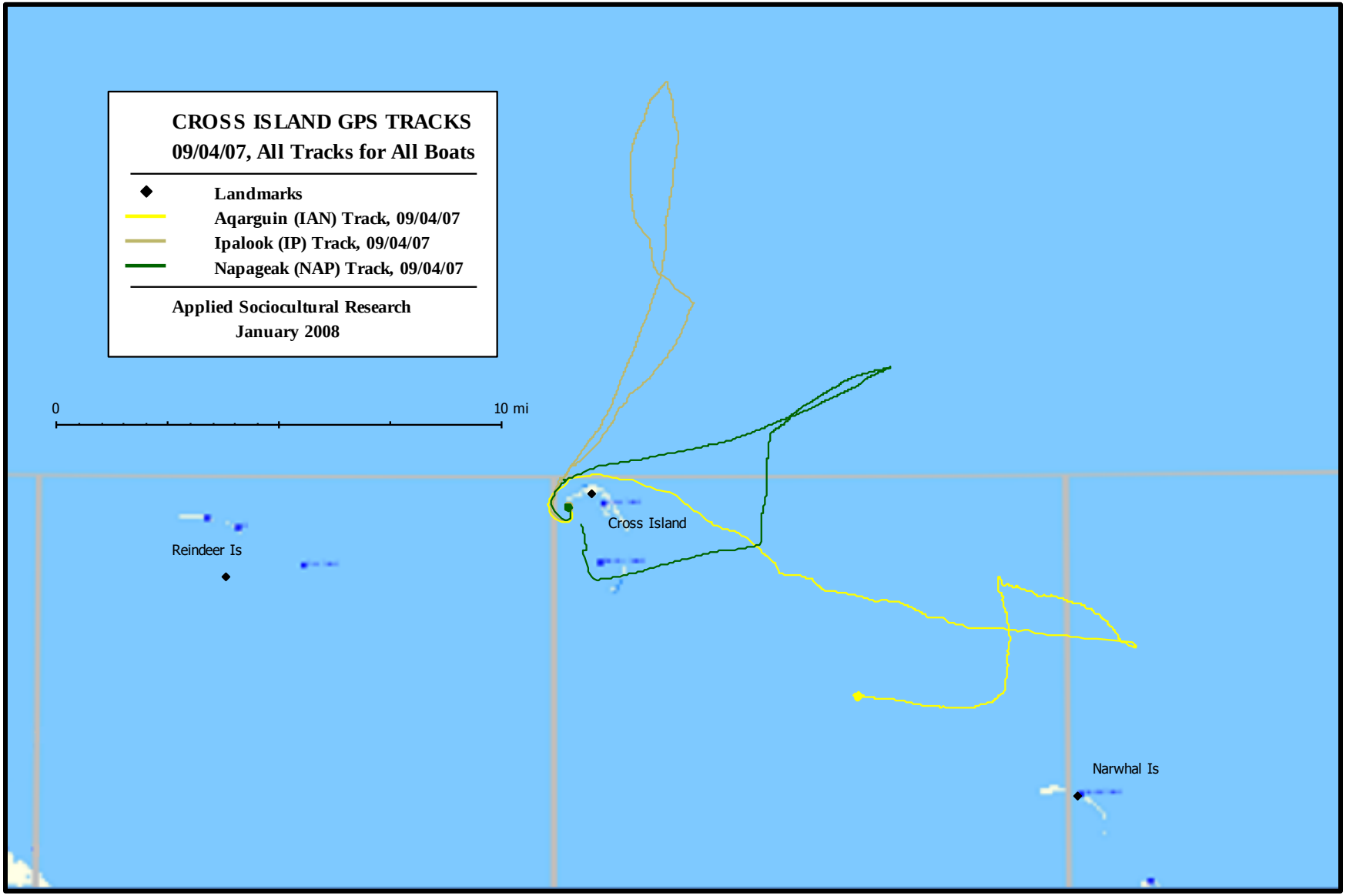
Reindeer Is
Cross Island
Narwhal Is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09/04/07, All Tracks for All Boats
Landmarks
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Ipalook (IP) Track, 09/04/07
Napageak (NAP) Track, 09/04/07
Applied Sociocultural Research
January 2008
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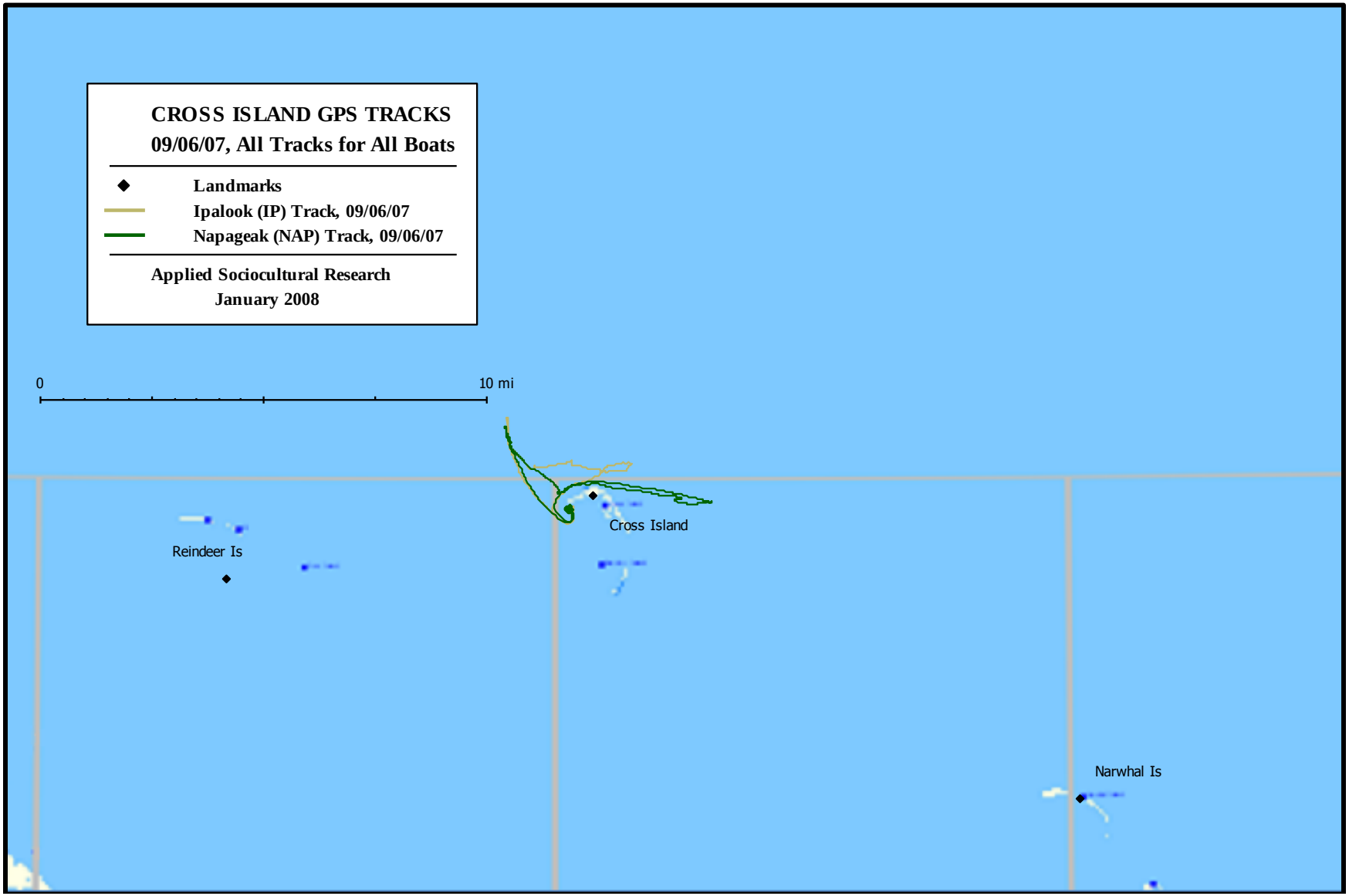
Reindeer Is
Cross Island
Narwhal Is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Landmarks
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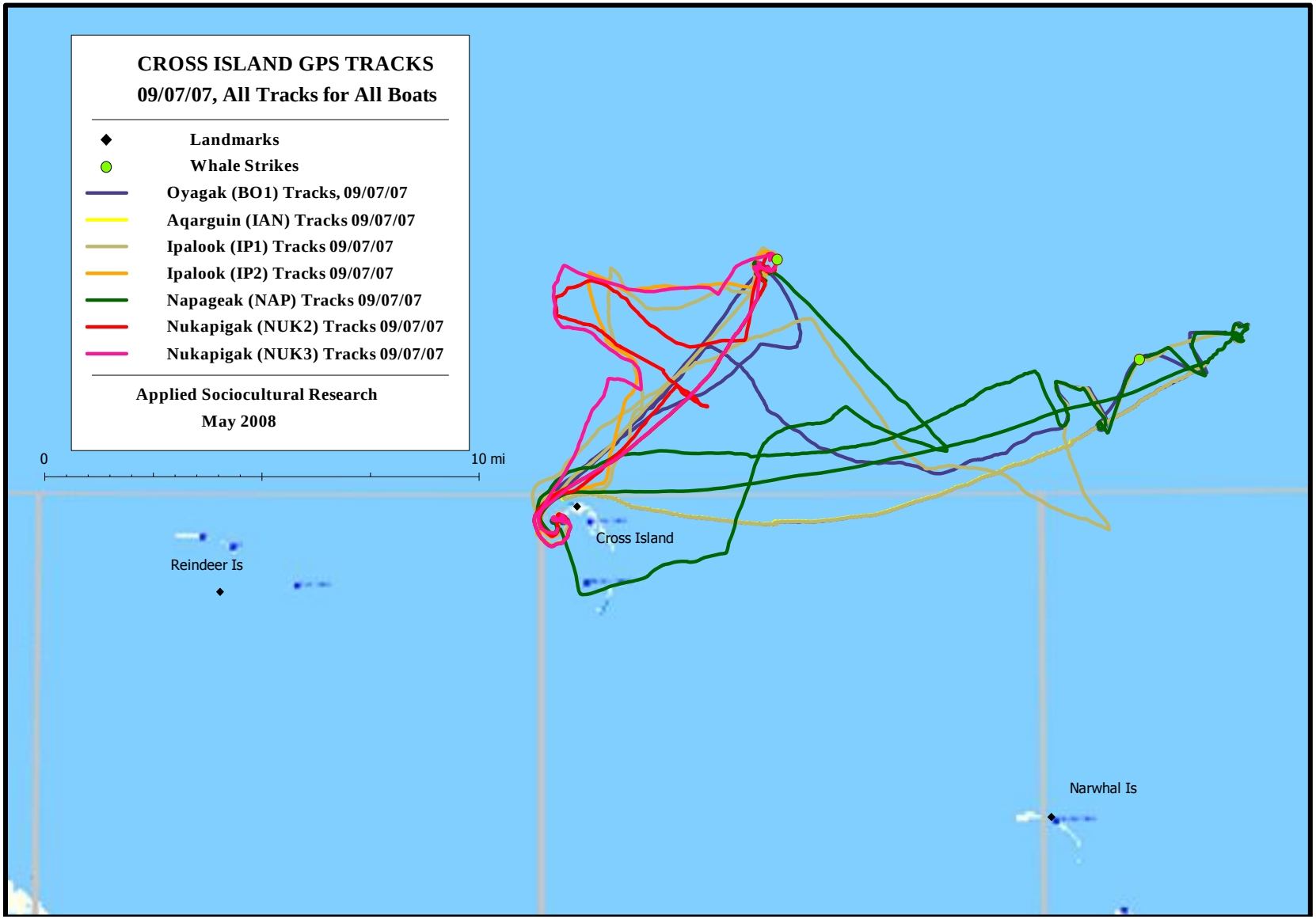
Narwhal Is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Whale Strikes
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Ipalook (IP2) Tracks 09/07/07
Napageak (NAP) Tracks 09/07/07
Nukapigak (NUK2) Tracks 09/07/07
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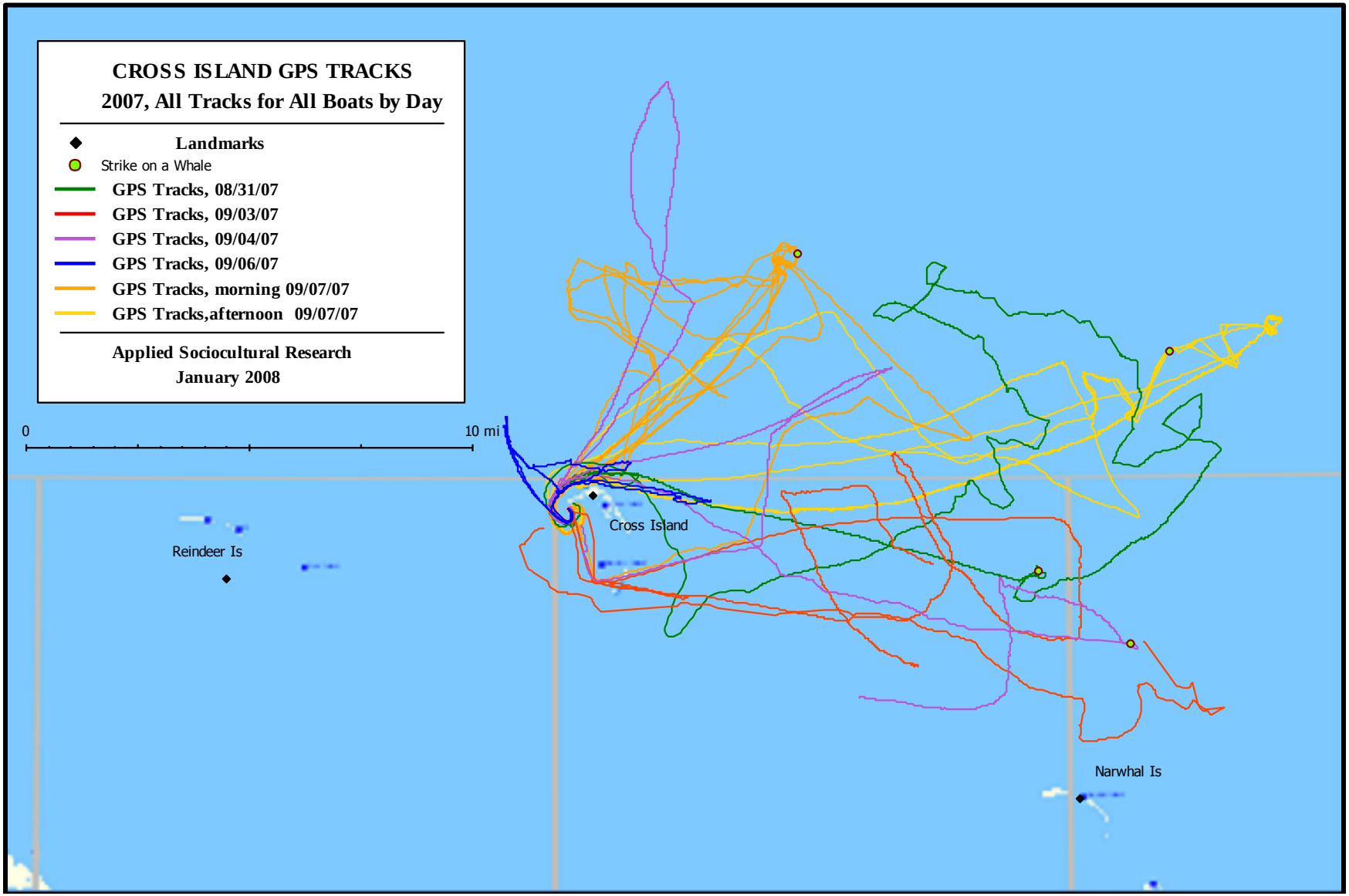
Cross Island
Narwhal Is


CROSS ISLAND GPS TRACKS
2007, All Tracks for All Boats by Day
Landmarks
Strike on a Whale
GPS Tracks, 08/31/07
GPS Tracks, 09/03/07
GPS Tracks, 09/04/07
GPS Tracks, 09/06/07
GPS Tracks, morning 09/07/07
GPS Tracks,afternoon 09/07/07
Applied Sociocultural Research
January 2008
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Reindeer Is
Cross Island
Narwhal Is

Appendix B: Boat Report Forms for the 2007 Season

Printed copies of the boat report forms are not included in this report, in the interests of report size. They are available in electronic form on the CD-ROM included with this report (as a PDF file.

Appendix C: Weather Measurements, Cross Island, 2007

A printed copy of this database is not included in this report, in the interests of report size. It is available in electronic form on the CD-ROM included with this report (as an Excel file).

The Department of the Interior Mission

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

The Minerals Management Service Mission

As a bureau of the Department of the Interior, the Minerals Management Service's (MMS) primary responsibilities are to manage the mineral resources located on the Nation's Outer Continental Shelf (OCS), collect revenue from the Federal OCS and onshore Federal and Indian lands, and distribute those revenues.

Moreover, in working to meet its responsibilities, the **Offshore Minerals Management Program** administers the OCS competitive leasing program and oversees the safe and environmentally sound exploration and production of our Nation's offshore natural gas, oil and other mineral resources. The MMS **Royalty Management Program** meets its responsibilities by ensuring the efficient, timely and accurate collection and disbursement of revenue from mineral leasing and production due to Indian tribes and allottees, States and the U.S. Treasury.

The MMS strives to fulfill its responsibilities through the general guiding principles of: (1) being responsive to the public's concerns and interests by maintaining a dialogue with all potentially affected parties and (2) carrying out its programs with an emphasis on working to enhance the quality of life for all Americans by lending MMS assistance and expertise to economic development and environmental protection.