3-A: Addendum Marine Environment Summary

Appendix 3-A - Marine Resources Environmental Summary Addendum

Whale Tail Pit - Expansion Project

Submitted to:

Nunavut Impact Review Board

Submitted by:

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Appendix 3-A - Marine Resources Environmental Summary

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3.A-1 INTRODUCTION

Agnico Eagle Mines Limited – Meadowbank Division (Agnico Eagle) is proposing to expand and extend the Whale Tail Pit operations to include a larger Whale Tail open pit, development of the IVR open pit, associated IVR Waste Rock Storage Facility and IVR Attenuation Pond as well as underground operations (referred to as the Expansion Project) while continuing to operate and process ore at the Meadowbank Mine.

The purpose of this appendix is to address updates to the Approved Project, in relation to the impacts of the Expansion Project. The Expansion Project is presented in the form of an Addendum to the Approved Project.

A summary of the key changes to the assessment of the marine component for the Expansion Project compared to the FEIS developed for the Approved Project is provided in Table 3.A-1.

Table 3-A-1: Marine Environment: Approved Project vs Expansion Project Comparison

Section of FEIS	Approved Project	Expansion Project
3.A-1 Introduction	The Whale Tail Pit Project (Approved Project) is a Meadowbank satellite deposit located on the Amaruq Exploration property.	The Expansion Project will include: • the development of the IVR Pit; • underground operations; and • will extend marine operations for an additional three to four years and closure activities for an additional seven years.
3.A-2 Study Areas	The Local Study Area (LSA) and Regional Study Area (RSA) boundaries for the Marine Environment encompasses the Approved Project shipping corridor in the channel of Chesterfield Inlet, Hudson Bay, and Hudson Strait (Figure 3-A-1). The Approved Project shipping corridor has been broken down into the following three shipping route segments: i) eastern Hudson Strait to the mouth of Chesterfield Inlet, ii) the mouth of Chesterfield Inlet to Baker Lake via Chesterfield Narrows, and iii) the mouth of Chesterfield Inlet to the Port of Churchill (ocean-going vessel and/or tug-assisted barge). For the Approved Project, the temporal boundaries were operations running from 2019 through 2023 and closure ending in 2029 (Approved Project FEIS Volume 3, Section 3.3.2; Agnico Eagle 2016).	LSA and RSA for the Expansion Project are consistent with those presented for the Approved Project; construction activities are proposed to start in 2019 and end in 2020, operations will occur from 2020 to 2025, and closure will occur from 2026 to 2051, followed by post-closure starting in 2051. The shipping route segment iii) the mouth of Chesterfield Inlet to the Port of Churchill (ocean-going vessel and/or tug-assisted barge) has been considered in the assessment; however, it is currently (as of 2018) not being used and will likely not be used in the short-term.
3.A-3 Valued Components	While the marine resource VCs were not identified in the original FEIS (Cumberland 2005), these were identified to facilitate the assessment of marine resources for the Approved Project.	There was no change to the list of marine resource VCs assessed for the Expansion Project from the Approved Project. The identification of marine resource VCs and factors considered in their selection are described in Table 3.A-2.
3.A-4 Incorporation of IQ	Sources reviewed to inform the effect assessment: • Whale Tail IQ Baseline Report (Approved Project Volume 7, Appendix 7-A; Agnico Eagle 2016); • IQ workshop held in the community of Chesterfield Inlet in January 2010 (Agnico Eagle 2013) and meetings with Kivalliq communities (Agnico Eagle 2014a). • IQ studies conducted by Nanuk Enterprises in 1997-1998 and 2010-2011 in Rankin Inlet, Chesterfield Inlet, and Whale Cove (Nanuk 1999).	Additional sources of IQ and Project concerns reviewed for the Expansion Project are listed below: • Whale Tail Pit Open House-Chesterfield Inlet-October 24, 2016 • Whale Tail Pit Open House-Naujaat, October 2016 • Baker Lake HTO Meeting Q1-February 10, 2017 • Meeting with Coral Harbour HTO, July 5, 2017 • Public Meeting – Chesterfield Inlet: July 5, 2017

Section of FEIS	Approved Project	Expansion Project
	• IQ studies conducted by Nanuk Enterprises / Outcrop Ltd. during 2012, consisting of interviews with local hunters, fishers, tour operators, and experienced seamen representing the communities of Rankin Inlet, Chesterfield Inlet, and Whale Cove (Agnico Eagle 2014b). • Interview conducted on 15 July 2011 by Nunami Stantec in Rankin Inlet with representatives from the Kangiqliniq Hunters and Trappers Organization (Kangiqliniq HTO 2011). • Interviews by Higdon et al. (2013) summarizing information on killer whales gathered during interviews in 11 eastern Nunavut communities (Kivalliq and Qikiqtaaluk regions) between 2007 and 2010. • A vessel reconnaissance tour to collect IQ on traditional resource use with informal questioning of two Inuit guides conducted by Stantec in 2009 (AREVA 2014). • Review of literature summarizing historical Traditional Resource Use in the Hudson Bay/ Hudson Strait region including the Nunavut Atlas (CCI 1992) and the Inuit Land and Occupancy Project (Freeman and Murty 1976)	• Pre-Hearing Conference Decision concerning the Whale Tail Pit Project and an Application for a New Type “A” Water License proposed by Agnico Eagle Mines Limited. • Nunavut Impact Review Board’s Hearing Regarding the Review of Agnico Eagle Mines Limited’s Whale Tail Pit Project Proposal. Hearing held at Baker Lake, Nunavut. • In Pit Disposal Community Minutes-Baker Lake March 6, 2018 • Baker Lake Water Quality Improvement Project, Power Potential and Shipping Community Consultation • July 10-13 Community Consultation Notes. July 10-13, 2018, Baker Lake and Chesterfield Inlet, Nunavut
3.A-5 Project Components Assessed	Approved Project components assessed for potential effects on marine resource VCs are limited to marine shipping activities including: • vessel transportation in the shipping corridor within the assessment boundaries (Hudson Bay, Hudson Strait and the channel of Chesterfield Inlet); and • ship lightering activities (ship-to-ship transfer / loading).	The Expansion Project shipping route, shipping volumes, volume of fuel being transported, lightering activities and anchorage locations will remain consistent with those identified for the Approved Project. There are no changes to the project component assessed for the Expansion Project from the Approved Project.
3.A-6 Summary of Existing Environment	The baseline environment presented in the Approved Project FEIS outlined the physical, biological and existing shipping and navigational activities (Approved Project FEIS Volume 3, Appendix 3-A, Section 3.A-6.1, Section 3.A-6.2, and Section 3.A-6.3; Agnico Eagle 2016). Tables summarizing the existing biological environment are provided in the Approved FEIS including: • Overview of Marine Fish Species within the Study Area • Marine Mammals Harvested throughout the Year by Coastal Inuit Communities in Nunavut • Overview of Marine Mammal Species within the Hudson Bay / Hudson Strait Area	The baseline environment presented in the Approved Project (FEIS Volume 3, Appendix 3-A, Section 3.A-6; Agnico Eagle 2016) is sufficient for the purposes of the Expansion Project. There have been no changes under the *Species at Risk Act* or by the Committee on Status of Endangered Wildlife in Canada (COSEWIC) to the listing status of species identified in the Approved Project FEIS. There have been no additional sensitive or protected areas identified in the RSA or LSA since the Approved Project. To address concerns raised during the Approved Project Technical Meetings and Pre-hearing Conference, Figure 3.A-1 and Figure 3.A-5 through Figure 3.A-18 which outline the baseline environment have been updated to include the south of Coats Island shipping route.

Section of FEIS	Approved Project	Expansion Project
	• Ecologically and Culturally Important Seabird Species Potentially Present within the Study Area • Ecologically and Biologically Significant Areas (EBSAs) in the Vicinity of the Study Areas • Environment Canada Key Marine Habitat Sites for Migratory Birds in the Vicinity of the Project Area In addition, the Approved Project FEIS contained tables summarizing vessel traffic and encounters in Hudson Strait.	
3.A-7 Pathway Analysis and Potential Project-related Effects Assessment	The following primary pathways were identified and assessed in the Approved Project: • Potential environmental effects of the Project on marine water quality include the following: o Accidental fuel spills may result in changes to marine water quality • Potential environmental effects of the Project on marine fish include the following: o potential mortality or reduced health due to exposure to accidental fuel spills; and o loss / degradation of habitat due to altered water quality from potential accidental fuel spills. • Potential environmental effects of the Project on marine mammals include the following: o mortality and health risk due to accidental fuel spills; o loss / degradation of habitat due to altered water quality from potential accidental fuel spills; o mortality and injury risk due to collisions with vessels; and o change in behaviour due to underwater noise from Project vessels. • Potential environmental effects of the Project on marine birds include the following: o potential mortality and health risk due to accidental fuel spills; o loss / degradation of habitat due to altered water quality from accidental fuel spills;	As the shipping route, shipping volumes, volume of fuel being transported, lightering activities, and anchorage locations will remain consistent with those identified for the Approved Project, the Expansion Project activities represent a negligible change from the Approved Project activities and no new pathways were identified. Table 3.A-4 summarizes the rationale for the pathways identified for the Approved Project (primary pathways) and the Expansion Project.

Section of FEIS	Approved Project	Expansion Project
	o potential mortality and injury risk from collision with vessels due to sensory disturbance from ship lighting; and o change in behaviour due to sensory disturbance from in-air noise and ship lighting.	
3.A-8 Effects Analysis	The following potential adverse residual impacts were assessed in the Approved Project FEIS: • Loss or alteration of fish habitat due to an accidental spill, as well as potential fish mortality or health risk due to exposure to an accidental fuel spill. • Loss or alteration of marine mammal habitat due to an accidental spill, potential marine mammal mortality or health risk due to an accidental spill, potential mortality / injury due to vessel collisions, and potential changes in behavior due to underwater noise from vessel operations. • Loss or alteration of marine bird habitat due to an accidental spill, potential marine bird mortality or health risk due to an accidental spill, potential mortality or injury due to collisions with ships due to sensory disturbance from ship lighting, and behavioural changes due to sensory disturbance (in-air noise and lighting).	No detectable environmental changes or residuals effects are anticipated because of the Expansion Project. There were no linkages identified during the analysis of pathways for potential effects on marine resource VCs associated with the Expansion Project. Consistent with the methodology applied for the Approved Project FEIS, the assessment of Expansion Project activities yielded no changes to residual effects determinations made in the Approved Project FEIS (see Table 3.A-4). To date (July 2018), no vessel strikes on marine mammals have been recorded since the start of the Meadowbank Mine and Approved Project.
3.A-9 Cumulative Effects	Cumulative effects were considered in all pathways based on the summary of past, present and reasonably foreseeable future development (RFFDs, FEIS - Appendix 3-D). The main sources of cumulative effects are shipping operations for residential and mineral and oil and gas exploration supplies, commercial shipping, shipping for commercial, recreational and subsistence fisheries and wildlife harvest, research vessels, governmental activities and tourism. Figure 3.A-1 provides an outline of shipping routes used in past, present and RFFDs in the LSA and RSA.	Consistent with the methodology applied for the Approved Project FEIS, the assessment of Expansion Project activities yielded no changes to the conclusions of the cumulative effects assessment made in the Approved Project FEIS (see Table 3.A-4). Figure 3.A-1 was updated to include the south of Coats island shipping route.
3.A-10 Assessment of Significance	The identified Project-environment pathways for marine resource VCs are predicted to not result in significant impacts on marine fish productivity, or the structure and function of self-sustaining and ecologically effective marine wildlife populations relative to natural factors.	Consistent with the methodology applied in the Approved Project FEIS, the assessment of Expansion Project activities yielded no changes to the significance determinations made in the Approved Project FEIS (see Table 3.A-5).

Section of FEIS	Approved Project	Expansion Project
	The scale of combined impacts from Project pathways, incrementally or cumulatively, will not be large enough to result in irreversible changes at the population level.	
3.A-11 Uncertainty	Uncertainties in the Approved Project FEIS are related to the following elements: • adequacy of baseline data, • limited available data in the region; • understanding/forecasting of future developments; • understanding of impacts on complex ecosystems/interactions; and • effectiveness of the environmental design features and mitigation Uncertainty has been addressed by applying a conservative estimate of effects in the residual impact classification and in the determination of significance. Some uncertainties may be addressed through monitoring and follow-up activities.	Potential uncertainties presented in the Approved Project assessment also apply to the Expansion Project.
3.A-12 Monitoring and Follow-up	The following follow-up monitoring will be carried out to support the Approved Project: • Agnico Eagle will require all contracted shipping companies to provide marine mammal and seabird observing during shipping operations using trained observers and established data collection and recording protocols. • In the unlikely event of a major spill, follow-up monitoring on marine mammals and their habitats, seabirds and their habitats and fish species and their habitats would be proposed.	Monitoring and follow-up activities presented in the Approved Project assessment (e.g., marine mammal and seabird observer program) will be carried forward through the Expansion Project.
3.A-13 Mitigation Measures	The following mitigation measures will be carried out to support the Approved Project: • Implementation of a Shipping Management Plan (Approved Project FEIS Volume 8, Appendix 8-D.5; Agnico Eagle 2016) that will include measures to address marine navigational safety, accidents and collisions, spill prevention and response, pollution prevention measures, ballast water management, waste management, radio equipment and communications, and occupational health and safety. • The Approved Project will implement a marine mammal and seabird observer program onboard Project vessels, speed restrictions subject to ship and human safety considerations (<14 knots), safe approach distances from marine mammals, and wildlife sightings record-keeping.	Mitigation measures outlined in the Approved Project will be carried forward through the Expansion Project. Since the submission of the Approved Project FEIS the Shipping Management Plan was updated in April of 2018 to capture Meadowbank Mine NIRB Project Certificate 004 Condition 36 and Whale Tail Pit NIRB Project Certificate 008 Condition 37, 38, 39, 40, 41, 42 and 43. The Shipping Management Plan has further been updated to address the Expansion Project (Volume 8, Appendix 8-D.6) Figures presented in Section 3.A-3 below were updated to include the southern shipping route as the primary shipping route.

Section of FEIS	Approved Project	Expansion Project
	• Implementation of a Spill Contingency Plan and Emergency Response Plan • Implementation of a Shipboard Oil Pollution Emergency Plan (SOPEP) or Shipboard Marine Pollution Emergency Plan in accordance with MARPOL 73/78, Annex I, IMO Res. MEPC. 78(43). • Each ship will train an Emergency Response Team	

3.A-2 VALUED COMPONENTS

Table 3-A-2 lists all VCs selected to assess the effects to the marine environment and the rationale for their inclusion. The list of VCs are consistent with those identified in the Approved Project FEIS.

Table 3.A-2: Marine Environment and Marine Wildlife Valued Components

Valued Component	Rationale for Inclusion
Marine Water Quality	• Aboriginal, regulatory, conservation, and other stakeholder importance • Project shipping activities have the potential to affect chemical properties of marine water in shipping corridor • Marine water quality is important for the health of marine wildlife, and human uses that rely on those resources • Pathway component with direct and indirect linkage to marine fish, marine mammal and marine bird VCs
Marine Fish	• Commercial, social, cultural, and ecological importance in Project area • Potential to be affected by Project activities • Identified as important during IQ studies
Marine Mammals	• Commercial, social, cultural, and ecological importance in Project area • Biological indicators for marine and terrestrial ecosystem health • Potential to be affected by Project activities • Include several federally listed species • Identified as important during IQ studies
Marine Birds	• Cultural and aesthetic value to society • Ecological importance in Project area • Biological indicators for marine and terrestrial ecosystem health • Migratory and non-migratory species protected by provincial and federal regulations • Include several federally listed species • Potential to be affected by Project activities • Identified as important during IQ studies

VC = valued component

3.A-3 INCORPORATION OF INUIT QAUJIMAJATUQANGIT

A comprehensive list of publicly available Inuit Qaujimajatuqangit (IQ) sources relevant to the Project were reviewed (refer to the Approved Project FEIS, Volume 3, Appendix 3-A, Section 3.A-4; Agnico Eagle 2016).

IQ related to marine wildlife (marine fish, marine mammals and marine birds) in the Project area was incorporated into baseline reporting, including information on marine wildlife abundance and distribution, migration patterns, breeding areas, critical habitat features (e.g. walrus haul-out locations), harvesting patterns, and the effects of climate change on marine wildlife populations and on harvesting activities.

IQ was incorporated in the assessment by considering Project-specific questions and concerns related to marine environment and marine wildlife that were raised by local community members. Particular emphasis was placed on assessing the impacts from shipping on marine wildlife.

Additional IQ and Project concerns related to the marine environment were provided by community members since the Approved Project FEIS submission and identified through a review of community consultation notes (Agnico Eagle 2016a, 2017a, 2017b; NIRB and NWB 2017; and NIRB 2017), as well as during community consultation with

Baker Lake and Chesterfield Inlet for the Expansion Project (Agnico Eagle 2018a). IQ and Project concerns related to the marine environment are summarized below.

The waters around Chesterfield Inlet were described as "*unique and… central in the Kivalliq region [to the] other 6 communities in the area*" (Agnico Eagle 2017b, p. 5). Chesterfield Inlet community members indicated they rely on Char (e.g., Arctic, River and Lake Char), seals and whales as part of their diet (Agnico Eagle 2018a). The community relies on their own population of fish which is considered abundant, as explained by one community member "*we never run out of fish for many years as far as we remember"* (Agnico Eagle 2018a, p.63), and Arctic Char runs were reported 'everywhere' in the waters near Chesterfield Inlet (Agnico Eagle 2017b). It was noted that River Char and Arctic Char travel up to Baker Lake and beyond, and to 'Big River Lake' and beyond (Agnico Eagle 2018a).

Baker Lake community members including women, men, Elders, and youth indicated that Arctic Char is a preferred fish species, which is harvested from Hudson's Bay and tastes different from freshwater Char (Agnico Eagle 2018a). Different Inuktitut names are given to fish based on the stage of their lifecycle (i.e. changing appearance) and type of water body (e.g., lake vs. sea). There are also differences based on regional dialect, for example, Arctic Char has four different names (Agnico Eagle 2018a). How char migrate, and change from living in salt water to fresh water was explained:

> *They don't go down to Hudson Bay, char we see have their system of going up river for winter and come down for summer. Now, system they go through that they have to before [travelling up] river, prepare themselves down on the coast to take in freshwater. If they go up the river they don't go today and next day, they have to acclimatize. Two types of Char (Agnico Eagle 2018a, p.45)*
>
> *Down coast, char will go up rivers up as far as 80 miles and will go to the same spot every year. That is changing because of climate change* (Agnico Eagle 2018a, p.45)

Coats Island was identified as an important area for marine birds:

> *I mean, yeah, Coats Island, the murres are up in the cliffs and there's a lot of them. If they all fly at the same time, it would seem like the cliff would be falling, because that's how many. It seems like the land is moving because of the abundance of the murres. We need to ensure that these things are conserved and ensure that they are not being chased away* (NIRB 2017, p. 649)

Coral Harbour community members identified 'Walrus Island' as important traditional hunting grounds, and several marine mammals were identified as valuable resources to the community for subsistence, including seals, whales and walruses (NIRB 2017). Changes in marine mammal distribution because of ship traffic near Walrus Island have been observed by Coral Harbour community members:

> *We do have wildlife that we hold very dear -- our seals, our bearded seals, our harp seals, and whales and walruses. In our community, there's a lot of people that are hunting… Our wildlife are just being scared away from that area where they normally are…We notice that half of our sea mammals are being chased away to the other -- the other way; so we have to go further. It's not just for us. It's for our children and for our grandchildren* (NIRB 2017, p. 648)

Changing marine mammal distribution patterns near Coats Island because of ship traffic have also been observed:

> *At Coats Island still, our wildlife that I mentioned earlier -- seals, bearded seals, and all of the sea mammals -- they have everything there. Half of them, they've moved south; they've been chased south. It's not good for*

> *our community. And we've seen this -- it is our waters in Nunavut. There's hardly any more seals. It seems like it's like a lake now because we know that lakes don't have seals. It's like that now* (NIRB 2017, p. 649-650)

Chesterfield Inlet community members have also observed changes to marine mammals because of increased shipping traffic through Chesterfield Inlet between the Hamlet and Baker Lake over the years (Agnico Eagle 2017b; NIRB and NWB 2017; Agnico Eagle 2018a). It was noted that the abundance of marine mammals, including seals and whales, have been affected in the Chesterfield Inlet, including fewer seals observed in the area between Baker Lake and Chesterfield Inlet (Agnico Eagle 2017a; NIRB and NWB 2017; Agnico Eagle 2018a).

Several concerns were raised by community members from Chesterfield Inlet and Coral Harbour about the effects of Project shipping on marine resources and the community. Table 3.A-3 outlines the concerns and how they were addressed in the Approved Project FEIS.

Table 3.A-3: Community Concerns and Mitigation

Concerns	How Addressed
Potential dumping of ballast water into Hudson's Bay (NIRB and NWB 2017).	Effects related to the introduction of exotic species from ballast water are expected to be limited by the implementation of the Ballast Water Management Plan as defined in the Shipping Management Plan (Volume 8, Appendix 8-D.6).
Potential effects on Arctic Char or River Char (Agnico Eagle 2018a).	Effects related to marine fish were assessed in the Approved Project FEIS and are outlined in Table 3.A-4.
The number of ships travelling through Hudson Bay, Chesterfield Inlet, and to Baker Lake during Project construction and operations (Agnico Eagle 2016a, 2018a; NIRB 2017).	The Expansion Project shipping volumes will remain consistent with those identified for the Approved Project. Effects related to shipping activities were assessed across all marine VCs for the Approved Project FEIS and are presented in Table 3.A-4. No new pathways for the Expansion Project were identified.
The number of ships anchored just outside of Chesterfield Inlet and regulations around the number of ships that could be anchored in an area at one time (NIRB and NWB 2017).	As stated above, there are no changes to the number of ships anchored outside Chesterfield Inlet from the Approved Project. Effects related to the anchoring of vessels in this area are presented in Table 3.A-4.
Shipping routes through Hudson Bay and Chesterfield Inlet and effects on marine mammals and birds, including ensuring that ship routes are south of Coats Island to minimize disturbance to marine life, and whether there was monitoring of marine mammals along the shipping route, including shipping by barge (NIRB and NWB 2017; NIRB 2017; Agnico Eagle 2017a, 2017b, 2018a).	To address Whale Tail Pit NIRB Project Certificate 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", Figure 3.A-1 and Figure 3.A-5 through Figure 3.A-18 were updated for the Expansion Project to include the southern shipping route as the primary route to be used as per the Shipping Management Plan (see Figure 3.A-1 and Figure 3.A-5 through Figure 3.A-18 in Section 3.A-3 below).
Effects of ship traffic on marine mammal abundance and distribution in the waters near Chesterfield Inlet, especially during marine mammal migration seasons (Agnico Eagle 2017b). To minimize disturbance to marine resources, it was requested if ship traffic could be limited, or temporarily halted during evening peak hours during marine mammal migration in the summer, and if community members (e.g., Elders and youth) could	Effects related to the presence of Project vessels are presented in Table 3.A-4. The Expansion Project will implement a marine mammal and seabird observer program onboard Project vessels similar to the on-going program related to the Approved Project. This program uses local observers to assist in the monitoring of marine mammal and seabirds during shipping activities.

Concerns	How Addressed
participate in monitoring the marine environment on anchoring/shipping vessels (Agnico Eagle 2017b).	
Noise pollution from shipping (e.g., ship propellers and engines) and potential effects on marine mammals and Arctic Char, and whether marine noise was being enforced (NIRB and NWB 2017; Agnico Eagle 2017b, 2018a). Chesterfield Inlet community requested if quieter, more energy efficient ships could be used (NIRB and NWB 2017).	Effects related to the generation of underwater noise from Expansion Projects vessels are presented in Table 3.A-4.
Potential effects of an oil spill on the marine environment, including the contamination of food sources that the community relies on (e.g., whales and seals), and contingency plans in case of a fuel or oil spill, including compensation (Agnico Eagle 2017b, 2018a). Concerns with the length of time it would take for oil spill crews to respond to a spill near Chesterfield Inlet, and it was requested if community members could be trained on how to use emergency spill kits (Agnico Eagle 2017b, 2018a).	The Shipping Management Plan (Volume 8, Appendix 8-D.6), Spill Contingency Plan (Volume 8, Appendix 8-D.5) and Emergency Response Plan (Volume 8, Appendix 8-D.3) outline measures for spill prevention and response, pollution prevention, and personnel training and competence. The Approved Project also stated that all vessels will have a Shipboard Oil Pollution Emergency Plan (SOPEP) or a Shipboard Marine Pollution Emergency Plan in accordance with MARPOL 73/78, Annex I, IMO Res. MEPC. 78(43) and that each ship has an Emergency Response Team consisting of competent and trained personnel responsible to deal with emergency situations including fire, explosions, and oil spills. As required by NIRB Project Certificate No.004 Condition 45: “[Cumberland] shall carry and require contracted shippers to carry adequate insurance to fully compensate losses arising from a spill or accident, including but not limited to the loss of resources arising from the spill or accident; any claims are to be reported to proper officials with a copy to NIRB’s Monitoring Officer”. This condition was fully complied with as of the 2017 Annual Report (Agnico Eagle 2017).

3.A-4 PATHWAY ANALYSIS AND POTENTIAL PROJECT-RELATED EFFECTS ASSESSMENT

Analysis of the pathways for potential effects on marine VCs for the Approved Project and Expansion Project are provided in Table 3.A-4. Project activities considered in the pathway analysis are limited to those directly associated with marine shipping, which will occur during all phases of the Project (construction, operations, and closure). Residual effects were analyzed using measurable indicators for marine VCs and are expressed as effects statements, including the following:

- changes in habitat (quality and quantity);
- changes in survival and health risk; and
- changes in behavior.

Residual effects determinations are presented in Table 3.A-5.

Table 3.A-4: Potential Pathways for Effects on Marine Environment and Marine Wildlife

#	Project Activity	Valued Components				Effects Pathways	Environmental Design Features and Mitigation	Approved Project - Pathway Assessment	Approved Project Rationale	Expansion Project - Pathway Assessment	Expansion Project Rationale
		Water quality	Marine Mammals	Marine Fish	Marine Birds						
1	Marine operations including navigation in the shipping corridor and the channel of Chesterfield Inlet and reloading (lightering) of fuel and dry goods from ocean-going ships onto barges	X	X	X	X	Solid waste, grey water, and bilge water discharges from ships may result in direct adverse effects on marine water quality in the proposed shipping corridor and associated adverse effects on marine wildlife and their habitats.	Adherence to MARPOL Convention, Protocols and Annexes as set out by the International Maritime Organization (IMO 2008; MARPOL 73/78). Adherence to mitigation outlined in Agnico Eagle's Shipping Management Plan (Volume 8, Appendix 8-D.6).	Secondary	Effects related to the discharge of waste, grey and bilge water from ship are expected to be limited by the implementation of the Shipping Management Plan and adherence to MARPOL and other IMO conventions. The pathway is expected to have a negligible residual effect.	No Linkage	No change to the shipping volumes from the Approved Project. This effect is considered previously assessed. Mitigation measures outlined in the Approved Project will be carried forward through the Expansion Project.
2	Marine operations including navigation in the shipping corridor and the channel of Chesterfield Inlet and reloading (lightering) of fuel and dry goods from ocean-going ships onto barges		X	X	X	Introduction of exotic marine species (including pathogens) from ship ballast water exchange during seasonal shipping events can affect native marine wildlife VCs.	Adherence to Ballast Water Management Plan (BWMP) as defined in the Shipping Management Plan (Volume 8, Appendix 8-D.6). Adherence to mitigation outlined in Agnico's Shipping Management Plan (Volume 8, Appendix 8-D.6).	Secondary	Effects related to the introduction of exotic species from ballast water are expected to be limited by the implementation of the Ballast Water Management Plan as defined in the Shipping Management Plan. The pathway is expected to have a negligible residual effect.	No Linkage	No change to the shipping volumes from the Approved Project. This effect is considered previously assessed. Mitigation measures outlined in the Approved Project will be carried forward through the Expansion Project.
3	Marine operations including navigation in the shipping corridor and the channel of Chesterfield Inlet and reloading (lightering) of fuel and dry goods from ocean-going ships onto barges	X	X	X	X	Antifouling toxins (e.g., tributyltin) potentially leaching from Project vessels can have an effect on the marine environment and bio-accumulation in marine food chains.	Adherence to MARPOL Convention, Protocols and Annexes as set out by the International Maritime Organization (IMO 2008; MARPOL 73/78). Adherence to mitigation outlined in Agnico Eagle's Shipping Management Plan (Volume 8, Appendix 8-D.6).	Secondary	Effects related to the antifouling toxins leaching from Project vessels are expected to be limited by the implementation the Shipping Management Plan and adherence to MARPOL and other IMO conventions. The pathway is expected to have a negligible residual effect.	No Linkage	No change to the shipping volumes from the Approved Project. This effect is considered previously assessed. Mitigation measures outlined in the Approved Project will be carried forward through the Expansion Project.
4	Marine operations including navigation in the shipping corridor and the channel of Chesterfield Inlet and reloading (lightering) of fuel and dry goods from ocean-going ships onto barges	X	X	X	X	Accidents and malfunctions could result in fuel spills with direct adverse effects on marine water quality and associated adverse effects on marine wildlife VCs and their habitats.	Adherence to Spill Contingency Plan (Volume 8, Appendix 8-D.5). Adherence to Emergency Response Plan (Volume 8, Appendix 8-D.3). Adherence to Shipping Management Plan (Volume 8, Appendix 8-D.6). Adherence to Oil Pollution Emergency Plan (OPEP; Approved Project FEIS Volume 8, Section 8.3.4.6; Agnico Eagle 2016). Compliance with Shipboard Oil Pollution Emergency Plan (SOPEP). Adherence to MARPOL Convention, Protocols and Annexes as set out by the International Maritime Organization (IMO 2008; MARPOL 73/78); *Canada Shipping Act*; and *Arctic Waters Pollution Prevention Act.* Operational activities have been engineered to use contained handling systems to minimize the risk of accidental spills into the marine environment.	Primary	Modelling conducted for the Meliadine FEIS (Agnico Eagle 2014b) identified a zone extending 26 km on either side of the shipping route as a 'hypothetical spill limit' - or the maximum spatial extent that a diesel fuel slick could potentially reach. This was used to assess the potential effects to marine resource VCs. A minor diesel spill is likely to result in temporary localized exceedances of water quality guidelines for the protection of aquatic life. There exists the potential for acute or chronic effects on fish, marine mammals and marine birds within the immediate area of the spill, but not at levels beyond natural variability. A major diesel spill would result in measurable effects in excess of water quality standards and potential for mortality of fish, marine mammals and marine birds at levels beyond natural variability, thus representing a potential change of state from baseline conditions. No marine spills have occurred on the Meadowbank Mine since the start of the mine, the likelihood of an accidental spill (major or minor) in the marine environment is considered low (unlikely) provided prescribed industry-standard prevention and response measures are in place.	No Linkage	No change to the shipping volumes or quantity of fuel being shipping from the Approved Project. This effect is considered previously assessed. Mitigation measures outlined in the Approved Project will be carried forward through the Expansion Project.

#	Project Activity	Valued Components				Effects Pathways	Environmental Design Features and Mitigation	Approved Project - Pathway Assessment	Approved Project Rationale	Expansion Project - Pathway Assessment	Expansion Project Rationale
		Water quality	Marine Mammals	Marine Fish	Marine Birds						
5	Marine operations including navigation in the shipping corridor and the channel of Chesterfield Inlet and reloading (lightering) of fuel and dry goods from ocean-going ships onto barges	X	X	X	X	Accidental spills of dry cargo (loading and offloading barges) can have direct adverse effects on marine water quality and associated adverse effects on marine wildlife VCs and their habitats	See Item 4	Secondary	Effects from accidental spills of dry cargo are expected to be limited by the implementation the Spill Contingency Plan, Emergency Response Plan, Shipping Management Plan, adherence to Oil Pollution Emergency Plan, compliance with Shipboard Oil Pollution Emergency Plan and adherence to relevant legislation, and the MARPOL and other IMO conventions. The pathway is expected to have a negligible residual effect.		No change to the shipping volumes from the Approved Project. This effect is considered previously assessed. Mitigation measures outlined in the Approved Project will be carried forward through the Expansion Project.
6	Marine operations including navigation in the shipping corridor and the channel of Chesterfield Inlet and reloading (lightering) of fuel and dry goods from ocean-going ships onto barges		X	X	X	Alteration in marine wildlife behavior due to underwater noise from vessel activities	Vessels will follow recommended shipping routes in LSA, maintaining a constant course and constant speed subject to ship and human safety considerations. Implementation of vessel speed restrictions: <14 knots in recommended shipping routes subject to ship and human safety considerations. Avoidance of rapid accelerations. To the extent possible, vessel will shut-down vessel engines and propellers while anchored. Vessels will not approach within 300 m of a walrus or polar bear on sea ice, or any mammal engaged in feeding activities. For all other mammal encounters, vessels will not approach within 500 m. If a mammal approaches within 500 m of a vessel, the vessel shall reduce its speed and, if possible, cautiously move away from the animal. If a vessel is unable to detour around a stationary marine mammal, it shall reduce its speed and wait until the animal(s) moves at least 500 m from the vessel prior to resuming speed. The vessel shall 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. Adherence to all other mitigation outlined in Agnico Eagle's Shipping Management Plan (Volume 8, Appendix 8-D.6).	Primary (Marine Mammals); Secondary (Marine Fish); No Linkage (Marine Birds)	Underwater noise generated by Project vessels during shipping will likely exceed the acoustic behavioral thresholds for marine mammals. Behavioral changes may include evasive maneuvers such as diving or changes in swimming direction and/or speed. The period of exposure to shipping noise above the disturbance threshold will vary depending on the speed and direction of travel of both the animal and the ship. The maximum propagation distance for ship noise above the disturbance threshold is predicted to be less than 5 km. Based on available literature, marine mammals will either habituate to vessel sounds and remain in area or leave temporality and return once the noise has subsided. Changes in behavior, therefore, are temporary and reversible with no effects at the population level anticipated. Effects related to the alteration in fish behavior due to underwater noise from vessel activities are expected to be limited by the implementation of the Shipping Management Plan. Changes in fish behavior are considered temporary and reversible. The pathway is expected to have a negligible residual effect.	No Linkage	No change to the shipping volumes from the Approved Project. This effect is considered previously assessed. Mitigation measures outlined in the Approved Project will be carried forward through the Expansion Project.
7	Marine operations including navigation in the shipping corridor and the channel of Chesterfield Inlet and reloading (lightering) of fuel and dry goods from ocean-going ships onto barges		X		X	Vessel movements in the shipping corridor may result in collisions with marine mammals	Adherence to mitigation outlined in Agnico Eagle's Shipping Management Plan (Volume 8, Appendix 8-D.6) (see above).	Primary	To date, no vessel strikes on marine mammals have been recorded since the start of the Meadowbank Mine. To further minimize the potential for a vessel strike, Agnico Eagle has developed a Shipping Management Plan (Volume 8, Appendix 8-D.6) that includes specific mitigation measures for interactions with marine wildlife, including vessel speed restrictions (<14 knots subject to ship and human safety considerations), and minimum approach distances from any observed marine mammals.	No Linkage	No change to the shipping volumes from the Approved Project. This effect is considered previously assessed. Mitigation measures outlined in the Approved Project will be carried forward through the Expansion Project.

#	Project Activity	Valued Components				Effects Pathways	Environmental Design Features and Mitigation	Approved Project - Pathway Assessment	Approved Project Rationale	Expansion Project - Pathway Assessment	Expansion Project Rationale
		Water quality	Marine Mammals	Marine Fish	Marine Birds						
									Given application of the proposed mitigation, the likelihood of a vessel strike is considered low. In the rare event that a marine mammal strike was to occur, the consequence would likely be a non-lethal injury (laceration from propeller and/or blunt force injury) than direct mortality. The low vessel speeds that prevail during operations will greatly reduce the likelihood of ship strikes on marine mammals by providing ample time for animals to avoid oncoming vessels, as well as time for crew on Approved Project vessels to detect and avoid marine mammals during active vessel operations.		
8	Marine operations including navigation in the shipping corridor and the channel of Chesterfield Inlet and reloading (lightering) of fuel and dry goods from ocean-going ships onto barges				X	Vessel lighting at night may result in marine bird mortality or injury due to collisions with vessels (sensory disturbance)	Where feasible, lights on ships will be minimized to mandatory navigational lighting or shielded and/or angled to minimize direct illumination and reflection of the sea surface. Navigation will occur during summer when daylight is extended, minimizing the need for lighting. Vessels will maintain a minimum distance of 200 m from nesting locations in accordance with best management practices for raptor conservation (Demarchi et al. 2005)	Primary	To date, no vessel strikes on marine birds have been recorded since the start of the Meadowbank Mine The potential for injury or mortality of marine birds by means of striking the ship because of sensory disturbance due to vessel lighting is low in magnitude, medium-term (over the life of the Project), and isolated in frequency for both incremental and cumulative scenarios. The effects of any injuries or fatalities on a marine bird population are expected to be reversible through natural recruitment. With proposed mitigation in place (e.g., shielded lights), the probability of a fatality or injury from a collision with vessels due to lighting is considered unlikely.	No Linkage	No change to the shipping volumes from the Approved Project. This effect is considered previously assessed. Mitigation measures outlined in the Approved Project will be carried forward through the Expansion Project.
9	Marine operations including navigation in the shipping corridor and the channel of Chesterfield Inlet and reloading (lightering) of fuel and dry goods from ocean-going ships onto barges				X	Alteration of marine bird behavior due to vessel lighting at night and in-air noise during ship-to-ship loading (lightering)	Activities will be scheduled during daylight hours whenever practical to minimize the need for staging lights. Work will occur during summer when daylight is extended, minimizing the need for site lighting. Lightering occurs at approximately 1 km distance from the shore away from important bird nesting and breeding areas, therefore in-air noise disturbance for birds will be negligible	Primary	The potential for behavioral changes (sensory disturbance) in marine birds due to in-air noise from lightering activities (e.g., vessel operations) is considered low for the incremental effect, since the lightering operations area is located away from important bird nesting and breeding areas and moderate for cumulative effect.	No Linkage	No change to the shipping volumes from the Approved Project. This effect is considered previously assessed. Mitigation measures outlined in the Approved Project will be carried forward through the Expansion Project.

Table 3.A-5: Residual Impacts Classification and Determination of Significance on Marine Resource Valued Components

Pathway	Magnitude		Geographic Extent		Duration	Frequency	Reversibility	Likelihood	Significance for Assessment Endpoint	Consequence of Proposed Change: Determining Significance
	Incremental	Cumulative	Incremental	Cumulative						
Marine Fish and Fish Habitat										
Mortality and health effect from minor fuel spill	Moderate	Moderate	Local	Local	Short-term	Isolated	Reversible	Unlikely	Not Significant	No change
Mortality and health effect from major fuel spill	High	High	Regional to Beyond Regional	Regional to Beyond Regional	Medium-term	Isolated	Reversible	Unlikely	Not Significant	No change
Change in Habitat Quality due to minor spill	Moderate	Moderate	Local	Local	Short-term	Isolated	Reversible	Unlikely	Not Significant	No change
Change in Habitat Quality due to Major spill	High	High	Regional to Beyond Regional	Regional to Beyond Regional	Medium-term	Isolated	Reversible	Unlikely	Not Significant	No change
Marine Mammals										
Mortality and health effect from minor fuel spill	Low	Low	Local	Local	Short-term	Isolated	Reversible	Unlikely	Not Significant	No change
Mortality and health effect from major fuel spill	High	High	Regional to Beyond Regional	Regional to Beyond Regional	Medium-term	Isolated	Reversible	Unlikely	Not Significant	No change
Change in Habitat Quality due to minor spill	Low	Low	Local	Local	Short-term	Isolated	Reversible	Unlikely	Not Significant	No change
Change in Habitat Quality due to Major spill	High	High	Regional to Beyond Regional	Regional to Beyond Regional	Medium-term	Isolated	Reversible	Unlikely	Not Significant	No change

Pathway	Magnitude		Geographic Extent		Duration	Frequency	Reversibility	Likelihood	Significance for Assessment Endpoint	Consequence of Proposed Change: Determining Significance
	Incremental	Cumulative	Incremental	Cumulative						
Mortality and Injury Risk due to Vessel Collision	Low	Moderate	Local	Regional to Beyond Regional	Medium-term	Isolated	Reversible	Possible	Not Significant	No change
Change in Behaviour due to Underwater Noise	Low	Moderate	Regional	Regional to Beyond Regional	Short-term	Periodic	Reversible	Likely	Not Significant	No change
Marine Birds										
Mortality and Health Effect from Minor Fuel Spill	Low	Low	Local	Local	Short-term	Isolated	Reversible	Unlikely	Not Significant	No change
Mortality and Health Effect from Major Fuel Spill	High	High	Regional to Beyond Regional	Regional to Beyond Regional	Medium-term	Isolated	Reversible	Unlikely	Not Significant	No change
Change in Habitat Quality due to minor spill	Low	Low	Local	Local	Short-term	Isolated	Reversible	Unlikely	Not Significant	No change
Change in Habitat Quality due to Major spill	High	High	Regional to Beyond Regional	Regional to Beyond Regional	Medium-term	Isolated	Reversible	Unlikely	Not Significant	No change
Mortality and Injury Risk due to Collision with Vessels	Low	Low	Local	Regional to Beyond Regional	Medium-term	Isolated	Reversible	Unlikely	Not Significant	No change
Change in behaviour due to In-air Noise and Vessel Lighting	Low	Moderate	Local	Regional to Beyond Regional	Medium-term	Periodic	Reversible	Likely	Not Significant	No change

Note: For further information on consequence of proposed change: determining significance for the Expansion Project refer to Volume 3, Table 3.4-2.

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Figures

KEY MAP

Taloyoak
Igloolik
FURY AND HECLA STRAIT
Hall Beach
Pangnirtung
NUNAVUT
NUNAVUT
Repulse Bay
FOXE BASIN
Iqaluit
NUNAVUT
NUNAVUT
Cape Dorset
Southampton Island
FOXE CHANNEL
Kimmirut
Resolution Island
Coral Harbour
NUNAVUT
NUNAVUT
Salisbury Island
LABRADOR SEA
Baker Lake
Target Rock
(SEE INSET)
Nottingham Island
HUDSON STRAIT
Chesterfield Narrows (South Channel)
Deer Island
ROES WELCOME SOUND
Killiniq
Chesterfield Inlet
Ivujivik
Coats Island
Akpatok Island
Mansel Island
Rankin Inlet
Whale Cove
Arviat
HUDSON BAY
Inukjuak
Churchill
Sanikiluaq
MANITOBA
MANITOBA
Winisk
ONTARIO
ONTARIO
NEWFOUNDLANDNEWFOUNDLAND

INSET
Target Rock
Chesterfield Narrows (South Channel)
Deer Island
Chesterfield Inlet

LEGEND

- POPULATED AREA
- LIGHTERING POINT (HELICOPTER ISLAND)
- SHIPPING ROUTE
- LOCAL STUDY AREA (LSA)
- REGIONAL STUDY AREA (RSA)
- PROVINCE / TERRITORY BOUNDARY

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REFERENCE(S)

1. BASE DATA ESRI, GARMIN, GEBCO, NOAA NGDC, AND OTHER CONTRIBUTORS SOURCE: ESRI, DIGITALGLOBE, GEOEYE, EARTHSTAR GEOGRAPHICS, CNES/AIRBUS DS, USDA, USGS, AEROGRID, IGN, AND THE GIS USER COMMUNITY
2. SHIPPING ROUTE DATA OBTAINED FROM THE DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.
3. PROVINCE AND POPULATED AREA DATA OBTAINED FROM ESRI.

COORDINATE SYSTEM: CANADA ALBERS EQUAL AREA CONIC

CLIENT
AGNICO EAGLE MINES LIMITED: MEADOWBANK DIVISION

PROJECT
WHALE TAIL PIT – EXPANSION PROJECT

TITLE
MARINE RESOURCES STUDY AREA

CONSULTANT
GOLDER

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PREPARED	MH
REVIEWED	AO
APPROVED	PR

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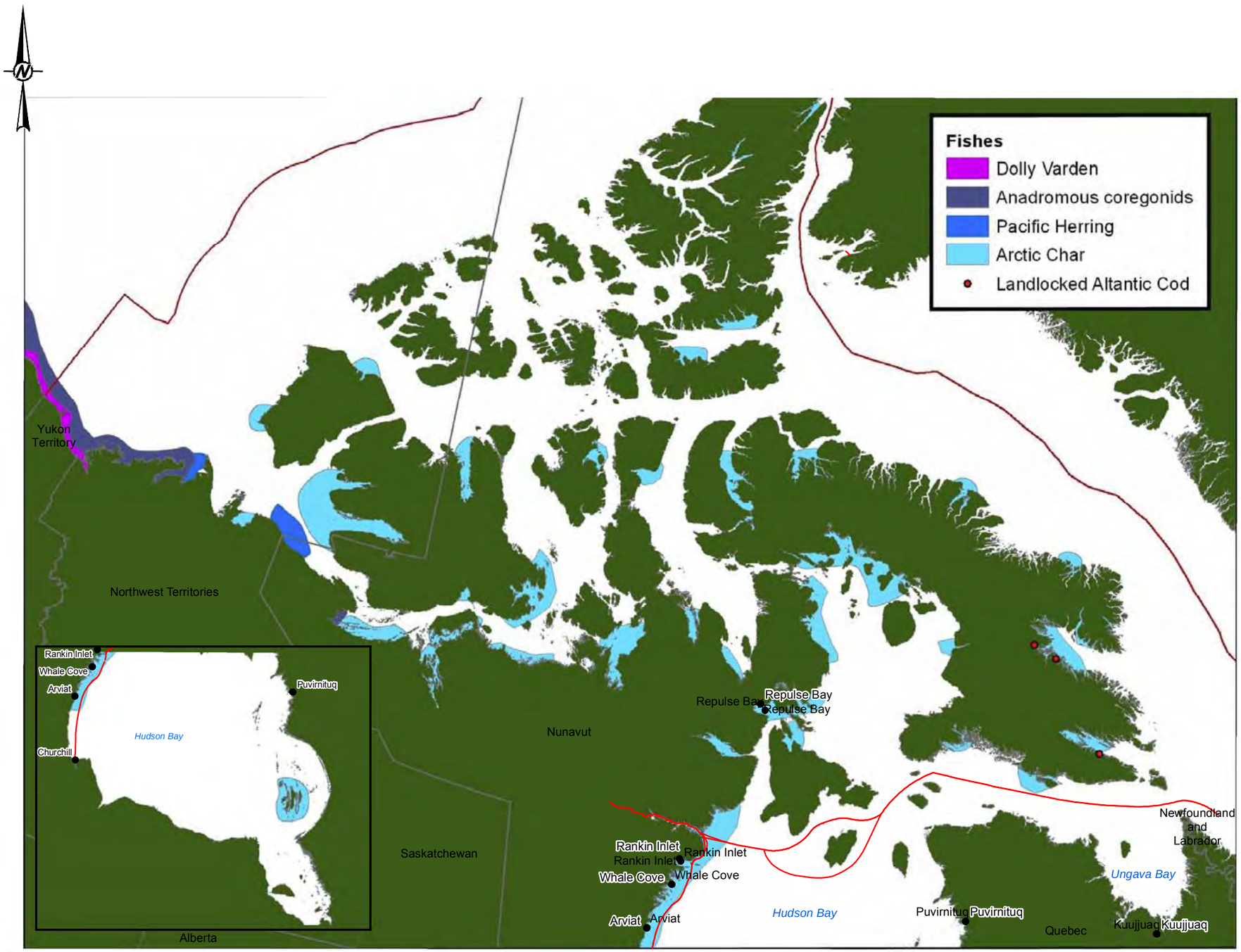

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3. SHIPPING ROUTE DATA OBTAINED FROM THE DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.

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CLIENT

AGNICO EAGLE MINES LIMITED: MEADOWBANK DIVISION

PROJECT

WHALE TAIL PIT – EXPANSION PROJECT

TITLE

DISTRIBUTION OF ARCTIC CHAR (*SALVELINUS ALPINES*) AND OTHER SELECTED FISH SPECIES IN HUDSON BAY, HUDSON STRAIT AND ADJACENT ARCTIC WATERS

CONSULTANT

GOLDER

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REVIEWED	AO
APPROVED	PR

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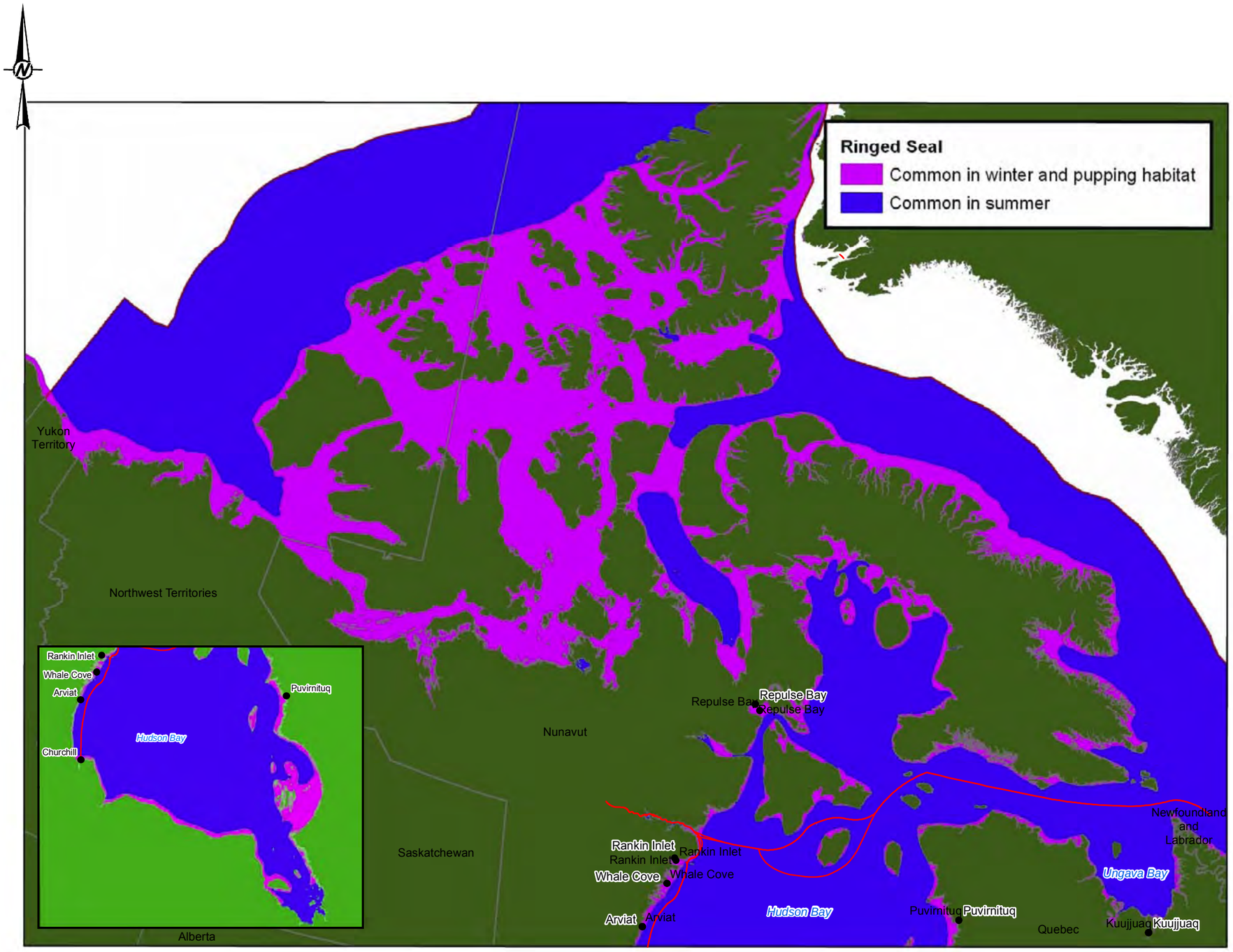

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COORDINATE SYSTEM: CANADA ALBERS EQUAL AREA CONIC

CLIENT

AGNICO EAGLE MINES LIMITED:
MEADOWBANK DIVISION

AGNICO EAGLE

PROJECT

WHALE TAIL PIT – EXPANSION PROJECT

TITLE

DISTRIBUTION OF RINGED SEAL (*PHOCA HISPIDA*) IN HUDSON BAY, HUDSON STRAIT AND ADJACENT ARCTIC WATERS

CONSULTANT

GOLDER

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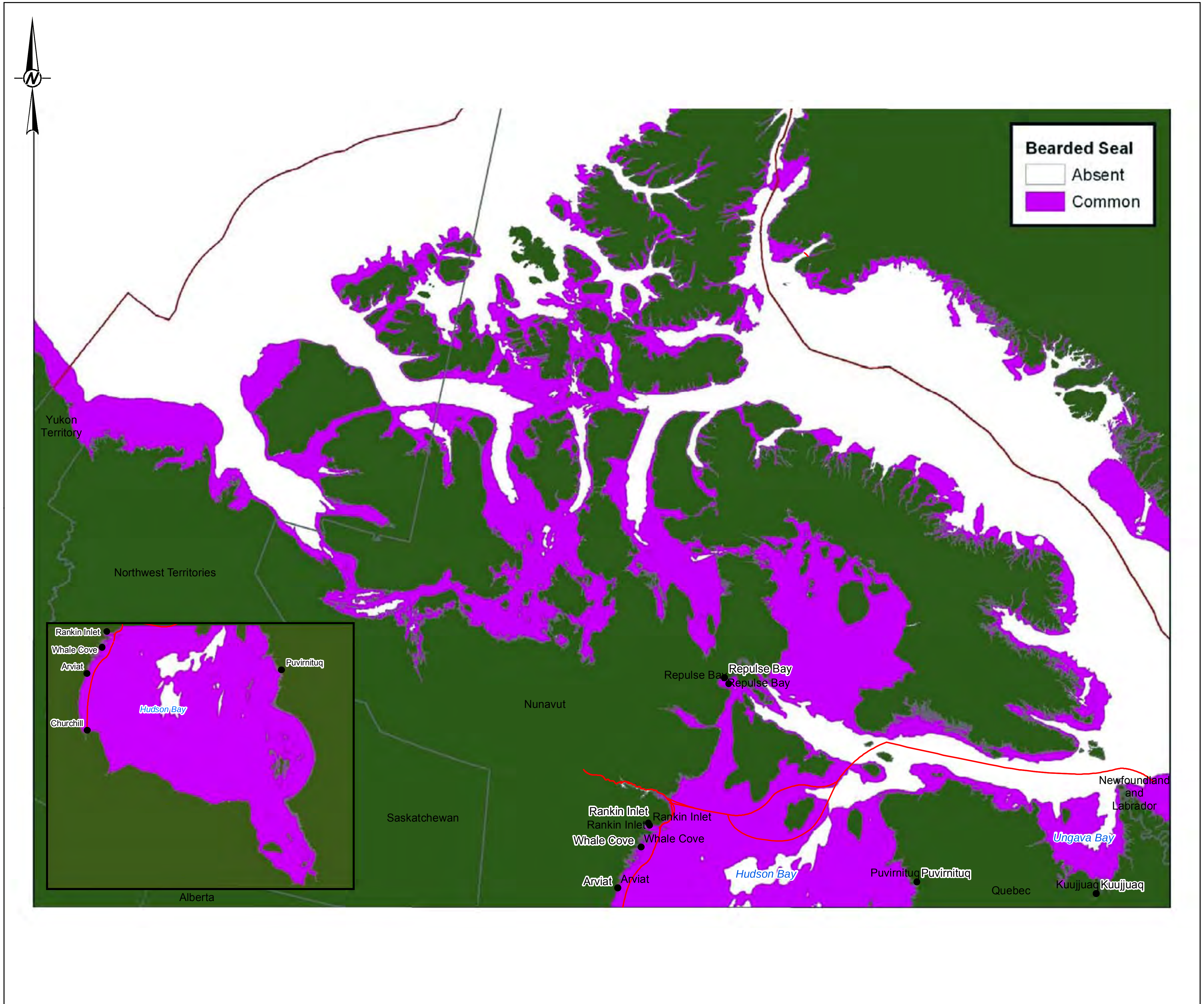

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AGNICO EAGLE

AGNICO EAGLE MINES LIMITED: MEADOWBANK DIVISION

PROJECT

WHALE TAIL PIT – EXPANSION PROJECT

TITLE

DISTRIBUTION OF BEARDED SEAL (*ERIGNATHUS BARBATUS*) IN HUDSON BAY, HUDSON STRAIT AND ADJACENT ARCTIC WATERS

CONSULTANT

GOLDER

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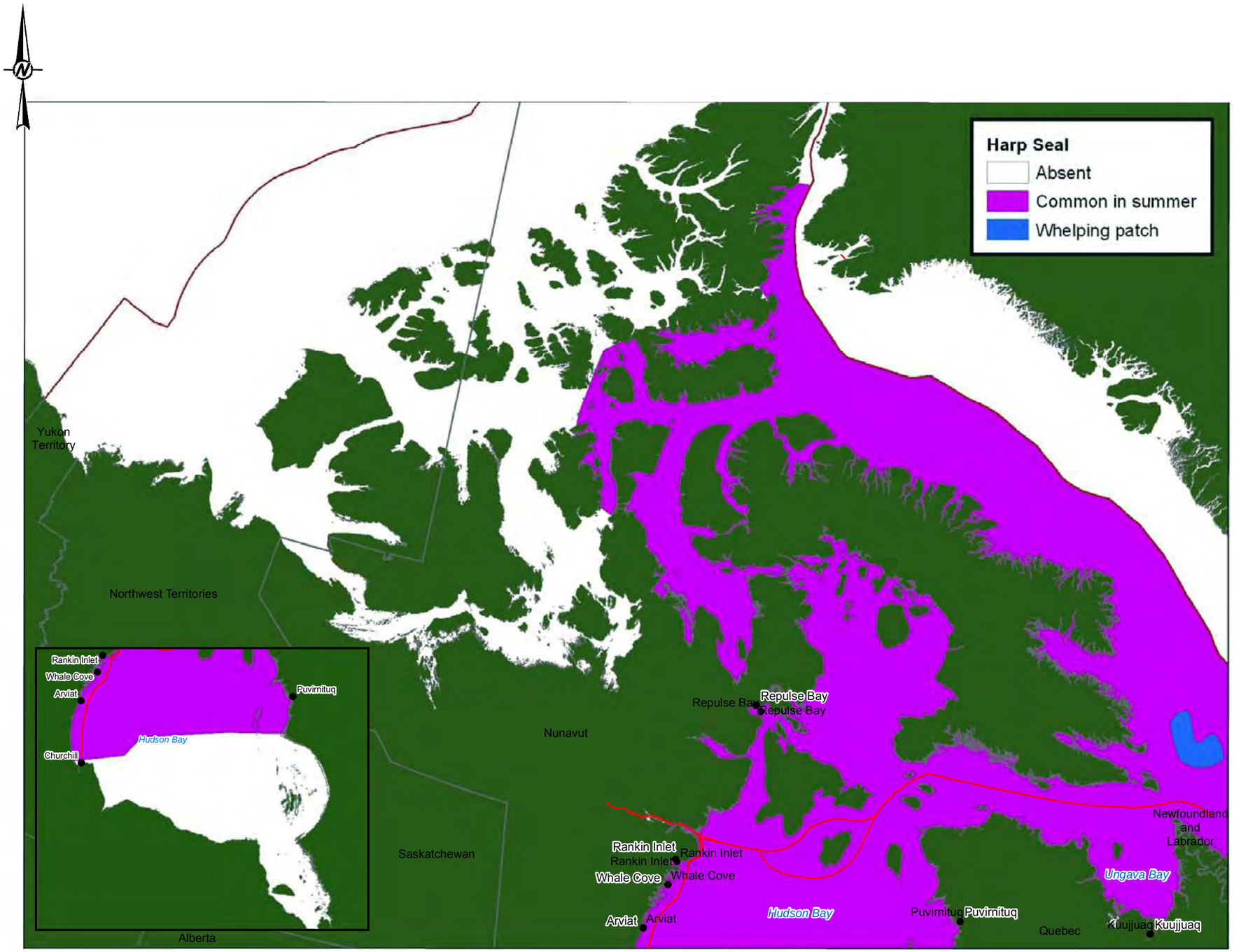

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CLIENT

AGNICO EAGLE MINES LIMITED: MEADOWBANK DIVISION

AGNICO EAGLE

PROJECT

WHALE TAIL PIT – EXPANSION PROJECT

TITLE

DISTRIBUTION OF HARP SEAL (*PAGOPHILUS GROENLANDICA*) IN HUDSON BAY, HUDSON STRAIT AND ADJACENT ARCTIC WATERS

CONSULTANT

GOLDER

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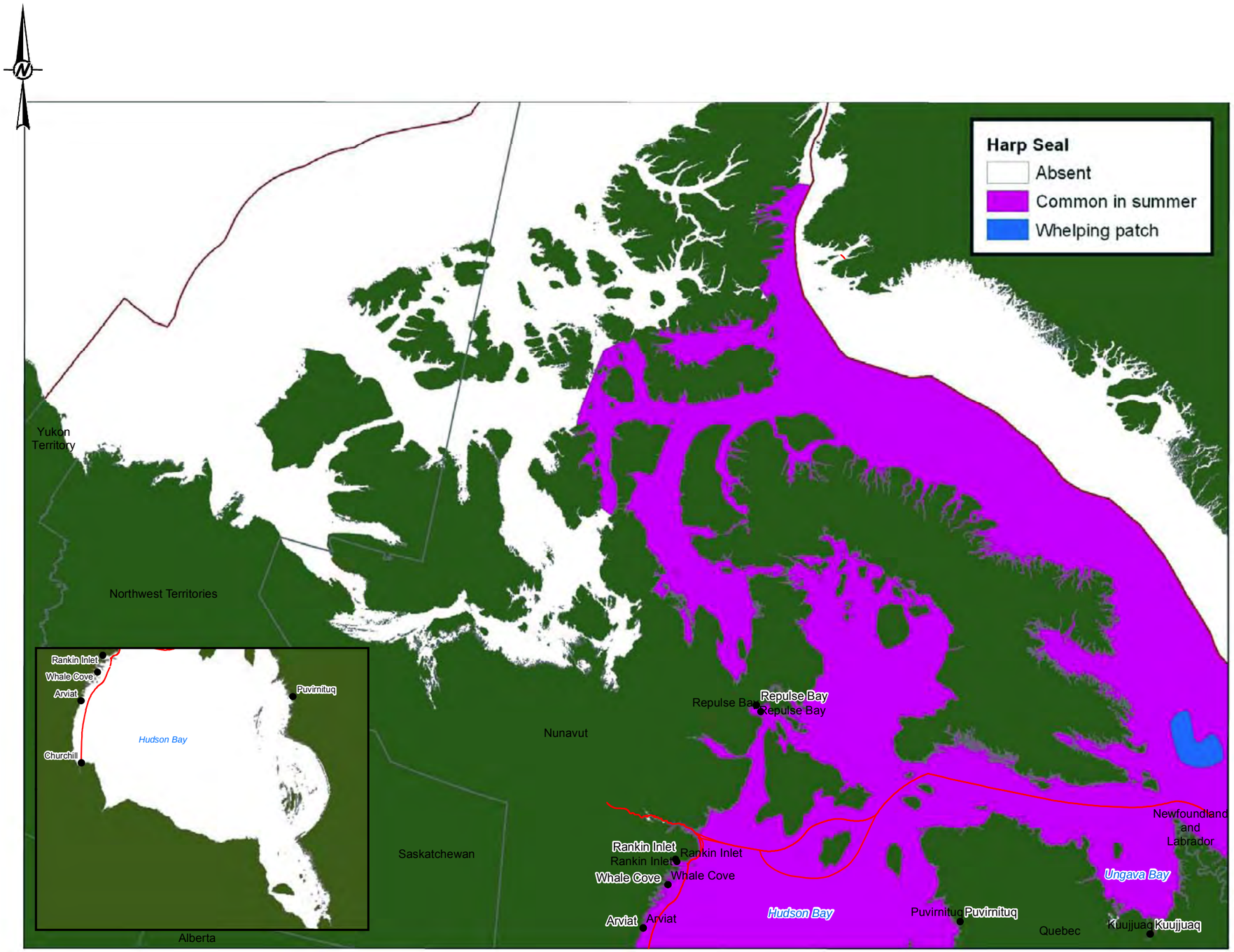

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AGNICO EAGLE

AGNICO EAGLE MINES LIMITED: MEADOWBANK DIVISION

PROJECT

WHALE TAIL PIT – EXPANSION PROJECT

TITLE

DISTRIBUTION OF HOODED SEAL (*CYSTOPHORA CRISTATA*) IN HUDSON BAY, HUDSON STRAIT AND ADJACENT ARCTIC WATERS

CONSULTANT

GOLDER

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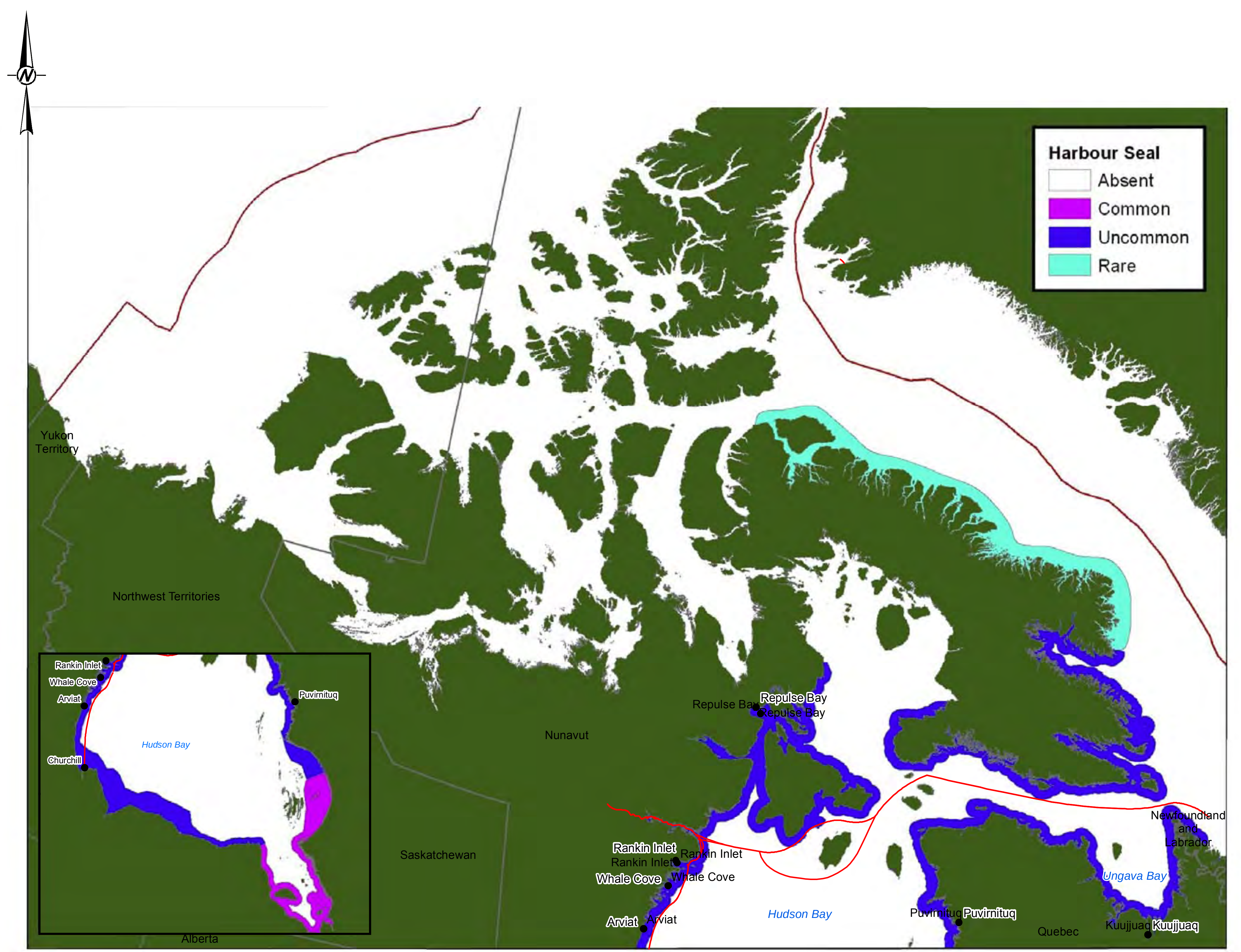

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AGNICO EAGLE

AGNICO EAGLE MINES LIMITED: MEADOWBANK DIVISION

PROJECT

WHALE TAIL PIT – EXPANSION PROJECT

TITLE

DISTRIBUTION OF HARBOUR SEAL (*PHOCA VITULINA CONCOLOR*) IN HUDSON BAY, HUDSON STRAIT AND ADJACENT ARCTIC WATERS

CONSULTANT

GOLDER

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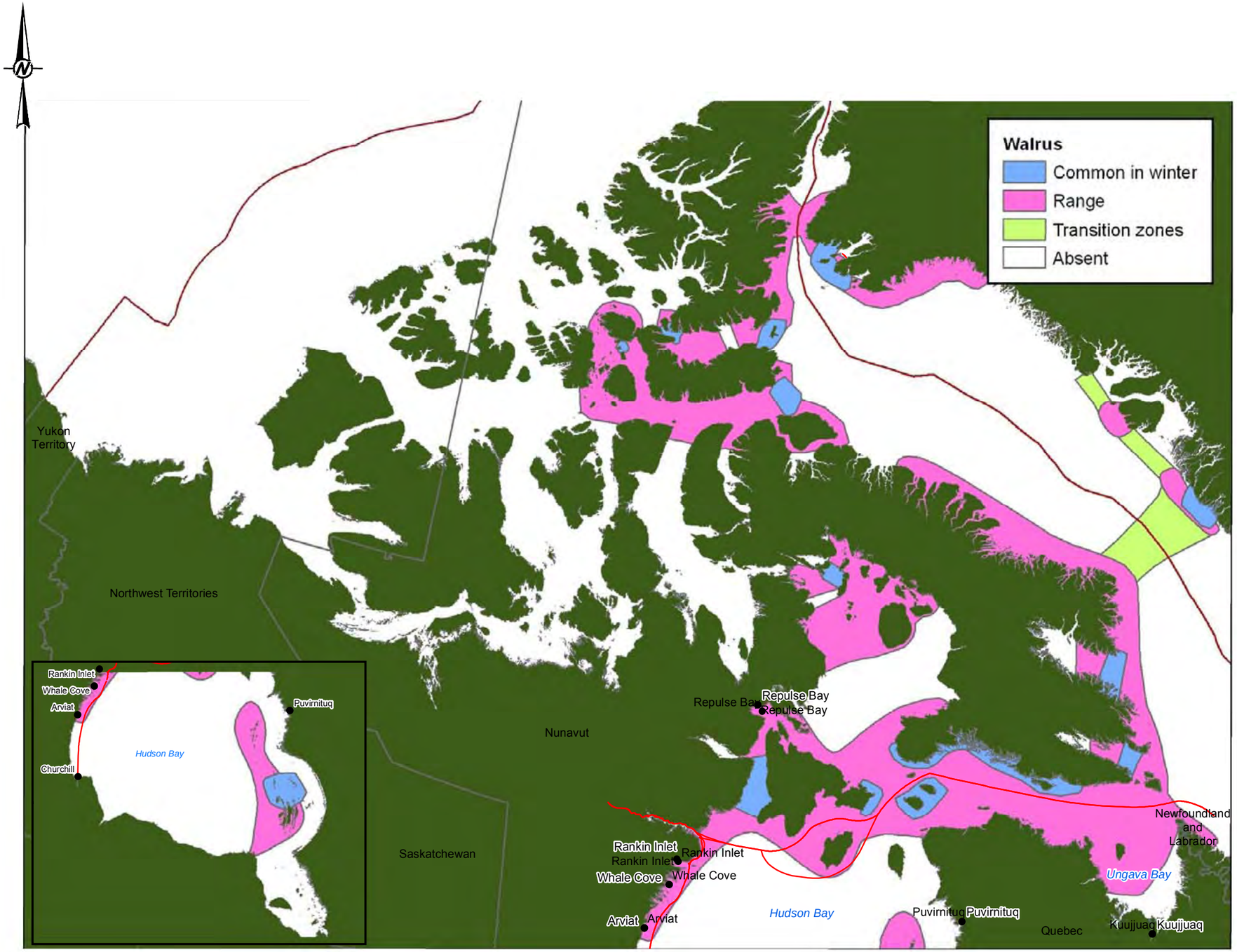

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3. SHIPPING ROUTE DATA OBTAINED FROM THE DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.

COORDINATE SYSTEM: CANADA ALBERS EQUAL AREA CONIC

CLIENT

AGNICO EAGLE MINES LIMITED:
MEADOWBANK DIVISION

PROJECT

WHALE TAIL PIT – EXPANSION PROJECT

TITLE

DISTRIBUTION OF ATLANTIC WALRUS (*ODOBENUS ROSMARUS ROSMARUS*) IN HUDSON BAY, HUDSON STRAIT AND ADJACENT ARCTIC WATERS

CONSULTANT

GOLDER

YYYY-MM-DD	2018-08-30
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REVIEWED	AO
APPROVED	PR

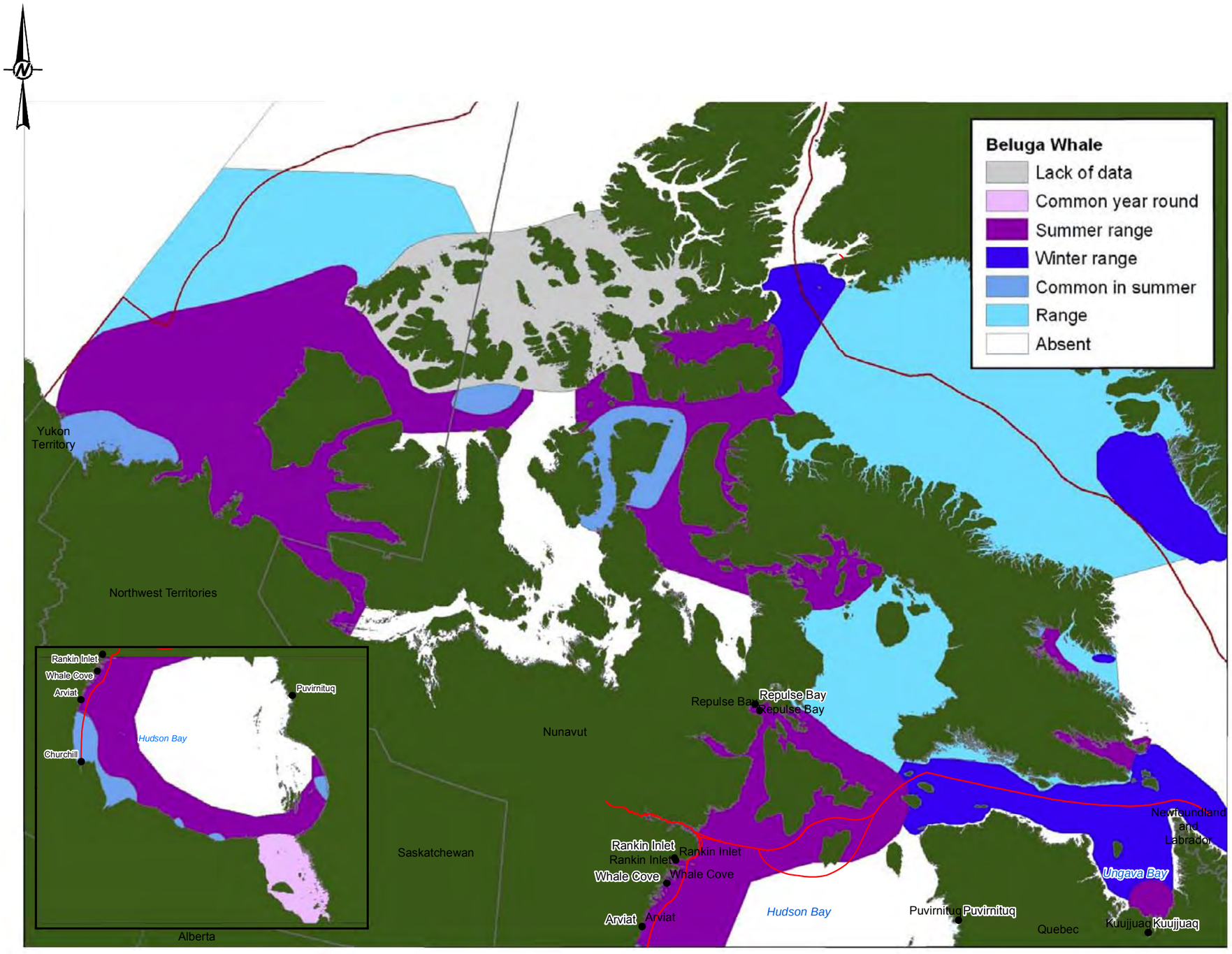
PROJECT NO.	PHASE	REV.	FIGURE
1896037	2500	0	11

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25mm

0

PATH: Y:\burnaby\CAD-GIS\Client\Agnico_Eagle_Mines_Ltd\Whale_Tail\9_PROJECTS\1896037\02_PRODUCTION\2500\MXD\2505\Report\1896037_FIG_11_Distribution_of_Atlantic_Walrus.mxd PRINTED ON: 2018-08-30 AT 6:38:42 PM



LEGEND

SHIPPING ROUTE

240 0 240

1:12,000,000 KILOMETERS

REFERENCE(S)

1. PROVINCIAL DATA OBTAINED FROM E.S.R.I.
2. BASE IMAGE OBTAINED FROM STEPHENSON AND HARTWIG, 2010
3. SHIPPING ROUTE DATA OBTAINED FROM THE DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.

COORDINATE SYSTEM: CANADA ALBERS EQUAL AREA CONIC

CLIENT

AGNICO EAGLE MINES LIMITED:
MEADOWBANK DIVISION

AGNICO EAGLE

PROJECT

WHALE TAIL PIT – EXPANSION PROJECT

TITLE

DISTRIBUTION OF BELUGA WHALES (*DELPHINAPTERUS LEUCAS*) IN HUDSON BAY, HUDSON STRAIT AND ADJACENT ARCTIC WATERS

CONSULTANT

GOLDER

YYYY-MM-DD	2018-08-30
DESIGNED	AK
PREPARED	DSC
REVIEWED	AO
APPROVED	PR

PROJECT NO.	PHASE	REV.	FIGURE
1896037	2500	0	12

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

25mm

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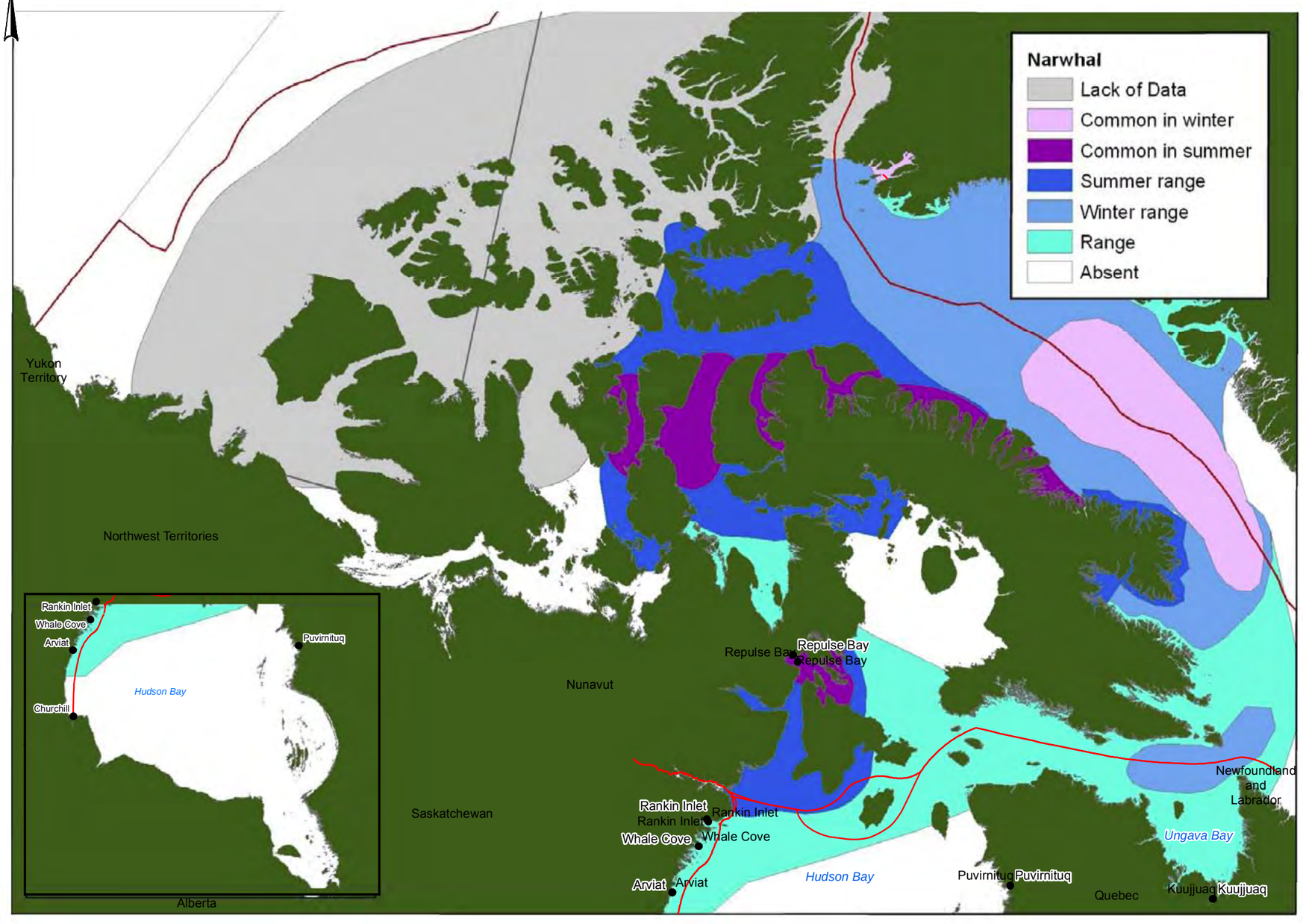

LEGEND

SHIPPING ROUTE

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1:12,000,000 KILOMETERS

REFERENCE(S)

1. PROVINCIAL DATA OBTAINED FROM E.S.R.I.
2. BASE IMAGE OBTAINED FROM STEPHENSON AND HARTWIG, 2010
3. SHIPPING ROUTE DATA OBTAINED FROM THE DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.

COORDINATE SYSTEM: CANADA ALBERS EQUAL AREA CONIC

CLIENT

AGNICO EAGLE MINES LIMITED: MEADOWBANK DIVISION

PROJECT

WHALE TAIL PIT – EXPANSION PROJECT

TITLE

DISTRIBUTION OF NARWHAL (*MONODON MONOCEROS*) IN HUDSON BAY, HUDSON STRAIT AND ADJACENT ARCTIC WATERS

CONSULTANT

GOLDER

YYYY-MM-DD	2018-08-30
DESIGNED	AK
PREPARED	DSC
REVIEWED	AO
APPROVED	PR

PROJECT NO.	PHASE	REV.	FIGURE
1896037	2500	0	13

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25mm

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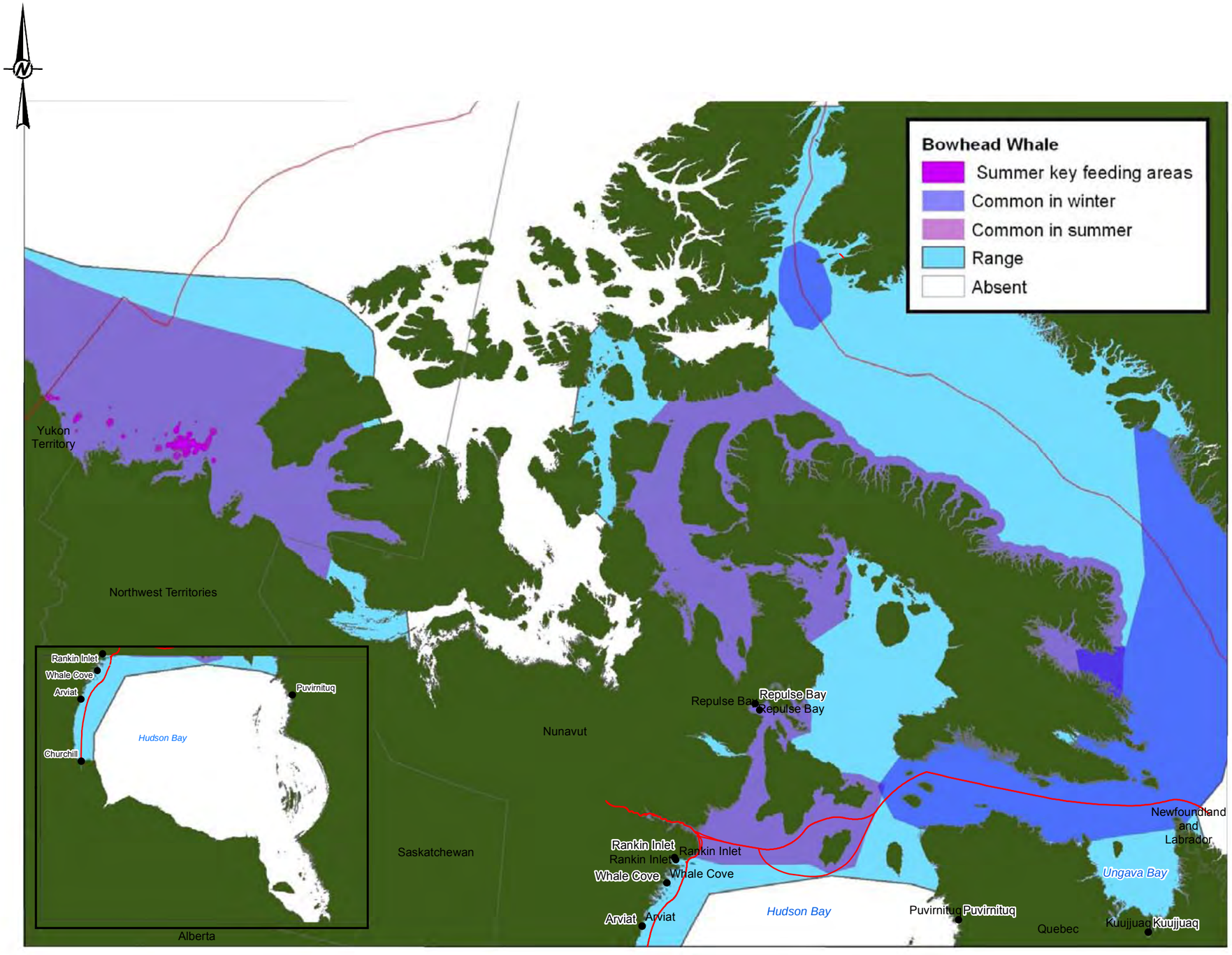

LEGEND

SHIPPING ROUTE

240 0 240

1:12,000,000 KILOMETERS

REFERENCE(S)

1. PROVINCIAL DATA OBTAINED FROM E.S.R.I.
2. BASE IMAGE OBTAINED FROM STEPHENSON AND HARTWIG, 2010
3. SHIPPING ROUTE DATA OBTAINED FROM THE DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.

COORDINATE SYSTEM: CANADA ALBERS EQUAL AREA CONIC

CLIENT

AGNICO EAGLE MINES LIMITED: MEADOWBANK DIVISION

AGNICO EAGLE

PROJECT

WHALE TAIL PIT – EXPANSION PROJECT

TITLE

DISTRIBUTION OF BOWHEAD WHALES (*BALAENA MYSTICETUS*) IN HUDSON BAY, HUDSON STRAIT AND ADJACENT ARCTIC WATERS

CONSULTANT

GOLDER

YYYY-MM-DD	2018-08-30
DESIGNED	AK
PREPARED	DSC
REVIEWED	AO
APPROVED	PR

PROJECT NO.	PHASE	REV.	FIGURE
1896037	2500	0	14

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

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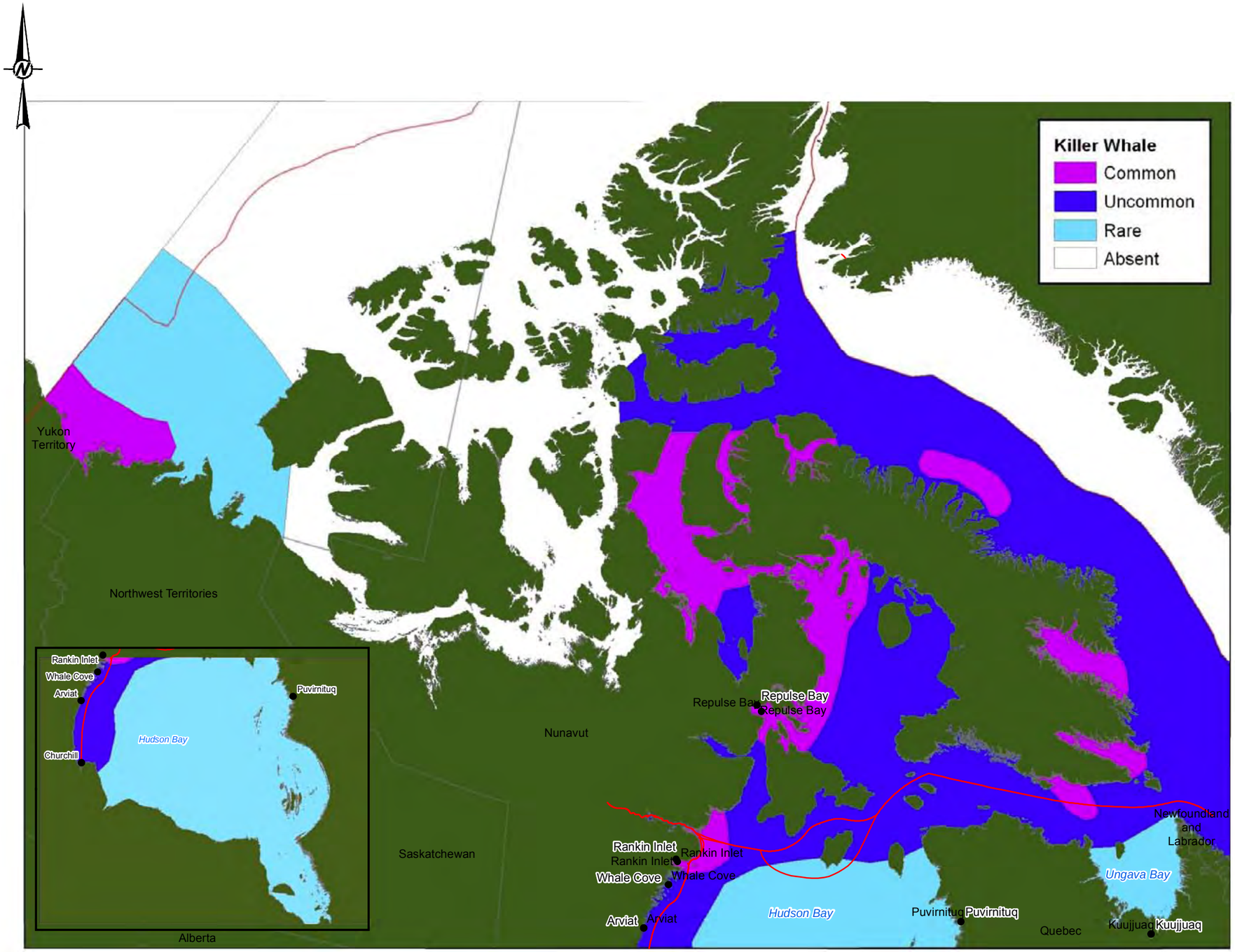
PATH: Y:\burnaby\CAD-GIS\Client\Agnico_Eagle_Mines_Ltd\Whale_Tail\9_PROJECTS\1896037\02_PRODUCTION\2500\MXD\2505\Report\1896037_FIG_14_Distribution_of_Bowhead_Whales.mxd PRINTED ON: 2018-08-30 AT: 6:40:20 PM



LEGEND

SHIPPING ROUTE

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1:12,000,000 KILOMETERS

REFERENCE(S)

1. PROVINCIAL DATA OBTAINED FROM E.S.R.I.
2. BASE IMAGE OBTAINED FROM STEPHENSON AND HARTWIG, 2010
3. SHIPPING ROUTE DATA OBTAINED FROM THE DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.

COORDINATE SYSTEM: CANADA ALBERS EQUAL AREA CONIC

CLIENT

AGNICO EAGLE MINES LIMITED: MEADOWBANK DIVISION

PROJECT

WHALE TAIL PIT – EXPANSION PROJECT

TITLE

DISTRIBUTION OF KILLER WHALE (*ORCINUS ORCA*) IN HUDSON BAY, HUDSON STRAIT AND ADJACENT ARCTIC WATERS

CONSULTANT

GOLDER

YYYY-MM-DD	2018-08-30
DESIGNED	AK
PREPARED	DSC
REVIEWED	AO
APPROVED	PR

PROJECT NO.	PHASE	REV.	FIGURE
1896037	2500	0	15

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25mm

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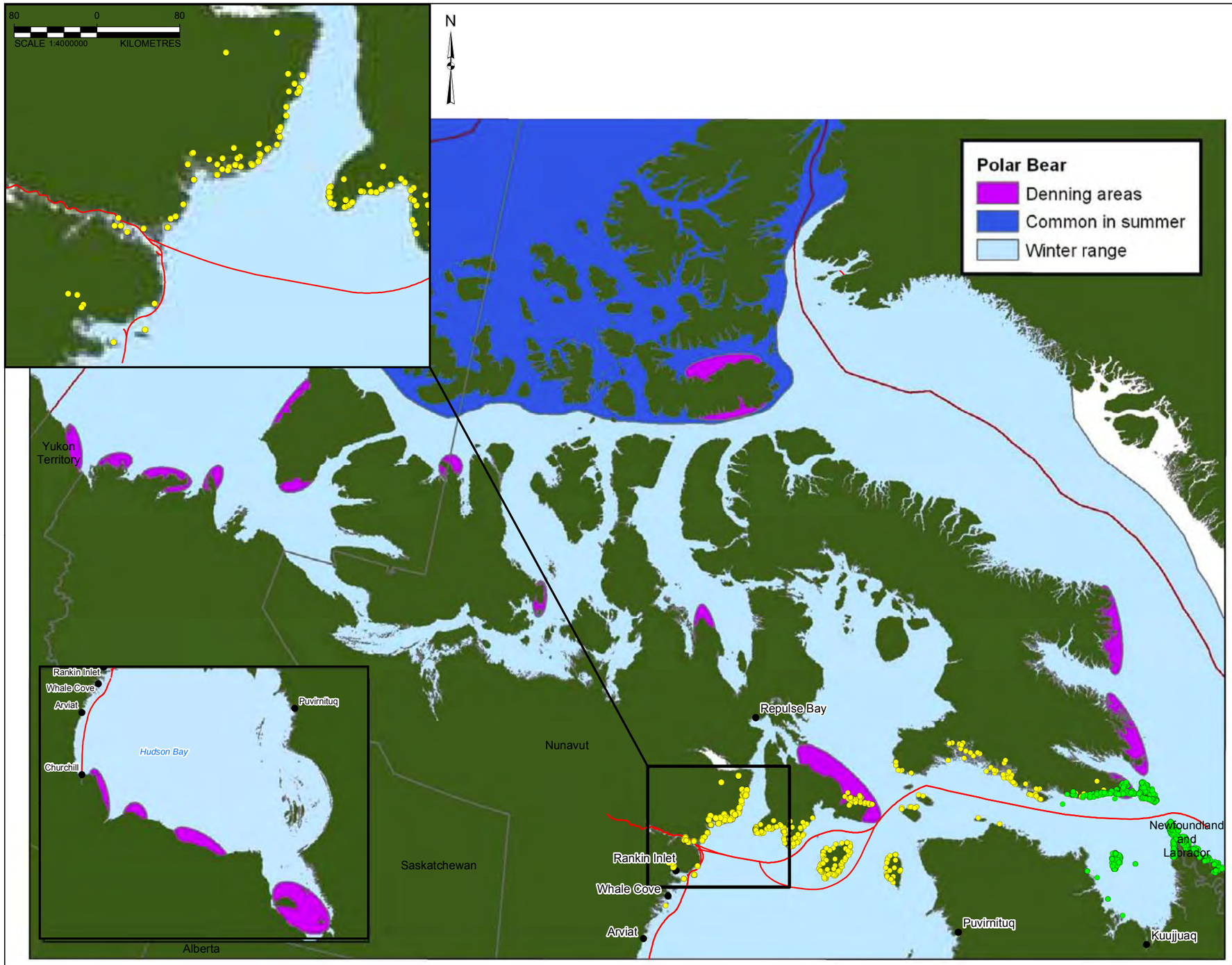

LEGEND

POLAR BEAR SIGHTINGS

- POLAR BEAR SURVEY SITING (2009 - 2011)
- POLAR BEAR SURVEY SITING (2005 - 2007)
- SHIPPING ROUTE

240 0 240

1:12,000,000 KILOMETERS

REFERENCE(S)

1. PROVINCIAL DATA OBTAINED FROM E.S.R.I.
2. BASE IMAGE OBTAINED FROM STEPHENSON AND HARTWIG, 2010
3. SHIPPING ROUTE DATA OBTAINED FROM THE DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.

COORDINATE SYSTEM: CANADA ALBERS EQUAL AREA CONIC

CLIENT

AGNICO EAGLE MINES LIMITED: MEADOWBANK DIVISION

PROJECT

WHALE TAIL PIT – EXPANSION PROJECT

TITLE

DISTRIBUTION OF POLAR BEAR (*URSUS MARITIMUS*) IN HUDSON BAY, HUDSON STRAIT AND ADJACENT ARCTIC WATERS

CONSULTANT

GOLDER

YYYY-MM-DD	2018-08-30
DESIGNED	AK
PREPARED	DSC
REVIEWED	AO
APPROVED	PR

PROJECT NO.	PHASE	REV.	FIGURE
1896037	2500	0	16

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

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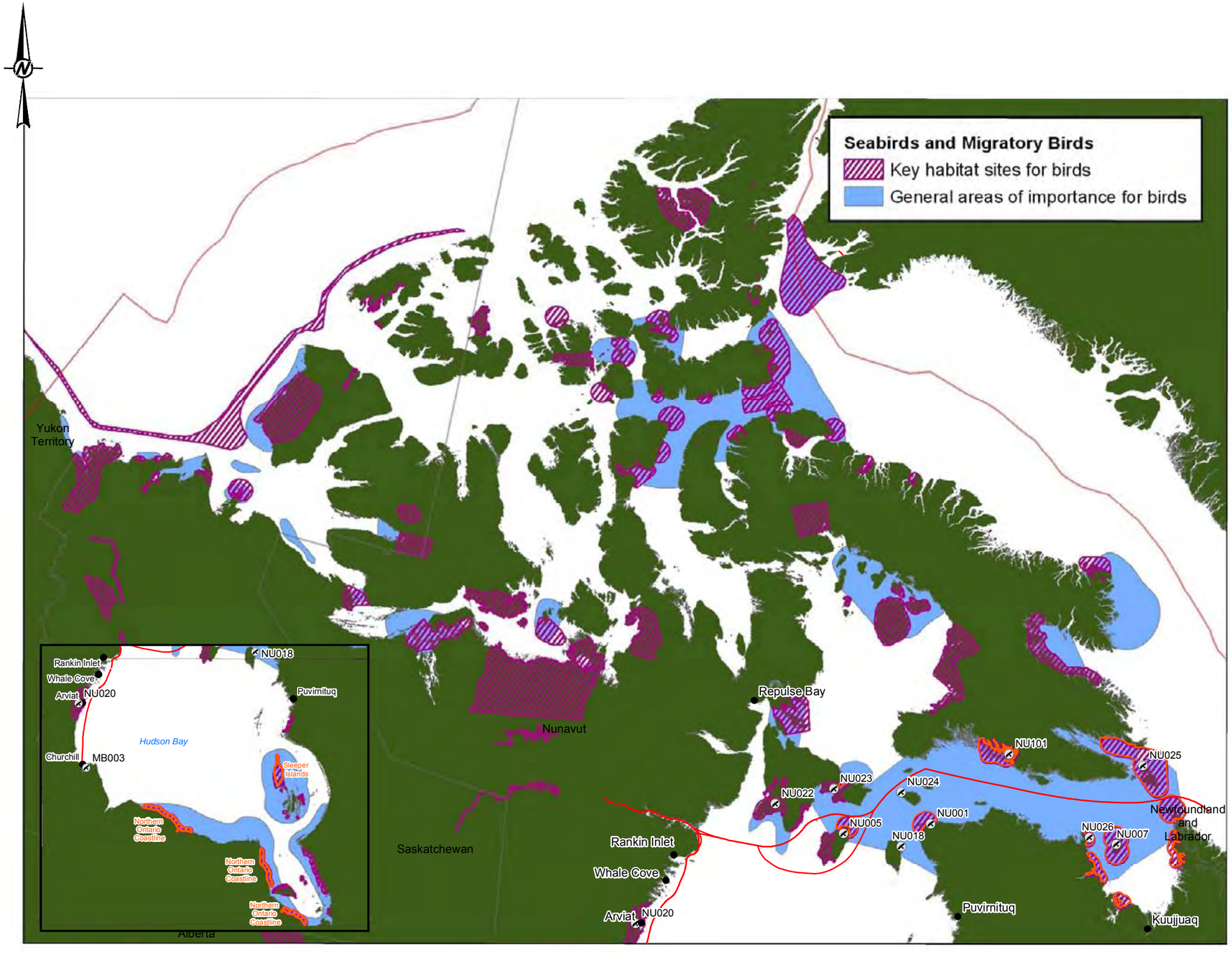

LEGEND

- IMPORTANT BIRD AREAS
- COMMUNITY
- SHIPPING ROUTE
- KEY MARINE HABITAT AREAS FOR MIGRATORY BIRDS

ID#	Important Bird Areas
NU022	Harry Gibbons Migratory Bird Sanctuary (federal)
MB003	Wapusk National Park (federal)
NU005	Cape Pembroke
MB013	Seal River Estuary Heritage River (federal)
NU020	McConnell River Migratory Bird Sanctuary (federal) & Ramsar Site
NU023	East Bay Migratory Bird Sanctuary (federal)
NU024	Fraser Island
NU001	Digges Sound
NU101	Markham Bay Eider Colony
NU026	Eider Islands
NU007	Akpatok Island
NU018	Mansel Island
NU025	Hantzsch Island

240 0 240
1:12,000,000 KILOMETERS

REFERENCE(S)
1. PROVINCIAL DATA OBTAINED FROM E.S.R.I.
2. BASE IMAGE OBTAINED FROM STEPHENSON AND HARTWIG, 2010
3. SHIPPING ROUTE DATA OBTAINED FROM THE DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.

COORDINATE SYSTEM: CANADA ALBERS EQUAL AREA CONIC

CLIENT
AGNICO EAGLE MINES LIMITED:
MEADOWBANK DIVISION

PROJECT
WHALE TAIL PIT – EXPANSION PROJECT

TITLE
KEY MARINE HABITAT AREAS FOR MIGRATORY BIRDS

CONSULTANT
GOLDER

YYYY-MM-DD	2018-08-30
DESIGNED	AK
PREPARED	DSC
REVIEWED	AO
APPROVED	PR

PROJECT NO.	PHASE	REV.	FIGURE
1896037	2500	0	17

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B
25mm
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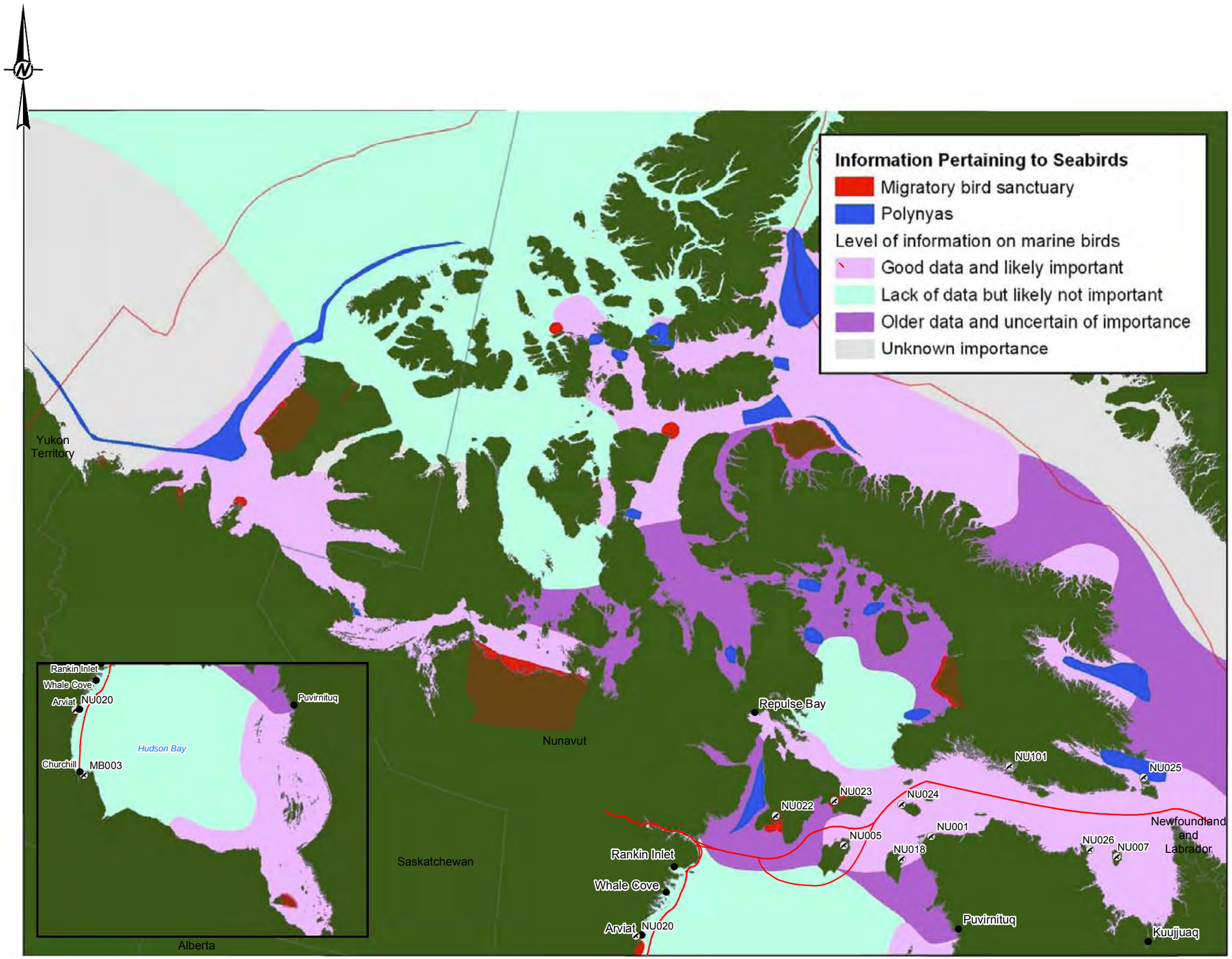

LEGEND

SHIPPING ROUTE

ID#	Important Bird Areas
NU022	Harry Gibbons Migratory Bird Sanctuary (federal)
MB003	Wapusk National Park (federal)
NU005	Cape Pembroke
MB013	Seal River Estuary Heritage River (federal)
NU020	McConnell River Migratory Bird Sanctuary (federal) & Ramsar Site
NU023	East Bay Migratory Bird Sanctuary (federal)
NU024	Fraser Island
NU001	Digges Sound
NU101	Markham Bay Eider Colony
NU026	Eider Islands
NU007	Akpatok Island
NU018	Mansel Island
NU025	Hantzsch Island

240 0 240

1:12,000,000 KILOMETERS

REFERENCE(S)

1. PROVINCIAL DATA OBTAINED FROM E.S.R.I.
2. BASE IMAGE OBTAINED FROM STEPHENSON AND HARTWIG, 2010
3. SHIPPING ROUTE DATA OBTAINED FROM THE DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.

COORDINATE SYSTEM: CANADA ALBERS EQUAL AREA CONIC

CLIENT

AGNICO EAGLE MINES LIMITED: MEADOWBANK DIVISION

AGNICO EAGLE

PROJECT

WHALE TAIL PIT – EXPANSION PROJECT

TITLE

DISTRIBUTION OF MARINE BIRDS AND BIRD HABITAT IN HUDSON BAY, HUDSON STRAIT AND ADJACENT ARCTIC WATERS

CONSULTANT

GOLDER

YYYY-MM-DD	2018-08-30
DESIGNED	AK
PREPARED	DSC
REVIEWED	AO
APPROVED	PR

PROJECT NO.	PHASE	REV.	FIGURE
1896037	2500	0	18

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25mm

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PATH: Y:\burnaby\CAD-GIS\Client\Agnico_Eagle_Mines_Ltd\Whale_Tail\9.0_PROJECT\S1896037\02_PRODUCTION\2500\MXD\2500\Report\1896037_FIG_18_Distribution_of_Birds.mxd PRINTED ON: 2018-08-30 AT: 6:39:10 PM