INUIT QAUJIMAJATUQANGIT OF FRESHWATER STUDY FOR BAFFINLAND'S MARY RIVER PROJECT

SPECIFIC TO THE COMMUNITY OF

Mittimatalik (Pond Inlet)

August 20, 2025

FINAL REPORT

Qikiqtani Inuit Association

Inuit Qaujimajatuqangit Of Freshwater Study For Baffinland's Mary River Project
Specific to the Community Of Mittimatalik

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Qikiqtani Inuit Association

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Thanks and acknowledgements go to Mittimatalik community members, elders, knowledge holders, land users, and to QIA staff, and leadership who contributed. This Report could not have been completed without their support and expert knowledge.

Disclaimer:

The information contained in this Report is based on research conducted by Qikiqtani Inuit Association, with support from Firelight Research Inc., as well as published works and archival research. It reflects the understandings of the authors and is not intended to be a complete depiction of the dynamic and living system of use and knowledge maintained by Inuit. It may be updated, refined, or changed as new information becomes available. All mapped information is based on interviews with Mittimatalik knowledge holders conducted within constraints of time, budget and scope. Base map data originate from the National Topographic System and Natural Resources Canada. The information contained herein should not be construed as to define, limit, or otherwise constrain the Nunavut Agreement rights of Inuit.

During the intervening period between the completion of the interviews of this Study (2020) and Report publication (2025), a number of water quality monitoring or mitigation programs have been initiated by Baffinland through processes such as the Dust Audit Committee or the Environmental Management System (EMS). These programs have not been considered in this Report, and future engagement between Baffinland and the impacted communities is encouraged in order to identify the degree to which concerns and potential perceived impacts listed here may now have been addressed or are in the process of being investigated and addressed.

EXECUTIVE SUMMARY

The Qikiqtani Inuit Association (QIA) engaged Firelight Research Inc. (Firelight) to support an Inuit Qaujimajatuqangit Of Freshwater Study For Baffinland's Mary River Project Specific to the Community Of Mittimatalik. This Report provides baseline and, where possible within resource limitations, trend-over-time information relating to Mittimatalingmiut knowledge and use of freshwater resources, based on Inuit Qaujimajatuqangit, within areas potentially impacted by the Project.

Data for the Study was collected during mapping interviews with Mittimatalik community members focused on the vicinity of the Project, including watersheds in which Project components are located. 22 Mittimatalik community members were interviewed between November 8 and November 12, 2020, and included non-confidential site-specific (i.e., mapped) and qualitative information related to the Project. Site-specific mapped data and qualitative data from a past Tusaqtavut Study (QIA 2019a) conducted by QIA with Mittimatalik were also included in this Report.

The site-specific data clearly demonstrate the importance of the Study Area for use of freshwater by Inuit from Mittimatalik. A total of 95 site-specific values are reported in the Study Area (the Footprint, Local Study Area, and Regional Study Area). As shown in this data, the Study Area contains numerous important sites of freshwater resources used by or otherwise valued by Inuit. Mapped sites include, but are not limited to:

- Sites and areas used for gathering freshwater for drinking and other uses;
- Important char habitat, including spawning rivers and overwintering lakes;
- Important water crossings on travel routes that are relied upon to access hunting grounds and other communities;
- Important fishing sites relied upon for traditional food harvesting; and
- Waterbodies of Heightened Importance.

Rooted in the important Inuit uses of water and sources of water which Inuit value (identified during interviews), Mittimatalingmiut have identified several important objectives for the Inuit protection and conservation of water:

1. Freshwater must be available and of sufficient quality for Inuit use from preferred locations on the land and on icebergs.

2. Freshwater must be clean and plentiful in lakes, rivers and streams in order to support healthy fish populations.

3. Waterbodies of Heightened Importance must be protected from changes in water quality, quantity or flow which materially reduce their value or usability to Inuit.

4. Inuit Quajimajatuqangit should be utilised to decide which freshwater sources are important and need protection.

5. Water sources must be protected in order to maintain other important aspects of Inuit culture and way of life.

6. Inuit defined principles, laws and norms surrounding water should be followed in order to ensure the sanctity, purity and cleanliness of water sources is protected.

7. Water sources that do not require treatment are strongly preferred and must be protected.

These objectives should be considered a preliminary list, representative of research conducted with Mittimatalingmiut and verification with the Inuit Committee of the Inuit Stewardship Program. Further research with other impacted Inuit communities may add additional Inuit water objectives.

The term “Waterbodies of Heightened Importance” is used in this Report to signify waterbodies that have been identified by Inuit as critical to the resources they have used, use now, and/or would like to use in the future. Such waterbodies have heightened cultural importance and sensitivities to change, that merit heightened monitoring, management provisions and compensation requirements in the event substantial effects from the Project are identified. While Mittimatalik participants mapped these Waterbodies of Heightened Importance during interviews, the criteria of recorded Inuit use, observed impacts to Inuit use, and proximity to Inuit Owned Lands (IOL) parcels were used to distill these Inuit-identified sites into preliminary list of candidate Waterbodies of Heightened Importance in relation to the Project (see Table 1). Note that this is a preliminary list of candidate Waterbodies of Heightened Importance identified by the community of Mittimatalik, and this list may increase or be altered through engagement of Inuit from other Project-impacted communities.

Participants were asked to provide guidance on what different elements or considerations are taken into account when deciding whether a water source is of good, uncertain or bad water quality. Input from participants was collated to produce a series of preliminary Inuit water quality indicators, or observable parameters.

- Water Colour and Clarity
- Water Taste and Smell
- Water Temperature
- Rate of Flow (for rivers and creeks)
- Waterbody Size, Depth and Connectivity
- Riverbed or Lakebottom
- Vegetation
- Animals/ Invertebrates
- Past Inuit Use
- Degree of Visible Human Disturbance

- Quality of Fish and Fish Habitat

The matrix of observational indicators of water quality which Inuit have and continue to use as part of their decision-making around water collection and use, as well as identified Waterbodies of Heightened Importance, should form the foundation of future Inuit—led water monitoring.

Based on participants' definitions of what constitutes good, medium and bad water quality, a series of 'drinkability' thresholds are presented.

- Baseline Threshold: Water is safe.
- Threshold 1: Water which was considered safe is now considered uncertain and has to be boiled or filtered before use or consumption.
- Threshold 2: Water which was considered safe once boiled or filtered is now avoided as unsafe.

Project impacts described by Inuit and documented within this report indicate that Inuit thresholds related to fresh water are already being breached in some areas, and that Inuit objectives related to the use of freshwater are being impacted. Participants observed the following interactions between the Project and their Freshwater values:

- Increased perceived contamination of snow, ice, and water bodies from observations of dust caused by Project components associated with the mine and the tote road;
- Reduced trust in previously utilised water collection sites;
- Reduced ability to collect freshwater while out on the land due to the above;
- Deterrence from traveling to contaminated areas due to the lack of access to freshwater while out on the land;
- Perceived impacts to fish health due to dust contamination of fish habitat;
- Reduced ability to trust the safety of char gathered in freshwater environments due to concerns around potential impacts to their health;
- Reduced ability to catch, share, and consume char due to the above;
- Avoidance of harvesting in the Study Area (including in preferred areas) due to observed dust and perceived contamination of water;
- Reduced confidence in the health of country foods due to concerns about dust and other potential contaminants from the Project.

The observed impacts described above, are also likely to lead to the following potential/additional impacts, sometimes called "knock on" or "spin off" effects, tied to Inuit culture, resources and land use and Inuit rights:

- Disruptions to "sense of place" through decreased ability of people to connect with nature and spend time in places that are culturally and spiritually meaningful, due to Project activities;

- Disconnection from Inuit culture and an altered ability to practice rights due to the above disruptions;

- Impacts on access to important country food sources due to all of the above impacts and related loss of trust (due to observed changes and/or perceived contamination) and increased avoidance;

- Increased travel costs due to the need to travel farther to access preferred country foods.

In summary, impacts from the Mary River Project, have had a direct impact on the access to, use and confidence of Inuit from Mittimatalik in their freshwater, particularly the freshwater from some lakes and rivers found in the Study Area. These impacts, including patterns of avoidance and loss of confidence have impacted and will may continue to impact, the ability of Inuit from Mittimatalik to continue resource harvesting, travelling across and using the land and transmit cultural knowledge and Inuit Qaujiamajatuqangit between generations in the Study Area.

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ACRONYMS AND ABBREVIATIONS

Firelight	Firelight Research Inc.
GN	Government of Nunavut
HTO	Hunters and Trappers Organization
IOL	Inuit Owned Lands
IQ	Inuit Qaujimajatuqangit
ISP	Inuit Stewardship Program
km	Kilometre
LSA	Local Study Area
NA	Nunavut Agreement
NU	Nunavut
NIRB	Nunavut Impact Review Board
The Project	Mary River Project
The Proponent	Baffinland Iron Mines Corporation or Baffinland
QIA	Qikiqtani Inuit Association
Report	Inuit Qaujimajatuqangit Of Freshwater Study For Baffinland's Mary River Project Specific to the Community Of Mittimatalik
RSA	Regional Study Area
Study	Inuit Qaujimajatuqangit of Freshwater Study For Baffinland's Mary River Project For The Community Of Mittimatalik (Pond Inlet)
Study Area	The RSA, LSA, and Project Footprint combined
TARP	Trigger, Action, Response Plans
TK	Traditional Knowledge
TLU	Traditional Land Use
WCA	Water Compensation Agreement
VC	Valued Component

1. INTRODUCTION

1.1 OVERVIEW

This 'Inuit Qaujimajatuqangit Of Freshwater Study For Baffinland's Mary River Project Specific to the Community Of Mittimatalik' Report (the Report) documents the background, methods, and results of a Freshwater Inuit Qaujimajatuqangit study (the Study) for the community of Mittimatalik (Pond Inlet) specific to the Mary River Project, operated by Baffinland Iron Mines Corporation (Baffinland or the Proponent) on northern Baffin Island. For the purposes of this Report, the term "the Project" refers collectively to existing Mary River Project infrastructure and activities (e.g. mine, road, Milne port) as well as proposed and permitted future developments (e.g. southern rail, Steensby port).

Information presented in this report is based on current and available Mittimatalingmiut Inuit Qaujimajatuqangit data in relation to the north Baffin region. This Report provides baseline and, where possible within resource limitations, trend-over-time information relating to Mittimatalingmiut knowledge and use of freshwater resources, based on Inuit Qaujimajatuqangit, within areas potentially impacted by the Project. Maps and descriptions of Inuit use of and values related to freshwater, and a series of Inuit-defined water quality indicators are described within the Report. Observed existing and potential Project effects on Inuit uses and perceptions of water in impacted areas, as identified by Inuit, is also provided, along with a framework of freshwater quality indicators (or observable parameters) used by Inuit to gauge water drinkability. A provisional list of Waterbodies of Heightened Importance identified by Mittimatalingmiut Inuit during interviews is also provided, along with areas and priorities for monitoring of freshwater potentially impacted by the Project.

It is understood to be the desire of QIA and Inuit of the communities impacted by the Mary River Project that, through integration of Inuit Qaujimajatuqangit collected during this Study and additional engagement with Inuit by QIA and Baffinland, a set of Inuit-defined Objectives, Indicators, Thresholds and Responses (OITRs) of freshwater quality, quantity and flow can be established and incorporated into the Inuit-led monitoring activities being undertaken as part of the Inuit Stewardship Program and other water monitoring programs. Information collected during the Study can also inform appropriate thresholds and responses to Project-related impacts to Inuit water values within the Project management plans.

This Report includes non-confidential site-specific (i.e., mapped) and qualitative information related to the Project. For the purpose of this Report, site-specific data are knowledge and use values reported by Mittimatalingmiut that are specific, spatially distinct, and that may be mapped (exact locations of values may be treated as confidential). Study participants can access their Inuit Qaujimajatuqangit data shared during interviews by making a request of QIA.

The Report is organised into eight sections:

- Section 1 presents an overview of the scope of work and Report and Study limitations;
- Section 2 presents background information regarding the Project and the community of Mittimatalik;
- Section 3 presents a definition of the Study Area and information on the methods used for the Study;
- Section 4 describes Inuit knowledge and use of freshwater within the Study Area, presents candidate Waterbodies of Heightened Importance as identified by Inuit, and summarizes identified Inuit objectives related to fresh water;
- Section 5 summarises water quality indicators identified by Inuit in the Study;
- Section 6 describes existing and potential impacts from the Project and other sources to freshwater and use of freshwater, as identified by Inuit,
- Section 7 outlines possible Inuit thresholds for water values;
- Section 8 provides a summary of findings and a Report conclusion.

1.2 SCOPE OF WORK

The Qikiqtani Inuit Association (QIA) engaged Firelight Research Inc. (Firelight) to support an Inuit Qaujimajatuqangit Of Freshwater Study For Baffinland's Mary River Project Specific to the Community Of Mittimatalik. This included:

- Working with QIA staff to conduct a community scoping meeting;
- Working with QIA staff to conduct interviews and workshops in Mittimatalik;
- Collating and analysing results from interviews and focus groups;
- Preparing and submitting a draft report to QIA based on Inuit Qaujiamajatuqangit documented during interviews and focus groups. Report components include:
    - List of Waterbodies of Heightened Importance;
    - Inuit Qaujiamajatuqangit-based water and waterbody health indicators;
    - Preliminary identification of sites recommended for additional monitoring by knowledge holders; and
    - Preliminary identification by Inuit of thresholds of acceptable change to waterbodies and water quality;
- Verifying the results of the Study through a community meeting in Mittimatalik; and

- Finalizing the report based on QIA feedback.

1.3 LIMITATIONS

This Report has certain limitations and should only be considered a first step in identifying Inuit values related to freshwater that may be impacted by the Project. Limitations of this Report include the following:

- The Study was conducted with the community of Mittimatalik, therefore the values, uses, and Project impacts on members of other Inuit communities impacted by the Project are not included in this Report.

- Not all knowledge holders were able to participate in this Study. Efforts were made to include key knowledge holders active within or with strong knowledge of the Study Area, but Mittimatalik elders, hunters, and community members with important knowledge of the Study Area (i.e., Footprint, LSA, and RSA combined) may have been unable to participate due to availability, time and budget restrictions.

- Data collected for each participant are limited by what the participant was able and willing to report at the time of the interview.

- Interviews included and analysed in this report were conducted in 2019 and 2020. Due to Covid-19 related challenges in access to transcription and translation services analysis of report data was delayed. Impacts may have increased or decreased in their nature, severity and duration since this time. In addition, Project monitoring and mitigations may have advanced since this time. Therefore some impacts identified (in Section 6) may no longer be relevant or may have altered, for example by having been addressed through mitigations or Project modifications. Section 6 identifies impacts as observed at the time of the interviews and includes them as evidence of the kinds of observations which Inuit make and which influence the concerns which Mittimatalingmiut have for their environment. Future updates will be necessary to determine if impacts have increased or decreased over time.

- This Study was focused on recording actual Inuit experience and observation of freshwater conditions. Proponent efforts to mitigate impacts to freshwater were not described to participants or discussed during interviews, as this type of community engagement was outside the scope of the investigation. Inuit talked about what they have observed on out the land, which includes observable impacts after Baffinland's mitigation measures (at the time) had been applied. While further mitigations and monitoring programs have been developed and undertaken in the intervening period between the completion of the Study and the publication of this Report, these programs are not addressed here. Further engagement is needed to update the observations recorded in this Report and to determine whether the new (since 2020) or refined programs have addressed the perceived impacts documented in this Report.

- The area demarcated by mapped site-specific use values should be understood to be a small portion of the actual area required for the meaningful practice of a Mittimatalingmiut way of life. Site-specific mapped values (e.g., a water collection site) reflect particular instances of use that are reflective of wider practices of culture, livelihood, and other Inuit rights within a particular landscape. For example, a single water collection site may be mapped with a precise point, but that point does not capture the entire spectrum of related practices and values such as, for example, collection of water from the same water body at multiple locations, trails used to access the site, or nearby camping locations chosen for their proximity to freshwater.

- This Report includes a limited number of Inuit recommendations for the monitoring and protection of water values that may be impacted by the Project, as identified by Mittimatalingmiut involved in the Study. It does not include a comprehensive list of QIA and Inuit party recommendations for water monitoring, mitigation and compensation – nor does it include any analysis of the existing monitoring or mitigation efforts and initiatives which Baffinland has pursued in the intervening period between the completion of these interviews in 2020 and the present (2025). Further engagement is recommended between QIA, impacted Inuit communities, and Baffinland on this subject.

- This Report should not be taken as a replacement for other studies that may be required, including but not limited to cumulative effects, socio-economics, diet, Inuit Qaujiamajatuqangit studies specific to marine and terrestrial wildlife, and health and wellbeing.

- Candidate Waterbodies of Heightened Importance presented in this Report should be interpreted as preliminary only. Further locations may be added through further consultation and field work with Mittimatalik and other impacted communities. It is important to note that the inclusion of this element in the interviews and Report was not intended as a substitute for the required extensive consultation with impacted Inuit community bodies to identify a full list of Inuit-defined Waterbodies of Heightened Importance.

In light of the above limitations, this Report can be used as a representational account of only some of the knowledge, use, and cultural values related to freshwater of the community of Mittimatalik. It is not intended as a complete depiction of the dynamic way of life and living system of use and knowledge maintained by the Mittimatalik community. It is important to note that the Study does not reflect all past, current and desired future use by Mittimatalik community members in those areas, and **an absence of data on a waterbody or other geographic area does not signify an absence of use or value of that area.**

This Report is non-confidential and is intended for consideration by Inuit (including but not limited to the impacted communities and the Qikiqtani Inuit Association), the Nunavut Impact Review Board (NIRB), the Nunavut Water Board, agents of the territorial and federal governments, and the Proponent. All data included in this Report are the property of QIA and may not be used or reproduced outside the Project environmental assessment or regulatory process without the written consent of QIA.

Re-interpretation or analysis of the following results will require input and participation from QIA and the Mittimatalik community.

Nothing in this Report should be construed as to waive, reduce, or otherwise constrain Inuit rights within, or outside of, regulatory processes. This Report should not be relied upon to inform other projects or initiatives without the written consent of the QIA.

2. BACKGROUND

2.1 MITTIMATALIK COMMUNITY PROFILE

Mittimatalik is a primarily Inuit community located on northern Baffin Island, Nunavut with a population of 1,617 (Government of Canada 2017). Mittimatalik is situated in an area known as Mittimatalik in Inuktitut, which is translated as 'the place where Mittima is buried' (Hamlet of Mittimatalik 2019). Inuit have been resident in the North Baffin region for roughly 1,000 years, when the archaeological record indicates that their ancestors, the Thule people, moved into the eastern Arctic and the Qikiqtaaluk, previously occupied by the Dorset culture, known as Tuniit in Inuktitut (Hamlet of Mittimatalik 2019).

Hunting marine and terrestrial creatures has been central to the Inuit of northern Baffin Island since time immemorial (Bennett and Rowley 2004; Stenton 1991). Hunting terrestrial mammals including caribou, wolverine, fox, Arctic hare, lemmings, and wolves provided food and necessary materials for the construction of clothing needed to withstand the cold climate (Bennett and Rowley 2004; Hallam and Ingold 2016; Stenton 1991). Marine mammals such as small whales, walrus, and seals provided necessary materials for clothing and tools as well as essential food, rich in the fats and nutrients required to support life in an environment where vegetable sources of nutrition are limited (Lee and Wenzel 2004; Bennett and Rowley 2004). Fishing, the collection of plants and berries, camping, and soapstone collection have been part of the Inuit way of life since time immemorial (Bennett and Rowley 2004).The complex and multi-layered culture and body of knowledge comprised of the aforementioned activities and built over generations is encapsulated in the term Inuit Qaujimajtuqangit (Tester and Irniq 2008; Wenzel 2004; Karetak et al. 2017).

The seasonal round of harvesting which was traditionally undertaken in the Mittimatalik area, in conjunction with movement between a number of seasonally located camps, began to change in 1921 with the arrival of a Hudson's Bay Company outpost (Matthiasson 1992). While whalers had been travelling and harvesting whales in the region for some decades already, substantial social changes were precipitated by the arrival of the Hudson's Bay Company. The following decades saw the arrival of missionaries, the Royal Canadian Mounted Police, and agents of the Federal and Territorial governments. Each wave of arrivals and the changes they brought, shifted the development of the community of Mittimatalik further towards a settled community and away from the previously seasonally mobile lifeway which the Mittimatalingmiut had lived (Matthiasson 1992). While the Mittimatalik community was obliged to adapt to these changes in their environment, as well as the introduction of southern-style schooling and participation in the wage economy, harvesting food from the land and travelling on the land remained important and continues to be central to the identities of Mittimatalik community members (QIA, 2014, QIA 2019, Condon et al. 1995)

The signing of the *Nunavut Agreement* and *Nunavut Act* in 1993 produced the Territory of Nunavut and resulted in the designation of Inuit Owned Lands (IOL) (Henderson 2008). The presence of the iron ore deposit at Mary River on an IOL, alongside an obligation to safeguard and promote the rights and interests of Inuit under the *Nunavut*

Agreement, has involved QIA in the planning, NIRB review and NWB licensing processes for the Project, and precipitated the preparation of this Study.

2.2 THE MARY RIVER PROJECT

This section provides background information about Baffinland's Mary River Mine Project (the Project). At the time that the interviews for this Study were conducted, Baffinland was proposing the 'Phase 2' activities and as such references to it may appear in participant quotes, and in the Interview Guide – however as this application was withdrawn it is not reflected in the Report analysis or findings. Impacts identified by Inuit refer to activities already underway. For the purposes of this Report, the combination of existing and permitted Mary River Mine developments, along with those proposed as part of Mary River Project Phase 2, are referred to as the Project.

The Mary River Mine is situated in the northern interior of Baffin Island, roughly halfway between Ikpikitturjuaq (Steensby Inlet) to the south, and Qinngua (Milne Inlet) to the north. Currently for the Project, ore is excavated, crushed, and graded into coarse and fine grades at a facility on site before being trucked via the tote road to Milne Port. The tote road runs from the mine site north to Qinngua, largely following Phillips Creek. At the port facility at Qinngua, ore is loaded onto ships that transit out of the loading area, past Bruce Head and northeast around Ragged Island into Eclipse Sound. Ships then transit east between the south shore of Bylot Island and the community of Mittimatalik, into Guys Bight, and subsequently Baffin Bay as they proceed to their destination.

What eventually became the Mary River Mine property was initially discovered in 1962. The current operations phase began in 2014 when initial approval was received from the NIRB to operate the mine, with ore first being shipped to Europe during the summer of 2015 (Baffinland Iron Mines Corporation 2019).

In addition to parts of the Project that already exist today, certain Project components have already been approved but have not yet been built. These include another port at Steensby Inlet (Steensby Port) and a railway (the Southern Railway) connecting the Mary River Mine site to the Steensby Port. Once built, ore would then be shipped from Steensby Port through Foxe Basin, Foxe Channel, and Hudson Strait.

Project components are shown in relation to the Study Area (as defined in Section 3.2) in Figure 1 in Section 3. Note that the Study Area is limited to the terrestrial and freshwater aquatic components of the Project (including the permitted but not yet built terrestrial/freshwater components described in above). The marine shipping routes for the Project are not included in the Study Area.

3. METHODS

3.1 OVERVIEW

Data for this Study were collected from mapping interviews specific to the Project with 22 Mittimatalik community members, conducted between November 8 and November 12, 2020 and from interviews completed for the 2019 Tusaqtavut Inuit Qaujiamajatuqangit Study with Mittimatalik (QIA 2019a). This section details the data collection methodologies used and analyses conducted, including for both quantitative (i.e., mapped) and qualitative data.

3.2 DEFINING THE STUDY AREA

The Study Area consists of the Regional Study Area (RSA), Local Study Area (LSA) and Project Footprint. The Project Footprint is defined as the terrestrial Project components. The LSA[1] is defined by a 5 km buffer around terrestrial (non-marine) Project components, and the RSA[2] incorporates a 25km buffer around the locations of existing, approved and proposed terrestrial Project components and activities. See Figure 1 on the following page for a map of the Project and the Study Area.

3.3 MAPPING INTERVIEWS

22 Mittimatalik community members were interviewed between November 8 and November 12, 2020. Interviews were conducted at the Mittimatalik Visitor Centre. Interview teams prioritised the documentation of values within the LSA and RSA. Values beyond the RSA were documented where time permitted.

Interview participants were identified and contacted by QIA staff. Participants were chronologically assigned identifier codes in the form of P##. Participants assigned an identifier code in previous studies kept this given code. Informed consent was obtained for all interviews.

The Study also draws on qualitative and mapped data collected for the 2019 QIA Tusaqtavut Study completed with the community of Mittimatalik (QIA 2019).

[1] Five kilometres is an approximation of the distance easily travelled in a day from a point of origin (e.g., a cabin, camp, or other location) by foot, through bush, and back again, as when hunting (Candler et al. 2010). It is used as a reasonable spatial approximation of use surrounding a given transportation or habitation value. Direct and indirect Project effects may interact with Inuit values in this area.

[2] The RSA is a broad area within which direct and indirect effects of the Project, such as noise, dust, odours, effects on water, and other forms of disturbance may be anticipated to interact with cumulative effects, causing additive or synergistic effect with impacts to Inuit values.

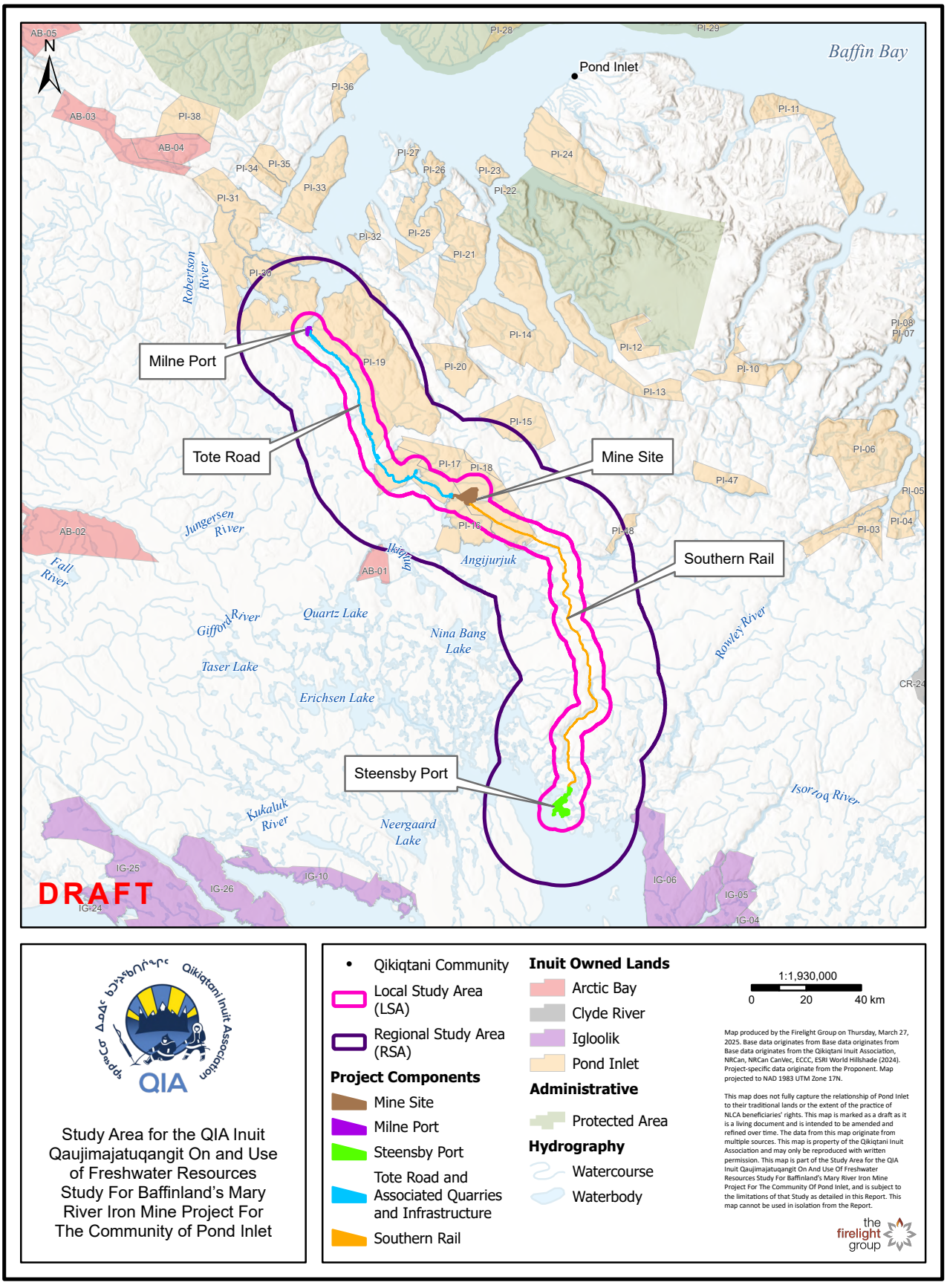

Figure 1. Project Components and Study Area for the QIA Inuit Qaujimajatuqangit Of Freshwater Study For Baffinland's Mary River Project Specific to the Community Of Mittimatalik Mapping Interviews

For the 2019 Tusaqtavut, 35 Inuit Mittimatalik community members were interviewed in 54 separate mapping interviews between February and April 2019.

All mapped data included in this Study were collected using the direct-to-digital methodology as described in Sections 3.3.2 and 3.3.3, below. Interviews followed a semi-structured format and interview and mapping protocols used were based on standard techniques (Tobias 2009; DeRoy 2012).

All data collected for this Study adheres to the following established best practices for Inuit Qaujimajatuqangit/ Traditional Knowledge/ Traditional Land Use (IQ/TK/TLU) studies in the regulatory context of a Project-specific proposed Project (Olson et al. 2016):

- **Methods development:** A semi-structured interview guide should be developed with the community to ensure that all questions are culturally appropriate. Development of codes/symbols/signifiers for mapping should be done with the community to ensure appropriateness.

- **Informed consent:** Each participant should read and sign a consent form that clearly indicates who is conducting the Study, its purpose, who will have intellectual property rights over the information shared during the interview, and their rights in the interview process.

- **Semi-structured individual interviews:** To obtain detailed IQ/TK/TLU information, individual interviews should be conducted with a broad cross-section of traditional knowledge holders and land users.

- **Data management:** Recording of participant names, dates of interviews, who conducted the interviews, and how the data is stored is an essential part of IQ/TK/TLU research.

- **Mapping protocols:** Mapping should be conducted with a trained researcher. Mapping codes should be developed with the community before the Study begins and used consistently throughout. Proper documentation of sites, and attribute data should be collected in a consistent manner. Site-specific mapping should be done at a scale of 1:50,000 or better.

- **Established spatial boundaries:** The proposed Project Footprint, Local Study Area, and Regional Study Area should be clearly indicated on maps during all IQ/TK/TLU interviews.

- **Established temporal boundaries:** The temporal boundaries of the IQ/TK/TLU study should include current use (i.e. use in the participant's lifetime), historical use, and anticipated or desired future use.

- **Recording of IQ/TK/TLU interviews:** All interviews should be audio recorded with proper attributions.

- **Data analysis:** Recorded interviews should be transcribed and coded according to emerging themes, or valued components. Map data should be analysed using mapping software, such as ESRI ArcGIS, to understand the types and density of use in the proposed project footprint, local study area, and regional study area.

Participants had the option to conduct the interview in Inuktitut or English. An interpreter or Inuktitut-speaking QIA staff member was present or available for all interviews. All audio was recorded digitally. Where interpreted material has been used as part of the analysis conducted in the preparation of this Report, this has been indicated in the quote citation.

3.3.1 Site-specific Data Collection and Analysis

For the purpose of this Report, *site-specific data* are values reported by Mittimatalingmiut that are specific, spatially distinct, and that may be mapped (however, exact locations may be treated as confidential).

Shape files for the physical Project components were provided by the Proponent.

Site-specific data were mapped and managed using a 'direct-to-digital' process in which Google Earth imagery was projected onto a wall or screen. Points, lines, or polygons, geo-referenced at a scale of 1:50,000 or finer, were used to mark areas of reported use and importance of freshwater to Inuit. Some lines and polygons denoting areas of use and impacted use were mapped at a coarser scale (i.e., greater than 1:50,000).

Data collection focused on the Project Footprint (terrestrial Project components), Local Study Area (LSA; 5 km buffer around terrestrial Project components),) and Regional Study Area (RSA; 25km buffer around terrestrial Project components). See Figure 1 for a map of the Project and the Study Area.

Maps of site-specific values presented in this Report are generated from data mapped during the 2020 Study interviews and from the 2019 Tusaqtavut study for Mittimatalik. Only data relating to knowledge and use of freshwater and fishing is described in this Report. Data relating to the other valued components described in the 2019 Tusaqtavut report were not included in maps for this Study.

Mapped points are randomised within a 250 m radius and then buffered by one kilometre. A one-kilometre buffer is also generated around each line and polygon. Buffering is done to account for a margin of error and to protect information confidentiality, as per good practice principles of direct-to-digital IQ/TLU/TK mapping (DeRoy 2012).

Site-specific data are presented in maps below according to five 'activity classes' categories. These activity classes are designed to capture and illustrate the multiple aspects of how freshwater is important to and used by Inuit. The five activity classes used in maps provided throughout this Report are:

- *Habitation* values (including temporary, occasional, seasonal, and permanent camps and cabins);

- *Cultural* and spiritual values (including place names and teaching sites);
- *Subsistence* values (including water collection areas and locations where fish are harvested);
- *Environmental* feature values (including specific, highly valued habitat for char as well as valued waterbodies and watersheds); and
- *Transportation* values (including trails and water routes used to access locations used for freshwater sources and fishing sites).

The temporal boundaries set for the data collection include past, current, and planned future knowledge and use. For the purpose of this Study:

- A past value refers to an account of knowledge and use prior to living memory, passed down through intergenerational transfer of Inuit Qaujimajatuqangit;
- A current value refers to an account of knowledge and use within living memory; and
- A planned future value refers to desired anticipated or intended use.

3.3.2 Qualitative Data Collection and Analysis

Qualitative data were also collected during the semi-structured interviews. The knowledge and use values of Mittimatalik that have been impacted by the Mary River Project to date were explored, as well as participants concerns around potential future effects from ongoing activities and the then-proposed Phase 2 development.

The English portions, including translations, of the audio from the interviews were transcribed. Transcripts were then reviewed, coded thematically, and analysed for issues and concerns identified by Study respondents. These data are summarised in Sections 4, 5, 6 and 7.

All spellings of Inuktitut words used in this Report were either verified during interviews, based on spellings encountered in relevant literature from the northern Qikiqtani, or based on the place names in use by the Inuit Heritage Trust (“Inuit Heritage Trust: Place Names Program” n.d.).

4. USE AND IMPORTANCE OF FRESHWATER

This section outlines the importance of freshwater in the Study Area to Mittimatalingmiut, drawing on site-specific (i.e., mapped) data and qualitative data collected during Study and Tusaqtavut interviews.

- Section 4.1 outlines the multi-faceted way in which fresh water is important to Inuit, drawing from qualitative data collected during interviews.
- Section 4.2 describes reported Inuit use of freshwater within the Study Area, using mapped data and quotes from participants.
- Section 4.3 identifies candidate Waterbodies of Heightened Importance based on Inuit use, important qualities of water described in Section 4.2, and direct identification by Inuit participants.
- Section 4.4 draws on the three previous sections to arrive at a preliminary set of Inuit Water Objectives that are based on how freshwater is important to and used by Inuit.

4.1 IMPORTANCE OF WATER TO INUIT

This section draws on qualitative data collected during the Study and Tusaqtavut interviews and outlines the multi-faceted way in which freshwater is important to Inuit.

4.1.1 Inuit-Identified Principles, Laws and Rules related to Water

Living off the land and collecting water from the land has emphasized a long tradition of caring for the land and water in order to avoid contamination and the spoiling of a water source or char stream. Inuit have developed a rich tradition of laws, rules, and customary behaviours to moderate their own protection and conservation of freshwater systems and resources.

In the examples below, participants describe two of the core principles of these rules. Maintaining the cleanliness or purity of water source is held to be centrally important as is treating water (and the land more generally) with respect and a degree of solemnity.

> *No activities in or around streams, lakes, that were used by Inuit for any purpose. Dogs were never tied up around streams, lakes, rivers. And there were no playing, no playing around those water sources. (P05, 08-Nov-20*
>
> *(Interviewer:) Do you know any rules around the use of fresh water, like a rule for fishing or a rule for how you would travel around fresh water? (P17:) Yes … Try and keep the place as clean as possible. (P17, 10-Nov-20)*
>
> *Yeah. [If] The land is in good condition. I think of the water is good to drink and to cook with. (P38, 09-Nov-20)*

These rules are passed on and taught from generation to generation and as such can be considered to reflect a kind of collective knowledge passed on while Inuit are young, as the participant below explains.

> *(Interviewer:) Who taught you about those values, or, or those rules about water? (P17:) Growing up from parents and other older people. (P17, 10-Nov-20)*

These rules and stories whether they relate to cleanliness or to the uses of water are valuable data for the design of future monitoring programs as they underline the importance both of freshwater but also of important Inuit indicators. In describing traditional stories, a participant described important rules they were taught.

> *(Interviewer:) Do you know of Inuit stories or traditions related to the use of freshwater? (P49:) Yes. We can only drink moving water like, like a river. Don't drink a still like a, a lake – partial lake or something that has there's no flowing. And then it's not good. And snow. Snow we could hunt snow … Snow if we were thirsty out on the land, not to gulp in snow. That could maybe numb your insides or and make, make it cold for your body temperature. And you can die from it. Hypothermia. Unless, if you're, if you're do – going inside for soon that you can take, take snow with you. To you and then drink it. And on salt, salt ice when it's thin, you can actually cut a piece and put it upside down and make – you can make it fresh and not salty. That's, that's traditional, I guess, that's been passed on. (P49, 12-Nov-20)*

These key indicators, of flow, temperature, the state of water and the taste are extrapolated into the key Inuit water quality indicators in Section 5.

4.1.2 Drinking Water Importance

This section describes the importance of freshwater to Inuit use and cultural continuity. Freshwater was described by participants as being an important element of traditional medicinal practices and emphasized how freshwater played a role in the spiritual and cultural connection of Inuit to the land.

> *Yes, it [freshwater] was very important, back in the day before Qallunaat came, before the colonial time, it was spiritual and it had its medical properties. (P05, 08-Nov-20)*

> *…everything to Inuit is interconnected, so water has been used for survival, it's very, has a significance with Inuit, it's spiritual. (P05, 08-Nov-20)*

Freshwater plays a central role in Inuit health and survival, and as such is considered by Inuit, including the participants quoted below, to be foundational component of a healthy environment.

> *(Interviewer:) Is fresh water important to Inuit? (P17:) Yes … Without water we can't survive. (P17, 10-Nov-20)*

Yes [freshwater is important to Inuit] … Very. The – we, we need, we need to drink freshwater. That's just to survive. (P49, 12-Nov-20)

It's very important [to health], everybody drinks mostly water especially if it's from the glacier or iceberg. (P45, 12-Nov-20)

Water was described as being refreshing and energizing by participants, who saw freshwater from the land as a nourishing force that sustained them.

(Interviewer:) What role does freshwater play in your health? (P49:) Very much because you need water to, to fresh, freshen up your body system ... (P49, 12-Nov-209)

[Freshwater plays a] Major role [in health]. We can't live without the water around our area cuz it's the only thing that we might be able to get, if we don't catch any animal. We're not always hundred percent sure if we're gonna get animal or not. Water can give us energy. P38 09-Nov-20)

When you drink tea, you don't get full because it is just water right. But if you use that spring water [on the Mary River] it makes you feel like you had a healthy hearty meal. (P04, 07-Feb-19, interpreted from Inuktitut)

Freshwater was associated with purity and cleanliness by participants. One participant explained that language has developed to describe the inherent purity of some water, particularly the term, *Kikaituk*.

(Interviewer:) You used the term in Inuktitut for clean, fresh water. It's the cleanest, freshest water. Kikaituk. (P42, 10-Nov-20)

Freshwater is used by Inuit for a variety of purposes including drinking, cooking, and washing.

We use it [freshwater] for, almost everything like drinking it, using it for tea coffee and cooking. (P48, 12-Sep-20)

[We use freshwater] For drinking and make tea, coffee. And make something out of it like juice or something. (P49, 12-Nov-20)

[Freshwater is used] Mainly for drinking and cooking. (P42, 10-Nov-20)

(Interviewer:) What do you use fresh water for? (P45:) Health reasons for me, I use it for drinking and cooking. (P45, 12-Nov-20)

Inuit also use freshwater for washing their clothes and themselves.

[Freshwater is used for] Mainly to have– drinking tea or coffee, cook my meal. To keep the salt water off my clothings. (P38 , 09-Nov-20)

Drinking, cleaning, washing. (P05, 08-Nov-20)

> *What I think, if a person drinks good water, there would not be rashes on their body and would have smoother skin. For example, I have cabins and when I melt iceberg and use it to bathe in it and my body got really clean, it is a lot better than chlorinated water. (P43, 10-Nov-20, interpreted from Inuktitut)*

Freshwater is important ultimately to all aspects of Inuit life, to health and survival of Inuit but also to the proper function of the terrestrial environment, essential to the health and survival of the ecosystems which Inuit rely on.

4.1.3 Water Source Preferences

Inuit expressed preferences about the sources of the freshwater that they might gather while travelling on the land. Water gathered on the land was broadly considered by participants to be superior to water which comes out of the tap in Mittimatalik, flowing from the lake which is the drinking water reservoir for the Hamlet.

> *It's very important [to participants health]. I also prefer it to tap water. (P05, 08-Nov-20)*

> *(Interviewer:) Do you prefer, water from the land or water from the town? Like, tap water. (P17:) Maybe water from the land … The water from the lands got no chlorine. The water we get from the town with chlorine in it. (P17, 10-Nov-20)*

Participants expressed a preference for running water over frozen water. This may reflect a preference for running water as being cleaner and may also reflect the fact that running water when travelling on the land is easier to gather and use for drinking water than frozen water which must be melted on the stove or in the kettle.

> *I prefer running water [to frozen water]. (P38, 09-Nov-20)*

> *(Interviewer:) Do you prefer frozen water or running water? (P17:) Running water I guess? (P17, 10-Nov-20)*

> *There is always an open area of water there [close to Ikiqtuuq Lake] where you can check for fish and people have their tea there ... Winter time when you are travelling that route it is very cold outside you hear creek water running, river water running.* (P04, 07-Feb-19, interpreted from Inuktitut)

> *I usually camp out near the fresh water, like where it's always flowing because rather than having to pluck out my…like this, I just got to go to the river and just fill up my teapot.* (P09, 05-Feb-19)

Icebergs are a preferred source of water for Mittimatalingmiut. Participants described how community members would travel the Eclipse Sound area during the winter to reach icebergs which had been trapped in the sea ice so that they could gather large chucks of the iceberg to take them home as a source of pure water.

Everyone prefers iceberg, and that's the best for drinking … It seems more pure, no discoloration. Aesthetically just looking at it, wow, just no taste like it. Nothing compares.(P05, 08-Nov-20)

(P42:) [Participant had been collecting iceberg water] Ever since I've been remembering. When I have a chance with the boat … It is important. Like I said, it's, it's raw. Naturally raw water. Its hasn't been touched by chemicals either. And it's not as hard as the lake water. (P42 ,10-Nov-20)

I would prefer an iceberg water when, when, with, when it freezes up. And get some chunks of ice, iceberg and use it for drinking water and for anything like tea and coffee. Which is more fresh than water, the water lake. (P49, 12-Nov-20)

I think from the studies here I can say most people prefer the iceberg … Everybody [collects iceberg water]. Iceberg, multiyear ice, on the ocean, anywhere. Multiyear ice, iceberg, all year long. (P05, 08-Nov-20)

I, I think we're being spoiled with iceberg. You know, iceberg is, it's one of the best. I mean, I'd advise you to get it. (P49, 12-Nov-20)

The tap water, when you use it for laundry and when we use it for toilet, it fine, when you use it for cleaning purposes, but we Mittimatalikmiut prefer melted iceberg to drink water or make tea from it. (P43, 10-Nov-20, interpreted from Inuktitut)

I believe that any water, if it's tap water or iceberg water, if I put it in a clear mug, you can tell if it's good water, it can look like magnifying glass … Let's say you have two different mugs, tap water and iceberg water, we can use iceberg water in a clear mug, as a magnifying glass, yes. (P43, 10-Nov-20, interpreted from Inuktitut)

…the water from iceberg and tap water are not the same, even if it looks clean, when you drink from the tap water, you will still be thirsty. (P43, 10-Nov-20, interpreted from Inuktitut)

When an iceberg lands close to our shore, then many Inuit will go to collect ice for their drinking water, whenever an iceberg grounds itself near our community. In our community, we rarely ever collect ice from our lakes up here. (P37, 09-Nov-20, interpreted from Inuktitut)

The water from the land, especially the meltwater from the glaciers is the freshest water you can get, as well as water we melt from the icebergs that ground unto the waters offshore. The water from iceberg ice is extremely fresh and sparkling. However, the water that is coming directly from our glaciers that is clean is amongst the best waters you can taste. (P37, 09-Nov-20, interpreted from Inuktitut)

> *…whenever I get ice from iceberg, I don't filter them. (P16, 08-Nov-20, interpreted from Inuktitut)*
>
> *The ice we collect from icebergs and melt it, we drink it as is it, it's already good water and it's clear. We rinsed it first, before putting it in a pot. (P36, 08-Nov-20, interpreted from Inuktitut)*
>
> *The best water comes from iceberg and the other one is from glacier, is the best water, especially if you're going to drink tea from it. The water from streams and or rivers are not the same. When you make tea out of it, it get dark, it's good water but it get dark, there are others that don't get dark. (P16, 08-Nov-20, interpreted from Inuktitut)*
>
> *What I think is, if a human drink water from iceberg and I believe that their actions and their physical being, and mind can be a lot cleaner. For when we go to other communities, their water seems different, and you'll still be thirsty, and we want to drink the water at home instead. (P43, 10-Nov-20, interpreted from Inuktitut)*

This very pure iceberg water is considered the particular favourite of elders, who participants often described as being the recipients of gifts of water.

> *(Interviewer:) Do you collect ice or snow while on the land in the winter? (P38:) Yeah, all the time. Every chance I get, I collect ice and snow. Mostly ice for the elders. (P38, 09-Nov-20)*
>
> *Out on the land [I] like fresh iceberg. I would prefer iceberg and, and that's number one. (P49, 12-Nov-20)*
>
> *(Interviewer:) Do you collect ice or snow when you're out on the land in the winter? (P49:) Not really. Well, I – like I said, if there's an iceberg close by, I collect ice. Chunks of ice for drinking water only. For nothing else. Not for cleaning. Not for anything, but for drinking water. And I barely use snow in town or out on the land, but if you have no choice, yeah. I would, I would use snow. (P49, 12-Nov-20)*

The difference between glacier and iceberg water was described by one participant as being primarily a question of taste, water from both sources being considered pure or trusted.

> *I think they're [glacier and iceberg water] the same. But glacier water is more from the land. And iceberg water is very fresh. (P45, 12-Nov-20)*

Glacier water is an important water source for many Mittimatalingmiut who described it as being pure water of high value, ranked second only to the iceberg water.

> *[Describing freshwater source preferences] Multiyear ice. Especially in the summer, the water on the ice … When we didn't have iceberg we would get water from the glacial stream, for elders. (P05, 08-Nov-20)*

See that ice glacier? That's water coming out. That's where I get good water there also. Because I know that place, the water's coming from glacier. (P44, 10-Nov-20)

(Interviewer:) What's the best water for drinking? (P38:) The best water for drinking is the glacier water from, from the rivers that we collect. (P38, 09-Nov-20)

The water that comes down is like really crystal clear, it's just like clear, clear, clear. Like very fresh, coming off the glacier, you know it. It's just like one of the best waters I've had. (P09, 05-Feb-19)

(Interviewer:) Is there something that indicates to you that it might be fresh water? (P45:) Yes … I know where it is coming from … Up where the glacier is. (P45, 12-Nov-20)

And also, when we have icebergs, we try to have that as water source when its available. And when I go boating to fetch water, I would choose the water from the glaciers in the summer. In any place that has glaciers water because there are areas and streams that come from glacier waters. (P08, 12-Nov-20, interpreted from Inuktitut)

And also, at Ivisaa has glacier water. I get water there as well. (P08, 12-Nov-20, interpreted from Inuktitut)

…[the water] from a glacier when you drink it has no taste at all — and you can tell the mineral in the water, the water smells of iron or minerals, even if the minerals are not flowing through a river. (P04, 10-Nov-20, interpreted from Inuktitut)

Elders prefer land water, and participants explained that they would often gather water on the land specifically to bring back to Mittimatalik as a substitute for tapwater for elders in the community.

And elders like it [freshwater gathered on the land], so when I can we gather for elders too. (P05, 08-Nov-20)

Using snow melted for water is not an uncommon practice amongst Inuit, particularly in the winter. However, as one participant explained, using melted snow requires an understanding of the relative density and purity of layers of snow – the deeper, harder snow being preferred for drinking water.

(Interviewer:) When you're travelling out on the land, do you collect ice? (P42:) Yes … Iceberg. But when I don't have iceberg, I dig up the snow and go down to the very first layer of snow, which is like those little hard snowflakes … you have to dig through the snow. And then you come on, on top on bottom of that first layer, which is kind of hard. That's the best drinking water you can make from a snow. You know when you digging the snow? When you go to the bottom, and you hit something hard … That's

underneath is the ground. So, that one is good drinking, best drinking water. Better than the snow on top. (P42, 10-Nov-20)

While travelling on the land, while gathering drinking water is an opportunistic process, Inuit have clear preferences when it comes to locations and types of water source which they favour for their drinking water. These preferences are discussed further through the water quality indicators provided in Section 5 below.

4.1.4 Learning about Water: Stories and Teaching

Choosing good drinking water and knowing locations and indicators which can be trusted is important knowledge, passed down between generations of Inuit.

(Interviewer:) Who taught you about those water values or water qualities? (P49:) My father and some friends like my uncles and friends and grandparents. (P49, 12-Nov-20)

People learn important water collection sites, for example sites that don't freeze, and places where it is easier to find water. Finding freshwater, particularly water that is clean, and doesn't require melting is an important travelling and survival skill.

I know elders like the fresh, they know a place of water that never freezes, and they collect it. (P48, 12-Sep-20)

(Interviewer:) Do you know of Inuit Legends or stories or traditions that are related to using fresh water? (P45:) Yup, there was finding ways of looking for fresh water … And there – most times they're using icebergs for fresh water. (P45, 12-Nov-20)

The story that I know about the freshwater that my grandfather told me, he told me– If you, if you're out caribou hunting and you can't find any freshwater but you can hear them. Just start digging down further. You can go, or at least until you can reach the water and you can get the freshwater from the earth itself. That's where he taught me. (P38, 09-Nov-20

Yeah, they [past generations of Inuit, and elders] can find water like say if you're on the ocean at floe edge for example and there's no stream around, they can tell you, they can tell from looking at it the fresh snow melt on the ice, that water from salt water they can tell that. They found underground sources of water and they've used skin or the stomach lining as a water bottle. That's during hunting. And they would put snow in there and melt it. The water bottle's made from stomach lining or skin. That would be used for hunting and elders will tell you the fresh snow that would melt under the snow, there's a little puddle and they'll tell you what kind of snow is best for melting or drinking. (P05, 08-Nov-20)

By dog team traveling we would choose the first layer of snow next to the ground [to collect for water]. Over the winter the snow collects on top of it layer by layer and we would select the bottom layer. The snow from the first snow fall. As we would prefer the first layers of snow the bottom layer

because it would have ice crystals. That's what we use to choose. (P08, 12-Nov-20, interpreted from Inuktitut)

If we [do] not have Colman stove like the white people and no way to melt water. I could make water. I would remove the caribou intestines and there's a small stomach and I would melt the snow using the little bag using the heat from the caribou. Because we did not have a pot to melt it. (P08, 12-Nov-20, interpreted from Inuktitut)

And if I'm out hunting and harvested a caribou, if I'm thirsty and I wouldn't have a Coleman stove and I really want to drink, I would slit the caribou stomach and take out the guts, clean the stomach and put snow in it, I would start butchering another caribou, and wait for the snow to melt and I can drink from it after. (P43, 10-Nov-20, interpreted from Inuktitut)

Ways to make water using body heat have also been passed down through generations. One participant, quoted below, explained how water has to be treated with caution in extreme cold, but can be defrosted by one's body heat in an emergency.

(Interviewer:) Have you ever been out on the land when you haven't found water? Drinking water? … What was that like? (P49:) I, you know, you – you become thirsty. You want to drink water. Now, it was like, it was actually like a week without water, but, but there are, there are ways of melting snow when you're out there with no, nothing to melt it. You can melt it with your body heat inside and drink, drink it that way. And we were advised in the past not to take snow for your thirst. Not to put it in your mouth without melting it because like I said, it numbs your like everything and your body temperature goes down. And you can actually freeze from it, from hypothermia. And sometimes in the summer too when there's no river, when there's freshwater, you, you know, you look for river or, or an iceberg in the summer. (P49, 12-Nov-20)

Alongside choosing good water from reliable and clean sources, Inuit have also passed down knowledge related to traditional ways to filter water. One participant described how a sealskin bag could be used as a filtration method, by allowing sediment to settle at the bottom.

It [freshwater] has been like stored in sealskin. They had no other sources to check the water how bad it is. They put it in their sealskin bag for some time to get rid of the dirt. (P42, 10-Nov-20)

Given the importance of freshwater for survival on the land, Inuit have evolved a complex set of skills and a deep body of knowledge focused on how to recognize good water, filter poor water, and find water in a survival scenario.

4.1.5 Seasonality of Freshwater

During each season Inuit know to look for water sources in different places and rely on different techniques to procure freshwater supplies.

Winter water sources include snow and icebergs which have become trapped in the sea-ice.

> *(Interviewer:) In the winter what do you look for to find fresh water? (P45:) Icebergs. (Interviewer:) What about in the summer? (P45:) The creeks or the river, I don't know so much the river maybe the creeks where it's coming from. (P45, 12-Nov-20)*

> *[In the winter] I look for iceberg mainly. If I can't find iceberg at close, I would dig up that snow until I hit that surface snow that, that first snow. (P42, 10-Nov-20)*

> *(Interviewer:) Ok. Can you tell us what kind of water you would look for during winter? Sorry, what kind of indicators you would look to find in winter to get fresh water? (P48:) During winter it's usually form the iceberg. (P48, 12-Sep-20)*

In the spring and summer Inuit primarily target running water from small springs or creeks.

> *(Interviewer:) What about in the summer. What would you look for to find freshwater in the summer? (P42:) Little creeks. (Interviewer:) Is that different in spring or fall? Would you look for something different in spring to find freshwater? (P42:) Yes … Runoff. (P42, 10-Nov-20)*

> *(Interviewer:) Do you prefer frozen or running water? (P45:) Frozen, running water during the summer, frozen for the winter. (P45, 12-Nov-20)*

> *Anywhere water is always available in the springtime. It can be on the land or in the ice. When the snow starts to melt then water is ready everywhere. (P08, 12-Nov-20, interpreted from Inuktitut)*

> *(Interviewer:) What about summertime, what would you look for in the summer to find fresh water? (P48:) I go up to an area where people don't usually hangout or do recreation activities at. Like to that stream where it is clean … Springtime, they usually get water from the ice, like you can tell if it's saltwater or clear water when the ice is melting. That's where we usually got our water from. Fall time, it's usually from the stream. (P48, 12-Sep-20)*

In the fall, participants describe seeking freshwater wherever it could be found including both running water from rivers and creeks as well as icebergs (if available).

> *Okay. In fall at this time, I go if the water, if the ocean ice is safe enough I will go look for iceberg. But at this time of the month I also know of fresh water coming out from what I already told you, so I will go there too. (P44, 10-Nov-20)*

Accessing freshwater is based on a complex knowledge of specific locations to procure easy to access and safe freshwater. This water knowledge will often involve sites

across a large area, as hunters and travelling Inuit will traditionally gather water along the trail.

4.1.6 Importance of Fishing

While this Report focuses primarily on freshwater, fishing is introduced here and discussed further in the Report in the context of Inuit indicators of freshwater as well as possible Project and cumulative effects on fish. For Inuit, the presence, health and abundance of freshwater and anadromous fish, primarily char, is a critical function of freshwater systems and a key indicator of the health of the watersheds of northern Baffin Island.

Fishing, primarily for Arctic char, is an important activity for many Mittimatalingmiut. Participants identified the importance of fishing in the Study Area, particularly for char in the areas of Lake Qurluqtuuq and Tuugat Lake (which are accessed from Qinngua), and in the small lakes and rivers of the Phillips Creek and Mary River watersheds. While char are anadromous and are often caught in saltwater, a large portion of the fishing conducted by Mittimatalik community members also takes place in bodies of fresh water throughout the North Baffin region. Fishing is an activity which generates relatively low cost, readily available and abundant country food, and as it doesn't require a lot of additional or costly equipment, it is an activity widely practised by community members who will often fish while on other hunts or trips or, depending on the season may make it their primary goal during an excursion on the land.

While char are caught both at sea and in the rivers and lakes, some participants identified the char as preferable when they are caught in freshwater systems. One participant describes their preference for landlocked char.

> *Landlocked chars are more– flakier than the, the one that goes to the ocean. So, we prefer the land locks more than the Arctic chars. (P38, 09-Nov-20)*

Mittimatalingmiut favour a number of key locations for their fishing. In particular a number of sites are valued locations, in use over many generations, including the Mary River area with its lakes and rivers, Phillips Creek, and the Tugaat area, amongst other sites.

> *Like, the ice melts and breaks up faster than surrounding lakes in that area [Mary River area]. And apparently it's like so much fish, as soon as you drop your hook in, you're catching one. (P04, 04-Feb-19, interpreted from Inuktitut)*

> *The ones [fish] that comes from Tugaat are the best, they're different and I would keep eating them. (P37, 09-Nov-20, interpreted from Inuktitut)*

> *As [a] Pond Inlet resident I really preferred Tugaat [for fishing] … Yes, I netted there when I was young. I also fish with a spear. We did not have nets back then we used fish spears. Maybe in the 60s. (P08, 12-Nov-20, interpreted from Inuktitut)*

> *At Tugaat Lake was I was saying the fish tastes like sweet taste and the skin is thin. At Tugaat Lake, I was saying this to, it's even better, you can eat it but you don't have heart burn, if you eat too much you get heart burn. But Tugaat Lake you can eat it day after day, day after day and you don't get heartburn. (P07, 05-Feb-19)*

> *Before Mary River. Fishing place in the summertime right there through the river up to here [Phillips Creek]. That's the falls. Right there is where they – that's where they would camp out when the fish are going up stream. That is a very famous fishing spot. (P04, 05-Feb-19, interpreted from Inuktitut)*

> *They found it was absolutely wonderful because even though they would get wet from the [Mary] River they would only get clean and no salt. The most beautiful area ... In that point, there is great abundance of char. Every time you cast you will always catch one. You don't have to cast more than once to catch a fish. That's how many there were. (P04, 05-Feb-19, interpreted from Inuktitut)*

Certain months are more productive than others.

> *[Productive fishing is] In, in, in August. Maybe July. July and August because that's when they go downstream to salt water. The migration of fish to saltwater. (P49, 12-Nov-20)*

Inuit have evolved a complex and highly place-specific knowledge when it comes to important char runs. This highly place-specific knowledge of fishing locations and habitat is based on a strong understanding of the hydrology and seasonal conditions which affect these important bodies of freshwater. In the quotes below, participants provide examples of this knowledge – outlining fishing technologies including caching and the use of weirs, which are highly place-specific.

> *They would do that in the fall when they won't get spoiled. So, there is a number of caches there [at head of Qinngua] – like you can see the round stone formations and they would use that in the fall so that they could use the fish in the winter time. And when you do it in the fall they do not start to rot.* (P04, 05-Feb-19, interpreted from Inuktitut)

> *This area [by Avaliqqurjuaq] they have stone weirs built in, and there's a whole bunch of weirs that extend for a long ways, and the traditional Inuit would hike up into the hills and fish off the weirs ... So when the fish were migrating back up to the lake, the people would use those weirs to catch the fish.* (P04, 04-Feb-19, interpreted from Inuktitut)

> *It's Avaliquapik and Avaliqurjuaq … [personal name] used to tell stories about this place saying that the fish going to the ocean and the other ones are coming back from the ocean. The fish switch places. There's an old story asking, "Where do you eat to get so fat?" "We go to the ocean". So they told the other fish, "we will try next year!" (P04, 10-Nov-20, interpreted from Inuktitut)*

4.1.7 Managing Risks associated with Freshwater

Many of the participants described how in their experience the tapwater in the community was often marked by a poor taste, leading to their preference for water collected from the land. For some participants, this difference in taste was only part of the difference, and they referenced additional reasons, including the chemicals added to reservoir water to purify it, as another source of the poor taste they could perceive.

> *I prefer the traditional water. Besides, the tapwater. 'Cause when they're doing the water deliveries, they add some chlorine to it, to, to kill the germs but it is awful taste to it. (P38, 09-Nov-20)*

> *It [freshwater from the land] doesn't have any additives in it, so it is healthy then what we receive from the hamlet services. Sometimes you can really taste the chlorine or smell it when it is from the tap water. Most of the summer we always have boil water advisory. (P48, 12-Sep-20)*

> *(Interviewer:) If you know that Inuit are collecting the water there [out on the land] and sharing it with their elders, including your mom. Is that an area that you would like to see protected? (P48:) Yes, because that is important part of that elder's nutrition, I guess. Because it is way safer than the ones we get from the hamlet, it doesn't have any additives in it, no chlorine. (P48, 12-Sep-20)*

Tapwater in the community of Mittimatalik, coming primarily from the reservoir lake, and often stored in water tanks, carries risks according to participants. These risks range from poor taste through to possible toxic contamination. These risks may contribute to the preference evinced by many participants from water collected from the land.

> *Yes. It's [freshwater] more preferred than tap water, tap water you have chemicals, metals, biofilm, DBPs, by-products of chlorine. If we have turbid waters or dirty pipes, you'll get chemical by-products which have significant health impacts. (P05, 08-Nov-20)*

> *Yes … yes, I myself experience sickness from -– I avoided drinking tap water – I started avoiding drinking tap water – I was having ulcers in my stomach. (P45, 12-Nov-20)*

> *[Interviewer]: Do you prefer water the community or the land? [P36]: I prefer water from the land, because I don't like the taste the water that's delivered to us and because it has chlorine added to it… (P36, 08-Nov-20, interpreted from Inuktitut)*

Although water from the land is preferred, it is acknowledged as coming with some risks. In the quotes below, participants described the extent of those risks, ranging in severity from stomach-aches to being potentially lethal.

> *(Interviewer:) When you collect water. Have you ever boiled or chemically treated it? (P17:) Just boiled … Growing up, I was told not to drink straight*

from the lake 'cause I would get stomach-ache. If I drink too much of it. (P17, 10-Nov-20)

If I drink the water from the stream. And it's no good. I would stop going there right away, 'cause I had relatives die from bad water before. (P38, 09-Nov-20)

The trucked water is also brought here but it's different from our regular water. There is too much additive so it's not so good anymore. (P40, 09-Nov-20, interpreted from Inuktitut)

Filtering and boiling water are techniques used by Inuit to manage the hazards associated with collecting water from an unknown or suspect source.

Moving water it's, it seems to me like that water is filtering out some of the contaminants. And while use the pond with the river [inaudible 0:27:14:0] is collecting what's available and not running off at all. (P42, 10-Nov-20)

I've watched my great grandfather. This, this stream right here. I've watched him clean, clean, purify the water with caribou skin before. (P38, 09-Nov-20)

My grandfather grabbed some water from here, purified it … Yeah, it was mostly murky. How do I say it? Like, mostly debris of sand. So, he had to naturally purify it with caribou skin. (P38, 09-Nov-20)

(Interviewer:) When you collect water, have you ever boiled it? (P42:) Yes … That's the only thing that we have up north. No chemical solution to clean with it, so we boil the water. (P42, 10-Nov-20)

Water choices are based on decisions rooted in personal and communal experience and observation, rooted in IQ. Despite the hazards associated with poor water quality, people seek out what they consider good water and try to find adaptive solutions when none is easily available.

4.2 PRELIMINARY INUIT WATER OBJECTIVES

Rooted in the important Inuit uses of water and sources of water which Inuit value (identified in the previous section), Mittimatalingmiut have identified several important objectives for the Inuit protection and conservation of water. These objectives should be considered a preliminary list, representative of research conducted with Mittimatalingmiut and verification with the Inuit Committee of the Inuit Stewardship Program. Further research with other impacted Inuit communities may add additional Inuit water objectives.

1. **Freshwater must be available and of sufficient quality for Inuit use from preferred locations on the land and on icebergs.** Inuit prefer water from the land over tapwater, when they know that it is safe. Water collected from the land for use must be within natural observational parameters, to be considered clean and safe by Inuit.

2. **Freshwater must be clean and plentiful in lakes, rivers and streams in order to support healthy fish populations.**

3. **Waterbodies of Heightened Importance must be protected from changes in water quality, quantity or flow which materially reduce their value or usability to Inuit**. Certain types of freshwater are preferred, high value water sources, noted for their purity and health benefits. These sources are culturally significant, and they must be protected to ensure that Inuit can continue to drink from them and use them. These water sources include icebergs throughout Eclipse Sound, glacial rivers and streams, and freshwater springs.

4. **Inuit Qaujiamajatuqangit must be utilised to decide which freshwater sources are important and need protection.** When collecting water from the land Inuit have developed a deep body of knowledge about how to collect the purest water, most efficiently. Inuit favour sites where water is flowing, not still. Inuit know places where strong currents and flow mean that water does not freeze, enabling them to quickly gather pure fresh water even in the winter. Inuit know they can melt snow provided it is clean, and will use the deeper, harder snow as it is better.

5. **Water sources must be protected to maintain other important aspects of Inuit culture and way of life.** Patterns of water use and collection sites are closely connected to important areas for other cultural practices and land uses (e.g. hunting, fishing, travelling, camping) and must be protected.

6. **Inuit defined principles, laws and norms surrounding water must be followed to ensure the sanctity, purity and cleanliness of water sources is protected.** For this reason, human and animal waste should always be kept away from water sources. This includes any man-made changes, recreational activities like swimming, industrial waste or impacts, or offal and remains from processing the harvest. Inuit avoid water which has been contaminated in these ways.

7. **Water sources that do not require treatment are strongly preferred and must be protected**. When Inuit are unsure about the safety or purity of a water source they will adapt to the situation by either avoiding that water or treating it. Inuit may treat water by boiling, filtering or using a chemical treatment, or by allowing sediment to settle in a container. In all cases Inuit prefer not to take these steps but to be sure about the quality of the water they are using and to be able to use it without fear or concern.

4.3 MAPPING INUIT USE OF WATER

4.3.1 Overview of mapped freshwater and fishing values

A total of 95 site-specific freshwater and fishing values were reported by participants in the Regional Study Area, with 33 of those occurring within the Local Study Area, and are shown in Figure 2 on the following page. These values are reported by a total of 28 unique participants. Figures 3-4 below show the distribution of site-specific values in in relation to the RSA and LSA at a finer scale. Inuit-reported use values contribute strongly to the identification of candidate Waterbodies of Heightened Importance outlined in Section 4.4 below.

As shown in this data, the Study Area contains numerous important sites of freshwater resources used by or otherwise valued by Inuit. Mapped sites include, but are not limited to:

- Sites and areas used for gathering freshwater for drinking and other uses;
- Important char habitat, including spawning rivers and overwintering lakes;
- Important water crossings on travel routes that are relied upon to access hunting grounds and other communities;
- Important fishing sites relied upon for traditional food harvesting, as well as sites historically used to cache fish; and
- Waterbodies of Heightened Importance.

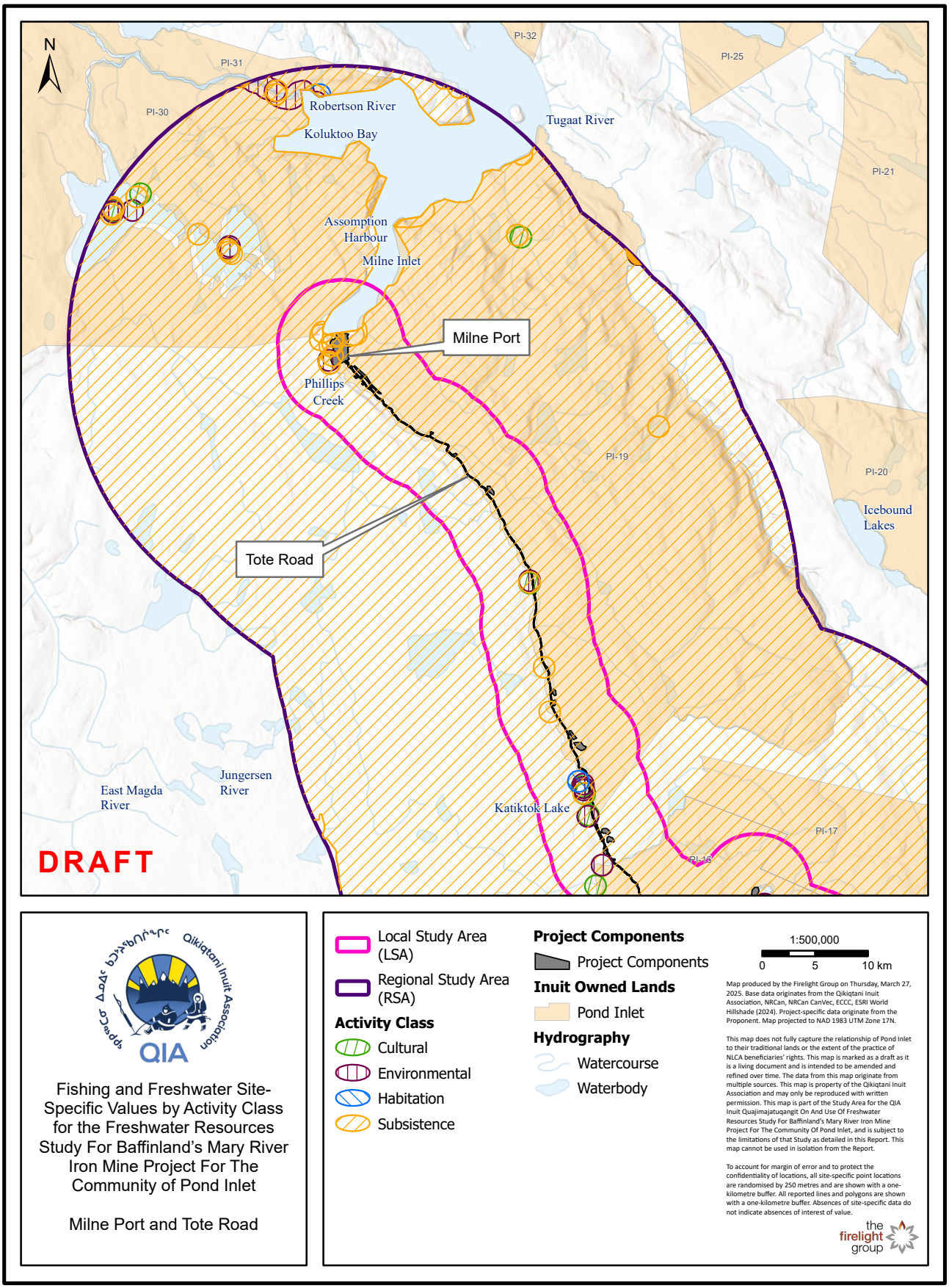

Figure 2: Fishing and freshwater site-specific use values reported by Inuit around the Study Area, including within the RSA.

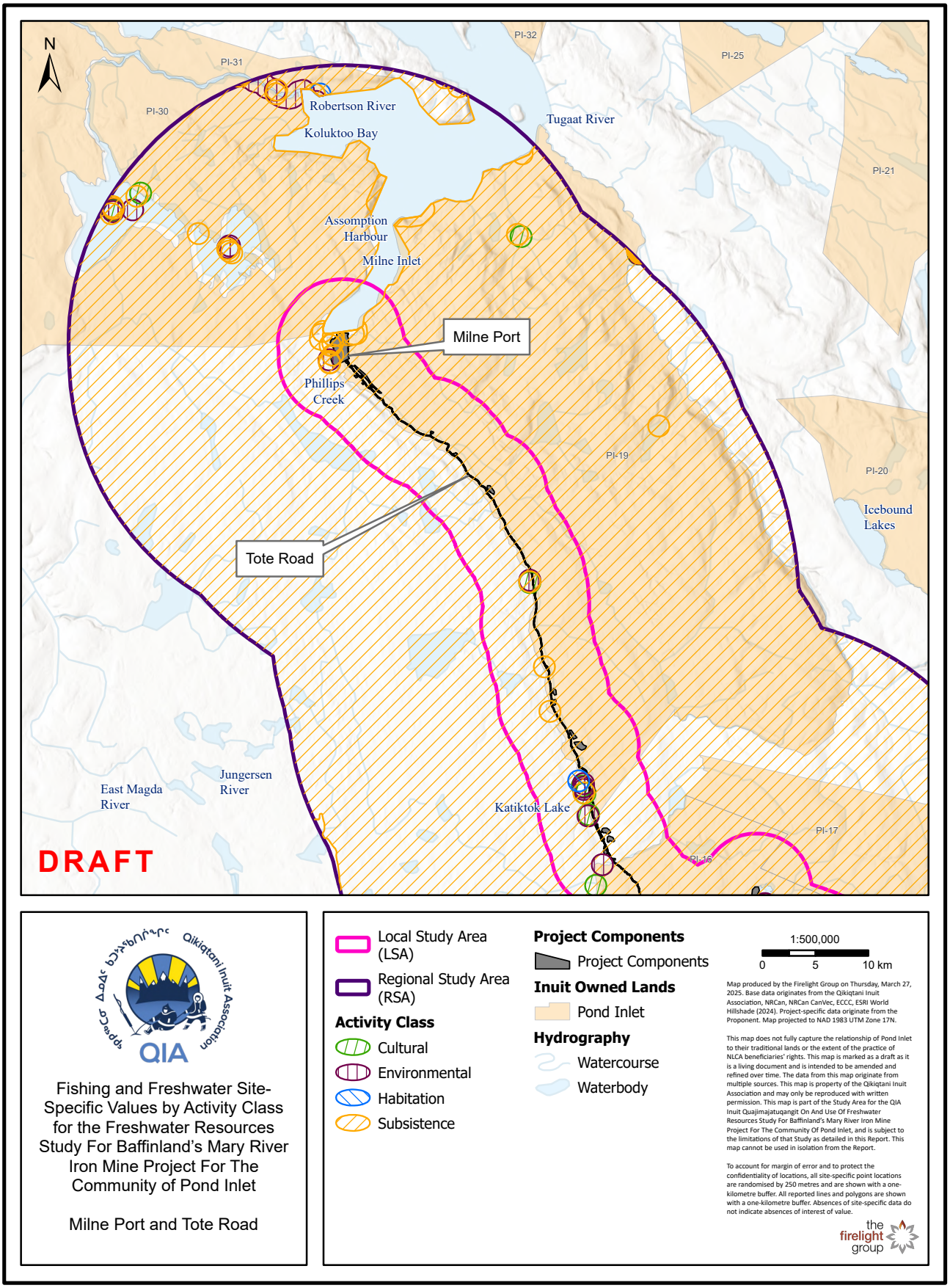

Figure 3. Fishing and freshwater site-specific use values reported by Inuit within the RSA, adjacent to the Milne Port and Tote Road.

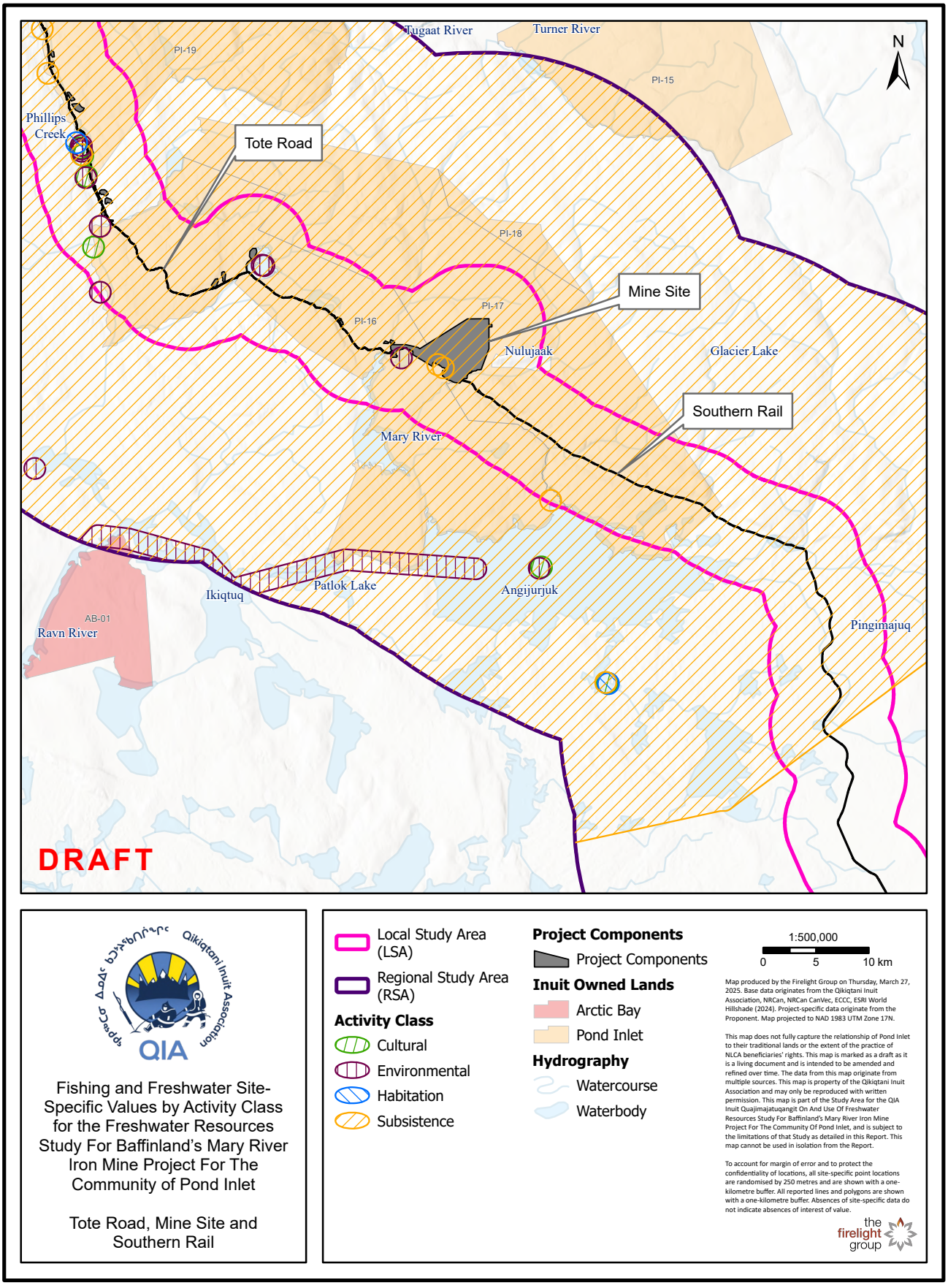

Figure 4. Fishing and freshwater site-specific use values reported by Inuit within the RSA, adjacent to the Mine Site.

4.4 CANDIDATE WATERBODIES OF HEIGHTENED IMPORTANCE

4.4.1 The Significance of Waterbodies of Heightened Importance

"Waterbodies of Heightened Importance" means waterbodies that have been identified by Inuit as critical to the resources they have used, use now, and/or would like to use in the future, or that have heightened cultural importance and sensitivities to change, that merit heightened monitoring, management provisions and/or compensation requirements in the event substantial effects attributed to Project activities are identified. This term, Waterbodies of Heightened Importance, was first used in the Inuit Certainty Agreement (June 16, 2020) in Sections 17.1 and 17.2 where they are also referred to as "Waterbodies of Unique Value and/or Cultural Significance".

Relevant discussion of thresholds of change (i.e. what constitutes a substantial Project Effect in water) may also be found within the language of the *Nunavut Agreement* which makes specific reference to changes to water quality, quantity and flow. According to the *Nunavut Agreement*, Article 20.3.3. the Nunavut Water Board must take into account the following criteria when assessing compensation:

> *In determining the appropriate compensation for loss or damage under Section 20.3.2, the NWB shall take into account the following:*
>
> *(a) the adverse effects of the change in quality, quantity or flow of water on Inuit Owned Lands, owned or used by the person or group affected;*
>
> *(b) the nuisance, inconvenience, disturbance or noise caused by the change in quality, quantity or flow of water to the person or group affected;*
>
> *(c) the adverse effects of the change in quality, quantity or flow of water in combination with existing water uses;*
>
> *(d) the cumulative effect of the change in quality, quantity or flow of water in combination with existing water uses;*
>
> *(e) the cultural attachment of Inuit to Inuit Owned Lands, including water, adversely affected by the change in quality, quantity or flow of water;*
>
> *(f) The peculiar and special value of Inuit Owned Lands, including water, affected by the change in quality, quantity or flow of water; and*
>
> *(g) interference with Inuit rights, whether derived from this Article or some other source.*

Articles (e) and (f) refer to the unique nature of IOLs and this is why overlap with an IOL has been included as a determining factor in the determination of Waterbodies of Heightened Importance.

4.4.2 Identifying Waterbodies of Heightened Importance

Inuit participants in the Study were asked to identify Waterbodies of Heightened Importance within the Study Area. **Note that this is a preliminary list of candidate Waterbodies of Heightened Importance; these locations are subject to possible revision by the community of Mittimatalik, QIA and the other impacted communities.** Locations for enhanced monitoring for Project impacts (alongside Waterbodies of Heightened Importance) are discussed in Section 8.

A review of these preliminary Waterbodies of Heightened Importance was conducted in order to identify those that are most at risk from Project impacts. Three criteria were used in order to generate the shortlist of candidates presented in Table 1 on the following page:

- *Proximity to IOL Parcels:* Article 20 of the *Nunavut Agreement* specifies that compensation should be paid to the impacted persons or groups for impacts to water on IOL parcels.

- *Existing impacts:* Waterbodies were reviewed in relation to areas where Inuit reported impacts to use of freshwater and other resources. Two columns are used in Table 1 below to distinguish waterbodies where impacts have already been observed either directly to waterbodies themselves or to waterbodies upstream.

- *Current Inuit use:* All of the waterbodies listed in Table 1 below are used by Inuit for fishing and/or collection of water. The majority are also important for other Inuit land use and cultural practices.

Table 1 lists the candidate Waterbodies of Heightened Importance and outlines whether each of these waterbodies fulfils each of the above criteria.

All Waterbodies of Heightened Importance identified by Study participants are presented in Figures 5 and 6 on the following pages.

It should be noted that Table 1 is not an exhaustive cataloguing of all waterbodies known, used and important to Inuit but is focused on the area around the Project and within the Study Area. Furthermore, this cataloguing does not include icebergs, which as described elsewhere in this report are an important source of freshwater and one where Inuit have observed Project-related impacts driven by dustfall. Icebergs have been observed and used by Inuit throughout the Eclipse Sound area and have been noted as being dust-impacted throughout Milne Inlet. This is an important consideration for the spatial extent of freshwater-related monitoring.

Table 1: Candidate Waterbodies of Heightened Importance in Study Area of the Mary River Project

Waterbody	IOL Parcel (overlapping)	Downstream of currently impacted areas	Reported Project impacts to use or avoidance	High use area (freshwater and fishing)	High use area (other harvesting/ land use)
Phillips Creek	PI-19	X	X	X	X
Tugaat River	PI-19		X	X	X
Robertson River	PI-31 and PI-30		X	X	
Ravn River	PI-48		X	X	X
Camp Lake	PI-16	X	X	X	X
Turner River	PI-15		X	X	X
Mary River	PI-16, PI-17 and PI-18	X	X	X	X
Iqaluit Tasinga	Downstream of PI-14 and PI-20 and upstream of PI-21		X	X	X
Tugaat Lake	PI-19		X	X	X
Nina Bang Lake				X	X
Quartz Lake	Downstream of PI-16, 17, 18 and AB-01	X		X	X
Erichsen Lake	Downstream of PI-16, 17, 18	X		X	X
Angijurjuk Lake	PI-16 and PI-17	X	X	X	X
Qurluqtuup Lake	PI-30 and upstream of PI-31		X	X	X
Qoluqto Lake	PI-31		X	X	X
Katiktok (Qattiktuq) Lake	PI-19	X	X	X	X
Qaangirtalik/ Qaamiqtalik[3]	PI-16		X	X	X
Inukshuligaajuk/ Amittuarjuk/ Tallurugaarjuk[4]	PI-19	X	X	X	X

[3] Correct Inuktitut spelling unclear.

[4] All three place names refer to the same location.

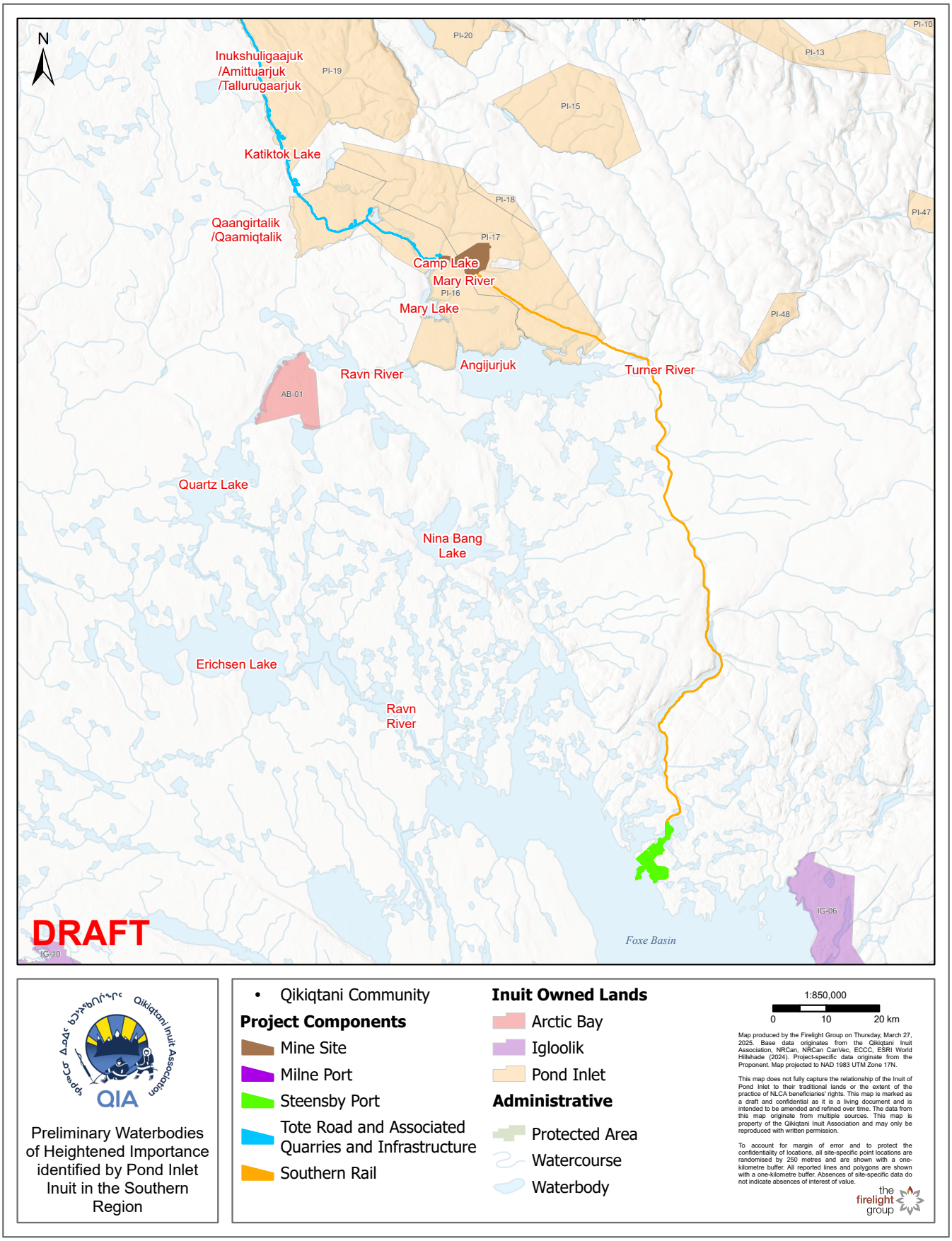

Figure 5: Preliminary candidate Waterbodies of Heightened Importance identified by Mittimatalingmiut in the southern half of the Study Area

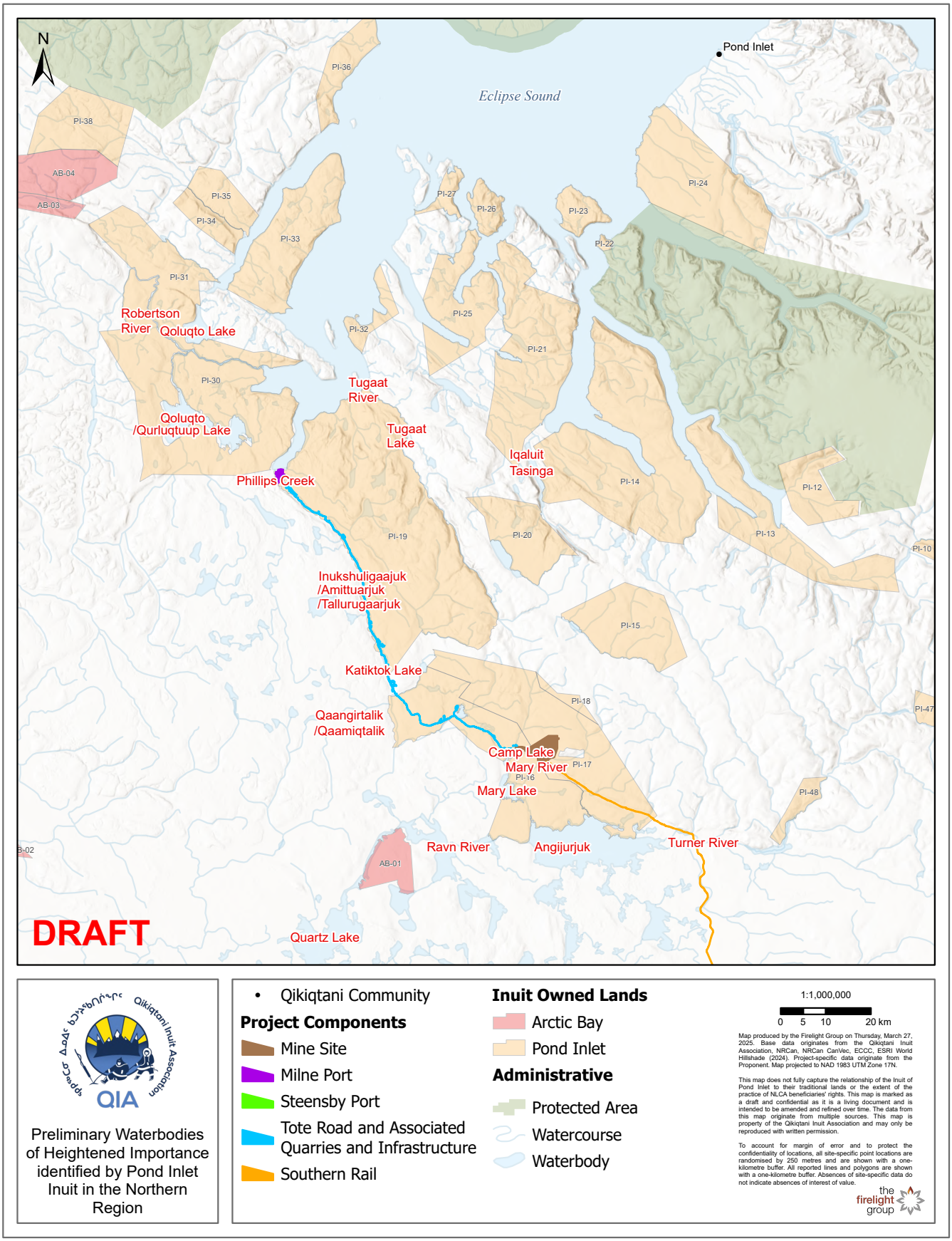

Figure 6: Preliminary candidate Waterbodies of Heightened Importance identified by Mittimatalingmiut in the northern half of the Study Area

5. INUIT WATER QUALITY INDICATORS

This section describes Inuit-defined indicators of water quality. These indicators (or observable parameters) are based on observations made by Inuit throughout the Study Area when they are deciding on the safety of a source of freshwater. Inuit indicators are how the achievement of the above Inuit Water Objectives (see Section 4.2) will be measured, and the tools used to determine whether Inuit-defined thresholds of acceptable change to a water source have been breached (see Section 6). These indicators are designed to be built into future Inuit-led water quality monitoring programs and research associated with the Inuit Stewardship Program and should inform overall Project monitoring and management.

Inuit indicators are explored one-by-one in the subsections below. For each Inuit indicator, direct quotes are used to describe how Study participants judged whether water was good (is drinkable), medium (water that left a person feeling unsure, and inclined to treat or boil it), or bad (and not for drinking or use). Further quotes are used to explain the rationale provided by participants for these choices and the choice and function of these indicators in their decision-making. The indicator chart spectrum (summarised in Table 2 below) is based on a combination of interview transcripts as well as handwritten charts completed by interview participants. It should be noted that while the indicator charts include a category for uncertain water – where Inuit might consider the water adequate for use upon treatment or boiling – this category should be treated with caution as a guideline or threshold for assessment of water quality. As noted in Section 4, boiling or treatment of water is not desirable for Inuit and water sources considered "uncertain" may be avoided out of Inuit aversion to risk.

Inuit decision-making about water quality is inherently subjective, based on personal experience and a personal risk calculation, but it is also deeply rooted in Inuit Qaujiamajatuqangit. All of the indicators which follow are not considered in isolation but together form a matrix of indicators against which Inuit balance their own instincts, experiences and collective knowledge of what observable conditions are indicators that a site is a source of safe water.

In order to integrate these indicators into a consistent monitoring program, consideration will have to be given to additional complementary measures and indicators which can support the consistent application of these indicators, and ensure reliability, and comparability (including between different seasons). Additional indicators are also necessary to help separate or distinguish Project-related impacts from other environmental changes (e.g. potential climate change impacts on water temperature or the body condition of char). Ultimately this matrix of key indicators is an attempt to describe the calculation Inuit must make when they are assessing the health of an aquatic environment and the health of the freshwater they might gather or use from that water system. This calculation is made throughout the process of gathering water but is constantly re-evaluated as the water is stored and consumed and involves both second-hand knowledge and the wisdom of fellow community members as well as one's first-hand observations gathered on the land. Thresholds of acceptable change related to the indicators below are discussed in Section 6.3 of this Report.

Table 2: Summary table of identified Inuit water quality indicators

Indicator	Good Water	Uncertain Water (Consider boiling, treating, or avoiding)	Bad water (would not drink)
Water Colour and Clarity	Clear, colourless, without silt or suspended sediment	Cloudy, sediment or suspended silt	Brown tint or colour, murkiness, milky, high levels of suspended sediment
Water Taste and Smell	No smell or taste, cool smell, clean and fresh	Water tastes of organic matter (mud, sand, soil or vegetation)	Salty taste, smell is foreign or suspicious (e.g. oil, sewage, garbage, chlorine etc.)
Water Temperature	Cold water		Warm water
Rate of Flow (for rivers and creeks)	Strong rivers, creeks with strong flow	Depends on river location (e.g. proximity to known human sites, contamination sources), presence of foam in the water	Still or stagnant water
Waterbody Size, Depth and Connectivity	Large, deep, evidence of connectivity (inflow and outflow) to larger bodies of water		Small, shallow, lack of obvious connectivity to other waterbodies, rapid change in size of waterbody
Riverbed or Lakebottom	Rocky	Sediment or silt bottom	Sediment or silt bottom, stirred easily and makes water coloured or cloudy, evidence of algae or slimy feeling
Vegetation	Healthy, local vegetation growing nearby (with preference for mosses)		Little, no or decreasing (unhealthy) vegetation growing nearby
Animals/ Invertebrates	Evidence of animal use is an indicator of safety, but good water is ideal free of insects or aquatic invertebrates	Some aquatic insects and invertebrates can be tolerated, but Inuit boil or treat the water before drinking	While animal use can mean the water is safe, this is balanced with a desire to avoid water befouled by animals (e.g. water sources close to goose nesting sites, or where dogs are kept)
Past Inuit Use	Prior use and knowledge of the site as safe is an indicator of safety	Treat with caution if site is unknown or appears to have changed/be different from past reports and experiences	If site is known to be unusable
Degree of Visible Human Disturbance	Clean and farther away from any human developments or human use	Possible past human disturbance of the area	Close to or flowing from any sites frequently used or occupied by humans – evidence of human (including industrial) disturbance, e.g. garbage, contaminants in water, presence of dust on snow/ground/ice etc.
Quality of Fish and Fish Habitat	(Char) Healthy, large, fatty, abundant, red-fleshed, clear-skinned and tasty fish		Absence of fish, smaller than expected or deformed fish, poor tasting fish, red spots on skin, discoloured flesh

5.1 Water Colour and Clarity

Good Water	Uncertain Water (Consider boiling, treating, or avoiding)	Bad water (would not drink)
Clear, colourless, without silt or suspended sediment	Cloudy, sediment or suspended silt	Brown tint or colour, murkiness, milky, high levels of suspended sediment

Participants consistently described water clarity as being an important indicator of water quality. The clearer the water, the more certain participants felt about its purity.

> *When it's coloured, we know it's from the, from the natural underground. So we try to look for more clear water from the stream and collect some water. (P38, 09-Nov-20)*

> *(Interviewer:) And then if you saw water that was clear, crystal clear, that had no colour. Would you think of that as good water or bad water? (P17:) I would think it's good water. (P17, 10-Nov-20)*

> *[Interviewer]: Now, in terms of water and its' appearance, what kind of characteristics do you need to see to consider it fresh drinking water? [P37]: When it is extremely clear and no visible detritus or dirty water where you can clearly see the bottom of the water. This usually occurs in rivers that have fairly strong currents that keep the water clear. (P37, 09-Nov-20, interpreted from Inuktitut)*

Colour in water, notably any brown or peat coloured tinting was described by participants as evidence that the water had passed through organic matter or was high in silt.

> *From what the elders tell me, you can tell [water quality] by the coloration or activity around it. Activity around the river. Different times of the year, the coloration for example when it's just melting you get all that organic material and it'll be discoloured. Or summer time further upstream, if something's happening like too much rain or a lot of silt going in, the permafrost is melting upstream, you can tell by the turbidity. The discoloration, silt. Sometimes melt. (P05, 08-Nov-20)*

> *[Good water is] Clear. Like if we had no choice we would also, I even go for the discoloured organic water, like the organic melting. I don't mind that because our elders used to do that, and we've tested it for bacteria's, we did DNA testing and it was still good, it's just the aesthetics, we prefer nowadays we prefer, it's not survival anymore it's we prefer, aesthetic. There's better looking [laughter]. (P05, 08-Nov-20)*

Coloured water was perceived by participants as being suspect, and likely dirty or contaminated. Water which was coloured was considered to be untrustworthy.

No, [if the water had colour in it] that would tell me that it is dirty, or something went into it. (P48, 12-Sep-20)

[Interviewer]: …how would the water look like if it's not good water? [P39]: If it's cloudy or there's some soil in it … Or even if there's foam in it. (P39, 09-Nov-20, interpreted from Inuktitut)

…sometimes the water causes diarrhea … if you have brownish water. (P04, 10-Nov-20, interpreted from Inuktitut)

…I would have to boil it if its brown water. (P04, 10-Nov-20, interpreted from Inuktitut)

(Interviewer:) If water has colour. If you see colour in the water, would you think of that as good water or bad water? (P17:) I would consider it bad water, contaminated. (P17, 10-Nov-20)

No, distrust [freshwater that is coloured] because in the past – well Inuit were very careful like in the past. Like, like for anything suspicious. Even, even if it's clear. Even if it's good. You don't take that chance because there might be something bad in it. So, if you suspect anything that is not right, you don't take it. Even food. Even animals. They, they have like defects or something, you just give it dogs. Not to humans. It doesn't fit for your human. Same thing with, with water and snow. If it's anything suspicious, we don't – we won't take it. (P49, 12-Nov-20)

[Prefers frozen over running water] Because it tastes a lot better when it is frozen, and it is a lot more clear. Sometimes our water is brown, so it doesn't look drinkable. (P48, 12-Sep-20)

…there's no concerns from the lakes, as long as it's not cloudy, cloudy ones concerns me. (P16, 08-Nov-20, interpreted from Inuktitut)

You can tell the difference between good water and the water you can't drink, I can tell [by] how they look like … Some of them, when you look at the water, the top layer, maybe you know this, it looks like there's some oil in it. Just by looking at it, I feel that I can tell it's not good water. (P41, 10-Nov-20, interpreted from Inuktitut)

For the ones [streams/flowing water] that I considered not drinkable is, if you understand the term "uqsuarlaqi" (oil coming out of the water) … Some waters would have colours coming out from it, green, blue, I feel like not drinking water from them. (P41, 10-Nov-20, interpreted from Inuktitut)

Good water is blue. If it's green then it's impossible to drink … [Interviewer asks what makes green water green] … [P04]: It's because it's mixed with salt that it becomes green water because the ocean water is mostly green. (P04, 10-Nov-20, interpreted from Inuktitut)

[Interviewer]: When you see good water and you can drink from it no problem and just by looking at it, what would it look like and how would it be? [P46]: The colour would be bluish water. [Interviewer]: …for when you look at it and you're not sure, can I drink from it or not, how would it look like? [P46]: It would be yellowish. [Interviewer]: …how would you tell that you can't drink from it? What would it look like? [P46]: The colour would be brown. (P46, 12-Nov-20, interpreted from Inuktitut)

Participants described water colour as being seasonal, and saw it as linked to the melting of ice and snow, drawing organic matter into water sources through meltwater flows. This impacted participant's seasonal choices of water source (as has been discussed in Section (4.1.7).

(Interviewer:) In the winter, what do you look for to find good water? (P17:) Clear, clear ice or clear snow. (P17, 10-Nov-20)

When you go to the river, it's like more cleaner and more clearer during the fall time when there's a little bit of snow and that there. (P42, 10-Nov-20)

Summer, fall, summer to fall is the best time there [to collect water] for me … That's the time where it's not yellowish, or you know from the organic material that's freshly melted it will be yellow when it's just melting, and those are the times when there's no discoloration… (P05, 08-Nov-20)

5.2 Water Taste and Smell

Good Water	Uncertain Water (Consider boiling, treating, or avoiding)	Bad water (would not drink)
No smell or taste, cool smell, clean and fresh	Water tastes of organic matter (mud, sand, soil or vegetation)	Salty taste, smell of anything foreign or suspicious (e.g. oil, sewage, garbage, chlorine etc.)

Water should be tasteless and have no smell. In the quotes below describe participants use smell and taste as key indicators of water quality or potability.

(Interviewer:) Have you had water that has had a taste to it. So if you drink water and you notice a taste. Would that be good or bad water? (P17:) I think it would be bad water. (P17, 10-Nov-20)

(Interviewer:) The same thing with smell. If you were to smell the water. Either before drinking or while you're drinking that had a smell to it. Would that be good water or bad water? (P17:) Would be bad water, I guess. (P17, 10-Nov-20)

[Interviewer]: And when you look at the creek or river who how would you know it's impossible to drink? … [P04]: …you take a sip you can tell if it's not salty and if you take a small sip and it feels salty then it would not be good … good water has no taste. (P04, 10-Nov-20, interpreted from Inuktitut)

(Interviewer:) If water was coloured, would you trust or distrust it? (P42:) Distrust it. (Interviewer:) And if it was clean and clear? (P42:) I would trust it. (Interviewer:) What if the water had a taste? (P42:) I would not trust it. (Interviewer:) Or a smell? (P42:) I would still not trust it. I will make – give you example. I collected iceberg ever since when I was young. And one time I hit this certain spot that had a smell. And I figured it was just another ice, but once I melted it, the taste was still there. That's just an example. (P42, 10-Nov-20)

If there's a smell, I would be concerned to drink it [the water]. [P16, 08-Nov-20, interpreted from Inuktitut)

Now, in terms of just sniffing the water if there is no odour of any kind and I don't smell anything untoward, then I would determine this was fresh drinkable water, as I would also take a small taste test to see if my eyes were correct by using my tongue to taste the water … For me, if there is no foreign smell or anything chemical or metallic then I would determine that it was clean clear drinkable water, especially in looking at the water, as well as in tasting it beforehand. (P37, 09-Nov-20, interpreted from Inuktitut)

If it's [water] not drinkable there would be old taste … It would taste like metal. (P46, 12-Nov-20, interpreted from Inuktitut)

Some participants explained how they will often taste a small amount of the water they gather while out on the land, and gauge, based on the taste whether the water is potable.

(Interviewer:) How would you – so, if you came across clear water, how would you know if it was good? Or would you not know, and you would just boil it? (P49:) If it's clear and crystal clear like – That's a sign and then you, you, you can test it. I can test it with and take a sip. And test it that way … If it taste awful, then I would not take it. Or if it's salty. Or a bit of salt in it, I would not take it. (P49, 12-Nov-20)

[Interviewer]: When you know that it's fresh water, the water that you're about to drink and when you drink it, and you would know that this one is good water, just by tasting it, what would it taste like? [P41]: This is how I know, let's say, it's really delicious … It would be smooth, and it feels like your whole body can feel it. (P41, 10-Nov-20, interpreted from Inuktitut)

Usually discolouration or the browning of the water or if it is yellowish, it is water that is not clean enough for me to consider using as drinking water. Also, I would try out a small cup to determine how dirty or unclean it is. If it is acidic, then I wouldn't even try to collect the water. "Murky water". (P37, 09-Nov-20, interpreted from Inuktitut)

I would use my tastebuds to determine the taste first, as some people have very distinct tastes that can determine if the water is brackish or salty. When you first take a taste, you can usually determine so that is one way to

determine if the water is okay to drink, especially when looking for water to use for tea. We first take a taste to determine if the water is palatable and useable for tea. In looking at the pool of water, if the appearance seems clean and clear, then one would at least conduct a taste test to determine the suitability, for example, just filling one's mouth just to check if the water is acceptable to drink. (P37, 09-Nov-20, interpreted from Inuktitut)

If it is a little acidic or if the water seems discoloured or dirty, then you can try a small sample on the tip of your tongue. If you cannot even swallow the sample, then I would not even consider taking a drink of this water. (P37, 09-Nov-20, interpreted from Inuktitut)

There can be natural causes of taste differences as some participants identified. This can be related to where the water was collected and the ice or rocks the water has been exposed to at its source. As the second quote explains, the area around Mary River is known to be rich in metals which may affect the taste of water in the area.

(Interviewer:) And then, if you found that water had taste to it would you trust that water? (P45:) Yes, we can tell the difference between a salty iceberg and a clear water from the iceberg. (P45, 12-Nov-20)

(Interviewer:) Is there anything about water taste that makes it good or bad? (P05:) I think we can tell when there's salty water, like if say youth gathered iceberg and they didn't know the best way to get the ice with no salt, you can taste the salt. In some streams because of the minerals and the rocks it makes it more salty too, your elders will tell you that if it tastes – like there's some areas around Mary River where elders told us some of the streams taste like metals. It was from the red rocks. (P05, 08-Nov-20)

Water with a foreign/unnatural smell is treated with suspicion and considered likely to be contaminated. In the quotes below participants describe some of these smell in both land and tapwater.

(Interviewer:) What about water that had a smell to it? Would you trust that water? (P49:) Smell? No, I would not trust it. Like – but we do tug water smells. And, and if, if it – if the Hamlet says it's okay, then we can possibly drink it. But, but when you drink tea with it, it tastes awful. (P49, 12-Nov-20)

(Interviewer:) And what about smell? Are there smells that you associate maybe with good water, or bad water? (P05) I've never really, no. One time I had water that had no choice to use it, smelled like soil, but it was still good and we tested it too. The only smelly water that I'd say is bad is tapwater, because our lake, our water lake has little small fish. Sometimes you can smell the fish, at certain times of the year here. (P05, 08-Nov-20)

(Interviewer:) Do prefer water that comes from out on the land or water from the town? (P48:) From the land … Because it tastes a lot better than the tap water we get. And the tap water is from a lake that has lake trout, small lake trout in it. So sometimes it smells like fish. (P48, 12-Sep-20)

5.3 WATER TEMPERATURE

Good Water	Uncertain Water (Consider boiling, treating, or avoiding)	Bad water (would not drink)
Cold water		Warm water

Colder water was considered to be preferrable and more likely to be drinkable (potable).

> *(Interviewer:) So what makes water, good water by temperature? (P05:) Okay, yep, for me I like kuktu [phonetic spelling 00:22:05] because it's colder. We used a probe and temperature sensors to gather water parameters. I like the coldest ones. Kuktu, very short stream, from the stream, from gathering to the ice, where it's melting, it's very short so it's cold. And I preferred it more. And when we're boiling ice or water we, I've learned to boil it at a low temperature so we don't mix too much stuff or get – I don't know how to explain it. Yeah, I'll just leave it there. (P05, 08-Nov-20)*

> *(Interviewer:) …when you think about temperature of water, if you think of warm water do you think you would trust that? (P45:) Nope … I have always had cold water… (P45, 12-Nov-20)*

> *Personally, I prefer the coldest water possible whenever I drink fresh water, and I prefer to drink water that is almost freezing cold. (P37, 09-Nov-20, interpreted from Inuktitut)*

> *The streams and rivers usually have the freshest water in terms of taste and coldness as it is usually very cold, and further it is very "fresh" as it streams to the sea. (P37, 09-Nov-20, interpreted from Inuktitut)*

> *I can drink really cold water. You wait for it to get cold. It's more comforting for the body and you don't get thirsty [for] longer and it's more comfortable to drink. When it's warm or lukewarm you … drink more often.(P04, 10-Nov-20, interpreted from Inuktitut)*

Warmer water was described by participants as not for drinking. With increased temperature the risk of bacteria increased.

> *I was told when it's more warmer, don't use it for drinking water, use it for cooking only. That's what I was told. Because the more warmer, it is from the natural resources, the more bacteria. The, they'll have. So, I was told, only to cook with the warm water that I collected. (P38, 09-Nov-20)*

> *(Interviewer:) Is there anything related to temperature that you would associate with bad water? And you wouldn't drink it? (P05:) Again with water parameters, we're able to tell discoloration or if it's more turbid it would also be warmer. (P05, 08-Nov-20)*

Warmer water can indicate something wrong or abnormal. Participants described warmer water as potentially coming from a spring underground. This is as opposed to glacial melt waters which was perceived generally as preferable.

> *I, ever since I was growing up, outside water is never warm. That would tell me there is something wrong in that land. (P48, 12-Sep-20)*

> *(Interviewer:) So, when we talk about the indicators, we want to have you think about whether it makes you trust or distrust a water source. So, for example, when we look at the temperature of the water, if it's warm water, would you trust it or? (P42:) No … Distrust it … Warm water seems to come from the inside of ground, in which picks up more things that goes into the water. And contaminants from there. But the ones that come off through the rocks are more cleaner and clearer. (P42, 10-Nov-20)*

5.4 Rate of Flow

Good Water	Uncertain Water (Consider boiling, treating, or avoiding)	Bad water (would not drink)
Strong rivers, creeks with strong flow	Depends on river location (e.g. proximity to known human sites, contamination sources), presence of foam in the water	Still or stagnant water

Faster rivers or streams were generally considered to be a positive indicator of a drinking source, indicating that any contaminants or toxins were more likely to be washed out of the river more quickly. Stagnant and still pools or lakes were considered environments more prone to bacteria, parasites or contaminants.

> *(Interviewer:) If you came across a lake that had no river and was just sitting there not moving, would you trust that? (P49:) No. I – that's, that has been passed down from my parents, my father, that you don't take – you don't drink from a lake. When there – if there's no river flowing from it or to it. (P49, 12-Nov-20)*

> *We prefer drinking water that is coming from a river, strong flowing river, not from a stream or a creek… (P43, 10-Nov-20, interpreted from Inuktitut)*

> *Stream, I would. Like I said, we were told that anything river streams you can drink, but when there's no, no streams, don't drink it. That'd be a dead water. It's not good for you. (P49, 12-Nov-20)*

> *(Interviewer:) So, we look at how fast water can move, so if a river is running very fast would you trust that water? (P45:) Yes. (Interviewer:) What if you had a river that wasn't, a lake that wasn't moving and it had no river out of it? (P45:) No, I wouldn't trust it … Maybe it might have more parasites or something. Like it has been sitting there for a while. (P45, 12-Nov-20)*

This preference for faster water was however not universally held. Some participants, including those quoted below, described slower rivers and those with lower flow as potentially potable and trustworthy, indicating that water choices remain subjective and dependent upon the specific context being considered.

> *(Interviewer:) Ok. If you can think about how fast or slow, water is moving, which is called flow. Would you drink water that is fast flowing water? (P17:) No … Too fast [laughs]. P17, 10-Nov-20)*

> *(Interviewer:) Related to water around flow, depending on how fast or slow the water is moving, are there conditions that make the flow of water good or bad? (P05) Just for preference. We prefer the low flow … But scientifically no, not really. It depends on the stream, how much soil or sand. P05 08-Nov-20*

In some cases, fast water was seen as more likely to be fish-bearing and therefore to be avoided, as this water was prioritized as a fish migratory corridor.

> *(Interviewer:) In terms of water that fast or slow. Would you still drink water from a lake or a river, depending on the flow of water? (P38:) If the stream is too fast we don't we don't collect water from there, 'cause it's mainly for the fish to go up and down. (Interviewer:) So you prefer a slow– (P38:) Yeah, slow current. P38 09-Nov-20)*

5.5 Waterbody Size, Depth and Connectivity

Good Water	Uncertain Water (Consider boiling, treating, or avoiding)	Bad water (would not drink)
Large, deep, evidence of connectivity (inflow and outflow) to larger bodies of water		Small, shallow, lack of obvious connectivity to other waterbodies, rapid change in size of waterbody

Participants felt that generally larger and deeper bodies of water were superior, and more likely to have better quality water.

> *There is a difference [between water from larger and smaller lakes], a small one has been sitting there for a while and the bigger one might be better. (P45, 12-Nov-20)*

Changes to size are a cause for concern. The rapid emptying of a lake or creek possibly indicating a correlated shift in water quality.

> *(Interviewer:) If you knew there was a larger lake and then it got smaller, would you trust that smaller body of water if it changed its size? (P48:) No that would mean something is going on with nature around the area, it is changing, and it is not in the normal, it is not normal anymore. (P48, 12-Sep-20)*

While the size of a waterbody was considered important, participants also explained that they would have more faith in waterbodies which were obviously connected to a broader water system by rivers and creeks. In and outflows of water from lakes were considered a sign, as described below, that the water was being refreshed and not becoming stagnant.

> *(Interviewer:) If we look at how big a body of water is, if you had a very big lake, would you trust that? (P49:) If there's a river flowing from it, yes. Or to it. (P49, 12-Nov-20)*

Deeper water may be superior in part because deeper bodies of water allow sediment to settle further and are less likely to be disturbed.

> *(Interviewer:) Why would you trust a large body [of water], but not a small body? (P42:) For a large body, it's – it could be more deeper … And the sediments would sink a lot better, while the shallow water, the sediments stir up to the top side more easily. (P42, 10-Nov-20)*

5.6 RIVERBED AND LAKEBOTTOM

Good Water	Uncertain Water (Consider boiling, treating, or avoiding)	Bad water (would not drink)
Rocky	Sediment or silt bottom	Sediment or silt bottom, stirred easily and makes water coloured or cloudy, evidence of algae or slimy feeling

The consistency or appearance of a riverbed or lakebottom was considered to be an important indicator of likely water quality. Participants explained that they would avoid silt, sediment and mud.

> *I try not to get water when the bottom of the stream is all silky, like, green, green rocks. We try not to get that, it taste more like salt water than fresh water, even though it's way up in the land. (P38, 09-Nov-20)*

> *(Interviewer:) What about a body of water the same thing, the bottom either a flowing river or bottom of a lake, you see that it is very muddy, you wouldn't trust that? (P45:) Nope. (P45, 12-Nov-20)*

> *When you look at the river if the rocks on the creek are not too black or brown, we can tell if it's good water. If it's covered in dark or black covers on the rocks sometimes there is algae on the water sometimes or if there is green on the water and looks think those the waters that are undrinkable. You can tell. It's not poisonous but it doesn't quench the thirst and not very good to drink. (P04, 10-Nov-20, interpreted from Inuktitut)*

> *…if there is any sediment or sand in the water or even particles of soil or earthen material, I would not want to drink from this contaminated water source. (P37, 09-Nov-20, interpreted from Inuktitut)*

5.7 Presence and type of Vegetation

Good Water	Uncertain Water (Consider boiling, treating, or avoiding)	Bad water (would not drink)
Healthy, local vegetation growing nearby (with preference for mosses)		Little, no or decreasing (unhealthy) vegetation growing nearby

The presence of plants is an important indicator of the health of an area and of a water source. Participants identified plants as being a reason to trust a water source.

> *(Interviewer:) If you know that there are plants growing around a lake or stream, would that be good water or bad water? (P17:) Good water. (P17, 10-Nov-20)*

> *(Interviewer:) What if plants were growing around a body of water, along a stream or around the lake, would you trust it? (P48:) Yes. (P48, 12-Sep-20)*

> *Those areas that I collect my water from. It makes it special because there's lots of vegetation for everyone to get like blueberries, blackberries or, or– what are those in English– I don't know what they are in English, we use them for cooking. When, when there's good water, we can collect those plants and cook our meals ... so it's pretty much one stop station. When we go to a good water, that mean we get we can get berries and plants for food to cook. (P38, 09-Nov-20)*

However, one participant noted that vegetation could also signal standing water and poor water quality, as they describe below.

> *When there is too much arctic cotton in the area [it] is a good indication that's it not good water and sometimes we won't drink water from them. Weeds growing around the water is also indicator that it's not good water. It's drinkable but not good water and mostly weeds are growing in the area even if the water is dirty. And when there is absolutely no vegetation there means it's salt water. (P04, 10-Nov-20, interpreted from Inuktitut)*

Areas where plants are absent or no longer look abundant or healthy are considered to be suspect and potentially contaminated.

> *(Interviewer:) What if there were no plants growing near the water? (P45:) I don't think I would trust it. (P45, 12-Nov-20)*

> *Plants are going very good and healthy, that means I can drink the water from that area. But if the water. There's lots of water resources there but if there's vegetation that is mostly dying in that area, I'm not gonna drink the water. (P38, 09-Nov-20)*

Sometimes if there's a dried white film around the lake then it's impossible to drink. If the water is surrounded by white stuff with no plant growth then you know it's not drinkable. If parts are white and no creek and no plants growing on it it could be poisonous. (P04, 10-Nov-20, interpreted from Inuktitut)

Some mosses are perceived as acting as a filter, which may indicate a preference by some Inuit for water which flows along mossy creeks and rivers.

Well like I said, if you tramp on the sediment, the sediments can go up to the surface. While the rock, rocky, shallow area would have less than murky water because the rocks collect more – I don't know what you call those little moss that grow in the water, on the rocks. They're slippery. To me, they're like cleaners. (P42, 10-Nov-20)

5.8 Animal/Invertebrate Presence and Use

Good Water	Uncertain Water (Consider boiling, treating, or avoiding)	Bad water (would not drink)
Evidence of animal use is an indicator of safety, but good water is ideal free of insects or aquatic invertebrates	Some aquatic insects and invertebrates can be tolerated, but Inuit boil or treat the water before drinking	While animal use can mean the water is safe, this is balanced with a desire to avoid water befouled by animals (e.g. water sources close to goose nesting sites, or where dogs are kept)

The presence of invertebrates and water insects was seen by many participants as a sign that water should be boiled before use..

(Interviewer:) If you noticed the water had bugs or invertebrates, which are like bugs, in the water. What do you think of that water is good or bad? (P17:) I would boil the water before drinking it. (P17, 10-Nov-20)

I need to boil the water … It would be yellowish or brown because the bugs would have to be killed sometimes, they having little white moving bugs. So, when that happens in sandy waters, silt or murky water on the creek or river or stream … we say it's impossible to drink. (P04, 10-Nov-20, interpreted from Inuktitut)

If I know that there are bugs or fish in it and if we have to drink from it, I would boil the water first, before drink from it. (P46, 12-Nov-20, interpreted from Inuktitut)

Although insects are tolerated and considered a good sign, Inuit are deeply concerned about the cleanliness of water and whether or not it potentially contains parasites.

(Interviewer:) Do you know what you would be told to do or not do when it comes to fresh water? (P45:) Yes … It's look for some that have no parasites or look for some that are clean. (P45, 12-Nov-20)

For me I don't like lake water. It's warmer and there'd be more invertebrates and bugs. Because the lake is around land, you'll also get the land, land bugs hatching eggs. We've asked elders if there was any kind of like lakes or streams that would have potentially bad invertebrates, like those tapeworms. I've seen, collected tapeworms from our water source, water lake. (P05, 08-Nov-20)

According to the principle of 'if its good enough for animals, its good enough for me' many participants explained that evidence of animal consumption of water from a site was an indicator they would use to be sure that water was likely safe for human consumption.

(Interviewer:) If you noticed that a body of water had been used by animals for drinking. Would that be good water or bad water? (P17:) Good water. (P17, 10-Nov-20)

People say as long as there is Sandhill crane or loons, they would always have fish there. The birds were indicators that there was fish. (P04, 12-Nov-20, interpreted from Inuktitut)

[Interviewer]: …on the lake or creek or if the environment has wildlife or vegetation and you see the lake, how can you tell whether the water is good? [P04]: Because it has birds and is clean water and clear water …if it has bad water, wildlife, especially birds would not be present… (P04, 10-Nov-20, interpreted from Inuktitut)

I'll use a lake for example, if I want to have a drink of water from it and there's bird/s and animals, I would think, "it must be good water that there are other species in it". If there is nothing around it, such as animals, I would think that it's not good water even though it looks clean, I think that's how I understand it. (P41, 10-Nov-20, interpreted from Inuktitut)

Yes, I would trust it [if participant noticed animas using water source] … Animals like even though they don't drink clean water, it means you can survive on it. (P42, 10-Nov-20)

(Interviewer:) If you noticed a lake or body of water was used by animals, would you trust it? (P48:) Yes, it wouldn't be contaminated enough for animals to live in it. (P48, 12-Sep-20)

While water use by animals was a common indicator of water purity, many participants were concerned that the animal use of the water had to be separated from water which was too exposed to animals, citing examples like rivers which flow past bird nesting areas or where dogs are kept – these areas being sources of faecal matter which could foul water.

Some areas where there's a lot of wildlife, usually get the faecal matter after rains flushed in them [waterbodies and rivers]. We've proven it can stay up to even a month later. (P05, 08-Nov-20)

(Interviewer:) … do you collect water from snow while out on the land in the winter? (P05:) If I have to, yes. Mainly near the bird sanctuary, for geese hunting, geese picking … No, just snow and any kind of fresh ice, like there's, like we wouldn't get it from the land it's like all the geese, faecal matter there, nobody use the streams. We get water from the snow on the ice. And fresh snow melt water. (P05, 08-Nov-20)

5.9 Past Inuit Use

Good Water	Uncertain Water (Consider boiling, treating, or avoiding)	Bad water (would not drink)
Prior use and knowledge of the site as safe is an indicator of safety	Treat with caution if site is unknown or appears to have changed/be different from past reports and experiences	If site is known to be unusable

For most participants, evidence of past Inuit use of a site as an area of water collection was a reason to trust that water source, just as evidence of an outpost camp likely means a good place for camping.

…there's a traditional camp site and it was used by our ancestors, for the traditional camp sites and they would know the area and would stay there for most of the times, that is why that us younger ones, we choose the places that are traditional campgrounds, there one of the places to stay at. (P43, 10-Nov-20, interpreted from Inuktitut)

[Interviewer]: …do you know of anything in places where there have been outpost camps whether the water good water sources? [P04]: Yes. Their water source would have good water. The camps were an indication that there is good water source in the area, that's the only reason for that site because they can live in it. (P04, 10-Nov-20, interpreted from Inuktitut)

Participants explained how prior use of a site would be an indicator that a site might be safe and potable or at least that they would know more about how the land around the water source had been used or misused.

(Interviewer:) If you knew Inuit went to a certain location before but you hadn't been there would you still trust that water? (P45:) I would ask where they would get water. (P45, 12-Nov-20)

(Interviewer:) And if you knew they had gone to that place you would still trust it? (P45:) Yes. (P45, 12-Nov-20)

(Interviewer:) If you knew there was a lake or a stream that you knew other Inuit had used before you, would you trust it? (P48:) If it is, I know the older people used to use the lake I was living there at. A lot of people started water skipping on it, so it was very contaminated and very dirty. It would depend if people use for recreational activity or not. (P48, 12-Sep-20)

5.10 DEGREE OF VISIBLE HUMAN DISTURBANCE

Good Water	Uncertain Water (Consider boiling, treating, or avoiding)	Bad water (would not drink)
Clean and farther away from any human developments or human use	Possible past human disturbance of the area	Close to or flowing from any sites frequently used or occupied by humans – evidence of human (including industrial) disturbance, e.g. garbage, contaminants in water, presence of dust on snow/ground/ice etc.

Human disturbance to a water system was widely identified by participants as being a key reason to avoid a water source. Disturbance, including construction or industrial activity was a cause for concern.

> *(Interviewer:) If you knew that people would cause disturbance in the water or there was development around water, would you trust that water? (P45:) No. (P45, 12-Nov-20)*

> *(Interviewer:) Would that be the same if you knew that people were developing near water. Would that be good or bad? If there was development, like construction? (P17:) Would be bad. (P17, 10-Nov-20)*

> *(Interviewer:) If you know that humans or people would cause disturbance around a body of water, would that be good or bad? (P17:) That'd be bad. (P17, 10-Nov-20)*

> *The lands which are not continually used by Inuit and regardless of if it is a lake or snow, areas that haven't been reached by Inuit or that have no snowmobile tracks, is generally the best snow to gather if you want to get fresher water. (P37, 09-Nov-20, interpreted from Inuktitut)*

In the quotes below, a participant described how their observations of water quality were impacted by the areas of extensive ore dust close to the Project. Inuit perspectives on the impact of ore dust from the Project are described further in Section 7.1.2).

> *(Interviewer:) ... do you or others in Mittimatalik – are you aware or have noticed impacts from the project on freshwater? (P49:) Yes. Definitely. From Mary River right down to Milne Inlet. Maybe dust caused by – I don't know, by trucks and that and b-trains. (Interviewer:) When did you first begin to notice those changes? (P49:) In maybe March and April when there's snow … Because, because the snow is impacted or affected … Since 2013. Around 2012 – 13. About when they started shipping. Experimenting and the explore, exploring stages … It's been reported every – yeah, every time there's meetings … With Baffinland and NIRB … But Baffinland says it's, it's*

good for drinking water, but like I say, if anything's suspicious, we don't drink. (P49 12-Nov-20)

(Interviewer:) And then what about the water? What do you look for? What are the qualities of water that you would think of would be needed to make sure that the fish stay healthy? (P49:) No chemicals in it. When – or any dust from mainly from like the Mary River. (P49, 12-Nov-20)

Human disturbance is a broad category which can include both industrial development but also a range of other actions or human uses of a place. As the quotes below describe the tethering of dogs in an area close to water courses can be a source of contamination.

(Interviewer:) If you knew that a lake or a stream was disturbed by humans or development, would you trust that water? (P49:) I don't think – no. I don't think so. Like, like we do have a river beside our place and there is some dogs above. We don't trust it. (P49, 12-Nov-20)

(Interviewer:) Is there something in water quality around colour that would make it bad? (P05:) Yes and no. Like we've tested discoloured water and half the time it was still good, and if it wasn't good it was because of further activity by humans, dogs. (P05, 08-Nov-20)

5.11 FISH HABITAT AND FISH QUALITY AND QUANTITY

Good Water	Uncertain Water (Consider boiling, treating, or avoiding)	Bad water (would not drink)
(Char) Healthy, large, fatty, abundant, red-fleshed, clear-skinned and tasty fish		Absence of fish, smaller than expected or deformed fish, poor tasting fish, red spots on skin, discoloured flesh

Alongside collecting freshwater for drinking, cooking or washing, Inuit also use the lakes and rivers of the interior of Baffin Island for fishing. This fishing is primarily focused on Arctic char, an anadromous fish capable of spending a part of its life in salt and freshwater. When pursuing char fishing in freshwater, Inuit use a variety of indicators to assess the health of the freshwater environment as well as the health of any fish they may catch for human consumption.

A number of the indicators used by Inuit to assess the health of fish populations and habitat are similar to those described throughout Section 5 and used to assess water quality. Healthy fish and fish habitat can therefore also be used as an indication that water is safe for human consumption. Small or deformed fish, or abnormal fish populations in a waterbody may lead to Inuit avoidance of drinking water from that waterbody.

When considering the freshwater aquatic environment, Inuit are engaged in assessing the quality of the water, as well as the health of the surrounding area. One participant emphasized that clean water is an important part of ensuring the health of char.

> *(Interviewer:) When you're thinking about fish. What do you think about water, that would make healthy fish? (P17:) I would think it's coming from the clear water or fresh water. (P17, 10-Nov-20)*
>
> *(Interviewer:) What makes you think about the health of a fish, what makes a fish healthy? (P17:) Maybe when it's eating the good fishes or the fresh water. (P17, 10-Nov-20)*
>
> *[Interviewer]: When he's fishing, what does he look at to know if a fish is healthy? [P43]: We check to make sure they're healthy and if they're coming from a big lake, I don't think we check them, only if they're coming from a smaller lake, that we check them to see if they're okay. (P43, 10-Nov-20, interpreted from Inuktitut)*

Healthy environments for char were also described by participants as being places where human disturbance was not evident and where the possibility of contamination was minimized.

> *(Interviewer:) When you're looking at a fish, what helps you think about it being a healthy fish? (P42:) I think about it like around the surroundings of the area. I would think about that. That's what affects is. What the main body of the pond is coming from the surrounding areas … Yes. If it was like industrial or a road, Tote road or something like that. (Interviewer:) What conditions in the water are needed to make healthy fish? (P42:) Good, clean, clear water. (P42, 10-Nov-20)*
>
> *(Interviewer:) When you see a healthy fish, what conditions in the water, what conditions in the water would make it healthy? What do you need to see about water that would make fish healthy? (P48:) When the water is not really contaminated and if they have enough to eat that were damage. (P48, 12-Sep-20)*

Insects are an indicator that it is good water, as has been previously described. Invertebrates and insects are an important food source for char, and as such are an indicator of water quality and a precursor to a healthy population of char in a lake or stream.

> *When you have insects on the water, it means that there's abundant of something under the water. It's could be those little fish that landlocked fish could be – there could be more landlocked fish … Will cause better water, I believe. (P42, 10-Nov-20)*
>
> *(Interviewer:) If you saw invertebrates or bugs in a body of water, whether a small lake or a big lake or stream, would you would you think of that as good or bad water? (P38:) I would think, think of it as a good water, as a main resource for the chars. They, that's the only way they get fatten up. We share the same lake as them. (P38, 09-Nov-20)*

As has been described in relation to freshwater for drinking, freshwater as char habitat was described by participants as being best when colder.

> *The water condition for the fish to be happy? My grandfather told me that if the lake is too warm or it gets too hot out during summer season and the fish at the lake. If it's too hot for them, they're just gonna float away and die. (P38, 09-Nov-20)*

While freshwater quality is assessed according to a number of key indicators for the purposes of drinking, many of the same indicators in relation to purity, lack of human disturbance or development, and temperature are also applied by Inuit when assessing the health of a water system as habitat for Arctic char.

Char which are caught are subjected to careful examinations by Inuit to determine whether the fish are kept and healthy enough to be eaten. As the participants quote below explain, this examination includes judgements regarding movement, char size, colouration and relative fattiness.

> *(Interviewer:) What makes you determine the health of a fish, what do you look for when you look to see a healthy fish? (P48:) From what I have seen in Arctic Char, it has to be red meat. Like for me to see it healthy. (Interviewer:) Are there other indicators like would you look at the size or wither it's fatty or? (P48:) Yea, sometimes they are skinny, and their scale is different. They look dry. (Interviewer:) So those would-be unhealthy fish? (P48:) For me, yes. And if the meat is not red. (P48, 12-Sep-20)*

> *(Interviewer:) Okay. We're going to talk about fishing. So, how do you determine if you've got a healthy fish? (P49:) By, by looking at it and it's like it's clear and no, no defects. (P49, 12-Nov-20)*

> *[Interviewer]: How does he know the health of a fish, what makes a good fish? [P08]: We see fish anytime and if it looks different than usual or moves differently than usual, we know that something is not right. (P08, 12-Nov-20, interpreted from Inuktitut)*

> *…we don't eat fish that is long and skinny, and we call them "Aanna", but we mostly choose fat fish … [Interviewer]: …"aana" is the grandmother of the fish … [P43]: The fish we called aana are skinny ones and we do not prefer the ones that have parasites in their mouth. (P43, 10-Nov-20, interpreted from Inuktitut)*

Participants described paying close attention to the colour and appearance of the fish skin.

> *(Interviewer:) When you think of a fish, what makes a fish healthy when you think about the water that the fish are in? So, what about the water that would make healthy fish? What would you look for? (P49:) In the fish? Gut is clear and it's clean. Clean skin. And, and the health if it's too, too skinny, I wouldn't take it. (P49, 12-Nov-20)*

> *If they have some spots I will consider there to be something wrong. Not normal spot they used to have. … That's Iqaluit over here, Iqaluit Lake. Our Iqaluit. When the fish get too many, they get red spots. Like not normal spots. That's what happens when the fish get too many. (P44, 10-Nov-20)*

While participants described judging fish against their past experience and ideal standards in making a decision on whether or not to keep their catch, this decision may be re-evaluated once a fish is being gutted. In the quotes below, participants described the interior qualities of the fish they take into consideration when assessing a fish's suitability for human consumption.

> *(Interviewer:) Is there anything in the fish when you cut it up or clean it that you would look to make it? (P49:) Yes, I would look to – when we cut it, we, we look – I would look inside to see if its good or anything suspicious out of it. (P49, 12-Nov-20)*

> *(Interviewer:) Do you look at the size of fish or fat when you think about a healthy fish? (P17:) The fat. (P17, 10-Nov-20)*

> *When there's no scars or no red spots. When it's nice and all same colour. That makes it good fish. (P44, 10-Nov-20)*

When fishing, as when collecting freshwater for drinking, Inuit on the land are engaged in a complex and ongoing decision-making process based on their experiences, second-hand knowledge and observations. Assessing the land and the condition of freshwater is a key part of fishing decision-making, ultimately helping Inuit answer the critical questions of; is this water healthy enough for fish? And, are these fish healthy enough to consume?

The indicators described in the preceding section have been identified by Inuit and they should form the basis for understanding the water-use decisions made by Inuit. They should also form a foundational basis for future Inuit-led monitoring and have been incorporated in this Report as the basis for the possible thresholds developed and discussed in Section 7.

6. INUIT THRESHOLDS OF DRINKABILITY

Note: This material is preliminary in nature and requires additional input from a larger cross-section of North Baffin Inuit, including on how many of the Inuit indicators must be at what points on the analytical spectrum for a waterbody to be considered an acceptable vs. unacceptable place to gather useable water from or to harvest fish from. In addition, thresholds must be considered by the Inuit Avatimut Kamattiarnirmut Katimajiit (IAKK, or the Inuit Stewardship Committee for the Mary River Project), and may emerge from the ongoing research and monitoring of the Inuit Stewardship Program. What is presented below are broad regional thresholds of drinkability developed based on the testimony received to-date from Mittimatalingmiut, but designed to be applicable across the North Baffin.

The indicators of water quality identified in Section 5 all involve Inuit calculations of the relative safety of water. These indicators are non-technical and do not require scientific measurement, but are instead based in Inuit observation, backed by community knowledge and Inuit Qaujiamajatuqangit. These parameters are useful for Inuit measurement of water quality and the assessment of change, as they provide not only a point-specific assessment of water quality rooted in risk assessment, but are also inherently comparative as Inuit are gauging their current observations against community knowledge and Inuit Qaujiamajatuqangit of the site – an approach which lends itself to gauging change over time.

Based on the Indicators identified in Section 5, several important thresholds related to the drinkability (or potability) of fresh water have been identified by extrapolating from the judgements provided by Inuit for this Study. These thresholds are focused on drinkability of water and are not proxies for all other Inuit water values. When assessing each indicator of water quality, Inuit make a judgement of whether water is good enough to drink. At either end of the spectrum, Inuit are either certain the water source is safe or have decided the water source is bad or impacted and they avoid it. In the middle of this spectrum, as described in Section 5, Inuit are uncertain and make a judgement to either risk considering water safe, filter or boil it in order to consider it safe, or avoid it altogether. This spectrum can be adopted into a series of drinkable water quality thresholds, as below:

- Baseline Threshold: Water is safe.
- Threshold 1: Water which was considered safe is now considered uncertain, and has to be boiled or filtered before use or consumption.
- Threshold 2: Water which was considered safe once boiled or filtered is now avoided as unsafe.

7. Inuit Observed Impacts to Freshwater

7.1 Impacts on Freshwater from the Mary River Project

Impacts from the Mary River Project have been experienced by various Inuit communities in the Qikiqtaaluk region, as documented in the Tusaqtavut Studies issued by QIA (QIA 2019a, 2019b, and 2021). This section of the Report focuses specifically on observed changes and perceived Project impacts to freshwater (including fishing) as identified in Tusaqtavut Studies and this Inuit Qaujimajatuqangit Of Freshwater Study For Baffinland's Mary River Project Specific to the Community Of Mittimatalik.

- Section 7.1.1 outlines impacts to freshwater due to Project physical works and activities, as described by Mittimatalingmiut.

- In Section 7.1.2, the pathways through which Project physical works and activities impact Inuit use of freshwater are discussed in more detail.

Under the terms of the Project's Water Compensation Agreement, the *Nunavut Water Act* and the *Nunavut Agreement*, the primary criteria for assessing changes to freshwater are quality, quantity and flow of water. Investigations into the changes observed and experienced by Mittimatalingmiut reveals that water quality is the primary factor which is viewed as already being impacted. A scientific assessment of water quality is beyond the scope of this report, and therefore what is reported here is Inuit observations of water quality. Where water is observed or otherwise perceived as contaminated, and Inuit avoid using it, drinking it, or harvesting nearby, this observed and/or perceived contamination – whether measurable using scientific techniques or not - results in a tangible impact to Inuit values, culture and land use by reducing the ability of Inuit to trust in the landscape they inhabit and the resources they customarily rely on.

Existing (or past) impacts and Inuit concerns about future water use are described together in Section 7.1. For many Mittimatalingmiut participants, perceptions of existing impacts that are already constraining Inuit use of freshwater take precedent over the hypothetical nature of future impacts. As a result, the future modifications proposed by Baffinland to address concerns like dust (e.g. ore movement by railway etc.) are not seen as offsetting impacts already being felt. Inuit will gauge success of mitigation via their own observations of the environment.

A fulsome consideration of the success of existing Project monitoring, management and mitigations (e.g. the Dust Audit Committee and the Environmental Management System (EMS) as it has continued to develop since the interviews reported here were conducted in 2020) was outside of the scope of this Study. While some elements of the impacts described in this report may have been monitored or mitigated during the intervening period between the conduct of the Study and its publication, the observations and perceptions of impacts described in this section remain illustrative of the types of concerns voiced by Inuit at the time of the Study.

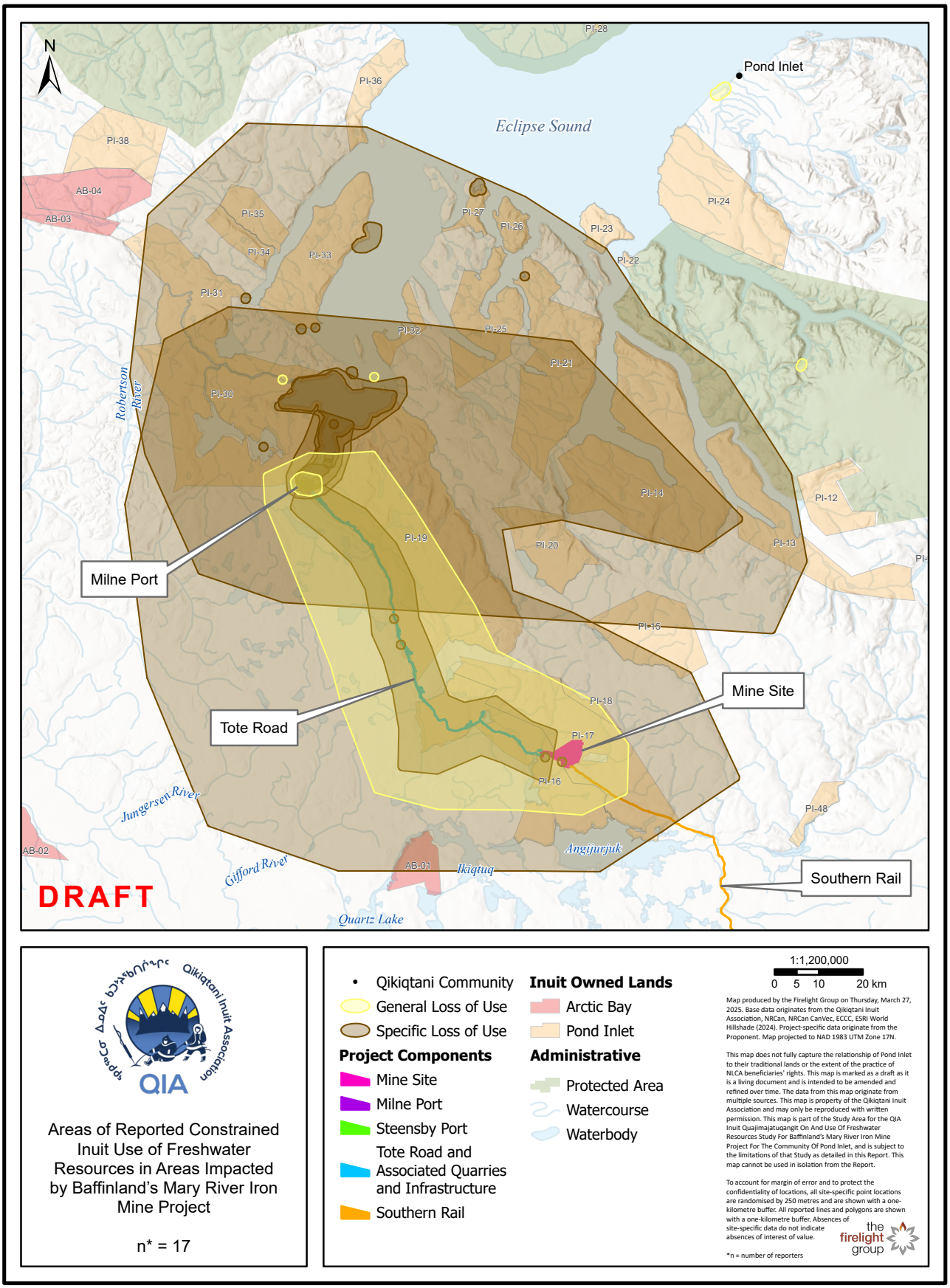

Figure 7: Areas of constrained use of freshwater resources reported by Mittimatalingmiut in the vicinity of the Mary River Project

7.1.1 Project-Related Impacts Identified by Inuit

Inuit have experienced a range of Project impacts on their freshwater values. While some impacts are concentrated around the Project Footprint, many of the concerns identified have been experienced throughout the Study Area due to their highly dispersed nature. Figure 9 shows areas where Mittimatalingmiut reported constrained use of freshwater and other resources due to impacts from Mary River operations.

Constrained use values are subdivided into the categories of 'General Loss of Use' and 'Specific Loss of Use' and indicated in Figure 7, by shades of yellow and brown respectively. 'General Loss of Use' describes areas where Inuit use of the water and other resources is constrained in a wide-ranging way, for example due to observations of environmental degradation or reduced harvesting success. 'Specific Loss of Use' indicates areas where changes experienced by Inuit in their land use are specific to one value or activity, for example an activity ceasing to be practiced at a site. Note that this map (Figure 7) represents the observations and testimony of some interview participants and cannot be assumed to reflect the use patterns of all Mittimatalingmiut, or to reflect constraints on use across all activities or values.

Airborne dust dispersal is of particular concern for Inuit as it has the potential to introduce ore dust throughout the environment. Inuit have noticed dust dispersed throughout the environment, including on terrestrial animals, vegetation and also in the freshwater environment. Participants described Project-related dust dispersal as occurring year-round. Participants described how while the dust was perhaps particularly visible against the snow of winter and spring, the knowledge that dispersal was occurring meant that they were reducing their use of the same areas throughout the year, including the summer due to concerns around possible contamination.

> *(Interviewer:) Okay, are there areas that you would now avoid to no longer get fresh water? (P45:) Maybe closer to Milne inlet where the ice is red from the dust. (Interviewer:) So, you are saying you would avoid it when there is ice and red dust? (P45:) Yes. (Interviewer:) Would you also avoid in the summertime when no ice? (P45:) Yes. (P45, 12-Nov-20)*

While areas around the Project sites (e.g. from Milne Port along Phillips Creek) cannot be avoided as they are important travel corridors, Inuit hunters and travellers moving through the area were described by participants as now avoiding the collection of freshwater from previously used sites. These sites include areas around the Milne Port where ore dust dispersed across the ice and snow was noted by participants.

> *They avoid it [collecting water from Milne Port area]. Yes, they do avoid it, but they have no choice but to go through here … Just passing it through. That's the only way you can go through [to Baffin interior] just passing through. You just avoid the snow for drinking water. (P42, 10-Nov-20)*

> *(Interviewer:) Are there other areas that you would avoid and no longer get drinking water from? (P42:) Yes. Milne Inlet… Around that general area … (P42, 10-Nov-20)*

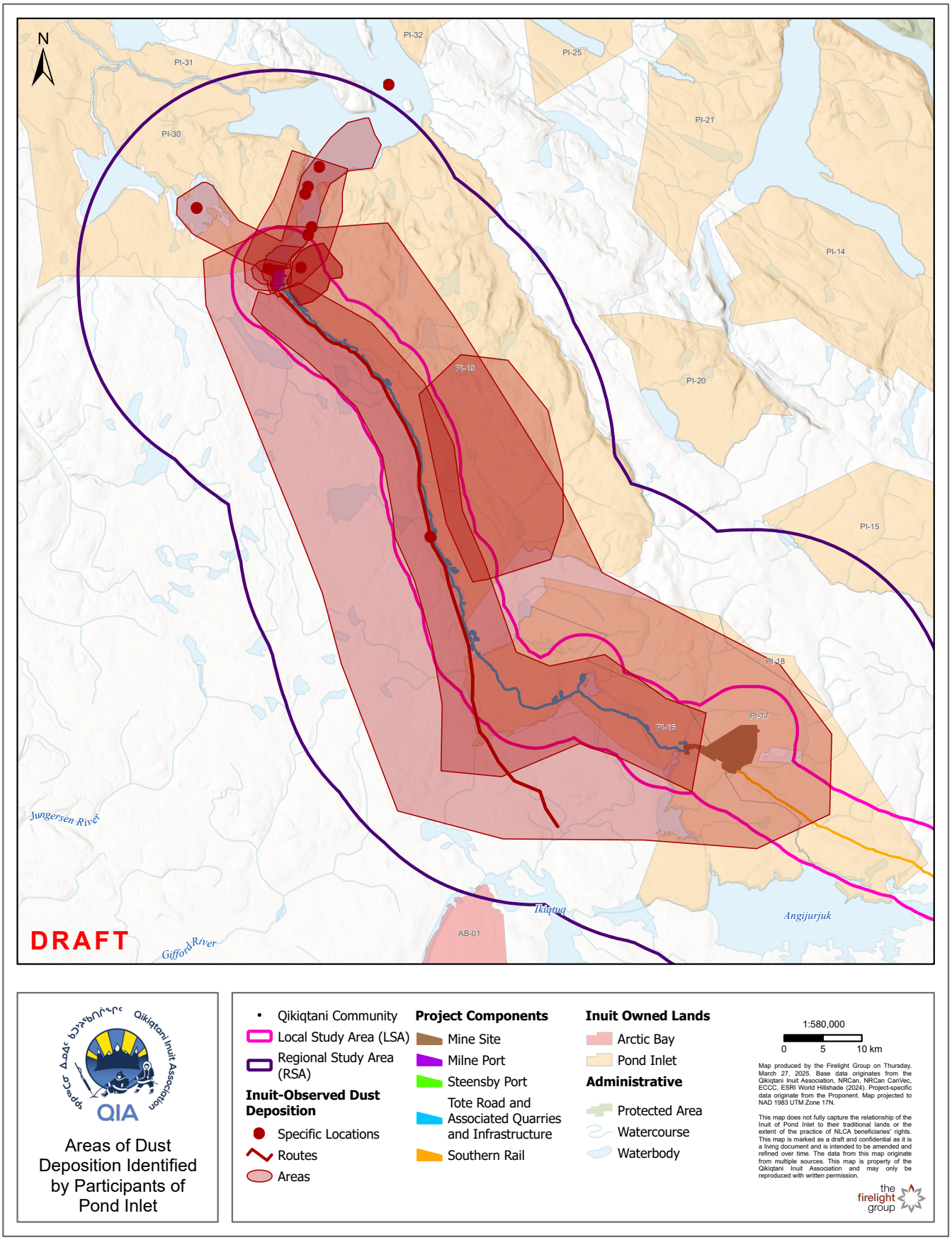

Figure 8: Sites of Inuit-observed dust deposition in the Mary River Project area.

(Interviewer:) Yeah. In these areas that you've identified, have you noticed any changes in the water? (P49:) Not around Mittimatalik. Only in Mary River, Milne Inlet … The dust and the colour of the, the water. Freshwater … Red … From, from the dust. Yeah. (P49, 12-Nov-20)

The Milne Port ore stockpile is a particular area of concern. Participants noted that the dust dispersal had particularly increased with the increase in ore stockpiling.

Well people have noticed that the colour of water around the surrounding areas, especially along the main stockpile area, and people were concerned about it. Not being able, able to drink water from it. And also, the fish around those surrounding areas becoming kind of a concern also … Seems like it's started like in five years ago, or so. Ever since the mine started, especially when they started stockpiling the material. (P42, 10-Nov-20)

All that iron ore sitting at the coast around here – is that – yeah … All that – all this area here all iron ore, reddish dust everywhere … Even the iceberg that I collected – because I need water when I go the hunter's cabin, that area was red … So, when the wind blows this way, all that red stuff, or the iron ore is accumulating in this area ... From [Kugluktu 00:10:55] Bay area, and this way. Like when we had the meetings the previous year or years, we had – well, I had encouraged Baffinland to come up with a building to shelter the iron ore dust that's being collected before in spreads everywhere. But it's too late now, so it's pretty much all over the place. (P15, 29-Apr-19)

…Milne Inlet and we go there to camp, we drive across and go up the hill and travel further down and there a very large lake, that lake used to have lots of char, but we haven't been there (early spring) because of all the red dust is affecting that lake … The snow on top is now covered in red dust, it used to be clean … It must be coming from Milne Inlet… We haven't gone there last spring to fish … I think it was two years ago [when we last went] … (P36, 08-Nov-20, interpreted from Inuktitut)

Due to the Milne Port location the dust dispersal is also seen to be having an impact on icebergs and their water, which has been observed to be impacted by stockpile dust. In the quote below one participant described how freshwater collection close to Milne Inlet (including coveted iceberg water) is now avoided due to the perceived risk of dust impacts. Hunters now bring their water with them from elsewhere when travelling into the Baffin Island interior.

And all that dust it blows away and goes on the ice … So, that at that general area, access of drinking water is off-limits to us for sure. So, we like some people what they do is they get if they can get iceberg, iceberg from there, they bring it to – with them to go caribou hunting … They're not going to collect it here [Milne Inlet area]. No, no. If, if they find iceberg somewhere around here, they're going to get it first because they know we can't get any water. You can't make water out of that general area anymore. So, they either bring water or iceberg … It's been known ever since when the mining started when … Dust started to appear on the ice. So, that's when it started, it

started from first day they started stockpiling it. I don't know which year, but it's been happening. (P42, 10-Nov-20)

Ore dust at Milne Port is also observed to blow out onto the sea ice. In the quotes below Inuit describe noting it while travelling and harvesting on the sea ice and explain their concern that whether through the melting of the sea ice or through downstream flow into the ocean, marine mammals may be impacted by dust dispersal as well.

When you're traveling to Milne Inlet, even when you're not close to It [The Mary River Project], you can already see the dust on the ice and it goes quite aways in the area of Milne Inlet, even the seal breathing holes are red, you can see the red around it and where the seal was basking at. (P36, 08-Nov-20, interpreted from Inuktitut)

…the dust from iron is contaminating the rivers and lakes and it's also affecting some fish and not only to fish, it's also having an effect on marine mammals, such as narwhal and seal are affected as well. (P39, 09-Nov-20, interpreted from Inuktitut)

Participants described the hauling along the tote road from Milne Port as another source of significant dust dispersal.

I noticed that the snow has changed, from the ore dust … [Interviewer]: is it only the Milne Inlet tote road area? [P16]: Yes. [Interviewer]: When do you think all this wasn't there? [P16]: It would've been before the trucks hauling ore, It was never like that, it's only when the trucks hauling to Milne Inlet, I'm not exactly sure when … [Interviewer]: Is it when Baffinland started? [P16]: Yes, it happened ever since they started hauling ore. (P16, 08-Nov-20, interpreted from Inuktitut)

The snow in between Mary River and Milne is covered in red dust that are being hauled by trucks and the dust has thickened and the red dust almost reaching to Iluvilik (Bruce Head) and I've seen that it's almost reaching Qurluqtuuq Lake. And that is why I say it's impacted … Recently, maybe two years ago, it is noticed by men who are hunters, they see that the red areas on the ice, caused by red dust … It [freshwater] is disgusting, even if it's snow, ice or land, it's disgusting from the dust covering it. (P24, 09-Nov-20, interpreted from Inuktitut)

The Phillips Creek corridor has traditionally been an important access point along which Inuit hunters and travellers have moved on their way into the interior of North Baffin. As one participant explained, traditionally travellers would have stopped along Phillips Creek to collect drinking water without concern.

(Interviewer:) Are there areas here [close to Mine Site] that you used to go to [before the Project], to get water? (P49:) Yeah. Water? … Yes, all along this river. Without – before Baffinland? … Anywhere we used to stop along the river. Yes. (P49, 12-Nov-20)

Participants reported that they now had concerns about Project-related contamination entering Phillips Creek. Below, several participants describe how they no longer collect their water along Phillips Creek when travelling in the area because of their knowledge of nearby industrial activity, and their observations of there being too much dust.

> *The river at the Milne Inlet we use it all the time. The river … Phillips Creek … Mainly, it was mainly used to collect our water, but we stopped collecting our water there. So we only use it for crossing, crossing, now to go to the caribou hunting ground … Before the mine started, we would collect [water] from here. But, since it started. I haven't been going there … Last time I got my water there was 2005 … They let us but it's the contamination of the river. (P38, 09-Nov-20)*

> *(Interviewer:) Would you still collect water there? From that riverbed [Phillips Creek]? … (P17:) Too much dust. Too much of construction going on there. (Interviewer:) On that, are there places now, you avoid? To– When you're gathering drinking water, do you know places to stay away from? (P17:) Just that road to Mary River. Between Mary River and Milne Inlet. (P17, 10-Nov-20)*

> *We are told not to collect any type of water in these lakes [along the Tote road]. Any lakes near Mary River because they [Baffinland staff] say it's contaminated. So we've been collecting our water from the mine [tap].* (P15, 07-Feb-19)

The Mary River mine site area is now often avoided by harvesters travelling through the interior of Baffin Island. In the quote below, one participant explains how in this area the dust is so omnipresent that Inuit consider the water from the area largely undrinkable.

> *(Interviewer:) Are there locations that you would avoid and no longer go to, to gather drinking water? (P48:) The areas around Mine inlet and Mary River … one of the hunters said that they can't drink anything in this area anymore because of dust and around Mary river … I was the HTO manager for a while, back in 2013 and also 2017 and 2018 and we had a hunter who told us that the water in that area is not drinkable anymore because of the red dust … there is a cabin in that area that HTO owns … Yes, other side of the mine. A hunter said that the water is not drinkable anymore. Because the wind blows the dust everywhere. (P48, 12-Sep-20)*

> *…the trails we use to go Arctic Bay and to Igloolik, for the area of the mining, it is concerning to get water, where would we get water from? When there's snow and it's covered from the dust, it's like you get a broth from the ore and when it melts, it's not good anymore … it's when the dust had been blown away from the wind and to where it landed. It is very disgusting. (P39, 09-Nov-20, interpreted from Inuktitut)*

> *…I can be anywhere and drink water, however, if I know that there's iron ore around that area and I would definitely not drink in that area. (P41, 10-Nov-20, interpreted from Inuktitut*

I wouldn't want to drink water at Mary River, knowing that they pour salt into the lake including iron ore dust, I don't want to drink from it, as it looks disgusting. (P41, 10-Nov-20, interpreted from Inuktitut)

The fresh water all around Mary River, I know they're contaminated, and it is concerning for me. (P24, 09-Nov-20, interpreted from Inuktitut)

When I was out caribou hunting in November to Mary River, I got some ice from a lake and it was not good for me, I had to travel further in order to get good ice… Since it is contaminated, you can see the red dust has thickened along the trail and it's coming from the red dust, even on the lakes, where there's lots of fish in them. I can say that, yes, it has been effected by Baffinland, our hunting ground has been affected. (P24, 09-Nov-20, interpreted from Inuktitut)

One participant explained that they now carry equipment to filter any water they might gather close to the mine site.

(Interviewer:) Where does the water you drink, come from? (P38:) Mainly from the glacier water or from the, from the ground, itself … But when I go close to Mary River. I always have to filter my water. Every time. I started bringing Brita and Certa filter to Mary River, just to have fresh water. 'Cause from right here, where this point is from here to all the way to where this, keep going down right here. That much so is red ore and we can get fresh water from the snow … Yeah, from the dust. From here to here, all the way around … That's where I start filtering my snow, after I melt them. (P38, 09-Nov-20)

Participants explained that hunters now have to carry water with them into the interior of Baffin Island, because these areas are now felt to be too contaminated by dust to be safe.

Lots of changes we noticed from the impact [of the Project on freshwater]. When– we go to start carrying more and more water, when we go caribou hunting towards Mary River. (P38, 09-Nov-20)

Like this day, if we're travelling home, we collect our water from the [tap at the] mine and bring it with us by a thermos. And if we're travelling from the [Mittimatalik] towards Mary River, same thing, we do the same thing because we cannot collect any water in that [Tote road] area as well. So we always fill up our thermoses in those both sites before we travel back and forth. (P15, 07-Feb-19)

(Interviewer:) Are there areas of water that you now avoid? (P49:) Yes … Now, yeah because of Mary River … All that area from there. Where there's dust, we avoid that … In fact, that's been advised that, you know, well hunters advise that … Before you go up there, bring your own water or chunk of iceberg for drinking water… (P49, 12-Nov-20)

Impacts to fish and fishing were noted by many participants who noted that they were observing changes to the quantity and quality of fish and the purity or cleanliness of their habitat due to Project dust. Participants described a number of waterbodies in which populations of char have reduced. Study participants noted that dust deposited in rivers and lakes may be contributing to these reductions in fish populations, and this concern was echoed by participants in the Mittimatalik Tusaqtavut Study.

> *This is the body of the fish Koluktoo [or Qurluqtuuq] Bay … That has been known to Inuit from Mittimatalik many, many years. And it's important because their taste – fish taste different. And not – up you can go up here to. to go for fish. Now, I don't. They taste good, but the activity at the Milne Inlet probably has caused kind of concern of the red ice that gets when there's a – there's a big blizzard at there one time. (P42, 10-Nov-20)*

> *He knows the way to Mary River very well, he's travelled it quite a few times. And they used to have a lot of fish, and they say - people are saying that the fish, that char, aren't there anymore*. (P08, 05-Feb-19, interpreted from Inuktitut)

> *Growing up, we used to go there [Tugaat River] every summer for, we used do that every summer for caribou hunting, there used to be plenty and lots of fish, now there's nothing.* (P17, 07-Feb-19)

> *This is Iqaluit Lake, this is the lake. We fish by nets here during the winter. It used to have lots of fish that time and commercial quota was limited to 5000 lbs. but now it's less … [Interviewer]: You mentioned that Iqaluit was used and you said it has less fish now from long ago. [P04]: We don't know we are just thinking that it might be from the mine. That's what we are just thinking. (P04, 10-Nov-20, interpreted from Inuktitut)*

> *The cabin near the Mary River site had land locked fish but recently no tests are done but the river flows south … people would find dead fish along the river. People just recently were finding dead fish that seagulls were eating at the river in the summer time when the river is flowing. It's [the river is] going to Angiyuryuk and all the lakes flow into Angiyuryuk. Angiyuryuk is flowing to Tasirjuaq and to Kangirlujuaq starting at Qatiktuq flowing south all the time. (P04, 12-Nov-20, interpreted from Inuktitut)*

> *For the ones [lakes] close to Mary River and for the ones that have fish in them, we know they're impacted, there are less and less fish up there. (P41, 10-Nov-20, interpreted from Inuktitut)*

> *Fish, I think it's most impacted especially around the area of the [Mary River] site and also Qurluqtuuq, someone found dead fish, I think Qurluqtuuq is the most impacted … It was this summer [that the dead fish were found] … It was never noticed before and no one ever found dead fish, it seems like it started when the mine started to operate that it was noticed. (P46, 12-Nov-20, interpreted from Inuktitut)*

Alongside dust, Project shipping was also seen as having an impact on fish and fishing in the vicinity of the Project – even upstream in the freshwater environment. As the quote below explains, decreased abundance of char in previously productive lakes, is felt to be linked to increased marine shipping.

> *Kugluktuq had huge fish, bigger than all the fish in the other lakes and very fat … Now the studies show that the fish are depleting. It used to have lots of fish … things are different now after they started mining and carrying ore and shipping… Iqaluit, Tugaat, and Qugluktuq have less fish now when they started carrying ore. (P04, 10-Nov-20, interpreted from Inuktitut)*

Concerns over water quality are also concerns about impacts to plants and animals for Inuit who continue to rely on and value hunting as a component of their culture and subsistence.

> *(Interviewer:) Have you been concerned about the quality of the water? (P49:) Yes, but I would be more concerned for the hunters than for myself. (Interviewer:) Are you concerned for the animals? (P49:) Animals? Yes, of course. Yes. And if they start to die, we would know it's not safe. (P49, 12-Nov-20)*

> *I think for the ones that eats plants, [they] will be most affected [by the mines] … Yes, also the humans, it will be harder for them to harvest them [the animals], if the area is contaminated. (P16, 08-Nov-20, interpreted from Inuktitut)*

> *The water all around Mary River and towards us was good water, now they're not good and some of the vegetation is not good anymore. We went to Mary River to do some studies and the food that caribou eat (lichen) are contaminated all around Mary River. (P24, 09-Nov-20, interpreted from Inuktitut)*

Some participants described observing animals like foxes, visibly coloured by their contact with red ore dust.

> *[Interviewer]: Between when it [the mine] started and now, when would the dust have started to show? [P36]: I think it was when they started to crush iron ore. Whenever we're out camping, we see foxes that are white, black and brown, I've never seen a red fox, but when I first saw a red fox at Mary River. They must use the system that they crush ore outside, but I've never seen this kind of stuff before. I've never seen the actual crushing station, but I've seen a cloud of red dust and probably that when they're crushing it. (P36, 08-Nov-20, interpreted from Inuktitut)*

> *…the dust that is from the drilling is reaching the beach area, so now there is no caribou, no fish and even the hares have gone and the foxes we seen on TV now have red fur. (P40, 09-Nov-20, interpreted from Inuktitut)*

While ore dust was identified as perceived source of environmental contamination, some Inuit also identified other sources – including mercury and sewage from the Mine Site.

> *I've had some fish that came from the lakes near Mary River … This one had lots of fish in it and they're using it as a sewage lagoon … [Interviewer]: And you can't go there anymore … [P24]: No, there are restrictions. It was our main hunting area, wolves and caribou, we are now restricted and don't go there anymore. (P24, 09-Nov-20, interpreted from Inuktitut)*

> *[Interviewer]: There was another water body, near Milne Inlet, that you wanted protected? [P24]: Yes, this one [Phillips Creek] has lots of fish. However, today that the fish are contaminated? I heard that they contained more mercury in them … Yes, it has char there … whenever we go caribou hunting … we would get fish to eat [from Phillips Creek]. (P24, 09-Nov-20, interpreted from Inuktitut)*

As Inuit have observed the spread of ore dust and perceived impacts to freshwater, their ability to gather drinking water has been eroded. They have witnessed a series of connected and cascading impacts to enjoyment of the land, and their ability to continue culturally important activities and teaching. Their observations of Project effects extend to the health of the broader environment used and inhabited by Inuit, including plants, terrestrial animals, and fishing on the rivers and lakes of the Baffin Island interior. For this reason, impacts to water have broader, more far-reaching effects on Inuit use of land and resources, as avoidance behaviours increase and land use activities are limited or altered to adjust.

7.1.2 Project-Related Impacts on Freshwater and Fishing: Outcomes on Inuit Culture, Resources and Land Use

Participants described several impact pathways by which Project effects were felt on freshwater systems and which, by extension, impact Inuit culture, resources and land use overall. Dust and pollutants or contaminants from the Project were seen by participants as entering the water systems either through surface water run off during the snow free months or through accumulation on the surface of the snow and subsequently entering the water during the spring thaw. In the quote below, a participant describes how dust on the land has prevented their access to freshwater.

> *(Interviewer:) Have you ever been out on the land and not been able to get water? (P38:) Yes, last spring of June. I, I wasn't able to get any water at my cabin at all because of the dust. My cabin is right here. (P38, 09-Nov-20)*

Though they are spatially localized (although this "localization" can extend several kilometres from the Project footprint), airborne dust and possible waterborne contaminants impacts from the Project have been observed by hunters and travellers from all five of the impacted communities while accessing the centre of northern Baffin Island (QIA 2019a, 2019b and 2021). Inuit harvesters perceive greater contamination and as a result experience reduced enjoyment of the land, and greater reluctance to harvest and drink water from the land where such contamination is observed (or

suspected). Because of the cultural importance of the centre of northern Baffin Island and the area around the Project, impacts are felt by Inuit regardless of the distance they were obliged to travel to hunt, fish or use this area.

> *(Interviewer:) This has impacted Mittimatalik. Do you think this will impact other communities? (P38:) Yep. 'Cause Artic Bay, Igloolik goes here too. So, they'll be impacted too with drinking water. So we're not the only community. Igloolik, Arctic Bay and Mittimatalik. We share this hunting ground. (P38, 09-Nov-20)*

> *…also Igloolik water has been affected too, it's from the dust, the dust that's coming from the mining, it's gone everywhere … if it's just the same as last year, the red area on the snow, you would notice it, especially when it's melting in this area, when the snow is melting, and the seal breathing holes would turn red… (P39, 09-Nov-20, interpreted from Inuktitut)*

> *[Interviewer]: Do you think this will not only impact Pond Inlet but other communities? [P24]: Yes, as I stated earlier, that Qaanniqtalik has a river flowing toward Igloolik hunting grounds. It will have an impact on everyone, even to our ocean and also to Igloolik hunting area. (P24, 09-Nov-20, interpreted from Inuktitut)*

Avoidance of sources of freshwater was described by Study participants as an increasingly common behaviour amongst Mittimatalingmiut. Concerns around observed, potential or perceived contamination or pollutants, as described in the examples below, lead to a loss of trust and to adaptive behaviours like filtering or avoidance.

> *(Interviewer:) Would you know that anyone still uses the water from that location? (P49:) Mary River. Yeah, Baffinland. Purifying the water, I guess. (Interviewer:) Would you still collect water here? (P49:) No. (Interviewer:) What if you boiled it? Would you trust it still or? (P49:) I don't think so. I don't know. (P49 12-Nov-20)*

> *Ever since there's mining activity, I have never gone to Milne Inlet to hunt caribou, also I've never been to Mary River in the summer time, because of all that contamination is in effect. (P24, 09-Nov-20, interpreted from Inuktitut)*

The impacts of this pattern of avoidance are substantial. One participant explains that they feel they have lost their right to their preferred source of water.

> *(Interviewer:) Would you still prefer this water [icebergs, multiyear ice] if there was 176 ships coming in here, annually? (P05:) Prefer the icebergs? I don't know, probably not. It depends on what the rules and regulations they have, like even if they're dumping outside, the currents can still bring it in, the sewage and whatnot, grey water, whatever. Even if they're regulated not to dump in that area, it may be pushed in, so I don't know if I would. I'd probably prefer the streams. (Interviewer:) How does that make you feel?*

> *(P05:) Like they've taken away my right to healthy water. Iceberg, that's the most preferred. (P05, 08-Nov-20)*

Participants described experiencing Project impacts on freshwater through a number of different impact pathways, chief amongst them the perception that ore dust observed entering the environment would act as a pollutant or contaminant. Participants described their concerns about this perceived contamination and exercised typical Inuit caution about "uncertain" or "bad" water in many cases, leading to outright avoidance of water from sources considered impacted.

8. INUIT MONITORING PRIORITIES

Study participants were asked to identify their priorities for freshwater management and monitoring with the goal of having those opinions inform the development of the relevant Project management and monitoring programs. *It is important to note that the inclusion of this element in the interviews was not intended as a substitute for the extensive consultative requirements regarding other relevant Inuit and community bodies designed to introduce Inuit voices into the development of these monitoring programs, including the IAKK.*

Since the Study was conducted, Inuit-led studies have been initiative and Inuit-led monitoring has begun to be designed under the Inuit Stewardship Program. The monitoring priorities identified during the Study are provided below to provide a reference for future iterations of this monitoring or other programs carried out by Baffinland. It is understood that impacts on freshwater due to dust dispersion from Project activities are being further investigated through studies and monitoring being conducted by Baffinland and through the Inuit Stewardship Program.

8.1 WHAT SHOULD BE MONITORED?

Participants were asked to identify their priorities for what aspects of water quality should be monitored in the future. Responses from participants varied, many referencing the key indicators discussed in Section 5 of this Report, while others referred to the changes they were already able to identify in the landscape (as described in Section 6). Monitoring indicators were primarily focused on observational data, rooted in Inuit Qaujiamajatuqangit, rather than in technical measurements – and as such further efforts to support the refinement, and comparability (e.g. across seasons or between monitoring/data-collectors) will be required before implementation. While background knowledge of the chemical safety or potability of water is factored into decision-making, for most hunters and travellers, decisions are rooted in first-person observation and knowledge that is shared between land users and across generations.

Monitoring water quality, including previously referenced observational indicators like taste and colour was important for one participant, who described future monitoring in the context of existing and past programs which have focused on the health of the drinking water reservoir outside of Mittimatalik which supplies the community.

> *(Interviewer:) What would be the most important things for Inuit to monitor when looking at the health of freshwater. (P48:) They would have to monitor the quality, the taste, the colour and have samples, test the water. (P48, 12-Sep-20)*

Monitoring of the various species (invertebrates, insects, fish, animals etc.) which use freshwater was important to participants. In the quotes below, participants described how monitoring non-human water inhabitants and users might enhance understandings of the changes being observed in freshwater systems.

> *(Interviewer:) What do you think it would be important for Inuit to monitor, when we're talking about the health of freshwater? (P38:) I think it would be important to monitor the little creatures that lives in the lakes, all the time. Try and see their changes, try and catch what's causing the problem of the lake. (P38, 09-Nov-20)*
>
> *[Inuit should monitor] The quality of the water, the species in the water and the movement of the species, like there life cycle, I guess. (P48, 12-Sep-20)*

The degree to which a site has visible signs of human disturbance was an important aspect to monitor for participants. Despite changes to Project design and on-site protocols, dust and its air and waterborne movement beyond the Project Footprint on the land remains a significant concern to Inuit, as one participant explained.

> *Yeah, like I said, water around Mary river and Milne Inlet, the freshwater is not drinkable anymore because of red dust. I know they say it's going to be covered but] there is always a way for the dust to get out and get blown by the wind. (P48, 12-Sep-20)*

Monitoring contaminants remains a priority for Inuit due to the perception that contaminants are entering the environment (and wildlife) through various pathways. In the quotes below participants describe how they feel contaminant transmission along these pathways should be tested and monitored.

> *What Environment Canada's doing, what kind of pollution in the air, how much pollution there is, definitely noise acoustics. There was a fishing project that monitored contaminants in and around the lakes in the whole area, and there was a correlation, there was some correlation from the closer lakes to the shipping route. I think that needs to be continued. Any, anywhere where the hunters gather water for contaminants, all the extra activity, all that. And if they can also do what Environment Canada's doing in the area where they hunt narwhals, Saviit, you'll probably see more contamination there. (P05, 08-Nov-20)*
>
> *Well, it mainly would be important [to be monitoring] mainly for the fish and also for drinking water, I suppose … Testing for water how, what kind of contaminants it's getting. (P42, 10-Nov-20)*
>
> *Yeah, I would like to see monitoring program and fresh water … looking for bad water, or chemical reaction, or coming from the rain or snow, there may be some material left behind.(P44, 10-Nov-20)*

Participants outlined a number of important impact pathways and indicators to monitor. Concerns were noted about how contaminants might be entering freshwater systems – including through dust, other airborne pollutants or rainwater runoff. Important indicators for monitoring included invertebrate life, as well as the health and abundance of other species which use freshwater, such as fish or terrestrial wildlife. It should be noted that the proposed indicators (see Table 2) are focused on the question of water quality or potability – and are not necessarily capable of identifying the source of

change or impact. Further refinement of these or additional indicators is required to support distinguishing Project-related impacts from other environmental changes impacting water quality.

Alongside these important monitoring subjects, drawn in many cases from observed impacts, the following indicators are also used by Inuit to gauge water quality and should be given consideration within a monitoring regime.

- Water Clarity
- Water Smell
- Water Temperature
- Rate of Flow (for rivers and creeks)
- Waterbody Size, Depth and Connectivity
- Riverbed or Lakebottom
- Vegetation
- Past Inuit Use

While the water quality indicators identified previously in this report are an important foundation for a monitoring program, Inuit have a deep body of Inuit Qaujimajatuqangit, and place-specific knowledge, and a long tradition of rules, laws and normative behaviours which can be drawn on to develop and enrich water monitoring protocols and programs, as Sections 4.2.1 and 4.4 have described.

8.2 Important Sites for Monitoring Identified by Inuit

Participants were asked to identify their priority areas for future monitoring. These suggested sites were focused on Inuit-suggested candidate Waterbodies of Heightened Importance. These waterbodies are sites of special importance for ecological, cultural and Inuit use reasons, and a list of them were identified in Section 4.3. Of general concern to participants are areas where changes have already been noted, largely focused in watersheds close to or overlapping the Project Footprint (as described in Section 6.1 and shown in Figures 9 and 10).

Milne Inlet, Phillips Creek corridor and the Tugaat Plateau:

Waterbodies in the vicinity of Milne Inlet are seen as an important area for monitoring for a variety of reasons. A number of importance freshwater sources including Qurluqtuup Lake, Qoluqto Lake, the Robertson River, Tugaat River and Phillips Creek are located in the area. Additionally, these freshwater sources support populations of char that in turn act as a food source directly for Inuit themselves and for the narwhal harvested by Inuit in the Inlet. Milne Inlet, and the surrounding waterbodies, is also a central area identified by Inuit as prone to dust contamination from the Port facility.

> *This area right here [Milne Inlet] would be best to focus on [for monitoring]. So, so we'll know if the – or spreading further or not. So– and more and more people are here during summer time … There's people hunting for narwhals during summer time. That's where we want the freshwater to be monitored the most … The changes of the temperatures. How is it getting more– degrees around the area. (P38, 09-Nov-20)*

Other key Waterbodies of Heightened Importance within this area – noted for both its use and cultural importance, its status as an important travel and ecological corridor and the concentration of Project physical works and activities included:

- Tugaat Lake
- Iqaluit Tasinga

North Baffin Island Interior:

One participant identified the area at the watershed boundary in the northern interior of Baffin Island as being an important monitoring site. This height-of-land area is seen as the source of various watercourses and thus a significant site for the landscape of the North Baffin area.

> *(Interviewer:) Would you want the monitoring to be just along the Tote road or would you want all of the areas that you've identified as important bodies of water? (P49:) I think all of – everywhere. Like if – yeah. Not just the – well, I think it's important too that the rivers, I think, I don't know where maybe where there, we, we call Qattiktuq. The highest, high … You know, that's where the river starts flowing south … To Iglulik area. It's maybe just a little bit of south to it. (P49, 12-Nov-20)*

Other Waterbodies of Heightened Importance within the island's interior included:

- Ravn River
- Camp Lake
- Turner River
- Mary River
- Nina Bang Lake
- Quartz Lake
- Erichsen Lake
- Angijurjuk Lake
- Qaangirtalik/ Qaamiqtalik

- Inukshuligaajuk/Amittuarjuk/Tallurugaarjuk

The Waterbodies of Heightened Importance are key waterbodies for ongoing monitoring, including never before implemented, consistent Inuit-led monitoring using Inuit Qaujimajatuqangit and Inuit Qaujimaningit enriched observational indicators. Participants identified these sites as high priorities for monitoring due to their importance but also, as has been described for their ecological importance (as important watershed locations etc.) or for their potential exposure to Project effects. It should be noted that, as was described in Section 6, Inuit have already observed Project impacts at some of these waterbodies.

8.3 RECOMMENDED SEASONALITY OF MONITORING

Study participants were asked to identify the ideal timing for monitoring, both in terms of intervals and seasonality. Participants felt, as the quote below describes, that given the potentially long-term nature of mine impacts, long-term monitoring is required.

> *(Interviewer:) Do you think the impacts will stop when Mary River stops? Or do you think those impacts will continue past the mine when they stop? (P42) Well, it all depends on impact of the mine. It might have contaminants, it's going to be like couple years before eventually when it can be noticeable, if has, if it has been impacted or not. (P42, 10-Nov-20)*

According to Study participants, monitoring should run year-round. Two participants explain how they would value monitoring which occurred year-round in order to reflect any seasonal changes to water systems.

> *(Interviewer:) What time of year should monitoring take place? Is it just winter or summer, or is it all year? (P45:) Maybe all year. (P45, 12-Nov-20)*

> *(Interviewer:) When do you think it should take, in the summer, the winter or all year? (P48:) I think it should be all year. The data will be useful if it's for all year around, you can see the seasonal changes of freshwater. How they change every season. (P48, 12-Sep-20)*

While year-round monitoring was seen as important, particular seasons were identified as priorities, as has been noted elsewhere in this report. The spring, particularly during the thaw, was seen as important. As one of the participants quoted below explains, snow melt has an important potential role in moving contaminants into water systems.

> *[Monitoring] Could be all year. But it would be better if they start [monitoring] during springtime during when it starts to melt. (P38, 09-Nov-20)*

> *(Interviewer:) Do you know what time of year monitoring should take place? Should it be done in the winter or in the summer or all year? (P42) Spring. Well, what I would suggest is, is springtime, which is melt. When it starts to melt, that's when you can gather up more information from the accumulation of chemicals before they runoff. (P42, 10-Nov-20)*

9. CONCLUSION

9.1 SUMMARY

This Report outlines the importance of the Mary River Project Study Area for Inuit use of freshwater and highlights some of the concerns Inuit from Mittimatalik have raised about impacts to their traditional fishing locations, fish stocks, freshwater gathering sites and the environment around these sites.

This Report outlines these Inuit observations both of importance and change, including both “pre-Project” values and “post-Project initiation” changes.

The Report outlines Inuit water Objectives (Section 4) gathered from an analysis of Inuit water use and Waterbodies of Heightened Importance, both of which are proposed as the foundation for future conservation and management of freshwater resources on the land.

The Report also lays out a set of Inuit-defined water quality Indicators (Section 5). These are qualities of water or of the freshwater environment which Inuit pay special attention to when making judgements of water quality and safety. Inuit use these indicators in combination with their individual and group experiences to make judgements about the relative safety and purity of water or gathered foods like fish while out travelling on the land. While water quality monitoring is currently carried out by Baffinland to test for chemicals and other contaminant concentrations, Inuit rely heavily on observation and community knowledge when making decisions on the land. These Indicators can form the foundation for an Inuit and Inuit Qaujiamajatuqangit-led water quality monitoring program committed to by Baffinland, which would complement existing efforts by better encompassing Inuit risk assessment. Establishing observable parameters which speak to the judgements Inuit are making about water being good, uncertain, or bad is a critical step in this process.

Inuit experiences, quoted and described in this Report, demonstrate clearly that judging the health of the freshwater environment is a complex assessment, constantly being made by Inuit who are drinking, gathering, fishing or otherwise using water on the land. As impacts to water continue or intensify, Inuit are obliged to judge what the effects of consuming this water will be on their health and to make adjustments to their patterns of land use that reflect their assessment of these risks. Avoidance of impacted areas is becoming more common, a response which has a series of cascading impacts. As a result of this cascade of impacts, Project effects can be seen to extend well beyond individual choices around water consumption and into the broader scope of land use, and the maintenance of Inuit culture and traditions.

Project impacts have been felt by Mittimatalingmiut to their freshwater sources in the Study Area. In particular, participants described their concerns around observations of dustfall extending beyond the Project Footprint. While the spring season and related snowmelt was seen as a particularly concerning pathway whereby dust was carried by meltwaters into larger streams and waterbodies, Inuit have observed ore dust-covered land, snow, sea-ice and animals year-round.

The site-specific data collected during the course of this Study demonstrate that the Study Area is of great importance to the community of Mittimatalik and includes a number of Waterbodies of Heightened Importance identified by Inuit. The mapped data clearly demonstrate that Mittimatalingmiut use or have used the freshwater throughout the Study Area across multiple generations. A combined total of 95 site-specific values were reported in the Study Area (the Project Footprint, LSA, and RSA), including (but not limited to):

- Sites and areas used for gathering freshwater for drinking and other uses;
- Important Arctic char habitat, including spawning rivers and overwintering lakes;
- Important water crossings on travel routes that are relied upon to access hunting grounds and other communities; and
- Important fishing sites relied upon for traditional food harvesting.

Through data collected during interviews with Inuit elders and land users, the Study has identified potential interactions between the Project and freshwater. As participants consistently explained, freshwater is a linking element in their landscape – consumed by Inuit and animals alike, and essential for the healthy and normal function of the land. Freshwater is connected with all aspects of Inuit life and culture and impacts to freshwater will have impacts far beyond fishing and collection of freshwater.

Participants have observed the following potential interactions between the Project and their Freshwater and Fishing values:

- Increased perceived contamination of snow, ice, and water bodies from dust caused by Project components associated with the mine and the tote road;
- Reduced trust in previously utilised water collection sites;
- Reduced ability to collect freshwater while out on the land due to the above;
- Deterrence from traveling to contaminated areas due to the lack of access to freshwater while out on the land;
- Perceived impacts to fish health due to dust contamination of fish habitat;
- Reduced ability to trust the safety of char gathered in freshwater environments due to concerns around potential impacts to their health;
- Reduced ability to catch, share, and consume Arctic char due to the above;
- Avoidance of harvesting in the Study Area due to perceived contamination of water;
- Avoidance of preferred harvesting areas due to perceived water-borne contamination; and

- Reduced confidence in the health of country foods due to concerns with dust and other contaminants from the Project.

The observed impacts described above, are also likely to lead to the following potential/additional impacts, sometimes called “knock on” or “spin off” effects, tied to Inuit culture, resources and land use and Inuit rights:

- Disruptions to “sense of place” through decreased ability of people to connect with nature and spend time in places that are culturally and spiritually meaningful, due to Project activities;

- Disconnection from Inuit culture and an altered ability to practice rights due to the above disruptions;

- Impacts on access to important country food sources due to all of the above impacts and related loss of trust (due to observed changes and/or perceived contamination) and increased avoidance;

- Increased travel costs due to the need to travel farther to access preferred country foods.

In summary, impacts from the Mary River Project, are and will likely in the future have a direct impact on the access to, use and confidence of Inuit from Mittimatalik in their freshwater, particularly the freshwater from some lakes and rivers found in the Study Area. These impacts, including patterns of avoidance and loss of confidence are already impacting and may continue to impact, the ability of Inuit from Mittimatalik to continue resource harvesting, travelling across and using the land and transmit cultural knowledge and Inuit Qaujiamajatuqangit between generations in the Study Area.

These Project impacts considered alongside the matrix of indicators of water quality which Inuit have and continue to use as part of their decision-making around water collection and use, as well as identified Waterbodies of Heightened Importance, could support the foundation of future Inuit-led water monitoring programs as well supporting the ongoing refinement of Baffinland’s scientific monitoring programs. Project impacts described by Inuit and documented within this Report indicate that Inuit thresholds related to fresh water may be being breached in some instances, and that Inuit objectives related to the use and values of freshwater may have been impacted. Further work is required to identify appropriate responses to the triggering of Inuit-identified thresholds, and to ensure that any future Inuit-led water monitoring program is well-integrated with the various ongoing monitoring programs which Baffinland operates, to ensure that findings can be effectively implemented.

Building Inuit observational parameters and on-territory investigations into the Project’s monitoring system through Inuit-led monitoring will allow for expanded data collection and enhanced risk communication, more directly targeting the factors which cause Inuit concern when they are assessing the health of water and the land. While this Report is intended to lay a foundation for the Objectives, Indicators, Thresholds and Responses required in such a monitoring program, further engagement with communities is required. Further research to address how the scale and severity of an impact triggers a

response is required. While Inuit Objectives have been used alongside identified Indicators to form the basis of the thresholds outlined in this Report, Inuit may identify other key Objectives, Indicators, and Thresholds through future work.

As has been demonstrated in this Report, Inuit concerns around water quality and changes, whether Project-driven or otherwise, are rooted in Inuit Qaujimajatuqangit, Inuit Qaujimaningit, first-hand Inuit observations, shared knowledge and a necessarily cautious approach to water choices. Avoidance and loss of trust of previously used and trusted water sources cannot be measured using western science-centric monitoring programs and can only be captured through Inuit-led monitoring and definition of impact thresholds. It is this gap between measured impacts and felt (observed and perceived) impacts which must be addressed as a priority.

9.2 CLOSURE

Should you wish to discuss any aspect of this Report further, please do not hesitate to contact Knut Kitching at 778-228-8033.

Sincerely,

Knut Kitching

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