# NUNAVUT
# COASTAL RESOURCE INVENTORY

## Pangnirtung


ᐊᐅᑎᓕᕐᓂᖅ
Department of Environment
Avatiliqiyikkut
Ministère de l'Environnement

NCRI

Nunavut Coastal Resource Inventory – Pangnirtung
2013

Department of Environment
Fisheries and Sealing Division
Box 1000 Station 1310
Iqaluit, Nunavut, X0A 0H0

# EXECUTIVE SUMMARY

This report is derived from the Hamlet of Pangnirtung and represents one component of the Nunavut Coastal Resource Inventory (NCRI). “Coastal inventory”, as used here, refers to the collection of information on coastal resources and activities gained from community interviews, research, reports, maps, and other resources. This data is presented in a series of maps.

Coastal resource inventories have been conducted in many jurisdictions throughout Canada, notably along the Atlantic and Pacific coasts. These inventories have been used as a means of gathering reliable information on coastal resources to facilitate their strategic assessment, leading to the promotion of economic development, coastal management, and conservation opportunities. In Nunavut, the coastal resource inventory has two additional applications: the preservation of traditional knowledge (Inuit Qaujimajatuqangit, or IQ) and the preparation for forthcoming environmental changes, particularly those driven by climate change.

The Fisheries and Sealing Division of the Department of Environment (DOE) initiated this inventory in 2007 by conducting a pilot project in the community of Igloolik, Nunavut. The NCRI has since been completed in the following communities:

- 2008 Kugluktuk and Chesterfield Inlet
- 2009 Arctic Bay and Kimmirut
- 2010 Sanikiluaq
- 2011 Qikitarjuaq and Gjoa Haven
- 2012 Iqaluit, Repulse Bay, and Grise Fiord
- 2013 Pangnirtung

This report presents the findings of the coastal resource inventory of Pangnirtung, which was conducted in February 2013.

Inventory deliverables include:

- A final report summarizing all of the activities undertaken as part of this project;
- Provision of the coastal resource inventory in a GIS database;
- Large-format resource inventory maps for the Hamlet of Pangnirtung, Nunavut; and
- Key recommendations on both the use of this study as well as future initiatives.

Pangnirtung was visited in February 2013 to conduct on-site interviews. A total of nine individuals were interviewed. During the interviews we asked participants about the coastal species they currently observe or have previously observed in the area and had them draw the location of their observations on the maps that we provided. We used photographs to help participants identify the species they have seen. The interviews lasted between 1.5 - 4 hours, depending on the participant. The data collected throughout the interviews was compiled into a database and the maps were digitized and analyzed.

The maps produced in the interviews are presented here, organized into the following categories: Marine Mammals, Fish, Birds, Invertebrates, Marine Plants, Areas of High Diversity, and Other.

A number of recommendations were provided both on the use of this study as well as for future initiatives. The recommendations include:

- That the report be translated into Inuktitut and formally presented to the city of Iqaluit to be used as a resource tool;
- That new methodologies also be developed in the collection and management of local data. For instance, these inventories should not simply be a snapshot in time but a temporal knowledge base that will grow and expand as new information becomes available. A good example of this is the GeoConnections program (www.geoconnections.org) which provides geospatial data and tools to establish goals for social, economic and environmental initiatives

# TABLE OF CONTENTS

# LIST OF TABLES



# LIST OF FIGURES

# INTRODUCTION

This document is one in a series of reports produced by the Nunavut Coastal Resource Inventory (NCRI). The overall goal of this initiative is to conduct inventories in all 26 of Nunavut's coastal communities. Each community is unique in terms of its physical environment, oceanographic setting, organisms present, and the interests and approaches of its hunters and trappers.

## THE COASTAL RESOURCE INVENTORY

A coastal resource inventory is a collection of information on coastal and aquatic resources and activities gained principally from interviews with elders and hunters in each community. Coastal resources are defined as the animals and plants that live near the coast, on the beaches, on and around islands, above and below the surface of the ocean, above and below sea ice, on the sea floor, and in lakes and rivers.

All of the community-specific data is digitized and mapped using a Geographic Information System (GIS). This approach can be an effective tool to assist with management, development, and conservation of coastal areas.

Resource inventories have been conducted along Canada's Atlantic and Pacific coasts. The information has been used to provide the foundation for an integrated coastal management plan, to assist with the protection of important coastal areas, and to facilitate environmental impact assessments, sensitivity mapping, and community planning. Coastal resource inventories have also provided different levels of government with the tools to engage in strategic assessments, informed development, and enlightened stewardship.

The principle source of information for community-based coastal inventories is traditional knowledge or, in Inuktitut, Inuit Qaujimajatuqangit (IQ), gathered through interviews. Over the past 50 years, Inuit have transitioned from a resource-based nomadic life style to a wage-based economy. Coastal and land-based activities remain extremely important, contributing to Inuit quality of life, providing income and food, and as a significant part of the Inuit culture. The NCRI aims to retain some of this valuable knowledge by engaging community elders, hunters and fishers to document the presence, distribution, and characteristics of various coastal resources. IQ is unique in that it is qualitative, intuitive, holistic, spiritual, empirical, personal, and often based on a long time-series of observations (Berkes 2002). It is particularly useful for recording historical data that are unattainable in any other manner. A complementary coupling of IQ and scientific knowledge may provide a means to better understand and manage coastal resources

**Figure 1.** Map of Nunavut

Information on coastal resources may provide insights regarding the potential for future fisheries development or other economic opportunities. Given the high unemployment rates in many of Nunavut's coastal communities, it is increasingly important to identify areas of potential economic development. In order to determine both feasibility and long-term sustainability of a new fishery, information on species-specific abundance and distribution of fish stocks (or other coastal resources) must be obtained. Combining communal knowledge of local resources can be a vital step in establishing a commercialized fishery. This information could also lead to the identification of potential coastal parks and related tourism opportunities. This may include sensitive coastal areas, breeding grounds, important species, and unique habitats. Attaining this information comes with much responsibility, however, and should be accompanied by a vision for the resource, coupled with an implementation plan. The resource should be thoughtfully governed from the outset to avoid unsustainable exploitation.

IQ embodies both tangible and intangible Inuit knowledge. Conserving this knowledge has importance in its own right and for its potential to inform future management plans. Some communities have expressed an interest in exploring development options using a database that has its origins in the living memories, experience, history, and skills of the people who live there. Other communities have opted for a continuation of existing practices: the gathering of extant knowledge into a form that could assist informed decision-making. Regardless, there is growing urgency throughout the Territory to identify, record, and conserve Nunavut's traditional, biological, cultural, and ecological knowledge.

There is increasing concern over the impact of climate change on the Arctic environment. Over the past 20 years, an increasing number of arctic researchers have commented on the predicted impacts of climate change on the marine environment (Tynan and DeMaster 1997, Michel et al. 2006, Ford et al. 2008a, 2008b, Moore and Huntington 2008). Additionally, the Intergovernmental Panel on Climate Change has reported that the increase in global temperatures is very likely caused by human activity, and that warming is predicted to occur faster in the Polar Regions than anywhere else on the planet (IPCC 2007, 2014). Many changes are predicted to occur in recurrent open water sites, with the potential to affect various coastal resources. Specific impacts can be expected on water stratification and its role in nutrient renewal, the balance between multi-year and annual ice, the duration and location of open water, and the impacts of tidal mixing and topographic upwelling. These physical changes could influence the marine food web through the prevalence of ice algae, the timing and magnitude of primary and secondary production, and changes in the distribution, abundance, and success of traditional species. Inuit can expect significant environmental changes in sea ice, fast ice, coastal erosion, animal behaviour, and population abundances, to name a few. For instance, apparent changes in polar bear health and abundance have been linked to climate change driven shifts in sea ice formation and movement. The coastal resource inventory provides a means of collecting information on environmental changes observed by community members.

## PERSONNEL AND PROJECT DELIVERABLES

The Coastal Resource Inventory of Pangnirtung was conducted by Department of Environment (DOE) staff with the assistance of the Marine Institute of Memorial University of Newfoundland. Overall project leadership was provided by Wayne Lynch, Director, Fisheries and Sealing Division.

Project deliverables include:

- A final report summarizing project activities;
- The Nunavut Coastal Resource Inventory in a GIS database;
- A series of large-format resource inventory maps; and
- Recommendations on the use of this study and future initiatives

# METHODOLOGY

## COMMUNITY SELECTION

Criteria to guide community selection were established prior to the start of the NCRI process and were based on a series of interviews with a broad range of individuals, all of whom had some prior experience working with traditional knowledge and/or communities. Community selection did not depend on meeting the requirements of every single criterion, but rather on the general picture conveyed by the responses to these queries. The present criteria are as follows:

- Is the selected community willing to participate in the project?
- Is the community considered to be an important source of data on coastal resources?
- Are any other projects underway in the community that might be complementary to the coastal inventory?
- Does the community possess an existing repository of oral history that could be made available to the project?
- Does the community have a strong but under-utilized or under-managed connection with a particular resource animal, such that inventory data could prove useful?
- Does the community wish to acquire or use any of the coastal inventory data produced by the project?
- Is the community presently involved in a commercial fishery?
- Is the community currently seeking infrastructure for which the coastal inventory study might prove supportive?
- Does the community have a strong and broadly-accepted leadership available to assist the project?
- Does the community have a close association with a park or a protected area?

## COMMUNITY VISITS

The community was visited for on-site interview sessions in February 2013. A scoping session was designed to put into place all of the elements that were required to properly conduct the interviews. This process depended on the support and participation of the Pangnirtung Hunters and Trappers Association (HTA) and the Hamlet office. The HTA formally agreed to support this initiative by providing an annotated list of local Inuit hunters and trappers who, in their opinion, were among the most knowledgeable and accomplished members of the community and could best satisfy the requirements of the interview process. The final selection of ten interviewees (Appendix 1) was made by NCRI project personnel. In addition, HTA personnel recommended the names of individuals who could be used as translators and student observers. These individuals were contacted, and tentative interview schedules were established.

## THE INTERVIEWS

Six individuals were present during each interview: the interviewee, an interviewer, a translator, a recorder, a science consultant, and a student observer. The interviewer followed a defined protocol that placed emphasis on a series of predetermined questions and photographs of various living resources thought to occur in the area. Maps covering the area of interest and colour coded pencils were provided for interviewees to illustrate locations of interest. Interviewees were encouraged to supplement their responses by drawing on the maps provided to annotate their verbal remarks. Specific categories addressed in the interviews included: interviewee life-history information; locations of outpost camps; archaeological sites; travel routes and hunting/fishing areas frequented; the geographic occurrence of mammals, fish, birds, invertebrates, and plants; linkages between coastal resources; present and future environmental changes; and potential economic development (e.g. the possibility of an emergent fishery). Qualitative data was gathered in the form of individual opinions, assumptions, and conclusions. Observations are generally made without any additional

information or justification, and sometimes suggest a correlation to some other environmental change.

Annotations on the maps were coded to enable future identification and reference. Follow-up questions were asked of the interviewee, clarifications were elicited, and, if appropriate, discussion ensued about the information presented. The entire process was recorded using audio and video equipment, while selected portions were simultaneously manually recorded. Manual recording was used to maintain a running record of all map annotations and codes. This permitted the analysis of interviews to proceed without first transcribing the audiotapes. The interviews varied from 1.5 - 4 hours, depending on the individual being interviewed.

## POST-INTERVIEW METHODOLOGY

All of the data manually recorded throughout the interview was entered into a spreadsheet, using audio and video data for verification when needed. The maps were scanned and the hand drawn data was digitized using Geographic Information System (GIS).

## NON-INTERVIEW DATA ACQUISITION

Data on marine resources can be found scattered throughout many different sources including scientific papers, government reports, environmental impact assessments, and maps. However, three surveys with similar geographic breadth and goals have proven to be especially useful. The three-volume "*Inuit Land Use and Occupancy Study*" was undertaken in the early 1970s and published in 1976 by Indian and Northern Affairs. It grew out of the documentation required by the land claim process and was used to substantiate Inuit claims to residency and land use. The study contained detailed information on traditional land use up to that time, based on interviews with Inuit in each community. It used topographic maps to outline regions associated with hunting, trapping, and fishing activities for every community in Nunavut over three periods: pre-contact, the trading period up to the 1950s, and the present (early 1970s). The third volume is an atlas that displays the results. The original research is available in Ottawa at the National Archives and a copy is also available in the Legislative Library in Iqaluit.

The second is the *Nunavut Atlas* co-published in 1992 by the Canadian Circumpolar Institute and the Tunngavik Federation of Nunavut. This atlas is largely data collected for the Inuit Land Use and Occupancy Study. The resource data and maps are great resources but the information is approximately 35 years old. Relevant maps from this volume are presented in this report (Figure 46).

The third document is the *Nunavut Wildlife Harvest Study* produced by the Nunavut Wildlife Management Board in 2004 as mandated by the Nunavut Land Claim Agreement. Harvest data was collected monthly from Inuit hunters from 1996 to 2001. The purpose of the study was to determine the current harvesting levels and patterns of Inuit use of wildlife resources. Once completed this information was to be used to manage wildlife resources in Nunavut.

## DATA MANAGEMENT AND ANALYSIS

Data collected through interviews and research were, when appropriate, plotted on working maps. In order to stay within the size of the geographic area under discussion, the scale of the map is kept relatively small. The scale was common to all maps to permit relatively easy comparisons. Information was separated according to resource categories and all information associated with a specific geographic location was entered into a tabular database. The development, care, and maintenance of this tabular database are extremely important, not only as a storage facility for information, but as an active repository accessed by users with diverse interests.

Data management also included protecting the confidentiality of the data. Each interviewee provided their consent to be interviewed, as well as audio and video taped. Any person or organization wishing to access NCRI data must provide written justification to the NCRI Steering Committee and agree to the terms outlined in the Data Release Form.

## GIS INTERFACE

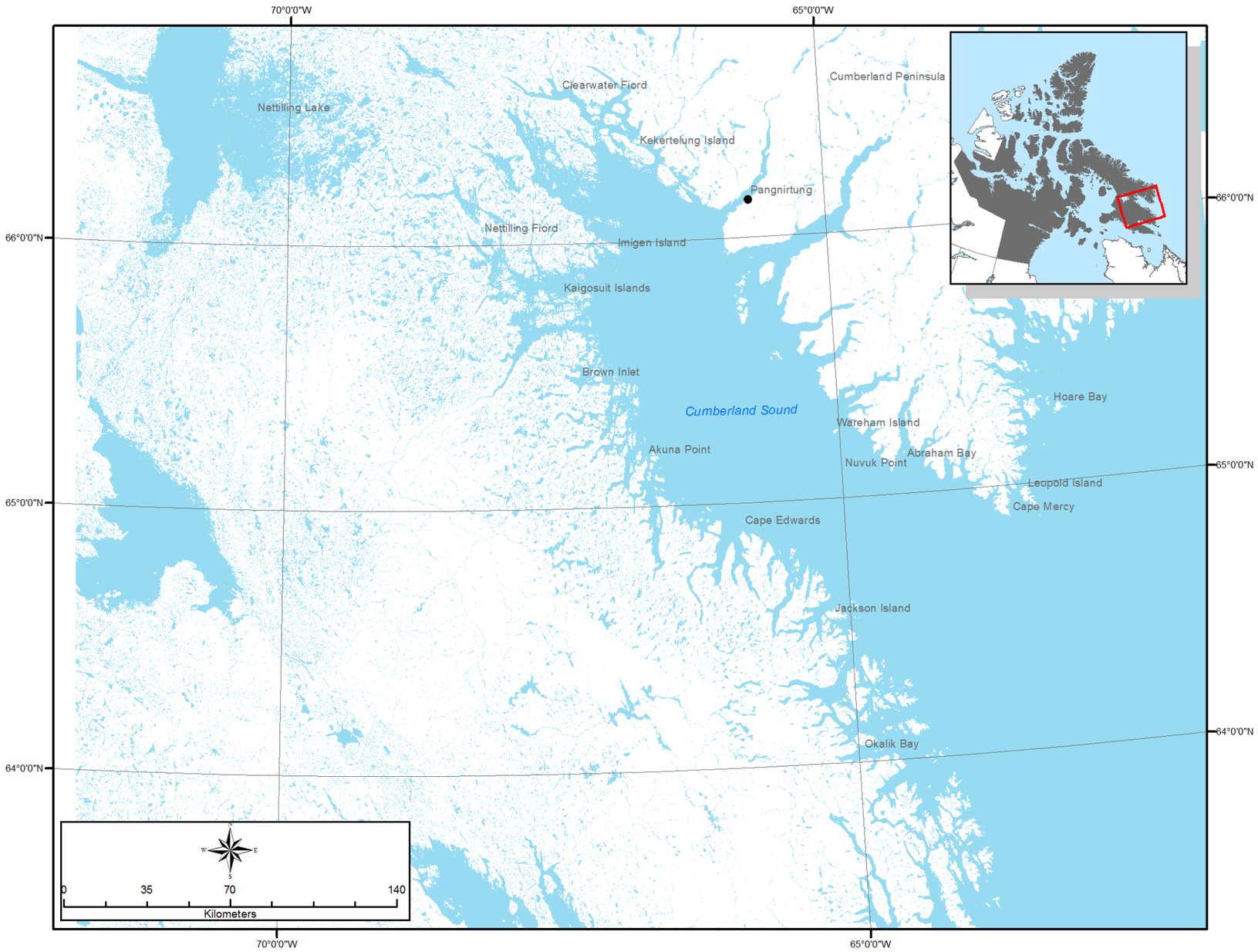
Once the inventory maps and database were completed, they were entered into a GIS which creates computer-generated maps. It also links information to the geographic locations contained in the database. Attributes associated with each piece of data include information such as the species name, the interviewee source, and the time of year it was observed.

## INTERACTIVE ATLAS

The NCRI results are published in community-specific reports that are shared with project partners (community HTOs, Hamlets, high schools, and all interviewees) and that are publicly available in hard-copy and PDF formats.

Reports are currently produced in English and Inuktitut. The results from all communities are also displayed online in an interactive atlas, with this information available within a year of interviews in a community. The reports can take up to two years to produce. Links to access the Atlas: ncriatlas.ca and http://www.gov.nu.ca/environment/information/nunavut-coastal-resource-inventory

**Figure 2.** The Study Area Extent Discussed in the Pangnirtung Interviews



# RESOURCE INVENTORY

The observations below provide highly personal insights that could warrant additional investigation.

## MARINE ENVIRONMENT

The geographic area identified by interviewees as the normal range of their hunting and fishing activities spans approximately 150 km from Pangnirtung in all directions. This area encompasses Cumberland Sound.

## HUNTING/FISHING

Pangnirtung hunters and fishers depend on a broad array of animals to supply their country food needs. Ensuring access to and availability of country food continues to be an issue of importance and concern for the community.

- Interviewees indicated that they are seeing more polar bears now than in the past, particularly closer to town and in the upper portion of Cumberland Sound. They noted that in the past they used to have to travel far distances to hunt for bears, but this is no longer the case. One interviewee noted that he's had several encounters with polar bears in recent years and had to shoot one that came into his camp
- Participants indicated that they are seeing less ringed seal in Cumberland Sound than in the past and suspect that this occurrence is related to increased human activities and noise pollution. Conversely, many noted that they are now seeing significantly more harp seals in the area as well as more hooded seals
- One participant noted that he has noticed less narwhal in the fiords during the summer/fall since people started hunting them at the floe edge in the spring. He also noted that he is seeing more bowhead whales than in the past
- One participant noted that in regards to the commercial Turbot fishery, there were less Greenland Sharks caught in the early winter in the 1990's. He claimed that it is now the opposite. He also noted that Turbot can be harvested earlier in the winter and fewer sharks are being caught
- One participant indicated that many people hunt eider ducks and has noticed and increase in the number of Snow Geese in the area

## HEALTH, SIZE, AND PRESENCE

Throughout the course of the interviews references were repeatedly made regarding the health, size, or presence/absence of different species:

- Interviewees noted that the flesh of sea run Arctic Char is becoming whiter in colour and the taste has changed since the arrival of Capelin (a small marine fish) into Cumberland Sound
- One participant noted that there was no change in sea run Char from Isuituq and has observed more landlocked Char in his nets in the Iqalukjuaq area. He also noted that he has caught some reddish coloured Char in salt water.
- Another participant commented that Char are getting larger in size, particularly in Avatoqtuu and Iqaluqjuaq
- Participants commented that not only are they seeing more polar bears, but they are displaying new behaviours such as increased aggression. Bears are now posing more of a threat in camping areas and around cabins and are breaking into cabins and causing damage to property. Participants feel as though bears are now less afraid of humans, particularly those that have been tranquilized and handled by researchers. Additional new polar bear behaviors that have been observed include killing seal pups and not eating them as well as breaking eider duck eggs and not eating them. Polar bears appear to be eating more seal pups and it was questioned as to whether this may be related to the decline of Ringed Seals in the area
- More skinny, sick bears are being observed and the participants believe that Cumberland Sound bears appear to be hungry
- One participant noted that ringed seals appear to be larger in size. He also noted that there are many more Harp Seals in the area, and some Harp seal pups appear to be sickly. He believes that this is because there are too many harp seals in the area now

## CHANGES UNDERWAY

Participants commented on changes in their local area regarding species and climate change.

- Participants noted that Capelin have arrived to the area in large numbers in the last 5-7 years. There are so many that they blacken the water. They believe that sea run Char are now feeding on this abundant species and that is the reason for the change in flesh colour and taste
- One interviewee noted that there is less year-round snow in the mountainous areas which decreases denning habitat for polar bears and affects travel routes
- Interviewees noted changes in sea ice. The ice has become thinner and more unpredictable. The floe edge is much closer and has become more dangerous for winter travel. Sea ice changes have made the ice more dangerous and caused earlier break-up which in turn has impacted the winter Turbot fishery as well as hunting activities. Ice at the mouth of Pangnirtung Fiord has become less safe to travel on and freeze-up has become unpredictable. Participants would like to see a better system put into place for monitoring ice conditions
- Participants noted that they have observed the glaciers melting. The runoff washes out the bridge in town and floods the rivers in the National park

## ECONOMIC DEVELOPMENT

The interviewees discussed the following with regards to social changes and economic development in their area:

- Many interviewees expressed desire for the development of a commercial scallop fishery, as scallops are ready available for harvest in Cumberland Sound
- Participants expressed the potential for an arctic cod fishery
- Northern shrimp, crab and walrus were also mentioned as species of interest for commercial harvest
- Participants noted that new fishing areas need to be developed and the boundary line for the Cumberland Sound Turbot Management Area needs to be extended in order to develop a summer Turbot fishery
- The interviewees overall do not mind tourism so long as it does not interfere with wildlife. They don't like seeing cruise ships because they can disturb wildlife
- One interviewee would like to see a program put in place to buy frozen seals and other uncleaned skins from hunters and would like to see a country food store established
- Participants support commercial fisheries and economic development in the community. One participant noted that he likes seeing young people getting involved in the commercial fishery
- One participant suggested a road leading to the mouth of the fiord be built to extend the fishing season

# MARINE RESOURCES IN A PHYSICAL SETTING

The coastal communities of Nunavut are diverse, extending over 27° of latitude and 60° of longitude. In addition to different geomorphologies, climates, and wildlife they also experience widely different marine environments. These include: significant differences in residual circulation, tidal range, tidal currents, tidal mixing, shore-fast leads, ice-edge upwelling, topographic upwelling, and polynyas; all of which influence the abundance, diversity and concentration of marine animals and plants. The oceanographic context in which these organisms occur, especially the causal mechanisms that contribute to population dynamics, is an essential prerequisite to understanding changes that occur over time.

One of the stated goals of this initiative is to develop the capacity to monitor Nunavut's marine resources within the context of climate change. Organisms will experience the impacts of climate change, both directly and indirectly, through changes in their physiology and through variations in their physical or biological environments. Responsible monitoring of marine resources will require more than just a quantitative assessment of certain species; it will require an ecosystem approach that, by definition, includes the physical factors at play in that system.

## RECURRENT OPEN WATER AND ARCTIC BIOLOGY

The presence of open water in winter can be a chance occurrence that reflects either temporary or recurring conditions. Temporary open water sites are largely unpredictable and have limited usefulness to animals and humans. Alternatively, recurrent open water sites are a physical indicator of one or several predictable physical processes that result in spatial and temporal reliability.

The formation of recurring open water sites in ice-covered seas, including polynyas, pack ice edges, and shore-fast leads reflect local geography, ice conditions, and water movements such as upwelling and tidal mixing. There is a positive correlation between recurrent open water sites and abundance of marine organisms. Stirling (1980, 1997) identified increases in the abundance of birds, seals, and whales with proximity to ice edges, polynyas, and pack ice. In some cases, animals are drawn to these sites for practical reasons such as the availability of breathing holes, a platform to haul out and rest, predator avoidance, pupping, or moulting (Stirling 1997). Ultimately, recurrent open water sites encourage a non-homogeneous distribution of animals that is linked to greater biological productivity.

Major contributing factors in the abundance of marine organisms observed at reoccurring open water locations is due to food availability, the product of primary production in phytoplankton, ice algae, and marine plants. Algal groups are important but their relative contributions can vary depending on ice conditions and available light. Ice algae can represent 5 to 30% of the total primary production (Alexander, 1974; Harrisson and Cota, 1991; Legendre et al 1992). Plant material is grazed and enters into the food web, supplying energy to invertebrates, such as copepods, amphipods, and shellfish, to fish such as Arctic Cod, to mammals such as seals, Narwhal, Walrus, and Polar Bears, and to birds such as Thick-Billed Murres, Northern Fulmars, Black-Legged Kittiwakes, and Black Guillemots. This results in a form of oasis or hotspot in an otherwise ice-covered area. With climate change, the sea ice thinning faster and earlier in the spring and sunlight sufficient to drive photosynthesis, especially in ice algae, is available sooner. These conditions are extending both the growing and grazing seasons, in some cases by as much as two months.

These open water sites also appear to have great importance to the peoples that have occupied the Arctic for several thousand years. Archaeological data obtained from historic Inuit habitation sites, coupled with modern sea-ice extremes, have been used to infer a strong causal relationship between polynyas and historic Inuit settlement patterns (Henshaw 2003). Schledermann (1980) drew attention to the fact that the early settlers of present-day Nunavut did not create settlements in random fashion. Since they depended almost entirely on food resources obtained through hunting, settlements were usually located within reasonable proximity of game, which often meant areas of recurrent open water. Schledermann (1980) also found a close correlation between the distribution of recurring polynyas in the eastern Canadian High Arctic and the abundance of archaeological sites from the Thule culture which specialized in hunting marine mammals.

## OCEANOGRAPHIC FACTORS THAT CONTRIBUTE TO OPEN WATER

The Hamlet of Pangnirtung is located in the High Arctic on the southern part of Baffin Island within Cumberland Sound, approximately 50 km south of the Arctic Circle (66°08'48"N, 65°42'04"W).

### TIDAL MIXING

Even at somewhat limited velocities, tidal currents can produce sufficient turbulence to generate the vertical mixing capable of forming and maintaining a polynya. A slow-moving tidal current that encounters a shallow and/or narrow strait increases in velocity, promoting vertical mixing. Tidal mixing also delivers nutrients, which promote plant and algal growth when sufficient light is available, especially in summer months. Examples of this phenomenon are the well-known polynyas in Fury and Hecla Strait at the head of Foxe Basin (Hannah et al 2009).

### POLYNYAS

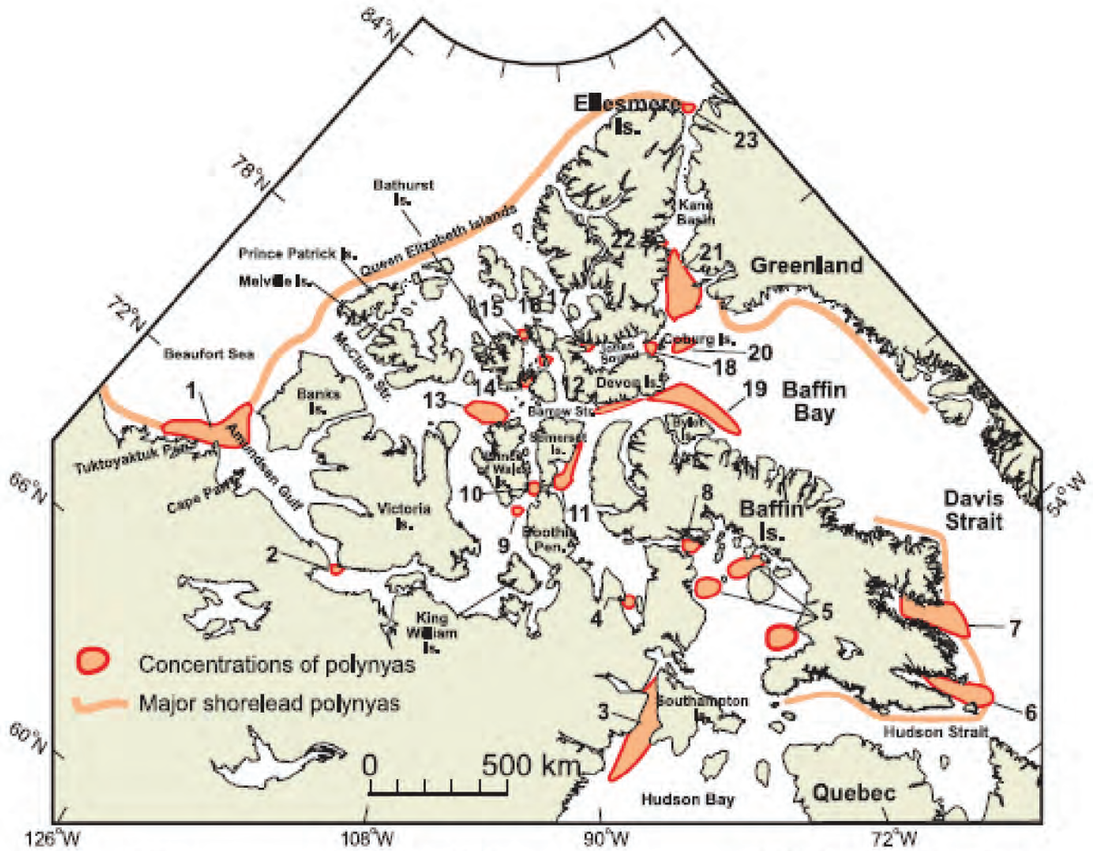
If the Arctic were covered with a thick, seamless layer of sea-ice, many of the organisms that currently exist there and contribute to the region's productivity would find it impossible to survive. Polynyas and leads provide the necessary breaks in the ice that permit sunlight to penetrate and photosynthesis to proceed (in both planktonic and ice-based algae), allow mammals to breath, and permit over-wintering birds to feed. Wind, water movement, and heat transfer are among the primary factors that contribute to the establishment and maintenance of these open water sites.

Polynyas have long been viewed as extraordinary because of the obvious contradiction of open water occurring in conditions that promote ice. The explanation for this phenomenon is twofold: in some cases the introduction of heat forestalls ice formation, while in others any newly formed ice is rapidly removed. The process is controlled by wind and/or ocean currents, which remove any ice formed at the site. Other factors include turbulence from surface waves or currents that can inhibit ice formation, adjacent coastlines, and shore-fast ice or ice bridges that prevent ice from drifting into polynyas (Hannah et al 2009).

Recurring polynyas typically occur between near shoals and islands, within the land-fast ice. There are two types of polynyas that reoccur each year: those that remain open all year long and those that only freeze over for one or two of the coldest months of the year. Animals such as seals, walrus and some migratory sea birds use these polynyas as important over-wintering areas.

A recurring polynya has been identified in Cumberland Sound (the Cumberland Sound polynya), and it encompasses all but the most northerly part of Cumberland Sound.

**Figure 3.** Map of known polynyas in Nunavut




1 Cape Bathurst
2 Lambert Channel
3 Roes Welcome Sound
4 Committee Bay
5 Foxe Basin
6 Frobisher Bay
7 Cumberland Sound
8 Fury and Hecla Strait
9 Franklin Strait
10 Bellot Strait
11 Prince Regent Inlet
12 Lancaster Sound
13 Viscount Melville Sound
14 Karluk Brooman
15 Queens Channel and Penny Strait
16 Dundas Island
17 Hell Gate – Cardigan Strait
18 Lady Ann Strait
19 Bylot Island
20 Coburg Island
21 North Water (NOW)
22 Flagler Bay
23 Lincoln Sea

FIG. 1. A map of known polynyas in the Canadian Arctic, adapted from Barber and Massom (2007) and Stirling (1981). The Karluk Brooman polynyas were identified by Schledermann (1980) and Brown and Nettleship (1981).

## LAND-FAST LEADS (FLAW LEADS)

Extensive systems of land-fast leads occur throughout the Arctic. Land-fast ice generally comprises first-year ice, possibly mixed with multi-year remnants, that is fixed to the coast. This ice platform extends outward, eventually merging with offshore pack ice (Sterling 1981). The physical presence of this ice cover modifies tidal and wind energy, dramatically changing circulation (George 2004). Eventually, a fracture or crack may develop between the attached ice and the free-floating pack ice due to offshore winds, or through the actions of coastal currents. These leads are normally linear in shape and run parallel to shorelines. They are recurrent and predictable in their location and are among the areas where open water is found most consistently during winter and early spring. Because of these factors, land-fast lead systems are of great biological importance.

The boundary between the ice edge and the beginning of the lead is an ecosystem that is very important and has been identified as biologically rich and diverse by many elders and previous research. For instance:

- The land-fast ice edge is an important Inuit hunting site (Crawford and Jorgenson 1990)
- During late spring and early summer, large numbers of sea birds and marine mammals congregate at the edges of land-fast ice (McLaughlin et al. 2005)
- Ringed seals and polar bears are the only marine animals that regularly occupy extensive land-fast coastal ice (Tynan and DeMaster 1997)
- Bearded seals prefer relatively shallow water (<150 m) with thin shifting ice and leads kept open by strong currents (Tynan and DeMaster 1997)
- Along with polynyas, land-fast lead systems and ice edges play key roles in influencing the abundance and distribution of marine mammals and sea birds (McLaughlin et al. 2005)
- Satellite observations of polar bears in multi-year ice show that they are often associated with leads (Stirling 1997)
- High densities of arctic cod are found immediately below the edge of land-fast sea ice, linked to the availability of high concentrations of copepod prey (Crawford and Jorgenson 1990)
- Near the ice edge the diet of adult ringed seals and narwhal is composed primarily of arctic cod while amphipods and copepods are consumed in smaller numbers (Bradstreet and Cross 1982)

The reasons for greater biological abundance and diversity associated with land-fast leads and ice edges are largely the same as those outlined above for recurrent open water. However, upwelling is an additional mechanism that appears to occur at shore-fast and pack ice edges.

## UPWELLING: TOPOGRAPHIC AND ICE-EDGE

Upwelling is a mechanism by which colder, deeper water is moved to the surface, where it can create and/or maintain ice-free open water. Topographic upwelling occurs where a current moving through warmer subsurface water is deflected or welled upward toward the surface by a bottom structure such as a sill, bank, or ridge (Tee et al. 1993).

Ice-edge upwelling occurs when wind blows parallel to the ice edge and causes surface water to move away from the edge. The surface water is then replaced from below (Tang and Ikeda, 1989). The upwelling zone may be several kilometres wide and draw subsurface water from depths of up to 100 metres. This phenomenon has been observed in the Bering Sea (Alexander and Niebauer 1981), the Arctic Ocean (Buckley et al. 1979, Johannesen et al. 1983) and off the coast of Newfoundland (Tang and Ikeda 1989).

Upwelled water usually carries nutrients into the upper layer where, with sufficient light, both phytoplankton and ice algae can grow and provide a strong stimulus to the local food web. This is one explanation for why polynyas and shore-fast leads are so productive.

## MARINE RESOURCES IN THE CONTEXT OF GLOBAL WARMING

Over the past 20 years, many Arctic researchers have commented on the impending probability of global warming, with its predicted impacts on the marine environment as well as the abundance, diversity, and well-being of marine organisms (Tynan and DeMaster 1997, Michel et al. 2006, Moore and Huntington 2008). Changes may occur affecting water stratification and its role in nutrient renewal, the balance between multi-year and annual ice, the relative importance of ice algae, the timing and magnitude of primary and secondary production, changes in traditional species distributions and hunting sites, amongst others. Each of these changes could exert some influence on the food web and the state of the resources as they are presently defined.

# GUIDE TO MAPS AND TABLES

The following group of maps summarizes the geographic context, species locations, and information from earlier studies (derived from the *Nunavut Atlas*). The maps are accompanied by data in tables, which provides additional detail, along with descriptive information, when available. Table 1 describes the map codes used in the tables.

**Table 1.** Guide to maps codes

| CATEGORY | MAP CODE |
|---|---|
| Present {since year 2000} | Appended with 'P' |
| Historic {before year 2000} | Appended with an 'H' |
| Everywhere (seen all over/no specific place/only where they go) | Appended with a upper case 'E' |
| High Abundance | Appended with an 'A' |
| Migration (use arrows to indicate direction) | Appended with an 'M' |
| Spawning / Nesting / Denning / Calving / Pupping areas | Appended with an 'S' |
| Nursery Area | Appended with an 'N' |
| Significant Area of High Diversity | SADP |
| Significant Unique Area | SAUP |
| Significant Area for Other Reason | SAOP |
| Other | OTH |
| Area Known Best (area most familiar with or a travel route) | AKB |
| Camp / Cabin (typically modern) | CAMP |

Generally, maps comprise groupings of several species or a single species as reported in multiple interviews. Species and interviews are normally color-coded and locations are labeled with a number. The first number in the label refers to a specific interview while the second is a location identifier. These labels can be used to look-up relevant information in the table associated with each map.

The species identified by interviewees as being distributed "Everywhere" are not mapped in this report. The designation of "Everywhere" was used when interviewees felt that the organism under discussion has been observed everywhere throughout their travels and places with which they are very familiar. Giving a species an "Everywhere" designation does not confer any information about abundance nor should it be presumed to be ubiquitous; it is only a measure of distribution relative to where the interviewee has been. "Everywhere" data is provided in the table of data following the maps.

Some species were described by a portion of the interviewees as being "Everywhere" while other interviewees provided specific locations for the same species. In these cases, an asterisk has been placed after the species name in the title of the map. For example, arctic char is written as "Arctic Char*" in the map title because it was reported in specific locations, as well as being "Everywhere". The asterisk simply provides a visual cue that the species has two designations.

Please note that the data presented on birds has been further qualified in Appendix 3. Of all the species presented to the interviewees, birds (e.g. sandpipers or gulls) present the greatest challenge in proper identification; a challenge often encountered by even the keenest observers. To assist in interpreting the data, Appendix 3 compares observations recorded through the inventory with literature and sightings by other authors. In the future, inventory work will endeavour to qualify all species reported in a similar way.

Note: The asterisk (*) after some species names in the titles of the maps indicates that the species was also considered to be seen "Everywhere" by some interviewees. Species identified as being "Everywhere Only" are shown by the use of a solid bullet in the Map legend.

# MAPS-PRESENT

**Figure 4.** Camp sites

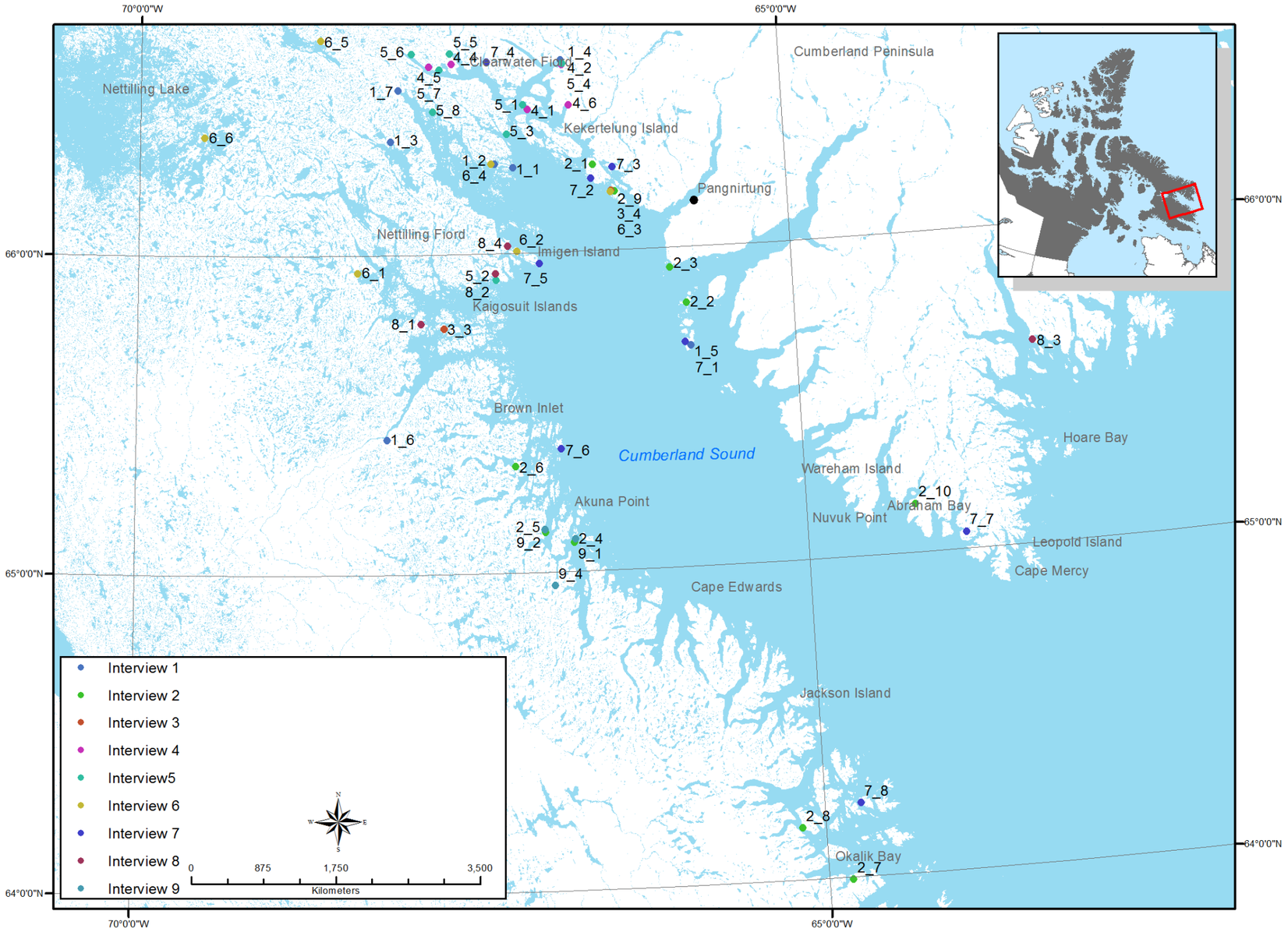


**Table 2.** Camp sites

| MAP CODE | INTERVIEW CODE | COMMENTS |
|---|---|---|
| 1_1 | PAN_01_0213 | Camp where he was born |
| 1_2 | PAN_01_0213 | Cabin |
| 1_3 | PAN_01_0213 | Cabin used in August |
| 1_4 | PAN_01_0213 | Camp for caribou and clams |
| 1_5 | PAN_01_0213 | Cabin for spring whale hunting |
| 1_6 | PAN_01_0213 | Camp for winter fishing |
| 1_7 | PAN_01_0213 | Camp for early summer caribou and seal hunting |
| 2_1 | PAN_02_0213 | Birthplace "Torpait" (year-round camp) |
| 2_2 | PAN_02_0213 | Year-round camp |
| 2_3 | PAN_02_0213 | Year-round camp "Ikirasak" |
| 2_4 | PAN_02_0213 | Winter and summer "Qlmaqsuuk" (lived here +10 years) |
| 2_5 | PAN_02_0213 | "Kipisa", hunting area |
| 2_6 | PAN_02_0213 | Historical camping area, during winter has good access to floe-edge |
| 2_7 | PAN_02_0213 | Summer seal and walrus hunting camp |
| 2_8H | PAN_02_0213 | Old camp (before his time) people still use it |
| 2_9 | PAN_02_0213 | His cabin (fish, seal, beluga) "Sanirut" |
| 2_10 | PAN_02_0213 | Summer walrus camp |
| 3_1 | PAN_03_0213 | Summer camp, 3 camping areas here |
| 3_2 | PAN_03_0213 | Spring camp |
| 3_3 | PAN_03_0213 | |
| 3_4 | PAN_03_0213 | |
| 3_5 | PAN_03_0213 | Spring/summer camp, Drum Island |
| 4_1 | PAN_04_0213 | Nunatak, Spring, summer, fall |
| 4_2 | PAN_04_0213 | Iqalugarjuk, Fall caribou hunting |
| 4_3 | PAN_04_0213 | Ishuituq, Fall caribou hunting |
| 4_4 | PAN_04_0213 | Fall caribou hunting |
| 4_5 | PAN_04_0213 | Where he spent most of his life |
| 4_6 | PAN_04_0213 | Summer |
| 4_7 | PAN_04_0213 | March/April camp for seal pup hunting |
| 5_1 | PAN_04_0213 | Year-round camp where he was born |
| 5_2 | PAN_05_0213 | Spent first 5 years here, Father from here |
| 5_3 | PAN_05_0213 | Spent 2 years here (Bon Accord) |
| 5_4 | PAN_05_0213 | Summer camp (caribou), Has cabin there now |
| 5_5 | PAN_05_0213 | Summer camp |
| 5_6 | PAN_05_0213 | Ishuituk, Fishing, Spent one summer there |
| 5_7 | PAN_05_0213 | Spring camp for yearling seals |
| 5_8 | PAN_05_0213 | Spring/summer camp for yearling seals |
| 6_1 | PAN_06_0213 | Cabin used in summer |
| 6_2 | PAN_06_0213 | Summer camp |
| 6_3 | PAN_06_0213 | Summer camp for seals and fish |
| 6_4 | PAN_06_0213 | Summer camp |
| 6_5 | PAN_06_0213 | Winter, HTO cabin for caribou |
| 6_6 | PAN_06_0213 | Winter, HTO cabin for caribou |
| 7_1 | PAN_07_0213 | Spring cabin, or all year |
| 7_2 | PAN_07_2013 | Grandfathers summer cabin |
| 7_3 | PAN_07_0213 | Fishing summer camp |
| 7_4 | PAN_07_0213 | Fishing summer camp |
| 7_5 | PAN_07_0213 | Beluga spring hunting camp |
| 7_6 | PAN_07_0213 | Beluga spring hunting camp, Duck eggs |
| 7_7 | PAN_07_0213 | Walrus hunting camp |
| 7_8 | PAN_07_0213 | Walrus and caribou hunting camp |
| 8_1 | PAN_08_0213 | Where he was born |
| 8_2 | PAN_08_0213 | Lived here after he got married, spent 5 years there |
| 8_3 | PAN_08_2013 | Camp for polar bear hunting, old sod houses here |
| 8_4 | PAN_08_0213 | Camp for hunting with dogs |
| 9_1 | PAN_09_0213 | Place of birth, Qimiksuuk |
| 9_2 | PAN_09_0213 | Where he grew up, Qipisa |
| 9_3 | PAN_09_0213 | General area where he lived prior to 1965 |
| 9_4 | PAN_09_0213 | Summer fishing camp |
| 9_5 | PAN_09_0213 | Summer and winter camp |
| 9_6 | PAN_09_0213 | Winter camping and polar bear camping |
| 10_1 | PAN_10_0213 | Place of birth |
| 10_2 | PAN_10_0213 | Has gone once per summer for 40 years |
| 10_3 | PAN_10_0213 | Fishing cabin used in July-August. Also used for clients |

**Figure 5.** Areas with significant diversity and areas important for other reasons

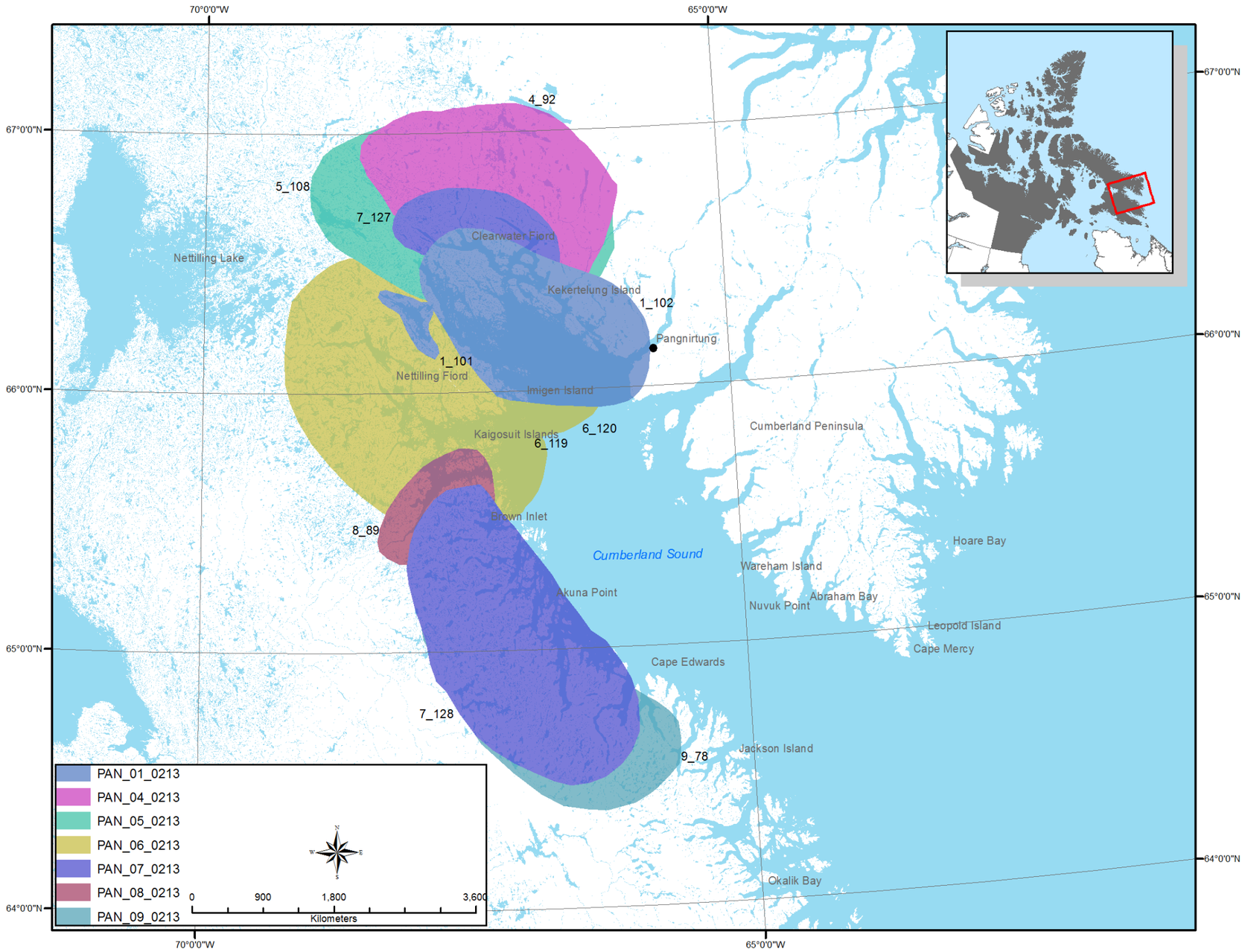


**Table 3.** Areas with significant diversity and areas important for other reasons

| MAP CODE | INTERVIEW CODE | MONTHS | COMMENTS |
|---|---|---|---|
| 1_101 | PAN_01_0213 | | A special camping spot, close to his heart, good hunting and fishing, and beautiful lake |
| 1_102 | PAN_01_0213 | Jun, Jul | Important to whale |
| _ | PAN_02_0213 | | All of Cumberland Sound |
| 2_104 | PAN_02_0213 | | |
| 4_92 | PAN_04_0213 | | Caribou calving grounds, Should be protected from activity |
| 5_108 | PAN_05_0213 | | Caribou and fishing area, very nice ancestral area |
| 6_119 | PAN_06_0213 | | Important to belugas (calving area), Should be protected from disturbance, Limit sonar and development |
| 6_120 | PAN_06_0213 | | Area to protect from mining development |
| 7_127 | PAN_07_0213 | | Beluga calving area |
| 7_128 | PAN_07_0213 | | Important for caribou |
| 8_89 | PAN_08_0213 | | He grew up there and considers it home. He has a cabin there, lots of country food available. |
| 9_78 | PAN_09_0213 | | Caribou area. This is where he spent much of his life. He thinks helicopter traffic from the diamond mine is scaring away wildlife (caribou and seals). |

**Figure 6.** Arctic Char Probability of Occurrence

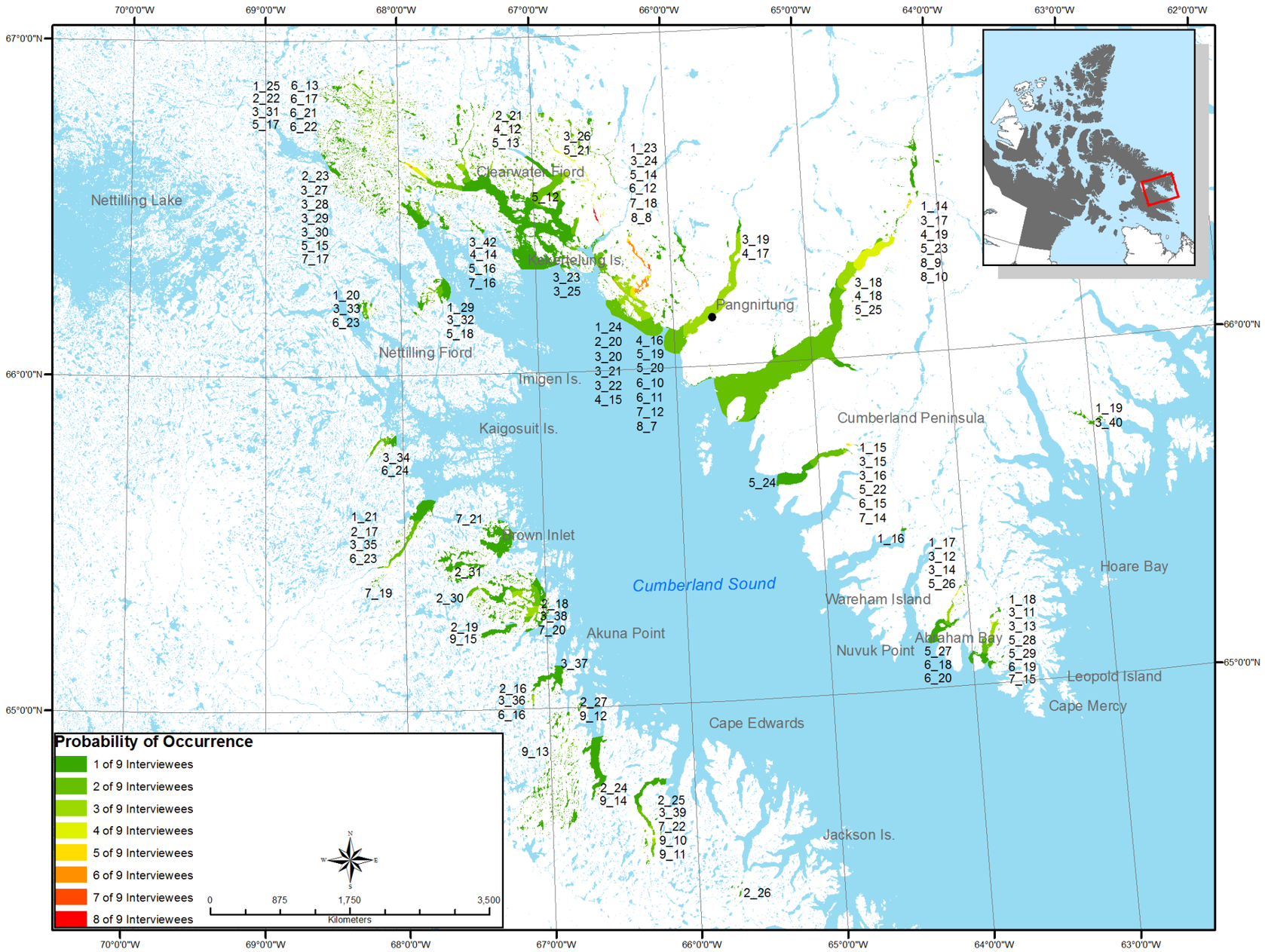


**Table 4.** Probability of Occurrence for Arctic Char

| MAP CODE | INTERVIEW CODE | MONTHS | COMMENTS |
|---|---|---|---|
| 1_14 | PAN_01_0213 | Jan to Apr | |
| 1_15 | PAN_01_0213 | Jan to Apr | |
| 1_16 | PAN_01_0213 | Jan to Apr | Not fished much |
| 1_17 | PAN_01_0213 | Jan to Apr | |
| 1_18 | PAN_01_0213 | Jan to Mar | Not fished much |
| 1_19 | PAN_01_0213 | Jul, Aug | |
| 1_20 | PAN_01_0213 | Jan to Apr | |
| 1_21 | PAN_01_0213 | Jan to Mar | |
| 1_22 | PAN_01_0213 | Jan to May | |
| 1_23 | PAN_01_0213 | Jan to May | |
| 1_24 | PAN_01_0213 | Jan to May | |
| 1_25 | PAN_01_0213 | Jan to May | |
| 1_6S | PAN_01_0213 | Jan to Apr | |
| 1_7S | PAN_01_0213 | Jan to Apr | Not fished much |
| 1_29 | PAN_01_0213 | Jan to Apr | |
| 2_16 | PAN_02_0213 | Jan to Apr, and Sep to Dec | |
| 2_17 | PAN_02_0213 | Jan to Apr | |
| 2_18 | PAN_02_0213 | Jan to May, and Sep to Dec | |
| 2_19 | PAN_02_0213 | Jan to May, and Sep to Dec | |
| 2_20 | PAN_02_0213 | Jan to May, and Sep to Dec | |
| 2_21 | PAN_02_0213 | Jan to May, and Sep to Dec | |
| 2_22 | PAN_02_0213 | Jan to May, and Sep to Dec | |
| 2_23 | PAN_02_0213 | Jan to May, and Sep to Dec | |
| 2_24 | PAN_02_0213 | Jan to May, and Sep to Dec | |
| 2_25 | PAN_02_0213 | Jan to Apr | |
| 2_26 | PAN_02_0213 | Jan to Apr | |
| 2_27 | PAN_02_0213 | Jun to Sep | Old fish weir here |
| 2_28S | PAN_02_0213 | Sep, Oct | Spawning is thought to occur in October |
| 2_29S | PAN_02_0213 | Sep, Oct | |
| 2_30S | PAN_02_0213 | Sep, Oct | |
| 2_31S | PAN_02_0213 | | |
| 3_11 | PAN_03_0213 | Year-round | |
| 3_12 | PAN_03_0213 | Year-round | |
| 3_13 | PAN_03_0213 | Jan to May | |
| 3_14 | PAN_03_0213 | Jan to May | |
| 3_15 | PAN_03_0213 | Jan to May | |
| 3_16 | PAN_03_0213 | Jul, Aug | |
| 3_17 | PAN_03_0213 | Jan to May | |
| 3_18 | PAN_03_0213 | Jul, Aug | |
| 3_19 | PAN_03_0213 | Jul, Aug | |
| 3_20 | PAN_03_0213 | Jul, Aug | |
| 3_21 | PAN_03_0213 | Jan to May | |
| 3_22 | PAN_03_0213 | July, August | |
| 3_23 | PAN_03_0213 | June to Aug | |
| 3_24 | PAN_03_0213 | Jan to May | |
| 3_25 | PAN_03_0213 | Jul, Aug | |
| 3_26 | PAN_03_0213 | Jul, Aug | |
| 3_27 | PAN_03_0213 | Jul, Aug | |
| 3_28 | PAN_03_0213 | Jul, Aug | |
| 3_29 | PAN_03_0213 | Jul, Aug | |
| 3_30 | PAN_03_0213 | Jan to May | |
| 3_31 | PAN_03_0213 | Jan to May, Jul, Aug | |
| 3_32 | PAN_03_0213 | Jul, Aug | |
| 3_33 | PAN_03_0213 | Jul, Aug | |
| 3_34 | PAN_03_0213 | Jul, Aug | |
| 3_35 | PAN_03_0213 | Jul, Aug | |
| 3_36 | PAN_03_0213 | Jan to Apr | |
| 3_37 | PAN_03_0213 | Jul, Aug | |
| 3_38 | PAN_03_0213 | Jul, Aug | |
| 3_39 | PAN_03_0213 | Jul, Aug | |
| 3_40 | PAN_03_0213 | Jan to Apr | |
| 3_41 | PAN_03_0213 | Jan to May | |
| 3_42 | PAN_03_0213 | Jul, Aug | |
| 4_12 | PAN_04_0213 | Jan to Apr | |
| 4_13S | PAN_04_0213 | Sep, Oct | |
| 4_14 | PAN_04_0213 | Jul, Aug | |

| MAP CODE | INTERVIEW CODE | MONTHS | COMMENTS |
|---|---|---|---|
| 4_15 | PAN_04_0213 | Jul, Aug | |
| 4_16 | PAN_04_0213 | Jan to Apr, and Oct to Dec | |
| 4_17 | PAN_04_0213 | Jul, Aug | |
| 4_18 | PAN_04_0213 | Jul, Aug | |
| 4_19 | PAN_04_0213 | Jan to Apr, and Oct to Dec | |
| 5_12 | PAN_05_0213 | Jul, Aug | |
| 5_13 | PAN_05_0213 | Jul, Aug | |
| 5_14 | PAN_05_0213 | Jan to Apr, and Oct to Dec | |
| 5_15 | PAN_05_0213 | Jan to Apr, and Oct to Dec | |
| 5_16 | PAN_05_0213 | Jul, Aug | |
| 5_17 | PAN_05_0213 | Jul, Aug | |
| 5_18 | PAN_05_0213 | Jul, Aug | |
| 5_19 | PAN_05_0213 | Jul, Aug | |
| 5_20 | PAN_05_0213 | Year-round | |
| 5_21S | PAN_05_0213 | Sep, Oct | |
| 5_22 | PAN_05_0213 | Jan to Apr | |
| 5_23 | PAN_05_0213 | Jan to Apr | |
| 5_24 | PAN_05_0213 | Jul, Aug | |
| 5_25 | PAN_05_0213 | Jul, Aug | |
| 5_26 | PAN_05_0213 | Jan to Apr | |
| 5_27 | PAN_05_0213 | Jul, Aug | |
| 6_10 | PAN_06_0213 | Jan to Apr | |
| 6_11 | PAN_06_0213 | Jul, Aug | |
| 6_12 | PAN_06_0213 | Jan to Apr | |
| 6_13 | PAN_06_0213 | Jan to Apr | |
| 6_14 | PAN_06_0213 | Jan to Apr | |
| 6_15 | PAN_06_0213 | Jan to Apr | |
| 6_16 | PAN_06_0213 | Jan to Apr | |
| 6_17 | PAN_06_0213 | Jan to Apr | |
| 6_18 | PAN_06_0213 | Jan to Apr | |
| 6_19 | PAN_06_0213 | Jul, Aug | |
| 6_20 | PAN_06_0213 | Jul, Aug | |
| 6_21 | PAN_06_0213 | Jul, Aug | |
| 6_22 | PAN_06_0213 | Jan to Apr | |
| 6_23 | PAN_06_0213 | Jul, Aug | |
| 6_24 | PAN_06_0213 | Jul, Aug | |
| 6_25 | PAN_06_0213 | Jul, Aug | |
| 7_12 | PAN_07_0213 | Year-round | |
| 7_13 | PAN_07_0213 | Jan to Apr | |
| 7_14 | PAN_07_0213 | Mar to Jun | Spawn in September and October |
| 7_15 | PAN_07_0213 | Jul, Aug | |
| 7_16 | PAN_07_0213 | June, July | |
| 7_17 | PAN_07_0213 | Jul, Aug | |
| 7_18 | PAN_07_0213 | Jan to Apr | |
| 7_19 | PAN_07_0213 | Jan to Apr | Spawn in September and October |
| 7_20 | PAN_07_0213 | Jul, Aug | |
| 7_21 | PAN_07_0213 | Jul, Aug | |
| 7_22 | PAN_07_0213 | Jul, Aug | |
| 8_7 | PAN_08_0213 | Jan to Apr | |

| MAP CODE | INTERVIEW CODE | MONTHS | COMMENTS |
|---|---|---|---|
| 8_8 | PAN_08_0213 | Jan to Apr | |
| 8_9 | PAN_08_0213 | Jan to Apr | Spawn in September and October |
| 8_10 | PAN_08_0213 | Jan to Apr | Spawn in September and October |
| 9_10 | PAN_09_0213 | Jan to Apr | |
| 9_11 | PAN_09_0213 | Jul, Aug | |
| 9_12 | PAN_09_0213 | Jan to Apr | There have always been lots of fish here. Used to be a fishing weir. Spawn in September and October. |
| 9_13 | PAN_09_0213 | Jan to Apr | |
| 9_14 | PAN_09_0213 | Jul, Aug | |
| 9_15 | PAN_09_0213 | Year-round | |
| 1_13E | PAN_01_0213 | Jul, Aug | In summer, everywhere along coastline |
| 1_13E | PAN_01_0213 | Jul, Aug | In summer, everywhere along coastline |
| 1_13E | PAN_01_0213 | Jul, Aug | In summer, everywhere along coastline |
| 2_15E | PAN_02_0213 | Jul, Aug | Everywhere |
| 2_15E | PAN_02_0213 | Jul, Aug | Everywhere |
| 3_10E | PAN_03_0213 | Jul, Aug | Spawning in all wintering lakes |
| 4_20E | PAN_04_0213 | Jul, Aug | Everywhere |

**Figure 7.** Probability of Occurrence for Land-locked Char

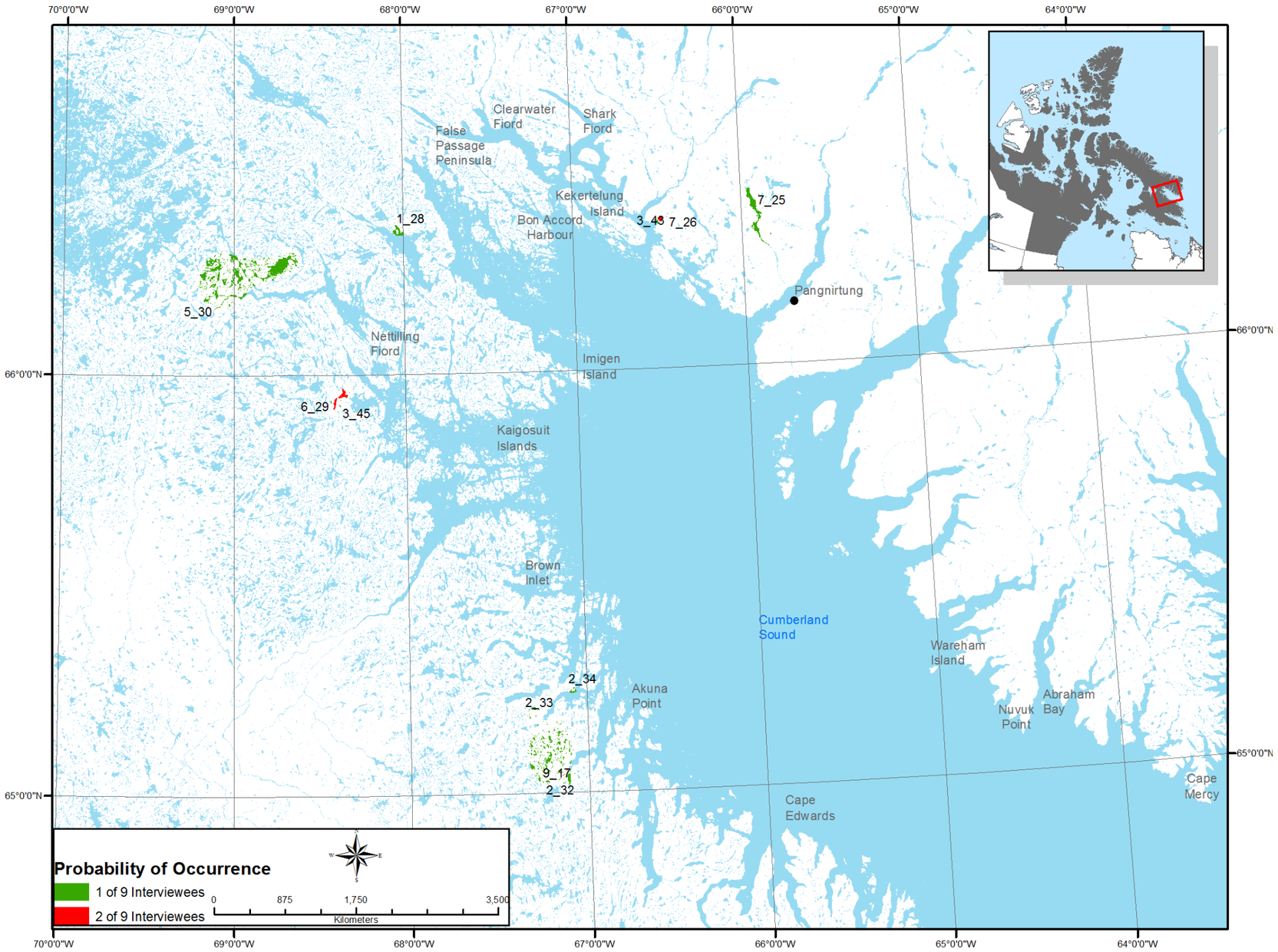


**Table 5.** Probability of Occurrence for Land-locked Char

| MAP CODE | INTERVIEW CODE | MONTHS | COMMENTS |
|---|---|---|---|
| 2_32 | PAN_02_0213 | Year-round | Lots found here. The lake never freezes because of a current |
| 2_33 | PAN_02_0213 | Year-round | |
| 2_34 | PAN_02_0213 | Year-round | Good eating, nice fish |
| 3_43 | PAN_03_0213 | Year-round | |
| 3_44 | PAN_03_0213 | Year-round | |
| 3_45 | PAN_03_0213 | Year-round | |
| 5_30 | PAN_05_0213 | Year-round | |
| 6_29 | PAN_06_0213 | Year-round | |
| 7_25 | PAN_07_0213 | Year-round | |
| 7_26 | PAN_07_0213 | Year-round | |
| 9_17 | PAN_09_0213 | Year-round | |
| 2_35E | PAN_02_0213 | | Everywhere. Seen in most lakes when caribou hunting |

**Figure 8.** Lake Trout, Round Whitefish, Atlantic Salmon and Bull Trout Areas of Occurrence

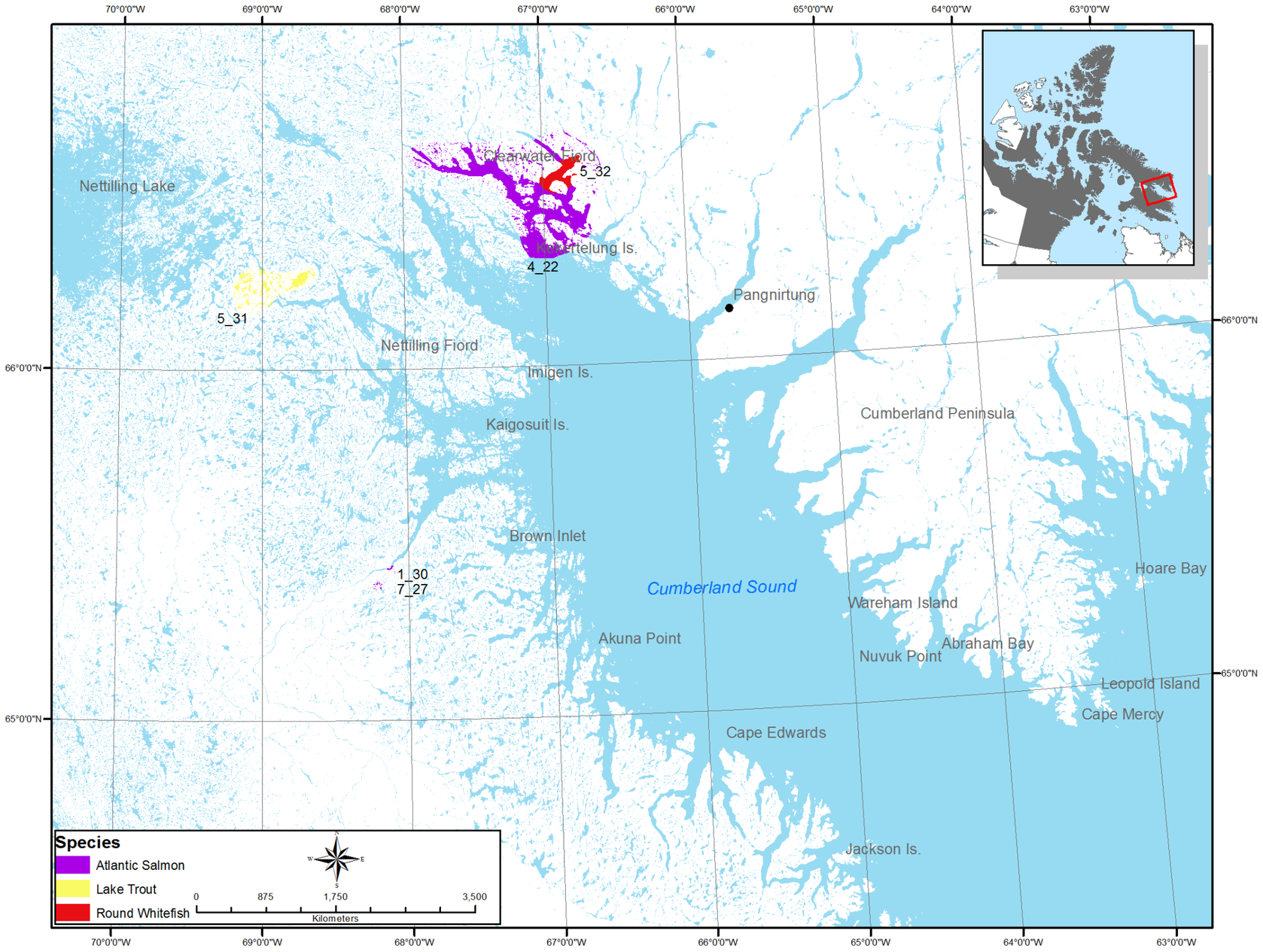


**Table 6.** Lake Trout, Round Whitefish, Atlantic Salmon and Bull Trout Areas of Occurrence

| MAP CODE | INTERVIEW CODE | SPECIES | MONTHS | COMMENTS |
|---|---|---|---|---|
| 5_31 | PAN_05_0213 | Lake Trout | | Possible lake trout here, with white flesh |
| 5_32 | PAN_05_0213 | Round Whitefish | | Something similar to this caught in a net in salt water |
| 1_30 | PAN_01_0213 | Atlantic Salmon | | Saw one caught here 15 years ago |
| 4_22 | PAN_04_0213 | Atlantic Salmon | Jul, Aug | Sometimes caught in char nets, the odd one |
| 7_27 | PAN_07_0213 | Atlantic Salmon | Jan to Apr | |

**Figure 9.** Areas of Occurrence for Atlantic Cod, Toothed Cod, and Arctic Cod

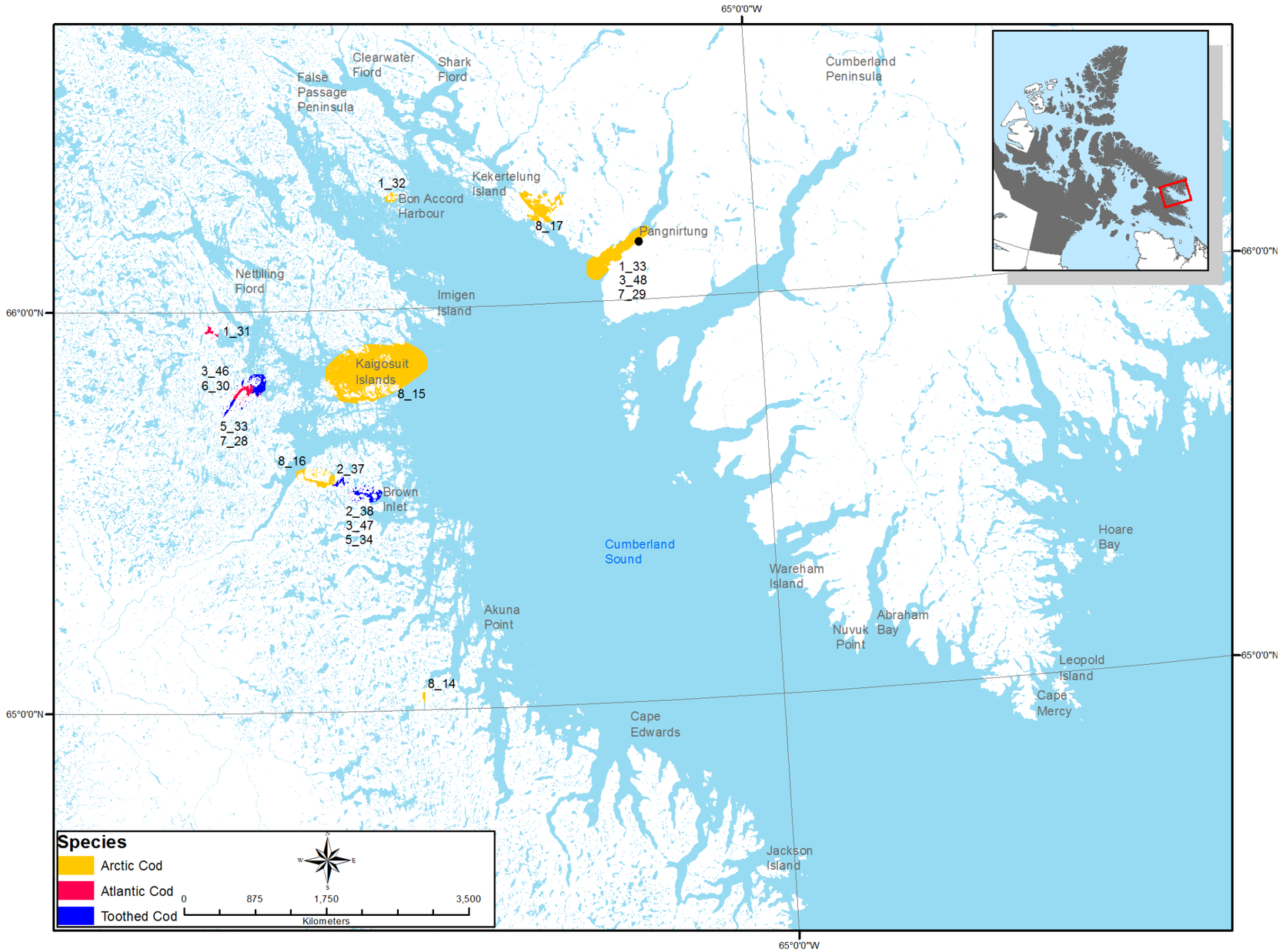


**Table 7.** Areas of Occurrence for Atlantic Cod, Toothed Cod, and Arctic Cod

| MAP CODE | INTERVIEW CODE | SPECIES | MONTHS | COMMENTS |
|---|---|---|---|---|
| 1_31 | PAN_01_0213 | Atlantic Cod | Year-round | Landlocked cod |
| 3_46 | PAN_03_0213 | Atlantic Cod | Year-round | Big fish in brackish lagoons, not sure if it's cod |
| 3_47 | PAN_03_0213 | Atlantic Cod | Year-round | |
| 6_30 | PAN_06_0213 | Atlantic Cod | Year-round | |
| 2_37 | PAN_02_0213 | Toothed Cod | Jul to Sep | The tide brings saltwater into the lake (brackish). Lagoons with big cod here. |
| 2_38 | PAN_02_0213 | Toothed Cod | Jul to Sep | The tide brings saltwater into the lake (brackish). Lagoons with big cod here. |
| 5_33 | PAN_05_0213 | Toothed Cod | | |
| 5_34 | PAN_05_0213 | Toothed Cod | | |
| 7_28 | PAN_07_0213 | Toothed Cod | | |
| 1_32 | PAN_01_0213 | Arctic Cod | May | Seen in cracks in the ice in spring |
| 1_33 | PAN_01_0213 | Arctic Cod | May | |
| 3_48 | PAN_03_0213 | Arctic Cod | Year-round | |
| 7_29 | PAN_07_0213 | Arctic Cod | Jan to Jun | Along cracks in ice at mouth of fiord |
| 8_15 | PAN_08_0213 | Arctic Cod | | Seen during breakup along the shores |
| 8_16 | PAN_08_0213 | Arctic Cod | | Will see birds go after them along the shoreline when the ice is breaking up |
| 8_17 | PAN_08_0213 | Arctic Cod | | |
| 1_34E | PAN_01_0213 | Arctic Cod | | Everywhere |
| 2_36E | PAN_02_0213 | Arctic Cod | | Everywhere |
| 6_31E | PAN_06_0213 | Arctic Cod | Jan to Apr | Everywhere. Rare, but found in cracks in ice or along shore |
| 8_18E | PAN_08_0213 | Arctic Cod | | Everywhere |
| 9_18E | PAN_09_0213 | Arctic Cod | | Everywhere. Seen in cracks in the ice |

**Figure 10.** Areas of Occurrence for Capelin, Pacific Herring, Atlantic Herring, Ninespine Stickleback, and Rainbow Smelt

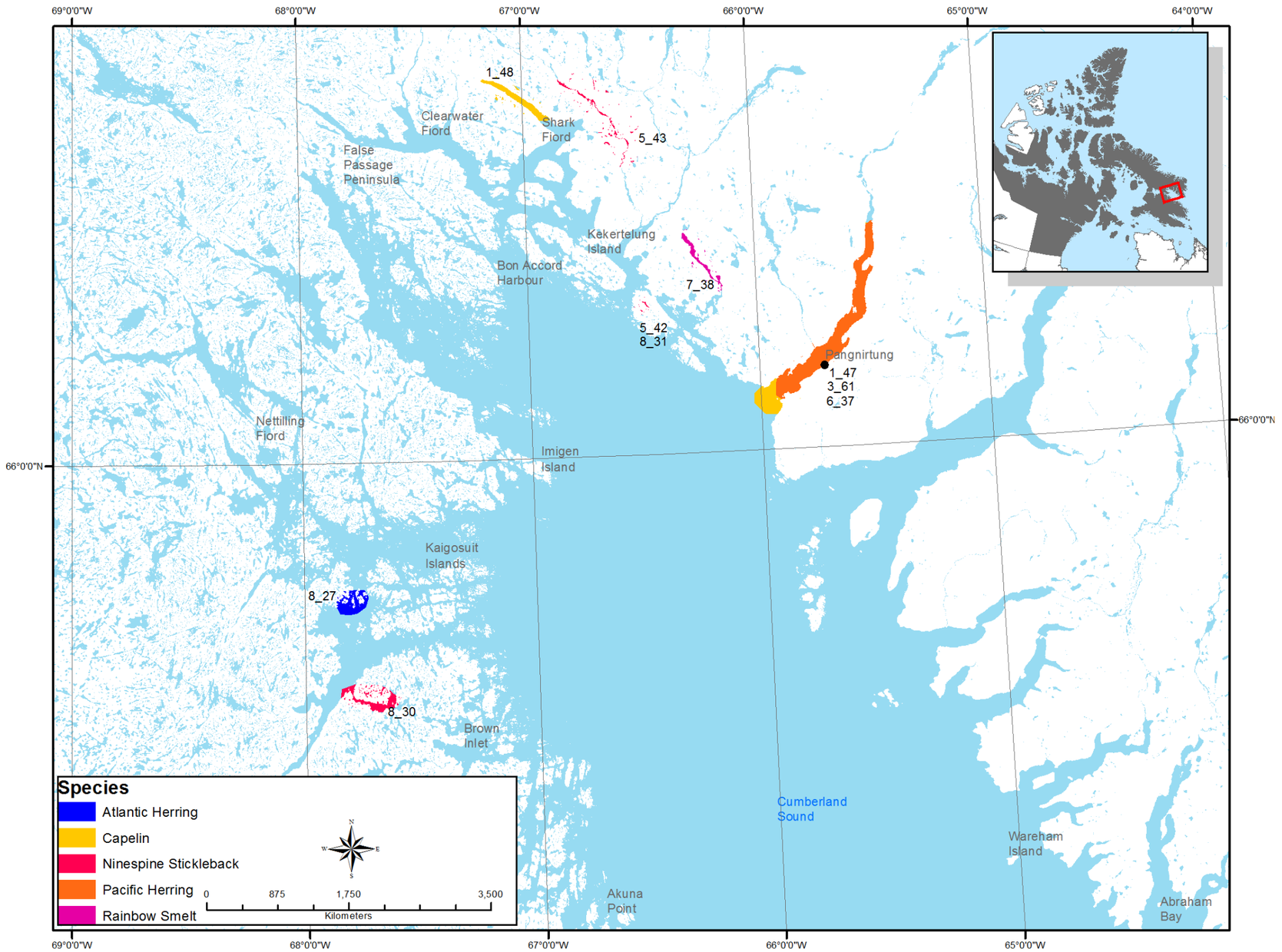


**Table 8.** Areas of Occurrence for Capelin, Pacific Herring, Atlantic Herring, Threespine Stickleback, Ninespine Stickleback, and Rainbow Smelt

| MAP CODE | INTERVIEW CODE | SPECIES | MONTHS | COMMENTS |
|---|---|---|---|---|
| 1_47 | PAN_01_0213 | Capelin | July | |
| 1_48 | PAN_01_0213 | Capelin | July | |
| 6_37 | PAN_06_0213 | Capelin | Jun to Aug | Arrived in last 7 years |
| 3_61 | PAN_03_0213 | Pacific Herring | Jul, Aug | Often seen jumping out of water a boat passes |
| 8_27 | PAN_08_0213 | Atlantic Herring | | Can be seen swimming in cracks in the ice |
| 5_42 | PAN_05_0213 | Ninespine Stickleback | | |
| 5_43 | PAN_05_0213 | Ninespine Stickleback | | |
| 8_30 | PAN_08_0213 | Ninespine Stickleback | | |
| 8_31S | PAN_08_0213 | Ninespine Stickleback | | |
| 1_49E | PAN_01_0213 | Capelin | July | Mainly in bays, only in last 10 years |
| 2_43E | PAN_02_0213 | Capelin | Jul, Aug | Has noticed them in very high numbers over the last few years |
| 3_60E | PAN_03_0213 | Capelin | Jun to Aug | |
| 4_32E | PAN_04_0213 | Capelin | Jul, Aug | They showed up in small numbers around 7 years ago and now they are everywhere |
| 5_40E | PAN_05_0213 | Capelin | Jul, Aug | Arrived 7 years ago, Now there are lots |
| 6_38E | PAN_06_0213 | Capelin | Jun to Aug | Arrived in last 7 years |
| 7_36E | PAN_07_0213 | Capelin | Jul, Aug | New in last 7 years, very abundant in last 3 years |
| 8_26E | PAN_08_0213 | Capelin | Jul, Aug | |
| 9_22E | PAN_09_0213 | Capelin | | First noticed capelin 3-5 years ago |
| 3_62E | PAN_03_0213 | Trout Perch | Jul, Aug | Found in most lakes |
| 7_37E | PAN_07_0213 | Rainbow Smelt | | Found in lakes |
| 8_28E | PAN_08_0213 | Rainbow Smelt | | Found in many small lakes |
| 9_23E | PAN_09_0213 | Rainbow Smelt | | In many lakes |
| 1_50E | PAN_01_0213 | Threespine Stickleback | Jul to Oct | Mainly in small creeks and rivers |
| 4_34E | PAN_04_0213 | Threespine Stickleback | | Found in small lakes and rivers |
| 2_45E | PAN_02_0213 | Ninespine Stickleback | | Found in small lakes |
| 3_63E | PAN_03_0213 | Ninespine Stickleback | Jul, Aug | Found in most lakes |
| 4_33E | PAN_04_0213 | Ninespine Stickleback | | Found in small lakes and rivers |
| 5_41E | PAN_05_0213 | Ninespine Stickleback | | |
| 6_39E | PAN_06_0213 | Ninespine Stickleback | | Found in small lakes and rivers |
| 7_39E | PAN_07_0213 | Ninespine Stickleback | | Found in lakes, rivers, and ponds |
| 8_29E | PAN_08_0213 | Ninespine Stickleback | | Found in most lakes |
| 9_24E | PAN_09_0213 | Ninespine Stickleback | | In many small lakes |

**Figure 11.** Probability of Occurrence for Greenland Halibut

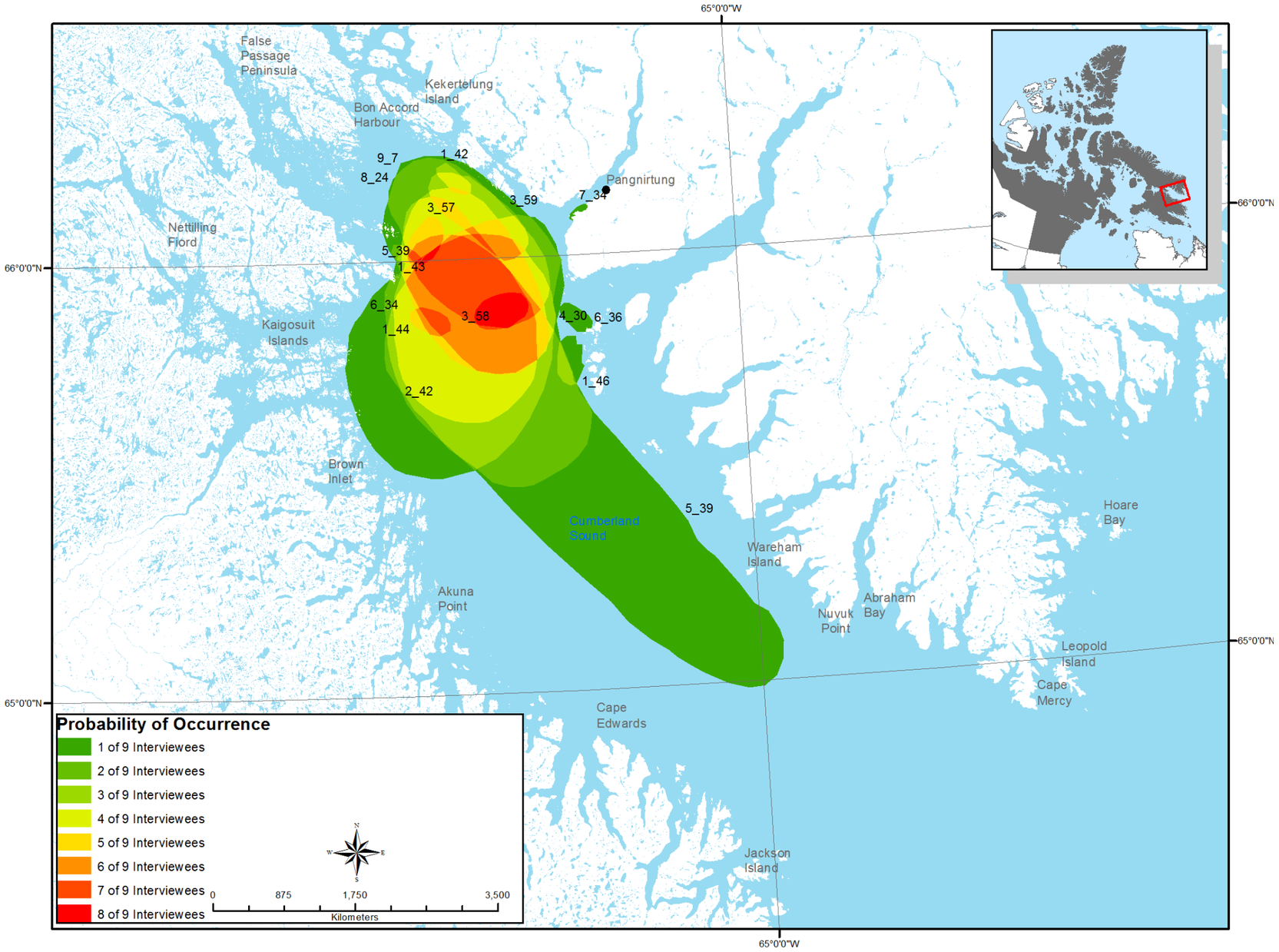


**Table 9.** Probability of Occurrence for Greenland Halibut (turbot)

| MAP CODE | INTERVIEW CODE | MONTHS | COMMENTS |
|---|---|---|---|
| 1_42 | PAN_01_0213 | Jan to Apr | Female with eggs caught here in January 2013, first one he's seen |
| 1_43 | PAN_01_0213 | Jan to Apr | |
| 1_44 | PAN_01_0213 | Jan to Apr | |
| 1_46 | PAN_01_0213 | Jan to Apr | |
| 2_42 | PAN_02_0213 | Jan to Apr | |
| 3_57 | PAN_03_0213 | Jan to Apr | |
| 3_58 | PAN_03_0213 | Jan to Apr | |
| 3_59 | PAN_03_0213 | Jan to Apr | |
| 4_30 | PAN_04_0213 | Jan to Apr | |
| 5_39 | PAN_05_0213 | Jan to Apr | |
| 6_34 | PAN_06_0213 | Jan to Apr | |
| 6_36H | PAN_06_0213 | Apr, May | Dead halibut found along a crack here in the 1970s |
| 7_34 | PAN_07_0213 | Jan to Apr | |
| 8_25 | PAN_08_0213 | Jan to Apr | |
| 9_21 | PAN_09_0213 | Jan to Apr | |
| 1_45E | PAN_01_0213 | Jan to Apr | Everywhere |
| 2_41E | PAN_02_0213 | | Everywhere |
| 4_31E | PAN_04_0213 | | Everywhere |
| 6_35E | PAN_06_0213 | | Everywhere |
| 7_35E | PAN_07_0213 | | Everywhere |

**Figure 12.** Probability of Occurrence for Greenlandic Shark

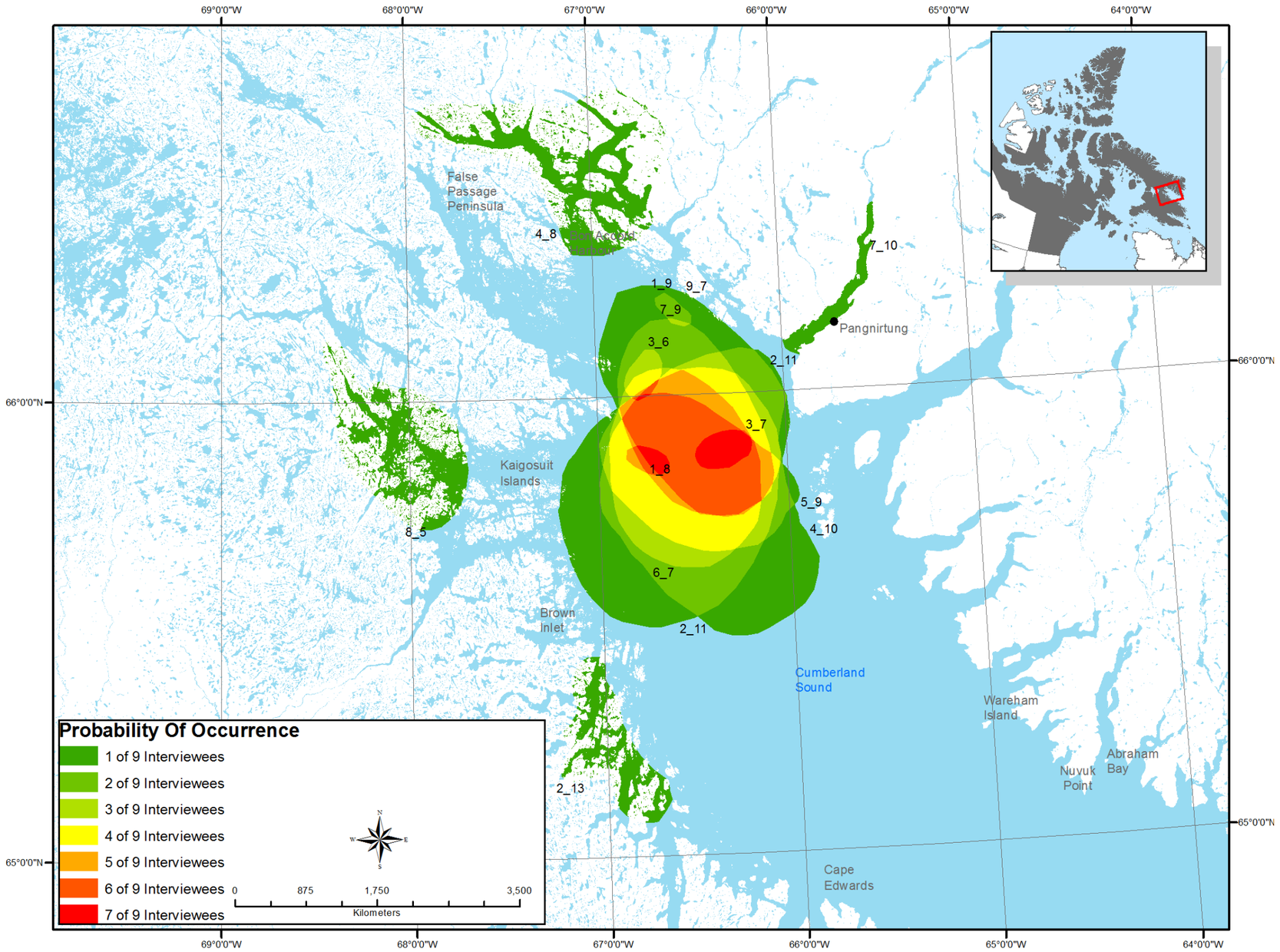


**Table 10.** Probability of Occurrence for Greenlandic Shark

| MAP CODE | INTERVIEW CODE | YEAR | MONTHS | COMMENTS |
|---|---|---|---|---|
| 1_8H | PAN_01_0213 | 1990s | Jan to Apr | Lots in 1990s during winter fishing, less now, eat turbot on lines and seals in nets |
| 1_9 | PAN_01_0213 | 2011 | Jan to Apr | |
| 1_10 | PAN_01_0213 | 2004 | Jul, Aug | Saw one near shore |
| 2_11 | PAN_02_0213 | | Jan to Apr | |
| 2_13 | PAN_02_0213 | | Jul to Sep | As kids, they were warned of sharks in this area |
| 3_6 | PAN_03_0213 | | Jan to Apr | Seen in deep waters, areas with turbot |
| 3_7 | PAN_03_0213 | | Jan to Apr | |
| 4_8 | PAN_04_0213 | | Jul, Aug | Sharks are seen during beluga hunts |
| 4_10 | PAN_04_0213 | | Year-round | |
| 5_9 | PAN_05_0213 | | Jan to Apr | |
| 6_7 | PAN_06_0213 | | Jan to Apr | |
| 7_9 | PAN_07_0213 | | Jan to Apr | |
| 7_10 | PAN_07_0213 | | Sep to Nov | |
| 8_5 | PAN_08_0213 | | Jan to Apr | |
| 9_7 | PAN_09_0213 | | Jan to Apr | |
| 9_8 | PAN_09_0213 | | | His father once harpooned a shark in this area |
| 2_12E | PAN_02_0213 | | Year-round | Everywhere |
| 4_9E | PAN_04_0213 | | | Everywhere |
| 5_10E | PAN_05_0213 | | | Everywhere |
| 6_8E | PAN_06_0213 | | | Everywhere |

**Figure 13.** Areas of Occurrence for Atlantic Wolffish, and Spotted Wolffish

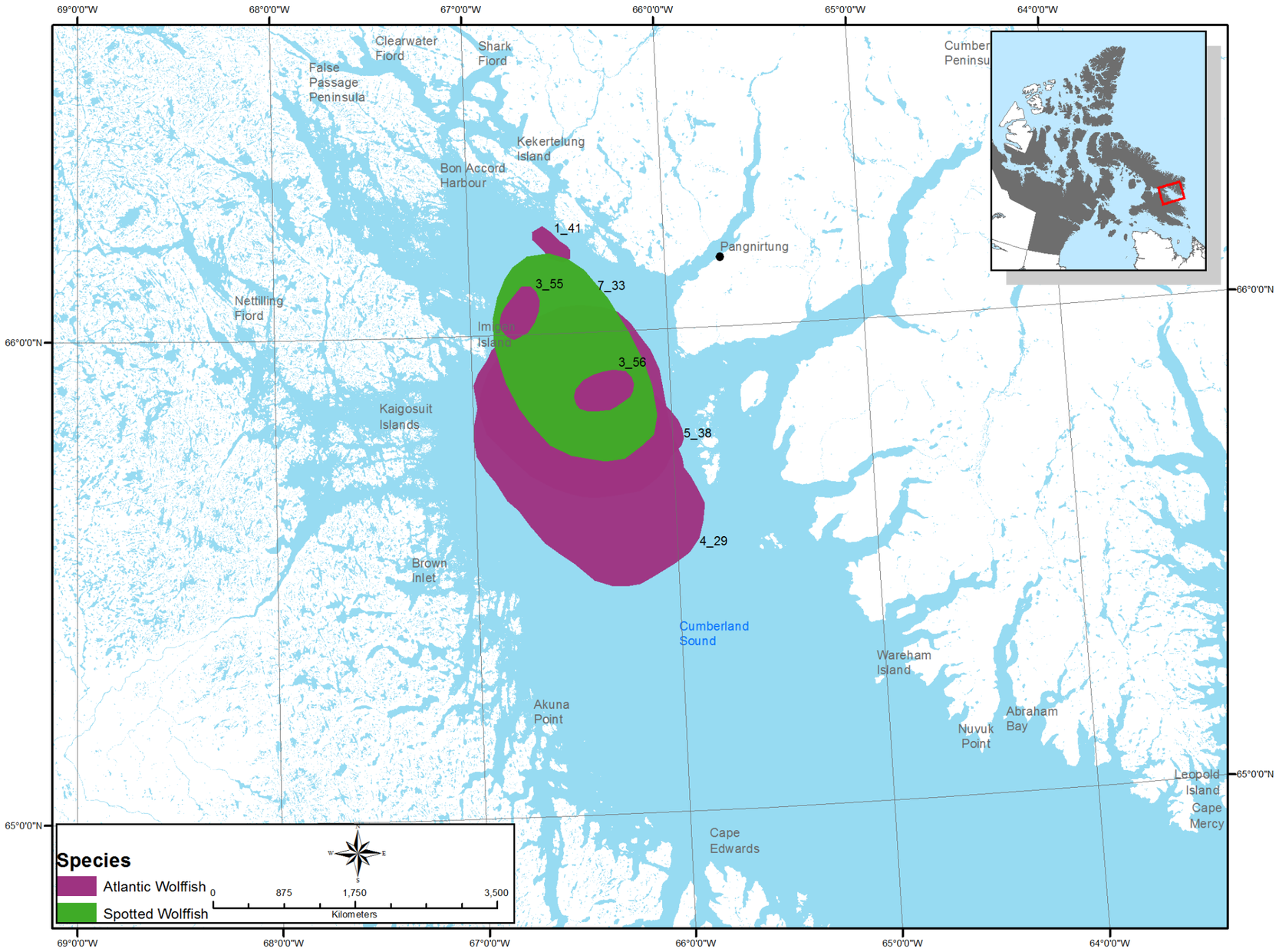


**Table 11.** Areas of Occurrence for Atlantic Wolffish, and Spotted Wolffish

| MAP CODE | INTERVIEW CODE | SPECIES | MONTHS | COMMENTS |
|---|---|---|---|---|
| 1_41 | PAN_01_0213 | Atlantic Wolffish | Jan to Apr | Caught turbot fishing |
| 3_55 | PAN_03_0213 | Atlantic Wolffish | Jan to Apr | Caught in winter turbot fishery |
| 3_56 | PAN_03_0213 | Atlantic Wolffish | Jan to May | |
| 4_29 | PAN_04_0213 | Atlantic Wolffish | Jan to Apr | |
| 5_38 | PAN_05_0213 | Atlantic Wolffish | Jan to Apr | |
| 8_23 | PAN_08_0213 | Atlantic Wolffish | Jan to Apr | He's seen turbot fishermen catch them |
| 7_33 | PAN_07_0213 | Spotted Wolffish | Jan to Apr | |

**Figure 14.** Areas of Occurrence for Roughhead Grenadier and Rock Grenadier

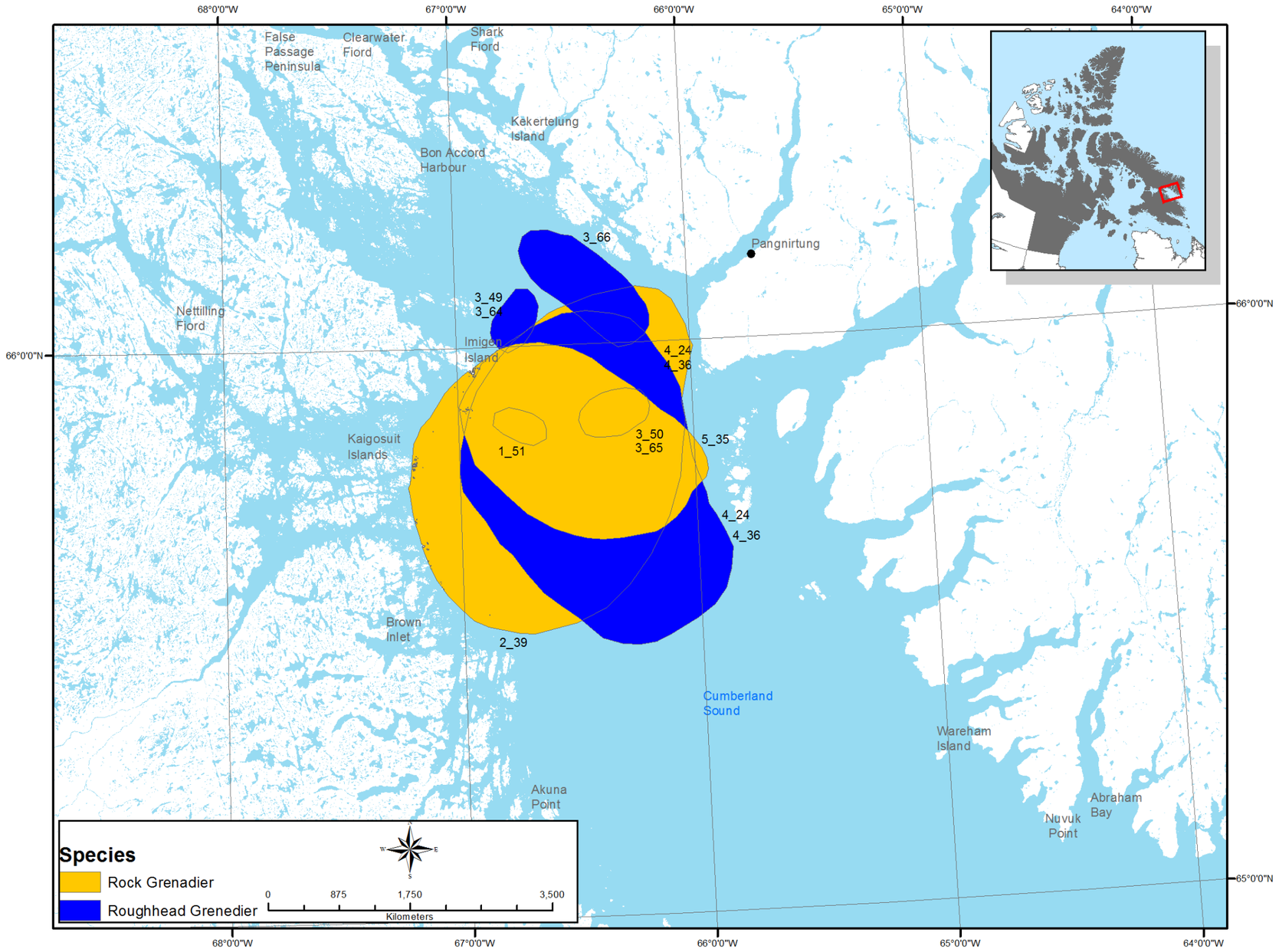


**Table 12.** Areas of Occurrence for Roughhead Grenadier and Rock Grenadier

| MAP CODE | INTERVIEW CODE | SPECIES | MONTHS | COMMENTS |
|---|---|---|---|---|
| 1_51 | PAN_01_0213 | Roughhead Grenadier | Jan to Apr | Caught mainly in the "313" fishing area |
| 3_64 | PAN_03_0213 | Roughhead Grenadier | Jan to May | |
| 3_65 | PAN_03_0213 | Roughhead Grenadier | Jan to May | |
| 3_66 | PAN_03_0213 | Roughhead Grenadier | Jan to May | |
| 4_36 | PAN_04_0213 | Roughhead Grenadier | Jan to May | |
| 2_39 | PAN_02_0213 | Rock Grenadier | Jan to Apr | Caught while turbot fishing |
| 4_24 | PAN_04_0213 | Rock Grenadier | Jan to Apr | Fishermen catch these |
| 5_35 | PAN_05_0213 | Rock Grenadier | Jan to Apr | |

**Figure 15.** Areas of Occurrence for Atlantic Spiny Lumpsucker, Leatherfin Lumpsucker, and Lumpsucker

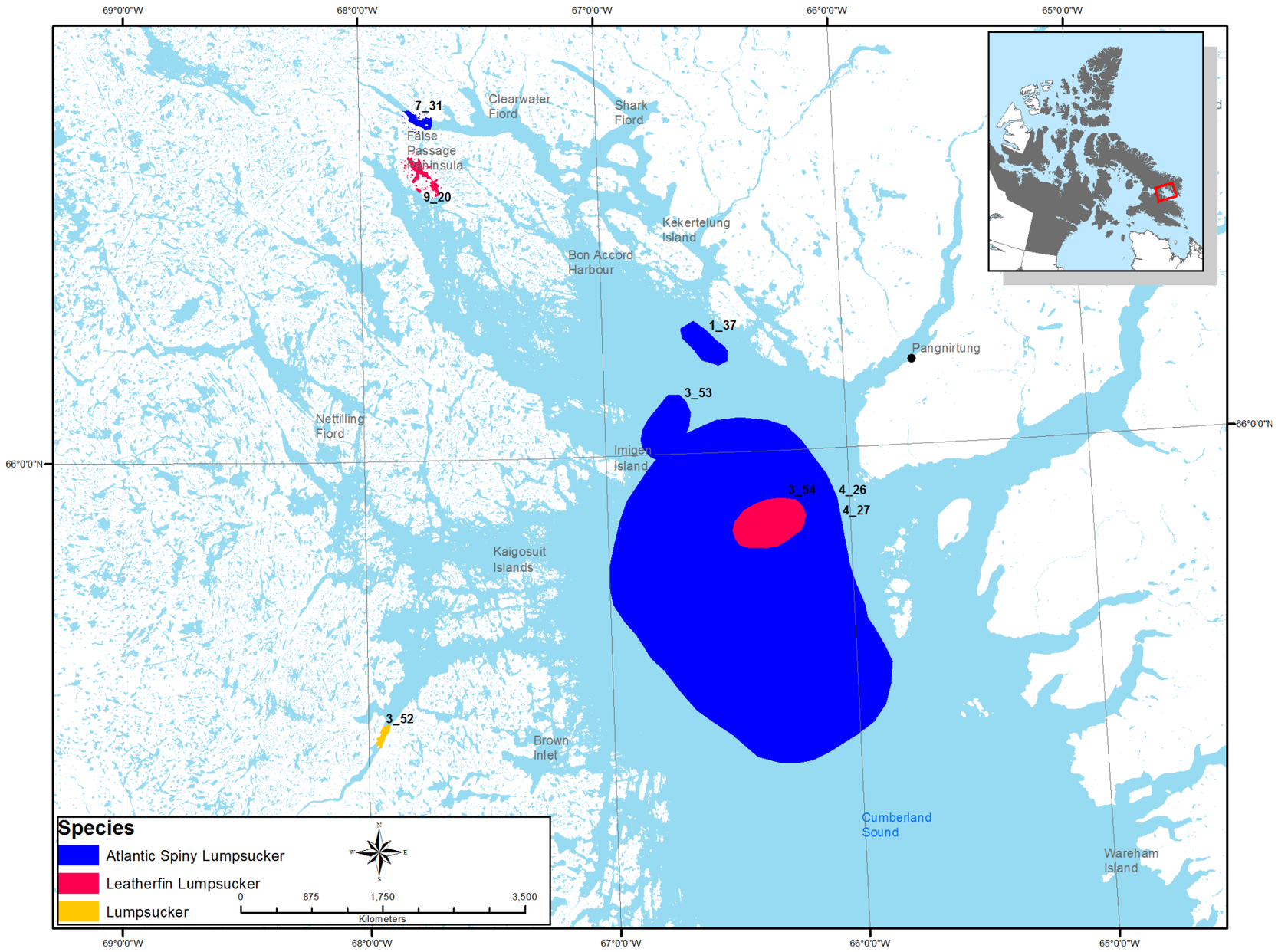


**Table 13.** Areas of Occurrence for Atlantic Spiny Lumpsucker, Leatherfin Lumpsucker, and Lumpsucker

| MAP CODE | INTERVIEW CODE | SPECIES | MONTHS | COMMENTS |
|---|---|---|---|---|
| 1_37 | PAN_01_0213 | Atlantic Spiny Lumpsucker | Jan to Apr | Found in turbot guts |
| 3_53 | PAN_03_0213 | Atlantic Spiny Lumpsucker | Jan to May | Caught on turbot lines |
| 3_54 | PAN_03_0213 | Atlantic Spiny Lumpsucker | Jan to May | Catch it when fishing |
| 4_27 | PAN_04_0213 | Atlantic Spiny Lumpsucker | Jan to Apr | |
| 7_31 | PAN_07_0213 | Atlantic Spiny Lumpsucker | Jul, Aug | |
| 4_26 | PAN_04_0213 | Leatherfin Lumpsucker | Jan to Apr | |
| 9_20 | PAN_09_0213 | Leatherfin Lumpsucker | Jul, Aug | |
| 3_52 | PAN_03_0213 | Lumpsucker | July | Saw one once |

**Figure 16.** Probability of Occurrence for Arctic Skate

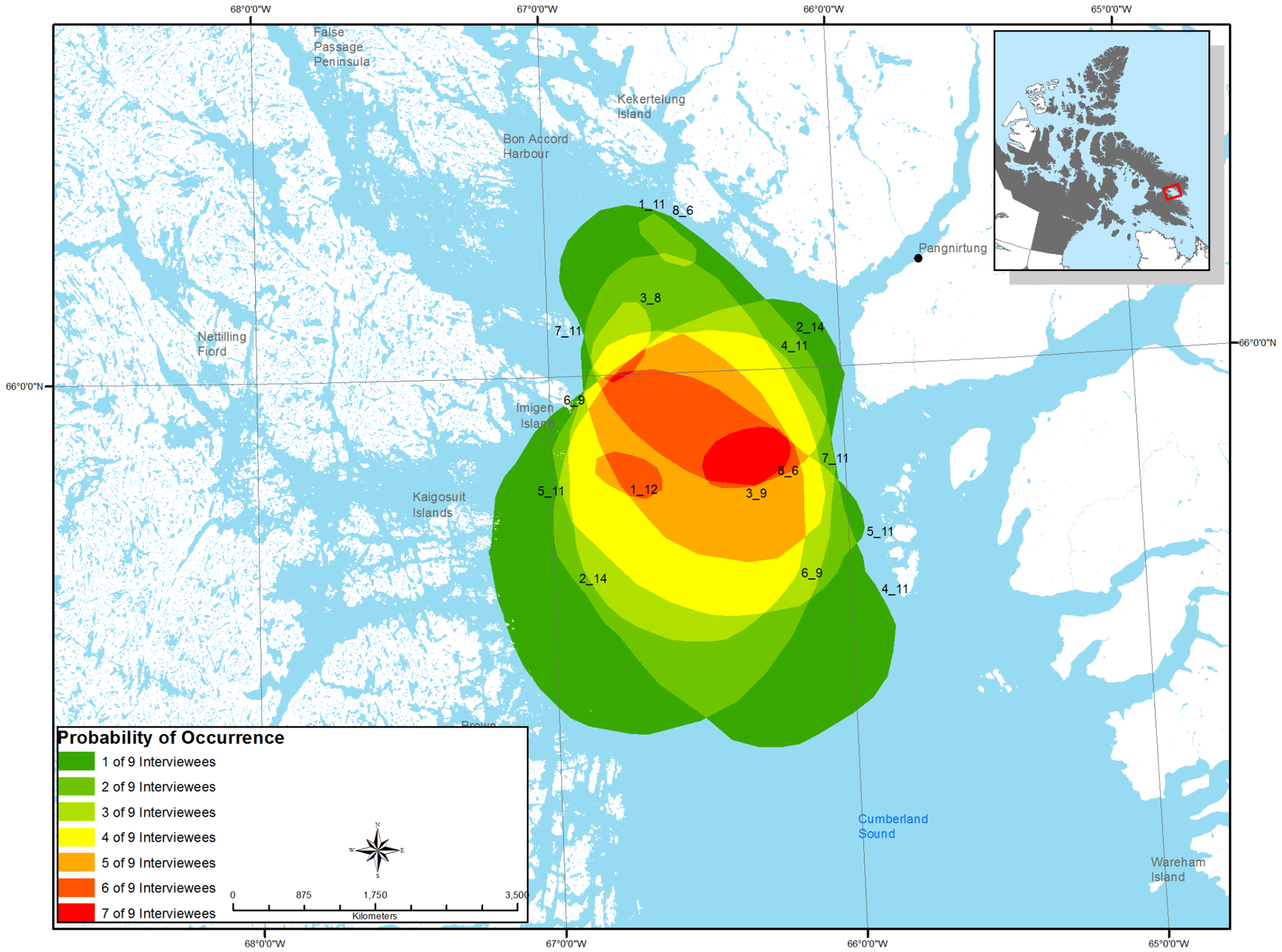


**Table 14.** Probability of Occurrence for Arctic Skate

| MAP CODE | INTERVIEW CODE | YEAR | MONTHS | COMMENTS |
|---|---|---|---|---|
| 1_11 | PAN_01_0213 | 2013 | Jan to Apr | |
| 1_12H | PAN_01_0213 | 1990s | Jan to Apr | |
| 2_14 | PAN_02_0213 | | Jan to Apr | Deep water |
| 3_8 | PAN_03_0213 | | Jan to Apr | |
| 3_9 | PAN_03_0213 | | Jan to Apr | |
| 4_11 | PAN_04_0213 | | Jan to Apr | |
| 5_11 | PAN_05_0213 | | Jan to Apr | |
| 6_9 | PAN_06_0213 | | Jan to Apr | |
| 7_11 | PAN_07_0213 | | Jan to Apr | |
| 8_6 | PAN_08_0213 | | Jan to Apr | |
| 9_9 | PAN_09_0213 | | Jan to Apr | |

**Figure 17.** Areas of Occurrence Arctic Eelpout, and Shulupaoluk

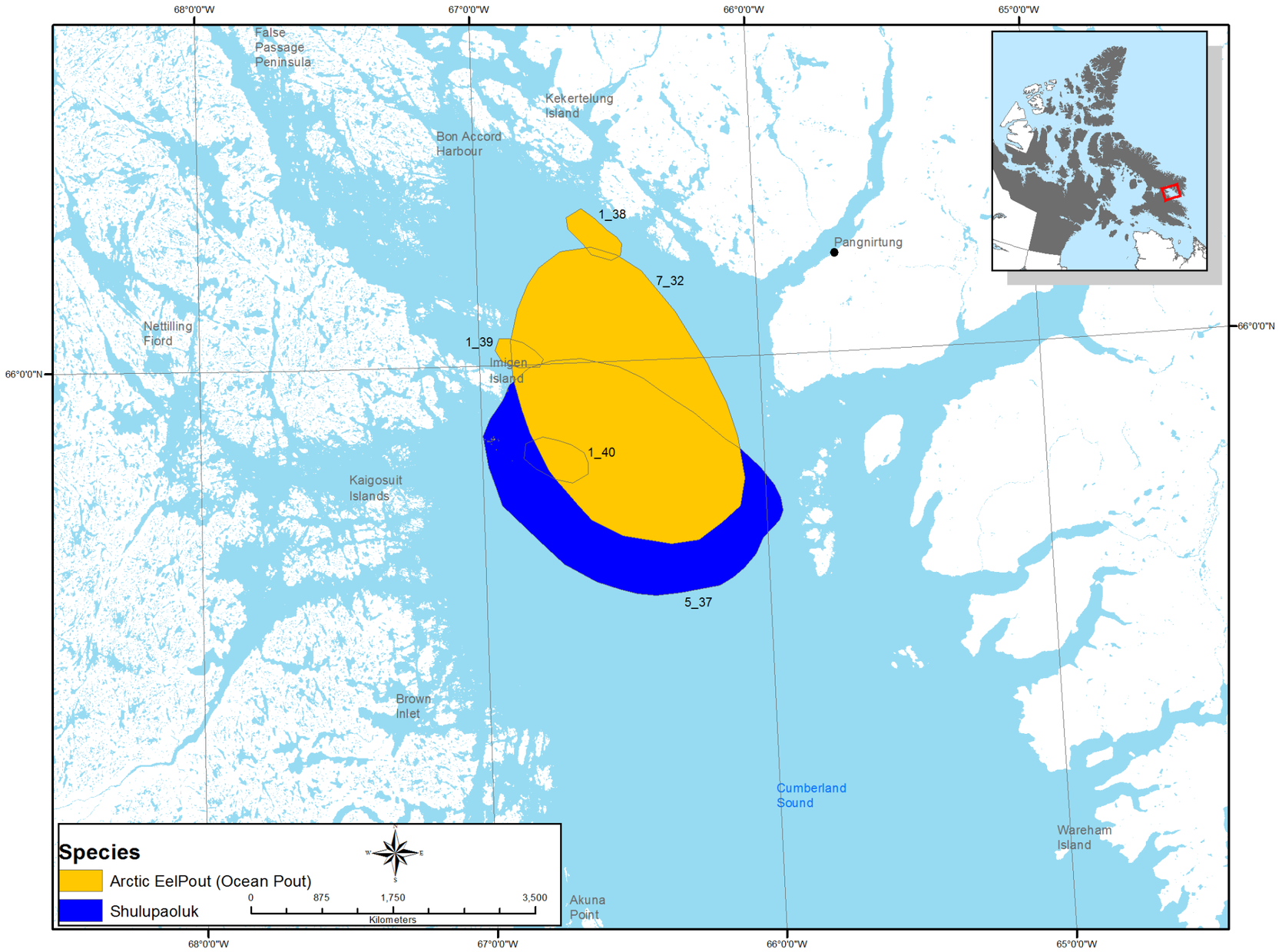


**Table 15.** Areas of Occurrence Arctic Eelpout, and Shulupaoluk

| MAP CODE | INTERVIEW CODE | SPECIES | MONTHS | COMMENTS |
|---|---|---|---|---|
| 1_38 | PAN_01_0213 | Arctic EelPout (Ocean Pout) | Jan to Apr | Caught frequently, usually darker than our picture |
| 1_39 | PAN_01_0213 | Arctic EelPout (Ocean Pout) | Jan to Apr | Caught frequently, usually darker than our picture |
| 1_40 | PAN_01_0213 | Arctic EelPout (Ocean Pout) | Jan to Apr | Caught frequently, usually darker than our picture |
| 7_32 | PAN_07_0213 | Arctic EelPout (Ocean Pout) | Jan to Apr | |
| 5_37 | PAN_05_0213 | Shulupaoluk | Jan to Apr | |

**Table 16.** Shorthorn Sculpin

| MAP CODE | INTERVIEW CODE | SPECIES | MONTHS | COMMENTS |
|---|---|---|---|---|
| 1_35E | PAN_01_0213 | Shorthorn Sculpin | | Everywhere |
| 2_40E | PAN_02_0213 | Shorthorn Sculpin | | Everywhere. Local name: Kaniqtuq or Konoguk. Several different kinds, but hard to tell apart |
| 3_51E | PAN_03_0213 | Shorthorn Sculpin | Year-round | Everywhere |
| 4_25E | PAN_04_0213 | Shorthorn Sculpin | Year-round | Everywhere |
| 5_36E | PAN_05_0213 | Shorthorn Sculpin | | Everywhere. Mainly in shallow water |
| 6_33E | PAN_06_0213 | Shorthorn Sculpin | | Everywhere. Found in shallow waters |
| 7_30E | PAN_07_0213 | Shorthorn Sculpin | | Everywhere. Found in shallow water |
| 8_20E | PAN_08_0213 | Shorthorn Sculpin | | Everywhere |

**Figure 18.** Probability of Occurrence for Truncate Softshell Clam

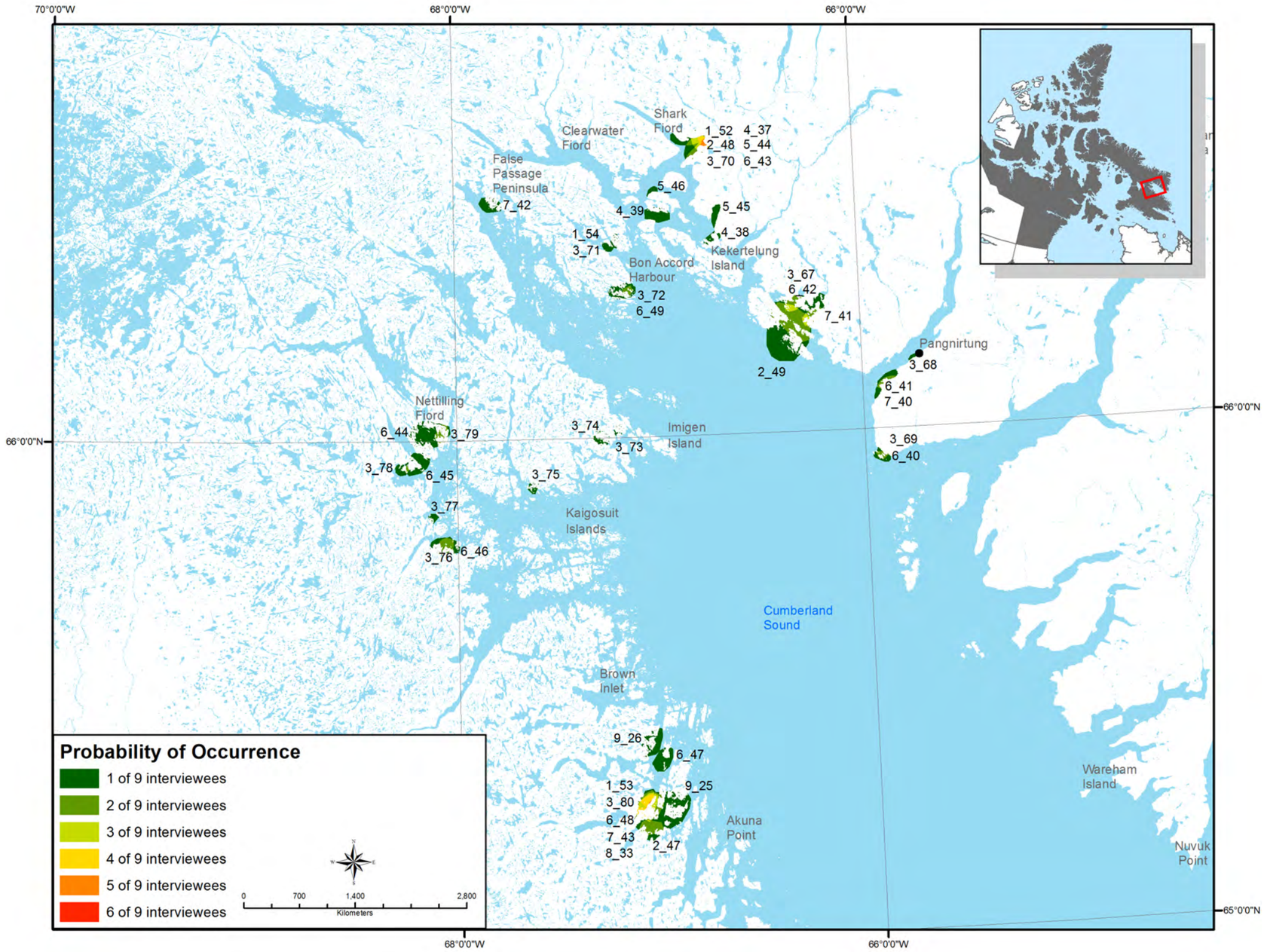


**Table 17.** Probability of Occurrence for Truncate Softshell Clam

| MAP CODE | INTERVIEW CODE | MONTHS | COMMENTS |
|---|---|---|---|
| 1_52 | PAN_01_0213 | Jul to Sep | |
| 1_53 | PAN_01_0213 | Jul to Sep | |
| 1_54 | PAN_01_0213 | Jul to Sep | |
| 1_55 | PAN_01_0213 | Jul to Sep | |
| 2_47 | PAN_02_0213 | | |
| 2_48 | PAN_02_0213 | | |
| 2_49 | PAN_02_0213 | | |
| 3_67 | PAN_03_0213 | Jul, Aug | |
| 3_68 | PAN_03_0213 | Jul, Aug | |
| 3_69 | PAN_03_0213 | Jul, Aug | |
| 3_70 | PAN_03_0213 | Jul, Aug | |
| 3_71 | PAN_03_0213 | Jul, Aug | |
| 3_72 | PAN_03_0213 | Jul, Aug | |
| 3_73 | PAN_03_0213 | Jul, Aug | |
| 3_74 | PAN_03_0213 | Jul, Aug | |
| 3_75 | PAN_03_0213 | Jul, Aug | |
| 3_76 | PAN_03_0213 | Jul, Aug | |
| 3_77 | PAN_03_0213 | Jul, Aug | |
| 3_78 | PAN_03_0213 | Jul, Aug | |
| 3_79 | PAN_03_0213 | Jul, Aug | |
| 3_80 | PAN_03_0213 | Jul, Aug | |
| 4_37 | PAN_04_0213 | | Larger clams here |
| 4_38 | PAN_04_0213 | | Larger clams here |
| 4_39 | PAN_04_0213 | | Larger clams here |
| 5_44 | PAN_05_0213 | | |
| 5_45 | PAN_05_0213 | | |
| 5_46 | PAN_05_0213 | | |
| 6_40 | PAN_06_0213 | | |
| 6_41 | PAN_06_0213 | | |
| 6_42 | PAN_06_0213 | | |
| 6_43 | PAN_06_0213 | | |
| 6_44 | PAN_06_0213 | | |
| 6_45 | PAN_06_0213 | | |
| 6_46 | PAN_06_0213 | | |
| 6_47 | PAN_06_0213 | | |
| 6_48 | PAN_06_0213 | | |
| 6_49 | PAN_06_0213 | | |
| 7_40 | PAN_07_0213 | | |
| 7_41 | PAN_07_0213 | | |
| 7_42 | PAN_07_0213 | | |
| 7_43 | PAN_07_0213 | | |
| 8_33 | PAN_08_0213 | | |
| 9_25 | PAN_09_0213 | | |
| 9_26 | PAN_09_0213 | | |
| 2_46E | PAN_02_0213 | Year-round | Everywhere |
| 4_40E | PAN_04_0213 | | Everywhere |
| 5_47E | PAN_05_0213 | | Everywhere |
| 8_32E | PAN_08_0213 | | Everywhere |

**Figure 19.** Probability of Occurrence for Whelk

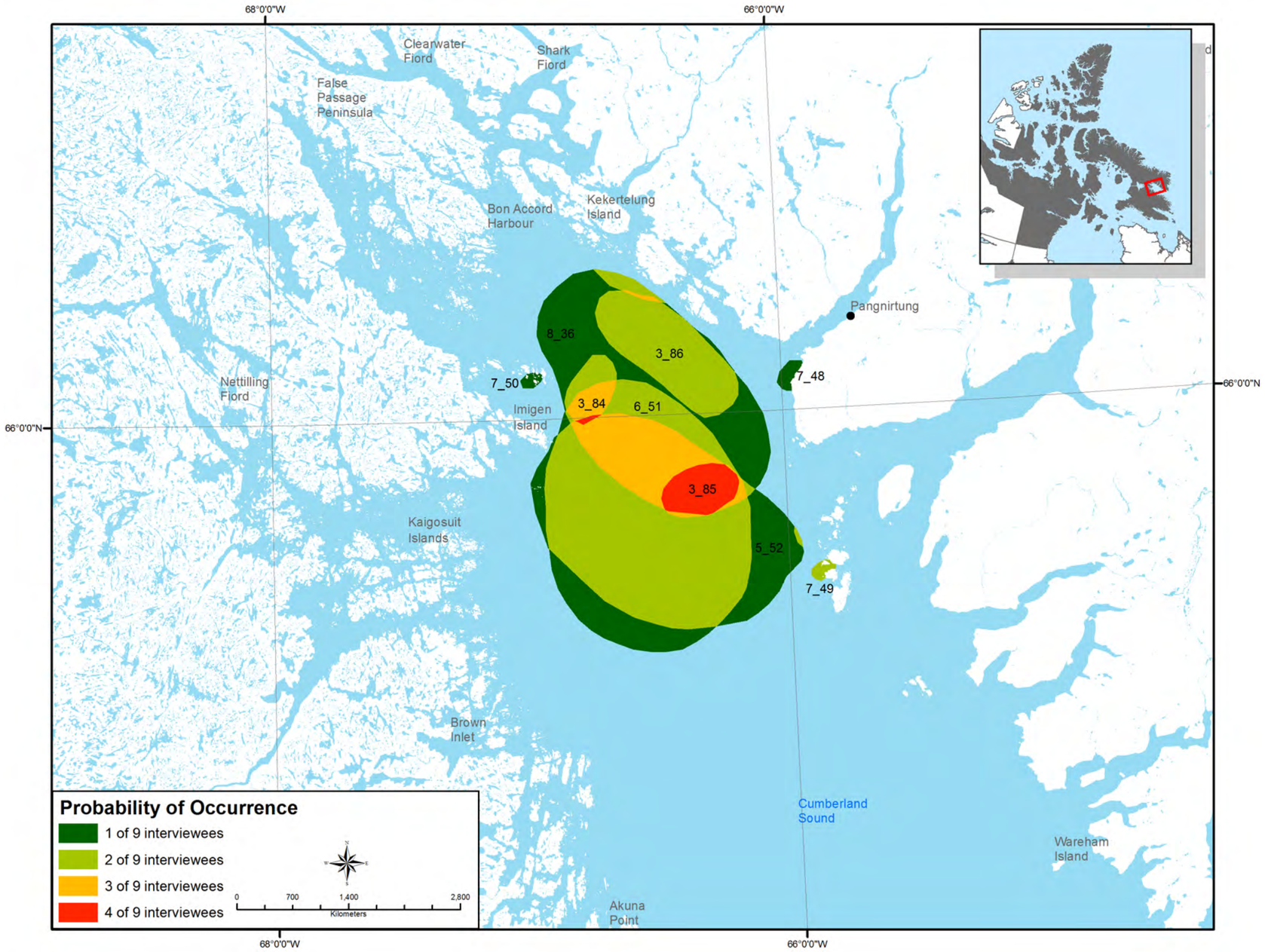


**Table 18.** Probability of Occurrence for Whelk

| MAP CODE | INTERVIEW CODE | MONTHS | COMMENTS |
|---|---|---|---|
| 3_84 | PAN_03_0213 | Jan to May | |
| 3_85 | PAN_03_0213 | Jan to May | |
| 3_86 | PAN_03_0213 | Jan to May | |
| 5_52 | PAN_05_0213 | Jan to Apr | |
| 6_51 | PAN_06_0213 | Jan to Apr | Caught on turbot lines during winter |
| 7_48 | PAN_07_0213 | | |
| 7_49 | PAN_07_0213 | | |
| 7_50 | PAN_07_0213 | | |
| 7_51 | PAN_07_0213 | | Can be found at low tides |
| 8_36 | PAN_08_0213 | | Can be caught on turbot lines or found at low tides |
| 9_31 | PAN_09_0213 | | Shallow or deep water |
| 4_43E | PAN_04_0213 | | Everywhere. Not too common, but can be found at low tide |
| 5_51E | PAN_05_0213 | | Everywhere. Can be found at very low tides or caught on longlines, Not very common |
| 8_37E | PAN_08_0213 | | Everywhere. Sporadically at low tide |

**Figure 20.** Probability of Occurrence for Icelandic Scallop

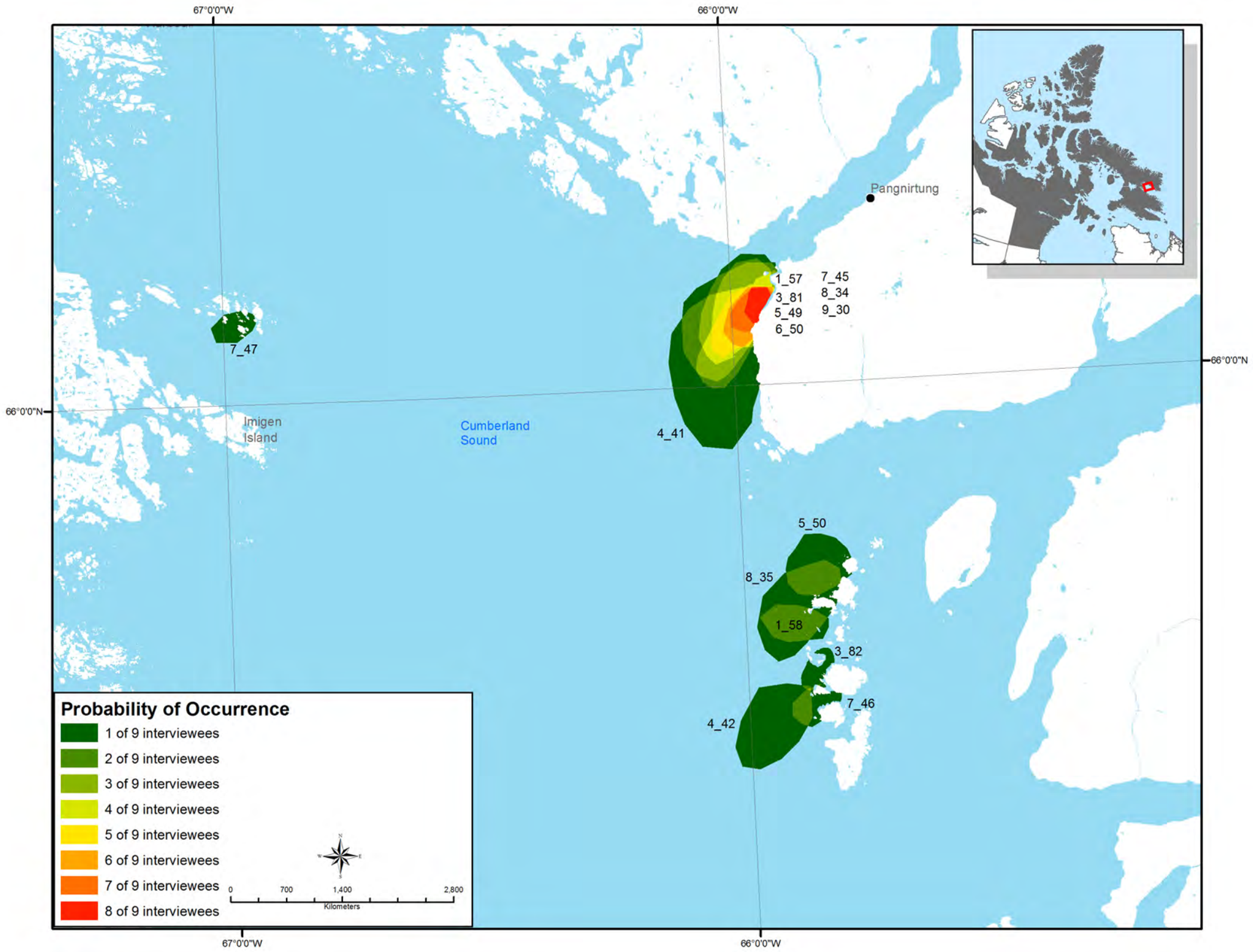


**Table 19.** Probability of Occurrence for Icelandic Scallop

| MAP CODE | INTERVIEW CODE | MONTHS | COMMENTS |
|---|---|---|---|
| 1_57 | PAN_01_0213 | Jul, Aug | |
| 1_58 | PAN_01_0213 | Jul, Aug | Larger scallops |
| 4_41 | PAN_04_0213 | | |
| 4_42 | PAN_04_0213 | | |
| 5_49 | PAN_05_0213 | | |
| 5_50 | PAN_05_0213 | | |
| 6_50 | PAN_06_0213 | | |
| 7_45 | PAN_07_0213 | | Found in shallow areas with lots of current |
| 7_46 | PAN_07_0213 | | |
| 7_47 | PAN_07_0213 | | |
| 8_34 | PAN_08_0213 | | People are starting to fish for these more now |
| 8_35 | PAN_08_0213 | | |
| 9_30 | PAN_09_0213 | | |

**Figure 21.** Areas of Occurrence for Sea Anemone, Sea Urchin and Blue Mussel

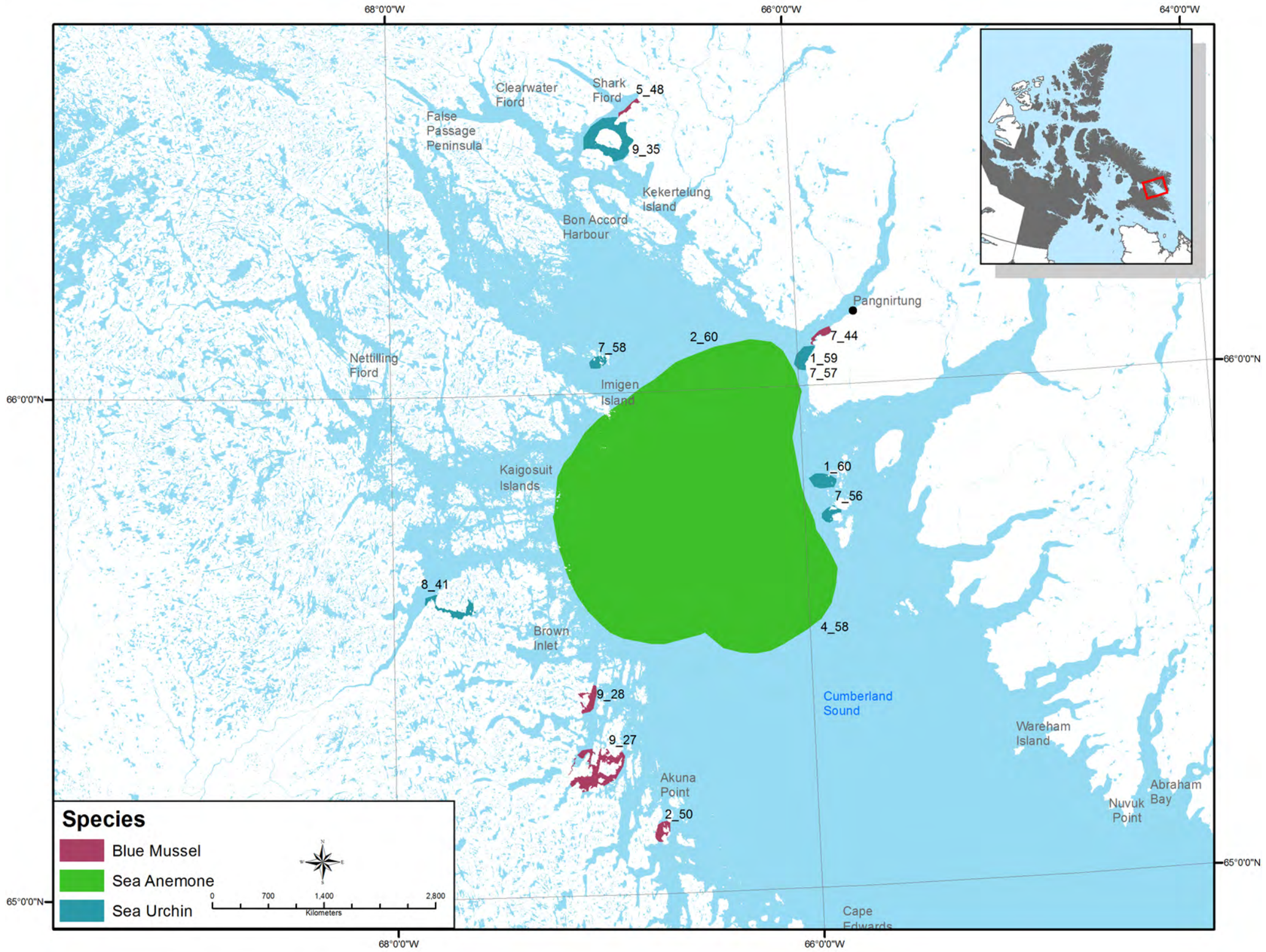


**Table 20.** Areas of Occurrence for Sea Anemone, Sea Urchin and Blue Mussel

| MAP CODE | INTERVIEW CODE | SPECIES | MONTHS | COMMENTS |
|---|---|---|---|---|
| 2_60 | PAN_02_0213 | Sea Anemone | | Rare. Found at low tide or on turbot lines |
| 4_58 | PAN_04_0213 | Sea Anemone | Jan to Apr | |
| 1_59 | PAN_01_0213 | Sea Urchin | Jul, Aug | |
| 1_60 | PAN_01_0213 | Sea Urchin | Jul, Aug | |
| 7_55 | PAN_07_0213 | Sea Urchin | | Caught in scallop drag |
| 7_56 | PAN_07_0213 | Sea Urchin | | |
| 7_57 | PAN_07_0213 | Sea Urchin | | |
| 7_58 | PAN_07_0213 | Sea Urchin | | |
| 8_41 | PAN_08_0213 | Sea Urchin | | |
| 9_35 | PAN_09_0213 | Sea Urchin | | |
| 9_36 | PAN_09_0213 | Sea Urchin | | |
| 1_56 | PAN_01_0213 | Blue Mussel | | |
| 2_50 | PAN_02_0213 | Blue Mussel | Jul to Sep | |
| 5_48 | PAN_05_0213 | Blue Mussel | | Not very common, seen at very low tides |
| 7_44 | PAN_07_0213 | Blue Mussel | | Not common |
| 9_27 | PAN_09_0213 | Blue Mussel | | Not abundant |
| 9_28 | PAN_09_0213 | Blue Mussel | | Not abundant |

**Figure 22.** Probability of Occurrence for Basket Star

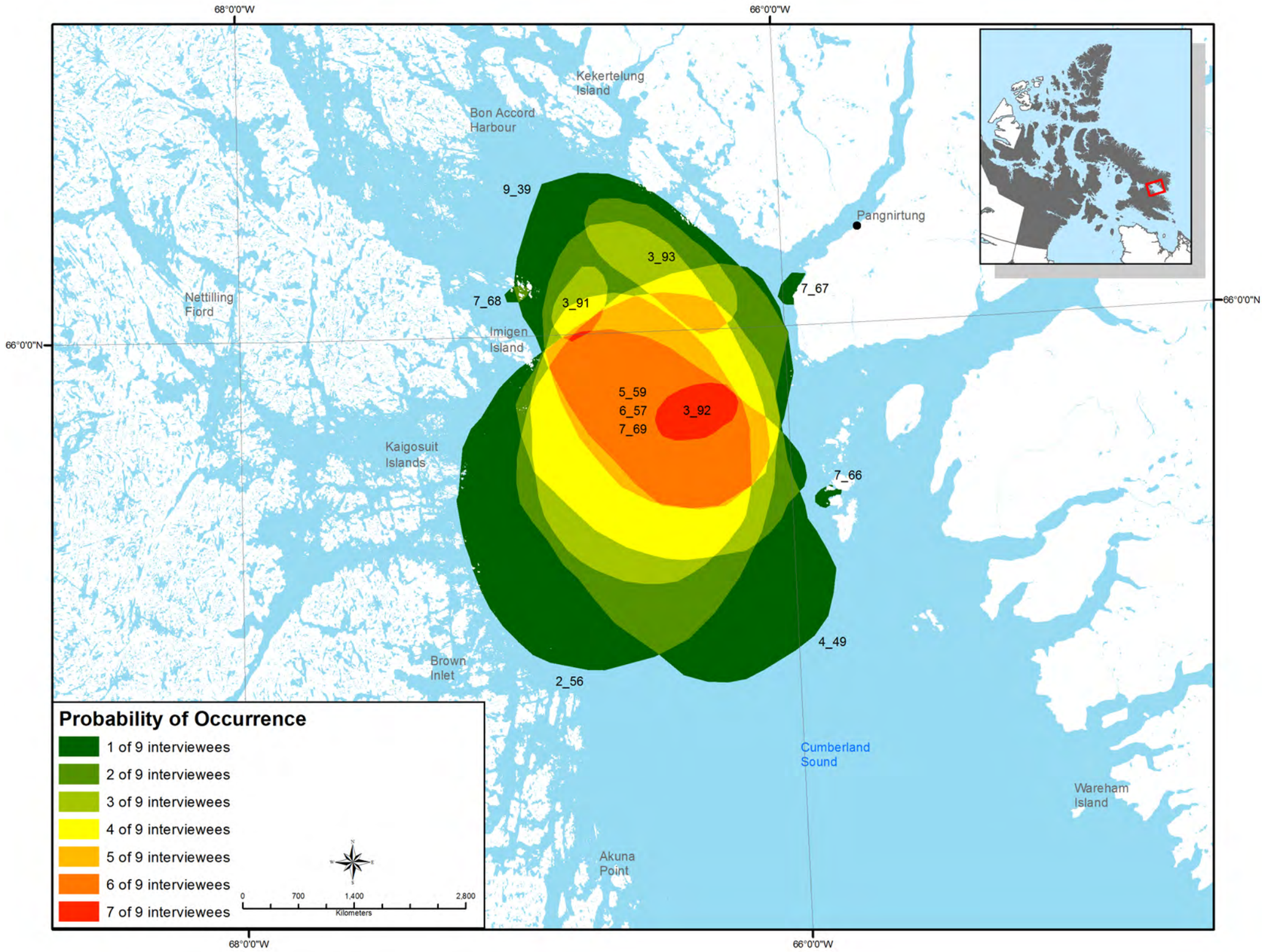


**Table 21.** Probability of Occurrence for Basket Star

| MAP CODE | INTERVIEW CODE | MONTHS | COMMENTS |
|---|---|---|---|
| 2_56 | PAN_02_0213 | Jan to Apr | |
| 3_91 | PAN_03_0213 | | Caught on turbot lines |
| 3_92 | PAN_03_0213 | | |
| 3_93 | PAN_03_0213 | | |
| 4_49 | PAN_04_0213 | Jan to Apr | |
| 5_59 | PAN_05_0213 | Jan to Apr | |
| 6_57 | PAN_06_0213 | Jan to Apr | |
| 7_66 | PAN_07_0213 | Jun to Aug | Caught in scallop drag and on turbot lines |
| 7_67 | PAN_07_0213 | Jun to Aug | |
| 7_68 | PAN_07_0213 | Jun to Aug | |
| 7_69 | PAN_07_0213 | Jan to Apr | |
| 9_39 | PAN_09_0213 | Jan to Apr | Caught on turbot lines |

**Figure 23.** Areas of Occurrence for Brittle Star, Mud Star, and Polar Sea Star

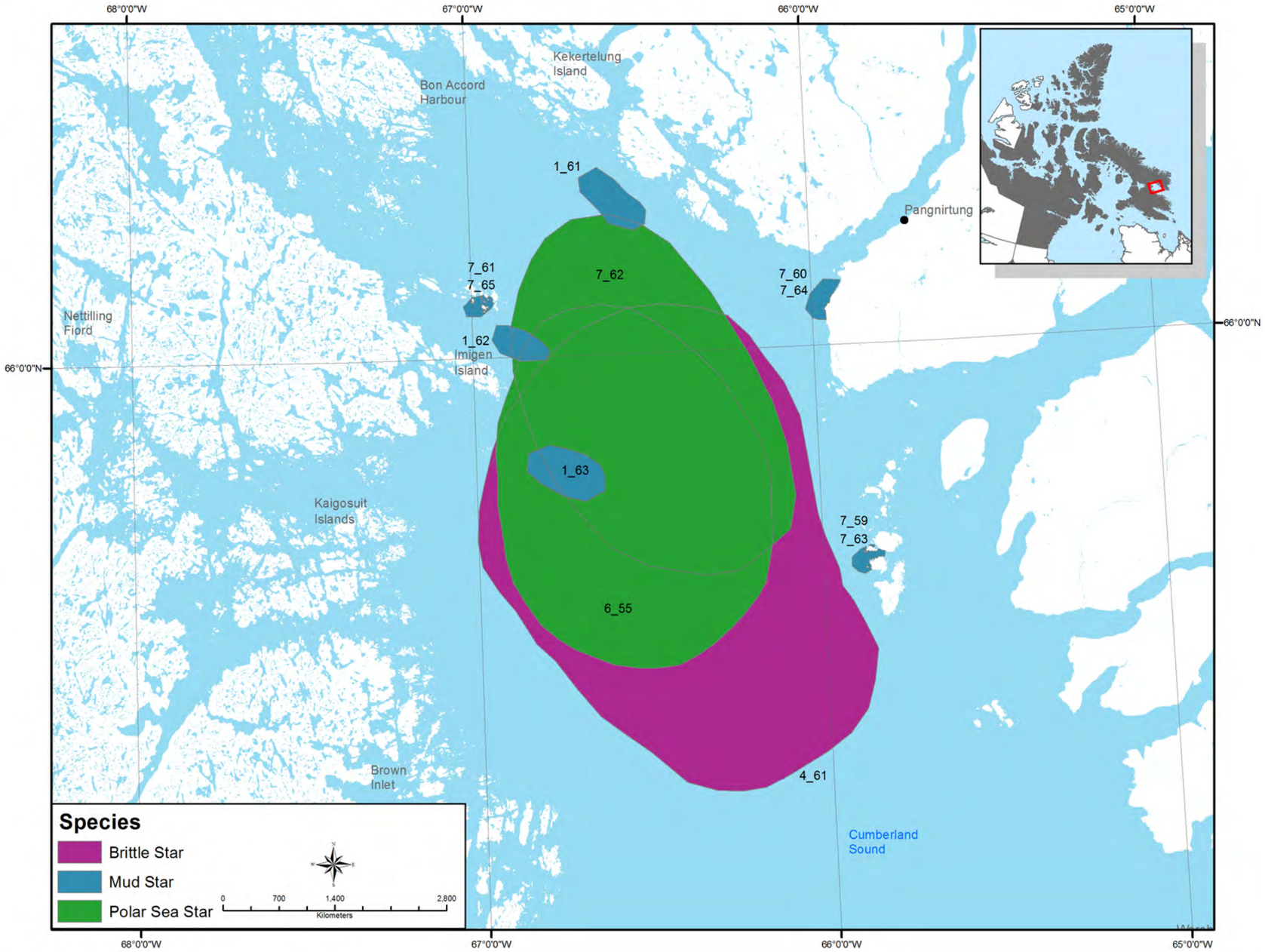


**Table 22.** Areas of Occurrence for Brittle Star, Mud Star, and Polar Sea Star

| MAP CODE | INTERVIEW CODE | SPECIES | MONTHS | COMMENTS |
|---|---|---|---|---|
| 4_61 | PAN_04_0213 | Brittle Star | Jan to Apr | Seen in deep water |
| 1_61 | PAN_01_0213 | Mud Star | Jan to Apr | Grab onto turbot bait |
| 1_62 | PAN_01_0213 | Mud Star | Jan to Apr | Grab onto turbot bait |
| 1_63 | PAN_01_0213 | Mud Star | Jan to Apr | Grab onto turbot bait |
| 7_63 | PAN_07_0213 | Mud Star | Jul, Aug | Caught in scallop drag |
| 7_64 | PAN_07_0213 | Mud Star | Jul, Aug | |
| 7_65 | PAN_07_0213 | Mud Star | Jul, Aug | |
| 6_55 | PAN_06_0213 | Polar Sea Star | Jan to Apr | Caught on turbot longlines |
| 7_59 | PAN_07_0213 | Polar Sea Star | Jul, Aug | Caught in scallop drag and on turbot lines |
| 7_60 | PAN_07_0213 | Polar Sea Star | Jul, Aug | |
| 7_61 | PAN_07_0213 | Polar Sea Star | Jul, Aug | |
| 7_62 | PAN_07_0213 | Polar Sea Star | Jan to Apr | |
| 2_55E | PAN_02_0213 | Mud Star | | Everywhere |
| 3_90E | PAN_03_0213 | Mud Star | | Everywhere. Rare, Caught on turbot lines |
| 4_48E | PAN_04_0213 | Mud Star | | Everywhere |
| 5_58E | PAN_05_0213 | Mud Star | | Everywhere. Not abundant |
| 6_56E | PAN_06_0213 | Mud Star | | Everywhere. Found in tidal flats |
| 2_54E | PAN_02_0213 | Polar Sea Star | | Everywhere |
| 3_89E | PAN_03_0213 | Polar Sea Star | | Everywhere. Caught on turbot lines |
| 5_57E | PAN_05_0213 | Polar Sea Star | | Everywhere |
| 8_42E | PAN_08_0213 | Polar Sea Star | | Everywhere. Can be found at very low tides or caught on hooks |

**Figure 24.** Areas of Occurrence for Jellyfish, Northern Shrimp, Amphipod, and Crayfish

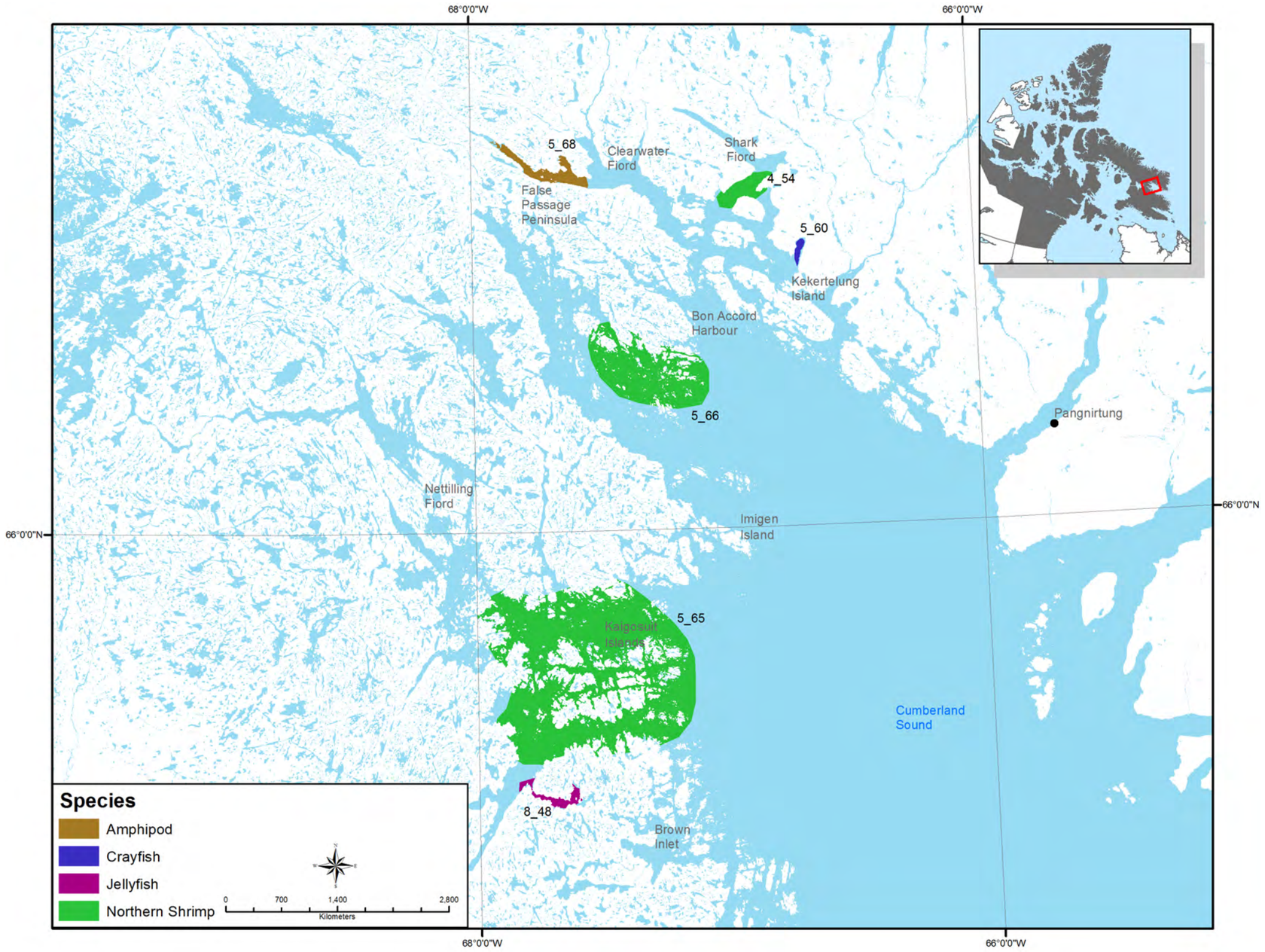


**Table 23.** Areas of Occurrence for Jellyfish, Northern Shrimp, Amphipod, and Crayfish

| MAP CODE | INTERVIEW CODE | SPECIES | MONTHS | COMMENTS |
|---|---|---|---|---|
| 8_48 | PAN_08_0213 | Jellyfish | | Very large jellyfish can be found here occasionally |
| 4_54 | PAN_04_0213 | Northern Shrimp | | Seen at very low tide |
| 5_65 | PAN_05_0213 | Northern Shrimp | | Found in stomachs of bearded seals and belugas in these areas |
| 5_66 | PAN_05_0213 | Northern Shrimp | | Found in stomachs of bearded seals and belugas in these areas |
| 5_68 | PAN_05_0213 | Amphipod | | |
| 5_60 | PAN_05_0213 | Crayfish | | |
| 3_100E | PAN_03_0213 | Ctenophore | | Everywhere |
| 4_60E | PAN_04_0213 | Ctenophore | | Everywhere |
| 5_71E | PAN_05_0213 | Ctenophore | | Everywhere |
| 6_61E | PAN_06_0213 | Ctenophore | | Everywhere |
| 8_49E | PAN_08_0213 | Ctenophore | | Everywhere |
| 2_61E | PAN_02_0213 | Jellyfish | | Everywher.e Several different kinds. Local name: nuvaqiit (like snot), Sometimes on turbot fishing lines at low tides |
| 3_99E | PAN_03_0213 | Jellyfish | | Everywhere |
| 4_59E | PAN_04_0213 | Jellyfish | | Everywhere. All kinds and sizes, used to cure rashes |
| 5_70E | PAN_05_0213 | Jellyfish | | Everywhere. Good for treatment of rashes |
| 6_60E | PAN_06_0213 | Jellyfish | | Everywhere. Good for treating skin ailments |
| 1_66E | PAN_01_0213 | Amphipod | All months of the year | Everywhere |
| 2_57E | PAN_02_0213 | Amphipod | | Everywhere. Two types: one is red and one is transparent, Lots this year, more than usual |
| 3_94E | PAN_03_0213 | Amphipod | | Everywhere |
| 4_55E | PAN_04_0213 | Amphipod | | Everywhere |
| 5_67E | PAN_05_0213 | Amphipod | | Everywhere. Two kinds: reddish (in shalloow water) and transparent (in deep water) |
| 6_58E | PAN_06_0213 | Amphipod | | Everywhere |
| 7_79E | PAN_07_0213 | Amphipod | | Everywhere |
| 8_45E | PAN_08_0213 | Amphipod | | Everywhere. Two kinds: a reddish brown kind and a transparent kind |
| 9_42E | PAN_09_0213 | Amphipod | | Everywhere |
| 8_46E | PAN_08_0213 | Mysid Shrimp | | Everywhere. Commonly eaten by seals |
| 4_53E | PAN_04_0213 | Crayfish | | Everywhere. Found in tidal areas |
| 8_44E | PAN_08_0213 | Crayfish | | Everywhere. Not common, can be found in tidal zone |

**Figure 25.** Areas of Occurrence for Sea Spider, and Toad Crab

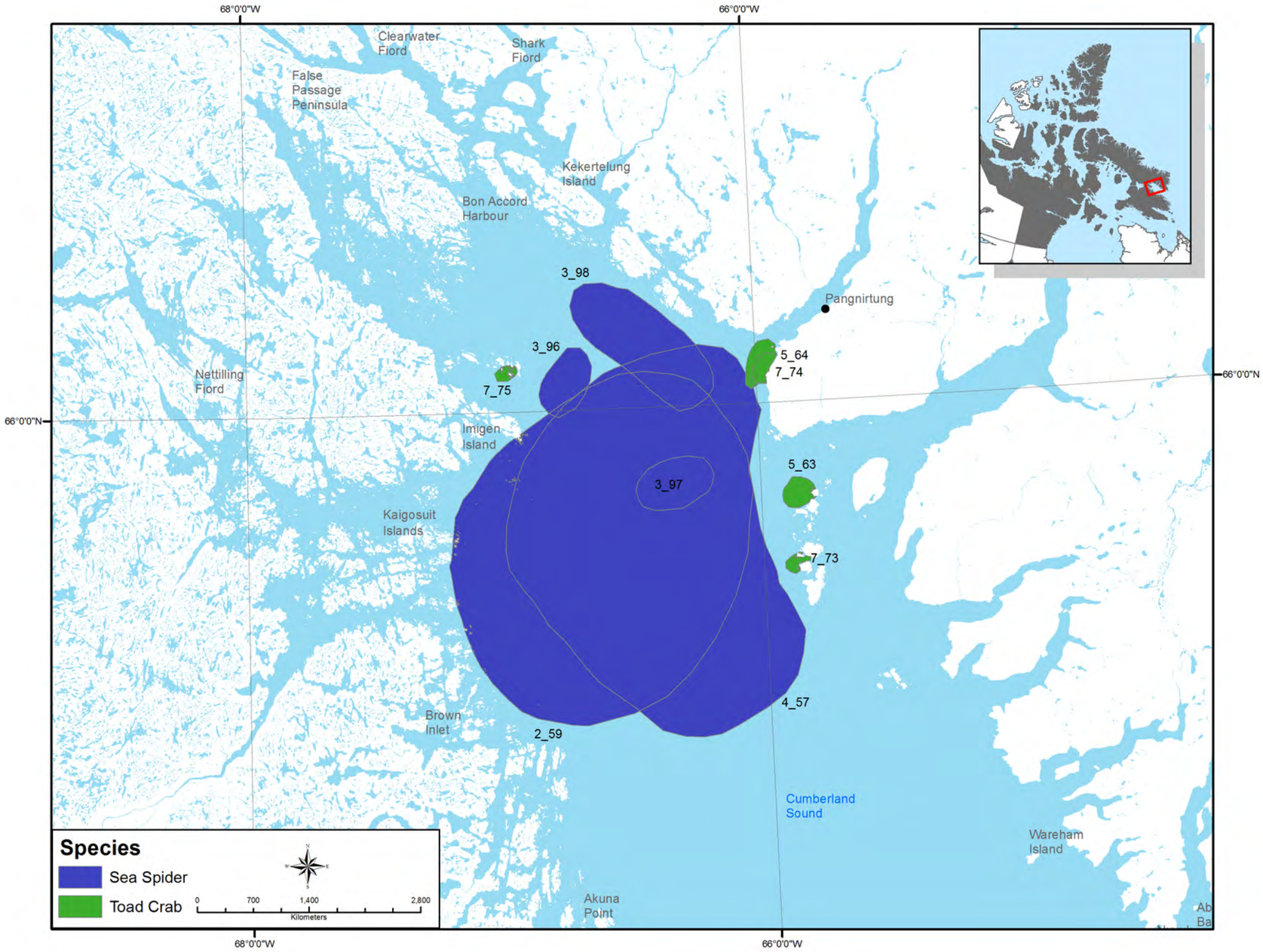


**Table 24.** Areas of Occurrence for Sea Spider, and Toad Crab

| MAP CODE | INTERVIEW CODE | SPECIES | MONTHS | COMMENTS |
|---|---|---|---|---|
| 2_59 | PAN_02_0213 | Sea Spider | Jan to Apr | Found in turbot hooks/ bait |
| 3_96 | PAN_03_0213 | Sea Spider | | Caught on turbot lines |
| 3_97 | PAN_03_0213 | Sea Spider | | |
| 3_98 | PAN_03_0213 | Sea Spider | | |
| 4_57 | PAN_04_0213 | Sea Spider | Jan to Apr | Caught on turbot lines |
| 5_63 | PAN_05_0213 | Toad Crab | | |
| 5_64 | PAN_05_0213 | Toad Crab | | |
| 7_73 | PAN_07_0213 | Toad Crab | Jun to Aug | Caught in scallop drag |
| 7_74 | PAN_07_0213 | Toad Crab | Jun to Aug | |
| 7_75 | PAN_07_0213 | Toad Crab | Jun to Aug | |

**Figure 26.** Probability of Occurrence for Polar Bear

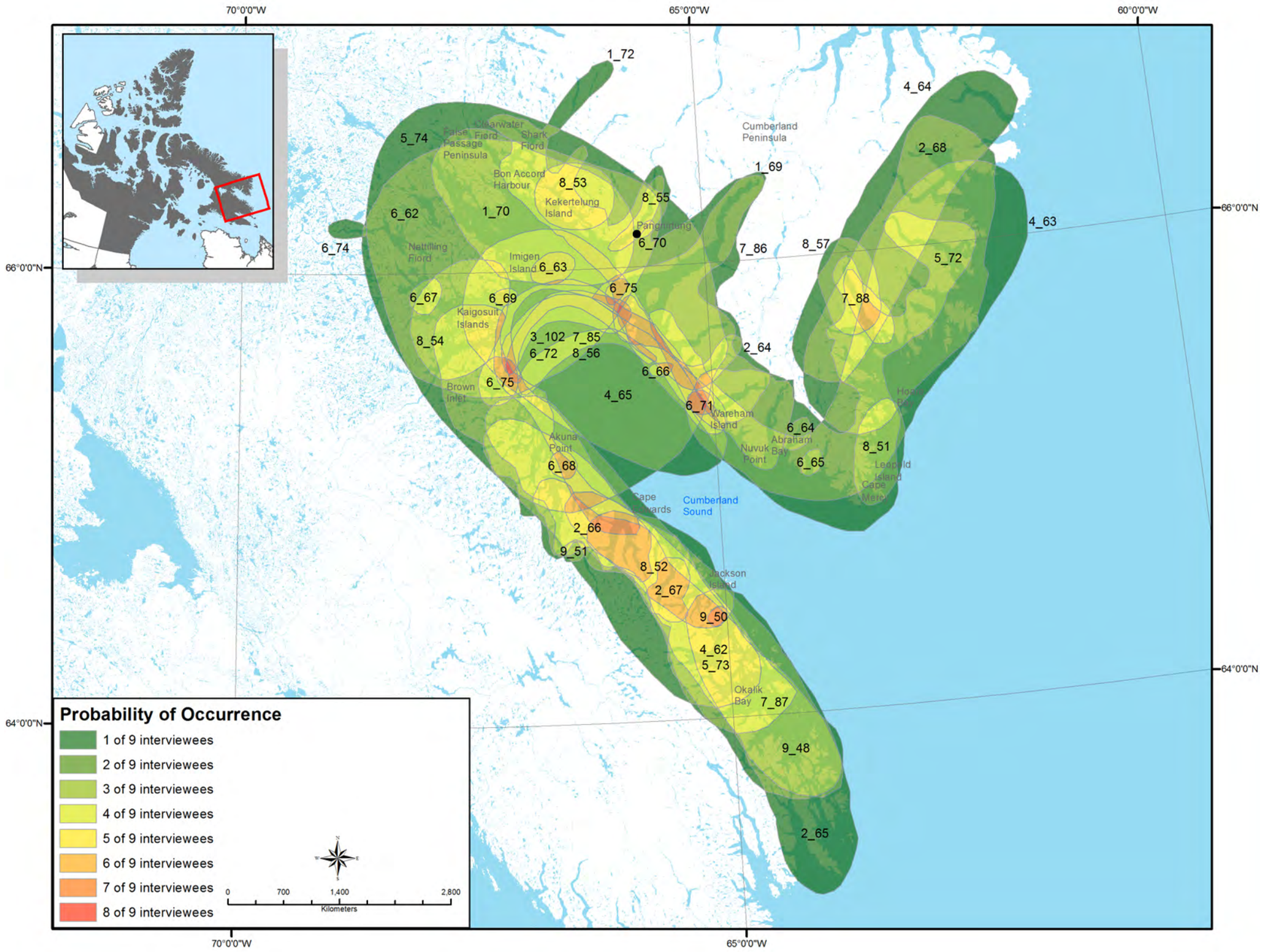


**Table 25.** Probability of Occurrence for Polar Bear

| MAP CODE | INTERVIEW CODE | MONTHS | COMMENTS |
|---|---|---|---|
| 1_69 | PAN_01_0213 | Jun to Nov | Denning areas in these fiords |
| 1_70 | PAN_01_0213 | Apr to Jun | |
| 1_72 | PAN_01_0213 | December | |
| 2_64 | PAN_02_0213 | Jul to Sep | There are far more bears here now then when he was young, bears are almost problematic |
| 2_65 | PAN_02_0213 | Jul to Sep | There are far more bears here now then when he was young, bears are almost problematic |
| 2_66 | PAN_02_0213 | Mar, Apr | Polar Bears hunt seal pups here |
| 2_67S | PAN_02_0213 | Oct to Dec | Denning area, High altitude, Snow year-round |
| 2_68H | PAN_02_0213 | | Historic, polar bear hunting area, People who lived here in the past used bears as stable food |
| 3_102 | PAN_03_0213 | Jan to May | Floe edge |
| 4_62 | PAN_04_0213 | Jun to Sep | |
| 4_63 | PAN_04_0213 | Jun to Sep | |
| 4_64S | PAN_04_0213 | Jan, Feb, and Oct to Dec | Will den in the winter and start hunting in the spring |
| 4_65 | PAN_04_0213 | Jan to Apr | |
| 5_72 | PAN_05_0213 | Jan to Apr | |
| 5_73 | PAN_05_0213 | Jan to Apr | |
| 5_74 | PAN_05_0213 | Jul to Sep | |
| 6_62 | PAN_06_0213 | Jul, Aug | More bears in this area in the summer, More than in the past |
| 6_63H | PAN_06_0213 | Jul, Aug | Bears found on ice here. He saw 42 bears around a bowhead whale carcass caught in the ice floe in the mid 1980s |
| 6_64 | PAN_06_0213 | Jul, Aug | |
| 6_65 | PAN_06_0213 | Jul, Aug | |
| 6_66 | PAN_06_0213 | Jul, Aug | |
| 6_67 | PAN_06_0213 | Jul, Aug | |
| 6_68 | PAN_06_0213 | Jul, Aug | |
| 6_69 | PAN_06_0213 | Jul, Aug | |
| 6_70 | PAN_06_0213 | Sep to Dec | |
| 6_71 | PAN_06_0213 | Jan to May | |
| 6_72 | PAN_06_0213 | Jan to May | Lots of bears in winter at floe edge |
| 7_85 | PAN_07_0213 | Jan to Apr | At floe edge |
| 7_86 | PAN_07_0213 | Apr to Jun | |
| 7_87 | PAN_07_0213 | Jul to Sep | |
| 7_88S | PAN_07_0213 | | |
| 8_51H | PAN_08_0213 | Jan to Apr | In the past, these areas were where most of the bears were hunted. Would travel there by dog team |
| 8_52H | PAN_08_0213 | Jan to Apr | In the past, these areas were where most of the bears were hunted |
| 8_53 | PAN_08_0213 | Jul to Sep | Far more bears in these areas now |
| 8_54 | PAN_08_0213 | Jul to Sep | Far more bears in these areas now |
| 8_55 | PAN_08_0213 | Jul to Sep | Bears are seen every year in town now, but never were in the past. Has become more common to see bears in the fiord. |
| 8_56 | PAN_08_0213 | Mar, Apr | Bears found here after the bear quota is filled and they are also hunting seal pups |
| 8_57S | PAN_08_0213 | | |
| 9_48H | PAN_09_0213 | Jan to Apr | |
| 9_50S | PAN_09_0213 | Jul to Sep | |
| 9_51SH | PAN_09_0213 | | |
| 2_63E | PAN_02_0213 | Year-round | Everywhere |
| 3_101E | PAN_03_0213 | Jul to Sep | Everywhere. Bears along floe edge in winter, Near ice floes in summer |
| 7_84E | PAN_07_0213 | | Everywhere. More bears are being found closer to town. Doesn't have to travel far to hunt them |
| 9_49E | PAN_09_0213 | Year-round | Everywhere |

**Figure 27.** Walrus Probability of Occurrence

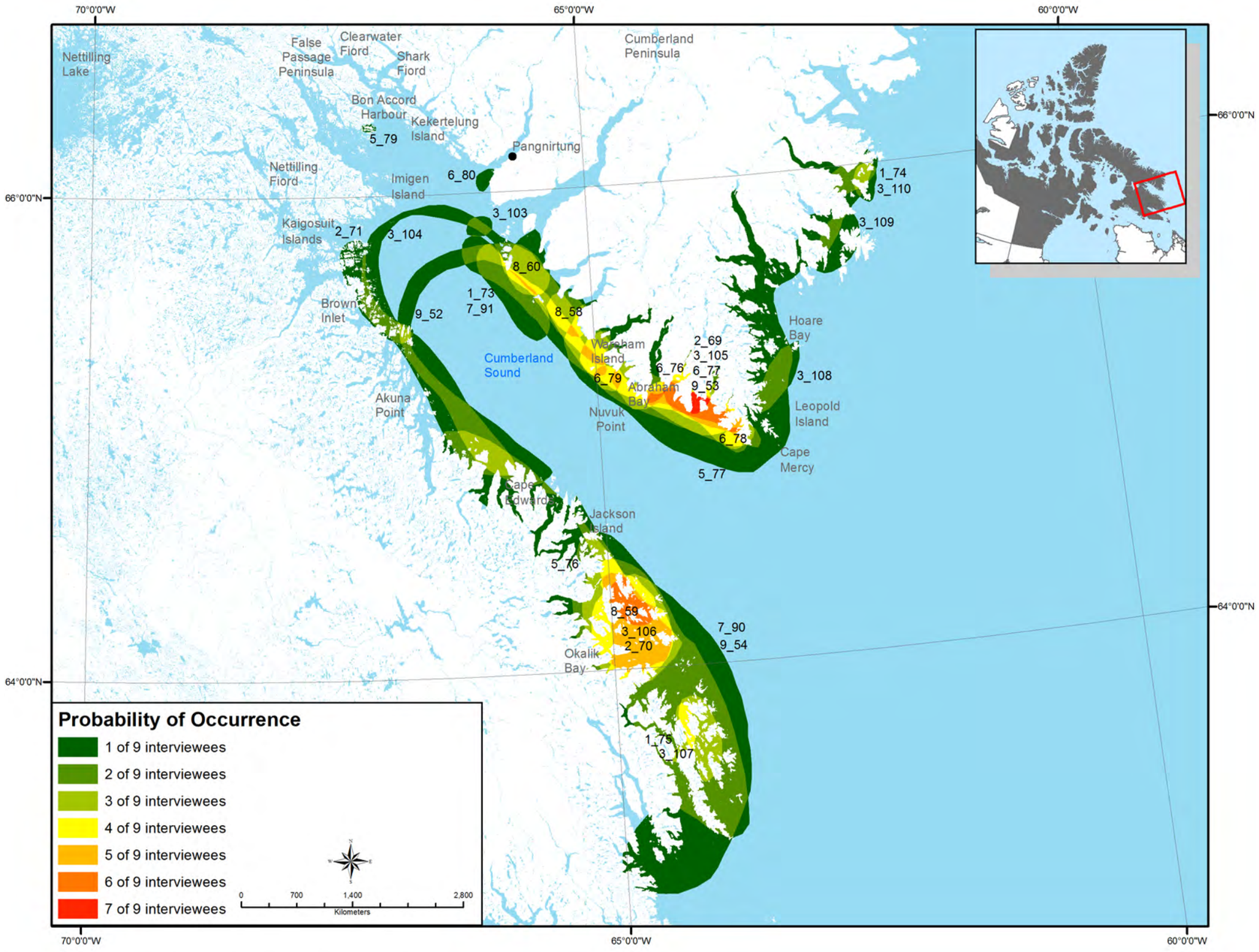


**Table 26.** Probability of Occurrence for Walrus

| MAP CODE | INTERVIEW CODE | MONTHS | COMMENTS |
|---|---|---|---|
| 1_73 | PAN_01_0213 | Jun, Jul | |
| 1_74 | PAN_01_0213 | August | |
| 1_75 | PAN_01_0213 | Aug, Sep | |
| 2_69 | PAN_02_0213 | Jul to Sep | Walrus hunting area |
| 2_70 | PAN_02_0213 | Jul to Sep | |
| 2_71H | PAN_02_0213 | Jul to Sep | Walrus have moved away from this area |
| 3_103 | PAN_03_0213 | February | |
| 3_104 | PAN_03_0213 | Jan to Apr | |
| 3_105 | PAN_03_0213 | Jul, Aug | |
| 3_106 | PAN_03_0213 | Jul, Aug | |
| 3_107 | PAN_03_0213 | Jul, Aug | |
| 3_108 | PAN_03_0213 | Jul, Aug | |
| 3_109 | PAN_03_0213 | Jul, Aug | |
| 3_110 | PAN_03_0213 | Jul, Aug | |
| 5_76 | PAN_05_0213 | Year-round | Spend time farther from people |
| 5_77 | PAN_05_0213 | | |
| 5_79H | PAN_05_0213 | | |
| 6_76 | PAN_06_0213 | Jul to Sep | |
| 6_77 | PAN_06_0213 | Jul to Sep | |
| 6_78 | PAN_06_0213 | Jul to Sep | |
| 6_79 | PAN_06_0213 | Jul to Sep | |
| 7_90 | PAN_07_0213 | Jul to Sep | |
| 7_91 | PAN_07_0213 | Jan to Apr | Seen along floe edge |
| 8_58 | PAN_08_0213 | Jul to Sep | |
| 8_59 | PAN_08_0213 | Jul to Sep | |
| 8_60 | PAN_08_0213 | Jul to Sep | Less common, but can also be seen here |
| 9_52 | PAN_09_0213 | Jan to Apr | When walrus are along the floe edge, there will be no seals around. Walrus were more common before outboard motors were widely used. |
| 9_53 | PAN_09_0213 | Jul to Sep | |
| 9_54 | PAN_09_0213 | Jul to Sep | |

**Figure 28.** Probability of Occurrence for Ringed Seal

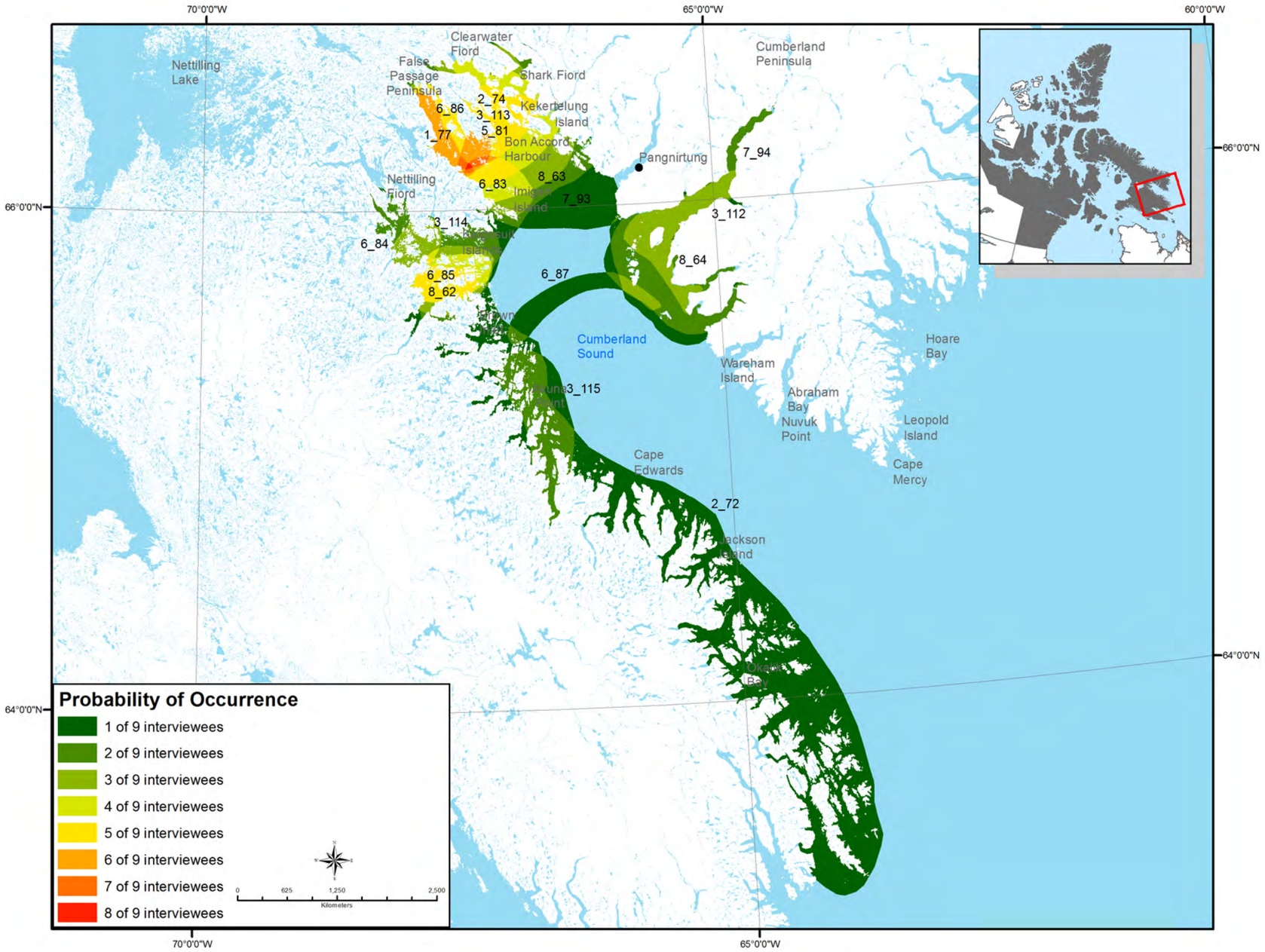


**Table 27.** Probability of Occurrence for Ringed Seal

| MAP CODE | INTERVIEW CODE | MONTHS | COMMENTS |
|---|---|---|---|
| 1_77S | PAN_01_0213 | Apr to Jun | |
| 2_72 | PAN_02_0213 | Year-round | Less seals here then before due to an increase in bears |
| 2_74 | PAN_02_0213 | Year-round | |
| 3_112S | PAN_03_0213 | Mar, Apr | |
| 3_113S | PAN_03_0213 | Mar, Apr | |
| 3_114S | PAN_03_0213 | Mar, Apr | |
| 3_115S | PAN_03_0213 | Mar, Apr | |
| 5_81 | PAN_05_0213 | Year-round | |
| 6_83 | PAN_06_0213 | Jul, Aug | |
| 6_84 | PAN_06_0213 | Jul, Aug | |
| 6_85 | PAN_06_0213 | Jul, Aug | |
| 6_86 | PAN_06_0213 | Jul, Aug | |
| 6_87 | PAN_06_0213 | Jan to May | |
| 7_93 | PAN_07_0213 | Aug to Oct | |
| 7_94S | PAN_07_0213 | Mar to Jun | |
| 8_62 | PAN_08_0213 | Year-round | |
| 8_63S | PAN_08_0213 | Mar, Apr | |
| 8_64S | PAN_08_0213 | Mar, Apr | |
| 1_76E | PAN_01_0213 | Year-round | Everywhere. Lots in fiords in late spring, dens near small islands |
| 2_73E | PAN_02_0213 | Year-round | Everywhere |
| 3_111E | PAN_03_0213 | Year-round | Everywhere |
| 4_66E | PAN_04_0213 | Year-round | Everywhere. Denning can be anywhere especially in bogs and fiords |
| 4_67ES | PAN_04_0213 | | Everywhere |
| 5_80E | PAN_05_0213 | | Everywhere |
| 6_82E | PAN_06_0213 | | Everywhere |
| 7_92E | PAN_07_0213 | Year-round | Everywhere |
| 8_61E | PAN_08_0213 | Year-round | Everywhere |
| 9_55E | PAN_09_0213 | | Everywhere |

**Figure 29.** Probability of Occurrence for Hooded/Crested Seal

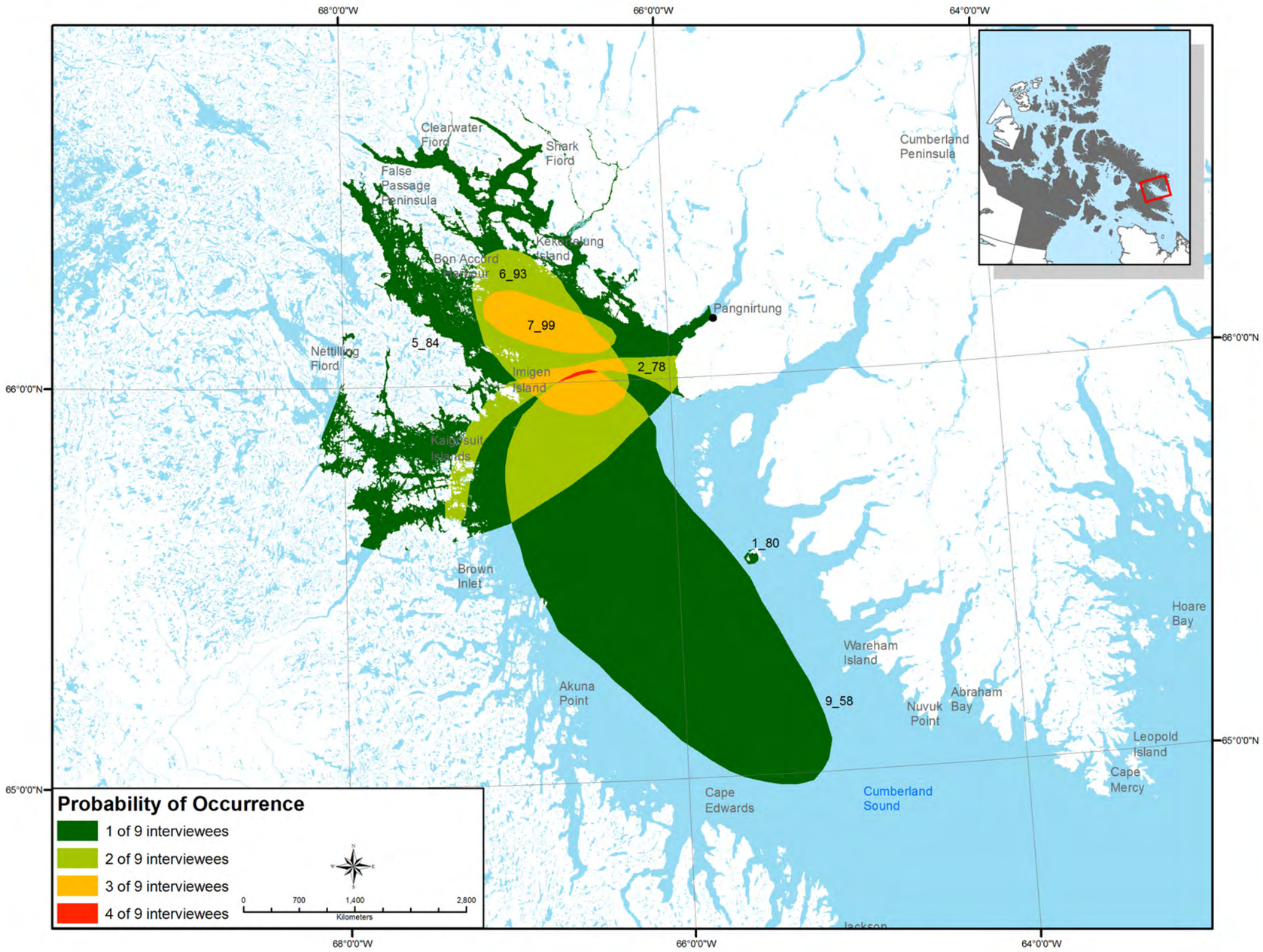


**Table 28.** Probability of Occurrence for Hooded/Crested Seal

| MAP CODE | INTERVIEW CODE | MONTHS | COMMENTS |
|---|---|---|---|
| 2_78 | PAN_02_0213 | Jan to Apr, and Nov, Dec | Seen in fall/early winter, Found along floe edge |
| 1_80H | PAN_01_0213 | Jun to Sep | Were seen 15 years ago |
| 5_84 | PAN_05_0213 | Sep to Nov | More numerous now, especially the juveniles in late fall/early winter since changes in the sea ice |
| 6_93 | PAN_06_0213 | Oct to Dec | Mainly young ones, Found often in late fall/early winter |
| 7_99 | PAN_07_0213 | Sep, Oct | Adults and young in early winter/late fall |
| 9_58 | PAN_09_0213 | | Not common, usually seen in open water or basking on pieces of broken ice. |
| 4_70E | PAN_04_0213 | Aug, Sep | Everywhere. Seen occasionally, mainly young ones in late fall and early winter |
| 8_68E | PAN_08_0213 | Aug to Oct | Everywhere. There are more Hooded Seals now than in the past. They are more often found out in open water, not up in the fiords |

**Figure 30.** Areas of Occurrence for Harbour Seal, and Harp Seal

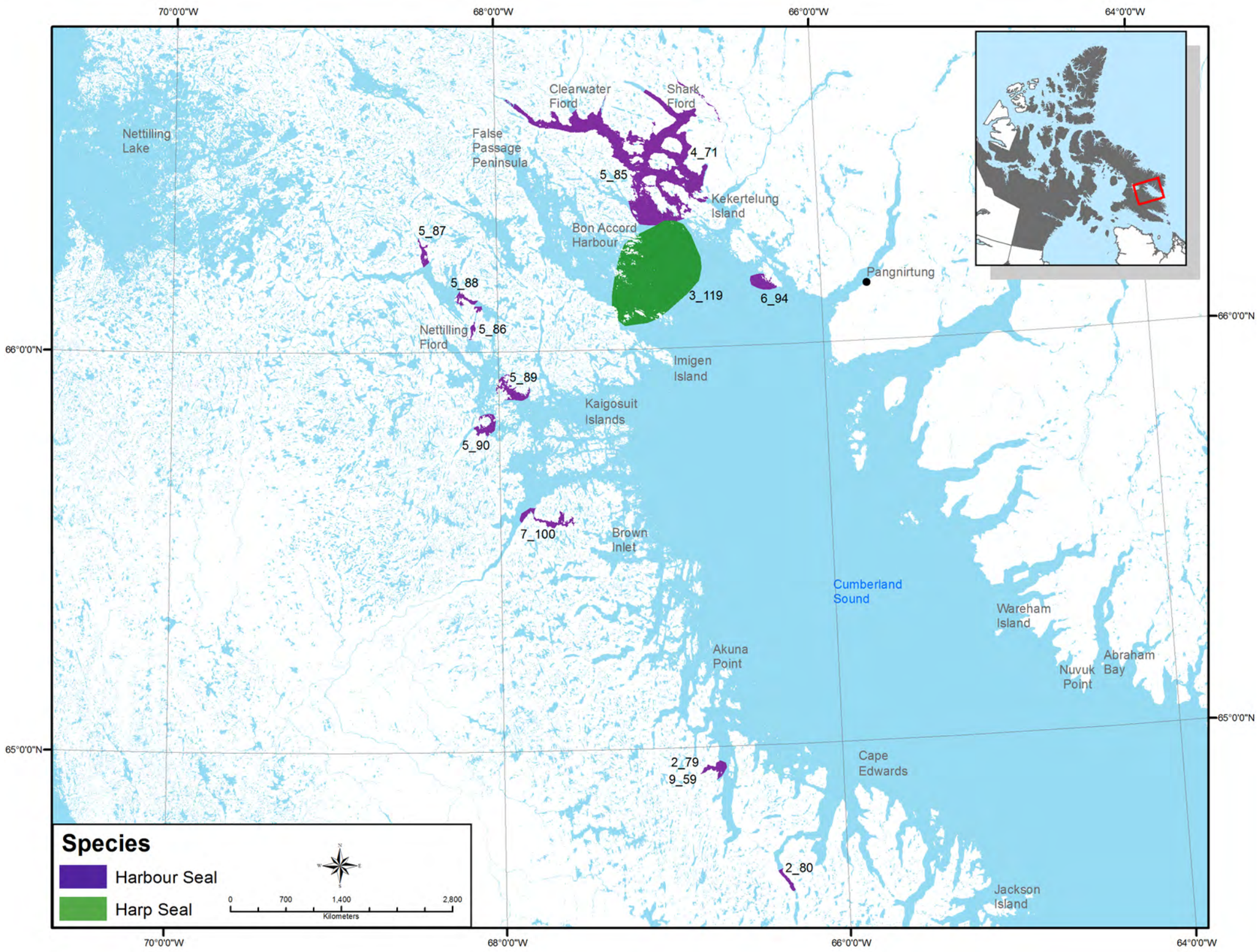


**Table 29.** Areas of Occurrence for Harbour Seal, and Harp Seal

| MAP CODE | INTERVIEW CODE | SPECIES | MONTHS | COMMENTS |
|---|---|---|---|---|
| 2_79H | PAN_02_0213 | Harbour Seal | Oct to Dec | Less common now than in the past |
| 2_80H | PAN_02_0213 | Harbour Seal | | |
| 4_71 | PAN_04_0213 | Harbour Seal | Jul to Sep | Found at river mouths in summer, but not common |
| 5_85 | PAN_05_0213 | Harbour Seal | Jul, Aug | Rare, spend all their time in inlets during the summer, Lake lagoon type areas, Breeding pairs in that area |
| 5_86 | PAN_05_0213 | Harbour Seal | Jul, Aug | Breeding pairs in that area |
| 5_87 | PAN_05_0213 | Harbour Seal | Jul, Aug | Three seals at one time in this area |
| 5_88 | PAN_05_0213 | Harbour Seal | Jul, Aug | Shot one in that area |
| 5_89 | PAN_05_0213 | Harbour Seal | | |
| 5_90H | PAN_05_0213 | Harbour Seal | | |
| 6_94 | PAN_06_0213 | Harbour Seal | | Only observed once in Cumberland Sound, Has seen them in Frobisher Bay before |
| 7_100 | PAN_07_0213 | Harbour Seal | Jul, Aug | Only saw one |
| 9_59H | PAN_09_0213 | Harbour Seal | | Not common, even less common now. |
| 3_119 | PAN_03_0213 | Harp Seal | Sep, Oct | Adults and young, Not common, Arrive in late fall |
| 1_78E | PAN_01_0213 | Harp Seal | Jun to Dec | Everywhere |
| 2_75E | PAN_02_0213 | Harp Seal | | Everywhere. There are more than there used to be (mainly in summer, rare in winter) |
| 3_116E | PAN_03_0213 | Harp Seal | Jun to Oct | Everywhere |
| 4_68E | PAN_04_0213 | Harp Seal | Jul to Sep | Everywhere |
| 5_82E | PAN_05_0213 | Harp Seal | Jun to Oct | Everywhere. More abundant now, especially during freeze up |
| 6_88E | PAN_06_0213 | Harp Seal | Jul to Oct | Everywhere |
| 7_95E | PAN_07_0213 | Harp Seal | Jul to Oct | Everywhere. More harp seals recently |
| 8_65E | PAN_08_0213 | Harp Seal | Jul to Oct | Everywhere |
| 9_56E | PAN_09_0213 | Harp Seal | | Everywhere. Seeing less on top of the ice during spring. |

**Figure 31.** Probability of Occurrence for Bearded Seal

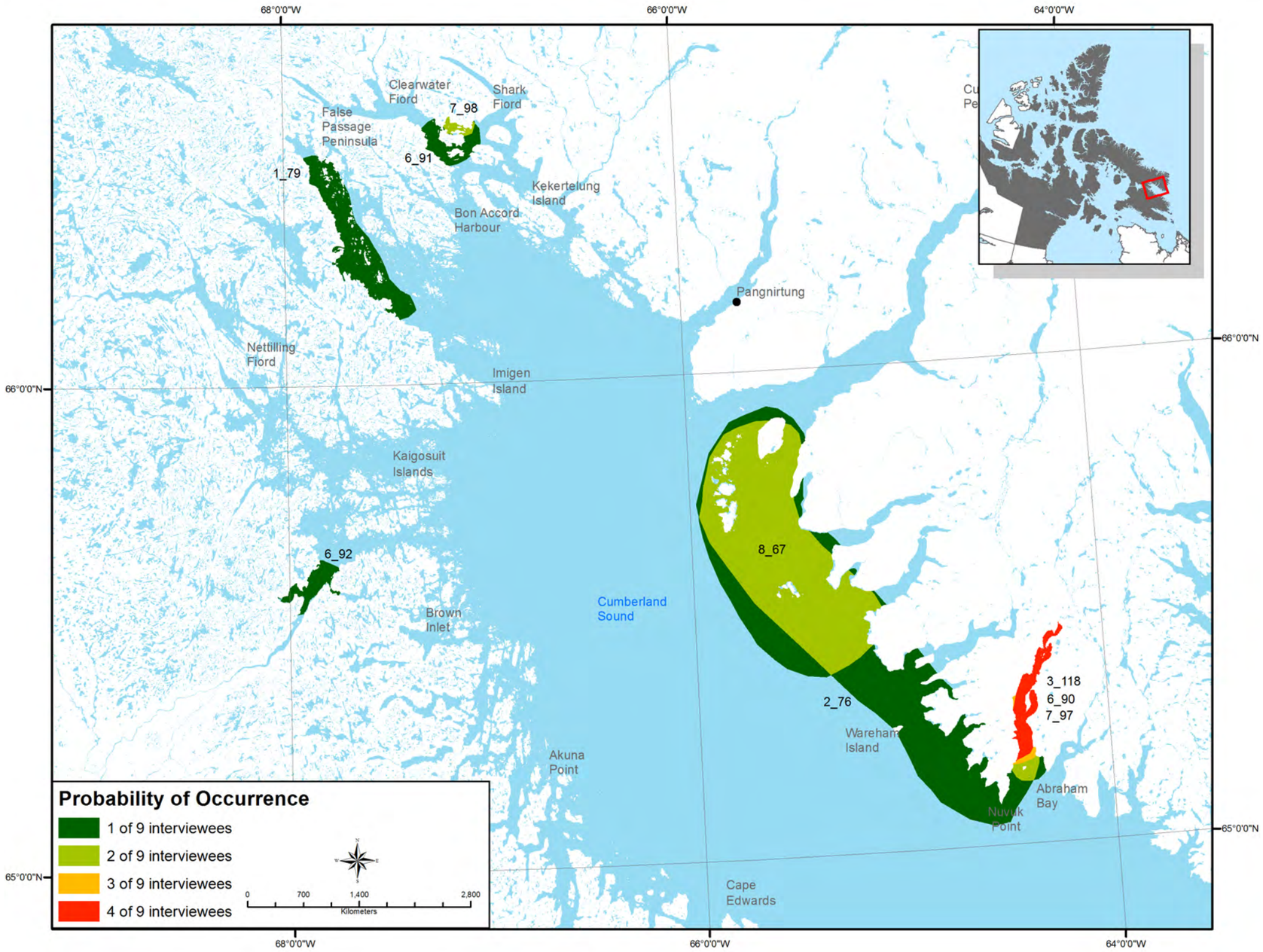


**Table 30.** Probability of Occurrence for Bearded Seal

| MAP CODE | INTERVIEW CODE | MONTHS | COMMENTS |
|---|---|---|---|
| 1_79 | PAN_01_0213 | May to Sep | Not as many as before, or as many as other seals |
| 2_76 | PAN_02_0213 | Jan to Apr | Less common |
| 3_118 | PAN_03_0213 | Jul, Aug | |
| 6_90 | PAN_06_0213 | Jul to Sep | |
| 6_91 | PAN_06_0213 | Jul to Sep | |
| 6_92 | PAN_06_0213 | Jul to Sep | |
| 7_97 | PAN_07_0213 | Jul to Sep | |
| 7_98 | PAN_07_0213 | Jul to Sep | |
| 8_67 | PAN_08_0213 | | |
| 3_117E | PAN_03_0213 | Year-round | Everywhere |
| 4_69E | PAN_04_0213 | Jul to Sep | Everywhere. Mainly seen in summer, also hunted by bears |
| 5_83E | PAN_05_0213 | | Everywhere. Less common than harp and ringed seals, but no change in numbers over time |
| 6_89E | PAN_06_0213 | Jul, Aug | Everywhere. Less common than ringed seals and harp seals |
| 7_96E | PAN_07_0213 | | Everywhere. Less common than harp or ringed seal |
| 8_66E | PAN_08_0213 | | Everywhere |
| 9_57E | PAN_09_0213 | | Everywhere. Least common seal in the area (less than ringed or harp). |

**Figure 32.** Probability of Occurrence for Beluga

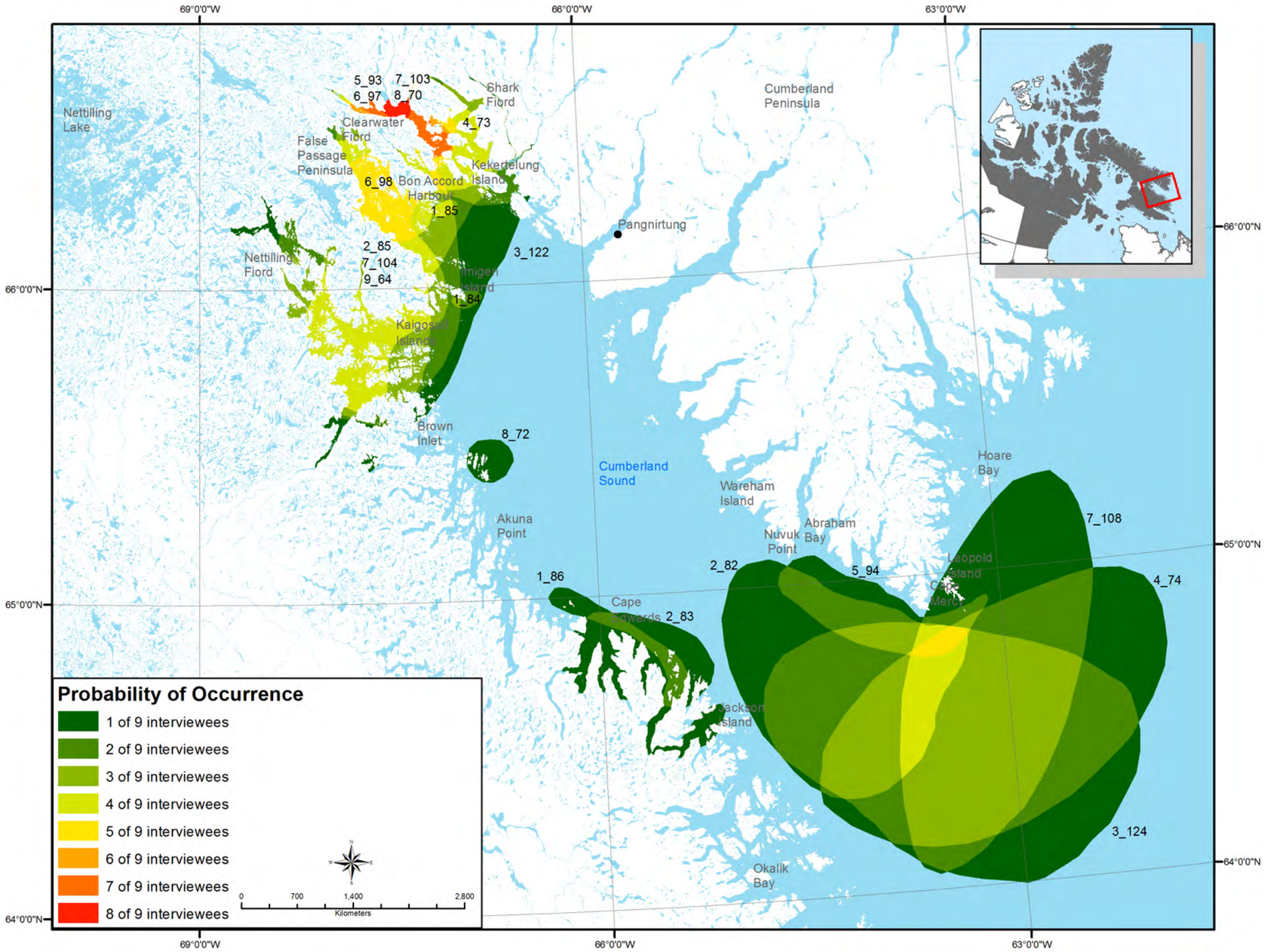


**Table 31.** Probability of Occurrence for Beluga

| MAP CODE | INTERVIEW CODE | MONTHS | COMMENTS |
|---|---|---|---|
| 1_84 | PAN_01_0213 | July | |
| 1_85 | PAN_01_0213 | July | |
| 1_86 | PAN_01_0213 | Jun, Jul | |
| 2_82 | PAN_02_0213 | Jan to Apr, and Dec | |
| 2_83 | PAN_02_0213 | Apr to Jun | |
| 2_85S | PAN_02_0213 | Jul, Aug | |
| 3_122 | PAN_03_0213 | Jul, Aug | |
| 3_124 | PAN_03_0213 | Jan to Apr, and Oct to Dec | |
| 4_73S | PAN_04_0213 | Jul, Aug | |
| 4_74 | PAN_04_0213 | Jan to Apr, and Nov, Dec | |
| 5_93 | PAN_05_0213 | Jul, Aug | |
| 5_94 | PAN_05_0213 | Jan to Apr, and Oct to Dec | |
| 6_97 | PAN_06_0213 | Jul, Aug | |
| 6_98 | PAN_06_0213 | Jul, Aug | |
| 7_103S | PAN_07_0213 | Jun to Aug | |
| 7_104 | PAN_07_0213 | Jul to Sep | |
| 7_108 | PAN_07_0213 | Jan to Apr | |
| 8_70S | PAN_08_0213 | Jun to Sep | |
| 8_72 | PAN_08_0213 | Jun to Sep | Early summer beluga hunting place |
| 9_64 | PAN_09_0213 | Jul to Sep | |
| 2_84E | PAN_02_0213 | Jul to Sep | Everywhere |
| 6_100E | PAN_06_0213 | Jul, Aug | Everywhere on the south side of Cumberland Sound in summer |

**Figure 33.** Probability of Occurrence for Narwhal

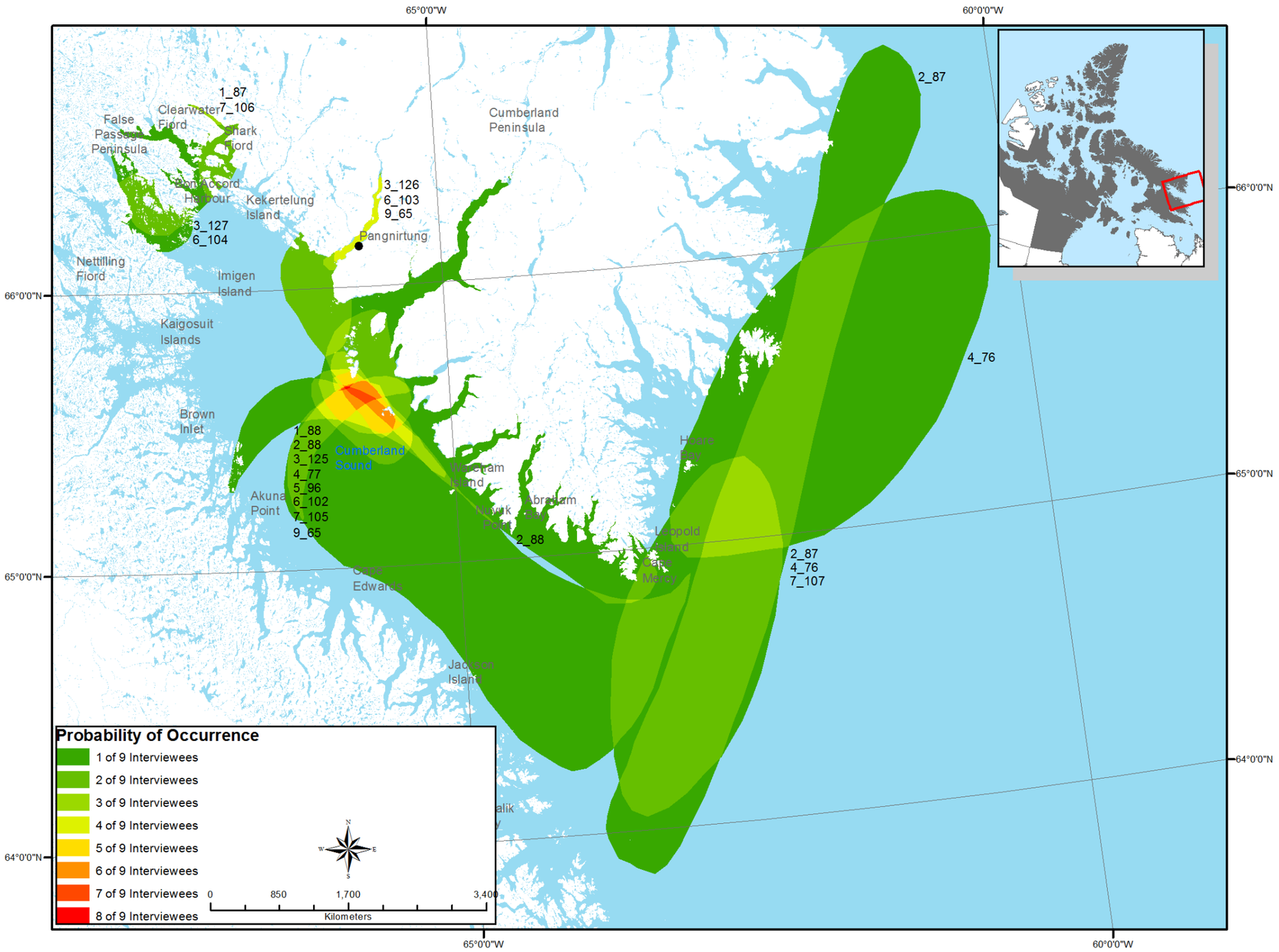


**Table 32.** Probability of Occurrence for Narwhal

| MAP CODE | INTERVIEW CODE | MONTHS | COMMENTS |
|---|---|---|---|
| 1_87 | PAN_01_0213 | Apr to Jun | |
| 1_88 | PAN_01_0213 | Apr to Jun | |
| 2_87 | PAN_02_0213 | Jan to Apr | |
| 2_88 | PAN_02_0213 | Mar to May | |
| 3_125 | PAN_03_0213 | Apr, May | |
| 3_126 | PAN_03_0213 | Sep, Oct | |
| 3_127 | PAN_03_0213 | Sep, Oct | |
| 4_77 | PAN_04_0213 | Mar to May | |
| 5_96 | PAN_05_0213 | Mar, Apr | Before they started hunting them, they used to go into the fiords |
| 6_102 | PAN_06_0213 | May to Jul | |
| 6_103 | PAN_06_0213 | Jul to Sep | |
| 6_104 | PAN_06_0213 | Jul to Sep | Not every year |
| 7_105 | PAN_07_0213 | Apr, May | |
| 7_106 | PAN_07_0213 | Sep, Oct | Sporadic in this area |
| 7_107 | PAN_07_0213 | Jan to Apr | |
| 9_65 | PAN_09_0213 | | Narwhal usually stay on the north side of Cumberland Sound. Since he lived on the south side he rarely saw them. |
| 2_89E | PAN_02_0213 | | Everywhere. Commonly found throughout Cumberland Sound, but more common in the outer portion |
| 8_73E | PAN_08_0213 | | Everywhere. Not as common as belugas. Killer whales chase them into Cumberland Sound. Mainly found in the fiords |

**Figure 34.** Probability of Occurrence for Orca

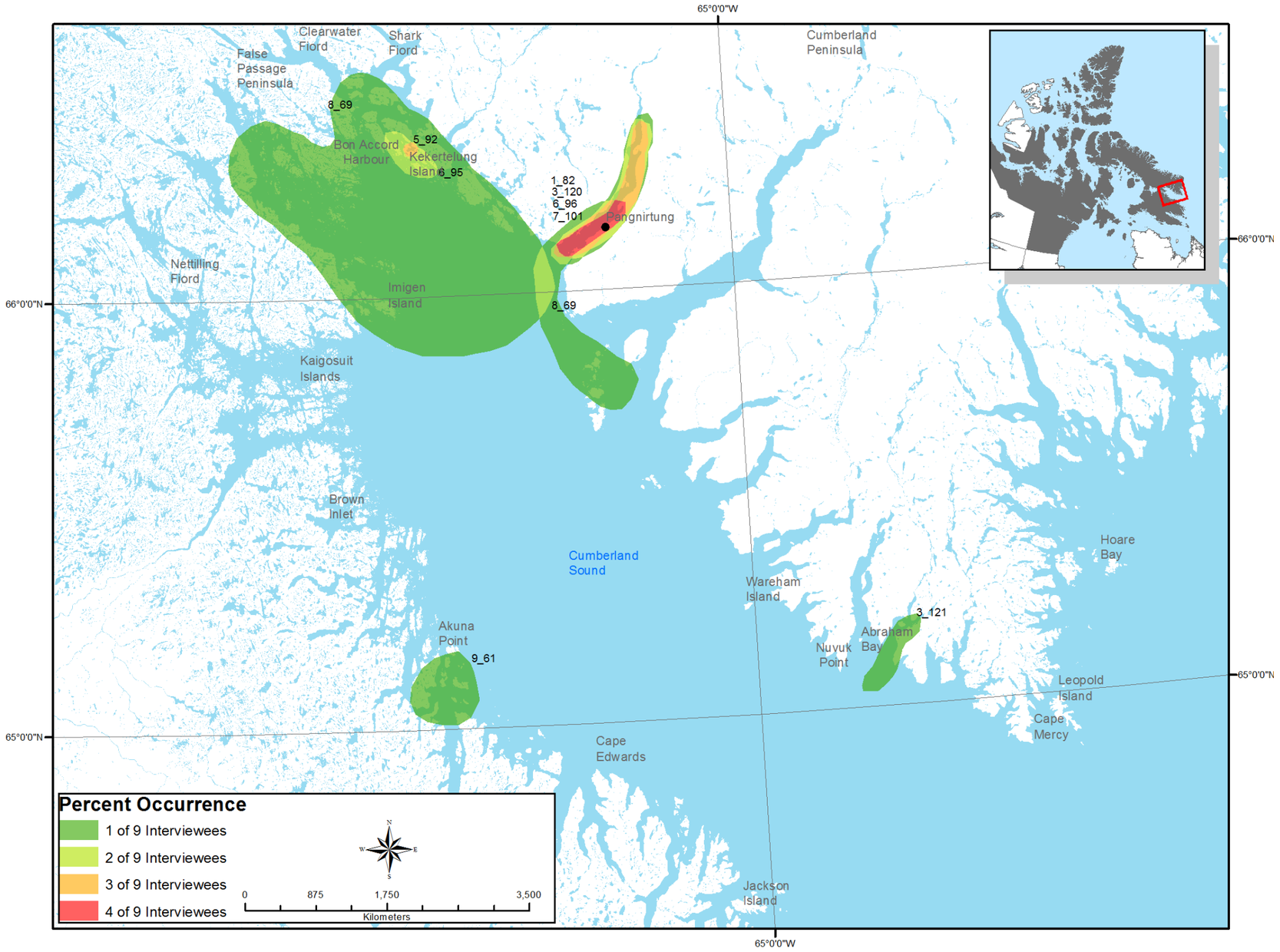


**Table 33.** Probability of Occurrence for Orca (Killer whale)

| MAP CODE | INTERVIEW CODE | MONTHS | COMMENTS |
|---|---|---|---|
| 1_82H | PAN_01_0213 | Jul to Sep | A pod came into Pang fiord around 15 years ago and have been seen sporadically since |
| 3_120 | PAN_03_0213 | Jul to Sep | |
| 3_121 | PAN_03_0213 | Jul to Sep | |
| 5_92H | PAN_05_0213 | | Killer whales were once killed here (in the 1970s by Inuit) because they were trapped |
| 6_95H | PAN_06_0213 | | Hunted killer whales here in the 1970s |
| 6_96 | PAN_06_0213 | August | Saw some in the fiord around 3 years ago |
| 7_101 | PAN_07_0213 | Jul, Aug | Sporadic |
| 8_69 | PAN_08_0213 | | Sometimes follow belugas into the fiords and inlets. This is happening more than before, but sightings are still only sporadic |
| 9_61H | PAN_09_0213 | | Had a close encounter with killer whales following his boat once. More common recently. |
| 2_81E | PAN_02_0213 | | Everywhere. Were very common when he was younger, then became less common, and now seem to be coming back |
| 4_72E | PAN_04_0213 | | Everywhere. More around now than in the past, They eat/hunt bowhead whales |
| 5_91E | PAN_05_0213 | Jul to Sep | Everywhere. Not common |
| 9_62E | PAN_09_0213 | | Everywhere |

**Figure 35.** Areas of Occurrence for Common Minke Whale, and Sperm Whale

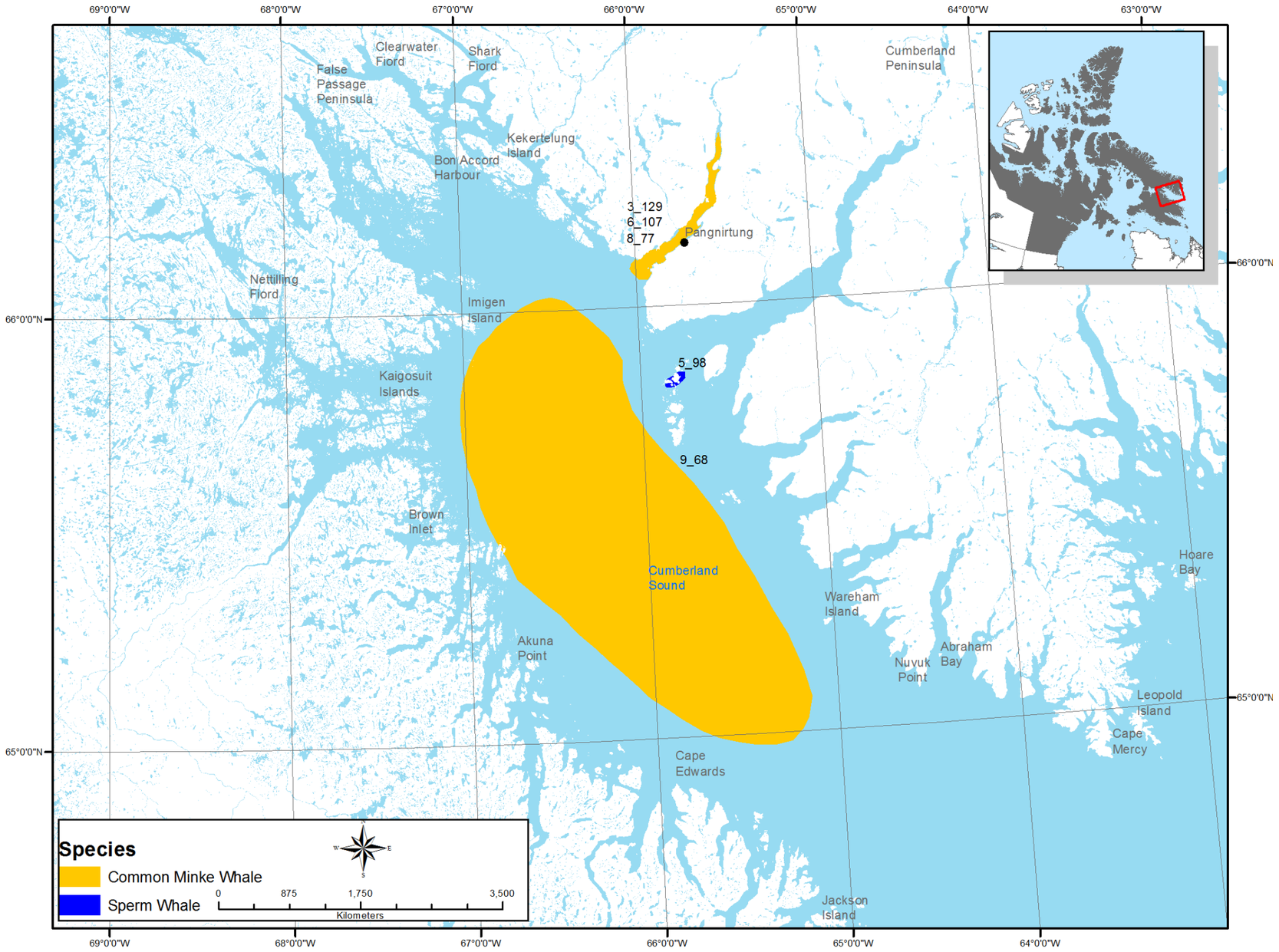


**Table 34.** Areas of Occurrence for Common Minke Whale, and Sperm Whale

| MAP CODE | INTERVIEW CODE | SPECIES | MONTHS | COMMENTS |
|---|---|---|---|---|
| 3_129 | PAN_03_0213 | Common Minke Whale | | In fiords or in CS |
| 6_107 | PAN_06_0213 | Common Minke Whale | Jul, Aug | Not common, sporadic |
| 8_77 | PAN_08_0213 | Common Minke Whale | | |
| 9_68 | PAN_09_0213 | Common Minke Whale | | Not common, found in open water or near shore. |
| 5_98H | PAN_05_0213 | Sperm Whale | | Saw a sperm whale carcass on shore as a teenager |
| 7_113E | PAN_07_0213 | Common Minke Whale | Sep, Oct | Everywhere. Sporadic, mainly seen in the fall |
| 8_76E | PAN_08_0213 | Common Minke Whale | | Everywhere. There seem to be more of these now |
| 8_78E | PAN_08_0213 | Sperm Whale | | Everywhere. Rarely seen, described as a whale with teeth |

**Figure 36.** Probability of Occurrence for Bowhead Whale

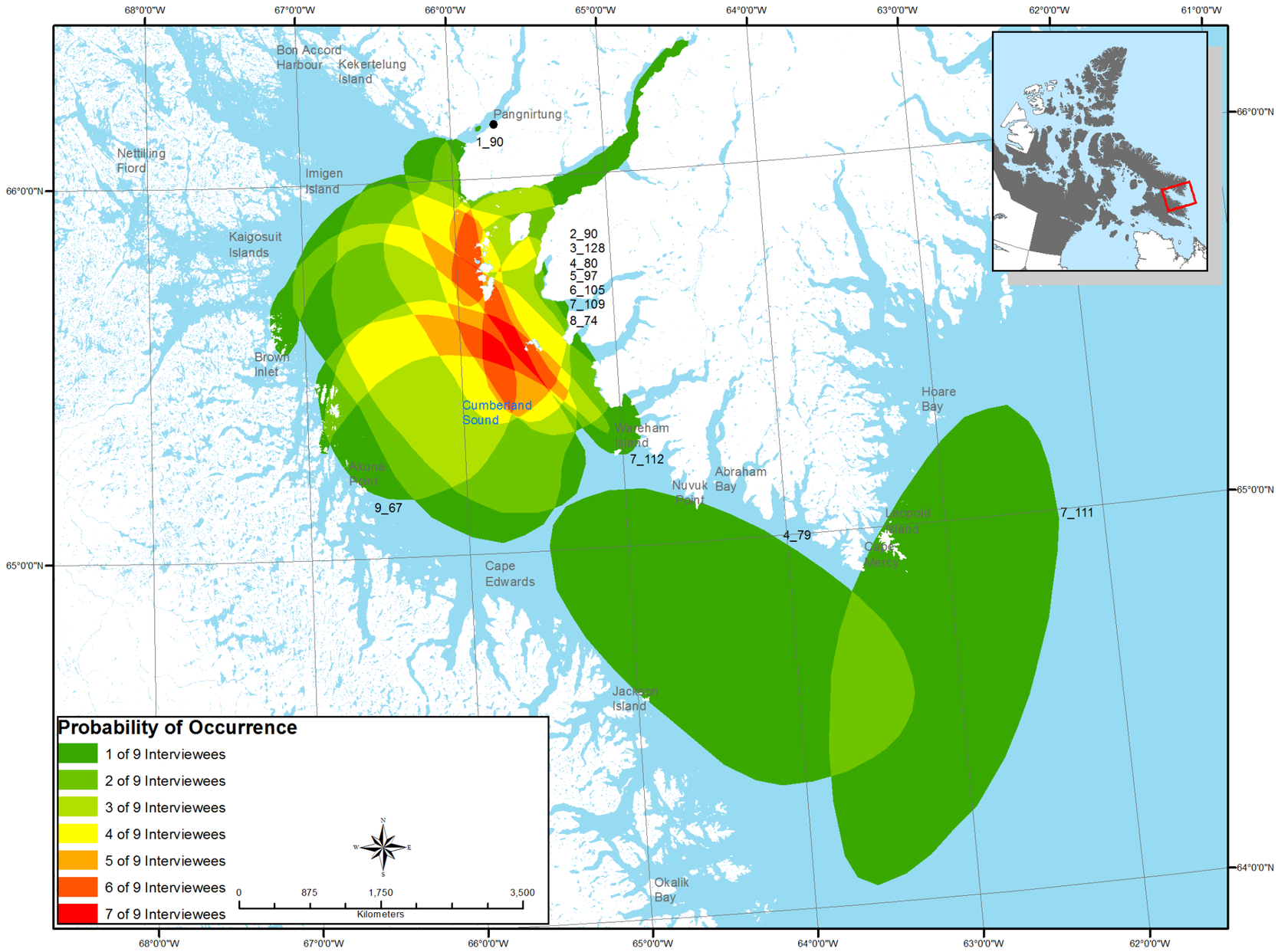


**Table 35.** Probability of Occurrence for Bowhead Whale

| MAP CODE | INTERVIEW CODE | MONTHS | COMMENTS |
|---|---|---|---|
| 1_90 | PAN_01_0213 | Jul to Sep | |
| 2_90 | PAN_02_0213 | Year-round | Lots found in deep water |
| 3_128 | PAN_03_0213 | Jul to Sep | |
| 4_79 | PAN_04_0213 | Jan to Apr | |
| 4_80 | PAN_04_0213 | Jul to Sep | |
| 5_97 | PAN_05_0213 | Jan to Apr | More abundant now along the floe edge than when he was younger |
| 6_105 | PAN_06_0213 | July, August | |
| 7_109 | PAN_07_0213 | Jul to Sep | |
| 7_111 | PAN_07_0213 | Jan to Apr | |
| 7_112 | PAN_07_0213 | Mar to May | |
| 8_74 | PAN_08_0213 | | |
| 9_67 | PAN_09_0213 | | |
| 1_89E | PAN_01_0213 | Jun to Sep | Everywhere. Few around after breakup |
| 6_106E | PAN_06_0213 | Jul, Aug | Everywhere. |
| 7_110E | PAN_07_0213 | Jul to Sep | Everywhere. |
| 8_75E | PAN_08_0213 | | Everywhere. More now than in the past. Have to be careful when boating not to hit them. |
| 9_66E | PAN_09_0213 | | Everywhere. More common now than in the past. When there are lots around you can smell them. |

**Figure 37.** Migration Routes for Beluga Interviews 1 through 5

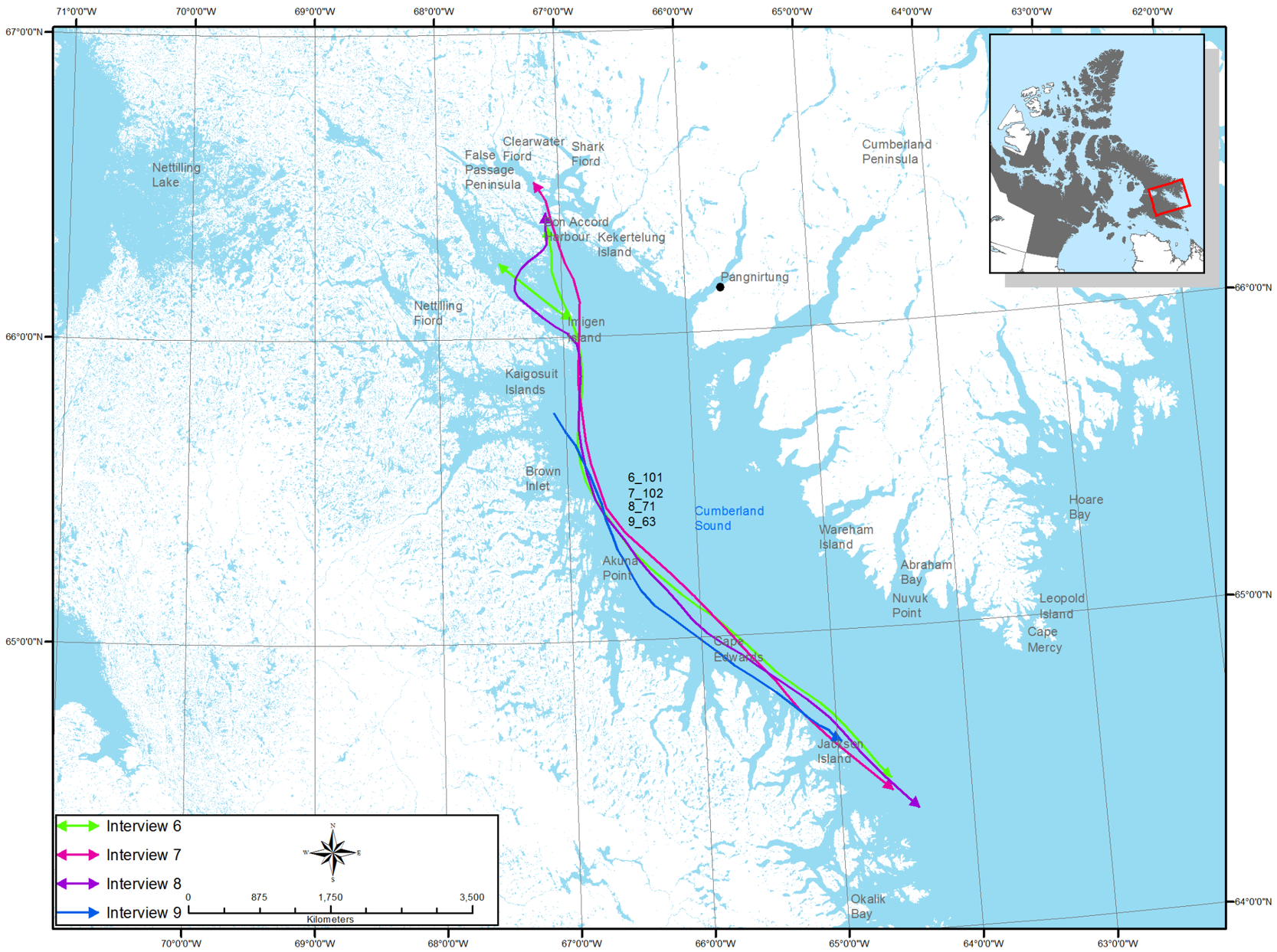



**Table 36.** Migration Routes for Beluga Interviews 1 through 5

| MAP CODE | INTERVIEW CODE | MONTHS |
|---|---|---|
| 1_83M | PAN_01_0213 | July |
| 2_86M | PAN_02_0213 | Jun, Jul |
| 3_123M | PAN_03_0213 | Jun, Jul |
| 4_75M | PAN_04_0213 | May, Jun |
| 5_95M | PAN_05_0213 | May, Jun |

**Figure 38.** Migration Routes for Beluga Interviews 6 Through 9

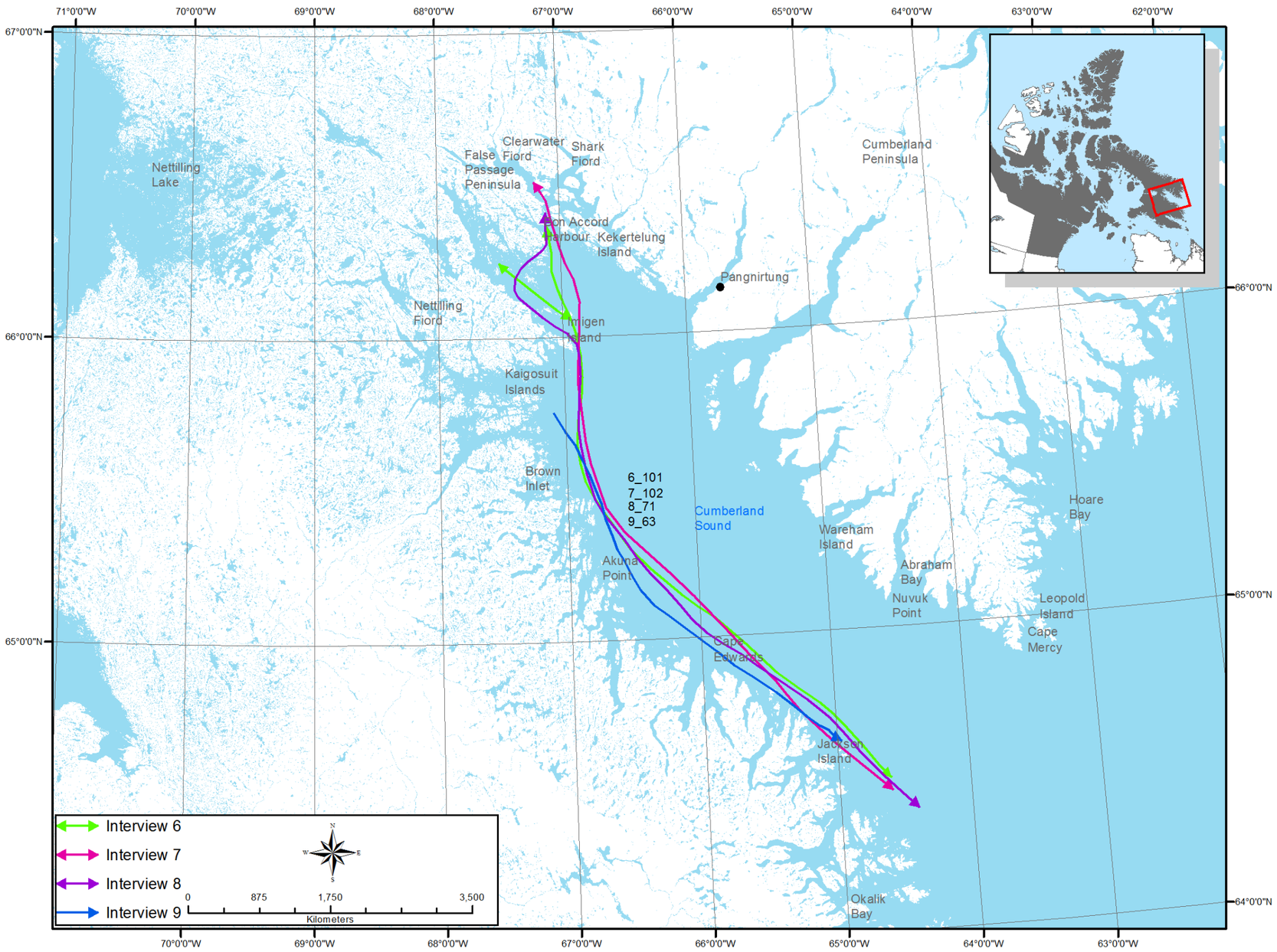



**Table 37.** Migration Routes for Beluga Interviews 6 Through 9

| MAP CODE | INTERVIEW CODE | MONTHS | COMMENTS |
|---|---|---|---|
| 6_101M | PAN_06_0213 | Jun, Jul, Sep, Oct | |
| 7_102M | PAN_07_0213 | Apr to Jun, Sep, Oct | Two kinds of beluga: small ones found along shore and large ones in deep water. Small ones don't go to Clearwater fiord |
| 8_71M | PAN_08_0213 | Jun, Jul, Oct | |
| 9_63M | PAN_09_0213 | Sep, Oct | |

**Figure 39.** Migration Routes for Narwhal

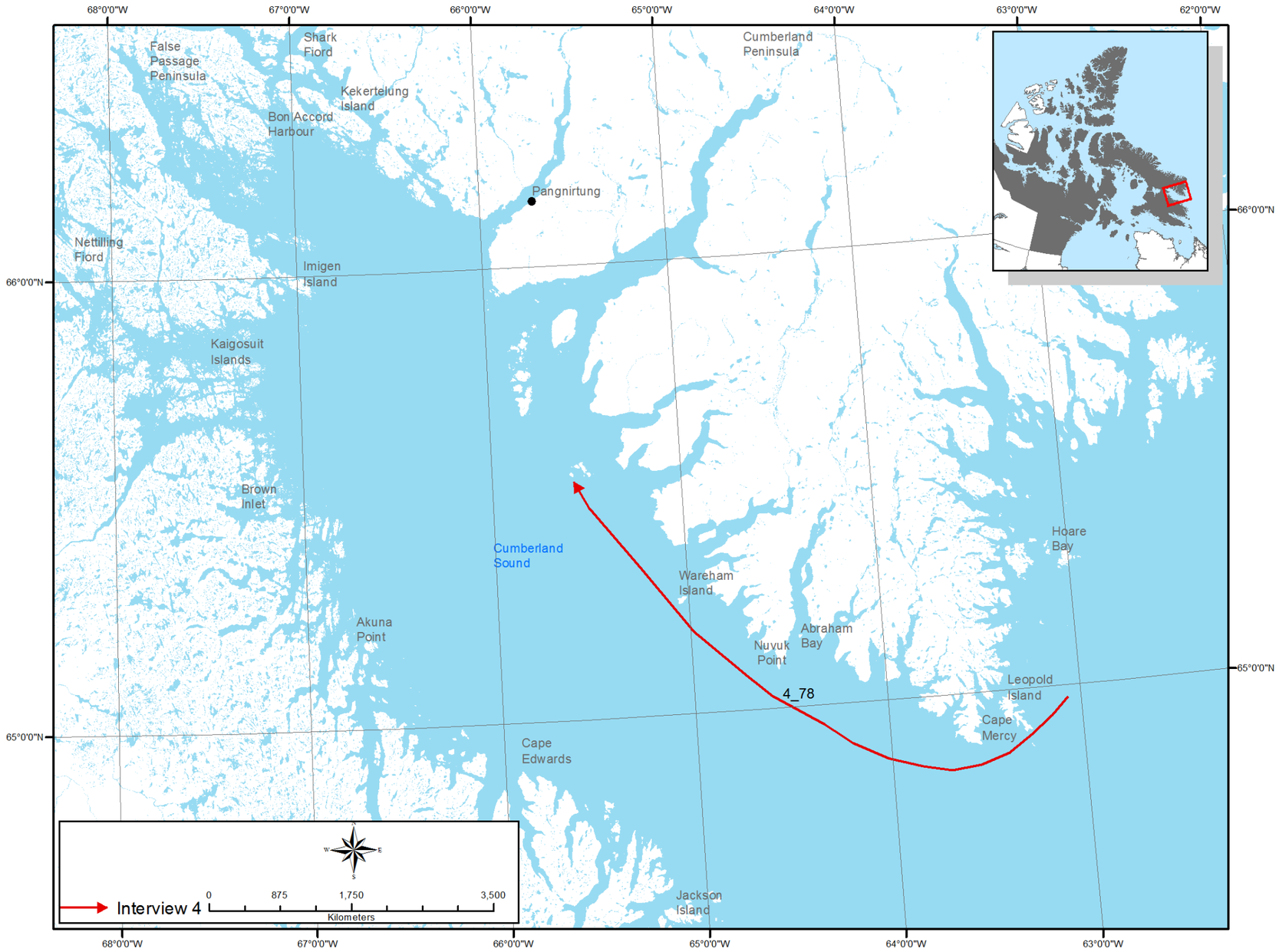



**Table 38.** Migration Routes for Narwhal

| MAP CODE | INTERVIEW CODE |
|---|---|
| 4_78M | PAN_04_0213 |

**Figure 40.** Areas of Occurrence for Edible Kelp, Hollow Stemmed Kelp and Sea Colander

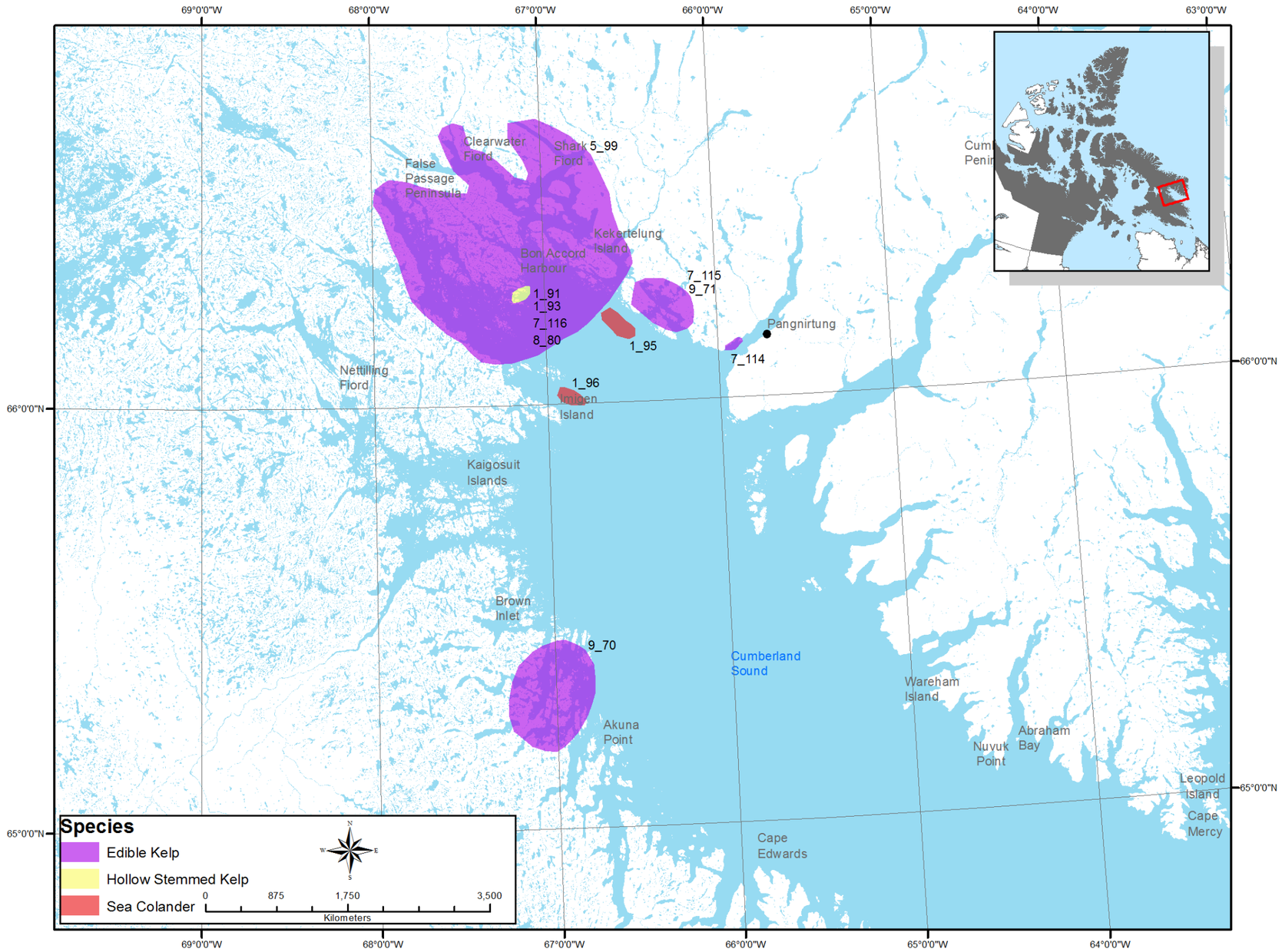


**Table 39.** Areas of Occurrence for Edible Kelp, Hollow Stemmed Kelp and Sea Colander

| MAP CODE | INTERVIEW CODE | SPECIES | MONTHS | COMMENTS |
|---|---|---|---|---|
| 1_91 | PAN_01_0213 | Edible Kelp | Feb, Mar | |
| 5_99 | PAN_05_0213 | Edible Kelp | | In currents in the tidal area |
| 7_114 | PAN_07_0213 | Edible Kelp | | Found in areas with strong currents |
| 7_115 | PAN_07_0213 | Edible Kelp | | |
| 7_116 | PAN_07_0213 | Edible Kelp | | |
| 8_80 | PAN_08_0213 | Edible Kelp | | |
| 9_70 | PAN_09_0213 | Edible Kelp | | |
| 9_71 | PAN_09_0213 | Edible Kelp | | |
| 1_93 | PAN_01_0213 | Hollow Stemmed Kelp | | |
| 1_95 | PAN_01_0213 | Sea Colander | Jan to Mar | Gets caught in turbot lines |
| 1_96 | PAN_01_0213 | Sea Colander | Jan to Mar | |

**Table 40.** Edible Kelp, Hollow Stemmed Kelp, Sea Colander, Bladder Wrack, Goose Grass, Sea Lungwort, Floating Buttercup, Robbin's Pondweed, Alpine Pondweed, Variableleaf Pondweed, Sephamore Grass, Dulse, Eel Grass and Western Pondweed

| MAP CODE | INTERVIEW CODE | SPECIES | MONTHS | COMMENTS |
|---|---|---|---|---|
| 1_92E | PAN_01_0213 | Edible Kelp | | Everywhere |
| 2_91E | PAN_02_0213 | Edible Kelp | | Everywhere |
| 3_130E | PAN_03_0213 | Edible Kelp | | Everywhere. Mainly in current areas |
| 4_82E | PAN_04_0213 | Edible Kelp | | Everywhere |
| 6_109E | PAN_06_0213 | Edible Kelp | | Everywhere. Found in strong current areas |
| 8_79E | PAN_08_0213 | Edible Kelp | | Everywhere |
| 9_69E | PAN_09_0213 | Edible Kelp | | Everywhere. Found in areas with strong tidal currents |
| 1_94E | PAN_01_0213 | Hollow Stemmed Kelp | | Everywhere |
| 2_92E | PAN_02_0213 | Hollow Stemmed Kelp | | Everywhere. Found in deep water |
| 3_131E | PAN_03_0213 | Hollow Stemmed Kelp | | Everywhere |
| 4_83E | PAN_04_0213 | Hollow Stemmed Kelp | | Everywhere |
| 5_100E | PAN_05_0213 | Hollow Stemmed Kelp | | Everywhere |
| 6_110E | PAN_06_0213 | Hollow Stemmed Kelp | | Everywhere. Seen floating after storms in large amounts |
| 7_117E | PAN_07_0213 | Hollow Stemmed Kelp | | Everywhere |
| 8_81E | PAN_08_0213 | Hollow Stemmed Kelp | | Everywhere |
| 9_72E | PAN_09_0213 | Hollow Stemmed Kelp | | Everywhere |
| 2_93E | PAN_02_0213 | Sea Colander | | Everywhere. Found in deep water |
| 5_101E | PAN_05_0213 | Sea Colander | | Everywhere. Not as common |
| 6_111E | PAN_06_0213 | Sea Colander | | Everywhere. Not common |
| 8_82E | PAN_08_0213 | Sea Colander | | Everywhere. Not common |
| 9_73E | PAN_09_0213 | Sea Colander | | Everywhere. Not abundant |
| 1_97E | PAN_01_0213 | Bladder Wrack | | Everywhere |
| 2_94E | PAN_02_0213 | Bladder Wrack | | Everywhere |
| 3_132E | PAN_03_0213 | Bladder Wrack | | Everywhere |
| 4_84E | PAN_04_0213 | Bladder Wrack | | Everywhere |
| 5_102E | PAN_05_0213 | Bladder Wrack | | Everywhere |
| 6_112E | PAN_06_0213 | Bladder Wrack | | Everywhere. Along tidal areas |
| 7_119E | PAN_07_0213 | Bladder Wrack | | Everywhere in tidal areas |
| 8_83E | PAN_08_0213 | Bladder Wrack | | Everywhere |
| 9_74E | PAN_09_0213 | Bladder Wrack | | Everywhere |
| 1_98E | PAN_01_0213 | Goose Grass | | Everywhere. Found in muddy coastal areas |

| MAP CODE | INTERVIEW CODE | SPECIES | MONTHS | COMMENTS |
|---|---|---|---|---|
| 2_100E | PAN_02_0213 | Goose Grass | | Everywhere. Found where river enters the ocean |
| 3_136E | PAN_03_0213 | Goose Grass | | Everywhere. Found on ocean shores |
| 4_88E | PAN_04_0213 | Goose Grass | | Everywhere. Freshwater |
| 5_105E | PAN_05_0213 | Goose Grass | | Everywhere |
| 6_116E | PAN_06_0213 | Goose Grass | | Everywhere. Grows in tidal areas in mud |
| 7_124E | PAN_07_0213 | Goose Grass | | Everywhere In tidal zone |
| 8_85E | PAN_08_0213 | Goose Grass | | Everywhere. Grows within reach of very high tides |
| 9_76E | PAN_09_0213 | Goose Grass | | Everywhere. Grows along the ocean shore below the highest tide mark |
| 1_99E | PAN_01_0213 | Sea Lungwort | | Everywhere. Grows in shale |
| 2_101E | PAN_02_0213 | Sea Lungwort | | Everywhere. Found growing in shale |
| 3_137E | PAN_03_0213 | Sea Lungwort | | Everywhere |
| 4_89E | PAN_04_0213 | Sea Lungwort | | Everywhere. Boggy areas |
| 5_106E | PAN_05_0213 | Sea Lungwort | | Everywhere. High tide mark |
| 6_117E | PAN_06_0213 | Sea Lungwort | | Everywhere. Not common |
| 7_125E | PAN_07_0213 | Sea Lungwort | | Everywhere. Sporadic |
| 8_86E | PAN_08_0213 | Sea Lungwort | | Everywhere. Grows along the ocean shore |
| 9_77E | PAN_09_0213 | Sea Lungwort | | Everywhere. Don't mind salt water, like gravel and shale environment |
| 1_100E | PAN_01_0213 | Floating Buttercup | | Everywhere. Found in shallow ponds |
| 2_102E | PAN_02_0213 | Floating Buttercup | | Everywhere |
| 3_138E | PAN_03_0213 | Floating Buttercup | | Everywhere. Found in shallow ponds |
| 4_90E | PAN_04_0213 | Floating Buttercup | | Everywhere. Boggy areas |
| 5_107E | PAN_05_0213 | Floating Buttercup | | Everywhere |
| 6_118E | PAN_06_0213 | Floating Buttercup | | Everywhere. Found in small lakes |
| 7_126E | PAN_07_0213 | Floating Buttercup | | Everywhere. In lakes |
| 8_87E | PAN_08_0213 | Floating Buttercup | | Everywhere. Grows along the ocean shore |
| 2_95E | PAN_02_0213 | Robbin's Pondweed | | Everywhere. Freshwater |
| 7_121E | PAN_07_0213 | Robbin's Pondweed | | Everywhere. In ponds |
| 2_96E | PAN_02_0213 | Alpine Pondweed | | Everywhere Freshwater |
| 4_85E | PAN_04_0213 | Alpine Pondweed | | Everywhere Freshwater |
| 2_97E | PAN_02_0213 | Variableleaf Pondweed | | Everywhere Freshwater |
| 3_134E | PAN_03_0213 | Variableleaf Pondweed | | Everywhere. Found in creeks and ponds |
| 4_86E | PAN_04_0213 | Variableleaf Pondweed | | Everywhere Freshwater |
| 7_122E | PAN_07_0213 | Variableleaf Pondweed | | Everywhere In ponds |
| 2_99E | PAN_02_0213 | Semaphore Grass | | Everywhere Freshwater |
| 3_135E | PAN_03_0213 | Semaphore Grass | | Everywhere Found in ponds |
| 4_87E | PAN_04_0213 | Semaphore Grass | | Everywhere Freshwater |
| 5_104E | PAN_05_0213 | Semaphore Grass | | Everywhere |
| 6_115E | PAN_06_0213 | Semaphore Grass | | Everywhere. Found in small ponds and creeks |
| 7_123E | PAN_07_0213 | Semaphore Grass | | Everywhere. In ponds |
| 3_133E | PAN_03_0213 | Dulse | | Everywhere. Not that commnon |
| 5_103E | PAN_05_0213 | Dulse | | Everywhere. Sparse |
| 6_113E | PAN_06_0213 | Dulse | | Everywhere. Not common, but more common during spring tides |
| 7_120E | PAN_07_0213 | Dulse | | Everywhere. Not common, not in abundance |
| 8_84E | PAN_08_0213 | Dulse | | Everywhere. Not common, but can be found at very low tides |
| 9_75E | PAN_09_0213 | Dulse | | Everywhere. Found near other kelp, but not common |
| 6_114E | PAN_06_0213 | Eel Grass | | Everywhere. Grows in sandy areas |
| 2_98E | PAN_02_0213 | Whitestem Pondweed | | Everywhere. Freshwater |

**Figure 41.** Areas of Occurrence for Snow Goose, Cackling Goose and Canada Goose

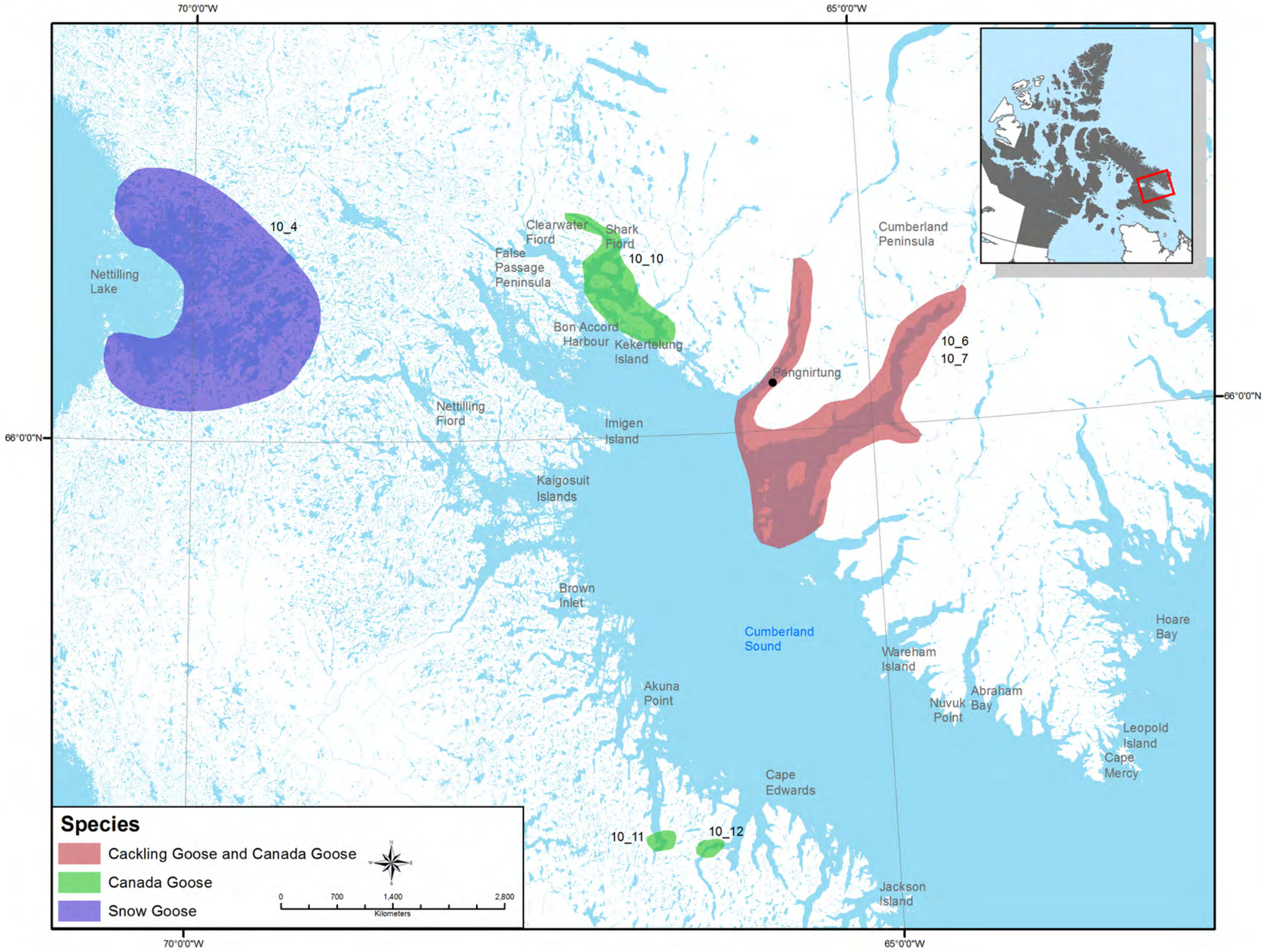


**Table 41.** Areas of Occurrence for Snow Goose, Cackling Goose and Canada Goose

| MAP CODE | INTERVIEW CODE | SPECIES | MONTHS | COMMENTS |
|---|---|---|---|---|
| 10_4S | PAN_10_0313 | Snow Goose | | Increase in numbers since 45 years ago. |
| 10_6S | PAN_10_0313 | Cackling Goose | | |
| 10_7S | PAN_10_0313 | Canada Goose | | |
| 10_10 | PAN_10_0313 | Canada Goose | Jul to Sep | |
| 10_11 | PAN_10_0313 | Canada Goose | | |
| 10_12 | PAN_10_0313 | Canada Goose | | |

**Figure 42.** Areas of Occurrence for King Eider and Common Eider

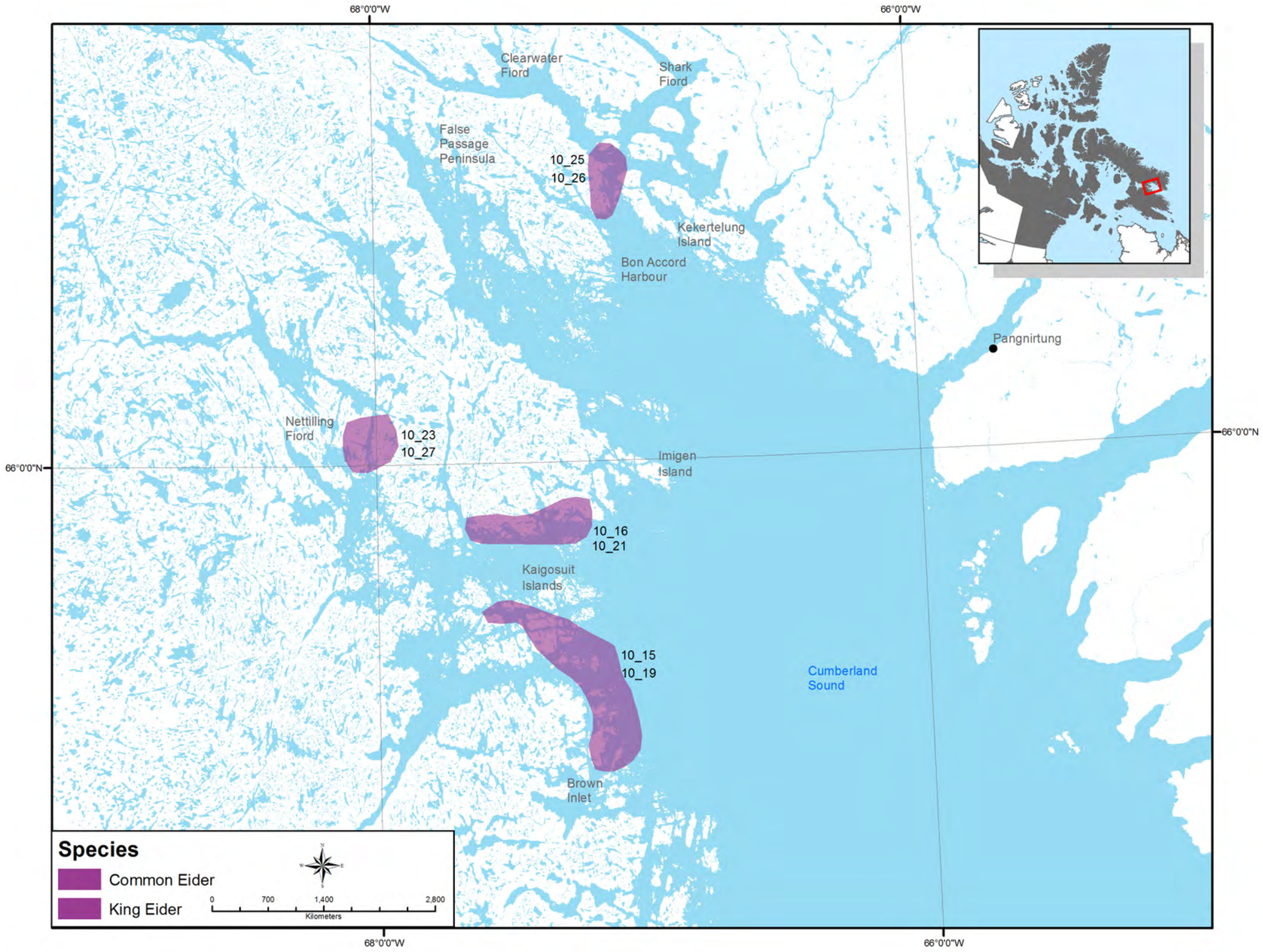


**Table 42.** Areas of Occurrence for King Eider and Common Eider

| MAP CODE | INTERVIEW CODE | SPECIES | MONTHS | COMMENTS |
|---|---|---|---|---|
| 10_15S | PAN_10_0313 | King Eider | | |
| 10_16S | PAN_10_0313 | King Eider | | |
| 10_23S | PAN_10_0313 | King Eider | | King Eider stays a shorter period than Common eider. |
| 10_25 | PAN_10_0313 | King Eider | Jul to Sep | |
| 10_19S | PAN_10_0313 | Common Eider | | |
| 10_21S | PAN_10_0313 | Common Eider | | |
| 10_26S | PAN_10_0313 | Common Eider | | |
| 10_27S | PAN_10_0313 | Common Eider | | |

**Figure 43.** Areas of Occurrence for Long-tailed Duck, Rock Ptarmigan, Common Loon and Yellow-billed Loon

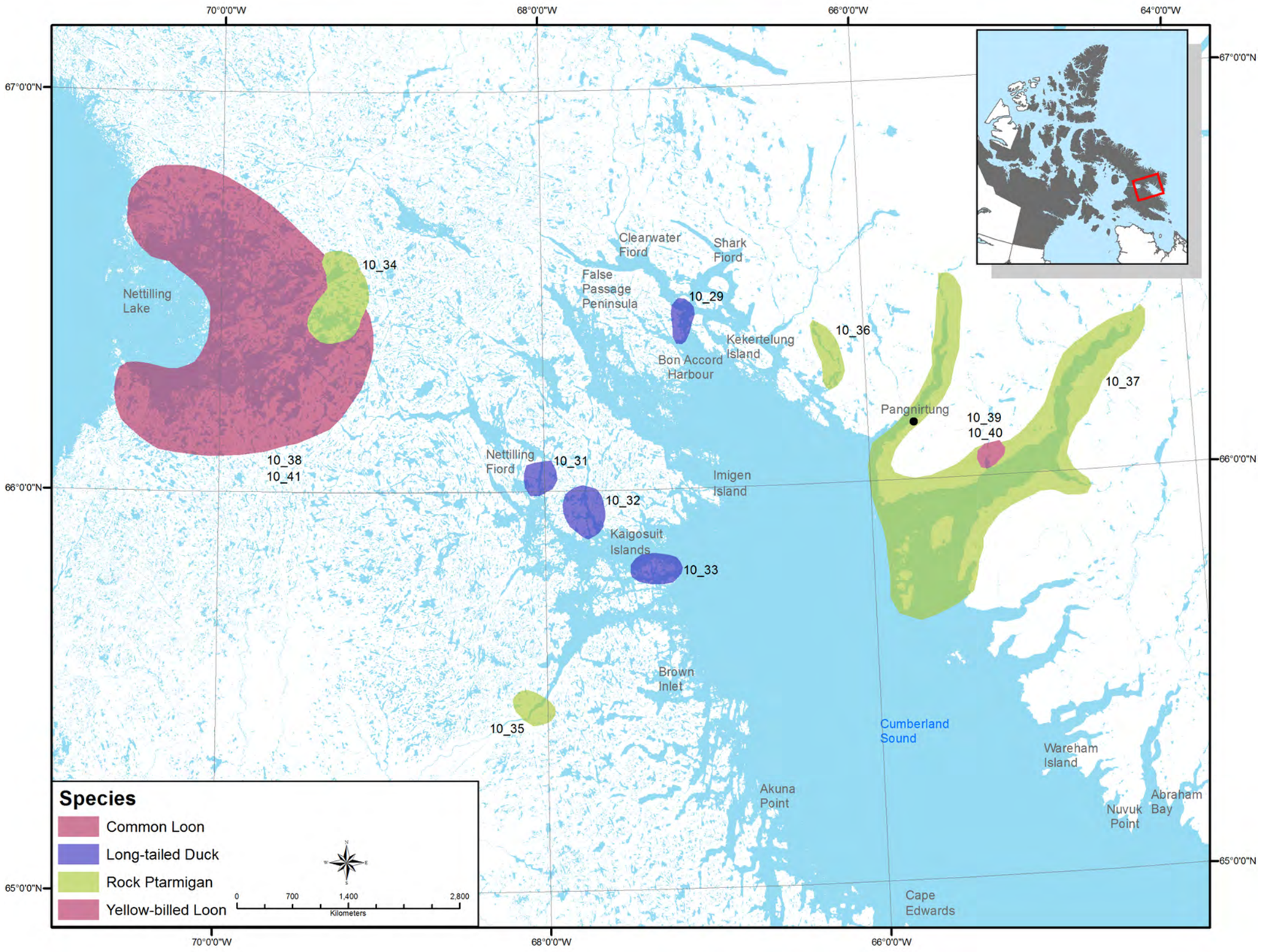


**Table 43.** Areas of Occurrence for Long-tailed Duck, Rock Ptarmigan, Common Loon and Yellow-billed Loon

| MAP CODE | INTERVIEW CODE | SPECIES | MONTHS |
|---|---|---|---|
| 10_29S | PAN_10_0313 | Long-tailed Duck | |
| 10_31 | PAN_10_0313 | Long-tailed Duck | |
| 10_32 | PAN_10_0313 | Long-tailed Duck | |
| 10_33 | PAN_10_0313 | Long-tailed Duck | |
| 10_34 | PAN_10_0313 | Rock Ptarmigan | Jun to Aug |
| 10_35 | PAN_10_0313 | Rock Ptarmigan | Jun to Aug |
| 10_36 | PAN_10_0313 | Rock Ptarmigan | Jan to Apr, Nov, Dec |
| 10_37 | PAN_10_0313 | Rock Ptarmigan | Jan to Apr, Nov, Dec |
| 10_38 | PAN_10_0313 | Common Loon | Jul, Aug |
| 10_39 | PAN_10_0313 | Common Loon | Jul, Aug |
| 10_40 | PAN_10_0313 | Yellow-billed Loon | Jul, Aug |
| 10_41 | PAN_10_0313 | Yellow-billed Loon | Jul, Aug |

**Figure 44.** Areas of Occurrence for Gyrfalcon, Peregrine Falcon, Killdeer, Sanderling, Spotted Sandpiper and Baird's Sandpiper

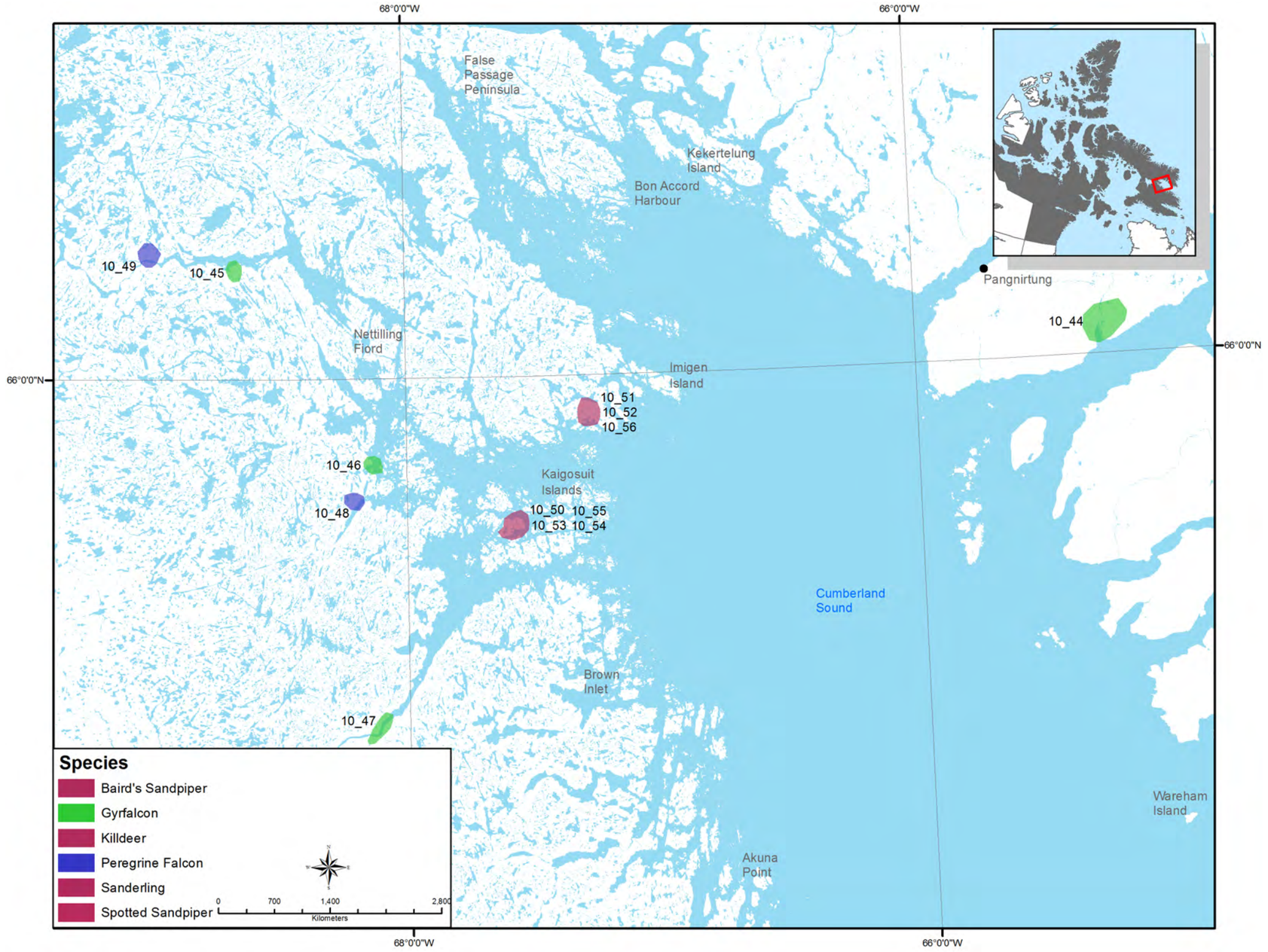


**Table 44.** Areas of Occurrence for Gyrfalcon, Peregrine Falcon, Killdeer, Sanderling, Spotted Sandpiper and Baird's Sandpiper

| MAP CODE | INTERVIEW CODE | SPECIES | MONTHS | COMMENTS |
|---|---|---|---|---|
| 10_44S | PAN_10_0313 | Gyrfalcon | | |
| 10_45S | PAN_10_0313 | Gyrfalcon | | |
| 10_46S | PAN_10_0313 | Gyrfalcon | | |
| 10_47S | PAN_10_0313 | Gyrfalcon | | |
| 10_48S | PAN_10_0313 | Peregrine Falcon | | |
| 10_49S | PAN_10_0313 | Peregrine Falcon | | |
| 10_50S | PAN_10_0313 | Killdeer | | |
| 10_51 | PAN_10_0313 | Killdeer | Jul, Aug | Seen on ocean |
| 10_52 | PAN_10_0313 | Sanderling | | |
| 10_53 | PAN_10_0313 | Sanderling | | |
| 10_54 | PAN_10_0313 | Spotted Sandpiper | | |
| 10_55 | PAN_10_0313 | Baird's Sandpiper | | |
| 10_56 | PAN_10_0313 | Baird's Sandpiper | | |

**Figure 45.** Areas of Occurrence for Ivory Gull, Arctic Tern, Snowy Owl, Snow Bunting, and Tundra Swan

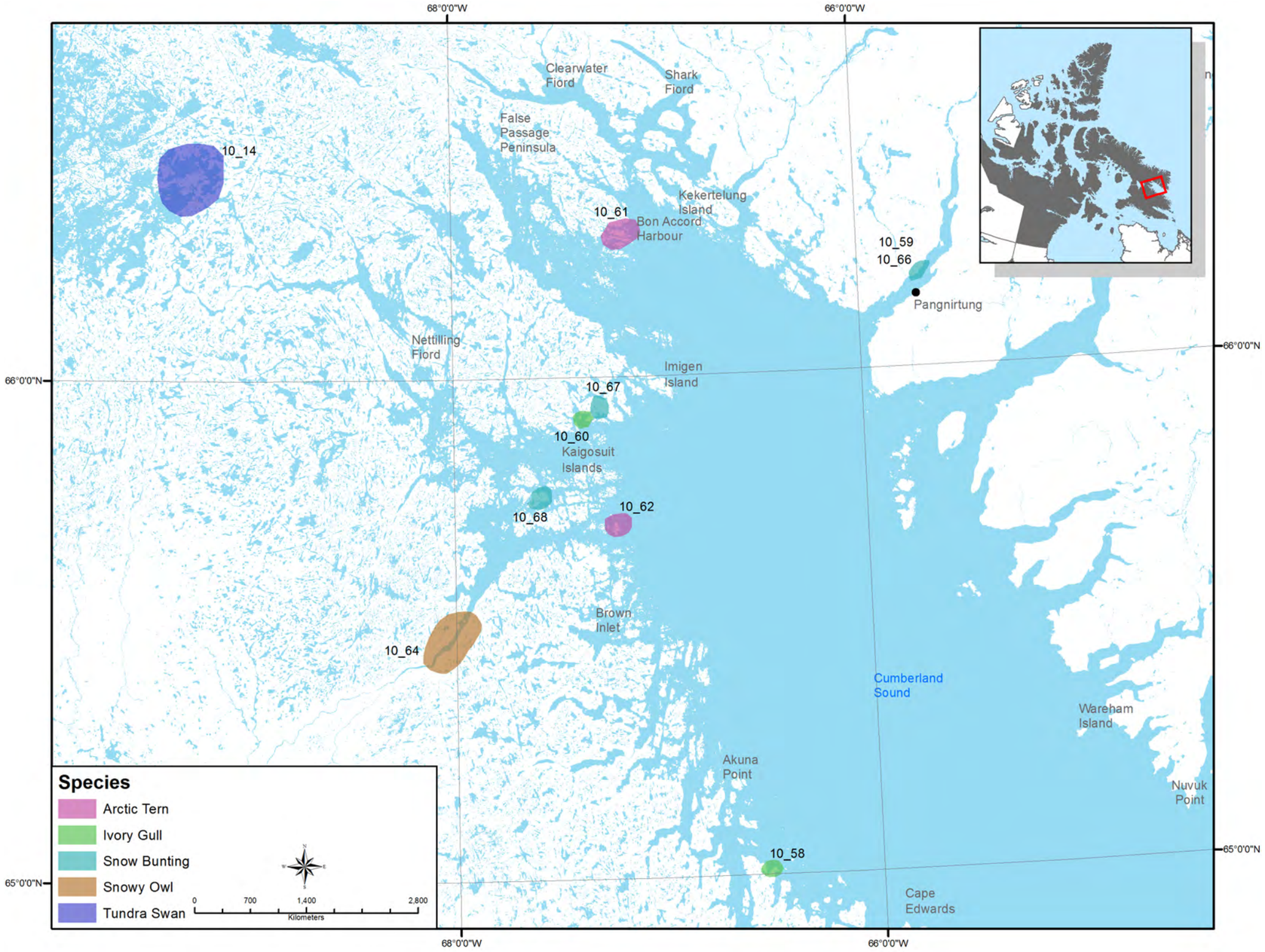


**Table 45.** Areas of Occurrence for Ivory Gull, Arctic Tern, Snowy Owl, Snow Bunting, and Tundra Swan

| MAP CODE | INTERVIEW CODE | SPECIES | MONTHS | COMMENTS |
|---|---|---|---|---|
| 10_58S | PAN_10_0313 | Ivory Gull | | |
| 10_59S | PAN_10_0313 | Ivory Gull | | |
| 10_60S | PAN_10_0313 | Ivory Gull | | Seen on cliffs |
| 10_61S | PAN_10_0313 | Arctic Tern | | |
| 10_62S | PAN_10_0313 | Arctic Tern | | |
| 10_64S | PAN_10_0313 | Snowy Owl | | |
| 10_66 | PAN_10_0313 | Snow Bunting | | |
| 10_67 | PAN_10_0313 | Snow Bunting | | |
| 10_68 | PAN_10_0313 | Snow Bunting | | |
| 10_14 | PAN_10_0313 | Tundra Swan | Jun to Aug | Observed 5 to 7 years ago. |

**Table 46.** Northern Fulmer, Ivory Gull, Black Guillemot, and Common Raven

| MAP CODE | INTERVIEW CODE | SPECIES | MONTHS | COMMENTS |
|---|---|---|---|---|
| 10_42E | PAN_10_0313 | Northern Fulmar | | Everywhere |
| 10_57E | PAN_10_0313 | Ivory Gull | June to Oct | Everywhere |
| 10_63E | PAN_10_0313 | Black Guillemot | | Everywhere |
| 10_65E | PAN_10_0313 | Common Raven | Year-round | Everywhere. Closer to city and hunting areas. Follow you when hunting. |

# MAPS-HISTORIC

**Figure 46.** Nunavut Atlas – Cumberland Sound

# CUMBERLAND SOUND

### 1. SEABIRDS
Small inlets within these areas support breeding colonies of Arctic terns (20-15 pairs per colony).

### 2. SEABIRDS
Small numbers of Arctic terns and gulls inhabit these areas. They are most common in the vicinity of Amadjuak Lake, where they nest on small islands in or near the lake, particularly along the eastern shore.

### 3. WATERFOWL AND SEABIRDS
Canada geese are found in small, widely scattered flocks throughout the interior plains west, south and southeast of Amadjuak Lake. These are exclusively non-breeding and molting geese which also forage in these lowlands. Arctic terns also occur in these areas, most commonly near Amadjuak Lake where they nest on small inlets along the eastern shore. Oldsquwas, gulls, loons, snow geese and jaegers have also been seen in these areas.

### 4. SEABIRDS
These areas are support nesting colonies of Kumlien's and/or glaucous gulls, with 5 to 400 breeding pairs per colony. Glaucous gulls also occur as isolated breeding pairs in small groups throughout coastal Cumberland Sound.

### 5. WATERFOWL AND SEABIRDS
This large area comprises the nearshore waters and immediate coast along the west and east sides of Cumberland Sound. It provides important habitat for common eiders, black guillemots, glaucous and/or Kumlein's gulls, king eiders, oldsquaws, red-breasted mergansers and res-throated loons. This area may be utilized for a variety of activities, such as nesting, molting, staging, feeding and brood-rearing, primarily from spring to fall. Northern fulmars may rarely occur in these coastal waters during August and September. Northern fulmars are more numerous along the east coast of the sound. Common eiders nest throughout the area, usually in loose colonies on small islands in or near the sea, and on headlands, slopes and shores of salt water bays. Common eiders nest in only small numbers to the southeast of Chidliak Point on the west side of Cumberland Sound, and on the east side of the sound (off this map sheet) they are infrequent nesters as well (with the exception of Miliakdiuin and Kikistan Islands); however, these areas may be important staging areas for post-breeding male common eiders. Most common eider nesting activity occurs on the west side of the sound north of Childliak Point, due to increased availability of low coastal areas for nesting and to less severe ice conditions in summer. Black guillemots are common nesters throughout the area, selecting reefs, small offshore islands, and steep, fractured and/or talus-strewn coastal areas for nesting sites. Black guillemots are particularly numerous along the outer coast north of Popham Bay and near the mouth of Kingnait Fiord. Breeding glaucous and/or Kumlein's gulls also occur commonly and widely within this area, their colonies tending to be more numerous and larger in upper Cumberland Sound.

### 6. WATERFOWL
The small islands within these areas are important breeding sites for common eiders from mid-June to early August.

### 7. SEABIRDS
The many small islands and adjacent waters within these areas are of importance for breeding and foraging black guillemots.

### 8. WATERFOWL AND SEABIRDS
The offshore waters of Cumberland Sound are important to marine birds from spring through fall, for staging, brood-rearing, molting, and especially feeding. They are particularly important for eiders, guillemots and gulls. Non-breeding pelagic wanderers such as fulmars and jaegers use this area widely. Ice edges and open in leads in the sea ice are used by marine birds during late April and May.

### 9. WATERFOWL AND SEABIRDS
Marine birds may overwinter in small numbers in the recurring polynya at the mouth of Cumberland Sound. These may include common and king eiders, oldsquaws, Kumlien's gulls, glaucous gulls, ivory gulls, thick-billed murres, dovekies and black guillemots. This polynya, however, is of greater importance for birds returning in spring, serving as an open-water area where birds concentrate until conditions are suitable for them to continue migration. Birds which may use this area in spring include the overwintering species listed above, and in addition may include black-legged kittiwakes, phalaropes, loons and jaegers.

### 10. RAPTORS
The status of raptors within these areas is unknown, although scattered cliff faces and availability suitable prey may provide optimal breeding habitat for raptors such as rough-legged hawks and peregrine falcons.

### 11. RAPTORS
These coastal areas of Cumberland Sound, which contain numerous cliff faces and an abundance suitable prey species, provide optimal breeding habitat for cliff-nesting raptors. These areas are particularly important for nesting gyrfalcons on Baffin Island. A few peregrine falcons also breed in these areas. Most breeding sites for falcons are on or near the coast. Gyrfalcons may also occur in these areas as spring and fall migrants and a few may overwinter here.

### 12. RAPTORS
Numerous cliff faces and the relative abundance of suitable prey species along the east coast of Cumberland Sound (from Kumlien Fiord north) should provide optimal breeding habitat for cliff-nesting raptors. Although the status of raptors in these areas is unknown, upper Cumberland Sound (to the west and northwest of these areas) has been documented to be important to cliff-nesting raptors especially gyrfalcons.

### 13. RAPTORS
Although the status of raptors within these areas is unknown, numerous cliff faces and the relative abundance of suitable prey species within these areas may provide optimal breeding habitat cliff-nesting raptors. The west coast of Cumberland Sound to the northwest of these areas is known to be important to breeding cliff-nesting raptors, particularly gyrfalcons.

### 14. CARIBOU
The western portion of this map area provides important winter range for caribou which are part of the migratory South Baffin herd, estimated to number in excess of 55,000 animals. This population has increased in numbers during the past few decades. Only a few caribou remain in this area during summer, mainly in the non-migratory bull caribou.

### 15. CARIBOU
Caribou of the south Baffin herd which winter in Foxe Peninsula and to the east and southeast of Nettiling and Amadjuak lakes migrate north during March to May to calving and summering grounds Longstaff Bluff-Dewer lakes area and on the next extensive lowlands of west-central Baffin Island which stretch from the calving grounds to northern Foxe Peninsula. Females and juveniles are in the vanguard of this migration. The migrating caribou are funneled around the east side of Nettiling Lake (to the north of this map), avoiding the poor snow conditions of the Great Plain of the Koukdjuak. During late summer and

fall, caribou gradually drift south back to their wintering grounds. Great numbers of caribou migrate south through the Great Plain of the Koukdjuak (to the west and northwest of this map area), enroute to all wintering areas of the south Baffin herd. Many southward migrants use the area east of Nettiling Lake. Bull caribou generally lead the southward migrations.

### 16. CARIBOU

These areas comprise the range of the small resident sub-population of caribou that occurs year-round on Hall Peninsula. This sub-population is thought to number about 3,500 animals. Some animals of this sub-population may calve and summer on the plateaus and plains bordering the McKeand River. This population makes limited seasonal migrations, mainly of an elevational nature. Summers are spent in coastal lowlands, well-vegetated river valleys, and the well-vegetated river valleys, and the well-vegetated interior plains in the central interior of Hall Peninsula. Winters are spent in rugged uplands, many of which are near the coast. They are reported to calve in mid-June at high elevations along the west coast of Cumberland Sound and throughout the uplands that border many of the large river valleys on the southeast end of the peninsula, particularly in the area inland from Cyrus Field bay. After calving, many caribou move down to the snow-free river valleys, and then inland to summering grounds on the interior plains. The main summering area for the hall Peninsula herd is the interior plains to the southwest and south of Chidliak bay, where the more northerly and westerly parts of the range of this herd is mostly used during winter.

### 17. CARIBOU

Although reportedly more abundant in the past, very few caribou inhabit this part of Cumberland Peninsula. Much of the area is un-vegetated and or poorly-vegetated. It is thought that caribou which on the peninsula previously summered on the western lowlands of Baffin Island. Inuit elders from Pangnirtung believe that the establishment of the settlement of Pangnirtung disrupted the migrations of this population of caribou.

### 18. CARIBOU

The generally well-vegetated interior plains that surround the large lakes which are headwaters of the McKeand River appear to be an important summering and post-calving area for the resident sub-population of caribou on Hall Peninsula.

### 19. CARIBOU

Caribou only occur on the Leybourne Islands during summer.

### 20. WOLVES

Wolves occur wherever caribou are found. They are particularly numerous in the Amadjuak lake area.

### 21. ARCTIC FOXES

Foxes have been reported to den in these areas.

### 22. POLAR BEARS AND SEALS

Polar bears rarely occur west or northwest of Blacklead Island. The ice in this area tends to be smooth, not the type of habitat in which bears prefer to hunt. Also, constant hunting pressure by Inuit may have discouraged bears from the area and may have reduced the number of seals as well. Ringed seals occur in most coastal areas of Cumberland Sound, but are especially abundant east of Cape Edwards in the waters around Moodie Island and Popham Bay.

Polar bears occur in moderate numbers along the coast to the southeast of Blacklead Island. Bears in this areas show a very high degree of fidelity to their winter and spring feeding grounds.

### 23. POLAR BEARS

Polar bears occur along the east coast of Cumberland Sound, hunting ringed and bearded seals on the fast ice and in the offshore pack ice during the winter and spring. The fiords are utilized by bears during early summer for hunting seals. Polar bears also occur at the Cumberland Sound floe edge in winter and spring.

### 24. POLAR BEARS

Coastal regions east of Ujuktuk Fiord are important maternity denning areas for polar bears.

### 25. POLAR BEARS

The southeastern end of Cumberland Peninsula is an important summer retreat for polar bears.

### 26. SEALS

Ringed seals occur year-round along all the coasts of Cumberland Sound. It is estimated that 59,000 to 69,000 ringed seals inhabit the sound. The population here may be supplemented by immigration of seals from Hoare Bay. Harp seals occur in summer along the east coast of Cumberland Sound.

### 27. SEALS

A large number of harp seals were seen in the waters around Kalgousuit and Kaigosuiyat Islands in August of 1982.

### 28. SEALS

Strong currents and high tidal amplitude make the ice in Cumberland Sound unstable and unsuitable for ringed seal pup production. However, the area receives a large part of the surplus production from adjacent pupping areas and can thus sustain an annual kill far above what could be supported by its resident population. Bearded seals occur sporadically throughout Cumberland Sound; they were common in Sulut and Neptune bays in the summer of 1966.

### 29. SEALS, BELUGAS AND NARWHALS

While most harp seals migrating from Newfoundland continue northward along the eastern coast of Baffin Island, some enter Cumberland Sound and most of its fiords and small bays during late spring and early summer. They are common in fiords at the head of the sound in July and August. The seals leave the sound in fall. Large numbers of departing harp seals were observed along the coast in September and October of 1979. A few hooded seals enter the sound in summer. Some harp and hooded seals may overwinter in the open water near the mouth of Cumberland Sound. Belugas are known to enter the sound in large groups. They have been seen here from April to June (aggregating at the floe edge) but by late July most have moved to the head of the sound, (especially Clearwater Fiord, with lesser numbers in Kangilo Fiord), where they probably calve and spend the rest of the summer. This apparently isolated population now numbers 500 to 700 after a long-term decline from about 5,000 animals. The whales remain in Clearwater Fiord until late August and then move back and forth into the main sound until late September. Belugas leave the area via the south coast of the sound in October. Some animals may winter along the floe edge at the mouth of Cumberland Sound but most overwinter in Frobisher Bay, Davis Strait and Hudson Strait. Narwhals also occur regularly in Cumberland Sound. They migrate into the sound through the leads during May and June and remain until September or October. They are seen along the floe edge every year. A few narwhals occasionally winter in the Cumberland Sound polynya. Bearded seals move to the head of Cumberland Sound during July and August. They remain until fall when they return to the mouth of the sound to overwinter there in the pack ice.

### 30. SEALS
Harbor seals are occasionally seen during winter in the Cumberland Sound polynya. During summer they are found regularly in Cumberland Sound. They tend to occur in or near estuaries or freshwater, and to haul out on land to pup and to rest and molt. Harbor seals generally occur only in small numbers in Cumberland Sound. Harbor seals have been reported from the McKeand River at approximately 64013"W. Ringed seals are numerous at the floe edge in Cumberland Sound.

### 31. WALRUSES
These are locations of summer terrestrial haul-out sites for walruses.

### 32. WALRUSES
Walruses are found near the mouth of Cumberland Sound in summer and fall and at the floe edge in spring. These animals may overwinter in lighter ice areas to the south, and some winter in the Cumberland Sound polynya.

### 33. WALRUSES
Walruses occur year-round in the vicinity of the Leybourne Islands and Sulut Bay, and near Kipisa and Utusivik. They also occur year-round in the Abraham Bay area.

### 34. BELUGA
These inshore areas are frequented by belugas during late summer.

### 35. BELUGA
Three belugas were found entrapped in the ice here in March 1984.

### 36. BELUGA
Belugas have been reported to occur in the McKeand River during summer.

### 37. BOWHEADS
Between 1711 and 1811, commercial whalers harvested over 28,000 bowheads from eastern Arctic waters. The bowhead population never recovered and now only a few hundred whales remain in the eastern Arctic. These whales still appear to follow traditional migration routes, with a few entering Cumberland Sound in September and October and remaining until December at the floe edge. They overwinter in the pack-ice of Davis Straight, and from Cumberland Sound to the north coast of Labrador. Sightings of bowhead whales are occasionally made in Cumberland Sound during summer.

### 38. BOWHEADS
Bowhead whales migrating southwards along the east coast of Baffin Island from summering areas in the high arctic often enter Cumberland Sound where they concentrate in fall.

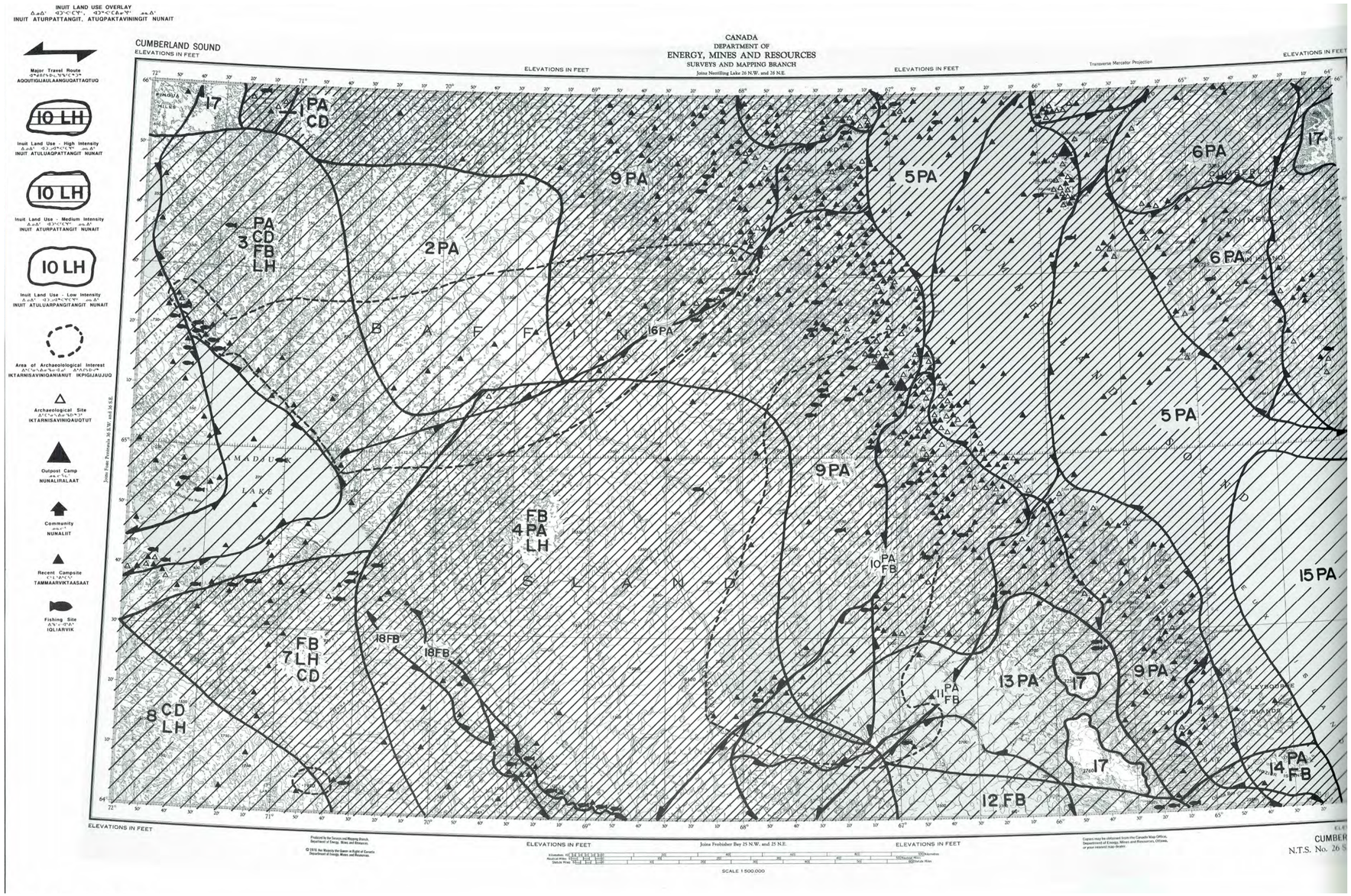
### 39. BOWHEADS
Bowheads have been seen in Nettiling Fiord during the summer.

**Wildlife Note: Other Marine Mammals Occurring in Cumberland Sound**

Killer whales are regularly seen in Cumberland Sound, particularly off Kingnait Fiord, in August and September.

Sperm whales, harbor porpoises, northern bottlenose whales and minke whales are occasionally seen in this area, near the northern limits of their ranges. A sperm whale was seen off Kingnait Fiord in August 1985.

**Figure 47.** Nunavut Atlas – Cumberland Sound



# CUMBERLAND SOUND

## INUIT LAND USE

### 1PA & CD
Nettilling Lake has traditionally provided an arctic char fishery for Pangnirtung and Cape Dorset residents. Pangnirtung residents continue to fish in this area, while Cape Dorset residents have used the area in the recent years.

### 2PA
Caribou are occasionally hunted by Pangnirtung residents in this area.

### 3PA, CD, FB & LH
This area is part of the large area used by Cape Dorset hunters for caribou hunting and arctic char fishing in the recent and historical past. A winter travel route goes from Amadjuak Bay, to the south, through Mingo and Amadjuak lakes and northward to Burwash Bay on Nettilling Lake. Cape Dorset residents very rarely use the Amadjuak Lake area now, but they anticipate increased use in the future. Pangnirtung residents occasionally hunt caribou on the east side of Amadjuak Lake.

Lake Harbour residents formerly used the southern part of this area for fishing, caribou hunting and arctic fox trapping. Markham Bay outpost camp residents make occasional use of the southern part of this area now for winter caribou and wolf hunting. Residents of Iqaluit occasionally hunt wolves and caribou along the eastern and southern shores of Amadjuak Lake during winter and early spring.

### 4FB, PA & LH
This portion of interior South Baffin Island is used by Frobisher Bay hunters for caribou and wolf hunting in winter. The Sylvia Grinnell Lake and River are used for Arctic char fishing. Wolves are hunted, and Arctic foxes are trapped be residents of Iqaluit in the southern part of this area (around the McKeand River), and in the area between Amadjuak Lake and Sylvia Grinnell Lake.

Pangnirtung residents occasionally use the northern part of this area, down to about 650N, for caribou hunting during winter and early spring. Markham Bay outpost camp residents occasionally use the southwestern corner of this area (around Sylvia Grinnell Lake) for winter caribou hunting.

### 5PA
A part of Pangnirtung's annual quota of 40 narwhals is taken in this area, including Kingnait Fiord. About 50 belugas are taken annually in Cumberland Sound. Much of Pangnirtung's annual harvest of up to 5400 ringed seals and 4800 harp seals (until recently, when the market for seal pelts collapsed) is taken in this part of the sound.

The coast of Cumberland Peninsula from Nijadluk Harbour to Kingnait Fiord is an intensively-used shore area where polar bears, bearded, harp and ringed seals and walruses are hunted. Recurring polynyas off Shomeo Point, the mouth of Kingnait Fiord, and Littlecote Channel allow for year-round hunting of ringed-seals. The floe edge is used from April to June for hunting seals, walruses, narwhals, belugas and polar bears (the seaward boundary of this Inuit Land Use zone approximates the maximum seaward position of the floe edge).

Pangnirtung hunters take up to 14 polar bears annually, mostly in the Hoare Bay-Exeter Bay area (to the northeast of this map area), but other bear hunting areas include the east and west coasts of Cumberland Sound and the Leybourne Islands area. Most hunting for polar bears occurs in winter and early spring. Miliakdjuin Island is a favored hunting locale for newborn ringed seal pups. Walruses are hunted in the Lemieux Islands during summer. Waterfowl, especially eiders, are harvested in Cumberland Sound by Pangnirtung residents. Domestic Arctic char fisheries occur in many coastal areas of the sound.

Nettilling Fiord provides access to inland water travel routes to Nettilling Lake.

### 6PA
Polar bears are occasionally hunted on travel routes inland from the Ujuktuk Fiord-Kumlein Fiord area. Some caribou are also hunted in this area.

### 7FB, LH & CD
Historically, caribou have been hunted year-round throughout this portion of South Baffin Island, including central Mata Incognita Peninsula to the south, by Frobisher Bay and Lake Harbour hunters. Fox trapping was also an important activity in this area. The area is still used occasionally today in winter by residents of outpost camps at Markham Bay, Cape Dorset residents formerly hunted caribou throughout much of this area. Residents of Iqaluit hunt wolves in this area during winter.

### 8CD & LH
In recent past years, Cape Dorset and Lake Harbour residents have used this area for caribou hunters and Arctic fox trapping. Residents of Markham Bay outpost camps occasionally use this area for caribou hunting in winter.

### 9PA
This large area is intensively used for year-round caribou hunting by Pangnirtung residents. However, hunter tend to be concentrated in late fall, winter and early spring when skidoo travel is possible. Caribou are taken in the highlands inland from Ptarmigan Fiord during summer. Fall caribou hunting occurs along the entire west coast of Cumberland Sound. Caribou are also hunted on the Lemieux and Leybourne islands. Residents of Markham Bay Outpost Camps occasionally travel by skidoo to the lake at the head of Ptarmigan Fiord for char fishing during winter and spring.

### 10PA & FB
This is the main skidoo travel route between Pangnirtung and Frobisher Bay (formerly travelled with dog teams). This route is sometimes used by residents of Iqaluit and of outpost camps at Markham Bay on fishing trips for the Cumberland Sound area during winter.

### 11PA & FB
This winter travel route between Pangnirtung and Frobisher Bay (via Opingvik) was more heavily used in the past with dog teams. The route to the west (10PA & FB) is more heavily used today.

### 12FB
The interior part of Hall Peninsula was used by Frobisher Bay hunters for caribou hunting in the historic past.

### 13PA
This are is currently only occasionally used for caribou hunting by Pangnirtung hunters.

### 14PA & FB
This has traditionally been a polar bear hunting area for residents of Pangnirtung and Frobisher Bay.

### 15PA
This offshore area is used very infrequently for sea mammal hunting by Pangnirtung residents.

### 16PA
This travel route between Pangnirtung and Amadjuak Lake was formerly used by hunters (on foot) searching for caribou in late summer. Today, hunters from Pangnirtung travel this route by skidoo on caribou hunting trips to McKeand River area during winter and early spring.

### 17
These areas are currently not used for any Inuit Land Use activities.

### 18FB
These skidoo routes are used by Inuit from Iqaluit to reach caribou and wolf hunting areas around Amadjuak Lake during winter and early spring (and to reach Sylvia Grinnell Lake for fishing).

### 19FB
This is a skidoo travel route from Iqaluit to the outpost camp at Allen Island.

## NOTES ON COMMERCIAL FISHERIES
A commercial quota of 10,300 kg of Arctic char has been established for Pangnirtung fishermen in Nettilling Lake.

A commercial quota of 4,500 kg of Arctic char has been established for Irvine Inlet for Pangnirtung fishermen.

The area adjacent to Opingivik Outpost Camp has an Arctic char commercial quota of 900 kg.

Test fishing (by longline) for Greenland halibut and Atlantic cod has been conducted in northern Cumberland Sound by Pangnirtung fishermen over the past few open-water seasons, with a view to establishing commercial fisheries for these species.

# ACKNOWLEDGEMENTS

The NCRI research team received assistance from many sources, both institutional and individual, throughout this initiative through the provision of advice, technical assistance and documentation, review of project materials, essential services and interviews. We thank all for their very generous support.

**Community of Pangnirtung**

Hamlet of Pangnirtung

Pangnirtung HTA Board Members and Chairpersons

**Department of Environment, Government of Nunavut**

**Interviewees – Pangnirtung**

Joopa Sowdluapik, Lasalusie Ishulutak, Jackie Nowdlak, Jaypetee Qappik, Peteroosie Qappik, Mosesee Nowdlak, Patrick Kilabuk, Pauloosie Vevee, Jooshua Akulukjuk and Joavee Alivaktuq.

**Inuit Heritage Trust (IHT), Iqaluit**

Jim Richards, Arctic Bird Specialist, Ontario, Canada Jim is credited with providing valuable advice as well as many of the bird photos.

**Legislative Library, Iqaluit**

**Fisheries and Marine Institute of Memorial University of Newfoundland, Newfoundland**

**Nunavut Wildlife Management Board, Iqaluit**

# COLLECTED REFERENCES

Ainley, G.A., C.T. Tynan and I. Stirling. 2003. Sea Ice: A Critical Habitat for Polar Marine Mammals and Birds. In: Sea Ice: an Introduction to its Physics, Chemistry and Geology, Thomas, D.N. and G.S. Dieckmann (eds.), Blackwell Publishers, 240-266.

Alexander, V. 1974. Primary productivity regimes of the nearshore Beaufort Sea, with reference to the potential role of ice biota. In: J.C. Reed and J.E. Sater (Editors), The Coast and Shelf of the Beaufort Sea. Arctic Institute of North America, Arlington, Va. Pp. 604-635.

Alexander, V. and H.J. Niebauer. 1981. Oceanography of the eastern Bering Sea ice edge zone in spring. Limnology and Oceanography 26: 1111-1125.

American Ornithologists Union. 1998. The A.O.U. Checklist of North American Birds (Seventh Edition). Washington, D.C. and supplements thereto through the 49th supplement, 2008.

Ashkui Project. Combining Traditional Ecological Knowledge and Western Science: URL: http://www.ec.gc. ca/EnviroZine/english/issues/26/print_version_e.cfm

Berkes, F. 1993. Traditional Ecological Knowledge in Perspective. Pp 1-10, In: Inglis, J.T. (ed.) Traditional Ecological Knowledge: Concepts and Cases. International Program on Traditional Ecological Knowledge, Canadian Museum of Nature, Ottawa and International Development Research Centre, Ottawa. 150 pp.

Berkes, F, R., Huebert, H. Fast, M. Manseau and A. Diduck. 2005. Breaking Ice: Renewable Resource and Ocean Management in the Canadian North. University of Calgary Press, 396 pp.

Bradstreet, M.S.W. and W.E. Cross. 1982. Trophic Relationships at High Arctic Edges. Arctic 35: 1-12.

Bray, R. 1943. Notes on the Birds of Southampton Island, Baffin Island and Meleville Peninsula. Auk 60:504-536

Brook, R., M. M'Lot and S. McLachlan. 2006. Pitfalls to avoid when linking traditional and scientific knowledge. pp 13-20 In : (Riewe, R. and J. Oakes, eds.) Climate Change: linking traditional and scientific knowledge. Aboriginal Issues Press.

Buckley, J.R., T. Gammelsrod, J.A. Johannessen, O.M. Johannessen 1979 and L.P. Roed. 1979. Upwelling: Oceanic Structure at the Edge of the Arctic Ice Pack in Winter. Science 203: 165-167.

Canadian Wildlife Service, 2007. Northwest Territories/ Nunavut Bird Checklist Survey program data. Available online at http://www.pnr-rpn.gc.ca/checklist

Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Wildlife Species Search. Available online: http://www.cosewic.gc.ca/eng/sct1/ searchform_e.cfm Acessed online: 28/06/2011. Last updated:01/06/2011

Crawford, R. and J.Jorgenson. 1990. Density Distribution of Fish in the Presence of Whales at the Admiralty Inlet Landfast Ice Edge. Arctic 43: 215-222.

Csanady, G.T. 1982. Circulation in the coastal ocean. D. Reidel, Dordrecht, The Netherlands, 279 pp.

Department of Fisheries and Oceans. Aquatic Species at Risk. Accessed online at: http://www.dfo-mpo.gc.ca/species-especes/search-location-recherche-endroit-eng.htm. Last updated; 02/06/2011.

DFO 2009. Web Tide Model http://www.mar.dfo-mpo.gc.ca/science/ocean/ coastal_hydrodynamics/WebTide/webtide.html

Dyke, A.S., J. Hooper and J.M. Savelle. 1996. A History of sea ice in the Canadian Arctic Archipelago based on post-glacial remains of the bowhead whale (Balaena mysticetus). Arctic 49: 235-255.

Dyke, A.S. and J.M. Savalle. 2001. Holocene History of the Bering Sea Bowhead Whale (Balaena mysticetus) in its Beaufort Sea Summer Grounds off Southwestern Victoria Island, Western Canadian Arctic. Quaaterney Research 55: 371-379.

Ellis, D. V. 1956. Observations on the migration, distribution and breeding of birds in the Canadian Arctic during 1954 and 1955. Dansk Ornithologisk Forenings Tidesskrift 50:207-230

Ford, J.D., B. Smit, J. Wandel, M. Allurut, K. Shappa, H. Ittusarjuat, and K. Qrunnut. 2008a. Climate change in the Arctic: current and future vulnerability in two Inuit communities in Canada. Geographical Journal 174: 45 – 62.

Ford, J.D., T. Pearce, J. Gilligan, B. Smit and J. Oakes. 2008b. Climate change and hazards associated with ice use in northern Canada. Arctic, Antarctic and Alpine Research 40: 647- 659.

George, J.C.C., H.P. Huntington, K. Brewster, H. Eicken, D.W. Norton and R. Glenn. 2004. Observations on Shorefast Ice Dynamics in Arctic Alaska and the Responses of the Inupiat Hunting Community. Arctic 57(4): 363-374.

Gilligan, J., J. Clifford-Pena, J. Edye-Rowntree, K. Johansson, R. Gislason, T. Green and G. Arnold with J. Heath and R. Brook. 2006. The value of integrating traditional, local and scientific knowledge. pp 3-12 In: Riewe, R. and J. Oakes, (eds.) Climate Change: linking traditional and scientific knowledge. Aboriginal Issues Press.

Godfrey, W. Earle. 1986. The Birds of Canada (Revised Edition). National Museum of Natural Sciences, Ottawa, Canada.

Hannah, C.G., F. Dupont and M. Dunphy. 2009. Polynyas and Tidal Currents in the Canadian Arctic Archipelago. Arctic 62 (1): 83-95.

Harrisson, W.G. and G.F. Cota 1991. Primary production in polar waters: relation to nutrient availability, In: E. Sakshaug, C.C.E. Hopkins and N.A. Oritsland (Editors), Proc. Pro Mare Symp. On Polar Marine Ecology (Trondheim, 12-16 May 1990. Polar Res. 10(1): 87-104.

Hay, K. 2000. Final Report of the Inuit Bowhead Knowledge Study. 2000. Nunavut Wildlife Management Board.

Henshaw, A. 2003. Polynyas and Ice Edge Habitats in Cultural Context: Archaeological Perspectives from Southeast Baffin Island. Arctic 56 (1): 1-13.

Hohn, E. Otto. 1968. The Birds of Chesterfield Inlet, District of Keewatin, NWT, Canada. Canadian Field Naturalist 82(4):224-262.

Huntington, H.P. 2000. Using traditional Ecological knowledge in science: methods and applications. Ecological Applications 10(5): 1270-1274.

Ingram, R.G., J. Bacle, D.G. Barber, Y. Gratton, and H. Melling. 2002. An overview of physical processes in the North Water. Deep Sea Research II, 49: 4893-4906.

Ingram, R.G., E. Carmack, F. Mclaughlin and S. Nicol. 2005. Polar Ocean Coastal Boundaries Pan-Regional Overview. In: Robinson, A.R., Brink, K.H. (Eds.) The Sea, Vol. 14: The Global Coastal Ocean, Regional Studies and Syntheses, Wiley, New York, pp 61-81.

Ingram, R.G. and S. Prinsenberg. 1998. Coastal Oceanography of Hudson Bay and Surrounding Eastern Canadian Arctic Waters. In: Robinson, A.R., Brink, K.H. (eds.) The Sea, Vol. 11: The Global Coastal Ocean, Regional Studies and Syntheses, Wiley, New York, pp 835 -862.

International Union for Conservation of Nature (IUCN). The IUCN red list of endangered species. Available Online at: http://www.iucnredlist.org/apps/redlist/search Acessed online; 28/06/2011

Inuit Land Use and Occupancy Project (1976), Volumes 1-3; Indian and Northern Affairs ISBN 0-660-00-401-1

Inuit Qaujimajatuqangit of Climate Change in Nunavut. 2005. (Four Volumes: North Baffin Region; South Baffin Region; Kivalliq Region; and, Kitikmeot Region)

IPCC 2007a. Summary for Policy Makers. In: Climate Change 2007: The Physical Science Basis. (February 2007) Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. IPCC Secretariat, c/o WMO 7bis, Avenue de la Paix. C.P. No 2300, 1211 Geneva 2, Switzerland, 18 pp. (www.ipcc.ch/)

IPCC 2007b. Summary for Policy Makers. In: Climate Change 2007: Climate Change Impacts, Adaption and Vulnerability. (April 2007). Working group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. IPCC Secretariat, c/o WMO 7bis Avenue de la Paix, C.P. No 2300, 1211 Geneva 2, Switzerland, 23 pp. (www.ipcc.ch/)

IPCC 2007c. Summary for Policy Makers. In: Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment. (August 2007) Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, United Kingdom and New York. (www.ipcc.ch/)

IPCC 2007d. Summary for Policy Makers. In Climate Change 2007: Synthesis Report. Approved in detail at IPCC Plenary XXVII (Valencia, Spain 12 – 17 November 2007). (www.ipcc.ch/)

Johannessen, O.M., J.A. Johannessen, M. Morison, B.A. Farrelly and E.A.S. Svendsen. 1983. The Mesoscale oceanographic conditions in the marginal ice zone north of Svalbard in early fall 1979. J. Geophysical Research 88: 2755-2769.

Legendre, L., S.F. Ackley, G.S. Dieckmann, B. Gulliksen, R. Horner, T. Hoshia, I.A. Melnikov, W.S. Reeburgh, M. Spindler, and C.W. Sullivan. 1992. Ecology of sea ice biota. 2. Global significance. Polar Biol. 12: 429-444.

McGhee, R. 1993. Ancient Peoples of the Arctic. UBC Press, in association with the Canadian Museum of Civilization, Vancouver.

McLaughlin, F.A., E.C. Carmack, R.G. Ingram and W.J. Williams, 2005. Oceanography of the Northwest Passage In The Sea, Vol. 14: The Global Coastal Ocean, Regional Studies and Syntheses, A.R. Robinson and K.H. Brink, eds. John Wiley and Sons, Inc., New York, pp 1213-1244.

Melling, H. 2000. Exchanges of freshwater through the shallow straits of the North American Arctic. In: The Freshwater Budget of the Arctic Ocean, E.L. Lewis et al (eds.), Kluwer Academic Publishers, Dordrecht., 479-502.

Michel, C., R.G. Ingram and L.R. Harris. 2006. Variability in oceanographic and ecological processes in the Canadian Arctic Archipelago. Progress in Oceanography 71: 379- 401.

Moller, H., F. Birkes, P. O'Brian Lyver and M. Kislalioglu. 2004. Combining science and traditional ecological knowledge: monitoring populations for co-management. Ecology and Society 9(3): [online]. http://www. ecologyandsociety.org/vol9/iss3/art2

Moore, S. and H.P. Huntington. 2008. Arctic marine mammals and climate change: impacts and resilience. Ecological Applications 18(2), Supplement: S157-S165.

Nunavut Wildlife Management Board. 2004. The Nunavut Wildlife Harvest Study - Final Report. 822 p.

O'Brien, J. P., M.D. Bishop, K.S. Regular, F.A. Bowdring, T.C. Anderson. 1998. Community-Based Coastal Resource Inventories in Newfoundland and Labrador – Procedures Manual. Fisheries and Oceans, St. John's, Newfoundland

Priest, H. 2004. The Nunavut Wildlife Harvest Study. 2004. Nunavut Wildlife Management Board.

Prinsenberg, S.J. 1986a. The circulation pattern and current structure of Hudson Bay. Pp. 187-204, In: Martin, I.P. (ed.) Canadian Inland Seas. Elsevier Oceanography Series.

Prinsenberg, S.J. 1986b. On the physical oceanography of Foxe Basin. Pp. 217-236, In: Martin, I.P. (ed.) Canadian Inland Seas. Elsevier Oceanography Series.

Prinsenberg, S. 1988. Ice ridge contributions to the freshwater contents of Hudson Bay and Foxe Basin. Arctic, 41:6-11.

Prinsenberg, S.J. and N.G. Freeman. 1986. Tidal heights and currents in Hudson Bay and James Bay. Pp. 205-216, In: Martin, I.P. (ed.) Canadian Inland Seas. Elsevier Oceanography Series.

Pyle, Peter and David F. DeSante. 2006. English and Scientific Alpha

Codes for North American Birds through the 47th AOU Supplement. The Institute for Bird Populations, Pt. Reyes, CA.

Renaud, Wayne E., Stephen R. Johnson and P. Dianne Hollingdale. 1979. Breeding Birds of Arctic Bay, Baffin Island, N.W.T., with notes in the Biogeographic Significance of the Avifauna. Arctic. 32(2):122-134

Richard, Pierre. 2001. Marine Mammals of Nunavut. Qikitqtani School Operations, Box 1330, Iqaluit, Nunavut, X0A 0H0.

Richards, Jim, and Tony White. 2008. Birds of Nunavut: A Checklist (private publication, sponsored by Environment Canada).

Saville, D.B.O. 1951. Bird Observations at Chesterfield Inlet, Keewatin, in 1950. Canadian Field Naturalist 65(4):145-157.

Schledermann, P. 1980. Polynyas and prehistoric settlement patterns. Arctic 33 (2): 292-302

Schledermann, P. 1990. Crossroads to Greenland, Arctic Institute of North America, Calgary, 364 pp.

Shortt, T. M., and H. S. Peters. 1942. Some recent bird records from Canada's Eastern Arctic. Canadian Journal of Research 20:338-348

Sibley, David Allen. 2004. Identification of Canada and Cackling Goose, Updated, October 7, 2004 http://www.sibleyguides.com/canada_cackling.htm

Smith, M. and B. Rigby. 1981. Distribution of polynyas in the Canadian Arctic. Pp. 6-28, In: Polynyas in the Canadian Arctic. Stirling, I. and H. Cleator (eds.) Occasional Paper, Number 45, Canadian Wildlife Service.

Soper, J. D. 1928 A faunal investigation of southern Baffin Island. National Museum of Canada Bulletin 53: 76-116

Stewart, D.B. and W.L. Lockhart. 2004. Summary of the Hudson Bay Marine Ecosystem Overview. Prepared by Arctic Biological Consultants, Winnipeg, for Canada Department of Fisheries and Oceans, Winnipeg, Mb. Draft vi + 66 pp.

Stirling, I. 1980. The Biological Importance of Polynyas in the Canadian Arctic. Arctic 33: 303-315.

Stirling, I. 1997. The importance of polynyas, ice edges, and leads to marine mammals and birds. J. of Marine Systems 10: 9-21.

Stirling, I., H. Cleator. And T.G. Smith. 1981. Marine Mammals. pp. 45-58, In: Polynyas in the Canadian Arctic (Stirling, I. and H. Cleator (eds.). Occasional Paper, Number 45, Canadian Wildlife Service.

Sutton, George Miksch. 1931. Notes on Birds Observed Along the West Coast of Hudson Bay. Condor 33:154-159.

Tang, C.L. and M.Ikeda.1989. Ice-Edge Upwelling off the Newfoundland Coast during LIMEX. Atmosphere-Ocean 27: 658-681.

Tee, K.T., P.C. Smith and D. Levaivre. 1993. Topographic Upwelling off the Coast of Nova Scotia. J. Physical Oceanography 23(8): 1703-1726.

Tynan, C.T. and D.P. DeMaster. 1997. Observations and Predictions of Arctic Climate Change: Potential Effects on Marine Mammals. Arctic 50: 308-322.

Welch, H.E., M.A. Bergmann, T.D. Siferd, K.A. Martin, M.F. Curtis, R.E. Crawford, R.J. Conover, and H. Hop. 1992. Energy flow through the marine ecosystem of the Lancaster Sound region, Arctic Canada. Arctic, 45: 343-357.

# APPENDIX 1
# INTERVIEWEE BIOGRAPHIES

| INTERVIEW | NAME | BACKGROUND |
|---|---|---|
| PAN_01_0213 | Joopa Sowdluapik | Joopa was born in 1959 at an outpost camp in Bonaccord in Cumberland Sound and grew up in Pangnirtung. He has been fishing and hunting since he was eight years old and is still an active harvester. |
| PAN_02_0213 | Lasalusie Ishulutak | Lasalusie was born in 1948 at a year-round outpost camp known as "Torpait" located on Ushulutak Point in Cumberland Sound. He spent his youth in the Ushulutak area residing at an outpost camp, and moved to Pangnirtung in 1983. He has been fishing and hunting since he was nine/ten years of age and is still actively harvesting. |
| PAN_03_0213 | Jackie Nowdlak | Jackie was born in Pangnirtung in 1972 and has resided there for his entire life. He has been fishing and hunting since he was fifteen years old and is still an active harvester. |
| PAN_04_0213 | Jaypetee Qappik | Jaypetee was born in Pangnirtung and grew up in the Nunatak/Kikiktaaluk area of Cumberland Sound and moved to Pangnirtung in 1964. He has been fishing and hunting since childhood and is still actively harvesting. |
| PAN_05_0213 | Peteroosie Qappik | Peteroosie was born in the Nunatak area of Cumberland Sound in 1932 and moved to Pangnirtung in 1965. He has been fishing and hunting since he was sixteen/seventeen years of age and is still an active harvester, however he does not hunt and fish as much as he used to. |
| PAN_06_0213 | Mosesee Nowdlak | Mosesee was born in 1950 in Iqaluit and grew up in the Iqaluit/Frobisher Bay area and moved to Pangnirtung in 1969. He has been fishing and hunting since he was twenty years old and is still an active harvester. |
| PAN_07_0213 | Patrick Kilabuk | Patrick was born in 1985 in Iqaluit and grew up in Pangnirtung, where he still resides today. He has been fishing and hunting since he was nine years old and is still an active harvester. |
| PAN_08_0213 | Pauloosie Vevee | Pauloosie was born in 1929 in Pangnirtung, spent the first portion of his life at an outpost camp in Cumberland Sound before moving to Pangnirtung in 1954. He has been fishing and hunting since he was sixteen/seventeen years of age and is still an active harvester. |
| PAN_09_0213 | Jooshua Akulukjuk | Jooshua was born in 1939 at an outpost camp in the Qimiksuuk area of Cumberland Sound, and spent the first part of his life at outpost camps in the Qipisa area before moving to Pangnirtung in 1965. He started fishing and hunting when he was very young and is no longer an active harvester. |
| PAN_10_0213 | Joavee Alivaktuq | Joavee was born at an outpost cam in the Cumberland Sound area in 1951 and moved to Pangnirtung in 1964. He has been fishing and hunting since he was very young and is still an active harvester. |

# APPENDIX 2
# ACRONYMS AND ABBREVIATIONS

**CRI -** Coastal Resource Inventory

**CLEY -** Department of Culture, Language, Elders and Youth

**CWS -** Canadian Wildlife Service

**DFO -** Department of Fisheries and Oceans (Government of Canada)

**DOE -** Department of Environment (Government of Nunavut)

**DSD -** Department of Sustainable Development (Government of Nunavut)

**ED & T -** Department of Economic Development and Transportation (Government of Nunavut)

**GC -** Government of Canada

**GN -** Government of Nunavut

**HTO -** Hunter/Trapper Organization

**INAC -** Indian and Northern Affairs (Government of Canada)

**IQ -** Inuit Qaujimajatuqangit

**IPCC -** Intergovernmental Panel on Climate Change

**NRCan -** Natural Resources Canada (Government of Canada)

**NRI -** Nunavut Research Institute

**NTI -** Nunavut Tunngavik Incorporated

**NWMB -** Nunavut Wildlife Management Board

**TK -** Traditional Knowledge

**TEK -** Traditional Ecological Knowledge

# APPENDIX 3 - BIRD EVALUATION

| SPECIES | GODFREY 1986 | SNYDER 1957 | SOPER 1928 | WATSON 1957 | TAVERNER 1934 | CWS | MISC. | RICHARDS & WHITE 2008 | NCRI INTERVIEW | COMMENTS (ONLY ON BIRDS FROM INTERVIEW) |
|---|---|---|---|---|---|---|---|---|---|---|
| Gr. White-fronted Goose | | x | x | | | | | MB | | |
| Snow Goose | x | | x | | | x | | MB | x | ok |
| Cackling Goose | x | | | | | | | MB | x | possible |
| Canada Goose | x | x | x | x | x | x | | MB | x | ok |
| Tundra Swan | x | x | x | x | | | | MB | x | ok |
| Steller's Eider | | x | x | | x | | x | V | | |
| King Eider | x | | x | x | x | x | x | MB | x | ok |
| Common Eider | x | x | x | | | x | x | MBw | x | ok |
| Harlequin Duck | | x | x | | x | | x | MBw | | |
| Long-tailed Duck | x | x | x | x | x | | x | MB | x | ok |
| Red-breasted Merganser | x | x | x | | x | | | MB | | |
| Willow Ptarmigan | | | x | | | | x | PB | | |
| Rock Ptarmigan | x | x | x | x | x | x | x | PB | x | ok |
| Red-throated Loon | x | x | x | x | | x | x | MB | | |
| Pacific Loon | x | x | | | | | | MB | | |
| Common Loon | x | x | x | x | | x | x | MB | x | ok |
| Yellow-billed Loon | | | | | | | | MB | x | highly unlikely |
| Northern Fulmar | | | x | x | x | x | x | MBw | x | ok |
| Double-crested Cormorant | | | | | | | x | A | | |
| Great Cormorant | | x | x | x | x | | | - | | |
| Great Blue Heron | | | | | | | x | A | | |
| Northern Goshawk | | x | x | | | | x | A | | |
| Golden Eagle | | x | x | | x | | | Vb | | |
| Rough-legged Hawk | x | | | | | | | MB | | |
| Gyrfalcon | x | x | x | x | | | x | PB | x | ok |
| Peregrine Falcon | x | x | x | x | | x | x | MB | x | ok |
| Sandhill Crane | x | x | x | | | | | MB | | |
| Northern Lapwing | | x | | | x | | x | A | | |
| American Golden-Plover | x | x | | | | | | MB | | |
| Common Ringed Plover | x | | x | | | | x | MB | | |
| Semipalmated Plover | x | x | x | x | x | | x | MB | | |

| SPECIES | GODFREY 1986 | SNYDER 1957 | SOPER 1928 | WATSON 1957 | TAVERNER 1934 | CWS | MISC. | RICHARDS & WHITE 2008 | NCRI INTERVIEW | COMMENTS (ONLY ON BIRDS FROM INTERVIEW) |
|---|---|---|---|---|---|---|---|---|---|---|
| Killdeer | | | | | | | | A | x | highly unlikely |
| Spotted Sandpiper | | | | | | | | A | x | highly unlikely |
| Greater Yellowlegs | | x | x | | x | | x | A | | |
| Eskimo Curlew | | x | | | x | | | (M) | | |
| Hudsonian Godwit | | x | x | | x | | | Vb | x | ok |
| Ruddy Turnstone | | | | | x | | x | MB | | |
| Red Knot | | | x | | | | | MB | | |
| Sanderling | | | x | | x | x | x | MB | | |
| Semipalmated Sandpiper | x | | | | | | | MB | | |
| Least Sandpiper | | x | | | | | x | MB | | |
| White-rumped Sandpiper | x | x | x | x | x | x | | MB | | |
| Baird's Sandpiper | x | x | | x | | | x | MB | x | ok |
| Purple Sandpiper | x | x | x | x | x | | | MB | | |
| Red-necked Phalarope | x | x | x | x | | | | MB | | |
| Red Phalarope | x | x | x | | | | x | MB | | |
| Black-legged Kittiwake | | x | x | x | | x | x | MB | | |
| Ivory Gull | | x | x | | | | x | MBw | x | ok |
| Sabine's Gull | | | x | x | | x | | MB | | |
| Ross's Gull | | | | | | x | | MB | | |
| Herring Gull | | x | x | | | | | MB | | |
| Iceland Gull | x | x | x | | | x | x | MB | | |
| Glaucous Gull | x | x | x | x | x | x | x | MBw | | |
| Great Black-backed Gull | | | x | | | x | x | Mb | | |
| Arctic Tern | x | x | x | | | | | MB | x | ok |
| Pomarine Jaeger | | x | | | x | x | | MB | | |
| Parasitic Jaeger | x | x | x | | | x | | MBw | | |
| Long-tailed Jaeger | x | x | x | | | | | MB | | |
| Dovekie | | x | | | x | x | | MBw | | |
| Thick-billed Murre | | x | x | x | x | x | x | MBw | | |
| Black Guillemot | x | x | x | x | x | x | x | MBw | x | ok |
| Atlantic Puffin | | | | | | | x | MB | | |
| Snowy Owl | x | x | x | | x | | x | PB | x | ok |

| SPECIES | GODFREY 1986 | SNYDER 1957 | SOPER 1928 | WATSON 1957 | TAVERNER 1934 | CWS | MISC. | RICHARDS & WHITE 2008 | NCRI INTERVIEW | COMMENTS (ONLY ON BIRDS FROM INTERVIEW) |
|---|---|---|---|---|---|---|---|---|---|---|
| Short-eared Owl | | | x | | | | | MB | | |
| Common Raven | x | x | x | x | x | x | x | PB | x | ok |
| Horned Lark | x | x | | x | | x | x | MB | | |
| Northern Wheatear | x | x | x | x | x | x | x | MB | | |
| Water Pipit | x | x | x | x | | x | x | MB | | |
| Lapland Longspur | x | x | x | x | x | x | x | MB | | |
| Snow Bunting | x | x | x | x | x | x | x | MB | x | ok |
| Common Redpoll | x | | x | x | | | x | MB | | |
| Hoary Redpoll | x | x | x | x | x | | x | MBw | | |

**CODES USED BY RICHARDS:**
M = migrant

B= breeds

b = possible breeder

P = permanent resident

w = winter records

V = vagrant

A = accidental

(M) = extinct

-= not on official NU list

**Note:** species appearing in the columns under Godfrey and Snyder are considered to be breeding, or at least within the normal breeding range of those species.

## BASIC RESEARCH BIBLIOGRAPHY

**American Ornithologists Union Check-List of North American Birds, 1998 and Supplements.**

**CWS.** NWT/NU Checklist Survey (CWS, Yellowknife)

**Godfrey. W. Earl. 1986** The Birds of Canada (revised edition). Nat. Mus. of Canada

**Richards, Jim and Tony White 2008.** Birds of Nunavut: A Checklist. 22pp

**Snyder, L. L. 1957.** Arctic Birds of Canada

### SUPPORTING BIBLIOGRAPHY

**Baird, P. D., et al. 1953.** Baffin Island Expedition, 1953: a preliminary field report. *Arctic* 6:227-251 (Northern Fulmar, Snowy Owl, Snow Bunting, American Pipit, Lapland Longspur, Common Redpoll, King Eider)

**Bray, Reynold. 1945.** Notes on the Birds of Southampton Island, Baffin Island and Melville Peninsula. *The Auk* 60(4):504-536 (Sanderling)

**Diemer, Kristen M., et al. 2011.** Marine mammal and seabird summer distribution and abundance in the fjords of northeast Cumberland Sound of Baffin Island, Nunavut, Canada. *Polar Biol.* 34:41-48 (Common Eider, Glaucous Gull, Iceland Gull, Black Guillemot, Red-throated Loon, Common Loon, Northern Fulmar, Great Black-backed Gull)

**Eckert, Cameron D. 2011.** Northern Canada and Greenland. *North American Birds* 65(2):297-8 (Snow Bunting)

**Eckert, Cameron D. 2012.** Northern Canada and Greenland. *North American Birds* 66(1):110-112 (Great Blue Heron)

**Gaston, A. J., and S. A. Smith. 1987.** Seabirds in the Cape Dyer – Reid Bay area of Cumberland Peninsula, Baffin Island, Northwest Territories. Canadian Field-Naturalist 101(1):49-55 (Thick-billed Murre, Black-legged Kittiwake, Northern Fulmar)

**Gaston, Anthony J., and Jennifer F. Provencher. 2012**. A specimen of the high arctic subspecies of Atlantic Puffin, *Fratercula arctica naumanni*, in Canada. *Canadian Field-Naturalist* 126(1):50-54

**Kumlien, Ludwig. 1879.** Contributions to the natural history of Arctic America, made in conjunction with the Howgate Polar Expedition, 1877-1878. U.S. Nat. Mus. Bull. 15, 1-179

**Orr, Craig D., and John L. Parsons. 1982.** Ivory Gulls, *Pagophila eburnean*, and ice edges in Davis Strait and the Labrador Sea. *Canadian Field-Naturalist* 96(3):323-328

**Orr, Craig D., and Richard M. P. Ward. 1982.** The autumn migration of Thick-billed Murres near southern Baffin Island and northern Labrador. *Arctic* 35(4):531-535

**Shortt, T. M., and H. S. Peters. 1942.** Some Recent Bird Records from Canada's Eastern Arctic. *Can. Journal of Research*. Vol. 20:338-348 (Common Loon, Northern Fulmar, Semipalmated Plover, Glaucous Gull, Black-legged Kittiwake, Northern Raven, Northern Wheatear, Common Redpoll, American Pipit)

**Soper, J. Dewey. 1928.** A Faunal Investigation of Southern Baffin Island. Nat. Mus. of Canada, Bull. No. 35, Biol. Series No. 15

**Soper, J. Dewey. 1934.** Interesting bird records for southern Baffin Island. *The Canadian Field-Naturalist* 48(3):41-44; 48(4):65-68; 48(5):79-82; (Northern Wheatear, Double-crested Cormorant, Harlequin Duck, Willow Ptarmigan, C. Ringed Plover, Ruddy Turnstone, Red Phalarope)

**Soper, J. Dewey. 1946.** Ornithological results of the Baffin Island expeditions of 1928-1929 and 1930-1931, together with more recent records. *The Auk* 63(1):1-24; 63(2):223-239; 63(3):418-427 (Harlequin Duck, Northern Lapwing)

**Taverner, P. A. 1934.** Birds of the Eastern Arctic (in: Canada's Eastern Arctic) Dept. of the Interior, Ottawa. pp 113-128

**Watson, Adam. 1957.** Birds in Cumberland Peninsula, Baffin Island. *The Canadian Field Naturalist* 71(3):87-109

**Watson, Adam. 1963.** Bird numbers on tundra in Baffin Island. *Arctic* 16(2):101-108 (Hoary Redpoll, Common Redpoll, Gyrfalcon, Peregrine Falcon, Glaucous Gull, Snow Bunting, Lapland Longspur, Horned Lark, Water Pipit, Snowy Owl, Baird's Sandpiper, Red-throated Loon, Long-tailed Duck, Common Loon)

**Watson, Adam. 1986.** Notes on the sexual cycle of some Baffin Island birds. *The Canadian Field-Naturalist* 100(3):396-7 (Rock Ptarmigan, Common Redpoll, Hoary Redpoll, Lapland Longspur, Snow Bunting)

**Wynne-Edwards, V. C. 1952.** Zoology of the Baird Expedition (1950): The Birds Observed in Central and South-East Baffin Island. *The Auk* 69 (4):353-391 (Common Ringed Plover, Semipalmated Plover)

**Wynne-Edwards, V. C. 1952.** The Fulmars of Cape Searle. Arctic 5(2):105-117 (Northern Fulmar, Thick-billed Murre, Black Guillemot, Glaucous Gull)

This report covers species found in the Cumberland Sound IBA as well as Auyuittuq National Park, the Kekerton Territorial Park and the Pisuktinu Tunngavik Territorial Park as per CWS, Environment Canada.

**Note:** A report of a Gray Sea Eagle (now; White-tailed Eagle) is convincing, but is yet to be accepted on any official list of Canadian birds. It was first published by the U.S. Natl. Mus., Bull. No. 15, p. 82, and was discussed by Snyder (1957) and Godfrey (1986). This species is normally found in Greenland and the records for Pangnirtung and for the Cumberland Peninsula (1877 and 1878) are no doubt valid. However, this species must remain as 'hypothetical' until further evidence is presented.

ᐊᐸᑎᓕᓪᓚᕆᐅᑦ
Department of Environment
Avatiliqiyikkut
Ministère de l’Environnement