



2020

NINGINGANIQ NATIONAL WILDLIFE AREA MANAGEMENT PLAN



Acknowledgements

Former and current members of the Ninginganiq Area Co-management Committee (ACMC) developed this management plan: Leah Arreak, Siu-Ling Han, Danica Hogan, Jacobie Iqalukjuak, Enuusiq Jaypoody, Sam Palituq, James Qillaq, Leah Tassugat, and Jaysie Tigullaraq.

Former Canadian Wildlife Service (CWS) employees, especially Vicky Johnston, and the community of Clyde River, NU also made contributions to this management plan. Jerry Natanine and Dennis Tigullaraq provided interpretation services during the management planning process, and Leetia Janes translated the written plan into Inuktitut. The ACMC and CWS also wish to thank all of the people and organizations that reviewed this document, or provided logistical support during the management planning process.

Copies of this plan are available at the following addresses:

Environment and Climate Change Canada
Public Inquiries Centre
7th Floor, Fontaine Building
200 Sacré-Coeur Boulevard
Gatineau QC K1A 0H3
Telephone: 819-997-2800
Toll Free: 1-800-668-6767 (in Canada only)
Email: ec.enviroinfo.ec@canada.ca

Environment and Climate Change Canada – Canadian Wildlife Service
Northern Region
933 Mivvik Street, 3rd Floor
P.O. Box 1870
Iqaluit, NU X0A 0H0
Telephone: 867-975-4642
Email: ec.nupermisscf-cwspemitnu.ec@canada.ca

Environment and Climate Change Canada Protected Areas website:
<https://www.canada.ca/en/environment-climate-change/services/wildlife-habitat.html>

ISBN: [XXXX]
Cat. No.: [XXXX]

How to cite this document:

Environment and Climate Change Canada. 2020. Ninginganiq National Wildlife Area Management Plan. Environment and Climate Change Canada, Canadian Wildlife Service Northern Region, [XX] pp.

Unless otherwise specified, you may not reproduce materials in this publication, in whole or in part, for the purposes of commercial redistribution without prior written permission from Environment and Climate Change Canada's copyright administrator. To obtain permission to reproduce Government of Canada materials for commercial purposes, apply for Crown Copyright Clearance by contacting:

Environment and Climate Change Canada
Public Inquiries Centre
Fontaine Building, 12th Floor
200 Sacré-Coeur Boulevard
Gatineau, QC K1A 0H3



About Environment and Climate Change Canada's Protected Areas and Management Plans

What are Environment and Climate Change Canada Protected Areas?

Environment and Climate Change Canada establishes marine and terrestrial National Wildlife Areas for the purposes of conservation, research, and interpretation. National Wildlife Areas are established to protect migratory birds, species at risk, and other wildlife and their habitats. National Wildlife Areas are established under the authority of the *Canada Wildlife Act* and are, first and foremost, places for wildlife. Migratory Bird Sanctuaries are established under the authority of the *Migratory Birds Convention Act, 1994* and provide a refuge for migratory birds in the marine and terrestrial environment.

How has the federal government's investment from Budget 2018 helped manage and expand Environment and Climate Change Canada's National Wildlife Areas and Migratory Bird Sanctuaries?

The Nature Legacy represents a historic investment over five years of \$1.3 billion dollars that will help Environment and Climate Change Canada expand its national wildlife areas and migratory bird sanctuaries, pursue its biodiversity conservation objectives and increase its capacity to manage its protected areas.

According to the budget 2018, Environment and Climate Change Canada will be conserving more areas, and have more resources to effectively manage and monitor the habitats and species found inside its protected areas

What is the size of the Environment and Climate Change Canada Protected Areas Network?

The current Protected Areas Network consists of 55 National Wildlife Areas and 92 Migratory Bird Sanctuaries comprising more than 14 million hectares across Canada.

What is a Management Plan?

A management plan provides the framework in which management decisions are made and is intended to be used by Environment and Climate Change Canada staff to guide decision making, notably with respect to permitting. Management is undertaken to maintain the ecological integrity of the protected area and the attributes for which the protected area was established. Environment and Climate Change Canada, in partnership with Inuit, prepares a management plan for each CWS protected area in Nunavut in consultation with the public and other stakeholders.

A management plan specifies authorized activities in a protected area and identifies other activities that may be conducted under the authority of a permit. It may also describe



the necessary improvements needed in the habitat, and specify where and when these improvements should be made. A management plan identifies Inuit and Indigenous rights and allowable practices specified under land claims agreements. Further, measures carried out for the conservation of wildlife must not be inconsistent with any law respecting wildlife in the province or territory in which the protected area is situated.

What is Protected Area Management?

Management includes monitoring wildlife, maintaining and improving wildlife habitat, periodic inspections, enforcement of regulations, as well as the maintenance facilities and infrastructure. Research is also an important activity in protected areas; hence, Environment and Climate Change Canada staff carry out or coordinates research at some sites.

The Series

All of the National Wildlife Areas are to have a management plan. The management plans should be initially reviewed 5 years after the approval of the first plan, and every 10 years thereafter.

To Learn More

To learn more about Environment and Climate Change Canada's protected areas, please visit our website at <https://www.canada.ca/en/environment-climate-change/services/national-wildlife-areas.html> or contact the Canadian Wildlife Service.



Ninginganiq National Wildlife Area

The Ninginganiq National Wildlife Area (NWA) is located on the east coast of Baffin Island, approximately 100 km south-southeast of the community of Clyde River, Nunavut. The NWA includes the shoreline and islands of Isabella Bay and the adjacent ocean out to 12 nautical miles from shore. The NWA is 3,362 km² in size, consisting of approximately 530 km² of land and 2,832 km² of marine area. The Inuktitut word “Ninginganiq” translates roughly as “the place where fog sits” (Finley 1988a, Sanguya and Gearheard 2014). The NWA was established in 2010 to protect the marine habitat of the Bowhead Whale (*Balaena mysticetus*). Isabella Bay provides exceptional feeding conditions for Bowhead Whales due to upwellings caused by the interactions between ocean currents, wind, and the unique bathymetry of the bay (COSEWIC 2009, Dueck and Ferguson 2009). In September 2002, 147 Bowheads were observed at one time in Isabella Bay, making this the single largest known concentration of this species anywhere in Canada (Northern Environmental Marine Organization 2003).

An important motivating factor for protecting Isabella Bay as a NWA is the unique relationship between Inuit and Bowhead Whales; these whales had great significance to early human communities in the Arctic (Higdon 2008). The Bowhead Whale was one of the most important species harvested by Inuit and Thule, providing food, oil, and building materials for entire communities (McCartney 1980, McCartney and Savelle 1993, Moshenko et al. 2003, Higdon 2008), however, severe depletion of the Bowhead population by commercial whaling in the 19th century undermined the importance of whales to subsistence (Ross 1979, COSEWIC 2009). Isabella Bay was an important base for commercial whalers in the 19th century (Finley 1990) and a number of historical artifacts remaining from this period can be found in Ninginganiq NWA, making it an important site for historical and archeological research.

The major management challenge for the NWA lies in protecting the marine habitat from current and future human activities. Particular attention must be paid to tourism activities to ensure they do not harm wildlife or disrupt marine habitat in the NWA. Anticipated increased pressures from activities such as shipping, pollution, fishing, and non-renewable resource exploration and extraction need to be regulated in keeping with the conservation objectives for the NWA.

Access to Ninginganiq NWA by anyone other than Inuit enrolled under the Nunavut Agreement is restricted; therefore, any non- Nunavut Inuit must obtain a permit to access or conduct any activity within Ninginganiq NWA.

Access to Ninginganiq NWA is restricted for anyone who is not Nunavut Inuit. In Nunavut, Nunavut Inuit, as per the Nunavut Agreement (NA), can hunt wildlife, including the collection of migratory bird eggs and feathers, for their economic, social, and cultural needs. For all non-Nunavut Inuit, a permit must be obtained to access or conduct any type of activity in the NWA. Permitted activities must be in accordance with conservation objectives of the management plan.



Co-Management and Approval Process

The *Inuit Impact and Benefit Agreement for National Wildlife Areas and Migratory Bird Sanctuaries in the Nunavut Settlement Area (IIBA)* allowed the creation of the Ninginganiq NWA and defined general principles for its management. The NWA is managed by the Canadian Wildlife Service (CWS) of Environment and Climate Change Canada (ECCC) as part of a co-management agreement with Inuit through the Ninginganiq Area Co-Management Committee (ACMC). The ACMC provides advice on all aspects of NWA management and all significant policy decisions affecting the NWA, including Inuit use of the NWA, permit applications, research conducted within the NWA, management and protection of wildlife and wildlife habitat, and visitor use. The ACMC has six members: three appointed by the Qikiqtani Inuit Association (QIA) and three appointed by ECCC. Five members are appointed from the Clyde River Community Lands and Resources Committee (CLARC), or a similar committee in the community if CLARC members are unavailable, while the remaining member is a CWS employee.

The ACMC recommends the completed Management Plan to the Nunavut Wildlife Management Board (NWMB) for approval in accordance with sections 5.2.34(c) and 5.3.16 of the NA. Since the NWA includes Inuit Owned Lands (IOL), the ACMC also provides the Qikiqtani Inuit Association (QIA) and Nunavut Tunngavik Incorporated (NTI) with a copy of the completed Management Plan when the Plan is sent to the NWMB. If, in accordance with the decision-making process in the Nunavut Land Claim Agreement (NLCA), the NWMB or the Minister of ECCC rejects, in whole or part, the completed Management Plan, the Plan is returned to the ACMC for reconsideration. The ACMC shall revise the Plan and re-submit it to the NWMB and the Minister. Once the Minister accepts the Management Plan, the Minister proceeds forthwith to do all things necessary to implement the Plan.

For greater certainty, nothing in this management plan shall be construed to abrogate or derogate from the protection provided for existing aboriginal or treaty rights of the Aboriginal peoples of Canada by the recognition and affirmation of those rights in section 35 of the Constitution Act, 1982.



TABLE OF CONTENTS

TABLE OF CONTENTS	VII
LIST OF TABLES	IX
LIST OF FIGURES	X
LIST OF ABBREVIATIONS	XI
1 DESCRIPTION OF THE PROTECTED AREA	1
1.1 Regional Context.....	6
1.2 Historical Background.....	7
1.3 Land Ownership and Interests	8
1.4 Facilities & Infrastructure	9
2 CULTURAL RESOURCES	11
2.1 Cultural History.....	11
2.2 Documented Sites of Importance	13
2.3 Traditional and Subsistence Land Uses	16
3 ECOLOGICAL RESOURCES	17
3.1 Terrestrial and Aquatic Habitats.....	17
3.2 Wildlife	20
3.2.1 Bowhead Whales.....	20
3.2.2 Other Marine Mammals.....	22
3.2.3 Marine Plants and Other Marine Animals.....	24
3.2.4 Birds.....	24
3.2.5 Terrestrial Mammals.....	27
3.3 Species at Risk	27
3.4 Invasive Species	29
4 MANAGEMENT CONSIDERATIONS	30
4.1 Harvest of Wildlife	30
4.2 Tourism.....	30
4.3 Noise	31
4.4 Ship Collisions	31
4.5 Pollution.....	31
4.6 Commercial Fishing.....	32
4.7 Climate Change	32
5 GOALS & OBJECTIVES	33
5.1 Vision.....	33
5.2 Goals & Objectives.....	33
5.3 Evaluation.....	34
6 MANAGEMENT APPROACHES	34
6.1 Cultural Resources Management.....	34
6.2 Habitat Management.....	38
6.3 Wildlife Management.....	38
6.4 Monitoring.....	39
6.5 Research	39
6.6 Public Information & Outreach	41
7 AUTHORIZATIONS AND PROHIBITIONS	42
7.1 Prohibition of Entry	42
7.2 Inuit Activities Authorized without a Permit	42
7.3 Authorized Activities.....	42



7.4	Permits	43
7.5	Other Federal and Territorial Authorizations	44
8	HEALTH & SAFETY	45
9	ENFORCEMENT	46
10	PLAN IMPLEMENTATION.....	47
10.1	Management Authorities & Mandates.....	47
10.1.1	Environment and Climate Change Canada, Canadian Wildlife Service (ECCC,CWS) 47	
10.1.2	Area Co-Management Committee (ACMC)	48
10.1.3	Nunavut Wildlife Management Board (NWMB)	48
10.1.4	Qikiqtani Inuit Association (QIA)	48
10.1.5	Nunavut Tunngavik Incorporated (NTI)	48
10.2	Management Plan Review.....	48
11	COLLABORATORS	49
11.1	Inuit and Public Partners.....	49
11.2	Government of Nunavut (GN)	49
12	LITERATURE CITED	50
	APPENDIX A	60

DRAFT



LIST OF TABLES

Table 1: Summary Information on Ninginganiq National Wildlife Area.....	4
Table 2: Facilities and Infrastructure in Ninginganiq National Wildlife Area	9
Table 3: Species at Risk in Ninginganiq National Wildlife Area	28
Table 4: Management Approaches for Ninginganiq NWA	35
Table 5: Implementation Strategy timeline for Ninginganiq NWA Management Plan.....	47

DRAFT



LIST OF FIGURES

Figure 1: Ninginganiq National Wildlife Area	2
Figure 2: Inuit Owned Lands (IOLs) in Ninginganiq NWA.....	3
Figure 3: Photos from the 2011 ACMC site visit to Ninginganiq NWA. A. Stone windbreak on Siuraqtjuarusiq; B. Cabin frames at Taliruujaq; C. Cabins at Nuvuktiapik; D. Rock scoping shelter at Nuvuktiapik.....	10
Figure 4: Scottish Whaling boat, Eclipse (1903), in Pond Inlet.....	12
Figure 5: Photos of important historical sites in Ninginganiq NWA. A. Examples of meat caches in the NWA; B. Graves of 4 whalers at Taliruujaq.....	15
Figure 6: Examples of plants found in Ninginganiq NWA	19
Figure 7: Distribution of the Eastern Canada-West Greenland population of Bowhead Whales .	20
Figure 8: Wildlife area of special interest for Polar Bears in Ninginganiq NWA	23
Figure 9: Area of known falcon nest sites within Ninginganiq NWA.....	26
Figure 10: Ninginganiq National Wildlife Area permit application process	44

DRAFT



LIST OF ABBREVIATIONS

ACMC	Area Co-Management Committee
CIRNAC	Crown-Indigenous Relations and Northern Affairs Canada
CLARC	Community Land and Resource Committee
CLO	Community Liaison Officer
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CWA	<i>Canada Wildlife Act</i>
CWS	Canadian Wildlife Service
DIAND	Department of Indian Affairs and Northern Development
DFO	Department of Fisheries and Oceans Canada
ECCC	Environment and Climate Change Canada
GN	Government of Nunavut
GNWT	Government of the Northwest Territories
HTO	Hunters and Trappers Organization
IIBA	<i>Inuit Impact and Benefit Agreement for National Wildlife Areas and Migratory Bird Sanctuaries in the Nunavut Settlement Area</i>
IHT	Inuit Heritage Trust
IOL	Inuit-Owned Lands
IQ	Inuit Qaujimajatuqangit
IUCN	International Union for the Conservation of Nature
MBCA	<i>Migratory Birds Convention Act</i>
MBS	Migratory Bird Sanctuary
NIRB	Nunavut Impact Review Board
NA	<i>Nunavut Agreement between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in right of Canada</i>
NCLA	<i>Nunavut Land Claim Agreement</i>
NPC	Nunavut Planning Commission
NSA	Nunavut Settlement Area
NTI	Nunavut Tunngavik Incorporated
NWA	National Wildlife Area
NWMB	Nunavut Wildlife Management Board
NU	Nunavut
QIA	Qikiqtani Inuit Association
QWB	Qikiqtaaluk Wildlife Board



RCMP	Royal Canadian Mounted Police
RIA	Regional Inuit Association
SARA	<i>Species at Risk Act</i>
TC	Transport Canada

DRAFT



1 DESCRIPTION OF THE PROTECTED AREA

The Ninginganiq National Wildlife Area (NWA) is located on the east coast of Baffin Island, approximately 100 km south-southeast of the community of Clyde River, Nunavut (**Figure 1**). The NWA includes the shoreline and islands of Isabella Bay and the adjacent ocean out to 12 nautical miles (or 22.2 km) from shore. The NWA covers an area of 3,362 km² consisting of approximately 530 km² of land and 2,832 km² of marine area. The Inuktitut word “Ninginganiq” translates roughly as “the place where fog sits” (Finley 1988a, Sanguya and Gearheard 2014). The surface land is administered by the Crown under Environment and Climate Change Canada (ECCC), except for four parcels of Inuit Owned Lands (IOLs) that are owned by the Qikiqtani Inuit Association (QIA) (**Figure 2**). The NWA is managed by the Canadian Wildlife Service (CWS) of ECCC as part of a co-management agreement with Inuit. The Ninginganiq Area Co-Management Committee (ACMC) provides advice on all aspects of NWA management, including all significant policy decisions affecting the NWA.

The NWA was established in 2010 with the primary intent of protecting the marine habitat of the Bowhead Whale (Canada Gazette Part II, Vol. 144, No. 13, *Balaena mysticetus*; see **Table 1**). The interaction of ocean currents and wind with the shallow inshore banks and deep offshore troughs of the bay create ideal feeding habitat for the whales (Finley et al. 1994). In 2009, the Bowhead Whale population using this area, the Eastern Canada-West Greenland population, was assessed as Special Concern by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) (COSEWIC 2009). Up to 147 Bowheads have been observed at one time in Isabella Bay, making this the single largest known concentration of Bowheads anywhere in Canada (Northern Environmental Marine Organization 2003, Sanguya and Gearheard 2014). Isabella Bay is also identified as an ‘Ecologically and Biologically Significant Area’ by the Department of Fisheries and Oceans Canada (DFO) (DFO 2015b).



Figure 1: Ninginganiq National Wildlife Area



Figure 2: Inuit Owned Lands (IOLs) in Ninginganiq NWA



Table 1: Summary Information on Ninginganiq National Wildlife Area

Protected Area Designation	National Wildlife Area
Province or Territory	Nunavut
Latitude and Longitude	69°50'N / 67°00'W
Size	3,362 km ²
Protected Area Designation Criteria	<ul style="list-style-type: none"> • Area supports the largest known concentration of Bowhead Whales (<i>Balaena mysticetus</i>) in Canada. • Area provides unique feeding and resting habitat for Bowhead Whales. • Area provides habitat for species listed under SARA (Polar Bear, Peregrine Falcon, Ivory Gull, Ross's Gull) and for many breeding and migrating birds.
Protected Area Classification System	A. Species or Critical Habitat Conservation
International Union for Conservation of Nature (IUCN) Classification	Ib – Wilderness Area
Order-in-Council Number	P.C. 2010-705
Directory of Federal Real Property (DFRP) Number	21601
Gazetted	2010
Additional Designations	Ecologically and Biologically Significant Area (Department of Fisheries and Oceans Canada)
Faunistic and Floristic Importance	Largest concentration of Bowhead Whales in Canada.
Invasive Species	None
Species at Risk	<p>Listed under federal Species at Risk Act (SARA): Polar Bear, Peregrine Falcon (Special Concern) Ivory Gull (Endangered) Ross' Gull (Threatened)</p> <p>Assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC): Bowhead Whale, Beluga Whale, Narwhal, Atlantic Walrus, Ringed Seal, and Wolverine (Special Concern) Caribou (Threatened)</p>
Management Agency	Environment and Climate Change Canada



Public Access and Use	<p>Nunavut Inuit have a free and unrestricted right of access for the purpose of harvesting to all lands, waters, and marine areas within the NWA, as per <i>Article 5</i> of the <i>IIBA</i> and subject to <i>s.5.7.18</i> of the <i>Nunavut Agreement</i>.</p> <p>For all non-Nunavut Inuit, a permit must be obtained to access or conduct any type of activity in the NWA.</p>
------------------------------	---

DRAFT



1.1 REGIONAL CONTEXT

Ninginganiq NWA is located on the east coast of Baffin Island, Nunavut, approximately 100 km south-southeast of Clyde River (**Figure 1**). The NWA encompasses all of Isabella Bay from the mouth of McBeth Fiord out to the Canadian territorial limit (12 nautical miles; 22.2 km). The terrestrial portion of the area (530 km²) includes all of the islands in the bay and land located within approximately 1 km of the shoreline. The marine portion of the NWA (2,832 km²) begins at the mouth of McBeth Fiord. Maximum ocean depths of 560 m are reached near the head of the fiord but gradually diminish towards the 30 km-wide mouth where depths range from 200 to 260 m (Finley et al. 1986, Finley 1990). The bottom of the bay is marked by deep glacial troughs, and rock and gravel deposits created during the last glaciation (Gilbert 1985).

The terrestrial landscape, which has been heavily glaciated, consists of moraines, outwash plains, shallow tundra ponds, and remnant glaciers (Sutherland 1853, Ives and Andrews 1963). The terrain is more rugged on the south side of Isabella Bay, near McBeth Fiord. The ground consists mainly of sand, silt, boulders, cobbles, and gravels/pebbles (Davis et al. 2006). Glaciers flank the mouth of McBeth Fiord and extend into the western part of the NWA. The highest point of land is the top of the Kiitarayuk Glacier (~900 m above sea level). Average daily temperatures in the area are +5.0 C in July and -29.1 C in January, and ~75% of the annual 258 mm of precipitation falls as snow (Environment and Climate Change Canada 2019).

The closest community to Ninginganiq NWA is Clyde River (Kangiqtugaapik), located on the Baffin Island coast approximately 100 km north-northwest of Isabella Bay. The community regularly uses the NWA for hunting and fishing purposes (Sanguya and Gearheard 2014, Government of Nunavut 2014). The only terrestrial transportation route in the NWA is a lightly-travelled (i.e., 10 to 50 passes per season) snowmobile route between Clyde River and Broughton Island (Government of Nunavut 2014).

Seismic vessels ran transects through Ninginganiq in the 1970s, and exploratory oil and gas drilling has occurred in southern Davis Strait and the continental shelf at Isabella Bay in the past (Nunami Stantec 2018). Although Ninginganiq NWA and the immediate surrounding area are thought to have low potential for hydrocarbon deposits, there is a favourable chance of pooled hydrocarbons (e.g., oil, gas, and gas condensates) east of the NWA in Baffin Bay (National Energy Board 1994, Nunami Stantec 2018).

All ship traffic bound for Lancaster Sound passes through Davis Strait (Pizzolato et al. 2016, Dawson et al. 2018). In most years, spring and early summer traffic must travel on the Greenland side of Davis Strait because heavy ice late into the shipping season makes travel on the Canadian side difficult (Canadian Ice Service 2011, Reeves et al. 2014). In exceptional years when the Baffin Island shore lead opens early, ships preferentially route through it, potentially entering into, or coming close to, the NWA (Pizzolato et al. 2016).

Interest in tourism development at Ninginganiq NWA has been expressed by several agencies, with most potential tourism focused on Bowhead Whale watching. Ecotourism vessels (usually less than 6/year) currently visit the NWA for whale watching purposes, primarily in August and September (Canadian Wildlife Service, unpublished data 2011-2020).

In 1990, establishment of a land-based, territorial historic park was proposed at Isabella Bay in conjunction with efforts to create a Bowhead Whale sanctuary. The purpose of the historic



park was to promote tourism based on the area's archaeological resources and whale watching. The proposal was turned down, but the Nangmoutaq (Clyde River) Hunters and Trappers Organization (HTO) proposed to construct a research, education, and ecotourism lodge at Nuvuktiapik to provide basic facilities for a small number of tourists interested in a learning-oriented and participatory tourism experience. The proposed lodge has not yet been pursued.

Some research on Bowhead Whales and their habitat has occurred in Ninginganiq NWA in the past (Finley et al. 1986, Finley 1988b, Finley 1990, Finley et al. 1994). There is high potential for further monitoring/studies of the whales, their habitat, and other wildlife in the NWA in the future.

1.2 HISTORICAL BACKGROUND

Although Inuit have always lived and hunted in the Clyde River area, a permanent settlement was not established until the Hudson's Bay Company opened a trading post in 1923 (Milton Freeman Research 1976, Wenzel 2008). The traders moved families from Kimmirut (then Lake Harbour) and Iqaluit (then Frobisher Bay) to Clyde River to access a local source of furs, while other families moved into the area to trade and to replace income lost when the whaling industry closed (Wenzel 2008). The population grew from 32 people in 1931 to its present population of 1,053 (2016 Canada census). Hunting is still very important to many people in Clyde River, and community members regularly visit and hunt in the Isabella Bay area (Priest and Usher 2004, Government of Nunavut 2014)

An important motivating factor for protecting Isabella Bay as a NWA is the unique relationship between Inuit and Bowhead Whales, as the whales had great significance to early human communities in the Arctic (Higdon 2008). Bowheads were one of the most important species harvested by Inuit, providing food, oil, and building materials for entire communities until severe depletion of the Bowhead population by commercial whaling in the 19th century undermined the importance of whales to subsistence (Finley 1990, Wenzel 2008). Inuit are concerned about losing their communal knowledge about the Bowhead Whale and the techniques for hunting it, and many believe that resumption of the Bowhead hunt will help them preserve their culture (Nunavut Wildlife Management Board 2000).

The community of Clyde River's initiative to assist with the recovery of the Bowhead Whale population started in 1983. The underlying objective was to increase the population to levels that could sustain hunting. The Hamlet Council and the Hunters and Trappers Association of Clyde River formed the Igalirtuuq Steering Committee in 1988 to develop a conservation plan for Isabella Bay. In May 1990, the Steering committee submitted the plan "Igalirtuuq: a Conservation Proposal for Bowhead Whales at Isabella Bay, Baffin Island, NWT", to the federal Ministers of DFO, the Department of Indian Affairs and Northern Development (DIAND), and the Government of the Northwest Territories Department of Renewable Resources. Following two workshops in 1992, the community decided to pursue a NWA under the *Canada Wildlife Act* (CWA); this protective mechanism was endorsed by the community during a plebiscite in March 1993. In June 1993, the Nunavut Wildlife Management Board (NWMB) approved the proposal in principle and in June 1994, the NWMB approved the NWA boundary.

CWS and Inuit drafted a management plan and inter-governmental cooperative management agreement between 1994 to 1996. The terrestrial crown lands within the



proposed boundary were transferred from DIAND to Environment Canada in 1996. In January 1998, the QIA and CWS began negotiating the lease for IOL parcels within the proposed boundary.

In 2008, as part of the *Inuit Impact and Benefit Agreement for National Wildlife Areas and Migratory Bird Sanctuaries in the Nunavut Settlement Area (IIBA)*, which was negotiated under the authority of the NA, the Government of Canada (2010) committed to taking the necessary steps to establish three new NWAs in Nunavut on the coast of Baffin Island: Ninginganiq, Akpait, and Qaqulluit. The IIBA was agreed to by the Inuit of the Nunavut Settlement Area (NSA 2008), Nunavut Tunngavik Incorporated (NTI), the Kitikmeot Inuit Association, the Kivalliq Inuit Association, the Qikiqtani Inuit Association (QIA), the Nangmoutaq Hunters and Trappers Organization (HTO), and the Government of Canada. In 2010, an amendment to the Wildlife Area Regulations under the Canada Wildlife Act led to the creation of the three NWAs, including Ninginganiq NWA.

1.3 LAND OWNERSHIP AND INTERESTS

Within the terrestrial portion of Ninginganiq NWA, the administration of terrestrial surface Crown lands rests with ECCC, except for four parcels of IOL: one located on Aulitiving Island (CR-02); and three on the mainland within 1 km of the high-water mark along the coastline of Isabella Bay (CR-01, CR-03, CR-07; **Figure 1**). The seabed in the marine portion of the NWA is also administered by ECCC. All ECCC administered lands in the NWA are subject to the Government of Canada's ban on oil and gas, mining, dumping, and bottom trawling activities in federal marine protected areas (announced April 25, 2019). As specified in the IIBA, the IOL in the NWA are also subject to the CWA and its regulations, on the condition that CWS issues the necessary permits under the CWA to allow the Nangmoutaq HTO and the QIA, or their designate(s), to build an ecotourism lodge and research facility, a Twin Otter airstrip, and vessel docking facilities on the Ninginganiq IOL in the vicinity of the easternmost point of Cape Raper. Sub-surface rights for the entire area rest with Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC).

The Nunavut Agreement (NA) states that "Inuit shall enjoy special rights and benefits with respect to [the NWA]...". Article 5 of the IIBA addresses the specific activities for which Nunavut Inuit hold rights, including:

- the free and unrestricted right of access for the purpose of harvesting to all lands, waters, and marine areas within the NWA;
- the right to guide or transport sports hunters and their equipment through the NWA to a destination within or outside the NWA;
- the right to remove up to 50 cubic yards per year of carving stone from Crown lands and any amount of stone from IOL;
- and the right to establish new outpost camps anywhere in the NWA, except where this is inconsistent with wildlife and wildlife habitat conservation.



1.4 FACILITIES & INFRASTRUCTURE

The Ninginganiq ACMC identified the following infrastructure items and issues during a site visit in May 2011 (see **Table 2**; **Figure 1** shows the location of Inuit place names used throughout the management plan):

- Siuraqtujuarusiq has a lookout hill used in the past by whalers to scope for whales. There is an oval-shaped stone shelter at the lookout, about two and a half feet high, facing Aulativikjuarusiq (**Figure 3A**);
- There used to be three cabins at Talirujaq, but only two frames are still standing (**Figure 3B**);
- At Nuvuktiapik, there are two cabins; the smaller one can be used by anyone, the larger one was built by the community and DFO (**Figure 3C**). The smaller cabin has no door and the bigger cabin has most of the windows broken. Sleeping in tents at Nuvuktiapik is dangerous due to bears.
- On a hill at Nuvuktiapik, there is an old scoping place to watch for Bowhead Whales (**Figure 3D**). The place is made of rocks for shelter from the wind. The shelter was rebuilt by Bowhead Whale researcher, Kerry Finley.

Table 2: Facilities and Infrastructure in Ninginganiq National Wildlife Area

Type of facility or infrastructure	Location	Land Owner
Two cabins; the smaller one can be used by anyone while the other belongs to the community	Nuvuktiapik	On IOL
Rock shelter at an old scoping place up a hill.	Nuvuktiapik	On IOL
Stone shelter at the look-out hill	Siuraqtujuarusiq	On IOL
Three cabins but only two frames are still standing	Taliruujaq	On IOL



A



B



C



D



Figure 3: Photos from the 2011 ACCM site visit to Ninginganiq NWA. A. Stone windbreak on Siuraqtjuarusiq; B. Cabin frames at Taliruujaq; C. Cabins at Nuvuktiapik; D. Rock scoping shelter at Nuvuktiapik



2 CULTURAL RESOURCES

2.1 CULTURAL HISTORY

The area around Ninginganiq NWA was originally inhabited by nomadic people from the Dorset and Thule cultures (Wenzel and Community of Clyde River 1999). Stories and descriptions of the Dorset, or Tuniit, have been passed down through Inuit oral tradition. The Tuniit culture declined as the Arctic climate warmed (i.e., around 1,000 AD) and they were replaced by the Thule Inuit whose subsistence was based on open-water hunting of large marine mammals (Meldgaard 1960, Wenzel and Community of Clyde River 1999, Moshenko et al. 2003). In many areas, Bowhead Whales were of major importance to the Thule people (McCartney 1980, McCartney and Savelle 1993, Higdon 2008). The Thule are thought to be the ancestors of modern Inuit, who were present in the region of Ninginganiq NWA by the 1800s (Wenzel 2008).

Before the arrival of Europeans, Inuit living on central Baffin Island led a nomadic lifestyle with the location and time of camp use determined by the season (Wenzel 2008). Wenzel (2008) summarizes Boas' observation that the Inuit travelled to Ijellirtung (McBeth Fiord), behind Isabella Bay, to reach an important Arctic Char (*Salvelinus alpinus*) area. The site called Igaliruuq and the winter camp at Cape Raper (Nuvuktiapik) were the primary locations where Inuit lived before whalers arrived (Boas 1888, Wenzel 2008). Here, they hunted for seals through the ice or at the floe edge and for Polar Bears on the sea ice. In summer, Inuit travelled inland from Isabella Bay to hunt Caribou (*Rangifer tarandus ssp. groenlandicus*) (Wenzel 2008). Arctic Char were fished at the Kuuktannaq River in the fall, when families were making their way back to the coast.

In his research into the historic settlement patterns along the eastern coast of Baffin Island, Wenzel (2008) references the initial assumptions made by ethnographer Franz Boas about habitation in the area of the NWA, mainly that the Akudnirmiut people used Home Bay's islands during summers to hunt Caribou before moving in August to the southeast tip of Henry Kater Peninsula to meet whalers (Boas 1888, Wenzel 2008). Boas also noted that the Inuit traveled to McBeth Fiord, behind Isabella Bay, to reach areas important for Arctic Char (Boas 1888, Wenzel 2008); birds did not seem to be abundant for harvest.

Through journals from the Hudson's Bay Company post at Clyde River and the Royal Canadian Mounted Police (RCMP), Wenzel (2008) provides population statistics for one Inuit camp site near the NWA: in 1923 to 1924, nine men and ten women lived in a camp near Tikerqan (Tikiqqat), where the Sabellum Trading and Gold Company Post was located. The winter settlements at Henry Kater and Isabella Bay were reported by Inuit and the RCMP to have been snowhouse villages, rather than sod houses used in other parts of the region (Wenzel 2008).

Wenzel (2008) also identifies the families associated with sites in the NWA during specific periods:

- Between 1930 to 1940 the family group "Ilkuq" (numbering 6 to 7 people) lived around Tilavunik; and



- In the mid-1960s, the Naiaunasaq group, led by Kunilussi (numbering 30 to 35 people) used Isabella Bay area for spring hunting.

The data collected by Wenzel (2008) also indicate that there was an apparent reluctance of groups to take up residence in Isabella Bay due to legends of a giant living in McBeth Fiord.

European whalers hunted Bowheads in the NWA for their baleen and blubber (Moshenko et al. 2003). Baleen was used to make corsets and other items of European clothing, and the blubber was sold as oil, which was used for lighting, lubrication, and soap manufacturing (Kugler 1980, Ross 1993). Whaling began in Davis Strait area as early as the late 1600s and occurred at substantial levels by 1719, when Dutch whalers began keeping reliable records (Ross 1979, Woodby and Botkin 1993, Higdon 2008). Whaling in Davis Strait for much of the 18th century was dominated by the Dutch until about 1794, although German whalers also took some whales (Ross 1979). In 1820, the east coast of Baffin Island from Pond Inlet to Cape Dyer was open to commercial whaling (Finley 1990) and Scottish whaling fleets were prominent in the fishery for two decades in the mid- to late 1800s (Higdon 2008; **Figure 4**). British whalers dominated the Davis Strait whale fishery through the 19th century, however, American whalers became increasingly active in the latter part of the century (Holland 1970, Ross 1979, Higdon 2008). Harvesting of Bowheads continued through the late 1800s until around 1911 when the area was depleted of whales (Woodby and Botkin 1993). The Isabella Bay Bowhead Whales were called 'rocknoser' by the British whalers because of their peculiar habit of appearing to do 'headstands' in shallow waters and planting their noses on rocks (Finley 1990). This rock rubbing behavior appears to be an effort to remove loose skin during moulting (Fortune et al. 2017).

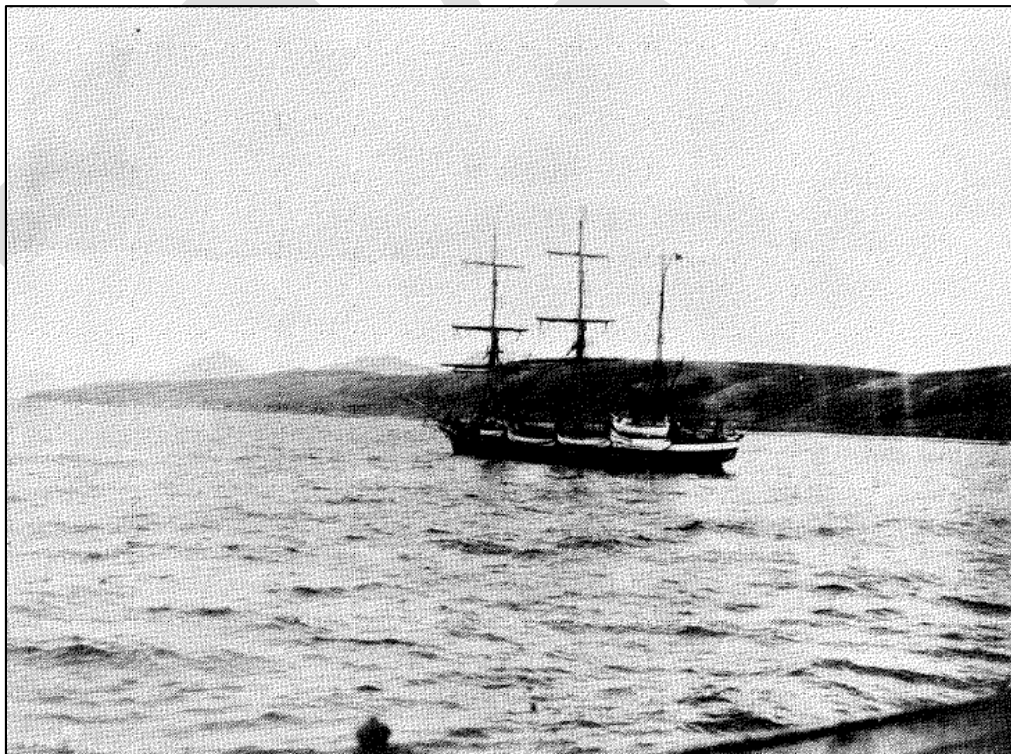


Figure 4: Scottish Whaling boat, Eclipse (1903), in Pond Inlet (from Ross 1979)



Inuit of the area were active participants in the 'rocknose' whaling industry (Higdon 2008). They changed their camping and hunting patterns, gathering at important points of contact such as Arctic Harbour (Taliruujaq) and Ravenscraig Harbour (Aqvikiuk) (Finley 1990). Today there are many artifacts, qammaqs, tent rings, and meat caches dating from that time (**Figure 3, Figure 4**). When the rocknosing industry finally collapsed, the autumn camps dispersed again until after the First World War, when fur traders appeared and the trading post at Clyde River was established (Finley 1990). Inuit, including the Sanguya, Tassugat, and Kuniliusie families, remained living in camps at Isabella Bay until the 1960s and several frame structures and artifacts from this period remain at Igalirtuuq, Nuvuktiapik, and Taliruujaq (CWS, unpublished data). The Qaqqasiq family was the last to live at Isabella Bay; they moved to Clyde River in 1971. Inuit continue to use the area today for subsistence and recreational purposes (Priest and Usher 2004, Government of Nunavut 2014).

2.2 DOCUMENTED SITES OF IMPORTANCE

Inuit hunted Bowheads opportunistically in Isabella Bay, although other areas (e.g., Cumberland Sound) may have been more important to them (Higdon 2008). Oral tradition and the location of old qammaqs indicate that pre-European contact whaling occurred along the Baffin Coast in areas where Bowheads concentrated in the summer and fall (Higdon 2008).

Captain John Ross and the crews of the HMS Isabella and the HMS Alexander were the first Europeans to visit the NW A area, naming Isabella Bay in honour of their whaling ship (Ross 1819, Levere 1988, Finley 1990). Their 1818 expedition around Baffin Bay, and their report of the Bowheads' migration off the east coast of Baffin Island, opened the way for the British Arctic whaling fleet (Ross 1819, Holland 1970, Finley 1990). William Parry, a member of Ross' expedition, revisited the area in the autumn of 1820 and he hailed three whaling ships near Clyde River (Wenzel and Community of Clyde River 1999). He boasted "Thus has a new and extensive field been opened for one of the most lucrative branches of our commerce" (Holland 1970).

The east coast of Baffin Island eventually became famous as the autumn 'rocknosing' grounds (Finley 1990). Despite the importance of Arctic Harbour (Taliruujaq) on Aulitiving Island in the NW A to the rocknosing grounds, the sailing fleet often avoided the area due to heavy ice conditions (Finley 1990). However, the introduction of auxiliary steam-powered ships in 1859 allowed the rocknosing grounds to be fully exploited (Finley 2001). The graves of four whalers at Taliruujaq date from 1871 to 1882, which was the height of the third and final pulse of whaling in Baffin Bay (Marshall Macklin Monaghan Ltd. 1982, Prince of Whales Northern Heritage Centre, unpublished data). By 1906, there were almost no whales remaining on the rocknosing grounds (Ross 1979, Finley 1990).

The Sabellum Trading and Gold Company had a trading post from 1923-1926 on the southern shores of Henry Kater Peninsula, in Alexander Bay (Wenzel and Community of Clyde River 1999).

Inuit and researchers believe that the area around Isabella Bay has high potential for archaeological sites, but no extensive surveys have been undertaken. According to the Canadian Museum of History Sites Online - Web Mapping Service, there are no documented archaeological sites within the boundary of Ninginganiq NWA, however, over 65



archaeological sites have been identified along the coast south of Home Bay, and 28 between the NWA and Clyde River. These archaeological sites are predominantly Thule, some late, but there are also some Dorset, indigenous historic Inuit, contemporary Inuit, historic Inuit, and undetermined sites.

Records from the Prince of Wales Northern Heritage Centre describe four sites related to the NWA:

1. Pinera (Piniraaq in Clyde Inlet, not within the NWA). 19 houses from classic Thule to modern;
2. Nuvuktiapik Island. Tent rings and caches (late Thule to historic), stone house of some antiquity, and Thule houses; see **Figure 5A** for examples.
3. Taliruujaq (Arctic Harbour) on Aulitiving Island. A European whalers' burial ground with four graves from the 1870s to 1880s and three with decipherable headstones (**Figure 5B**), and a whalebone graveyard; and
4. Taliruyuk. Historic Inuit settlement dating to the turn of the century with 13 qammaqs, 14+ tent rings, and dozens of meat caches. Artefacts associated with the houses date to the early 1900s.

The *Archaeological Sites and Paleontological Resources Regulations* of the *Nunavut Act* protect cultural sites in Nunavut, including sites of archaeological, ethnological, paleontological, or historical importance. As per section 6.4 of the IIBA, NTI may provide additional information regarding sites of cultural and wildlife importance to Inuit in the NWA, at a later date.

The Igalirtuuq Steering Committee and Ninginganiq ACMC conducted several field trips to Isabella Bay as part of NWA establishment and management. The objectives of two trips were to identify sites of historical importance to Inuit, and document structures, artifacts, and archeological sites. Accounts from these field trips provide additional layers of traditional knowledge regarding Inuit use of this site.



A



B

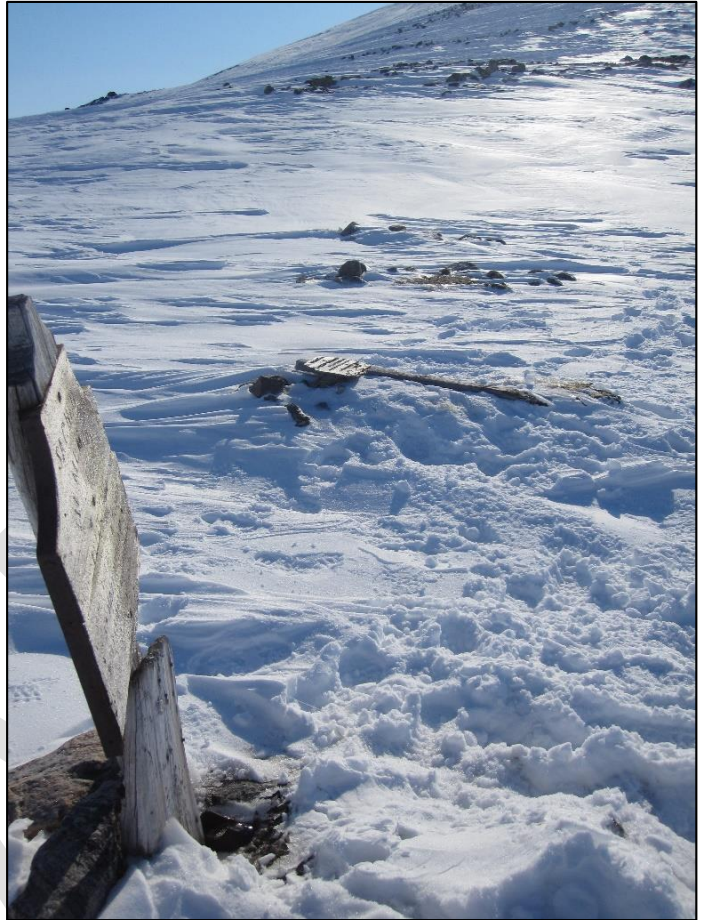


Figure 5: Photos of important historical sites in Ninginganiq NWA. A. Examples of meat caches in the NWA; B. Graves of 4 whalers at Taliruujaq



2.3 TRADITIONAL AND SUBSISTENCE LAND USES

Ringed Seals (*Pusa hispida*), a particularly important species for coastal Inuit, are hunted primarily during winter and spring in the Clyde River area, including Isabella Bay (Milton Freeman Research 1976, Wenzel 1989, Wenzel 1995, Priest and Usher 2004, Gearheard et al. 2006, Government of Nunavut 2014). Bearded Seal (*Erignathus barbatus*) and Harp Seal (*Pagophilus groenlandicus*) are occasionally hunted (Milton Freeman Research 1976, Priest and Usher 2004, Government of Nunavut 2014). Polar Bears (*Ursus maritimus*), an economically important species to the Clyde River community, are hunted in winter and spring when they hunt for seals along leads in the fast ice, at the floe edge, or in offshore pack ice (Milton Freeman Research 1976, Gearheard et al. 2006, Wenzel 2011, Government of Nunavut 2014). The southern shore of Isabella Bay was identified as an important Polar Bear hunting area in the past (Milton Freeman Research 1976). Clyde River residents also hunted Narwhal (*Monodon monoceros*) in the past from Home Bay north to Scott Inlet, including the southern portion of Isabella Bay (Milton Freeman Research 1976, Government of Nunavut 2014).

Hunting of terrestrial mammals in Ninginganiq NWA is limited since most Caribou (*Rangifer tarandus*) occur further inland, rarely moving close enough to the coast to enter the NWA (Milton Freeman Research 1976, Wenzel 2008, Government of Nunavut 2014, Jenkins and Goorts 2013, Campbell et al. 2015). Because birds were not particularly important game to local people (Milton Freeman Research 1976, Wenzel 2008), bird hunting is not common in Ninginganiq NWA, however, eiders, ducks, swans, geese, and ptarmigan are occasionally hunted (Priest and Usher 2004, Harder and Wenzel 2012, Government of Nunavut 2014). Bird eggs, especially goose eggs, are commonly harvested in June and July (Priest and Usher 2004, Government of Nunavut 2014). At present, trapping does not occur in the NWA, although Clyde River trappers take a small number of Arctic Fox (*Vulpes lagopus*) and Arctic Wolf (*Canis lupus*) in other nearby areas (Priest and Usher 2004).

Arctic Char is the most important fish for Clyde River residents (Priest and Usher 2004). The Kuuktannaq, just north of Nuvuktiapik, is the main fishing area for Arctic Char in late summer, but some fishing also takes place at the head of McBeth Fiord (Priest and Usher 2004, Government of Nunavut 2014). Commercial fishing for Turbot (*Scophthalmus maximus*) occurs in Baffin Bay outside the 12 nautical mile territorial boundary of the NWA (Church 2011). Some non-commercial fishing also occurs in the vicinity of the NWA (Priest and Usher 2004).

Inuit elders of Clyde River were interviewed to assist development of a community-based conservation strategy for Bowhead Whales by incorporating Inuit Qaujimajatuqangit (IQ) into the decision-making process for this species and establishing a forum for exchange of scientific and traditional knowledge (a summary of some of the interviews are found in Finley 1988a). The elders' accounts of wildlife harvest, wildlife behaviour, human occupation of Isabella Bay in the past century, and environmental change during that period, support findings established through western scientific research processes.



3 ECOLOGICAL RESOURCES

3.1 TERRESTRIAL AND AQUATIC HABITATS

Climate is the ultimate driving force behind the biological phenomena that create good feeding habitat for Bowhead Whales at Isabella Bay (Finley 1988b, Finley et al. 1994, Finley et al. 1998). Atmospheric conditions determine the extent of sea ice (Canadian Ice Service 2011) and thus the amount of solar energy entering the marine system. The extent of solar energy influences the abundance of plankton (i.e., small marine plants and animals) growing in the area, and consequently, the abundance of larger animals that feed on plankton, such as Bowheads (Finley et al. 1994, Finley et al. 1998).

Weather at Ninginganiq is influenced by a major upper atmospheric trough on the east coast of Baffin Island (Bradley 1973, Maxwell 1980). Movements of the trough expose the region to two very different air masses, resulting in extreme year-to-year variation in local sea ice conditions and in summer climate (Bradley 1973, Maxwell 1980). Summers tend to be cool (mean July temperature is +5°C) and cloudy, with frequent high winds and fog (Bradley 1973, Maxwell 1981). In years with persistent pack ice, summers are cooler, and cloud cover and fog are much less common. Generally, ice break-up occurs in Isabella Bay in late August (Finley 1990, Canadian Ice Service 2011, Northern Environmental Marine Organization 2003). Autumn weather is highly variable, but tends to be stormy, with storms growing in frequency and intensity prior to freeze-up in late October (Maxwell 1981). Winter temperatures (Oct-April) range between -7 °C and -30 °C and ~75% of the annual 258 mm of precipitation falls as snow (Environment and Climate Change Canada 2019)

Approximately 84% of the area encompassed by Ninginganiq NWA, which is centred on Isabella Bay, is marine (**Figure 1**). The bay is approximately 30 km wide at its mouth and has a maximum depth of 260 m (Finley 1987, Finley 1990). The bottom of the bay is marked by deep glacial troughs, and rock and gravel deposits created during the last glaciation (Finley 1987, Finley 1990). Two of these troughs, Aqvik and Kater, are particularly deep and biologically significant for Bowhead Whales (Finley 1987, Finley 1990, Finley et al. 1994, Northern Environmental Marine Organization 2003). The shallow Isabella Bank (i.e., <30 m), which is situated in the lee of Cape Raper, accumulates nutrient-rich sediment because it is sheltered from the prevailing winds and currents (Finley 1990, Aitken and Fournier 1993). Icebergs ground on the tip of Isabella Bank and off the tip of the Kater Peninsula (Finley 1987, Finley 1990, Northern Environmental Marine Organization 2003). The marine plain north of Isabella Bay, the longest stretch of shallow water on the east coast of Baffin Island (70 km), is oriented parallel with the prevailing winds and therefore experiences the effects of 'wind-forcing', where wind piles warmer water over colder water (Finley et al. 1994). The cold (<0°C) southward-flowing Baffin Current flows over the shallow marine plain and its rate of flow is strengthened or weakened by ocean depth and prevailing winds during the brief open water period (Fissel et al. 1982, Finley 1990). This main current interacts with the tides, wind-driven currents, and the underwater topography of Isabella Bay to produce rich upwellings of zooplankton of the genus *Calanus* in early autumn (Finley et al. 1994).



A number of oceanographic features interact to create a variety of important habitats for Bowhead Whales at Isabella Bay. Most importantly, the two deep troughs, Aqvik and Kater, generate large concentrations of *Calanus* copepods that are critical food for the whales (Bradstreet et al. 1987, Finley et al. 1986, Finley et al. 1994, Finley 1987, Northern Environmental Marine Organization 2002). The shallow waters of Isabella Bank are used by the Bowheads for various functions including resting, grooming, social-sexual activity, and rubbing and moulting (Finley et al. 1994, Nunavut Wildlife Management Board 2000). The Bowheads also use the shallow waters as important protection from Killer Whales (*Orcinus orca*) (Finley et al. 1984, Finley et al. 1986, Finley 1990, George et al. 1994, Northern Environmental Marine Organization 2002, Reinhart et al. 2013). The movement of marine mammals into shallow inshore waters to avoid Killer Whales is known as *ardlungaiuq*, *arlungajut* (Finley and Miller 1982), *ardlinguyuq* (Finley 1990), or *aarlirijuk* in various dialects of Inuktitut (Nunavut Wildlife Management Board 2000). These shallow, protective areas may become increasingly important as Killer Whale numbers increase in the region (Higdon et al. 2011).

The majority of Ninginganiq NWA's land base is characterized by coastal lowlands dotted with shallow tundra ponds, continuous permafrost, thin or absent soils, and an extremely short growing season (Sutherland 1853). The terrain is more rugged on the south side of Isabella Bay, and inland near McBeth Fiord. Glaciers flank the mouth of McBeth Fiord and extend into the western part of the NWA. The highest point of land is at the top of the Kiitarayuk Glacier (~900 m above sea level).

Northern Environmental Marine Organization conducted a botanical survey for Cape Raper in 2002 (Northern Environmental Marine Organization 2003). The terrestrial vegetation of Ninginganiq NWA is characterized by species that are able to survive permafrost, extreme cold, shallow soils, and strong winds (Porsild 1964). Habitats range from dry, barren, hill summits and poorly vegetated nearshore plains to wet, completely vegetated tundra (Northern Environmental Marine Organization 2003). Grass, sedge, saxifrage, moss, and lichen species are common (Roosdahl 1995, Northern Environmental Marine Organization 2003). Approximately 20 additional species were identified north of the NWA at Clyde River (Northern Environmental Marine Organization 2003). The dominant shrubs are Dwarf Willow (*Salix herbacea*) and Arctic Willow (*Salix arctica*), while heath plants such as Bog Blueberry (*Vaccinium uliginosum*), Crowberry (*Empetrum nigrum*), White Arctic Heather (*Cassiope tetragona*), and Labrador Tea (*Ledum decumbens*) are common in drier habitats (Northern Environmental Marine Organization 2003). Lichens and mosses have also been described for the general area (Roosdahl 1995, Northern Environmental Marine Organization 2003). **Figure 6** provides examples of some of the species identified at Cape Raper.



Armeria maritima
(Seapink)



Saxifraga nivalis
(Snow Saxifrage)



Alopocurus magellanicus
(Foxtail)



Silene uralensis
(Bladder Campion)



Salix arctica
(Arctic Willow)



Honckenya peploides
(Sea-beach Sandwort)

**Figure 6: Examples of plants found in Ninginganiq NWA
(Photo credit: D. Hogan)**

3.2 WILDLIFE

3.2.1 Bowhead Whales

The Bowhead Whales of Ninginganiq NWA belong to the Eastern Canada-West Greenland population (COSEWIC 2009). This population summers mainly in Baffin Bay and surrounding waters, Foxe Basin, and northwestern Hudson Bay, and winters in northern Hudson Bay, Hudson Strait, Davis Strait, and southern Baffin Bay (Dueck et al. 2006, COSEWIC 2009, SARA Registry 2017; **Figure 7**). Until about 2005, scientists believed that the population consisted of two putative stocks: one centred in northern Hudson Bay and Foxe Basin, the other in Davis Strait and Baffin Bay (COSEWIC 2009). Since then, genetic analysis (Postma et al. 2006), satellite tracking (Heide-Jørgensen et al. 2003, Heide-Jørgensen et al. 2006, Dueck et al. 2006), and patterns of seasonal age segregation and reproductive classes (Cosens and Blouw 2003) support the hypothesis of a single Eastern Canada-West Greenland population.

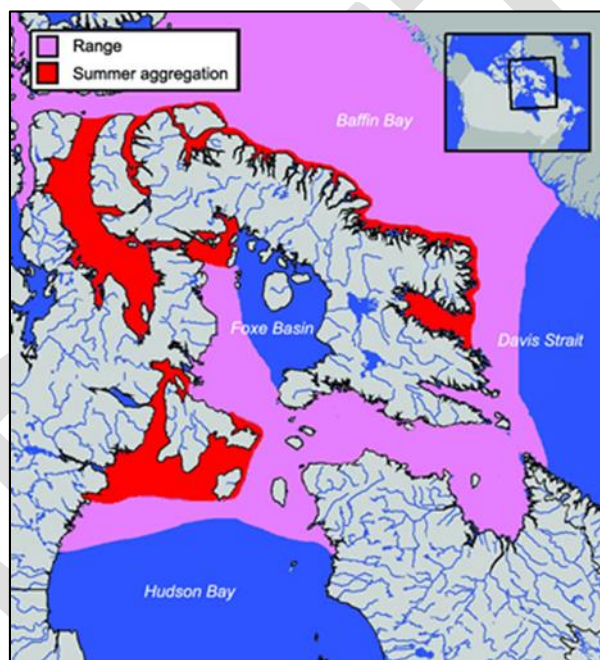


Figure 7: Distribution of the Eastern Canada-West Greenland population of Bowhead Whales (DFO 2016)

Researchers believe that the Eastern Canada-West Greenland population numbered about 12,000 individuals prior to commercial whaling (Ross 1979, Woodby and Botkin 1993). Commercial whaling, which ended in the early 1900s, severely depleted the population to below 1,000 individuals (Woodby and Botkin 1993, Finley 2001). Although whaling no longer occurs in the area, research suggests that the Bowhead Whale population recovered only moderately in the last 100 years (Finley 2001). Recent surveys estimate the Eastern Canada-West Greenland population between 6,300 and 7,700 individuals (Cosens et al. 2006, Doniol-Valcroze et al. 2015, Frasier et al. 2015). Inuit testimony indicates that the number of Bowhead Whales occurring seasonally in the marine waters of Nunavut has increased significantly in recent decades, generally between the 1950s to 1970s, with the reported years and extent of increase varying among communities and informants from within communities (Nunavut



Wildlife Management Board 2000). A recent late summer survey of Isabella Bay estimated a total of 1,105 (95% CI: 532-2,294) whales using the area (Hansen et al. 2012). Thus, IQ and scientific research both support the apparent increase in the Eastern Canada-West Greenland population of Bowheads. In 2009, COSEWIC assessed the Eastern Canada-West Greenland population as a species of Special Concern. The federal government has not yet listed the population under the *Species at Risk Act* (SARA).

Bowheads are generally present in Isabella Bay from late August until early October, although they can be present as early as May or as late as November (Finley et al. 1994, Nunavut Wildlife Management Board 2000, Dueck et al. 2006, Nielson et al. 2015). The first arrivals are large adolescents that spend most of their time on Isabella Bank, where they rest, groom, and engage in social-sexual activity (Finley et al. 1994). Adults arrive in late August and into September and spend considerable time feeding in the offshore troughs (Finley et al. 1986, Finley et al. 1994, Finley 1987). Generally, there are 10 to 80 whales present in Isabella Bay during peak times in mid-September (Finley et al. 1984, Finley et al. 1986, Finley et al. 1994, Finley 1987, Finley 1988b, Northern Environmental Marine Organization 2002, Northern Environmental Marine Organization 2003, Doniol-Valcroze et al. 2015), however, researchers have documented up to 147 individuals using the bay at one time (Northern Environmental Marine Organization 2003).

The whales that use Isabella Bay are a seasonally segregated portion of the population consisting mostly of large adults and adolescents (Finley et al. 1984, Finley et al. 1986, Finley et al. 1994, Finley 1987, Finley 1990). Observers rarely see females with calves, as this portion of the population generally summers in the high Arctic islands and join the males and adolescents just before freeze-up in late October (McCartney and Savelle 1985, Finley et al. 1994). The whales migrate south to Cumberland Sound and eventually out into Davis Strait and southwest Greenland (Burns et al. 1993, CWS 1996, COSEWIC 2009).

The number, distribution, and phenology of Bowhead Whales using Isabella Bay is largely dependent on the biology and behaviour of *Calanus* copepods, the main food item (Finley et al. 1986, Finley et al. 1994, Finley et al. 1998, Lowry 1993, Nunavut Wildlife Management Board 2000, Laidre et al. 2004, Laidre et al. 2007). This relationship has been termed the "*Calanus* Connection" (Finley et al. 1998). The autumn gathering of Bowheads coincides with a downward migration of adult *Calanus* copepods, which are rich in stored energy after a season of feeding on phytoplankton (Bradstreet and Cross 1982, Finley et al. 1986, Dueck and Ferguson 2009). The first northerly gales of late summer transport and deposit the summer's crop of *Calanus* into the deep troughs at Isabella Bay. Bowheads feast on the *Calanus* in the troughs by diving repeatedly for up to 30 minutes at a time in the same spot and filtering food out of the water column (Finley et al. 1994, Nielsen et al. 2015). They also skim along the ocean floor to scoop up the copepods. The surviving copepods are slowly carried on water currents out into Baffin Bay and then northward to the Northwater Polynya to spawn in the spring. From there, the cycle repeats and they are once again carried to Isabella Bay in late summer (Finley et al. 1994). A recent study of the stomach contents of three Bowheads from the Eastern Canada-West Greenland population found that Opossum Shrimps (*Mysis oculata*) were also an important food item (Pomerleau et al. 2011).

The strength of the "*Calanus* Connection" is ultimately dependent on climatic conditions (Finley et al. 1994). If the Baffin ice fields melt early, there are plenty of fat-rich copepods at



Isabella Bay for the whales to feed on, but in the worst ice seasons (e.g., the years 1983 and 1992), the Bowheads' *Calanus* feast fails to occur.

Despite the population increase observed since the early 1900's, the population is not yet secure, partly due to general life history traits such as long generation times (e.g., 17 to 20 years for females to reach maturity) and low reproductive rates (e.g., females give birth to a single calf every 3 to 7 years) (Rugh et al. 1992, Schell and Saupe 1993, COSEWIC 2009). Killer Whale predation, especially on calves, may also be a significant factor affecting the recovery of the population (Mitchell and Reeves 1982, Reeves and Mitchell 1988, George et al. 1994, Finley 2001, Moshenko et al. 2003, Higdon et al. 2011). Many of the whales at Isabella Bay have scars from Killer Whale attacks and adult Bowhead Whales have been observed fending off the attackers (Finley et al. 1984, Finley et al. 1986, Finley 1990, George et al. 1994, Northern Environmental Marine Organization 2002, Reinhart et al. 2013). Killer Whale attacks could increase if the protection provided to Bowheads by sea-ice cover diminishes as a result of climate change (Moshenko et al. 2003, Higdon et al. 2011, IPCC 2014). A range of other current and potential future human activities potentially threaten Bowheads through disturbance from boat traffic, low-flying aircraft, and offshore oil and gas extraction, and through activities resulting in pollution or destruction of habitat and entanglement in fishing nets (Finley et al. 1986, Philo et al. 1992, Finley 2001, COSEWIC 2009).

3.2.2 Other Marine Mammals

Polar Bears are present throughout Baffin Bay and Davis Strait with apparently stable, according to scientists, or increasing, according to Inuit, populations (Dowsley 2007, Peacock et al. 2013). Polar Bears concentrate on the shores of Isabella Bay in late summer after dispersal of the pack ice (Government of the Northwest Territories 1993, Igalirtuuq Steering Committee 2000, Government of Nunavut 2014). During winter and spring, bears wander widely over the offshore pack ice, but winter denning sites for females have been found on Aulitvik Island and on the Kater Peninsula (Government of the Northwest Territories 1993). In 1987, the area from Cape Hunter to Home Bay, which includes the NWA, was nominated for a proposed conservation area and identified as an area of special interest due to important denning areas in the highlands, and the use of coastal plains as a summer concentration area for Polar Bears (Government of the Northwest Territories 1993) (**Figure 8**).

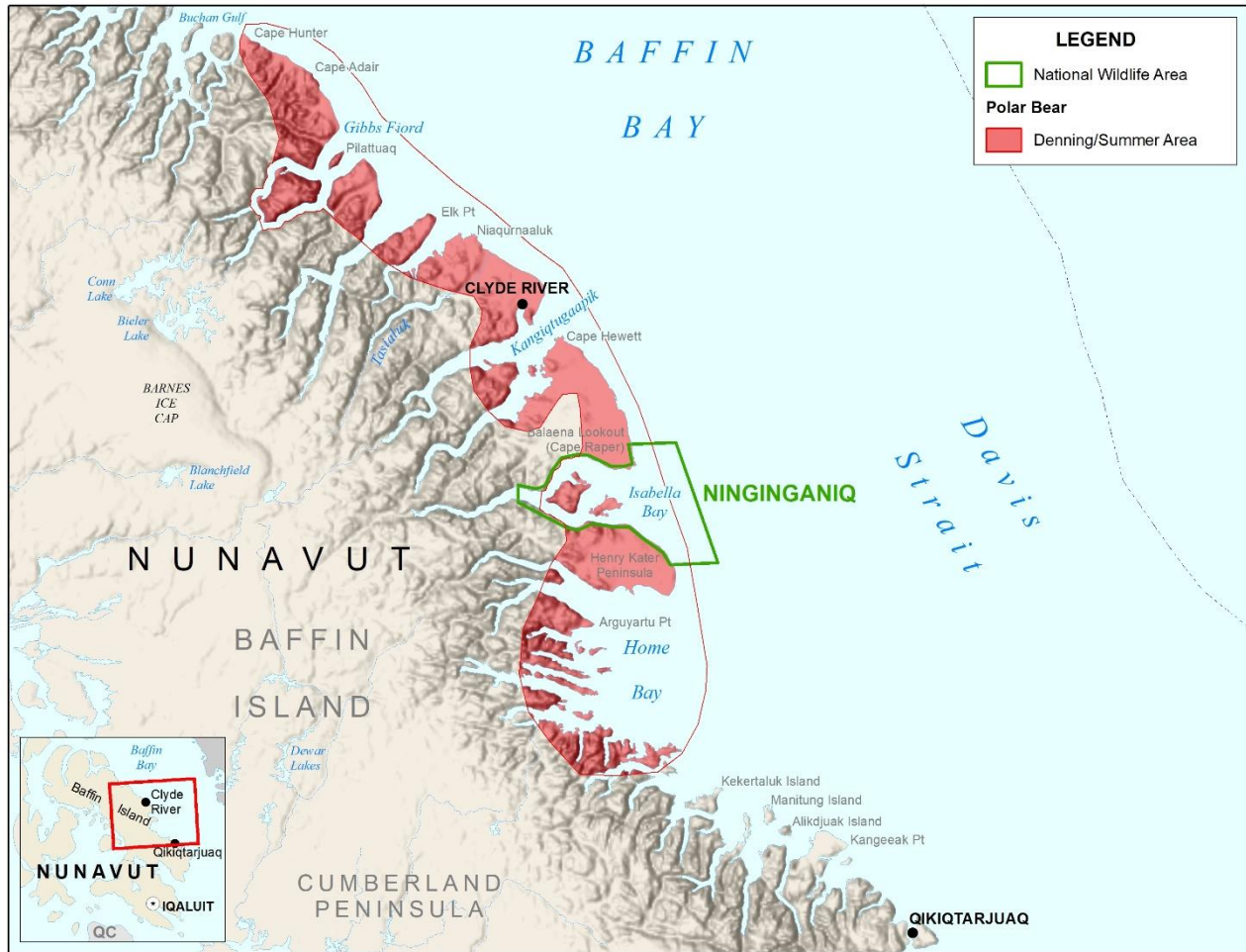


Figure 8: Wildlife area of special interest for Polar Bears in Ninginganiq NWA



Ringed Seals are the most abundant year-round inhabitant of Ninginganiq NWA (Government of Nunavut 2014). During summer and autumn, small numbers of Bearded Seals visit the area where they prefer to feed in the shallow waters of Isabella Bank (Government of Nunavut 2014). In September and October, small numbers of Harp Seals migrate southward through the NWA (Government of Nunavut 2014). Inuit used to hunt walrus in Isabella Bay around Bearslide and Aulitiving islands (Milton Freeman Research 1976) and there are old haul out sites around Aulitiving Island (Finley 1988a, Wenzel 2008). Killer Whales occasionally visit Isabella Bay in August and September (Finley et al. 1986, Higdon et al. 2011), while Belugas (*Delphinapterus leucas*) occasionally occur in the area in July and August (Government of Nunavut 2014). Narwhals rarely use the Isabella Bay area, but these whales have been hunted there in the past (Government of Nunavut 2014).

The Inuit Land Use and Occupancy Project for Clyde River documents hunting practices by species from 1923 to 1974 (Milton Freeman Research 1976). The document reports that open water leads and breathing holes for seals occur throughout the region at fiord mouths and in larger bays, including Isabella Bay. Inuit historically hunted Bearded Seals on floating ice in late summer and early fall in locations, including Isabella Bay, where ice pans collected. Inuit report that Harp seals are uncommon in the Isabella Bay area, being instead concentrated further north near Cape Christian.

3.2.3 Marine Plants and Other Marine Animals

The bottom of Isabella Bank is a mixture of boulder-kelp ("seaweeds") and bivalve communities (Aitken and Fournier 1993). The kelp genera *Laminaria* and *Rhodomela* are common (CWS, unpublished information). Aitken and Fournier (1993) described the marine macrobenthos of McBeth Fiord in detail; the macrobenthos is comprised of several species of bivalves, gastropods, polychaetes, and echinoderms. Arctic Char, Arctic Cod (*Arctogadus glacialis*), Atlantic Halibut (*Hippoglossus hippoglossus*), Deepwater Redfish (*Sebastes mentella*), Gelatinous snailfish (*Liparis fabricii*), Greenland Halibut (*Reinhardtius hippoglossoides*), Roundnose Grenadier (*Coryphaenoides rupestris*), Polar Cod (*Boreogadus saida*), Turbot, sculpin and other species also inhabit the marine portion within and near the NWA (Jørgensen et al. 2005, Jørgensen et al. 2011).

Several studies have focused on zooplankton surveys in Ninginganiq NWA, given the importance of these organisms, especially copepods, to Bowhead Whales (Finley 1987, Finley et al. 1994, Northern Environmental Marine Organization 2003). *Calanus* copepods dominate the marine zooplankton community with *Calanus hyperboreus*, *Calanus glacialis*, and *Metridia longa* being the most common species (Finley 1987, Finley et al. 1994, Finley 1998, Northern Environmental Marine Organization 2003). Amphipods are also present in significant numbers, especially *Parathemisto libellula*. Pteropods, larvaceans, chaetognaths (arrowworms), and ctenophores (comb jellies) are minor components of the marine community in the NWA, and swarms of Opossum Shrimps (*Mysis oculata*) also inhabit the coast (Northern Environmental Marine Organization 2003).

3.2.4 Birds

Seabirds and waterfowl are most abundant between mid-August to early October and several significant seabird colonies are located on the eastern coastline of Baffin Bay (McLaren 1982, Mallory and Fontaine 2004). Large numbers (5,000 to 8,000) of King Eider (*Somateria spectabilis*) gather at Isabella Bay to moult and feed on clams, while Long-tailed



Ducks (*Clangula hyemalis*) gather in large numbers in late September to feed on mysids on the outer coast, particularly around the Kuuktannaq River (CWS, unpublished information). Red-throated Loons (*Gavia stellata*) nest on the tundra ponds of the Kuuktannaq plains and carry fish from Isabella Bank back to their chicks (CWS, unpublished information). During September, large numbers of Dovekies (*Alle alle*) migrate through the NW A, where they feed on *Calanus* copepods (CWS, unpublished information). Clyde River hunters have mentioned that a Dovekie breeding colony is present in Isabella Bay, but this has not been confirmed (Northern Environmental Marine Organization 2003). The only confirmed breeding record of Dovekie in the area is in Home Bay, just south of Isabella Bay (Finley and Evans 1984). Northern Fulmars (*Fulmarus glacialis*) are particularly abundant in those years when the Bowheads are feeding intensively, because they consume the fat-rich whale feces (Finley 1987, Finley 1998). According to local traditional knowledge, Snow Geese (*Chen caerulescens*) are present on the northern shore of Isabella Bay, east of Cape Raper, in May and June (Government of Nunavut 2014). Other waterbird species observed directly in the NW A include Black Guillemot (*Cephus grylle*), Canada Goose (*Branta canadensis*), Common Eider (*Somateria mollissima*), Glaucous Gull (*Larus hyperboreus*), and Common Loon (*Gavia immer*) (Northern Environmental Marine Organization 2003). Other waterbird/shorebird species using Clyde River and surrounding areas include: Arctic Tern (*Sterna paradisaea*), Common Ringed Plover (*Charadrius hiaticula*), Iceland Gull (*Larus glaucooides*), Ivory Gull (*Pagophila eburnea*), and Thick-billed Murre (*Uria lomvia*) (Sale 2006, McKinnon et al. 2009, Gaston 2011, Government of Nunavut 2014, Richards and Gaston 2018).

Terrestrial birds are not abundant. Peregrine Falcons, of the *tundrius* subspecies (*Falco peregrinus* ssp. *tundrius*), are known to nest on coastal cliffs at the mouth of McBeth Fiord and at Cape Raper (**Figure 9**) (Government of the Northwest Territories 1993). Cliff nesting sites for Peregrine Falcon and Gyrfalcon (*Falco rusticolus*) have been identified as much as 150 km inland from the coast, towards the Barnes Ice Cap (Government of the Northwest Territories 1993). Gyrfalcon pass through the area during migration in September and October (Government of the Northwest Territories 1993). Other terrestrial bird species identified as nesting in the region include American Pipit (*Anthus rubescens*), Common Raven (*Corvus corax*), Snowy Owl (*Bubo scandiacus*), Horned Lark (*Eremophila alpestris*), Lapland Longspur (*Calcarius lapponicus*), Northern Wheatear (*Oenanthe oenanthe*), and Rock Ptarmigan (*Lagopus muta*) (Northern Environmental Marine Organization 2003, Sale 2006, Government of Nunavut 2014, Richards and Gaston 2018). See **Appendix A** for a complete list of birds observed in the NW A.

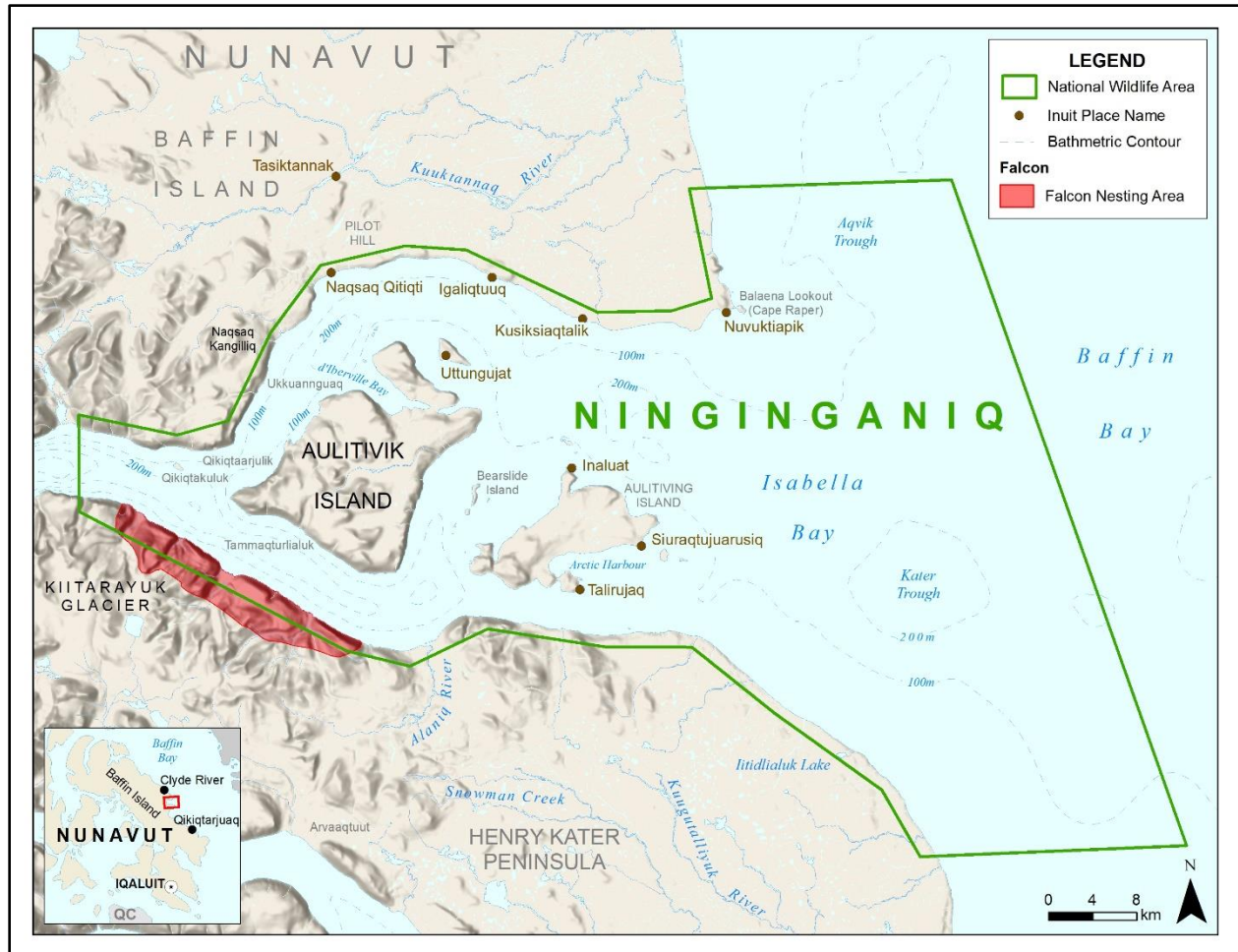


Figure 9: Area of known falcon nest sites within Ninginganiq NWA.



3.2.5 Terrestrial Mammals

There have been few formal surveys for terrestrial mammals in Ninginganiq NWA, however, local people have a wide knowledge of the area and its wildlife resources. Barren-ground Caribou from the Northeast Baffin Island population (Government of Nunavut 2005) are present at the head and south of McBeth Fiord and along the McBeth River valley, however, they rarely, if ever, occur within the NWA (Jenkins and Goorts 2013). Arctic Fox, Arctic Hares (*Lepus arcticus*), and Ermine (*Mustela erminea*) are commonly found in the NWA, while Arctic Wolves are rarely seen. In some years, lemmings (*Lemmus sibiricus*) are abundant.

The Inuit Land Use and Occupancy Project for Clyde River documents hunting practices by species from 1923 to 1974 (Milton Freeman Research 1976). The document reports that Caribou migrate from the lowlands at Home Bay (south of Isabella Bay) inland towards the Barnes Ice Cap (to the north west), where they can often be found in the valleys at the heads of fiords.

After the Hudson's Bay Company established their post at Clyde River in 1923, fox trapping became one of the most important historical economic activities in the area; the industry identified Henry Kater Peninsula as an important fox denning area (Milton Freeman Research 1976).

3.3 SPECIES AT RISK

Two wildlife species (**Table 3**) that occur in Ninginganiq NWA are listed as Special Concern under the SARA: Polar Bear and the *anatum/tundrius* subspecies of the Peregrine Falcon (both in Schedule 1). Ross' Gull (*Rhodostethia rosea*) and Ivory Gull (*Pagophila eburnea*) also occur in the NWA; they are listed, respectively, as Threatened (Schedule 1) and Endangered (Schedule 1) under SARA. Red Knots (*Calidris canutus islandica*) potentially occur in the NWA, and are listed as Endangered under SARA. Six other species that have been observed, or have the potential to occur, in the NWA have been assessed by COSEWIC as Special Concern: Bowhead Whale, Beluga Whale, Narwhal, Atlantic Walrus, Ringed Seal, and Wolverine (*Gulo gulo*). Caribou belonging to the Barren-ground population could potentially occur in the NWA and have been assessed as Threatened by COSEWIC.



Table 3: Species at Risk in Ninginganiq National Wildlife Area

Common and Scientific Names of Species	Status			Presence or Potential of Presence ⁴
	Canada		Nunavut	
	SARA ¹	COSEWIC ²	Territorial Ranking ³	
Birds				
Peregrine Falcon <i>Falco peregrinus</i> ssp. <i>Anatum/tundrius</i>	Special Concern	Not at Risk (2017)	NA	Confirmed
Ross' Gull <i>Rhodostethia rosea</i>	Threatened	Threatened	NA	Rare
Ivory Gull <i>Pagophila eburnea</i>	Endangered	Endangered	NA	Rare
Red Knot <i>Caldris canutus islandica</i>	Endangered	Endangered	NA	Potential
Mammals				
Atlantic Walrus, High Arctic population <i>Odobenus rosmarus</i> ssp. <i>rosmarus</i>	No Status	Special Concern	NA	Rare
Ringed Seal <i>Pusa hispida</i>	No Status	Special Concern	NA	Confirmed
Beluga Whale, Eastern High arctic-Baffin Bay population <i>Delphinapterus leucas</i>	No status	Special Concern	NA	Rare
Bowhead Whale, Eastern Canada-West Greenland population <i>Balaena mysticetus</i>	No status	Special Concern	NA	Confirmed
Caribou (Barren-ground) <i>Rangifer tarandus</i>	No status	Threatened	NA	Potential
Narwhal <i>Monodon monoceros</i>	No Status	Special Concern	NA	Confirmed
Polar Bear <i>Ursus maritimus</i>	Special Concern	Special Concern	NA	Confirmed
Wolverine <i>Gulo gulo</i> ssp. <i>luscus</i>	Special Concern	Special Concern	NA	Potential (Awan and Szor 2012)

1. *Species at Risk Act*: Extinct, Extirpated, Endangered, Threatened, Special Concern, Not at Risk (assessed and deemed not at risk of extinction) or No Status (not rated)
2. Committee on the Status of Endangered Wildlife in Canada: the same status names as the SARA status
3. Territorial ranking using provincial codes, if applicable
4. List as 'confirmed', 'rare', or 'potential'



3.4 INVASIVE SPECIES

There are currently no known threats from invasive species to the ecosystems of Ninginganiq NWA. However, as Arctic ice melts, new shipping routes will be opened up for tourism, mining, and other commercial purposes (Lackenbauer and Lajeunesse 2014, Pizzolato et al. 2016, Dawson et al. 2017). Ships may carry organisms from other parts of the world in their ballast waters and discharge of ballast waters could introduce invasive species to pristine Arctic waters presenting a serious risk to the Arctic environment (Buck 2012, Chan et al. 2012, Ware et al. 2016). Given the right conditions, invasive species can thrive in habitats with low biodiversity and without established predators thereby overtaking native populations and out-competing them for food sources (Carlton 1996, Stachowicz et al. 1999). Changing climate conditions could also favor invasive species (Drinkwater 2005, Chan et al. 2013).

DRAFT



4 MANAGEMENT CONSIDERATIONS

The remoteness of Ninginganiq NWA, the relatively low local human population, and the low level of resource extraction in the surrounding area currently limit threats to the ecosystem. Nevertheless, a number of potential threats are examined here to ensure that management is pro-active and challenges can be addressed quickly if they arise.

4.1 HARVEST OF WILDLIFE

The NWMB manages harvest of wildlife in Nunavut and can establish and modify levels of total allowable harvest of wildlife. The NWMB is the main instrument of wildlife management and the main regulator of access to wildlife in the NSA. Under the NA, the NWMB is to manage wildlife populations under the following principles of conservation: maintenance of the natural balance of ecological systems within the NSA; protection of wildlife habitat; maintenance of vital, healthy wildlife populations capable of sustaining harvesting needs; and restoration and revitalization of depleted populations of wildlife and wildlife habitat. Inuit may harvest migratory birds and their eggs throughout the year, while non-Inuit are subject to the *Migratory Birds Convention Act, 1994* and the hunting regulations specified in the *Migratory Bird Regulations*.

DFO, NWMB, and Regional Wildlife Organizations under the NA co-manage Bowhead hunting. In 2015, NWMB and DFO increased the total allowable harvest of Bowhead Whales in the NSA from three to five Bowheads per year, which is well below the calculation of harvest that the Eastern Canada-West Greenland bowhead whale population can support (DFO 2015a). DFO distributes the Bowhead tags amongst the management regions in the NSA (Kitikmeot, Kivalliq, and Qikiqtani) and regional wildlife boards determine which communities receive the tags each year. Bowhead Whale populations in the NWA do not seem to be currently threatened by these regulated Inuit harvests, but impacts of this hunt should be evaluated on an ongoing basis.

4.2 TOURISM

Development of tourism in the Ninginganiq NWA area could provide a welcome additional economic activity for the Inuit of Clyde River (Nickels 1992). The ACMC does not expect any future organized tours and tourism facilities to have much impact on the terrestrial ecosystems of the NWA, as the number of tourists that might take advantage of these facilities is likely to be small. However, tourists on cruise ships and smaller vessels could cause disturbance to the whales (Northern Environmental Marine Organization 2003, Jansen et al. 2010, Bone 2018, Carter et al. 2017). These vessels also have the potential to pollute the marine ecosystem, which could cause significant disruption and damage to the whales and marine habitat. The ACMC suggests that visitors follow recognized DFO whale-watching guidelines/regulations and other tourism regulations while conducting activities within the NWA. ECCC may develop additional guidelines for visitors as more information about tourism impacts in the NWA becomes available. Furthermore, conservation and protection of archeological sites and artifacts from human trampling, acts of vandalism, or theft will require supervision of all tourism activity.



4.3 NOISE

The main sources of anthropogenic noise in the Arctic are ships, small watercraft, aircraft, and activities associated with resource extraction (e.g., drilling, seismic exploration, marine construction) (Richardson and Malme 1993). Bowhead Whales react to some types and levels of noise by avoiding the source area (Richardson et al. 1985, Richardson et al. 1987), although this can vary among individuals, seasons, and habitats (Richardson and Malme 1993, Moshenko et al. 2003). Inuit in Clyde River and Pond Inlet have voiced concern about increasing tourism, including the increasing numbers of large tour ships and the impact of their unregulated operations on their communities and the marine environment (Marshall Macklin Monaghan Ltd. 1982, Nickels 1992, Stewart et al. 2011, Stewart et al. 2013). Generally, whales in Ninginganiq NWA show little reaction to vessel passages, but sometimes when ships approach closer, the whales move into shallow waters. The eastern Canadian Arctic continues to experience a steady increase in commercial, recreational, and research vessel traffic and this trend is almost certain to continue as climate continues to change and ice cover is reduced (Paxian et al. 2010, Pizzolato et al. 2016, Dawson et al. 2018).

4.4 SHIP COLLISIONS

Bowheads are slow moving, which may make them particularly susceptible to ship strikes, as has been found with similar whale species (Kraus 1990). As ship traffic increases, this threat could increase. In spite of the whale's tendency to avoid sources of noise, the whales could habituate to ship noise, leading to increased risk of collisions (George et al. 1994), especially when whales are feeding intensively in Isabella Bay. Currently, ship traffic in the NWA is relatively low, however, impacts of ship collisions on the whales should be monitored if shipping traffic increases in the future.

4.5 POLLUTION

The main potential source of pollution in the immediate vicinity of Ninginganiq NWA comes from ships transiting close to the area, or from cruise ships entering the area to view whales. Discharge of sewage, bilge waters, and oil remain a threat to the marine ecosystem and the whales themselves (COSEWIC 2009, Beyer et al. 2016, Blanken et al. 2017, Bone 2018, Nevalainen et al. 2018, Vergeynst et al. 2018). Transport Canada currently bans ships under 400 tons from discharging untreated sewage less than 3 nm from land; the distance is increased to less than 12 nm of land for ships over 400 tons.

The isolated location of Baffin Bay/northern Davis Strait and the associated high operating and transportation costs make it unlikely that oil and gas exploration will be widely contemplated for the foreseeable future (Harsem et al. 2015), however, offshore oil and gas exploration could increase as the area becomes more accessible, making oil spills a legitimate concern. Increased oil and gas exploration near the NWA may also increase associated vessel traffic near the NWA, which could increase the chance of ship-based oil spills in the area. The closest exploratory licenses are located in northwestern Baffin Bay at the entrance to Lancaster Sound, approximately 500 km north of the Ninginganiq NWA. The role of ice cover, bathymetry, water temperature, storms and winds, and the Baffin Current in carrying oil from sites of spills to Isabella Bay are unknown; therefore, the extent of risk from nearby oil exploration is not yet established. Ultimately, more information is required before the threat of pollution from oil and gas exploration can be fully understood for Ninginganiq NWA; the Nunavut Impact Review Board final report for the Strategic Environmental Assessment in Baffin



Bay and Davis Strait provides some more detailed information regarding some of the information deficiencies and uncertainties regarding the threat of oil and gas extraction for the general area (Nunavut Impact Review Board 2019).

4.6 COMMERCIAL FISHING

Commercial fishing is an important economic activity off Baffin Island that is only likely to grow in Nunavut waters as climate changes (Church 2011). Turbot, Greenland Halibut, Northern Shrimp (*Pandalus borealis*), Striped Shrimp (*Pandalus montagui*) and smaller numbers of Arctic Char are currently fished commercially in Baffin Bay, nearshore and offshore of Isabella Bay (Church 2011, Government of Nunavut 2016, Bone 2018, DFO 2020). Greenland Halibut and Northern Shrimp are also an important fishery off Greenland (Jørgensen and Arboe 2013). As ice cover decreases in extent and duration, new and existing commercial fisheries could gain access to the productive areas close to Isabella Bay. Some types of commercial fishing are known to alter marine ecosystems (e.g., trawling), thus posing a threat to the habitat the whales depend on. The Federal government has banned bottom trawling in federally protected areas; however, increased fishing boat traffic could affect whale behaviour. In addition, increased use of fishing gear could increase risk of whale entanglement. Inuit have reported Bowheads swimming into nets in Cumberland Sound and near Pangnirtung, resulting in destroyed nets and entanglement (Nunavut Wildlife Management Board 2000). Currently, researchers do not think that entanglement-related mortality is a major threat to the Eastern Canada-West Greenland population of Bowheads; however, its direct link to population recovery is uncertain. Future development of commercial fisheries near Ninginganiq NWA could, presumably, increase the risks of entanglement.

4.7 CLIMATE CHANGE

Habitat change, such as changes in sea-ice extent, can be a direct result of climate change (IPCC 2014). This can take the shape of loss of ice-associated habitat (e.g., for algae and copepods), which is highly productive and provides feeding habitat for whales and other wildlife (Finley 2001, Lairdre et al. 2008). In addition, loss of sea-ice cover could increase predation of Bowheads by Killer Whales (Moshenko et al. 2003, Higdon et al. 2011, IPCC 2014). A range of native and non-indigenous species may expand their northern limits via natural dispersal in a warming climate (Chan et al. 2012). On a larger scale, changes in ecosystems where prey availability shifts regionally or seasonally could have serious consequences for the whale-*Calanus* connection in Isabella Bay. Lairdre et al. (2008) rated the Bowhead Whale as being more sensitive to climate change than other marine mammals such as belugas and seals. Additionally, changes in sea-ice directly affect the ability of hunters from Clyde River and other communities to access key target species such as Ringed Seal and Polar Bear (Gearheard et al. 2006).

Reduced permanent Arctic ice in the future may open up the North-west passage increasing shipping traffic, the potential for pollution, noise disturbance, ships, strikes, and effects on communities such as Clyde River and Pond Inlet (COSEWIC 2009, Paxian et al. 2010, Stewart et al. 2013, Pizzolato et al. 2016).



5 GOALS & OBJECTIVES

5.1 VISION

The long-term vision for Ninginganiq NWA is protection of Bowhead Whales and other wildlife, conservation of the marine and terrestrial habitats on which they depend, and protection of the traditional Inuit use of the area. The NWA will also serve as a key site for research on Bowhead Whale ecology, the marine ecosystem of Isabella Bay, and the historical ties of the Inuit to traditional and commercial whaling. Research outcomes will provide a sound basis and infrastructure for management, education, and eco-tourism projects and programs.

5.2 GOALS & OBJECTIVES

The management approaches and plans that aim to attain the goals and objectives for Ninginganiq NWA will respect the principles set out in Article 2.1 of the IIBA.

Further expression of the vision is set out in the following management goals and objectives for the NWA:

Goal 1: Protect Bowhead Whales and other wildlife using Ninginganiq NWA, and the marine and terrestrial habitat they depend on, from harm by human activities.

Objective 1.1: Make organizations with a mandate to regulate activities outside the jurisdiction of ECCC aware of the conservation goals and objectives of the Ninginganiq NWA.

Objective 1.2: Control, supervise, and monitor access to Ninginganiq NWA.

Objective 1.3: Effectively enforce regulations to prevent threats to Bowhead Whales, other wildlife, and their habitat; work with relevant regulatory agencies, as required.

Objective 1.4: Monitor the terrestrial and marine ecosystems to establish baselines and monitor change in these baselines over time.

Objective 1.5: Empower Inuit to play a leadership role in documenting environmental conditions and changes.

Goal 2: Conserve and protect the cultural and historical elements of Ninginganiq NWA, especially with regard to traditional and commercial whaling.

Objective 2.1: Control, supervise, and monitor access to Ninginganiq NWA.

Objective 2.2: Empower Inuit to play a leadership role in documenting archeological sites and artifacts.

Objective 2.3: Conduct research on cultural and historical elements to identify areas of archeological importance.



Goal 3: Increase public awareness of, and appreciation for, the natural and cultural resources of the area, particularly Bowhead Whales and other wildlife.

Objective 3.1: Create promotional and educational materials and make them available to the public.

5.3 EVALUATION

ECCC and the ACMC will perform annual monitoring in the NWA within the limits imposed by the availability of financial and human resources. The ACMC will review the management plan 5 years after its initial approval and review the plan every 10 years thereafter. The ACMC will evaluate the plan by reviewing data obtained from the monitoring and research projects outlined below and establishing priorities for action and allocation of resources.

6 MANAGEMENT APPROACHES

This section and **Table 4** contain a description of possible approaches that ECCC could use in the management of Ninginganiq NWA, however, ECCC and the ACMC will determine management actions during the annual work planning process.

6.1 CULTURAL RESOURCES MANAGEMENT

Within the terrestrial portion of Ninginganiq NWA, archeological sites and artifacts require protection from visitors; protection requires proper investigation, identification, description and mapping of these sites, as well as controlled access to the sites. ECCC will keep a record of known archaeological sites within the NWA, and will encourage research to document this information. Additionally, all visitors wishing to access the archeological sites in the NWA must apply for a CWS permit; the ACMC will review permit applications prior to permit issuance.

In accordance with s. 2.1.7 of the IIBA, the archaeological and cultural heritage of Inuit must be protected in the management of Ninginganiq NWA. This includes protection and conservation of archaeological sites, artifacts, and cultural sites of importance to Inuit. All activities within the NWA must comply with the requirements of the *Nunavut Archaeological and Palaeontological Sites Regulations* and Article 33 of the *Nunavut Agreement*. If an archaeological site, specimen or artifact is encountered which has not been previously identified, it should be photographed and the geographic coordinates recorded. This information must then be provided to the Government of Nunavut's Department of Culture and Heritage, the Inuit Heritage Trust, and NTL as soon as reasonably practicable.



Table 4: Management Approaches for Ninginganiq NWA

Threats and Challenges	Goal and Objective(s)	Management Approaches	Performance Indicators (review every 5 years)
Tourism	<p>Goal 1: Protect Bowhead Whales and other wildlife using Ninginganiq NWA, and the marine and terrestrial habitat they depend on, from harm by human activities.</p> <p><i>Objective 1.2: Control, supervise, and monitor access to Ninginganiq NWA.</i></p> <p><i>Objective 1.3: Effectively enforce regulations to prevent threats to Bowhead Whales, other wildlife, and their habitat.</i></p> <p><i>Objective 1.4: Monitor the terrestrial and marine ecosystems to establish baselines and monitor change in these baselines over time.</i></p> <hr/> <p>Goal 2: Conserve and protect the cultural and historical elements of Ninginganiq NWA, especially with regard to traditional and commercial whaling.</p> <p><i>Objective 2.1: Control, supervise, and monitor access to Ninginganiq NWA.</i></p> <p><i>Objective 2.2: Inuit play a leadership role in documenting archeological sites and artifacts.</i></p> <p><i>Objective 2.3: Conduct research concerning cultural and historical elements of the NWA to identify areas of archeological importance.</i></p>	<ol style="list-style-type: none"> 1. Maintain careful control and supervision of all activities in the NWA via a rigorous permitting process. 2. Create standard conditions for permits allowing tourism operators to access the NWA. 3. Engage ECCC Wildlife Enforcement Officers to develop a plan to maintain an enforcement presence in the NWA. 4. Create and post public notices detailing how to report illegal or suspicious activities witnessed in the NWA. 5. Create promotional and educational materials to make the public aware of the ecological, cultural, and historical importance of the NWA. 6. Post promotional and educational materials at strategic locations in Clyde River and on the land. 7. Promote research opportunities and monitoring within the NWA. Seek out collaborators for research providing baseline data on ecological, archeological, and cultural 	<ol style="list-style-type: none"> 1. All non-Nunavut Inuit visitors obtain a permit to conduct activities in the NWA. 2. CWS includes standard conditions for tourism operators on NWA permits. 3. ECCC Wildlife Enforcement Officers have an annual presence in the NWA. 4. Reporting, promotional, and educational materials are available to the public. 5. Collection of baseline data for ecological, archaeological, and cultural aspects of the NWA occurs and is ongoing. 6. Emergency response plan for ships visiting the NWA is developed within 10 years of plan approval.



Threats and Challenges	Goal and Objective(s)	Management Approaches	Performance Indicators (review every 5 years)
Tourism	<p>Goal 3: Increase public awareness of, and appreciation for, the natural and cultural resources of the area, particularly Bowhead Whales and other wildlife.</p> <p><i>Objective 3.1:</i> Create promotional and educational materials and make them available to the public.</p>	<p>aspects of the NWA.</p> <p>8. Create an emergency response plan for the NWA, in case of ship-based contamination (e.g., oil/fuel spill, grounding).</p>	
Harvest of wildlife	<p>Goal 1: Protect Bowhead Whales and other wildlife using Ninginganiq NWA, and the marine and terrestrial habitat they depend on, from harm by human activities.</p> <p><i>Objective 1.1:</i> Make organizations with a mandate to regulate activities outside the jurisdiction of ECCC aware of the conservation goals and objectives of the Ninginganiq NWA.</p> <p><i>Objective 1.3:</i> Effectively enforce regulations to prevent threats to Bowhead Whales, other wildlife, and their habitat.</p> <p><i>Objective 1.4:</i> Monitor the terrestrial and marine ecosystems to establish baselines and monitor change in these baselines over time.</p> <p><i>Objective 1.5:</i> Inuit play a leadership role in documenting environmental conditions and changes.</p>	<p>Management Approaches 1-7 above.</p> <p>9. Ensure regular communication between the ACMC, Nangmoutaq HTO, QWB, NWMB, and Clyde River community about hunting pressures in the NWA.</p> <p>10. Develop a resource for Inuit and visitors using the NWA to report archeological, cultural, and wildlife observations/uses.</p>	<p>7. Lines of communication between ACMC and HTO, QWB, NWMB, and Clyde River community are clear and established.</p> <p>8. Visitors using the NWA report wildlife, archaeological, and cultural observations, and uses.</p>



Threats and Challenges	Goal and Objective(s)	Management Approaches	Performance Indicators (review every 5 years)
<p>Noise Ship collisions Pollution Fishing</p>	<p>Goal 1: Protect Bowhead Whales and other wildlife using Ninginganiq NWA, and the marine and terrestrial habitat they depend on, from harm by human activities.</p> <p><i>Objective 1.1: Make organizations with a mandate to regulate activities outside the jurisdiction of ECCC aware of the conservation goals and objectives of the Ninginganiq NWA.</i></p> <p><i>Objective 1.2: Control, supervise, and monitor access to Ninginganiq NWA.</i></p> <p><i>Objective 1.3: Effectively enforce regulations to prevent threats to Bowhead Whales, other wildlife, and their habitat.</i></p> <p><i>Objective 1.4: Monitor the terrestrial and marine ecosystems to establish baselines and monitor change in these baselines over time.</i></p> <p><i>Objective 1.5: Inuit play a leadership role in documenting environmental conditions and changes.</i></p>	<p>Management Approaches 1-8 above.</p> <p>11. Provide the Ninginganiq NWA Management Plan to organizations with regulatory authorities that may affect the NWA. These should include, but are not limited to DFO, Transport Canada (TC), RCMP, Canadian Coast Guard (CCG), Government of Nunavut, QWB, NWMB, and the Nangmoutaq HTO.</p>	<p>9. Organizations with regulatory authorities that may affect the NWA have received copies of the management plan.</p>
<p>Climate change</p>	<p>Goal 1: Protect Bowhead Whales and other wildlife using Ninginganiq NWA, and the marine and terrestrial habitat they depend on, from harm by human activities.</p> <p><i>Objective 1.4: Monitor the terrestrial and marine ecosystems to establish baselines and monitor change in these baselines over time.</i></p> <p><i>Objective 1.5: Inuit play a leadership role in documenting environmental conditions and changes.</i></p>	<p>Management Approaches 7 and 10 above.</p>	



6.2 HABITAT MANAGEMENT

Ninginganiq NWA is remote and its terrestrial and marine ecosystems are relatively untouched since the end of commercial whaling in the early 1900s. The conditions that make the marine ecosystem valuable to Bowhead Whales are influenced by the particular characteristics of marine currents, bathymetry, winds, and ice cover of Isabella Bay. These features cannot be controlled, therefore, no habitat intervention is required or feasible in the marine portion of the NWA.

Controls and restrictions on human activities are necessary to protect this pristine ecosystem. Threats to habitat in the NWA are managed through strict access conditions for visitors; all non-Nunavut Inuit visitors (including vessels) that enter the NWA for any reason are required to apply for a CWS permit, which is reviewed by the ACMC prior to permit issuance.

Given that Isabella Bay is a productive marine ecosystem, it is possible that commercial fishing in the area may become attractive to industry in the future. Since commercial fishing poses a threat to the wildlife and habitat of the NWA, it is not currently permitted within Ninginganiq NWA.

Non-renewable resource extraction is incompatible with the conservation objectives for the NWA due to the sensitivity of the ecosystem to pollution. Any surface activity related to sub-surface exploration and exploitation of non-renewable resources is prohibited and will not be permitted by CWS.

6.3 WILDLIFE MANAGEMENT

Wildlife management in the NWA focuses mainly on avoiding or minimizing the threats, potential or existing, to whales and other wildlife using the area through the CWS permitting process outlined in Section 7.3. Current threats include climate change, disturbance by cruise ships, other tourism vessels, or vessels transiting through the area (Finley et al. 1986, Kraus 1990, George et al. 1994, Richardson and Malme 1993, Northern Environmental Marine Organization 2003), pollution, harvest, habitat loss, and entanglement due to fishing activities (Philo et al. 1992, Finley 2001). Where the permitting process does not provide sufficient protection for wildlife within the NWA, discussions with agencies having regulatory authority outside the jurisdiction of ECCC (e.g., Nunavut Government, NWMB, NTI, DFO, TC, CCG and CIRNAC) will be pursued to ensure that the conservation vision, goals, and objectives for Ninginganiq NWA are duly considered in their decision making processes.

During the period when the whales are present in the NWA (i.e., usually from early August to late October), any subsistence harvest of marine mammals is strongly discouraged in the NWA, particularly in the shallow area beside Nuvuktiapik and the deep feeding troughs.

The QIA or its designate(s) have a right of first refusal to provide outfitting or guiding operations in Ninginganiq NWA. If a non-Nunavut Inuit firm applies for an NWA permit for an outfitting or guiding operation in Ninginganiq NWA, CWS shall give the QIA, or its designate(s), a right of first refusal to acquire a permit to carry on a business that is substantially similar to that described in the non-Nunavut Inuit application.



ECCC will take no specific management actions in the NWA concerning the species listed under the *Species at Risk Act*. Species' distributions occur over an area that extends outside the NWA; these species will be managed by other agencies, or at other spatial levels. ECCC will collaborate with other agencies to manage these species, as appropriate.

6.4 MONITORING

Monitoring of the terrestrial and marine ecosystems is an essential component of the management of Ninginganiq NWA. The principal aim of protecting Bowhead Whales, other wildlife, and their habitat from existing and future human activities requires careful monitoring of changes in population health and ecosystem conditions.

Managers know relatively little about the current state of the habitats and wildlife populations in the NWA, thus, the requirement for basic surveys to establish baselines against which managers can detect change are included in this section on monitoring.

Monitoring needs include:

Ecological resources

1. Survey wildlife and habitat for priority species to establish baselines in the NWA;
2. Collect information required to understand the impacts of climate change and vessel traffic on the ecology of the NWA;
3. Collect IQ on wildlife, habitat, and impacts of climate change and vessel traffic on the ecology of the NWA.

Cultural Resources

1. Survey and map archeological sites within the NWA;
2. Document IQ on archeological sites (e.g., family histories, structures, etc.);
3. Survey and map current Inuit use of the NWA (e.g., types of activities, time of year, etc.)

Other

1. Map and evaluate the condition of all built infrastructure and waste materials for clean up;
2. Collect information on marine vessel traffic and noise in and around the NWA

6.5 RESEARCH

Research priorities focus on enhancing knowledge of the ecology of Bowhead Whales and other wildlife. Specific research priorities include:

- Research on threats to whales, wildlife, and the habitat in the NWA
- Research on wildlife, wildlife habitat, and ecosystem processes



- Research that increases understanding of the history of whaling and use of the site by Inuit
- Research to enhance the cultural value of the site and help re-build Inuit connection with the traditional whale hunting culture.

The CWS permitting system is the primary way in which the Ninginganiq ACMC monitors activities within the NWA. Effective and efficient research and monitoring requires a coordinated approach and will be carried out through liaison with researchers and partner agencies in a manner that contributes to the goals, objectives, and priorities outlined in this plan. All research proposals must be submitted to Environment and Climate Change Canada's Canadian Wildlife Service; refer to section **Error! Reference source not found.** of this management plan for information related to permitting.

The ACMC will advise ECCC on research associated with Ninginganiq NW A, including review of all CWS permit applications for research in the NW A, and recommendation of the terms and conditions to include in each permit.

The ACMC will consider approving CWS permits for research activities that support management of the NW A, especially those related to the monitoring/research priorities described in Section 6.4 and 6.5.

DRAFT



6.6 PUBLIC INFORMATION & OUTREACH

Activities within Ninginganiq NWA should support opportunities to build capacity and encourage self-reliance, and the cultural and socio-economic well-being of Inuit (CAIIBA 2.1.8). In addition, ECCC will support activities that encourage public awareness and understanding of nature conservation and support ECCC's role. Ultimately, these actions will lead to healthy populations of wildlife and sustainable habitats.

ECCC and the ACMC will develop education and outreach materials to inform Canadians about the cultural and ecological significance of Ninginganiq NWA. In addition to promoting the role of the site for Bowhead Whale ecology and recovery, ECCC and the ACMC will promote the understanding and appreciation of the historical importance of the site for Inuit whaling culture. These priority areas will help frame efforts to develop sustainable tourism for the area. ECCC and the ACMC will conduct public information and awareness activities largely off-site through communications, education, and other outreach materials; material will be available in English, French, and Inuktitut.



7 AUTHORIZATIONS AND PROHIBITIONS

In the interest of wildlife and their environment, ECCC minimizes and controls human activities in NWAs through the implementation of the *Wildlife Area Regulations*. These regulations prohibit certain activities in the wildlife area and provide mechanisms for the Minister of ECCC to authorize certain activities to take place in NWAs that are otherwise considered prohibited. The regulations also provide the authority for the Minister to prohibit entry into NWAs.

7.1 PROHIBITION OF ENTRY

Access to Ninginganiq NWA by anyone other than Inuit enrolled under the Nunavut Agreement is restricted; therefore, any non- Nunavut Inuit must obtain a permit to access or conduct any activity within Ninginganiq NWA.

Under the *Wildlife Area Regulations*, the Minister may publish a notice in a local newspaper or post notices at the entrance of any wildlife area or on the boundary of any part thereof prohibiting entry to any wildlife area or part thereof. ECCC posts these notices when the Minister is of the opinion that entry is a public health and safety concern or when entry may disturb wildlife and their habitat.

7.2 INUIT ACTIVITIES AUTHORIZED WITHOUT A PERMIT

As set out in the *Nunavut Agreement* "Inuit have a free and unrestricted right of access for the purpose of harvesting to all lands, waters and marine areas within the Nunavut Settlement Area" (Section 5.7.16). This includes all NWAs in Nunavut. Inuit enrolled under the NA have free and unrestricted right of access to all lands, waters, and marine areas within the NWA for the following activities:

- Harvesting (*Nunavut Agreement* s. 5.7.16);
- Removal of up to 50 cubic meters of carving stone (*Nunavut Agreement* s. 19.9.4); and
- Establishment of new outpost camps (subject to terms of the NWA management plan; *Nunavut Agreement* s. 7.2.4).

The IIBA give Nunavut Inuit a further right of access without a permit for the purpose of guiding sport hunters in or across the NWA, and extends the right of access for the purpose of Inuit harvesting (without a permit) to cover activities that are reasonably incidental to harvesting.

7.3 AUTHORIZED ACTIVITIES

Access to Ninginganiq NWA by anyone other than Inuit enrolled under the Nunavut Agreement is restricted; therefore, any non- Nunavut Inuit must obtain a permit to access or conduct any activity within Ninginganiq NWA.



Note: If there is a discrepancy between the information presented in this document and any notice posted by the Minister, the notice prevails.

7.4 PERMITS

CWS issues a permit authorizing an activity in a NWA only if the Minister is of the opinion that the activity is scientific research relating to wildlife or habitat conservation, the activity benefits wildlife and their habitats, will contribute to wildlife conservation, or the activity is not inconsistent with the purpose for which the NWA was established and is consistent with the most recent management plan. The Minister may also add terms and conditions to permits in order to minimize the impact of an activity on wildlife and wildlife habitat.

Potential applicants must make all requests for permit applications or authorizations in writing to the following address or e-mail address:

Environment and Climate Change Canada – Canadian Wildlife Service
Northern Region
933 Mivvik Street, 3rd Floor
P.O. Box 1870
Iqaluit, NU X0A0H0
Telephone: 867-975-4642
Email: ec.cwspemittnorth-nordpermisscf.ec@canada.ca

Contact ec.cwspemittnorth-nordpermisscf.ec@canada.ca or 1-800-668-6767 (in Canada only) if you have any questions, comments, or concerns about federal wildlife permits in Nunavut or if you need assistance completing an application form.

Once submitted, the permit undergoes the process displayed in **Figure 10**. Please note that permitting requests for activities within a NWA in Nunavut take a significant amount of time to process. The Area Co-management Committee associated with the NWA must review project proposals, as per the *IIBA*. In addition, under the *Nunavut Agreement* and the *Nunavut Planning and Project Assessment Act*, territorial review processes must occur before the CWS can issue a permit; therefore, the Nunavut Planning Commission (NPC) must verify that proposed projects conform to any applicable land use plans. If required, the NPC may also recommend that the Nunavut Impact Review Board (NIRB) screen the project proposal. Applicants should contact the NPC and NIRB for further information on the territorial review process.

Given the length of the process outlined in Figure 10, the deadline to apply for a permit for Ninginganiq NWA for an activity that will begin between June 1 and October 31 is February 1. For all other times of the year, applicants must submit a permit application a minimum of 4 months in advance of the proposed activity start date.

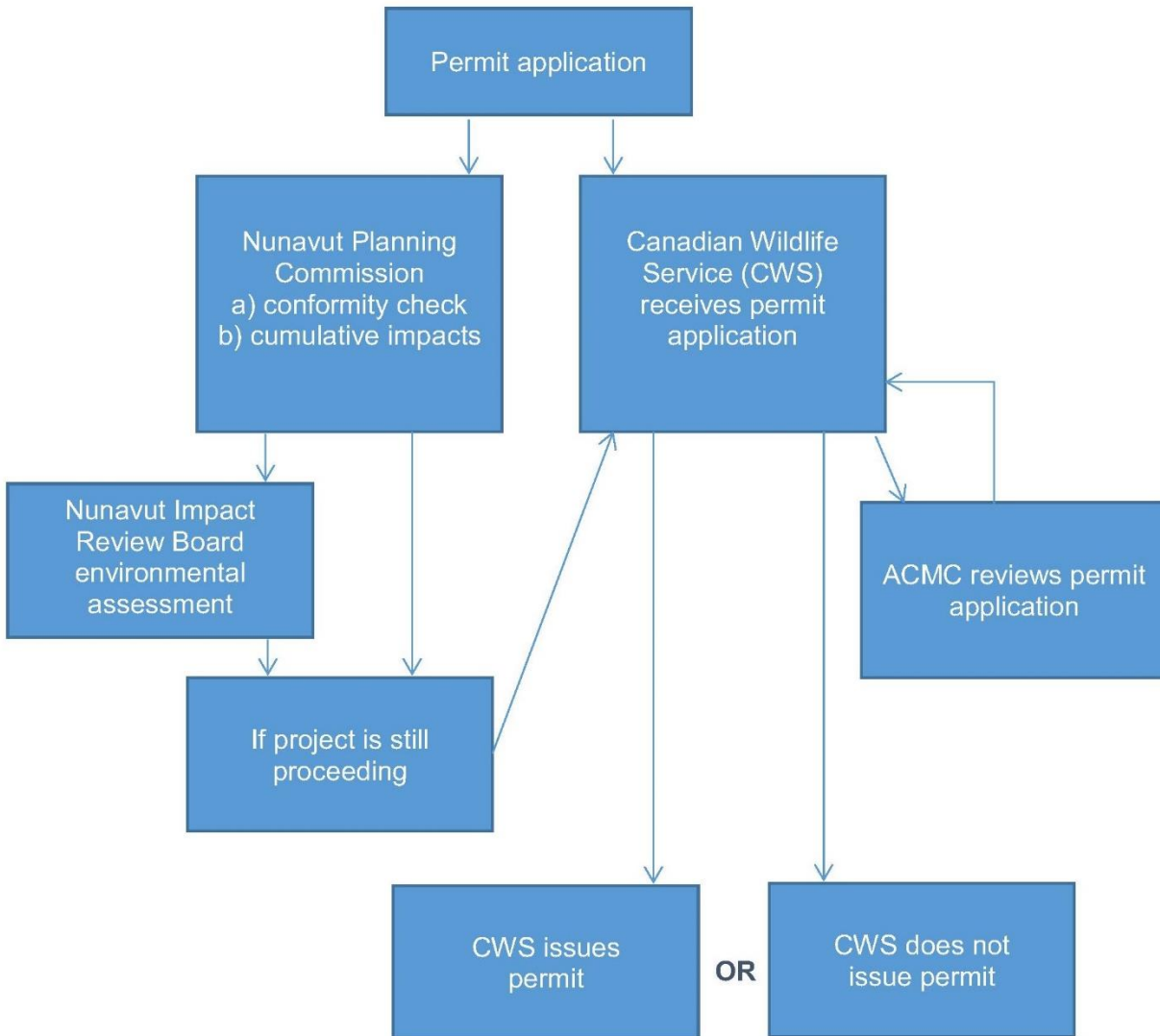


Figure 10: Ninginganiq National Wildlife Area permit application process

7.5 OTHER FEDERAL AND TERRITORIAL AUTHORIZATIONS

Depending on the type of activity, other federal or territorial permits or authorizations may be required to undertake an activity in this NWA. Contact your regional federal and territorial permitting office for more information.



8 HEALTH & SAFETY

The ACMC will consider the following safety issues in the annual work plans for the Ninginganiq NWA:

- Repair or remove damaged cabins at Nuvuktiapik;
- Assess previous work carried out in the region to collect old fuel drums and relocate them to collection areas. It is unclear if the clean-up work was completed in Isabella Bay, but it should be finished if waste still needs to be removed from the NW A; and
- Assess need for the installation of navigational aids for vessels in Ninginganiq NW A.

Any visitor to the area must prepare for the remoteness of the area, difficult weather, difficult ice conditions, and the danger posed by Polar Bears and other wildlife. Use of measures and equipment appropriate for remote wilderness is required.

Please contact the **Canadian Environmental Emergencies Notification System for the Northwest Territories and Nunavut** to report environmental emergencies:
1-867-920-8130

CWS will make all reasonable efforts to protect the health and safety of the public, including adequately informing visitors of any known or anticipated hazards or risks. Further, ECCC staff will take all reasonable and necessary precautions to protect their own health and assure safety, and that of their co-workers; however, visitors, including researchers and contractors, must make all reasonable efforts to inform themselves of risks and hazards, and be prepared and self-sufficient. **Natural areas contain some inherent dangers and proper precautions must be taken by visitors, recognising that ECCC staff neither regularly patrol nor offer services for visitor safety in NWAs.**

To report an incident within the Ninginganiq NWA please contact one of the below offices:

- Canadian Wildlife Service Enforcement Office (Yellowknife or Iqaluit):
ec.dalfnord-wednorth.ec@canada.ca
- Canadian Wildlife Service Permitting Office (Iqaluit): 867-975-4642
ec.nupermisscf-cwspemitnu.ec@canada.ca
- Government of Nunavut Wildlife Office in Clyde River, NU: 867-924-6235
- Royal Canadian Mounted Police detachment in Clyde River, NU: 867-924-0123, or 867-924-1111 during an emergency
- Any member of the Ninginganiq ACMC in Clyde River, NU



9 ENFORCEMENT

ECCC manages NWAs based on three acts and their regulations:

- *Migratory Birds Convention Act, 1994, and Migratory Birds Regulations*
- *Canada Wildlife Act; and Wildlife Area Regulations*
- *Species at Risk Act*

For the purposes of the administration of the *Migratory Birds Convention Act, 1994* and *Migratory Birds Regulations*, and the *Canada Wildlife Act* and *Wildlife Area Regulations*, ECCC Wildlife Officers possess the powers of a police constable. Designated Territorial Conservation Officers and the Royal Canadian Mounted Police can also enforce the *Migratory Birds Regulations* and *Wildlife Area Regulations* under the *Migratory Birds Convention Act* and *Canada Wildlife Act*, respectively.

Officers monitor compliance with authorizations and permits issued under these Acts and Regulations on an ongoing basis and will initiate investigations, as required. CWS will enforce the *Migratory Birds Regulations* and *Wildlife Area Regulations* universally. When necessary, officers will lay charges.

As part of the Ninginganiq NWA is on federal land, the general prohibitions of the *Species at Risk Act* (Sections 32. and 33.) apply to all extirpated, endangered, and threatened species listed on Schedule 1. Visitors to the NWA must not kill, harm, harass, capture or take individuals of Schedule 1 species. In addition, visitors must not damage or destroy residences of Schedule 1 species. If a managing agency identifies critical habitat of a listed species within the NWA, the Federal government will publish a description of that habitat in the *Canada Gazette*. Section 58 of the *Species at Risk Act* prohibits the destruction of critical habitat within the wildlife area.



10 PLAN IMPLEMENTATION

ECCC and the ACMC will implement the management plan over a 10-year period, developing annual work plans in accordance with priorities and budgets. ECCC will develop the details of management plan implementation through ECCC's annual work planning process, as human and financial resources allow. An adaptive management approach will be favoured for the implementation of the management plan. ECCC and the ACMC will evaluate the implementation of the plan (5) years after its publication, based on the actions identified in **Table 5**.

Table 5: Implementation Strategy timeline for Ninginganiq NWA Management Plan.

Activity	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Maintain rigorous permitting process	X	X	X	X	X	X	X	X	X	X
Create/revise standard permit conditions	X	X	X	X	X	X	X	X	X	X
Develop plan for enforcement presence	X	X	X							
Create public resources for reporting suspicious activity	X	X	X							
Create promotional/educational materials				X	X	X				
Post promotional/educational materials on land				X	X	X				
Promote/encourage research opportunities	X	X	X	X	X	X	X	X	X	X
Create emergency response plan							X	X	X	X
Ensure regular communication with hunting organizations	X	X	X	X	X	X	X	X	X	X
Create tool for reporting archaeological sites				X	X	X				
Provide Management Plan to relevant regulatory authorities	X	X	X							

10.1 MANAGEMENT AUTHORITIES & MANDATES

10.1.1 Environment and Climate Change Canada, Canadian Wildlife Service (ECCC, CWS)

Management authority over the Ninginganiq NWA provided under the *Canada Wildlife Act* and the *Wildlife Area Regulations*.



10.1.2 Area Co-Management Committee (ACMC)

Provides advice to the Minister of ECCC on all aspects of the management of the NWA, as mandated in the IIBA.

10.1.3 Nunavut Wildlife Management Board (NWMB)

Management authority over wildlife harvest in the NSA, as mandated in the NA.

10.1.4 Qikiqtani Inuit Association (QIA)

The QIA represents the interests of the Inuit of the Baffin Region and provides advice regarding the use of IOL and may also promote activities on IOL in Ninginganiq NWA.

10.1.5 Nunavut Tunngavik Incorporated (NTI)

The NTI coordinates and manages Inuit responsibilities set out in the NA. On IOL in Ninginganiq NWA, consultation with NTI is required with regards to the disposition of rights to sub-surface non-renewable resources.

10.2 MANAGEMENT PLAN REVIEW

The Management Plan will be reviewed five (5) years after its publication. As outlined in the IIBA, the Government of Canada, a Designated Inuit Organization, any member of the Ninginganiq ACMC, or any person whose interests are affected by the Management Plan may propose an amendment to the plan to the Ninginganiq ACMC. The ACMC shall consider the proposed amendment and may recommend amendments to the Management Plan in accordance with the process set forth under Parts 3.5 and 3.6 of the IIBA.



11 COLLABORATORS

11.1 INUIT AND PUBLIC PARTNERS

The Ninginganiq ACMC will advise on the management of Ninginganiq NWA in consultation with regional institutions of public government as well as local resource co-management boards and authorities, such as the QIA and the QWB, in addition to the NWMB. The NWMB plays a key role in wildlife management within Nunavut including regulating harvesting activities within the NSA. Other partners may include DFO, TC, CIRNAC, the HTO in Clyde River, Nunavut Marine Council, NPC, the Hamlet of Clyde River, Inuit Heritage Trust (IHT), Prince of Wales Northern Heritage Centre, Canadian Museum of History, and Nunavut Tourism.

Collaborations could be developed or pursued with universities and research centres to conduct research in the NWA.

11.2 GOVERNMENT OF NUNAVUT (GN)

The GN Department of Environment - Wildlife Management Division has a legislated mandate for the management of terrestrial wildlife species in Nunavut. In addition to the *Nunavut Wildlife Act*, the Wildlife Management Division is responsible for fulfilling government responsibilities under a wide range of federal legislation and both national and international agreements and conventions, including on-going responsibility for the co-management of Nunavut wildlife as obligated under the *NA*. One of the primary goals of the Division is to achieve a balanced approach to wildlife management that meets legislative requirements, uses both science and IQ and reflects the values and needs of Nunavummiut.

The GN Department of Culture and Heritage is the government agency responsible for the management and protection of archaeological and palaeontological sites in Nunavut. This is done through regulations, legislation, and policy. These regulations include obtaining authorization from the GN, in the form of a permit, to conduct any type of activity at an archaeological or paleontological site, whether it is research, resource development, or tourism.



12 LITERATURE CITED

- Aitken, A. E., and Fournier, J. 1993. Macrobenthos communities of Cambridge, McBeth and Itirbilung Fiords, Baffin Island, Northwest Territories, Canada. *Arctic* 46(1): 60-71.
- Awan, M., and Szor, G. 2012. Wolverine (*Gulo gulo*) carcass collection and harvest monitoring in Nunavut, Summary Report. Government of Nunavut, Department of Environment.
- Beyer, J., Trannum, H., Bakke, T., Hodson, P., and Collier, T. 2016. Environmental effects of the Deepwater Horizon oil spill: a review. *Marine Pollution Bulletin* 110: 28-51.
- Blanken, H., Tremblay, L., Gaskin, S., and Slavin, A. 2017. Modelling the long-term evolution of worst-case Arctic oil spills. *Marine Pollution Bulletin* 116: 315-331.
- Boas, F. 1888. The Central Eskimo. Sixth Annual Report of the Bureau of Ethnology to the Secretary of the Smithsonian Institution, 1884-1885, Government Printing Office, Washington, 1888, pages 399-670. Retrieved from Project Gutenberg at: http://www.gutenberg.org/files/42084/42084-h/42084-h.htm#tribes_baffin_padlimiut.
- Bone, B. 2018. Overview of marine protected areas in the eastern Canadian Arctic and their ability to mitigate current and future threats. Master of Marine Management Thesis, Dalhousie University, Halifax, Nova Scotia.
- Bradley, R.S. 1973. Seasonal climatic fluctuations on Baffin Island during the period of instrumental records. *Arctic* 26: 230-243.
- Bradstreet, M.S. and W.E. Cross. 1982. Trophic relationships at high Arctic ice edges. *Arctic* 35: 1-12.
- Bradstreet, M. S., Thomson, D. H., and Fissel, D. B. 1987. Bowhead Whale food availability characteristics in the southern Beaufort Sea: 1985 and 1986. *Environmental Studies* No. 50. Ottawa: Department of Indian Affairs and Northern Development. 359 p.
- Buck, E. H. 2012. Ballast Water Management to Combat Invasive Species. Congressional Research Service. 7-5700. RL32344 Retrieved from: <https://fas.org/sgp/crs/misc/RL32344.pdf>.
- Burns, J. J., Montague, J. J., and Cowles, C. J. 1993. The Bowhead Whale. Special Publication Number 2, The Society for Marine Mammalogy, Lawrence, Kansas, pp.787
- Campbell, M., Goorts, J., Lee, D. S., Boulanger, J., and Pretzlaw, T. 2015. Aerial abundance estimates, seasonal range use, and spatial affiliations of the Barren-Ground Caribou (*Rangifer tarandus groenlandicus*) on Baffin Island – March 2014. Government of Nunavut Department of Environment Technical Report Series – No: 01-2015.
- Canadian Ice Service. 2011. Sea Ice Climatic Atlas- Northern Canadian Waters 1981-2010. Environment Canada, Ottawa, Ontario, Canada.
- Carlton, J. T. 1996. Pattern, process, and prediction in marine invasion ecology. *Biological Conservation* 78: 97-106.
- Carter, N., Dawson, J., Joyce, J., Ogilvie, A. and Weber, M. 2017. Arctic corridors and Northern voices: governing marine transportation in the Canadian Arctic – Pond Inlet, Nunavut. Department of Geography, Environment and Geomatics, University of Ottawa.



Chan, F. T., Bronnenhuber, J. E., Bradie, J. N., Howland, K. L., Simard, N., and Bailey, S. A. 2012. Risk assessment for ship-mediated introductions of aquatic nonindigenous species to the Canadian Arctic. Canadian Science Advisory Secretariat, Research Document 2011/105, Fisheries and Oceans Canada.

Chan, F., Bailey, S., Wiley, C., and MacIsaac, H. 2013. Relative risk assessment for ballast-mediated invasions at Canadian Arctic ports. *Biological Invasions* 15 : 295-308.

Church, R. 2011. Arctic bottom trawling in Canadian waters: exploring the possibilities for legal action against unsustainable fishing. *Review of European Community & International Environmental Law* 20(1): 11-18.

Cosens, S. E., and Blouw, A. 2003. Size-and-age class segregation of Bowhead Whales summering in northern Foxe Basin: a photogrammetric analysis. *Marine Mammal Science*, 19(2): 284-296.

Cosens, S. E., Cleator, H., and Richard, P. 2006. Numbers of Bowhead Whales (*Balaena mysticetus*) in the Eastern Canadian Arctic, based on aerial surveys in August 2002, 2003 and 2004. Canadian Science Advisory Secretariat, Research Document 2006/052, Fisheries and Oceans Canada.

COSEWIC, Committee on the Status of Endangered Wildlife in Canada. 2009. Assessment and Update Status Report on the Bowhead Whale *Balaena mysticetus*, Bering-Chukchi-Beaufort population and Eastern Canada-West Greenland population in Canada. COSEWIC, Ottawa. 49 pp.

CWS, Canadian Wildlife Service. 1996. Draft Igalirtuuq National Wildlife Area Management Plan. Draft #5, October 25, 1995 with minor revisions on 4 September, 1996. 46 p.

Davis, P. T., Briner, J. P., Coulthard, R. D., Finkel, R. W., and Miller, G. H. 2006. Preservation of Arctic landscapes overridden by cold-based ice sheets. *Quaternary Research* 65: 156-163.

Dawson, J., Copland, L., Mussells, O. and Carter, N. 2017. Shipping trends in Nunavut 1990-2015: a report prepared for the Nunavut general monitoring program. Ottawa, Canada and Iqaluit, Nunavut.

Dawson, J., Pizzolato, L., Howell S. E. L., Copland, L., and Johnston, M. E. 2018. Temporal and spatial patterns of ship traffic in the Canadian Arctic from 1990 to 2015. *Arctic* 71(1): 15-26.

DFO, Department of Fisheries and Oceans. 2015a. Updated abundance estimate and harvest advice for the Eastern Canada-West Greenland Bowhead Whale population. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2015/052.

DFO, Department of Fisheries and Oceans. 2015b. Ecologically and biologically significant areas in Canada's Eastern Arctic Biogeographic Region, 2015. Fisheries and Oceans Canada.

DFO, Department of Fisheries and Oceans. 2016. Bowhead Whale (Eastern Canada-West Greenland population). Accessed December 09, 2019: <https://www.dfo-mpo.gc.ca/species-especes/profiles-profil/bowheadwhale-baleineboreale2-eng.html>.

DFO, Department of Fisheries and Oceans. 2020. Greenland halibut-Northwest Atlantic Fisheries Organization Subarea 0. Accessed March 05, 2020: <http://www.dfo-mpo.gc.ca/fisheries-peches/ifmp-gmp/groundfish-poisson-fond/2019/halibut-fletan-eng.htm#toc1>



Doniol-Valcroze, T., Gosselin, J.-F., Pike, D., Lawson, J., Asselin, N., Hedges, K. and Ferguson, S. 2015. Abundance estimate of the Eastern Canada – West Greenland Bowhead Whale population based on the 2013 High Arctic Cetacean Survey. Canadian Science Advisory Secretariat, Research Document 2015/058, Fisheries and Oceans Canada.

Dowsley, M. 2007. Inuit perspectives on Polar Bears (*Ursus maritimus*) and climate change in Baffin Bay, Nunavut, Canada. *Research and Practice in Social Sciences* 2(2): 53-74.

Drinkwater, K. 2005. The response of Atlantic Cod (*Gadus morhua*) to future climate change. *ICES Journal of Marine Sciences* 62: 1327-1337.

Dueck, L., and Ferguson, S. H. 2009. Habitat use by Bowhead Whales (*Balaena mysticetus*) of the eastern Canadian Arctic. Canadian Science Advisory Secretariat, Research Document 2008/082, Fisheries and Oceans Canada.

Dueck, L. P., Heide-Jørgensen, M. P., Jensen, M. V., and Postma, L. D. 2006. Update on investigations of Bowhead Whale (*Balaena mysticetus*) movements in the eastern Arctic, 2003-2005, based on satellite-linked telemetry. Canadian Science Advisory Secretariat, Research Document 2006/050, Fisheries and Oceans Canada.

Environment and Climate Change Canada. 2019. Canadian Climate Normals 1981 - 2010 Station Data; Clyde A. Accessed Nov 4 2019: https://climate.weather.gc.ca/climate_normals/results_1981_2010_e.html?searchType=stnProv&lstProvince=NU&txtCentralLatMin=0&txtCentralLatSec=0&txtCentralLongMin=0&txtCentralLongSec=0&stnID=1743&dispBack=0

Finley, K. J. 1987. Continuing studies of the Eastern Arctic Bowhead Whale at Isabella Bay, Baffin Island, 1986. Prepared by LGL Ltd, Sidney, BC for World Wildlife Fund Canada, Department of Indian and Northern Affairs, and Department of Fisheries and Oceans.

Finley, K. J. 1988a. Cross-cultural exchange of ecological knowledge: toward a community-based conservation strategy for the Bowhead Whale. December 1988 Canadian Environmental Assessment Review Committee report, 44 pages.

Finley, K. J. 1988b. Studies of the Eastern Arctic Bowhead Whale at Isabella Bay, Baffin Island, 1987. Final Report, June 1998, 79 pages.

Finley, K. J. 1990. Isabella Bay, Baffin Island: an important historical and present-day concentration area for the Endangered Bowhead Whale (*Balaena mysticetus*) of the Eastern Canadian Arctic. *Arctic* 43(2): 137-152.

Finley, K. J. 1998. Isabella Bowhead Studies 1997 (Year of the Orange Fulmar). Report prepared by K. J. Finley Ecological Research for the Namautuq Hunters and Trappers Organization, Igalirtuuq Committee, Nunavut Wildlife Management Board, Nunavut Research Institute, World Wildlife Fund, and Canadian Wildlife Service.

Finley, K. J. 2001. Natural history and conservation of the Greenland Whale, or Bowhead, in the Northwest Atlantic. *Arctic* 54(1): 55-76.

Finley, K. J., and Miller, G. W. 1982. The 1979 hunt for Narwhals (*Monodon monoceros*) and an examination of harpoon gun technology near Pond Inlet, northern Baffin Island. Report of the International Whaling Commission 32: 449-460.

Finley, K. J., and Evans, C. R. 1984. First Canadian breeding record of the Dovekie (*Alle alle*). *Arctic* 37(3): 288-289.



Finley, K. J., Evans, C. R., and Davis, R. A. 1984. Evaluation of the importance of Isabella Bay, Baffin Island, as summer habitat for the Endangered Bowhead Whale. Progress Report of 1984 Studies. Prepared by LGL Ltd, King City, Ontario for World Wildlife Fund Canada.

Finley, K. J., Evans, C. R., and Murison, L. 1986. An investigation of Isabella Bay, Baffin Island, as summer habitat for the Eastern Arctic Bowhead Whale (*Balaena mysticetus*), 1983-1985. Prepared by LGL Ltd, Sidney, BC for World Wildlife Fund Canada.

Finley, K. J., Fissel, D. B., Goodyear, J. D., and Ashton, H. J. 1994. Definition of critical Bowhead Whale feeding habitat in Baffin Bay, 1992. Report by K.J. Finley Ecological Research and ASL Environmental Science Ltd. Sidney, B.C. for Supply & Services Canada, Environment Canada, World Wildlife Fund (Canada) and Indian Affairs & Northern Development. 99 pp.

Finley, K. J., Fissel, D. B., and Goodyear, J. D. 1998. The *Calanus* connection: feeding ecology and habitat of Bowhead Whales (*Balaena mysticetus*) within the Baffin marine ecosystem, in relation to climatic oscillations. Arctic seas, International Symposium on Climate Change, Mystic, Connecticut, October 21-24, 1998.

Fissel, D. B., Lemon, D. D., and Birch, J. R. 1982. Major features of the summer near-surface circulation of western Baffin Bay, 1978 and 1979. *Arctic* 35: 180-200.

Fortune, S. M. E., Koski, W. R., Higdon, J. W., Trites, A. W., Baumgartner, M. F., and Ferguson, S. H. 2017. Evidence of molting and the function of "rocknosing" behavior in Bowhead Whales in the eastern Canadian Arctic. *PLoS ONE* 12(11): e0186156.

Frasier, T. R., Petersen, S. D., Postma, L., Johnson, L., Heide-Jørgensen, M. P., and Ferguson, S. H. 2015. Abundance estimates of the Eastern Canada-West Greenland Bowhead Whale (*Balaena mysticetus*) population based on genetic mark-recapture analyses. Canadian Science Advisory Secretariat, Research Document 2015/008, Fisheries and Oceans Canada.

Gaston, A. J. 2011. Arctic seabirds: diversity, populations, trends, and causes. Pp 147–160 in Watson, R. T., Cade, T. J., Fuller, M., Hunt, G., and Potapov, E. (Eds.). *Gyrfalcons and Ptarmigan in a Changing World*, Volume I. The Peregrine Fund, Boise, Idaho, USA.

Gearhead, S., Matumeak, W., Angutikjuaq, I., Maslanik, J., Huntington, H. P., Leavitt, J., Matumeak Kagak, D., Tigullaraq, G., and Barry, R. G. 2006. "It's Not that Simple": a collaborative Comparison of sea ice environments, their uses, observed changes, and adaptations in Barrow, Alaska, USA, and Clyde River, Nunavut, Canada. *Ambio* 35(4): 204-212.

George, J. C., Philo, L. M., Hazard, K., Withrow, D., Carroll, G. M., and Sudam, R. 1994. Frequency of Killer Whale (*Orcinus orca*) attacks and ship collisions based on scarring on Bowhead Whales (*Balaena mysticetus*) of the Bering-Chukchi-Beaufort Seas Stock. *Arctic* 47(3): 247-255.

Gilbert, R. 1985. Quaternary glaciomarine sedimentation interpreted from seismic surveys of fiords on Baffin Island, N.W.T. *Arctic* 38(4): 271-280.

Government of the Northwest Territories. 1993. Terrestrial Wildlife – Igalirtuuq NWA. Letter prepared by Wildlife Management Division, Department of Renewable Resources, Government of the Northwest Territories, Yellowknife, N.W.T.



Government of Nunavut. 2005. Recommendations on Total Allowable Harvest (TAH) Rates for Terrestrial Wildlife Populations in Nunavut. Department of Environment. December 2005.

Government of Nunavut. 2014. Nunavut Coastal Resource Inventory – Clyde River 2014. Department of Environment, Fisheries and Sealing Division, Iqaluit, Nunavut. 71 pp.

Government of Nunavut. 2016. Nunavut Fisheries Strategy – 2016-2020. Department of Environment, Fisheries and Sealing Division.

Hansen, R. G., Heide-Jørgensen, M. P., and Laidre, K. L. 2012. Recent abundance of Bowhead Whales in Isabella Bay, Canada. *Journal of Cetacena Research and Management* 12(3): 317-319.

Harder, M. T., and Wenzel, G. W. 2012. Inuit subsistence, social economy and food security in Clyde River, Nunavut. *Arctic* 65(3): 305-318.

Harsem, Ø., Heen, K., Rodrigues, J. M. P., and Vassdal, T. 2015. Oil exploration and sea ice projections in the Arctic. *Polar Record* 51(1): 91-106.

Heide-Jørgensen, M. P., Laidre, K. L., Wiig, Ø., Jensen, M. V., Dueck, L., Maiers, L. D., Schmidt, H. C., and Hobbs, R. C. 2003. From Greenland to Canada in ten days: tracks of Bowhead Whales, *Balaena mysticetus*, across Baffin Bay. *Arctic* 56(1): 21-31.

Heide-Jørgensen, M. P., Laidre, K. L., Jensen, M. V., Dueck, L., and Postma, L. D. 2006. Dissolving stock discreteness with satellite tracking: Bowhead Whales in Baffin Bay. *Marine Mammal Science* 22: 34-45.

Higdon, J. 2008. Commercial and subsistence harvests of Bowhead Whales (*Balaena mysticetus*) in eastern Canada and West Greenland. CSAS Research Document 2008/008. <http://waves-vagues.dfo-mpo.gc.ca/Library/40590057.pdf>.

Higdon, J. W., Hauser, D. D. W., and Ferguson, S. H. 2011. Killer Whales (*Orcinus orca*) in the Canadian Arctic: distribution, prey items, group sizes, and seasonality. *Marine Mammal Science*. 2011.

Holland, C. A. 1970. William Penny, 1809-92: Arctic whaling master. *The Polar Record* 15(94): 25-43.

Igaliqtuuq Steering Committee. 2000. Bowhead Monitoring Project Final Report. Prepared by the Igaliqtuuq Steering Committee, Clyde River, Nunavut for Nunavut Wildlife Management Board.

IPCC, Intergovernmental Panel on Climate Change. 2014. Climate change 2014: Synthesis report. Contribution of working groups, I, II, and III to the fifth assessment report of the Intergovernmental Panel on Climate Change [Core writing team, R. K. Pachauri and L. A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp.

Ives, J.D. and J.T Andrews. 1963. Studies on the physical geography of north-central Baffin Island, N.W.T. *Geographical Bulletin* 19: 5-48.

Jansen, J., Boveng, P., Dahle, S. and Bengtson, J. 2010. Reaction of Harbor Seals to cruise ships. *Journal of Wildlife Management* 74(6): 1186-1194.



- Jenkins, D. and Goorts, J. 2013. Baffin Island Caribou Consultations 2012. Consultation Report, Government of Nunavut, Department of Environment, Pond Inlet, NU. 86 pp.
- Jørgensen, O. A., and Arboe, N. H. 2013. Distribution of the commercial fishery for Greenland Halibut and Northern Shrimp in Baffin Bay. Technical Report No. 91, Pinngortitaleriffik, Greenland Institute of Natural Resources.
- Jørgensen, O. A., Hvingel, C., Møller, P. R., and Treble, M. A. 2005. Identification and mapping of bottom fish assemblages in Davis Strait and southern Baffin Bay. *Canadian Journal of Fisheries and Aquatic Sciences* 62: 1833-1852.
- Jørgensen, O. A., Hvingel, C., and Treble, M. A. 2011. Identification and mapping of bottom fish assemblages in northern Baffin Bay. *Journal of Northwest Atlantic Fishery Science* 43: 65-79.
- Kraus, S. D. 1990. Rates and potential causes of mortality in North Atlantic Right Whales (*Eubalaena glacialis*). *Marine Mammal Science* 6(4): 278-291.
- Kugler, R. C. 1980. The Whale Oil Trade 1750-1775. Old Dartmouth Historical Sketch 79, New Bedford, Massachusetts.
- Lackenbauer, W., and Lajeunesse, A. 2014. On Uncertain Ice: The Future of Arctic Shipping and the Northwest Passage. Prepared for the Canadian Defense & Foreign Affairs Institute, Calgary, AB.
- Laidre, K. L., Sheffield, G., and George, J. C. 2004. Bowhead Whale feeding in the Alaskan Beaufort Sea, based on stomach contents analyses. *Journal of Cetacean Research and Management* 6(3): 215-223.
- Laidre, K. L., Heide-Jørgensen, M. P., and Nielsen, T. G. 2007. Role of the Bowhead Whale as a predator in West Greenland. *Marine Ecology Progress Series* 346: 285-297.
- Laidre, L. L., Stirling, I., Lowry, L. F., Wiig, Ø., Heide-Jørgensen, M. P. and Fergus, S. H. 2008. Quantifying the sensitivity of Arctic marine mammals to climate induced habitat change. *Ecological Applications* 18: 297-315.
- Levere, T. H. 1988. Science and the Canadian Arctic, 1818-76, from Sir John Ross to Sir George Strong Nares. *Arctic* 41(2): 127-137.
- Lowry, L. F. 1993. Foods and feeding ecology. Pages 201 -238 in Burns, J. J., Montague, J. J., and Cowles, C. J. (eds). *The Bowhead Whale*. 1993. Special Publication No. 2. Society for Marine Mammalogy, Lawrence, KS.
- Mallory, M. L., and Fontaine, A. J. 2004. Key marine habitat sites for migratory birds in Nunavut and the Northwest Territories. Occasional Paper No. 109, Canadian Wildlife Service.
- Marshall Macklin Monaghan Ltd. 1982. Baffin Regional Tourism Planning Project, Community Tourism Development Plan, Clyde River (Kangirluqaapik). Prepared for Department of Economic Development and Tourism, Government of the Northwest Territories.
- Maxwell, J. B. 1980. The Climate of the Canadian Arctic Islands and Adjacent Waters. Volume 1. *Climatological Studies* 30. Atmospheric Environment Service, Toronto. 531 pp.
- Maxwell, J. B. 1981. Climatic regions of the Canadian Arctic Islands. *Arctic* 34(3): 225-240.



- McCartney, A. P. 1980. The nature of Thule Eskimo whale use. *Arctic* 33(3): 517-541.
- McCartney, A. P., and Savelle, J. M. 1993. Bowhead Whale bones and Thule Eskimo subsistence settlement patterns in the central Canadian Arctic. *The Polar Record* 29(168): 1-12.
- Mckinnon, L., Gilchrist, H. G., and Fifield, D. 2009. A pelagic seabird survey of Arctic and sub-Arctic Canadian waters during fall. *Marine Ornithology* 37: 77-84.
- McLaren, P. L. 1982. Spring migration and habitat use by seabirds in eastern Lancaster Sound and western Baffin Bay. *Arctic* 35(1): 88-111.
- Meldgaard, J. 1960. Origin and evolution of Eskimo cultures in the Eastern Arctic. *Canadian Geographical Journal*, pp 64-75.
- Milton Freeman Research Ltd. 1976. "Clyde" in Inuit Land Use and Occupancy Project – Volume One: Land Use and Occupancy pp. 146-151.
- Mitchell, E. D., and Reeves, R. R. 1982. Factors affecting abundance of Bowhead Whales, *Balaena mysticetus*, in the eastern Arctic of North America, 1915-1980. *Biological Conservation* 22: 59-78.
- Moshenko, R. W., Cosens, S. E., and Thomas, T. A. 2003. Conservation Strategy for Bowhead Whales (*Balaena mysticetus*) in the Eastern Canadian Arctic. National Recovery Plan No. 24. Recovery of Nationally Endangered Wildlife (RENEW). Ottawa, Ontario. 51 pp.
- National Energy Board. 1994. Memorandum October 26, 1994.
- Northern Environmental Marine Organization. 2002. Isabella Bay Bowhead Whale Critical Habitat Stewardship Program, Final Report 2001-2002. Prepared for Environment Canada. 14 pp.
- Northern Environmental Marine Organization. 2003. Isabella Bay Bowhead Whale Critical Habitat Stewardship Program – Final Report 2002-2003. 51 pp.
- Nevalainen, M., Helle, I., and Vanhatalo, J. 2018. Estimating the acute impacts of Arctic marine oil spills using expert elicitation. *Marine Pollution Bulletin* 131: 782-792.
- Nickels, S. 1992. Northern Conservation and Tourism: the Perceptions of Clyde River Inuit. MA Thesis, McGill University, Montreal.
- Nielsen, N. H., Laidre, K., Larsen, R. S., and Heide-Jørgensen, M. P. 2015. Identification of potential foraging areas for Bowhead Whales in Baffin Bay and adjacent waters. *Arctic* 68(2): 169-179.
- Nunami Stantec. 2018. Strategic Environmental Assessment in Baffin Bay and Davis Strait. Oil and Gas Life Cycle Activities and Hypothetical Scenarios—May 30, 2018. 110 pp.
- Nunavut Impact Review Board. 2019. Nunavut Impact Review Board Final Report for the Strategic Environmental Assessment in Baffin Bay and Davis Strait NIRB File No. 17SN034. Cambridge Bay, NU, Canada.
- Nunavut Wildlife Management Board. 2000. Final report of the Inuit Bowhead Knowledge Study, Nunavut, Canada. Iqaluit, Nunavut: Nunavut Wildlife Management Board.



Paxian, A., Eyring, V., Beer, W., Sausen, R., and Wright, C. 2010. Present-day and future global bottom-up ship emission inventories including polar routes. *Environmental Science and Technology* 44: 1333-1339.

Peacock, E., Taylor, M. K., Laake, J., and Stirling, I. 2013. Population ecology of Polar Bears in Davis Strait, Canada and Greenland. *The Journal of Wildlife Management* 77(3): 463-476.

Philo, L. M., George, J. C., and Albert, T. F. 1992. Rope entanglement of Bowhead Whales (*Balaena mysticetus*). *Marine Mammal Science* 8(3): 306-311.

Pizzolato, L., Howell, S. E. L., Dawson, J., Laliberté, F. and Copland, L. 2016. The influence of declining sea ice on shipping activity in the Canadian Arctic. *Geophysical Research Letters* 43(12): 12,146–12,154.

Pomerleau, C., Ferguson, S. H., and Walkusz, W. 2011. Stomach contents of Bowhead Whales (*Balaena mysticetus*) from four locations in the Canadian Arctic. *Polar Biology* 34: 615-620.

Porsild, A. E. 1964. *Illustrated Flora of the Canadian Arctic Archipelago*. Bulletin 146, Second Edition. National Museum of Canada, Ottawa. 218 pp.

Postma, L. D., Dueck, L. P., Heide-Jørgensen, M. P., and S. E. Cosens. 2006. Molecular genetic support of a single population of Bowhead Whales (*Balaena mysticetus*) in eastern Canadian Arctic and western Greenland waters. DFO Canadian Science, Canadian Science Advisory Secretariat, Research Document 2006/051.

Priest, H. and P.J. Usher. 2004. *The Nunavut Wildlife Harvest Study*, Nunavut Wildlife Management Board, February 2004.

Reeves, R. R., and Mitchell, E. 1988. Distribution and seasonality of Killer Whales in the eastern Canadian Arctic. *Rit Fiskideildar* 11:136–160.

Reeves, R.R., Ewins, P.J., Agbayani, S., Heide-Jorgensen, M.P, Kovacs, K.M, Lydersen, C., Suydam, R., Elliot, W., Polet, G., van Dijk, Y., and R. Blijleven. 2014. Distribution of endemic cetaceans in relation to hydrocarbon development and commercial shipping in a warming climate. *Marine Policy* 44: 375-389.

Reinhart, N. R., Ferguson, S. H., Koski, W. R., Higdon, J. W., LeBlanc, B., Tervo, O, and Jepson, P. D. 2013. Occurrence of Killer Whale *Orcinus orca* rake marks on Eastern Canada-West Greenland bowhead whales *Balaena mysticetus*. *Polar Biology* 36: 1133-1146.

Richards, J. M., and A. J. Gaston. 2018. *Birds of Nunavut*. UBC Press, Vancouver, BC.

Richardson, W. J., and Malme, C. I. 1993. Man-made noise and behavioral response. In: Burns, J. J., Montague, J. J., and Cowles, C. J. eds. *The Bowhead Whale*. Special Publication No. 2. Society for Marine Mammalogy, Lawrence, KS, Pages 631-700

Richardson, W. J., Fraker, M. A., Würsig, B., and Wells, R. S. 1985. Behaviour of Bowhead Whales *Balaena mysticetus* summering in the Beaufort Sea: reactions to industrial activities. *Biological Conservation* 32: 195-230.

Richardson, W.J., Davis, R.A., Evans, C.R., Ljungblad, D.K. & Norton, P., 1987. Summer distribution of bowhead whales, *Balaena mysticetus*, relative to oil industry activities in the Canadian Beaufort Sea, 1980–84. *Arctic* 40: 93–104



Roosdahl 1995. Lichens of Isabella Bay, Baffin Island (near Clyde River). Unpublished report.

Ross, J. 1819. Voyage of Discovery Made under the Orders of the Admiralty in his Majesty's Ships *Isabella* and *Alexander* for the Purpose of Exploring Baffin's Bay and Inquiring into the Probability of a North-west Passage. John Murray, Albemarle-Street, London.

Ross, W. G. 1979. The annual catch of Greenland (Bowhead) Whales in waters north of Canada 1719-1915: a preliminary compilation. *Arctic* 32(2): 91-121.

Ross, W.G. 1993. Commercial whaling in the North Atlantic sector. Pages 511-561 in J.J. Burns, J.J. Montague and C.J. Cowles, eds. *The Bowhead Whale*. Special Publication No. 2. Society for Marine Mammalogy, Lawrence, KS.

Rugh, D. J., Miller, G. W., Withrow D. E., and Koski, W. R. 1992. Calving intervals of Bowhead Whales established through photographic identifications. *Journal of Mammalogy* 73: 487-490.

Sale, R. 2006. *A Complete Guide to Arctic Wildlife*. Firefly Books, Buffalo, New York.

Sanguya, J., and Gearheard, S. 2014. Documenting Inuit Knowledge about the People, Wildlife, and Wildlife. Final Report. 74 pp.

SARA Registry. 2017. Species profile: Bowhead Whale eastern Canada-west Greenland population. Accessed: December 2019. https://wildlife-species.canada.ca/species-risk-registry/species/speciesDetails_e.cfm?sid=1054

Schell, D. M., and Saupe, S. M. 1993. Feeding and growth as indicated by stable isotopes. In: Burns, J.J., Montague, J.J., and Cowles, C.J., eds. *The Bowhead Whale*. The Society for Marine Mammalogy, Special Publication No. 2. Lawrence, Kansas: Allen Press. 491-509.

Stachowicz, J. J., Whitlatch, R. B., and Osman, R. W. 1999. Species diversity and invasion resistance in a marine ecosystem. *Science* 286: 1577-1579.

Stewart, E. J., Dawson, J., and Draper, D. 2011. Cruise tourism and residents in Arctic Canada: development of a resident attitude typology. *Journal of Hospitality and Tourism Management* 18(1):95-106.

Stewart, E. J., Dawson, J., Howell, S. E. L., Johnston, M. E., Pearce, T., and Lemelin, H. 2013. Local-level responses to sea ice change and cruise tourism in Arctic Canada's Northwest Passage. *Polar Geography* 36(1-2): 142-162.

Sutherland, P. C. 1853. On the geological and glacial phenomena of the coasts of Davis' Strait and Baffin's Bay. *Quarterly Journal of the Geological Society* 9: 296-312.

Vergeynst, L., Wegeberg, S., Aamand, J., Lassen, P., Gosewinkel, U., Fritt-Rasmussen, Gustavson, K., and Mosbech, A. 2018. Biodegradation of marine oil spills in the Arctic with a Greenland perspective. *Science of the Total Environment* 626: 1243-1258.

Ware, C., Berge, J., Jelmerf, A., Olsen, S. M., Pellissier, L., Wisz, M., Kriticos, D., Semenov, G., Kwaśniewski, S., and Alsos, I. G. 2016. Biological introduction risks from shipping in a warming Arctic. *Journal of Applied Ecology* 53: 340-349.



Wenzel, G. W. 1989. Sealing at Clyde River, N.W.T: a discussion of Inuit economy. *Études/Inuit/Studies* 13(1): 3-22.

Wenzel, G. W. 1995. Ningiqtuq: resource sharing and generalized reciprocity in Clyde River, Nunavut. *Arctic Anthropology* 32(2): 43-60.

Wenzel, G. W. 2008, "Clyde Inuit settlement and community: from before Boas to centralization". *Arctic Anthropology* 45(1): 1-21.

Wenzel, G. W. 2011. Polar Bear management, sport hunting and Inuit subsistence at Clyde River, Nunavut. *Marine Policy* 35: 457-465.

Wenzel, G. W and Community of Clyde River. 1999. Clyde River Historical Notes. Unpublished Report. 29 pages.

Woodby, D. A. and Botkin, D. B. 1993. Stock sizes prior to commercial whaling. pp. 387-407. In: Burns, J. J., Montague, J. J., and Cowles, C. J. (eds.) Special Publication. No. 2. The Bowhead Whale. 1st. Edn. Society of Marine Mammalogy, Lawrence, KS. 787 pp.

DRAFT

