Appendix 39

Meadowbank and Whale Tail Marine Mammal and Seabird 2022 Annual Report

AGNICO EAGLE

Meadowbank and Meliadine Mines

Marine Mammal and Seabird Annual Report, 2022

March 2023

Project No.: 0659043

The business of sustainability

ERM

March 2023

Meadowbank and Meliadine Mines

Marine Mammal and Seabird Annual Report, 2022

ERM Consultants Canada Ltd.

120 Adelaide Street West, Suite 2010
Toronto, ON
Canada M5H 1T1

T: +1 416 646 3608
F: +1 416 642 1269

EXECUTIVE SUMMARY

Agnico Eagle Mines Limited (Agnico Eagle) operates two mines in eastern Nunavut; the Meadowbank Complex (Meadowbank and Whale Tail Mines) approximately 85 km north of Baker Lake, and the Meliadine Mine, approximately 25 km north of Rankin Inlet. Agnico Eagle supplies these projects through annual sea-lifts during the open water season. The shipping company Groupe Desgagnés ships dry cargo, and the Woodward Group of Companies (Woodward) supplied fuel to Meadowbank and Meliadine.

Agnico Eagle holds three Project Certificates (PCs) from the Nunavut Impact Review Board (NIRB) for Meadowbank Mine (No. 004 and 008) and the Meliadine Mine (No. 006). These PCs include conditions related to protection of marine mammals and seabirds, including avoiding sensitive breeding and habitat areas for marine mammals and seabirds and conducting a Marine Mammal and Seabird Observer (MMSO) program by vessel crew (see Table 1 for Compliance to Project Conditions).

The objective of this report is to present a summary of the MMSO data collected by Groupe Desgagnés and Woodward during the 2022 MMSO program to support Agnico Eagle's 2022 annual report to the NIRB. Results from the previous years for Meliadine (2017 to 2021) and Meadowbank (2018 to 2021) are also provided as a comparison between years.

In 2020 through 2022, ERM provided updated training materials for vessel crew that were delivered by Agnico Eagle to shipping companies supplying Meadowbank and Meliadine. These training materials were provided to Groupe Desgagnés and Woodward and included updated instructions for vessel crew on: 1) setbacks from sensitive marine wildlife habitats such as marine mammal haul-outs and seabird colonies, 2) mitigation procedures should marine mammals or seabirds be observed in or near the vessel path, and 3) training materials for dedicated MMSO crew observers including detailed methods for marine mammal and seabird surveys, data sheets, and training videos.

The 2022 MMSO program resulted in greater survey effort compared to 2021. Since the improvement in training in 2020, all years (2020 through 2022) have resulted in greater survey effort compared to previous years. A total of 27 Groupe Desgagnés and Woodward vessels serviced the Projects between July and November during the 2022 shipping season: 13 for Meadowbank, seven for Meliadine, and seven serviced both Meadowbank and Meliadine. Datasheets were obtained from 21 of the 27 vessels in 2022, which is similar to the last two years (23 of the 29 vessels in 2021, and 19 of the 25 vessels in 2020), all of which are greater than previous years (six vessels providing datasheets in 2019, and only two participating vessels in 2018).

Setbacks from Sensitive Habitats

In compliance with Whale Tail Mine Certificate No. 008, Term and Condition 39, project vessels must follow a setback distance of 500 m from colonies and aggregations of seabirds and marine mammals while transiting through the Hudson Strait, Hudson Bay, and Chesterfield Inlet. In addition, vessels must follow a setback distance of 2 km from Marble Island, as per Meliadine's Shipping Management Plan (Agnico Eagle 2022b). Vessel tracks were mapped along with identified sensitive areas for wildlife; where detailed data was available, vessels were shown to avoid these areas where safe to do so. Groupe Desgagnés and/or Woodward had several occasions where tracks appeared to intersect with 500 m setback polygons, or the 2 km setback polygon around Marble Island. However, in all but one case (one point within the Marble Island polygon), no ship track point was located within a setback polygon. Track data is based on satellite AIS (Automatic Identification System); therefore, ship track intersections likely occurred due to lack of ship track resolution and the intersection of existing points to create a continuous shipping track. Agnico Eagle will continue to explore in 2023 the feasibility to obtain accurate track data..

Table 1: Project Certificates, Conditions, Compliance, and Document Section

Project Certificate and Condition #	Compliance	Section
Meadowbank PC 004, Condition 36 Cumberland shall ensure the placement of local area marine mammal monitors onboard all vessels transporting fuel or materials for the Project through Chesterfield Inlet.	**In Compliance** Local area marine mammal monitors have conducted surveys aboard vessels transiting between Chesterfield Inlet and Baker Lake between 2008 and 2019 and in 2022. During 2020 and 2021, due to COVID-19, local monitors could not board vessels and vessel crew conducted the monitoring.	1.6 Overview 3.4 Results
Meadowbank PC 004, Condition 41 Subject to vessel and human safety considerations, Cumberland shall require shippers carrying cargo to the Project through Chesterfield Inlet to follow the following mitigation procedures in the event that marine mammals are in the vicinity of the shipping activities: a. Wildlife will be given right of way; b. Ships will maintain a straight course, constant speed, and will avoid erratic behaviour; and **c.** When marine mammals appear to be trapped or disturbed by vessel movements, the vessel will stop until the mammals have moved away from the area.	**In Compliance** In 2020, Agnico Eagle updated the maps and training materials showing the setbacks and mitigation measures when marine mammals and seabirds are observed. These materials were presented to Groupe Desgagnés and Woodward for distribution to all captains and bridge crew of vessels supplying Agnico Eagle Nunavut mines from 2020 through 2022. Vessel tracks, where sufficient data are available, show vessels avoiding sensitive areas for marine wildlife.	1.3 Training 1.4 Mitigation 3.1 Results
Whale Tail PC 008, Condition 38 The Proponent shall ensure that marine shipping activities avoid sensitive wildlife habitat and species along the shipping route and use a routing south of Coats Island as the primary shipping route, subject to vessel and human safety considerations.	**In Compliance** In 2022, Agnico Eagle emphasized the importance of routing south of Coats Island. As a result, captains were required to travel north of Coats Island on three occasions due to safety issues associated with inclement weather south of Coats Island.	3.1 Results
Whale Tail PC 008, Condition 39 The Proponent shall ensure that, subject to vessel safety requirements, a setback distance of at least 500 metres is maintained from colonies and aggregations of seabirds and marine mammals during Project shipping transiting through Hudson Strait, Hudson Bay, and Chesterfield Inlet.	**In Compliance** In 2020, Agnico Eagle updated the maps and training materials showing the setbacks and mitigation measures when marine mammals and seabirds are observed. These materials were presented to Groupe Desgagnés and Woodward for distribution to all captains and bridge crew of vessels supplying Agnico Eagle Nunavut mines from 2020 through 2022. Vessel tracks, where sufficient data are available, show vessels avoiding sensitive areas for marine wildlife.	1.3 Training 1.4 Mitigation 3.1 Results

Project Certificate and Condition #	Compliance	Section
Whale Tail PC 008, Condition 40 The Proponent shall develop and implement a ship-based marine mammal monitoring program, as part of a Marine Mammal Management and Monitoring Plan, in consultation with Fisheries and Oceans Canada, communities, and other interested parties. The Proponent shall report any accidental contact by project vessels with marine mammals or seabird colonies to applicable responsible authorities including Fisheries and Oceans Canada and Environment and Climate Change Canada.	**In Compliance** In 2020, Agnico Eagle updated the training materials for MMSO monitoring. These materials were presented to Groupe Desgagnés and Woodward for distribution to all captains and bridge crew of vessels supplying Agnico Eagle Nunavut projects from 2020 through 2022. Results of MMSO monitoring show compliance with updated training materials. No vessel strikes with marine mammals or seabirds were reported.	1.3 Training 1.4 Mitigation 3.2 Marine Mammal Results 3.3 Seabird Results Appendices A, B, C (Training documents including Mitigation Summary and SOPs)
Meliadine PC 006, Condition 82 The Proponent shall require all contracted shipping companies to provide full-time marine wildlife monitoring using trained observers and established data collection and recording protocols. Monitoring plans should include provisions for all *Species At Risk Act* (SARA) and for the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) listed species (birds and mammals).	**In Compliance** In 2020, Agnico Eagle updated the training materials for MMSO monitoring. These materials were presented to Groupe Desgagnés and Woodward for distribution to all captains and bridge crew of vessels supplying Agnico Eagle Nunavut mines from 2020 through 2022. Results of MMSO monitoring show compliance with updated training materials. No vessel strikes with marine mammals or marine birds were reported.	1.3 Training 1.4 Mitigation 3.2 Marine Mammal Results 3.3 Seabird Results
Meliadine PC 006, Condition 83 The Proponent shall ensure that, subject to vessel and human safety considerations, all Project shipping adhere to the following mitigation procedures while in the vicinity of marine mammals (including polar bear) and birds: a. Marine mammals will be given right of way; b. Ships will, when possible, maintain a straight course and constant speed, avoiding erratic behaviour; and c. When marine mammals appear to be trapped or disturbed by vessel movements, the vessel will implement appropriate measures to mitigate disturbance, including stoppage of movement until wildlife have moved away from the immediate area.	**In Compliance** In 2020, Agnico Eagle updated the maps and training materials showing the setbacks and mitigation measures when marine mammals and seabirds are observed. These materials were presented to Groupe Desgagnés and Woodward for distribution to all captains and bridge crew of vessels supplying Agnico Eagle Nunavut mines from 2020 through 2022. Vessel tracks, where sufficient data are available, show vessels avoiding sensitive areas for marine wildlife.	1.3 Training 1.4 Mitigation 3.1 Results

Vessel Mitigation

Vessels are required to transit south of Coats Island whenever the weather is safe to do so. The majority (89%) of vessels servicing the Meadowbank and Meliadine projects in 2022 travelled south of Coats Island, with the exception of three occasions, one of which occurred in August due to windy conditions in Hudson Bay, and the other two occurred in October, both due to inclement weather.

Marine Mammal Monitoring

In 2022, 92 transects were surveyed for marine mammals, and 47 stationary surveys were completed. There was a total of 32 sightings (19 during dedicated surveys and 13 incidentally) of marine mammals during the 2022 shipping season, compared to 35 (surveys and incidentally) in 2021, 12 (surveys and incidentally) in 2020, seven (all during surveys) in 2019, none in 2018, and six (all incidental) in 2017. The majority of all marine mammal sightings between 2017 and 2022 were recorded in the Hudson Strait or near Marble Island and Chesterfield Inlet. There is an insufficient number of marine mammal sightings recorded to conduct a density analysis. No marine mammal-vessel interactions (e.g., strikes) were recorded by Groupe Desgagnés or Woodward in 2022, or in previous years (2017 through 2021).

Seabird Monitoring

No interactions between vessels and seabirds were recorded during the MMSO in 2022, or in previous years. Seabird survey effort on moving vessels in 2022 was similar to 2021 and higher than early years, with 163 surveys completed. Over five years of moving vessel surveys for seabirds between 2018 and 2022, 49 species and 8,624 individual birds were recorded. No new species were recorded in 2022. The most common species recorded in 2022 were northern fulmar, razorbill, herring gull, and common murre. For the second year, common murre were reported in large numbers; while they can occur in the eastern portion of the shipping zone near Newfoundland, they are not common through the majority of the survey area. It is possible that identifications of common murre were actually thick-billed murre, which occur throughout the survey area. Across all years, thick-billed murre and northern fulmar are consistently among the most commonly recorded species.

Seabird detectability and density were estimated using models which account for lower detectability of birds with greater distance from survey transects. Detectability estimates were mostly consistent between years, with the highest estimate in 2022, followed by 2019 and 2021. Despite the higher detectability estimate, 2022 had the lowest predicted seabird density. The spatial effort of surveys in 2022 was higher than all previous years, but the number of seabirds recorded was similar to other years. The differences in estimated density are a reflection of variability in the effort and number of birds detected between years.

Stationary vessel surveys in 2022 were frequently lacking records of survey time, creating a lower sample size of surveys which were used for analysis. A total of 2,592 individuals from 37 species were recorded during stationary vessel surveys from 2019 to 2022. Nearly 50% of records were from 2021, and the remaining records were almost all from 2022 and 2020. The detection rate for stationary vessel surveys is roughly half of that for moving vessel surveys. This result is generally consistent with the data, which indicate that both detections and number of birds recorded per survey were lower for stationary surveys compared to moving surveys.

Marine Wildlife Observations - Baker Lake

Agnico Eagle conducts a program of community wildlife observers on barges ferrying supplies between Helicopter Island and Baker Lake within Chesterfield Inlet. Community wildlife observers record incidental sightings of wildlife rather than completing standardized surveys. There were 54 incidental observation sheets completed in 2022 by community members in July, August, and October. On seven of these sheets, observers noted that no birds were observed during a particular time. Wildlife were observed during 47 of the 54 “surveys” conducted in 2022. During these surveys, there were 45 separate sightings

of birds (total of 117 individuals), one sighting of caribou (a group of five animals), and one sighting of a muskox group (eight animals). No marine mammals were observed. The most commonly observed birds were unknown gull species.

In addition to community wildlife observers, the shipping companies continued to record marine wildlife sightings while vessels were at anchor near Helicopter Island, or on the tugs/barges between Helicopter Island and Baker Lake to supplement the community observer effort. In 2022, the tugs (Atlantic Beech and Atlantic Elm) recorded a total of 54 incidental sightings while transiting between Helicopter Island and Baker Lake over 27 separate days between July 13 and October 24. No marine mammals were recorded incidentally, and a total of 233 seabirds were recorded across 13 different species.

In addition to the incidental sightings by the barges, vessels also completed stationary surveys while anchored at Helicopter Island and moving transect surveys when conditions allowed. In 2022 there were 34 stationary surveys for marine mammals completed at Helicopter Island, and one moving transect survey between Helicopter Island and Baker Lake. No marine mammals were observed during any of these surveys. For seabirds, 110 stationary surveys were completed (27 of which had temporal effort recorded) and 15 moving transect surveys. During stationary seabird surveys, 383 individuals across 15 different species were observed, and during moving transect surveys, 172 individual seabirds across 12 different species were observed.

CONTENTS

List of Tables

List of Figures

ACRONYMS AND ABBREVIATIONS

Agnico Eagle	Agnico Eagle Mines Limited
AIC	Akaike's Information Criterion
AIS	Automatic Identification System
CI	Confidence Interval
ECSAS	Eastern Canada Seabirds at Sea
GPS	Global Positioning System
km	Kilometre
MMMMP	Marine Mammal Management and Monitoring Plan
MMSO	Marine Mammal and Seabird Observer
NIRB	Nunavut Impact Review Board
RSA	Regional Study Area
SMP	Shipping Management Plan
SOP	Standard Operating Procedure
VTS	Vessel Traffic Services
Woodward	Woodward Group and Companies

1. INTRODUCTION

1.1 Project Background

Agnico Eagle Mines Limited (Agnico Eagle) contracts the shipping company Groupe Desgagnés to ship cargo and Woodward Group and Companies (Woodward) to ship fuel from Bécancour, Quebec, to its Nunavut Operations, Meadowbank and Meliadine. Since 2017, Agnico Eagle has required shipping companies to conduct vessel-based monitoring of marine mammals and seabirds using the vessel crew.

The Marine Mammal and Seabird Observer (MMSO) Annual Report summarizes results of the 2022 shipping season. The MMSO monitoring program and report satisfies the following Project Certificate Conditions from the Nunavut Impact Review Board (NIRB):

- Whale Tail NIRB Project Certificate No. 008, Terms and Conditions 38, 39, and 40 (NIRB 2020);
- Meliadine Mine NIRB Project Certificate No 006, Terms and Conditions 82 and 83 (NIRB 2022); and
- Meadowbank NIRB Project Certificate No. 004, Terms and Conditions 36 and 41 (NIRB 2018).

This monitoring program is described in:

- the Meadowbank Shipping Management Plan Version 4 (Agnico Eagle 2022a); and
- the Meliadine Shipping Management Plan Version 9 (Agnico Eagle 2022b).

In 2020, the MMSO program was improved following comments from interveners on previous years' MMSO reports. ERM worked with Agnico Eagle to:

- develop training materials, Standard Operating Procedures (SOPs), and data sheets for Groupe Desgagnés and Woodward personnel who would be acting as MMSO observers (Appendices A to C);
- develop mitigation SOPs for vessel crew when marine mammals and seabirds are observed; and
- develop and present training workshops for MMSO observers.

Since the requirements for the Meadowbank and Meliadine projects are very similar, and as initiated in 2020, the 2022 MMSO Annual Report addresses reporting for both projects.

1.1.1 Agnico Eagle Meadowbank Division

Agnico Eagle – Meadowbank Complex operates the Meadowbank and Whale Tail Mines (Figure 1.1-1). The Meadowbank Complex holds NIRB Project Certificates 004 and 008.

Shipping is carried out during the open water season (typically from July to late October) and follows recommended shipping routes that are presently in use for the annual sea lift to Chesterfield Inlet, Baker Lake, and other communities. The shipping route extends through Hudson Strait and across Hudson Bay to Chesterfield Inlet (Figure 1.1-2). There, dry cargo is lightered onto tug-assisted barges and fuel is lightered onto smaller shuttle tankers for Groupe Desgagnés and/or Woodward through the Baker Lake access passage (Chesterfield narrows, south channel) to the Meadowbank Mine barge unloading facilities and laydown area in Baker Lake.

In addition, the Meadowbank Complex is required to place a local area marine wildlife monitor on-board all vessels transporting fuel or materials for the Project through Chesterfield Inlet to satisfy the NIRB Project Certificate No. 004, Term and Condition 36.

Whale Tail Mine Certificate No. 008, Term and Condition 39 requires that project vessels must follow a setback distance of 500 m from colonies and aggregation of seabirds and marine mammals while

transiting through the Hudson Strait, Hudson Bay, and Chesterfield Inlet. To support compliance with this condition, setback polygons were created (Figure 1.1-2).

1.1.2 Agnico Eagle Meliadine Division

Agnico Eagle – Meliadine Division operates the Meliadine Mine (Figure 1.1-1). The Meliadine Project holds the NIRB Project Certificate 006.

Shipping is carried out during the open water season (typically from July to late October) and follows the recommended shipping routes presently in use for the annual sea lift to Rankin Inlet and other Kivalliq communities. The shipping route study area extends through Hudson Strait and across Hudson Bay to Rankin Inlet, with vessels anchoring either outside or inside Melvin Bay (Figure 1.1-2).

1.1.3 MMSO Annual Report Overview

This MMSO Annual Report provides an overview of:

- training, mitigation, and monitoring required on vessels;
- the vessels that supplied Meadowbank Complex and Meliadine in 2022;
- mitigation measures conducted by these vessels, including setbacks from sensitive habitats, traveling south of Coats Island and avoiding marine mammals and seabirds observed at sea;
- marine mammal monitoring conducted from 2017 to 2022 (2017 was for Meliadine only);
- seabird monitoring conducted from 2018 to 2022; and
- community surveys carried out from barges between Helicopter Island in Chesterfield Inlet and the Hamlet of Baker Lake from 2008 to 2019 and in 2022, and completed by Groupe Desgagnés and Woodward in 2020, 2021, and 2022 (due to restrictions related to the Covid-19 pandemic).

1.2 MMSO Program Objectives

The Meadowbank and Meliadine Shipping Management Plans (SMPs) outline a MMSO program within the Meadowbank Complex Marine Mammal Management and Monitoring Plan (MMMMP; Agnico Eagle 2022c) and Meliadine Marine Environmental Management Plan (MEMP; Agnico Eagle 2022d) that is implemented by Project shipping contractors (Agnico Eagle 2022a, 2022b). Groupe Desgagnés and Woodward are required to implement a MMSO program during shipping activities in the marine Regional Study Area (RSA; Hudson Strait through Hudson Bay) and in Chesterfield Inlet.

The objectives of the MMSO program are to:

1. mitigate interactions between marine mammals and seabirds and Project vessels;
2. collect information on marine wildlife presence along the shipping route; and
3. engage local community members to record sightings of wildlife opportunistically while travelling through Chesterfield Inlet.

As the MMSO related Terms and Conditions are similar between Meadowbank and Meliadine, the MMSO program is presented in one consolidated report in 2022, as was done in 2020 and 2021. This report presents a summary of the MMSO data collected by Groupe Desgagnés and Woodward on-board their vessels during the 2022 MMSO program to provide information to support Agnico Eagle's 2022 Annual Reports to the NIRB. This report also includes a summary of all data collected between 2017 and 2022.

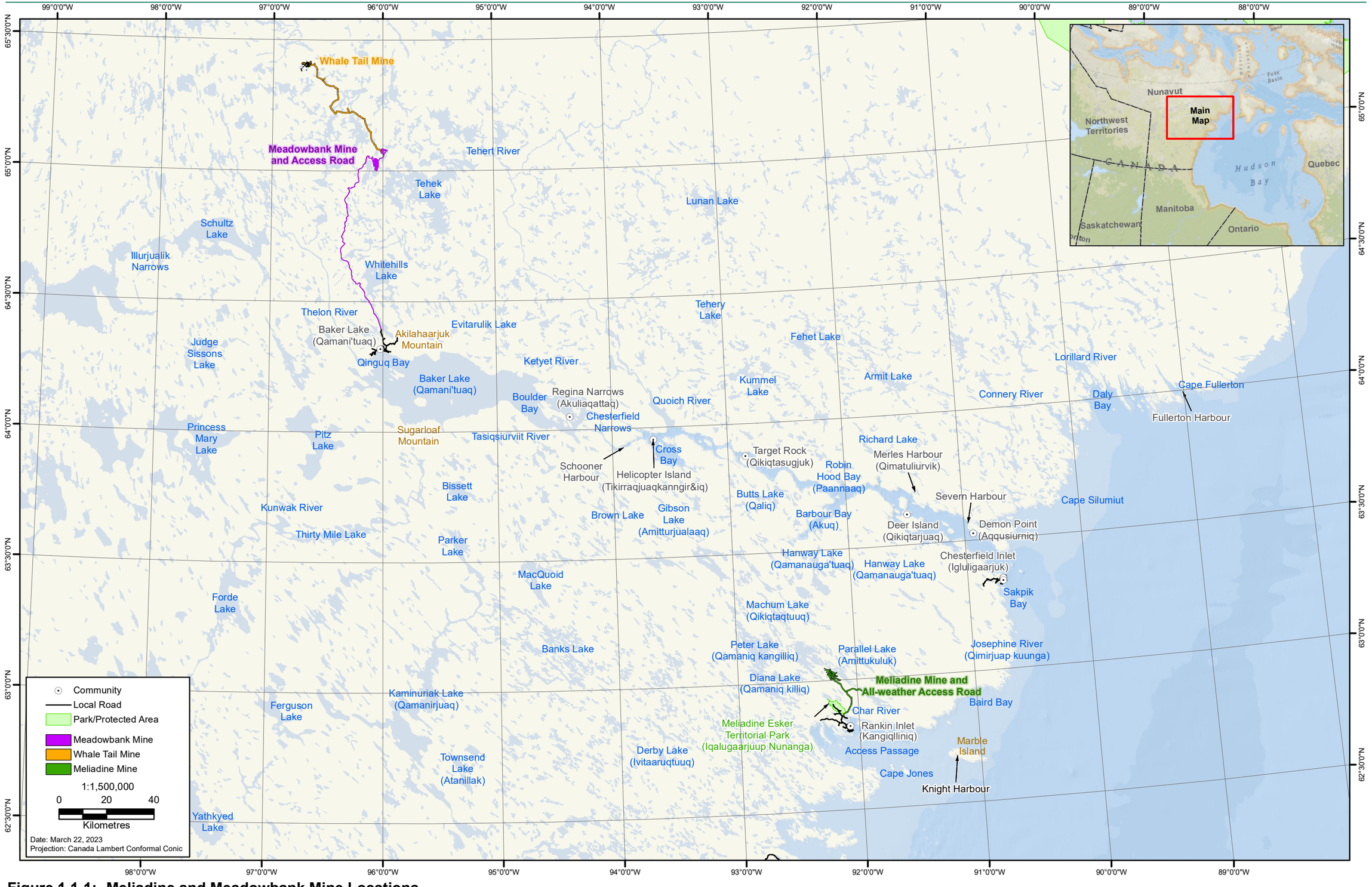

Figure 1.1-1: Meliadine and Meadowbank Mine Locations

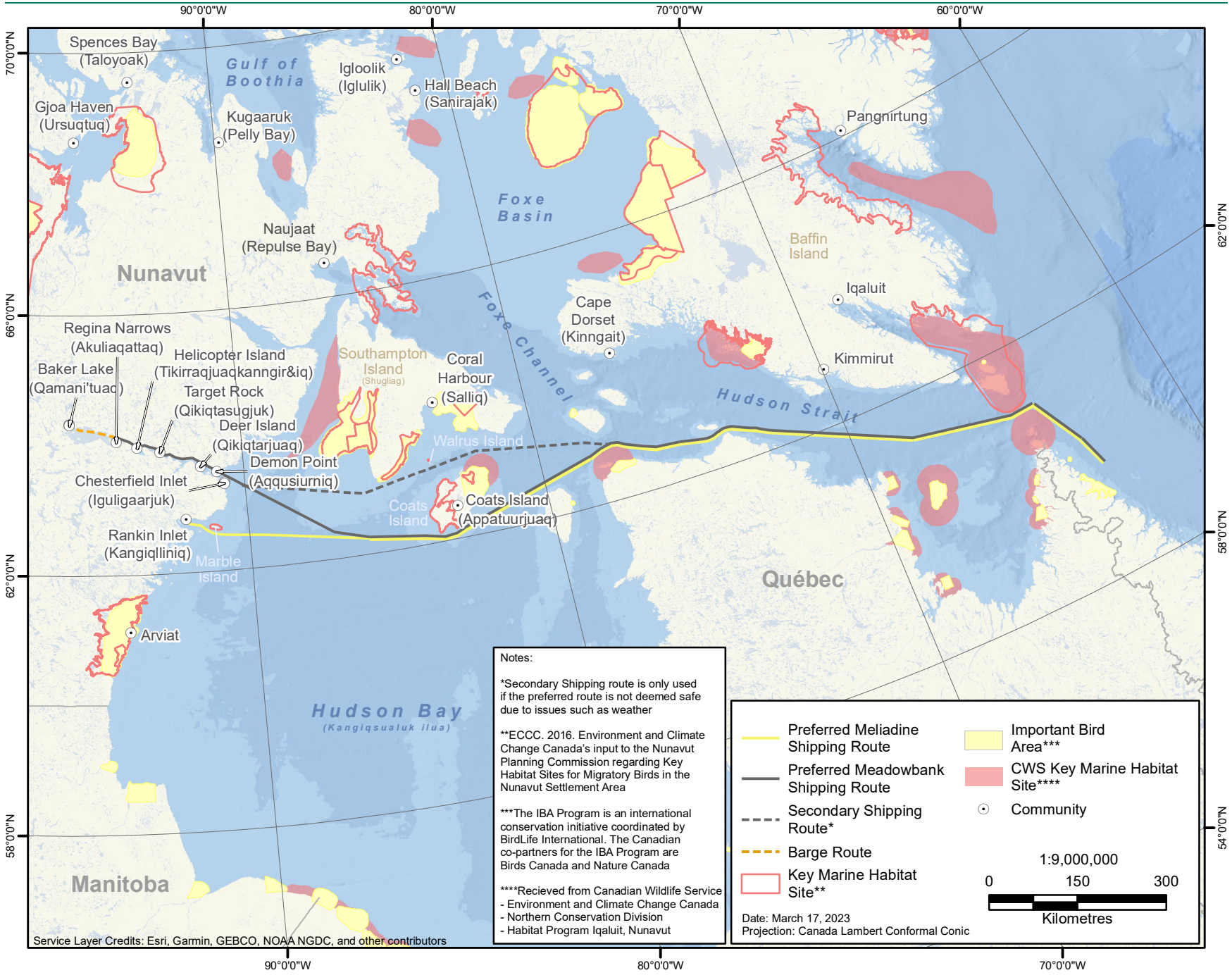

Figure 1.1-2: Marine Mammal and Seabird Observer Program Study Area along Shipping Route to Meliadine and Meadowbank Mines

1.3 MMSO Training

Training provided by Agnico Eagle for the assigned MMSOs was updated in 2020. Minor updates to the seabird datasheets were completed in 2021 and 2022 following comments from Environment and Climate Change Canada (ECCC) to encourage MMSOs to improve data collection using five-minute survey intervals for seabird surveys (see survey methods in Section 2.3). In 2022, training was provided through virtual webinars, as well as holding monthly meetings with the shipping companies to provide additional recommendations and feedback on data collection. The enhanced training material included the following:

- A Marine Shipping Mitigation Summary Brochure (Appendix A), which is required to be reviewed by all captains and assigned MMSOs, and to be kept by captains onboard the vessel at all times for easy and quick reference. This is a 10-page document summarizing guidelines for operation of vessels (e.g., how to transit near animals, preferred routes), mitigation measures for captains based on Section 4.2 of the SMPs, as well as a summary of the monitoring program and survey techniques.
- A pre-trip training presentation/webinar was created and recorded in 2020 and was required to be reviewed by vessel crew members again in 2022. The recorded webinar is also available on the ship for review by MMSOs as needed.
- All MMSOs and captains are required to review and become proficient with the material provided in the Marine Mammal Monitoring SOP (Appendix B) and the Seabird Monitoring SOP (Appendix C), which details the methods for conducting both types of surveys.
- Crew are required to learn marine mammal and seabird identification, including common species (identification guides have been provided).
- All MMSOs and captains are required to review how to fill out the *Marine Mammal Sightings Form, Seabird Sightings Form, Incidental Marine Wildlife Sightings Form*, and the *Marine Mammal and Seabird Observer (MMSO) Incident Report Form* (Attachments in Appendices B and C).
- A one-page fact sheet for marine mammal surveys and a one-page fact sheet for seabird surveys were created and provided to the shipping companies in 2022 to emphasize survey methodologies for the MMSOs.

In addition, the *Marine Mammal Sightings Form, Seabird Sightings Form, Incidental Marine Wildlife Sightings Form*, and the *Marine Mammal and Seabird Observer (MMSO) Incident Report Form* were all updated between 2020 and 2022 to improve data collection and simplify the process for the MMSOs onboard the vessels. These data sheets are provided as attachments within Appendices B and C.

1.4 Marine Mammal and Seabird Mitigation

Project Certificates 004, 006, and 008 require vessels supplying the Meadowbank Complex and Meliadine mines to avoid sensitive marine mammal and seabird habitats such as haul-outs and breeding colonies. Mitigation and management measures (summarized from Section 4.2 of the Shipping Management Plans for Meadowbank and Meliadine; Agnico Eagle 2022a, 2022b) include the following:

1. General navigational requirements while travelling through Hudson Straight to Helicopter Island or Rankin Inlet, include the following:
    - ships will, when possible, maintain a straight course and constant speed, and avoid erratic behaviour;
    - marine mammals will be given right of way as safe navigation allows;
    - the ship will not be operated in such a way as to separate an individual member(s) of a group of marine mammals from other members of the group;

- ships will maintain the required setback distances (500 m) around marine mammals and seabirds on land;
- ships will use a routing south of Coats Island as the primary shipping route;
- ships travelling for the Meliadine mine will remain at least 2 km from Marble Island to avoid disturbing seals, walrus and marine birds that might be in the vicinity; and
- ships will maintain the required setback distances around marine mammals and seabirds in the water (between 100 m and 500 m depending on group size or behaviour of animals, see Appendix A).

2. As part of the shipping companies' standard operating procedures, ship crews will monitor for marine mammals and seabirds from Hudson Strait to the lightering point near Helicopter Island (Meadowbank) or Rankin Inlet (Meliadine).
3. The ship's Master will be notified if there is a concern of the ship striking a marine mammal.
4. Ship personnel are required to take actions to avoid a possible collision by implementing management measures (e.g., reduce speed, stop vessel until animal moves away), if safe to do so.
5. If a collision occurs, the appropriate people will be contacted and the incident will be documented.

This report describes the vessel routes, and their avoidance of sensitive wildlife areas. The report also describes any observations of marine mammals and seabirds that would trigger mitigation and the mitigation that occurred, if any.

1.5 MMSO Program Monitoring on Vessels

The MMSO Program was developed to meet commitments made during the NIRB hearings related to marine shipping. The MMSO program is required to be conducted during all routine shipping activities along the shipping route from Bécancour to the project. The program includes collection of information on marine wildlife species presence along the shipping route. In addition, surveys are occasionally conducted while the vessel is anchored at Helicopter Island or Rankin Inlet. The marine mammal and seabird monitoring is conducted by ship's crew and methods are provided in Section 2 and Appendices B and C. Results of MMSO monitoring at sea are reported in Sections 3.2 and 3.3.

1.6 Marine Wildlife Observations – Baker Lake

When transporting dry cargo and fuel from Bécancour to Baker Lake, deep-water vessels can enter Chesterfield Inlet, but must stop at Helicopter Island (Tikirraqjuaqkanngir&iq) at the west end of the Inlet. There, material is loaded aboard barges, and tugs move the barges through the narrow passage connecting Chesterfield Inlet to Baker Lake, and then on to the hamlet of Baker Lake.

To satisfy NIRB Project Certificate No. 004, Term and Condition 36, Agnico Eagle's Meadowbank Complex is required to engage a local area marine wildlife monitor onboard all vessels transporting fuel or dry cargo for the mine on barge shipping between Helicopter Island and Baker Lake.

During 2020 and 2021, due to the Covid-19 pandemic, Inuit observers were not allowed aboard vessels; therefore, marine wildlife observations were only made by vessel crew when possible. In 2022, standard practice resumed, and local monitors were again onboard vessels to record sightings of wildlife. Results of marine wildlife monitoring between Helicopter Island and Baker Lake are reported in Section 3.4.
In addition to local monitors, both Groupe Desgagnés and Woodward MMSOs completed marine wildlife observations in 2022 between Helicopter Island and Baker Lake. These results are presented in Sections 3.2 and 3.3 and summarized in Section 3.4.1.

2. METHODS

Groupe Desgagnés and Woodward crew members were assigned MMSO duties and were trained to complete the surveys following the SOPs (Appendices B and C) and in accordance with the methods outlined in the SMPs (Agnico Eagle 2022a, 2022b). These methods are summarized below and described in detail in Appendices B and C.

2.1 Vessel Tracks

Agnico Eagle provided ERM with a list of vessel names and dates of delivery for shipments to Meadowbank and Meliadine. Each vessel is required by Transport Canada to transmit Automatic Identification System (AIS) data via a transceiver on board. These data are used by other vessels and Vessel Traffic Services (VTS) to monitor vessel movements. ERM acquired archived AIS data from Vesseltracker, a commercial AIS supplier that aggregates AIS data from satellite and shore-based stations. These data vary in frequency based on distance from shore, location of shore-based stations, and position of satellites. In some cases, AIS position data is available on an hourly or sub-hourly basis, but in other cases, position data can be 12 hours or more between fixes.

Tracks for the vessel names and dates provided by Agnico Eagle were downloaded from Vesseltracker (2023) and plotted using ArcGIS 10.8.1. Only vessels traveling to Meadowbank or Meliadine are presented in this report. In addition, important bird areas and marine mammal aggregations were buffered by 500 m, and Marble Island was buffered by 2 km, as defined by the SMPs (Agnico Eagle 2022a, 2022b), to establish setback polygons. A Geographic Information System (GIS) was used to perform an overlay and near analysis to identify which lines and points intersected or were in close proximity to these buffered areas.

2.2 Marine Mammals

MMSO observations were completed while the vessels were traveling to Agnico Eagle mines. Surveys are carried out by the dedicated MMSO from a high location on the vessel, either on the bow or in the wheelhouse, depending on weather. One to three surveys are completed daily from the same location on the vessel each time. Marine mammal surveys last for a minimum of 1.5 hours to not more than two hours to mitigate observer fatigue and eyestrain. A precise scan routine is carried out throughout the marine mammal observation period as described in the MMMMP and the Marine Mammal Survey SOP (Agnico Eagle 2022c, 2022d; Appendix B).

All marine mammals observed during the dedicated marine mammal survey periods are recorded on the "*Marine Mammal Sightings Form*", including GPS location, distance to animal, angle to animal, number of individuals, species, and behaviour. If a marine mammal is observed during the voyage outside of the dedicated marine mammal observation period (i.e., off-effort), this is recorded as an incidental sighting on the "*Incidental Marine Wildlife Sightings Form*" (Appendix B).

Further details regarding survey methods for marine mammals are provided in the SOP provided in Appendix B, and within the MMMMP (Agnico Eagle 2022c, 2022d).

2.2.1 Marine Mammal Data Analysis

This section outlines the methods used to summarize the environmental conditions, observer effort, and marine mammal sightings related to the information recorded by Groupe Desgagnés and Woodward. There were not enough marine mammal sightings recorded during the MMSO programs to conduct a density analysis. However, after an additional shipping season and due to the improvement in data collection in recent years, the possibility for a density analysis will be revisited in 2023.

2.2.1.1 Temporal and Spatial Observation Effort

Temporal (hours) and spatial (km) marine mammal observation effort was defined as the effort dedicated to marine mammal surveys as recorded by Groupe Desgagnés and Woodward on the MMSO datasheets. Marine mammal spatial effort was calculated as linear kilometres using GPS coordinates that were recorded at the start and end of each MMSO survey transect. Start and end times were recorded on the datasheets and were used to determine temporal effort (i.e., the time spent completing marine mammal surveys). If a start or end location, or a start or end time was not entered in the datasheet, then spatial and/or temporal effort could not be calculated for that survey and was excluded from the survey effort.

2.2.1.2 Environmental Variables

Environmental variables were recorded on the datasheets during surveys. These variables include wind speed and direction, sea state (Beaufort scale), weather (e.g., precipitation and cloud conditions), visibility (in km), and sun glare. Environmental variables were summarized as a percentage of observation effort.

2.3 Seabirds

Dedicated MMSOs are directed to complete surveys from moving and stationary platforms according to the Eastern Canada Seabirds at Sea (ECSAS) standardized protocol for pelagic surveys from moving and stationary platforms (Gjerdrum et al. 2012). Surveys for seabirds were conducted by the dedicated MMSO from a high location on the vessel, either on the bridge or in the wheelhouse, depending on weather. Surveys are carried out at the same location on the vessel as much as possible. Surveys are best completed along a transect line; therefore, it is best to start a seabird observation period when the vessel is and will be moving in a straight line for an extended period of time (i.e., Moving Vessel Surveys, Appendix C Section 2.4.3). If the vessel is stationary (e.g., anchored) for a day or portion of a day, then a seabird survey will be required while anchored to ensure the minimum of one survey per day is met (i.e., Stationary Vessel Survey, Appendix C Section 2.4.4). Training for crew members focused on following the ECSAS protocol, which involves surveys conducted in 5-minute “snapshot” intervals, as per recommendations by ECCC.

For both survey types (moving and stationary), binoculars or spotting scopes are used to confirm species identification and other details when necessary. All seabirds observed during surveys are recorded including species, number of individuals, location (in flight or on water), distance to the vessel, and behaviour. Additional information regarding the seabird surveys can be found in Appendix C.

MMSOs are directed to complete each seabird survey period on a moving vessel during six consecutive five-minute periods and repeated three times a day to capture morning, afternoon and evening periods, when possible. A precise scan routine is conducted within 300 m from the vessel as described in the MMMMP and the Seabird Survey SOP (Agnico Eagle 2022c, 2022d; Appendix C). All birds observed within this 300 m transect, whether flying or on the water, are recorded and considered in-transect sightings.

Stationary vessel surveys are carried out as a 180° semi-circle scan of the surrounding area from the front (bow) of the vessel. Birds within 300 m are considered inside the survey area; however, birds beyond 300 m are still recorded. The survey ends when all seabirds within the semi-circle have been recorded, or if no seabirds are seen during the initial scan, the survey is complete.

If a seabird is observed during the voyage outside of the dedicated seabird observation period (i.e., off-effort), this is recorded as an incidental sighting on the “*Incidental Marine Wildlife Sightings Form*” (Appendix B).

2.3.1 Seabird Data Analysis

2.3.1.1 Temporal and Spatial Observation Effort

The number of survey hours and kilometres (km) were recorded as indices of effort for seabird surveys. Seabird spatial effort was calculated as linear kilometres using GPS coordinates that were recorded by Groupe Desgagnés and Woodward at the start and end of each survey. Start and end times recorded on datasheets were used to determine temporal effort (i.e., the time spent completing seabird surveys). Spatial effort is reported for moving vessel surveys only, while temporal effort is reported for both moving vessel and stationary vessel surveys.

In 2022, crew member training focused on emphasizing five-minute interval surveys, as per the Eastern Canada Seabirds at Sea (ECSAS) standardized protocol for pelagic surveys from moving and stationary platforms (Gjerdrum et al. 2012). Therefore, in 2022, shipping companies recorded start/end time and position for each five-minute interval of a survey (for moving vessel surveys). Each survey consisted of six five-minute intervals. Survey effort was summarized by incorporating all six intervals. However, each five-minute interval was considered separately for distance models because the precise start and end locations are required for modelling.

2.3.1.2 Environmental Variables

Environmental conditions were recorded on survey datasheets: wind speed (Beaufort scale) and direction, sea state, weather (e.g., precipitation and cloud conditions), visibility, and sun glare. Environmental variables were summarized according to the number of seabird detections so that any trends with poorer weather or visibility conditions could be visually assessed.

2.3.1.3 Data Analysis

Distance analyses estimate the diminishing detectability of objects (e.g., birds) with greater distance from observers. For example, a bird flying within 50 m is more likely to be seen and identified than a bird flying 300 m away from an observer. Because birds at greater distances are more likely to be missed during surveys, the number of birds recorded does not represent the true abundance of birds in the area. Distance models take these detectability changes into account and allow more accurate estimation of seabird density (Buckland et al. 2001). Seabird monitoring records included observations of seabirds at varying distances from the vessel. Data from a moving vessel can be approximated as sampling along line transects. This analysis is also possible for point data (i.e., stationary vessel surveys), but estimates of seabird density require repeated observations at the same point locations. Therefore, the analysis of the stationary vessel surveys only includes detection estimates, but not density estimates.

2.3.1.4 Moving Vessel Surveys – Data Analysis

Density of seabirds was estimated via distance modelling of moving vessel surveys, with comparison of results between years of surveying. Distance model selection did not include environmental variables, due to low sample size limiting modelling fitting capabilities (Buckland et al. 2001); visual assessment of variation in detection rate according to environmental variables was conducted to determine if any major anomalies were present with poor weather such as rain, snow, or fog.

Analysis of seabird data was performed using the Distance software adapted for R (Distance package v 1.0.7, run on R v 4.1.1; Miller et al. 2019, R Core Team 2021). First, model “key functions” are fit to the data to determine the general shape of the model curve, which describes the change in detection with distance. The three main key functions are: hazard rate, half-normal, and uniform. For example, a uniform function indicates that detection drops off consistently with distance (e.g., a bird is less likely to be seen at

50 m than 0 m, and less likely still to be seen at 100 m). Hazard rate and half-normal curves maintain consistent detection for a certain distance, but detection drops off more steeply at farther distances (e.g., a bird is just as likely to be detected if it is within 100 m but much less likely to be detected past 150 m; Miller et al. 2019). These key functions can have adjustment terms which refine the main model fit: cosine, simple polynomial, and hermite polynomial (a type of orthogonal polynomial) adjustments. All model key function and adjustment combinations were tested for fitting the data.

The observation data were binned into distance categories for analysis: 0-50 m, 50 to 100 m, 100 to 200 m, and 200 to 300 m. The closest distance bins were considered for grouping in case of evasive movements causing an abnormal detection distribution (e.g., if there are more sightings > 50 m away because birds dive or fly away as the ship approaches), but there did not appear to be any anomalies in the data requiring the distance bins to be grouped differently. Models accounted for variable detection according to group size; density estimates results are presented as individuals per km^2. Analyses included only on-transect sightings and did not use re-sightings of the same birds.

Models were selected using the minimum Akaike's Information Criterion (AIC; Akaike 1973). AIC values provide relative rankings between models fit with the same data, where the lowest AIC ranked model is considered the best fit to the data. Top models were also checked for adequate goodness of fit indices including plotting model curves against the data.

2.4 Marine Wildlife Observations – Baker Lake

When transporting equipment and fuel from Bécancour to Baker Lake, deep-water vessels can enter Chesterfield Inlet, but must stop at Helicopter Island (Tikirraqjuaqkanngir&iq) at the west end of the Inlet. There, material is loaded aboard barges, and tugs move the barges through the narrow passage connecting Chesterfield Inlet to Baker Lake, and then on to the hamlet of Baker Lake.

To satisfy NIRB Project Certificate No. 004, Term and Condition 36, Agnico Eagle's Meadowbank Complex is required to engage a local area marine wildlife monitor onboard all vessels transporting fuel or materials for the Mine on barge shipping between Helicopter Island and Baker Lake. Local area marine wildlife observers record all observations of wildlife as incidental sightings. Note that in 2020 and in 2021, community members were not permitted to board vessels due to health and safety restrictions in place related to the Covid-19 pandemic. Therefore, Groupe Desgagnés and Woodward had their MMSOs record sightings of marine mammals and seabirds when possible while travelling on the barge, following methods described in Section 2.2 and 2.3. Local monitors and Groupe Desgagnés and Woodward MMSOs completed the marine wildlife surveys in 2022, with results from the vessel companies presented in Sections 3.2 and 3.3 and summarized in Section 3.4.1.

3. RESULTS

3.1 Shipping Activity in 2022

During the 2022 shipping season, a total of 27 vessels, (two of which were tugs, 14 cargo, and 11 fuel) travelled to Meadowbank (13 vessels), Meliadine (seven vessels), or to both Meadowbank and Meliadine (seven vessels) between July 3 and November 11, 2022 (Table 3.1-1; Figure 3.1-1 through 3.1-4). Vessel tracks broadcast using Automated Information System (AIS) vessel positioning were downloaded from Vesseltracker (2022) and plotted using ArcGIS 10.8.1.

Table 3.1-1: Summary of Groupe Desgagnés and Woodward Vessels during the Shipping Season, July to November 2022

Vessel Name	Fuel or Cargo	Project and Number of Trips			Total Trips
		Meadowbank	Meliadine	Meadowbank and Meliadine	
Kivalliq W	Fuel	1	-	1	**2**
Kitikmeot W	Fuel	2	-	-	**2**
Tuvaq W[1]	Fuel	2	-	-	**2**
Qikiqtalluk W	Fuel	-	2	1	**3**
Marlin Ametrine	Fuel	2	-	-	**2**
Nordika Desgagnés	Cargo	1	2	1	**4**
Atlantic Elm Tug[2]	Cargo	1	-	-	**1**
Atlantic Beech Tug[2]	Cargo	1	-	-	**1**
Acadia Desgagnés	Cargo	1	-	-	**1**
Claude Desgagnés	Cargo	-	1	1	**2**
Sedna Desgagnés	Cargo	-	1	-	**1**
Zélada Desgagnés	Cargo	1	-	1	**2**
Miena Desgagnés	Cargo	1	1	2	**4**
Total		**13**	**7**	**7**	**27**

[1]The Tuvaq W. was also transiting between Helicopter Island and Baker Lake for the Meadowbank mine between August 15 and August 23; however, this is not included as a separate trip due to the nature of the vessel transiting only locally.

[2]The Atlantic Elm and Atlantic Beech Tugs were also transiting between Helicopter Island and Baker Lake for the Meadowbank mine between July and October; however, these are not all considered separate trips due to the nature of the tug transiting only locally.

Most (67%) of these vessels delivered cargo and fuel exclusively for Agnico Eagle, while nine trips also conducted community re-supply before visiting Agnico Eagle mines, including the following:

- Three vessels in July (Kivalliq W., Tuvaq W. and Zelada Desgagnés.; Figure 3.1-1).
- One vessel in August (Acadia Desgagnés; Figure 3.1-2).
- One vessel in September (Sedna Desgagnés; Figure 3.1-3).
- Four vessels in October and November (Tuvaq W., Qikiqtaaluk W., Kivalliq W., and Marlin Ametrine; Figure 3.1-4).

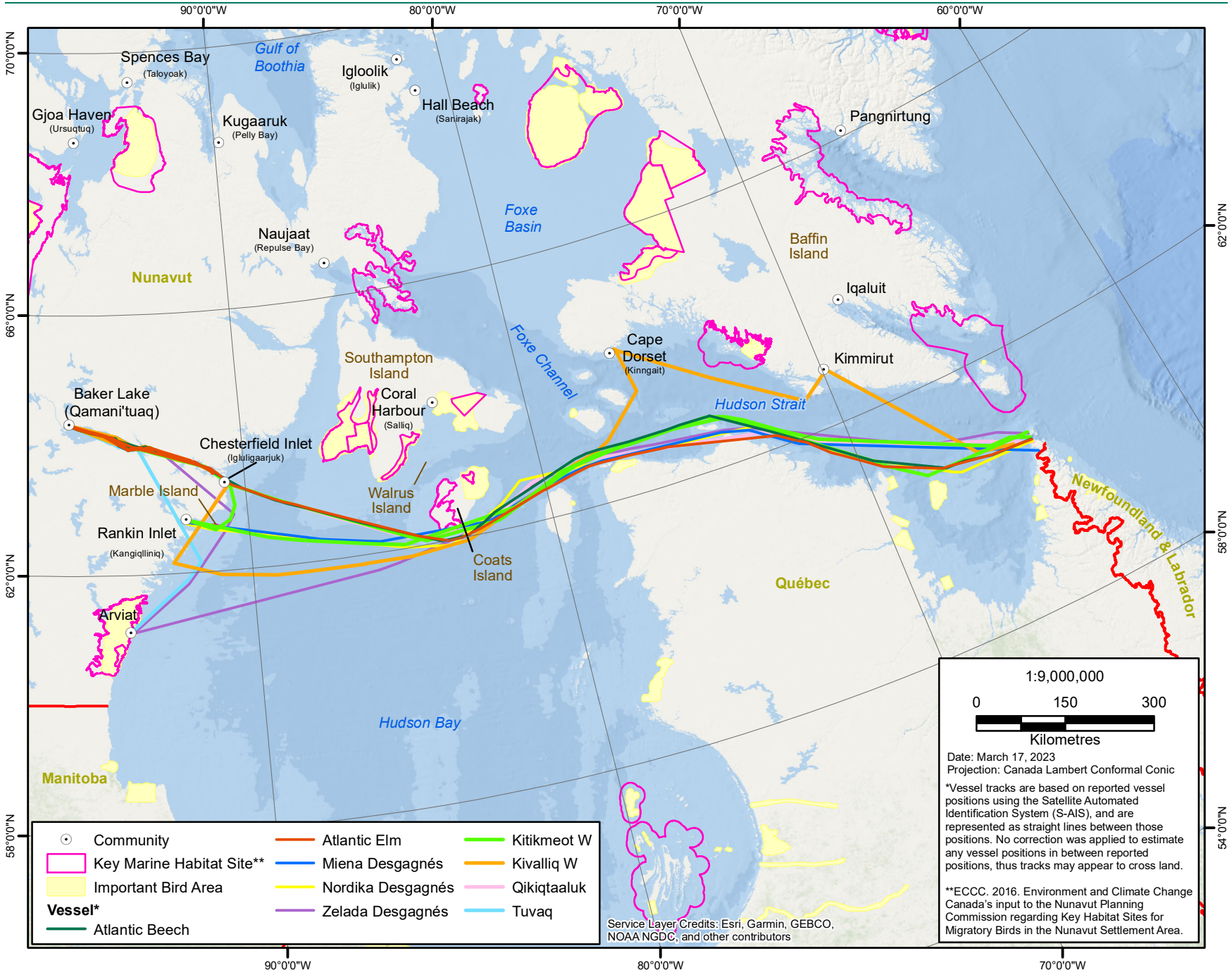

Figure 3.1-1: Groupe Desgagnés and Woodward Shipping Tracks, July 2022

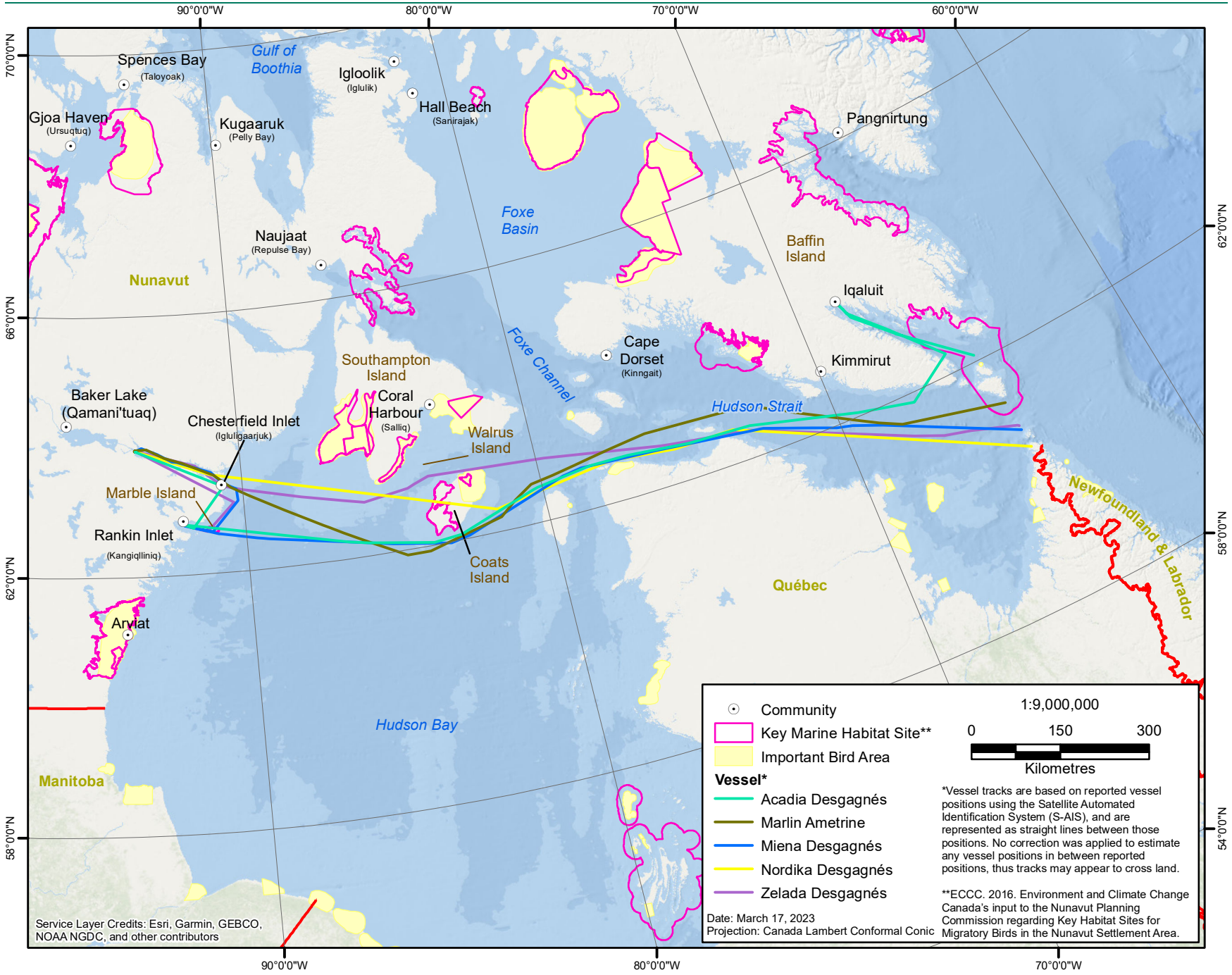

Figure 3.1-2: Groupe Desgagnés and Woodward Shipping Tracks, August 2022

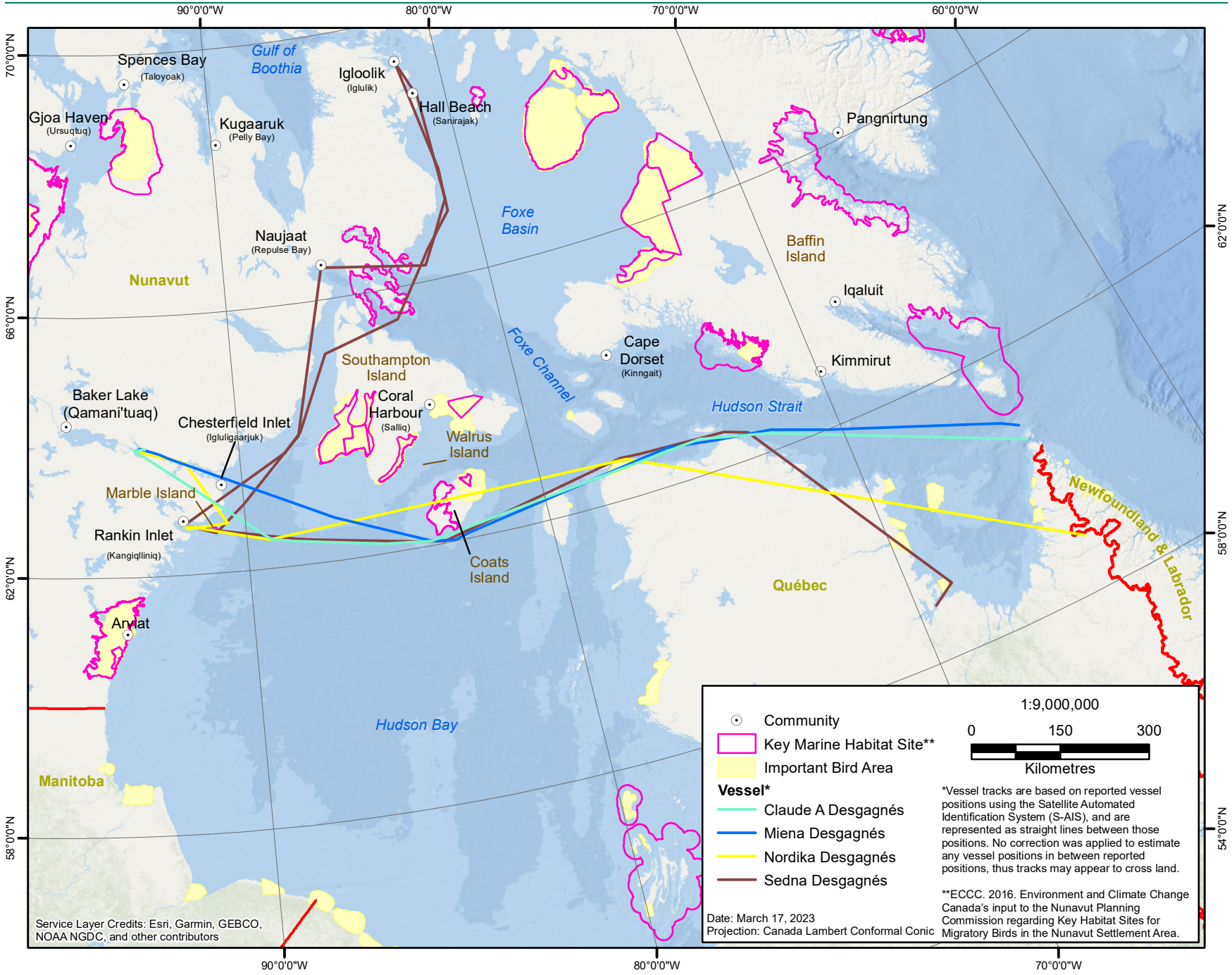

Figure 3.1-3: Groupe Desgagnés and Woodward Shipping Tracks, September 2022

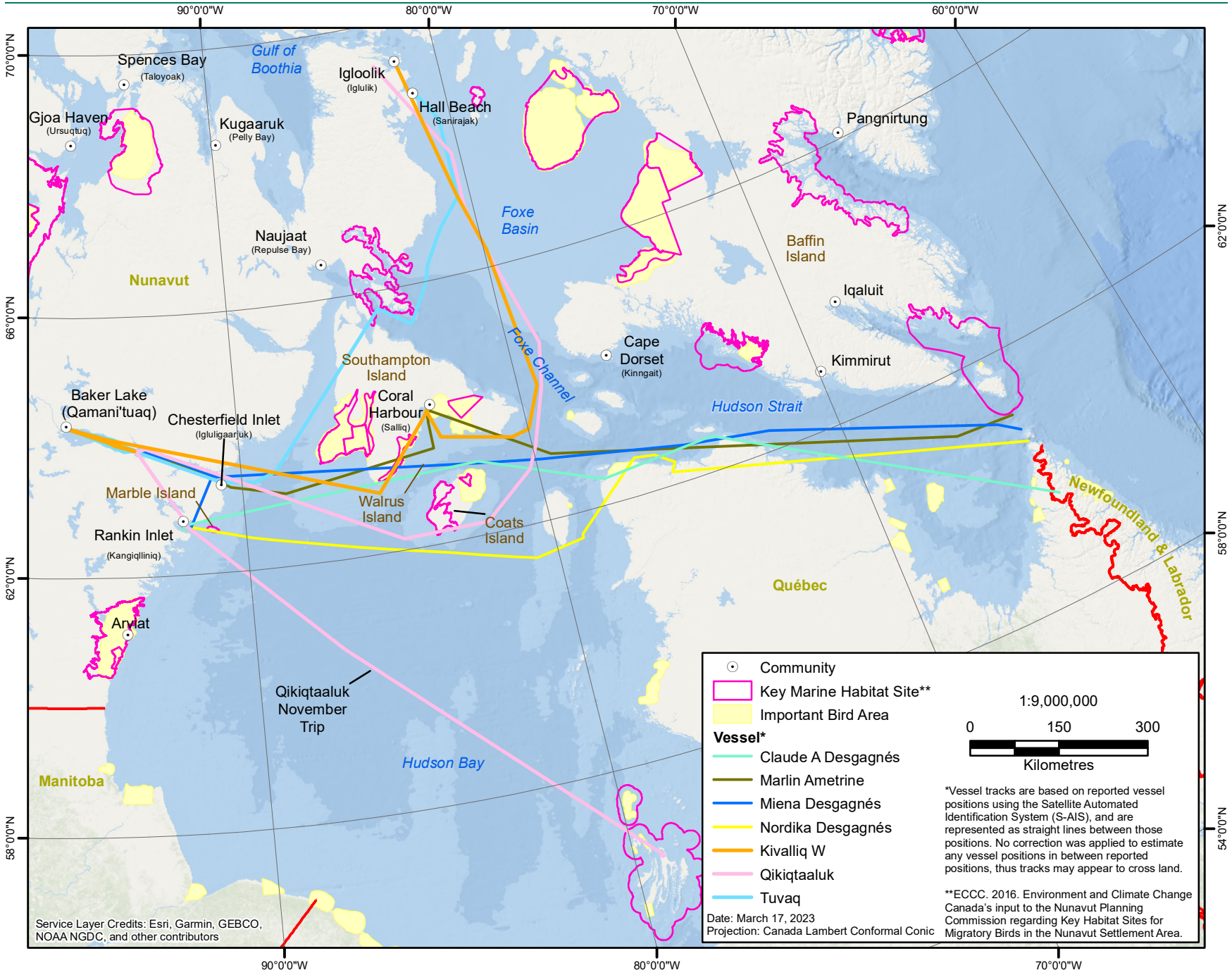

Figure 3.1-4: Groupe Desgagnés and Woodward Shipping Tracks, October and November 2022

3.1.1 Mitigation Measures – Setbacks from Sensitive Habitats

Project vessels must follow a setback distance of 500 m from colonies and aggregation of seabirds and marine mammals while transiting through the Hudson Strait, Hudson Bay, and Chesterfield Inlet, and a setback distance of 2 km from Marble Island. Maps were produced that included these locations, buffers, and the vessel tracks.

Where AIS data was recorded frequently (every hour), vessel tracks avoided the setback areas. However, in some cases, the AIS data was recorded less frequently (every 6 to 12 hours). These long delays between position fixes create erroneous vessel tracks, with vessels in some cases appearing to cross dry land and in other cases appearing to cross the setback areas. For example, during a vessel trip by the Nordika Desgagnés in August (Figure 3.1-2) and another trip in September (Figure 3.1-3), no positions were recorded over two days between August 14 and August 16, or between September 16 and September 18, respectively; therefore, the vessel tracks both appear as straight lines going directly across Coats Island. Due to the poor resolution of this data, information (e.g., route, setbacks) regarding these trips cannot be extrapolated with confidence.

Track data is based on satellite positioning; therefore, ship track intersections likely occurred due to lack of ship track resolution and the intersection of existing points to create a continuous shipping track. Groupe Desgagnés and/or Woodward vessel tracks appeared to cross through the 2 km setback polygon at Marble Island on six occasions, and at the Coats Island setback polygon on six occasions (Figures 3.1-1 through 3.1-4). However, when examining the data, it appears that a vessel only entered the 2 km Marble Island buffer on one occasion, described below.

In all cases where track lines appeared to intersect the setbacks, the point locations were investigated further. From these 12 tracks, only one location point received from the satellite AIS was located within the setback polygons: on one occasion in August, the Miena Desgagnés appeared to be within the 2 km setback buffer around Marble Island. No other points were recorded within the Marble Island setback. The closest ship track point to the Coats Island setback was recorded by the Miena Desgagnés in October, 11.4 km from the setback polygon. Therefore, it is unlikely that the ship passed directly through the setbacks and that the intersections are due to lack of ship track resolution. Vessel captains will be reminded of the importance of maintaining a 2 km buffer around Marble Island prior to the start of the 2023 shipping season.

3.1.2 Mitigation Measures – Coats Island

The corridor between Southampton and Coats Islands has been identified by the community of Coral Harbour as an important breeding ground for walrus and marine birds, and as a potential migration route for marine mammals. Due to concerns that vessel traffic between Coats Island, Walrus Island (north of Coats Island) and Southampton Island may disturb these animals, vessels are required to transit south of Coats Island whenever the weather is safe to do so.

Of the 27 vessels servicing the Meadowbank and Meliadine mines in 2022, the majority (89%, 24 trips) travelled south of Coats Island. Vessels travelled north of Coats Island on the following three occasions (Figures 3.1-2 and 3.1-4):

1. On August 21, the Zelada Desgagnés was required to use the north passage due to high winds.
2. On October 6, the Miena Desgagnés was required to use the north passage due to high seas in Hudson Bay.
3. On October 13, the Claude Desgagnés was required to use the north passage due to high winds.

3.1.3 Mitigation Measures – Avoidance of Marine Mammals and Seabirds

Ships are required to follow mitigation measures outlined in Section 4.2 of the SMPs (Agnico Eagle 2022a, 2022b), summarized in Section 1.4 and Appendix A. In 2022, one incidental sighting of a polar bear triggered mitigation measures by the vessel on July 24. The animal was observed in the water swimming approximately 100 m from the vessel near Marble Island. As per the *Shipping Management Plans* (Agnico Eagle 2022a and 2022b) vessels are required to reduce speed and if possible, cautiously move away from the animal if a marine mammal approaches within 500 m of a ship. Therefore, in compliance with these guidelines, the vessel altered its course to increase the distance between the vessel and the polar bear. As a result, the vessel passed the polar bear approximately 200 m away. No other mitigation measures were reported in 2022. No incidents with marine mammals or seabirds were reported for the 2022 shipping season.

3.2 Marine Mammal Observations

3.2.1 Survey Effort

Surveys were conducted in 2022 by dedicated crew MMSOs between Hudson Straight and Rankin Inlet/Helicopter Island between July 4 and October 23 on board various Groupe Desgagnés and Woodward vessels. A total of 161 marine mammal surveys were conducted in 2022. However, of the 161 surveys, 22 (18 moving vessel surveys and four stationary surveys) were excluded from the analysis of survey effort due to missing start and/or end times, or missing start and/or end latitudes or longitudes. Therefore, a total of 139 marine mammal surveys (92 while the vessel was moving, and another 47 surveys while the vessel was stationary) were completed in 2022.

The 92 transects surveyed while the vessel was moving included a total spatial effort of 2,765.8 km of marine mammal transects over 109.3 hours (Table 3.2-1; Figure 3.2-1). An additional 56.6 hours of surveying was completed while the vessel was anchored. Of the 47 stationary surveys completed while the vessel was anchored, 35 were conducted within Chesterfield Inlet near Helicopter Island, and the remaining 11 were conducted in Rankin Inlet. One stationary survey was completed while the vessel was anchored at Ivujivik near Digges Islands. Appendix D summarizes all marine mammal surveys and sightings information.

Table 3.2-1: Marine Mammal Survey Effort, 2017 to 2022

Year of Survey	Moving Surveys			Stationary Surveys
	Number of Transects Surveyed	Total km Surveyed (Spatial Effort)	Total Time Surveyed (Temporal Effort; hr)	Total Time (hr) Anchored Vessel
2017	11	NA[1]	10.25	0.00
2018	31	1,155.7	29	0.00
2019	38	1,898.3	62.82	59.25
2020	58	2,354.7	112.33	92.5
2021	56	2,824.9	110.5	80.4
2022	92	2,765.8	109.3	56.6
Total	**286**	**8,644.7**	**434.2**	**288.75**

[1] *Spatial data for the 2017 surveys are not available.*

According to the observation datasheets completed by Groupe Desgagnés and Woodward, marine mammal observer effort in 2022 was similar to 2021 and 2020, all of which were greater than previous years (Table 3.2-1). In 2022, observer effort during transit was 109.3 hours and 2,765.8 km, and an

additional 56.6 hours of effort while the vessel was anchored, compared to 2021, when effort during transit was 110.5 hours and 2,824.9 km, and an additional 80.4 hours of effort while the vessel was anchored. In 2020, observer effort during transit was 112.3 hours and 2,354.7 km. A total of 92.5 hours of effort was conducted while anchored in 2020. In 2019, observer effort during transit was 62.8 hours and 1,8.3 km with 59.3 hours of stationary effort.

Datasheets with missing survey times, dates and/or GPS coordinates were not incorporated into the effort analysis. In 2022, there were 18 transects while the vessel was moving that were missing either a start or end time, or the GPS coordinates for the start or end location of the transect, and four stationary surveys that were missing start or end times (i.e., no temporal effort). Sightings during these surveys are reported as incidental observations (see Table 3.2.3).

3.2.1.1 Environmental Variables and Weather Conditions

The weather conditions (Figure 3.2-2a) for the 2022 marine mammal observation program were predominantly partly cloudy, cloudy, or clear (41%, 27%, and 19% of the survey effort, respectively). Rain and fog were present for a combined 9% of the survey time, while 4% of the survey effort lacks weather data. Average visibility extended to 11 km, with a maximum of 30 km and minimum of 1 km.

The sea state (Figure 3.2-2b) ranged from sea state 0 (calm) to sea state 6 (large waves with white foam crests); however, the sea state fell predominantly within states 0 (calm), 1 (ripples), and 2 (small wavelets all over; 20%, 22% and 20% of the survey effort, respectively). Large wavelets, few whitecaps (sea state 3) occurred 18% of the survey effort while sea state 4 (small waves, frequent whitecaps) occurred slightly more frequently (10% of survey effort). Sea state 5 (moderate waves, many whitecaps) and 6 (large waves and white foam crests) occurred rarely (8% and 1% of survey effort), and 1% of the survey effort lacked sea state data.

Glare conditions were generally favourable during surveys in 2022; however, one fifth (16%) of the 2022 marine mammal surveys proceeded with bright glare (Figure 3.2-2c). Glare was recorded as none and slight/grey 42% and 33% of the time respectively, and glare data is absent for 9% of the survey effort.

3.2.2 Marine Mammal Observations 2022

Marine mammals were observed during dedicated surveys and incidentally in 2022. Survey results, incidental sightings, and species descriptions are provided in the following sections.

3.2.2.1 Marine Mammal Observations during Surveys, 2022

During dedicated marine mammal surveys, there was a total of 19 separate sightings of marine mammals (102 animals) by Groupe Desgagnés and Woodward during the MMSO Program in 2022. Three species of marine mammals and two unknown species were recorded during these surveys (Table 3.2-2; Figure 3.2-3). Species observed included Atlantic walrus (*Odobenus rosmarus rosmarus*), bearded seal (*Erignathus barbatus*), and fin whale (*Balaenoptera physalus*). In addition, there were 12 separate sightings of seals that were not identified to species, as well as a sighting of an unknown cetacean species that was observed “spraying”. This sighting has been categorized as an unknown whale species, as it was observed within Hudson Bay and is therefore unlikely to have been a dolphin.

The majority (89%) of sightings occurred in July (nine sightings) and August (eight sightings), and the most commonly observed species were unidentified seal species (11 separate sightings totalling 15 individuals) observed in July and August, and bearded seals (four separate sightings totalling 82 individuals) observed in July and August.

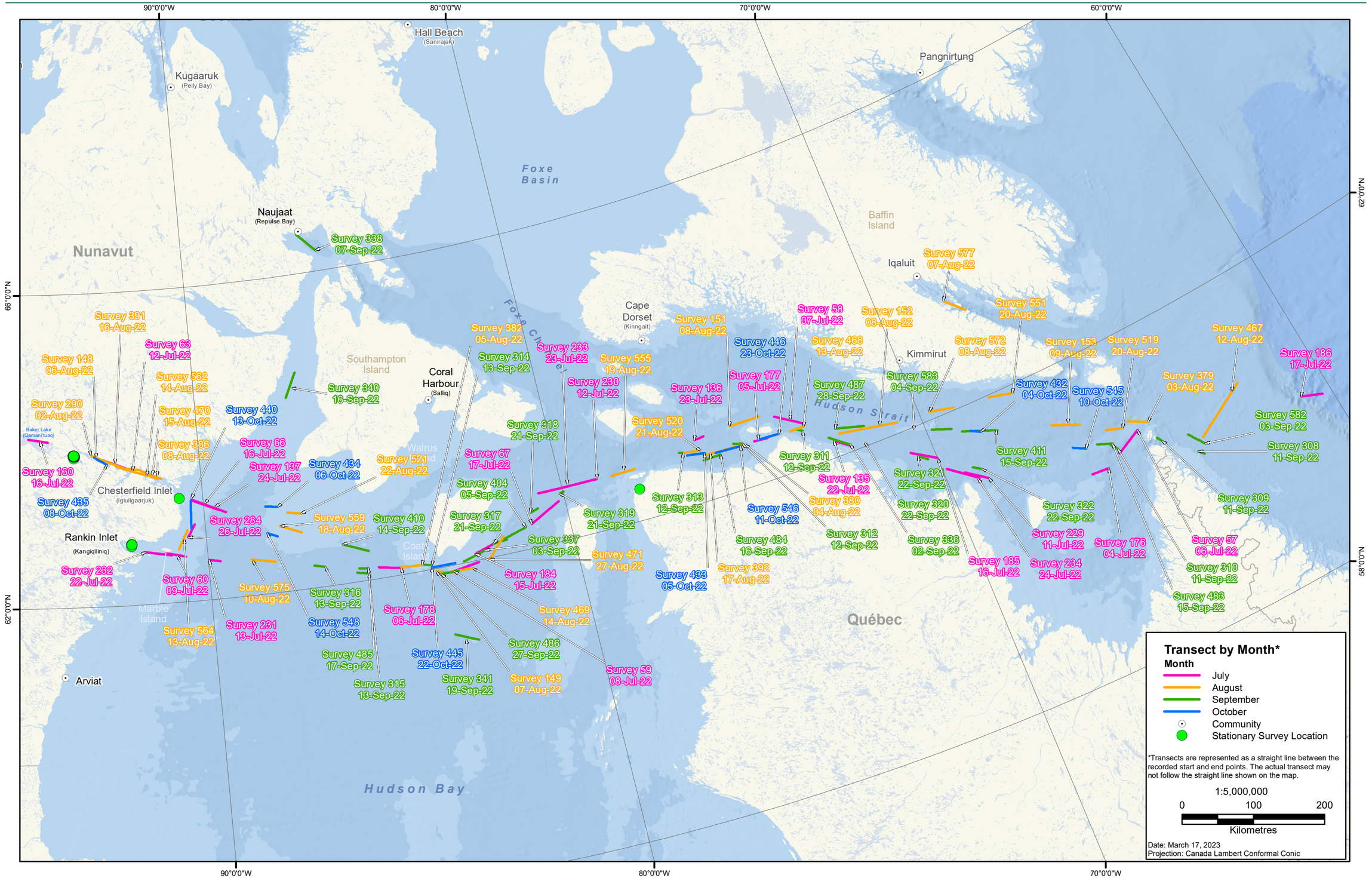

Figure 3.2-1: Marine Mammal Survey Transects, July to October, 2022

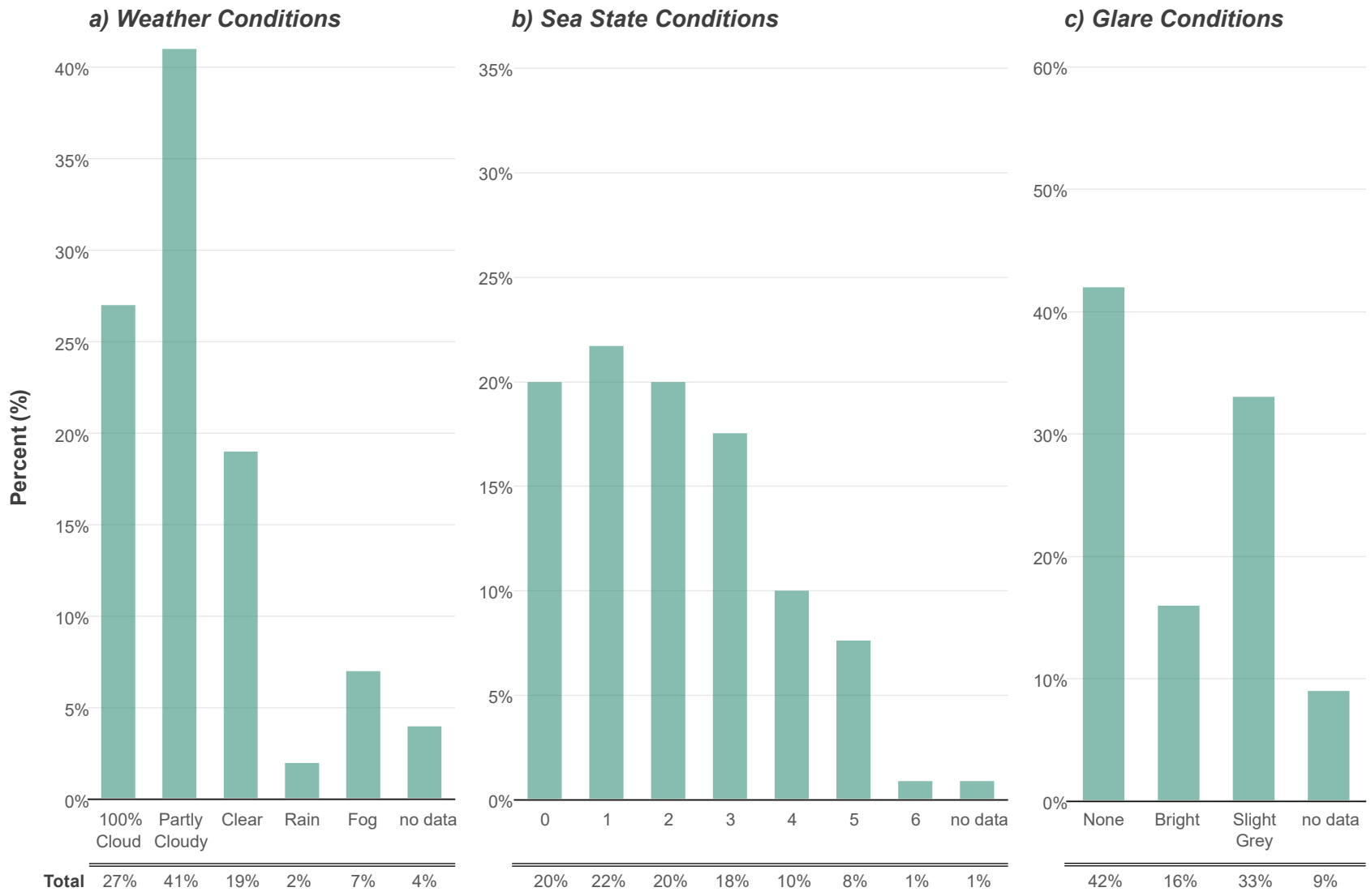

Figure 3.2-2: Percent Weather, Sea State, and Glare Conditions During Marine Mammal Surveys Conducted in 2022

Table 3.2-2: Marine Mammal Observations during Surveys, July to September 2022

Month	Species Observed	Number of Sightings	Number of Animals Observed
July	Unknown Seal	7	7
	Bearded Seal	2	80
August	Unknown Seal	4	8
	Bearded Seal	2	2
	Atlantic Walrus	1	1
	Unknown Whale	1	1
September	Fin Whale	1	2
	Unknown Seal	1	1
	Total	**19**	**102**

3.2.2.2 Marine Mammals Observed Incidentally, 2022

Incidental observations of marine mammals are sightings of animals while on the vessel, but outside of the dedicated MMSO survey time (i.e., “off-effort” sightings). There were 13 incidental observations (59 animals) during 2022 (Table 3.2-3; Figure 3.2-4). Five species were observed incidentally including polar bear (*Ursus maritimus*), Atlantic walrus, harbour seal (*Phoca vitulina*), grey seal (*Halichoerus grypus*), and pilot whale (*Globicephala melas*). In addition, unknown seal species were observed on three separate occasions. Marine mammals were observed incidentally between July and September, 2022.

Table 3.2-3: Incidental Observations of Marine Mammals, July to September 2022

Month	Species Observed	Number of Sightings	Number of Animals Observed
July	Atlantic Walrus	2	7
	Polar Bear[1]	1	1
	Harbour Seal	2	2
	Unknown Seal	3	21
August	Grey Seal	1	22
	Pilot Whale[2]	2	3
September	Harbour Seal	2	3
	Total	**13**	**59**

[1] *Species listed on Schedule 1 of the federal* Species at Risk Act *(SARA).*

[2] *Species was identified as “pilot whale” – in the north Atlantic, this would be long-finned pilot whale. This species has not been observed before and is unlikely to occur in the study area, and therefore could be a misidentified species. However, recent studies show long-finned pilot whale sightings in Baffin Bay.*

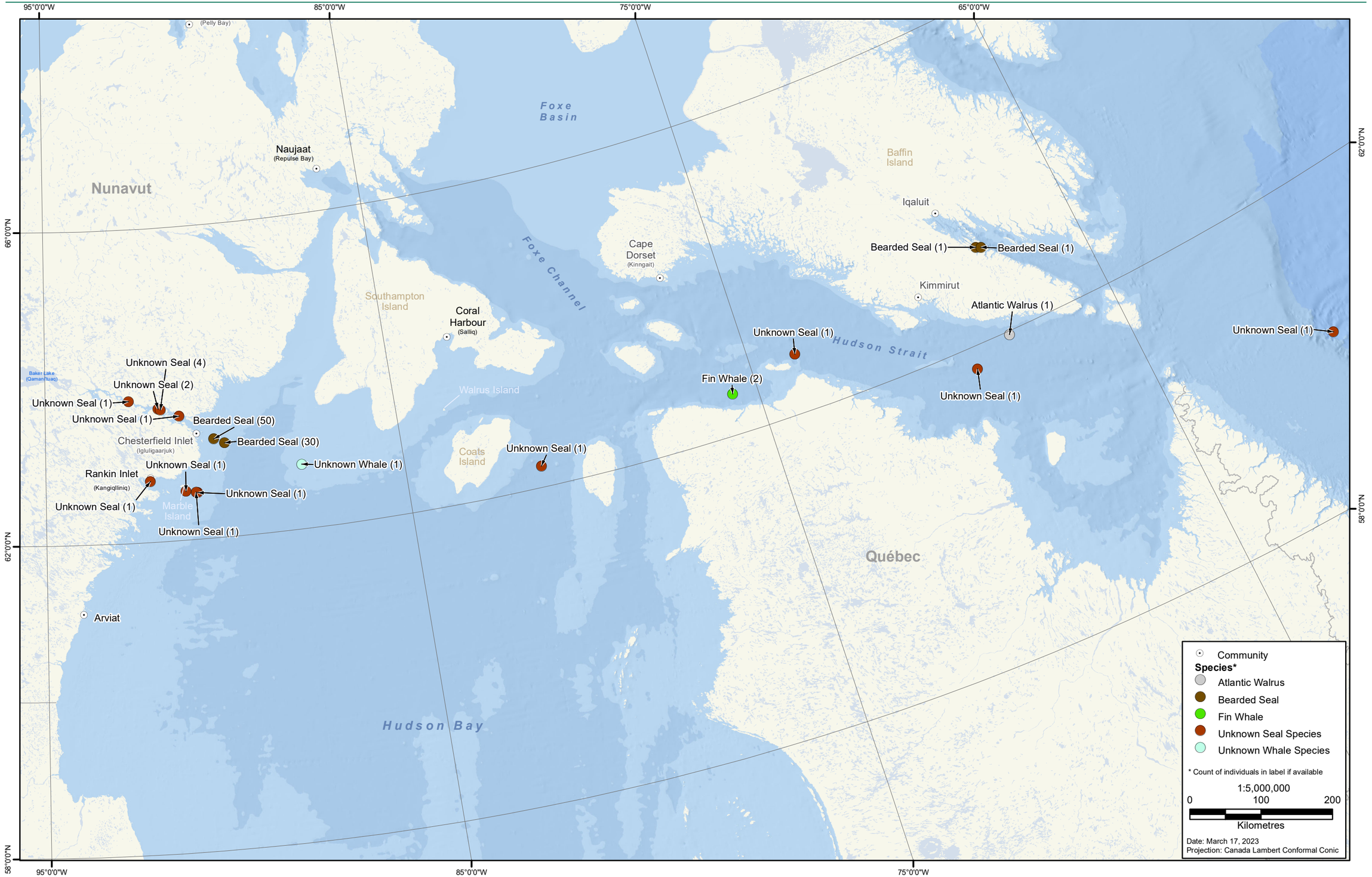

Figure 3.2-3: Marine Mammals Observed during MMSO Surveys, July to November, 2022

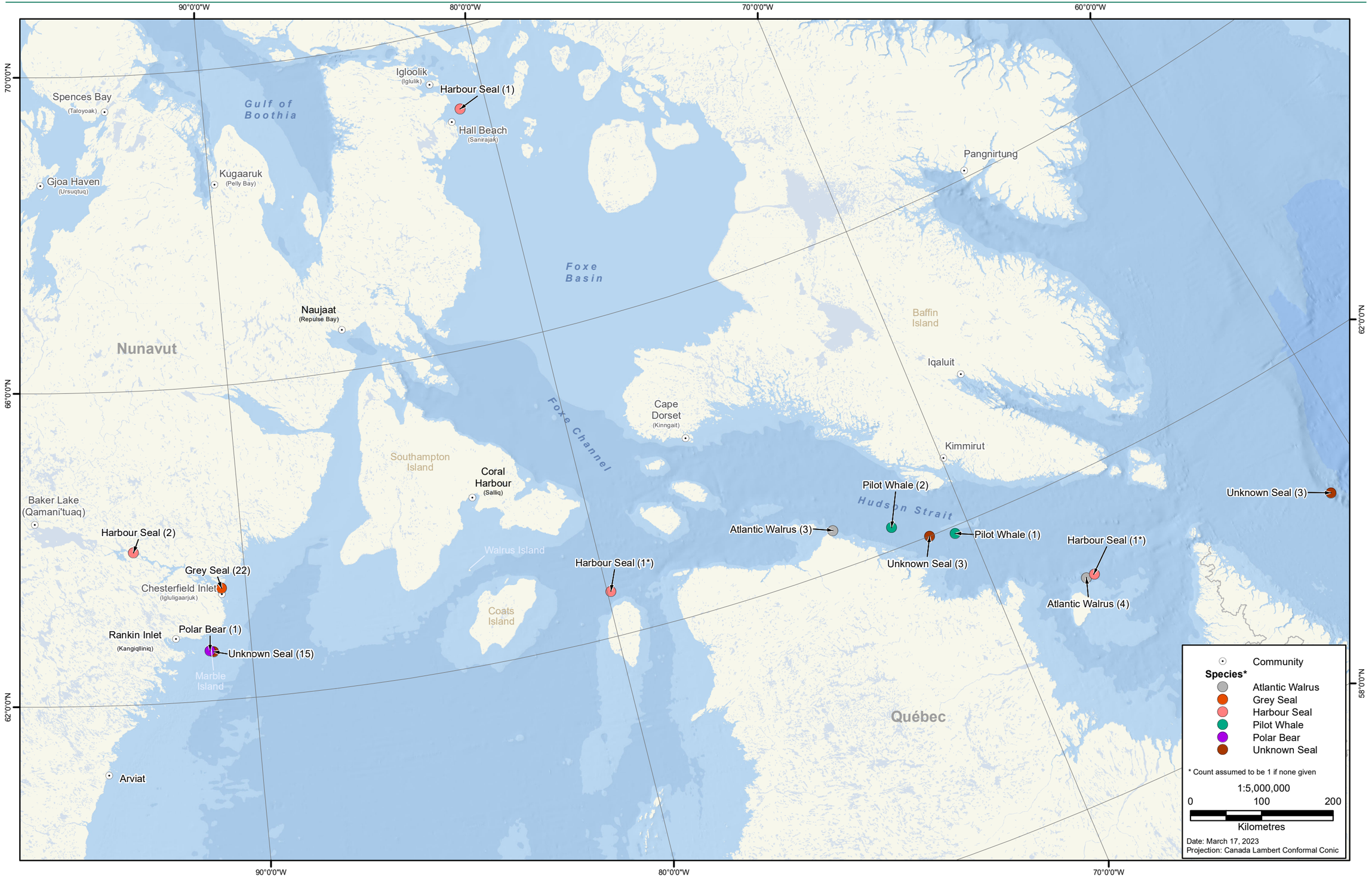

Figure 3.2-4: Incidental Observations of Marine Mammals, July to September 2022

3.2.2.3 Species Observed in 2022

A summary of the marine mammal sightings by the MMSOs in 2022 is provided in the following sections.

Polar Bears

One polar bear was observed incidentally (i.e., off-effort) on July 24, 2022. The animal was observed in the water swimming approximately 100 m from the vessel near Marble Island (Figure 3.2-4). As per the *Shipping Management Plans* (Agnico Eagle 2022a and 2022b), the vessel altered its course to increase the distance between the vessel and the polar bear. As a result, the vessel passed the polar bear approximately 200 m away (Section 3.1.3). Polar bears are listed as Special Concern on Schedule 1 of the federal *Species at Risk Act* (*SARA*).

Long-finned Pilot Whale

Two separate sightings of pilot whales (one group of two animals, one individual) were recorded on August 28, 2022. Both sightings were incidental observations. The first sighting occurred at 12:30pm, approximately 750 m from the vessel. Two animals were observed swimming in Hudson Strait. The second sighting occurred on the same day at 15:55, approximately 200 m from the vessel (Figure 3.2-3). This sighting was of a single animal swimming in Hudson Strait, approximately 90 km from the first sighting. This could have been a resighting of the same whale, given the proximity of the two sightings and the speed at which pilot whales can travel (approximately 35 km/hr).

Long-finned pilot whales are common in the north Atlantic, however are a rare sighting in the Arctic. This is the first time they have been recorded during MMSO surveys or incidentally for the Project. In the last 10 years, long-finned pilot whales have been recorded in Arctic waters. In 2012 and 2013, long-finned pilot whales were observed between July and October during surveys around Baffin Bay and Melville Bay (Froun-Mouy et al. 2017) and around Iceland between 2014 and 2020 (Selbmann et al. 2022).

Fin Whale

One group of two fin whales was reported on one occasion during dedicated marine mammal surveys on September 16, 2022, in Hudson Strait approximately 200 m from the vessel. Fin whales have a wide-ranging distribution in the north Atlantic up to Davis Strait. A fin whale was also recorded during MMSO surveys in 2019 and in 2021 in the eastern Hudson Strait at a similar location. Fin whales are listed as Special Concern on Schedule 1 of the federal *Species at Risk Act* (SARA).

Seals

A total of 24 separate sightings of seals were recorded in 2022: 16 separate occasions during dedicated marine mammal surveys (Figure 3.2-3) and eight separate incidental sightings (Figure 3.2-4). During dedicated surveys, bearded seals were observed on four occasions (total of 82 individuals), and there were 12 separate sightings of unknown seal species (16 individuals). Two large groups of bearded seals (50 animals and 30 animals) were observed in July near Chesterfield Inlet on July 16. It is possible that some of these animals were re-sightings, as the group of 30 animals was recorded approximately 16 km away from the first group two hours later, as bearded seals are capable of swimming 35 km/hr. Seals were most commonly observed in July (nine separate sightings of 87 individuals) but were observed between July and September (Table 3.2-2).

Seals were observed incidentally (i.e., off-effort) on an additional eight occasions in 2022 (Figure 3.2-4). Three separate sightings of unknown seal species occurred in July (21 individuals), four sightings of harbour seals, including two sightings in July (two animals) and two sightings in September (three animals), and one sighting of a group of 22 grey seals in August (Figure 3.2-4; Table 3.2-3).

One sighting of a seal was recorded as the animal being less than 100 m from the vessel. This was a sighting on July 17 of a seal species swimming in the water 50 m from the vessel. The seal was observed in the water and the vessel continued to travel without changing course. As a result, the seal continued to swim without responding to the vessel and no additional mitigation was required.

Atlantic Walrus

A total of three separate sightings of Atlantic walrus were recorded in 2022. One Atlantic walrus was observed during dedicated MMSO surveys on August 20, 2022, on the ice south of Saddleback Island near the northern coastline of Hudson Strait (Figure 3.2-3). No additional information regarding this sighting was recorded. Two additional walrus groups were observed incidentally (i.e., off-effort) in 2022: one group of three individuals was observed swimming very close to each other in Hudson Strait east of Charles Island on July 5, and one group of four individuals was observed resting on ice north of Akpatok Island in Hudson Strait on July 13. The group of three individuals observed swimming on July 5 was observed 30 m from the vessel. The vessel did not change course to ensure the walrus were not disturbed by the vessel, and as a result, the walrus continued to swim by the vessel.

3.2.3 Marine Mammal Observations 2017 to 2022

Marine mammals have been observed during surveys and incidentally between 2017 and 2022 (Figures 3.2-5 and 3.2-6). A total of seven different species were identified along the shipping route in 2022, and an additional two unknown species (unknown whale species and unknown seal species). This is a similar number to previous years. In 2021, 13 species were identified, in 2020 and 2019 five species were recorded, and there were no recorded observations of marine mammals during surveys in 2018 or 2017; however, marine mammals were observed incidentally (off-effort) in 2017 (Table 3.2-4). Since 2017, the number of marine mammal individuals observed has increased (Figure 3.2-7), while the diversity of species (i.e., number of different species observed) has fluctuated (Figure 3.2-7), with the highest diversity observed in 2021 (13 species, excluding unknowns) and 2022 (seven species, excluding unknowns).

Species observed in previous years are summarized in Table 3.2-4. Sightings during 2021 included white-beaked dolphin, white-sided dolphin, blue whale, minke whale, beluga whale, fin whale, killer whale, walrus, polar bears and seals. Sightings during surveys in 2020 included white-beaked dolphins, walrus, polar bears, and seals. Sightings during surveys in 2019 included bowhead whale (*Balaena mysticetus;* one sighting of three to four individuals), fin whale (one sighting of one individual), harp seal *(*one sighting of four individuals), killer whale (three sightings totaling eight individuals), and polar bear (one sighting of one individual; Table 3.2-4). All sightings of whales in 2019 were within Hudson Strait (Figure 3.2-5). No unidentified marine mammals were recorded during the 2019 MMSO program.

In 2017, marine mammals were only observed incidentally (i.e., off-effort), and no marine mammals were observed during dedicated surveys. The marine mammals observed incidentally in 2017 included walrus (three sightings of three, two, and one individual), harp seal (one sighting of one individual), and unidentified seal species (two sightings of one individual each; Table 3.2-4). The walruses were observed near Marble Island and near Charles Island in Hudson Strait (Figure 3.2-6).

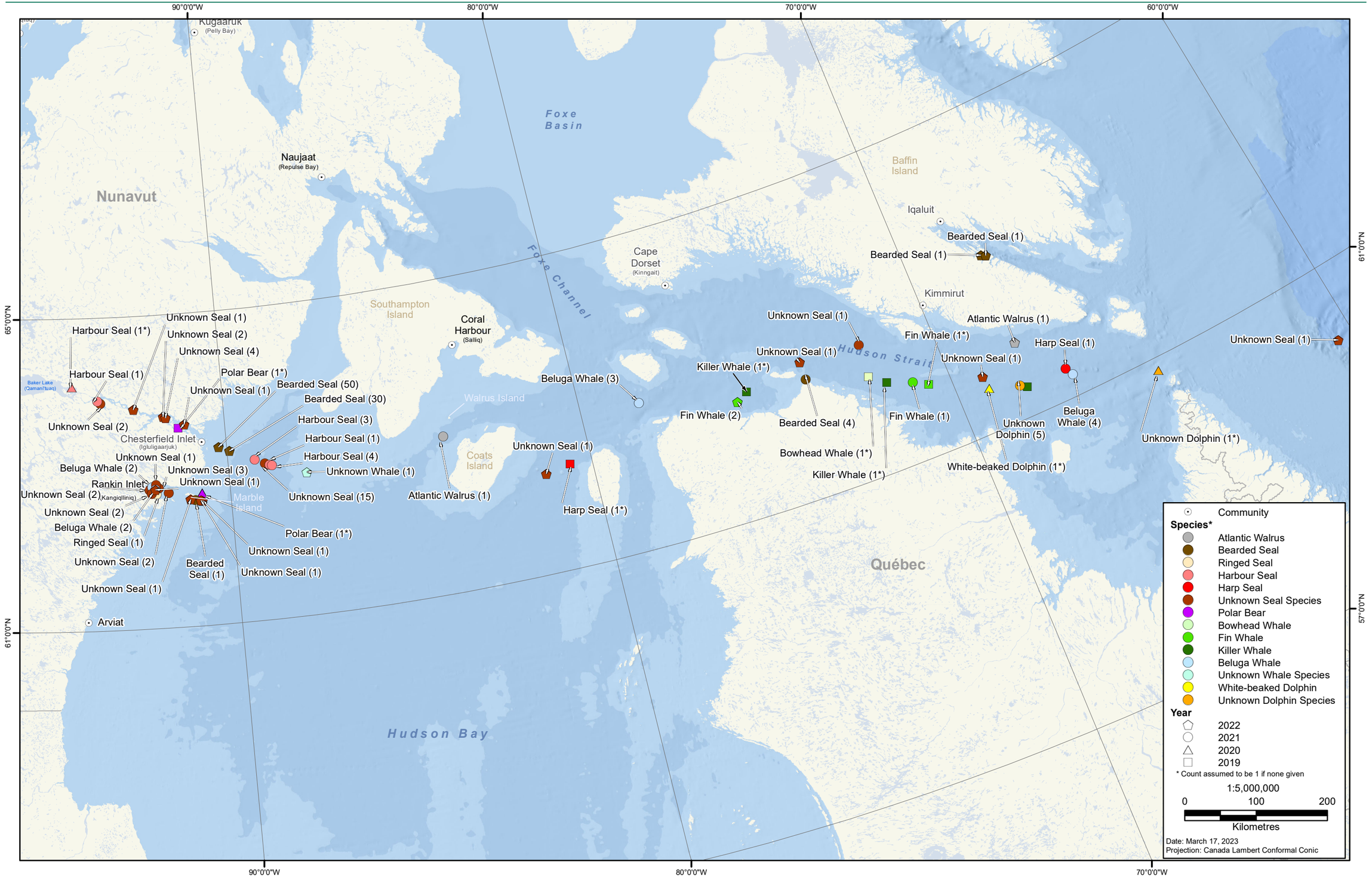

Figure 3.2-5: Marine Mammals Observed during MMSO Surveys, 2019 to 2022