NUNAVUT PARKS
MIRNGUIQSIRVIIT ᓂᕿᙵᓱᓕᕆᔨᒃ ᑲᓇᕐᑎᑦ PARCS NUNAVUT

Harvaqtuuq/ Kazan River

20-Year Monitoring Report

2000-2020

Nunavut

Canadian Heritage Rivers System

Table of Contents

List of Tables iii
List of Figures iv
Introduction 1
Desktop Analysis 1
Stakeholder Engagement 2
Background 3
Overview of the Harvaqtuuq/Kazan River Corridor 4
Section 1: Chronology of Significant Events 7
Section 2: Changes and Threats to Natural, Cultural and Recreational Values since Designation 4
Natural Values 2
Theme I: Hydrology 2
Theme II: Physiography 11
Theme IV: Biotic Environments 13
Theme V: River Vegetation 13
Theme VI: River Fauna 14
Cultural Values 22
Theme I: Resource Harvesting 22
Theme II: Water Transport 27
Theme III: Riparian Settlement 28
Theme IV: Hydroelectric Power Generation 29

Theme V: Culture and Recreation....31
Theme VI: Jurisdictional Use....31
Theme VII: Environmental Regulation....32
Recreational Values....33
Theme I: Recreational Values....33
Section 3: Integrity Guidelines since Designation 35
Section 4: Designation Document Recommendations and Current Status 36
Section 5: Summary of Benefits and Costs since Designation 37
Summary Recommendations From Previous Decadal Report 2000:....42
Protecting the Harvaqtuuq/Kazan River....42
Section 6: Overall Assessment 44
Overall Assessment....44
Works Cited 45

List of Tables

Table 1: Comparison of selected water quality parameters between 2020 KIA monitoring and 1995/96 data in the 2000 Harvaqtuuq/Kazan River CHRS Report. Note that additional parameters can be found in KIA's Heritage Rivers Water Quality Report 2020 (Prairie Scientific, 2020). 3

Table 2: Elder interview results. 4

Table 3: Population estimates and trends for the Beverly/Ahiak and Qamanirjuaq caribou populations (Government of Canada, 2016). 17

Table 4: SARA and COSEWIC status of at-risk species in the region surrounding the Harvaqtuuq/Kazan River. 19

Table 5: Hunter Harvest Survey data from 2004 NWMB report. 23

Table 6: Hunter Harvest Survey data 1978-2011 25

Table 7: Designation document recommendations 36

Table 8: Summary of benefits 38

Table 9: Summary of recommendations from previous report 42

List of Figures

Figure 1: Harvaqtuuq/Kazan Heritage River 6

Figure 2: Exploration Overview 2008 active projects Harvaqtuuq/Kazan River, highlighted in yellow 7

Figure 3: Cropped map of Kivalliq region from Exploration Overview 2008: to show exploration activity surrounding Harvaqtuuq/Kazan River and the community of Baker Lake. 8

Figure 4: Daily Discharge in 1987 and 2017 in the Upper Harvaqtuuq/Kazan River (Water Survey of Canada, 1983-2018) 6

Figure 5: Daily Discharge in 1986 and 2015 in the Lower Harvaqtuuq/Kazan River (Water Survey of Canada, 1983-2018). 7

Figure 6: The Annual Average Daily Discharge in the Upper Harvaqtuuq/Kazan River (Water Survey of Canada, 1983-2018) 9

Figure 7: The Annual Average Daily Discharge in the Lower Harvaqtuuq/Kazan River (Water Survey of Canada, 1983-2018) 9

Figure 8: Annual Average Water Level Per Year (m) Upper Harvaqtuuq/Kazan River (Water Survey of Canada, 1983-2018) 10

Figure 9: Map of route the proposed Hydro-Fibre route 30

List of Acronyms

AEM	Agnico Eagle Mines
BLHTO	Baker Lake Hunter and Trappers Organization
CANNOR	Canada Northern Economic Development Agency
CHR	Canadian Heritage River
CHRS	Canadian Heritage River Systems
CIB	Canada Investment Bank
CIRNAC	Crown Indigenous Relations and Northern Affairs Canada
CLARC	Community Lands and Resource Committee
CNGO	Canada-Nunavut Geoscience Office
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
DNLUP	Draft Nunavut Land Use Plan
FEIS	Final Environmental Impact Statement
GN	Government of Nunavut
HTO	Hunters and Trappers Organization
IIBA	Inuit Impact and Benefit Agreement
KIA	Kivalliq Inuit Association
MOU	Memorandum of Understanding
NIRB	Nunavut Impact Review Board
NPC	Nunavut Planning Commission
NPSP	Nunavut Parks and Special Places
NTI	Nunavut Tunngavik Incorporated
NWMB	Nunavut Wildlife Management Board
NWT	Northwest Territories
RIA	Regional Inuit Association
SARA	Species at Risk Act

Introduction

Since the designation of the Harvaqtuuq/Kazan River over 30 years ago, the Canadian Heritage Rivers System (CHRS) has developed a requirement that comprehensive reviews of Heritage Rivers be performed every ten years. This policy is echoed in Umbrella Inuit Impact and Benefit Agreement (IIBA) for Canadian Heritage Rivers, signed in 2019, between the Inuit of the Nunavut Settlement area represented by Nunavut Tunngavik Incorporated (NTI) with the three Regional Inuit Association (RIA) in Nunavut and Government of Canada and Government of Nunavut.

In summary, the purpose of these reviews is the following:

- Chronicle any significant events which have occurred in the previous decade.
- Assess the status of the Natural, Cultural and Recreational Values for which the Harvaqtuuq/Kazan River was originally nominated.
- Assess the status of the actions in the designation document.
- Evaluate the impacts (i.e., benefits and drawbacks) CHRS designation has had on the environmental, social, cultural, and recreational domains of the river, and the associated financial costs.
- Ensure the river remains a viable and meaningful component of the CHRS.

The previous CHRS report regarding Harvaqtuuq/Kazan River was published in 2000, and as such, the present report is a multidecadal update, inclusive of the years 2000 to 2019. That noted, where more current information was identified (i.e., to the end of 2021), it has been included.

Two primary methods were employed to produce this 20-Year Monitoring Report.

Desktop Analysis

Many sources of information, from academic literature to regulatory impact statements to government data to secondary data were compiled, reviewed and analyzed to create a comprehensive update to the Harvaqtuuq/Kazan River.

A major change in landscape use surrounding the Harvaqtuuq/Kazan River since the first decadal report and the creation of Nunavut Territory in 1999 is the increased permitting and licencing of resource exploration & extraction for gold, uranium, and nickel in the Kivalliq region.

It should be noted that AREVA Resources Canada Inc. put forward a project proposal to develop a uranium mine and mill about 80 km west of Baker Lake, NU to the Nunavut Impact Review Board (NIRB) in November 2008. The proposal was returned to proponent until the Nunavut Planning Commission (NPC) reviewed the proposal to see if it conformed to the Keewatin Regional Land Use Plan; the proposal received conformity in January 2009 by NPC. Next, NIRB gave the project a file number; 09MN003 and comments to the project proposal were accepted until February 2009 and the NIRB then reviewed and decided in March 2009 a full environmental

review process should proceed and therefore an environmental impact statement process began and a more detailed project Final Environmental Impact Statement (FEIS) was submitted in 2014 to NIRB. A NIRB final hearing for this project was held in Baker Lake, NU in March 2-14, 2015. NIRBs decision and letter dated May 2015 to the Federal Minister was not to approve this project at this time.

> *"After a thorough review of the potential ecosystemic and socio-economic impacts of the proposed Project, the Board has concluded that the Kiggavik Uranium Mine Project should not proceed at this time. The Kiggavik Project as presented has no definite start date or development schedule. The Board found that this adversely affected the weight and confidence which it could give to assessments of future ecosystemic and socio-economic effects."*

In July 2016 the federal minister agreed with NIRBs decision and this project did not proceed and was closed. Data used in this report comes from six years of work done by and for AREVA Resources Canada Inc. associated with the Draft & Final Environment Impact Statement (FEIS) for the Kiggavik Uranium Mine & Mill Project in 2014.

The use of this information, and all other secondary information is not intended to represent or convey its legitimacy above other sources; rather, it is considered a vehicle for identifying and prioritizing the Inuit perspective as gathered during that time. That noted, it is acknowledged that reports produced by and for AREVA had among their objectives to secure favourable decision; as such, their use in this report is limited to the Inuit perspective as expressed at the time, as well as objective data free of interpretation.

Article 6.3.7 of the IIBA further stipulates that the Government of Nunavut shall engage with the appropriate Regional Inuit Association and Adjacent Community in completing a ten-year CHRS monitoring report.

Stakeholder Engagement

In addition to aggregating and synthesizing available data, it was critical to ensure that the Inuit voice was prioritized in understanding the current state of the Harvaqtuuq/Kazan River with respect to the Natural, Cultural and Recreational Values, as well as community and individual priorities, concerns, ideas and opportunities.

To this end, a series of stakeholder interviews were conducted in-person and via telephone between November 19 and December 21, 2021. In addition, a community Open House was held in the Adjacent Community of Baker Lake on December 1 and 2, 2021. At the Open House, residents of Baker Lake were invited to complete an interview/ questionnaire in Inuktitut or English and share their thoughts and opinions on the Harvaqtuuq/Kazan River over the previous 20 years. The Open House proved to be an excellent venue for the two-way exchange of information, knowledge and perspective between the community and the Government of Nunavut. A total of 44 residents completed questionnaires during the Open House.

Background

In September of 1988, the Government of the Northwest Territories (NWT) and Parks Canada undertook a community-based initiative at the request of the residents of Baker Lake. A major emphasis was placed on gathering information from residents and ensuring a high level of community awareness and support. Background reports and nomination documents were prepared for both the Kangirjuap/Thelon and Harvaqtuuq/Kazan Rivers and were tabled with the CHRS in 1989. Nominations were made by three cooperating parties – the Municipality of Baker Lake, the Government of NWT, and the Government of Canada. The CHRS nomination framework was based on a series of guidelines within each of the categories of natural heritage values, human heritage values, and recreation values. The ability of the river to meet these guidelines was assessed as a measure of its suitability for CHRS status. The Harvaqtuuq/Kazan River met two of the four natural heritage value guidelines; four of the five human heritage value guidelines; and both of the recreations value guidelines.[1] The nomination was accepted on June 15, 1989, and a management plan for the Harvaqtuuq/Kazan was submitted to the CHRS Board in 1990 to conclude the designation process.

On July 9, 2019, thirty years after these nominations, the Umbrella Inuit Impact and Benefit Agreement (IIBA) for the Canadian Heritage Rivers (CHRs) in Nunavut was signed in a ceremony in Kugluktuk, Nunavut. This agreement fulfills an obligation in the Nunavut Agreement and identifies that Inuit of the adjacent communities associated with CHRs in Nunavut, Nunavut Tunngavik Incorporated and the Regional Inuit Associations, are to collaborate with the federal and territorial governments regarding the heritage rivers in Nunavut.

Article 6 of the IIBA details Heritage River planning and management and ensures the appropriate consideration of Inuit Qaujimajatuqangit in all aspects of decision making related to the Heritage Rivers. It also requires that the signatory Parties and a representative from each adjacent community meet annually around March of each year, or what times suits the signatories best, to review implementation against the objectives of the IIBA, and to propose any amendments as may be necessary to better meet them or to mitigate new or unforeseen impacts.

As this report details the impacts and benefits of CHRS designation, and IIBA benefits are included in Section 5 of this report.

[1] During the 1990s considerable effort was made to upgrade the framework for Heritage River nomination; systematic frameworks were developed for natural and cultural heritage that were more sophisticated than earlier models. This new framework, which distinguishes between Natural, Cultural and Recreational Values was used as the basis for the previous 10-Year Monitoring Report, and for this report.

Overview of the Harvaqtuuq/Kazan River Corridor

The Harvaqtuuq/Kazan River flows about 850 km northwards from Kasba Lake near the northern border of Saskatchewan to the south shore of Baker Lake. This 5,000km^2 drainage basin lies in the heart of the mainland portion of the Nunavut Territory. The upper reaches of the river traverse the transition zone between the boreal forest of black spruce and tamarack and the treeless tundra adding significantly to the diversity of the biological character of the river corridor. Below Ennadai Lake the landscape is characterized by rocky hills and plains, now rebounding from their glacial past at one of the highest rates in the world. The river course combines large lakes with wide meandering sections, narrow swift sections and waterfalls. (see Figure 1).

Most prominent of the wildlife associated with the river corridor are the caribou of the Qamanirjuaq herds and to a lesser extent the Beverly herd. On their annual migration route, the Harvaqtuuq/Kazan lies just to the west of the one of the major calving areas of the Qamanirjuaq herd. Other notable species in the area include the muskox which appears to be expanding its range from the core area within the Thelon Wildlife Sanctuary to the northwest and increasing their numbers in the central and southern portion of the Harvaqtuuq/Kazan River corridor

The river corridor, along with the vast mainland tundra areas, are also significant for a wide variety of waterfowl species and trout, grayling and whitefish are among the resident fish species.

The richness of the area, especially the relationship of the caribou to the river, accounts for the significance of the Harvaqtuuq/Kazan River's significance to Inuit. The Caribou Inuit was a name given by the Fifth Thule Expedition that generalized Inuit who lived inland west of Hudson Bay. More precisely there are nine cultural groups in the area surrounding Baker Lake, the

only inland Inuit community. One cultural group calls the lower reaches of the Harvaqtuuq/Kazan River area home; the Harvaqtuurmiut – Inuit who lived on the lower reaches of the Harvaqtuuq/Kazan River adapted their lifestyle to the seasonal movements of the caribou and took particular advantage of the herds' river crossing points to harvest this important source of food, clothing and shelter. Many Harvaqtuurmiut now live in the community of Baker Lake but return to the lower reaches of the Harvaqtuuq/Kazan River for hunting and camping (Hughson,

2010; Keith, 2000; Mannik, 1989; Stewart et al, 2004; Webster et al, no date). The upper Kazan River area has two other Inuit groups the Ahiarmiut – the Out-of-the-way-Dwellers who lived closer to Ennadai Lake and the Paalirmiut – people of the willows who lived who lived between the Ahiarmiut and Harvaqtuurmiut (Issenman,B. 1997; Tester & Kulchyski,1994; Webster et al, no date). Inuit from these groups live mainly in the communities of Arviat or Rankin Inlet along the western Hudson Bay coast and some in Baker Lake call these areas along the upper reaches of the Harvaqtuuq/Kazan River their homelands.

Evidence of Inuit presence is found throughout the length of the corridor and the abundance of caribou allowed Inuit to sustain themselves inland all year round.

Similarly, Dene from the south extended their activities into the southern reaches of the river corridor although this use declined significantly by the 18th Century. It wasn't until the late 1800's that non-Inuit missionaries and explorers arrived in the region and began to record the extent of Inuit and Dene activity. Specific archaeological surveys followed in the early part of the 1900's, specifically the Fifth Thule Expedition.

In the early 1990's, various field work occurred including the documentation of traditional Inuit place names and archaeological field work which occurred in support of the nomination and designation in 1995 of the *Fall Caribou Crossing National Historic Site* on the Harvaqtuuq/Kazan River between Kazan Falls and the narrows in Thirty Mile Lake (Stewart,2000.; Stewart et al 2004).

Because of both its cultural significance and its captivating natural characteristics, the Harvaqtuuq/Kazan River has also been attractive as a destination for wilderness river users. Because of its remoteness and the length of the trip from natural starting points such as Kasba Lake and Ennadai Lake to Baker Lake, the numbers are not high year over year, though such trips have incredible value as a way to appreciate the life of early inhabitants of the area.

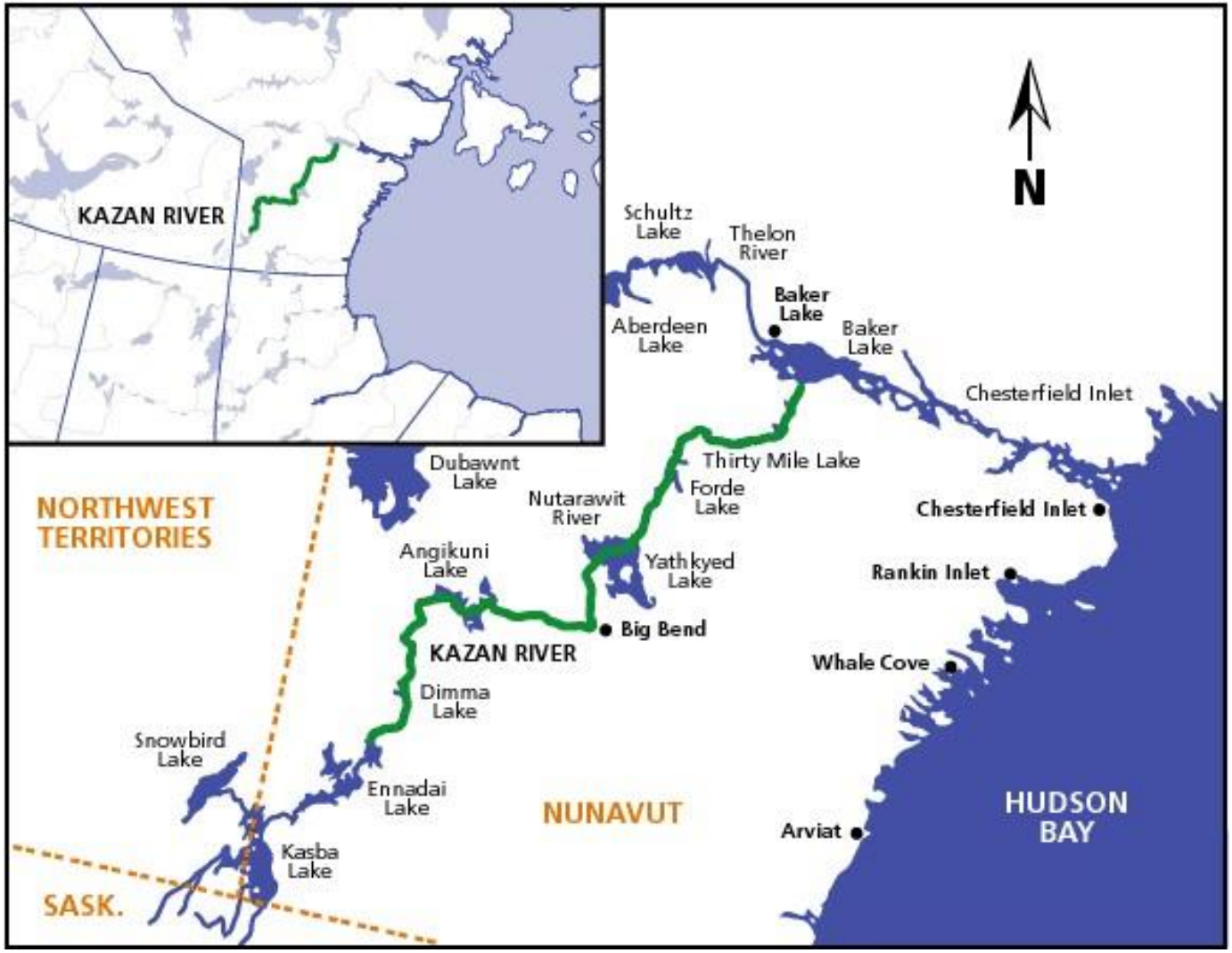

Figure 1: Harvaqtuuq/Kazan Heritage River

Section 1: Chronology of Significant Events

Significant events, actions and research that have occurred since the 2000 Harvaqtuuq/Kazan River CHRS report are included below.

Canada-Nunavut Geoscience Office: Exploration Overview

Month/Year: 2000-present

Brief Description:

- An annual publication which tries to capture the exploration and mining activities in Nunavut for a given year.
- This publication is a combined effort with four partners; federal government represented by Crown-Indigenous Relations and Northern Canada (CIRNAC), Government of Nunavut (GN), Nunavut Tunngavik Incorporated (NTI), and the Canada-Nunavut Geoscience Office (CNGO).
- This information is made available to the public and industry alike.
- From these annual reports; exploration activities that occur near the Harvaqtuuq/Kazan River drainage area can be acknowledged.
- Over the 20-year period, exploration went from 2 active projects in 2000 to as high as 11 active projects in 2008 (see Figure 2 & 3) with a majority in search of uranium. By 2018 onwards there were 0 active projects in the area near the Harvaqtuuq/Kazan River. (Canada-Nunavut Geoscience Office, 2021). Exploration activity will likely rise when prices are favorable.

Kivalliq Region (Active Projects)

Project	Operator	Partner
BASE METALS		
Greyhound Project	Intrepid Mines Limited	Aura Silver Resources Inc.
DIAMONDS		
Churchill[1], Churchill West[2]	Shear Minerals Ltd.[1,2]	Stornoway Diamond Corporation[1], International Samuel Exploration Corp[2]
Diamonds North Permits	Diamonds North Resources Ltd.	
Indigo	Indicator Minerals Inc.	
Itza Lake	Stornoway Diamond Corporation	Bayswater Uranium Corporation
Nanuq	Peregrine Diamonds Ltd.	
Nanuq North	Indicator Minerals Inc.	Peregrine Diamonds Ltd., Hunter Exploration Group
ENERGY		
Aberdeen, Turqavik	Cameco Corporation	
Amer Lake	Uranium North Resources Corp.	
Angilak (Lac Cinquante, Yathkyed)	Kivalliq Energy Corporation	Nunavut Tunngavik Inc.
Baker Lake Basin	Aurora Energy Resources Inc.	Pacific Ridge Exploration Ltd., Kivalliq Energy Corporation
Baker Lake	Majescor Resources Inc.	
Bugs	Ur-Energy Inc.	J.D. Charlton
Garry Lake	Uravan Minerals Inc.	
Kiggavik Project (Kiggavik[1], Sissons[2]), St. Tropez Claims[3]	AREVA Resources Canada Inc.[1,2,3]	DAE Woo International Corp[1,2], JCU Canada Exploration Co. Ltd.[2]
North Thelon Project (Kiggavik North[1], Kiggavik South[1], Tanqueray Option[2], Judge Sissons[3], Schultz Lake[3] and BL-21[4])	Forum Uranium Corp.[1,2,3,4]	Tanqueray Resources Ltd.[2], Agnico-Eagle Mines Ltd.[3], Nunavut Tunngavik Inc.[4]
North Thelon Uranium [1] (Amer Lake East, Amer Lake West, Central Kiggavik, Itza Lake, Southwest Kiggavik), North Thelon Permit Area 1 and Permit Area 2 [2]	Bayswater Uranium Corporation [1,2]	Strongbow Exploration Inc. [2]
Nueltin Lake	Cameco Corporation	
Ruby Hill	Western Uranium Corporation	
South Baker Project (Hawk, SW Hawk, Kam, Li)	Uranium North Resources Corp.	
Thelon Basin	Titan Uranium Inc.	Mega Uranium Ltd.
Yathkyed Lake	Uranium North Resources Corp.	
GOLD		
Baker Lake	Tanqueray Resources Ltd.	
Kiyuk Lake	Newmont Mining Corporation	Marcelle Hauseux, Shawn Sumacz
Maze Lake	Laurentian Goldfields Ltd.	Terrane Metals Corp.
Meadowbank	Agnico-Eagle Mines Limited	
Meliadine East	Meliadine Resources Ltd.	Comaplex Minerals Corp.
Meliadine West	Comaplex Minerals Corp.	Meliadine Resources Ltd.
SY	Corsa Capital Ltd.	Kaminak Gold Corporation
NICKLE-COPPER-PGEs		
Baker Lake	Tanqueray Resources Ltd.	
Ferguson Lake	Starfield Resources Inc.	

Figure 2: Exploration Overview 2008 active projects Harvaqtuuq/Kazan River, highlighted in yellow

Source : https://cngo.ca/exploration-overview/2008/

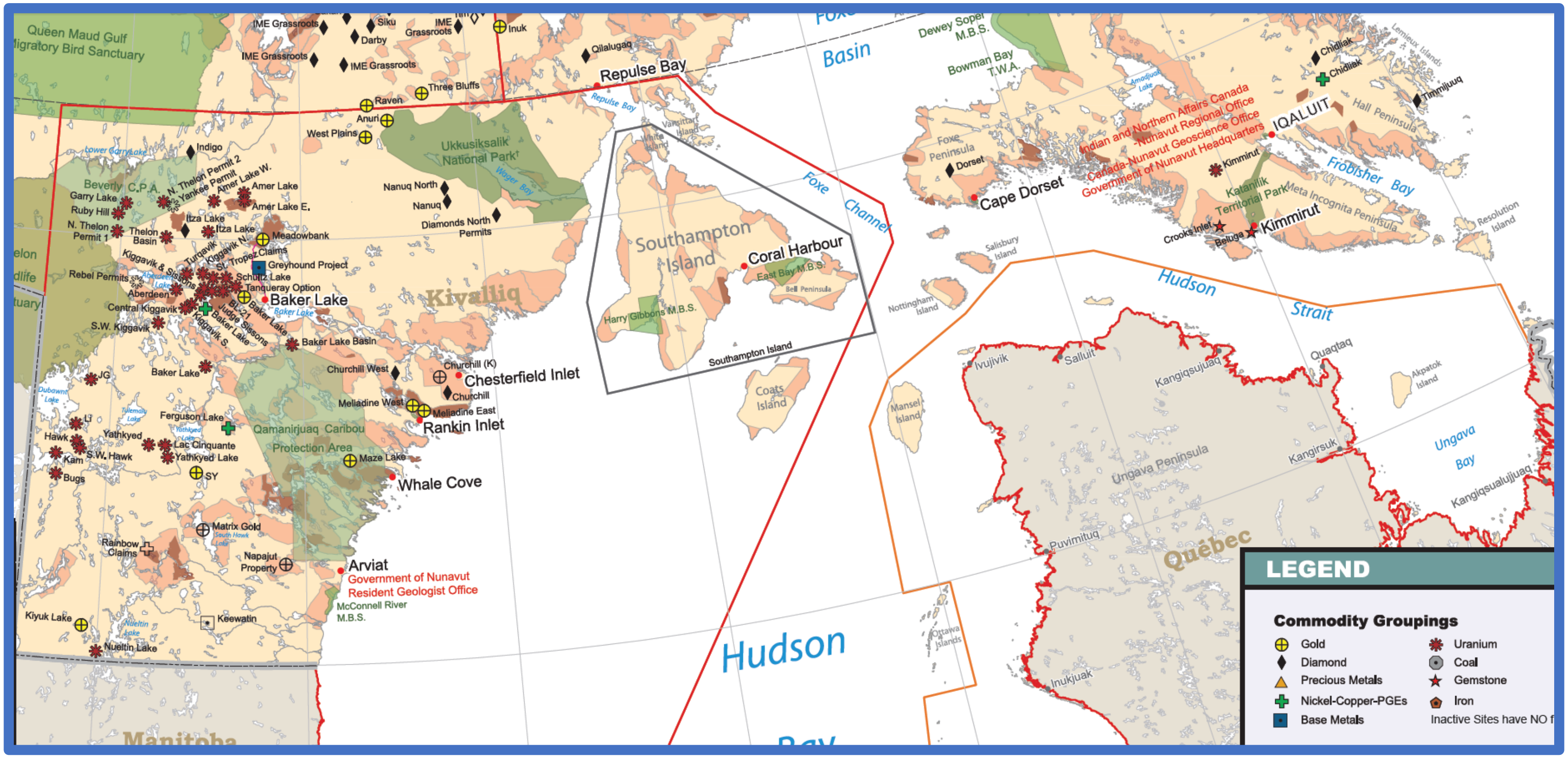

Figure 3: Cropped map of Kivalliq region from Exploration Overview 2008: to show exploration activity surrounding Harvaqtuuq/Kazan River and the community of Baker Lake.

Source: https://cngo.ca/exploration-overview/2008/

Active mining operations in the Kivalliq Region

Month/Year: 2010-present

Brief Description:

- Resource exploration near Baker Lake led to the discovery of mineralization at Meadowbank in 1983. Extensive exploration began in 1994 with the acquisition of the Meadowbank deposit by Cumberland Resources. Agnico Eagle Mines (AEM) acquired Cumberland in 2007; the Meadowbank Project reached commercial production in 2010 and concluded in 2019.
- Operations at the Meadowbank Complex transitioned to the Amaruq site, located approximately 50km from the Meadowbank site. The Whale Tail pit at Amaruq reached commercial production in 2019 and is expected to continue operating until 2026.
- AEM also operated the Meliadine mine near Rankin Inlet, which entered commercial production in 2019 and is expected to operate until 2032.[2]

Government of Canada Minister of Indigenous and Northern Affairs decision to not approve the Kiggavik Uranium Mine and Mill Project (the Kiggavik Project)

Month/Year: July 25, 2016

Brief Description:

- The Kiggavik Project – a uranium mine & mill proposed by AREVA in the Kivalliq Region – would have brought intense land development within the Harvaqtuuq/Kazan Basin watershed.
- The Minister's decision not to approve was likely a victory for the protection of the Harvaqtuuq/Kazan River and its wildlife.
- Much research was conducted to prepare AREVA's Final Environmental Impact Statement (FEIS) for the Nunavut Impact and Review Board (NIRB), which is available to the public and provides recent information on environmental and social trends observed in the region.
- January 23, 2018 – AREVA is now known as ORANO.

[2] For more details, see https://www.agnicoeagle.com/English/operations/default.aspx

Apology and settlement agreement from the Government of Canada for the Ahairmiut

Month/Year: January 2019

Brief Description:

- In January 2019, the Ahairmiut, an Inuit group whose traditional lands were located along the Kazan River at Ennadai Lake, received an official apology from, and finalized a settlement agreement with, the Government of Canada for the series of forced relocations they underwent during the 1950s and 1960s.[3]

Ratification of the Umbrella Inuit Impact and Benefit Agreement for Canadian Heritage Rivers in Nunavut

Month/Year: July 9, 2019

Brief Description:

- The Umbrella Inuit Impact and Benefit Agreement for Canadian Heritage Rivers in Nunavut was signed on July 9, 2019, in a ceremony in Kugluktuk, Nunavut.
- The agreement fulfills an obligation in the Nunavut Agreement.
- It identifies roles, responsibilities, and processes to be followed by Inuit organizations (Nunavut Tunngavik Incorporated, Regional Inuit Associations), federal and territorial governments, and adjacent communities with respect to Heritage Rivers in Nunavut.
- Funding will be provided to these organizations to support activities such as water quality monitoring, Inuit cultural camps, and business opportunities for Harvaqtuuq/Kazan and other Nunavut Heritage Rivers.

[3] For details, see https://www.rcaanc-cirnac.gc.ca/eng/1548182132843/1548182152538

Section 2: Changes and Threats to Natural, Cultural and Recreational Values since Designation

This section is a review of the Natural, Cultural and Recreational Values that supported the Harvaqtuuq/Kazan's status within the CHRS. Changes related to the Natural, Cultural and Recreational Values are included in their respective Text Boxes corresponding to each theme in which the designated values are organized. Discussion on a given value is only included in the following situations:

1. There has been a notable change in the value, or a new threat since the previous report.
2. There was an information gap in the 2000 Harvaqtuuq/Kazan River CHRS Report that can now be filled.
3. A value previously not considered a "designated value" for the Harvaqtuuq/Kazan River should be reconsidered as such.

In other words, if there are no observed or recommended changes to a value or new threats, it is not discussed.

Note that each cell under "Description of Change in Value" is divided into two cells: the first containing the value reported in the 2000 Harvaqtuuq/Kazan River CHRS Report – if available – and the second including the most recent value and the description of change (e.g., magnitude, positive or negative change, immediate or long-term).

Natural Values

Theme I: Hydrology

Natural Values Theme I: Hydrology			
NATURAL, CULTURAL OR RECREATIONAL VALUE	**DESCRIPTION OF CHANGE IN VALUE (e.g., Magnitude, Positive or Negative Change, Immediate or Long-term)**	**REASON FOR CHANGE (e.g., Threat, Stressor, Management Action)**	**ACTIONS TAKEN IN RESPONSE**
Water content (quality)	*No change.* Clear water: Total Suspended Solids (TSS) 0-50 mg/litre. More detailed information presented in **Table 1**.	N/A	N/A
Seasonal Variation	Summer melt	Climate change	
	Negative, long-term - Shorter and unpredictable freeze-up and thaw		
Drainage Basin	*No change* - Hudson Bay Basin.	'Permanent' landscape characteristic	N/A
River Size	Large rivers (85-500 m^3/s)[4]		
	Unknown - Upper Harvaqtuuq/Kazan River experiencing a decreasing annual average water level (approximately 0.5 metres since 2002). Elders report decreasing water levels in the Kazan.		

[4] The method which the author of the previous used to calculate volumetric flow is unreliable and should not be compared with present day values.

Water content

The Harvaqtuuq/Kazan has been included in the Kivalliq Inuit Association's (KIA) Innu'tuti water monitoring programs. Due to COVID-19 related travel restrictions, only the mouth of river on Baker Lake was sampled (Prairie Scientific, 2020). The water quality parameters measured at this site presented levels characteristic of oligotrophic (low nutrients and clear) northern freshwater systems and are shown in **Table 1**, in comparison with water quality reported in the previous CHRS Report.[5]

Table 1: Comparison of selected water quality parameters between 2020 KIA monitoring and 1995/96 data in the 2000 Harvaqtuuq/Kazan River CHRS Report. Note that additional parameters can be found in KIA's Heritage Rivers Water Quality Report 2020 (Prairie Scientific, 2020).

Parameter	1995-1996[6,5]	2020[7,8]
Temperature (°C)	8	3.9
pH	6.42	7.1
Dissolved Oxygen (mg/L)	-	13.4
Chlorophyll-a (ug/L)	-	0.95
Total Suspended Solids (mg/L)	4	<3.0
Total Dissolved Solids (mg/L)	20	20.5
Specific Conductivity (µS/cm)	32.1	28.8
Turbidity (NTU)	0.6	0.5
Total Phosphorus	0.006	0.0041
Total Kjeldahl Nitrogen (mg/L)	-	<0.20
Nitrate (mg/L)	-	<0.020
Nitrite (mg/L)	-	<0.010
Total Nitrogen (mg/L)	0.236	-
Total Alkalinity (as $CaCO_3$) (mg/L)	9.0	12.8

5 Sampling locations were above the Kazan Falls.
6 (CHRS and the Government of Nunavut, 2000)
7 (Prairie Scientific, 2020)
8 The KIA monitoring occurred in September 2020. Since water quality parameters experience seasonality, only values from September 1995 and 1996 were extracted from the previous CHRS Report and averaged for comparison in Table 1.

As part of the monitoring program, interviews with Elders regarding Inuit Qaujimajatuqangit were conducted, as incorporating traditional knowledge is an important part of understanding water quality and how it impacts the community members of Baker Lake. Elders were asked to rank the quality of a sample from the Harvaqtuuq/Kazan River and a sample of ultrapure water as a control for comparison. The results are shown in **Table 2** (Prairie Scientific, 2020).

Table 2: Elder interview results.

Question	Control		Harvaqtuuq/Kazan River Sample	
	Elder #1	Elder #2	Elder #1	Elder #2
How cloudy is the water [on a scale of 1-10]?	1	1	1	1
How bright would tea made from this water be [on a scale of 1-10]?	10	9	10	10
Is the water good to drink?	Y	Y	Y	Y
How would you rank the water quality [on a scale of 1-10]?	8	10	10	10
Does the water taste of land/vegetation?	Y	N	Y	N
How strong is the taste [on a scale of 1-10]?	2	1	8	1
Does the water taste salty	N	N	N	N
How strong is the taste [on a scale of 1-10]?	1	1	1	1
Does the water taste of rocks/metal?	Y	N	N	N
How strong is the taste [on a scale of 1-10]?	2	1	1	1
Does the water taste smooth?	Y	Y	Y	Y
How strong is the taste [on a scale of 1-10]?	9	9	10	8
How refreshing is the water [on a scale of 1-10]?	9	10	10	10

At the Community Open House, Baker Lake residents were asked how often they drink water from the Harvaqtuuq/Kazan River, and if they have noticed any changes in water quality (appearance, smell, taste) since 2000. Many people who completed the interview/questionnaire indicated that they do drink water from the Harvaqtuuq/Kazan River, though relatively few reported noticeable changes in water quality. Those that did suggested that the water is not as “fresh” as it used to be, one noted that tea made from water from the river at different locations has started tasting different than it once did. It was further suggested by Hamlet Office representatives that water quality is not a local concern, given that the river is relatively fast moving. That noted, the Kivalliq Inuit Association expressed a desire to expand water quality monitoring to more locations along the river, and to standardize parameters across all the organizations’ monitoring efforts, noting that additional resources beyond what is available through the IIBA would be required.

Seasonal Variation

The hydrological cycle in the area is characterized by an arctic nival (snowy) regime where streams are frozen to the bed through the winter and become active during freshet – spring snowmelt in June. At this point, stream discharge increases rapidly until it reaches a peak flow driven by the upstream watershed size. Flows recede through the remainder of the season, interrupted by rainfall events throughout the summer which temporarily increase flows causing secondary peaks (Areva, 2014a).

According to Inuit elders and community members, freeze up has been occurring later in the year likely due to climate change.

> *"November to February used to be really cold months, but the cold period is shorter now. The temperatures would reach -40 degrees (Celsius), but not too often now. Ice freeze-up is much later than it used to be. As a child it was in October, but now, it's late November. In 1959, a ship unloaded on the ice in late September. The first ice was in late August. Break -up seems to be quicker and more sudden. There used to be puddles on top of the ice, but not so much now." – Baker Lake Elder (Areva, 2014b)*

During the stakeholder engagement conducted for this report, it was further suggested that later, rapid freeze-up, combined with slower or later snow build up can create thicker ice, as the insulative properties of the snow are absent for longer periods of time.

One of the many concerns is the early and unpredictable melt of lakes and rivers makes ice travel routes unpredictable and unsafe in the spring (Government of Nunavut, 2016).

Two stations installed by the Water Survey of Canada have been collecting daily discharge (i.e., volumetric flow) data along the Harvaqtuuq/Kazan River daily since 1965. The first station – representing the Upper Harvaqtuuq/Kazan River – is located at the outlet of Ennadai Lake and the second – representing the Lower Harvaqtuuq/Kazan River – is stationed above the Kazan Falls. Beginning in 2002, the Water Survey of Canada began collecting water level data at these stations as well.

Based on the daily discharge data, it does not appear the peak flows of the upper and lower Harvaqtuuq/Kazan River have shifted in time, presuming freshet can be detected as a rapid increase in volumetric flow in the river. Example years of daily discharge with approximately 30 years difference were selected and presented in **Figures 4** and **5**. Freshet, represented as the peak daily discharge rate, began in late May/early June in both the upper and lower Harvaqtuuq/Kazan whether in the 1980s or 2010s. A deeper analysis – beyond the scope of this report – would be required to confirm whether variability of spring flows

in the Harvaqtuuq/Kazan River, and therefore its unpredictability, has increased over time. Detecting freeze-up in the daily discharge data is a more difficult task. It appears the Upper Harvaqtuuq/Kazan flows more rapidly approach 0 m^3/s in 1987 than in 2017. This could indicate that freeze-up is occurring later. A more comprehensive analysis of the Water Survey's data, including precise definitions for freeze-up and thaw from Elders, would be required to draw more reliable conclusions.

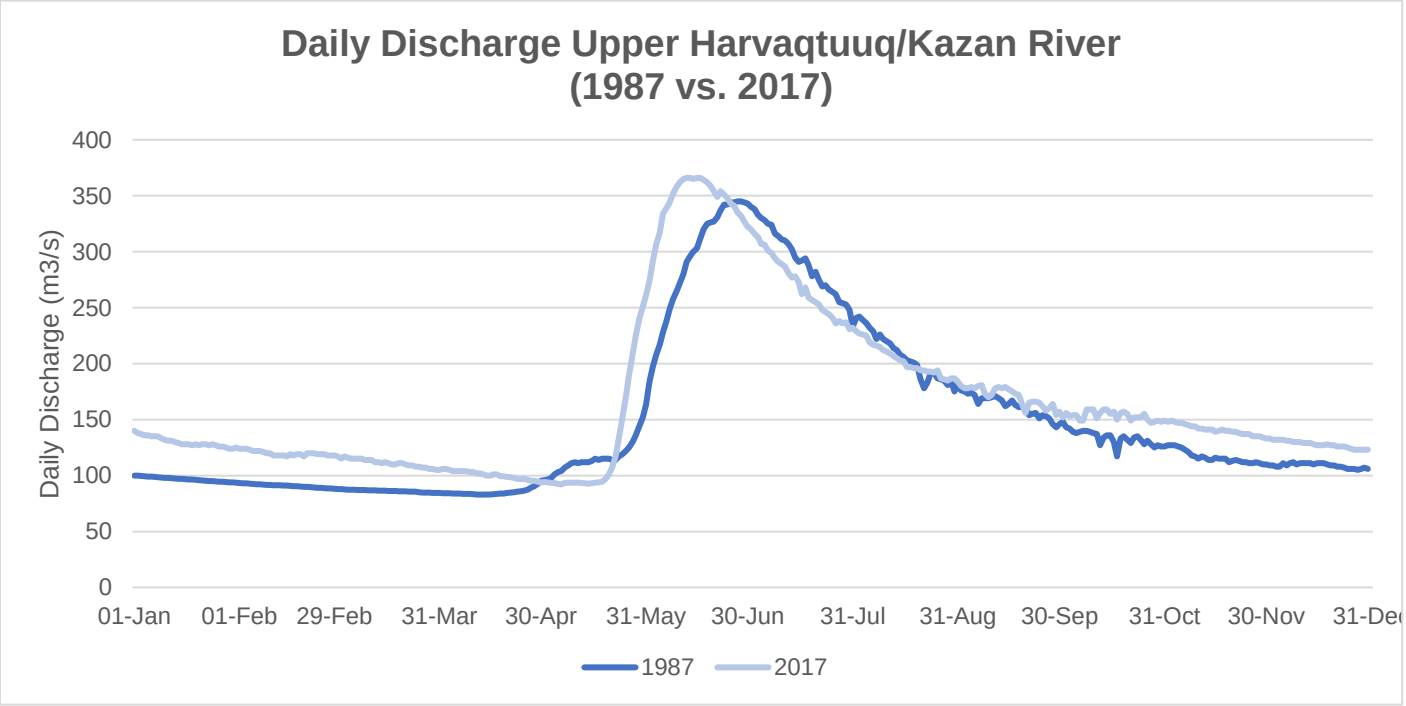

Figure 4: Daily Discharge in 1987 and 2017 in the Upper Harvaqtuuq/Kazan River (Water Survey of Canada, 1983-2018)

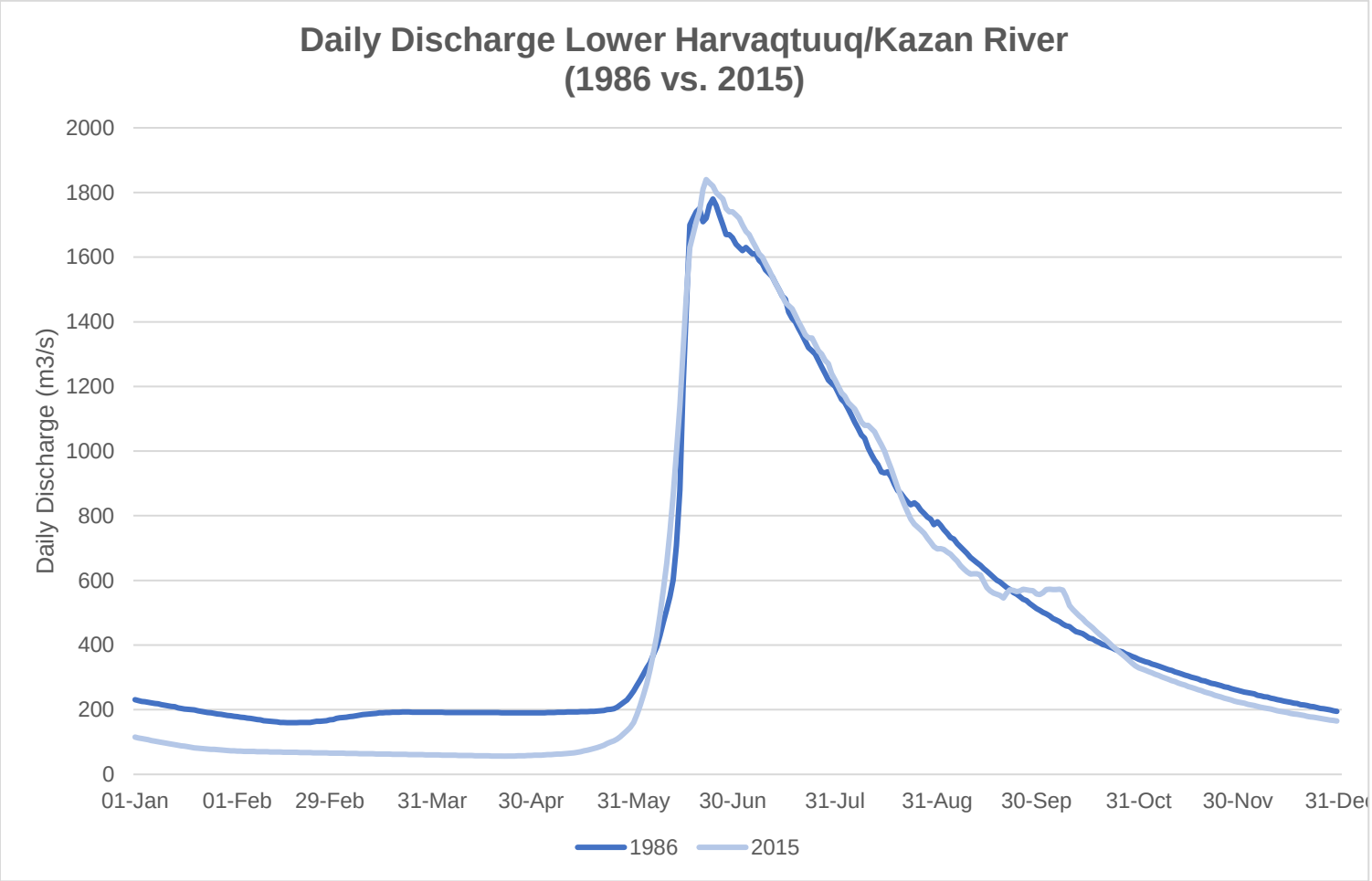

Figure 5: Daily Discharge in 1986 and 2015 in the Lower Harvaqtuuq/Kazan River (Water Survey of Canada, 1983-2018).

River Size

The previous CHRS report stated that daily discharge rates had shown a marked change during the previous decade. Local input from Baker Lake community members supported the rivers were unusually low and that the impact is mostly seen in changes to the vegetation along the riverbanks (CHRS and the Government of Nunavut, 2000). Elders have more recently noted that decreasing water levels make travelling by boat more difficult during the summer months (Areva, 2014b) and this was supported during the stakeholder engagement recently held in the community of Baker Lake in December 2021. Larger sandbars and lower water levels at the mouths of both the Harvaqtuuq/Kazan and Kangirjuap/Thelon Rivers have made it difficult to travel upstream by boat in recent years, which has limited access to caribou hunting grounds (Prairie Scientific, 2020).

A decrease in water levels would result in decreased daily discharge rates. However, the daily discharge data from these two stations do not show such a clear story and do not align with the narrative in the previous CHRS report. When looking at the average annual daily discharge rates from the past 50 years, shown in **Figures 6** and **7,** there is variability from year to year but no discernable trend (i.e., an increase or decrease in flows) for either the Upper or Lower Harvaqtuuq/Kazan River.[9]

The annual average water level in the Lower Harvaqtuuq/Kazan River, shown in **Figure 8**, may be experiencing a moderate decline (approximately 0.5 metres over the last two decades) but is difficult to confirm. This trend could not be established for the Upper Harvaqtuuq/Kazan River, as reliable water level data was not available.

[9] Note that only years with complete data sets were used. A data set was considered “complete” if there were daily discharge rates recorded for 364-365 days per year.

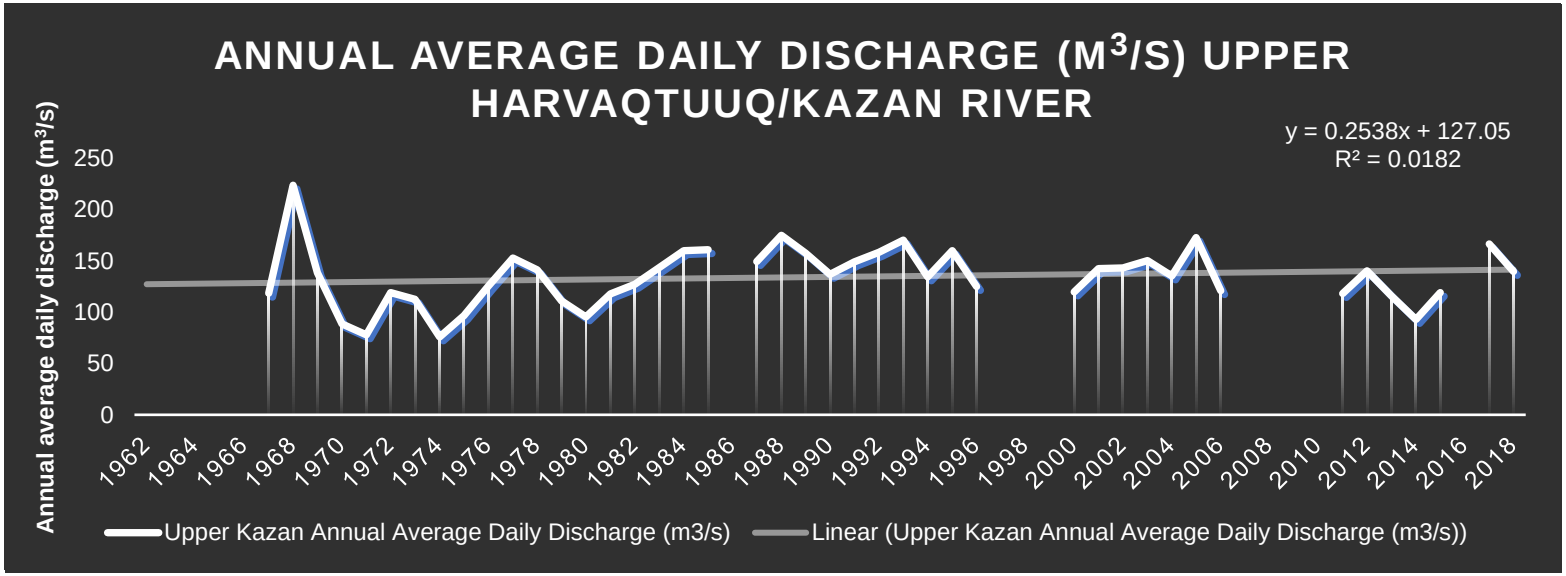

Figure 6: The Annual Average Daily Discharge in the Upper Harvaqtuuq/Kazan River (Water Survey of Canada, 1983-2018).

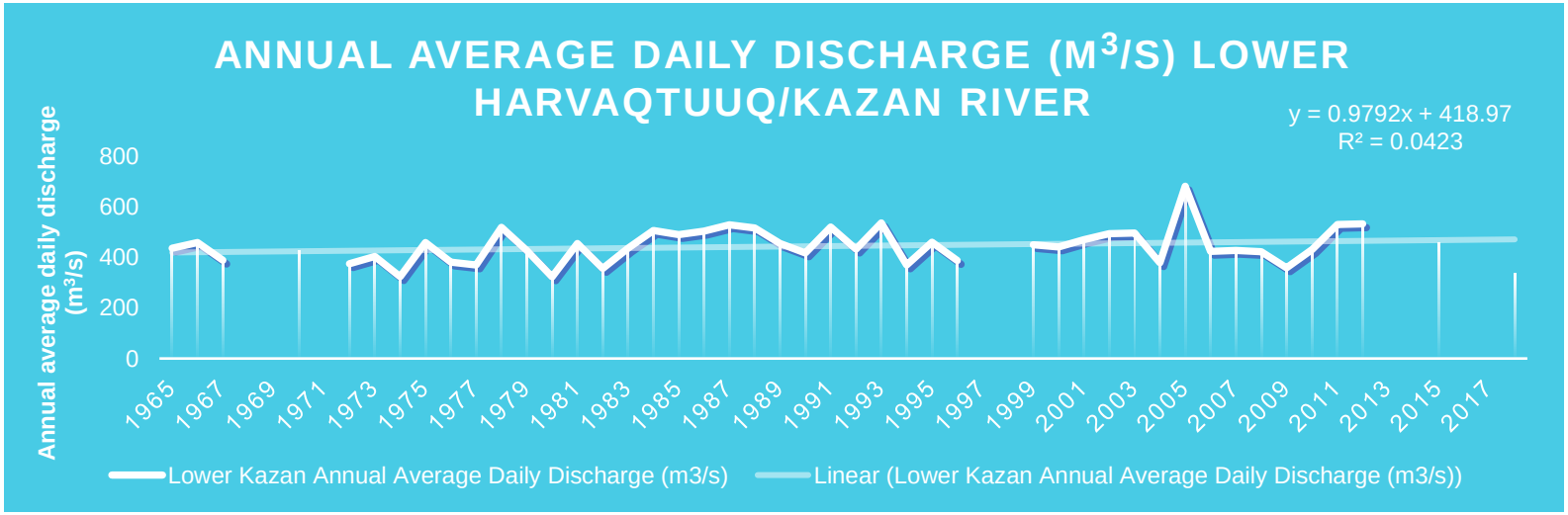

Figure 7: The Annual Average Daily Discharge in the Lower Harvaqtuuq/Kazan River (Water Survey of Canada, 1983-2018)

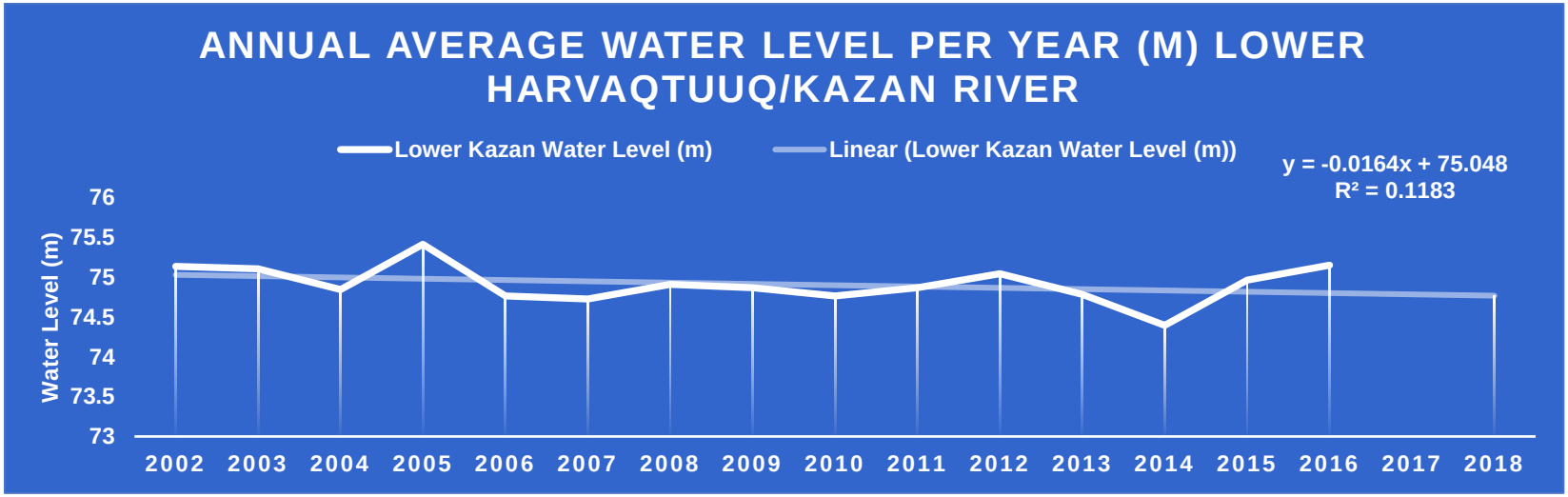

Figure 8: Annual Average Water Level Per Year (m) Upper Harvaqtuuq/Kazan River (Water Survey of Canada, 1983-2018)

Theme II: Physiography

Natural Values Theme II: Physiography			
NATURAL, CULTURAL OR RECREATIONAL VALUE	**DESCRIPTION OF CHANGE IN VALUE (e.g., Magnitude, Positive or Negative Change, Immediate or Long-term)**	**REASON FOR CHANGE (e.g., Threat, Stressor, Management Action)**	**ACTIONS TAKEN IN RESPONSE**
Hydrogeology	Not a designated value.	N/A	N/A
Geological Events[10]	Glacial rebound.	N/A	N/A
	Long-term - Three new gold mines and ongoing exploration.		
Physiographic Region	*No change* - Canadian Shield – Kazan Region.	N/A	N/A
Topography	*No change* - Moderate Gradient 1.3 – 2 m/km.	N/A	N/A

Geological Events

Land use activities, principally mining, can significantly alter landscapes and for the intents and purposes of this report are considered a geological event within the region. Since 2000, there have been three gold mining projects in the Kivalliq region of Nunavut initiated by Agnico Eagle Mines (AEM) that are relatively near the Harvaqtuuq/Kazan River. Additionally, there has been extensive uranium exploration, and a project proposal to the Nunavut Impact Review Board (NIRB) to begin mining uranium in the Kivalliq Region (i.e., the Kiggavik Project). This project proposal was ultimately denied by the Minister of Indigenous and Northern Affairs of Canada in 2016 (Minister of Indigenous and Northern Affairs, 2016). Concerns have been voiced to the NIRB by citizens regarding exploration leases in the region. Exploration, resource development and their cumulative effects on either the Harvaqtuuq/Kazan or Kangirjuap/Thelon Rivers may not be viewed in a holistic way by regulatory agencies and mining proponents, but rather on a project-by-project basis. This outlook may ultimately be detrimental to the land and wildlife in the region, as there may not be a complete understanding of impacts.

[10] In this report, this value has been used to include large-scale land development projects, particularly mine development.

Theme III: River Morphology

Natural Values Theme III: River Morphology			
NATURAL, CULTURAL OR RECREATIONAL VALUE	**DESCRIPTION OF CHANGE IN VALUE (e.g., Magnitude, Positive or Negative Change, Immediate or Long-term)**	**REASON FOR CHANGE (e.g., Threat, Stressor, Management Action)**	**ACTIONS TAKEN IN RESPONSE**
Valley Types	Unknown	N/A	N/A
Lakes and Ponds	Large Lake dominated. *Negative, Long-term* – Mid-summer surface temperatures of Baker Lake are warming.	Climate change	
Waterfalls and Rapids	*No change* - Qurluqtuq (i.e., Kazan Falls).	N/A	N/A
Fluvial Landforms	Not a designated value Unknown - Upper Harvaqtuuq/Kazan experiencing a decreasing annual average water level (approximately 0.5-0.75 metres since 2002). Lower Thelon is unchanged. Elders report decreasing water levels in the Kanirgjuap/Thelon.	N/A	N/A

Lakes and Ponds

Medeiros, Friel, Finkelstein, & Quinlan released a study in 2012 where they confirmed that Baker Lake, the terminal lake on the Harvaqtuuq/Kazan River, has experienced a 2°C increase in mid-summer surface water temperature over the past 60 years. This was determined via analysis of diatoms (algae) and chironomids (non-biting midge insects) from Baker Lake sediment cores and was validated with instrumental records over the same period, showing that the lake has responded to a warming climate (Medeiros, Friel, Finkelstein, & Quinlan, 2012).

Theme IV: Biotic Environments

Natural Values Theme IV: Biotic Environments			
NATURAL, CULTURAL OR RECREATIONAL VALUE	**DESCRIPTION OF CHANGE IN VALUE (e.g., Magnitude, Positive or Negative Change, Immediate or Long-term)**	**REASON FOR CHANGE (e.g., Threat, Stressor, Management Action)**	**ACTIONS TAKEN IN RESPONSE**
Aquatic Ecosystems	*No change* – Lowland zone river system; oligotrophic (low nutrients and clear) lakes.	N/A	N/A
Terrestrial Ecosystems	*No change* – Southern Arctic and Taiga Shield Ecozones.	N/A	N/A

Theme V: River Vegetation

Natural Values Theme V: River Vegetation			
NATURAL, CULTURAL OR RECREATIONAL VALUE	**DESCRIPTION OF CHANGE IN VALUE (e.g., Magnitude, Positive or Negative Change, Immediate or Long-term)**	**REASON FOR CHANGE (e.g., Threat, Stressor, Management Action)**	**ACTIONS TAKEN IN RESPONSE**
Significant Plant Communities	Not a designated value.	N/A	N/A
Rare Flora	Not a designated value	N/A	N/A

Theme VI: River Fauna

Natural Values Theme VI: River Fauna			
NATURAL, CULTURAL OR RECREATIONAL VALUE	**DESCRIPTION OF CHANGE IN VALUE (e.g., Magnitude, Positive or Negative Change, Immediate or Long-term)**	**REASON FOR CHANGE (e.g., Threat, Stressor, Management Action)**	**ACTIONS TAKEN IN RESPONSE**
Significant Animal Populations	**Caribou –** Caribou populations are large and healthy. No population estimate of Caribou populations *Negative, unknown – Declining* Barren-ground Caribou population (decline of nearly 50% since 1994 for the Qamanirjuaq subpopulation)	Climate change (i.e., increasing global temperatures, severe weather, ice storms, earlier spring flush), increases in mosquitoes and flies leading to harassment and reduced foraging, and development and industrial encroachment.	The Beverly/Ahiak and Qamanirjuaq subpopulations do not have a Total Allowable Harvest but have new sport-hunting restrictions that apply to **non-Inuit**: • 175 hunting tags for the Qamanirjuaq subpopulation. • 150 hunting tags for the Beverly and Ahiak subpopulations.
	Muskox – Muskox populations increasing and expanding in the Thelon Wildlife Sanctuary. No estimate of Muskox populations *Positive, unknown* – Increasing muskoxen population estimates (n = 2,143 in 1999; n = 4,736 in 2010)	The Thelon Wildlife Sanctuary, quotas and other protection have been enacted since 1917.	The Nunavut Wildlife Management Board established a new management plan and set the Muskox Total Allowable Harvest of 182 for the Kivalliq Region in 2015.
Rare Fauna	**Grizzly bears** - Reported to be increasing in the region. No population estimates.		

Natural Values Theme VI: River Fauna			
NATURAL, CULTURAL OR RECREATIONAL VALUE	**DESCRIPTION OF CHANGE IN VALUE (e.g., Magnitude, Positive or Negative Change, Immediate or Long-term)**	**REASON FOR CHANGE (e.g., Threat, Stressor, Management Action)**	**ACTIONS TAKEN IN RESPONSE**
	Positive, unknown – Likely increasing grizzly bear population (according to IQ and an increase from an average of 6 bears to 20 bears harvested annually between 2010 and 2019 in the Kivalliq Region).	Unknown but may be related to climate change and a resulting change in vegetation.	No Total Allowable Harvesting (TAH) limits have been placed on grizzly bears.
	Wolverine – Populations considered "insignificant". No population estimates.	N/A	N/A
	Unknown – Wolverine population trends are unknown due to limited data (21 wolverines were found north of Aberdeen Lake over two years of sampling [21 wolverines in 2013 and 14 wolverines in 2014] with a density of 2.36 wolverines/1000 km^2 in 2013 and 1.66 wolverines /1000 km^2 in 2014).		
	Peregrine Falcons – Removed from the endangered list. Anecdotal reports suggest that populations have risen.	Decreasing use of organochlorine pesticides.	N/A
	Unknown – Considered a species of 'Special Concern' under SARA. Stable occupancy, decreasing productivity and unknown abundance for peregrine falcons.		
	Short-eared owl – Not described in previous CHRS report.	N/A	N/A
	Unknown – Considered 'Threatened' by COSEWIC, short-eared owl population and trends in the Kivalliq are not known.		

Significant Animal Populations

Animals observed near the Harvaqtuuq/Kazan River have been included in **Appendix A** (Speller, et al., 1979; Urangesellschaft Canada Ltd., 1981; Areva, 2014c).

Caribou

As of 2016, the Barren-ground population of Caribou, which includes the Beverly herd native to the region surrounding the Harvaqtuuq/Kazan River, have been designated as threatened by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). This is because national populations have declined by over 50% since the 1990s. This meets the criteria for Endangered, but COSEWIC states that Threatened is the recommended status as overall the population does not appear to be facing imminent extinction at this time (Government of Canada, 2016). Two of these herds are native to the Kivalliq Region: the Beverly/Ahiak[11] and Qamanirjuaq subpopulations. The most recent subpopulation estimates are shown in **Table 3,** and according to COSEWIC both populations are in decline.

Given the infrequent survey history and the two different interpretations of trends in abundance depending on how the Beverly and Ahiak subpopulations are defined, it is difficult to establish trends for either of these subpopulations. Regardless, when the two groups are considered together, there is an overall declining trend. According to the Government of Nunavut, the Qamanirjuaq subpopulation has experienced a 47% decline since its 1994 peak population (Government of Nunavut, 2015). A survey conducted by the Government of Nunavut in 2017 found the subpopulation had increased but was still part of an overall declining trend (Government of Nunavut, 2018). This trend has been verified through surveys with Community Elders and hunters in Baker Lake. In September 2015, the BLHTO held a workshop to discuss Caribou Habitat with fourteen hunters and Elders. The focus of the conversation was regarding water crossings and calving grounds, both of which are sacred to Inuit. One Elder noted “Water crossings must be protected for their heritage value, their value to Inuit hunting, and their ecological value.” (Baker Lake Hunters and Trappers Organization, 2015). KIA also noted the importance of protecting water crossings and calving grounds in its 2015 submission to the Nunavut Planning Commission. KIA summarized their position stating “Management of caribou must be predicated on Inuit Qaujimajatuqangit (IQ) and scientific data related to caribou ecology and known or assumed vulnerability to disturbance, while acknowledging a balance between caribou protection and economic development opportunities (Kivalliq Inuit Association , Poole, & Gunn, 2016).

Most recently, in engagement conducted for this report, Baker Lake Residents and community stakeholders echoed the observation of declining numbers of caribou, particularly in recent years, and changes to their migration routes making harvesting more challenging. Further, Inuit have noticed that

[11] The Beverly and Ahiak subpopulations are included together when considering population estimates, as there are two interpretations of subpopulation characteristics and recent trends in their distribution and abundance.

some caribou are more easily scared, while others seem more "domesticated". Finally, a difference in taste/fat content has been observed by some hunters.

Table 3: Population estimates and trends for the Beverly/Ahiak and Qamanirjuaq caribou populations (Government of Canada, 2016).

Subpopulation	1989-1999 estimate	Most recent estimates (Year)	Most recent trend
Beverly/Ahiak	N/A	195,529 (2014)	Declining
Qamanirjuaq	495,665 (1994)	264,661 (2014) 288,244 (2017)	Declining

---

"There were more caribou in 1968 than there are today."

"Caribou haven't been round for a while, and I'm wondering why."

"Not many caribou have come through Baker Lake this year."

"There are many people who will say caribou numbers are decreasing."

- Elders from Baker Lake (Areva, 2014b)

It is known among Elders that caribou populations move from time to time and estimates by the government are faulty because they do not take this into consideration (McDonald, 1997). According to a study published in Global Change Biology, caribou population decline is more rapid than it has been in the past (Vors, 2009). Factors that may be contributing to the decline include, climate change (i.e., increasing global temperatures, severe weather, ice storms, earlier spring flush), increases in mosquitoes and flies leading to harassment and reduced foraging, and development and industrial encroachment (Bergerud, 1984; Government of Nunavut, 1984; Government of Northwest Territories, 1987; Cameron, 2005; Vistnes, Nellemann, Jordhoy, & Strand, 2004; Vistnes & Nellemann, Impacts of human activity on reindeer and caribou: The matter of spatial and temporal scales., 2007; Vors, 2009; Struzik, 2010). Human development and industrial

encroachment as a contributing factor have been restated in IQ and engagement data from the region (Areva, 2014b). Indeed, in engagement conducted as part of this report, observed changes have been attributed primarily to climate change, and increased activity in the area associated with exploration and mining.

The Hunters and Trappers Organization (HTO) has reported that daily traffic on Meadowbank's All-Weather Access Road is altering the caribou's pattern of migration. There are also concerns that the dust from the road, especially during summer, may have an impact on the caribou's health, as they are liable to consume the dust (Areva, 2014b).

Due to the controversy of placing quotas on caribou and its impact on food sovereignty, the Beverly/Ahiak and Qamanirjuaq subpopulations do not have a Total Allowable Harvest but have new sport-hunting restrictions that apply to **non-Inuit** (Government of Nunavut, 2018):

- 175 hunting tags for the Qamanirjuaq subpopulation.
- 150 hunting tags for the Beverly and Ahiak subpopulations.

Muskox

In 1999 and 2000, surveys conducted by the Government of Nunavut in the central Kivalliq Region estimated a population density of 0.043 muskox per km^2 (Government of Nunavut, 2001). This was considered low relative to densities observed in the Kitikmeot Region (0.105 to 0.110 muskox per km^2). Since the 2000 Harvaqtuuq/Kazan River CHRS Report, muskox populations have continued to increase. This has been reflected both by surveys and observations by residents in the Kivalliq Region and echoed in engagement done as part of this report. Kivalliq Region hunters have reported increased observations of muskox closer to their communities (Government of Nunavut and Nunavut Tunngavik Inc., 2012). Residents from Baker Lake have suggested that the animals may have moved into the area from the Thelon Wildlife Sanctuary.

Another muskox survey was conducted in 2010 by the Government of Nunavut in the central Kivalliq Region, in the area south of the Harvaqtuuq/Kazan (Government of Nunavut and Nunavut Tunngavik Inc., 2012). While population densities had decreased since the previous survey, the muskoxen had extended over a much larger range and the population was more spread out. Population estimates, however, had doubled since 1999 from 2,143 to 4,736 animals in 2010. It should be noted that both the 1999 and 2010 surveys were designed to evaluate muskox populations for the entire region despite being conducted in different areas.

In 2015, the Nunavut Wildlife Management Board (NWMB) established a new management plan and set a Total Allowable Harvest of 182 muskoxen for the Southern Mainland Kivalliq Group (Government of Nunavut, 2019). This is compared to the previous Total Allowable Harvest of 102 in the Kivalliq Region (The Rankin Inlet HTO, Nunavut Department of Environment, Nunavut Tunngavik Inc., 2012).

Rare Fauna

In this section, the focus on rare fauna has been limited to those which are either listed by SARA or COSEWIC as being at risk, as shown in **Table 4**.

Table 4: SARA and COSEWIC status of at-risk species in the region surrounding the Harvaqtuuq/Kazan River.

Scientific Name	Common Name	Status	SARA	COSEWIC
Ursus arctos	Grizzly bear	Resident	Special Concern	Special Concern
Gulo	Wolverine	Resident	Special Concern	Special Concern
Falco peregrinus	Peregrine falcon	Resident	Special Concern**	Not at risk
Asio flammeus	Short-eared owl	Summer Resident	Special Concern	Threated

** On Schedule 1, but under consideration for a status change.

Grizzly Bear

The grizzly is an edge species in the region, as they are considered to be at the extreme edge of their range in the transition zone between the boreal forest and arctic tundra. However, according to Baker Lake residents, sightings of grizzly bears have been on the rise aligned with anecdotal reports elsewhere in the region (Nunatsiaq News, 2013). An increase in grizzly bear sightings was also reported by a number of Baker Lake residents who participated in interviews/surveys as part of this report.

"As children (during 1940s and 1950s), hunters only saw a grizzly bear occasionally. Grizzlies are now seen every summer and take cached meat. Six individual hunters saw grizzlies on the same day." – Baker Lake Elder (Areva, 2014b)

Unfortunately, there is limited baseline data on grizzly bear distribution and density within Nunavut due to the cost and challenge of surveying bears at low densities in remote areas. Further, territory-wide surveys have not been conducted and no reliable current or historic estimates of population size exist for grizzly bears in the Kivalliq. However, grizzly bear harvests in the Kivalliq have increased substantially since 2008, increasing from an average of 6 bears annually to 20 bears harvested annually between 2010 and 2019 (Government of Nunavut, 2021). Currently, there is no Total Allowable Harvest on the subsistence harvest of grizzly bears, to allow local hunters to help control the numbers.

Wolverine

Wolverine have been listed as a species of Special Concern by both COSEWIC and SARA. Limited demographic information is available for the wolverine because of their solitary nature and dispersal across the region. The presence of wolverine within the region has been confirmed with the Aboriginal Traditional Knowledge report specific for wolverine by COSEWIC in 2004 (Cardinal, 2004) and during IQ studies for the Kiggavik Project, but populations were confirmed to be low (Areva, 2014b). A small number of Baker Lake residents who completed interviews/surveys as part of this report indicated that wolverines have become more abundant in the area over the past 20 years.

Unfortunately, baseline data prior to 2000 is not available, and as such, determining trends is not possible. In 2013 and 2014, the Government of Nunavut, in collaboration with the BLHTO, conducted a wolverine DNA mark-recapture study in a 3,344 km^2 area north of Aberdeen Lake to help establish baseline populations. In total 21 wolverines were found in the area over two years of sampling (21 wolverines in 2013 and 14 wolverines in 2014) with a density of 2.36 wolverines/1000 km^2 (Standard Error = 0.34) in 2013 and 1.66 wolverines /1000 km^2 (Standard Error = 0.29) in 2014 (Government of Nunavut, 2016). Per carcass collection and harvest monitoring in Nunavut, 19, 38, and 47 wolverines were harvested in the Kivalliq Region in 2010-2013, respectively (Government of Nunavut, 2012). Many of these harvested animals were reported from Baker Lake.

Peregrine Falcon

The peregrine falcon is currently listed as Special Concern under Schedule 1 of the SARA and is under consideration for status change. In the late 1970's, the opinion was the peregrine falcon populations in the Canadian Arctic were suffering from the same decline observed elsewhere in Canada, likely due to organochlorine pesticides (Franke, et al., 2020). In the mid-1990's populations of peregrine falcons were recovering, as discussed in the 2000 Harvaqtuuq/Kazan River CHRS Report. The population increased from 20 to 29 territorial pairs from 1982 to the mid-1990's, and at this time, production rates were constant. A recent article discussing the status and trends of circumpolar peregrine falcon populations included

measurements of peregrine falcon occupancy[12] and productivity[13] from 1982 to 2018 in Rankin Inlet. It was determined that peregrine falcon occupancy in the region was stable (neither increasing nor decreasing) but had decreasing productivity (Franke, et al., 2020). A similar trend can be observed when looking at 24 monitoring sites in the Arctic together; populations are generally stable, and it is reasonable to suggest that breeding populations at broader scales are similar, given the patterns observed at these monitoring sites are spatially and temporally valid (Franke, et al., 2020).

Short-eared Owl

There is a shortage of information on short-eared owl populations in Nunavut (COSEWIC, 2008). As such, it is not possible to determine any trends at this time.

[12] Defined as the quotient of the count of occupied nesting territories and the count of known nesting territories that were fully surveyed in a given breeding season (i.e., two or more surveys).
[13] Defined as the number of young that reach the minimum acceptable age for assessing success (80% of normal fledging age) and should be reported as the number of young produced per territorial pair, or per occupied territory in a particular year.

Cultural Values

Theme I: Resource Harvesting

Cultural Values Theme I: Resource Harvesting			
NATURAL, CULTURAL OR RECREATIONAL VALUE	**DESCRIPTION OF CHANGE IN VALUE (e.g., Magnitude, Positive or Negative Change, Immediate or Long-term)**	**REASON FOR CHANGE (e.g., Threat, Stressor, Management Action)**	**ACTIONS TAKEN IN RESPONSE**
Fishing	Original value of the river for appreciating this cultural element has been unaffected by land use along the corridor. *Unknown* – The GN published data on fish consumption pre-2000 in 2004 but no data available for 2000-2020.	There may be impacts from resource development in the Kivalliq, both on wildlife populations and a change in Inuit lifestyle. This impact is yet to be understood.	N/A
Hunting and Trapping	Original value of the river for appreciating this cultural element has been unaffected by land use activities along the corridor. *Unknown* – Available data is unreliable/inconclusive to understand trends.	There may be impacts from resource development in the Kivalliq, both on wildlife populations and a change in Inuit lifestyle. This impact is yet to be understood.	N/A
Resource Gathering	*Unknown* – No data is available from 1989-1999 to establish trends.	N/A	N/A
Water Extraction	**This is not a designated value for the Kazan River but may be reconsidered as such.** It is evident from recent IQ studies and from community engagement as part of this report that Inuit use freshwater from water bodies surrounding the Thelon and Kazan Rivers while hunting/travelling. Moreover, the Thelon and Kazan Rivers empty into Baker Lake, where it is presumed most of the drinking water comes from.	Not a designated value.	N/A

Considering the accelerated resource development that has occurred within the Kivalliq Region and the impact this could have on the wildlife and Inuit lifestyle, patterns of hunting and fishing by Baker Lake residents were studied by the NWMB, as well as AEM and Areva. The 2000 Harvaqtuuq/Kazan River CHRS Report did not provide any statistics on Resource Harvesting. Using data collected by the NWMB prior to 2000 included in their 2004 Hunter Harvest Report, it is possible to fill this data gap. However, the subsequent studies conducted by AEM and Areva are not directly comparable with this baseline, as different survey methods were used and there was a much lower response rate, leading to lower reported harvests (Areva, 2014c). That noted, the HTO submissions to NIRB as part of the review of the environmental assessment for the Kiggavik Project were clear that impacts to harvesting were seen by Inuit to be an unacceptable risk.

In the engagement conducted as part of this report, access to harvesting and the relative availability/abundance of animals to harvest was one of the most commonly expressed priorities of Baker Lake residents and community stakeholders, and remains a primary concern associated with exploration and development of the extractive industries. As noted, many Inuit who were interviewed or completed interviews indicated a decrease in caribou where they have been traditionally harvested along the Harvaqtuuq/Kazan River, and a corresponding increase in muskoxen, most often attributed to climate changes as well as to increasing activity in the area.

Fishing

The NWMB collected fish harvesting data in Baker Lake for their 2004 Hunter Harvest Report. However, due to response bias and measurement issues, only the data from year one of the survey (i.e., 1996/1997) is a reliable estimate of actual harvesting rates in Baker Lake (Nunavut Wildlife Management Board, 2004).

As of 2008, fish are still acknowledged as one of the main food sources for Inuit in Baker Lake (Areva, 2014b). However, during the interviews conducted by Areva in 2008, there was a sentiment among elders of a decrease in quality of fish in the Harvaqtuuq/Kazan and Kangirjuap/Thelon Rivers and connected freshwater lakes. This could be impacting harvesting rates but since harvest data was not collected for fish, the impact is unknown. During the engagement conducted as part of this report, very few of the residents or community stakeholders indicated changes to the abundance or quality of fish, though it was suggested that some species (e.g., whitefish, trout) are getting bigger and/or more colourful, and that fish species that are not typically found in the Harvaqtuuq/Kazan River (i.e., pike) are being seen more often.

Table 5: Hunter Harvest Survey data from 2004 NWMB report.

Species	1996/1997
Arctic char	1,157
Lake trout	3,795
Arctic grayling	1,031
Whitefish	452
Burbot	0

"…. There were quite a lot of fish, but I don't like the fish there anymore. I can make a hole through them just with my fingers now because they are really soft. They are alive, but too soft."

"…Today I hear that the fish are too soft and seem different."

- *Elders from Baker Lake (Areva, 2014b)*

Hunting and Trapping

Historical Hunter Harvest Data from the Baker Lake Area is shown in **Table 6**. In 1978, IDS completed a study to identify potential effects of exploration activities in and around Baker Lake using the Northwest Territories (NWT) Fish and Wildlife Service Records (1970 to 1977) and interviews conducted with 43 randomly selected Baker Lake households. The estimated annual harvesting numbers are shown in **Table 6.** It should be noted that data accuracy reportedly varied widely between years the survey was issued since harvest declaration were made from memory at the time the licence was returned, and since many licences were either not returned or not included in records. The report also states that hunters may have deliberately underestimated their harvest fearing the potential for future quotas or other restrictions. The NWMB data applies to the previous CHRS reporting cycle (i.e., 1989-1999), however, response bias and measurement issues were experienced and only the data from year one of the survey (i.e., 1996/1997) is a reliable estimate of actual harvesting rates in Baker Lake (Nunavut Wildlife Management Board, 2004). Estimates for 2000-2020 are derived from Areva's Hunter Harvest Survey for their FEIS, in which the mining company projected annual harvesting rates from surveys with a presumed 10% of Baker Lake's hunting population (Areva, 2014c). Given this much smaller sample size and a likely bias experienced by Areva – the company may have been eager to demonstrate that hunting had not been impacted by mining in the region – these results should be interpreted with caution.

Based on their Hunter Harvest Study and the Areva Diet Survey, Areva stated their results indicated that traditional harvesting activities did not decline in Baker Lake over the previous decade, and the number of hunters remained stable. However, approximately 40% of residents surveyed felt as though they were consuming less country food in 2010 relative to 1995. As caribou is the main food source for many Inuit in the region, it is presumed this would include caribou harvests. As such, the results of Areva's study are dubious, and it remains to be known the overall trends and potential influence of resource development for hunting and trapping.

Table 6: Hunter Harvest Survey data 1978-2011

Species harvested	IDS (1978)	NWMB (1996-1997)*	Areva Hunter Harvest Study (2007-2013)**	Areva Diet Survey (2010-2011)**
Caribou	4,100	2,856 (+/- 246)	5,000	5,020
Grizzly	N/A	1 (+/- 2)	N/A	N/A
Muskox	N/A	0	N/A	N/A
Wolverine	N/A	5 (+/- 4)	N/A	N/A
Wolf	N/A	72 (+/- 36)	N/A	N/A
Arctic Fox	N/A	314 (+/- 100)	N/A	N/A
Geese (all)	400	106 (+/- 39)	N/A	N/A
Canada goose	N/A	15 (+/- 12)	N/A	N/A
Ducks	N/A	N/A	N/A	N/A
Ptarmigan	2,800	26 (+/- 36)	N/A	N/A

* Sampling error, displayed as 95% confidence interval of the annual estimate for each species

**Average estimated harvest based on a presumed 10% response rate from hunters in Baker Lake. Interpret with caution.

Resource Gathering

As data was limited, the 2000 Harvaqtuuq/Kazan River CHRS Report provided limited information on the frequency and types of resources surrounding the Harvaqtuuq/Kazan River that are collected by Inuit. Therefore, it is not possible to determine any trends in resource gathering.

An Areva Diet Study which contacted a total of 189 residents in 2009 and 2010 (20% of households, or 23% of the total adult population in Baker Lake) estimated that 40% of households engaged in plant collecting, although most households (87%) are likely not engaged regularly.

IQ studies conducted by Areva indicate that certain plant species have value to Inuit for food, medicine, shelter and other human uses. During focus group discussions, Elders noted that sweet plants were harvested for food such as blueberries, (likely *Vaccinium uliginisum*), cloudberries (likely *Rubus chamaemorus*). Crowberry or 'black' berries (likely *Empetrum nigrum*) and mountain cranberry or 'red' berries (likely *Vaccinium vitis-idaea*) were gathered in the past and are still used today. Dried cloudberry leaves are used to make tea and roots of certain bushes were used to cure stomach aches. Edible purple flowers, possibly a saxifrage species, are consumed. Certain roots that are white and taste like carrots (Latin name unknown) are also consumed and a tundra moss (Latin name unknown) is boiled to make a hot beverage. However, Elders commented during focus groups that traditional cures were no longer used.

"Sweet plants were harvested as candy. Cowberries, blueberries, and black and red berries were also gathered; and still are. Dried cloudberry leaves are used to make tea. Roots of certain bushes were used to cure stomach aches. Rabbit droppings, mixed with water, was taken for stomach aches. Berries would fix people who were not able to eat meat. After eating the berries, they could eat meat again. There was a moss that when ground up cured snow blindness, and breast milk mixed with ice would also work. When people's eyes were bothered with 'white stuff' a louse tied with a hair was put into the eyes to take the white stuff out. There were no special places for collecting plants. Plants were everywhere; but the area around Judge Sissons Lake was good for red berries…. None of these traditional cures are used now: "Why bother now that there is a nursing station". But some people still use moss on the land when they forget to bring toilet paper with them."

- *Baker Lake Elder* *(Areva, 2014d)*

IQ interviews did not identify locations for collecting plants; rather it was noted that plants were "everywhere". The area around Sissons Lake was noted to be particularly good for red berries. Plants are typically gathered by Elders from August to September.

In the engagement conducted as part of this report, residents and community stakeholders were asked to indicate any changes to the types, amount or health of plants near the Harvaqtuuq/Kazan River over the previous 20-year period. Relatively few reported observable changes, though some noted an increased general abundance of certain plants, with others producing smaller or fewer berries (e.g., cloudberries). These changes were attributed to climate change as well as increased activity in the area and associated impacts, such as dust from the road leading to the Meadowbank Complex.

Water Extraction

This is not a designated value for the Harvaqtuuq/Kazan River but may be reconsidered as such. It is evident from recent IQ studies and from community engagement as part of this report that Inuit use freshwater from water bodies surrounding the Harvaqtuuq/Kazan and Kangirjuap/Thelon Rivers while hunting/travelling. Nearly all the people who completed the interview/questionnaire indicated that they do drink water from the Harvaqtuuq/Kazan River, though relatively few reported noticeable changes in water quality.

Moreover, the Harvaqtuuq/Kazan and Kangirjuap/Thelon Rivers empty into Baker Lake, where it is presumed most of the drinking water comes from.

Theme II: Water Transport

Cultural Values: Theme II: Water Transport			
NATURAL, CULTURAL OR RECREATIONAL VALUE	**DESCRIPTION OF CHANGE IN VALUE (e.g., Magnitude, Positive or Negative Change, Immediate or Long-term)**	**REASON FOR CHANGE (e.g., Threat, Stressor, Management Action)**	**ACTIONS TAKEN IN RESPONSE**
River Navigation	*No change* - Traditional transport (canoes/kayaks) associated with life cycle activities (hunting fishing) and movement of people.	N/A	N/A
Onshore Services	Not a designated value.	N/A	N/A
Surface Bulk Transportation	Not a designated value.	N/A	N/A

Theme III: Riparian Settlement

Cultural Values Theme III: Riparian Settlement			
NATURAL, CULTURAL OR RECREATIONAL VALUE	**DESCRIPTION OF CHANGE IN VALUE (e.g., Magnitude, Positive or Negative Change, Immediate or Long-term)**	**REASON FOR CHANGE (e.g., Threat, Stressor, Management Action)**	**ACTIONS TAKEN IN RESPONSE**
Siting of Dwellings	No change – Shoreline seasonal camps associated with life cycle activities.	N/A	N/A
Community Adaptations to Rivers	Original value of the river for appreciating this cultural element has been unaffected by land use activities along the corridor; archaeological sites are still important both because of their family significance but also as areas of significant hunting activity.	Climate change and the degradation of permafrost.	N/A
	Unknown – Risk of degeneration of archaeological artifacts and cultural remains. Any impacts have not been confirmed.		
River Crossings	Not a designated value.	N/A	N/A

Community Adaptation to Rivers

This was assigned as a designated value because of the archaeological evidence and sites of Indigenous communities, especially associated with key caribou crossing points. In the 2000 Harvaqtuuq/Kazan River CHRS Report this value had been unaffected and the archaeological sites were noted to be still important because of their family significance. Further, in engagement conducted as part of this report, it is clear that many Inuit in Baker Lake retain close family ties to areas along the Harvaqtuuq/Kazan River. During the Community Open House, residents pointed to areas on a map where their families and/or relatives lived prior to moving into the community, many just one or two generations in the past. These areas, including but not limited to campsites, harvesting routes and gravesites, remain important cultural elements for Inuit.

However, heritage and special places in Nunavut such as these are being affected by permafrost degradation. The cold Arctic climate helps preserve organic material in the permafrost and changes threaten cultural remains and archaeological artifacts that were previously preserved. Ongoing freeze-thaw cycles promote the decay of artifacts such as sod houses – many of which hold their form because of permafrost.

Theme IV: Hydroelectric Power Generation

Cultural Values Theme IV: Hydroelectric Power Generation			
NATURAL, CULTURAL OR RECREATIONAL VALUE	**DESCRIPTION OF CHANGE IN VALUE (e.g., Magnitude, Positive or Negative Change, Immediate or Long-term)**	**REASON FOR CHANGE (e.g., Threat, Stressor, Management Action)**	**ACTIONS TAKEN IN RESPONSE**
Hydro-Electric Power - Direct-drive water power	Not a designated value.	N/A	N/A
Hydro-Electric Power Transmission Line	Not a designated value.	N/A	N/A

Hydro-Electric Power – Direct-Drive water power

According to a report released by AEM in 2016, AEM was working with the Government of Nunavut and other stakeholders on a proposal for hydroelectric power generation on the Harvaqtuuq/Kazan and Kangirjuap/Thelon Rivers. AEM acknowledged the 2016 Draft Nunavut Land Use Plan (DNLUP) prevented future development of any alternative energy projects on the Harvaqtuuq/Kazan and Kangirjuap/Thelon Rivers watersheds but recommended this be reconsidered. According to AEM, Nunavut needs alternative energy sources to reduce costs to users, who currently rely on diesel fuel to supply electricity. Further, AEM states, hydroelectric power will enable Nunavummiut to do their part for reducing global carbon dioxide emissions to help reverse climate change (Agnico Eagle Mines Limited, 2016). Currently, run-of-river hydropower in the Kivalliq Region is being considered and has been included in the Draft 2021 Nunavut Land Use Plan (Nunavut Planning Commission, 2021).

Hydro-Electric Power Transmission Lines

The other major hydroelectric project that may have implications for the Harvaqtuuq/Kazan River is the Kivalliq Hydro-Fibre Link project, which proposes to build a 1,200 kilometer, 230kV transmission line and install fibreoptic cabling between Nunavut and Manitoba to deliver hydroelectricity to communities in the Kivalliq region. This project is a partnership between the Kivalliq Inuit Association, Sakku Investments Corporation, Anbaric Development Partners and the Ontario Teachers' Pension Plan. In 2020, the Canada Infrastructure Bank (CIB) signed a Memorandum of Understanding to work with these groups to plan and develop the project. KIA then established an Inuit Owned Corporation, Nukik, to lead the work with CIB. In 2021, the Canadian Northern Economic Development Agency (CanNor) invested nearly $3 million to continue feasibility work on the project. The project was also explicitly endorsed in the 2021 Federal Budget, with money pledged over a three-year period to support feasibility and planning. A Baseline Research program including fieldwork to

gather information about wildlife biology, vegetation, aquatics, geomorphology and permafrost conditions related to the Nunavut section of the corridor received a positive conformity decision from the Nunavut Planning Commission in May 2021 (Nunavut Planning Commission, 2021), and a screening decision from the Nunavut Impact Review Board recommending to the Minister of Norther Affairs that further review is not necessary pending approval of certain terms and conditions (Nunavut Impact Review Board, 2021).

The proposed route for the Kivalliq Hydro-Fibre Project looks to cross the Harvaqtuuq/Kazan River, see figure 9. However, to date most of the detailed data collection conducted as part of feasibility work only extend as far north as the Manitoba-Nunavut border, so relatively little is yet publicly known about the potential impacts to the river and more specifically to the corridor that has designated Heritage status. (Kivalliq Inuit Association, 2021) The progress of this project will be of significant interest to residents of Baker Lake, and to Nunavut Parks and Special Places division over the next 10 years. Studies and mitigation measures that are proposed for the Seal River – a Heritage River in Manitoba – may take place prior to those involving the Harvaqtuuq/Kazan River, and so may prove instructive to both the Government of Nunavut and to residents of Baker Lake.

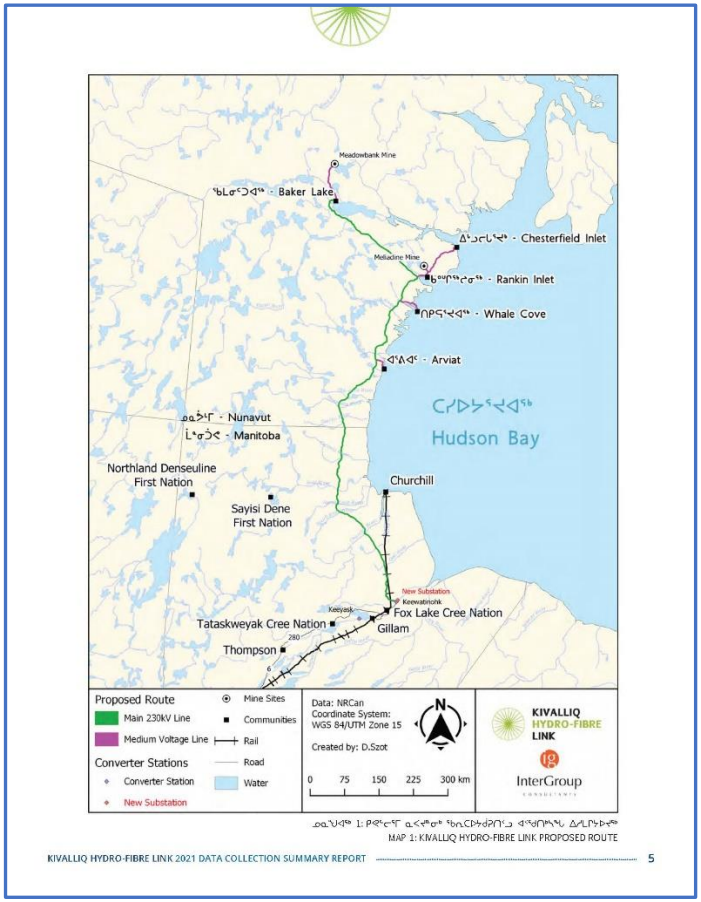

Figure 9: Map of route the proposed Hydro-Fibre route

Source:
https://static1.squarespace.com/static/5c3656965ffd209484a0285e/t/60904fd80729216c14fa62cf/1620070362055/KHFL+Fieldwork+Summary+APR20+LOW.pdfFL+Fieldwork+Summary+APR20+LOW.pdf (squarespace.com)

Theme V: Culture and Recreation

Cultural Values Theme V: Culture and Recreation			
NATURAL, CULTURAL OR RECREATIONAL VALUE	**DESCRIPTION OF CHANGE IN VALUE (e.g., Magnitude, Positive or Negative Change, Immediate or Long-term)**	**REASON FOR CHANGE (e.g., Threat, Stressor, Management Action)**	**ACTIONS TAKEN IN RESPONSE**
Spiritual and Symbolic Uses	*No change* – Original value of the river for appreciating this cultural element has been unaffected by land use activities along the corridor; the sites are still important because of their family significance for people living in Baker Lake.	N/A	N/A
Artistic Expression	Stories in oral tradition.	N/A	N/A

Theme VI: Jurisdictional Use

Cultural Values Theme VI: Jurisdictional Use			
NATURAL, CULTURAL OR RECREATIONAL VALUE	**DESCRIPTION OF CHANGE IN VALUE (e.g., Magnitude, Positive or Negative Change, Immediate or Long-term)**	**REASON FOR CHANGE (e.g., Threat, Stressor, Management Action)**	**ACTIONS TAKEN IN RESPONSE**
Exploration and Route Surveys	*No change.*	N/A	N/A
Military Uses	Not a designated value.	N/A	N/A
Boundary Delineation	Not a designated value.	N/A	N/A

Theme VII: Environmental Regulation

Cultural Values Theme VII: Environmental Regulation			
NATURAL, CULTURAL OR RECREATIONAL VALUE	**DESCRIPTION OF CHANGE IN VALUE (e.g., Magnitude, Positive or Negative Change, Immediate or Long-term)**	**REASON FOR CHANGE (e.g., Threat, Stressor, Management Action)**	**ACTIONS TAKEN IN RESPONSE**
Early flood control structures	Not a designated value.	N/A	N/A
Pioneering improvements to water quality	Not a designated value.	N/A	N/A
Pioneering improvements to aquatic ecosystems	Not a designated value.	N/A	N/A
Pioneering access and use regulation	Not a designated value.	N/A	N/A

Recreational Values

Theme I: Recreational Values

Recreational Values Theme I: Recreational Values			
NATURAL, CULTURAL OR RECREATIONAL VALUE	**DESCRIPTION OF CHANGE IN VALUE (e.g., Magnitude, Positive or Negative Change, Immediate or Long-term)**	**REASON FOR CHANGE (e.g., Threat, Stressor, Management Action)**	**ACTIONS TAKEN IN RESPONSE**
Capability for outstanding recreation experiences	•Enjoyable canoeing and kayaking opportunities. •Remote location – strong sense of wilderness •Excellent fishing •Excellent wildlife viewing opportunities •Enjoyable and accessible off river hiking •Sufficient water flow for navigability •Great diversity of landscape and scenic vistas •Easy opportunity to appreciate historical use of the river corridor	Management Action	N/A
	Positive, long-term – Increased capability to host travellers due to the revitalization of the Inuujaarvik Campground.		
Capable of supporting recreational use without loss of heritage values	*No change* - Supports non-consumptive uses; wilderness users tend to value low- impact activities. Remoteness and access limits user numbers to relatively low levels	N/A	N/A

Capability for outstanding recreation experiences

The Harvaqtuuq/Kazan River and adjacent area is used extensively by residents of Baker Lake for recreation purposes, often in combination with other traditional activities such as harvesting. In engagement conducted as part of this report, it is clear that these areas have personal, familial and cultural significance to Inuit, which includes access to recreation experiences.

The Harvaqtuuq/Kazan River continues to provide access to outstanding recreation experiences for the tourists that participate in canoe expeditions, typically originating in the Northwest Territories and often culminating in Baker Lake. Travel Nunavut indicated that the total annual number of tourists

is not large, due to the remoteness of the region and the difficulty and expense of accessing the river, which must be done via aircraft. Visitors typically register with the RCMP in Yellowknife and may also inform the BLHTO in Baker Lake that they plan to be in the community as part of their trip. It was estimated that approximately 75% of tourists do this. It is also evident that the COVID-19 pandemic has impacted this type of tourism, as a result of travel restrictions that have been in place since 2020.That noted, there is a demand for tourism, and it was further suggested that easier access and more amenities may be necessary to attract more visitors.

Section 3: Integrity Guidelines since Designation

Integrity guidelines were not established for the Harvaqtuuq/Kazan River as part of its CHRS designation, and as such, this section does not apply.

Section 4: Designation Document Recommendations and Current Status

The Management Plan—which serves as the Designation Document—for the Harvaqtuuq/Kazan River was published in 1990 by Northwest Territories Economic Development and Tourism. It identifies areas of significant natural heritage, recreational value and integrity on the river. It further outlines a strategy to pursue the establishment of territorial parks to further protect significant areas in consultation with Baker Lake.

This Management Plan was created prior to the establishment of the Nunavut Agreement; NPSP acknowledges that that it does not reflect the social and political context of Nunavut (Government of Nunavut, 2020). It was acknowledged that active implementation and monitoring under the Management Plan was foregone in favour of negotiating the IIBA, which under Article 9.4.2(b) of the Nunavut Agreement was to be done by 1998. Following the signing of the IIBA in 2019, the Government of Nunavut plans to work in partnership with KIA and revise the Management Plan (Government of Nunavut, 2020) as per IIBA article 6.3 *CHR Designation Documents.* This designation document is a collaboration between the signatories of the IIBA and the adjacent community to produce an up to date document relevant for today and how the CHR will look in the future. The IIBA ensures the Government of Nunavut works with the Kivalliq Inuit Association and the adjacent community to produce a designation document that incorporates Inuit Qaujimajatuqangit for the Harvaqtuuq/Kazan heritage river and ensures all parties are communicating and working together to highlight the importance of the Harvaqtuuq/Kazan heritage river within the national Canadian Heritage Rivers System.

Table 7: Designation document recommendations

RECOMMENDATION OR KEY ACTION	DEGREE of ACHIEVEMENT (Not yet Initiated, Initiated/Underway, Completed/ Addressed, On-going)	COMMENTS
Step 1: Workshops - planning stage with GN, KIA, and adjacent community to review background documents such as the 1990 Management Plan (Designation Document) to learn what is expected or long-term plan for the Harvaqtuuq/Kazan river and to develop a new designation document.	Not yet initiated	
Step 2: Newly updated CHR Designation Document for the Harvaqtuuq/Kazan River to reflect IIBA obligations.	Not yet initiated	

Section 5: Summary of Benefits and Costs since Designation

The CHRS lists the benefits of Heritage River status as providing opportunities to:

- foster cooperative river management that unites communities;
- celebrate and support the cultural connections of Indigenous Peoples with rivers;
- tell the stories of our nation, building sense of identity and pride;
- stimulate adventure travel and sustainable tourism;
- help Canadians connect to history, nature and cultural traditions;
- promote stewardship and citizen engagement;
- engage new Canadians and youth in river education, conservation, and recreation;
- encourage the protection of water resources to improve public health, well-being, and quality of life.

In the 2000 Harvaqtuuq/Kazan River CHRS Report, residents of Baker Lake expressed that Heritage River status had not fulfilled expectations in terms of promotion, education and economic spin-offs from tourism. This sentiment was echoed in the engagement conducted as part of this report. Baker Lake residents and community stakeholders generally indicated a lack of awareness as to what the benefits of Heritage River status are meant to be, that benefit delivery has not met expectations, and/or that the benefits to date have not been sufficient. However, that noted, there was a high level of awareness that the Harvaqtuuq/Kazan River is a Heritage River, and near unanimous agreement that Heritage Status is important and should be maintained.

Since the last decadal report in 2000 an Inuit Impact and Benefit Agreement (IIBA) for Canadian Heritage Rivers in Nunavut (CHR) was signed in 2019; an obligation under the Nunavut Agreement and so below is a summary table outlining the “Types of Benefits” as outlined in Appendix H of the PPOG for the CHRs in Nunavut.

Table 8: Summary of benefits

TYPE OF BENEFIT	SUBTYPE	DESCRIPTION
ENVIRONMENTAL BENEFITS	Improved Water Quality	Since 2004, KIA has had a Memorandum of Understanding with Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) for water quality monitoring conducted as part of the Innu'tuti Cumulative Effects Monitoring Program. KIA has incorporated its IIBA obligations into this broader program and has worked to identify additional water sampling sites within the IIBA implementation area in addition to those which currently exist.
	Water Monitoring	CHR NUNAVUT IIBA signed in 2019 – Article 14 - funds provided to RIA to support Water Monitoring activities in adjacent community of Baker Lake.
	Watershed	2021 Draft Nunavut Land Use Plan KIA mentioned in 2016 that the land use plan should expand the Land Use Designation for the Harvaqtuuq/Kazan Heritage River to its entire watershed. As it currently stands the heritage river status for the Harvaqtuuq/Kazan Heritage River is a corridor with a 1km buffer on either side of the riverbanks.
CULTURAL BENEFITS	Cultural Camps	CHR NUNAVUT IIBA signed in 2019 – Article 8 - funds provided to RIA for cultural camps in support of Inuit heritage transmission to younger generations in adjacent community of Baker Lake with respect to the Harvaqtuuq/Kazan Heritage River.
CULTURAL BENEFITS CON'T	Inuit Place Names	CHR NUNAVUT IIBA signed in 2019 – Article 10 - KIA to identify gaps for place names that have already been gathered by Inuit Heritage Trust or other organizations including KIA to ensure the inventories have been completed.
RECREATIONAL BENEFITS	CHR Education And Recreation Activities For Youth	CHR NUNAVUT IIBA signed in 2019 – Article 8 - funds provided to KIA to administer an education and recreation fund for youth activities in the adjacent community of Baker Lake.
	Promote Tourism	• CHRS Website – GIS Story Mapping Project an initiative launched in 2020 for all heritage rivers in Canada. For Harvaqtuuq/Kazan

TYPE OF BENEFIT	SUBTYPE	DESCRIPTION
		Heritage River – NP&SP - GN verified information with the adjacent community and KIA and submitted. • CHRS also manage their own Facebook and Twitter pages to promote Heritage Rivers nationally. • NP&SP have a webpage which promotes the Nunavut Heritage Rivers they manage.
	Promote Tourism	The overhaul of the Inuujaarvik Campground, managed by NP&SP in 2017 and in 2021 the addition of benches and picnic tables to add comfort to the site for all who visit the site.
IMPROVED KNOWLEDGE	Cultural Camps	CHR NUNAVUT IIBA signed in 2019 – Article 8 - funds provided to RIA for cultural camps in support of Inuit heritage transmission to younger generations in adjacent community of Baker Lake.
MONETARY BENEFITS	CHR NUNAVUT - IIBA	CHR NUNAVUT IIBA signed in 2019 - benefits to adjacent community of Baker Lake associated with Harvaqtuuq/Kazan heritage river, scholarships, cultural camps to name a few are some new benefits to the community.
MONETARY BENEFITS CON'T	Wildlife Compensation	CHR NUNAVUT IIBA signed in 2019 – Article 5 - Polar Bears & Grizzly bears compensation will appropriately compensate Inuit for emergency, accidental or illegal kills of bears in CHRs or adjacent to CHRs and in the case for Harvaqtuuq/Kazan Heritage River the compensation will go to the BLHTO.
	Inuit Opportunities Fund	CHR NUNAVUT IIBA signed in 2019 – Article 13 - *The Inuit Opportunities Fund* administered by the KIA is a way for Baker Lake to: a) promote CHR-related economic initiatives: b) promote Inuit cultural and recreational activities which support Inuit and may attract visitors to CHRs and adjacent communities c) promote training related to a) and b) above.

TYPE OF BENEFIT	SUBTYPE	DESCRIPTION
STEWARDSHIP	CHR NUNAVUT - IIBA	CHR NUNAVUT IIBA signed in 2019 – a signed IIBA brings programs needed to help the adjacent community of Baker Lake access the Harvaqtuuq/Kazan heritage river and bring back the connection to the river and landscape.
	Annual Community Clean-Up	The annual community clean-up in the adjacent community of Baker Lake, takes pride in doing a spring cleanup at various times; in the early spring to summer to collect garbage that is either on the frozen lake or along the shores or creeks that empty Baker Lake and in the community itself.
COMMUNITY ENGAGEMENT AND COLLABORATION	Consultation	CHR NUNAVUT IIBA signed in 2019 – Article 3 - ensures reasonable and culturally appropriate consultation techniques, which facilitate the sharing of views by unilingual or other Inuit. Interpretation and translation of relevant materials is to be made available regarding CHRs.
	Emergency Shelters	CHR NUNAVUT IIBA signed in 2019 – Article 8 – one emergency shelter is to be built on the lower reaches of the Harvaqtuuq/Kazan River to increase safety and access for Inuit, Visitors, Government of Nunavut and Government of Canada employees and contractors. In 2020 held a workshop with Baker Lake Community Lands and Resource Committee (CLARC) to discuss possible locations and later verified by elders with local knowledge of the area. KIA is currently working to source materials and have them transported to the identified location, and to ensure that they meet the requirements to be insulated, heated, have washrooms and utilize solar panels.
COMMUNITY ENGAGEMENT AND COLLABORATION	Inuit Employment	CHR NUNAVUT IIBA signed in 2019 - Article 11 – when recruiting for indeterminate and term positions in Nunavut with CHR related duties, the Government of Nunavut and the Government of Canada must give preference to qualified Inuit. Coordinator, Heritage Rivers & Planning and Management position has since 2020 moved from Rankin Inlet to Baker Lake.
	CHR Commemoration	CHR NUNAVUT IIBA signed in 2019 – Article 15 – in an event a CHRS plaque must be replaced for any reason, the Government of Nunavut must review

TYPE OF BENEFIT	SUBTYPE	DESCRIPTION
		existing text in consolation with KIA, and if appropriate, prepare new text for the plaque. This is required as there are four official languages in Nunavut and hence the current plaque must but be replaced.
EDUCATION	Scholarships	CHR NUNAVUT IIBA signed in 2019 – Article 11 - scholarships or educational grants are available to Inuit who are in post-secondary programs related to conservation, natural or applied sciences, cultural and heritage, wildlife or environmental management, economic development, tourism, and hospitality among other areas related to CHRs or CHR management. These funds are made available to Inuit residents of Baker Lake as they are the associated community for Harvaqtuuq/Kazan Heritage River.

Summary Recommendations From Previous Decadal Report 2000:

With the signing of the IIBA some of the recommendations are fulfilled to an extent but leave room for expansion for the future.

Table 9: Summary of recommendations from previous report

RECOMMENDATION From 2000 Report	DESCRIPTION	OUTCOME
ACTIVITIES **Develop facilities and programs which bring Inuit culture and visitors and connection to the river.**	Facility to be possibly be built to host visitors	IIBA – Emergency Shelter – Article 8 KIA to administer and have built on the lower reaches of the Harvaqtuuq /Kazan River with input from CLARC and elders who know the area.
	Possible opportunities: - Tourist lodge - Guiding - Tourist activities in the community	IIBA - *Inuit Opportunities Fund* – Article 13 administered by the KIA is a way for Baker Lake to: a) promote CHR-related economic initiatives: b) promote Inuit cultural and recreational activities which support Inuit and may attract visitors to CHRs and adjacent communities c) promote training related to a) and b) above this gives Inuit the opportunity to provide services.
MARKETING **Highly linked to the above and an important part to be successful.**	Business concept developments and planning of new activities	Cultural Camps – Article 8 Allows Inuit both youth and elders to connect or reconnect with the environment of their ancestors.
	Public awareness and education strategy	CHR EDUCATION and RECREATION ACTIVITIES for YOUTH - Article 8 - funds provided to KIA to administer an education and recreation fund for youth activities in the adjacent community of Baker Lake.

Protecting the Harvaqtuuq/Kazan River

Over the past 20 years, there have been discussions related to expanding the area of Heritage River designation to include the entire Harvaqtuuq/Kazan River watershed. This has not been actively pursued, however, due to ongoing land claim negotiations with other indigenous groups in the Northwest Territories and Manitoba. In respecting the negotiation process, the Government of Nunavut has chosen to avoid acting in haste in pursuing such an expansion.

During the engagement conducted as part of this report, it became apparent that there is a growing realization about the limits of Heritage River designation, particularly in terms of land use planning and associated protection of the marine and terrestrial environment. Whereas Heritage River designation is highly valued and considered important in celebrating, promoting and providing education with respect to the Harvaqtuuq/Kazan River, it does not provide any legal protection against the industrial activities that are seen as real and immediate threats to the natural, cultural and recreational values of the area. This was tacitly acknowledged in the Management Plan back in 1990, as illustrated in commitments to pursuing territorial park status for certain designated sections of the Harvaqtuuq/Kazan River. Further, in the Keewatin Regional Land Use Plan, approved in 2000, the Nunavut Planning Commission determined that the Department of Sustainable Development's proposal to establish a territorial park along the Harvaqtuuq/Kazan River conformed to the principles of the plan (Nunavut Planning Commission, 2000). It is important to note that the large majority of the area of the Harvaqtuuq/Kazan River that has Heritage River status is currently designated in the 2021 Draft Nunavut Land Use Plan as Limited Use, meaning that certain activities such as oil and gas/mineral exploration and production, quarries and linear infrastructure will be prohibited (Nunavut Planning Commission, 2021).

Nunavut Parks has developed a clear process for establishing a territorial park in the Nunavut Settlement Area (Mirnguiqsirviit, 2006). Should the Government of Nunavut, in collaboration with KIA and the community of Baker Lake wish to pursue enhanced protection for the Harvaqtuuq/Kazan River beyond what is provided in the commitments of the Draft Nunavut Land Use Plan, having Heritage River designation could be an asset in the efforts to establish a territorial park for the Harvaqtuuq/Kazan Heritage River and watershed.

Section 6: Overall Assessment

Overall Assessment

The designation as a Canadian Heritage River should

☒ remain in place

☐ be reviewed by the board due to the following concerns:

Works Cited

Agnico Eagle Mines Limited. (2016). *Nunavut Planning COmmission Public Hearing on the 2016 Draft Nunavut Land Use Plan.*

Areva. (2014a). *Kiggavik Project Final Environmental Impact Statement (Main document).*

Areva. (2014b). *Kiggavik Project Final Environmental Impact Statement (Volume 3B - IQ- Part1).*

Areva. (2014c). *Kiggavik Project FEIS: Tier 3 Technical Appendix 6C: Terrestrial Wildlife Baseline.*

Areva. (2014d). *Kiggavik Project FEIS: Tier 3 Technical Appendix 6B: Vegetation and Soils Baseline.*

Baker Lake Hunters and Trappers Organization. (2009, September 2). *Nunavut Impact Review Board Public Registry.* Retrieved from https://www.nirb.ca/application?strP=r

Baker Lake Hunters and Trappers Organization. (2015, September). *Submission for Nunavut Land Use Plan Final Hearing.* Retrieved from NPC Public Registry: https://lupit.nunavut.ca/portal/registry.php

Beak Consultants Ltd. (1987). Kiggavik Environmental Pre-feasibility Study 1986.

Bergerud, A. T. (1984). The buffalo of the North: caribou (Rangifer tarandus) and human developments. *Arctic*, 7-22.

Cameron, R. D. (2005). Central Arctic Caribou and petroleum development: distributional, nutritional, and reproductive implications. *Arctic*, 1-9.

Canadian Heritage River Systems. (n.d.). *The Thelon River - A Canadian Heritage River Story Map*. Retrieved from https://apca.maps.arcgis.com/apps/MapSeries/index.html?appid=64fc674875f6473c8940048f2a05d3d9

CHRS and the Government of Nunavut. (2000). *Thelon Heritage River: Ten-Year Review.* CHRS.

COSEWIC. (2008). *COSEWIC assessment and update status report on the Short-eared Owl in Canada.* Government of Canada.

Cumberland Resources. (2005). *Meadowbank Gold Project - Baseline Physical Ecosystem Report.*

Franke, A., Falk, K., Hawkshaw, K., Ambrose, S., Anderson, D. L., Bente, P. J., . . . Kharitonov, S. (2020). Status and trends of circumpolar peregrine falcon and gyrfalcon populations. *Terrestrial Biodiversity in a Rapidly Changing Arctic*, 762-783.

G.M. Wickware and Associates. (1990). Kiggavik Uranium Project, Baker Lake, Northwest Territories, Canada, Environmental Assessment. Supporting Document No. 2, Soils and Vegetation. Submitted to Beak Consultants Ltd.

Geological Survey of Canada. (2005). *History of ice flow in the Schultz Lake and Wager Bay areas, Kivalliq region, Nunavut.*

Geomatics International Ltd. (1990). Kiggavik Uranium Mine and Associated Transportation Corridors. A review of existing documentation on avifaunal resources and discussion of potential impacts A review of existing documentation on avifaunal resources and discussion of potential impacts.

Geomatics International Ltd. (1991). Preliminary results of summer survey 1991. Kiggavik and Andrew Lake. Vegetation and Soils.

Government of Canada. (2016). *COSEWIC Assessment and Status Report on the Caribou (Rangifer tarandus), Barren-ground population in Canada - 2016.*

Government of Canada. (2021, October 15). *Species at Risk Public Registry - Species Search*. Retrieved from Canada.ca: https://species-registry.canada.ca/index-en.html#/species?sortBy=commonNameSort&sortDirection=asc&pageSize=10&keywords=felt-leaf%20willow

Government of Northwest Territories. (1987). An annotated summary of recent literature on the effects of human disturbance on caribou. *File Report No. 62*.

Government of Nunavut. (1984). *A review of research on the effects of human activities on barren-ground caribou of the Beverly and Kaminuriak herds, Northwest Territories. File Report No. 43.*

Government of Nunavut. (2001). *The re-evaluation of Kivalliq and northeast Kitikmeot Muskox (Ovibos moschatus) populations, management zones and quotas. Technical Report Series 2001, No. 1-02.* Arviat, NU.

Government of Nunavut. (2006). *Vegetation Mapping the Kivalliq Using Digital Landsat TM 5/7 Data.*

Government of Nunavut. (2012). *Wolverine (Gulo gulo) carcass collection and harvest monitoring in Nunavut .*

Government of Nunavut. (2015). *Estimating abundance of the Qamanirjuaq mainland migratory barren-ground Caribou subpopulation - June 2014. Technical Report Series 01-2016.*

Government of Nunavut. (2016). *Estimates of wolverine density from mark-recapture DNA sampling, Aberdeen Lake, Kivalliq Region, Nunavut, 2013-14 .*

Government of Nunavut. (2016). *Schedule 6. Annual Monitoring Report.*

Government of Nunavut. (2018). *Estimating Abundance and Trend of the Qamanirjuaq Mainland Migratory Barren-Ground Caribou Subpopulation - June 2017.*

Government of Nunavut. (2018, July 24). Letter from Minister of the Department of Environment to the Nunavut Wildlife Management Board - Caribou Sport Hunting Hearing Decision. Nunavut.

Government of Nunavut. (2019). *Canadian Heritage Rivers System Annual Monitoring Report: Akillinik/Thelon River.*

Government of Nunavut. (2019). *Re-evaluation of The Central Kivalliq Muskoxen (Ovibos moschatus) Distribution, Abundance and Quotas in muskox management unit MX-13.* Arviat, Nunavut.

Government of Nunavut. (2020). Canadian Heritage Rivers System Annual Monitoring Report: Akillinik/Thelon River.

Government of Nunavut. (2021). *Grizzly Bear Harvest Monitoring in Nunavut.* Igloolik, Nunavut.

Government of Nunavut and Nunavut Tunngavik Inc. (2012). *A final report to the Nunavut Wildlife Management Board on the re-evaluation of muskoxen (Ovibos moschatus) populations in the Kivalliq Region. Report #2-10-08.*

Government of Nunavut. (n.d.). *Kivalliq Ecological Land Classification Map Atlas.*

Grimwood, B. (2012). *Picturing the Thelon: Natures, Ethics, and Travel within an Arctic Riverscape.*

Hughson, P. K. (2009, February 18). *Nunavut Impact Review Board Public Registry.* Retrieved from https://www.nirb.ca/application?strP=r

Kivalliq Inuit Association , Poole, K. G., & Gunn, A. (2016, February 16). *NPC Public Registry.* Retrieved from https://lupit.nunavut.ca/portal/registry.php?public=docs

Kivalliq Inuit Association. (2021). *Kivalliq Hydro-Fibre Link Data Collection Summary Report.*

McDonald, M. L. (1997). *Voices from the Bay: Traditional Ecological Knowledge of Inuit and Cree in the Hudson Bay Bioregion.* Ottawa: Canadian Arctic Resources Committee, Environmental Committee of Municipality of Sanikiluaq.

Medeiros, A. S., Friel, C. E., Finkelstein, S. A., & Quinlan, R. (2012). A high resolution multi-proxy record of pronounced recent environmental change at Baker Lake, Nunavut. *Paleoliminology*, 661-676.

Minister of Indigenous and Northern Affairs. (2016, July 14). Minister Decision Re: NIRB Final Hearing Report.

Mirnguiqsirviit. (2006). *Establishing a New Territorial Park in the Nunavut Settlement Area.* Iqaluit.

Nunatsiaq News. (2013). *Northbound grizzly bears begin to colonize western Nunavut.*

Nunavut Impact Review Board. (2021, July 22). Screening Decision Report: NIRB File No. 21YN027.

Nunavut Planning Commission. (2000). Keewatin Regional Land Use Plan.

Nunavut Planning Commission. (2021). *Draft Nunavut Land Use Plan.*

Nunavut Planning Commission. (2021). *Nunavut Land Use P:lan: Options and Recommendations.*

Nunavut Planning Commission. (2021). *Nunavut Land Use Plan: Draft July 2021.*

Nunavut Planning Commission. (2021, May 7). Re: NPC File No. 149542 [Kivalliq Hydro-Fibre Link].

Nunavut Wildlife Management Board. (2004). *The Nunavut Wildlife Harvest Study.*

Prairie Scientific. (2020). *Heritage Rivers Water Quality Report.*

Speller, S. D., Harris, R. E., Pangman, J., Boot., J., Dodd, N. J., & McCarty, L. S. (1979). *Environmental Studies Report – 1979.* Urangesellschaft Canada Limited.

Struzik, E. (2010). *A troubling decline in the caribou herds of the Arctic*. Retrieved from https://e360.yale.edu/features/a_troubling_decline_in_the_caribou_herds_of_the_arctic_

The Rankin Inlet HTO, Nunavut Department of Environment, Nunavut Tunngavik Inc. (2012). *A Final Report to the Nunavut Wildlife Management Board on the Re- evaluation of Muskoxen (Ovibos moschatus) Populations in the Kivalliq Region.*

Urangesellschaft Canada Ltd. (1981). *(Draft). Environmental Studies Report — 1980.*

Vistnes, I., & Nellemann, C. (2007). Impacts of human activity on reindeer and caribou: The matter of spatial and temporal scales. *Rangifer Report*, 47-56.

Vistnes, I., Nellemann, C., Jordhoy, P., & Strand, O. (2004). Effects of infrastructure on migration and range use of wild reindeer. *Journal of Wildlife Management*, 101-108.

Vors, L. S. (2009). Global declines of caribou and reindeer. *Global Change Biology*, 2626-2633.

Water Survey of Canada. (1983-2018). *Volumetric flow and water level data.*