Attachment 13.2

Fish Survey Report

(1,100 Pages)



Baffinland Iron Mines Corporation
Mary River Project – Phase 2 Proposal

North Railway Freshwater Habitat Survey: 2018 · Prepared for Baffinland Iron Mines Corporation

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BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT - PHASE 2 PROPOSAL

NORTH RAILWAY FRESHWATER HABITAT SURVEY: 2018

Prepared for:

Baffinland Iron Mines Corporation

Prepared by:

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ABBREVIATIONS AND ACRONYMS

ARCH	Arctic Char
BCMOE	British Columbia Ministry of Environment
C	Confined
CPUE	Catch-per-unit-effort
DFO	Fisheries and Oceans Canada
ERP	Early Revenue Phase
FEIS	Final Environmental Impact Statement
GPS	Global positioning system
IMP	Important
L	Lake
LP	Low point
MAR	Marginal
Mtpa	Million tonnes per annum
N	No
N/A	Not applicable
NFB	Not Fish-Bearing
NIRB	Nunavut Impact Review Board
NNST	Ninespine Stickleback
NSC	North/South Consultants Inc.
OW	Overwintering
P	Pond
PC	Partially confined
REAR	Rearing
S	Stream
SPAW	Spawning
UC	Unconfined
UTM	Universal Transverse Mercator
Y	Yes

1.0 INTRODUCTION

The Mary River Project is an operating iron ore mine located in the Qikiqtani Region of Nunavut (Figure 1). Baffinland Iron Mines Corporation (Baffinland; the Proponent) is the owner and operator of the Project. As part of the regulatory approval process, Baffinland submitted a Final Environmental Impact Statement (FEIS) to the Nunavut Impact Review Board (NIRB), which presented in-depth analyses and evaluation of potential environmental and socioeconomic effects associated with the Project.

In 2012, NIRB issued Project Certificate No 005 which provided approval for Baffinland to mine 18 million tonnes per annum (Mtpa) of iron ore, construct a railway to transport the ore south to a port at Steensby Inlet which operates year-round, and to ship the ore to market. The Project Certificate was subsequently amended to include the mining of an additional 4.2 Mtpa of ore, trucking this amount of ore by an existing road (the Tote Road) north to an existing port at Milne Inlet, and shipping the ore to market during the open water season. The total approved iron ore production was increased to 22.2 Mtpa (4.2 Mtpa transported by road to Milne Port, and 18 Mtpa transported by rail to Steensby Port). This is now considered the Approved Project. The 18 Mtpa Steensby rail project has not yet been constructed, however 4.2 Mtpa of iron ore is being transported north by road to Milne Port currently. Baffinland recently submitted a request for a second amendment to Project Certificate No.005 (the Early Revenue Phase [ERP] operation) to allow for a short-term increase in production and transport of ore via road through Milne Port from the current 4.2 Mtpa to 6.0 Mtpa.

Baffinland submitted an Addendum to the FEIS (the Phase 2 Proposal; the third project certificate amendment request) to NIRB in August, 2018. The Phase 2 Proposal will consist of a near-term expansion of the current 4.2 Mtpa ERP operation to 12 Mtpa, followed by the subsequent additional development of the originally approved 18 Mtpa South Rail operation. The near-term proposed expansion would include construction and operation of a North Railway (North Rail) adjacent to the Milne Inlet Tote Road.

As described in the Phase 2 Proposal, the North Railway will be a heavy-haul mineral transport railway built to transport 12 Mtpa of iron ore from the Mine Site to Milne Port. The Phase 2 Proposal Technical Supporting Document No. 14 (North/South Consultant Inc. [NSC] 2018) presented estimates of the amount of fish habitat that would be lost or altered by placement of North Rail infrastructure (i.e., crossings, bridges, and encroachments/infilling) and construction of stream diversions, and provided an initial screening assessment of potential effects on fish passage at the culvert crossings to assist with final detailed engineering design of the rail. The assessment of the potential effects of the Project on Arctic Char was completed through a combination of empirical data collected through field surveys and a desktop assessment using detailed site imagery. As the latter approach is associated with greater uncertainty than the former, where sites could not be classified as either char-bearing or not char-bearing with high confidence, the potentially affected habitat was assumed to support Arctic Char to provide a conservative (i.e., maximum potential impact) assessment.

This report presents the methods and results of an aquatic habitat field program conducted along the proposed North Rail alignment presented in the Phase 2 Proposal in the open-water season of 2018. The field surveys were intended to provide empirical assessments of the presence/absence of fish, to identify fish barriers, and to document aquatic habitat in the vicinity of the proposed rail alignment footprint in freshwater systems. As part of the Phase 2 Proposal, the Milne Inlet Tote Road would undergo some changes to accommodate construction of the North Rail and a temporary haul road would be constructed at a temporary ore transfer area. One crossing would also be required for a laydown area. This report

also presents the methods and results of aquatic habitat field surveys conducted in the open-water season of 2018 at proposed new (nine sites) or relocated (five sites) Milne Inlet Tote Road stream crossings, two crossings at the temporary haul road, and one crossing at a laydown area.

It should be noted that since completion of the Phase 2 Proposal and the 2018 fish habitat field surveys, the North Rail and Tote Road realignment have undergone final detailed engineering design. This has resulted in a number of changes to the potential interactions with fresh water identified in the Phase 2 Proposal. The final detailed design of the Project components pertaining to the North Rail and the Tote Road modifications was completed in April 2019 and updated lists of rail, Tote Road, and other infrastructure interactions with freshwater habitat are provided in a Technical Memorandum (NSC 2019). An updated description of potential effects of the North Rail and Tote Road realignment on char habitat will be presented in a subsequent document.

The information presented in this report describes the methods and results of the field program undertaken in 2018, with the intent of assessing fish and fish habitat at all locations where there were potential interactions with North Rail and Tote Road infrastructure described in the Phase 2 Proposal. Although, as noted above, there have been changes in the specific design of Project-related infrastructure at many of the crossings and some new locations have been added, the fish and fish habitat information acquired during the 2018 field survey still provides a useful description of fish habitat at or near the majority of sites identified in the final design.

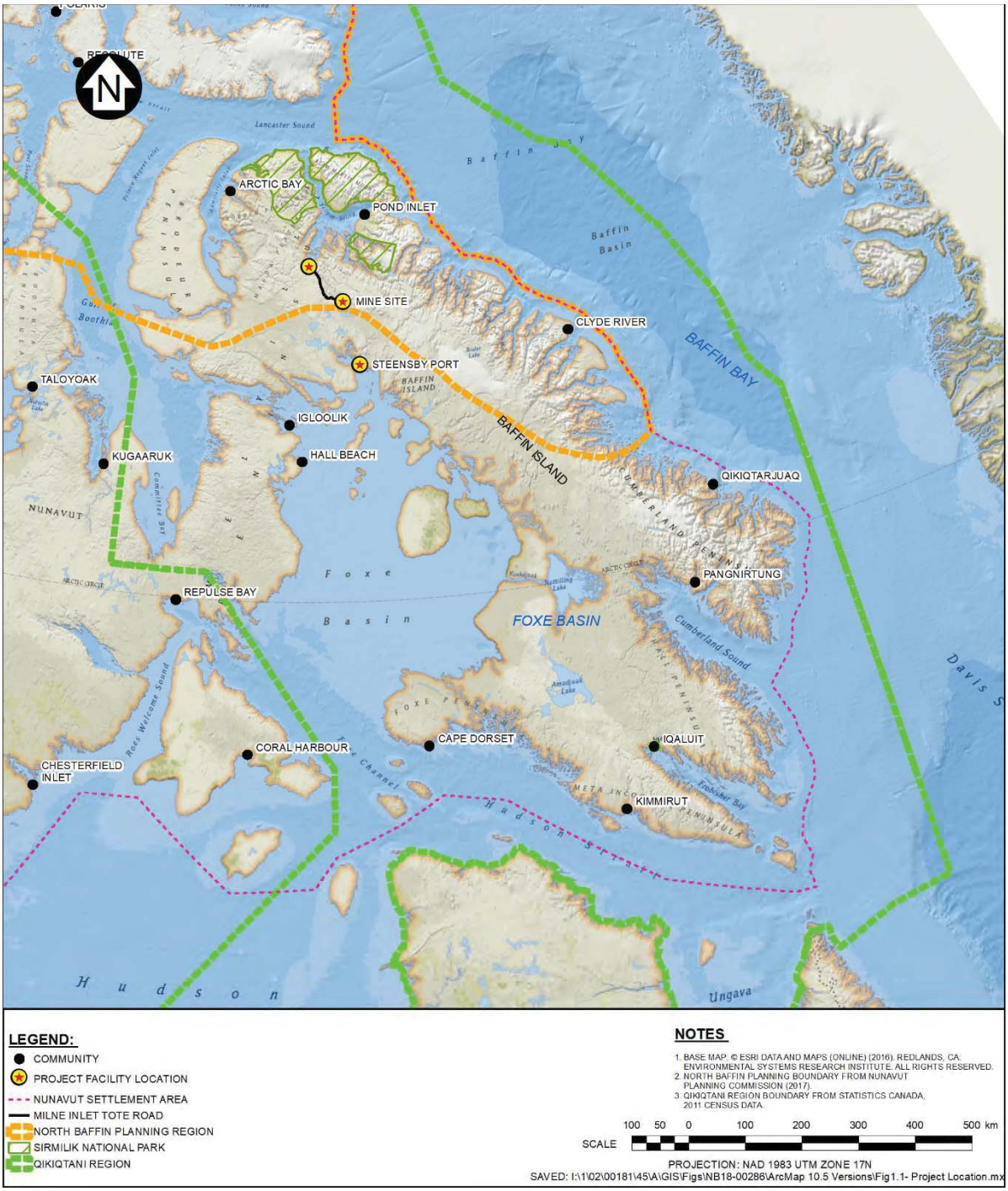


Figure 1. Project location map.

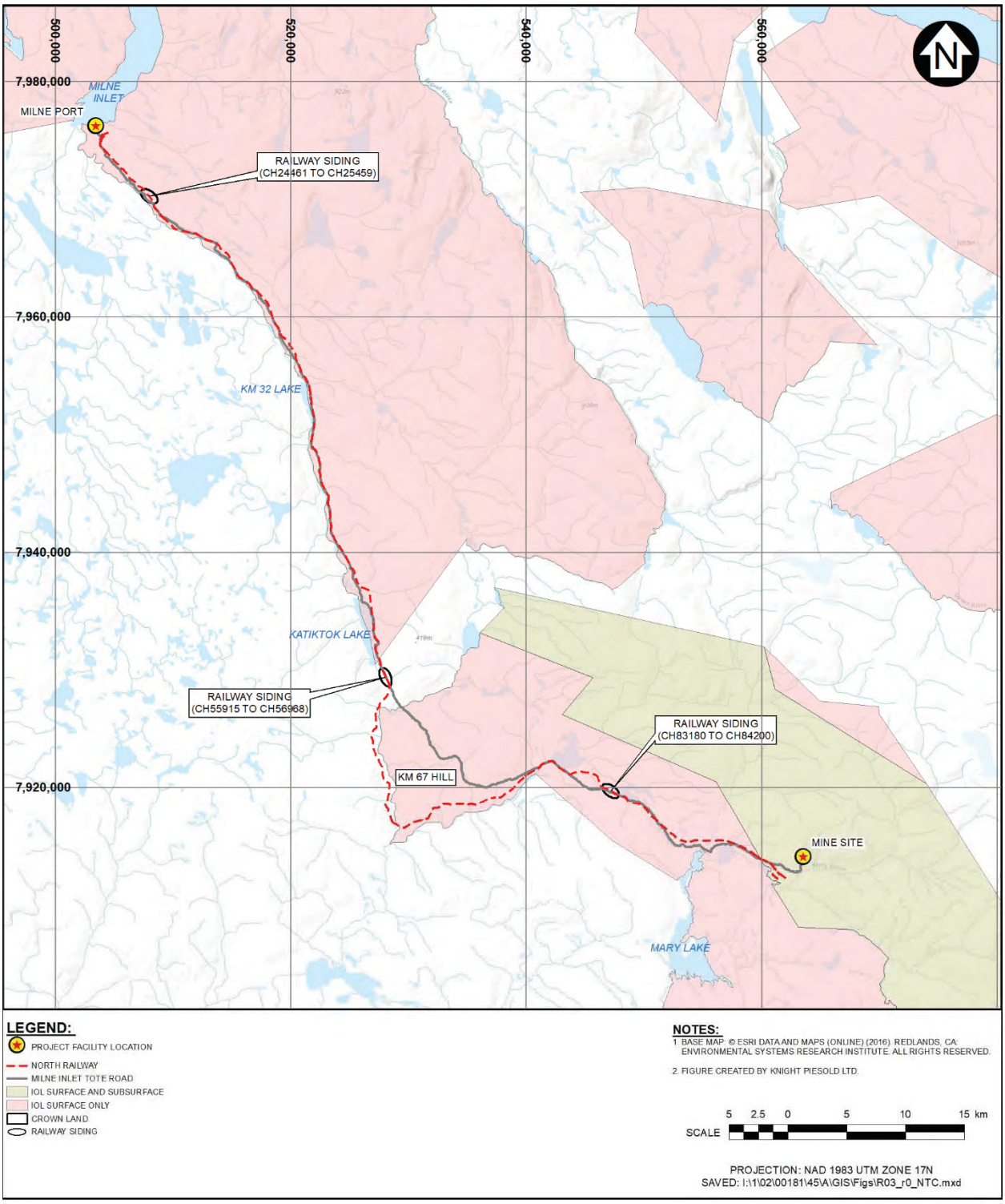


Figure 2. Location of Project activities.

2.0 METHODS

The following provides a description of field and data analysis methods for the early summer (June 28-July 11) and late summer/fall (August 23-September 3) North Rail and Tote Road realignment field programs conducted in 2018. Surveys, which consisted of determining presence/absence of the two fish species present in the study area (Arctic Char [*Salvelinus alpinus*] and Ninespine Stickleback [*Pungitius pungitius*]), and conducting habitat assessments, were undertaken at stream crossing, lake/pond encroachments/infill, bridge crossing, and diversion sites (see Appendix 1 for a list of all sites and Appendix 2 for maps of all sites). Sites were designated as fish-bearing where fish were observed or captured in 2018.

A qualitative habitat rating was assigned to each watercourse or lake (encroachments/diversions) as follows:

- Not Fish Bearing: no fish present, based on surveys completed in 2018;
- Marginal Habitat: provides limited quantity or quality of habitat; or
- Important Habitat: easily accessible to fish and provides abundant, suitable habitat for one or more life stages.

Habitat quality was described for the footprints (i.e., crossing, cut, bridge, and encroachment locations). Habitat data over larger areas was collected for cuts, where habitat quality was also characterized for the length of the streams that could potentially be affected and for lakes, where habitat quality was characterized for the lake as a whole.

2.1 FIELD METHODS

2.1.1 Stream Crossings

2.1.1.1 North Rail Crossings

Rail stream crossings identified in the Phase 2 Proposal were assessed for fish presence and habitat use using protocols specific to the Mary River Project developed in 2007 by NSC and Knight Piésold Ltd. to ensure that crossings are assessed in a standardized manner (Baffinland 2012a). The protocol was based upon those described in Fisheries and Oceans Canada (DFO) and British Columbia Ministry of the Environment's ([BCMOE] 1989) and NSC (2006). Some site-specific changes to the field methods for the Milne Inlet rail surveys were also made to better capture conditions in this study area, as noted below.

The following information was collected during an early summer survey (late June/early July) and repeated in fall (late August/early September) at all stream crossing sites:

1) If sites were deemed to be not aquatic habitat, disconnected from overwintering habitat, and/or otherwise did not provide fish habitat due to the presence of permanent barriers, representative photographs (aerial or ground-based) and a brief description of physical conditions were recorded;

2) At all sites with the potential to provide fish habitat (i.e., presence of water at sufficient depths for use by the smallest size classes, no readily apparent barriers to movement to the site from probable overwintering locations), fish presence/absence was first determined with backpack electrofishing surveys conducted from 50 m downstream to 50 m upstream of the crossing centre line. If fish were not captured or observed during this initial survey, the electrofished area was expanded to include a

greater area with an emphasis on habitat types known to be preferred by either species, as based on field programs completed over the period of 2006-2018 (Baffinland 2009, 2010, 2011, 2012a,b, 2013, 2014, 2015, 2016, 2017; Johnson and Bernhardt 2007; Knight Piésold 2007a,b, 2008; NSC 2008). All captured fish were placed in a pail filled with source water and, at the completion of the transect survey, identified to species and measured for fork length (± 1 mm) before being released back into their source waterbodies;

3) If fish were still not captured or observed during the expanded survey, but habitat appeared otherwise suitable, the stream section between the crossing and the nearest potential overwintering site (defined as lakes with maximum depth > 3.0 m) was surveyed for any potential natural barriers (e.g., high vertical drops, interrupted surface flow) to fish movement;

4) Following confirmation of fish presence (or determination of potential fish usage under other flow conditions), measurements of physical habitat characteristics were collected at 20 m intervals over a distance of 100 m upstream and downstream of the crossing, including: wetted and bankfull widths; maximum water depth; and a profile of water depth and velocity across the stream (at 25, 50 and 75% of the width) using a digital flow metre. Channel confinement, gradient, and morphology, as well as substrate composition were also evaluated at each fish-bearing water-crossing. Photographs were taken of representative habitat at each surveyed profile transect. At sites where existing habitat was determined to be highly uniform or where habitat quality was marginal and deemed to have probable intermittent use only, profiles were limited to every 50 m; and

5) Any identified barriers to fish movement, specifically for juvenile Arctic Char, were described and mapped. Fish movement information and barrier characteristics derived from past mine area and Milne Inlet Tote Road surveys were used to assist with barrier identification along the Rail alignment. For example, a gradient greater than 15°, falls, and channel blockages such as boulders were considered impassable barriers.

2.1.1.2 Milne Inlet Tote Road and Temporary Haul Road Crossings

New and relocated stream crossings along the Tote Road and the temporary haul road associated with the Phase 2 Proposal were also surveyed in 2018. All sites assessed along the Tote Road realignment and the temporary haul road were on the same streams as, and in close proximity to, rail crossing sites (i.e., within the 200 m reach assessed for habitat at fish-bearing rail crossings) and sites were assessed concurrently with the rail crossings. Therefore, the field surveys were conducted using the same protocols, though abbreviated, as described in Section 2.1.1.1.

In brief, the following information was collected during an early summer survey (late June/early July) and repeated in fall (late August/early September) at all sites:

1) If sites were deemed to be not aquatic habitat, disconnected from overwintering habitat, and/or otherwise did not provide fish habitat due to the presence of vertical barriers, representative photographs and a brief description of physical conditions were recorded;

2) At all remaining sites known, or with the potential, to provide fish habitat (i.e., presence of water at sufficient depths for use by the smallest size classes, no readily apparent barriers to movement to the site from probable overwintering locations), fish presence/absence was determined during the rail crossing surveys. See section 2.1.1.1 for a detailed description of fishing methods and data collected at these locations.

3) Physical habitat characteristics in fish-bearing streams were collected during rail crossing surveys and, if the crossing was more than 100 m upstream or downstream of the rail, these data were supplemented with habitat information from additional cross-sections of the stream at 50-m intervals as necessary. See Section 2.1.1.1 for detailed methods of habitat data collection; and

4) Any identified barriers to fish movement, specifically for juvenile Arctic Char, were described and mapped during rail crossing surveys and applied to Tote Road sites.

2.1.2 North Rail Bridges

Field methods for assessing bridge crossings identified in the Phase 2 Proposal were similar to those applied for smaller streams, but survey transect length was smaller (i.e., area surveyed extended from 60 m downstream to 60 m upstream of the crossing site). Electrofishing was not undertaken due to the size of the watercourses at the bridge crossing locations. Previous field studies have established the presence of fish in each river and that all are important, fish-bearing waterbodies (Table 1; Baffinland 2009, 2010, 2011, 2012a,b, 2015a, 2016a, 2017a; NSC 2008)

Table 1. Confirmed fish presence in rivers with proposed rail bridge crossings since 2006.

Site	Species Present	Years Captured/Observed
CV-15-5	Arctic Char	2006, 2008, 2009, 2010, 2016, 2017
CV-70-3	Arctic Char	2006, 2008, 2009, 2010, 2015, 2016, 2018
	Ninespine Stickleback	2008, 2016
CV-85-3 & CV-85-4	Arctic Char	2006, 2008, 2009, 2010, 2014, 2015, 2016
	Ninespine Stickleback	2010
CV-102-1	Arctic Char	2006, 2009, 2014, 2015, 2016, 2017, 2018

2.1.3 North Rail Lake/Pond Encroachments/Infilling

Lakes/ponds that were identified in the Phase 2 Proposal as being affected by encroachments or infilling along the rail alignment were assessed for fish presence/absence and habitat. Fish presence was first identified using backpack electrofishing along an approximately 100 m-long section of shoreline centred at the encroachment site, targeting all nearshore habitat types. Potential habitat use (foraging, overwintering, and spawning) was assessed for the rail footprint areas and for the lake as a whole. Habitat was characterized in detail (water depth, substrate) in the area of the encroachments/infilling. Overall habitat in the lake was also characterized to identify habitat uses supported for each species and to facilitate determination of relative abundance of habitat types and whether critical or limiting habitat may be affected by the encroachment/infill.

At small, shallow lakes with 100% visibility to maximum depth and that were not navigable with a boat, habitat assessments were conducted through collection of visual information on substrate, manual sampling of substrate, and point measurements of water depth. These shallow waterbodies were surveyed by wading and/or from aerial assessment.

The early summer surveys identified two fish-bearing lakes/ponds that were identified in the Phase 2 Proposal as being encroached upon by the North Rail with the potential to have sufficient depths for overwintering for one or both fish species (CV-18-1 and CV-106-3; Appendix 2, Maps 3 and 13).

A boat-based bathymetric and habitat mapping survey was conducted at these two lakes using a Lowrance Elite 7 echosounder with an integrated global positioning system (GPS) receiver and Totalscan® transducer supporting 83/200 kHz broadband sonar frequencies and 455/800 kHz StructureScan® frequencies. Depth and geographic coordinate data were collected along transects covering the study areas and logged to a flash memory card. The entire circumference of each lake was first surveyed at a depth of 1-2 m where nearshore substrate validation could be confirmed visually. Photographs of both the substrate and shoreline were collected with a digital, GPS-linked camera.

Surveys were conducted at boat speeds of approximately 5-10 km/hr. The sonar transponder was mounted at a depth of 0.2 m to the transom of a Zodiac powered by a 10 hp outboard motor. Surveys consisted of tracking and recording acoustic data and positions at 1-second intervals along transects spaced approximately 50 m apart. One or two long transects were surveyed across the maximum length of the lake. The survey followed the methodology developed in the BCMOE bathymetric standards for lake inventories (BCMOE 2009). The bathymetric mapping in this study did not follow a specific hydrographic standard and therefore it is advised that the map products should not be relied upon for navigation.

Substrate was validated at regular intervals over a variety of depths and distances from shore either through *in situ* visualization (shallow areas) or by collecting a sediment grab using a Ponar sampler followed by visual assessment of the contents (consistency, relative composition).

2.1.4 North Rail Stream Diversions

Fish presence/absence in areas that were identified in the Phase 2 Proposal as being affected by stream diversions was assessed using the same methods applied for stream crossing site assessments (see Section 2.1.1). Similarly, habitat quantity and quality were assessed using the same methods as described in Section 2.1.1, but covering the entire stream down to its confluence with another river/pond/lake. Surveys were completed both in streams that were to be diverted and in streams that were to receive diverted flows.

In addition, an aquatic habitat survey was conducted in an unnamed lake, downstream of the diversion at CV-90-4, which could potentially experience a reduction in inflow (Appendix 2, Map 11). The habitat survey was completed using a Lowrance sidescan echosounder as described in Section 2.1.3.

2.2 DATA ANALYSIS METHODS

2.2.1 General

For all sites, all collected habitat and fishing survey results were compiled into assessment sheets with representative habitat photographs. Sites were classified as not fish-bearing if no fish were captured during the 2018 survey or if the initial assessment indicated that it was not fish habitat (as discussed in Section 2.1.1.1). Fish catch-per-unit effort (CPUE) was calculated as the number of char/stickleback per minute of electrofishing. Using these data and habitat information, habitat quality of fish-bearing sites was identified as either Marginal or Important, as follows:

- Marginal Habitat: provides limited quantity or quality of habitat; or
- Important Habitat: easily accessible to fish and provides abundant, suitable habitat for one or more life stages.

2.2.2 Hydrology

Preliminary results of the 2018 stream flow monitoring program operated by Baffinland were provided by A. Rees (pers. comm. 2018) for three sites representative of different catchment sizes located within the study area (Table 2 and Figure 3). Flows at these locations were plotted to provide a general context regarding the flow conditions in the study area in 2018, as well as during the conduct of the field programs. Results for 2018 were compared to data for other years (2006-2017) directly and to mean, median, maximum, and minimum flows recorded for that period.

Table 2. Stream hydrometric sites surveyed in 2018.

Station ID	Station Name	Period of Record	Drainage Area (km^2)	Coordinates (UTM)	
				Easting	Northing
H01	Phillips Creek Tributary	2006-2008, 2011-2018	250	532831	7946247
H05	Camp Lake Tributary (CLT-1)	2006-2008, 2010-2018	5.3	558906	7915079
H06	Mary River	2006-2008, 2010-2018	240	563922	7912984

2.2.3 Bathymetry and Substrate in Lakes/Ponds

Lake habitat survey data were processed using Reefmaster 2.0 and exported from a Lowrance log file format (.sl2) to a Microsoft Excel format. Depths were corrected according to the transducer mounting depth (~ 0.15 m) for each survey. The corrected depth files were then imported into ArcGIS and projected to a Universal Transverse Mercator (UTM) Zone 17 (NAD83) projection and saved to a GIS ready ESRI® shapefile format. In addition to depth, Reefmaster also provides three acoustically derived variables that can be used to classify and map substrate, these include: Peak SV, E1, and E2. Peak SV measures the strength of the sonar return as it is reflected off the bottom, and is correlated to the hardness of the bottom. E1 is derived from the sonar returns that immediately follow the peak return of the first echo return. This value is commonly referred to as roughness or rugosity and is a measure of the roughness of the bottom. E2 is derived from the full second echo return of the bottom and is commonly referred to as hardness. The second echo return is generated when the sonar echos once again off the bottom, after having returned once to the surface and bounced off the underside of the boat. This second echo return is particularly useful for determining the relative hardness of the bottom. Mapping these variables allows the user to delineate boundaries of basic substrate classes for a given study area.

Bathymetric surfaces were interpolated from the corrected transducer depths and vector shorelines of the lakes (provided by Eagle Mapping 2008) using the Topo to Raster interpolation tool in ESRI® ArcGIS 10.6 software. A 0.5 metre bathymetric grid was produced for each lake. Areas, volumes, and depth statistics were calculated in ArcGIS for each of the three lakes.

Side scan images of the lake bottoms of the waterbodies collected during the field surveys using the Lowrance Elite 7 with the 455 kHz StructureScan® frequency were imported into Reefmaster 2.0. Reefmaster 2.0 uses the positional and bearing information from the GPS data to georeference the side scan images of the waterbody and displays them in a seamless mosaic. The side scan image mosaic was exported to a .mbtile format and imported into QGIS, from here it was saved as a GeoTIFF and brought into ArcGIS where major substrate change boundaries were delineated and digitized from the imagery, the mapped Peak SV, E1, and E2, variables and validation data (ponar grabs) obtained during field studies were used to verify the visually delineated substrate classes. Substrates in the field were previously classed according to size by the Wentworth scale (Wentworth 1922). Final symbolization of substrate classes and cartographic output were generated in ArcGIS® 10.6.

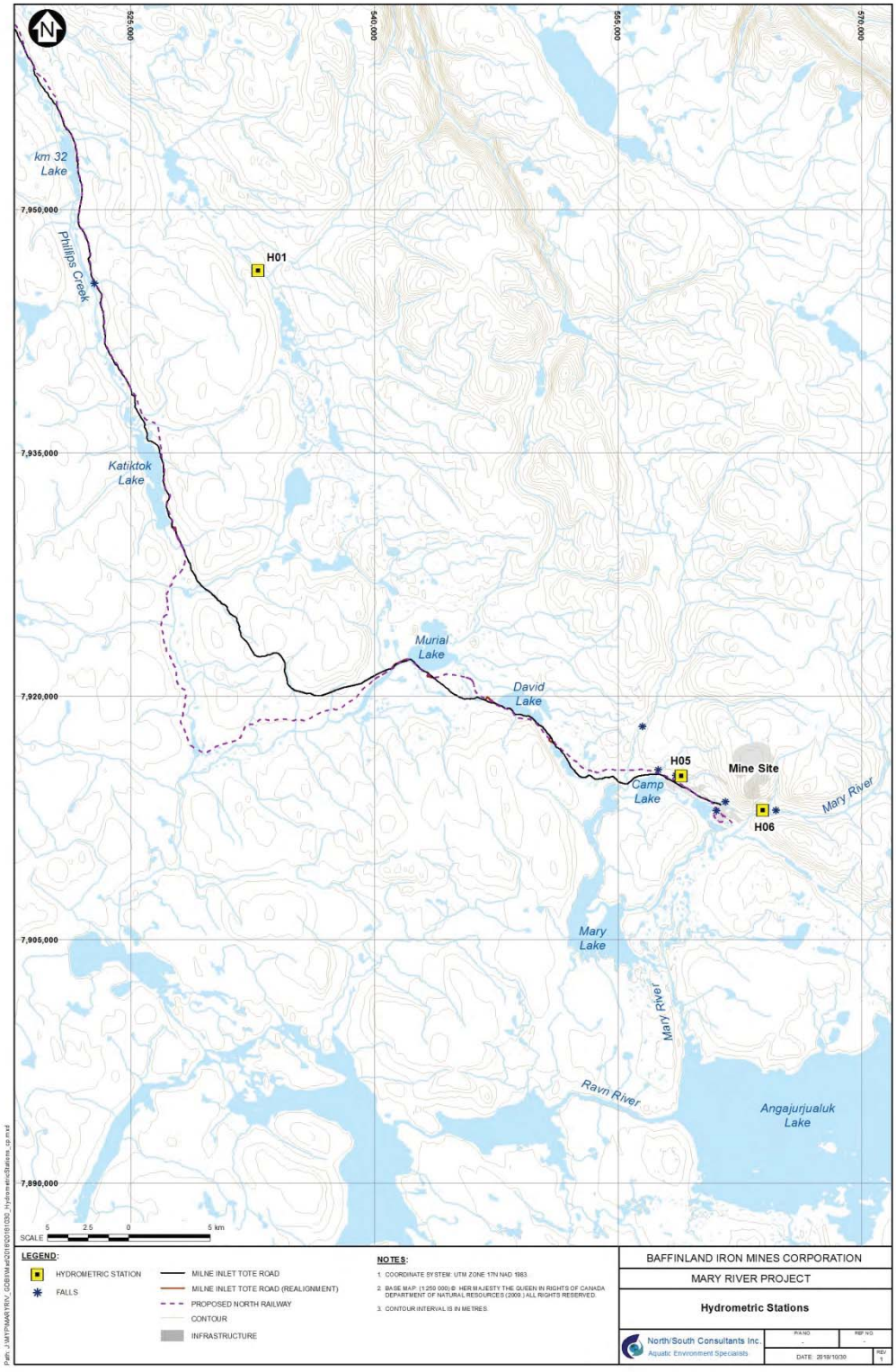


Figure 3. Hydrometric stations in the study area.

3.0 RESULTS

A total of 465 sites were assessed along the north rail alignment in early summer (June 28-July 11) and fall (August 23-September 3) 2018. An overview of fish habitat designations for all sites is provided in Appendix 1, maps of all sites are provided in Appendix 2, maps of diversion sites are provided in Appendix 3, and detailed habitat assessment sheets for each site are provided in Appendix 4. The following provides a summary of the results of the surveys.

3.1 GENERAL CONDITIONS

3.1.1 Water Temperature

Stream water temperatures during the early summer survey ranged from 6-12°C. Based on detailed studies conducted in the mine area, juvenile Arctic Char would be expected to be accessing and using stream habitat at these water temperatures. Studies conducted in the mine area have previously shown that in spring, juvenile Arctic Char typically begin to move into the small tributaries to the mine area lakes at temperatures of about 5-7°C (Baffinland 2012a). Typically, the number of Arctic Char moving upstream increased until water temperatures reach about 15°C in these streams. Although the general pattern is upstream movement during spring, Arctic Char were also observed to move downstream out of small tributary streams in spring, likely in response to changes in flow or reductions in water temperature. Juvenile Arctic Char are thought to move into these tributaries to access warmer water and foraging habitat and to avoid predators. Lake/pond temperatures were not recorded, but all surveyed lakes were ice-free at the start of the early summer survey.

During the fall survey, stream water temperatures were typically less than 6°C, though a few sites remained as high as 8°C. Based on detailed studies conducted in the mine area, Arctic Char may have moved, or begun movements, out of some of the streams to overwintering lakes at the time of the fall surveys; catches of char were greatly reduced in comparison to spring catches in most fish-bearing streams in fall, 2018. Data from Camp Lake Tributary 2 and Sheardown Lake Tributary 1 suggest that downstream movements of char in fall are generally triggered by a drop in water temperature to about 7°C (Baffinland 2012a). The number of fish moving out of tributaries to Camp and Sheardown lakes increased until water temperature in the tributaries had reached about 2°C and then declined to almost no movement.

3.1.2 Discharge

Preliminary stream flow gauging measurements collected at three representative sites (Phillips Creek tributary, Camp Lake Tributary 1, and the Mary River; Figure 3) in the open-water season of 2018 were reviewed to provide supporting information for the fish habitat field program. These preliminary results indicate that the summer field program was conducted during periods of near average (or median) flow conditions for this time of year, as estimated from the three gauging stations (Figure 4). However, the late summer/fall survey was conducted during largely below average flows (Figure 4). The summer survey also captured a brief period of relatively high flow. These short duration high flow events are common during early to mid-summer and result in higher flow compared to average summer flows for the period of record. As a result, discharge was greater during the summer survey relative to the late summer/fall program (Figure 4). The 2018 field programs therefore captured relatively high and low discharge periods

within the study area. It is noted, however, as shown in Figure 4, that discharge is typically higher during the spring freshet than discharge encountered during the summer field program.

3.2 STREAM CROSSINGS

3.2.1 North Rail Crossings

This category includes streams with culvert crossings only. Sites that have a combination of culvert with lake/pond encroachment/infill are included in Section 3.4. A total of 395 stream crossing sites were assessed along the rail alignment identified in the Phase 2 Proposal (Table 3; Appendix 1). For Arctic Char, 40 sites were identified as fish-bearing in the 2018 surveys. Twenty-nine of the char-bearing crossings were designated as important fish habitat and the remaining 11 as marginal, where habitat was not accessible throughout the open-water period and/or had less optimal habitat for juvenile char due to the absence of preferred characteristics. Char in the study area display a preference for streams with coarse substrates, riffle/pool morphology, and abundant cover (e.g., deep pools, overhanging banks, large cobble/boulder) and typically avoid shallow water over fine substrates with little to no flow (Baffinland 2012a).

Of the total of 355 sites that were classified as not char-bearing, 307 sites would not be expected to support char due to the presence of a permanent downstream barrier, the lack of connectivity to overwintering habitat, or the absence of a stream channel at the site (i.e., sites are not aquatic habitat). The remaining 48 sites may potentially support char under higher flow conditions; however, some of these sites may never be accessible due to the presence of soft barriers, such as sub-surface flow and high gradients.

Only 12 sites were identified as fish-bearing for Ninespine Stickleback in 2018. Most stickleback habitat along the rail corridor is distributed within approximately 20 km of the Mary River mine site. Stickleback prefer different habitat types than char, favouring little to no flow over fine substrates, and are thus more frequently observed in lakes/ponds.

Table 3. Summary of species-specific habitat status at stream crossings along the rail alignment.

Habitat Quality	Species	
	Arctic Char	Ninespine Stickleback
Not Fish-Bearing	355	383
Marginal	11	2
Important	29	10
Total	395	395

3.2.2 Milne Inlet Tote Road and Temporary Haul Road Crossings

Of the 17 sites surveyed in 2018, Char were present at five of the sites and stickleback were present at two of the Char-bearing streams (Table 4).

Table 4. Results of the 2018 field surveys conducted at Tote Road realignment, temporary haul road, and laydown area crossings.

Site ID	New or Relocated Crossing	Description	Arctic Char		Ninespine Stickleback	
			Fish Bearing	Habitat Quality	Fish Bearing	Habitat Quality
CV-169-1	New	Laydown Area	N	NFB	N	NFB
CV-146-1	Relocation	Tote Road Realignment	N	NFB	N	NFB
CV-146-2	Relocation	Tote Road Realignment	N	NFB	N	NFB
CV-146-3	Relocation	Tote Road Realignment	N	NFB	N	NFB
CV-131-1	New	Tote Road Realignment	N	NFB	N	NFB
CV-060-1	New	Temporary Haul Road	Y	IMP	N	NFB
CV-060-2	New	Tote Road Realignment	Y	IMP	N	NFB
CV-059-1	New	Temporary Haul Road	Y	MAR	N	NFB
CV-214-1	Relocation	Tote Road Realignment	N	NFB	N	NFB
CV-214-2	New	Tote Road Realignment	N	NFB	N	NFB
CV-215-1	Relocation	Tote Road Realignment	N	NFB	N	NFB
CV-216-1	New	Tote Road Realignment	N	NFB	N	NFB
CV-216-2	New	Tote Road Realignment	N	NFB	N	NFB
CV-020-1	New	Tote Road Realignment	N	NFB	N	NFB
CV-020-2	New	Tote Road Realignment	N	NFB	N	NFB
BG-13-1	New	Tote Road Realignment	Y	IMP	Y	IMP
BG-14-1	New	Tote Road Realignment	Y	IMP	Y	IMP

Y = Yes; N = No; NFB = Not Fish-Bearing; IMP = Important; MAR = Marginal

3.3 NORTH RAIL BRIDGES

All four bridge crossing sites identified in the Phase 2 Proposal provide abundant, important juvenile char habitat. None are deep enough to provide suitable char spawning or overwintering habitat and adult use is likely limited to migration between larger lakes. Although the bridge sites were not electrofished in 2018 for logistical reasons, juvenile char are known to use these rivers for rearing and migration in the open-water season (Table 1); therefore these sites were identified as char habitat. Two of the sites (CV-70-3 and CV-85-3) also provide habitat for Ninespine Stickleback (Appendix 1).

3.4 NORTH RAIL LAKE/POND ENCROACHMENTS/INFILLING

A total of 35 lake/pond encroachments/infilling sites were assessed along the rail alignment (Table 5). For Arctic Char, seven were identified as fish-bearing in 2018. The fishless ponds were of insufficient depth for overwintering (generally less than 2 m maximum depth) and were completely isolated from other waterbodies.

The unnamed ponds at CV-18-1 and CV-106-3 were identified during the early summer survey as potentially providing overwintering habitat for char (i.e., water depth was identified as potentially being sufficient) and detailed bathymetry and substrate surveys were conducted at these two encroachment locations in fall.

Maximum and mean depth in the unnamed lake at CV-18-1 was 3.73 m and 1.73 m, respectively (Figure 5) and substrates were predominantly a combination of sand/silt/clay with some patches of gravel and

cobble, particularly along the south shore (Figure 6). Habitat at the rail footprint is sand/silt with some submerged vegetation on the west side of the alignment and a mixture of silt/clay/sand and patches of gravel/cobble east of the alignment to a depth of 3.0-3.5 m. As this lake is isolated from any other waterbodies, it is used for the entire life cycle of the resident stickleback population.

The pond at CV-106-3 had a maximum and mean depth of 4.07 m and 1.97 m in fall 2018, respectively (Figure 7), and substrate was cobble/sand/boulder in most nearshore areas and sand/gravel or silt/clay at depth (Figure 8). Habitat at the encroachment site is predominantly sand with some small cobble to approximately 1.5 m depth and sparse aquatic vegetation. Shoreline electrofishing captured only stickleback, but this lake is connected downstream to known juvenile char habitat (multiple streams and ponds between Camp Lake and CV-106-3); as char were observed in the inflow and outflow of the pond, it was identified as marginal char habitat. The lake provides suitable habitat for the entire life cycle of stickleback, though spawning is also known from nearby, shallower ponds and interconnected streams.

Of the seven char-bearing ponds, six provided marginal habitat and one (CV-71-1) provided important char habitat. All seven of the encroachment sites identified as Arctic Char habitat are shallow nearshore sites with substrate that is comprised of predominantly fines, but still suitable for Arctic char feeding and rearing. The pond at CV-71-1 was identified as providing important char habitat relative to the others due to its larger size and the greater abundance of char observed during the surveys. Nearshore habitat in all of these lakes/ponds was relatively uniform.

Although the pond at CV-106-3 was deep enough (maximum depth = 4.07 m) for char overwintering, it appears that it is inaccessible to adults from Camp Lake (i.e., the connecting stream is too shallow for adult use. Based on previous studies conducted in the area, most juvenile char that use the CV-104-5 stream (i.e., Camp Lake Tributary 1) that drains the pond at CV-106-3, appear to return to Camp Lake for overwintering. The pond at CV-106-3 is likely limited to providing rearing habitat for juvenile char, though overwintering of some individuals may also occur.

Seven of the lake/pond encroachments/infilling sites were identified as providing important habitat for the Ninespine Stickleback and one of these (CV-18-1), was isolated and supported only Ninespine Stickleback. All provided important rearing and feeding habitat and were suitable for stickleback spawning, though the latter habitat is not limited to encroachment sites in any of the ponds/lakes. Two sites (CV-18-1 and CV-106-3) provided sufficient depths for overwintering and likely support year-round resident stickleback populations.

3.5 NORTH RAIL STREAM DIVERSIONS

Of the total of 31 cuts along the rail alignment described in the Phase 2 Proposal, none of the diverted streams provided fish habitat at or upstream of the cuts due to the absence of a waterbody at the cut, the presence of barriers downstream of the cut, and/or lack of connectivity with overwintering habitat in 2018. However, 14 sites were identified where char occur downstream of the cut. Based on planned flow management in the Phase 2 Proposal, there was the potential for a reduction in flow affecting char habitat in 10 of these drainages under certain flow conditions, as summarized in Table 6 and Appendix 3.

Table 5. Fish presence/absence and habitat quality for lake/pond encroachment/infilling sites surveyed during the 2018 field programs.

Site ID	2018 Fish Habitat Designation																Substrate		Comments
	Arctic Char								Ninespine Stickleback										
	Fish-Bearing	Habitat Quality	Potential Habitat Use at the Footprint			Potential Habitat Use in the Pond			Fish-Bearing	Habitat Quality	Potential Habitat Use at the Footprint			Potential Habitat Use in the Pond					
			REAR	OW	SPAW	REAR	OW	SPAW			REAR	OW	SPAW	REAR	OW	SPAW	Nearshore	Offshore	
CV-14-2	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	Fines	Fines	Connected to CV-14-3, but not to overwintering habitat
CV-14-3	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	Fines	Fines	Connected to CV-14-3, but not to overwintering habitat
CV-15-2	Y	MAR	Y	N	N	Y	N	N	Y	IMP	Y	N	Y	Y	N	Y	Fines dominant overlain by sparse (5%) small cobble with some aquatic vegetation	Loosely compacted fines/sparse cobble	Marginal open-water season use by juvenile ARCH for rearing possible in some years; char present in 2018. Important spring to fall habitat for NNST - rearing and spawning; NNST present in 2018. Upstream lake used for overwintering and ARCH spawning.
CV-15-3	Y	MAR	Y	N	N	Y	N	N	Y	IMP	Y	N	Y	Y	N	Y	Fines dominant overlain by sparse (5%) small cobble with some aquatic vegetation	Loosely compacted fines/sparse cobble	Marginal open-water season use by juvenile ARCH for rearing possible in some years; ARCH present in 2018. Important spring to fall habitat for NNST - rearing and spawning. NNST present in 2018. Upstream lake used for overwintering and ARCH spawning.
CV-15-4	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	Primarily Fines	Primarily Fines	Very shallow, marshy/pond complex.
CV-16-2	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	Fines with aquatic and terrestrial vegetation	Fines with aquatic and terrestrial vegetation	Isolated, non-fish bearing pond.
CV-17-1	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	Fines with some gravel and occasional cobble	Fines with some gravel	Isolated, non-fish bearing pond that formed because of the adjacent road (not a natural pond)
CV-18-1	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	Y	IMP	Y	Y	Y	Y	Y	Y	Primarily silt/sand dominant with small patches of cobble/gravel (including footprint area); south shore dominated by gravel/cobble/sand.	Primarily silt/clay/sand with patches of gravel/cobble/sand	Small lake never connected to Phillips Creek and does not support ARCH. There is an insufficient volume of water for overwintering and insufficient depth for spawning to establish a population of ARCH and the pond is isolated. Lake does support all life stages for a resident NNST population.
CV-19-2	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	Gravel/small cobble/fines	Gravel/small cobble/fines	Isolated, non-fish bearing pond.
CV-22-1	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	Primarily Fines	Primarily Fines	Very shallow, isolated pond.
CV-22-2	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	Primarily Fines	Primarily Fines	Very shallow, isolated pond.
CV-22-4	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	Loosely compacted fines/sparse cobble	Primarily Fines	Very shallow, isolated pond.

Table 5. - continued –

Site ID	2018 Fish Habitat Designation																Substrate		Comments
	Arctic Char								Ninespine Stickleback										
	Fish-Bearing	Habitat Quality	Potential Habitat Use at the Footprint			Potential Habitat Use in the Pond			Fish-Bearing	Habitat Quality	Potential Habitat Use at the Footprint			Potential Habitat Use in the Pond					
			REAR	OW	SPAW	REAR	OW	SPAW			REAR	OW	SPAW	REAR	OW	SPAW	Nearshore	Offshore	
CV-26-1	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	Primarily Fines	Primarily Fines	Marshy, very shallow, with no connectivity to downstream fish habitat
CV-28-5	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	Fines with aquatic and terrestrial vegetation	Fines with aquatic and terrestrial vegetation	Very shallow, isolated pond.
CV-30-7	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	Primarily Fines	Primarily Fines	Shallow, isolated, fishless pond.
CV-33-7	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	Gravel/small cobble/fines	Gravel/small cobble/fines	Isolated, non-fish bearing pond that formed due to the presence of the road
CV-53-2	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	Fines with some cobble and vegetation	Primarily fines and gravel	Isolated, non-fish bearing pond that formed due to the presence of the road
CV-60-2	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	Primarily Fines with some vegetation	Primarily Fines	Shallow, isolated, fishless pond.
CV-65-2	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	Primarily Fines	Primarily Fines	Very shallow, isolated, fishless pond.
CV-70-1	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	Primarily Fines	Primarily Fines	Shallow, isolated, fishless pond.
CV-71-1	Y	IMP	Y	N	N	Y	N	N	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	Primarily Fines	Primarily Fines	Several ARCH observed in summer and fall 2018. Pond is too shallow for ARCH overwintering or spawning, but provides abundant rearing/feeding habitat; well-connected to large river downstream and deeper, potential overwintering lake upstream. NNST were not identified from this lake 2018, but there are no obvious barriers to accessibility and NNST, though rare, have been captured in portions of the large downstream river.
CV-71-2a	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	Primarily Fines	Primarily Fines	Shallow, isolated, fishless pond.
CV-86-1	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	Primarily Fines	Primarily Fines	Shallow, isolated, fishless pond.
CV-89-2	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	Primarily Fines	Primarily Fines	Shallow, isolated, fishless pond.
CV-92-1	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	Primarily Fines	Primarily Fines	Shallow, isolated, fishless pond.
CV-99-1	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	Primarily Fines	Primarily Fines	Shallow, isolated, fishless pond.
CV-105-3	Y	MAR	Y	N	N	Y	N	N	Y	IMP	Y	N	Y	Y	N	Y	Primarily fines and vegetation with occasional cobble	Primarily fines and vegetation with occasional cobble	Footprint site was very shallow (< 4 cm); ARCH may only use the encroachment site habitat during periods of high water, preferring deeper areas of the pond or nearby stream habitat. ARCH present in 2018. NNST observed within the encroachment area in 2018.
CV-106-1	Y	MAR	Y	N	N	Y	N	N	Y	IMP	Y	N	Y	Y	N	Y	Primarily fines with occasional cobble	Primarily fines with occasional cobble	Marginal ARCH habitat. ARCH present in 2018. Important spring to fall habitat for NNST. NNST present in 2018.

Table 5. - continued –

Site ID	2018 Fish Habitat Designation																Substrate		Comments
	Arctic Char								Ninespine Stickleback										
	Fish-Bearing	Habitat Quality	Potential Habitat Use at the Footprint			Potential Habitat Use in the Pond			Fish-Bearing	Habitat Quality	Potential Habitat Use at the Footprint			Potential Habitat Use in the Pond					
			REAR	OW	SPAW	REAR	OW	SPAW			REAR	OW	SPAW	REAR	OW	SPAW	Nearshore	Offshore	
CV-106-2	Y	MAR	Y	N	N	Y	N	N	Y	IMP	Y	N	Y	Y	N	Y	Primarily fines with occasional cobble	Primarily fines with occasional cobble	Marginal ARCH habitat; ARCH present in 2018. Important spring to fall habitat for NNST. NNST present in 2018.
CV-106-3	Y [1]	MAR	Y [1]	N	N	Y	Y	N	Y	IMP	Y	Y	Y	Y	Y	Y	Sand dominant (60%) overlain with small cobble (40%) and patches of vegetation	Primarily fines with occasional large cobble/boulders	No ARCH captured or observed in the pond in 2018. However, ARCH were present in both the inflow and outflow streams in 2018 in very close proximity to the pond and presence in the pond is assumed. NNST present in pond in 2018; pond provides overwintering and spawning habitat for NNST.
CV-107-1	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	N	NFB	N	N	N	N/A	N/A	N/A	Primarily fines with occasional large cobble/boulders	Primarily fines with occasional large cobble/boulders	Fish were not captured in 2018 and the habitat quality is very poor. However lake is accessible and there is potential for use by NNST and juvenile ARCH.
CV-107-3	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	Primarily fines with sparse small cobble	Primarily fines with sparse small cobble	Roadside ditch pond.
CV-110-2	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	Primarily fines with vegetation	Primarily fines with vegetation and occasional large cobble/boulder	Upstream of known fish barrier; no access.
CV-110-3	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	Primarily fines with vegetation	Primarily fines with vegetation	Upstream of known fish barrier; no access.
CV-110-4	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	N	NFB	N/A	N/A	N/A	N/A	N/A	N/A	Primarily fines with vegetation	Primarily fines with vegetation	Upstream of known fish barrier; no access.

REAR = Rearing; OW = Overwintering; SPAW = Spawning; Y = Yes; N = No; P = Potential; NFB = Not Fish-Bearing; IMP = Important; MAR = Marginal; N/A = Not applicable; ARCH = Arctic Char; NNST = Ninespine Stickleback

[1] Fish not observed or captured in the pond in 2018 but designated as ARCH habitat due to presence in inflow and outflow in 2018.

Table 6. Rail alignment cuts and summary of habitat at and downstream of the cuts.

Site ID	Arctic Char				Ninespine Stickleback				Effects Summary
	Habitat at Cut		Habitat Downstream of Cut		Habitat at Cut		Habitat Downstream of Cut		
	Fish Bearing	Habitat Quality	Fish Bearing	Habitat Quality	Fish Bearing	Habitat Quality	Fish Bearing	Habitat Quality	
CV-0-2	N	NFB	N	NFB	N	NFB	N	NFB	No effect on char habitat. Cut stream is not char habitat and is redirected to the same drainage.
CV-8-0	N	NFB	Y	IMP	N	NFB	N	NFB	No effect on char habitat. Nearest downstream char habitat is Phillips Creek. Diversion to be returned to the same drainage upstream of char habitat.
CV-12-4b	N	NFB	N	NFB	N	NFB	N	NFB	No effect on char habitat. Cut is a dry spot with no connection to other habitat. Diversion to be returned to the same drainage upstream of char habitat.
CV-20-2	N	NFB	Y	IMP	N	NFB	N	NFB	No char habitat at or downstream of cut (first available downstream habitat is Phillips Creek). Diversion to be redirected into branch of same stream; and there is no potential for alteration of downstream habitat.
CV-35-5	N	NFB	N	NFB	N	NFB	N	NFB	No effect on char habitat. Cut is a dry spot with no connection to other habitat. Diversion to be returned to same drainage upstream of char habitat.
CV-46-1a	N	NFB	N	NFB	N	NFB	N	NFB	No effect on char habitat. Cut is in a fishless, isolated pond and will be diverted to non-char habitat. Diversion to be returned to same drainage upstream of char habitat.
CV-58-7	N	NFB	Y	IMP	N	NFB	Y	MAR	No loss of char habitat upstream of the cut. Potential for alteration to char habitat due to reduced flow near the downstream confluence, below permanent barriers under very high flow conditions (no fish use in 2018).
CV-58-8	N	NFB	Y	IMP	N	NFB	Y	MAR	Stream was dry in 2018. There is no char habitat upstream of the cut due to a permanent barrier. Potential for reduced flow to alter char habitat near the downstream confluence below permanent barriers under very high flow conditions.
CV-59-4b	N	NFB	N	NFB	N	NFB	N	NFB	No effect on char habitat. Site is a dry hillside with no connection to any other waterbody.

Table 6. - continued –

Site ID	Arctic Char				Ninespine Stickleback				Effects Summary
	Habitat at Cut		Habitat Downstream of Cut		Habitat at Cut		Habitat Downstream of Cut		
	Fish Bearing	Habitat Quality	Fish Bearing	Habitat Quality	Fish Bearing	Habitat Quality	Fish Bearing	Habitat Quality	
CV-59-4a	N	NFB	Y	IMP	N	NFB	Y	MAR	Very low water during 2018 surveys with multiple barriers from the cut (vertical drops) downstream to the confluence (surface flow disappears) with major downstream river. Potential for alteration of char habitat due to flow reductions in the lowermost reach of the stream cut by CV-59-4a. Fish were not present during the 2018 survey.
CV-60-4a	N	NFB	N	NFB	N	NFB	N	NFB	No effect on char habitat. Cut is a dry spot with no connection to other habitat. Diversion to be returned to same drainage upstream of char habitat.
CV-61-3	N	NFB	Y	IMP	N	NFB	Y	MAR	Stream to be diverted at CV-61-3 was nearly completely dry and no fish were present in the stream in both 2018 surveys. A small marshy area near the downstream confluence was present in 2018, which could potentially support fish under higher flows than observed in 2018; therefore there is potential for alteration of char habitat due to reduced flow in downstream area.
CV-62-3	N	NFB	Y	IMP	N	NFB	Y	MAR	Stream was dry to the confluence with CV-62-5 in both 2018 surveys. Very steep, dry terrain in the area of the cut (lack of channel and surface flow) likely to be impassable under most or all conditions. Soft barriers (lack of channel and surface flow) near the confluence with CV-62-5 prevented access to lower reaches in 2018. Downstream area could potentially provide intermittent fish habitat.
CV-62-6	N	NFB	Y	IMP	N	NFB	Y	MAR	No char habitat at or upstream of cut; stream is shallow and steep upstream to approximately 200 m downstream of the cut. Site was dry in fall 2018. The lowermost reaches near the confluence with large downstream river may provide marginal fish habitat during summer in some years, losing connectivity under low water levels. Potential for alteration to downstream habitat due to flow reduction.
CV-62-6b	N	NFB	Y	IMP	N	NFB	Y	MAR	Stream is small branch of stream cut at CV-62-6 with identical characteristics. No habitat in the stream branch but the stream contributes flow to stream CV-62-6 in summer and after rains. Potential for alteration to downstream habitat due to flow reduction.
CV-63-3a	N	NFB	N	NFB	N	NFB	N	NFB	Cut is not in char habitat (cut is at a low point and not a watercourse) and is diverted into non-char habitat.

Table 6. - continued -

Site ID	Arctic Char				Ninespine Stickleback				Effects Summary
	Habitat at Cut		Habitat Downstream of Cut		Habitat at Cut		Habitat Downstream of Cut		
	Fish Bearing	Habitat Quality	Fish Bearing	Habitat Quality	Fish Bearing	Habitat Quality	Fish Bearing	Habitat Quality	
CV-64-5a	N	NFB	N	NFB	N	NFB	N	NFB	Cut is not in char habitat (cur is at a low point and not a watercourse) and is diverted into non-char habitat.
CV-65-2a	N	NFB	N	NFB	N	NFB	N	NFB	Cut is not in char habitat (cut is at a low point and not a watercourse) and is diverted into non-char habitat.
CV-66-2a	N	NFB	N	NFB	N	NFB	N	NFB	Cut is in a low point (dry hillside) and is not fish habitat. Diversion is to non-char habitat. No potential for loss or alteration of char habitat.
CV-74-7	N	NFB	N	NFB	N	NFB	N	NFB	Cut is an isolated wetted area; numerous subsurface flow or water depth barriers present throughout the stream and there is no connectivity to overwintering habitat. No potential for downstream habitat alteration as cut is directed into adjacent stream that converges with cut stream.
CV-82-1a	N	NFB	N	NFB	N	NFB	N	NFB	Cut is not in a watercourse. No potential for effects on char habitat.
CV-90-2	N	NFB	Y	IMP	N	NFB	Y	MAR	Cut located in an isolated moist spot and there is no char habitat upstream or downstream of the cut, with the potential exception of the lowermost reach where elevation is similar to the downstream river (i.e., subject to backflow effect).
CV-90-4	N	NFB	Y	IMP	N	NFB	Y	IMP	No direct loss of char habitat due to known barrier at the inflow of the stream to the downstream lake; cut site was isolated and shallow in 2018.
CV-92-1b	N	NFB	N	NFB	N	NFB	N	NFB	No effect on char habitat. Site is a dry spot with no connectivity to overwintering habitat. Flow to be redirected into a shallow, isolated, fishless pond.
CV-95-1	N	NFB	N	NFB	N	NFB	N	NFB	Site is a low point and does not provide char habitat. No potential for alteration to downstream habitat as flow to be redirected to same drainage.
CV-97-6	N	NFB	Y	IMP	N	NFB	Y	IMP	Stream to be diverted is not char habitat. No potential for alteration to downstream habitat as flow to be redirected to same drainage.
CV-101-1a	N	NFB	N	NFB	N	NFB	N	NFB	Cut located in fishless habitat with no connections to overwintering habitat. No potential for alteration of char habitat downstream as cut to be redirected to same drainage at the confluence with downstream watercourse.

Table 6. - continued -

Site ID	Arctic Char				Ninespine Stickleback				Effects Summary
	Habitat at Cut		Habitat Downstream of Cut		Habitat at Cut		Habitat Downstream of Cut		
	Fish Bearing	Habitat Quality	Fish Bearing	Habitat Quality	Fish Bearing	Habitat Quality	Fish Bearing	Habitat Quality	
CV-101-1b	N	NFB	N	NFB	N	NFB	N	NFB	Cut located in fishless habitat with no connections to overwintering habitat. No potential for alteration of char habitat downstream as cut to be redirected to same drainage at the confluence with downstream watercourse.
CV-102-1a	N	NFB	N	NFB	N	NFB	N	NFB	Cut site was a moist low point in 2018 that is never connected to overwintering habitat. No potential for alteration to downstream habitat as flow to be redirected to adjacent stream in same drainage upstream of the confluence with the diverted stream.
CV-102-5	N	NFB	Y	IMP	N	NFB	Y	IMP	No char habitat at and upstream of cut. No potential for alteration to downstream char habitat as flow to be redirected upstream of the first available char habitat.
CV-109-1	N	NFB	Y	IMP	N	NFB	N	NFB	Area upstream and downstream of the cut was dry in 2018. Although unlikely, lowermost reaches of the stream near the confluence with a fish-bearing lake may be used during periods of high flow. No alteration to downstream lake as flow is redirected into the same drainage (i.e., adjacent tributary to larger downstream pond).

Y = Yes; N = No; NFB = Not Fish-Bearing; IMP = Important; MAR = Marginal

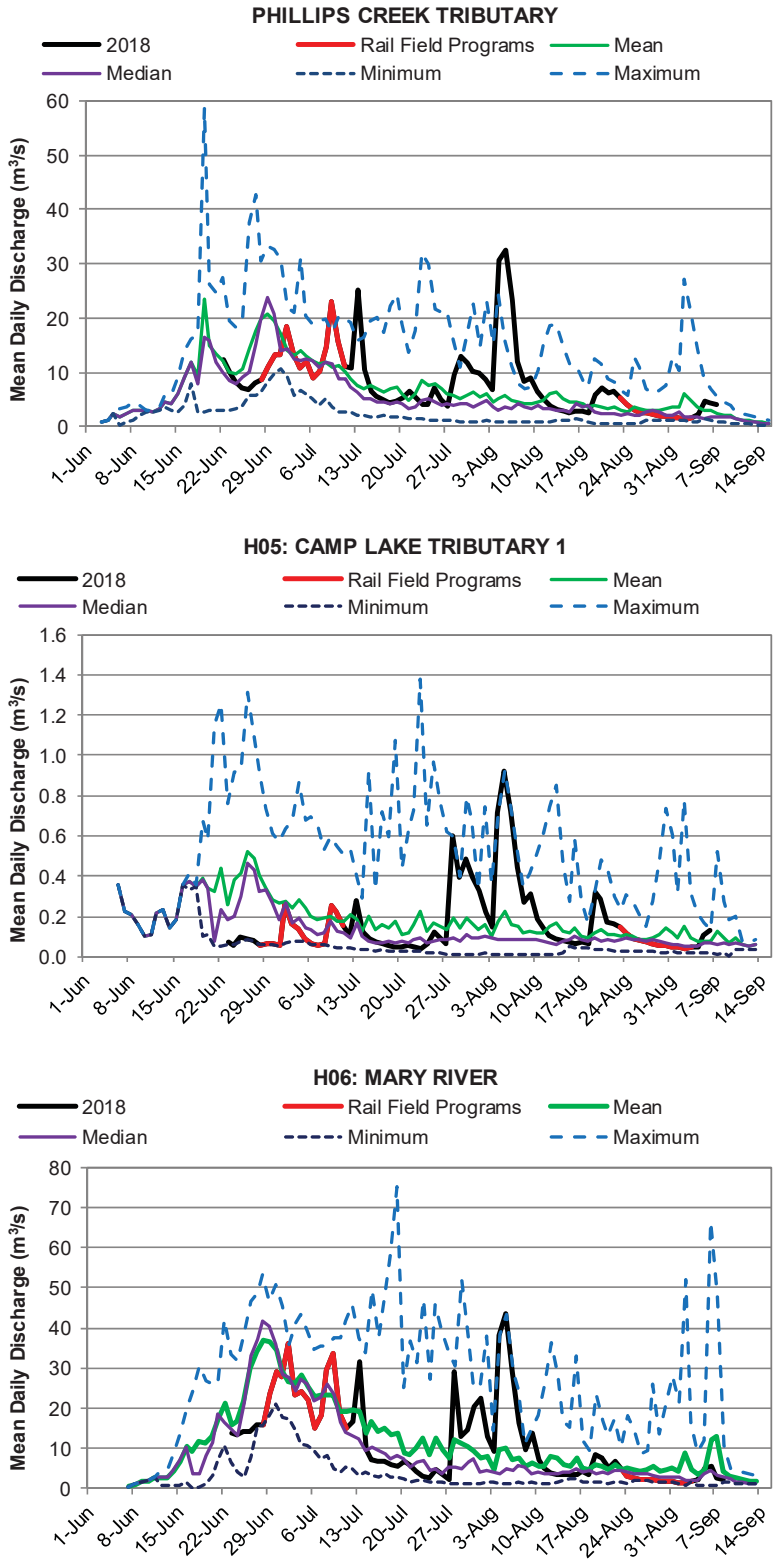


Figure 4. **Preliminary 2018 daily discharge and mean, median, minimum, and maximum daily discharges (2006-2017) for three stream gauging stations in the study area. Data provided by A. Rees (pers. comm. 2018).**

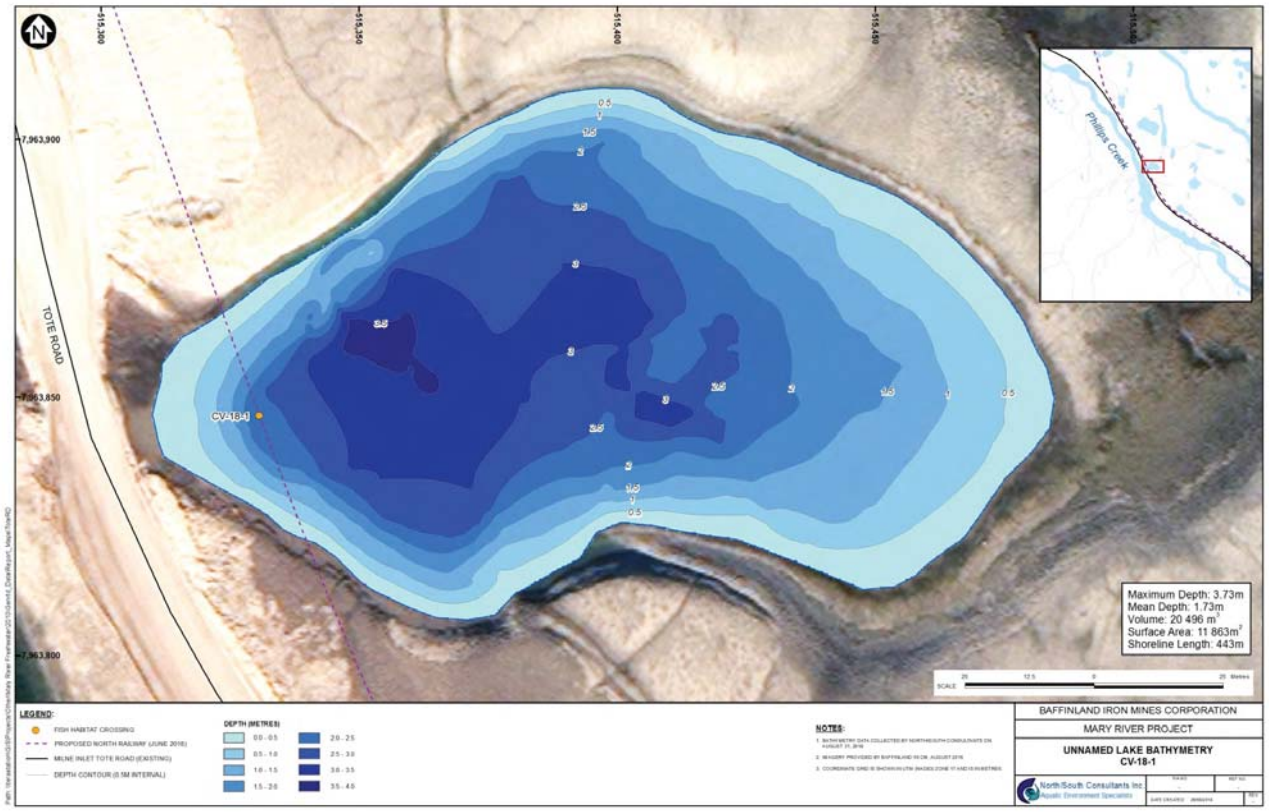


Figure 5. Bathymetry of the unnamed lake at site CV-18-1.

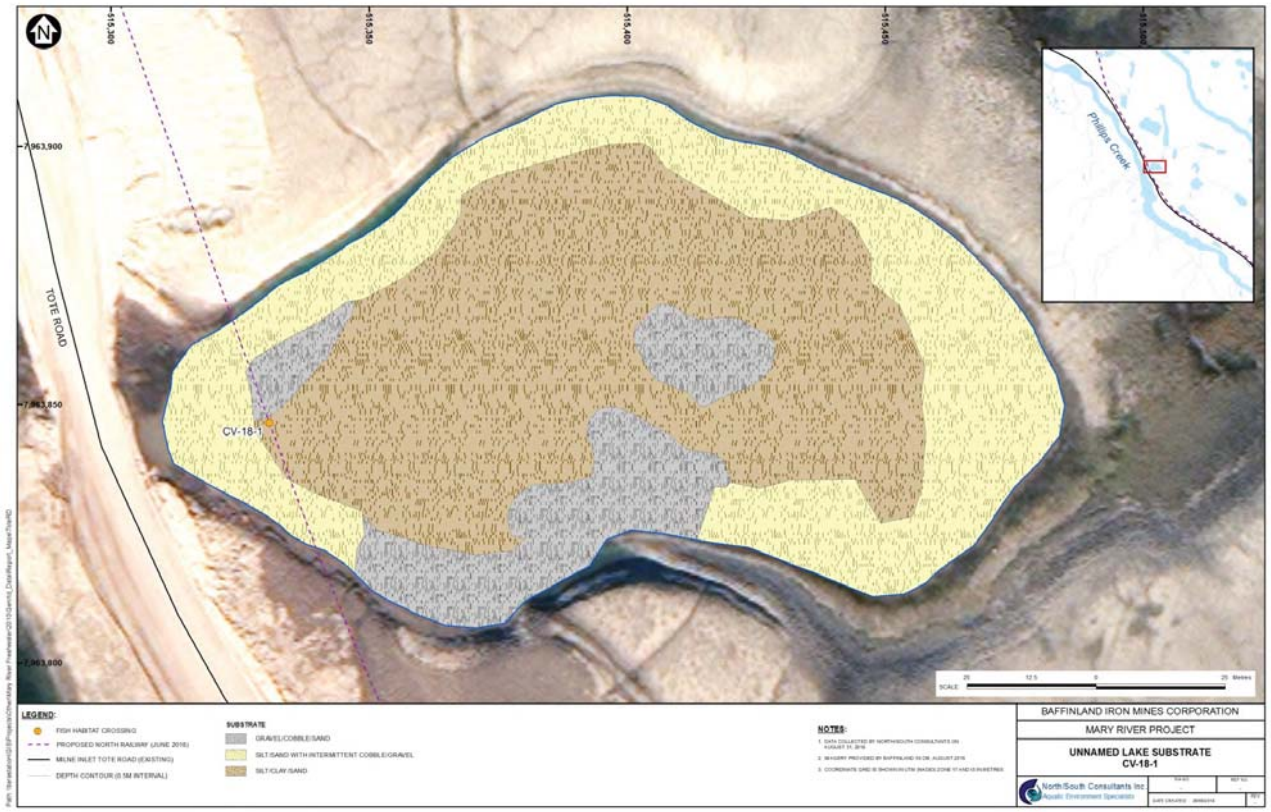


Figure 6. Substrate distribution map for the unnamed lake at site CV-18-1.

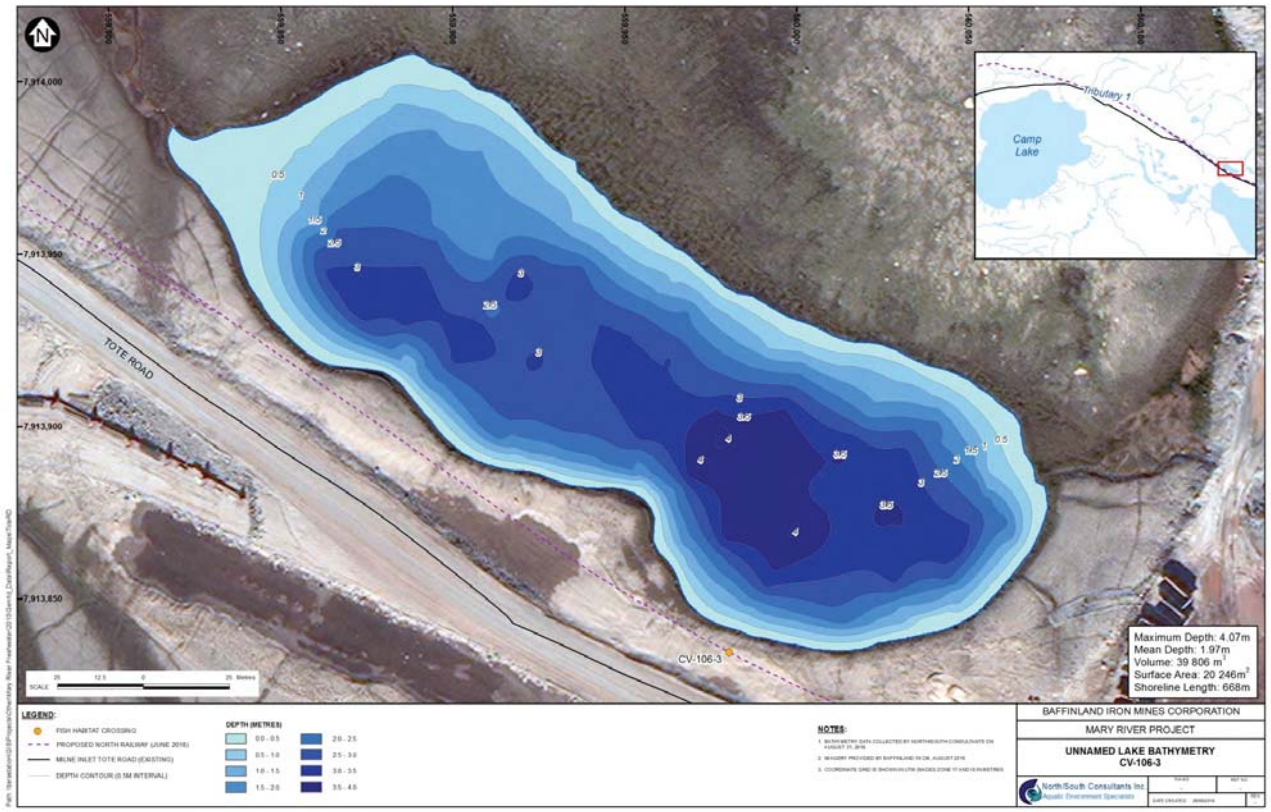


Figure 7. Bathymetry of the unnamed pond at site CV-106-3.

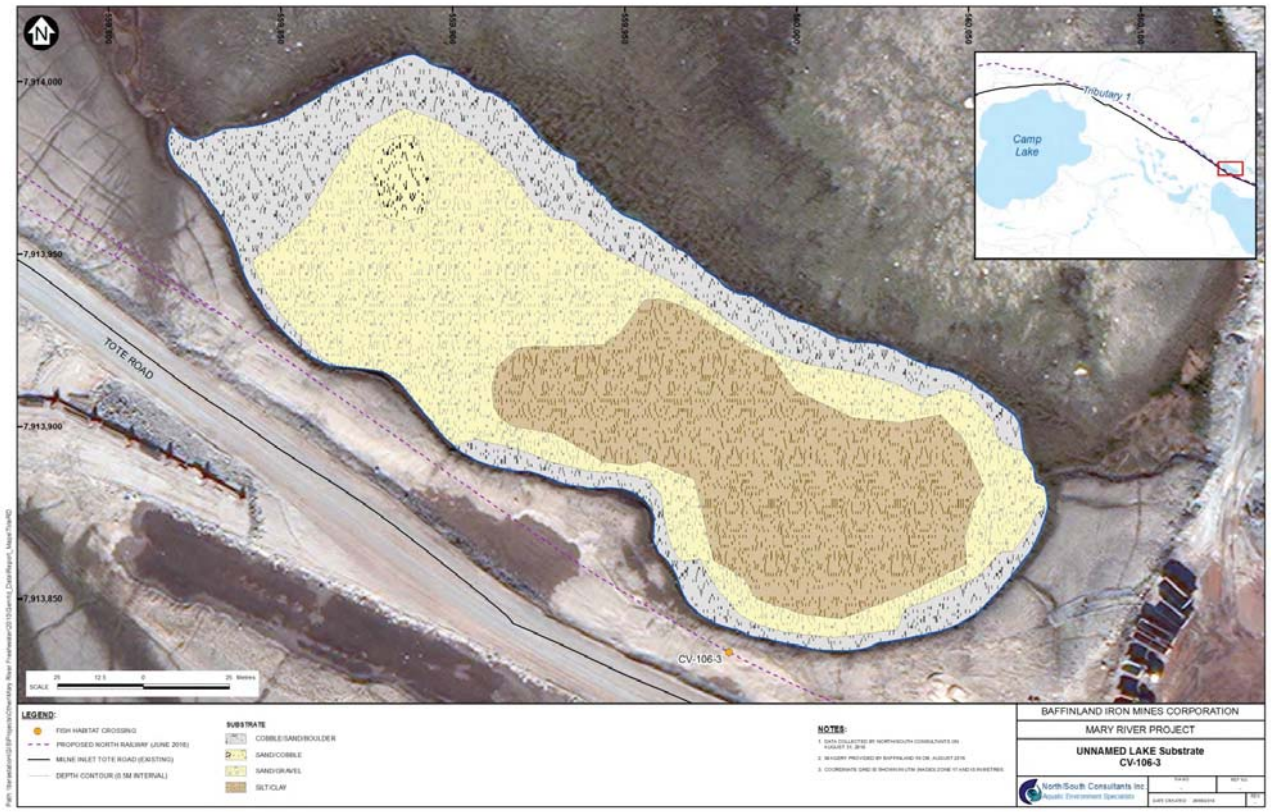


Figure 8. Substrate distribution map for the unnamed lake at site CV-106-3.

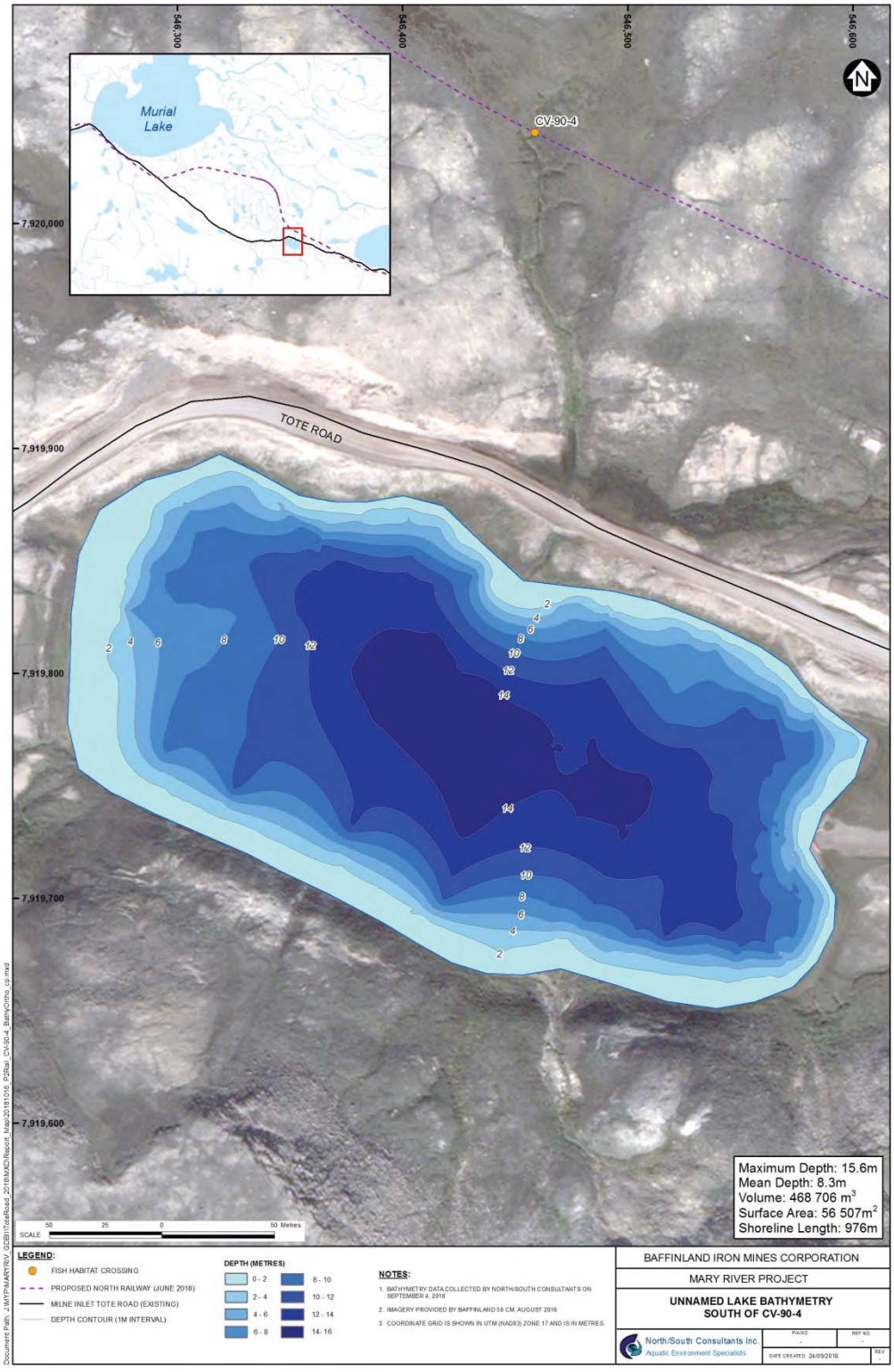


Figure 9. Bathymetry of the unnamed pond located downstream of the stream diversion site CV-90-4.

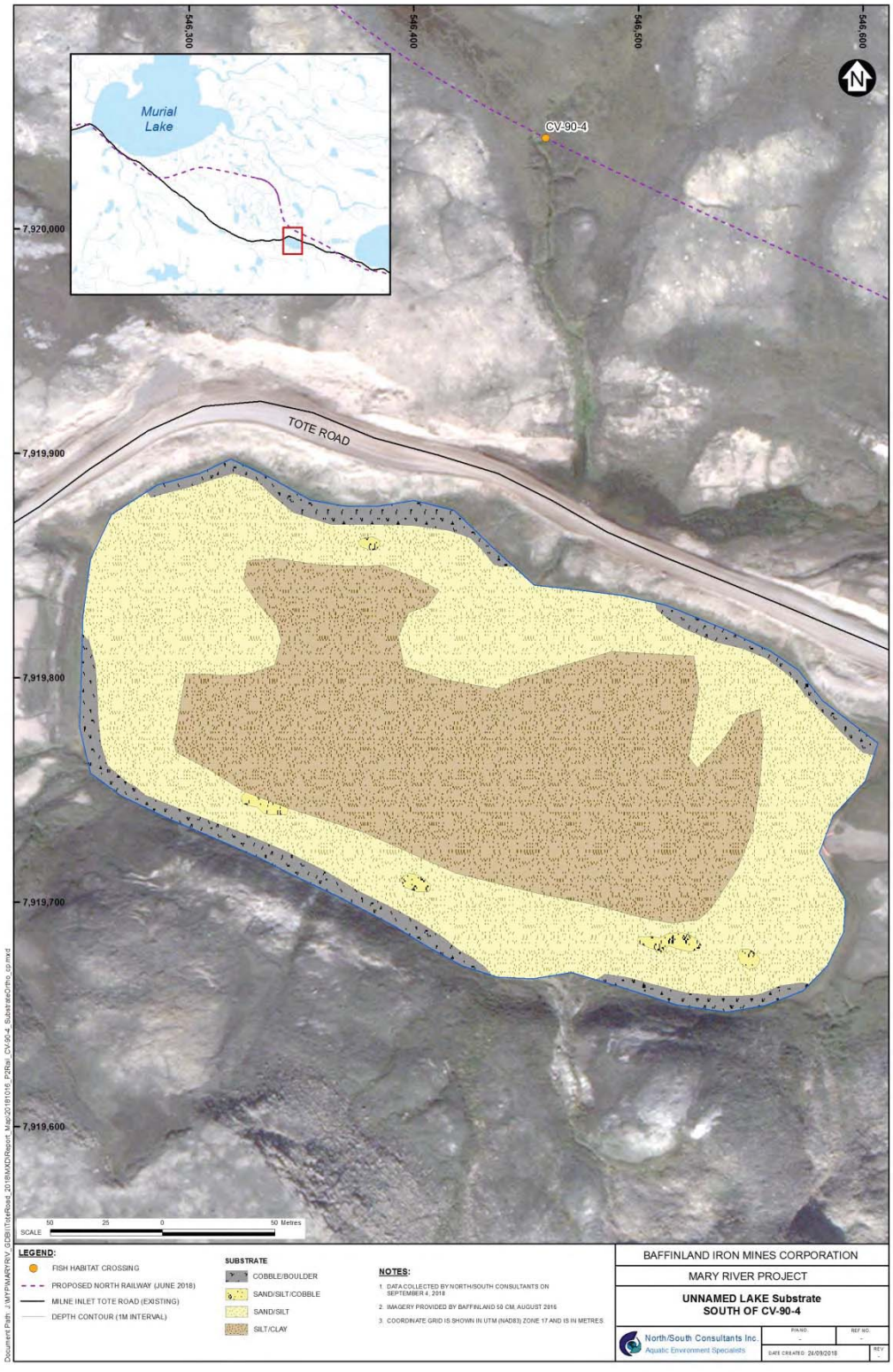


Figure 10. Substrate distribution map for the unnamed pond located downstream of the stream diversion site CV-90-4.

4.0 REFERENCES

4.1 LITERATURE CITED

Baffinland Iron Mines Corporation (Baffinland), 2009. Mary River Project Bulk Sampling Program - Tote Road Upgrades, Fish Habitat Monitoring 2008 Annual Report to Department of Fisheries and Oceans.

Baffinland. 2010. Mary River Project Bulk Sampling Program - Tote Road Upgrades, Fish Habitat Monitoring 2010 Annual Report to Department of Fisheries and Oceans.

Baffinland. 2011. Mary River Project Bulk Sampling Program - Tote Road Upgrades, Fish Habitat Monitoring 2011 Annual Report to Department of Fisheries and Oceans.

Baffinland. 2012a. Mary River Project - Final Environmental Impact Statement. Volume 7: Freshwater Environment. February 2012.

Baffinland. 2012b. Mary River Project Bulk Sampling Program - Tote Road Upgrades, Fish Habitat Monitoring 2012 Annual Report to Department of Fisheries and Oceans.

Baffinland. 2013. Mary River Project Bulk Program - Tote Road Upgrades, Fish Habitat Monitoring 2013 Annual Report to Department of Fisheries and Oceans.

Baffinland. 2014. Mary River Project Early Revenue Phase - Tote Road Upgrades, Fish Habitat Monitoring 2014 Annual Report to Department of Fisheries and Oceans.

Baffinland. 2015. Mary River Project Early Revenue Phase - Tote Road Upgrades, Fish Habitat Monitoring 2015 Annual Report to Department of Fisheries and Oceans.

Baffinland. 2016. Mary River Project Early Revenue Phase - Tote Road Upgrades, Fish Habitat Monitoring 2016 Annual Report to Department of Fisheries and Oceans.

Baffinland. 2017. Mary River Project - Tote Road Upgrades, Fish Habitat Monitoring, 2017 Annual Report, Early Revenue Phase, Tote Road Upgrades. Annual Report to Department of Fisheries and Oceans.

British Columbia Ministry of Environment (BCMOE). 2009. Bathymetric standards for lake inventories, Version 3. A standards manual prepared by BCMOE Ecosystems Branch for the Aquatic Ecosystems Task Force Resources Information Standards Committee. 50 pp.

Fisheries and Oceans Canada (DFO and BCMOE. 1989. Fish habitat inventory and information program: Stream survey field guide. 33 p.

Johnson, M.W. and W.J. Bernhardt. 2007. Fish and fish habitat report. A report prepared for Baffinland Iron Mines Corporation by North/South Consultants Inc., Winnipeg, Manitoba. 49 p.

Knight Piésold Ltd. 2007a. Baffinland Iron Mines Corporation, Mary River Project Bulk Sampling Program, Fish Habitat No Net Loss and Monitoring Plan. North Bay, Ontario. Ref. No. NB102-00181/10-4.

Knight Piésold Ltd. 2007b. Baffinland Iron Mines Corporation, Mary River Project Bulk Sampling Program - Tote Road Upgrades, Fish Habitat Monitoring 2007 Annual Report to Department of Fisheries and Oceans. North Bay, Ontario. Ref. No. NB102-00181/10-8.

Knight Piésold Ltd. 2008. Baffinland Iron Mines Corporation, Mary River Project Bulk Sampling Program, Road Upgrades. Fish Habitat Monitoring 2008 Annual Report to Department of Fisheries and Oceans. North Bay, Ontario. Ref. No. NB102-00181/13-1.

North/South Consultants Inc. (NSC). 2006. Alberta standard watercourse crossing assessment protocol. 17 p.

NSC. 2008. Freshwater Aquatic Environment Baseline Report: Fish and Fish Habitat. A report prepared for Knight Piésold Ltd. and Baffinland Iron Mines Corporation by North/South Consultants Inc., Winnipeg, Manitoba. 182 p. + appendices.

NSC. 2018. Mary River Project - Phase 2 Proposal - Technical Supporting Document No. 14, Freshwater Biota and Habitat Assessment. August 2018.

NSC. 2019. Mary River Phase 2 Proposal Update: Project Infrastructure Interactions with Fresh Water Streams and Ponds. Technical Memorandum prepared for Baffinland Iron Mines Corporation by North/South Consultants Inc., Winnipeg, Manitoba. May 1, 2019.

Wentworth, C.K. 1922. A scale of grade and class terms for clastic sediments. The Journal of Geology 30: 377-392.

4.2 PERSONAL COMMUNICATIONS

A. Rees. 2018. Email communication, October 29, 2018.

APPENDIX 1: LIST OF CROSSINGS, CUTS, ENCROACHMENTS/INFILLS, AND BRIDGES AND 2018 FISH HABITAT DESIGNATIONS

Table A1-1. List of stream crossings (culverts), bridges, cuts/diversions, and lake/pond encroachments/infills along the North Rail alignment and habitat designations.

Site	Description	Waterbody Type	Diversion to	Receives Diversion From	UTMs		Arctic Char		Ninespine Stickleback	
					Easting	Northing	Y/N	Habitat Quality	Y/N	Habitat Quality
CV-0-1	Culvert	S		CV-0-2	504289	7975593	N	NFB	N	NFB
CV-0-2	Cut	S	CV-0-1		504234	7975572	N	NFB	N	NFB
CV-0-3	Culvert	S			503796	7975281	N	NFB	N	NFB
CV-1-1	Culvert	LP			503802	7975052	N	NFB	N	NFB
CV-1-2	Culvert	S			503830	7974912	N	NFB	N	NFB
CV-1-3	Culvert	S			503820	7974824	N	NFB	N	NFB
CV-1-4	Culvert	LP			503877	7974421	N	NFB	N	NFB
CV-1-5	Culvert	LP			503938	7974333	N	NFB	N	NFB
CV-1-6	Culvert	S			504292	7974064	N	NFB	N	NFB
CV-1-7	Culvert	S			504662	7973667	N	NFB	N	NFB
CV-1-8	Culvert	S			504895	7973426	N	NFB	N	NFB
CV-1-9	Culvert	S			504924	7973381	N	NFB	N	NFB
CV-2-1	Culvert	S			505154	7973121	N	NFB	N	NFB
CV-2-2	Culvert	S			505217	7973067	N	NFB	N	NFB
CV-3-1	Culvert	LP			505388	7972906	N	NFB	N	NFB
CV-3-2	Culvert	S			505396	7972893	N	NFB	N	NFB
CV-4-1	Culvert	S			505666	7972585	N	NFB	N	NFB
CV-4-2	Culvert	S			505774	7972512	N	NFB	N	NFB
CV-4-3	Culvert	S			505836	7972435	N	NFB	N	NFB
CV-4-4	Culvert	S			505862	7972397	N	NFB	N	NFB
CV-4-5	Culvert	S			506070	7972201	N	NFB	N	NFB
CV-5-1	Culvert	S			506158	7972031	N	NFB	N	NFB
CV-5-2	Culvert	LP			506172	7971999	N	NFB	N	NFB
CV-5-3	Culvert	S			506297	7971792	N	NFB	N	NFB
CV-5-4	Culvert	S			506540	7971622	N	NFB	N	NFB

Table A1-1. List of stream crossings (culverts), bridges, cuts/diversions, and lake/pond encroachments/infills along the North Rail alignment and habitat designations.

Site	Description	Waterbody Type	Diversion to	Receives Diversion From	UTMs		Arctic Char		Ninespine Stickleback	
					Easting	Northing	Y/N	Habitat Quality	Y/N	Habitat Quality
CV-5-5	Culvert	S			506643	7971540	N	NFB	N	NFB
CV-5-6	Culvert	S			506661	7971526	N	NFB	N	NFB
CV-5-7	Culvert	LP			506781	7971420	N	NFB	N	NFB
CV-6-1	Culvert	LP			506927	7971257	N	NFB	N	NFB
CV-6-2	Culvert	LP			507170	7971061	N	NFB	N	NFB
CV-6-3	Culvert	S			507417	7970910	N	NFB	N	NFB
CV-6-4	Culvert	S			507476	7970841	N	NFB	N	NFB
CV-7-1	Culvert	LP			507732	7970526	N	NFB	N	NFB
CV-7-2	Culvert	LP			507884	7970336	N	NFB	N	NFB
CV-7-3	Culvert	LP			507953	7970255	N	NFB	N	NFB
CV-7-4	Culvert	LP			508038	7970146	N	NFB	N	NFB
CV-7-5	Culvert	LP			508060	7970116	N	NFB	N	NFB
CV-7-6	Culvert	LP			508094	7970073	N	NFB	N	NFB
CV-7-7	Culvert	LP			508097	7970069	N	NFB	N	NFB
CV-8-0	Cut	S	CV-8-1 and CV-8-2		508293	7969747	N	NFB	N	NFB
CV-8-1	Culvert	S		CV-8-0	508311	7969712	N	NFB	N	NFB
CV-8-2	Culvert	S		CV-8-0	508325	7969683	N	NFB	N	NFB
CV-8-3	Culvert	S			508351	7969601	N	NFB	N	NFB
CV-8-4	Culvert	LP			508412	7969338	N	NFB	N	NFB
CV-9-1	Culvert	S			508805	7968873	N	NFB	N	NFB
CV-10-1	Culvert	LP			509365	7968264	N	NFB	N	NFB
CV-10-2	Culvert	LP			509637	7968011	N	NFB	N	NFB
CV-10-3	Culvert	LP			509653	7967999	N	NFB	N	NFB
CV-10-4	Culvert	LP			509829	7967867	N	NFB	N	NFB
CV-10-5	Culvert	S			509872	7967824	N	NFB	N	NFB

Table A1-1. List of stream crossings (culverts), bridges, cuts/diversions, and lake/pond encroachments/infills along the North Rail alignment and habitat designations.

Site	Description	Waterbody Type	Diversion to	Receives Diversion From	UTMs		Arctic Char		Ninespine Stickleback	
					Easting	Northing	Y/N	Habitat Quality	Y/N	Habitat Quality
CV-11-1	Culvert	LP			509931	7967723	N	NFB	N	NFB
CV-11-2	Culvert	LP			510076	7967537	N	NFB	N	NFB
CV-11-3	Culvert	S			510214	7967455	N	NFB	N	NFB
CV-11-4	Culvert	LP			510472	7967402	N	NFB	N	NFB
CV-11-5	Culvert	LP			510589	7967385	N	NFB	N	NFB
CV-12-1	Culvert	LP			510933	7967256	N	NFB	N	NFB
CV-12-2	Culvert	LP			511019	7967241	N	NFB	N	NFB
CV-12-3	Culvert	LP			511127	7967223	N	NFB	N	NFB
CV-12-4	Culvert	LP			511355	7967185	N	NFB	N	NFB
CV-12-4b	Cut	LP	CV-12-5 and CV-13-1		511455	7967168	N	NFB	N	NFB
CV-12-5	Culvert	S		CV-12-4b	511552	7967152	N	NFB	N	NFB
CV-13-1	Culvert	LP		CV-12-4b	511798	7967111	N	NFB	N	NFB
CV-13-2	Culvert	LP			512120	7966981	N	NFB	N	NFB
CV-13-3	Culvert	LP			512375	7966823	N	NFB	N	NFB
CV-13-4	Culvert	S			512415	7966799	Y	IMP	N	NFB
CV-13-5	Culvert	S			512556	7966712	N	NFB	N	NFB
CV-14-1	Culvert	LP			513252	7966428	N	NFB	N	NFB
CV-14-2	Pond Infilling + Culvert	P			513436	7966375	N	NFB	N	NFB
CV-14-3	Pond Infilling + Culvert	P			513532	7966333	N	NFB	N	NFB
CV-15-1	Culvert	LP			513624	7966294	N	NFB	N	NFB
CV-15-2	Stream Crossing + Pond Infilling	S/P			513781	7966188	Y	MAR	Y	IMP
CV-15-3	Pond Infilling + Culvert	P			513892	7966034	Y	MAR	Y	IMP
CV-15-4	Pond Infilling + Culvert	P			514123	7965711	N	NFB	N	NFB
CV-15-5	Bridge	S			514239	7965626	Y	IMP	N	NFB
CV-16-1	Culvert	LP			514325	7965565	N	NFB	N	NFB

Table A1-1. List of stream crossings (culverts), bridges, cuts/diversions, and lake/pond encroachments/infills along the North Rail alignment and habitat designations.

Site	Description	Waterbody Type	Diversion to	Receives Diversion From	UTMs		Arctic Char		Ninespine Stickleback	
					Easting	Northing	Y/N	Habitat Quality	Y/N	Habitat Quality
CV-16-2	Stream Crossing + Pond Encroachment	S/P			514768	7965089	N	NFB	N	NFB
CV-16-3	Culvert	S			514811	7964916	N	NFB	N	NFB
CV-17-1	Pond Infilling + Culvert	P			515261	7964025	N	NFB	N	NFB
CV-18-1	Pond Infilling + Culvert	P			515331	7963846	N	NFB	Y	IMP
CV-18-2	Culvert	S			515405	7963693	N	NFB	N	NFB
CV-18-3	Culvert	LP			515607	7963389	N	NFB	N	NFB
CV-18-4	Culvert	LP			515682	7963328	N	NFB	N	NFB
CV-19-1	Culvert	S			515927	7963175	N	NFB	N	NFB
CV-19-2	Pond Infilling + Culvert	P			516161	7963031	N	NFB	N	NFB
CV-19-3	Culvert	LP			516613	7962587	N	NFB	N	NFB
CV-20-1	Culvert	LP		CV-20-2	517040	7962255	N	NFB	N	NFB
CV-20-2	Cut	S	CV-20-1		517267	7962029	N	NFB	N	NFB
CV-21-1	Culvert	LP			517365	7961888	N	NFB	N	NFB
CV-21-2	Culvert	LP			517607	7961640	N	NFB	N	NFB
CV-21-3	Culvert	S			517928	7961308	N	NFB	N	NFB
CV-21-4	Culvert	LP			518010	7961196	N	NFB	N	NFB
CV-22-1	Pond Infilling + Culvert	P			518123	7960950	N	NFB	N	NFB
CV-22-2	Pond Encroachment	P			518232	7960617	N	NFB	N	NFB
CV-22-3	Culvert	LP			518295	7960427	N	NFB	N	NFB
CV-22-4	Pond Encroachment	P			518370	7960198	N	NFB	N	NFB
CV-23-1	Culvert	LP			518441	7959981	N	NFB	N	NFB
CV-23-2	Culvert	S			518501	7959798	N	NFB	N	NFB
CV-23-3	Culvert	LP			518695	7959425	N	NFB	N	NFB
CV-23-4	Culvert	LP			518754	7959335	N	NFB	N	NFB

Table A1-1. List of stream crossings (culverts), bridges, cuts/diversions, and lake/pond encroachments/infills along the North Rail alignment and habitat designations.

Site	Description	Waterbody Type	Diversion to	Receives Diversion From	UTMs		Arctic Char		Ninespine Stickleback	
					Easting	Northing	Y/N	Habitat Quality	Y/N	Habitat Quality
CV-24-1	Culvert	LP			518988	7958946	N	NFB	N	NFB
CV-24-2	Culvert	LP			519081	7958667	N	NFB	N	NFB
CV-24-3	Culvert	S			519153	7958481	N	NFB	N	NFB
CV-25-1	Culvert	LP			519237	7958346	N	NFB	N	NFB
CV-25-2	Culvert	S			519507	7958144	N	NFB	N	NFB
CV-25-3	Culvert	S			519661	7958016	N	NFB	N	NFB
CV-26-1	Pond Infilling + Culvert	P			519989	7957450	N	NFB	N	NFB
CV-26-3	Culvert	LP			520156	7957209	N	NFB	N	NFB
CV-26-4	Culvert	LP			520224	7957110	N	NFB	N	NFB
CV-26-5	Culvert	LP			520386	7956847	N	NFB	N	NFB
CV-27-1	Culvert	LP			520406	7956775	N	NFB	N	NFB
CV-27-2	Culvert	S			520412	7956735	Y	MAR	N	NFB
CV-27-3	Culvert	LP			520516	7956235	N	NFB	N	NFB
CV-27-4	Culvert	LP			520564	7956131	N	NFB	N	NFB
CV-27-5	Culvert	LP			520699	7955833	N	NFB	N	NFB
CV-28-1	Culvert	LP			520722	7955784	N	NFB	N	NFB
CV-28-2	Culvert	S			520749	7955722	N	NFB	N	NFB
CV-28-3	Culvert	LP			520891	7955261	N	NFB	N	NFB
CV-28-4	Culvert	LP			520924	7955182	N	NFB	N	NFB
CV-28-5	Pond Infilling + Culvert	P			521005	7955067	N	NFB	N	NFB
CV-28-6	Culvert	S			521092	7954969	Y	IMP	N	NFB
CV-28-7	Culvert	S			521305	7954680	N	NFB	N	NFB
CV-29-1	Culvert	S			521341	7954608	N	NFB	N	NFB
CV-29-2	Culvert	S			521379	7954516	Y	IMP	N	NFB
CV-29-3	Culvert	S			521464	7954306	N	NFB	N	NFB

Table A1-1. List of stream crossings (culverts), bridges, cuts/diversions, and lake/pond encroachments/infills along the North Rail alignment and habitat designations.

Site	Description	Waterbody Type	Diversion to	Receives Diversion From	UTMs		Arctic Char		Ninespine Stickleback	
					Easting	Northing	Y/N	Habitat Quality	Y/N	Habitat Quality
CV-29-4	Culvert	S			521512	7954187	N	NFB	N	NFB
CV-29-5	Culvert	S			521541	7954115	N	NFB	N	NFB
CV-30-1	Culvert	S			521569	7954040	N	NFB	N	NFB
CV-30-2	Culvert	LP			521609	7953873	N	NFB	N	NFB
CV-30-3	Culvert	LP			521635	7953720	N	NFB	N	NFB
CV-30-4	Culvert	LP			521676	7953461	N	NFB	N	NFB
CV-30-5	Culvert	S			521687	7953363	Y	MAR	N	NFB
CV-30-6	Culvert	LP			521700	7953250	N	NFB	N	NFB
CV-30-7	Pond Infilling + Culvert	P			521712	7953143	N	NFB	N	NFB
CV-31-1	Culvert	S			521748	7952788	Y	IMP	N	NFB
CV-31-2	Culvert	S			521749	7952776	Y	IMP	N	NFB
CV-31-3	Culvert	LP			521763	7952346	N	NFB	N	NFB
CV-31-4	Culvert	LP			521772	7952278	N	NFB	N	NFB
CV-32-1	Culvert	LP			521827	7952066	N	NFB	N	NFB
CV-32-2	Culvert	LP			521882	7951861	N	NFB	N	NFB
CV-32-3	Culvert	LP			521946	7951620	N	NFB	N	NFB
CV-32-4	Culvert	S			521983	7951453	N	NFB	N	NFB
CV-33-1	Culvert	LP			521990	7951011	N	NFB	N	NFB
CV-33-2	Culvert	S			521991	7950911	N	NFB	N	NFB
CV-33-3	Culvert	LP			521990	7950839	N	NFB	N	NFB
CV-33-4	Culvert	S			521976	7950733	N	NFB	N	NFB
CV-33-5	Culvert	LP			521964	7950662	N	NFB	N	NFB
CV-33-6	Culvert	S			521947	7950568	Y	IMP	N	NFB
CV-33-7	Pond Encroachment + Culvert	P			521885	7950215	N	NFB	N	NFB
CV-34-1	Culvert	S			521789	7949673	N	NFB	N	NFB

Table A1-1. List of stream crossings (culverts), bridges, cuts/diversions, and lake/pond encroachments/infills along the North Rail alignment and habitat designations.

Site	Description	Waterbody Type	Diversion to	Receives Diversion From	UTMs		Arctic Char		Ninespine Stickleback	
					Easting	Northing	Y/N	Habitat Quality	Y/N	Habitat Quality
CV-34-2	Culvert	LP			521801	7949153	N	NFB	N	NFB
CV-35-2	Culvert	S			521947	7948828	Y	IMP	N	NFB
CV-35-4	Culvert	LP		CV-35-5	522249	7948287	N	NFB	N	NFB
CV-35-5	Cut	LP	CV-35-4		522298	7948170	N	NFB	N	NFB
CV-37-1	Culvert	LP			522533	7946398	N	NFB	N	NFB
CV-38-1	Culvert	S			522570	7946000	N	NFB	N	NFB
CV-38-2	Culvert	S			522646	7945802	N	NFB	N	NFB
CV-38-3	Culvert	S			522846	7945387	N	NFB	N	NFB
CV-39-1	Culvert	S			523125	7944922	N	NFB	N	NFB
CV-40-1	Culvert	LP			523148	7944309	N	NFB	N	NFB
CV-40-2	Culvert	S			523147	7944150	N	NFB	N	NFB
CV-40-3	Culvert	LP			523231	7943898	N	NFB	N	NFB
CV-40-4	Culvert	LP			523301	7943665	N	NFB	N	NFB
CV-41-1	Culvert	LP			523332	7943397	N	NFB	N	NFB
CV-41-2	Culvert	LP			523342	7943311	N	NFB	N	NFB
CV-41-3	Culvert	LP			523359	7943152	N	NFB	N	NFB
CV-41-4	Culvert	LP			523351	7942963	N	NFB	N	NFB
CV-42-1	Culvert	S			523423	7942323	N	NFB	N	NFB
CV-42-2	Culvert	LP			523475	7941603	N	NFB	N	NFB
CV-43-1	Culvert	S			523647	7941268	N	NFB	N	NFB
CV-43-2	Culvert	LP			523721	7941127	N	NFB	N	NFB
CV-43-3	Culvert	S			523738	7941095	N	NFB	N	NFB
CV-43-4	Culvert	S			523749	7941075	N	NFB	N	NFB
CV-43-5	Culvert	S			523846	7940904	N	NFB	N	NFB
CV-44-1	Culvert	LP			524074	7940563	N	NFB	N	NFB

Table A1-1. List of stream crossings (culverts), bridges, cuts/diversions, and lake/pond encroachments/infills along the North Rail alignment and habitat designations.

Site	Description	Waterbody Type	Diversion to	Receives Diversion From	UTMs		Arctic Char		Ninespine Stickleback	
					Easting	Northing	Y/N	Habitat Quality	Y/N	Habitat Quality
CV-44-2	Culvert	S			524174	7940415	N	NFB	N	NFB
CV-44-3	Culvert	S			524536	7939827	N	NFB	N	NFB
CV-45-1	Culvert	LP			525004	7938965	N	NFB	N	NFB
CV-46-1	Culvert	LP			525118	7938743	N	NFB	N	NFB
CV-46-1a	Cut	P	CV-46-3		525225	7938529	N	NFB	N	NFB
CV-46-2	Culvert	LP			525278	7938537	N	NFB	N	NFB
CV-46-3	Culvert	S		CV-46-1a	525380	7938336	N	NFB	N	NFB
CV-46-4	Culvert	S			525394	7938239	N	NFB	N	NFB
CV-46-6	Culvert	S			525404	7938168	N	NFB	N	NFB
CV-47-1A	Culvert	S			525415	7938089	N	NFB	N	NFB
CV-47-1B	Culvert	S			525454	7937939	N	NFB	N	NFB
CV-47-1	Culvert	S			525683	7937366	Y	IMP	N	NFB
CV-47-2	Culvert	S			525698	7937327	Y	IMP	N	NFB
CV-47-3	Culvert	S			525729	7937268	N	NFB	N	NFB
CV-48-1	Culvert	S/LP			525839	7937127	N	NFB	N	NFB
CV-48-2	Culvert	S/LP			525916	7937063	N	NFB	N	NFB
CV-48-3	Culvert	S			526356	7936875	N	NFB	N	NFB
CV-48-4	Culvert	S			526523	7936808	Y	IMP	N	NFB
CV-49-1	Culvert	LP			526690	7936443	N	NFB	N	NFB
CV-49-2	Culvert	S			526737	7936101	N	NFB	N	NFB
CV-49-3	Culvert	S/LP			526788	7935730	N	NFB	N	NFB
CV-50-1	Culvert	LP			526835	7935393	N	NFB	N	NFB
CV-50-2	Culvert	LP			526863	7935175	N	NFB	N	NFB
CV-50-3	Culvert	LP			526868	7935095	N	NFB	N	NFB
CV-50-4	Culvert	LP			526874	7934905	N	NFB	N	NFB

Table A1-1. List of stream crossings (culverts), bridges, cuts/diversions, and lake/pond encroachments/infills along the North Rail alignment and habitat designations.

Site	Description	Waterbody Type	Diversion to	Receives Diversion From	UTMs		Arctic Char		Ninespine Stickleback	
					Easting	Northing	Y/N	Habitat Quality	Y/N	Habitat Quality
CV-50-4a	Culvert	LP			526876	7934875	N	NFB	N	NFB
CV-50-4b	Culvert	LP			526888	7934776	N	NFB	N	NFB
CV-50-5	Culvert	S			526924	7934630	N	NFB	N	NFB
CV-50-6	Culvert	S			526926	7934620	Y	IMP	N	NFB
CV-51-1	Culvert	LP			527006	7934331	N	NFB	N	NFB
CV-51-2	Culvert	LP			527054	7933628	N	NFB	N	NFB
CV-52-1	Culvert	S			527080	7932998	N	NFB	N	NFB
CV-52-2	Culvert	S			527132	7932787	N	NFB	N	NFB
CV-52-3	Culvert	LP			527180	7932698	N	NFB	N	NFB
CV-53-1	Culvert	LP			527366	7932476	N	NFB	N	NFB
CV-53-2	Pond Infilling + Culvert	P			527274	7932000	N	NFB	N	NFB
CV-54-1	Culvert	S			527333	7931375	N	NFB	N	NFB
CV-54-2	Culvert	S			527529	7930869	N	NFB	N	NFB
CV-55-1	Culvert	LP			527583	7930653	N	NFB	N	NFB
CV-55-2	Culvert	LP			527632	7930421	N	NFB	N	NFB
CV-55-3	Culvert	S			527650	7930339	Y	IMP	N	NFB
CV-56-1	Culvert	S			528085	7929337	Y	MAR	N	NFB
CV-57-1	Culvert	S			528309	7928841	Y	MAR	N	NFB
CV-57-2	Culvert	S			528345	7928683	Y	IMP	N	NFB
CV-58-1	Culvert	S			528241	7927966	N	NFB	N	NFB
CV-58-2	Culvert	S			528168	7927807	N	NFB	N	NFB
CV-58-3	Culvert	S			528109	7927716	N	NFB	N	NFB
CV-58-4	Culvert	S			528062	7927656	N	NFB	N	NFB
CV-58-4a	Culvert	S			527931	7927527	N	NFB	N	NFB
CV-58-5	Culvert	S			527751	7927378	Y	IMP	N	NFB

Table A1-1. List of stream crossings (culverts), bridges, cuts/diversions, and lake/pond encroachments/infills along the North Rail alignment and habitat designations.

Site	Description	Waterbody Type	Diversion to	Receives Diversion From	UTMs		Arctic Char		Ninespine Stickleback	
					Easting	Northing	Y/N	Habitat Quality	Y/N	Habitat Quality
CV-58-6	Culvert	S			527681	7927318	N	NFB	N	NFB
CV-58-7	Cut	S	CV-59-1		527650	7927282	N	NFB	N	NFB
CV-58-8	Cut	S	CV-59-1		527613	7927217	N	NFB	N	NFB
CV-59-1	Culvert	S		CV-58-7 and CV-58-6	527590	7927169	N	NFB	N	NFB
CV-59-2	Culvert	S			527553	7927052	N	NFB	N	NFB
CV-59-3	Culvert	S			527529	7926917	N	NFB	N	NFB
CV-59-4b	Cut	LP	CV-59-4		527467	7926817	N	NFB	N	NFB
CV-59-4	Culvert	S		CV-59-4a and b	527395	7926734	Y	MAR	N	NFB
CV-59-4a	Cut	S	CV-59-4		527329	7926595	N	NFB	N	NFB
CV-59-5	Culvert	S			527272	7926457	N	NFB	N	NFB
CV-60-1	Culvert	S			527202	7926246	N	NFB	N	NFB
CV-60-2	Pond Infilling + Stream Crossing	S/P			527214	7926070	N	NFB	N	NFB
CV-60-3	Culvert	S			527225	7925961	N	NFB	N	NFB
CV-60-4	Culvert	S			527243	7925782	N	NFB	N	NFB
CV-60-4a	Cut	LP	CV-60-5		527252	7925685	N	NFB	N	NFB
CV-60-5	Culvert	S		CV-60-4a	527273	7925480	N	NFB	N	NFB
CV-60-6	Culvert	S			527283	7925381	N	NFB	N	NFB
CV-61-1	Culvert	S			527296	7925237	N	NFB	N	NFB
CV-61-2	Culvert	S		CV-61-3	527181	7925009	N	NFB	N	NFB
CV-61-3	Cut	S	CV-61-2		527023	7924876	N	NFB	N	NFB
CV-62-1	Culvert	S			526868	7924453	Y	IMP	N	NFB
CV-62-2	Culvert	S			526897	7924167	N	NFB	N	NFB
CV-62-3	Cut	S	CV-62-4		526951	7923938	N	NFB	N	NFB
CV-62-4	Culvert	LP		CV-62-3	526975	7923621	N	NFB	N	NFB
CV-62-5	Culvert	LP		CV-62-6 and CV-62-6b	526982	7923557	N	NFB	N	NFB

Table A1-1. List of stream crossings (culverts), bridges, cuts/diversions, and lake/pond encroachments/infills along the North Rail alignment and habitat designations.

Site	Description	Waterbody Type	Diversion to	Receives Diversion From	UTMs		Arctic Char		Ninespine Stickleback	
					Easting	Northing	Y/N	Habitat Quality	Y/N	Habitat Quality
CV-62-6	Cut	S	CV-62-5		527016	7923383	N	NFB	N	NFB
CV-62-6b	Cut	S	CV-62-5		527011	7923411	N	NFB	N	NFB
CV-63-1	Culvert	S			527058	7923177	N	NFB	N	NFB
CV-63-2	Culvert	S			527100	7923086	N	NFB	N	NFB
CV-63-3	Culvert	S		CV-63-3a	527162	7922964	N	NFB	N	NFB
CV-63-3a	Cut	LP	CV-63-3		527179	7922796	N	NFB	N	NFB
CV-63-4	Culvert	S			527204	7922667	N	NFB	N	NFB
CV-63-4a	Culvert	S			527229	7922619	N	NFB	N	NFB
CV-63-5	Culvert	S			527241	7922603	N	NFB	N	NFB
CV-64-1	Culvert	S			527295	7922538	N	NFB	N	NFB
CV-64-2	Culvert	S			527414	7922399	N	NFB	N	NFB
CV-64-3	Culvert	S			527482	7922239	N	NFB	N	NFB
CV-64-4	Culvert	S			527625	7921956	N	NFB	N	NFB
CV-64-5a	Cut	LP	CV-64-5		527688	7921835	N	NFB	N	NFB
CV-64-5	Culvert	S		CV-64-5a	527743	7921726	N	NFB	N	NFB
CV-64-6	Culvert	S			527757	7921691	N	NFB	N	NFB
CV-65-1	Culvert	S			527793	7921396	N	NFB	N	NFB
CV-65-2a	Cut	LP	CV-65-2		527803	7921140	N	NFB	N	NFB
CV-65-2	Pond Infilling + Culvert	P		CV-65-2a	527828	7920934	N	NFB	N	NFB
CV-66-1	Culvert	S			527959	7920627	N	NFB	N	NFB
CV-66-2a	Cut	LP	CV-66-2		528013	7920571	N	NFB	N	NFB
CV-66-2	Culvert	LP		CV-66-2a	528063	7920532	N	NFB	N	NFB
CV-66-3	Culvert	S			528328	7920342	N	NFB	N	NFB
CV-66-4	Culvert	LP			528359	7920292	N	NFB	N	NFB
CV-66-5	Culvert	S			528389	7920187	N	NFB	N	NFB

Table A1-1. List of stream crossings (culverts), bridges, cuts/diversions, and lake/pond encroachments/infills along the North Rail alignment and habitat designations.

Site	Description	Waterbody Type	Diversion to	Receives Diversion From	UTMs		Arctic Char		Ninespine Stickleback	
					Easting	Northing	Y/N	Habitat Quality	Y/N	Habitat Quality
CV-66-6	Culvert	S			528390	7920161	N	NFB	N	NFB
CV-66-7	Culvert	S			528378	7920014	N	NFB	N	NFB
CV-66-8	Culvert	S			528376	7919987	N	NFB	N	NFB
CV-67-1	Culvert	S			528299	7919743	N	NFB	N	NFB
CV-67-2	Culvert	S			528226	7918995	N	NFB	N	NFB
CV-68-1a	Culvert	S			528200	7918864	Y	IMP	N	NFB
CV-68-1	Culvert	S			528199	7918838	Y	IMP	N	NFB
CV-68-2	Culvert	LP			528194	7918768	N	NFB	N	NFB
CV-68-3	Culvert	S			528059	7918496	N	NFB	N	NFB
CV-68-4	Culvert	LP			528055	7918461	N	NFB	N	NFB
CV-68-5	Culvert	S			528081	7918334	N	NFB	N	NFB
CV-69-1	Culvert	LP			528322	7917862	N	NFB	N	NFB
CV-69-2	Culvert	S			528438	7917517	N	NFB	N	NFB
CV-69-3	Culvert	S			528458	7917456	N	NFB	N	NFB
CV-69-4	Culvert	S			528474	7917407	N	NFB	N	NFB
CV-70-1	Pond Encroachment	P			528704	7916939	N	NFB	N	NFB
CV-70-2	Culvert	S			529030	7916745	Y	MAR	Y	MAR
CV-70-3	Bridge	S			529120	7916693	Y	IMP	Y	MAR
CV-71-1	Pond Infilling + Culvert	P			529451	7916535	Y	IMP	N	NFB
CV-71-2a	Pond Encroachment	P			529708	7916558	N	NFB	N	NFB
CV-71-3	Culvert	LP			529965	7916706	N	NFB	N	NFB
CV-71-4	Culvert	LP			530214	7916862	N	NFB	N	NFB
CV-72-1	Culvert	S			530370	7916951	N	NFB	N	NFB
CV-72-1a	Culvert	S			530587	7917015	N	NFB	N	NFB
CV-72-2	Culvert	S			530784	7917069	N	NFB	N	NFB

Table A1-1. List of stream crossings (culverts), bridges, cuts/diversions, and lake/pond encroachments/infills along the North Rail alignment and habitat designations.

Site	Description	Waterbody Type	Diversion to	Receives Diversion From	UTMs		Arctic Char		Ninespine Stickleback	
					Easting	Northing	Y/N	Habitat Quality	Y/N	Habitat Quality
CV-72-3	Culvert	S			531048	7917142	N	NFB	N	NFB
CV-72-3a	Culvert	S			531130	7917165	N	NFB	N	NFB
CV-72-4	Culvert	S			531160	7917173	N	NFB	N	NFB
CV-73-1	Culvert	LP			531795	7917555	N	NFB	N	NFB
CV-73-2	Culvert	S			532007	7918051	N	NFB	N	NFB
CV-73-3	Culvert	S			532156	7918212	N	NFB	N	NFB
CV-73-4	Culvert	S			532303	7918244	N	NFB	N	NFB
CV-74-1	Culvert	S			532376	7918246	N	NFB	N	NFB
CV-74-2	Culvert	LP			532406	7918246	N	NFB	N	NFB
CV-74-3	Culvert	LP			532735	7918374	N	NFB	N	NFB
CV-74-4	Culvert	LP			532888	7918494	N	NFB	N	NFB
CV-74-6	Culvert	S		CV-74-7	532988	7918553	N	NFB	N	NFB
CV-74-7	Cut	S	CV-74-6		533258	7918549	N	NFB	N	NFB
CV-75-1	Culvert	S			533398	7918521	N	NFB	N	NFB
CV-75-1a	Culvert	S			533444	7918512	N	NFB	N	NFB
CV-75-2	Culvert	S			533559	7918501	N	NFB	N	NFB
CV-76-1	Culvert	S			533900	7918535	N	NFB	N	NFB
CV-76-1a	Culvert	LP			534333	7918581	N	NFB	N	NFB
CV-76-2	Culvert	LP			534506	7918563	N	NFB	N	NFB
CV-76-3	Culvert	LP			534825	7918511	N	NFB	N	NFB
CV-77-1	Culvert	LP			534992	7918491	N	NFB	N	NFB
CV-77-2	Culvert	S			535267	7918560	Y	IMP	N	NFB
CV-77-3	Culvert	S			535497	7918521	N	NFB	N	NFB
CV-78-1	Culvert	LP			535691	7918488	N	NFB	N	NFB
CV-78-2	Culvert	LP			535890	7918531	N	NFB	N	NFB

Table A1-1. List of stream crossings (culverts), bridges, cuts/diversions, and lake/pond encroachments/infills along the North Rail alignment and habitat designations.

Site	Description	Waterbody Type	Diversion to	Receives Diversion From	UTMs		Arctic Char		Ninespine Stickleback	
					Easting	Northing	Y/N	Habitat Quality	Y/N	Habitat Quality
CV-78-3	Culvert	S			536006	7918599	N	NFB	N	NFB
CV-78-4	Culvert	LP			536163	7918706	N	NFB	N	NFB
CV-78-5	Culvert	LP			536237	7918756	N	NFB	N	NFB
CV-78-6	Culvert	S			536450	7918866	N	NFB	N	NFB
CV-79-0	Culvert	S			537243	7919138	N	NFB	N	NFB
CV-79-1	Culvert	LP			537418	7919175	N	NFB	N	NFB
CV-80-1	Culvert	S			537461	7919180	Y	MAR	N	NFB
CV-80-1a	Culvert	LP			537487	7919182	N	NFB	N	NFB
CV-80-2	Culvert	S			538320	7919565	N	NFB	N	NFB
CV-80-2a	Culvert	S			538307	7919556	N	NFB	N	NFB
CV-80-2b	Culvert	S			538334	7919573	N	NFB	N	NFB
CV-80-3	Culvert	S			538453	7919642	N	NFB	N	NFB
CV-80-4	Culvert	S			538510	7919675	N	NFB	N	NFB
CV-80-5	Culvert	LP			538604	7919729	N	NFB	N	NFB
CV-81-1	Culvert	S			538691	7919779	N	NFB	N	NFB
CV-81-2	Culvert	S			538879	7919924	N	NFB	N	NFB
CV-81-3	Culvert	S			538942	7920004	N	NFB	N	NFB
CV-81-4	Culvert	S			539077	7920175	N	NFB	N	NFB
CV-82-1	Culvert	S		CV-82-1a	539131	7920244	N	NFB	N	NFB
CV-82-1a	Cut	LP	CV-82-1		539242	7920376	N	NFB	N	NFB
CV-82-2	Culvert	S			539376	7920489	N	NFB	N	NFB
CV-82-3	Culvert	LP			539508	7920599	N	NFB	N	NFB
CV-82-4	Culvert	LP			539729	7920783	N	NFB	N	NFB
CV-83-1	Culvert	S			539835	7920871	Y	MAR	N	NFB
CV-83-1a	Culvert	S			539887	7920915	N	NFB	N	NFB

Table A1-1. List of stream crossings (culverts), bridges, cuts/diversions, and lake/pond encroachments/infills along the North Rail alignment and habitat designations.

Site	Description	Waterbody Type	Diversion to	Receives Diversion From	UTMs		Arctic Char		Ninespine Stickleback	
					Easting	Northing	Y/N	Habitat Quality	Y/N	Habitat Quality
CV-83-2	Culvert	S			540162	7921134	N	NFB	Y	IMP
CV-84-1	Culvert	S			540842	7921510	Y	IMP	Y	IMP
CV-84-2	Culvert	S			541030	7921642	N	NFB	N	NFB
CV-84-3	Culvert	S			541294	7921948	N	NFB	N	NFB
CV-85-1	Culvert	S			541514	7922054	N	NFB	N	NFB
CV-85-2	Culvert	S			541921	7922236	N	NFB	N	NFB
CV-85-3	Bridge	S			542213	7922215	Y	IMP	Y	IMP
CV-85-4	Culvert	S			542288	7922156	Y	IMP	Y	IMP
CV-86-1	Pond Encroachment + Culvert	P			542671	7921780	N	NFB	N	NFB
CV-86-2	Culvert	S			542753	7921708	Y	MAR	Y	IMP
CV-87-1	Culvert	LP			543078	7921473	N	NFB	N	NFB
CV-87-2	Culvert	LP			543392	7921247	N	NFB	N	NFB
CV-87-3	Culvert	LP			543532	7921170	N	NFB	N	NFB
CV-87-4	Culvert	S			543736	7921141	N	NFB	N	NFB
CV-88-1	Culvert	LP			543976	7921204	N	NFB	N	NFB
CV-88-2	Culvert	S			544209	7921282	N	NFB	N	NFB
CV-88-3	Culvert	S			544259	7921299	N	NFB	N	NFB
CV-88-4	Culvert	LP			545151	7921245	N	NFB	N	NFB
CV-89-1	Culvert	S			545492	7921173	Y	IMP	Y	IMP
CV-89-2	Pond Infilling + Culvert	P			545729	7921121	N	NFB	N	NFB
CV-90-1	Culvert	LP			545902	7921048	N	NFB	N	NFB
CV-90-2	Cut	S	CV-90-3		546181	7920409	N	NFB	N	NFB
CV-90-3	Culvert	S		CV-90-2 and CV-90-4	546240	7920244	N	NFB	N	NFB
CV-90-4	Cut	S	CV-90-3		546459	7920041	N	NFB	N	NFB
CV-91-0	Culvert	S			546858	7919853	N	NFB	N	NFB

Table A1-1. List of stream crossings (culverts), bridges, cuts/diversions, and lake/pond encroachments/infills along the North Rail alignment and habitat designations.

Site	Description	Waterbody Type	Diversion to	Receives Diversion From	UTMs		Arctic Char		Ninespine Stickleback	
					Easting	Northing	Y/N	Habitat Quality	Y/N	Habitat Quality
CV-91-1	Culvert	S			546928	7919820	N	NFB	N	NFB
CV-91-2	Culvert	S			547012	7919781	N	NFB	N	NFB
CV-92-1b	Cut	LP	CV-92-1		547125	7919725	N	NFB	N	NFB
CV-92-1	Pond Encroachment + Culvert	P		CV-92-1b	547173	7919694	N	NFB	N	NFB
CV-92-2	Culvert	LP			547416	7919506	N	NFB	N	NFB
CV-92-3	Culvert	S			547521	7919456	N	NFB	N	NFB
CV-92-4	Culvert	LP			547721	7919363	N	NFB	N	NFB
CV-92-5	Culvert	S			547879	7919262	Y	IMP	N	NFB
CV-92-6	Culvert	LP			547927	7919241	N	NFB	N	NFB
CV-92-7	Culvert	S			548001	7919220	N	NFB	N	NFB
CV-92-8	Culvert	S			548033	7919215	N	NFB	N	NFB
CV-92-9	Culvert	S			548062	7919211	N	NFB	N	NFB
CV-93-1	Culvert	LP			548228	7919188	N	NFB	N	NFB
CV-93-2	Culvert	LP			548355	7919148	N	NFB	N	NFB
CV-93-3	Culvert	LP			548601	7918857	N	NFB	N	NFB
CV-93-3a	Culvert	S			548670	7918765	N	NFB	N	NFB
CV-93-4a	Culvert	S			548749	7918703	N	NFB	N	NFB
CV-93-4b	Culvert	S			548701	7918736	N	NFB	N	NFB
CV-93-4	Culvert	S			548770	7918691	Y	IMP	N	NFB
CV-94-1	Culvert	LP			548899	7918649	N	NFB	N	NFB
CV-94-2	Culvert	S		CV-95-1	549840	7918391	N	NFB	N	NFB
CV-95-1	Cut	LP	CV-94-2		550005	7918257	N	NFB	N	NFB
CV-95-2	Culvert	S			550144	7918111	N	NFB	N	NFB
CV-95-3	Culvert	S			550483	7917613	N	NFB	N	NFB
CV-95-4	Culvert	S			550630	7917484	N	NFB	N	NFB

Table A1-1. List of stream crossings (culverts), bridges, cuts/diversions, and lake/pond encroachments/infills along the North Rail alignment and habitat designations.

Site	Description	Waterbody Type	Diversion to	Receives Diversion From	UTMs		Arctic Char		Ninespine Stickleback	
					Easting	Northing	Y/N	Habitat Quality	Y/N	Habitat Quality
CV-95-5	Culvert	LP			550708	7917426	N	NFB	N	NFB
CV-95-5a	Culvert	S			550781	7917371	N	NFB	N	NFB
CV-95-6	Culvert	S			550832	7917333	N	NFB	N	NFB
CV-95-7	Culvert	LP			550885	7917294	N	NFB	N	NFB
CV-96-1	Culvert	S			550924	7917265	Y	IMP	Y	IMP
CV-96-2	Culvert	S			550964	7917235	N	NFB	N	NFB
CV-96-3	Culvert	LP			551117	7917101	N	NFB	N	NFB
CV-97-1	Culvert	S			551191	7917013	N	NFB	N	NFB
CV-97-2	Culvert	S			551226	7916972	N	NFB	N	NFB
CV-97-3	Culvert	S			551254	7916940	N	NFB	N	NFB
CV-97-4	Culvert	S			551292	7916898	N	NFB	N	NFB
CV-97-5	Culvert	S		CV-97-6	551351	7916843	N	NFB	N	NFB
CV-97-5b	Culvert	S			551326	7916865	N	NFB	N	NFB
CV-97-6	Cut	S	CV-97-5		551457	7916754	N	NFB	N	NFB
CV-97-7	Culvert	S			551576	7916658	N	NFB	N	NFB
CV-97-7a	Culvert	S			551560	7916671	N	NFB	N	NFB
CV-97-9	Culvert	S			551629	7916614	N	NFB	N	NFB
CV-97-10	Culvert	S			551781	7916475	N	NFB	N	NFB
CV-97-11	Culvert	LP			551823	7916434	N	NFB	N	NFB
CV-97-12	Culvert	LP			551891	7916370	N	NFB	N	NFB
CV-98-0	Culvert	LP			552001	7916266	N	NFB	N	NFB
CV-98-1	Culvert	LP			552043	7916226	N	NFB	N	NFB
CV-99-1	Pond Infilling + Culvert	P			552464	7915930	N	NFB	N	NFB
CV-99-2	Culvert	S/LP			552958	7915502	N	NFB	N	NFB
CV-99-3	Culvert	S			553253	7915414	Y	IMP	Y	IMP

Table A1-1. List of stream crossings (culverts), bridges, cuts/diversions, and lake/pond encroachments/infills along the North Rail alignment and habitat designations.

Site	Description	Waterbody Type	Diversion to	Receives Diversion From	UTMs		Arctic Char		Ninespine Stickleback	
					Easting	Northing	Y/N	Habitat Quality	Y/N	Habitat Quality
CV-100-1	Culvert	LP			553579	7915319	N	NFB	N	NFB
CV-100-2	Culvert	LP			553862	7915292	N	NFB	N	NFB
CV-100-3	Culvert	LP			554050	7915379	N	NFB	N	NFB
CV-100-4	Culvert	S			554185	7915443	N	NFB	N	NFB
CV-101-1	Culvert	S		CV-101-1a and CV-101-1b	554664	7915456	N	NFB	N	NFB
CV-101-1a	Cut	S	CV-101-1		554772	7915455	N	NFB	N	NFB
CV-101-1b	Cut	S	CV-101-1		554885	7915454	N	NFB	N	NFB
CV-101-2	Culvert	S			555200	7915449	N	NFB	N	NFB
CV-102-1	Bridge	S			555728	7915442	Y	IMP	N	NFB
CV-102-1a	Cut	LP	CV-102-2		555891	7915441	N	NFB	N	NFB
CV-102-2	Culvert	S		CV-102-1a	556019	7915438	Y	IMP	N	NFB
CV-102-3	Culvert	S			556373	7915485	N	NFB	N	NFB
CV-102-4	Culvert	S			556461	7915488	N	NFB	N	NFB
CV-102-5	Cut	S	CV-103-1		557111	7915356	N	NFB	N	NFB
CV-103-1	Culvert	S		CV-102-5	557447	7915244	Y	IMP	N	NFB
CV-104-1	Culvert	S			557574	7915202	N	NFB	N	NFB
CV-104-2	Culvert	S			557882	7915099	N	NFB	N	NFB
CV-104-3	Culvert	S			557996	7915052	N	NFB	N	NFB
CV-104-4	Culvert	LP			558154	7914976	N	NFB	N	NFB
CV-104-5	Culvert	S			558340	7914885	Y	IMP	Y	MAR
CV-105-1	Culvert	S			558552	7914777	N	NFB	N	NFB
CV-105-2	Culvert	S			558750	7914656	Y	MAR	Y	IMP
CV-105-3	Pond Infilling + Culvert	P			558875	7914578	Y	MAR	Y	IMP
CV-105-4	Culvert	S			559196	7914375	Y	MAR	Y	IMP
CV-106-1	Pond Infilling + Culvert	P			559334	7914281	Y	MAR	Y	IMP

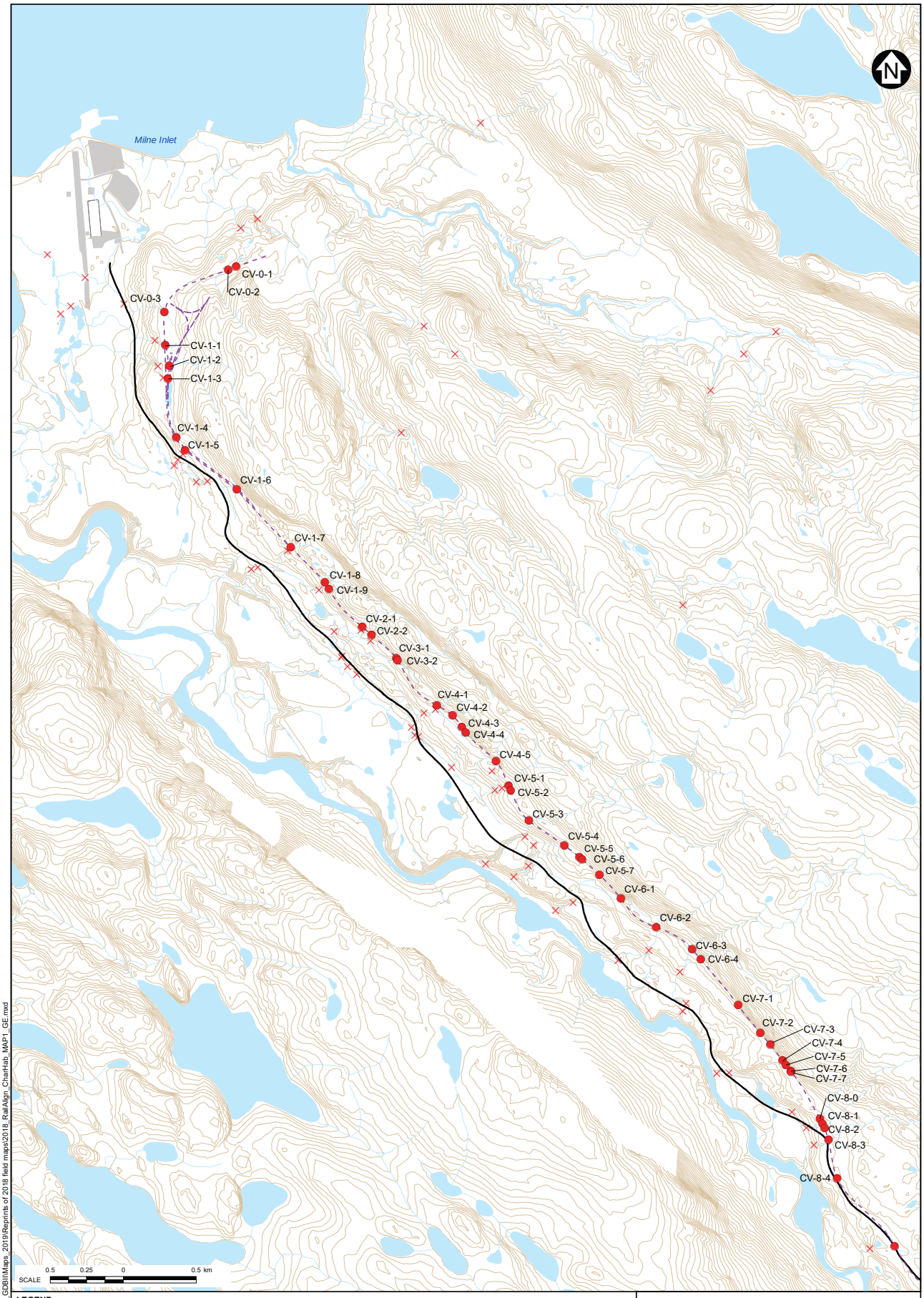
Table A1-1. List of stream crossings (culverts), bridges, cuts/diversions, and lake/pond encroachments/infills along the North Rail alignment and habitat designations.

Site	Description	Waterbody Type	Diversion to	Receives Diversion From	UTMs		Arctic Char		Ninespine Stickleback	
					Easting	Northing	Y/N	Habitat Quality	Y/N	Habitat Quality
CV-106-2	Pond Infilling + Culvert	P			559615	7914085	Y	MAR	Y	IMP
CV-106-3	Pond Encroachment	P			559980	7913834	Y	MAR	Y	IMP
CV-107-1	Pond Infilling + Culvert	P			560409	7913682	N	NFB	N	NFB
CV-107-2	Culvert	LP			560529	7913655	N	NFB	N	NFB
CV-107-3	Pond Infilling + Culvert	P			560660	7913555	N	NFB	N	NFB
CV-107-4	Culvert	S			560706	7913502	Y	IMP	Y	IMP
CV-108-1	Culvert	LP			560926	7913247	N	NFB	N	NFB
CV-108-2	Culvert	LP			560963	7913204	N	NFB	N	NFB
CV-108-3	Culvert	S			561364	7912739	N	NFB	N	NFB
CV-109-1	Cut	S	CV-109-2		561858	7912345	N	NFB	N	NFB
CV-109-2	Culvert	S		CV-109-1	561975	7912252	N	NFB	N	NFB
CV-109-3	Culvert	LP			562017	7912220	N	NFB	N	NFB
CV-110-1	Culvert	S			561084	7912910	N	NFB	N	NFB
CV-110-2	Pond Encroachment + Culvert	P			561266	7912241	N	NFB	N	NFB
CV-110-3	Pond Infilling + Culvert	P			561445	7912240	N	NFB	N	NFB
CV-110-4	Pond Infilling + Culvert	P			561546	7912425	N	NFB	N	NFB

S = stream; P = pond; LP = Low point; L = Lake; Y = Yes; N = No; P = Potential; NFB = Not Fish-Bearing; IMP = Important; MAR = Marginal

[1] Fish not present in 2018 field surveys but observed in a minimum of one previous survey

APPENDIX 2. NORTH RAIL CORRIDOR AND TOTE ROAD REALIGNMENT 2018 FISH HABITAT CLASSIFICATION MAPS



LEGEND:

ARCTIC CHAR HABITAT

- NO
- YES

- PROPOSED NORTH RAILWAY (JUNE 2018)
- MILNE INLET TOTE ROAD (EXISTING)
- MILNE INLET TOTE ROAD (REALIGNMENT)
- CONTOUR (5M INTERVAL)
- INFRASTRUCTURE

- PERMANENT BARRIER
- SOFT / SEASONAL BARRIER

NOTES:

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2. TOPOGRAPHY PROVIDED BY EAGLE MAPPING (2005)
3. COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 17 AND IS IN METRES.
4. CONTOUR INTERVAL IS 5 M AND IS IN METRES.

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MARY RIVER PROJECT

2018 FISH HABITAT FIELD INVESTIGATIONS (MAP 1 OF 13)

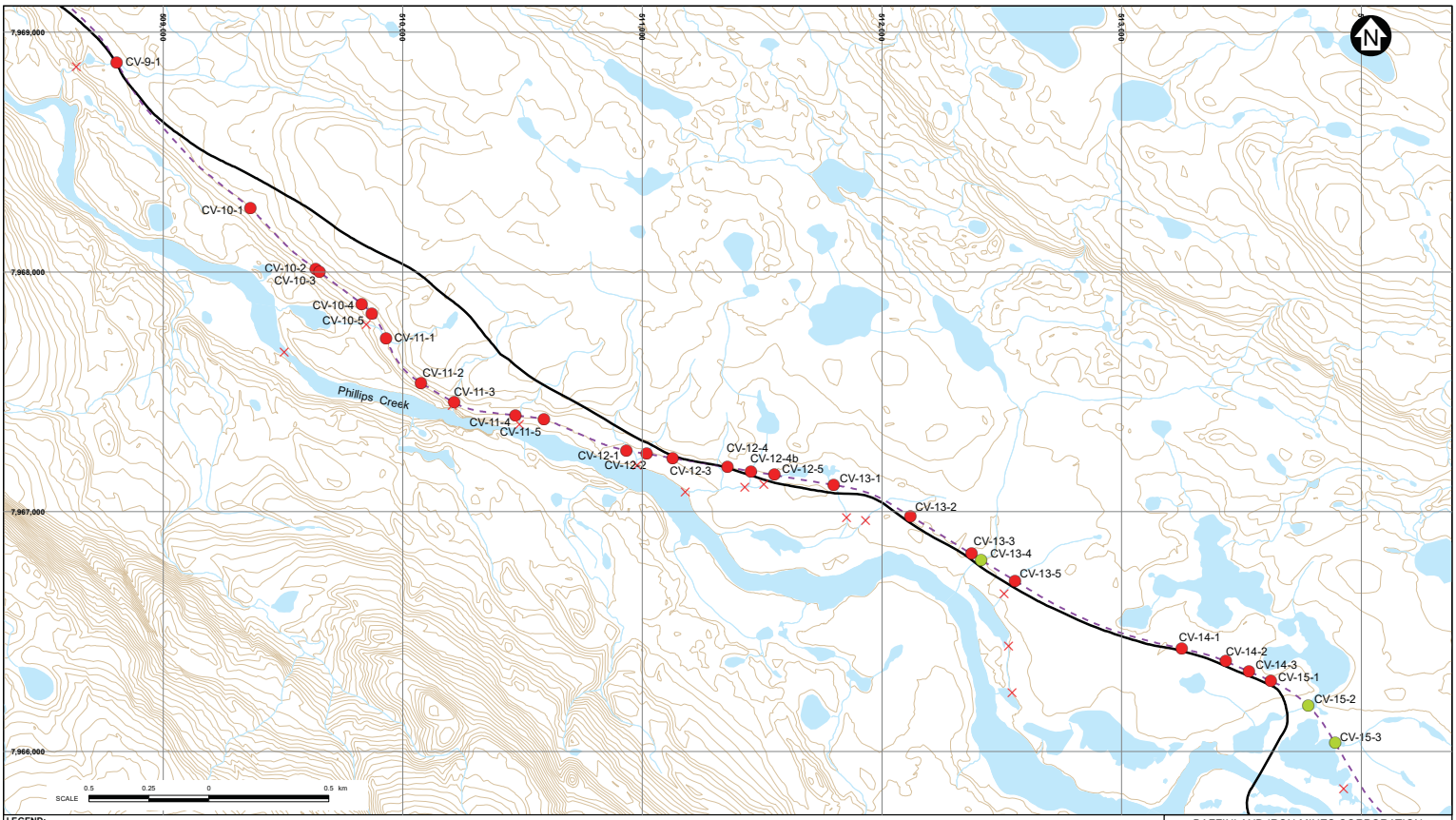
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LEGEND:

ARCTIC CHAR HABITAT

- NO
- YES

- PROPOSED NORTH RAILWAY (JUNE 2018)
- MILNE INLET TOTE ROAD (EXISTING)
- CONTOUR (5M INTERVAL)
- INFRASTRUCTURE

- PERMANENT BARRIER
- SOFT / SEASONAL BARRIER

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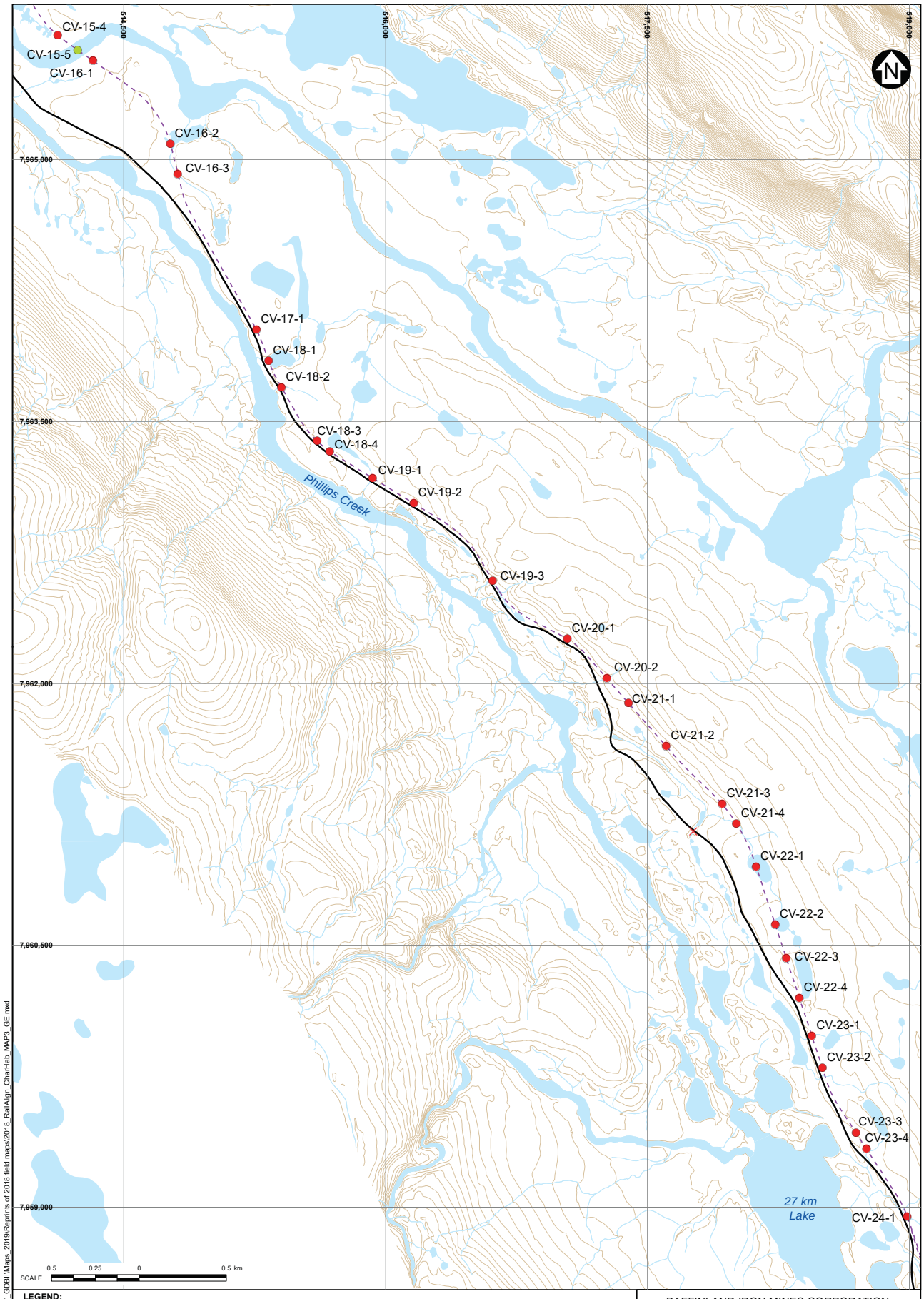
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2018 FISH HABITAT FIELD INVESTIGATIONS (MAP 2 OF 13)

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LEGEND:

ARCTIC CHAR HABITAT

- NO
- YES

- PROPOSED NORTH RAILWAY (JUNE 2018)
- MILNE INLET TOTE ROAD (EXISTING)
- CONTOUR (5M INTERVAL)
- INFRASTRUCTURE

- PERMANENT BARRIER
- SOFT / SEASONAL BARRIER

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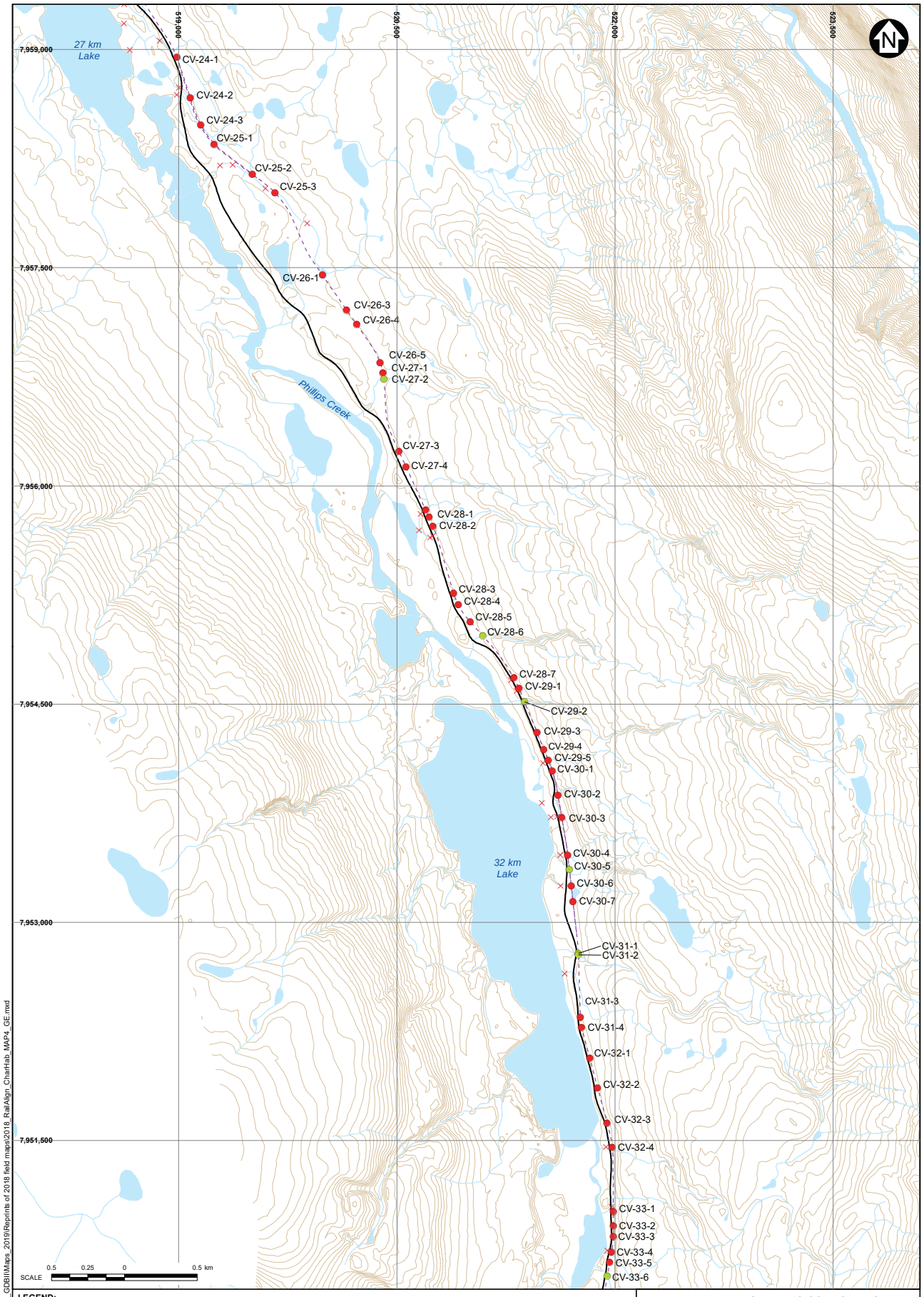
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2018 FISH HABITAT FIELD INVESTIGATIONS (MAP 3 OF 13)

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LEGEND:

ARCTIC CHAR HABITAT

- NO
- YES

- PROPOSED NORTH RAILWAY (JUNE 2018)
- MILNE INLET TOTE ROAD (EXISTING)
- CONTOUR (5M INTERVAL)
- INFRASTRUCTURE

- PERMANENT BARRIER
- SOFT / SEASONAL BARRIER

NOTES:

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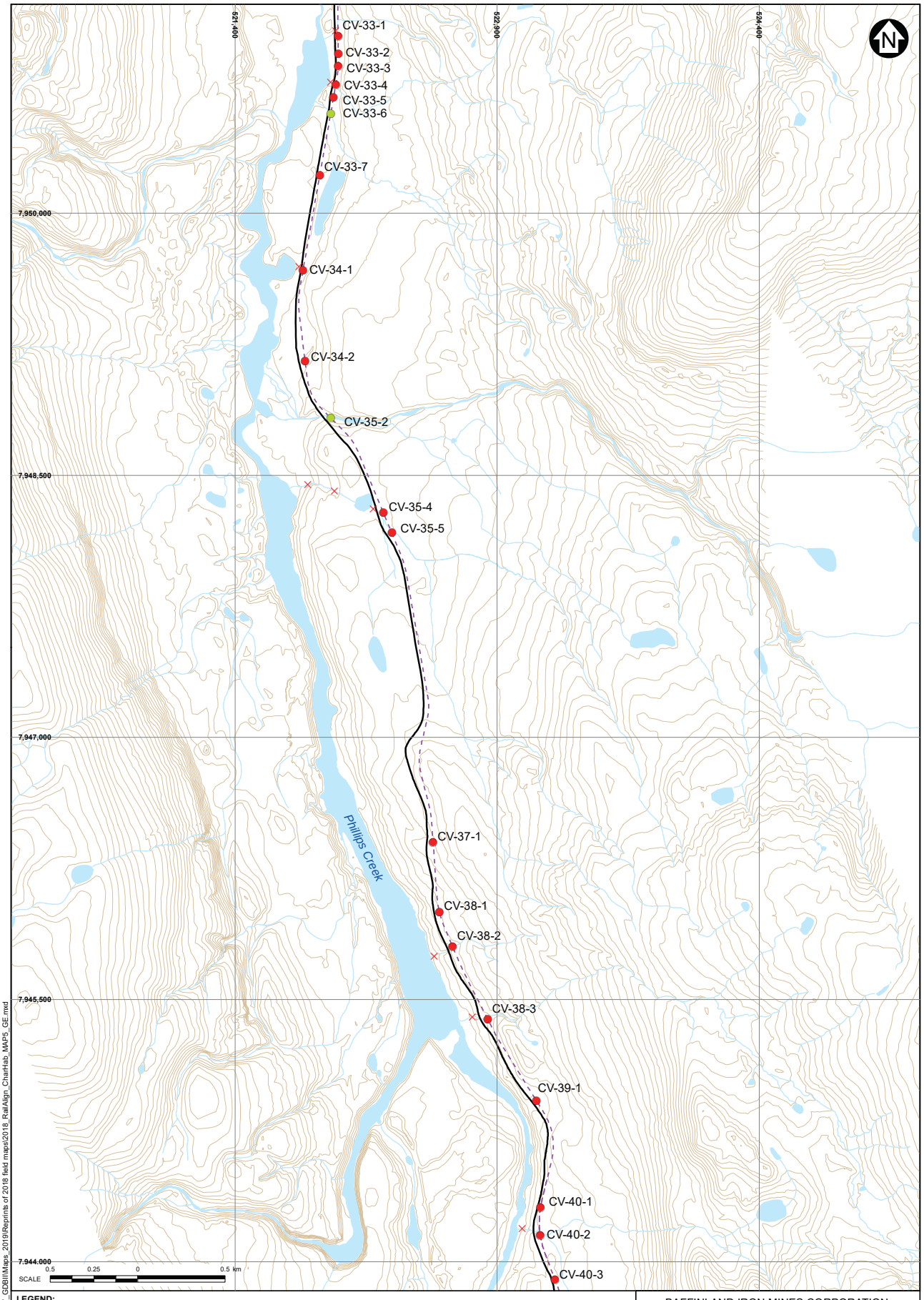
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2018 FISH HABITAT FIELD INVESTIGATIONS (MAP 4 OF 13)

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LEGEND:

ARCTIC CHAR HABITAT

- NO
- YES

- PROPOSED NORTH RAILWAY (JUNE 2018)
- MILNE INLET TOTE ROAD (EXISTING)
- CONTOUR (5M INTERVAL)
- INFRASTRUCTURE

- PERMANENT BARRIER
- SOFT / SEASONAL BARRIER

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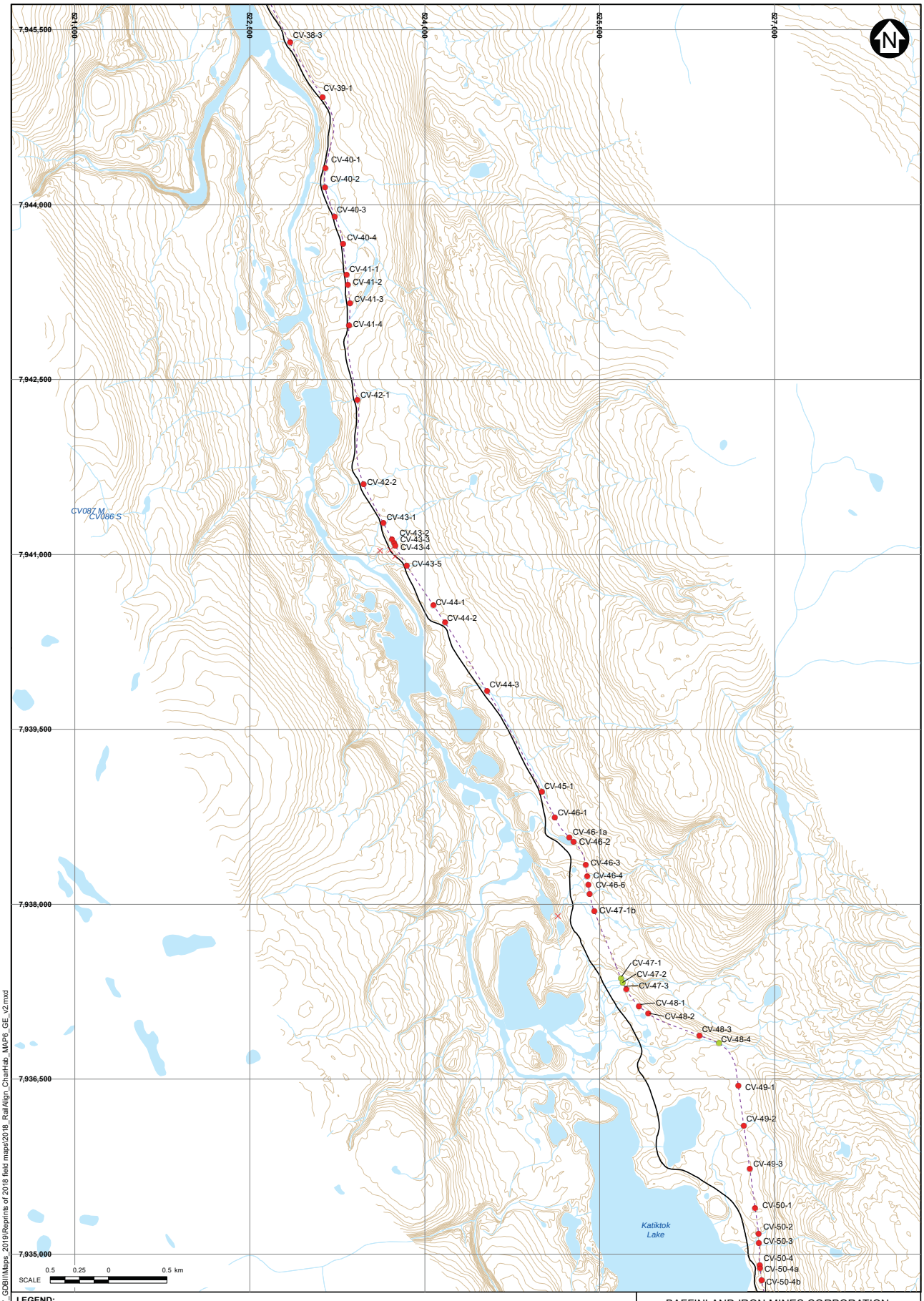
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2018 FISH HABITAT FIELD INVESTIGATIONS (MAP 5 OF 13)

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LEGEND:

ARCTIC CHAR HABITAT
- NO
- YES

- PROPOSED NORTH RAILWAY (JUNE 2018)
- MILNE INLET TOTE ROAD (EXISTING)
- CONTOUR (5M INTERVAL)
- INFRASTRUCTURE

- PERMANENT BARRIER
- SOFT / SEASONAL BARRIER

NOTES:

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4. CONTOUR INTERVAL IS 5 M AND IS IN METRES.

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2018 FISH HABITAT FIELD INVESTIGATIONS (MAP 6 OF 13)

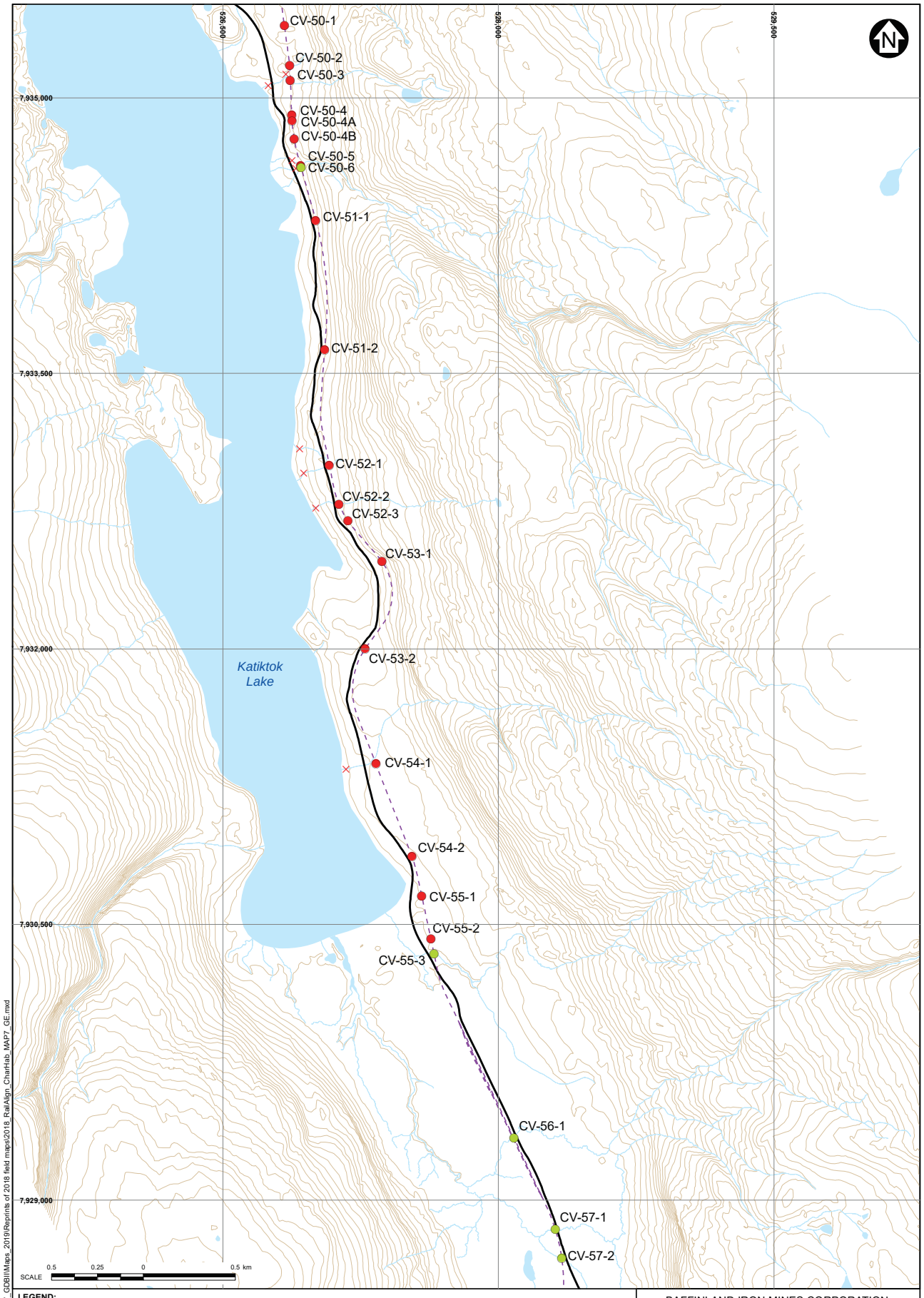
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LEGEND:

ARCTIC CHAR HABITAT
- NO
- YES

- PROPOSED NORTH RAILWAY (JUNE 2018)
- MILNE INLET TOTE ROAD (EXISTING)
- CONTOUR (5M INTERVAL)
- INFRASTRUCTURE

- PERMANENT BARRIER
- SOFT / SEASONAL BARRIER

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MARY RIVER PROJECT

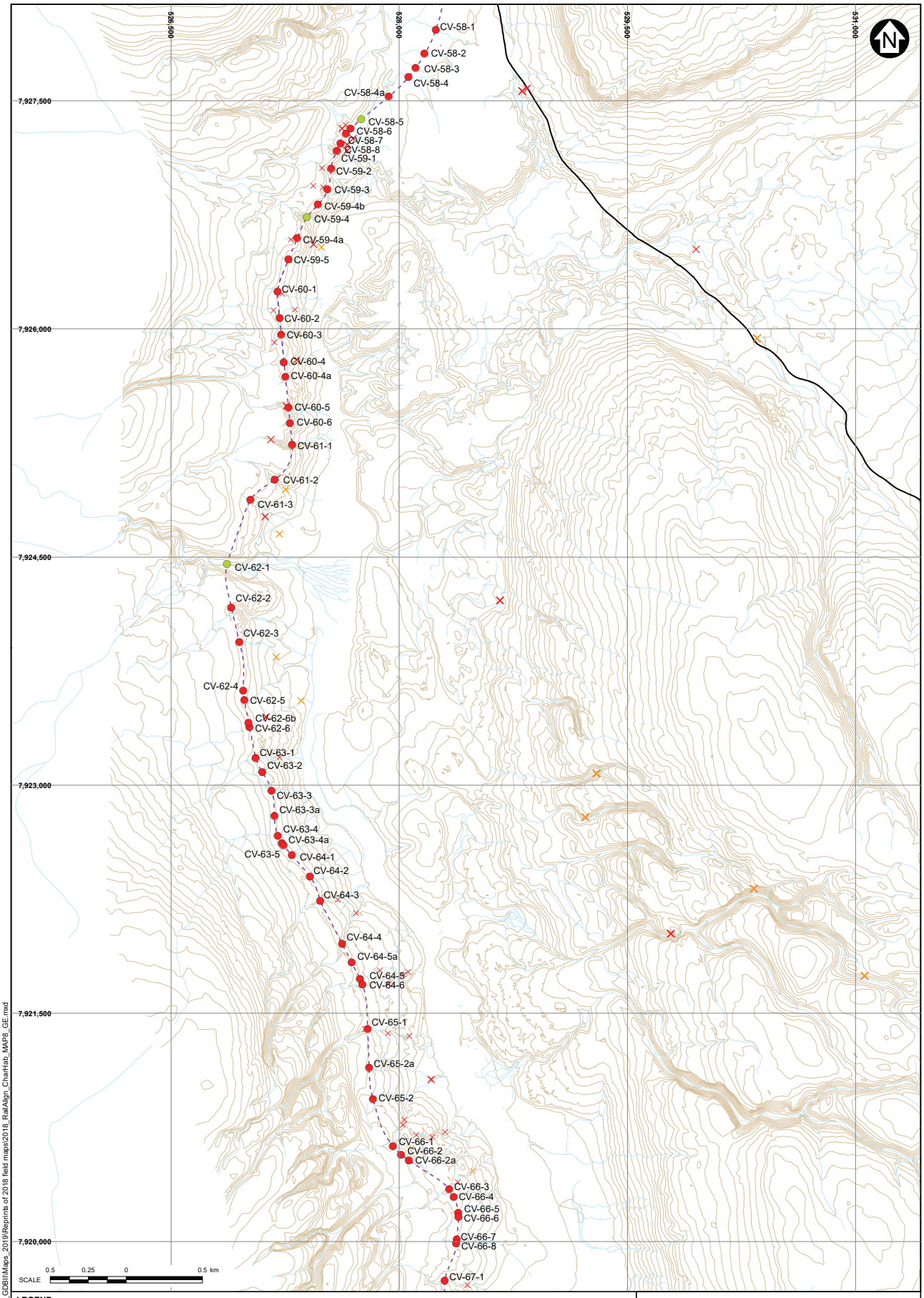
2018 FISH HABITAT FIELD INVESTIGATIONS (MAP 7 OF 13)

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LEGEND:

ARCTIC CHAR HABITAT

- NO
- YES

- PROPOSED NORTH RAILWAY (JUNE 2018)
- MILNE INLET TOTE ROAD (EXISTING)
- CONTOUR (5M INTERVAL)
- INFRASTRUCTURE

- PERMANENT BARRIER
- SOFT / SEASONAL BARRIER

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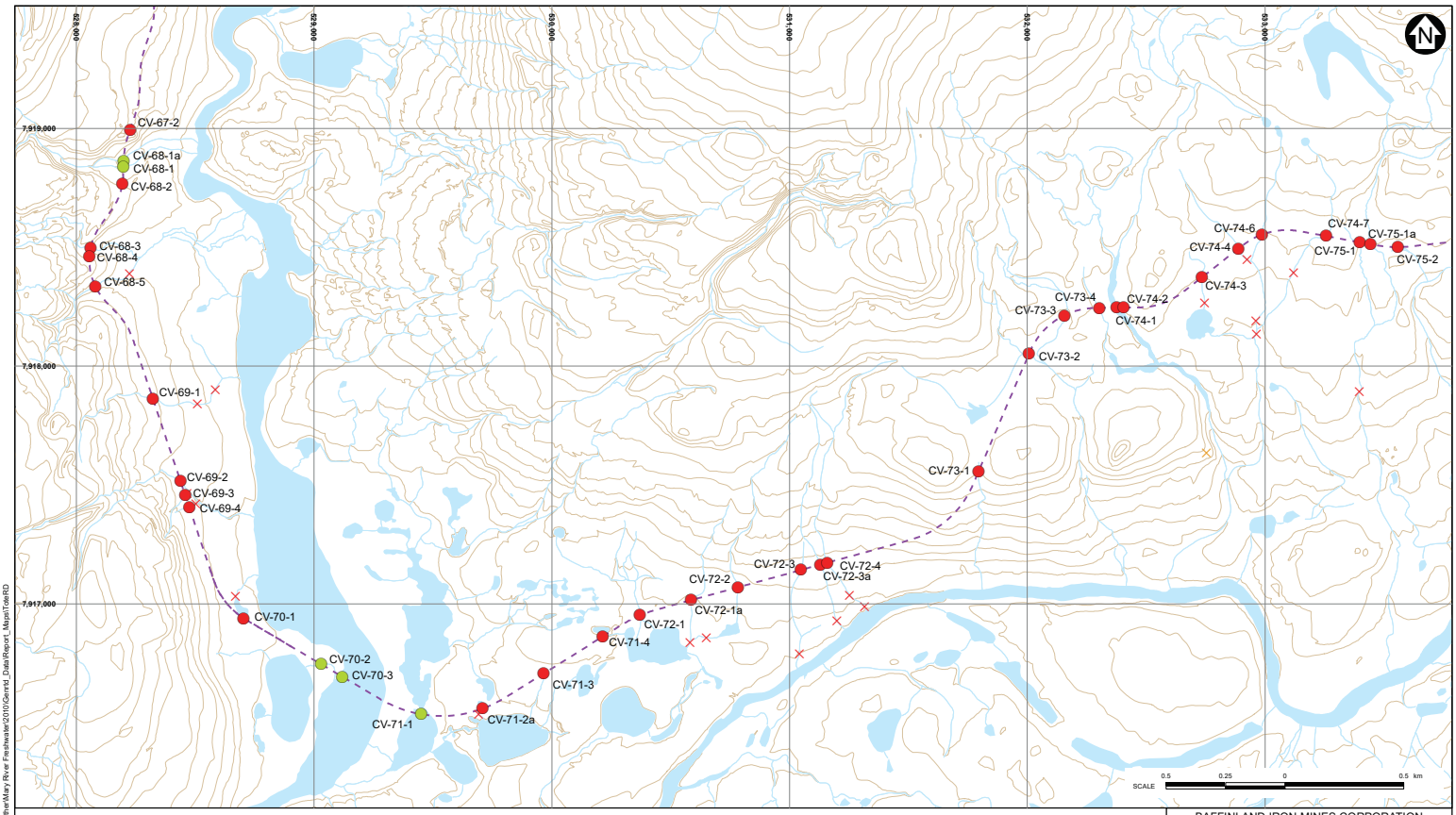
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2018 FISH HABITAT FIELD INVESTIGATIONS (MAP 8 OF 13)

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LEGEND:

ARCTIC CHAR HABITAT
- NO
- YES

- PROPOSED NORTH RAILWAY (JUNE 2018)
- MILNE INLET TOTE ROAD (EXISTING)
- MILNE INLET TOTE ROAD (REALIGNMENT)
- CONTOUR (5M INTERVAL)
- INFRASTRUCTURE
- PERMANENT BARRIER
- SOFT / SEASONAL BARRIER

NOTES:

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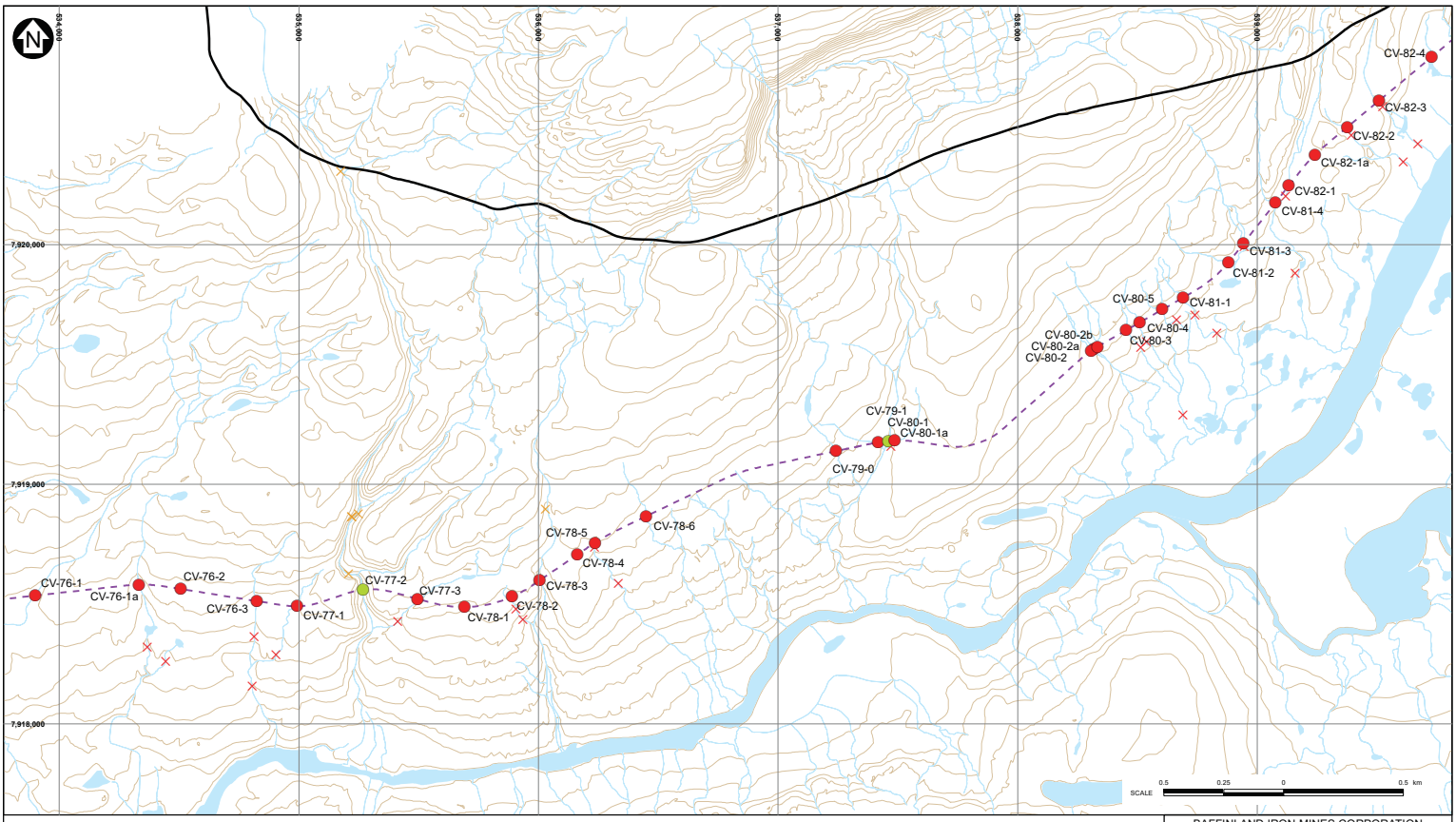
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2018 FISH HABITAT FIELD INVESTIGATIONS (MAP 9 OF 13)

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LEGEND:

ARCTIC CHAR HABITAT
- NO
- YES

- PROPOSED NORTH RAILWAY (JUNE 2018)
- MILNE INLET TOTE ROAD (EXISTING)
- CONTOUR (5M INTERVAL)
- INFRASTRUCTURE
- PERMANENT BARRIER
- SOFT / SEASONAL BARRIER

NOTES:

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3. COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 17 AND IS IN METRES.
4. CONTOUR INTERVAL IS 5 M AND IS IN METRES.

BAFFINLAND IRON MINES CORPORATION

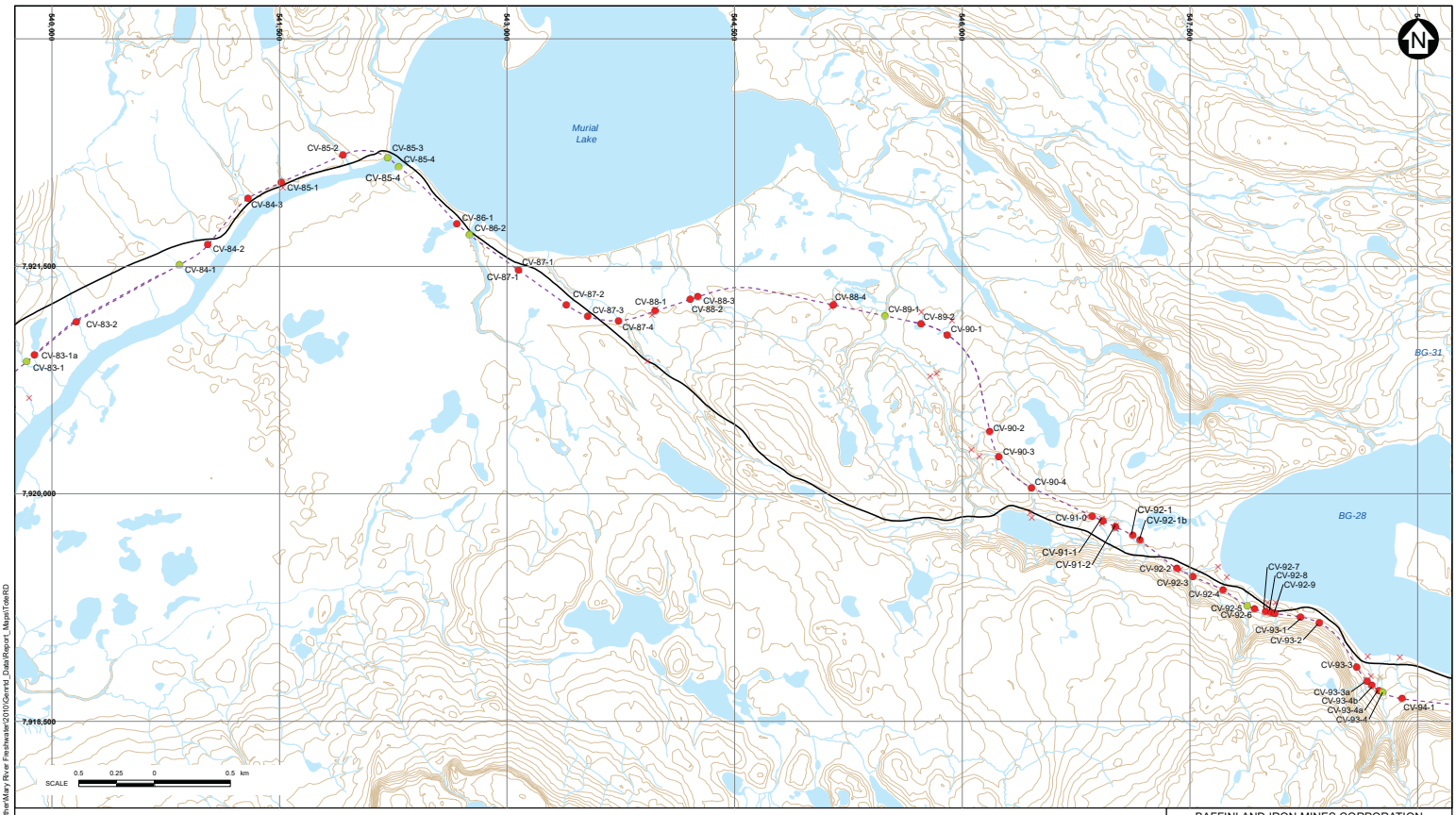
MARY RIVER PROJECT

2018 FISH HABITAT FIELD INVESTIGATIONS (MAP 10 OF 13)

North/South Consultants Inc.
Aquatic Environment Specialists

PIA NO.	REF NO.
-	-
DATE: 02/11/2019	REV -

Path: \\terrastation\GIS\Projects\Olive\Mary River Freshwater\2010\Gen\fd_Data\Report_Maps\TotoRD



LEGEND:

ARCTIC CHAR HABITAT
- NO
- YES

- PROPOSED NORTH RAILWAY (JUNE 2018)
- MILNE INLET TOTE ROAD (EXISTING)
- CONTOUR (5M INTERVAL)
- INFRASTRUCTURE
- PERMANENT BARRIER
- SOFT / SEASONAL BARRIER

NOTES:

1. BASE MAP: © HER MAJESTY THE QUEEN IN RIGHTS OF CANADA DEPARTMENT OF NATURAL RESOURCES (2009) / ALL RIGHTS RESERVED.
2. TOPOGRAPHY PROVIDED BY EAGLE MAPPING (2005)
3. COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 17 AND IS IN METRES.
4. CONTOUR INTERVAL IS 5 M AND IS IN METRES.

BAFFINLAND IRON MINES CORPORATION

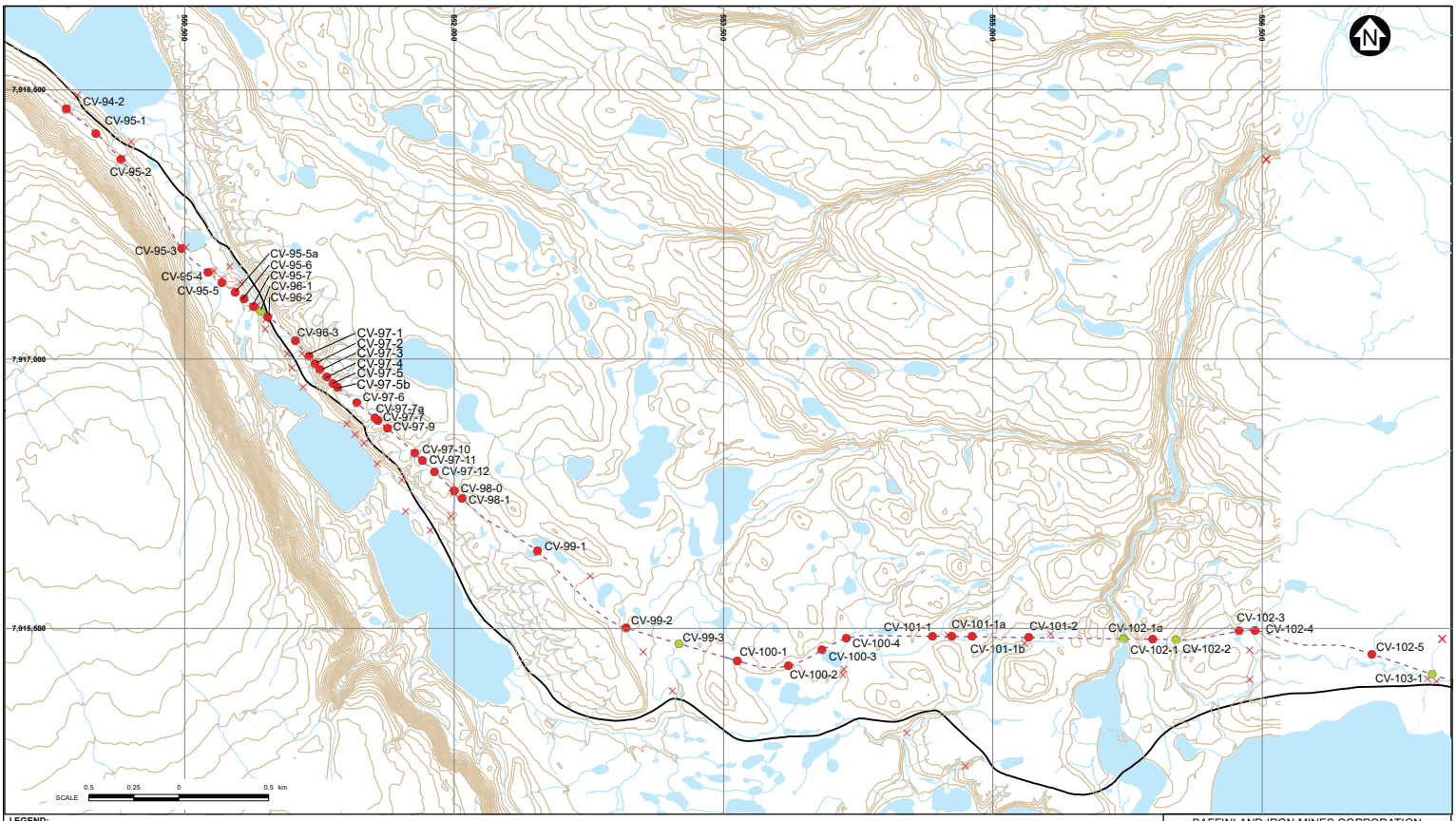
MARY RIVER PROJECT

2018 FISH HABITAT FIELD INVESTIGATIONS (MAP 11 OF 13)

North/South Consultants Inc.
Aquatic Environment Specialists

PIA NO.	REF NO.
-	-
DATE: 02/11/2019	REV -

Path: \\terrastation\GIS\Projects\Oltre\Mary River Freshwater\2010\Gen\fd_Data\Report_Maps\ToteRD



LEGEND:

ARCTIC CHAR HABITAT

- NO
- YES

- PROPOSED NORTH RAILWAY (JUNE 2018)
- MILNE INLET TOTE ROAD (EXISTING)
- CONTOUR (5M INTERVAL)
- INFRASTRUCTURE

- PERMANENT BARRIER
- SOFT / SEASONAL BARRIER

NOTES:

1. BASE MAP: © HER MAJESTY THE QUEEN IN RIGHT'S OF CANADA DEPARTMENT OF NATURAL RESOURCES (2009.) ALL RIGHTS RESERVED.
2. TOPOGRAPHY PROVIDED BY EAGLE MAPPING (2005)
3. COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 17 AND IS IN METRES.
4. CONTOUR INTERVAL IS 5 M AND IS IN METRES.

BAFFINLAND IRON MINES CORPORATION

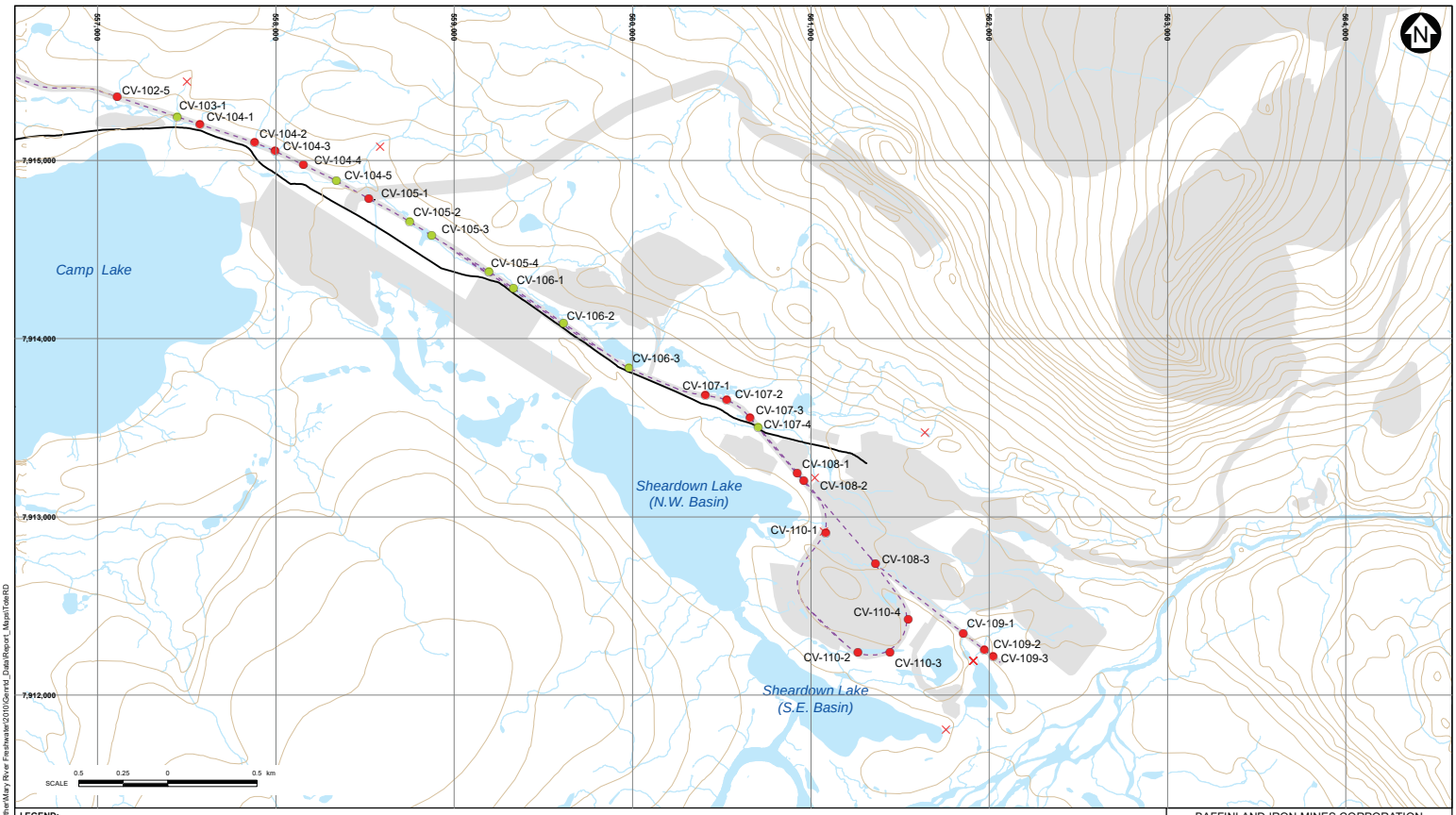
MARY RIVER PROJECT

2018 FISH HABITAT FIELD INVESTIGATIONS (MAP 12 OF 13)

North/South Consultants Inc.
Aquatic Environment Specialists

PIA NO.	REF NO.
-	-
DATE: 02/11/2019	REV -

Path: \\terastation\GIS\Projects\Other\Mary River Freshwater\2010\Gen\Rd_Data\Report_Maps\ToteRD



LEGEND:

ARCTIC CHAR HABITAT
- NO
- POTENTIAL
- YES

- PROPOSED NORTH RAILWAY (JUNE 2018)
- MILNE INLET TOTE ROAD (EXISTING)
- CONTOUR (5M INTERVAL)
- INFRASTRUCTURE

- PERMANENT BARRIER
- SOFT / SEASONAL BARRIER

NOTES:

1. BASE MAP: © HER MAJESTY THE QUEEN IN RIGHTS OF CANADA DEPARTMENT OF NATURAL RESOURCES (2009.) ALL RIGHTS RESERVED.
2. TOPOGRAPHY PROVIDED BY EAGLE MAPPING (2005)
3. COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 17 AND IS IN METRES.
4. CONTOUR INTERVAL IS 50 M AND IS IN METRES.

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

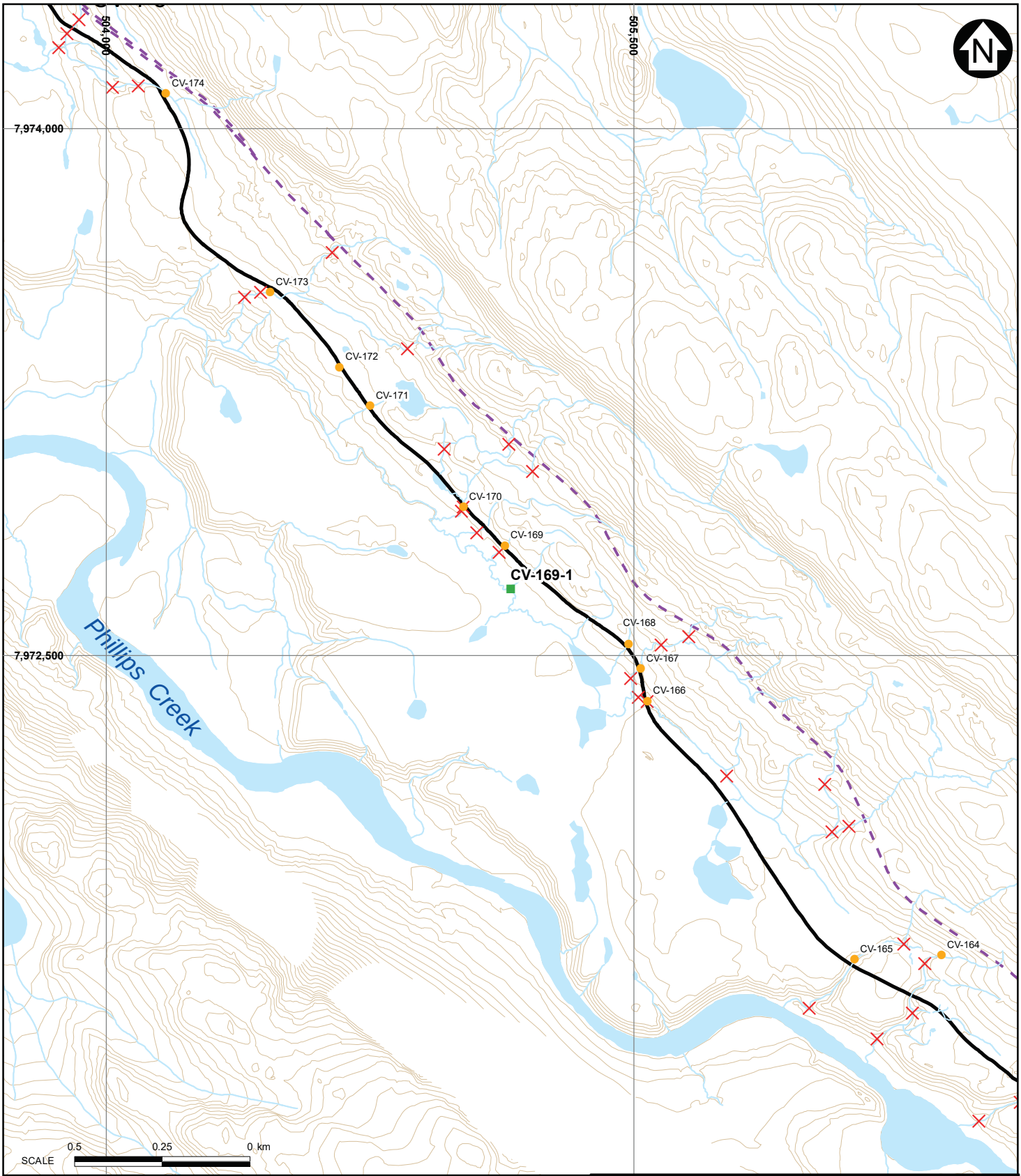
2018 FISH HABITAT FIELD INVESTIGATIONS (MAP 13 OF 13)

North/South Consultants Inc.
Aquatic Environment Specialists

PIA NO.	REF NO.
-	-

DATE: 02/11/2018 REV -

Path: \\teranation\GIS\Projects\Other\Mary River Freshwater\2010\Gen\fd_Data\Report_Maps\ToteRD



ARCTIC CHAR HABITAT AT REALIGNMENT SITES

- NO
- YES
- EXISTING TOTE ROAD CROSSINGS
- PERMANENT BARRIER
- SOFT / SEASONAL BARRIER
- PROPOSED NORTH RAILWAY
- MILNE INLET TOTE ROAD (EXISTING)
- CONTOUR (5M INTERVAL)
- INFRASTRUCTURE

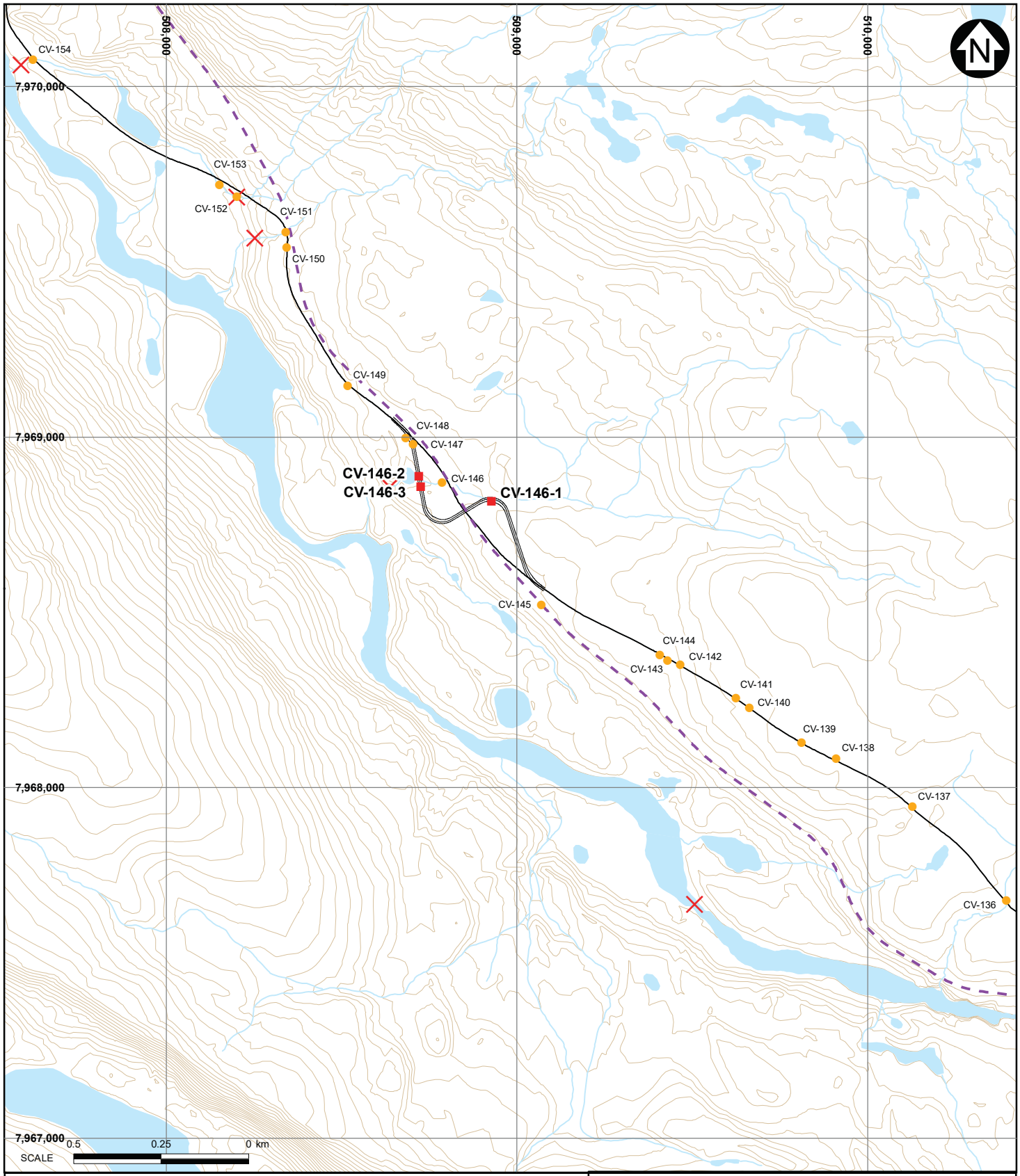
BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

2018 ARCTIC CHAR HABITAT AT TOTE ROAD REALIGNMENT SITES (MAP 1 OF 7)

North/South Consultants Inc.
Aquatic Environment Specialists

P/A NO.	REF NO.
-	-
DATE: 15/11/2018	REV 1



ARCTIC CHAR HABITAT AT REALIGNMENT SITES

- NO
- YES
- EXISTING TOTE ROAD CROSSINGS
- PERMANENT BARRIER
- SOFT / SEASONAL BARRIER
- PROPOSED NORTH RAILWAY
- MILNE INLET TOTE ROAD (EXISTING)
- CONTOUR (5M INTERVAL)
- INFRASTRUCTURE

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

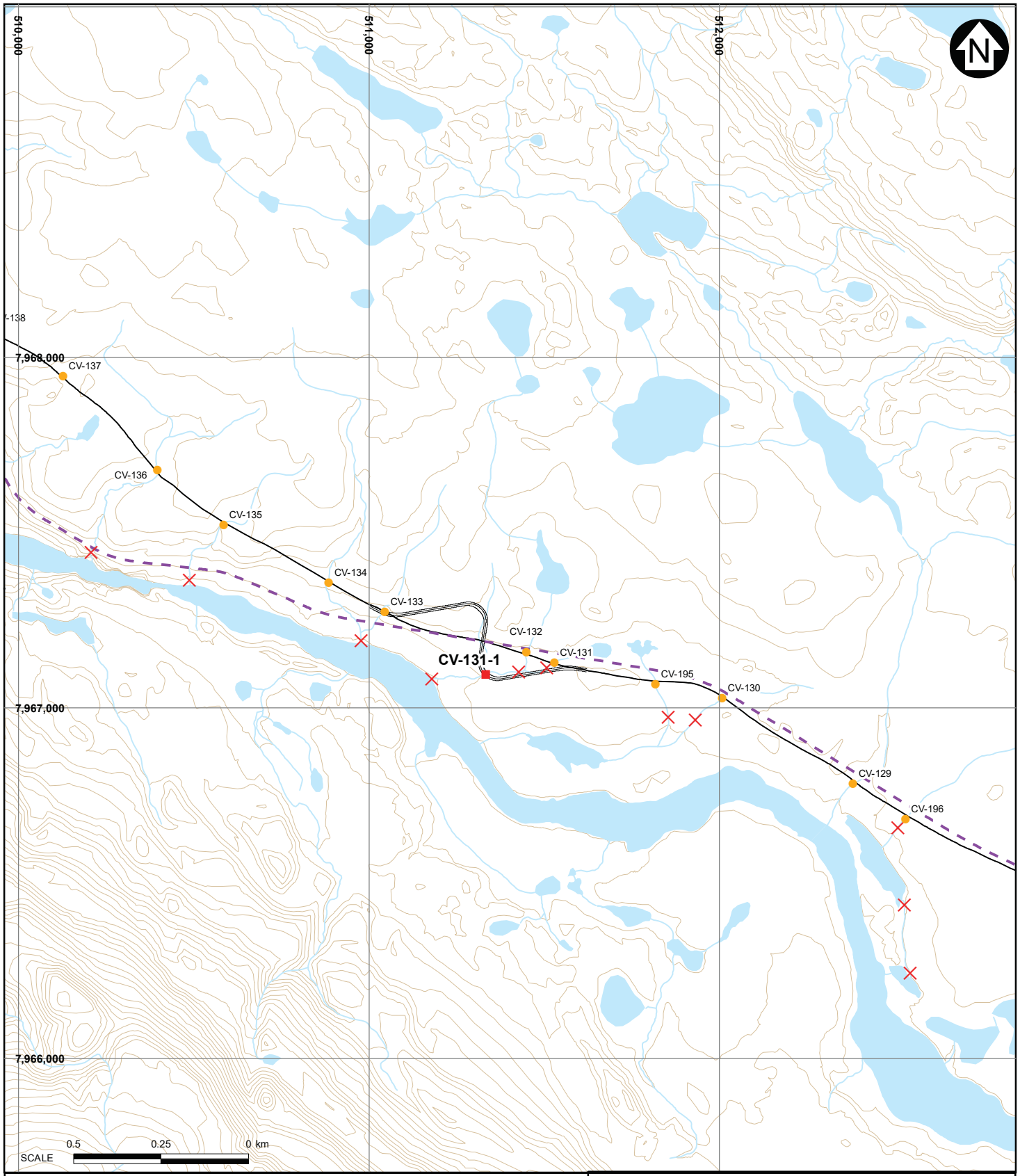
2018 ARCTIC CHAR HABITAT AT TOTE ROAD REALIGNMENT SITES (MAP 2 OF 7)

North/South Consultants Inc.
Aquatic Environment Specialists

P/A NO.	REF NO.
-	-

DATE: 15/11/2018

REV 1



ARCTIC CHAR HABITAT AT REALIGNMENT SITES

- NO
- YES
- EXISTING TOTE ROAD CROSSINGS
- PERMANENT BARRIER
- SOFT / SEASONAL BARRIER

- PROPOSED NORTH RAILWAY
- MILNE INLET TOTE ROAD (EXISTING)
- CONTOUR (5M INTERVAL)
- INFRASTRUCTURE

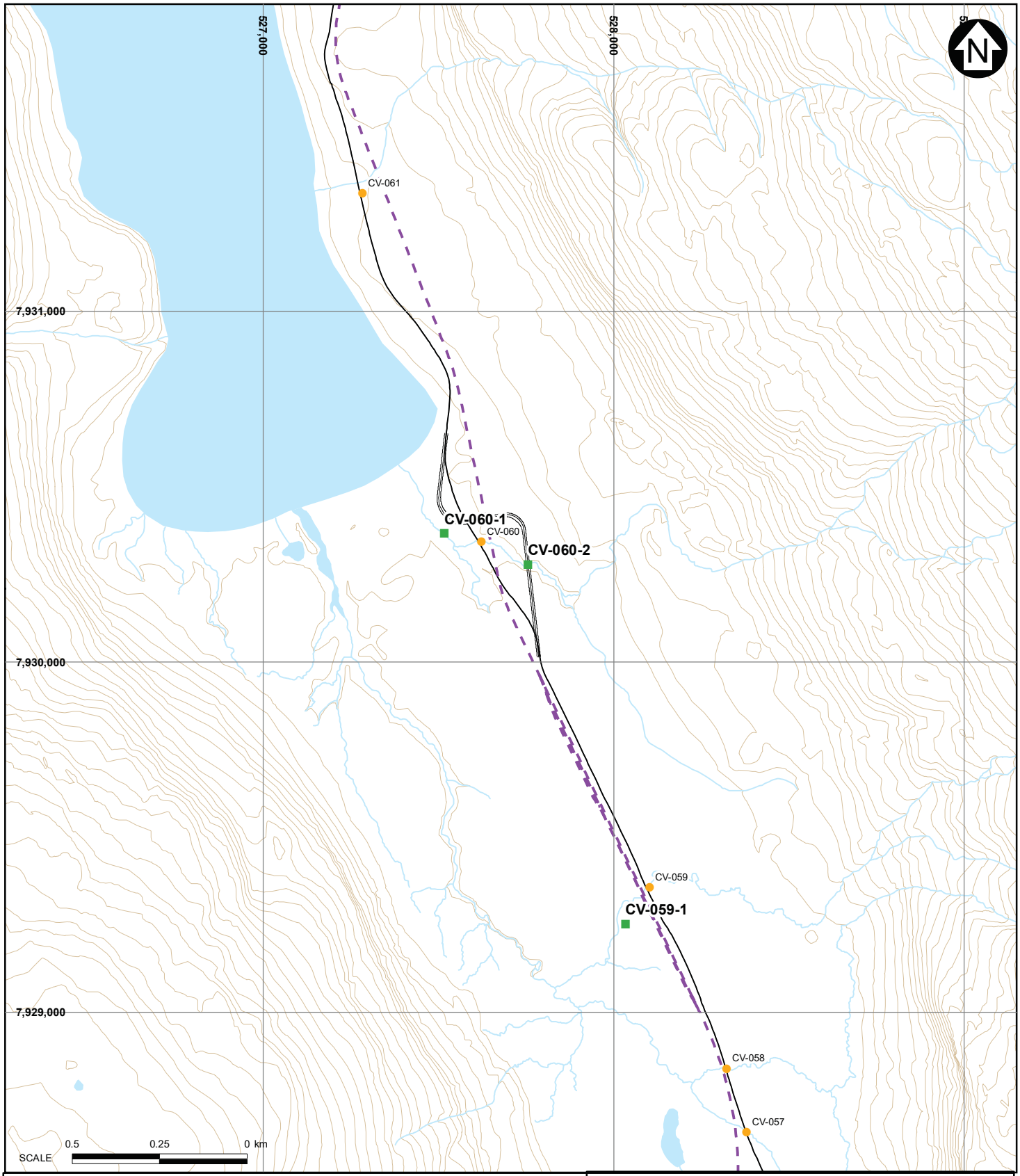
BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

2018 ARCTIC CHAR HABITAT AT TOTE ROAD REALIGNMENT SITES (MAP 3 OF 7)

North/South Consultants Inc.
Aquatic Environment Specialists

P/A NO.	REF NO.
-	-
DATE: 15/11/2018	REV 1



ARCTIC CHAR HABITAT AT REALIGNMENT SITES

- NO
- YES
- EXISTING TOTE ROAD CROSSINGS
- PERMANENT BARRIER
- SOFT / SEASONAL BARRIER

- PROPOSED NORTH RAILWAY
- MILNE INLET TOTE ROAD (EXISTING)
- CONTOUR (5M INTERVAL)
- INFRASTRUCTURE

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

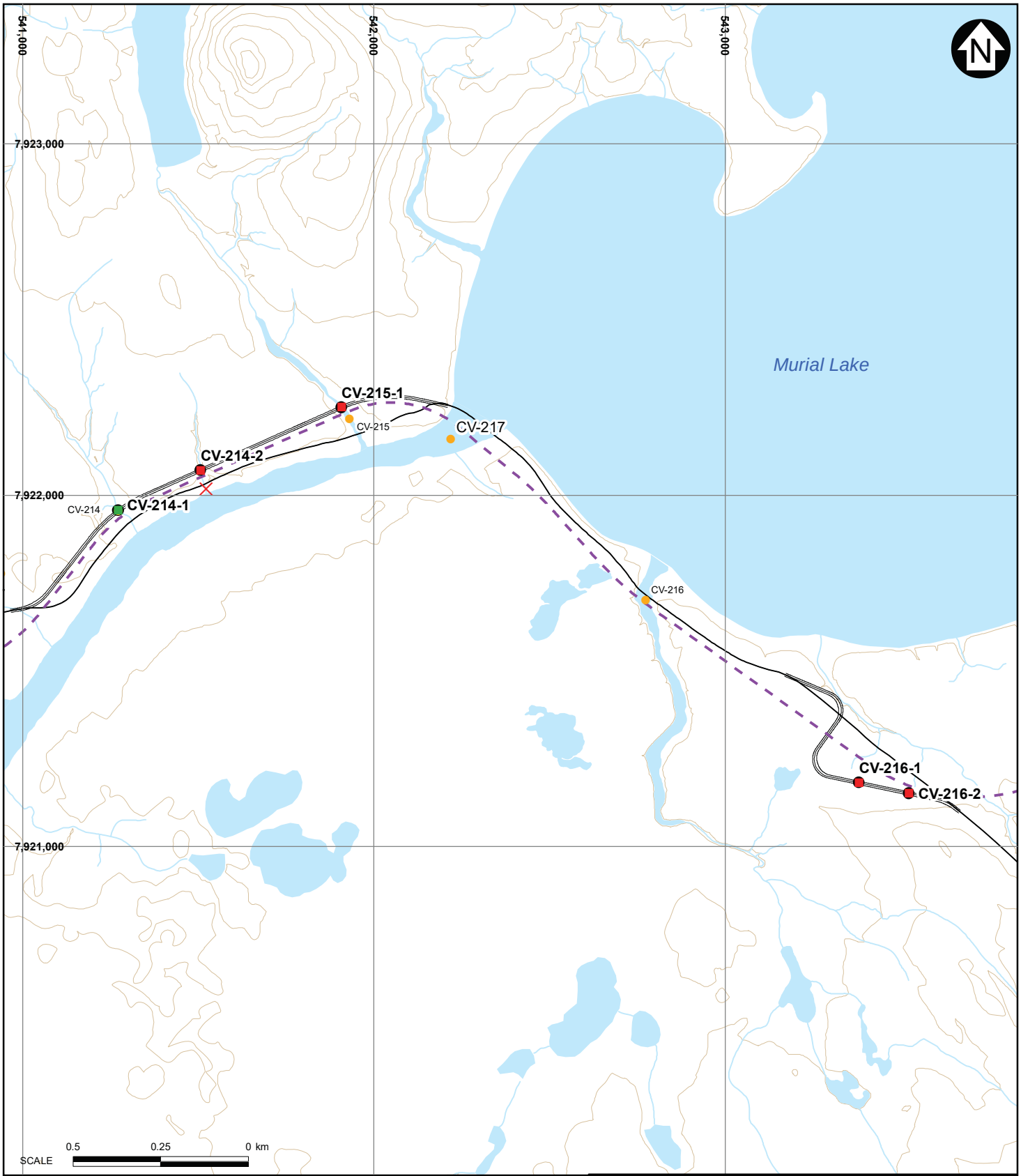
2018 ARCTIC CHAR HABITAT AT TOTE ROAD REALIGNMENT SITES (MAP 4 OF 7)

North/South Consultants Inc.
Aquatic Environment Specialists

P/A NO.	REF NO.
-	-

DATE: 15/11/2018

REV 1



ARCTIC CHAR HABITAT AT REALIGNMENT SITES

- NO
- YES
- EXISTING TOTE ROAD CROSSINGS
- PERMANENT BARRIER
- SOFT / SEASONAL BARRIER
- PROPOSED NORTH RAILWAY
- MILNE INLET TOTE ROAD (EXISTING)
- CONTOUR (5M INTERVAL)
- INFRASTRUCTURE

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

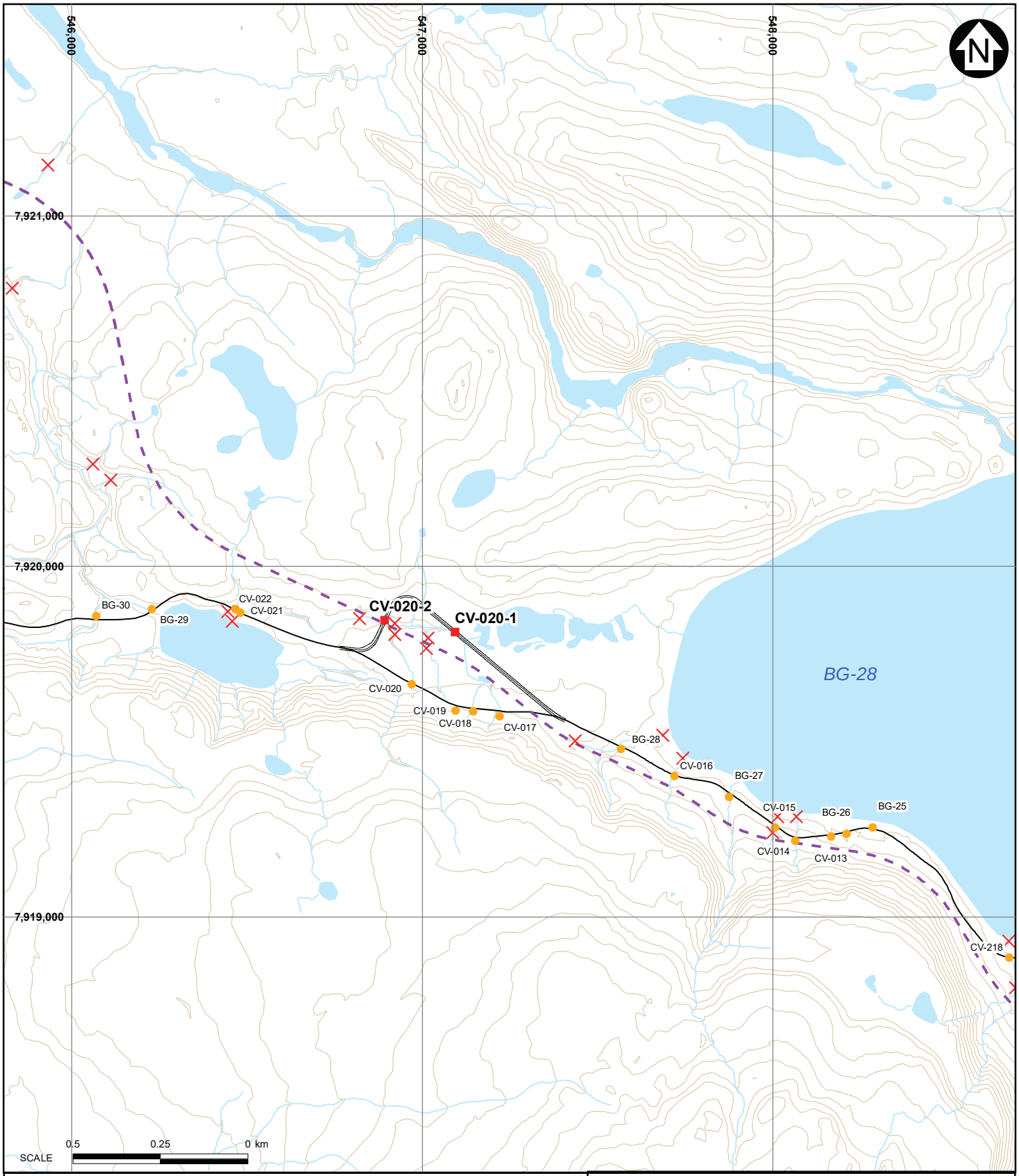
2018 ARCTIC CHAR HABITAT AT TOTE ROAD REALIGNMENT SITES (MAP 5 OF 7)

North/South Consultants Inc.
Aquatic Environment Specialists

P/A NO.	REF NO.
-	-

DATE: 15/11/2018

REV 1



ARCTIC CHAR HABITAT AT REALIGNMENT SITES

- NO
- YES
- EXISTING TOTE ROAD CROSSINGS
- PERMANENT BARRIER
- SOFT / SEASONAL BARRIER

- PROPOSED NORTH RAILWAY
- MILNE INLET TOTE ROAD (EXISTING)
- CONTOUR (5M INTERVAL)
- INFRASTRUCTURE

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

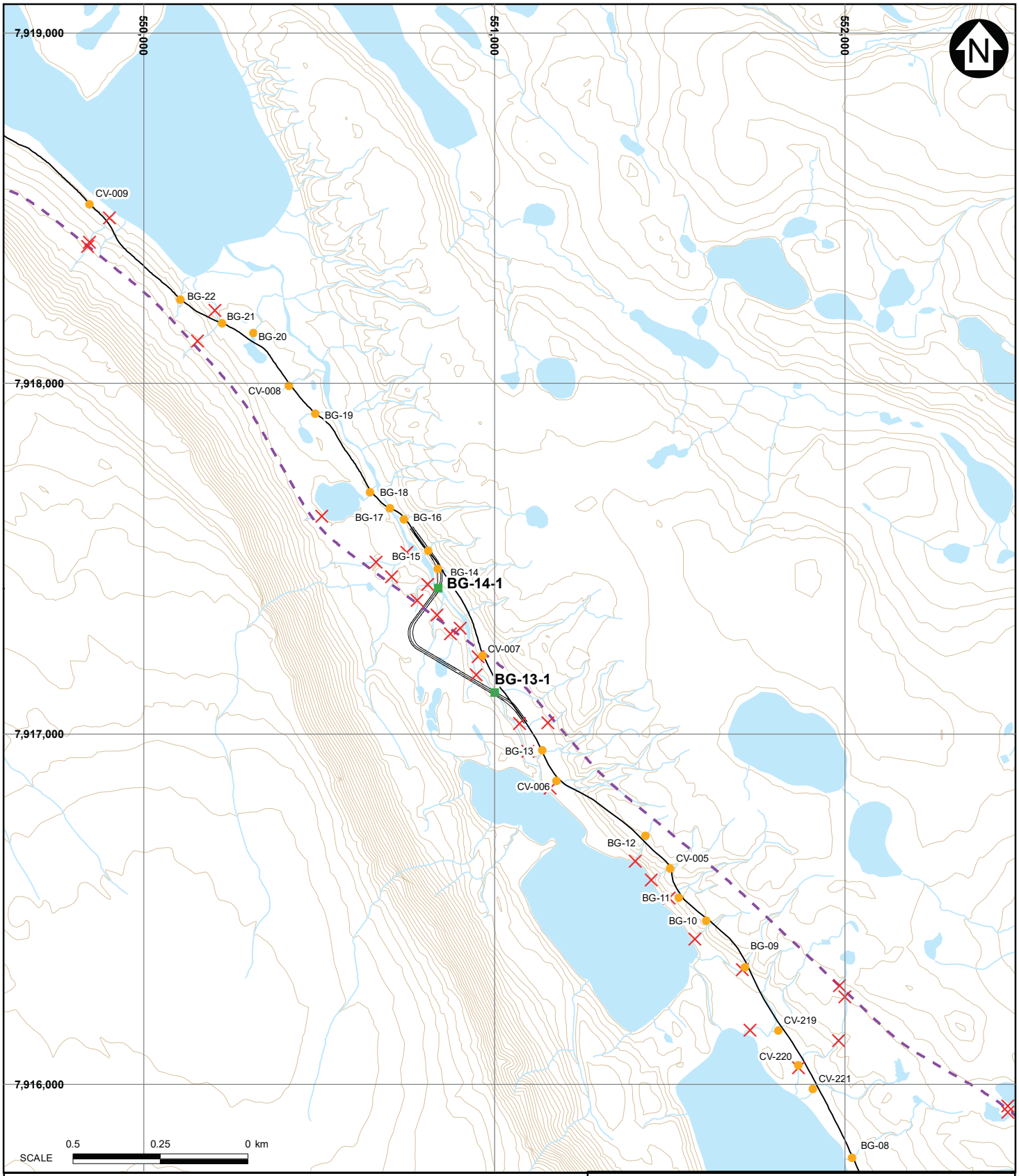
2018 ARCTIC CHAR HABITAT AT TOTE ROAD REALIGNMENT SITES (MAP 6 OF 7)

North/South Consultants Inc.
Aquatic Environment Specialists

P/A NO.	REF NO.
-	-

DATE: 15/11/2018

REV 1



ARCTIC CHAR HABITAT AT REALIGNMENT SITES

- NO
- YES
- EXISTING TOTE ROAD CROSSINGS
- PERMANENT BARRIER
- SOFT / SEASONAL BARRIER

- PROPOSED NORTH RAILWAY
- MILNE INLET TOTE ROAD (EXISTING)
- CONTOUR (5M INTERVAL)
- INFRASTRUCTURE

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

2018 ARCTIC CHAR HABITAT AT TOTE ROAD REALIGNMENT SITES (MAP 7 OF 7)

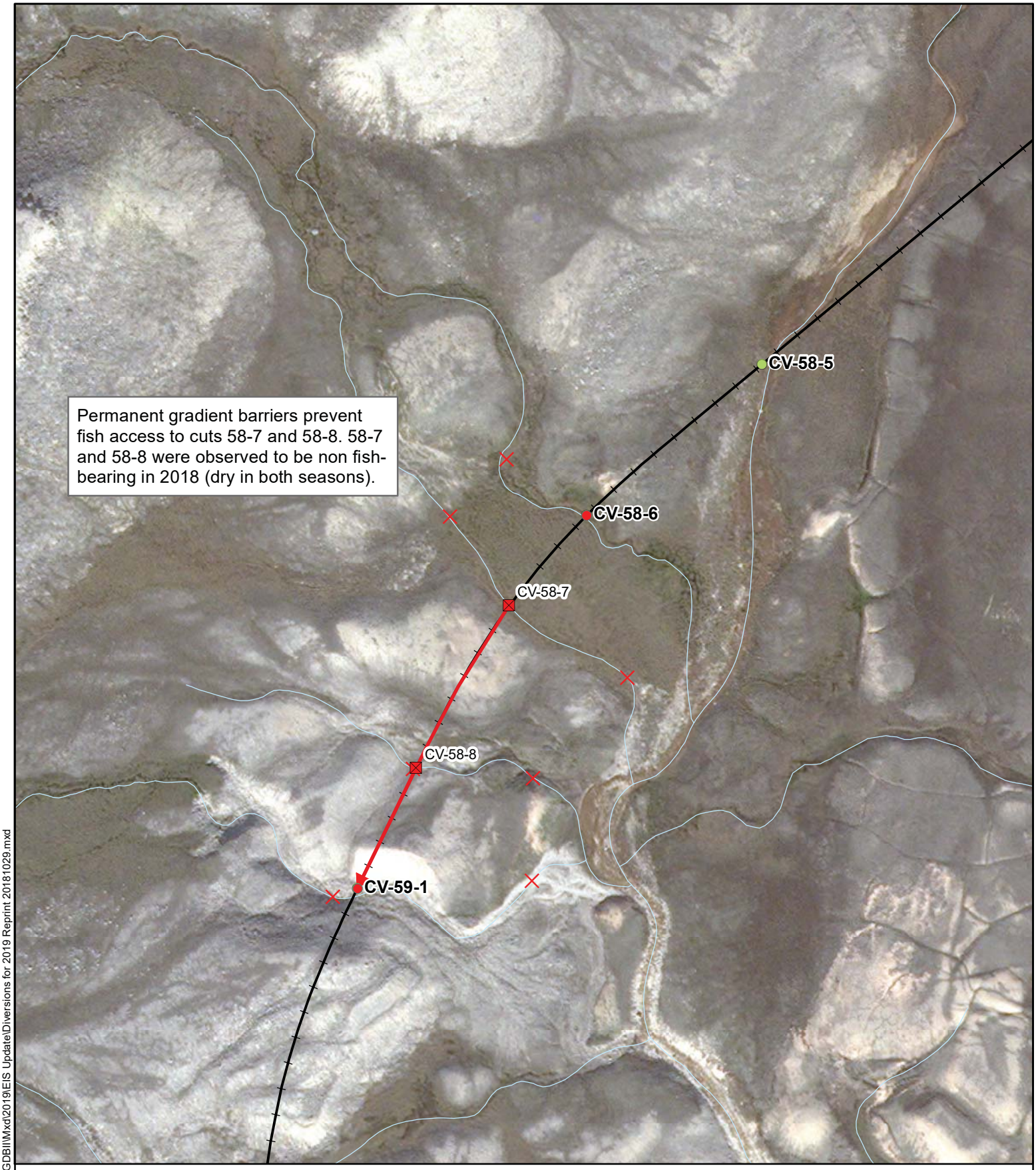
North/South Consultants Inc.
Aquatic Environment Specialists

P/A NO.	REF NO.
-	-

DATE: 15/11/2018

REV 1

APPENDIX 3. NORTH RAIL DIVERSION SITE MAPS AND RESULTS OF 2018 FIELD PROGRAMS



LEGEND:

ARCTIC CHAR HABITAT USE

Encroachments and Culvert Installations
- No
- Yes

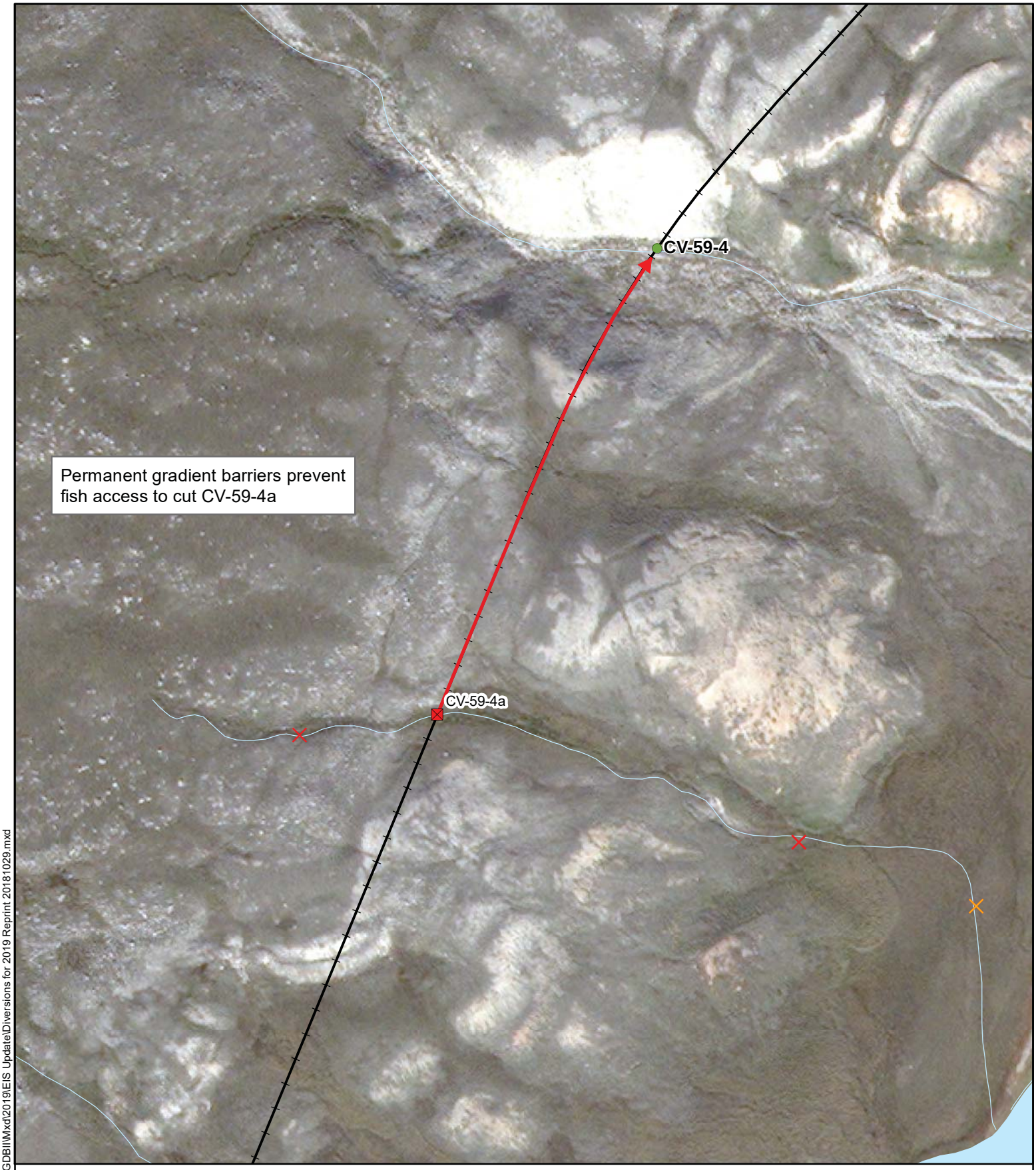
Bridges
- No
- Yes

Cuts
- No
- Yes

- PERMANENT BARRIER
- SOFT / SEASONAL BARRIER
- DIVERSION DIRECTION

SCALE: 1:2,000

Document Path: J:\MYP\MARYRIV_GDB\IIMxd\2019\EIS Update\Diversions for 2019 Reprint 20181029.mxd



LEGEND:

ARCTIC CHAR HABITAT USE

Encroachments and Culvert Installations
- No
- Yes

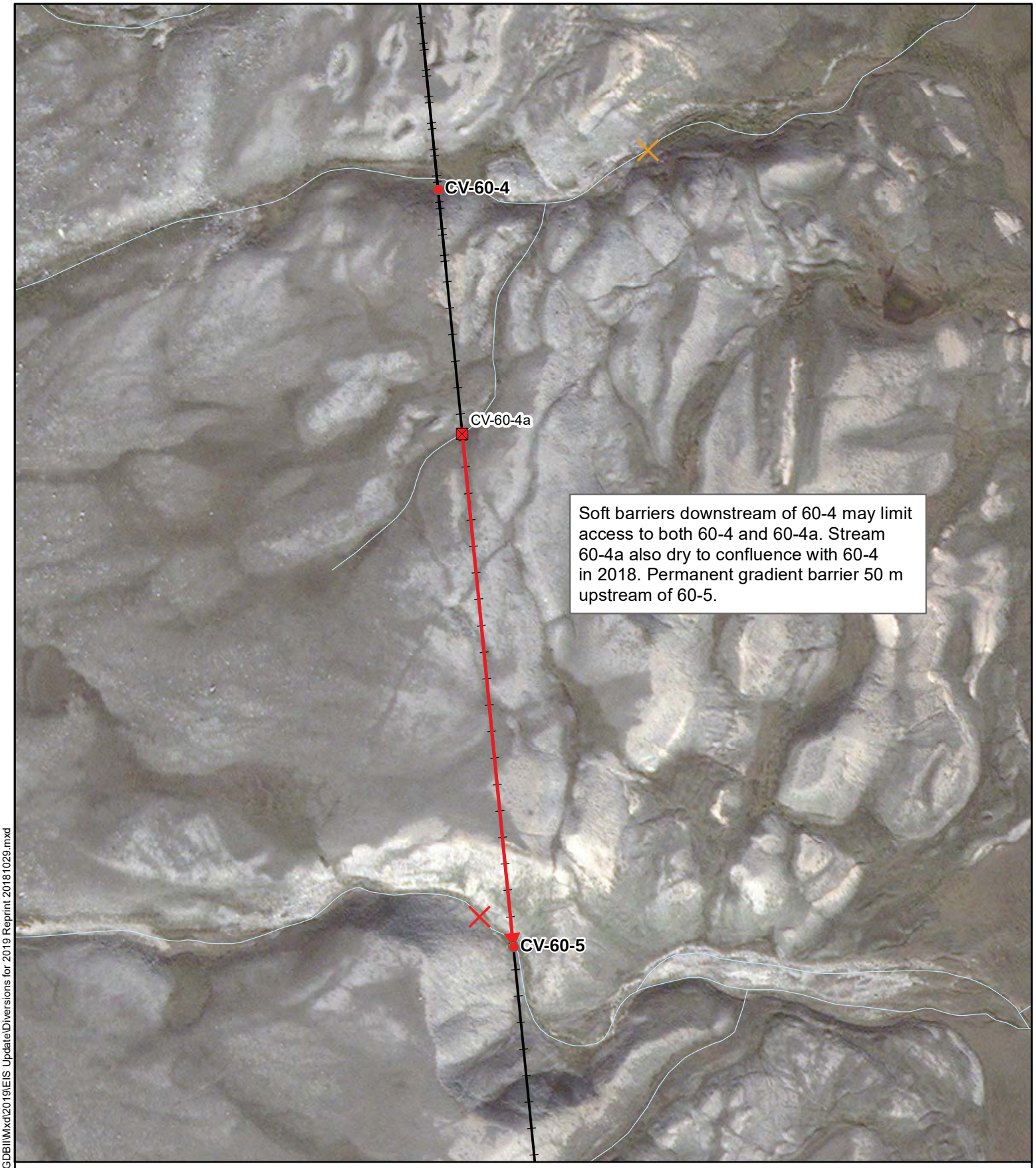
Bridges
- No
- Yes

Cuts
- No
- Yes

- PERMANENT BARRIER
- SOFT / SEASONAL BARRIER
- DIVERSION DIRECTION

SCALE: 1:1,500

Document Path: J:\MYP\MARYRIV_GDB\IIMxd\2019\EIS Update\Diversions for 2019 Reprint 20181029.mxd



LEGEND:

ARCTIC CHAR HABITAT USE

Encroachments and Culvert Installations
- No
- Yes

Bridges
- No
- Yes

Cuts
- No
- Yes

- PERMANENT BARRIER
- SOFT / SEASONAL BARRIER
- DIVERSION DIRECTION

SCALE: 1:2,000

Document Path: J:\MYP\MARYRIV_GDB\IIMxd\2019\EIS Update\Diversions for 2019 Reprint 20181029.mxd



LEGEND:

ARCTIC CHAR HABITAT USE

Encroachments and Culvert Installations
- No
- Yes

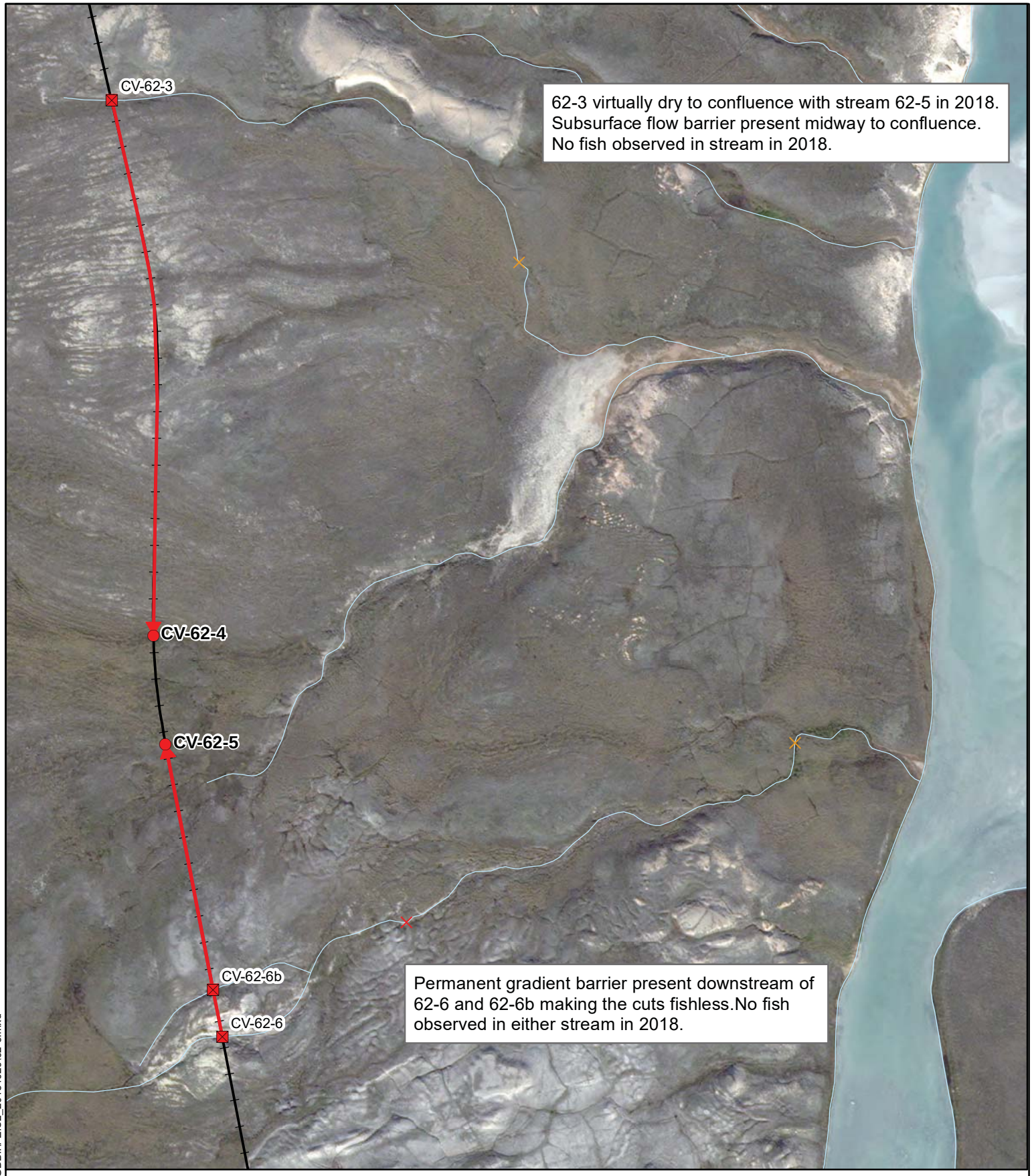
Bridges
- No
- Yes

Cuts
- No
- Yes

- PERMANENT BARRIER
- SOFT / SEASONAL BARRIER
- DIVERSION DIRECTION

SCALE: 1:2,000

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LEGEND:

ARCTIC CHAR HABITAT USE

Encroachments and Culvert Installations
- No
- Yes

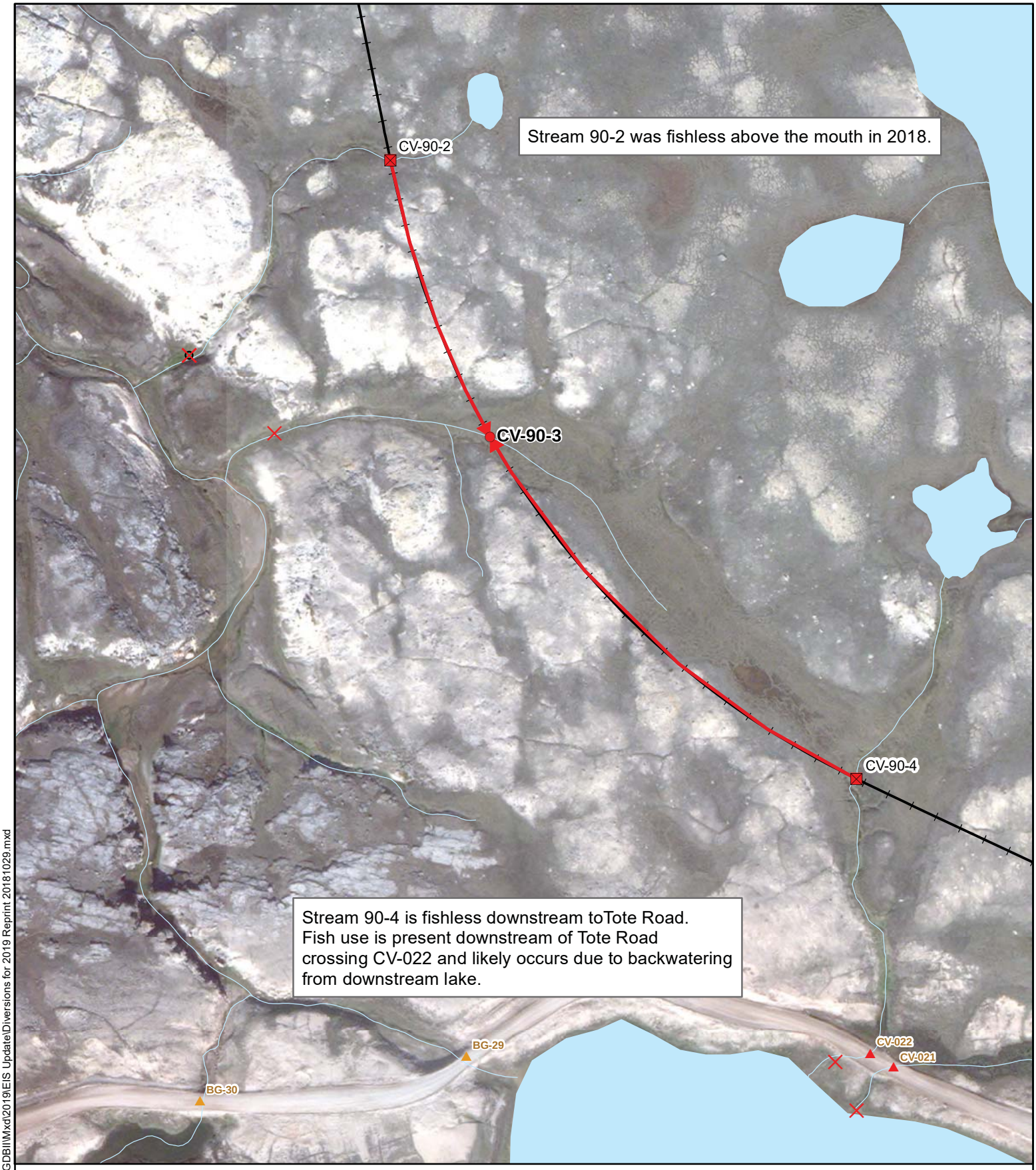
Bridges
- No
- Yes

Cuts
- No
- Yes

- PERMANENT BARRIER
- SOFT / SEASONAL BARRIER
- DIVERSION DIRECTION

SCALE: 1:3,000

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LEGEND:

ARCTIC CHAR HABITAT USE

Encroachments and Culvert Installations
- No
- Yes

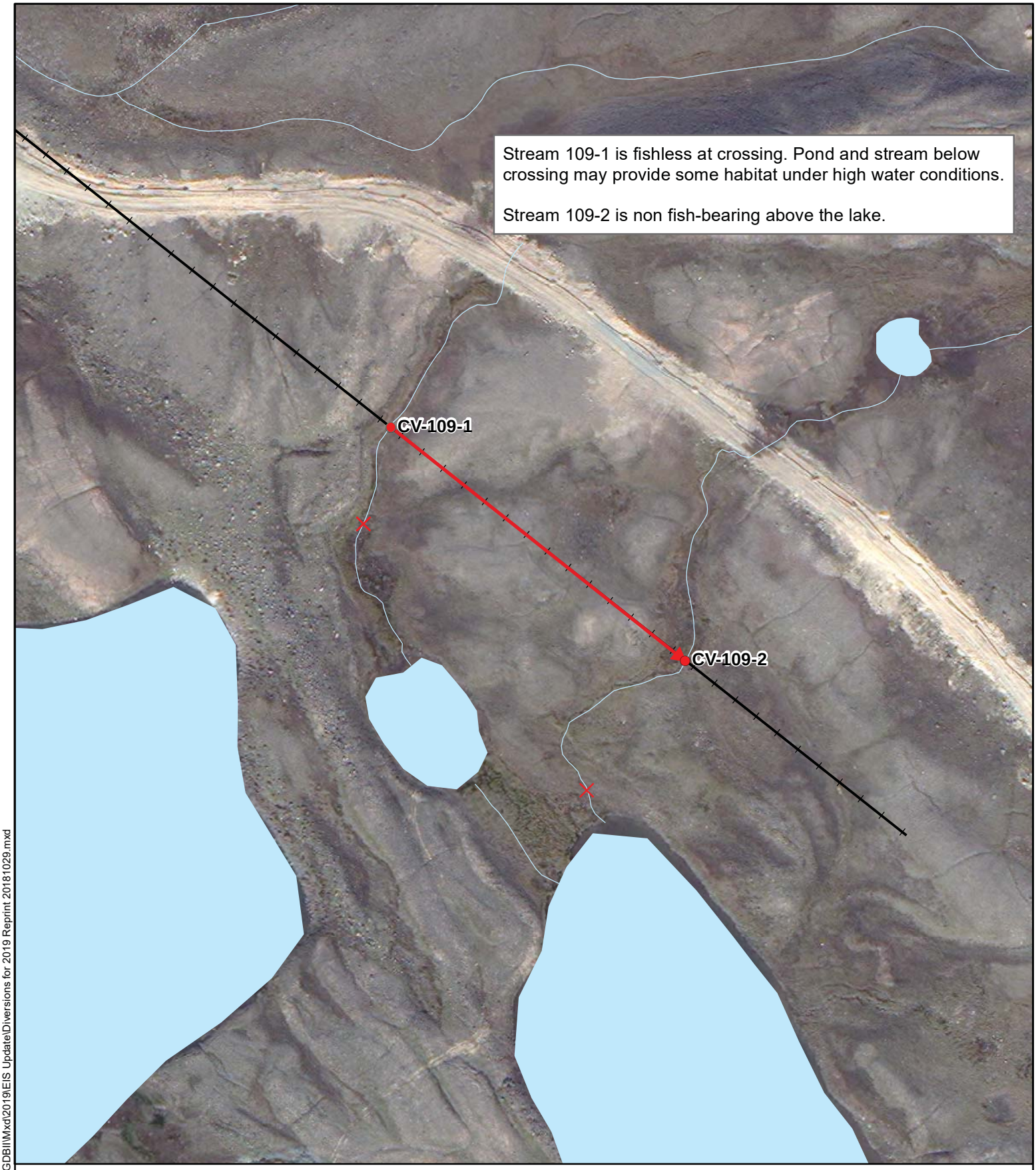
Bridges
- No
- Yes

Cuts
- No
- Yes

- PERMANENT BARRIER
- SOFT / SEASONAL BARRIER
- DIVERSION DIRECTION

SCALE: 1:3,000

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LEGEND:

ARCTIC CHAR HABITAT USE

Encroachments and Culvert Installations
- No
- Yes

Bridges
- No
- Yes

Cuts
- No
- Yes

- PERMANENT BARRIER
- SOFT / SEASONAL BARRIER
- DIVERSION DIRECTION

SCALE: 1:2,000

Document Path: J:\MYP\MARYRIV_GDB\IIMxd\2019\EIS Update\Diversions for 2019 Reprint 20181029.mxd

APPENDIX 4. DETAILED HABITAT ASSESSMENTS AND SUMMARY OF RESULTS FOR RAILWAY AND TOTE ROAD REALIGNMENT STREAM CROSSINGS

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-0-1 & CV-0-2 **Dates Surveyed:** 29 June & 23 August, 2018 **UTM Coordinates:** 17 W 504289 7975593 & 17 W 504234 7975572

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 5-10° **Flow Regime:** Permanent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

Both sites cross the same stream, which typically has low flows throughout the open-water period (based on observations from baseline studies at Milne Inlet). The two sites are also upstream of a previously identified permanent vertical barrier that is impassable under all flows with no access to overwintering habitat. The sites are never fish bearing.

Photographs



A **B** **C**

Figure 1. Aerial views of CV-0-1 and CV-0-2 in late June near crossings (A) and showing nearby infrastructure (B) and in late August (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-0-3 **Dates Surveyed:** 29 June & 23 August, 2018 **UTM Coordinates:** 17 W 503796 7975280

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** N/M **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

Crossing CV-0-3 was dry or nearly so in 2018, which is typical based on observations from Milne Inlet baseline and annual Tote Road studies of the area. The combination of low flows and vertical barriers downstream prevent all fish movements upstream from Phillips Creek.

Photographs



A **B**

Figure 1. Aerial views of CV-0-3 during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-1-1 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 503801 7975052

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/M **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry spot surrounded by Milne Inlet Port Site infrastructure and equipment during the 2018 survey. There are multiple permanent barriers to fish movement between the site and Phillips Creek downstream. There is never aquatic habitat.

Photographs



A



B

Figure 1. Summer ground (A) and fall aerial (B) views of CV-1-1.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-1-2 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 503830 7974912

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** N/M **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry creek bed during the 2018 survey. Based on previous surveys of Milne Inlet and Tote Road waterbodies, there are multiple permanent barriers to fish movement between the site and Phillips Creek downstream that are impassable under all flows. There is never aquatic habitat at this crossing.

Photographs



A



B

Figure 1. Summer ground (A) and fall aerial (B) views of CV-1-2.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-1-3 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 503820 7974824

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** > 10° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing is the outflow of a small, shallow, fishless pond. The stream had very low flows in 2018 with a steep downstream gradient. There are multiple permanent barriers to fish movement between the site and Phillips Creek downstream that are impassable under all flows. There is never aquatic habitat at this crossing.

Photographs



A B C

Figure 1. Views of CV-1-3 looking downstream towards a barrier (A) and across the stream (B) during summer, and a fall aerial (C) view of the upstream pond (arrow is the outlet crossing area).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-1-4 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 503877 7974420

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** > 10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

There was no water at this low point in 2018. There are multiple permanent vertical barriers to fish movement between the site and Phillips Creek downstream that are impassable under all flows. There is never aquatic habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-1-4 during summer (A) and aerially during fall (B) showing the surrounding terrain.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-1-5 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 503938 7974333

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** > 10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was a nearly dry low point in 2018. There is no connectivity to overwintering habitat and never aquatic habitat at this crossing.

Photographs



A B C

Figure 1. Views of CV-1-5 during summer downstream (A),and at (B) the crossing (A) and aerially during fall (C) showing the surrounding terrain (arrow is the crossing).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-1-6 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 504292 7974064

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** > 10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was nearly dry in 2018. In addition, there are permanent vertical barriers to fish movement between the site and Phillips Creek downstream that are impassable under all flows. There is never aquatic habitat at this crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-1-6 during summer, looking upstream (A) downstream (B) and across (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-1-6 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 504292 7974064

Photographs



A

Figure 2. Aerial view of CV-1-6 during fall (arrow is the crossing area).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING**
			Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-1-7 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 504662 7973667

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** > 10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was nearly dry in 2018. In addition, there are permanent vertical barriers to fish movement between the site and Phillips Creek downstream that are impassable under all flows. There is never aquatic habitat at this crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-1-7 during summer, looking upstream (A) and downstream (B) from the crossing and a fall aerial view (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-1-8 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 504895 7973426

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** > 15° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This stream was shallow, but maintained flows during the 2018 open-water period. However, there are several permanent vertical barriers to fish movement between the site and Phillips Creek downstream that are impassable under all flows. There is never aquatic habitat at this crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-1-8 during summer, looking upstream (A) downstream (B) and across (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-1-8 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 504895 7973426

Photographs



A

Figure 2. Aerial views of CV-1-8 and adjacent CV-1-9 during fall.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING**
			Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-1-9 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 504924 7973381

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** > 15° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This stream was shallow, but maintained flows during the 2018 open-water period. However, there are several permanent vertical barriers to fish movement between the site and Phillips Creek downstream that are impassable under all flows. There is never aquatic habitat at this crossing.

Photographs



A



B



C

Figure 1. Views of CV-1-9 during summer, looking upstream (A) downstream (B) and across (C).

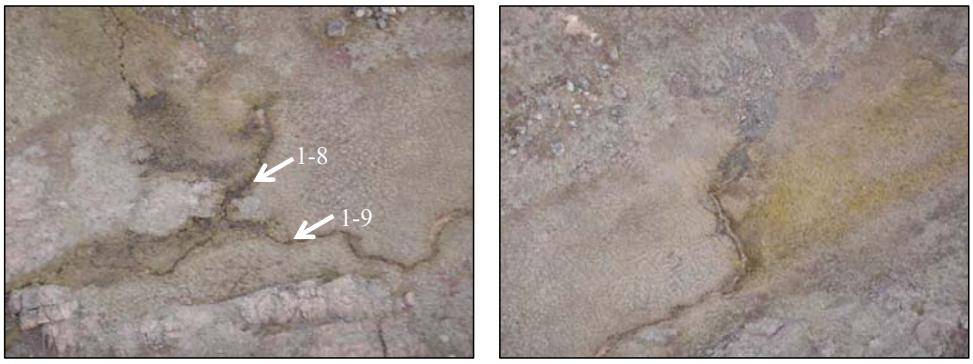
Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-1-9 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 504924 7973381

Photographs



A B

Figure 2. Aerial views of CV-1-9 and adjacent CV-1-8 (A) and the upstream end of CV-1-9 (B) during fall.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING**
			Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-2-1 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 505154 7973121

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** > 15° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This stream was shallow, but maintained flows during the 2018 open-water period. However, there are several permanent vertical barriers to fish movement at the crossing and between the site and Phillips Creek downstream that are impassable under all flows. There is never aquatic habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-2-1 during summer (A) and aerially, with nearby CV-2-2, during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-2-2 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 505217 7973067

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** > 15° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This stream was dry during the 2018 open-water period. In addition, there are several permanent vertical barriers to fish movement between the site and Phillips Creek downstream that are impassable under all flows. There is never aquatic habitat at this crossing.

Photographs



A **B**

Figure 1. Views of CV-2-2 during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-3-1 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 505388 7972906

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** > 10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

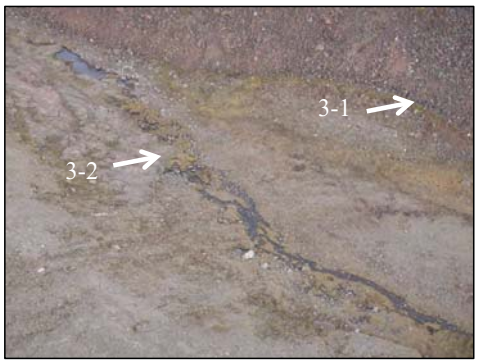
Comments & Summary

This crossing is a low point on a dry hillside. There is never aquatic habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-3-1 during summer (A) and aerially, with nearby CV-3-2, during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-3-2 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 505396 7972893

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** > 10° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was shallow with low flows during 2018. There are both soft (subsurface flow, high gradient) and permanent (vertical drops) barriers to fish movement at and downstream of the crossing. There is never aquatic habitat at this crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-3-2 during summer downstream from (A) and at (B) the crossing, and aerially, with nearby CV-3-1, during fall (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-4-1 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 505666 7972585

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** > 10° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was shallow with low flows during 2018. There are both soft (subsurface flow, high gradient) and permanent (vertical drops) barriers to fish movement at and downstream of the crossing. There is never aquatic habitat at this crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-4-1 during summer, looking upstream (A) downstream (B) and across (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-4-1 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 505666 7972585

Photographs



A

Figure 2. Aerial view of CV-4-1 during fall.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING**
			Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-4-2 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 505774 7972512

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was nearly dry in 2018 and on a steep rocky hillside. There are permanent (vertical drop) barriers to fish movement at and downstream of the crossing. There is never aquatic habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-4-2 during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-4-3 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 505836 7972435

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was nearly dry in 2018 and on a steep rocky hillside. There are permanent (vertical drop) barriers to fish movement at and downstream of the crossing. There is never aquatic habitat at this crossing.

Photographs





A **B**

Figure 1. Views of CV-4-3 during summer (A) and aerially, with nearby CV-4-4, during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-4-4 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 505862 7972397

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was dry in 2018 and on a steep rocky hillside. There are permanent (vertical drop) barriers to fish movement at and downstream of the crossing. There is never aquatic habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-4-4 during summer (A) and aerially, with nearby CV-4-3, during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-4-5 **Dates Surveyed:** 29 June & 23 August, 2018 **UTM Coordinates:** 17 W 506070 7972201

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was nearly dry in 2018 and on a steep rocky hillside. There are permanent (vertical drop) barriers to fish movement downstream of the crossing. There is never aquatic habitat at this crossing.

Photographs



A



B

Figure 1. Aerial views of CV-4-5 during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-5-1 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 506158 7972031

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was nearly dry in 2018 and on a steep rocky hillside. There are permanent (vertical drop) barriers to fish movement downstream of the crossing. There is never aquatic habitat at this crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-5-1 during summer looking upstream (A) and downstream (B) from the crossing, and an aerial view during fall (C) with nearby CV-5-2.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-5-2 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 506172 7971999

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

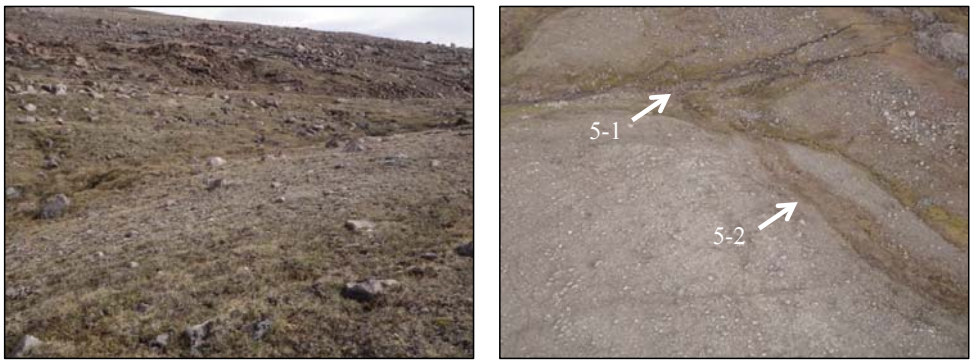
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing is a dry spot on a hillside. There is never aquatic habitat at this crossing.

Photographs



A **B**

Figure 1. Views of CV-5-2 during summer (A) and an aerial view during fall (B) with nearby CV-5-1.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-5-3 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 506297 7971792

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** > 15° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This stream on a steep hillside had low flows in 2018. In addition there are several permanent vertical barriers to fish movement at the crossing and between the site and Phillips Creek downstream that are impassable under all flows. There is never aquatic habitat at this crossing.

Photographs



A



B



C

Figure 1. Views of CV-5-3 during summer, looking upstream (A) downstream (B) and across (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-5-3 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 506297 7971792

Photographs



A

Figure 2. Aerial view of CV-5-3 during fall.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING**
			Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-5-4 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 506540 7971622

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This steep stream was nearly dry in 2018. In addition there are several permanent vertical barriers to fish movement at the crossing and between the site and Phillips Creek downstream that are impassable under all flows. There is never aquatic habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-5-4 during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-5-5 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 506643 7971540

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** > 10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This stream had flows in summer, but was largely dry in fall 2018. There are permanent vertical barriers to fish movement upstream of the crossing and between the Tote Road and Phillips Creek downstream that are impassable under all flows. There is never aquatic habitat at this crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-5-5 during summer looking upstream (A) downstream (B) and across (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-5-5 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 506643 7971540

Photographs



A

Figure 2. Aerial view of CV-5-5 and nearby 5-6 during fall.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING**
			Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-5-6 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 506661 7971526

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** > 10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This stream was nearly dry in 2018. In addition, there are permanent vertical barriers to fish movement upstream of the crossing and between the Tote Road and Phillips Creek downstream that are impassable under all flows. There is never aquatic habitat at this crossing.

Photographs



A **B**

Figure 1. Views of CV-5-6 during summer (A) and fall with nearby CV-5-5 (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-5-7 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 506781 7971420

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This site was a dry hillside in 2018. There is never aquatic habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-5-7 during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-6-1 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 506927 7971257

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This site was a dry hillside in 2018. There is never aquatic habitat at this crossing.

Photographs



A **B**

Figure 1. Views of CV-6-1 during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-6-2 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 507170 7971061

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This site was a nearly dry low point on a hillside in 2018. There is never aquatic habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-6-2 during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-6-3 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 507417 7970910

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** > 15° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This is a steep, shallow stream. In addition, there are permanent vertical barriers to fish movement between the site and Phillips Creek downstream that are impassable under all flows. There is never aquatic habitat at this crossing.

Photographs



A **B**

Figure 1. Views of CV-6-3 during summer, looking upstream (A) downstream (B) and across (C).

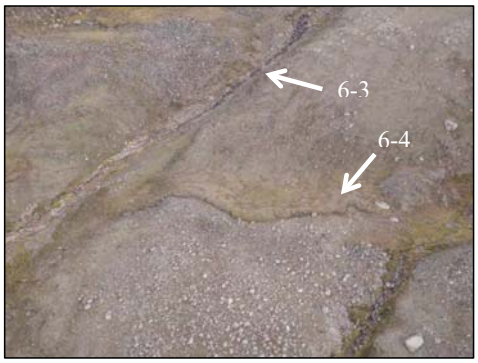
Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-6-3 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 507417 7970910

Photographs



A

Figure 2. Aerial view of CV-6-3 and nearby 6-4 during fall.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-6-4 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 507476 7970841

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** > 15° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This is a steep, shallow stream. In addition, there are permanent vertical barriers to fish movement between the site and Phillips Creek downstream that are impassable under all flows. There is never aquatic habitat at this crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-6-4 during summer, looking upstream (A) downstream (B) and across (C).

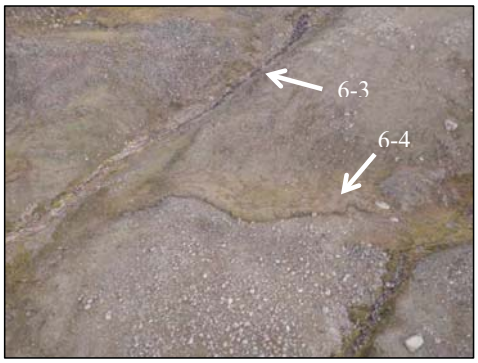
Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-6-4 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 507476 7970841

Photographs



A

Figure 2. Aerial view of CV-6-4 and nearby 6-3 during fall.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-7-1 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 507732 7970526

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

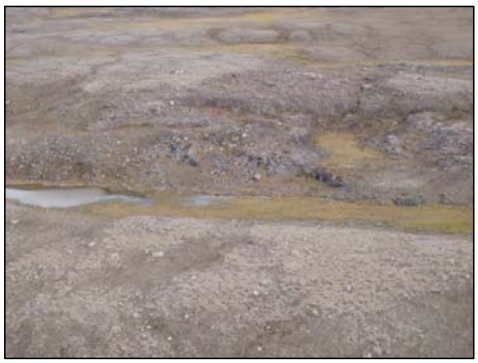
Comments & Summary

This site is a steep, dry low point on a hillside near a flat marshy area. There is never aquatic habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-7-1 during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-7-2 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 507884 7970336

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This site is a steep, dry low point on a hillside near a flat marshy area. There is never aquatic habitat at this crossing.

Photographs



A **B**

Figure 1. Views of CV-7-2 during summer (A) and aerially with nearby 7-3 during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-7-3 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 507953 7970254

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This site is a steep, dry low point on a hillside near a flat marshy area. There is never aquatic habitat at this crossing.

Photographs



A **B**

Figure 1. Views of CV-7-3 during summer (A) and aerially with nearby 7-2 during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-7-4 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 508038 7970146

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

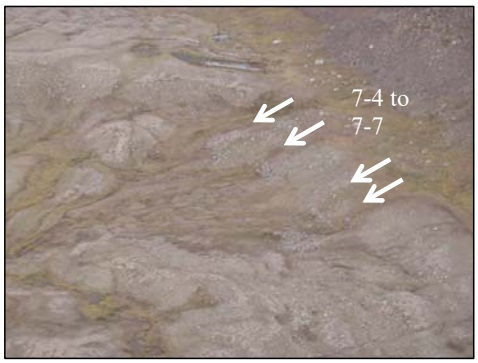
Comments & Summary

This site is a steep, dry low point on a hillside near a flat marshy area. There is never aquatic habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-7-4 during summer (A) and aerially with several nearby crossings during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-7-5 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 508060 7970116

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

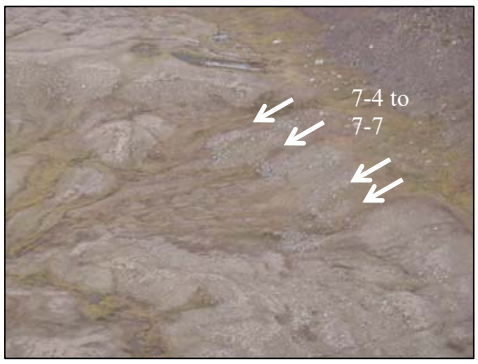
Comments & Summary

This site is a steep, dry low point on a hillside near a flat marshy area. There is never aquatic habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-7-5 during summer (A) and aerially with several nearby crossings during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-7-6 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 508094 7970073

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

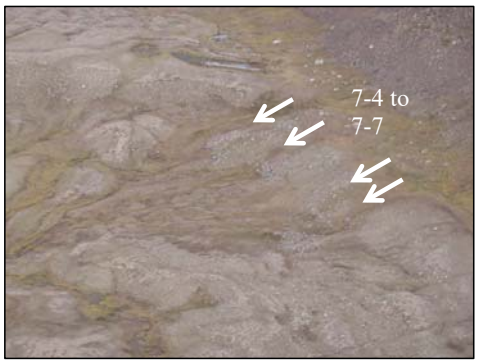
Comments & Summary

This site is a steep, dry low point on a hillside near a flat marshy area. There is never aquatic habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-7-6 during summer (A) and aerially with several nearby crossings during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-7-7 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 508097 7970069

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

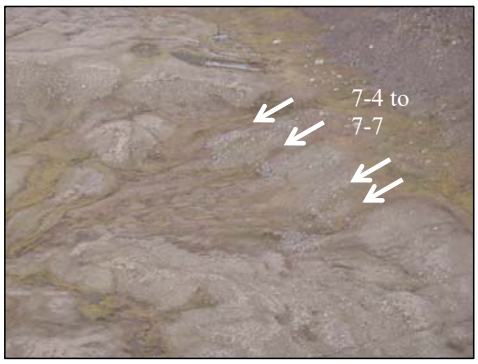
Comments & Summary

This site is a steep, dry low point on a hillside near a flat marshy area. There is never aquatic habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-7-7 during summer (A) and aerially with several nearby crossings during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-8-0 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 508293 7969747

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** > 15° **Flow Regime:** Permanent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This small stream maintains flows throughout the open-water period, but there is a very steep gradient and vertical barriers between the rail crossing and Phillips Creek downstream. Fish have never been captured or observed in this stream during annual Tote Road monitoring and there is no fish habitat use in the vicinity of the rail crossing.

Photographs



A **B** **C**

Figure 1. Summer views of CV-8-0 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

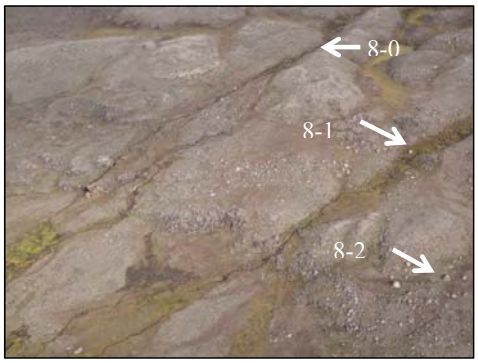
Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-8-0 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 508293 7969747

Photographs



A

Figure 2. Aerial views of CV-8-0 and nearby crossings CV-8-1 and 8-2 during fall (A).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING**
			Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-8-1 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 508311 7969712

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** > 15° **Flow Regime:** Permanent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This small stream maintains flows throughout the open-water period, but there is a very steep gradient and vertical barriers between the rail crossing and Phillips Creek downstream. Fish have never been captured or observed in this stream during annual Tote Road monitoring and there is no fish habitat use in the vicinity of the rail crossing.

Photographs



A **B** **C**

Figure 1. Summer views of CV-8-1 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

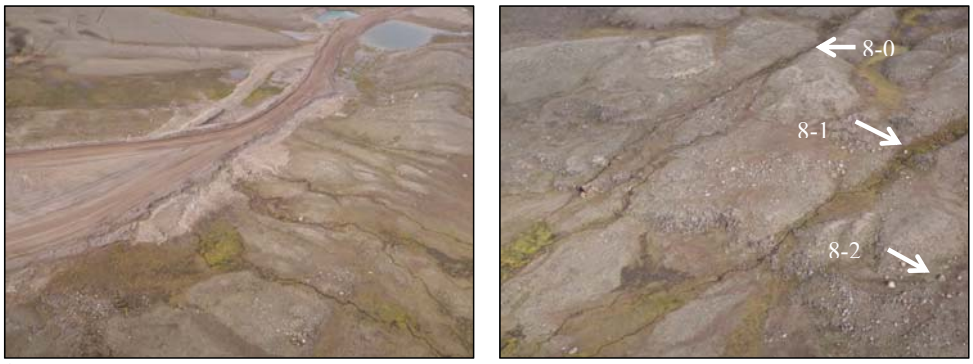
Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-8-1 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 508311 7969712

Photographs



A B

Figure 2. Aerial views of CV-8-1 and nearby crossings CV-8-0 and 8-2 during fall; (A) and (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-8-2 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 508325 7969683

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** > 15° **Flow Regime:** Permanent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

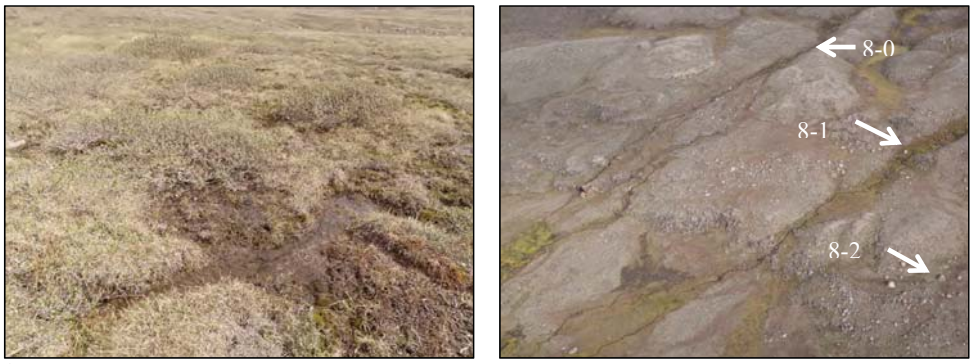
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This site was moist throughout the open-water period in 2018, but there is a very steep gradient and permanent vertical barriers between the rail crossing and Phillips Creek downstream. Fish have never been captured or observed in this stream during annual Tote Road monitoring and there is no fish habitat use in the vicinity of the rail crossing.

Photographs



A **B**

Figure 1. Views of CV-8-2 at the rail crossing during summer (A) and, aerially with nearby 8-0 and 8-1, during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-8-3 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 508351 7969601

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** > 15° **Flow Regime:** Permanent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

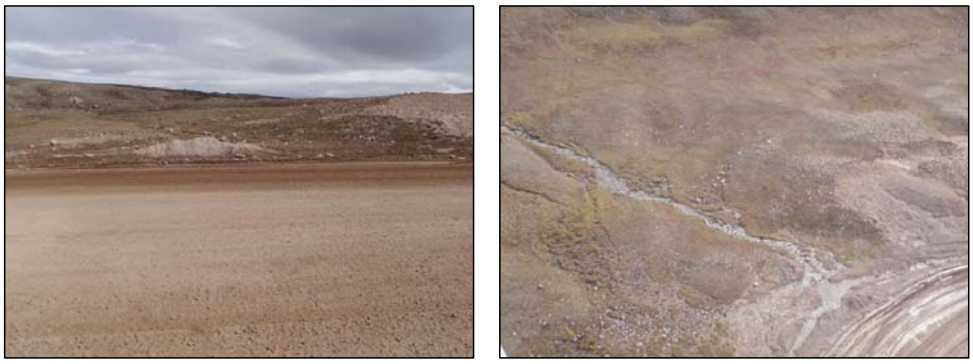
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This shallow rail crossing is immediately upstream of the Tote Road. There are permanent vertical barriers between the rail crossing and Phillips Creek downstream. Fish have never been captured or observed in this stream during annual Tote Road monitoring and there is no fish habitat use in the vicinity of the rail crossing.

Photographs



A **B**

Figure 1. Views of CV-8-3 at the rail crossing during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-8-4 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 508412 7969338

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** > 10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This site is a roadside ditch. There is never aquatic habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-8-4 at the rail crossing during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-9-1 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 508805 7968873

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** > 10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This stream had low flows during both surveys. It flows into a fishless pond downstream of the Tote Road and then into Phillips Creek. In addition to several soft barriers (subsurface flow), there is a permanent vertical barrier between the pond and Phillips Creek preventing fish access to the rail site. There is never aquatic habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-9-1 at the rail crossing during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-10-1 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 509365 7968264

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** > 10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This is a dry, low point on a hillside. There is never aquatic habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-10-1 at the rail crossing during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-10-2 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 509637 7968011

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/M **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This site is a dry, low point that may collect some snowmelt in early spring, but never provides aquatic habitat.

Photographs



A



B

Figure 1. Views of the CV-10-2 low point in late June (A) and an aerial image showing surrounding terrain in late August (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-10-3 **Dates Surveyed:** 29 June & 23 August, 2018 **UTM Coordinates:** 17 W 509653 7967999

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This is a dry, low point on a hillside. There is never aquatic habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-10-3 at the rail crossing during summer (A) and aerially during fall (B). CV-10-2 and 10-3 are both on the same hillside.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-10-4 **Dates Surveyed:** 29 June & 23 August, 2018 **UTM Coordinates:** 17 W 509829 7967867

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

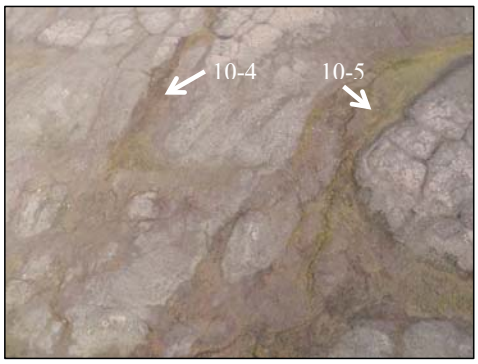
Comments & Summary

This is a dry, low point on a hillside. There is never aquatic habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-10-4 at the rail crossing during summer (A) and aerially, with 10-5, during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-10-5 **Dates Surveyed:** 29 June & 23 August, 2018 **UTM Coordinates:** 17 W 509872 7967824

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

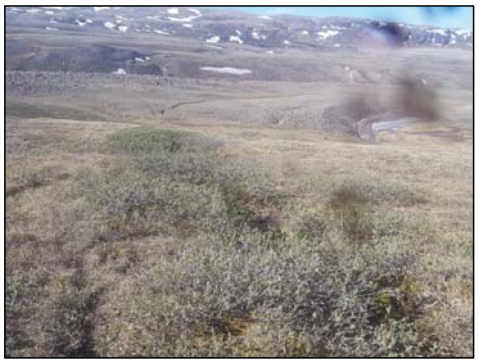
Comments & Summary

This site on a steep hillside was nearly dry in 2018. In addition to the soft barrier of the steep gradient, there is a large vertical drop barrier downstream between the crossing and Phillips Creek. There is never aquatic habitat at this crossing.

Photographs



A



B



C

Figure 1. Views of CV-10-5 at the rail crossing during summer, looking upstream (A), downstream (B), and across (C).

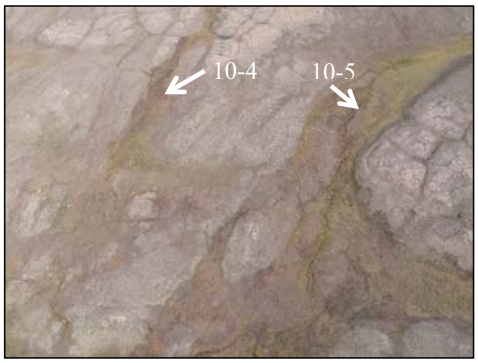
Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-10-5 **Dates Surveyed:** 29 June & 23 August, 2018 **UTM Coordinates:** 17 W 509872 7967824

Photographs



A

Figure 2. Aerial view of CV-10-5, with nearby CV-10-4, during fall.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-11-1 **Dates Surveyed:** 29 June & 23 August, 2018 **UTM Coordinates:** 17 W 509931 7967723

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a nearly dry low point on a steep hillside. In addition to the soft barrier of the steep gradient, there is a large vertical drop barrier downstream between the crossing and Phillips Creek. There is never aquatic habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-11-1 at the rail crossing during summer (A) and aerially during the fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-11-2 **Dates Surveyed:** 29 June & 23 August, 2018 **UTM Coordinates:** 17 W 510076 7967537

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry, low point on a steep hillside. In addition, there is a large vertical barrier downstream between the crossing and Phillips Creek. There is never aquatic habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-11-2 at the rail crossing during summer (A) and aerially, with nearby 11-3, during the fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-11-3 **Dates Surveyed:** 29 June & 23 August, 2018 **UTM Coordinates:** 17 W 510214 7967455

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a nearly dry stream on a steep hillside. In addition, there is a large vertical barrier downstream between the crossing and Phillips Creek. There is never aquatic habitat at this crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-11-3 at the rail crossing during summer, looking upstream (A) downstream (B) and across (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-11-3 **Dates Surveyed:** 29 June & 23 August, 2018 **UTM Coordinates:** 17 W 510214 7967455

Photographs



A

Figure 2. Aerial view of CV-11-3 and nearby 11-2 during fall.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-11-4 **Dates Surveyed:** 29 June & 23 August, 2018 **UTM Coordinates:** 17 W 510472 7967402

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry, low point on a steep hillside. In addition, there is a large vertical barrier downstream between the crossing and Phillips Creek. There is never aquatic habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-11-4 at the rail crossing during summer (A) and aerially during fall (B). CV-11-5 is in the same dry hillside area.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-11-5 **Dates Surveyed:** 29 June & 23 August, 2018 **UTM Coordinates:** 17 W 510589 7967385

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry, low point on a steep hillside. In addition, there is a large vertical barrier downstream between the crossing and Phillips Creek. There is never aquatic habitat at this crossing.

Photographs



A

Figure 1. Aerial view of CV-11-5 at the rail crossing during fall. CV-11-4 is in the same dry hillside area.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-12-1 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 510933 7967256

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry, low point on a steep hillside. In addition, there is a large vertical barrier downstream between the crossing and Phillips Creek. There is never aquatic habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-12-1 at the rail crossing during summer (A) and aerially, with 12-2, during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-12-2 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 511019 7967241

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry, low point on a steep hillside. In addition, there is a large vertical barrier downstream between the crossing and Phillips Creek. There is never aquatic habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-12-2 at the rail crossing during summer (A) and aerially, with 12-1, during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-12-3 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 511127 7967223

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry, pile of rocks on a steep hillside downstream of the Tote Road in summer and barely wetted during fall 2018. The soft gradient barrier and consistent lack of sufficient water (as noted during previous Tote Road surveys) prevent fish access to the crossing. There is never aquatic habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-12-3 at the rail crossing during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-12-4 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 511355 7967185

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This site is a dry, low point downstream of the Tote Road. There is never aquatic habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-12-4 at the rail crossing during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-12-4b | **Dates Surveyed:** 28 June & 23 August, 2018 | **UTM Coordinates:** 17 W 511455 7967168

General Physical Characteristics

Channel Confinement: UC | **Channel Gradient (range):** 5-10° | **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished | **Effort (min):** N/A | **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This site was nearly dry in 2018 and is largely a roadside ditch. None of the upstream ponds are fish-bearing and there are multiple barrier types (subsurface flow, lack of a channel) downstream to Phillips Creek that prevent fish access. There is never aquatic habitat at this crossing.

Photographs



A **B**

Figure 1. Views of CV-12-4b at the rail crossing during summer (A) and aerially, with nearby 12-5, during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-12-5 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 511552 7967152

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 2-5° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This site is a shallow fishless pond that formed on the upstream side of the Tote Road. None of the adjacent ponds are fish-bearing and downstream of the road, flows disperse across the tundra with no channel, insufficient depths for fish use and lack of connectivity to Phillips Creek. There is never aquatic habitat at this crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-12-5 at the rail crossing during summer (A) and (B) and aerially, with nearby 12-4b, during fall (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-13-1 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 511798 7967111

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 2-5° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

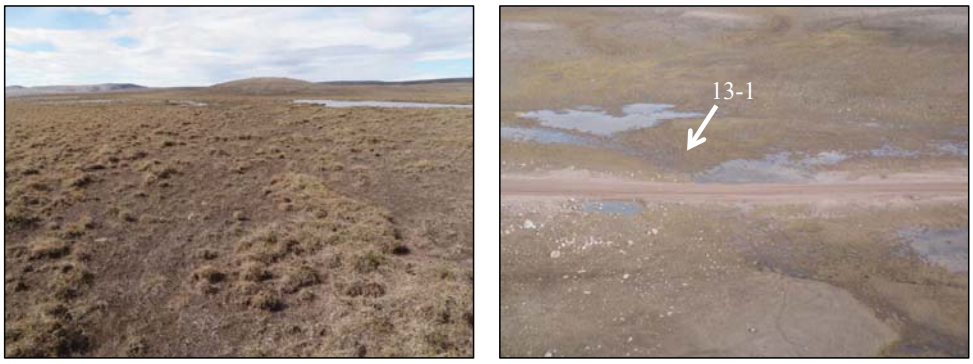
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This site was a dry low point during the summer survey and nearly so during the fall survey in 2018. Nearby ponds are fishless and there is no downstream connectivity to Phillips Creek due to several barriers, including lack of surface flow and water dispersed across the tundra. There is never aquatic habitat at this crossing.

Photographs



A **B**

Figure 1. Views of CV-13-1 at the rail crossing during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-13-2 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 512120 7966981

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 2-5° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

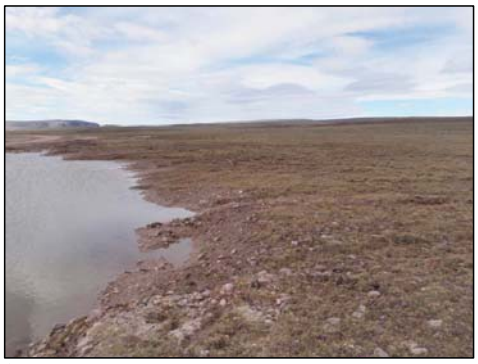
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This site is a low point where water has ponded alongside the Tote Road. It is shallow, fishless, and not connected to any fish-bearing habitat. There is never aquatic habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-13-2 at the rail crossing during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-13-3 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 512375 7966823

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/M **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This site was a dry low point in 2018. There is never aquatic habitat at this crossing.

Photographs



A

Figure 1. View of CV-13-3 at the rail crossing during summer (A).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-13-4 **Dates Surveyed:** 30 June & 24 August, 2018 **UTM Coordinates:** 17 W 512415 7966799

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 2-3° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	40.0	- / 34.6	- / 0.06	- / 0.08	- / 0.06	- / 0.08	- / 0.21	- / 0.18	- / 0.17	- / 0.25
80D	38.0	- / 28.8	- / 0.02	- / 0.04	- / 0.04	- / 0.05	- / 0.23	- / 0.24	- / 0.13	- / 0.25
60D	32.5	- / 23.0	- / 0.10	- / 0.10	- / 0.10	- / 0.10	- / 0.52	- / 0.18	- / 0.14	- / 0.52
40D	20.0	- / 8.8	- / 0.08	- / 0.16	- / 0.08	- / 0.18	- / 0.32	- / 0.38	- / 0.16	- / 0.40
20D	35.1	- / 11.4	- / -	- / 0.40	- /-	- / 0.40	- / -	- / 0.14	- / -	- / 0.14
0	13.2	5.7 / 4.9	0.17 / 0.26	0.28 / -	0.21 / 0.30	0.40 / 0.45	0.00 / 0.25	0.12 / -	0.09 / 0.07	0.12 / 0.25
20U	-	- / 4.4	- / 0.20	- / -	- / 0.14	- / 0.20	- / 0.60	- / -	- / 0.41	- / 0.60
40U	-	- / 6.9	- / 0.22	- / 0.08	- / 0.16	- / 0.25	- / 0.58	- / 0.49	- / 0.47	- / 0.60
60U	11.2	4.9 / 7.3	0.14 / 0.24	0.23 / 0.24	0.14 / 0.14	0.25 / 0.28	0.10 / 0.39	0.17 / 0.33	0.16 / 0.12	0.17 / 0.40
80U	11.0	4.6 / 7.3	0.09 / 0.16	0.10 / 0.20	0.16 / 0.08	0.10 / 0.20	0.08 / 0.48	0.10 / 0.67	0.33 / 0.14	0.35 / 0.70
100U	20.7	3.6 / 5.0	0.13 / 0.10	0.18 / 0.12	0.10 / 0.16	0.20 / 0.20	0.48 / 0.77	0.60 / 0.21	0.51 / 0.73	0.60 / 0.80

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	80	20	-	-	-	-	-	-	80	20	-
80D	70	30	-	-	-	-	-	10	80	10	-
60D	70	30	-	-	-	-	70	20	-	10	-
40D	60	20	20	-	-	-	60	30	-	10	-
20D	30	20	50	-	-	-	60	20	20	-	-
0	25	45	25	5	-	-	-	18	75	7	-
20U	70	30	-	-	-	-	-	-	80	20	-
40U	80	15	5	-	-	-	-	20	70	10	-
60U	60	40	-	-	-	-	-	15	55	30	-
80U	75	25	-	-	-	-	-	15	55	30	-
100U	88	12	-	-	-	-	-	10	60	30	-

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-13-4 **Dates Surveyed:** 30 June & 24 August, 2018 **UTM Coordinates:** 17 W 512415 7966799

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	9.55	7	0.73	56 - 150
	Fall	5.35	5	0.93	60 - 171
NNST	Summer	9.55	0	0	N/A
	Fall	5.35	0	0	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	N
NNST	N	N	N	N

Comments & Summary

A short distance upstream of Tote Road crossing CV-129 with important juvenile Arctic Char habitat throughout the open water season, but particularly during summer. Water temperatures in survey streams during fall sampling averaged approximately 5°C and fish had already begun downstream movements towards overwintering habitat.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-13-4 **Dates Surveyed:** 30 June & 24 August, 2018 **UTM Coordinates:** 17 W 512415 7966799

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of CV-13-4 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-13-4 **Dates Surveyed:** 30 June & 24 August, 2018 **UTM Coordinates:** 17 W 512415 7966799

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 2. Summer (top) and fall (bottom) views of CV-13-4 at the 80 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-13-4 **Dates Surveyed:** 30 June & 24 August, 2018 **UTM Coordinates:** 17 W 512415 7966799

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 3. Summer (top) and fall (bottom) views of CV-13-4 at the 60 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-13-4 **Dates Surveyed:** 30 June & 24 August, 2018 **UTM Coordinates:** 17 W 512415 7966799

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 4. Summer (top) and fall (bottom) views of CV-13-4 at the 40 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-13-4 **Dates Surveyed:** 30 June & 24 August, 2018 **UTM Coordinates:** 17 W 512415 7966799

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 5. Summer (top) and fall (bottom) views of CV-13-4 at the 20 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-13-4 **Dates Surveyed:** 30 June & 24 August, 2018 **UTM Coordinates:** 17 W 512415 7966799

Photographs



A B C

Figure 6. Summer (top) and fall (bottom) views of CV-13-4 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-13-4 **Dates Surveyed:** 30 June & 24 August, 2018 **UTM Coordinates:** 17 W 512415 7966799

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 7. Summer (top) and fall (bottom) views of CV-13-4 at the 20 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-13-4 **Dates Surveyed:** 30 June & 24 August, 2018 **UTM Coordinates:** 17 W 512415 7966799

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A



B



C

Figure 8. Summer (top) and fall (bottom) views of CV-13-4 at the 40 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-13-4 **Dates Surveyed:** 30 June & 24 August, 2018 **UTM Coordinates:** 17 W 512415 7966799

Photographs



A **B** **C**

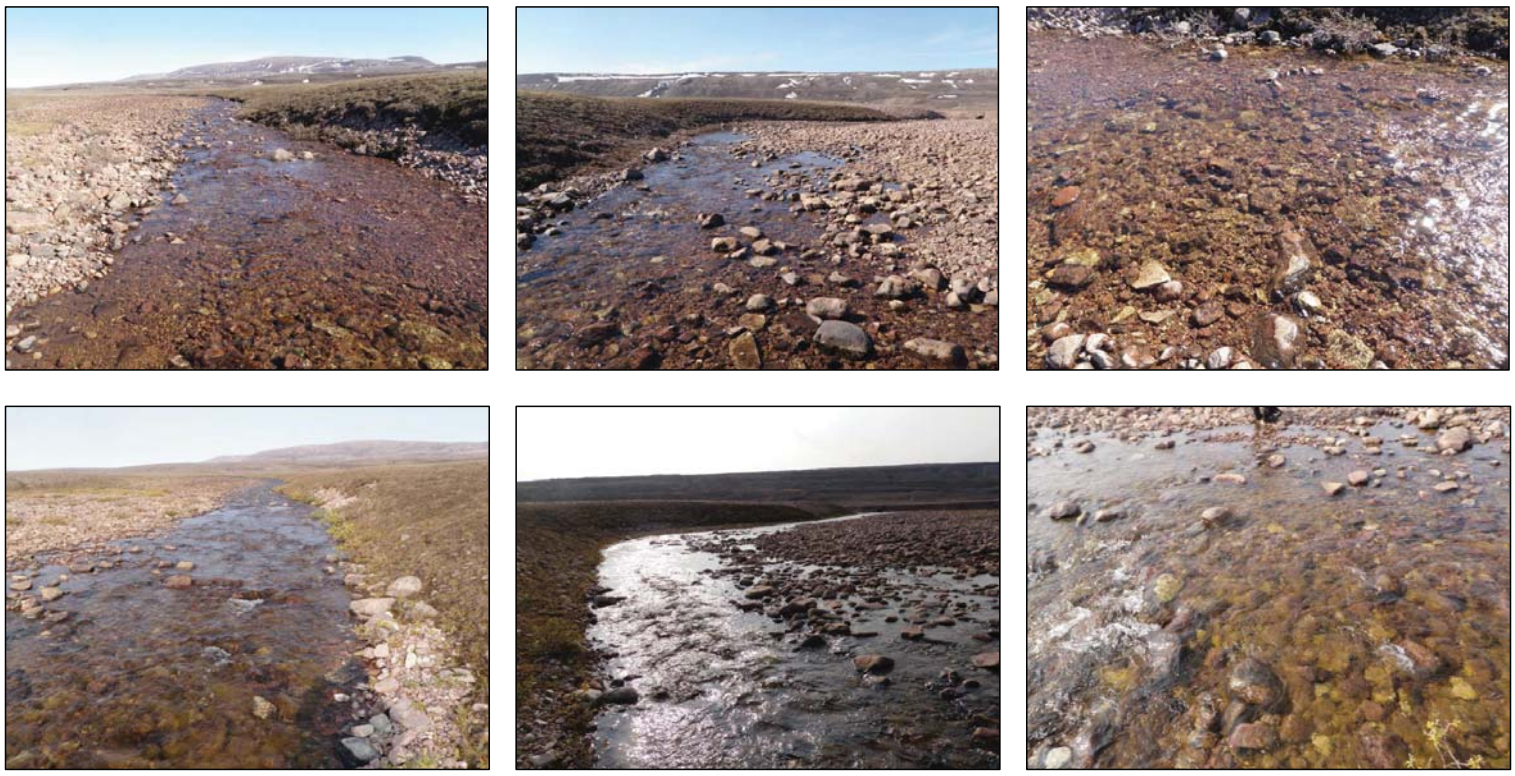
Figure 9. Summer (top) and fall (bottom) views of CV-13-4 at the 60 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-13-4 **Dates Surveyed:** 30 June & 24 August, 2018 **UTM Coordinates:** 17 W 512415 7966799

Photographs



A B C

Figure 10. Summer (top) and fall (bottom) views of CV-13-4 at the 80 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-13-4 **Dates Surveyed:** 30 June & 24 August, 2018 **UTM Coordinates:** 17 W 512415 7966799

Photographs



A B C

Figure 11. Summer (top) and fall (bottom) views of CV-13-4 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-13-5 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 512556 7966712

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 2-5° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This site was a dry low point in summer and slightly wetted marshy terrain during fall. There is no connectivity to overwintering habitat. There is never aquatic habitat at this crossing.

Photographs



A



B

Figure 1. View of CV-13-5 at the rail crossing during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-14-1 **Dates Surveyed:** 30 June & 23 August, 2018 **UTM Coordinates:** 17 W 513252 7966428

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1-5° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

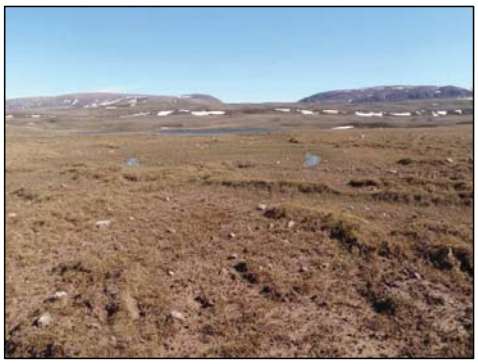
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This site was a nearly dry low point in summer and a wetter low point during fall. There is no connectivity to overwintering habitat. There is never aquatic habitat at this crossing.

Photographs



A



B

Figure 1. View of CV-14-1 at the rail crossing during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-14-2 **Dates Surveyed:** 30 June & 23 August, 2018 **UTM Coordinates:** 17 W 513436 7966375

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This site is a small shallow pond connected to a similar pond at CV-14-3, but with no other connections. There is no connectivity to overwintering habitat and never aquatic habitat at this crossing.

Photographs



A **B** **C**

Figure 1. View of CV-14-2 at the rail crossing during summer (A) and (B), and aerially, with nearby 14-3, during fall (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-14-3 **Dates Surveyed:** 30 June & 23 August, 2018 **UTM Coordinates:** 17 W 513532 7966333

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This site is a small shallow pond connected to a similar pond at CV-14-2, but with no other connections. There is no connectivity to overwintering habitat and never aquatic habitat at this crossing.

Photographs



A B C

Figure 1. View of CV-14-3 at the rail crossing during summer (A) and (B), and aerially, with nearby 14-2, during fall (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-15-1 **Dates Surveyed:** 30 June & 23 August, 2018 **UTM Coordinates:** 17 W 513624 7966294

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This site was a dry low point in 2018. There is never aquatic habitat at this crossing.

Photographs



A



B

Figure 1. View of CV-15-1 at the rail crossing during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-15-2 **Dates Surveyed:** 30 June & 24 August, 2018 **UTM Coordinates:** 17 W 513781 7966188

General Physical Characteristics

Channel Confinement: N/A **Channel Gradient (range):** N/A **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
0	N/A	N/A	N/A	N/A	N/A	0.70 / 0.75	N/A	N/A	N/A	0.00 / 0.00

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
Nearshore	-	80	20	-	-	-	80	-	20	-	-
Offshore	-	-	100	-	-	-	90	-	10	-	-

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - MARGINAL** **Ninespine Stickleback – IMPORTANT**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-15-2 **Dates Surveyed:** 30 June & 24 August, 2018 **UTM Coordinates:** 17 W 513781 7966188

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 50

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	4.50	0	0	N/A
	Fall	2.83	0	0	N/A
NNST	Summer	4.50	33	7.28	40 - 68
	Fall	2.83	0	0	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	M	N
NNST	H	N	H	H

Comments & Summary

This pond and nearby CV-15-3 provide abundant important NNST habitat during summer, but ARCH are uncommon. Most char in this area likely use a deeper upstream lake. Water temperatures in survey streams during fall sampling averaged approximately 5°C, so the absence of NNST in the fall catch may indicate that fish had already moved to the deep upstream lake for overwintering.

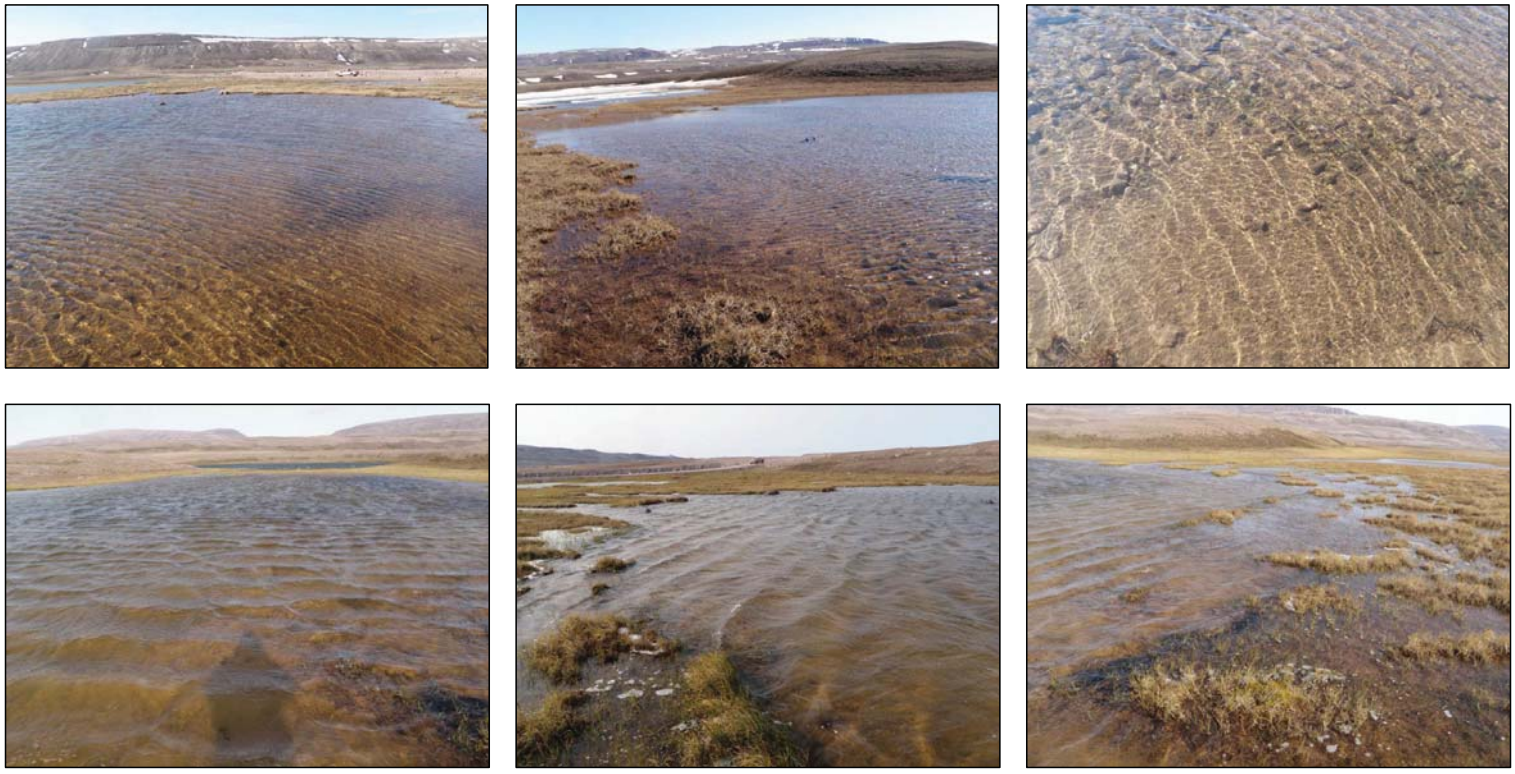
Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - MARGINAL** **Ninespine Stickleback – IMPORTANT**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-15-2 **Dates Surveyed:** 30 June & 24 August, 2018 **UTM Coordinates:** 17 W 513781 7966188

Photographs



A B C

Figure 1. Summer (top) and fall (bottom) views of CV-15-2 at the encroachment site (all images).

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-15-3 **Dates Surveyed:** 30 June & 24 August, 2018 **UTM Coordinates:** 17 W 513892 7966034

General Physical Characteristics

Channel Confinement: N/A **Channel Gradient (range):** N/A **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
0	N/A	N/A	N/A	N/A	N/A	1.00 / 1.05	N/A	N/A	N/A	0.00 / 0.00

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
Nearshore	-	80	20	-	-	-	75	-	20	5	-
Offshore	-	-	100	-	-	-	75	-	20	5	-

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - MARGINAL** **Ninespine Stickleback – IMPORTANT**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-15-3 **Dates Surveyed:** 30 June & 24 August, 2018 **UTM Coordinates:** 17 W 513892 7966034

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 50

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	4.50	1	0.48	-
	Fall	3.20	0	0.00	N/A
NNST	Summer	4.50	2	0.96	-
	Fall	3.20	0	0.00	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	M	N
NNST	H	N	H	H

Comments & Summary

This pond and nearby CV-15-2 provide abundant important NNST habitat, but ARCH are uncommon. Most char in this area likely use a deeper upstream lake. Water temperatures in survey streams during fall sampling averaged approximately 5°C, so the absence of NNST in the fall catch may indicate that fish had already moved to the deep upstream lake for overwintering.

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality – MARGINAL (ARCH) to IMPORTANT (NNST)

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-15-3 **Dates Surveyed:** 30 June & 24 August, 2018 **UTM Coordinates:** 17 W 513892 7966034

Photographs



A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of CV-15-3 at the encroachment site (all images).

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-15-4 **Dates Surveyed:** 30 June & 23 August, 2018 **UTM Coordinates:** 17 W 514123 7965711

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

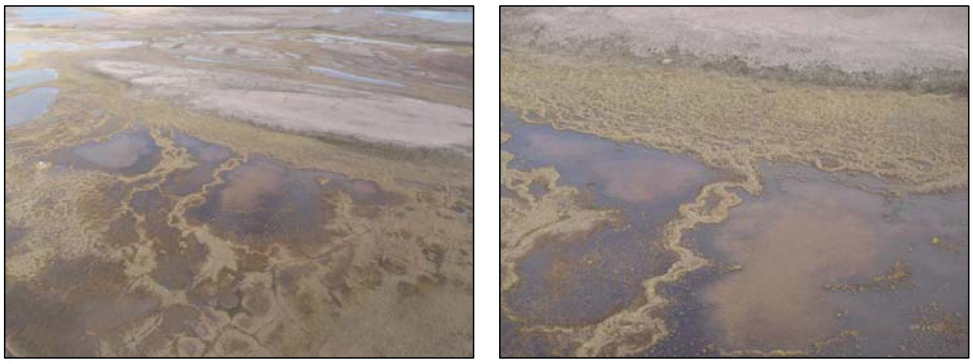
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This site is a shallow, fishless pond/marshy area that is unconnected to nearby fish habitat at 15-2, 15-3, or 15-5 even under high flows. There is never aquatic habitat at this crossing.

Photographs



A **B**

Figure 1. Aerial views of CV-15-4 at the rail crossing during fall (A) and (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-15-5 **Dates Surveyed:** 30 June & 30 August, 2018 **UTM Coordinates:** 17 W 514239 7965626

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1-3° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
60D	90.0	85.0 / 80.5	0.81 / 0.20	0.82 / 0.18	0.82 / -	0.90 / 0.90	0.47 / 0.34	0.65 / 0.43	0.50 / -	1.00 / 1.00
40D	90.0	85.0 / 80.5	0.24 / 0.22	0.50 / -	0.56 / -	1.00 / 1.00	0.25 / 0.18	0.40 / -	0.02 / -	1.00 / 1.00
20D	90.0	85.0 / 77.7	0.75 / 0.38	0.75 / -	0.68 / -	0.90 / 0.90	0.24 / 0.25	0.37 / -	0.22 / -	1.00 / 1.00
0	90.0	85.0 / 77.7	0.63 / 0.22	0.81 / -	1.07 / -	1.20 / 1.20	0.10 / 0.11	0.37 / -	0.57 / -	1.00 / 1.00
20U	90.0	85.0 / 81.4	0.48 / 0.70	0.69 / -	0.88 / -	1.00 / 1.00	0.23 / 0.09	0.14 / -	0.28 / -	1.00 / 1.00
40U	90.0	85.0 / 82.3	0.71 / 0.40	0.95 / -	1.20 / -	1.20 / 1.20	0.38 / 0.17	0.71 / -	0.41 / -	1.00 / 1.00
60U	90.0	85.0 / 72.2	0.80 / 0.42	1.12 / -	1.11 / -	1.25 / 1.25	0.54 / 0.20	0.40 / -	0.62 / -	1.00 / 1.00

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
60D	25	15	15	45	-	-	5	5	40	45	5
40D	25	15	15	45	-	-	5	5	40	45	5
20D	25	15	15	45	-	-	5	5	40	45	5
0	35	15	15	35	-	-	5	5	40	45	5
20U	30	20	20	30	-	-	5	5	35	45	10
40U	35	10	10	45	-	-	10	5	35	45	5
60U	35	10	10	45	-	-	10	5	35	45	5

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-15-5 **Dates Surveyed:** 30 June & 30 August, 2018 **UTM Coordinates:** 17 W 514239 7965626

Fisheries Data

Gear Used: Observation Only **Transect length (m):** N/A

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	N/A	2	-	~ 100-150
	Fall	N/A	0	-	N/A
NNST	Summer	N/A	0	-	N/A
	Fall	N/A	0	-	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	H
NNST	N	N	L	L

Comments & Summary

Large river with abundant high-quality habitat. Too broad and deep to effectively electrofish, but large numbers of char are known to use this river throughout the open-water season.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-15-5 **Dates Surveyed:** 30 June & 30 August, 2018 **UTM Coordinates:** 17 W 514239 7965626

Photographs



A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of CV-15-5 at the 60 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-15-5 **Dates Surveyed:** 30 June & 30 August, 2018 **UTM Coordinates:** 17 W 514239 7965626

Photographs



A B C

Figure 2. Summer (top) and fall (bottom) views of CV-15-5 at the 40 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-15-5 **Dates Surveyed:** 30 June & 30 August, 2018 **UTM Coordinates:** 17 W 514239 7965626

Photographs



A **B** **C**

Figure 3. Summer (top) and fall (bottom) views of CV-15-5 at the 20 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-15-5 **Dates Surveyed:** 30 June & 30 August, 2018 **UTM Coordinates:** 17 W 514239 7965626

Photographs



A **B** **C**

Figure 4. Summer (top) and fall (bottom) views of CV-15-5 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-15-5 **Dates Surveyed:** 30 June & 30 August, 2018 **UTM Coordinates:** 17 W 514239 7965626

Photographs



A **B** **C**

Figure 5. Summer (top) and fall (bottom) views of CV-15-5 at the 20 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-15-5 **Dates Surveyed:** 30 June & 30 August, 2018 **UTM Coordinates:** 17 W 514239 7965626

Photographs



A **B** **C**

Figure 6. Summer (top) and fall (bottom) views of CV-15-5 at the 40 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-15-5 **Dates Surveyed:** 30 June & 30 August, 2018 **UTM Coordinates:** 17 W 514239 7965626

Photographs



A **B** **C**

Figure 7. Summer (top) and fall (bottom) views of CV-15-5 at the 60 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-16-1 **Dates Surveyed:** 30 June & 23 August, 2018 **UTM Coordinates:** 17 W 514325 7965565

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

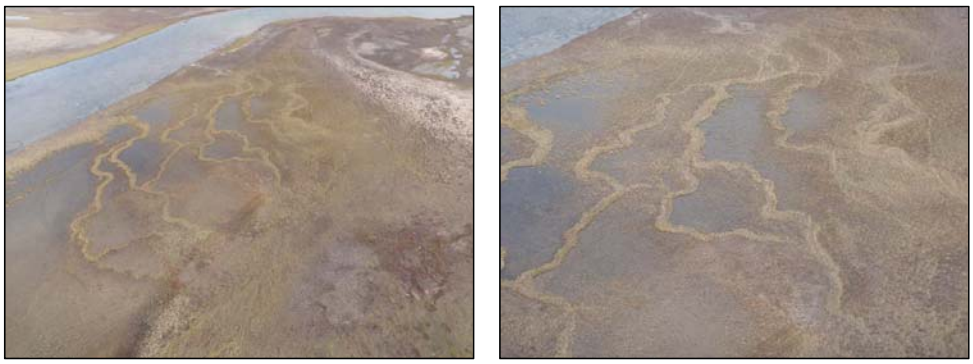
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This site is a shallow, fishless low point/marshy area that is unconnected to nearby fish habitat at 15-5 unless that large river were to exceed its bank-full width.

Photographs



A **B**

Figure 1. Aerial views of CV-16-1 at the rail crossing during fall (A) and (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-16-2 **Dates Surveyed:** 30 June & 23 August, 2018 **UTM Coordinates:** 17 W 514768 7965089

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This pond was fished in 2017 and no fish were captured or observed. It is too shallow for overwintering and is unconnected to CV-15-5 upstream due to a permanent vertical barrier at the confluence. There is no fish habitat at this crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-16-2 at the rail crossing during summer (A) and (B), and aerially during fall (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-16-3 **Dates Surveyed:** 30 June & 23 August, 2018 **UTM Coordinates:** 17 W 514811 7964916

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1-3° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

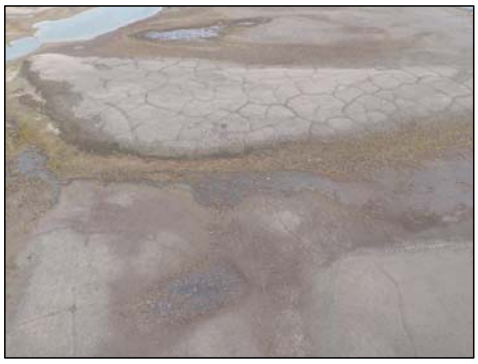
Comments & Summary

This was a dry creek bed in summer and nearly dry in fall. It is unconnected to fish-bearing habitat due to several soft and permanent barriers between the crossing and both upstream and downstream habitat. There is no fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-16-3 at the rail crossing during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-17-1 **Dates Surveyed:** 30 June & 23 August, 2018 **UTM Coordinates:** 17 W 515261 7964025

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

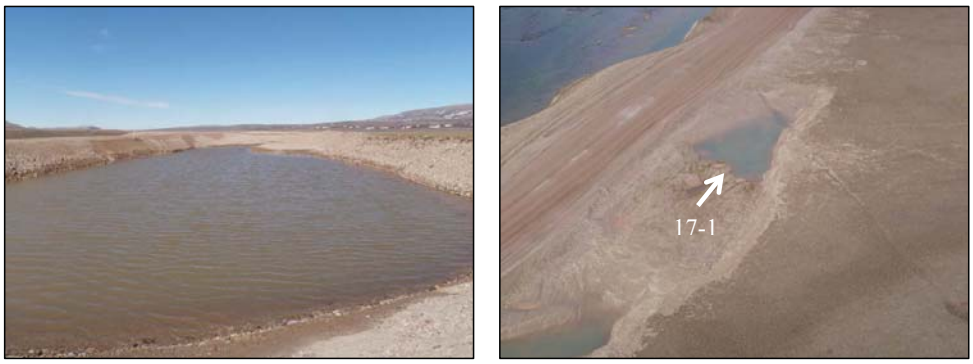
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This is a small, shallow, isolated pond beside the Tote Road. Fish were not observed and overwintering is not possible. There is no fish habitat at this crossing.

Photographs



A **B**

Figure 1. Views of CV-17-1 at the rail crossing during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-18-1 **Date Surveyed:** 30 June, 2018 **UTM Coordinates:** 17 W 515331 7963846

General Physical Characteristics

Channel Confinement: N/A **Channel Gradient (range):** N/A **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)				
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max	Min
0	N/A	N/A	N/A	N/A	N/A	> 2.00	N/A	N/A	N/A	0.00	0.00

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
Nearshore - East	-	80	20	-	-	-	90	-	10	-	-
Nearshore - West	-	80	20	-	-	-	90	-	10	-	-
Nearshore - North	-	80	20	-	-	-	10	-	80	10	-
Nearshore - South	-	80	20	-	-	-	10	-	80	10	-
Offshore	-	-	100	-	-	-	-	-	-	-	-

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - NOT FISH-BEARING** **Ninespine Stickleback – IMPORTANT**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-18-1 **Date Surveyed:** 30 June, 2018 **UTM Coordinates:** 17 W 515331 7963846

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	4.35	0	-	-
	Fall	-	N.A	N.A	N.A
NNST	Summer	4.35	9	2.07	33 - 66
	Fall	-	N.A	N.A	N.A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	H	H	H	H

Comments & Summary

This is an isolated pond that provides habitat for all life history stages of Ninespine Stickleback. There are no char in this pond. A detailed depth and substrate survey was conducted on 31 August, 2018.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - NOT FISH-BEARING** **Ninespine Stickleback – IMPORTANT**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-18-1 **Date Surveyed:** 30 June, 2018 **UTM Coordinates:** 17 W 515331 7963846

Photographs



A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of CV-18-1 shoreline habitat (A and B) and substrate (C).

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-18-2 **Dates Surveyed:** 30 June & 23 August, 2018 **UTM Coordinates:** 17 W 515405 7963693

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1-3° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This site is an area of shallow ponding on the upstream side of the Tote Road. There is a steep gradient and no channel downstream of the road, creating a barrier under all flow conditions. There is no fish habitat at this crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-18-2 at the rail crossing during summer (A) and (B), and aerially during fall (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-18-3 **Dates Surveyed:** 30 June & 23 August, 2018 **UTM Coordinates:** 17 W 515607 7963389

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

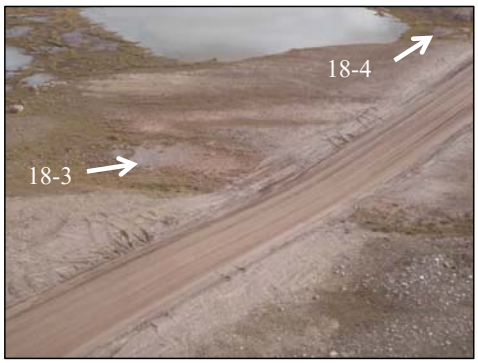
Comments & Summary

This was a dry low point during summer and nearly dry during fall. There are no connections to other habitat. There is no fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-18-3 at the rail crossing during summer (A) and (B), and aerially, with nearby 18-4 during fall (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-18-4 **Dates Surveyed:** 30 June & 23 August, 2018 **UTM Coordinates:** 17 W 515682 7963328

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a nearly dry low point during summer and fall 2018. There are no connections to other fish-bearing habitat. There is no fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-18-4 at the rail crossing during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-19-1 **Dates Surveyed:** 30 June & 23 August, 2018 **UTM Coordinates:** 17 W 515927 7963175

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This is an area of shallow ponding upstream of the Tote Road. There are no connections to other fish-bearing habitat due to downstream subsurface flow barriers. There is no fish habitat at this crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-19-1 at the rail crossing (A) and downstream of the Tote Road (B) during summer, and aerially during fall (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-19-2 **Dates Surveyed:** 30 June & 23 August, 2018 **UTM Coordinates:** 17 W 516161 7963031

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This is a shallow, isolated pond upstream of the Tote Road. Fish were not observed. It does not provide overwintering habitat and there are no connections to other fish-bearing waterbodies. There is no fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-19-2 at the rail crossing during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-19-3 **Dates Surveyed:** 30 June & 23 August, 2018 **UTM Coordinates:** 17 W 516613 7962587

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry low point in 2018. There is no fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-19-3 at the rail crossing during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-20-1 **Dates Surveyed:** 30 June & 23 August, 2018 **UTM Coordinates:** 17 W 517040 7962255

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry low point in 2018. There is no fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-20-1 at the rail crossing during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-20-2 **Dates Surveyed:** 30 June & 23 August, 2018 **UTM Coordinates:** 17 W 517267 7962029

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** > 5° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

Water levels were very low at this site during both surveys. In addition, there are multiple soft barriers to fish movement (subsurface flow, high gradient), and impassable vertical drops between the crossing and Phillips Creek downstream. There is no fish habitat at this crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-20-2 at the rail crossing during summer, looking upstream (A) downstream (B) and across (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-20-2 **Dates Surveyed:** 30 June & 23 August, 2018 **UTM Coordinates:** 17 W 517267 7962029

Photographs



A



B

Figure 2. Aerial views of CV-20-2 during fall (A) and (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-21-1 **Dates Surveyed:** 30 June & 23 August, 2018 **UTM Coordinates:** 17 W 517365 7961888

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** > 5° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

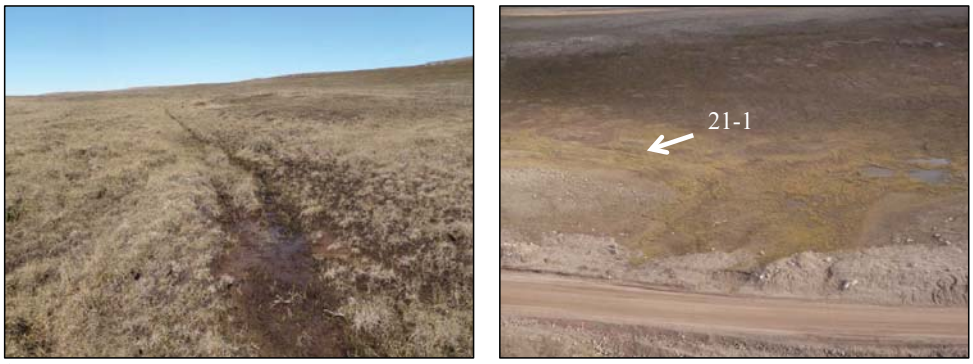
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This site was nearly dry in 2018. In addition, there was no defined channel and multiple soft barriers to fish movement (subsurface flow) and no connection to overwintering habitat. There is no fish habitat at this crossing.

Photographs



A **B**

Figure 1. Views of CV-21-1 at the rail crossing during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-21-2 **Dates Surveyed:** 30 June & 23 August, 2018 **UTM Coordinates:** 17 W 517607 7961640

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1-5° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

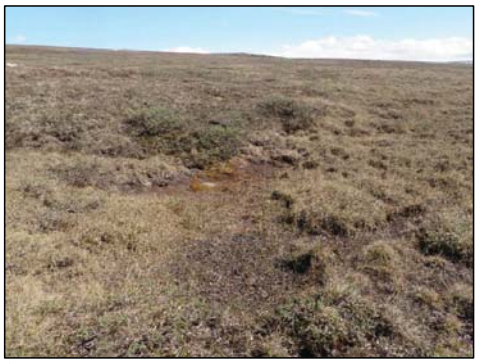
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This site was nearly dry in 2018. In addition, there was no defined channel and multiple soft barriers to fish movement (subsurface flow) and no connection to overwintering habitat. There is no fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-21-2 at the rail crossing during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-21-3 **Dates Surveyed:** 4 July & 23 August, 2018 **UTM Coordinates:** 17 W 517928 7961308

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1-5° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

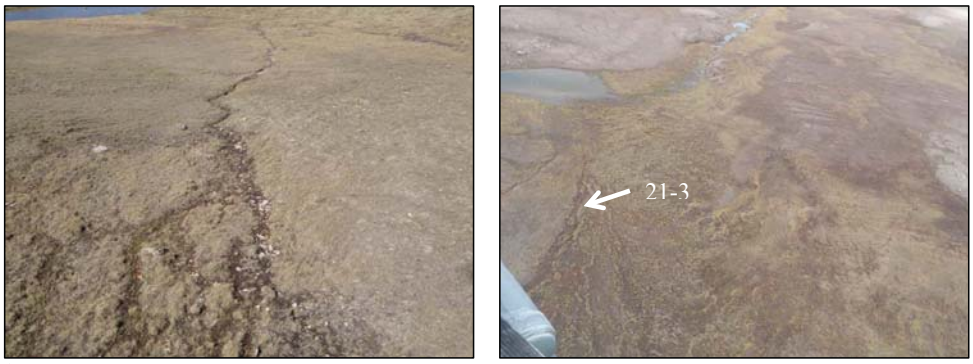
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This site was nearly dry in 2018. In addition, there were multiple soft barriers to fish movement (subsurface flow) and no connection to overwintering habitat. There is no fish habitat at this crossing.

Photographs



A **B**

Figure 1. Views of CV-21-3 at the rail crossing during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-21-4 **Dates Surveyed:** 4 July & 23 August, 2018 **UTM Coordinates:** 17 W 518010 7961196

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1-5° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This site was nearly dry in 2018. In addition, there was no defined channel and multiple soft barriers to fish movement (subsurface flow) and no connection to overwintering habitat. There is no fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-21-4 at the rail crossing during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-22-1 **Dates Surveyed:** 4 July & 23 August, 2018 **UTM Coordinates:** 17 W 518010 7961196

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Open Water

Fisheries Data

Gear Used: Backpack Electrofisher **Effort (min):** 2.43 **Transect Length (m):** 200

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This is a small, shallow (< 1 m maximum depth), isolated pond. Fish were not captured or observed in 2018. Depths are insufficient for overwintering and there is no access from other waterbodies. There is no fish habitat at this crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-22-1 at the rail crossing during summer (A) and (B), and aerially during fall (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-22-2 **Dates Surveyed:** 4 July & 23 August, 2018 **UTM Coordinates:** 17 W 518232 7960617

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This is a small, shallow (< 1 m maximum depth), isolated pond, similar to CV-22-1. Depths are insufficient for overwintering and there is no access from other waterbodies. There is no fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-22-2 at the rail crossing during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-22-3 **Dates Surveyed:** 30 June & 23 August, 2018 **UTM Coordinates:** 17 W 518295 7960427

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

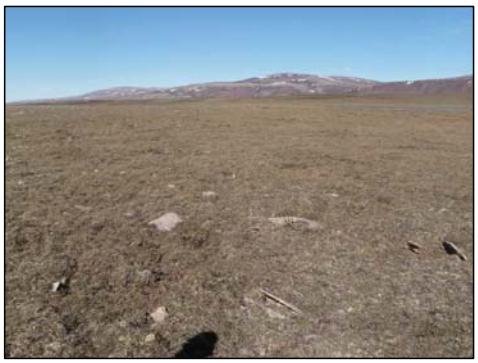
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry low point during summer and nearly dry during fall. There is no access from other waterbodies. There is no fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-22-3 at the rail crossing during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-22-4 **Dates Surveyed:** 30 June & 23 August, 2018 **UTM Coordinates:** 17 W 518370 7960198

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Open Water

Fisheries Data

Gear Used: Backpack Electrofisher **Effort (min):** 2.37 **Transect Length (m):** 200

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This is a small, shallow (< 1 m maximum depth), isolated pond. Overwintering is not possible in this pond and there is no access from other waterbodies. There is no fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-22-4 at the rail crossing during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-23-1 **Dates Surveyed:** 30 June & 23 August, 2018 **UTM Coordinates:** 17 W 518370 7960198

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry low point during summer and nearly dry during fall. There are no connections to overwintering habitat under any flow scenario. There is no fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-23-1 at the rail crossing during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-23-2 **Dates Surveyed:** 30 June & 23 August, 2018 **UTM Coordinates:** 17 W 518501 7959798

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1-5° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

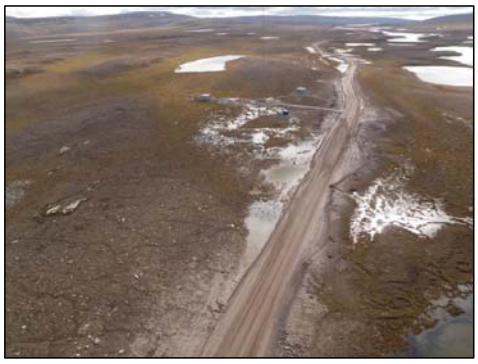
Comments & Summary

Water in this area is typically dispersed across the tundra in a very shallow film, but it also pools up against the upstream side of the Tote Road. Flows are often subsurface and there is a vertical barrier at the confluence with Phillips Creek. There is no fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-23-2 at the rail crossing during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-23-3 **Dates Surveyed:** 30 June & 23 August, 2018 **UTM Coordinates:** 17 W 518695 7959425

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry spot in 2018. There is no fish habitat at this crossing.

Photographs



A **B**

Figure 1. Views of CV-23-3 at the rail crossing during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-23-4 **Dates Surveyed:** 30 June & 23 August, 2018 **UTM Coordinates:** 17 W 518754 7959335

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

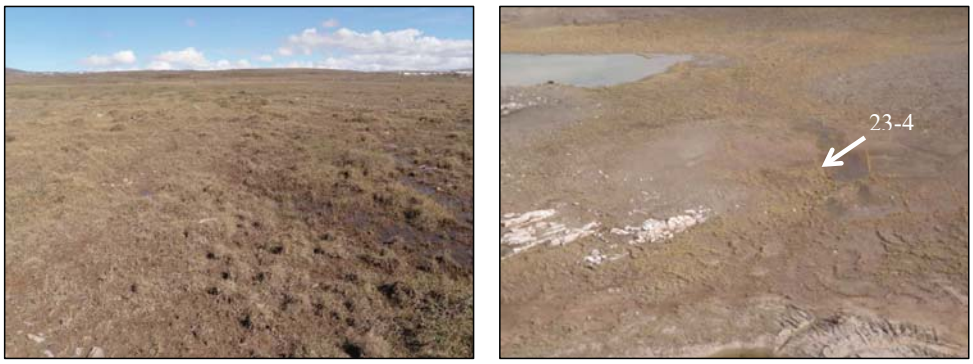
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry or nearly dry low point in 2018. There is no fish habitat at this crossing.

Photographs



A **B**

Figure 1. Views of CV-23-4 at the rail crossing during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-24-1 **Dates Surveyed:** 30 June & 23 August, 2018 **UTM Coordinates:** 17 W 518988 7958946

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

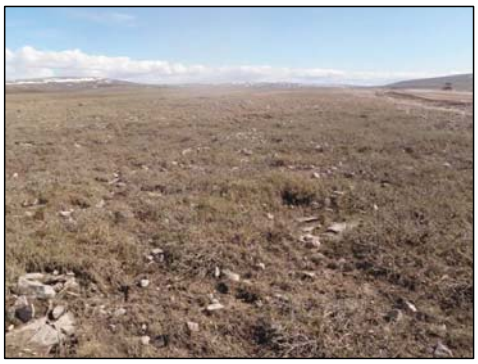
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry or nearly dry low point in 2018. There is no fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-24-1 at the rail crossing during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-24-3 **Dates Surveyed:** 1 July & 23 August, 2018 **UTM Coordinates:** 17 W 519153 7958481

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1-5° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This is a dry or nearly dry marshy terrestrial spot with no connections to other waterbodies and multiple upstream and downstream soft barriers (subsurface flow). There is no fish habitat at this crossing.

Photographs



A **B**

Figure 1. Aerial views of CV-24-3 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-25-1 **Dates Surveyed:** 1 July & 23 August, 2018 **UTM Coordinates:** 17 W 519225 7958229

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1-5° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This is a dry or nearly dry marshy terrestrial spot with no connections to other waterbodies and multiple upstream and downstream soft barriers (subsurface flow). This is part of the same system as several other crossings. There is no fish habitat at this crossing.

Photographs



A **B**

Figure 1. Aerial views of CV-25-1 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-25-2 **Dates Surveyed:** 1 July & 23 August, 2018 **UTM Coordinates:** 17 W 519507 7958144

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1-5° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This is a marshy terrestrial spot with no connections to other waterbodies and multiple upstream and downstream soft barriers (no surface water). This is part of the same system as several other nearby crossings. There is no fish habitat at this crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-25-2 at the rail crossing during summer looking upstream (A) downstream (B) and across (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-25-2 **Dates Surveyed:** 1 July & 23 August, 2018 **UTM Coordinates:** 17 W 519507 7958144

Photographs



A

Figure 2. Aerial view of CV-25-2 during fall.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING**
			Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-25-3 **Dates Surveyed:** 1 July & 23 August, 2018 **UTM Coordinates:** 17 W 519661 7958016

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1-5° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This is a marshy terrestrial spot with no connections to other waterbodies and multiple upstream and downstream soft barriers (no surface water). This is part of the same system as several other nearby crossings. There is no fish habitat at this crossing.

Photographs



A **B** **C**

Figure 1. Aerial views of CV-25-3 at the rail crossing during summer (A) and (B), and fall (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-26-1 **Dates Surveyed:** 1 July & 23 August, 2018 **UTM Coordinates:** 17 W 519989 7957450

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1-5° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This is a small, shallow pond that is part of a marshy terrestrial complex with no connections to overwintering waterbodies and multiple upstream and downstream soft barriers (no surface water). This is part of the same system as several other nearby crossings. There is no fish habitat at this crossing.

Photographs



A



B

Figure 1. Aerial views of CV-26-1 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-26-3 **Dates Surveyed:** 1 July & 23 August, 2018 **UTM Coordinates:** 17 W 520156 7957209

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1-5° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry low point in 2018. There is no fish habitat at this crossing.

Photographs



A

Figure 1. Aerial view of CV-26-3 at the rail crossing during summer (A).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-26-4 **Dates Surveyed:** 1 July & 23 August, 2018 **UTM Coordinates:** 17 W 520224 7957110

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a nearly dry low point in 2018. There is no fish habitat at this crossing.

Photographs



A

Figure 1. Aerial views of CV-26-4 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-26-5 **Dates Surveyed:** 1 July & 23 August, 2018 **UTM Coordinates:** 17 W 520386 7956847

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a nearly dry low point in 2018. There is no fish habitat at this crossing.

Photographs



A

Figure 1. Aerial view of CV-26-5 at the rail crossing during fall (A).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-27-1 **Date Surveyed:** 1 July, 2018 **UTM Coordinates:** 17 W 520406 7956775

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a nearly dry low point in 2018. There are no connections to other waterbodies under any flow scenarios. There is no fish habitat at this crossing.

Photographs



A

Figure 1. Aerial view of CV-27-1 at the rail crossing during fall (A).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-27-2 **Dates Surveyed:** 1 July & 24 August, 2018 **UTM Coordinates:** 17 W 520412 7956735

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 2-3° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	7.4	1.3 / 1.3	0.10 / -	0.16 / 0.30	0.12 / -	0.16 / 0.30	0.83 / -	0.28 / 0.38	0.03 / -	0.85 / 0.45
80D	9.7	3.0 / 2.0	0.20 / 0.20	0.12 / -	0.12 / 0.12	0.20 / 0.25	0.19 / 0.38	0.51 / -	0.04 / 0.18	0.60 / 0.50
60D	5.2	2.2 / 4.0	0.10 / 0.16	0.42 / -	0.32 / 0.14	0.50 / 0.50	0.11 / 0.29	0.09 / -	0.02 / 0.37	0.15 / 0.40
40D	5.5	2.0 / 1.0	0.09 / -	0.04 / 0.28	0.04 / -	0.10 / 0.28	0.32 / -	0.21 / 0.41	0.07 / -	0.40 / 0.50
20D	3.7	1.9 / 1.9	0.09 / 0.04	0.05 / -	0.03 / 0.06	0.10 / 0.10	0.21 / 0.32	0.15 / -	0.22 / 0.19	0.25 / 0.35
0	7.1	4.3 / 3.4	0.04 / 0.10	0.06 / -	0.07 / 0.12	0.10 / 0.15	0.16 / 0.40	0.16 / -	0.67 / 0.38	0.70 / 0.50
20U	3.4	2.1 / 2.3	0.10 / 0.08	0.08 / -	0.03 / 0.10	0.10 / 0.10	0.47 / 0.39	0.65 / -	0.18 / 0.56	0.70 / 0.70
40U	3.7	3.4 / 4.6	0.05 / 0.04	0.07 / -	0.05 / 0.12	0.10 / 0.15	0.54 / 0.32	0.56 / -	0.22 / 0.41	0.65 / 0.55
60U	2.1	1.4 / 1.8	0.08 / 0.24	0.13 / -	0.07 / 0.14	0.15 / 0.25	0.03 / 0.35	0.50 / -	0.12 / 0.27	0.50 / 0.40
80U	0.9	0.8 / 1.3	0.12 / 0.18	0.14 / -	0.06 / 0.10	0.15 / 0.20	0.42 / 0.98	0.06 / -	0.93 / 0.69	1.00 / 1.00
100U	1.5	1.0 / 1.1	0.16 / -	0.14 / 0.16	0.08 / -	0.20 / 0.20	0.16 / -	0.29 / 0.72	0.35 / -	0.40 / 0.75

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	40	40	10	10	-	-	15	5	70	10	-
80D	30	40	10	20	-	-	60	5	30	5	-
60D	30	40	20	10	-	-	75	5	15	5	-
40D	70	25	5	-	-	-	35	5	55	5	-
20D	75	25	-	-	-	-	-	10	85	5	-
0	75	15	-	-	10	-	-	5	85	10	-
20U	50	15	-	-	35	-	-	5	80	15	-
40U	30	25	-	-	45	-	-	5	80	15	-
60U	30	25	-	-	45	-	-	5	85	10	-
80U	40	15	-	-	45	-	-	5	85	10	-
100U	40	15	-	-	45	-	-	5	85	10	-

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality

Arctic Char - MARGINAL

Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-27-2 **Dates Surveyed:** 1 July & 24 August, 2018 **UTM Coordinates:** 17 W 520412 7956735

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	4.62	1	0.22	111
	Fall	4.07	3	0.74	68 - 155
NNST	Summer	4.62	0	-	N/A
	Fall	4.07	0	-	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	H
NNST	N	N	N	N

Comments & Summary

Stream provides important habitat for juvenile Arctic Char during the open water season.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - MARGINAL** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-27-2 **Dates Surveyed:** 1 July & 24 August, 2018 **UTM Coordinates:** 17 W 520412 7956735

Photographs



A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of CV-27-2 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-27-2 **Dates Surveyed:** 1 July & 24 August, 2018 **UTM Coordinates:** 17 W 520412 7956735

Photographs



A **B** **C**

Figure 2. Summer (top) and fall (bottom) views of CV-27-2 at the 80 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-27-2 **Dates Surveyed:** 1 July & 24 August, 2018 **UTM Coordinates:** 17 W 520412 7956735

Photographs



A **B** **C**

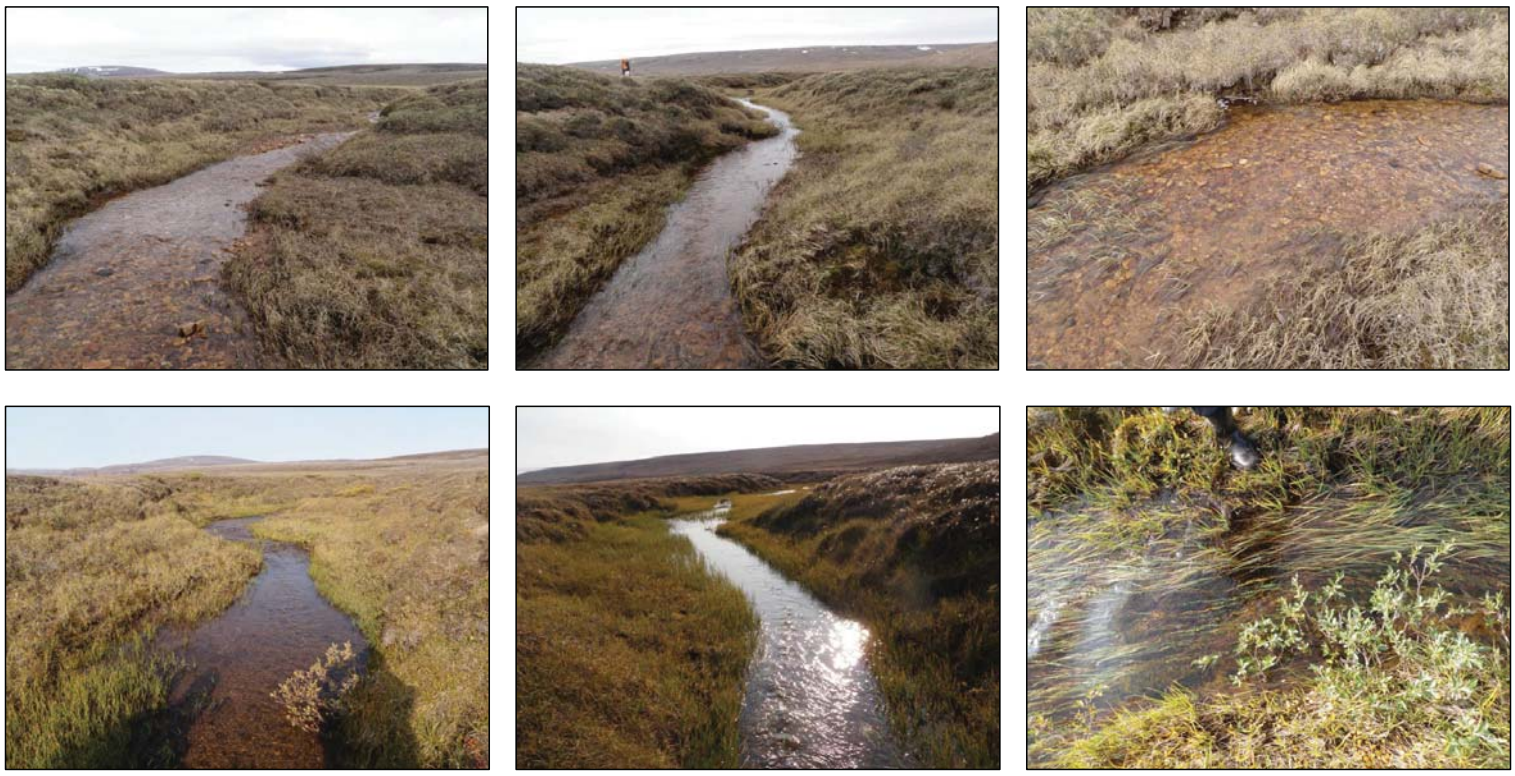
Figure 3. Summer (top) and fall (bottom) views of CV-27-2 at the 60 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-27-2 **Dates Surveyed:** 1 July & 24 August, 2018 **UTM Coordinates:** 17 W 520412 7956735

Photographs



A **B** **C**

Figure 4. Summer (top) and fall (bottom) views of CV-27-2 at the 40 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-27-2 **Dates Surveyed:** 1 July & 24 August, 2018 **UTM Coordinates:** 17 W 520412 7956735

Photographs



A **B** **C**

Figure 5. Summer (top) and fall (bottom) views of CV-27-2 at the 20 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-27-2 **Dates Surveyed:** 1 July & 24 August, 2018 **UTM Coordinates:** 17 W 520412 7956735

Photographs



A **B** **C**

Figure 6. Summer (top) and fall (bottom) views of CV-27-2 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-27-2 **Dates Surveyed:** 1 July & 24 August, 2018 **UTM Coordinates:** 17 W 520412 7956735

Photographs



A B C

Figure 7. Summer (top) and fall (bottom) views of CV-27-2 at the 20 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-27-2 **Dates Surveyed:** 1 July & 24 August, 2018 **UTM Coordinates:** 17 W 520412 7956735

Photographs



A **B** **C**

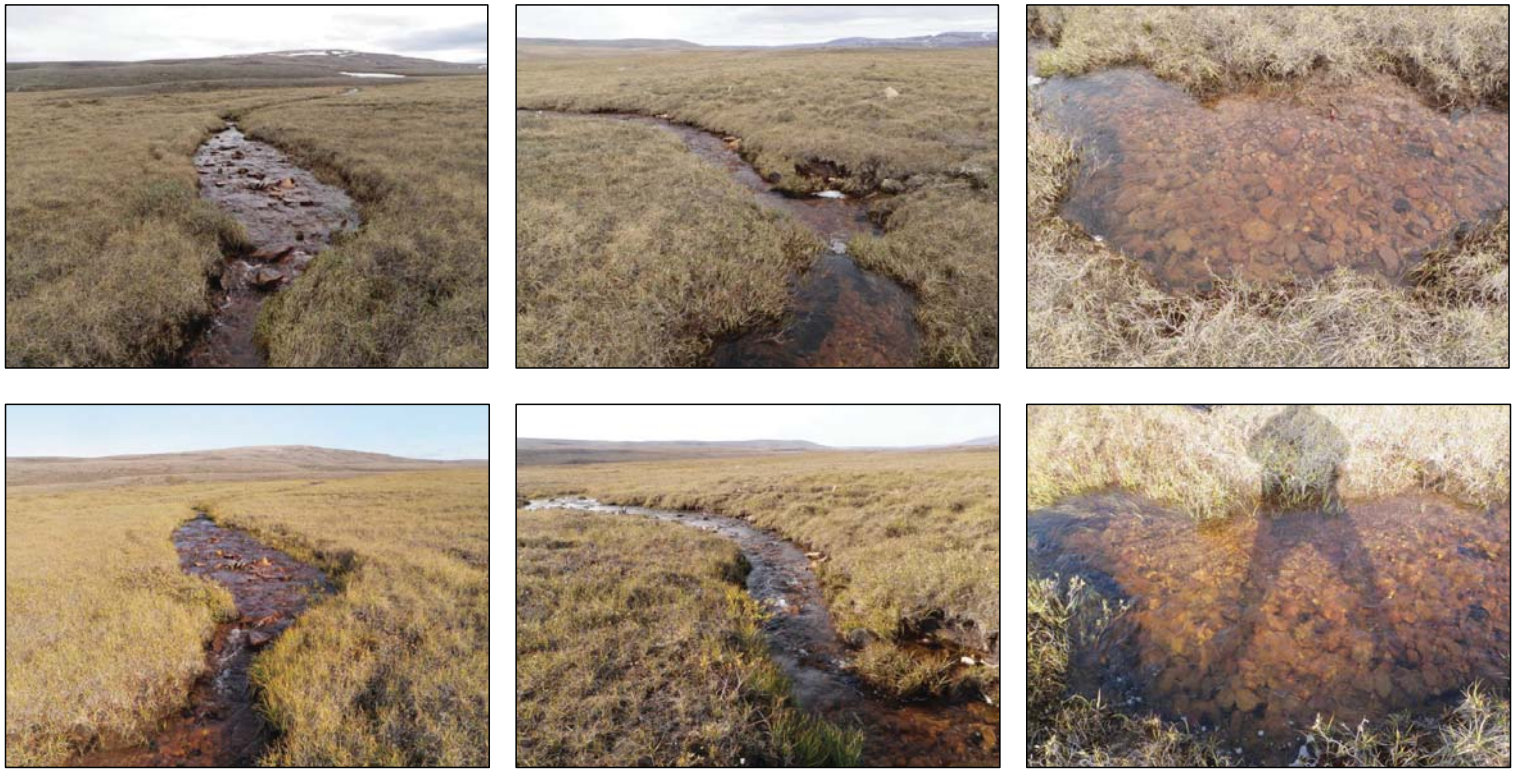
Figure 8. Summer (top) and fall (bottom) views of CV-27-2 at the 40 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-27-2 **Dates Surveyed:** 1 July & 24 August, 2018 **UTM Coordinates:** 17 W 520412 7956735

Photographs



A B C

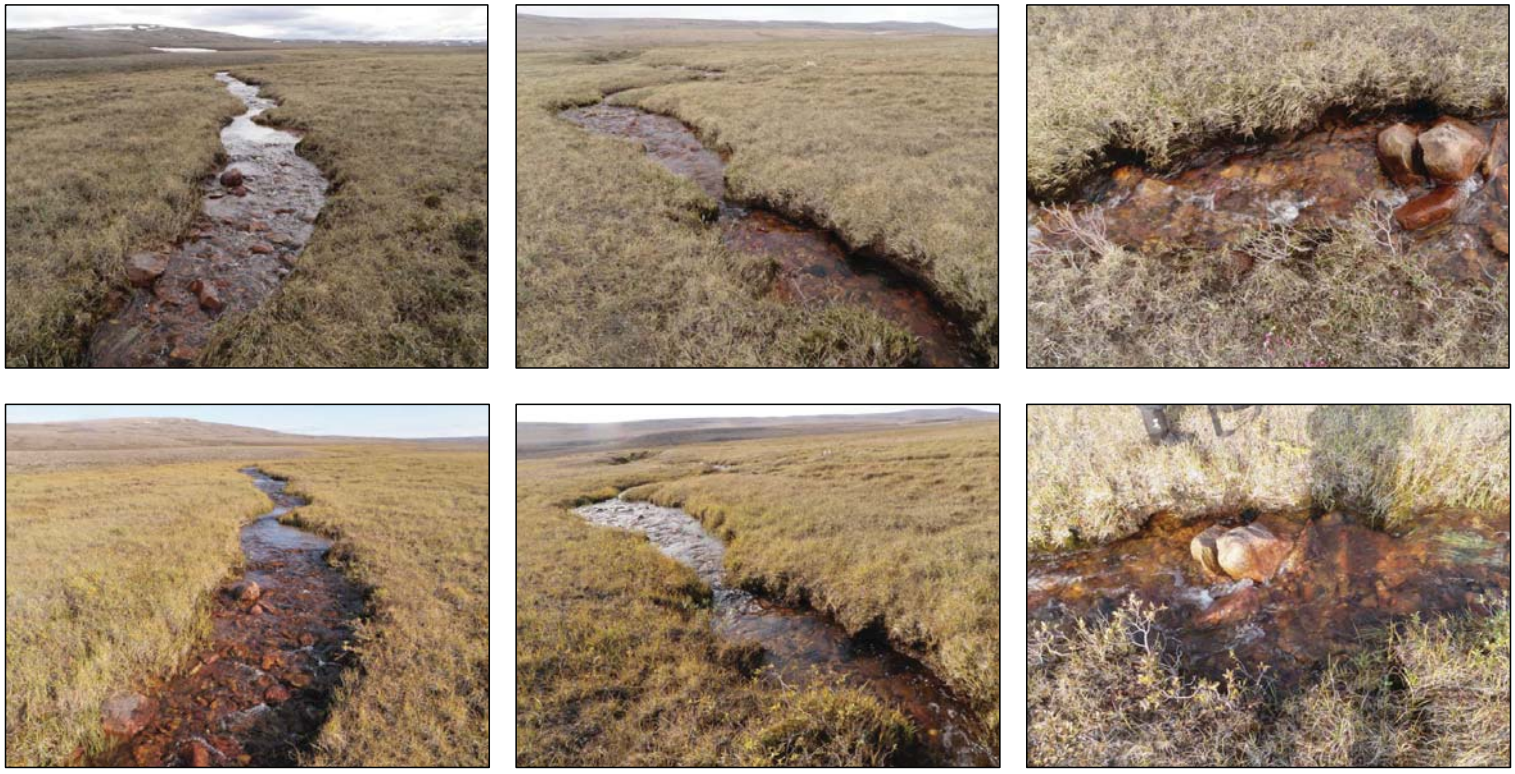
Figure 9. Summer (top) and fall (bottom) views of CV-27-2 at the 60 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-27-2 **Dates Surveyed:** 1 July & 24 August, 2018 **UTM Coordinates:** 17 W 520412 7956735

Photographs



A **B** **C**

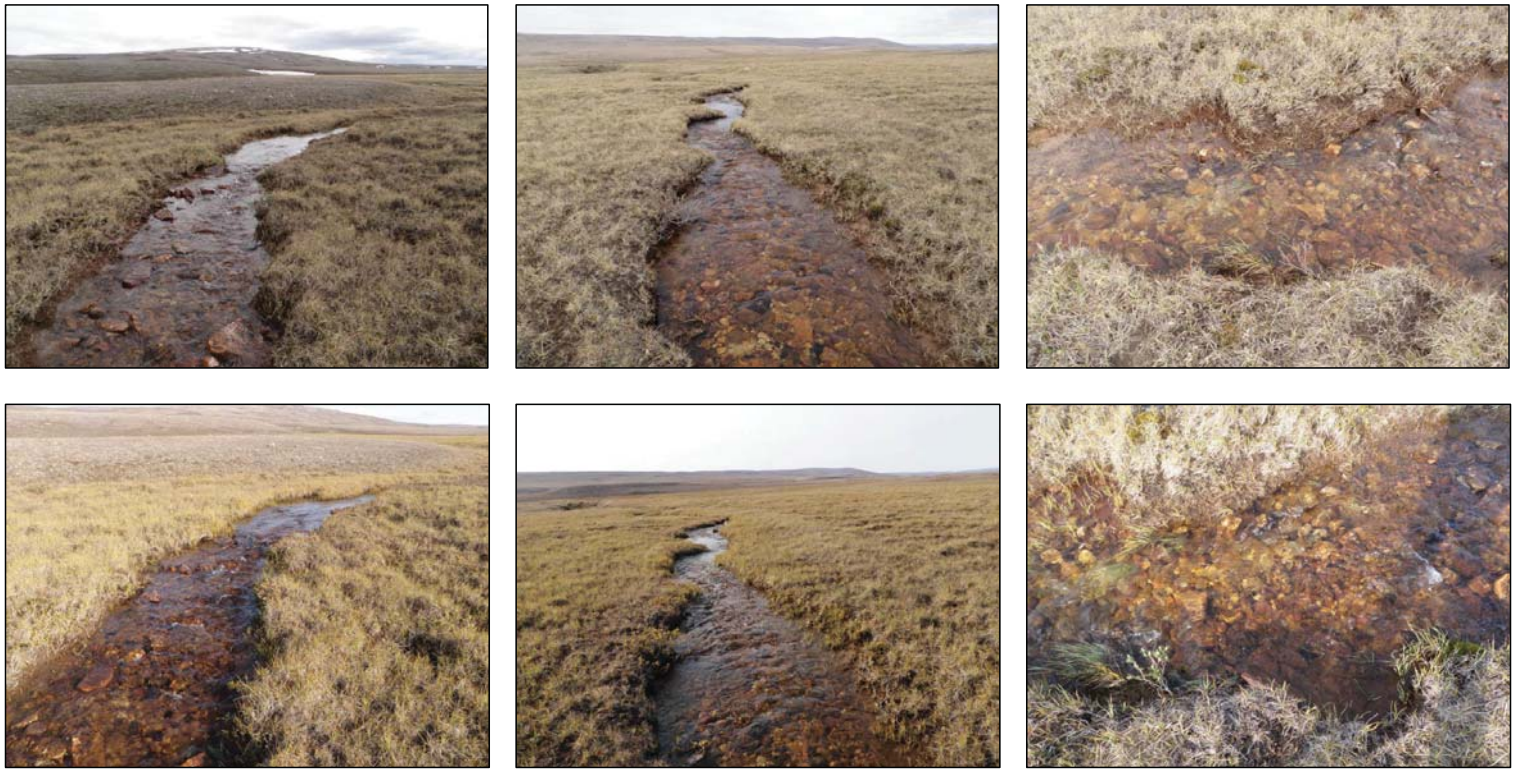
Figure 10. Summer (top) and fall (bottom) views of CV-27-2 at the 80 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-27-2 **Dates Surveyed:** 1 July & 24 August, 2018 **UTM Coordinates:** 17 W 520412 7956735

Photographs



A **B** **C**

Figure 11. Summer (top) and fall (bottom) views of CV-27-2 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-27-3 **Dates Surveyed:** 30 June & 23 August, 2018 **UTM Coordinates:** 17 W 520516 7956235

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 5-10° **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry low point in 2018. There is no fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-27-3 at the rail crossing during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-27-4 **Dates Surveyed:** 30 June & 23 August, 2018 **UTM Coordinates:** 17 W 520564 7956131

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 5-10° **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

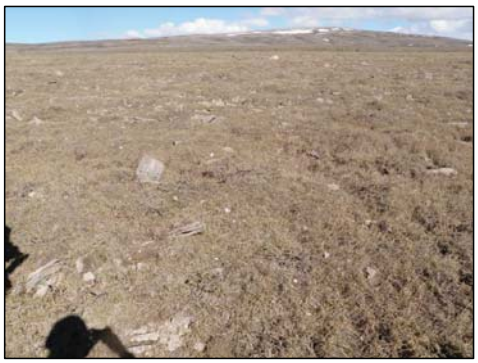
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry low point in 2018. There is no fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-27-4 at the rail crossing during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-27-5 **Dates Surveyed:** 30 June & 23 August, 2018 **UTM Coordinates:** 17 W 520699 7955833

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 5-10° **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a nearly dry spot in 2018. Lack of water and multiple soft barriers downstream (no surface water, steep gradient) prevent fish access to the crossing. There is no fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-27-5 at the rail crossing during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-28-1 **Dates Surveyed:** 30 June & 23 August, 2018 **UTM Coordinates:** 17 W 520722 7955784

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry low point in 2018. The area has already been disturbed by Tote Road activities. There is no fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-28-1 at the rail crossing during summer (A) and aerially with nearby 28-2, during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-28-2 **Dates Surveyed:** 30 June & 23 August, 2018 **UTM Coordinates:** 17 W 520749 7955722

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 5-10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

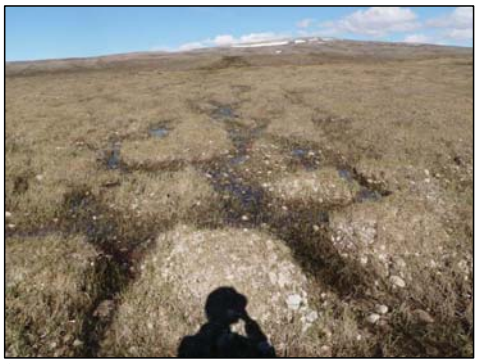
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a marshy terrestrial area with some surface flows in 2018. There are multiple soft barriers downstream of the crossing with no fish access from Phillips Creek. There is no fish habitat at this crossing.

Photographs



A



B



C

Figure 1. Views of CV-28-2 at the rail crossing during summer, looking upstream (A) downstream (B) and across (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-28-2 **Dates Surveyed:** 30 June & 23 August, 2018 **UTM Coordinates:** 17 W 520749 7955722

Photographs



A

Figure 2. Aerial view of CV-28-2 and nearby 28-1 during fall.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-28-3 **Dates Surveyed:** 5 July & 23 August, 2018 **UTM Coordinates:** 17 W 520891 7955261

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

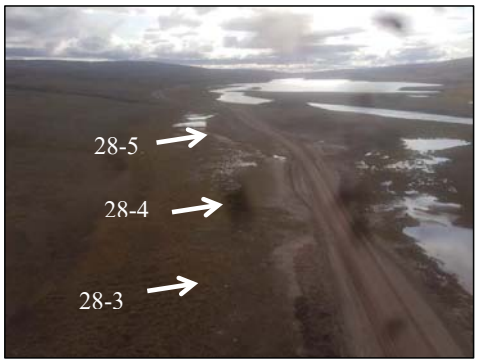
Comments & Summary

This was a dry to nearly dry low point during 2018. It is part of the same marshy terrestrial area as 28-4 and 28-5 characterized by disconnected patches of shallow surface water and no connection to larger waterbodies. There is no fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-28-3 at the rail crossing during summer (A) and aerially, with 28-4 and 28-5, during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-28-4 **Dates Surveyed:** 5 July & 23 August, 2018 **UTM Coordinates:** 17 W 520924 7955182

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

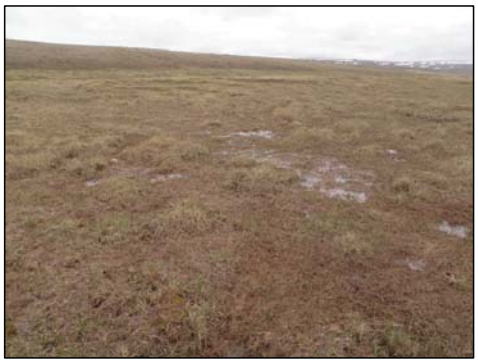
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

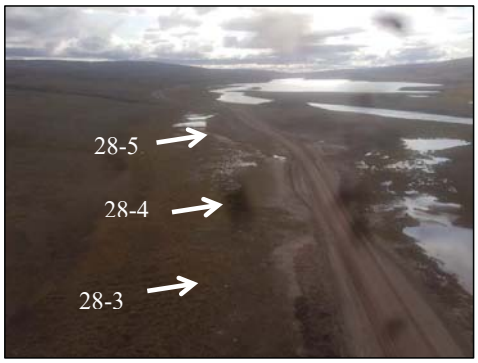
Comments & Summary

This was a dry to nearly dry low point during 2018. It is part of the same marshy terrestrial area as 28-3 and 28-5 characterized by disconnected patches of shallow surface water and no connection to larger waterbodies. There is no fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-28-4 at the rail crossing during summer (A) and aerially, with 28-3 and 28-5, during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-28-5 **Dates Surveyed:** 5 July & 23 August, 2018 **UTM Coordinates:** 17 W 521005 7955067

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

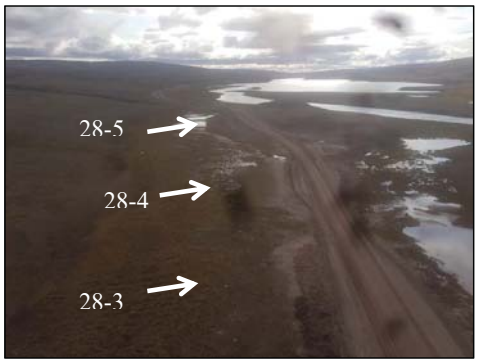
Comments & Summary

This was a barely wetted pond in 2018. It is part of the same marshy terrestrial area as 28-3 and 28-4 characterized by disconnected patches of shallow, fishless surface water and no connection to larger waterbodies. There is no fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-28-5 at the rail crossing during summer (A) and aerially, with 28-3 and 28-4, during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-28-6 **Dates Surveyed:** 5 July & 24 August, 2018 **UTM Coordinates:** 17 W 521092 7954969

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 4-7° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	TOTE ROAD CROSSING									
80D	TOTE ROAD CROSSING									
60D	25.0	- / 5.4	- / 0.06	- / 0.02	- / 0.02	- / 0.10	- / 0.27	- / 0.21	- / 0.28	- / 0.30
40D	7.0	- / 5.2	- / 0.12	- / -	- / 0.06	- / 0.15	- / 0.29	- / -	- / 0.22	- / 0.30
20D	4.5	- / 2.2	- / 0.06	- / -	- / 0.02	- / 0.10	- / 0.46	- / -	- / 0.49	- / 0.50
0	4.3	2.7 / 4.3	0.06 / 0.03	0.08 / 0.06	0.06 / 0.02	0.10 / 0.10	0.43 / 0.06	0.40 / 0.20	0.16 / 0.13	0.50 / 0.20
20U	5.2	4.5 / 4.6	0.14 / 0.04	0.02 / 0.06	0.02 / 0.08	0.15 / 0.15	0.51 / 0.29	0.13 / 0.42	0.20 / 0.43	0.55 / 0.50
40U	3.6	3.3 / 3.3	0.05 / 0.04	0.07 / 0.10	0.05 / 0.04	0.10 / 0.10	0.54 / 0.27	0.56 / 0.48	0.22 / 0.18	0.65 / 0.55
60U	7.3	6.7 / 7.0	0.10 / 0.02	0.16 / 0.10	0.08 / 0.06	0.20 / 0.15	0.39 / 0.27	0.13 / 0.46	0.18 / 0.39	0.45 / 0.50
80U	6.7	5.8 / 5.4	0.04 / 0.08	0.02 / 0.06	0.08 / 0.02	0.10 / 0.10	0.05 / 0.49	0.01 / 0.08	0.08 / 0.16	0.20 / 0.50
100U	17.7	6.2 / 7.4	0.02 / 0.06	0.03 / 0.04	0.06 / 0.02	0.08 / 0.08	0.04 / 0.23	0.16 / 0.20	0.24 / 0.18	0.30 / 0.30

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	TOTE ROAD CROSSING										
80D	TOTE ROAD CROSSING										
60D	90	10	-	-	-	-	10	30	60	-	-
40D	80	10	-	-	10	-	-	10	90	-	-
20D	20	20	-	-	60	-	-	10	90	-	-
0	50	15	-	-	35	-	5	5	60	30	-
20U	40	25	-	-	35	-	5	5	60	30	-
40U	50	20	-	-	30	-	-	5	60	35	-
60U	50	20	-	-	30	-	-	5	60	35	-
80U	40	20	-	-	40	-	-	5	60	30	5
100U	45	15	-	-	40	-	-	5	60	30	5

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-28-6 **Dates Surveyed:** 5 July & 24 August, 2018 **UTM Coordinates:** 17 W 521092 7954969

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	5.88	33	5.61	49 - 95
	Fall	3.67	0	-	N/A
NNST	Summer	5.88	0	-	N/A
	Fall	3.67	0	-	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	H
NNST	N	N	N	N

Comments & Summary

This rail crossing is a few metres upstream of CV-112 on the Tote Road. Provides important char rearing habitat throughout the open water season, but particularly during summer. Water temperatures in survey streams during fall sampling averaged approximately 5°C and fish had already begun downstream movements towards overwintering habitat, reducing catches.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-28-6 **Dates Surveyed:** 5 July & 24 August, 2018 **UTM Coordinates:** 17 W 521092 7954969

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of CV-28-6 at the 60 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-28-6 **Dates Surveyed:** 5 July & 24 August, 2018 **UTM Coordinates:** 17 W 521092 7954969

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A **B** **C**

Figure 2. Summer (top) and fall (bottom) views of CV-28-6 at the 40 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-28-6 **Dates Surveyed:** 5 July & 24 August, 2018 **UTM Coordinates:** 17 W 521092 7954969

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A



B



C

Figure 3. Summer (top) and fall (bottom) views of CV-28-6 at the 20 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-28-6 **Dates Surveyed:** 5 July & 24 August, 2018 **UTM Coordinates:** 17 W 521092 7954969

Photographs



A B C

Figure 4. Summer (top) and fall (bottom) views of CV-28-6 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-28-6 **Dates Surveyed:** 5 July & 24 August, 2018 **UTM Coordinates:** 17 W 521092 7954969

Photographs



A B C

Figure 5. Summer (top) and fall (bottom) views of CV-28-6 at the 20 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-28-6 **Dates Surveyed:** 5 July & 24 August, 2018 **UTM Coordinates:** 17 W 521092 7954969

Photographs



A B C

Figure 6. Summer (top) and fall (bottom) views of CV-28-6 at the 40 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-28-6 **Dates Surveyed:** 5 July & 24 August, 2018 **UTM Coordinates:** 17 W 521092 7954969

Photographs



A B C

Figure 7. Summer (top) and fall (bottom) views of CV-28-6 at the 60 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-28-6 **Dates Surveyed:** 5 July & 24 August, 2018 **UTM Coordinates:** 17 W 521092 7954969

Photographs



A B C

Figure 8. Summer (top) and fall (bottom) views of CV-28-6 at the 80 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-28-6 **Dates Surveyed:** 5 July & 24 August, 2018 **UTM Coordinates:** 17 W 521092 7954969

Photographs



A **B** **C**

Figure 9. Summer (top) and fall (bottom) views of CV-28-6 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-28-7 **Dates Surveyed:** 5 July & 23 August, 2018 **UTM Coordinates:** 17 W 521305 7954680

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a mostly dry spot during 2018 with some ponding occurring alongside the Tote Road. Steep gradient and lack of surface flow prevent access from Phillips Creek downstream. There is no fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-28-7 at the rail crossing during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-29-1 **Dates Surveyed:** 5 July & 23 August, 2018 **UTM Coordinates:** 17 W 521341 7954608

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** > 10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a mostly dry spot during 2018 with some ponding occurring alongside the Tote Road. Steep gradient and lack of surface flow prevent access from Phillips Creek downstream. There is no fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-29-1 at the rail crossing during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-29-2 **Date Surveyed:** 5 July and 25 August, 2018 **UTM Coordinates:** 17 W 521379 7954516

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 8-12° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	5.0	- / 1.8	- / 0.06	- / 0.08	- / 0.08	- / 0.10	- / 0.41	- / 0.50	- / 0.16	- / 0.50
80D	6.0	- / 1.7	- / 0.04	- / 0.06	- / 0.10	- / 0.10	- / 0.64	- / 0.51	- / 0.46	- / 0.70
60D	9.5	- / 2.4	- / 0.14	- / 0.06	- / 0.10	- / 0.15	- / 0.23	- / 0.50	- / 0.56	- / 0.60
40D	10.2	- / 8.2	- / 0.08	- / 0.02	- / 0.02	- / 0.10	- / 0.57	- / 0.22	- / 0.21	- / 0.60
20D	TOTE ROAD CROSSING									
0	8.6	4.1 / 5.5	0.02 / 0.02	0.06 / 0.04	0.02 / 0.02	0.10 / 0.10	0.11 / 0.20	0.57 / 0.39	0.25 / 0.23	0.60 / 0.45
20U	13.0	- / 4.9	- / 0.02	- / 0.02	- / 0.08	- / 0.10	- / 0.38	- / 0.32	- / 0.26	- / 0.45
40U	11.9	7.8 / 8.8	0.04 / 0.04	0.04 / 0.02	0.06 / 0.02	0.08 / 0.06	0.24 / 0.25	0.29 / 0.24	0.20 / 0.36	0.30 / 0.40
60U	9.6	7.9 / 7.3	0.03 / 0.04	0.10 / 0.04	0.02 / 0.04	0.10 / 0.06	0.37 / 0.14	0.27 / 0.47	0.21 / 0.16	0.40 / 0.50
80U	5.8	4.6 / 5.2	0.10 / 0.04	0.02 / 0.06	0.08 / 0.10	0.10 / 0.10	0.41 / 0.29	0.19 / 0.79	0.78 / 0.31	0.80 / 0.80
100U	7.2	6.4 / 6.3	0.02 / 0.02	0.08 / 0.04	0.02 / 0.06	0.10 / 0.10	0.44 / 0.33	0.50 / 0.96	0.29 / 0.19	0.50 / 1.00

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	75	25	-	-	-	-	-	10	80	10	-
80D	80	20	-	-	-	-	-	10	80	10	-
60D	80	20	-	-	-	-	-	10	80	10	-
40D	40	20	-	-	40	-	-	15	80	5	-
20D	TOTE ROAD CROSSING										
0	30	10	-	-	60	-	5	10	60	25	-
20U	15	15	-	-	70	-	-	10	80	10	-
40U	5	15	-	-	80	-	5	5	55	35	-
60U	5	20	-	-	75	-	5	5	55	35	-
80U	5	20	-	-	75	-	-	5	60	35	-
100U	5	20	-	-	75	-	-	5	55	40	-

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-29-2 **Date Surveyed:** 5 July and 25 August, 2018 **UTM Coordinates:** 17 W 521379 7954516

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	5.07	20	3.95	64 - 118
	Fall	4.48	4	0.89	55 - 75
NNST	Summer	5.07	0	-	N/A
	Fall	4.48	0	-	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	L
NNST	N	N	N	N

Comments & Summary

This rail crossing is immediately upstream of CV-111 on the Tote Road. Provides important char rearing habitat throughout the open water season, but increasing gradient upstream of the crossing likely limits natural char use to less than 100 m of upstream habitat. Water temperatures in survey streams during fall sampling averaged approximately 5°C and fish had already begun downstream movements towards overwintering habitat, likely reducing catch totals.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-29-2 **Date Surveyed:** 5 July and 25 August, 2018 **UTM Coordinates:** 17 W 521379 7954516

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of CV-29-2 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-29-2 **Date Surveyed:** 5 July and 25 August, 2018 **UTM Coordinates:** 17 W 521379 7954516

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A



B



C

Figure 2. Summer (top) and fall (bottom) views of CV-29-2 at the 80 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-29-2 **Date Surveyed:** 5 July and 25 August, 2018 **UTM Coordinates:** 17 W 521379 7954516

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A **B** **C**

Figure 3. Summer (top) and fall (bottom) views of CV-29-2 at the 60 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-29-2 **Date Surveyed:** 5 July and 25 August, 2018 **UTM Coordinates:** 17 W 521379 7954516

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 4. Summer (top) and fall (bottom) views of CV-29-2 at the 40 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-29-2 **Date Surveyed:** 5 July and 25 August, 2018 **UTM Coordinates:** 17 W 521379 7954516

Photographs



A **B** **C**

Figure 5. Summer (top) and fall (bottom) views of the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-29-2 **Date Surveyed:** 5 July and 25 August, 2018 **UTM Coordinates:** 17 W 521379 7954516

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

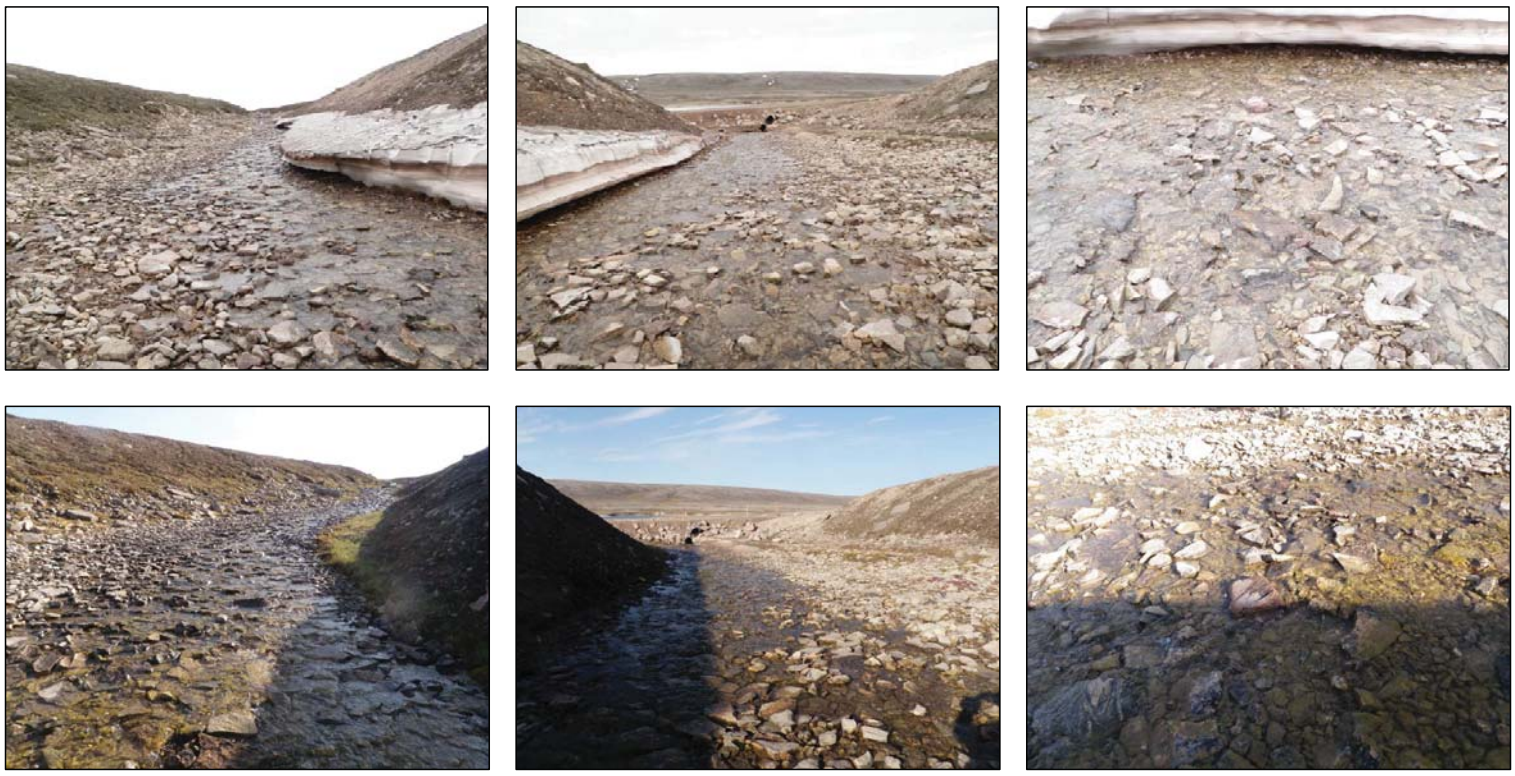
Figure 6. Summer (top) and fall (bottom) views of CV-29-2 at the 20 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-29-2 **Date Surveyed:** 5 July and 25 August, 2018 **UTM Coordinates:** 17 W 521379 7954516

Photographs



A B C

Figure 7. Summer (top) and fall (bottom) views of CV-29-2 at the 40 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-29-2 **Date Surveyed:** 5 July and 25 August, 2018 **UTM Coordinates:** 17 W 521379 7954516

Photographs



A **B** **C**

Figure 8. Summer (top) and fall (bottom) views of CV-29-2 at the 60 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-29-2 **Date Surveyed:** 5 July and 25 August, 2018 **UTM Coordinates:** 17 W 521379 7954516

Photographs



A B C

Figure 9. Summer (top) and fall (bottom) views of CV-29-2 at the 80 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-29-2 **Date Surveyed:** 5 July and 25 August, 2018 **UTM Coordinates:** 17 W 521379 7954516

Photographs



A B C

Figure 10. Summer (top) and fall (bottom) views of CV-29-2 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-29-3 **Dates Surveyed:** 5 July & 23 August, 2018 **UTM Coordinates:** 17 W 521464 7954306

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** > 10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry, grassy valley in 2018. Steep gradient and lack of surface flow prevent access from Phillips Creek downstream. There is no fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-29-3 at the rail crossing during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-29-4 **Dates Surveyed:** 5 July & 23 August, 2018 **UTM Coordinates:** 17 W 521512 7954187

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** > 10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry, grassy valley in 2018. Steep gradient and lack of surface flow prevent access from Phillips Creek downstream. There is no fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-29-4 at the rail crossing during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-29-5 **Dates Surveyed:** 5 July & 23 August, 2018 **UTM Coordinates:** 17 W 521541 7954115

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** > 10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a nearly dry, grassy valley in 2018. Steep gradient and lack of surface flow prevent access from Phillips Creek downstream over all flow regimes. There is no fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-29-5 at the rail crossing during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-30-1 **Dates Surveyed:** 5 July & 23 August, 2018 **UTM Coordinates:** 17 W 521569 7954040

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** > 10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry, grassy, rocky hillside in 2018. Steep gradient and lack of surface flow prevent access from Phillips Creek downstream over all flow regimes. There is no fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-30-1 at the rail crossing during summer (A) and aerially during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-30-2 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521609 7953873

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 5-10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry or nearly dry, grassy hillside in 2018. Steep gradient and lack of a channel or surface flow prevent access from Phillips Creek downstream over all flow regimes. There is no fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-30-2 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-30-3 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521635 7953720

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 5-10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a nearly dry, grassy hillside in 2018. Steep gradient and lack of surface flow and connectivity prevent access from Phillips Creek downstream over all flow regimes. There is no fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-30-3 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-30-4 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521676 7953461

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a Tote Road ditch pond with very little water in 2018. This site is not connected to any other waterbody. There is no fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-30-4 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-30-5 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521687 7953363

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 2-4° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	15.0	- / 2.6	- / -	- / 0.02	- / -	- / 0.04	- / -	- / 0.11	- / -	- / 0.15
20D	TOTE ROAD CROSSING									
0	1.5	0.7 / 1.1	- / -	0.08 / 0.02	- / -	0.08 / 0.06	- / -	0.12 / 0.18	- / -	0.12 / 0.18
40U	0.5	0.5 / -	- / -	0.08 / -	- / -	0.08 / -	- / -	0.63 / -	0.16 / -	0.65 / -
50U	0.8	- / 0.8	- / -	- / 0.04	- / -	- / 0.05	- / -	- / 0.26	- / -	- / 0.26
60U	0.4	0.4 / -	- / -	0.08 / -	- / -	0.08 / -	- / -	0.08 / -	- / -	0.10 / -
80U	0.3	0.3 / -	- / -	0.10 / -	- / -	0.10 / -	- / -	0.07 / -	- / -	0.08 / -
100U	0.9	0.6 / 0.9	- / -	0.04 / 0.20	- / -	0.05 / 0.20	- / -	0.11 / 0.03	- / -	0.15 / 0.10

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	40	60	-	-	-	-	80	-	20	-	-
20D	TOTE ROAD CROSSING										
0	35	65	-	-	-	-	60	30	10	-	-
40U	40	60	-	-	-	-	60	30	10	-	-
50U	40	60	-	-	-	-	90	10	-	-	-
60U	50	50	-	-	-	-	60	40	-	-	-
80U	40	60	-	-	-	-	95	5	-	-	-
100U	20	80	-	-	-	-	95	5	-	-	-

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-30-5 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521687 7953363

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	2.67	8	3.00	46 - 57
	Fall	-	N/A	N/A	N/A
NNST	Summer	2.67	0	-	N/A
	Fall	-	N/A	N/A	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	N
NNST	N	N	N	N

Comments & Summary

This rail crossing is immediately upstream of CV-106 on the Tote Road. Provides marginal char rearing habitat throughout the open water season. Quality and use of habitat restricted by shallow water and predominantly fine substrate. Note that a rip-rap barrier from 0-50 m downstream of the Tote Road was blocking fish movements during fall 2018, so electrofishing was not conducted. The barrier is scheduled to be removed.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - MARGINAL** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-30-5 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521687 7953363

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A



B



C

Figure 1. Summer (top) and fall (bottom) views of CV-30-5 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-30-5 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521687 7953363

Photographs



A **B** **C**

Figure 2. Summer (top) and fall (bottom) views of CV-30-5 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-30-5 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521687 7953363

Photographs



NO PHOTO



NO PHOTO



NO PHOTO

A **B** **C**

Figure 3. Summer (top) and fall (bottom) views of CV-30-5 at the 40 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

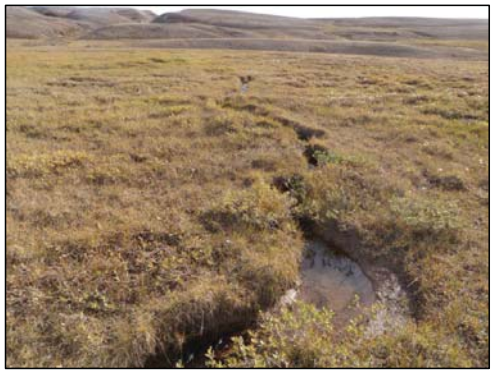
Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-30-5 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521687 7953363

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

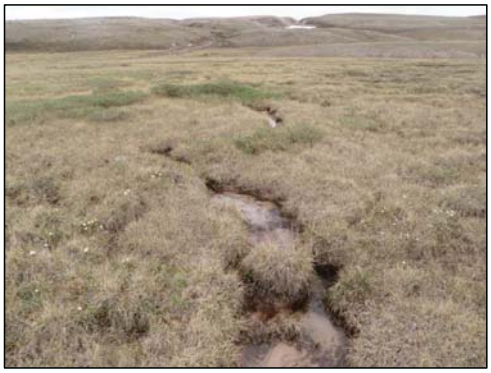
Figure 4. Summer (top) and fall (bottom) views of CV-30-5 at the 50 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-30-5 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521687 7953363

Photographs



NO PHOTO



NO PHOTO



NO PHOTO

A **B** **C**

Figure 5. Summer (top) and fall (bottom) views of CV-30-5 at the 60 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-30-5 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521687 7953363

Photographs



NO PHOTO

A



NO PHOTO

B



NO PHOTO

C

Figure 6. Summer (top) and fall (bottom) views of CV-30-5 at the 80 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-30-5 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521687 7953363

Photographs



A **B** **C**

Figure 7. Summer (top) and fall (bottom) views of CV-30-5 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-30-6 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521700 7953250

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 5-10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was shallow, marshy habitat adjacent to a fishless pond. This site is not connected to any other waterbody. There is no fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-30-6 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-30-7 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521712 7953143

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Open Water

Fisheries Data

Gear Used: Backpack Electrofisher **Effort (min):** 1.43 **Transect Length (m):** 100

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This is a shallow, isolated, fishless pond. Fish were not captured or observed during the July survey. There is no fish habitat at this crossing.

Photographs



A



B



C

Figure 1. Views of CV-30-7 at the rail crossing during summer (A) and fall (B) and (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-31-1 & CV-31-2 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521748 7952788 & 17 W 521749 7952776

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 2-10° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	14.0	- / 2.0	- / 0.12	- / 0.26	- / -	- / 0.30	- / 0.83	- / 0.20	- / -	- / 0.85
80D	9.4	- / 3.9	- / 0.12	- / 0.02	- / 0.04	- / 0.15	- / 0.44	- / 0.24	- / 0.13	- / 0.50
60D	3.5	- / 1.4	- / 0.02	- / -	- / 0.10	- / 0.10	- / 0.32	- / -	- / 0.45	- / 0.50
40D	6.0	- / 3.8	- / 0.10	- / 0.06	- / 0.10	- / 0.10	- / 0.32	- / 0.15	- / 0.50	- / 0.50
20D	TOTE ROAD CROSSING									
0	12.2	6.0 / 7.4	0.16 / 0.04	0.10 / 0.04	0.06 / 0.04	0.20 / 0.15	0.17 / 0.16	0.31 / 0.13	0.30 / 0.20	0.35 / 0.25
20U	18.0	- / 8.0	- / 0.04	- / 0.10	- / 0.06	- / 0.15	- / 0.30	- / 0.45	- / 0.60	- / 0.65
40U	-	- / 15.6	- / 0.02	- / 0.08	- / 0.02	- / 0.10	- / 0.18	- / 0.34	- / 0.15	- / 0.40
60U	18.0	14.9 / 16.8	0.04 / 0.10	0.01 / 0.04	0.03 / 0.02	0.05 / 0.10	0.25 / 0.47	0.26 / 0.33	0.24 / 0.16	0.26 / 0.50
80U	13.9	10.1 / 10.3	0.05 / 0.06	0.10 / 0.08	0.06 / 0.06	0.10 / 0.10	0.44 / 0.12	0.55 / 0.48	0.07 / 0.36	0.55 / 0.50
100U	10.6	6.8 / 6.9	0.04 / 0.02	0.08 / 0.14	0.04 / 0.04	0.08 / 0.15	0.28 / 0.28	0.46 / 0.31	0.27 / 0.15	0.50 / 0.40

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	30	60	10	-	-	-	-	10	90	-	-
80D	50	50	-	-	-	-	5	15	80	-	-
60D	80	20	-	-	-	-	-	5	80	15	-
40D	80	20	-	-	-	-	-	5	70	25	-
20D	TOTE ROAD CROSSING										
0	25	45	-	-	30	-	15	15	60	10	-
20U	40	30	-	-	30	-	-	-	80	20	-
40U	15	25	-	-	60	-	-	-	60	40	-
60U	10	30	-	-	60	-	-	5	50	45	-
80U	10	30	-	-	60	-	-	5	50	45	-
100U	5	25	-	-	70	-	-	5	50	45	-

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-31-1 & CV-31-2

Dates Surveyed: 5 July & 25 August, 2018

UTM Coordinates: 17 W 521748 7952788 & 17 W 521749 7952776

Fisheries Data

Gear Used: Backpack Electrofisher

Transect Length (m): 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	5.97	14	2.35	48 - 77
	Fall	3.12	1	0.32	78
NNST	Summer	5.97	0	-	N/A
	Fall	3.12	0	-	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	M
NNST	N	N	N	N

Comments & Summary

Two channels in the same stream, immediately upstream of CV-104 on the Tote Road. Provide important rearing habitat for smaller juvenile char throughout the open water season, but particularly during summer. Water temperatures in survey streams during fall sampling averaged approximately 5°C and fish had already begun downstream movements towards overwintering habitat, likely reducing catches.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-31-1 & CV-31-2

Dates Surveyed: 5 July & 25 August, 2018

UTM Coordinates: 17 W 521748 7952788 & 17 W 521749 7952776

Photographs

NO PHOTO

NO PHOTO

NO PHOTO



A



B



C

Figure 1. Summer (top) and fall (bottom) views of CV-31-1 & CV-31-2 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-31-1 & CV-31-2

Dates Surveyed: 5 July & 25 August, 2018

UTM Coordinates: 17 W 521748 7952788 & 17 W 521749 7952776

Photographs

NO PHOTO

NO PHOTO

NO PHOTO



A



B



C

Figure 2. Summer (top) and fall (bottom) views of CV-31-1 & CV-31-2 at the 80 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-31-1 & CV-31-2

Dates Surveyed: 5 July & 25 August, 2018

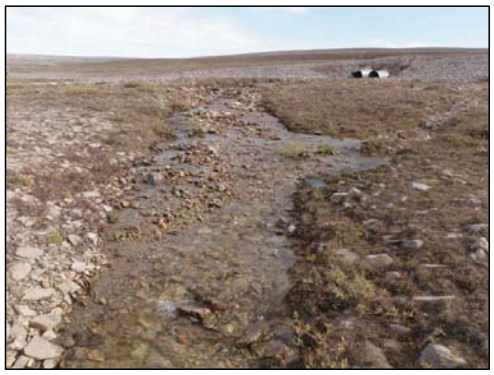
UTM Coordinates: 17 W 521748 7952788 & 17 W 521749 7952776

Photographs

NO PHOTO

NO PHOTO

NO PHOTO



A



B



C

Figure 3. Summer (top) and fall (bottom) views of CV-31-1 & CV-31-2 at the 60 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-31-1 & CV-31-2

Dates Surveyed: 5 July & 25 August, 2018

UTM Coordinates: 17 W 521748 7952788 & 17 W 521749 7952776

Photographs

NO PHOTO

NO PHOTO

NO PHOTO



A



B



C

Figure 4. Summer (top) and fall (bottom) views of CV-31-1 & CV-31-2 at the 40 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-31-1 & CV-31-2

Dates Surveyed: 5 July & 25 August, 2018

UTM Coordinates: 17 W 521748 7952788 & 17 W 521749 7952776

Photographs



A **B** **C**

Figure 5. Summer (top) and fall (bottom) views of CV-31-1 & CV-31-2 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-31-1 & CV-31-2

Dates Surveyed: 5 July & 25 August, 2018

UTM Coordinates: 17 W 521748 7952788 & 17 W 521749 7952776

Photographs

NO PHOTO

NO PHOTO

NO PHOTO



A



B



C

Figure 6. Summer (top) and fall (bottom) views of CV-31-1 & CV-31-2 at the 20 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-31-1 & CV-31-2

Dates Surveyed: 5 July & 25 August, 2018

UTM Coordinates: 17 W 521748 7952788 & 17 W 521749 7952776

Photographs

NO PHOTO

NO PHOTO

NO PHOTO



A



B



C

Figure 7. Summer (top) and fall (bottom) views of CV-31-1 & CV-31-2 at the 40 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-31-1 & CV-31-2

Dates Surveyed: 5 July & 25 August, 2018

UTM Coordinates: 17 W 521748 7952788 & 17 W 521749 7952776

Photographs



A B C

Figure 8. Summer (top) and fall (bottom) views of CV-31-1 & CV-31-2 at the 60 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-31-1 & CV-31-2

Dates Surveyed: 5 July & 25 August, 2018

UTM Coordinates: 17 W 521748 7952788 & 17 W 521749 7952776

Photographs



A **B** **C**

Figure 9. Summer (top) and fall (bottom) views of CV-31-1 & CV-31-2 at the 80 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-31-1 & CV-31-2

Dates Surveyed: 5 July & 25 August, 2018

UTM Coordinates: 17 W 521748 7952788 & 17 W 521749 7952776

Photographs



A **B** **C**

Figure 10. Summer (top) and fall (bottom) views of CV-31-1 & CV-31-2 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-31-3 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521763 7952346

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

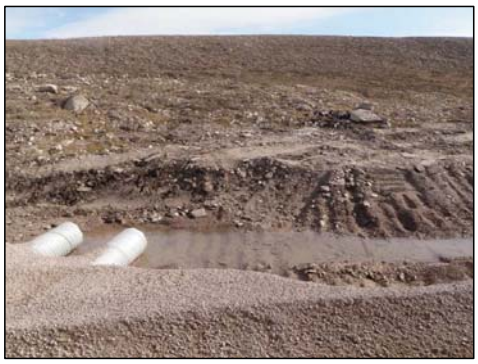
Comments & Summary

This was a dry hillside in 2018 with some ponding where it meets the Tote Road. There is no fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-31-3 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-31-4 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521772 7952278

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

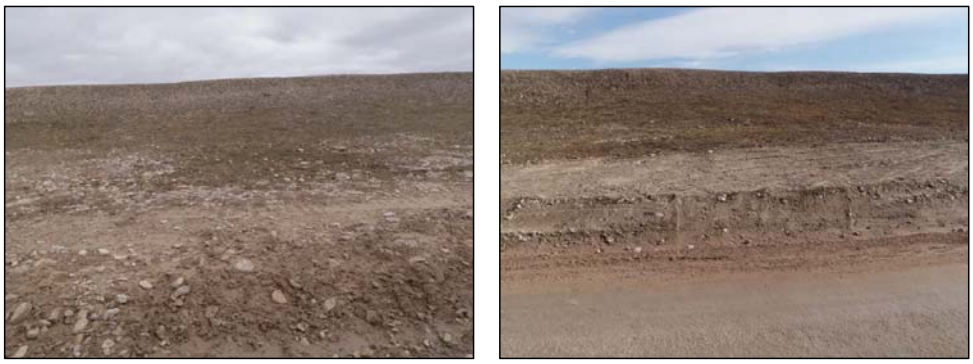
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry hillside in 2018. There is never fish habitat at this crossing.

Photographs



A **B**

Figure 1. Views of CV-31-4 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-32-1 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521827 7952066

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry hillside in 2018. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-32-1 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-32-2 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521882 7951861

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry hillside in 2018. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-32-2 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-32-3 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521946 7951620

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry hillside in 2018. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-32-3 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-32-4 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521983 7951453

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** > 10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a nearly dry, rocky depression on a hillside in 2018. Surface water was not maintained and there was no connectivity with other waterbodies. There is never fish habitat at this crossing.

Photographs



A **B**

Figure 1. Views of CV-32-4 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-33-1 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521990 7951011

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** N/A

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry hillside in 2018. There is never fish habitat at this crossing.

Photographs



A **B**

Figure 1. Views of CV-33-1 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-33-2 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521991 7950911

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** N/A

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a small trickle of water flowing over mostly terrestrial habitat and forming a pond at the Tote Road in 2018. There was no connection to Phillips Creek downstream. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-33-2 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-33-3 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521990 7950839

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** N/A

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry hillside in 2018. There is never fish habitat at this crossing.

Photographs



A **B**

Figure 1. Views of CV-33-3 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-33-4 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521976 7950733

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** N/A

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a thin layer of water flowing over rocks and terrestrial vegetation in 2018. There was insufficient water and no access from Phillips Creek. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-33-4 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-33-5 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521964 7950662

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** N/A

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a nearly dry hillside with some downstream pond formation at the Tote Road, but no connection with fish-bearing waterbodies. There is never fish habitat at this crossing.

Photographs



A **B**

Figure 1. Views of CV-33-5 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-33-6 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521947 7950568

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 2° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	6.0	- / 5.6	- / 0.09	- / 0.04	- / 0.08	- / 0.10	- / 0.13	- / 0.20	- / 0.29	- / 0.35
80D	12.5	- / 6.9	- / 0.02	-	- / 0.04	- / 0.05	- / 0.21	-	- / 0.40	- / 0.45
60D	12.8	- / 11.3	- / 0.02	- / 0.02	- / 0.02	- / 0.02	- / 0.09	- / 0.04	- / 0.07	- / 0.10
40D	13.5	- / 8.4	- / 0.04	-	- / 0.02	- / 0.05	- / 0.28	-	- / 0.12	- / 0.30
20D	20.0	- / 8.9	- / 0.04	-	- / 0.06	- / 0.08	- / 0.12	-	- / 0.24	- / 0.25
0	16.6	6.2 / 12.0	0.02 / -	0.06 / 0.02	0.06 / -	0.10 / 0.08	0.06 / -	0.02 / 0.11	0.10 / -	0.10 / 0.15
20U	22.0	- / 7.6	- / 0.01	-	- / 0.02	- / 0.05	- / 0.10	-	- / 0.12	- / 0.15
40U	24.5	8.1 / 8.1	0.07 / 0.04	0.01 / -	0.02 / 0.01	0.08 / 0.05	0.15 / 0.21	0.06 / -	0.16 / 0.08	0.20 / 0.25
60U	30.8	10.3 / 6.4	0.02 / 0.01	0.01 / -	0.02 / 0.04	0.03 / 0.05	0.14 / 0.11	0.04 / -	0.06 / 0.07	0.15 / 0.15
80U	21.7	6.0 / 8.6	0.03 / 0.02	0.02 / -	0.14 / -	0.15 / 0.11	0.12 / 0.20	0.09 / -	0.19 / -	0.20 / 0.20
100U	20.3	3.1 / 2.6	0.04 / 0.10	0.04 / -	0.03 / 0.08	0.05 / 0.10	0.06 / 0.05	0.19 / -	0.17 / 0.22	0.20 / 0.25

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	70	10	-	-	20	-	-	-	90	10	-
80D	60	10	-	-	30	-	-	-	90	10	-
60D	60	10	-	-	30	-	-	-	90	10	-
40D	80	10	-	-	10	-	20	10	70	-	-
20D	30	70	-	-	-	-	80	10	10	-	-
0	55	45	-	-	-	-	55	35	10	-	-
20U	60	40	-	-	-	-	20	-	80	-	-
40U	45	45	-	-	-	10	-	10	90	-	-
60U	45	50	-	-	-	5	30	5	65	-	-
80U	40	60	-	-	-	-	15	5	80	-	-
100U	30	70	-	-	-	-	15	5	80	-	-

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality

Arctic Char - IMPORTANT

Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-33-6 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521947 7950568

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	5.07	70	16.94	43 - 77
	Fall	3.00	3	1.00	34 - 42
NNST	Summer	5.07	0	-	N/A
	Fall	3.00	0	-	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	M
NNST	N	N	N	N

Comments & Summary

This rail crossing is immediately upstream of the Tote Road crossing at CV-102. This stream provides important rearing habitat for smaller juvenile Arctic Char throughout the open water season. Water temperatures in survey streams during fall sampling averaged approximately 5°C and fish had already begun downstream movements towards overwintering habitat.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-33-6 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521947 7950568

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of CV-33-6 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-33-6 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521947 7950568

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A **B** **C**

Figure 2. Summer (top) and fall (bottom) views of CV-33-6 at the 80 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-33-6 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521947 7950568

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 3. Summer (top) and fall (bottom) views of CV-33-6 at the 60 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

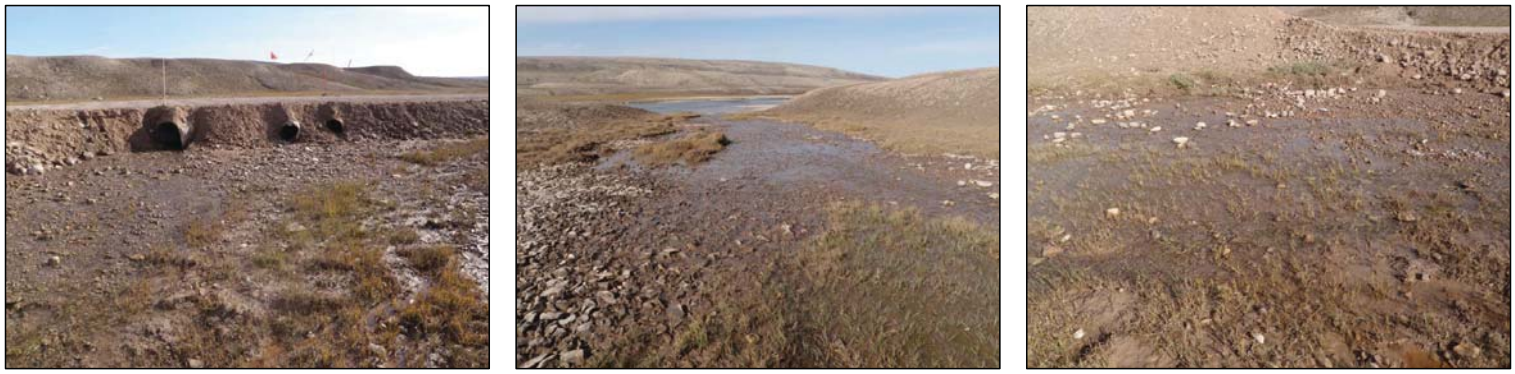
Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-33-6 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521947 7950568

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A **B** **C**

Figure 4. Summer (top) and fall (bottom) views of CV-33-6 at the 40 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-33-6 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521947 7950568

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A **B** **C**

Figure 5. Summer (top) and fall (bottom) views of CV-33-6 at the 20 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-33-6 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521947 7950568

Photographs



A **B** **C**

Figure 6. Summer (top) and fall (bottom) views of CV-33-6 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-33-6 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521947 7950568

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 7. Summer (top) and fall (bottom) views of CV-33-6 at the 20 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-33-6 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521947 7950568

Photographs



A **B** **C**

Figure 8. Summer (top) and fall (bottom) views of CV-33-6 at the 40 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-33-6 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521947 7950568

Photographs



A **B** **C**

Figure 9. Summer (top) and fall (bottom) views of CV-33-6 at the 60 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-33-6 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521947 7950568

Photographs



A **B** **C**

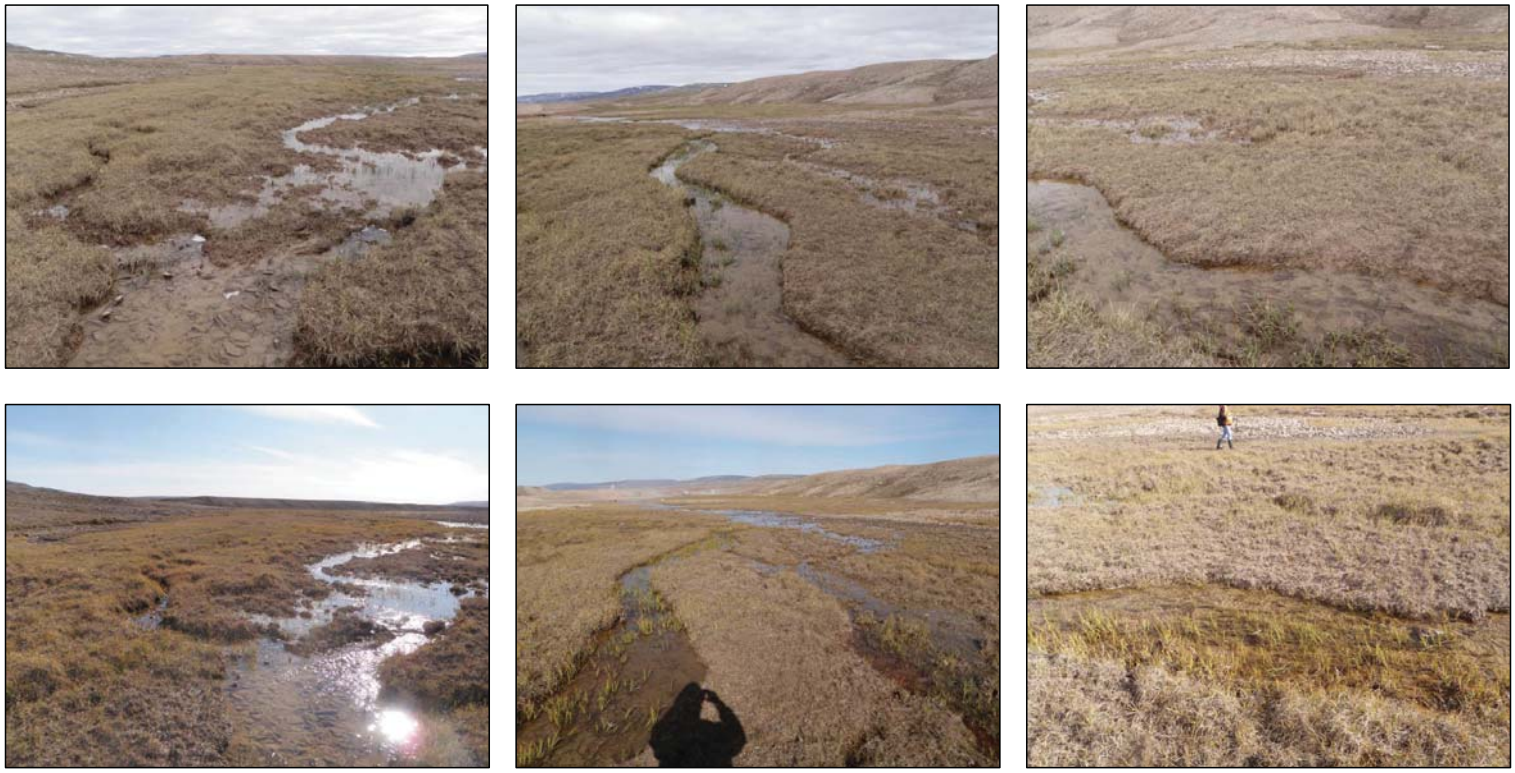
Figure 10. Summer (top) and fall (bottom) views of CV-33-6 at the 80 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-33-6 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521947 7950568

Photographs



A **B** **C**

Figure 11. Summer (top) and fall (bottom) views of CV-33-6 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-33-7 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521885 7950215

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** N/A

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a small, shallow, isolated pond at the edge of the Tote Road. It was fishless and would remain unconnected to other waterbodies under all flow regimes. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-33-7 (pond in the foreground) at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-34-1 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521789 7949673

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** N/A

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

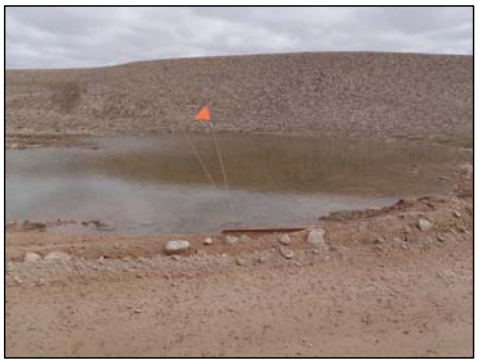
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a small, shallow, isolated pond that has formed alongside the Tote Road. It was fishless and not connected to other waterbodies . There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-34-1 (pond and adjacent inflow) at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING**
			Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-34-2 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521801 7949153

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** N/A

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry depression in 2018. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-34-2 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-35-2 **Date Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521947 7948828

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 4-5° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	-	-	-	-	-	-	-	-	-	-
80D	TOTE ROAD CROSSING									
60D	TOTE ROAD CROSSING									
40D	23.2	- / 6.2	- / 0.12	- / 0.14	- / 0.12	- / 0.15	- / 0.66	- / 0.56	- / 0.72	- / 0.75
20D	23.0	- / 10.8	- / 0.16	- / 0.20	- / 0.22	- / 0.25	- / 0.17	- / 0.22	- / 0.25	- / 0.30
0	16.9	11.7 / 13.5	0.30 / 0.20	0.10 / 0.20	0.27 / 0.44	0.30 / 0.50	0.09 / 0.37	0.54 / 0.15	0.36 / 0.13	0.60 / 0.45
20U	-	- / 7.9	- / 0.22	- / 0.16	- / 0.12	- / 0.25	- / 0.26	- / 0.46	- / 0.63	- / 0.65
40U	28.9	16.8 / 11.8	0.12 / 0.04	0.24 / 0.24	0.08 / 0.12	0.30 / 0.30	0.36 / 0.19	0.33 / 0.39	0.77 / 0.28	0.77 / 0.50
60U	29.8	10.5 / 10.7	0.30 / 0.08	0.19 / 0.26	0.16 / 0.24	0.30 / 0.30	0.39 / 0.39	0.32 / 0.53	0.78 / 0.60	0.78 / 0.65
80U	27.2	10.8 / 9.6	0.14 / 0.24	0.06 / 0.06	0.30 / 0.22	0.30 / 0.30	0.49 / 0.53	0.36 / 0.57	0.96 / 1.02	0.96 / 1.05
100U	27.7	6.2 / 15.1	0.15 / 0.08	0.26 / 0.18	0.12 / 0.20	0.30 / 0.30	0.22 / 0.31	0.61 / 0.69	0.48 / 0.41	0.61 / 0.70

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	-	-	-	-	-	-	-	-	-	-	-
80D	TOTE ROAD CROSSING										
60D	TOTE ROAD CROSSING										
40D	40	60	-	-	-	-	-	-	100	-	-
20D	40	50	10	-	-	-	-	-	100	-	-
0	50	35	15	-	-	-	5	-	85	10	-
20U	70	25	5	-	-	-	-	-	90	10	-
40U	75	15	10	-	-	-	5	-	80	15	-
60U	80	15	5	-	-	-	5	-	80	15	-
80U	80	15	5	-	-	-	5	-	75	20	-
100U	80	10	5	-	5	-	5	-	75	20	-

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality

Arctic Char - IMPORTANT

Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-35-2 **Date Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521947 7948828

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	5.77	16	2.77	74 - 150
	Fall	3.37	11	3.27	95 - 166
NNST	Summer	5.77	0	-	N/A
	Fall	3.37	0	-	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	M
NNST	N	N	N	N

Comments & Summary

This rail crossing is immediately upstream of CV-099 on the Tote Road. Provides important rearing habitat for several size classes of juvenile char throughout the open water season.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-35-2 **Date Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521947 7948828

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of CV-35-2 at the 40 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-35-2 **Date Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521947 7948828

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A **B** **C**

Figure 2. Summer (top) and fall (bottom) views of CV-35-2 at the 20 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-35-2 **Date Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521947 7948828

Photographs



A **B** **C**

Figure 3. Summer (top) and fall (bottom) views of CV-35-2 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-35-2 **Date Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521947 7948828

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A



B



C

Figure 4. Summer (top) and fall (bottom) views of CV-35-2 at the 20 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-35-2 **Date Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521947 7948828

Photographs



A B C

Figure 5. Summer (top) and fall (bottom) views of CV-35-2 at the 40 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-35-2 **Date Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521947 7948828

Photographs



A **B** **C**

Figure 6. Summer (top) and fall (bottom) views of CV-35-2 at the 60 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-35-2 **Date Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521947 7948828

Photographs



A **B** **C**

Figure 7. Summer (top) and fall (bottom) views of CV-35-2 at the 80 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-35-2 **Date Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 521947 7948828

Photographs



A **B** **C**

Figure 8. Summer (top) and fall (bottom) views of CV-35-2 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-35-4 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 522249 7948287

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** N/A

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a small, shallow marshy spot in 2018. There were no fish and no connections to other waterbodies. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-35-4 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-35-5 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 522298 7948170

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** N/A

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry low point in 2018. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-35-5 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-37-1 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 522533 7946398

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** N/A

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

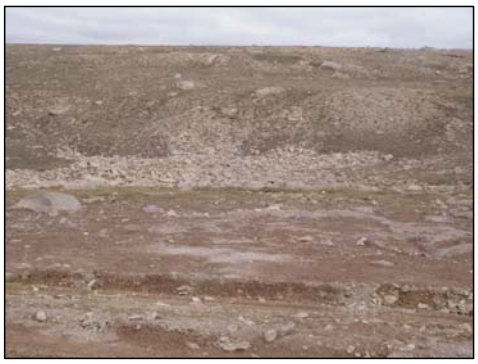
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This were a few puddles among rocks in 2018. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-37-1 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-38-1 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 522570 7946000

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** N/A

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a small trickle of water flowing over terrestrial habitat in 2018. Surface flows were not maintained downstream and there was no connectivity with other waterbodies. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-38-1 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-38-2 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 522646 7945802

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** N/A

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry, rocky, hillside depression in 2018. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-38-2 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-38-3 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 522846 7945387

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 5-10 **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This stream maintains sufficient flows and depths for fish use throughout the open-water period. However, a large, impassable, vertical barrier (waterfall) was previously identified approximately 30 m downstream of the Tote Road. Fish are present downstream of this waterfall, but they cannot access habitat near the rail crossing.

Photographs



A



B



C

Figure 1. Views of CV-38-3 at the rail crossing during summer, looking upstream (A) downstream (B) and across (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-38-3 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 522846 7945387

Photographs



A B C

Figure 2. Views of CV-38-3 at the rail crossing during fall, looking upstream (A) downstream (B) and across (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-39-1 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 523125 7944922

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was moist terrestrial habitat with some ponding at the Tote Road. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-39-1 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-40-1 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 523148 7944309

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** N/A

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a ditch pond alongside the Tote Road. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-40-1 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-40-2 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 523147 7944150

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a small amount of water flowing among and under a field of rocks. There was no connection to other waterbodies. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-40-2 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-40-3 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 523231 7943898

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry depression full of rocks. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-40-3 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-40-4 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 523301 7943665

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry low point in 2018. There is never fish habitat at this crossing.

Photographs



A **B**

Figure 1. Views of CV-40-4 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-41-1 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 523332 7943397

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry, grassy depression on a hillside in 2018. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-41-1 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-41-2 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 523342 7943311

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

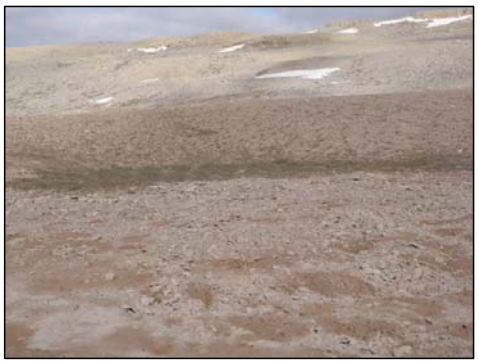
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry, grassy depression on a hillside in 2018. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-41-2 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-41-3 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 523359 794315

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry, rocky hillside in 2018. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-41-3 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-41-4 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 523351 7942963

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry, rocky low point in 2018. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-41-4 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-42-1 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 523423 7942323

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 2-5° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a thin trickle of water in 2018. Lack of surface flow in some areas and no connectivity to Phillips Creek prevent all fish access. There is never fish habitat at this crossing.

Photographs



A **B**

Figure 1. Views of CV-42-1 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-42-2 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 523475 7941603

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry depression in 2018. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-42-2 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-43-1 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 523647 7941268

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** > 10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

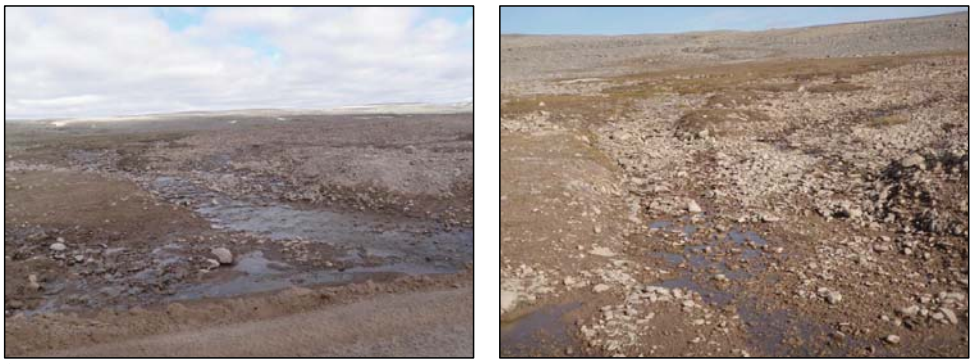
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This site had very low flows in both seasons surveyed in 2018. In addition, there are multiple soft barriers (subsurface flow and steep gradient) downstream of the crossing preventing access from Phillips Creek. There is never fish habitat at this crossing.

Photographs



A **B**

Figure 1. Views of CV-43-1 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-43-2 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 523721 7941127

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry, rocky low point in 2018. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-43-2 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-43-3 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 523738 7941095

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 5 to > 15° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This stream maintained sufficient flows and depths throughout the open-water period in 2018. However, there is a large, impassable vertical drop downstream of the Tote Road preventing fish access from Phillips Creek under all flow conditions. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-43-3 at the rail crossing (A) and downstream of the Tote Road, showing the vertical drop (B). Note that 43-4 joins with 43-3 upstream of the Tote Road.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

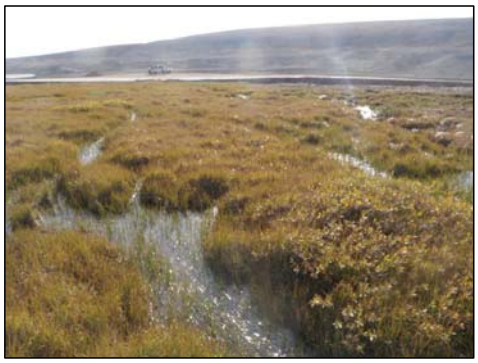
Location

Crossing ID: CV-43-3 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 523738 7941095

Photographs



A



B



C

Figure 2. Views of CV-43-3 at the rail crossing during fall, looking upstream (A) downstream (B) and across (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-43-4 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 523749 7941075

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 5 to > 15° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This stream maintained sufficient flows and depths throughout the open-water period in 2018. However, there is a large, impassable vertical drop downstream of the Tote Road preventing fish access from Phillips Creek under all flow conditions. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-43-4 at the rail crossing (A) and downstream of the Tote Road, showing the vertical drop (B). Note that 43-3 joins with 43-4 upstream of the Tote Road.

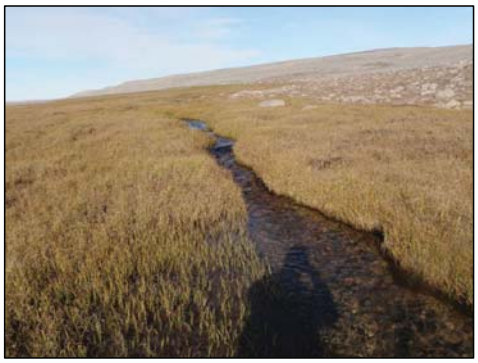
Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-43-4 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 523749 7941075

Photographs



A



B



C

Figure 2. Views of CV-43-4 at the rail crossing during fall, looking upstream (A) downstream (B) and across (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-43-5 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 523846 7940904

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 5 to > 10° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

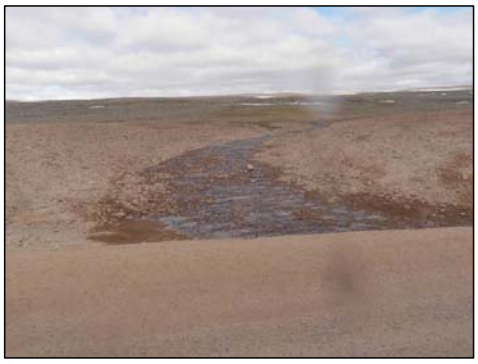
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

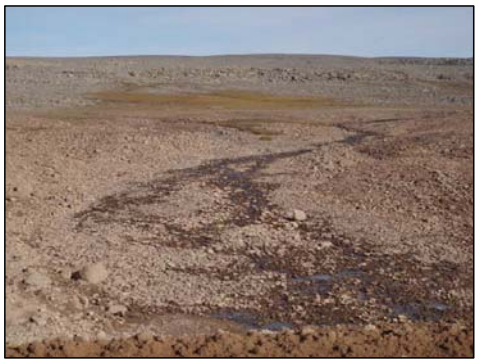
Comments & Summary

This stream maintained a small volume of flow throughout the open-water period in 2018. However, insufficient depths and steep vertical gradient downstream of the Tote Road prevent fish access from Phillips Creek. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-43-5 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-44-1 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 524074 7940563

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 5 to > 10° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a boulder field with small, unconnected puddles in 2018. There is never fish habitat at this crossing.

Photographs



A **B**

Figure 1. Views of CV-44-1 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-44-2 **Dates Surveyed:** 5 July & 25 August, 2018 **UTM Coordinates:** 17 W 524174 7940415

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 5 to > 15° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This maintained minimal flows during the open-water period in 2018. Downstream of the Tote Road is an impassable vertical barrier that prevents fish access to the rail site under all flow conditions. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-44-2 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-44-3 **Dates Surveyed:** 6 July & 25 August, 2018 **UTM Coordinates:** 17 W 524536 7939827

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 5 to > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This stream had a small amount of water flowing during summer, but was dry during fall, 2018. Downstream of the Tote Road is an impassable vertical barrier that prevents fish access to the rail site under all flow conditions. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-44-3 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-45-1 **Dates Surveyed:** 6 July & 25 August, 2018 **UTM Coordinates:** 17 W 525004 7938965

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry, low point in 2018. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-45-1 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-46-1 **Dates Surveyed:** 6 July & 25 August, 2018 **UTM Coordinates:** 17 W 525118 7938743

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a nearly dry, boulder field in 2018. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-46-1 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-46-1a | **Dates Surveyed:** 6 July & 25 August, 2018 | **UTM Coordinates:** 17 W 525226 7938529

General Physical Characteristics

Channel Confinement: UC | **Channel Gradient (range):** N/A | **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished | **Effort (min):** N/A | **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

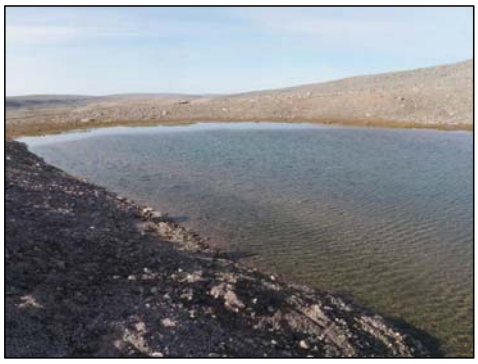
Comments & Summary

This was a small, shallow (< 1 m) pond with no connection to Phillips Creek. Depth is insufficient for overwintering. Fish were not observed. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-46-1a at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-46-2 **Dates Surveyed:** 6 July & 25 August, 2018 **UTM Coordinates:** 17 W 525278 7938537

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry depression adjacent to the CV-46-1a pond. There is never fish habitat at this crossing.

Photographs



A **B**

Figure 1. Views of CV-46-2 at the rail crossing during summer (A) and fall, with 46-1a in the foreground (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-46-3 **Dates Surveyed:** 4 July & 25 August, 2018 **UTM Coordinates:** 17 W 525380 7938336

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** > 10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was dry or nearly dry during the open-water period in 2018. There is no access from other waterbodies. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-46-3 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-46-4 **Dates Surveyed:** 4 July & 25 August, 2018 **UTM Coordinates:** 17 W 525394 7938239

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 5 to > 10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

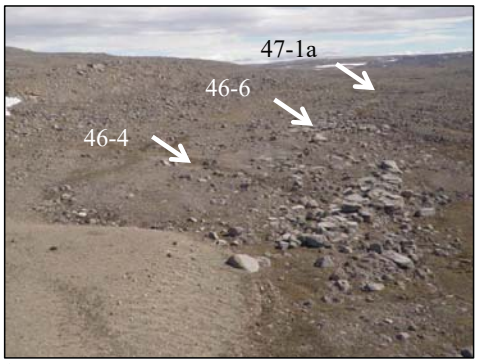
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This stream maintained a small amount of flow throughout the open-water period in 2018. However, there is a steep barrier downstream of the Tote Road preventing fish access from Phillips Creek under all flow conditions. There is never fish habitat at this crossing.

Photographs



A

Figure 1. Aerial view of CV-46-4 at the rail crossing with nearby 46-6 and 47-1a.

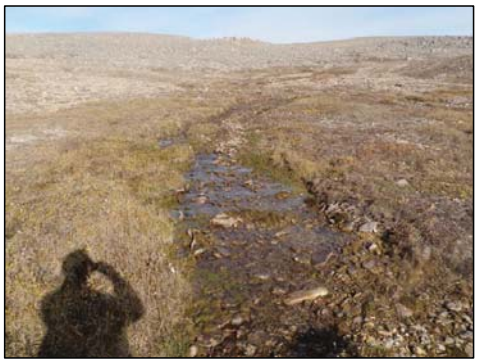
Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-46-4 **Dates Surveyed:** 4 July & 25 August, 2018 **UTM Coordinates:** 17 W 525394 7938239

Photographs



A



B



C

Figure 2. Views of CV-46-4 at the rail crossing during fall, looking upstream (A) downstream (B) and across (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-46-6 **Dates Surveyed:** 4 July & 25 August, 2018 **UTM Coordinates:** 17 W 525404 7938168

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 5 to > 10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

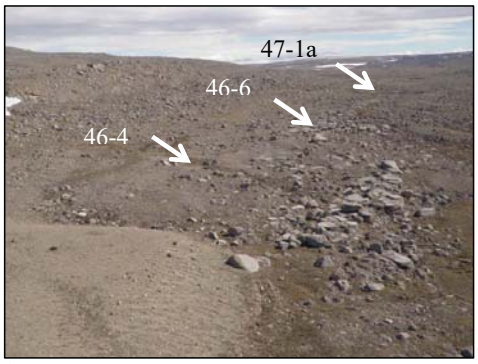
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This stream maintained a small amount of flow throughout the open-water period in 2018. However, there is a steep barrier downstream of the Tote Road preventing fish access from Phillips Creek under all flow conditions. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-46-6 at the rail crossing during summer (A) and fall (B). Note that these three crossings and 47-1b (not pictured) are all branches of the same stream.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-47-1 **Dates Surveyed:** 6 July & 25 August, 2018 **UTM Coordinates:** 17 W 525479 7937475

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 2-5° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	19.2	12.9 / 11.1	0.08 / 0.02	0.16 / 0.14	0.04 / 0.14	0.20 / 0.20	0.12 / 0.07	0.48 / 0.16	0.29 / 0.30	0.50 / 0.40
80D	14.8	12.3 / 10.7	0.14 / 0.14	0.12 / 0.08	0.03 / 0.16	0.15 / 0.20	0.49 / 0.41	0.53 / 0.58	0.19 / 0.45	0.53 / 0.60
60D	11.2	9.4 / 9.5	0.06 / 0.06	0.14 / 0.12	0.10 / 0.08	0.15 / 0.15	0.21 / 0.51	0.54 / 0.30	0.02 / 0.31	0.55 / 0.55
40D	10.9	10.0 / 10.0	0.03 / 0.14	0.04 / 0.20	0.20 / 0.04	0.20 / 0.20	0.05 / 0.07	0.14 / 1.09	0.85 / 0.21	0.85 / 1.10
20D	8.5	6.8 / 5.4	0.02 / 0.18	0.13 / 0.18	0.20 / 0.02	0.20 / 0.20	0.18 / 0.51	0.35 / 0.41	0.40 / 0.04	0.40 / 0.55
0	12.7	5.4 / 8.8	0.11 / 0.06	0.26 / 0.12	0.06 / 0.44	0.30 / 0.44	0.60 / 0.43	0.57 / 0.58	0.77 / 0.78	0.77 / 0.78
20U	17.5	8.7 / 6.9	0.04 / 0.18	0.14 / 0.12	0.10 / 0.04	0.15 / 0.20	0.12 / 0.75	0.59 / 0.58	0.53 / 0.13	0.59 / 0.75
40U	14.4	7.0 / 11.0	0.10 / 0.10	0.06 / 0.14	0.09 / 0.02	0.10 / 0.15	0.42 / 0.70	0.17 / 0.66	0.62 / 0.13	0.62 / 0.70
60U	27.7	12.2 / 7.1	0.26 / 0.12	0.06 / -	0.02 / 0.20	0.30 / 0.25	0.34 / 0.13	0.27 / -	0.33 / 0.27	0.35 / 0.30
80U	15.7	9.0 / 9.3	0.20 / 0.08	0.20 / 0.14	0.03 / 0.20	0.20 / 0.20	0.67 / 0.41	0.41 / 0.21	0.13 / 0.71	0.67 / 0.71
100U	11.5	7.6 / 7.8	0.08 / 0.22	0.12 / 0.08	0.12 / 0.10	0.15 / 0.25	0.01 / 0.61	0.41 / 0.22	0.95 / 0.31	0.95 / 0.70

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	65	35	-	-	-	-	-	5	75	20	-
80D	65	35	-	-	-	-	-	5	75	20	-
60D	80	20	-	-	-	-	-	10	70	20	-
40D	70	30	-	-	-	-	-	10	70	20	-
20D	80	20	-	-	-	-	-	10	70	20	-
0	80	15	5	-	-	-	-	5	65	25	5
20U	80	20	-	-	-	-	-	-	60	30	10
40U	80	20	-	-	-	-	-	5	60	30	5
60U	70	25	5	-	-	-	-	5	60	30	5
80U	80	20	-	-	-	-	-	5	55	30	10
100U	65	25	-	-	10	-	-	5	55	30	10

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality

Arctic Char - IMPORTANT

Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-47-1 **Dates Surveyed:** 6 July & 25 August, 2018 **UTM Coordinates:** 17 W 525479 7937475

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	7.47	40	5.36	59 - 143
	Fall	3.15	8	2.54	96 - 138
NNST	Summer	7.47	0	-	N/A
	Fall	3.15	0	-	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	N
NNST	N	N	N	N

Comments & Summary

This rail crossing is immediately upstream of CV-079 on the Tote Road. Provides important rearing habitat for several size classes of juvenile char throughout the open water season, but particularly during summer. Water temperatures in survey streams during fall sampling averaged approximately 5°C and fish had already begun downstream movements towards overwintering habitat, reducing catches.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-47-1 **Dates Surveyed:** 6 July & 25 August, 2018 **UTM Coordinates:** 17 W 525479 7937475

Photographs



A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of CV-47-1 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-47-1 **Dates Surveyed:** 6 July & 25 August, 2018 **UTM Coordinates:** 17 W 525479 7937475

Photographs



A B C

Figure 2. Summer (top) and fall (bottom) views of CV-47-1 at the 80 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-47-1 **Dates Surveyed:** 6 July & 25 August, 2018 **UTM Coordinates:** 17 W 525479 7937475

Photographs



A **B** **C**

Figure 3. Summer (top) and fall (bottom) views of CV-47-1 at the 60 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-47-1 **Dates Surveyed:** 6 July & 25 August, 2018 **UTM Coordinates:** 17 W 525479 7937475

Photographs



A **B** **C**

Figure 4. Summer (top) and fall (bottom) views of CV-47-1 at the 40 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-47-1 **Dates Surveyed:** 6 July & 25 August, 2018 **UTM Coordinates:** 17 W 525479 7937475

Photographs



A **B** **C**

Figure 5. Summer (top) and fall (bottom) views of CV-47-1 at the 20 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-47-1 **Dates Surveyed:** 6 July & 25 August, 2018 **UTM Coordinates:** 17 W 525479 7937475

Photographs



A B C

Figure 6. Summer (top) and fall (bottom) views of CV-47-1 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-47-1 **Dates Surveyed:** 6 July & 25 August, 2018 **UTM Coordinates:** 17 W 525479 7937475

Photographs



A B C

Figure 7. Summer (top) and fall (bottom) views of CV-47-1 at the 20 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-47-1 **Dates Surveyed:** 6 July & 25 August, 2018 **UTM Coordinates:** 17 W 525479 7937475

Photographs



A B C

Figure 8. Summer (top) and fall (bottom) views of CV-47-1 at the 40 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-47-1 **Dates Surveyed:** 6 July & 25 August, 2018 **UTM Coordinates:** 17 W 525479 7937475

Photographs



A B C

Figure 9. Summer (top) and fall (bottom) views of CV-47-1 at the 60 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-47-1 **Dates Surveyed:** 6 July & 25 August, 2018 **UTM Coordinates:** 17 W 525479 7937475

Photographs



A B C

Figure 10. Summer (top) and fall (bottom) views of CV-47-1 at the 80 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-47-1 **Dates Surveyed:** 6 July & 25 August, 2018 **UTM Coordinates:** 17 W 525479 7937475

Photographs



A B C

Figure 11. Summer (top) and fall (bottom) views of CV-47-1 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-47-1a | **Dates Surveyed:** 4 July & 25 August, 2018 | **UTM Coordinates:** 17 W 525415 7938089

General Physical Characteristics

Channel Confinement: PC | **Channel Gradient (range):** 5 to > 10° | **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished | **Effort (min):** N/A | **Transect Length (m):** N/A

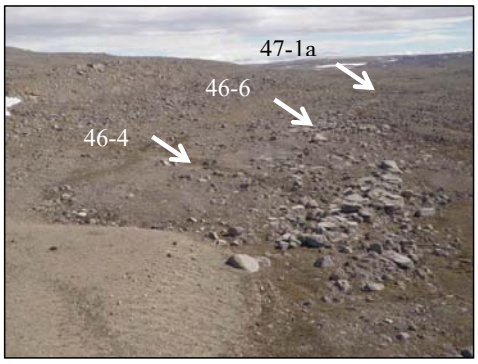
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This stream was dry or nearly dry during the open-water period in 2018. In addition, there is a steep barrier downstream of the Tote Road (shared by other streams in this valley) preventing fish access from Phillips Creek under all flow conditions. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-47-1a at the rail crossing during summer (A) and fall (B). Note that these three crossings and 47-1b (not pictured) are all branches of the same stream.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-47-1b | **Dates Surveyed:** 4 July & 25 August, 2018 | **UTM Coordinates:** 17 W 525454 7937939

General Physical Characteristics

Channel Confinement: UC | **Channel Gradient (range):** 2 to > 10° | **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished | **Effort (min):** N/A | **Transect Length (m):** N/A

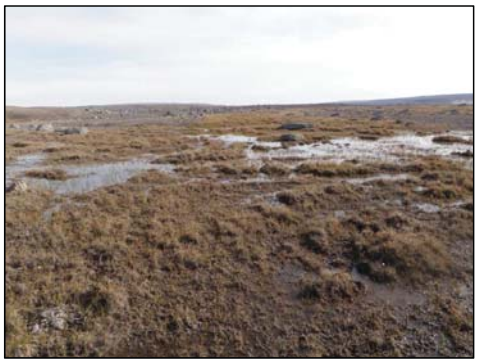
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was marshy with little flow during the open-water period in 2018. In addition, there is a steep barrier downstream of the Tote Road (shared by other streams in this valley) preventing fish access from Phillips Creek under all flow conditions. There is never fish habitat at this crossing.

Photographs



A

Figure 1. Views of CV-47-1b at the rail crossing during fall (A). Note that 47-1b and 46-4, 46-6, and 47-1a are all branches of the same stream.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-47-2 **Dates Surveyed:** 6 July & 25 August, 2018 **UTM Coordinates:** 17 W 525454 7937939

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 2-5° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	N
NNST	N	N	N	N

Comments & Summary

This is part of the braided stream system that includes CV-47-1. This particular branch is smaller and may dry up during periods of low water. When wetted, as it was in 2018, CV-47-2 provides important juvenile char rearing habitat. For additional hydrology, habitat and fisheries information, see CV-47-1.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT**
			Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-47-2 **Dates Surveyed:** 6 July & 25 August, 2018 **UTM Coordinates:** 17 W 525454 7937939

Photographs



A B C

Figure 1. Summer (top) and fall (bottom) views of CV-47-2 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT**
			Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-47-3 **Dates Surveyed:** 6 July & 25 August, 2018 **UTM Coordinates:** 17 W 525704 7937307

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 2-5° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	L	N
NNST	N	N	N	N

Comments & Summary

This braid was dry during 2018 sampling, but is known to be wetted during period of very high flows (observed during annual Tote Road monitoring). Under such flow conditions, it may provide some rearing habitat.

Photographs



A

Figure 1. View of CV-47-3 at the rail crossing during fall.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-48-1 **Dates Surveyed:** 4 July & 30 August, 2018 **UTM Coordinates:** 17 W 525839 7937127

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 5-10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

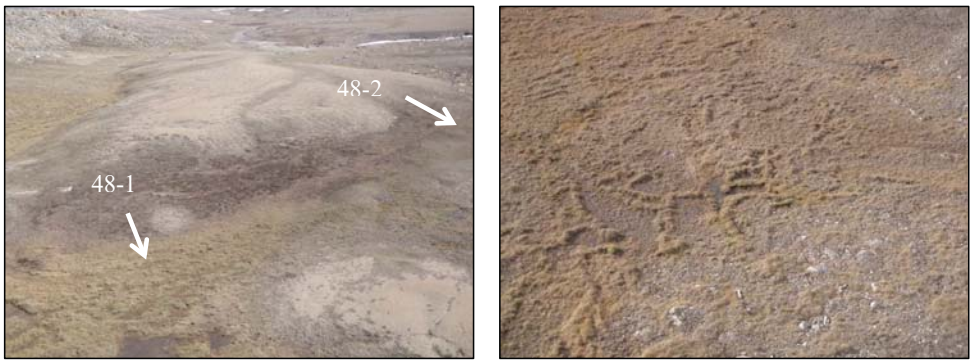
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was nearly dry marshy to dry during the open-water period in 2018. There were no connections to other waterbodies. There is never fish habitat at this crossing.

Photographs



A **B**

Figure 1. Views of CV-48-1 at the rail crossing, with nearby 48-2, during summer (A) and during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-48-2 **Dates Surveyed:** 4 July & 30 August, 2018 **UTM Coordinates:** 17 W 525916 7937063

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** N/A **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

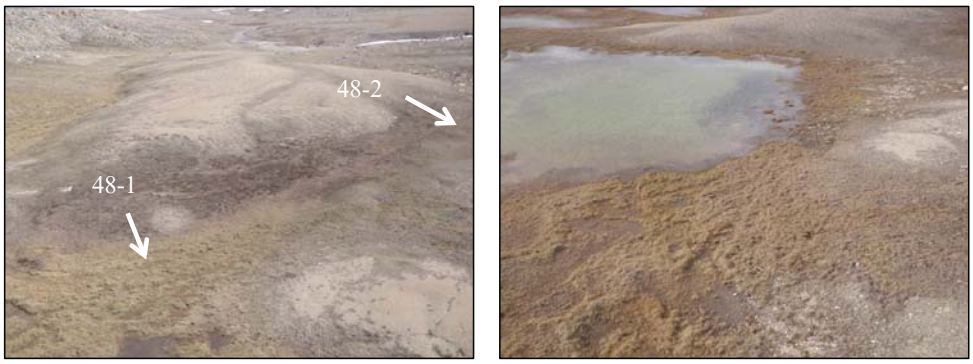
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a marshy area with adjacent shallow, fishless pond. There were no connections to other waterbodies. There is never fish habitat at this crossing.

Photographs



A **B**

Figure 1. Views of CV-48-2 at the rail crossing, with nearby 48-1, during summer (A) and during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-48-3 **Dates Surveyed:** 4 July & 30 August, 2018 **UTM Coordinates:** 17 W 526356 7936875

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a very steep, dry channel that joins with fish-bearing 48-4 downstream. However, the vertical barrier is impassable under all flow conditions. There is never fish habitat at this crossing.

Photographs



A

Figure 1. View of CV-48-3 at the rail crossing during fall.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-48-4 alternate **Date Surveyed:** 4 July 2018 **UTM Coordinates:** 17 W 526726 7936794

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 4-6° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	21.2	15.7	0.14	0.20	0.06	0.20	0.45	0.51	0.50	0.55
80D	17.9	10.6	0.10	0.28	0.10	0.30	0.83	0.31	0.28	0.85
60D	22.6	17.0	0.14	0.28	0.03	0.30	0.59	1.17	0.41	1.20
40D	19.5	12.4	0.16	0.12	0.06	0.20	0.37	0.94	0.56	0.95
20D	13.3	11.7	0.20	0.13	0.14	0.20	0.41	0.34	0.12	0.45
0	13.5	9.6	0.14	0.22	0.20	0.25	0.34	0.41	1.21	1.25
20U	9.7	7.8	0.22	0.30	0.16	0.30	0.35	0.60	0.71	0.75
40U	10.5	8.6	0.06	0.18	0.26	0.30	0.23	0.48	1.09	1.10
60U	10.1	7.9	0.44	0.07	0.19	0.45	0.59	0.04	0.37	0.65
80U	13.4	10.7	0.10	0.12	0.12	0.15	0.65	0.62	1.21	1.25
100U	11.0	6.2	0.12	0.19	0.16	0.20	0.32	0.64	0.19	0.65

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	70	30	-	-	-	-	-	5	70	20	5
80D	70	25	5	-	-	-	-	5	70	20	5
60D	70	25	5	-	-	-	-	5	65	20	10
40D	70	30	-	-	-	-	-	5	65	20	10
20D	70	25	-	-	5	-	-	5	65	20	10
0	70	15	5	-	10	-	-	5	50	25	20
20U	70	15	5	-	10	-	-	5	50	25	20
40U	70	20	5	-	5	-	-	5	50	25	20
60U	60	25	10	-	5	-	-	5	60	20	15
80U	75	25	-	-	-	-	-	5	60	25	10
100U	70	30	-	-	-	-	-	5	65	25	5

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality

Arctic Char - IMPORTANT

Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-48-4 alternate **Date Surveyed:** 4 July 2018 **UTM Coordinates:** 17 W 526726 7936794

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	5.78	2	0.35	~100 - 150
	Fall	N/A	-	-	-
NNST	Summer	5.78	0	-	N/A
	Fall	N/A	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	N
NNST	N	N	N	N

Comments & Summary

Note: GPS failed and lost all coordinates immediately prior to sampling here. Rail crossing location was a best estimate from the map and was approximately 240 m upstream of the actual crossing. Treat these data as an upstream extension of the fall assessment. Still abundant, important juvenile char habitat in this reach during the open water season.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-48-4 alternate **Date Surveyed:** 4 July 2018 **UTM Coordinates:** 17 W 526726 7936794

Photographs



A **B** **C**

Figure 1. 100 m (top) and 80 m (bottom) downstream cross-section views of CV-48-4 alternate; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-48-4 alternate **Date Surveyed:** 4 July 2018 **UTM Coordinates:** 17 W 526726 7936794

Photographs



A **B** **C**

Figure 2. 60 m (top) and 40 m (bottom) downstream cross-section views of CV-48-4 alternate; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-48-4 alternate **Date Surveyed:** 4 July 2018 **UTM Coordinates:** 17 W 526726 7936794

Photographs



A **B** **C**

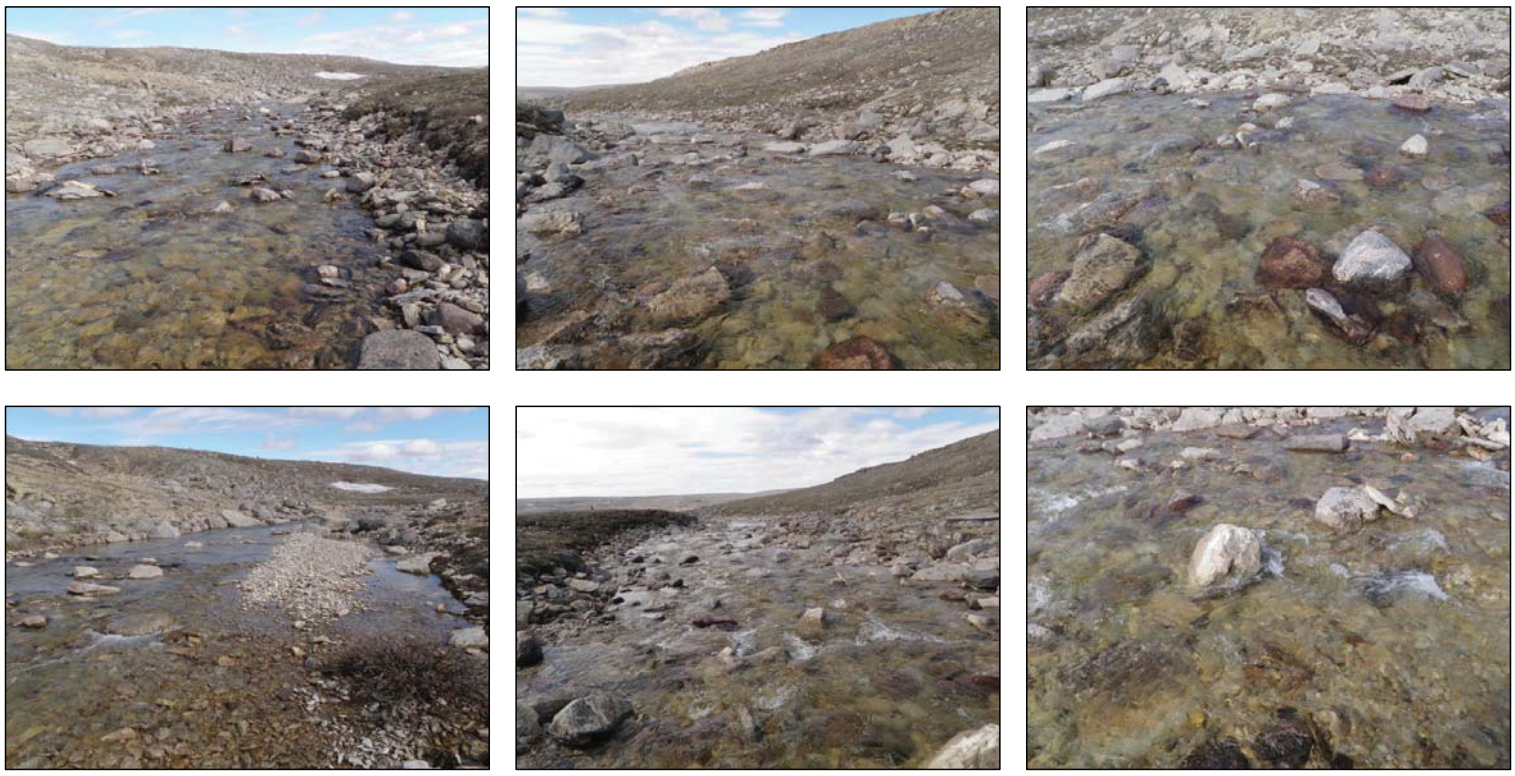
Figure 3. 20 m downstream (top) and rail crossing (bottom) cross-section views of CV-48-4 alternate; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-48-4 alternate **Date Surveyed:** 4 July 2018 **UTM Coordinates:** 17 W 526726 7936794

Photographs



A **B** **C**

Figure 4. 20 m (top) and 40 m (bottom) upstream cross-section views of CV-48-4 alternate; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-48-4 alternate **Date Surveyed:** 4 July 2018 **UTM Coordinates:** 17 W 526726 7936794

Photographs



A **B** **C**

Figure 5. 60 m (top) and 80 m (bottom) upstream cross-section views of CV-48-4 alternate; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-48-4 alternate **Date Surveyed:** 4 July 2018 **UTM Coordinates:** 17 W 526726 7936794

Photographs



A **B** **C**

Figure 6. 100 m upstream cross-section view of CV-48-4 alternate; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-48-4 **Date Surveyed:** 30 August 2018 **UTM Coordinates:** 17 W 526523 7936807

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 4-6° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	13.8	10.4	0.13	0.12	0.11	0.15	0.37	0.09	0.43	0.50
80D	11.0	9.0	0.11	0.15	0.06	0.15	0.36	0.47	0.42	0.50
60D	10.0	7.5	0.04	0.08	0.03	0.10	0.31	0.52	0.35	0.55
40D	9.9	4.4	0.14	0.14	0.09	0.15	0.30	0.38	0.28	0.40
20D	11.7	10.2	0.11	0.12	0.20	0.20	0.63	0.38	0.26	0.65
0	13.1	7.7	0.12	0.28	0.14	0.30	0.33	0.19	0.73	0.75
20U	10.0	7.0	0.02	0.18	0.13	0.20	0.23	0.33	0.44	0.50
40U	10.0	8.3	0.08	0.17	0.06	0.20	0.55	0.44	0.37	0.60
60U	15.0	13.2	0.08	0.04	0.08	0.10	0.47	0.50	0.56	0.60
80U	21.5	15.6	0.12	0.08	0.04	0.15	0.36	0.23	0.17	0.40
100U	22.0	12.2	0.15	0.16	0.02	0.20	0.41	0.11	0.21	0.50

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	60	40	-	-	-	-	-	-	60	30	10
80D	70	30	-	-	-	-	-	-	60	30	10
60D	70	30	-	-	-	-	-	-	60	30	10
40D	70	30	-	-	-	-	-	-	60	30	10
20D	70	30	-	-	-	-	-	-	60	30	10
0	60	30	5	-	5	-	-	-	50	40	10
20U	60	30	-	-	10	-	-	-	50	40	10
40U	60	30	-	-	10	-	-	-	50	40	10
60U	60	30	-	-	10	-	-	-	60	35	5
80U	60	40	-	-	-	-	-	-	60	40	-
100U	70	30	-	-	-	-	-	-	60	40	-

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality

Arctic Char - IMPORTANT

Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-48-4 **Date Surveyed:** 30 August 2018 **UTM Coordinates:** 17 W 526523 7936807

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	N/A	-	-	-
	Fall	3.78	0	-	N/A
NNST	Summer	N/A	-	-	-
	Fall	3.78	0	-	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	N
NNST	N	N	N	N

Comments & Summary

Provides important rearing habitat for several size classes of juvenile char throughout the open water season, but particularly during summer. Water temperatures in survey streams during fall sampling averaged approximately 5°C and fish had already begun downstream movements towards overwintering habitat, reducing catches. Note that the summary assessment was actually conducted 240 m upstream of this location due to a GPS malfunction (see CV-48-4 alternate sheet).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-48-4 **Date Surveyed:** 30 August 2018 **UTM Coordinates:** 17 W 526523 7936807

Photographs



A **B** **C**

Figure 1. 100 m (top) and 80 m (bottom) downstream cross-section views of CV-48-4; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-48-4 **Date Surveyed:** 30 August 2018 **UTM Coordinates:** 17 W 526523 7936807

Photographs



A **B** **C**

Figure 2. 60 m (top) and 40 m (bottom) downstream cross-section views of CV-48-4; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-48-4 **Date Surveyed:** 30 August 2018 **UTM Coordinates:** 17 W 526523 7936807

Photographs



A **B** **C**

Figure 3. 20 m downstream (top) and rail crossing (bottom) cross-section views of CV-48-4; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-48-4 **Date Surveyed:** 30 August 2018 **UTM Coordinates:** 17 W 526523 7936807

Photographs



A B C

Figure 4. 20 m (top) and 40 m (bottom) upstream cross-section views of CV-48-4; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-48-4 **Date Surveyed:** 30 August 2018 **UTM Coordinates:** 17 W 526523 7936807

Photographs



A **B** **C**

Figure 5. 60 m (top) and 80 m (bottom) upstream cross-section views of CV-48-4; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-48-4 **Date Surveyed:** 30 August 2018 **UTM Coordinates:** 17 W 526523 7936807

Photographs



A **B** **C**

Figure 6. 100 m upstream cross-section view of CV-48-4; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-49-1 **Dates Surveyed:** 4 July & 30 August, 2018 **UTM Coordinates:** 17 W 526690 7936443

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

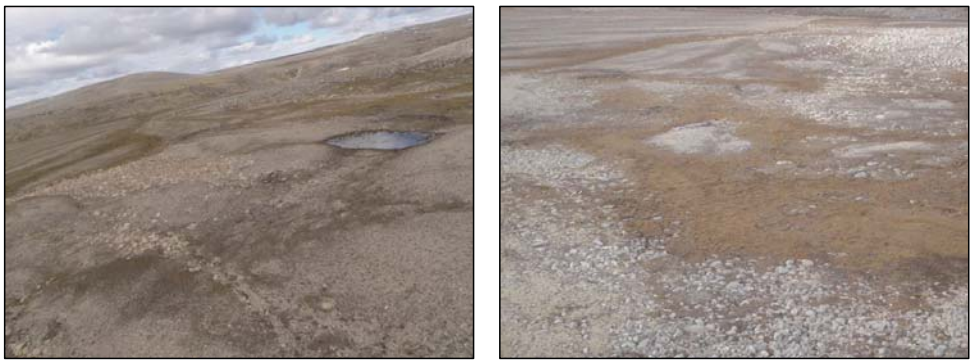
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a nearly dry marshy area with occasional shallow, isolated ponds. There is never fish habitat at this crossing.

Photographs



A **B**

Figure 1. Aerial views of CV-49-1 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-49-2 **Dates Surveyed:** 4 July & 30 August, 2018 **UTM Coordinates:** 17 W 526737 7936101

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

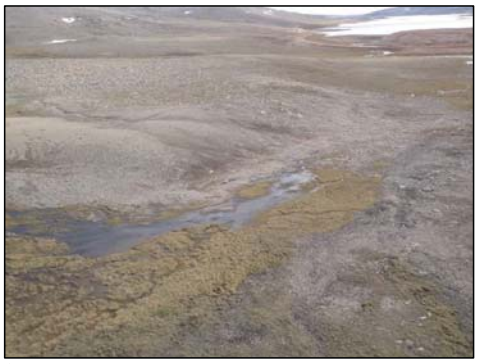
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was slightly wetted during summer and nearly dry during fall, 2018. The Tote Road crossing (> 500 m downstream) is known to provide marginal fish habitat; however, there are multiple soft barriers (subsurface water, lack of channel) between road and rail that prevent movements farther upstream. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Aerial views of CV-49-2 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-49-3 **Dates Surveyed:** 4 July & 30 August, 2018 **UTM Coordinates:** 17 W 526788 7935730

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

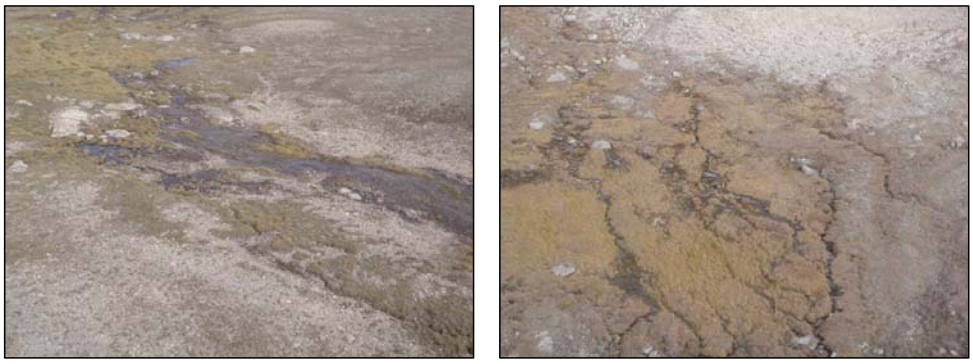
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing is in the same watershed as 49-2 and shares many characteristics. The Tote Road crossing (> 500 m downstream) is known to provide marginal fish habitat. Periods of very high water may allow access upstream of the soft barriers (subsurface water) between the road and rail. Fish use of this crossing would be rare, at best.

Photographs



A **B**

Figure 1. Aerial views of CV-49-3 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-50-1 **Dates Surveyed:** 8 July & 30 August, 2018 **UTM Coordinates:** 17 W 526835 7935393

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry low point. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-50-1 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-50-2 **Dates Surveyed:** 8 July & 30 August, 2018 **UTM Coordinates:** 17 W 526863 7935175

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This site was a few isolated, shallow, fishless puddles during summer and nearly dry during fall. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-50-2 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-50-3 **Dates Surveyed:** 8 July & 30 August, 2018 **UTM Coordinates:** 17 W 526868 7935095

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a nearly dry hillside. There is never fish habitat at this crossing.

Photographs



A **B**

Figure 1. Views of CV-50-3 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-50-4 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 526874 7934905

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry hillside. There is never fish habitat at this crossing.

Photographs



A B

Figure 1. Views of CV-50-4 at the rail crossing during summer, with nearby 50-4a (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-50-4a | **Dates Surveyed:** 8 July & 27 August, 2018 | **UTM Coordinates:** 17 W 526876 7934875

General Physical Characteristics

Channel Confinement: UC | **Channel Gradient (range):** N/A | **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished | **Effort (min):** N/A | **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry hillside. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-50-4a at the rail crossing during summer, with nearby 50-4 (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-50-4b | **Dates Surveyed:** 8 July & 27 August, 2018 | **UTM Coordinates:** 17 W 526888 7934776

General Physical Characteristics

Channel Confinement: UC | **Channel Gradient (range):** N/A | **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished | **Effort (min):** N/A | **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry hillside. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-50-4b at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-50-5 & CV-50-6 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 526924 7934630 & 17 W 526926 7934620

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 7-15° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	6.0	- / 2.4	- / 0.15	- / 0.17	- / 0.11	- / 0.20	- / 0.35	- / 0.16	- / 0.26	- / 0.40
80D	6.0	- / 3.4	- / 0.07	- / 0.17	- / 0.11	- / 0.20	- / 0.26	- / 0.68	- / 0.50	- / 0.70
60D	TOTE ROAD CROSSING									
40D	8.0	- / 4.0	- / 0.11	- / 0.11	- / 0.09	- / 0.15	- / 0.01	- / 0.81	- / 0.62	- / 0.85
20D	10.0	- / 5.6	- / 0.14	- / 0.11	- / 0.07	- / 0.15	- / 0.15	- / 0.00	- / 0.57	- / 0.60
0	9.2	8.3 / 7.7	0.20 / 0.06	0.10 / 0.14	0.10 / 0.15	0.20 / 0.20	0.24 / 0.05	0.31 / 0.46	0.40 / 0.78	0.45 / 0.80
20U	13.7	10.2 / 10.5	0.08 / 0.13	0.12 / 0.07	0.12 / 0.10	0.15 / 0.15	0.83 / 0.48	1.03 / 0.19	0.28 / 0.63	1.05 / 0.65
40U	16.9	6.9 / 4.4	0.04 / 0.20	0.10 / 0.24	0.08 / 0.20	0.15 / 0.25	0.06 / 0.01	1.05 / 0.84	0.32 / 0.18	1.05 / 0.85
60U	10.7	6.4 / 4.5	0.22 / 0.07	0.08 / 0.10	0.38 / 0.25	0.40 / 0.30	0.69 / 0.21	0.29 / 0.42	0.32 / 0.03	0.70 / 0.45
80U	-	- / 7.4	- / 0.10	- / 0.13	- / 0.15	- / 0.20	- / 0.25	- / 0.21	- / 0.56	- / 0.60
100U	FALLS BARRIER									

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	75	25	-	-	-	-	-	5	85	10	-
80D	75	25	-	-	-	-	-	5	85	10	-
60D	TOTE ROAD CROSSING										
40D	80	15	-	-	5	-	-	5	80	15	-
20D	75	15	-	-	10	-	-	5	80	15	-
0	70	10	-	-	20	-	-	-	70	25	5
20U	50	20	-	-	30	-	-	5	50	40	5
40U	10	30	-	-	60	-	-	-	40	40	20
60U	10	35	-	-	55	-	-	-	30	40	30
80U	30	30	-	-	40	-	-	-	20	30	50
100U	FALLS BARRIER										

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality

Arctic Char - IMPORTANT

Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-50-5 & CV-50-6

Dates Surveyed: 8 July & 27 August, 2018

UTM Coordinates: 17 W 526924 7934630 & 17 W 526926 7934620

Fisheries Data

Gear Used: Backpack Electrofisher

Transect Length (m): 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	5.15	14	2.72	53 - 101
	Fall	N/A	-	-	-
NNST	Summer	5.15	0	-	N/A
	Fall	N/A	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	N
NNST	N	N	N	N

Comments & Summary

These rail crossings are immediately upstream of CV-072 on the Tote Road. CV-50-6 provides important rearing habitat for several size classes of juvenile char throughout the open water season, but particularly during summer. Water temperatures in survey streams during fall sampling averaged approximately 5°C and fish had already begun downstream movements towards overwintering habitat, reducing catches. Note that the main channel is CV-50-6 while CV-50-5 is only intermittently wet (see Figure 10 below), providing marginal habitat for char.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-50-5 & CV-50-6

Dates Surveyed: 8 July & 27 August, 2018

UTM Coordinates: 17 W 526924 7934630 & 17 W 526926 7934620

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A



B



C

Figure 1. Summer (top) and fall (bottom) views of CV-50-6 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-50-5 & CV-50-6

Dates Surveyed: 8 July & 27 August, 2018

UTM Coordinates: 17 W 526924 7934630 & 17 W 526926 7934620

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A



B



C

Figure 2. Summer (top) and fall (bottom) views of CV-50-6 at the 80 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-50-5 & CV-50-6

Dates Surveyed: 8 July & 27 August, 2018

UTM Coordinates: 17 W 526924 7934630 & 17 W 526926 7934620

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A



B



C

Figure 3. Summer (top) and fall (bottom) views of CV-50-6 at the 40 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-50-5 & CV-50-6

Dates Surveyed: 8 July & 27 August, 2018

UTM Coordinates: 17 W 526924 7934630 & 17 W 526926 7934620

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A



B



C

Figure 4. Summer (top) and fall (bottom) views of CV-50-6 at the 20 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-50-5 & CV-50-6

Dates Surveyed: 8 July & 27 August, 2018

UTM Coordinates: 17 W 526924 7934630 & 17 W 526926 7934620

Photographs



A B C

Figure 5. Summer (top) and fall (bottom) views of CV-50-6 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-50-5 & CV-50-6

Dates Surveyed: 8 July & 27 August, 2018

UTM Coordinates: 17 W 526924 7934630 & 17 W 526926 7934620

Photographs



A B C

Figure 6. Summer (top) and fall (bottom) views of CV-50-6 at the 20 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-50-5 & CV-50-6

Dates Surveyed: 8 July & 27 August, 2018

UTM Coordinates: 17 W 526924 7934630 & 17 W 526926 7934620

Photographs



A B C

Figure 7. Summer (top) and fall (bottom) views of CV-50-6 at the 40 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-50-5 & CV-50-6

Dates Surveyed: 8 July & 27 August, 2018

UTM Coordinates: 17 W 526924 7934630 & 17 W 526926 7934620

Photographs



A B C

Figure 8. Summer (top) and fall (bottom) views of CV-50-6 at the 60 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-50-5 & CV-50-6

Dates Surveyed: 8 July & 27 August, 2018

UTM Coordinates: 17 W 526924 7934630 & 17 W 526926 7934620

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A



B



C

Figure 9. Summer (top) and fall (bottom) views of CV-50-6 at the 80 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-50-5 & CV-50-6

Dates Surveyed: 8 July & 27 August, 2018

UTM Coordinates: 17 W 526924 7934630 & 17 W 526926 7934620

Photographs



A B C

Figure 10. Summer (top) and fall (bottom) views of CV-50-5 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-51-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527006 7934331

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry hillside. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-51-1 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-51-2 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527054 7933628

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry hillside. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-51-2 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-52-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527080 7932998

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This site had very low water during 2018. In addition, there is no surface flow downstream of the Tote Road and no connectivity to overwintering habitat. There is never fish habitat at this crossing.

Photographs



A **B**

Figure 1. Views of CV-52-1 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-52-2 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527132 7932787

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a nearly dry hillside with some ponding at the Tote Road. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-52-2 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-52-3 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527180 7932698

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry hillside. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-52-3 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-53-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527366 7932476

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry hillside. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-53-1 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-53-2 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527274 7932000

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a small, shallow, fishless pond with no connections to other waterbodies. There is never fish habitat at this crossing.

Photographs



A **B**

Figure 1. Views of CV-53-2 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-54-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527333 7931375

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 2-5° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was shallow, marshy habitat with multiple soft barriers downstream and no connection to overwintering habitat under any flow condition. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-54-1 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-54-2 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527529 7930869

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 2-5° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This site was nearly dry in 2018 with multiple soft barriers to fish movement and no connectivity with overwintering habitat under any flow condition. There is never fish habitat at this crossing.

Photographs



A **B**

Figure 1. Views of CV-54-2 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-55-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527583 7930653

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This site was a shallow, isolated, low point at the Tote Road that showed some ponding in 2018. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-55-1 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-55-2 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527632 7930421

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This site was a shallow, isolated, fishless pond that had nearly dried up by fall. There is never fish habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-55-2 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-55-3 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527650 7930339

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	6.0	- / 4.6	- / -	- / 0.45	- / -	- / 0.50	- / -	- / 0.03	- / -	- / 0.05
80D	1.5	- / 0.6	- / -	- / 0.35	- / -	- / 0.40	- / -	- / 0.51	- / -	- / 0.55
60D	6.0	- / 3.2	- / 0.09	- / 0.13	- / -	- / 0.20	- / 0.12	- / 0.40	- / -	- / 0.40
40D	TOTE ROAD CROSSING									
20D	3.5	- / 2.9	- / -	- / 0.45	- / -	- / 0.50	- / -	- / 0.18	- / -	- / 0.20
0	7.5	- / 6.2	- / -	- / 0.30	- / -	- / 0.30	- / -	- / 0.29	- / -	- / 0.30
20U	3.0	- / 1.4	- / -	- / 0.25	- / -	- / 0.25	- / -	- / 0.34	- / -	- / 0.35
40U	3.2	- / 2.3	- / -	- / 0.72	- / -	- / 0.75	- / -	- / 0.02	- / -	- / 0.05
50U	3.2	1.1 / -	- / -	0.30 / -	- / -	0.30 / -	- / -	0.11 / -	- / -	0.15 / -
60U	4.3	- / 3.2	- / -	- / 0.73	- / -	- / 0.80	- / -	- / 0.06	- / -	- / 0.10
80U	3.8	- / 3.8	- / -	- / 0.55	- / -	- / 0.55	- / -	- / 0.09	- / -	- / 0.10
100U	3.8	2.9 / 1.9	- / -	0.58 / 0.62	- / -	0.65 / 0.65	- / -	0.05 / 0.12	- / -	0.05 / 0.15

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	-	40	60	-	-	-	100	-	-	-	-
80D	30	30	40	-	-	-	40	40	20	-	-
60D	20	75	5	-	-	-	60	20	20	-	-
40D	TOTE ROAD CROSSING										
20D	10	30	60	-	-	-	20	30	50	-	-
0	10	40	50	-	-	-	50	20	30	-	-
20U	10	50	40	-	-	-	90	10	-	-	-
40U	10	20	70	-	-	-	100	-	-	-	-
50U	5	55	40				95	5			
60U	-	20	80	-	-	-	100	-	-	-	-
80U	10	25	65	-	-	-	100	-	-	-	-
100U	5	25	70	-	-	-	100	-	-	-	-

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality

Arctic Char - IMPORTANT

Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-55-3 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527650 7930339

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	4.50	19	4.27	55 - 113
	Fall	N/A	-	-	-
NNST	Summer	4.50	0	-	-
	Fall	N/A	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	N
NNST	N	N	N	N

Comments & Summary

This rail crossing is immediately upstream of the Tote Road crossing at CV-060. In addition, there are two proposed road diversion crossings CV-060-1 and CV-060-2. CV-60-1 is approximately 100 m downstream of the existing road crossing, while CV-60-2 is approximately 160 m upstream of the existing road crossing. Habitat data from those two assessments complement the data found here. This stream is important rearing habitat for juvenile char throughout the open water season, but particularly during summer.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-55-3 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527650 7930339

Photographs

NO PHOTO (see CV-R060-1 50 m US transect) **NO PHOTO (see CV-R060-1 50 m US transect)** **NO PHOTO (see CV-R060-1 50 m US transect)**



A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of CV-55-3 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

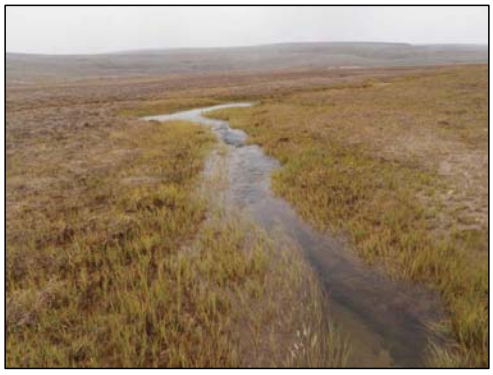
Location

Crossing ID: CV-55-3 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527650 7930339

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 2. Summer (top) and fall (bottom) views of CV-55-3 at the 80 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

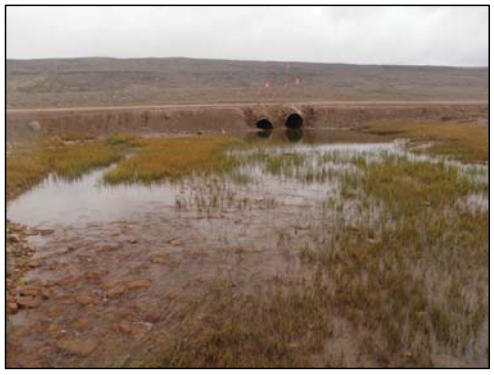
Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

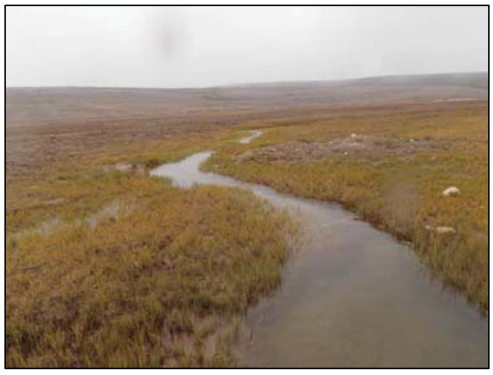
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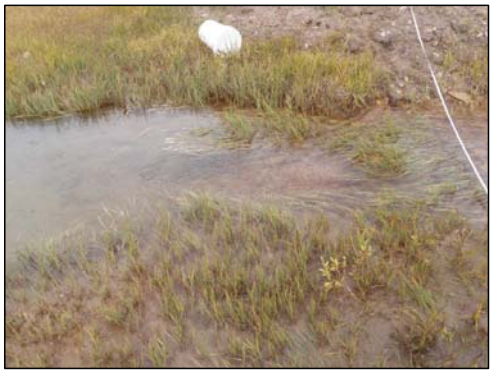
Crossing ID: CV-55-3 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527650 7930339

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 3. Summer (top) and fall (bottom) views of CV-55-3 at the 60 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

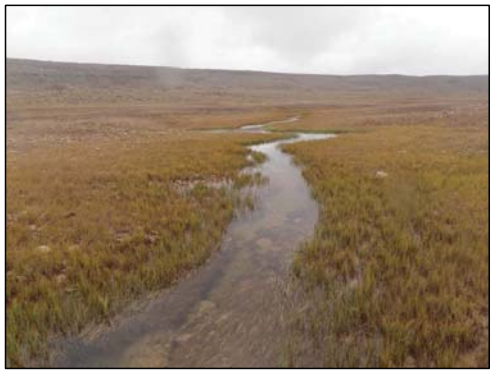
Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-55-3 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527650 7930339

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 5. Summer (top) and fall (bottom) views of CV-55-3 at the 20 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-55-3 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527650 7930339

Photographs



A **B** **C**

Figure 6. Summer (top) and fall (bottom) views of CV-55-3 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

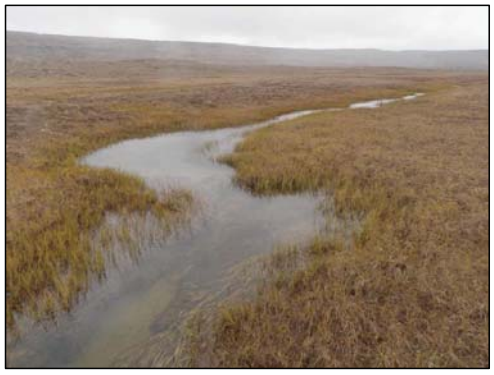
Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-55-3 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527650 7930339

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 7. Summer (top) and fall (bottom) views of CV-55-3 at the 20 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

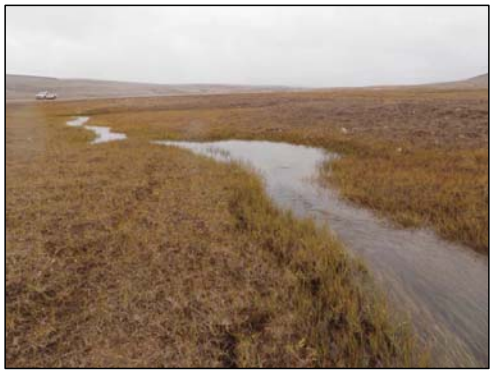
Location

Crossing ID: CV-55-3 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527650 7930339

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 8. Summer (top) and fall (bottom) views of CV-55-3 at the 40 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-55-3 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527650 7930339

Photographs



NO PHOTO



NO PHOTO



NO PHOTO

A **B** **C**

Figure 9. Summer (top) and fall (bottom) views of CV-55-3 at the 50 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-55-3 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527650 7930339

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A



B



C

Figure 10. Summer (top) and fall (bottom) views of CV-55-3 at the 60 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-55-3 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527650 7930339

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 11. Summer (top) and fall (bottom) views of CV-55-3 at the 80 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-55-3 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527650 7930339

Photographs



A B C

Figure 12. Summer (top) and fall (bottom) views of CV-55-3 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-56-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528085 7929337

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	11.9	2.0 / 2.7	- / -	0.10 / 0.09	- / 0.06	0.10 / 0.10	- / -	0.26 / 0.26	- / 0.17	0.30 / 0.30
80D	12.0	- / 5.0	- / 0.60	- / -	- / 0.40	- / 0.60	- / 0.00	- / -	- / 0.00	- / 0.00
60D	12.0	- / 3.6	- / 0.10	- / -	- / 0.20	- / 0.20	- / 0.05	- / -	- / 0.07	- / 0.10
50D	19.9	2.1 / -	- / -	0.20 / -	- / -	0.20 / -	- / -	0.09 / -	- / -	0.10 / -
40D	10.0	- / 3.1	- / 0.30	- / -	- / 0.13	- / 0.30	- / 0.00	- / -	- / 0.00	- / 0.00
20D	8.5	- / 5.4	- / 0.07	- / -	- / 0.05	- / 0.10	- / 0.50	- / -	- / 0.00	- / 0.50
0	8.0	- / 1.0	- / -	- / 0.15	- / -	- / 0.15	- / -	- / 0.62	- / -	- / 0.65
20U	TOTE ROAD CROSSING									
40U	6.5	- / 4.2	- / -	- / 0.47	- / -	- / 0.50	- / -	- / 0.00	- / -	- / 0.00
50U	7.0	6.0 / -	- / -	- / 0.54	- / -	- / 0.55	- / -	- / 0.01	- / -	- / 0.01
60U	9.0	- / 6.2	- / -	- / 0.92	- / -	- / 1.00	- / -	- / 0.00	- / -	- / 0.00
80U	5.0	- / 3.5	- / -	- / 1.00	- / -	- / 1.00	- / -	- / 0.00	- / -	- / 0.00
100U	4.0	2.2 / 3.0	- / -	0.58 / 0.70	- / -	0.65 / 0.70	- / -	0.02 / 0.00	- / -	0.02 / 0.00

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	45	35	-	-	-	20	70	30	-	-	-
80D	60	5	15	-	-	20	80	20	-	-	-
60D	20	75	5	-	-	-	95	5	-	-	-
50D	10	85	5	-	-	-	95	5	-	-	-
40D	-	75	25	-	-	-	95	5	-	-	-
20D	40	60	-	-	-	-	50	30	20	-	-
0	50	50	-	-	-	-	20	20	60	-	-
20U	TOTE ROAD CROSSING										
40U	-	40	60	-	-	-	80	-	20	-	-
50U	-	30	70	-	-	-	50	20	30	-	-
60U	-	20	80	-	-	-	80	-	20	-	-
80U	-	20	80	-	-	-	90	10	-	-	-
100U	-	20	80	-	-	-	95	5	-	-	-

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality

Arctic Char - MARGINAL

Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-56-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528085 7929337

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	4.52	5	1.11	99
	Fall	N/A	-	-	-
NNST	Summer	4.52	0	-	N/A
	Fall	N/A	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	N
NNST	N	N	N	N

Comments & Summary

Immediately upstream of CV-059 on the Tote Road. Provides marginal rearing habitat for smaller juvenile char throughout the open water season, but particularly during summer. Water temperatures in survey streams during fall sampling averaged approximately 5°C and fish had already begun downstream movements towards overwintering habitat.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - MARGINAL** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-56-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528085 7929337

Photographs



A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of CV-56-1 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-56-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528085 7929337

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A



B



C

Figure 2. Summer (top) and fall (bottom) views of CV-56-1 at the 80 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

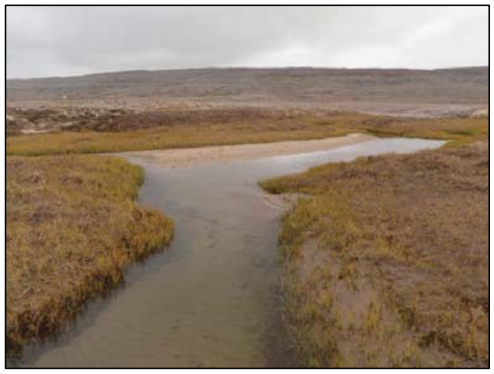
Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

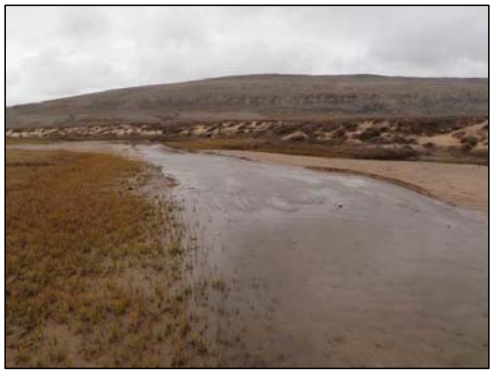
Location

Crossing ID: CV-56-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528085 7929337

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 3. Summer (top) and fall (bottom) views of CV-56-1 at the 60 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-56-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528085 7929337

Photographs



NO PHOTO



NO PHOTO



NO PHOTO

A **B** **C**

Figure 4. Summer (top) and fall (bottom) views of CV-56-1 at the 50 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-56-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528085 7929337

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A



B



C

Figure 5. Summer (top) and fall (bottom) views of CV-56-1 at the 40 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-56-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528085 7929337

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A



B



C

Figure 6. Summer (top) and fall (bottom) views of CV-56-1 at the 20 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-56-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528085 7929337

Photographs



A B C

Figure 7. Summer (top) and fall (bottom) views of CV-56-1 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-56-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528085 7929337

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 8. Summer (top) and fall (bottom) views of CV-56-1 at the 40 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-56-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528085 7929337

Photographs



NO PHOTO



NO PHOTO



NO PHOTO

A **B** **C**

Figure 9. Summer (top) and fall (bottom) views of CV-56-1 at the 50 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-56-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528085 7929337

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 10. Summer (top) and fall (bottom) views of CV-56-1 at the 60 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

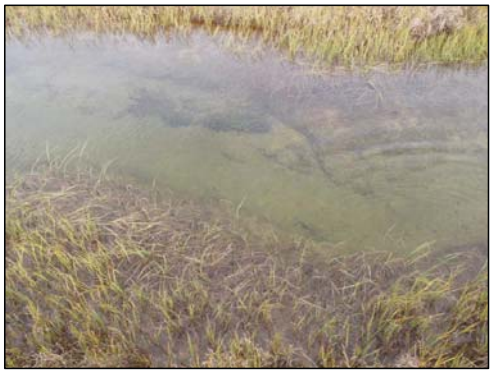
Crossing ID: CV-56-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528085 7929337

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

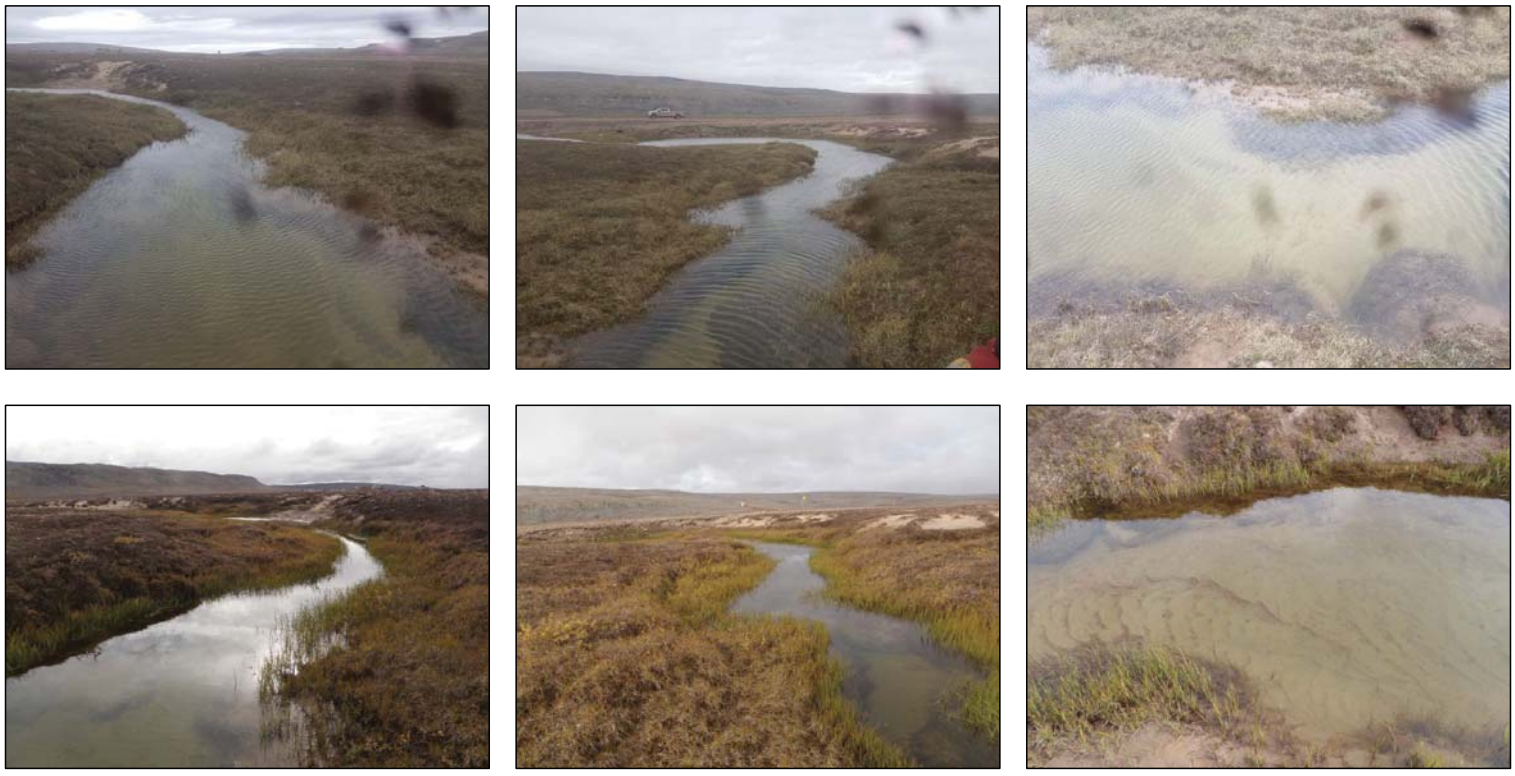
Figure 11. Summer (top) and fall (bottom) views of CV-56-1 at the 80 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-56-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528085 7929337

Photographs



A **B** **C**

Figure 12. Summer (top) and fall (bottom) views of CV-56-1 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-57-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528309 7928841

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	6.7	2.4 / 2.3	- / 0.31	0.74 / -	- / 0.15	0.20 / 0.75	- / 0.34	0.01 / -	- / 0.37	0.30 / 0.40
80D	6.0	- / 1.1	- / -	- / 0.30	- / -	- / 0.30	- / -	- / 0.32	- / -	- / 0.35
60D	10.5	- / 5.4	- / 0.40	- / -	- / 0.02	- / 0.40	- / 0.12	- / -	- / 0.15	- / 0.15
50D	12.2	1.4 / -	- / -	0.16 / -	- / -	0.30 / -	- / -	0.29 / -	- / -	0.30 / -
40D	13.0	- / 7.8	- / 0.10	- / -	- / 0.20	- / 0.25	- / 0.18	- / -	- / 0.26	- / 0.30
20D	9.5	- / 3.6	- / -	- / 0.35	- / -	- / 0.40	- / -	- / 0.07	- / -	- / 0.10
0	7.5	4.5 / 4.3	- / -	0.30 / 0.22	- / -	0.30 / 0.25	- / -	0.06 / 0.04	- / -	0.10 / 0.05
20U	9.0	8.7 / 4.3	- / 0.15	- / -	- / 0.26	- / 0.30	- / 0.10	- / -	- / 0.00	- / 0.10
40U	7.0	7.0 / 4.6	- / 0.34	- / -	- / 0.25	- / 0.35	- / 0.02	- / -	- / 0.00	- / 0.05
50U	6.3	3.5 / -	- / -	0.50 / -	- / -	0.50 / -	- / -	0.03 / -	- / -	0.05 / -
60U	7.0	12.2 / 5.1	- / -	- / 0.70	- / -	- / 0.70	- / -	- / 0.02	- / -	- / 0.05
80U	7.0	9.0 / 3.4	- / -	- / 0.32	- / -	- / 0.50	- / -	- / 0.15	- / -	- / 0.15
100U	6.8	3.1 / -	- / -	0.40 / 0.25	- / -	0.40 / 0.35	- / -	0.19 / 0.11	- / -	0.20 / 0.15

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	5	35	60	-	-	-	100	-	-	-	-
80D	20	50	30	-	-	-	100	-	-	-	-
60D	40	20	40	-	-	-	100	-	-	-	-
50D	10	60	30				90	10	-	-	-
40D	40	40	20	-	-	-	100	-	-	-	-
20D	20	30	50	-	-	-	80	15	5	-	-
0	10	60	30	-	-	-	80	15	5	-	-
20U	10	60	30	-	-	-	80	15	5	-	-
40U	-	40	60	-	-	-	90	5	5	-	-
50U	-	50	50	-	-	-	85	5	5	-	-
60U	-	30	70	-	-	-	100	-	-	-	-
80U	-	50	50	-	-	-	100	-	-	-	-
100U	10	45	45	-	-	-	100	-	-	-	-

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-57-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528309 7928841

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	3.67	6	1.64	96
	Fall	N/A	-	-	-
NNST	Summer	3.67	0	-	N/A
	Fall	N/A	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	M	N
NNST	N	N	N	N

Comments & Summary

Immediately downstream of CV-058 on the Tote Road. Provides marginal rearing habitat for small juvenile char throughout the open water season, but particularly during summer.

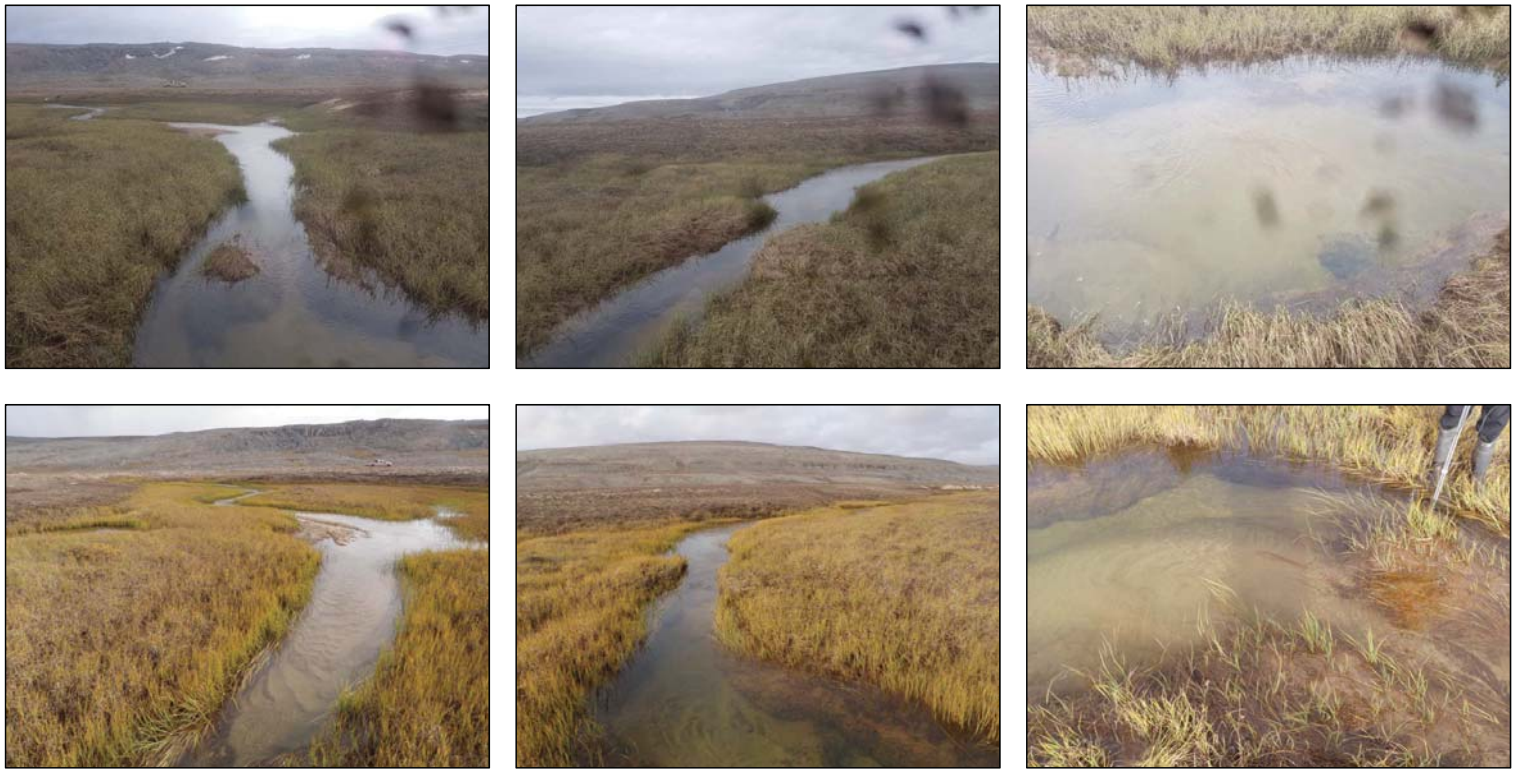
Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - MARGINAL** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-57-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528309 7928841

Photographs



A B C

Figure 1. Summer (top) and fall (bottom) views of CV-57-1 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Location

Crossing ID: CV-57-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528309 7928841

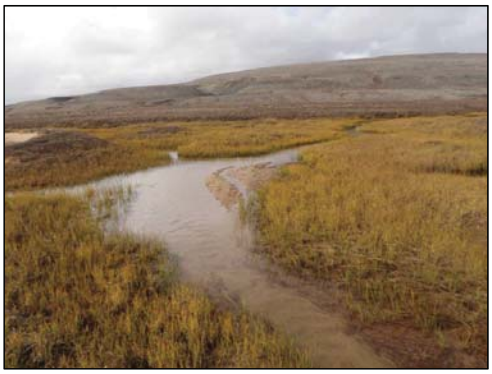
Photographs

NO PHOTO

NO PHOTO

NO PHOTO







A **B** **C**

Figure 2. Summer (top) and fall (bottom) views of CV-57-1 at the 80 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Location

Crossing ID: CV-57-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528309 7928841

Photographs

NO PHOTO

NO PHOTO

NO PHOTO







A B C

Figure 3. Summer (top) and fall (bottom) views of CV-57-1 at the 60 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Location

Crossing ID: CV-57-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528309 7928841

Photographs



NO PHOTO



NO PHOTO



NO PHOTO

A **B** **C**

Figure 4. Summer (top) and fall (bottom) views of CV-57-1 at the 50 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Location

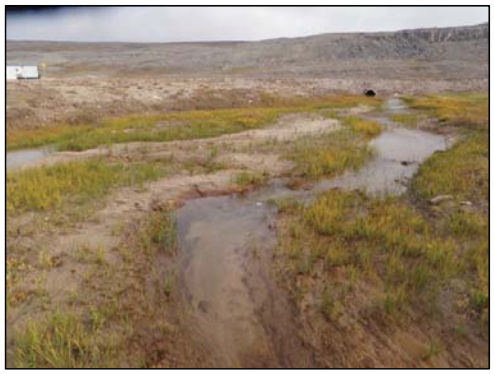
Crossing ID: CV-57-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528309 7928841

Photographs

NO PHOTO

NO PHOTO

NO PHOTO







A **B** **C**

Figure 5. Summer (top) and fall (bottom) views of CV-57-1 at the 40 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Location

Crossing ID: CV-57-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528309 7928841

Photographs

NO PHOTO

NO PHOTO

NO PHOTO







A **B** **C**

Figure 6. Summer (top) and fall (bottom) views of CV-57-1 at the 20 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Location

Crossing ID: CV-57-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528309 7928841

Photographs



A B C

Figure 7. Summer (top) and fall (bottom) views of CV-57-1 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Location

Crossing ID: CV-57-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528309 7928841

Photographs

NO PHOTO NO PHOTO NO PHOTO



A B C

Figure 8. Summer (top) and fall (bottom) views of CV-57-1 at the 20 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Location

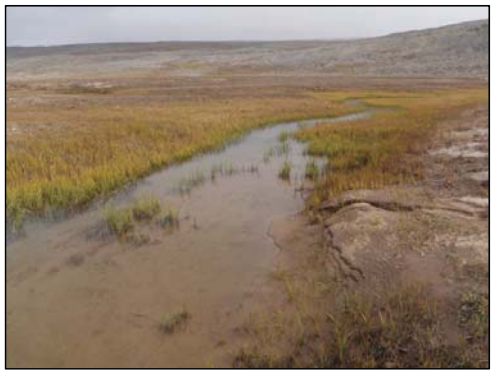
Crossing ID: CV-57-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528309 7928841

Photographs

NO PHOTO

NO PHOTO

NO PHOTO







A B C

Figure 9. Summer (top) and fall (bottom) views of CV-57-1 at the 40 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Location

Crossing ID: CV-57-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528309 7928841

Photographs



NO PHOTO



NO PHOTO



NO PHOTO

A **B** **C**

Figure 10. Summer (top) and fall (bottom) views of CV-57-1 at the 50 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Location

Crossing ID: CV-57-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528309 7928841

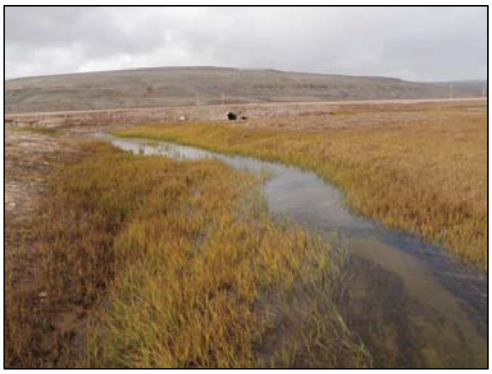
Photographs

NO PHOTO

NO PHOTO

NO PHOTO







A **B** **C**

Figure 11. Summer (top) and fall (bottom) views of CV-57-1 at the 60 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Location

Crossing ID: CV-57-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528309 7928841

Photographs

NO PHOTO

NO PHOTO

NO PHOTO







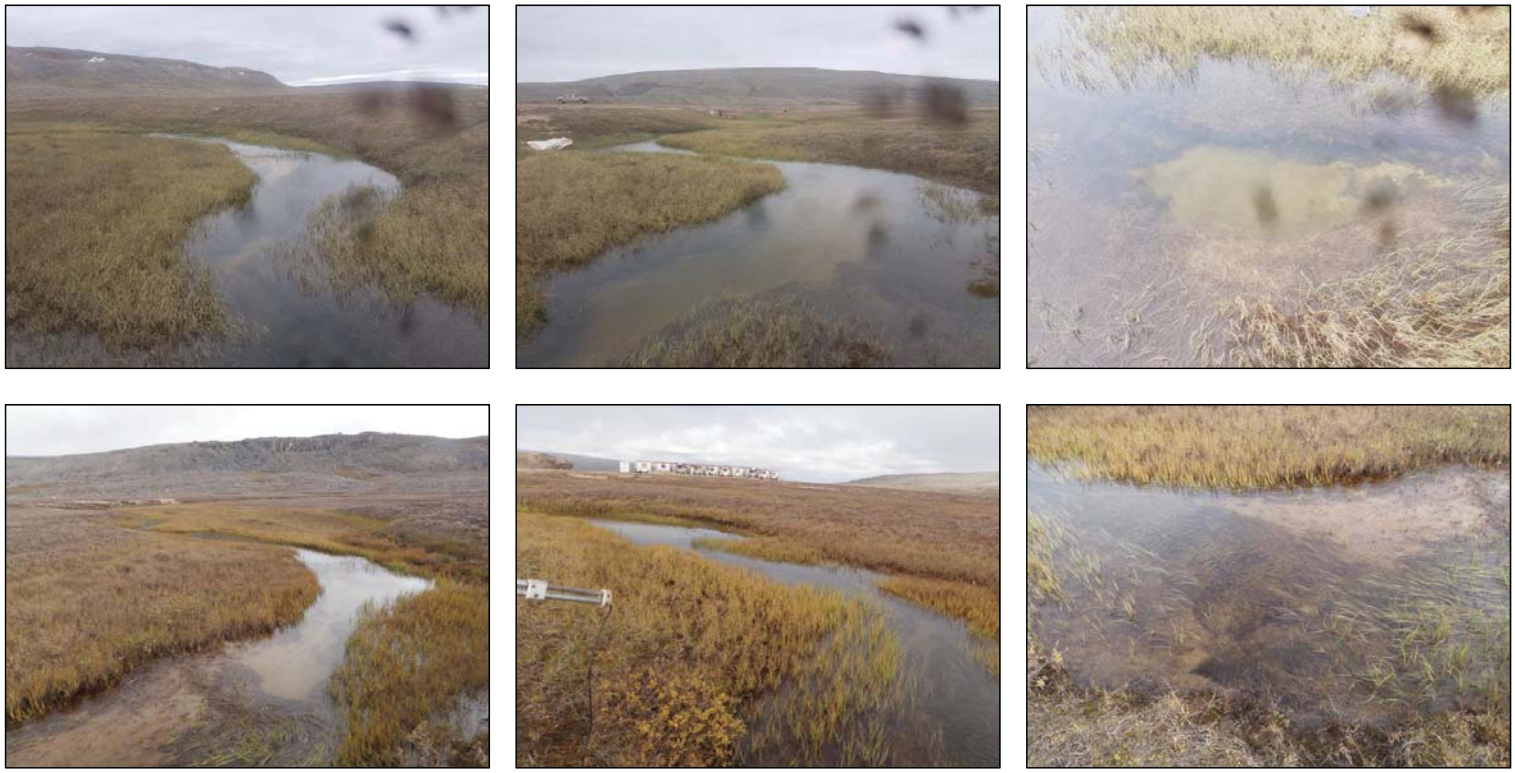
A **B** **C**

Figure 12. Summer (top) and fall (bottom) views of CV-57-1 at the 80 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Location

Crossing ID: CV-57-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528309 7928841

Photographs



A B C

Figure 13. Summer (top) and fall (bottom) views of CV-57-1 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-57-2 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528345 7928683

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	9.0	6.9 / 8.0	- / 0.60	0.50 / -	- / 0.40	0.50 / 0.60	- / 0.00	0.02 / -	- / 0.00	0.02 / 0.02
80D	7.0	- / 5.5	- / 0.17	- / -	- / 0.15	- / 0.20	- / 0.00	- / -	- / 0.00	- / 0.00
60D	8.0	- / 1.8	- / -	- / 0.50	- / -	- / 0.50	- / -	- / 0.02	- / -	- / 0.02
50D	4.8	2.4 / -	- / -	0.02 / -	- / -	0.10 / -	- / -	0.15 / -	- / -	0.15 / -
40D	6.0	- / 3.9	- / 0.55	- / -	- / 0.10	- / 0.60	- / 0.00	- / -	- / 0.07	- / 0.07
20D	5.0	- / 2.8	- / -	- / 0.08	- / -	- / 0.15	- / -	- / 0.22	- / -	- / 0.25
0	6.5	2.5 / 1.6	- / -	- / 0.10	- / -	- / 0.20	- / -	- / 0.21	- / -	- / 0.25
20U	5.0	8.7 / 2.0	- / -	- / 0.03	- / -	- / 0.10	- / -	- / 0.23	- / -	- / 0.25
40U	8.0	7.0 / 5.2	- / -	- / 0.51	- / -	- / 0.55	- / -	- / 0.00	- / -	- / 0.00
50U	6.6	5.1 / -	- / -	0.50 / -	- / -	0.50 / -	- / -	0.00 / -	- / -	0.00 / -
60U	8.0	12.2 / 6.1	- / -	- / 0.31	- / -	- / 0.40	- / -	- / 0.00	- / -	- / 0.00
80U	7.5	9.0 / 4.1	- / -	- / 0.34	- / -	- / 0.35	- / -	- / 0.00	- / -	- / 0.02
100U	5.8	1.6 / 3.6	- / -	0.10 / 0.63	- / -	0.40 / 0.65	- / -	0.05 / 0.00	- / -	0.05 / 0.00

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	10	40	50	-	-	-	100	-	-	-	-
80D	20	75	5	-	-	-	100	-	-	-	-
60D	40	30	30	-	-	-	100	-	-	-	-
50D	10	90	-	-	-	-	100	-	-	-	-
40D	10	40	50	-	-	-	100	-	-	-	-
20D	40	60	-	-	-	-	95	-	5	-	-
0	25	70	5	-	-	-	90	-	10	-	-
20U	50	50	-	-	-	-	70	20	10	-	-
40U	-	40	60	-	-	-	100	-	-	-	-
50U	-	50	50	-	-	-	95	-	5	-	-
60U	-	60	40	-	-	-	95	-	5	-	-
80U	-	70	30	-	-	-	95	-	5	-	-
100U	-	35	65	-	-	-	100	-	-	-	-

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-57-2 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528345 7928683

Fisheries Data

Gear Used: Electrofisher **Transect Length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	4.17	16	3.84	60 - 98
	Fall	N/A	-	-	-
NNST	Summer	4.17	0	-	N/A
	Fall	N/A	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	N
NNST	N	N	N	N

Comments & Summary

Immediately downstream of CV-057 on the Tote Road. Typically provides important rearing habitat (depending on water levels) for small juvenile char throughout the open-water season, but particularly during summer. Periods of low water can reduce habitat quality to Marginal due to the loss of deep pools.

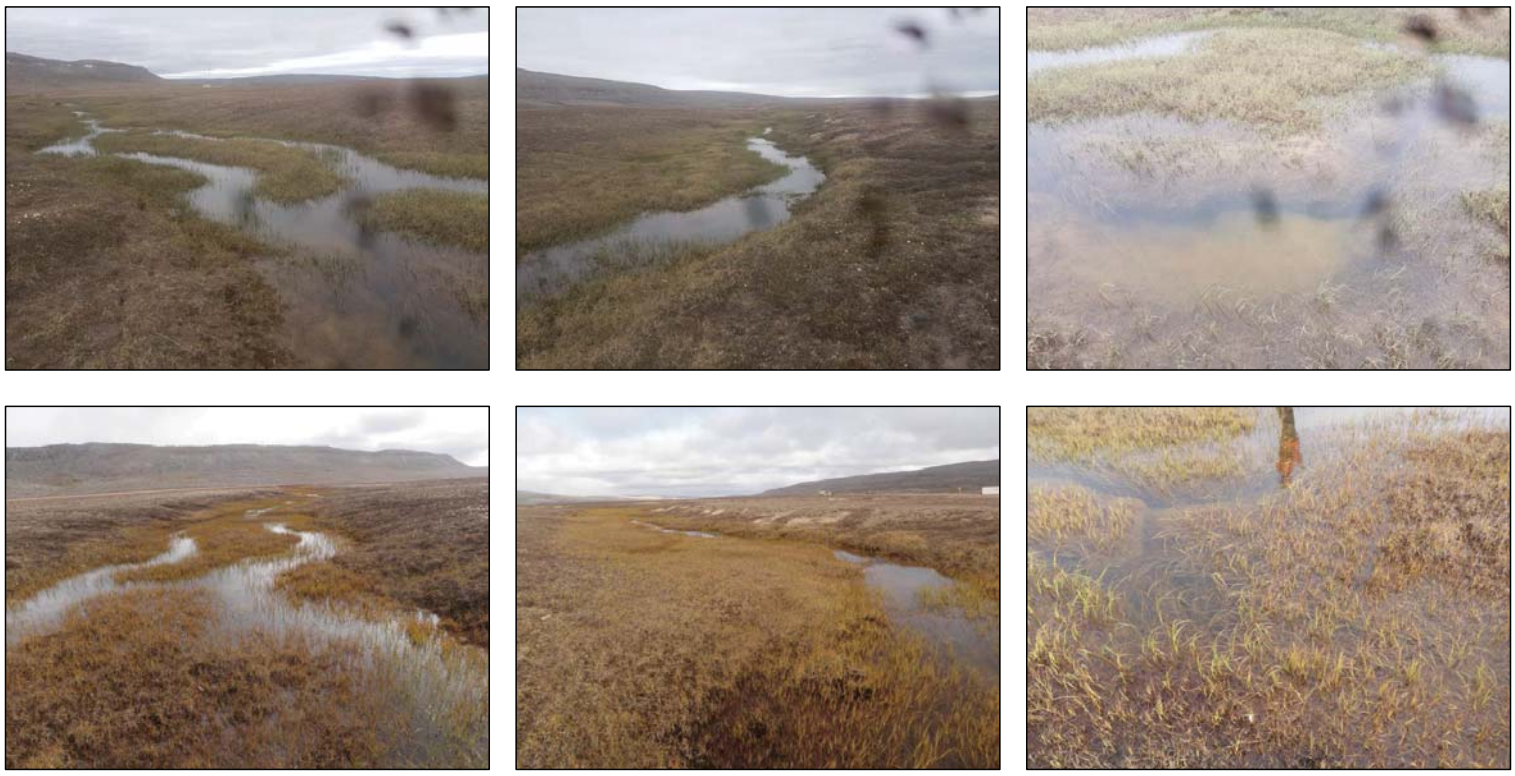
Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-57-2 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528345 7928683

Photographs



A B C

Figure 1. Summer (top) and fall (bottom) views of CV-57-2 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-57-2 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528345 7928683

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 2. Summer (top) and fall (bottom) views of CV-57-2 at the 80 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

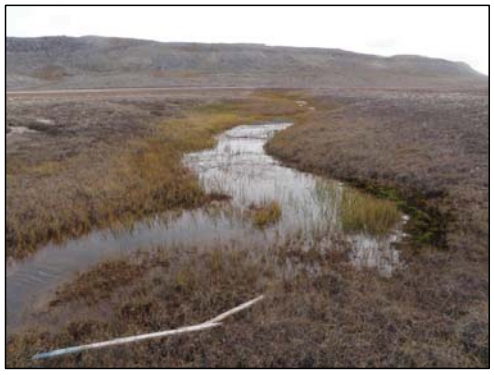
Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

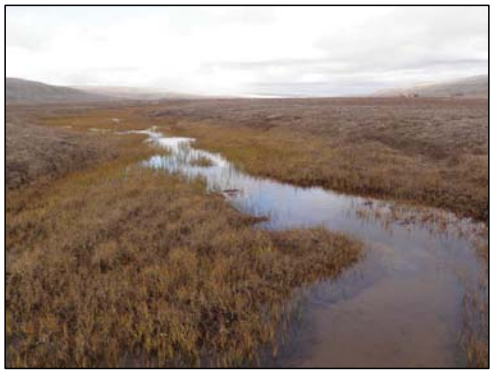
Location

Crossing ID: CV-57-2 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528345 7928683

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 3. Summer (top) and fall (bottom) views of CV-57-2 at the 60 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-57-2 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528345 7928683

Photographs



NO PHOTO



NO PHOTO



NO PHOTO

A **B** **C**

Figure 4. Summer (top) and fall (bottom) views of CV-57-2 at the 50 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

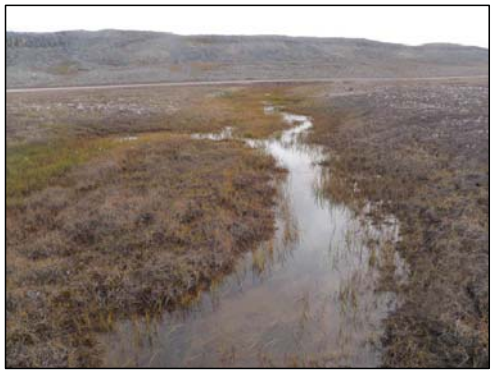
Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

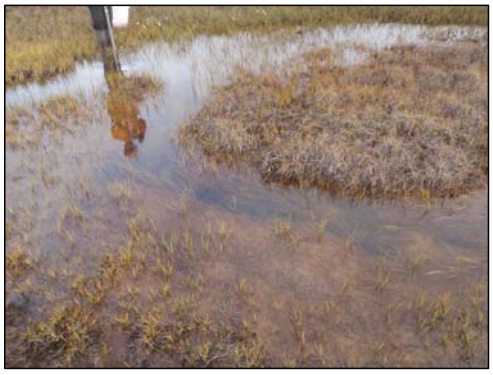
Crossing ID: CV-57-2 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528345 7928683

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 5. Summer (top) and fall (bottom) views of CV-57-2 at the 40 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

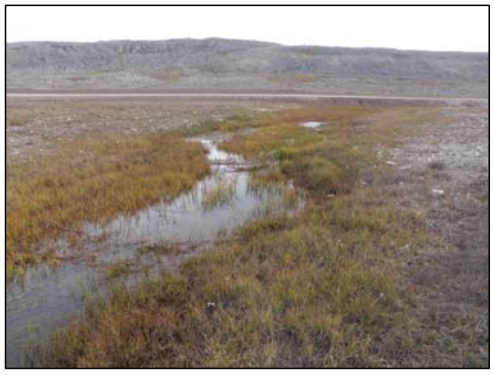
Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-57-2 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528345 7928683

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 6. Summer (top) and fall (bottom) views of CV-57-2 at the 20 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-57-2 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528345 7928683

Photographs



A B C

Figure 7. Summer (top) and fall (bottom) views of CV-57-2 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

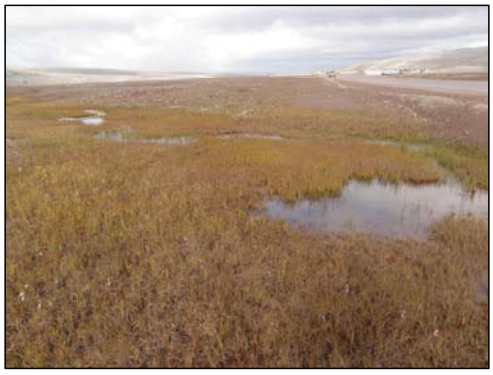
Location

Crossing ID: CV-57-2 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528345 7928683

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 8. Summer (top) and fall (bottom) views of CV-57-2 at the 20 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-57-2 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528345 7928683

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 9. Summer (top) and fall (bottom) views of CV-57-2 at the 40 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-57-2 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528345 7928683

Photographs



NO PHOTO



NO PHOTO



NO PHOTO

A **B** **C**

Figure 10. Summer (top) and fall (bottom) views of CV-57-2 at the 50 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-57-2 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528345 7928683

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 11. Summer (top) and fall (bottom) views of CV-57-2 at the 60 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-57-2 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528345 7928683

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 12. Summer (top) and fall (bottom) views of CV-57-2 at the 80 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-57-2 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528345 7928683

Photographs



A **B** **C**

Figure 13. Summer (top) and fall (bottom) views of CV-57-2 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-1 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 528241 7927966

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 4° **Flow Regime:** Intermittent

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	3.0	2.1 / -	- / -	0.03 / -	- / -	0.03 / -	- / -	0.00 / -	- / -	0.00 / -
50D	2.0	1.5 / 0.6	- / -	0.03 / 0.06	- / -	0.03 / 0.06	- / -	0.00 / 0.10	- / -	0.00 / 0.10
0	1.2	0.6 / 0.9	- / -	0.04 / 0.02	- / -	0.04 / 0.02	- / -	0.00 / 0.02	- / -	0.00 / 0.02
50U	2.0	0.9 / 1.4	- / -	0.05 / 0.01	- / -	0.05 / 0.02	- / -	0.00 / 0.04	- / -	0.00 / 0.04
100U	2.3	1.5 / 2.1	- / -	0.03 / 0.01	- / -	0.03 / 0.02	- / -	0.00 / 0.00	- / -	0.00 / 0.00

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	-	100	-	-	-	-	90	10	-	-	-
50D	5	95	-	-	-	-	70	30	-	-	-
0	5	95	-	-	-	-	100	-	-	-	-
50U	5	95	-	-	-	-	90	5	5	-	-
100U	-	100	-	-	-	-	100	-	-	-	-

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-1 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 528241 7927966

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	3.30	0	-	N/A
	Fall	-	N/A	N/A	N/A
NNST	Summer	3.30	0	-	N/A
	Fall	-	N/A	N/A	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

There was no evidence of fish use of habitat in this stream in 2018. There was very low water with little potential to support fish except during a high freshet or periods of extensive rain. However, this site is near enough to confirmed fish habitat (CV-58-5 stream) that intermittent use during high water may be possible.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-1 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 528241 7927966

Photographs



NO PHOTO

A



NO PHOTO

B



NO PHOTO

C

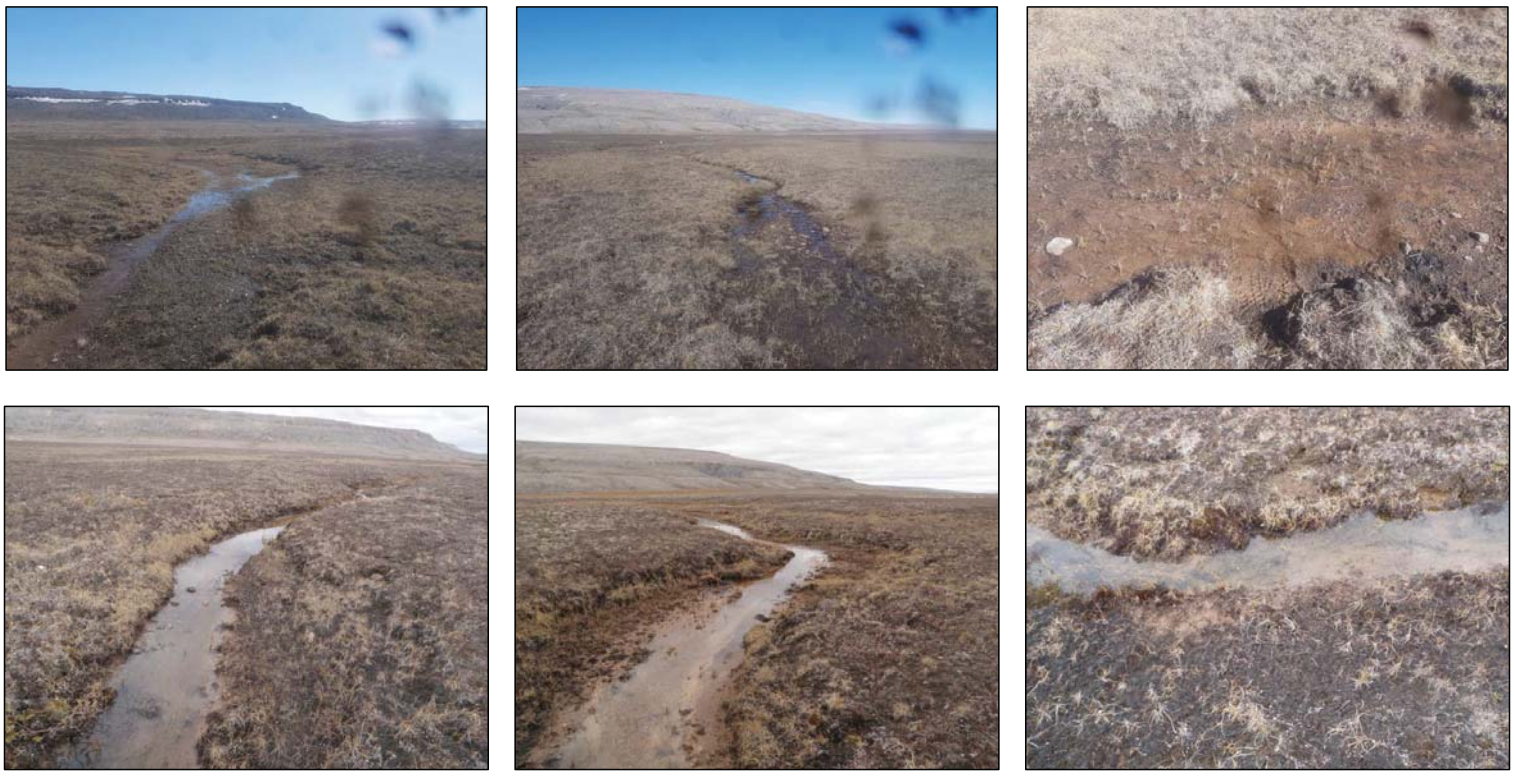
Figure 1. Summer (top) and fall (bottom) views of CV-58-1 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-1 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 528241 7927966

Photographs



A B C

Figure 2. Summer (top) and fall (bottom) views of CV-58-1 at the 50 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-1 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 528241 7927966

Photographs



A B C

Figure 3. Summer (top) and fall (bottom) views of CV-58-1 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-1 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 528241 7927966

Photographs



A **B** **C**

Figure 4. Summer (top) and fall (bottom) views of CV-58-1 at the 50 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-1 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 528241 7927966

Photographs



A **B** **C**

Figure 5. Summer (top) and fall (bottom) views of CV-58-1 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-2 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 528168 7927807

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 1-2° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Backpack Electrofisher **Effort (min):** 2.17 **Transect Length (m):** 100

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

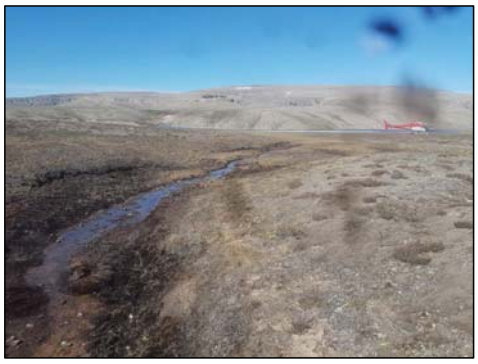
Comments & Summary

This stream was shallow (1 cm maximum depth) with almost no flow in 2018. In addition, there is a soft barrier downstream (lack of surface flow and no channel) preventing access from a possible overwintering lake. The barrier may be sufficient to prevent access to the rail crossing under all flow conditions.

Photographs



A



B



C

Figure 1. Views of CV-58-2 at the rail crossing during summer, looking upstream (A), downstream (B), and at the barrier near the confluence with a downstream lake (C).

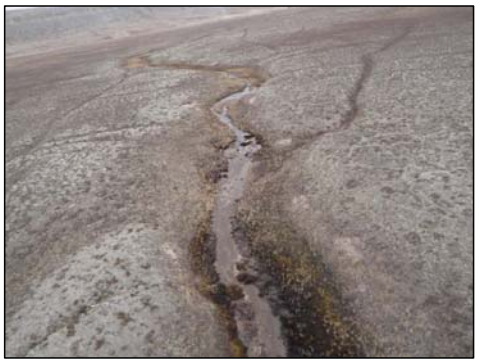
Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-2 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 528168 7927807

Photographs



A

Figure 2. Aerial view of CV-58-2 during fall.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING**
			Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-3 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 528109 7927716

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

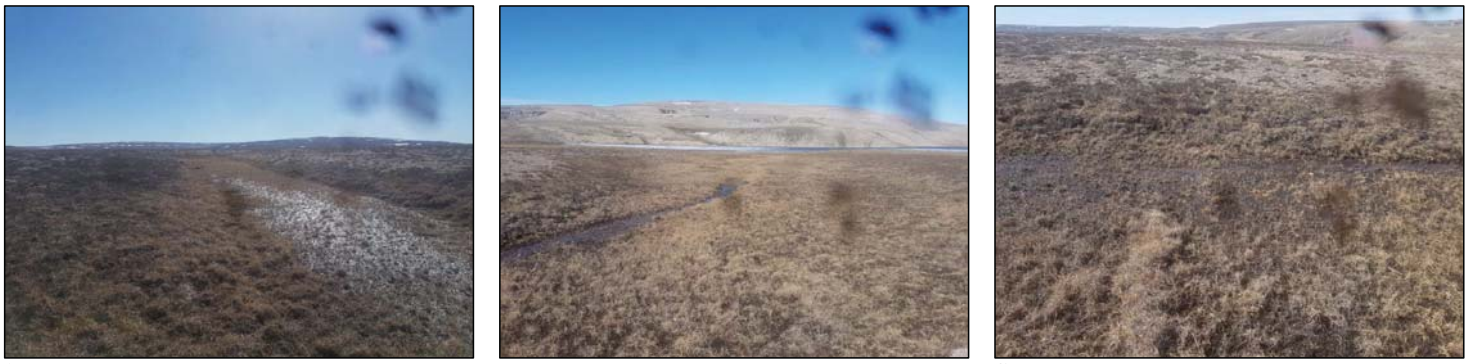
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This stream was nearly dry at the rail crossing in both June and August and no fish were observed. In addition, there were several downstream locations where there was no surface water or the channel disappeared and water dispersed across the tundra, creating a soft barrier to fish movements.

Photographs



A **B** **C**

Figure 1. Summer views of CV-58-3 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-3 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 528109 7927716

Photographs



A

Figure 2. Aerial view of CV-58-3 during fall, showing subsurface flows both upstream and downstream of the crossing (red arrows).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING**
			Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-4 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 528062 7927656

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1-2° **Flow Regime:** Intermittent

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	7.0	- / 5.8	- / -	- / 0.02	- / -	- / 0.02	- / -	- / 0.01	- / -	- / 0.01
50D	1.5	- / 0.8	- / -	- / 0.02	- / -	- / 0.05	- / -	- / 0.21	- / -	- / 0.21
0	2.7	0.4 / 0.3	- / -	0.03 / 0.04	- / -	0.03 / 0.04	- / -	0.05 / 0.29	- / -	0.20 / 0.30
50U	20.0	- / 14.6	- / -	- / 0.06	- / -	- / 0.10	- / -	- / 0.01	- / -	- / 0.05
100U	11.5	- / 7.8	- / -	- / 0.01	- / -	- / 0.02	- / -	- / 0.05	- / -	- / 0.05

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	-	100	-	-	-	-	95	5	-	-	-
50D	50	50	-	-	-	-	70	30	-	-	-
0	70	30	-	-	-	-	60	35	5	-	-
50U	-	100	-	-	-	-	70	30	-	-	-
100U	70	30	-	-	-	-	40	60	-	-	-

Baffinland Iron Mines **Mary River Project**	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-4 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 528062 7927656

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	1.63	0	-	N/A
	Fall	-	N/A	N/A	N/A
NNST	Summer	1.63	0	-	N/A
	Fall	-	N/A	N/A	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

There was no evidence of fish use of habitat in this stream in 2018. There was very low water with little potential to support fish except during a high freshet or periods of extensive rain. However, the site is near enough to confirmed fish habitat (CV-58-5 stream) that intermittent use during high water may be possible.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

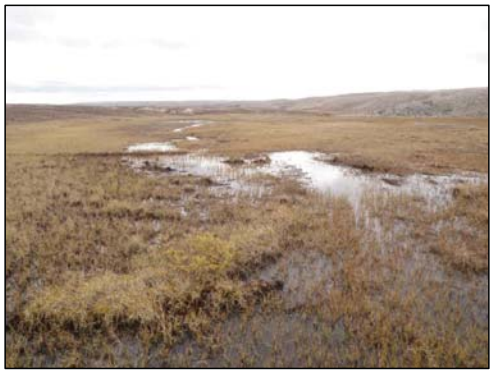
Location

Crossing ID: CV-58-4 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 528062 7927656

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of CV-58-4 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

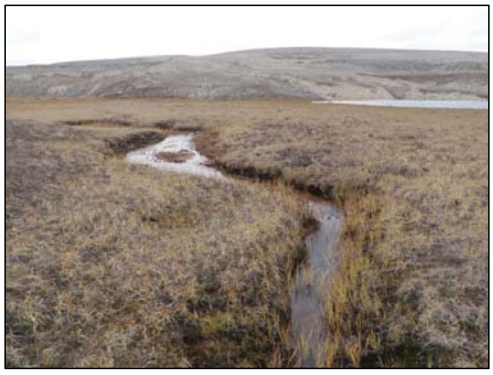
Crossing ID: CV-58-4 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 528062 7927656

Photographs

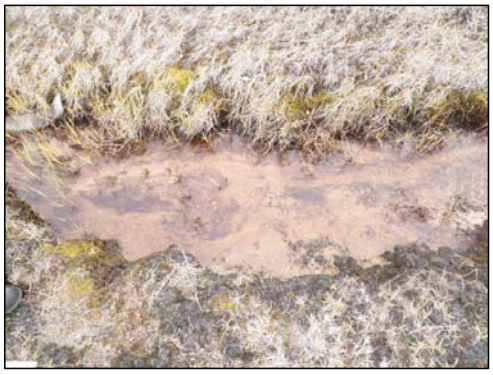
NO PHOTO **NO PHOTO** **NO PHOTO**



A



B



C

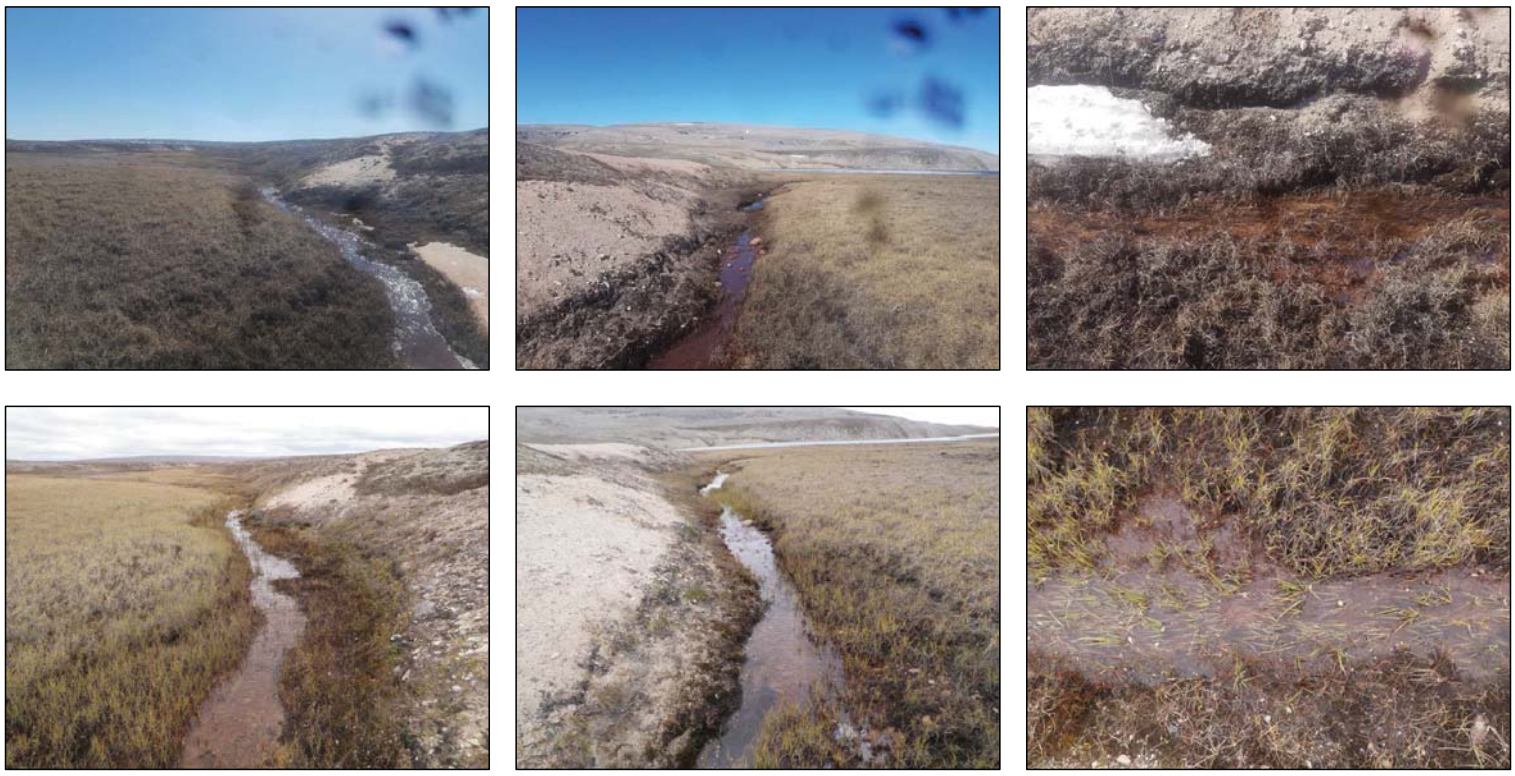
Figure 2. Summer (top) and fall (bottom) views of CV-58-4 at the 50 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-4 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 528062 7927656

Photographs



A B C

Figure 3. Summer (top) and fall (bottom) views of CV-58-4 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

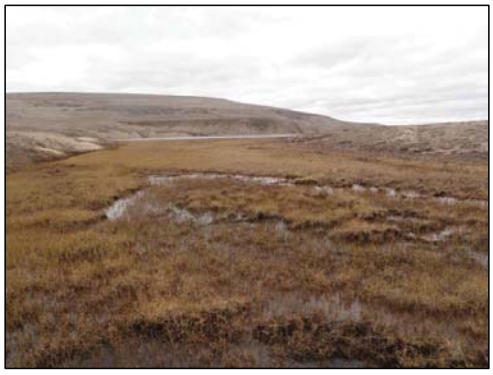
Location

Crossing ID: CV-58-4 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 528062 7927656

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 4. Summer (top) and fall (bottom) views of CV-58-4 at the 50 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-4 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 528062 7927656

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A



B



C

Figure 5. Summer (top) and fall (bottom) views of CV-58-4 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-4a | **Dates Surveyed:** 29 June & 30 August, 2018 | **UTM Coordinates:** 17 W 527931 7927527

General Physical Characteristics

Channel Confinement: C | **Channel Gradient (range):** 1° | **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished | **Effort (min):** N/A | **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This stream was nearly dry at the rail crossing in 2018. In addition, there were several soft barriers downstream and no access from other waterbodies. There is likely no fish habitat at this site under all flow conditions.

Photographs



A



B

Figure 1. Views of CV-58-4a at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-5 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 527751 7927378

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 2-3° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	10.7	7.1 / 6.7	0.03 / 0.02	0.03 / 0.08	0.05 / 0.02	0.10 / 0.10	0.05 / 0.13	0.17 / 0.24	0.38 / 0.36	0.40 / 0.40
80D	14.7	13.0 / 12.8	0.04 / 0.03	0.08 / 0.02	0.02 / 0.10	0.10 / 0.10	0.11 / 0.15	0.14 / 0.17	0.05 / 0.13	0.20 / 0.20
60D	23.5	19.8 / 19.6	0.03 / 0.02	0.03 / 0.04	0.03 / 0.02	0.05 / 0.05	0.04 / 0.09	0.20 / 0.19	0.07 / 0.08	0.20 / 0.20
40D	12.8	9.8 / 6.8	0.04 / 0.06	0.09 / 0.08	0.03 / 0.02	0.10 / 0.10	0.21 / 0.39	0.10 / 0.22	0.08 / 0.09	0.30 / 0.40
20D	4.8	3.6 / 4.5	0.01 / 0.02	0.02 / -	0.09 / 0.03	0.10 / 0.10	0.02 / 0.09	0.14 / -	0.13 / 0.32	0.25 / 0.35
0	2.5	1.4 / 1.6	-/ 0.02	0.07 / -	- / 0.10	0.10 / 0.10	- / 0.09	0.59 / -	- / 0.18	0.60 / 0.30
20U	14.9	9.1 / 8.8	0.02 / 0.03	0.02 / -	0.09 / 0.09	0.10 / 0.10	0.01 / 0.05	0.05 / -	0.11 / 0.24	0.15 / 0.25
40U	13.7	5.5 / 12.4	0.02 / -	- / -	0.30 / 0.12	0.30 / 0.25	0.00 / -	- / -	0.00 / 0.03	0.05 / 0.05
60U	8.8	3.2 / 4.4	0.06 / 0.07	0.09 / -	0.10 / 0.08	0.10 / 0.10	0.05 / 0.06	0.12 / -	0.04 / 0.11	0.10 / 0.15
80U	10.8	5.4 / 6.6	0.12 / -	0.16 / 0.09	0.03 / -	0.20 / 0.15	0.02 / -	0.02 / 0.08	0.01 / -	0.05 / 0.10
100U	11.4	6.1 / 3.8	0.10 / -	0.09 / 0.08	0.03 / -	0.10 / 0.10	0.05 / -	0.03 / 0.13	0.02 / -	0.10 / 0.15

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	75	25	-	-	-	-	-	5	50	45	-
80D	75	25	-	-	-	-	-	5	50	45	-
60D	55	45	-	-	-	-	-	5	45	45	5
40D	60	40	-	-	-	-	10	5	45	40	-
20D	70	30	-	-	-	-	-	5	60	35	-
0	85	15	-	-	-	-	-	5	70	25	-
20U	30	70	-	-	-	-	-	5	60	35	-
40U	5	75	20	-	-	-	15	5	80	-	-
60U	10	90	-	-	-	-	5	15	80	-	-
80U	5	95	-	-	-	-	80	10	10	-	-
100U	5	95	-	-	-	-	80	10	10	-	-

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality

Arctic Char - IMPORTANT

Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-5 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 527751 7927378

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	4.81	6	1.25	102 - 124
	Fall	3.05	2	0.66	95 - 107
NNST	Summer	4.81	0	-	N/A
	Fall	3.05	0	-	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	M
NNST	N	N	N	N

Comments & Summary

Provides important rearing habitat for juvenile char throughout the open water season, but particularly during summer. Large numbers of char were also captured during summer 2016. May also be a migratory route between two lakes. Water temperatures in survey streams during fall sampling averaged approximately 5°C and fish had already begun downstream movements towards overwintering habitat, reducing catches.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-5 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 527751 7927378

Photographs



A B C

Figure 1. Summer (top) and fall (bottom) views of CV-58-5 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-5 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 527751 7927378

Photographs



A **B** **C**

Figure 2. Summer (top) and fall (bottom) views of CV-58-5 at the 80 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-5 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 527751 7927378

Photographs



A **B** **C**

Figure 3. Summer (top) and fall (bottom) views of CV-58-5 at the 60 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-5 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 527751 7927378

Photographs



A B C

Figure 4. Summer (top) and fall (bottom) views of CV-58-5 at the 40 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-5 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 527751 7927378

Photographs



A **B** **C**

Figure 5. Summer (top) and fall (bottom) views of CV-58-5 at the 20 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-5 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 527751 7927378

Photographs



A B C

Figure 6. Summer (top) and fall (bottom) views of CV-58-5 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-5 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 527751 7927378

Photographs



A B C

Figure 7. Summer (top) and fall (bottom) views of CV-58-5 at the 20 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-5 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 527751 7927378

Photographs



A **B** **C**

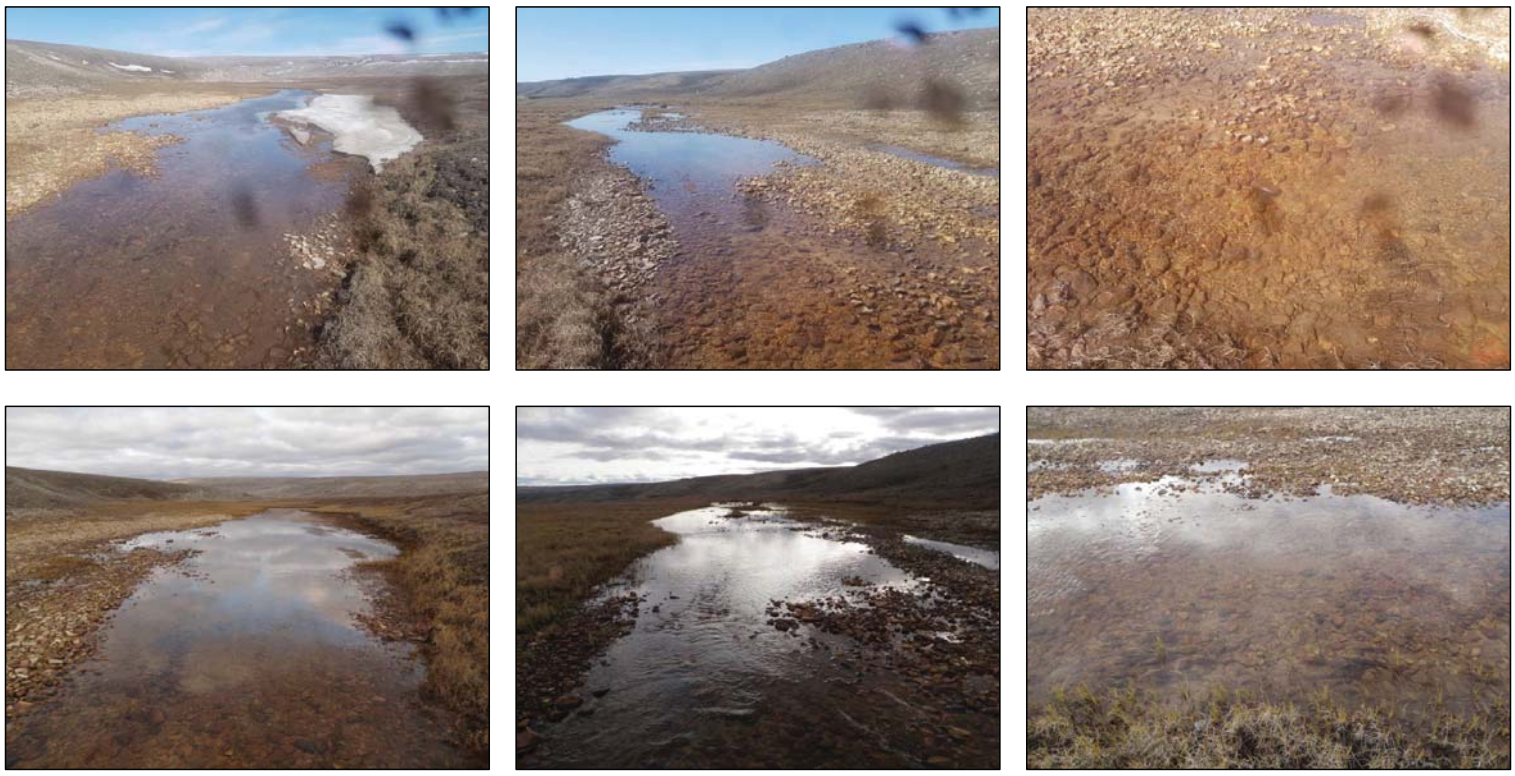
Figure 8. Summer (top) and fall (bottom) views of CV-58-5 at the 40 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-5 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 527751 7927378

Photographs



A **B** **C**

Figure 9. Summer (top) and fall (bottom) views of CV-58-5 at the 60 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-5 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 527751 7927378

Photographs



A B C

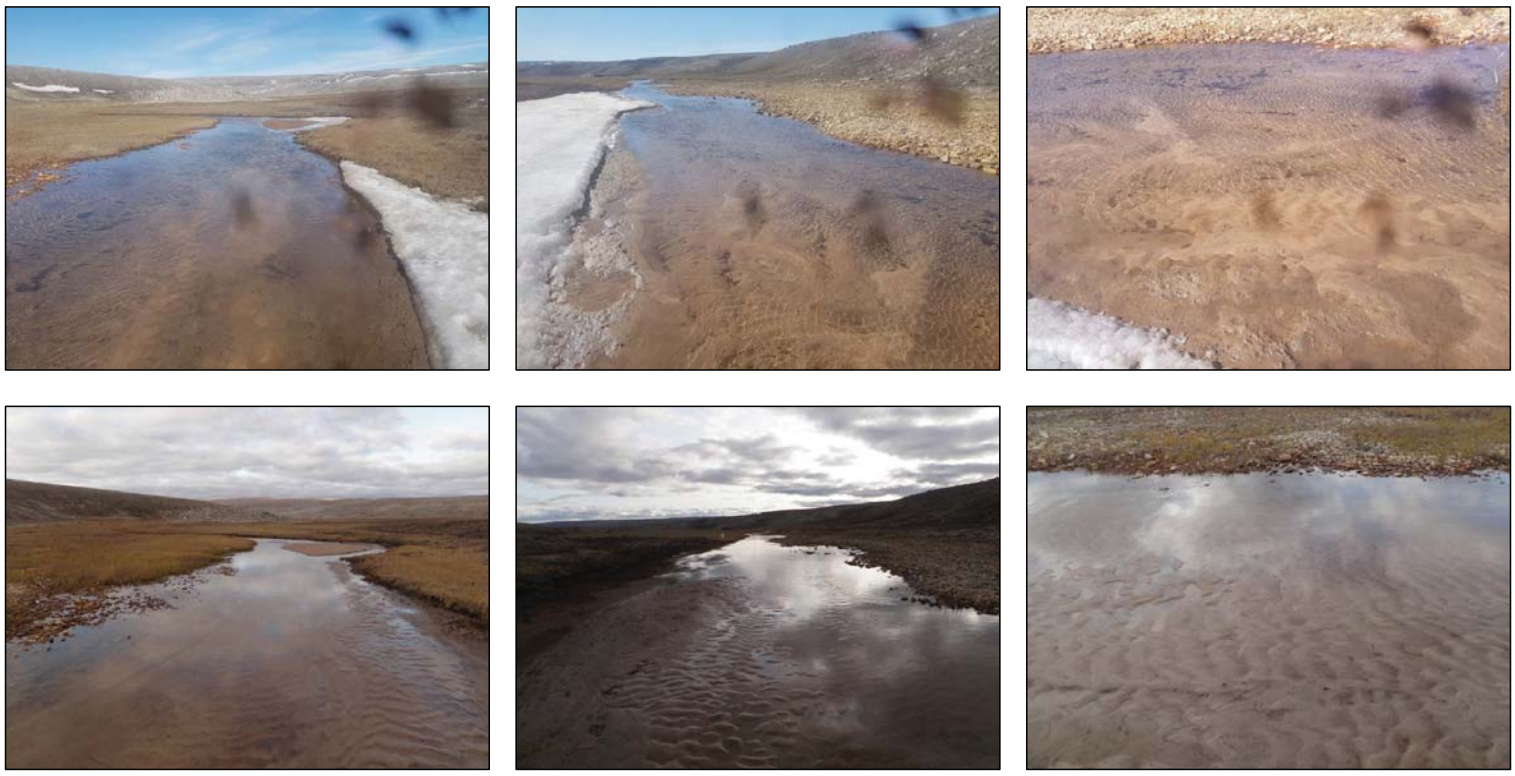
Figure 10. Summer (top) and fall (bottom) views of CV-58-5 at the 80 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-5 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 527751 7927378

Photographs



A B C

Figure 11. Summer (top) and fall (bottom) views of CV-58-5 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-6 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527681 7927318

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 5-13° **Flow Regime:** Intermittent

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	CV-58-5 STREAM									
50D	8.5	2.6 / 0.8	- / -	0.07 / 0.13	- / -	0.10 / 0.15	- / -	0.17 / 0.07	- / -	0.20 / 0.15
0	8.3	2.2 / 1.2	- / 0.01	0.04 / -	- / 0.02	0.05 / 0.05	- / 0.11	0.21 / -	- / 0.09	0.25 / 0.15
50U	FISH MOVEMENT BARRIER									

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	CV-58-5 STREAM										
50D	60	40	-	-	-	-	60	15	25	-	-
0	80	20	-	-	-	-	-	10	90	-	-
50U	FISH MOVEMENT BARRIER										

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality

Arctic Char - NOT FISH-BEARING

Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-6 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527681 7927318

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	2.87	0	-	N/A
	Fall	1.48	0	-	N/A
NNST	Summer	2.87	0	-	N/A
	Fall	1.48	0	-	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

There was no evidence of fish use of this stream in 2018. There was very low water with little potential to support fish except during a high freshet or periods of extensive rain. In addition, there is a steep barrier to fish movement starting at approximately 50 m upstream from the crossing. This crossing is near enough to confirmed fish habitat (CV-58-5) that intermittent use during high water may be possible.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-6 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527681 7927318

Photographs



A **B** **C**

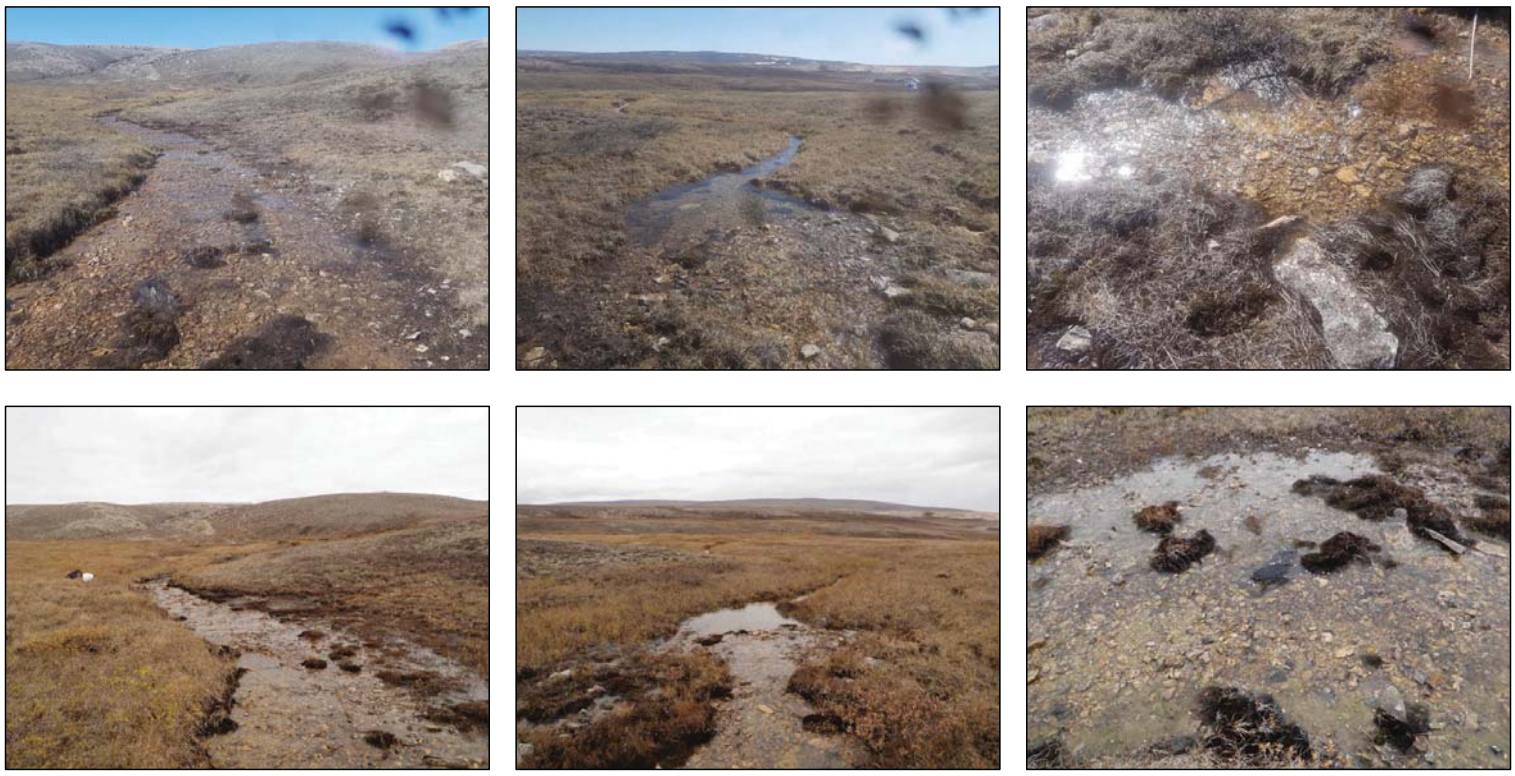
Figure 1. Summer (top) and fall (bottom) views of CV-58-6 at the 50 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-6 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527681 7927318

Photographs



A B C

Figure 2. Summer (top) and fall (bottom) views of CV-58-6 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-6 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527681 7927318

Photographs



A

Figure 3. View of the barrier to fish movement in CV-58-6 approximately 50 m upstream from the rail crossing.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-7 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527650 7927282

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** > 10° **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry hillside down to the confluence with fish-bearing CV-58-5. Vertical barriers would likely prevent access under all flow scenarios. There is never fish habitat at this rail crossing.

Photographs



A **B**

Figure 1. Views of CV-58-7 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-8 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527613 7927217

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** > 10° **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry, rocky hillside down to the confluence with CV-59-1 in 2018. Vertical barriers would likely prevent access to the crossing under all flow scenarios. There is never fish habitat at this rail crossing.

Photographs



A



B

Figure 1. Views of CV-58-8 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-59-1 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527590 7927169

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 10 to > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This stream had low water in 2018 with multiple locations of subsurface flow. There were also permanent vertical barriers to fish movement between the rail and fish-bearing 58-5 downstream. There is never fish habitat at this rail crossing.

Photographs



A **B**

Figure 1. Views of CV-59-1 at the rail crossing during summer (A) and (B), and fall (C). Note the multiple locations where flow is subsurface.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-59-2 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527553 7927052

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 10 to > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This stream had low water in 2018 with multiple locations of subsurface flow. There were also permanent vertical barriers to fish movement between the rail and fish-bearing 58-5 downstream. There is never fish habitat at this rail crossing.

Photographs



A **B**

Figure 1. Views of CV-59-2 at the rail crossing during summer (A) and (B), and fall (C). Note the locations where flow is subsurface.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-59-3 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527529 7926917

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 10 to > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry hillside valley in 2018. The very steep gradient would likely prevent any access even under much higher flows. There is never fish habitat at this rail crossing.

Photographs



A



B

Figure 1. Views of CV-59-3 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-59-4 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527395 7926734

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 8-13° **Flow Regime:** Intermittent

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	13.5	4.8 / dry	0.11 / -	0.08 / -	0.04 / -	0.15 / -	0.30 / -	0.20 / -	0.31 / -	0.35 / -
50D	9.0	2.0 / dry	0.08 / -	0.06 / -	0.10 / -	0.10 / -	0.04 / -	0.64 / -	0.50 / -	0.65 / -
0	10.8	2.9 / dry	0.07 / -	- / -	0.06 / -	0.10 / -	0.19 / -	- / -	0.20 / -	0.20 / -
50U	GRADIENT BARRIER									
100U										

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	85	15	-	-	-	-	-	-	60	40	-
50D	50	25	-	-	25	-	-	-	40	35	25
0	20	40	-	-	40	-	-	-	35	40	25
50U	GRADIENT BARRIER										
100U											

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality

Arctic Char - MARGINAL

Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-59-4 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527395 7926734

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	4.20	1	0.24	~150
	Fall	-	N/A	N/A	N/A
NNST	Summer	4.20	0	-	N/A
	Fall	-	N/A	N/A	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	L	N
NNST	N	N	N	N

Comments & Summary

Very steep gradient at and upstream from the crossing. One juvenile Arctic Char observed 50 m downstream of the crossing, but may not have access farther upstream. By fall, surface water had disappeared in several locations within the channel. Use limited to intermittent during high water.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - MARGINAL** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-59-4 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527395 7926734

Photographs



A **B** **C**

Figure 1. Summer views of CV-59-4 at the 100 m (top) and 50 m (bottom) downstream cross-sections; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-59-4 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527395 7926734

Photographs



A **B** **C**

Figure 2. Summer (top) views of CV-59-4 at the 50 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across. Fall (bottom) aerial view of the crossing.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-59-4a | **Dates Surveyed:** 29 June & 1 September, 2018 | **UTM Coordinates:** 17 W 527329 7926595

General Physical Characteristics

Channel Confinement: C | **Channel Gradient (range):** 10 to > 15° | **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished | **Effort (min):** N/A | **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This stream was nearly dry in 2018. Lack of surface flow downstream and a steep gradient near the crossing likely combine to prevent access during all flow conditions. There is probably never fish habitat at this rail crossing.

Photographs



A



B

Figure 1. Views of CV-59-4a at the rail crossing during summer (A) and fall (B). Note the loss of surface flow downstream in the fall image.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-59-4b | **Dates Surveyed:** 29 June & 1 September, 2018 | **UTM Coordinates:** 17 W 527467 7926817

General Physical Characteristics

Channel Confinement: PC | **Channel Gradient (range):** 10 to > 15° | **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished | **Effort (min):** N/A | **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry low point in 2018. There is never fish habitat at this rail crossing.

Photographs



A



B

Figure 1. Views of CV-59-4b at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-59-5 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527272 7926457

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 10 to > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This stream was nearly dry in 2018. Multiple movement barriers would exist downstream even under high flows. There is never fish habitat at this rail crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-59-5 at the rail crossing during summer (A) and (B), and fall (C). Note the lack of surface flow in multiple locations.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-60-1 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527202 7926246

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 5 to > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

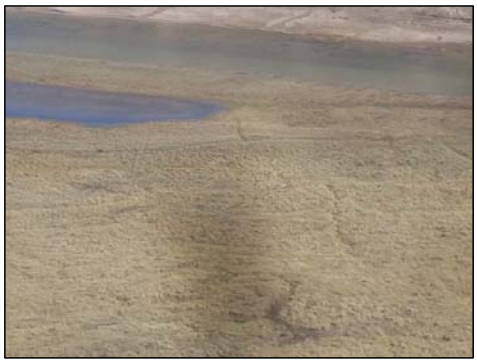
Comments & Summary

This stream was nearly dry in 2018. No connection with the downstream river and multiple movement barriers would exist even under high flows. There is never fish habitat at this rail crossing.

Photographs



A



B



C

Figure 1. Views of CV-60-1 at the rail crossing during summer (A) and (B), and fall (C). Note the lack of surface flow in multiple locations.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-60-2 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527214 7926070

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 5 to 10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This stream was nearly dry in 2018 while the adjacent pond was shallow and isolated. No connection with a downstream river and a lack of surface flow over a large area likely prevent fish access even under high flows. There is never fish habitat at this rail crossing.

Photographs



A **B**

Figure 1. Views of CV-60-2 at the rail crossing during summer (A) and fall (B). Note the general lack of surface flow.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-60-3 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527225 7925961

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 5 to > 10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was very little water at or near the crossing in 2018 and multiple locations with subsurface flow and steep vertical drops. These barriers likely prevent fish access even under high flows. There is never fish habitat at this rail crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-60-3 at the rail crossing during summer (A) and (B), and fall (C). Note the frequent lack of surface flow.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-60-4 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527243 7925782

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 5 to > 10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This stream had low water levels in summer and was nearly dry in fall 2018. In addition, there were multiple locations with subsurface flow and vertical drops. These barriers likely prevent fish access even under high flows. There is never fish habitat at this rail crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-60-4 at the rail crossing during summer (A), a downstream barrier (B), and the crossing during fall (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-60-4a | **Dates Surveyed:** 29 June & 1 September, 2018 | **UTM Coordinates:** 17 W 527252 7925685

General Physical Characteristics

Channel Confinement: PC | **Channel Gradient (range):** 5 to > 10° | **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished | **Effort (min):** N/A | **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This site was dry in 2018 with no obvious channel and multiple barriers to movement even if there were flows. There is never fish habitat at this rail crossing.

Photographs



A



B

Figure 1. Views of CV-60-4a at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-60-5 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527273 7925480

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 8-15° **Flow Regime:** Open

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	5.4	1.3 / 2.4	0.08 / 0.02	- / -	0.07 / 0.03	0.10 / 0.05	0.37 / 0.01	- / -	0.24 / 0.27	0.40 / 0.30
50D	9.8	3.2 / 2.1	0.08 / 0.07	- / -	0.05 / 0.02	0.10 / 0.10	0.66 / 0.35	- / -	0.46 / 0.05	0.70 / 0.40
0	6.3	1.4 / 1.2	0.10 / 0.03	- / -	0.09 / 0.02	0.10 / 0.05	0.08 / 0.20	- / -	0.43 / 0.06	0.50 / 0.25
50U	GRADIENT BARRIER									
100U										

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	20	35	-	-	45	-	-	-	70	30	-
50D	5	35	-	-	60	-	-	-	50	50	-
0	5	35	-	-	60	-	-	-	45	50	5
50U	GRADIENT BARRIER										
100U											

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality

Arctic Char - NOT FISH-BEARING

Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-60-5 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527273 7925480

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	2.93	0	-	N/A
	Fall	1.47	0	-	N/A
NNST	Summer	2.93	0	-	N/A
	Fall	1.47	0	-	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

There was no evidence of fish use of habitat within the survey transect. The stream is very steep, particularly at and upstream of the crossing, representing at least a soft barrier to movement. Fish use of this stream likely restricted to 100 m or more downstream from the rail crossing.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-60-5 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527273 7925480

Photographs



A B C

Figure 1. Summer (top) and fall (bottom) views of CV-60-5 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-60-5 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527273 7925480

Photographs



A B C

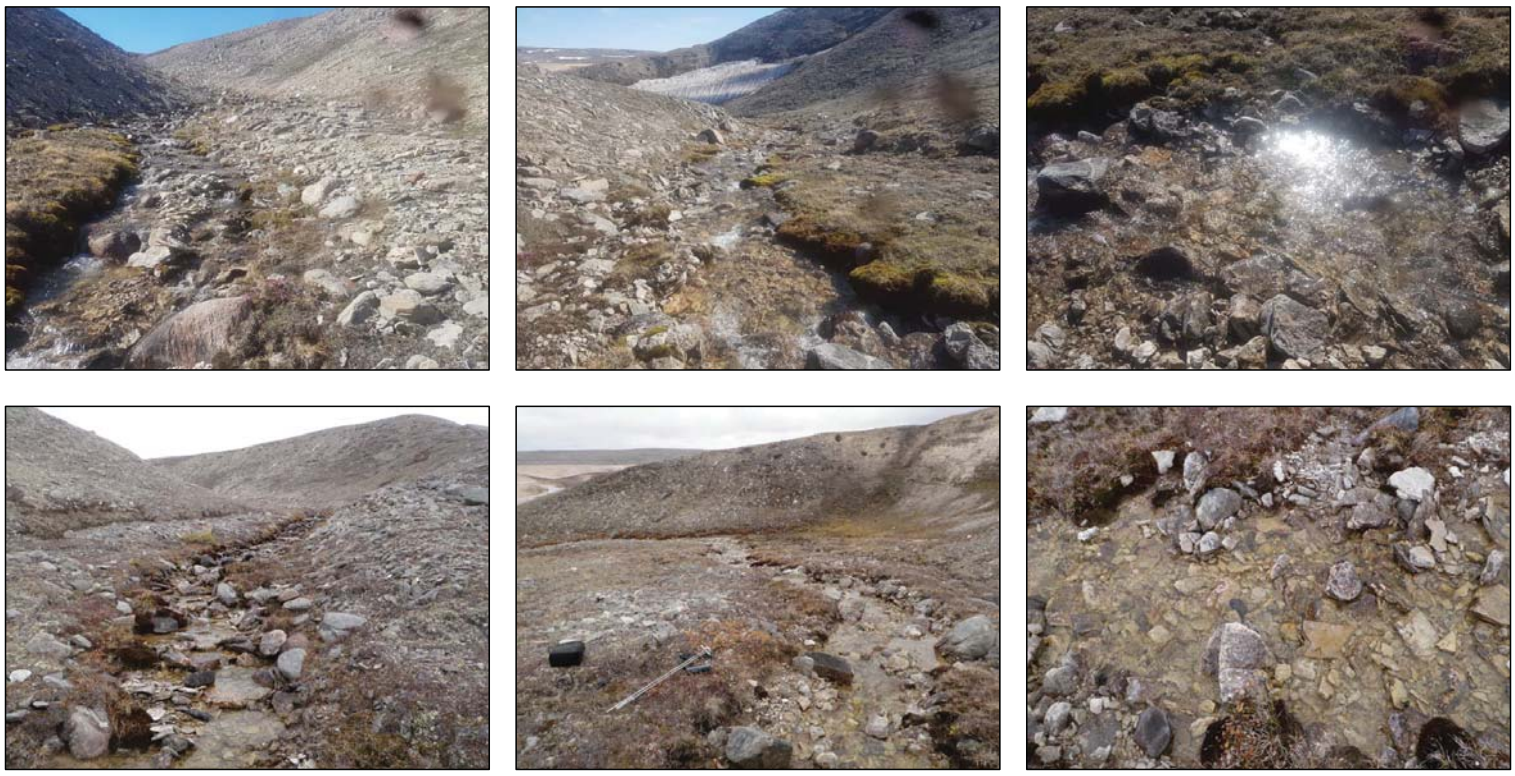
Figure 2. Summer (top) and fall (bottom) views of CV-60-5 at the 50 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-60-5 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527273 7925480

Photographs



A B C

Figure 3. Summer (top) and fall (bottom) views of CV-60-5 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-60-6 **Dates Surveyed:** 1 July & 1 September, 2018 **UTM Coordinates:** 17 W 527296 7925237

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 5 to > 15° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Backpack Electrofisher **Effort (min):** 1.32 **Transect Length (m):** 100

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was steep (~15°). There is never fish habitat at this rail crossing.

Photographs



A



B

Figure 1. Views of CV-60-6 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-61-1 **Dates Surveyed:** 1 July & 1 September, 2018 **UTM Coordinates:** 17 W 527296 7925237

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 5 to > 15° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Backpack Electrofisher **Effort (min):** 1.32 **Transect Length (m):** 100

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was shallow and steep (~15°) and the gradient continued to increase upstream. The nearest any char were captured or observed was 200 m downstream of the rail crossing. Starting approximately 125 m downstream the channel widens considerably and maximum depth is 1 cm. This likely represents a barrier to fish movements under most, if not all, flow conditions. Habitat downstream of the soft barrier is good quality for char. Fish use of habitat at or near the crossing is unlikely.

Photographs



A **B** **C**

Figure 1. Views of CV-61-1 at the rail crossing during summer, looking upstream (A), downstream (B), and across (C).

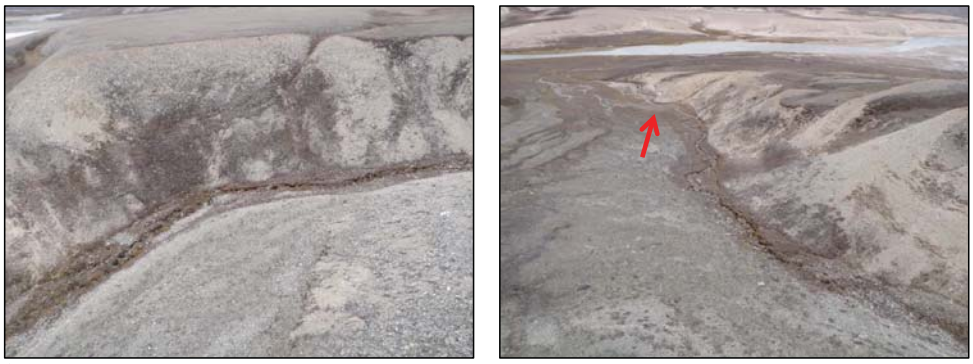
Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-61-1 **Dates Surveyed:** 1 July & 1 September, 2018 **UTM Coordinates:** 17 W 527296 7925237

Photographs



A B

Figure 2. Aerial views of CV-61-1 during fall of the crossing (A) and downstream (B) showing the barrier (arrow).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING**
			Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-61-2 **Dates Surveyed:** 1 July & 1 September, 2018 **UTM Coordinates:** 17 W 527181 7925009

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 5 to > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was very shallow and steep (~15°) and the gradient continued to increase upstream. Starting approximately 200 m downstream, the channel widens and flows become subsurface. This likely represents a barrier to fish movements under most, if not all, flow conditions. Fish use of habitat at or near the crossing is unlikely.

Photographs



A **B** **C**

Figure 1. Views of CV-61-2 at the rail crossing during summer (A), the downstream flow barrier (B), and the crossing during fall (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-61-3 **Dates Surveyed:** 1 July & 1 September, 2018 **UTM Coordinates:** 17 W 527023 7924876

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 5 to > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

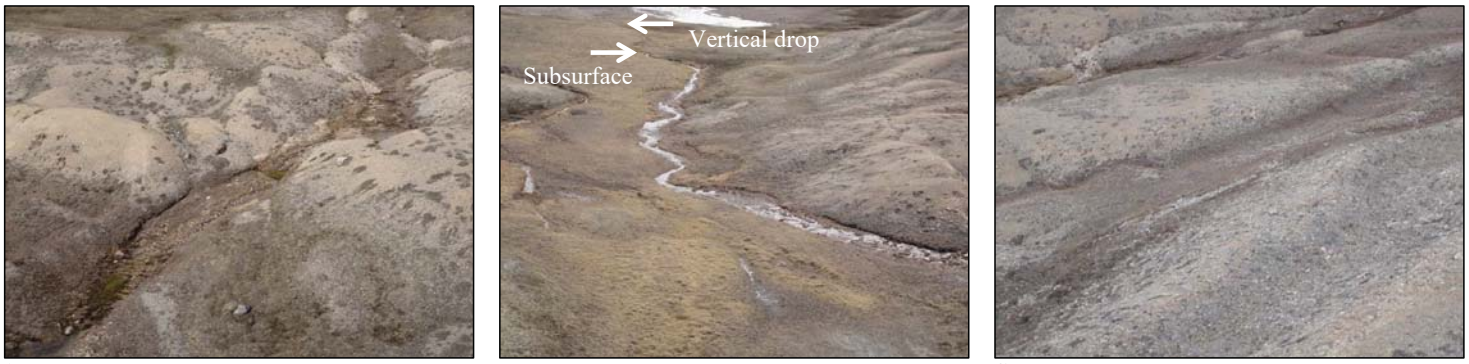
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was very shallow in 2018 and steep (~15°). There are multiple gradient and subsurface flow barriers to movement downstream that likely prevent fish movements under most, if not all, flow conditions. Fish use of habitat at or near the crossing is unlikely.

Photographs



A **B** **C**

Figure 1. Views of CV-61-3 at the rail crossing during summer (A), downstream barriers (B), and the crossing during fall (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-62-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 526868 7924453

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 5-8° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	21.0	19.0 / 10.3	0.09 / 0.20	0.20 / 0.16	- / 0.08	0.40 / 0.25	0.12 / 0.47	0.53/ 0.33	- / 0.19	> 2.00 / 0.55
80D	16.0	13.0 / 7.5	0.20 / 0.10	0.50 / 0.39	- / -	> 1.00 / 0.50	0.62 / 0.18	0.90 / 0.30	- / -	> 2.00 / 0.40
60D	17.0	14.0 / 5.7	0.30 / 0.12	0.20 / 0.36	- / -	0.80 / 0.40	0.82 / 0.75	0.78 / 0.43	- / -	> 2.00 / 0.80
40D	16.0	13.0 / 7.0	0.18 / 0.10	0.20 / 0.34	- / -	0.80 / 0.40	0.90 / 0.58	2.03 / 0.68	- / -	> 2.50 / 0.75
20D	19.0	14.0 / 8.5	0.48 / 0.32	0.50 / 0.26	- / -	0.70 / 0.40	0.60 / 0.44	1.52 / 0.63	- / -	> 2.00 / 0.70
0	23.0	14.0 / 6.9	0.30 / 0.26	0.30 / 0.24	- / -	0.80 / 0.35	0.94 / 0.75	0.72 / 0.45	- / -	> 2.00 / 0.80
20U	17.0	13.0 / 5.6	0.27 / 0.28	- / 0.44	- / -	0.80 / 0.50	0.65 / 0.51	- / 0.33	- / -	> 2.00 / 0.60
40U	18.0	16.0 / 7.5	0.15 / 0.15	- / 0.26	- / -	0.70 / 0.30	1.85 / 0.27	- / 0.59	- / -	> 2.00 / 0.65
60U	28.0	20.0 / 9.9	0.15 / 0.12	- / 0.13	- / 0.20	0.60 / 0.25	0.98 / 0.50	- / 0.09	- / 0.56	> 2.00 / 0.60
80U	30.0	15.0 / 6.9	0.10 / 0.18	0.16 / 0.26	- / -	0.60 / 0.30	0.97 / 0.74	- / 0.90	- / -	> 2.00 / 0.90
100U	15.0	12.0 / 4.3	0.21 / 0.14	- / 0.25	- / -	0.80 / 0.30	0.72 / 0.17	- / 0.67	- / -	> 2.00 / 0.70

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	85	5	10	-	-	-	-	-	55	40	5
80D	85	5	10	-	-	-	-	-	20	80	-
60D	75	5	15	-	5	-	-	-	15	80	5
40D	75	5	15	-	5	-	-	-	10	75	15
20D	75	5	15	-	5	-	-	-	10	80	10
0	65	10	20	-	5	-	-	-	10	70	20
20U	65	5	25	-	5	-	-	-	10	60	30
40U	75	5	15	-	5	-	-	-	10	80	10
60U	75	5	15	-	5	-	-	-	10	80	10
80U	75	5	10	-	10	-	-	-	15	80	5
100U	70	5	15	-	10	-	-	-	10	80	10

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality

Arctic Char - IMPORTANT

Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-62-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 526868 7924453

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	3.27	5	1.53	100 - 200
	Fall	3.63	0	-	N/A
NNST	Summer	3.27	0	-	N/A
	Fall	3.63	0	-	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	M
NNST	N	N	L	N

Comments & Summary

Provides important rearing habitat for juvenile char throughout the open water season, but particularly during summer. High discharge rates during early summer made sampling difficult and fish use likely greater than indicated by electrofishing survey results. Fall sampling likely occurred after fish had already begun movements to overwintering lakes. May want to consider a bridge at this location.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-62-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 526868 7924453

Photographs



A B C

Figure 1. Summer (top) and fall (bottom) views of CV-62-1 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-62-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 526868 7924453

Photographs



A B C

Figure 2. Summer (top) and fall (bottom) views of CV-62-1 at the 80 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-62-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 526868 7924453

Photographs



A **B** **C**

Figure 3. Summer (top) and fall (bottom) views of CV-62-1 at the 60 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-62-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 526868 7924453

Photographs



A B C

Figure 4. Summer (top) and fall (bottom) views of CV-62-1 at the 40 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-62-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 526868 7924453

Photographs



A **B** **C**

Figure 5. Summer (top) and fall (bottom) views of CV-62-1 at the 20 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-62-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 526868 7924453

Photographs



A **B** **C**

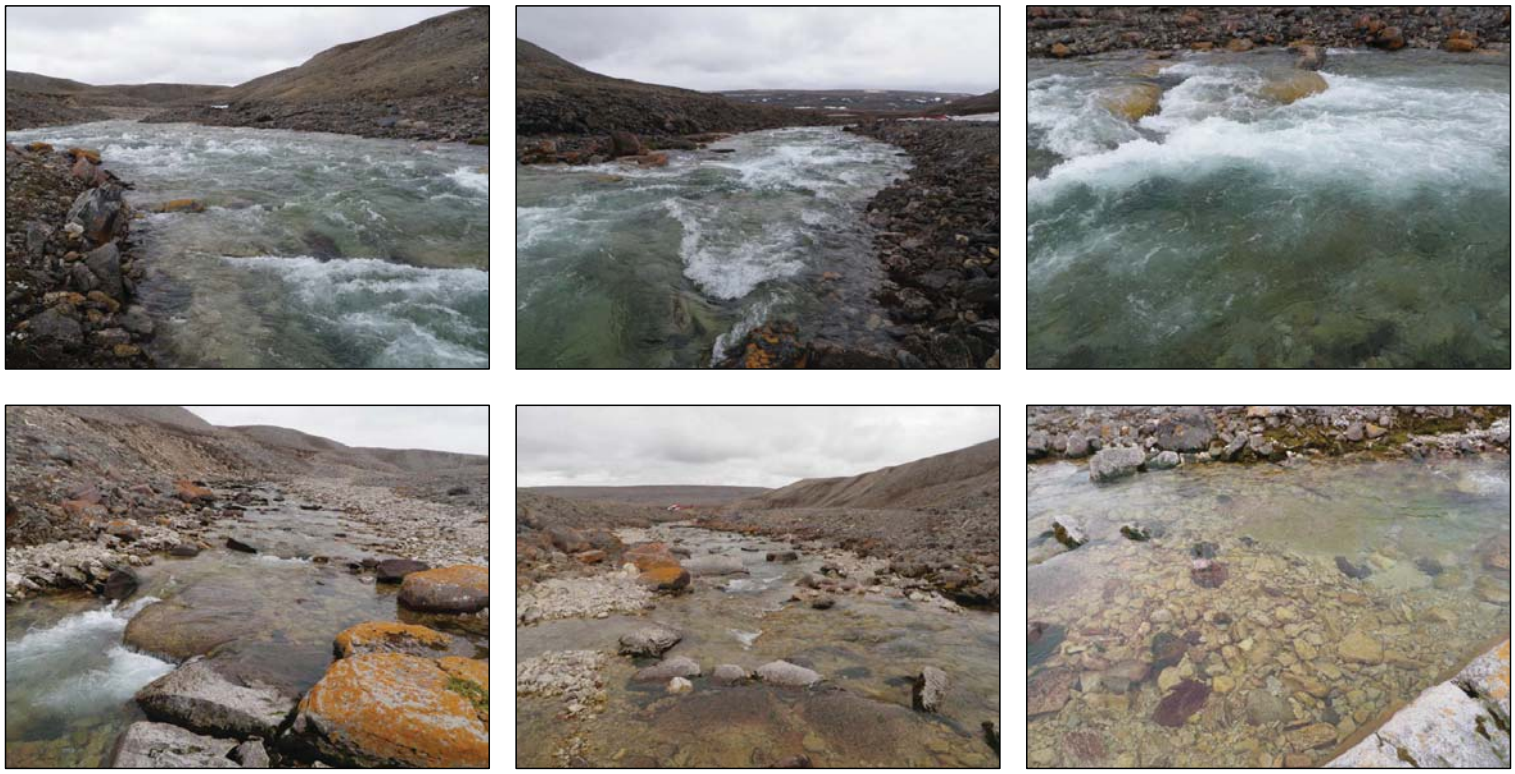
Figure 6. Summer (top) and fall (bottom) views of CV-62-1 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-62-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 526868 7924453

Photographs



A **B** **C**

Figure 7. Summer (top) and fall (bottom) views of CV-62-1 at the 20 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-62-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 526868 7924453

Photographs



A **B** **C**

Figure 8. Summer (top) and fall (bottom) views of CV-62-1 at the 40 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-62-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 526868 7924453

Photographs



A **B** **C**

Figure 9. Summer (top) and fall (bottom) views of CV-62-1 at the 60 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-62-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 526868 7924453

Photographs



A **B** **C**

Figure 10. Summer (top) and fall (bottom) views of CV-62-1 at the 80 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-62-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 526868 7924453

Photographs



A B C

Figure 11. Summer (top) and fall (bottom) views of CV-62-1 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-62-2 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 526897 7924167

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 5 to > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was very shallow in 2018 and steep (~15°). The channel widens downstream with very shallow (1 cm) and occasionally subsurface flows. These barriers to movement in 2018 likely prevent fish movements under most, if not all, flow conditions. Fish use of habitat at or near the crossing is unlikely.

Photographs



A B C

Figure 1. Views of CV-62-2 at the rail crossing during summer (A), downstream (B), and the crossing during fall (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-62-3 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 526951 7923938

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 5 to > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was dry in 2018 and steep. There are multiple potential soft barriers to movement even under very high flows. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-62-3 at the rail crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-62-4 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 526975 7923621

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 5 to > 10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was marshy/moist terrain with no channel and minimal flow in 2018. There are no connections with fish-bearing habitat. There is no fish use of habitat at the crossing.

Photographs



A **B**

Figure 1. Views of CV-62-4 at the rail crossing during summer, with 62-5 (A), and during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-62-5 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 526982 7923557

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 5 to > 10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was marshy/moist terrain with no channel and minimal flow in 2018. There are no connections with fish-bearing habitat. There is no fish use of habitat at the crossing.

Photographs



A **B**

Figure 1. Views of CV-62-5 at the rail crossing during summer, with 62-4 (A), and during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-62-6 & CV-62-6b

Dates Surveyed: 2 July & 1 September, 2018

UTM Coordinates: 17 W 527016 7923383 & 17 W 527011 7923411

General Physical Characteristics

Channel Confinement: PC

Channel Gradient (range): 5 to > 15°

Flow Regime: Open Water

Fisheries Data

Gear Used: Not Fished

Effort (min): N/A

Transect Length (m): N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

These are two branches of the same stream. Water was low in summer and nearly dry by fall, combined with a vertical drop barrier ~150 m downstream of the crossing, upstream access is prevented under any flow conditions. A subsurface flow barrier may exist at the downstream confluence. There is no fish use of habitat at the crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-62-6 (A) and 62-6b (B) during summer, and both crossings during fall (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

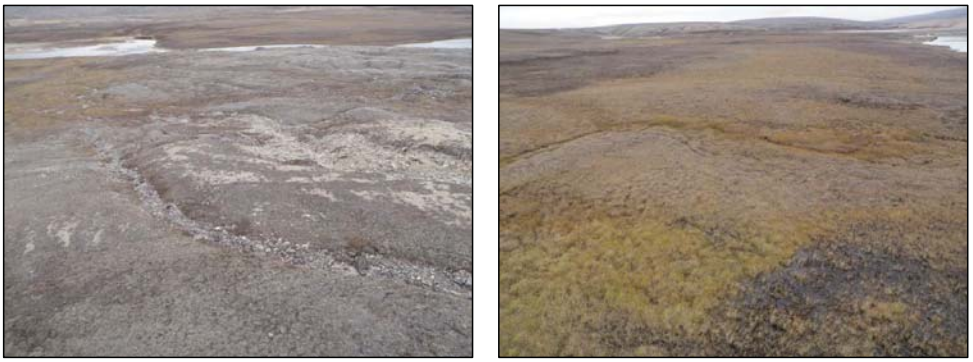
Location

Crossing ID: CV-62-6 & CV-62-6b

Dates Surveyed: 2 July & 1 September, 2018

UTM Coordinates: 17 W 527016 7923383 & 17 W 527011 7923411

Photographs



A **B**

Figure 2. Views of CV-62-6 and 62-6b at the crossing during fall (A) and near the downstream confluence (B) showing loss of surface flow.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-63-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 527058 7923177

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 5 to > 15° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing had flows during summer, but was nearly dry by fall 2018. There was an impassable vertical drop barrier 100 m downstream of the crossing. There is no fish use of habitat at the crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-63-1 at the crossing during summer (A), at the downstream barrier (B), and during fall looking upstream towards the crossing (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-63-2 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 527100 7923086

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 5 to > 15° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing had similar habitat to CV-63-1 and shared the same impassable downstream barrier. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-63-2 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-63-3 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 527162 7922964

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 5 to > 15° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was steep, but had sufficient water levels. However, there is an impassable vertical barrier 100 m downstream. There is no fish use of habitat at the crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-63-3 at the crossing during summer (A), at the downstream barrier (B), and at the crossing during fall (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-63-3a | **Dates Surveyed:** 2 July & 1 September, 2018 | **UTM Coordinates:** 17 W 527179 7922796

General Physical Characteristics

Channel Confinement: PC | **Channel Gradient (range):** 5 to > 15° | **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished | **Effort (min):** N/A | **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was nearly dry with no channel and was not connected to other waterbodies. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-63-3a at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-63-4 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 527204 7922667

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 5 to > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was very steep with low water levels in 2018. There were multiple subsurface flow barriers downstream of the crossing. The combined effects of all soft barriers likely prevent access under any flow condition. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-63-4 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-63-4a & CV-63-5

Dates Surveyed: 2 July & 1 September, 2018

UTM Coordinates: 17 W 527229 7922619 & 17 W 527241 7922603

General Physical Characteristics

Channel Confinement: PC

Channel Gradient (range): 5 to > 15°

Flow Regime: Intermittent

Fisheries Data

Gear Used: Not Fished

Effort (min): N/A

Transect Length (m): N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

These are two branches of the same stream. Both crossings were steep with low water levels. In addition, there were multiple subsurface flow barriers downstream including at the confluence of these two branches. The combined effects of all soft barriers likely prevent access under any flow condition. There is no fish use of habitat at the crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-63-4a (A) and 63-5 (B) at the crossing during summer, and both crossings during fall (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-64-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 527295 7922538

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 5 to > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

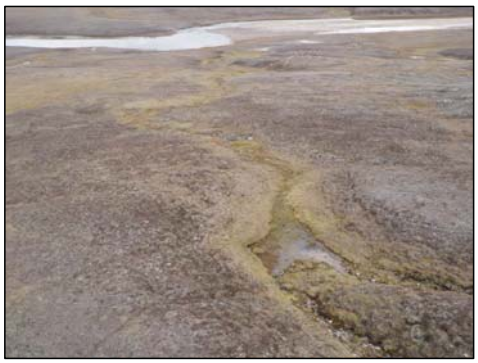
Comments & Summary

This was a moist, steep hillside valley with multiple subsurface flow barriers downstream of the crossing. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-64-1 during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-64-2 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 527414 7922399

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 5 to > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This site was steep, had patchy surface flow and had multiple vertical barriers downstream of the crossing. There is no fish use of habitat at the crossing.

Photographs



A **B**

Figure 1. Views of CV-64-2 during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-64-3 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 527482 7922239

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 5 to > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was steep, but wetted in 2018. However, starting at 160 m downstream from the crossing, there were multiple vertical barriers and occasional loss of surface flow. There is no fish use of habitat at the crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-64-3 during summer at the crossing (A), at the downstream barrier (B), and during fall at the crossing (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-64-4 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 527625 7921956

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 5 to > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was very steep with no flows in summer (still snow-covered) and nearly dry in fall 2018. There were multiple vertical barriers and occasional loss of surface flow downstream. There is no fish use of habitat at the crossing.

Photographs



A **B**

Figure 1. Views of CV-64-4 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-64-5 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 527743 7921726

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 5 to > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

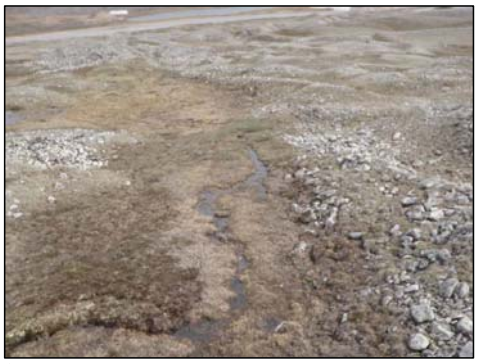
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was very steep and surface flows were intermittent in 2018. There are additional vertical barriers and loss of surface flow downstream. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-64-5 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-64-5a | **Dates Surveyed:** 2 July & 1 September, 2018 | **UTM Coordinates:** 17 W 527688 7921835

General Physical Characteristics

Channel Confinement: C | **Channel Gradient (range):** 5 to > 15° | **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished | **Effort (min):** N/A | **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was a dry low point. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-64-5a at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-64-6 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 527757 7921691

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 5 to > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was nearly dry and steep. Additional vertical barriers and lack of surface flow were observed downstream. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-64-6 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-65-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 527793 7921396

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 5 to > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was a dry and steep rocky valley. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-65-1 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-65-2 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 527828 7920934

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Open Water

Fisheries Data

Gear Used: Backpack Electrofisher **Effort (min):** 0.95 **Transect Length (m):** 50

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a shallow (0.40 m maximum depth), isolated pond. No fish were captured or observed during the survey. There is no fish use of habitat at the crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-65-2 at the crossing during summer (A) and (B), and during fall (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-65-2a | **Dates Surveyed:** 2 July & 1 September, 2018 | **UTM Coordinates:** 17 W 527803 7921140

General Physical Characteristics

Channel Confinement: PC | **Channel Gradient (range):** 5 to > 15° | **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished | **Effort (min):** N/A | **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was some moist terrain on a steep hill. Some downstream portions were channelized, but flows were low and frequently subsurface. There is no fish use of habitat at the crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-65-2a at the crossing during summer (A), at the crossing during fall (B), and downstream of the crossing during fall (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-66-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 527959 7920627

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 5 to > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

There was shallow water present at the crossing in 2018. However, there were multiple vertical barriers downstream, preventing all access. There is no fish use of habitat at the crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-66-1 at the crossing during summer (A), at one of the downstream barriers (B), and at the crossing during fall (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-66-2 & CV-66-2a

Dates Surveyed: 2 July & 1 September, 2018

UTM Coordinates: 17 W 528063 7920532 & 17 W 528013 7920571

General Physical Characteristics

Channel Confinement: C

Channel Gradient (range): > 10°

Flow Regime: Intermittent

Fisheries Data

Gear Used: Not Fished

Effort (min): N/A

Transect Length (m): N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing and 66-2a were contained within a small depression at the top of a hill. There was no access from any downstream habitat. There is no fish use of habitat at the crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-66-2 (A) and 66-2a (B) at the crossing during summer, and 66-2 at the crossing during fall (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-66-3 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528328 7920342

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 5 to > 15° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

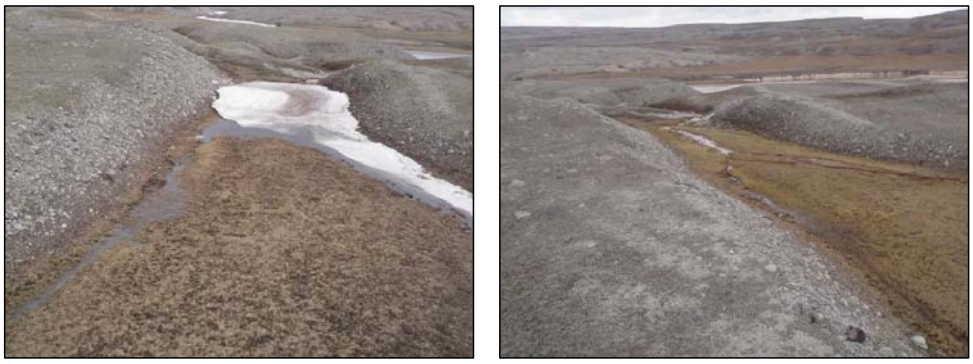
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This site was nearly dry in 2018 and had a very steep gradient almost immediately downstream of the crossing. The barrier would prevent access under all flow conditions. There is no fish use of habitat at the crossing.

Photographs



A **B**

Figure 1. Views of CV-66-3 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-66-4 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528359 7920292

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 5 to > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This site was a very shallow, marshy spot on top of a hill, lacking any noticeable downstream flow or connections to other waterbodies. There is no fish use of habitat at the crossing.

Photographs



A

Figure 1. Views of CV-66-4 at the crossing during summer.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-66-5 & CV-66-6 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528389 7920187 & 17 W 528390 7920161

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 5 to > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

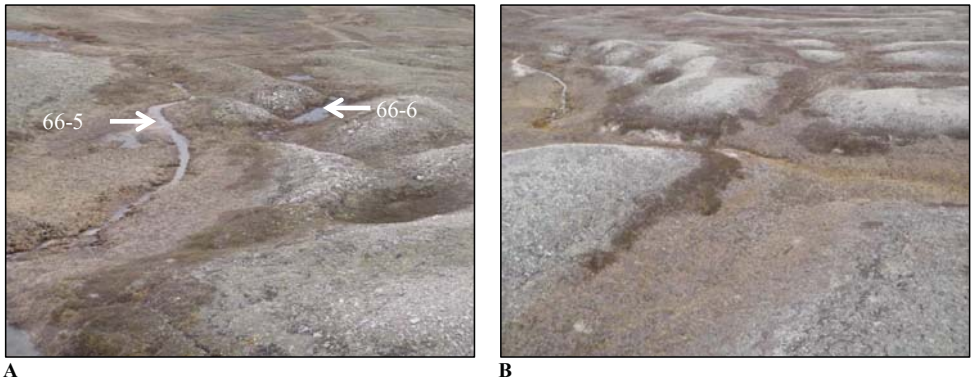
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

These are two branches of the same stream. Water levels were low in summer and even lower during fall when 66-6 was nearly dry. In addition, there were several patches of subsurface flow in both seasons, starting at 50 m downstream from the crossing. These barriers are likely impassable in all flows. There is no fish use of habitat at the crossing.

Photographs



A B

Figure 1. Views of CV-66-5 and 66-6 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-66-7 & CV-66-8

Dates Surveyed: 2 July & 1 September, 2018

UTM Coordinates: 17 W 528378 7920014 & 17 W 528376 7919987

General Physical Characteristics

Channel Confinement: C

Channel Gradient (range): 5 to > 15°

Flow Regime: Intermittent

Fisheries Data

Gear Used: Not Fished

Effort (min): N/A

Transect Length (m): N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

These are two branches of the same stream. Water levels were low in summer and even lower during fall. In addition, there were several patches of subsurface flow in both seasons. These barriers are likely impassable in all flows. There is no fish use of habitat at the crossing.

Photographs



A



B



C

Figure 1. Views of CV-66-7 (A) and 66-8 (B) at the crossing during summer, and 66-7 at the crossing during fall (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-67-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528299 7919743

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 5 to > 10° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing is steep, but had sufficient flows throughout the open-water period in 2018. However, there is a large boulder almost completely blocking the channel 100 m downstream of the crossing, creating a high vertical drop. There are additional vertical barriers downstream. There is likely never fish use of habitat at the crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-67-1 at the crossing during summer (A), one of the barriers (B), and at the crossing during fall (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-67-2 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528226 7918995

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 5 to > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was nearly dry in summer and dry in fall, 2018. The crossing is also atop a plateau with a very steep drop downstream. There is no fish use of habitat at the crossing.

Photographs



A **B**

Figure 1. Views of CV-67-2 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-1 & 68-1a

Dates Surveyed: 2 July & 1 September, 2018

UTM Coordinates: 17 W 528199 7918838 & 17 W 528200 7918864

General Physical Characteristics

Channel Confinement: C

Channel Gradient (range): 4-8°

Flow Regime: Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	15.4	7.7 / 2.4	0.25 / 0.17	0.26 / 0.12	0.50 / 0.08	0.50 / 0.25	0.15 / 0.70	0.87/ 0.51	0.26 / 0.58	1.00 / 0.75
80D	10.0	8.0 / 4.8	0.10 / 0.09	0.22 / 0.26	- / 0.11	0.30 / 0.30	0.80 / 0.15	0.00 / 0.29	- / 0.33	0.80 / 0.40
60D	10.0	7.5 / 4.5	0.10 / 0.12	0.24 / 0.14	- / -	0.30 / 0.20	0.73 / 0.26	0.84 / 0.40	- / -	0.85 / 0.45
40D	9.0	8.0 / 5.9	0.14 / 0.10	0.19 / 0.13	- / 0.11	0.25 / 0.20	0.49 / 0.17	0.81 / 0.26	- / 0.79	0.85 / 0.80
20D	8.0	7.5 / 6.0	0.22 / 0.02	0.15 / 0.16	0.07 / 0.03	0.25 / 0.20	0.80 / 0.37	0.95 / 0.52	0.36 / 0.36	1.00 / 0.60
0	11.0	5.0 / 4.0	0.30 / 0.06	0.28 / 0.12	0.07 / 0.17	0.35 / 0.20	0.36 / 0.18	1.04 / 0.21	0.18 / 0.19	1.10 / 0.25
20U	10.0	8.9 / 7.0	0.26 / 0.02	0.21 / 0.04	0.04 / 0.10	0.30 / 0.15	0.71 / 0.48	0.52 / 0.26	0.27 / 0.93	0.80 / 0.95
40U	10.0	7.0 / 7.8	0.20 / 0.11	0.22 / 0.06	- / 0.12	0.30 / 0.20	0.41 / 0.45	0.59 / 0.18	- / 0.07	0.70 / 0.50
60U	9.3	8.1 / 5.8	0.24 / 0.10	0.25 / 0.11	- / 0.06	0.30 / 0.15	0.63 / 0.25	0.57 / 0.26	- / 0.21	0.70 / 0.30
80U	7.0	6.0 / 3.7	0.38 / 0.09	0.16 / 0.14	- / 0.21	0.40 / 0.25	0.40 / 0.33	0.87 / 0.23	- / 0.55	0.90 / 0.60
100U	6.1	5.0 / 4.5	0.33 / 0.08	0.10 / 0.07	- / 0.14	0.40 / 0.20	0.81 / 0.52	0.22 / 0.43	- / 0.39	0.90 / 0.55

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	85	5	10	-	-	-	-	5	10	80	5
80D	70	15	15	-	-	-	-	5	10	80	5
60D	25	35	10	-	30	-	-	5	10	80	5
40D	50	30	5	-	15	-	-	-	25	70	5
20D	50	30	5	-	15	-	-	-	10	70	20
0	70	10	10	-	10	-	-	5	15	80	-
20U	80	10	5	-	5	-	-	5	15	80	-
40U	65	10	10	-	15	-	-	5	25	70	-
60U	60	20	5	-	15	-	-	5	35	60	-
80U	50	15	15	-	20	-	-	-	20	60	20
100U	30	20	10	-	40	-	-	-	20	60	20

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality

Arctic Char - IMPORTANT

Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-1 & 68-1a

Dates Surveyed: 2 July & 1 September, 2018

UTM Coordinates: 17 W 528199 7918838 & 17 W 528200 7918864

Fisheries Data

Gear Used: Backpack Electrofisher

Transect Length (m): 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	4.62	3	0.65	123
	Fall	3.37	0	-	N/A
NNST	Summer	4.62	0	-	N/A
	Fall	3.37	0	-	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	L
NNST	N	N	N	N

Comments & Summary

Provides important rearing habitat for juvenile char throughout the open water season, but particularly during summer. High discharge rates during early summer made sampling difficult and fish use was likely greater than indicated by electrofishing survey results. Fall sampling likely occurred after fish had begun downstream movements to overwintering locations.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-1 & 68-1a

Dates Surveyed: 2 July & 1 September, 2018

UTM Coordinates: 17 W 528199 7918838 & 17 W 528200 7918864

Photographs



A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of CV-68-1 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-1 & 68-1a

Dates Surveyed: 2 July & 1 September, 2018

UTM Coordinates: 17 W 528199 7918838 & 17 W 528200 7918864

Photographs



A B C

Figure 2. Summer (top) and fall (bottom) views of CV-68-1 at the 80 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-1 & 68-1a

Dates Surveyed: 2 July & 1 September, 2018

UTM Coordinates: 17 W 528199 7918838 & 17 W 528200 7918864

Photographs



A B C

Figure 3. Summer (top) and fall (bottom) views of CV-68-1 at the 60 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-1 & 68-1a

Dates Surveyed: 2 July & 1 September, 2018

UTM Coordinates: 17 W 528199 7918838 & 17 W 528200 7918864

Photographs



A **B** **C**

Figure 4. Summer (top) and fall (bottom) views of CV-68-1 at the 40 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-1 & 68-1a

Dates Surveyed: 2 July & 1 September, 2018

UTM Coordinates: 17 W 528199 7918838 & 17 W 528200 7918864

Photographs



A **B** **C**

Figure 5. Summer (top) and fall (bottom) views of CV-68-1 at the 20 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-1 & 68-1a

Dates Surveyed: 2 July & 1 September, 2018

UTM Coordinates: 17 W 528199 7918838 & 17 W 528200 7918864

Photographs



A B C

Figure 6. Summer (top) and fall (bottom) views of CV-68-1 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-1 & 68-1a

Dates Surveyed: 2 July & 1 September, 2018

UTM Coordinates: 17 W 528199 7918838 & 17 W 528200 7918864

Photographs



A B C

Figure 7. Summer (top) and fall (bottom) views of CV-68-1 at the 20 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across. Note the smaller channel of 68-1a appearing in the downstream-facing photos.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-1 & 68-1a

Dates Surveyed: 2 July & 1 September, 2018

UTM Coordinates: 17 W 528199 7918838 & 17 W 528200 7918864

Photographs



A B C

Figure 8. Summer (top) and fall (bottom) views of CV-68-1 at the 40 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-1 & 68-1a

Dates Surveyed: 2 July & 1 September, 2018

UTM Coordinates: 17 W 528199 7918838 & 17 W 528200 7918864

Photographs



A B C

Figure 9. Summer (top) and fall (bottom) views of CV-68-1 at the 60 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-1 & 68-1a

Dates Surveyed: 2 July & 1 September, 2018

UTM Coordinates: 17 W 528199 7918838 & 17 W 528200 7918864

Photographs



A B C

Figure 10. Summer (top) and fall (bottom) views of CV-68-1at the 80 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-1 & 68-1a

Dates Surveyed: 2 July & 1 September, 2018

UTM Coordinates: 17 W 528199 7918838 & 17 W 528200 7918864

Photographs



A **B** **C**

Figure 11. Summer (top) and fall (bottom) views of CV-68-1 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-2 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528194 7918768

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 5 to 10° **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was dry throughout 2018. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-68-2 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-3 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528059 7918496

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 2-12° **Flow Regime:** Open

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	0.5	0.4 / -	- / -	0.22 / -	- / -	0.25 / -	- / -	0.54 / -	- / -	0.55 / -
50D	16.5	12.3 / -	0.03 / -	0.02 / -	0.02 / -	0.03 / -	0.24 / -	0.22 / -	0.26 / -	0.30 / -
0	0.6	0.6 / -	0.22 / -	- / -	0.06 / -	0.25 / -	0.62 / -	- / -	1.32 / -	1.35 / -
50U	8.7	3.6 / -	0.04 / -	0.04 / -	0.05 / -	0.10 / -	0.30 / -	0.29 / -	0.34 / -	0.35 / -
100U	GRADIENT BARRIER									

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	50	40	10	-	-	-	-	25	60	15	-
50D	20	5	-	-	75	-	-	10	70	20	-
0	50	40	10	-	-	-	-	-	80	15	5
50U	50	25	-	-	25	-	-	-	80	15	5
100U	GRADIENT BARRIER										

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-3 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528059 7918496

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	3.98	0	-	N/A
	Fall	-	N/A	N/A	N/A
NNST	Summer	3.98	0	-	N/A
	Fall	-	N/A	N/A	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

There was no evidence of fish use of habitat within 100 m of the rail crossing in 2018. A very steep gradient was measured upstream from the crossing while downstream, the channel is widens considerably and depths become too shallow for fish use. One juvenile char was observed downstream of the electrofishing transect in a deeper pool, but it likely does not have access farther upstream due to the combination of very shallow water and increasing gradient. Use limited, at best, to intermittent during very high water.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-3 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528059 7918496

Photographs



A **B** **C**

Figure 1. 100 m (top) and 50 m (bottom) downstream cross-section views of CV-68-3 during summer; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-3 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528059 7918496

Photographs



A **B** **C**

Figure 2. Rail crossing (top) and 50 m (bottom) upstream cross-section views of CV-68-3 during summer; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-3 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528059 7918496

Photographs



Figure 3. Rail crossing (A) and downstream (B) aerial views during fall.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-4 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528055 7918461

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was a moist hillside in summer and dry in fall during 2018. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-68-4 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-5 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528081 7918334

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 5 to > 15° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was broad and very shallow in summer with even less water in fall. The channel narrows downstream, but there is also a near vertical drop at approximately 150 m downstream of the crossing. The gradient is likely sufficiently high to prevent access under all flows. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-68-5 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-69-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528322 7917862

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 5 to > 10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was shallow and marshy with no channel and no connections to other waterbodies. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-69-1 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-69-2 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528438 7917517

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 2-5° **Flow Regime:** Open

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	11.0	4.5 / 2.6	0.05 / 0.03	0.06 / 0.02	0.02 / 0.02	0.10 / 0.05	0.26 / 0.17	0.25 / 0.11	0.10 / 0.29	0.30 / 0.30
50D	9.4	3.1 / 0.6	0.04 / -	0.01 / 0.16	0.14 / -	0.15 / 0.16	0.05 / -	0.00 / 0.13	0.12 / -	0.15 / 0.15
0	7.6	4.6 / 3.8	0.16 / -	0.03 / 0.08	0.18 / 0.15	0.20 / 0.15	0.00 / -	0.15 / 0.13	0.03 / 0.02	0.15 / 0.15
50U	6.3	3.4 / 1.5	- / -	0.04 / 0.21	- / -	0.15 / 0.21	- / -	0.05 / 0.02	- / -	0.05 / 0.05
100U	SUBSURFACE FLOW BARRIER – FALL ONLY @ 70 m US									

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	65	35	-	-	-	-	45	10	35	5	5
50D	20	75	-	-	-	5	80	15	-	5	-
0	15	85	-	-	-	-	90	-	10	-	-
50U	25	65	-	-	10	-	60	10	-	30	-
100U	SUBSURFACE FLOW BARRIER – FALL ONLY @ 70 m US										

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-69-2 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528438 7917517

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	3.05	0	-	N/A
	Fall	3.50	0	-	N/A
NNST	Summer	3.05	0	-	N/A
	Fall	3.50	0	-	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	L	N
NNST	N	N	L	N

Comments & Summary

There are no obvious barriers to prevent fish in the large downstream river from accessing the crossing, and the habitat is suitable for both species. It is unknown why no fish were captured during either sampling period in 2018. Sampling additional years and/or seasons could help determine overall fish use.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-69-2 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528438 7917517

Photographs



A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of CV-69-2 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-69-2 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528438 7917517

Photographs



A **B** **C**

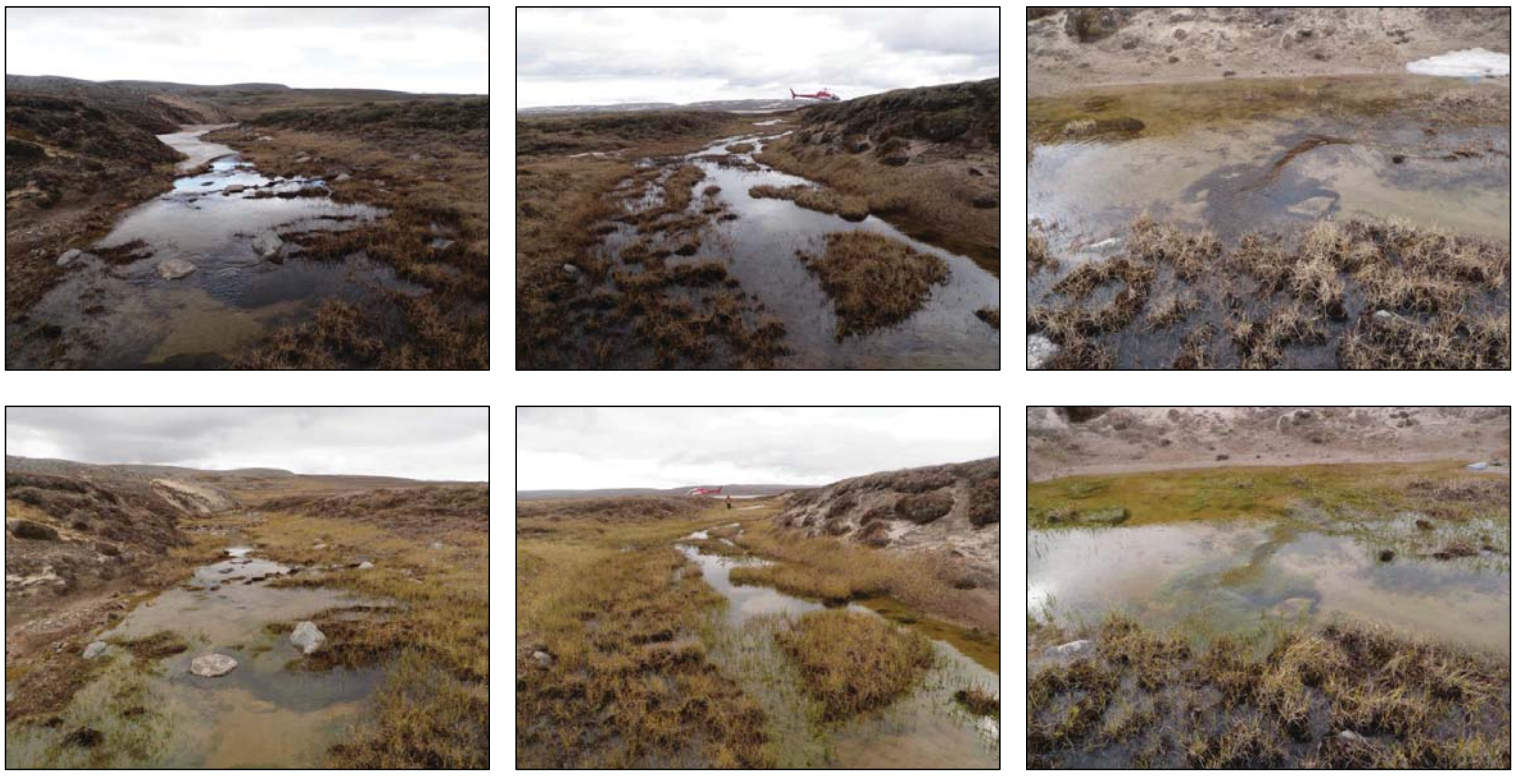
Figure 2. Summer (top) and fall (bottom) views of CV-69-2 at the 50 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-69-2 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528438 7917517

Photographs



A **B** **C**

Figure 3. Summer (top) and fall (bottom) views of CV-69-2 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-69-2 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528438 7917517

Photographs



A **B** **C**

Figure 4. Summer (top) and fall (bottom) views of CV-69-2 at the 50 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-69-2 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528438 7917517

Photographs



A

Figure 5. Subsurface flow barrier at 70 m upstream from the CV-69-2 rail crossing.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-69-3 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528458 7917456

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 5 to > 10° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was shallow in 2018, but had a relatively low gradient. However, there was a vertical drop near the downstream confluence with CV-69-2 that is likely impassable by the small juveniles that could be using 69-2 (though none were captured in 2018). There is likely no fish use of habitat at the crossing.

Photographs



A B C

Figure 1. Views of CV-69-3 at the crossing during summer, looking upstream (A), looking downstream (B), and looking across (C).

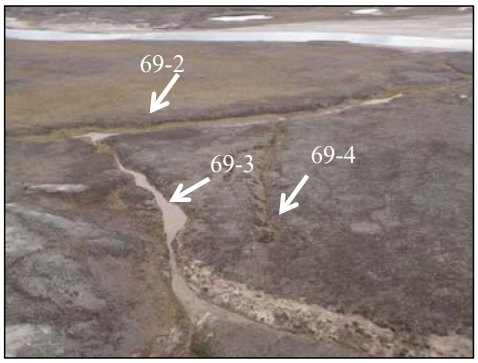
Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-69-3 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528458 7917456

Photographs



A

Figure 2. View of CV-69-3 and nearby 69-2 and 69-4 during fall.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING**
			Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-69-4 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528474 7917407

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 2-5° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was nearly dry in summer and dry in fall 2018. There is no connection or access from CV-69-2. There is no fish use of habitat at the crossing.

Photographs



A



B



C

Figure 1. Views of CV-69-4 at the crossing during summer, looking upstream (A), looking downstream (B), and looking across (C).

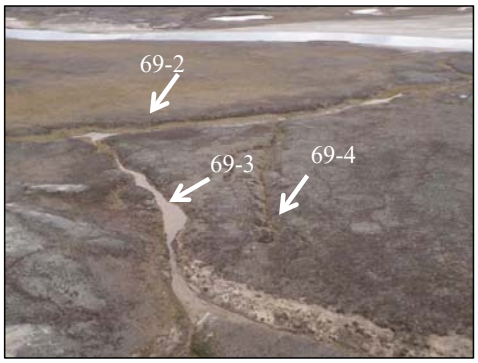
Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-69-4 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528474 7917407

Photographs



A

Figure 2. View of CV-69-4 and nearby 69-2 and 69-3 during fall.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING**
			Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-70-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528704 7916939

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Open Water

Fisheries Data

Gear Used: Backpack Electrofisher **Effort (min):** 2.15 **Transect Length (m):** 100

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a shallow (maximum 1.0-1.5 m), isolated pond atop a hill. Fish were not captured or observed during the survey. There is no fish use of habitat at the crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-70-1 at the crossing during summer (A) and (B), and during the fall (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-70-2 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 529030 7916745

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 1° **Flow Regime:** Open

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
0	-	-	- / -	0.04 / -	- / -	0.05 / -	- / -	0.08 / -	- / -	0.10 / -

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
0	40	60	-	-	-	-	100	-	-	-	-

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - MARGINAL** **Ninespine Stickleback – MARGINAL**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-70-2 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 529030 7916745

Fisheries Data

Gear Used: Not fished **Transect Length (m):** N/A

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	-	N/A	N/A	N/A
	Fall	-	N/A	N/A	N/A
NNST	Summer	-	N/A	N/A	N/A
	Fall	-	N/A	N/A	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	L	H
NNST	N	N	L	H

Comments & Summary

Fishing was not attempted in this stream because the shallow, sandy habitat means that visual assessment is highly accurate and char are typically able to maintain sufficient distance away from the electrofisher to render it ineffective. This is based on years of experience sampling in the Mary River area. In addition, this habitat type typically limits fish use to migration between waterbodies with preferred habitat. This particular stream is almost certainly used by fish as a migration corridor between the large downstream river and a small upstream lake throughout the open water season.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - MARGINAL** **Ninespine Stickleback – MARGINAL**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-70-2 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 529030 7916745

Photographs



A **B** **C**

Figure 1. Summer (top) views of CV-70-2 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across. Fall (bottom) aerial view of the crossing.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-70-3 **Dates Surveyed:** 2 July & 1 September 2018 **UTM Coordinates:** 17 W 529120 7916693

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1° **Flow Regime:** Open

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
0	-	-	- / -	- / -	0.20 / -	> 1.00 / -	- / -	- / -	0.38 / -	> 0.50 / -

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
0	-	25	-	-	-	75	100	-	-	-	-

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT** **Ninespine Stickleback – MARGINAL**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-70-3 **Dates Surveyed:** 2 July & 1 September 2018 **UTM Coordinates:** 17 W 529120 7916693

Fisheries Data

Gear Used: Not fished **Transect Length (m):** N/A

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	-	N/A	N/A	N/A
	Fall	-	N/A	N/A	N/A
NNST	Summer	-	N/A	N/A	N/A
	Fall	-	N/A	N/A	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	M	H
NNST	N	N	M	H

Comments & Summary

The depth and width of this river, combined with the substrate (sand), make electrofishing generally ineffective as the fish would see the surveyors and avoid the area without entering the effective range of the equipment. This major river provides abundant fish habitat and, particularly in the vicinity of the crossing, is a major migratory route for fish in this watershed.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT** **Ninespine Stickleback – MARGINAL**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-70-3 **Dates Surveyed:** 2 July & 1 September 2018 **UTM Coordinates:** 17 W 529120 7916693

Photographs



A **B** **C**

Figure 1. Summer (top) views of CV-70-3 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across. Fall (bottom) aerial view of the crossing.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-71-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 529451 7916535

General Physical Characteristics

Channel Confinement: N/A **Channel Gradient (range):** N/A **Flow Regime:** Open Water

Habitat Description

The north basin has a maximum depth of approximately 0.50 m and substrate is 100% sand/silt/clay. The south basin, including the encroachment area, has a maximum depth of approximately 1.50 m and similar substrate composition with patches of algae/aquatic vegetation.

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	N
NNST	N	N	N	N

Comments & Summary

Several juvenile Arctic Char were observed in the south basin of this lake during early summer surveys.This lake has a short downstream connection to a large river and an upstream connection to a smaller, but deeper lake. The CV-71-1 lake does not provide sufficient depth for char overwintering or spawning. Use by char is restricted to juvenile rearing during the open-water period with fish migrating to other overwintering waterbodies (e.g., the nearby upstream lake).

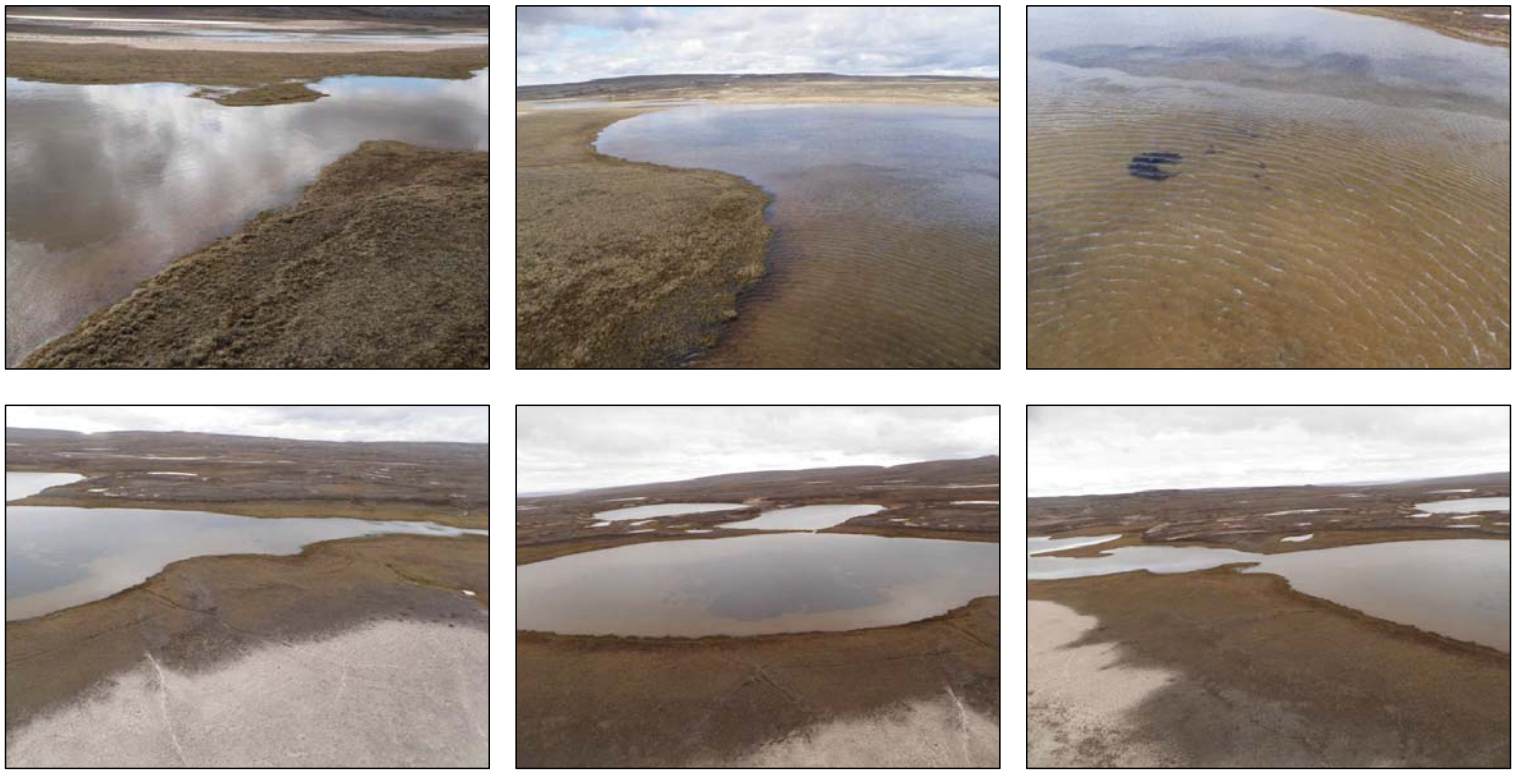
Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-71-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 529451 7916535

Photographs



A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of CV-71-1.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-71-2a | **Dates Surveyed:** 2 July & 1 September, 2018 | **UTM Coordinates:** 17 W 529708 7916558

General Physical Characteristics

Channel Confinement: UC | **Channel Gradient (range):** N/A | **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished | **Effort (min):** N/A | **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a shallow (maximum 0.3 m), isolated pond. The pond is too shallow for overwintering and it likely remains disconnected from other waterbodies in the area during all flow conditions. There is no fish use of habitat at the crossing.

Photographs



A **B**

Figure 1. Views of CV-71-2a at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-71-3 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 529965 7916706

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This is shallow, marshy, unconnected terrain. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-71-3 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-71-4 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 530214 7916862

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This is shallow, marshy, terrain adjacent to a fishless pond. It may occasionally become connected to the pond in high water conditions, but not to any fish-bearing waterbodies. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-71-4 at the crossing during summer (A) and fall, with the nearby pond in the background (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-72-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 530370 7916951

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1-5° **Flow Regime:** Open

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
0	-	-	-	-	-	~0.15	-	-	-	~0.20

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
0	20	80	-	-	-	-	100	-	-	-	-

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-72-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 530370 7916951

Fisheries Data

Gear Used: Not fished **Transect Length (m):** N/A

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	-	N/A	N/A	N/A
	Fall	-	N/A	N/A	N/A
NNST	Summer	-	N/A	N/A	N/A
	Fall	-	N/A	N/A	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

There was no evidence of fish use of habitat near the crossing during 2018. The crossing was shallow with water dispersed over a wide area, which may represent a soft barrier to fish access. Any fish use of this stream originating in the nearby downstream lake is likely restricted to no closer than 50 m downstream of the rail crossing where water depth is greater. During periods of higher flows, habitat would be marginal with intermittent use.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-72-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 530370 7916951

Photographs



A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of CV-72-1 at the rail crossing.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-72-1a | **Dates Surveyed:** 2 July & 1 September, 2018 | **UTM Coordinates:** 17 W 530587 7917015

General Physical Characteristics

Channel Confinement: UC | **Channel Gradient (range):** N/A | **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished | **Effort (min):** N/A | **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This is shallow, marshy, isolated terrain. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-72-1a at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-72-2 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 530784 7917069

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

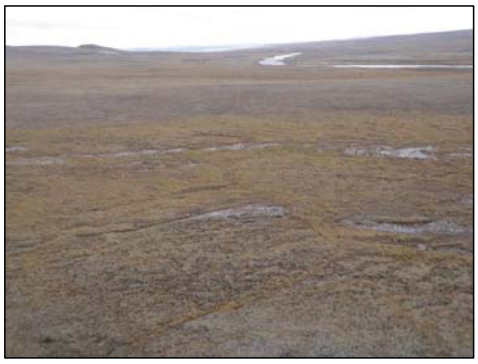
Comments & Summary

This is shallow, marshy, isolated terrain. There is some minor flow at the crossing, but no sustained channel and no connection to fish habitat due to a general lack of surface flow over large areas. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-72-2 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-72-3 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 531048 7917142

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

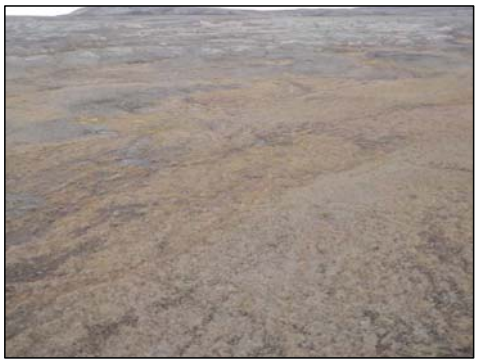
Comments & Summary

This is shallow, marshy, isolated terrain. There is no sustained channel and no connection to fish habitat due to a general lack of surface flow over large areas. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-72-3 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-72-3a & CV-72-4 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 531130 7917165 & 17 W 531160 7917173

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

These crossings are part of a broad, shallow, marshy, area. There is no sustained channel and no connection to fish habitat due to a general lack of surface flow at several intervals. There is also no access from the downstream river. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-72-3a and 72-4 at the crossing during summer (A) and fall (B). Note that accurately pinpointing the specific crossings is difficult at this location.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-73-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 531795 7917555

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was nearly dry in 2018. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-73-1 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-73-2 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 532007 7918051

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

There was a wetted channel at the crossing in 2018; however the channel disappears downstream and the water disperses over the tundra. Subsurface flows are common. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-73-2 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-73-3 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 532156 7918212

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

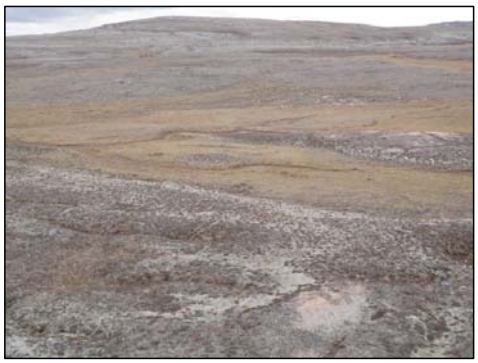
Comments & Summary

This crossing is part of the same system as CV-73-2 with the same downstream barriers preventing fish access to the site. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-73-3 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-73-4 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 532303 7918244

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing is part of the same system as CV-73-2 and CV-73-3 with the same downstream barriers preventing fish access to the site. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-73-4 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-1 **Dates Surveyed:** 2 July & 1 September 2018 **UTM Coordinates:** 17 W 532376 7918246

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 4-5° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	19.6	11.9 / 7.4	0.10 / 0.10	0.04 / 0.09	0.05 / 0.14	0.20 / 0.20	0.54 / 0.21	0.42/ 0.31	0.75 / 0.15	0.80 / 0.40
80D	-	- / 12.5	- / 0.06	- / 0.04	- / 0.09	- / 0.15	- / 0.27	- / 0.11	- / 0.65	- / 0.70
60D	-	- / 16.2	- / 0.10	- / 0.17	- / 0.09	- / 0.20	- / 0.12	- / 0.33	- / 0.42	- / 0.50
50D	33.6	17.7 / -	0.06 / -	0.04 / -	0.08 / -	0.15 / -	0.69 / -	0.27 / -	0.37 / -	0.75 / -
40D	-	- / 13.6	- / 0.08	- / 0.08	- / 0.02	- / 0.10	- / 0.16	- / 0.21	- / 0.23	- / 0.25
20D	-	- / 17.1	- / 0.06	- / 0.06	- / 0.09	- / 0.10	- / 0.25	- / 0.22	- / 0.29	- / 0.35
0	29.3	18.4 / 13.5	0.06 / 0.03	0.08 / 0.04	0.06 / 0.02	0.15 / 0.10	0.32 / 0.13	0.48 / 0.54	0.27 / 0.13	0.50 / 0.60
20U	-	- / 16.3	- / 0.02	- / 0.08	- / 0.02	- / 0.10	- / 0.13	- / 0.44	- / 0.23	- / 0.50
40U	-	- / 15.0	- / 0.07	- / 0.08	- / 0.09	- / 0.10	- / 0.26	- / 0.22	- / 0.46	- / 0.50
50U	34.4	20.4 / -	0.08 / -	0.04 / -	0.20 / -	0.20 / -	0.02 / -	0.24 / -	0.41 / -	0.45 / -
60U	-	- / 20.9	- / 0.02	- / 0.03	- / 0.07	- / 0.10	- / 0.17	- / 0.22	- / 0.53	- / 0.60
80U	-	- / 26.0	- / 0.11	- / 0.02	- / 0.09	- / 0.15	- / 0.16	- / 0.18	- / 0.15	- / 0.25
100U	28.4	24.3 / 23.7	0.26 / 0.18	0.08 / 0.07	0.05 / 0.15	0.30 / 0.20	0.09 / 0.12	0.14 / 0.16	0.20 / 0.14	0.25 / 0.20

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	65	35	-	-	-	-	-	-	30	55	15
80D	70	30	-	-	-	-	-	-	30	60	10
60D	70	30	-	-	-	-	-	-	20	60	20
50D	75	25	-	-	-	-	-	-	35	40	25
40D	70	30	-	-	-	-	-	-	20	60	20
20D	60	40	-	-	-	-	-	-	20	70	10
0	70	30	-	-	-	-	-	-	30	60	10
20U	60	40	-	-	-	-	-	-	30	60	10
40U	60	40	-	-	-	-	-	-	30	60	10
50U	40	60	-	-	-	-	-	-	35	40	25
60U	40	60	-	-	-	-	-	5	30	55	10
80U	30	70	-	-	-	-	-	5	30	55	10
100U	30	60	10	-	-	-	-	-	30	60	10

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality

Arctic Char - NOT FISH-BEARING

Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-1 **Dates Surveyed:** 2 July & 1 September 2018 **UTM Coordinates:** 17 W 532376 7918246

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	4.05	0	-	N/A
	Fall	3.70	0	-	N/A
NNST	Summer	4.05	0	-	N/A
	Fall	3.70	0	-	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

Provides suitable rearing habitat for juvenile char throughout the open water season, but fish were not captured during either survey. No obvious downstream barriers were identified. Use may primarily occur during mid-summer. Fall sampling likely occurred after fish had already begun movements to overwintering lakes.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-1 **Dates Surveyed:** 2 July & 1 September 2018 **UTM Coordinates:** 17 W 532376 7918246

Photographs



A B C

Figure 1. Summer (top) and fall (bottom) views of CV-74-1 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-1 **Dates Surveyed:** 2 July & 1 September 2018 **UTM Coordinates:** 17 W 532376 7918246

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A



B



C

Figure 2. Summer (top) and fall (bottom) views of CV-74-1 at the 80 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-1 **Dates Surveyed:** 2 July & 1 September 2018 **UTM Coordinates:** 17 W 532376 7918246

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A



B



C

Figure 3. Summer (top) and fall (bottom) views of CV-74-1 at the 60 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-1 **Dates Surveyed:** 2 July & 1 September 2018 **UTM Coordinates:** 17 W 532376 7918246

Photographs



NO PHOTO



NO PHOTO



NO PHOTO

A **B** **C**

Figure 4. Summer (top) and fall (bottom) views of CV-74-1 at the 50 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-1 **Dates Surveyed:** 2 July & 1 September 2018 **UTM Coordinates:** 17 W 532376 7918246

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A **B** **C**

Figure 5. Summer (top) and fall (bottom) views of CV-74-1 at the 40 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-1 **Dates Surveyed:** 2 July & 1 September 2018 **UTM Coordinates:** 17 W 532376 7918246

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A **B** **C**

Figure 6. Summer (top) and fall (bottom) views of CV-74-1 at the 20 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-1 **Dates Surveyed:** 2 July & 1 September 2018 **UTM Coordinates:** 17 W 532376 7918246

Photographs



A B C

Figure 7. Summer (top) and fall (bottom) views of CV-74-1 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-1 **Dates Surveyed:** 2 July & 1 September 2018 **UTM Coordinates:** 17 W 532376 7918246

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A **B** **C**

Figure 8. Summer (top) and fall (bottom) views of CV-74-1 at the 20 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-1 **Dates Surveyed:** 2 July & 1 September 2018 **UTM Coordinates:** 17 W 532376 7918246

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A



B



C

Figure 9. Summer (top) and fall (bottom) views of CV-74-1 at the 40 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-1 **Dates Surveyed:** 2 July & 1 September 2018 **UTM Coordinates:** 17 W 532376 7918246

Photographs



NO PHOTO



NO PHOTO



NO PHOTO

A **B** **C**

Figure 10. Summer (top) and fall (bottom) views of CV-74-1 at the 50 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

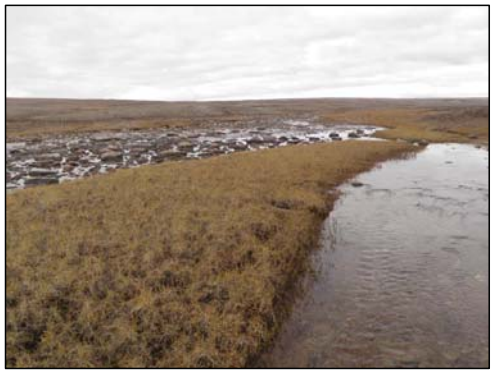
Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-1 **Dates Surveyed:** 2 July & 1 September 2018 **UTM Coordinates:** 17 W 532376 7918246

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 11. Summer (top) and fall (bottom) views of CV-74-1 at the 60 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-1 **Dates Surveyed:** 2 July & 1 September 2018 **UTM Coordinates:** 17 W 532376 7918246

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A



B



C

Figure 12. Summer (top) and fall (bottom) views of CV-74-1at the 80 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-1 **Dates Surveyed:** 2 July & 1 September 2018 **UTM Coordinates:** 17 W 532376 7918246

Photographs



A **B** **C**

Figure 13. Summer (top) and fall (bottom) views of CV-74-1 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-2 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 532406 7918246

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry low point in 2018. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-74-2 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-3 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 532735 7918374

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was nearly dry tundra in 2018. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-74-3 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-4 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 532888 7918494

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a nearly dry hillside in summer and dry in fall, 2018. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-74-4 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-6 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 532988 7918553

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was nearly dry in 2018 with no access for fish due to the lack of channel and surface flow downstream. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-74-6 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-7 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 533258 7918549

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

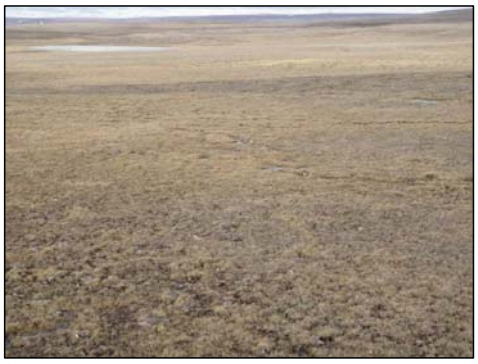
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing had some shallow flows in 2018, but the channel disappeared downstream and flows dispersed. There was no access for fish due to the lack of channel and surface flow downstream to the confluence with a large river. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-74-7 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-75-1 & CV-75-1a

Dates Surveyed: 3 July & 1 September, 2018

UTM Coordinates: 17 W 533398 7918521 & 17 W 533444 7918512

General Physical Characteristics

Channel Confinement: UC

Channel Gradient (range): N/A

Flow Regime: None

Fisheries Data

Gear Used: Backpack Electrofisher

Effort (min): 3.37

Transect Length (m): 100

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

These are two branches of the same waterbody. They are mostly wet puddles with a few longer reaches of surface water with flow. However, no fish were captured in these areas and there was a lack of surface flow/connectivity at the downstream confluence with a large river. There is no fish use of habitat at the crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-75-1 at the crossing during summer (A), the loss of surface flow downstream (B), and both crossings during fall (C)

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-75-1 & CV-75-1a

Dates Surveyed: 3 July & 1 September, 2018

UTM Coordinates: 17 W 533398 7918521 & 17 W 533444 7918512

Photographs



A **B** **C**

Figure 2. Views of CV-75-1a at the crossing during summer, looking upstream (A), downstream (B), and across (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-75-2 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 533559 7918501

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was broad and shallow with minor flows during 2018. However, there is no connection to either upstream or downstream habitat due to lengthy patches of subsurface flow. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-75-2 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-76-1 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 533900 7918535

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

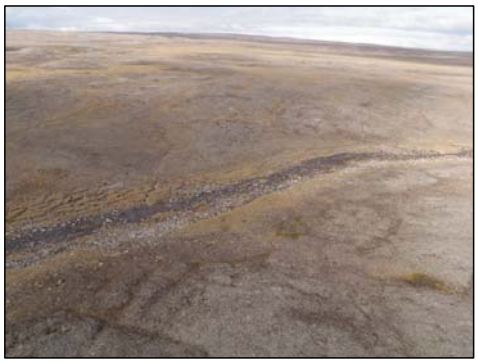
Comments & Summary

The crossing was shallow with water trickling among the rocks in 2018. However, there were multiple soft subsurface flow barriers between the crossing and the nearest overwintering site. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-76-1 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-76-1a | **Dates Surveyed:** 3 July & 1 September, 2018 | **UTM Coordinates:** 17 W 534333 7918581

General Physical Characteristics

Channel Confinement: UC | **Channel Gradient (range):** N/A | **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished | **Effort (min):** N/A | **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was nearly dry in 2018 with no connection to other waterbodies. There is no fish use of habitat at the crossing.

Photographs



A

Figure 1. Views of CV-76-1a at the crossing during summer (A).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-76-2 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 534506 7918563

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was nearly dry in 2018 with no connection to other waterbodies. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-76-2 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-76-3 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 534825 7918511

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was nearly dry in 2018 with no connection to other waterbodies. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-76-3 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-77-1 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 534992 7918491

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was nearly dry in 2018 with no connection to other waterbodies. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-77-1 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-77-2 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 535267 7918560

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 4-5° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	17.1	9.4 / 8.0	0.22 / 0.14	0.06 / 0.02	0.07 / 0.02	0.30 / 0.20	0.84 / 0.69	0.78/ 0.08	0.36 / 0.22	0.90 / 0.75
80D	21.8	11.7 / 10.0	0.11 / 0.14	0.12 / 0.10	0.16 / 0.15	0.20 / 0.20	0.19 / 0.25	0.27/ 0.18	0.37 / 0.13	0.45 / 0.30
60D	11.5	5.1 / 4.8	0.30 / 0.34	0.22 / -	0.12 / 0.15	0.35 / 0.40	0.00 / 0.20	0.68/ -	0.24 / 0.00	0.75 / 0.30
40D	17.2	8.3 / 7.5	0.10 / 0.04	0.21 / 0.17	0.12 / 0.14	0.30 / 0.20	0.05 / 0.30	0.45/ 0.65	0.11 / 0.59	0.55 / 0.70
20D	17.4	9.4 / 7.5	0.22 / 0.14	0.20 / 0.04	0.04 / 0.05	0.30 / 0.20	0.34 / 0.52	0.62/ 0.47	0.21 / 0.17	0.65 / 0.55
0	11.8	6.7 / 6.4	0.14 / 0.19	0.10 / 0.16	0.02 / 0.04	0.20 / 0.20	0.70 / 0.08	0.41/ 0.24	0.36 / 0.08	0.75 / 0.30
20U	7.7	5.7 / 2.7	0.18 / 0.16	0.33 / -	0.03 / 0.18	0.35 / 0.25	0.33 / 0.33	0.30/ -	0.10 / 0.39	0.40 / 0.40
40U	12.1	5.3 / 2.8	0.12 / -	0.30 / 0.13	0.10 / -	0.35 / 0.20	0.26 / -	0.60/ 0.82	0.18 / -	0.65 / 0.85
60U	8.5	3.3 / 2.2	0.16 / 0.12	0.12 / -	0.08 / 0.15	0.20 / 0.20	0.66 / 0.60	0.49/ -	0.19 / 0.18	0.70 / 0.65
80U	11.0	6.6 / 4.6	0.12 / 0.06	0.20 / -	0.10 / 0.04	0.25 / 0.15	0.50 / 0.31	0.10/ -	0.33 / 0.27	0.55 / 0.40
100U	5.7	4.8 / -	0.11 / -	0.08 / -	0.04 / -	0.15 / -	0.45 / -	0.23/ -	0.75 / -	0.80 / -

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	70	25	5	-	-	-	-	5	30	60	5
80D	65	35	-	-	-	-	-	5	30	60	5
60D	40	40	10	-	10	-	-	5	15	70	10
40D	50	30	5	-	15	-	-	5	15	65	15
20D	45	30	5	-	20	-	-	5	20	65	10
0	45	40	5	-	10	-	-	5	20	65	10
20U	30	35	5	-	30	-	-	-	-	60	40
40U	35	25	5	-	35	-	-	-	-	70	30
60U	15	50	-	-	35	-	-	-	-	50	50
80U	15	50	-	-	35	-	-	5	15	50	30
100U	10	40	-	-	50	-	-	5	20	35	40

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality

Arctic Char - IMPORTANT

Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-77-2 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 535267 7918560

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	4.47	2	0.45	189 - 221
	Fall	2.83	0	-	N/A
NNST	Summer	4.05	0	-	N/A
	Fall	2.83	0	-	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	L
NNST	N	N	N	N

Comments & Summary

Provides important rearing habitat for juvenile char throughout the open water season, particularly during summer. Fall water temperatures likely already triggered movements to overwintering areas, affecting catches.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-77-2 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 535267 7918560

Photographs



A B C

Figure 1. Summer (top) and fall (bottom) views of CV-77-2 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-77-2 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 535267 7918560

Photographs



A **B** **C**

Figure 2. Summer (top) and fall (bottom) views of CV-77-2 at the 80 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-77-2 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 535267 7918560

Photographs



A **B** **C**

Figure 3. Summer (top) and fall (bottom) views of CV-77-2 at the 60 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-77-2 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 535267 7918560

Photographs



A **B** **C**

Figure 4. Summer (top) and fall (bottom) views of CV-77-2 at the 40 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-77-2 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 535267 7918560

Photographs



A **B** **C**

Figure 5. Summer (top) and fall (bottom) views of CV-77-2 at the 20 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-77-2 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 535267 7918560

Photographs



A B C

Figure 6. Summer (top) and fall (bottom) views of CV-77-2 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-77-2 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 535267 7918560

Photographs



A **B** **C**

Figure 7. Summer (top) and fall (bottom) views of CV-77-2 at the 20 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-77-2 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 535267 7918560

Photographs



A **B** **C**

Figure 8. Summer (top) and fall (bottom) views of CV-77-2 at the 40 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-77-2 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 535267 7918560

Photographs



A **B** **C**

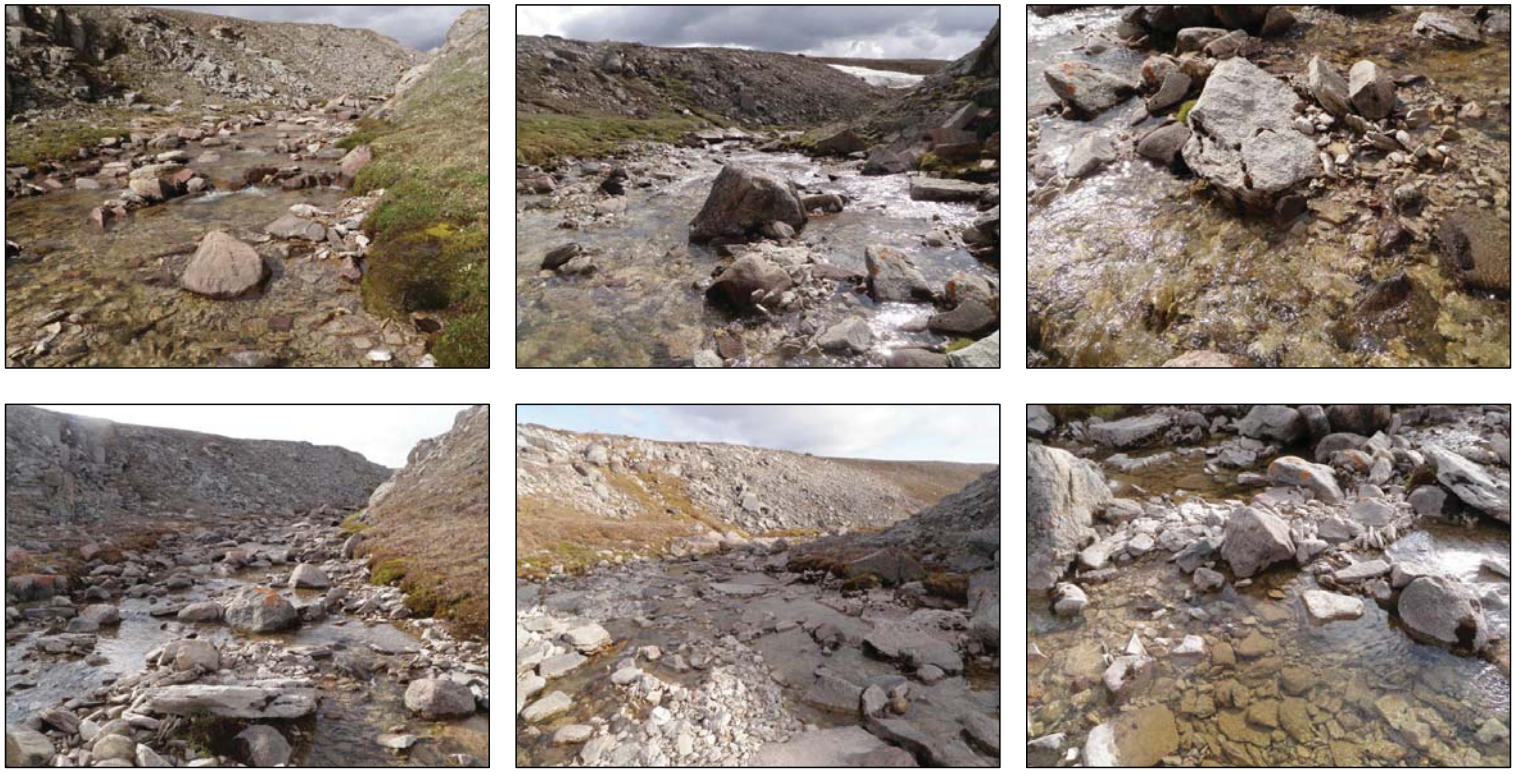
Figure 9. Summer (top) and fall (bottom) views of CV-77-2 at the 60 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-77-2 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 535267 7918560

Photographs



A **B** **C**

Figure 10. Summer (top) and fall (bottom) views of CV-77-2 at the 80 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-77-2 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 535267 7918560

Photographs



NO PHOTO



NO PHOTO



NO PHOTO

A **B** **C**

Figure 11. Summer (top) and fall (bottom) views of CV-77-2 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-77-3 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 535497 7918521

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 5 to > 15 **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was small, but wetted in 2018. However a steep downstream gradient and lack of connectivity to overwintering habitat prevents access. There is no fish use of habitat at the crossing.

Photographs



A **B**

Figure 1. Views of CV-77-3 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-78-1 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 535691 7918488

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was a nearly dry, isolated low point on a hillside. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-78-1 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-78-2 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 535890 7918531

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was a nearly dry, isolated low point on a hillside. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-78-2 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-78-3 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 536006 7918599

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 5-12° **Flow Regime:** Intermittent

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
0	-	-	-	-	-	~0.10	-	-	-	~0.50

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
0	50	50	-	-	-	-	-	-	40	60	-

Baffinland Iron Mines **Mary River Project**	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-78-3 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 536006 7918599

Fisheries Data

Gear Used: Not fished **Transect Length (m):** N/A

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	-	N/A	N/A	N/A
	Fall	-	N/A	N/A	N/A
NNST	Summer	-	N/A	N/A	N/A
	Fall	-	N/A	N/A	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	L	N
NNST	N	N	M	N

Comments & Summary

There was no evidence of fish use of crossing habitat in 2018. The crossing area is shallow and steep, which is a probable barrier under most flow conditions. The nearest consistently usable fish habitat is at least 100 m downstream from the crossing where the gradient is lower and the water is deeper. The crossing may be used by juvenile char during periods of particularly high water.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-78-3 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 536006 7918599

Photographs



A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of CV-78-3 at the rail crossing. Fall (B) image shows the suitable downstream habitat while all others show a lack of habitat at and upstream of the crossing.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-78-4 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 536163 7918706

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

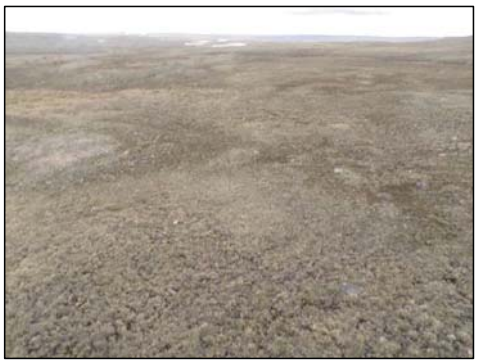
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was a dry low point on a hillside. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-78-4 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-78-5 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 536237 7918756

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was a nearly dry low point on a hillside. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-78-5 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-78-6 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 536450 7918866

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 5-10 **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

There was a wetted channel at the crossing, but the channel disappeared downstream and water was subsurface. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-78-6 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-79-0 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 537243 7919138

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 5 to > 10 **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was steep, though flows were maintained during the open-water period in 2018. However, downstream closer to the confluence with a large river, the channel disappeared and flows spread across and under the tundra. There is no fish use of habitat at the crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-79-0 at the crossing during summer (A) and fall (B), and a downstream view of the stream with subsurface flows (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-79-1 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 537418 7919175

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a dry spot adjacent to the CV-80-1 fish-bearing stream. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. View of CV-79-1 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-80-1 **Dates Surveyed:** 3 July & 2 September, 2018 **UTM Coordinates:** 17 W 537461 7919180

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 4-5° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	6.0	3.8 / 2.1	- / 0.12	0.10 / -	- / 0.05	0.15 / 0.15	- / 0.14	0.28/ -	- / 0.13	0.30 / 0.20
80D	4.8	- / 3.2	- / 0.12	- / -	- / 0.14	- / 0.15	- / 0.35	- / -	- / 0.02	- / 0.35
60D	3.8	- / 3.4	- / 0.10	- / -	- / 0.06	- / 0.15	- / 0.17	- / -	- / 0.10	- / 0.20
50D	11.1	7.4 / -	- / -	0.16 / -	- / -	0.20 / -	- / -	0.03 / -	- / -	0.05 / -
40D	6.8	- / 2.6	- / -	- / 0.15	- / -	- / 0.15	- / -	- / 0.06	- / -	- / 0.10
20D	8.6	- / 4.6	- / 0.10	- / -	- / 0.04	- / 0.10	- / 0.28	- / -	- / 0.11	- / 0.30
0	6.9	2.5 / 2.4	- / 0.12	0.18 / -	- / 0.18	0.20 / 0.20	- / 0.04	0.30 / -	- / 0.40	0.30 / 0.40
20U	3.0	- / 2.4	- / 0.06	- / -	- / 0.12	- / 0.15	- / 0.13	- / -	- / 0.23	- / 0.25
40U	3.2	- / 2.7	- / 0.06	- / -	- / 0.12	- / 0.15	- / 0.30	- / -	- / 0.12	- / 0.30
50U	7.5	4.7 / -	- / -	0.06 / -	- / -	0.15 / -	- / -	0.35 / -	- / -	0.35 / -
60U	11.5	- / 8.3	- / 0.06	- / 0.04	- / 0.04	- / 0.10	- / 0.34	- / 0.12	- / 0.10	- / 0.35
80U	12.5	- / 10.0	- / 0.08	- / 0.08	- / 0.06	- / 0.10	- / 0.03	- / 0.05	- / 0.06	- / 0.10
100U	15.4	2.1 / 6.6	- / -	0.10 / 0.12	- / -	0.15 / 0.15	- / -	0.11 / 0.18	- / -	0.15 / 0.20

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	40	60	-	-	-	-	-	5	80	15	-
80D	60	40	-	-	-	-	-	-	40	60	-
60D	50	50	-	-	-	-	-	-	50	50	-
50D	25	75	-	-	-	-	10	10	50	30	-
40D	-	100	-	-	-	-	90	-	-	10	-
20D	50	50	-	-	-	-	-	-	40	60	-
0	45	45	-	10	-	-	20	-	80	-	-
20U	70	30	-	-	-	-	-	-	60	40	-
40U	60	40	-	-	-	-	-	-	60	40	-
50U	50	50	-	-	-	-	-	5	60	35	-
60U	60	40	-	-	-	-	-	-	60	40	-
80U	60	40	-	-	-	-	-	-	60	40	-
100U	60	20	-	20	-	-	-	-	60	40	-

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-80-1 **Dates Surveyed:** 3 July & 2 September, 2018 **UTM Coordinates:** 17 W 537461 7919180

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	3.57	3	0.84	137 - 163
	Fall	4.22	0	-	N/A
NNST	Summer	3.57	0	-	N/A
	Fall	4.22	0	-	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	M	N
NNST	N	N	N	N

Comments & Summary

Turbidity was very high during summer sampling due to erosion from the upstream Tote Road, which may have affected fish use of the stream and catch rates. This stream provides suitable rearing habitat for juvenile char throughout the open-water season, particularly during summer, but turbidity and a layer of loose sediment covering existing substrate may reduce usage.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - MARGINAL** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-80-1 **Dates Surveyed:** 3 July & 2 September, 2018 **UTM Coordinates:** 17 W 537461 7919180

Photographs



A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of CV-80-1 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-80-1 **Dates Surveyed:** 3 July & 2 September, 2018 **UTM Coordinates:** 17 W 537461 7919180

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A **B** **C**

Figure 2. Summer (top) and fall (bottom) views of CV-80-1 at the 80 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-80-1 **Dates Surveyed:** 3 July & 2 September, 2018 **UTM Coordinates:** 17 W 537461 7919180

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A **B** **C**

Figure 3. Summer (top) and fall (bottom) views of CV-80-1 at the 60 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-80-1 **Dates Surveyed:** 3 July & 2 September, 2018 **UTM Coordinates:** 17 W 537461 7919180

Photographs



NO PHOTO



NO PHOTO



NO PHOTO

A **B** **C**

Figure 4. Summer (top) and fall (bottom) views of CV-80-1 at the 50 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-80-1 **Dates Surveyed:** 3 July & 2 September, 2018 **UTM Coordinates:** 17 W 537461 7919180

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 5. Summer (top) and fall (bottom) views of CV-80-1 at the 40 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-80-1 **Dates Surveyed:** 3 July & 2 September, 2018 **UTM Coordinates:** 17 W 537461 7919180

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A



B



C

Figure 6. Summer (top) and fall (bottom) views of CV-80-1 at the 20 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-80-1 **Dates Surveyed:** 3 July & 2 September, 2018 **UTM Coordinates:** 17 W 537461 7919180

Photographs



A **B** **C**

Figure 7. Summer (top) and fall (bottom) views of CV-80-1 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-80-1 **Dates Surveyed:** 3 July & 2 September, 2018 **UTM Coordinates:** 17 W 537461 7919180

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A **B** **C**

Figure 8. Summer (top) and fall (bottom) views of CV-80-1 at the 20 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-80-1 **Dates Surveyed:** 3 July & 2 September, 2018 **UTM Coordinates:** 17 W 537461 7919180

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 9. Summer (top) and fall (bottom) views of CV-80-1 at the 40 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-80-1 **Dates Surveyed:** 3 July & 2 September, 2018 **UTM Coordinates:** 17 W 537461 7919180

Photographs



NO PHOTO



NO PHOTO



NO PHOTO

A **B** **C**

Figure 10. Summer (top) and fall (bottom) views of CV-80-1 at the 50 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-80-1 **Dates Surveyed:** 3 July & 2 September, 2018 **UTM Coordinates:** 17 W 537461 7919180

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A



B



C

Figure 11. Summer (top) and fall (bottom) views of CV-80-1 at the 60 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-80-1 **Dates Surveyed:** 3 July & 2 September, 2018 **UTM Coordinates:** 17 W 537461 7919180

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A



B



C

Figure 12. Summer (top) and fall (bottom) views of CV-80-1at the 80 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-80-1 **Dates Surveyed:** 3 July & 2 September, 2018 **UTM Coordinates:** 17 W 537461 7919180

Photographs



A B C

Figure 13. Summer (top) and fall (bottom) views of CV-80-1 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-80-1a | **Dates Surveyed:** 3 July & 1 September, 2018 | **UTM Coordinates:** 17 W 537487 7919182

General Physical Characteristics

Channel Confinement: UC | **Channel Gradient (range):** N/A | **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished | **Effort (min):** N/A | **Transect Length (m):** N/A

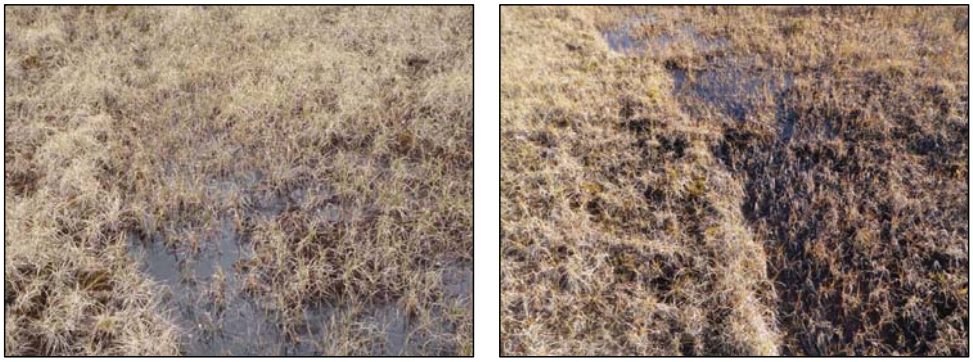
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a moist, grassy spot adjacent to CV-80-1. There is no fish use of habitat at the crossing.

Photographs



A **B**

Figure 1. View of CV-80-1a at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-80-2, CV-80-2a & CV-80-2b

Dates Surveyed: 3 July & 1 September, 2018

UTM Coordinates: 17 W 538320 7919565, 17 W 538307 7919556 & 17 W 538334 7919573

General Physical Characteristics

Channel Confinement: UC

Channel Gradient (range): 5 to > 10

Flow Regime: Open Water

Fisheries Data

Gear Used: Not Fished

Effort (min): N/A

Transect Length (m): N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

These are three branches of the same stream. The stream was shallow and steep, and surface flows disappeared downstream preventing all access. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-80-2, 80-2a, and 80-2b (from left to right in each photo) at the crossings during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-80-3 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 538453 7919642

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 5 to > 10 **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a moist spot with no connections to other waterbodies. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-80-3 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-80-4 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 538510 7919675

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 5 to > 10 **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was barely wetted with many stretches of subsurface flows and no connections to other waterbodies. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-80-4 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-80-5 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 538604 7919729

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a nearly dry low point on a hillside. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-80-5 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-81-1 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 538691 7919779

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 5 to > 10 **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This was a nearly dry marshy area. Most of the stream lacks a defined channel and there are multiple reaches with no surface flow. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-81-1 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-81-2 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 538879 7919924

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 5 to > 10 **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

There was a channel and sufficient flows at the crossing in 2018, but surface flows disappeared downstream and there was no connection to a pond or other waterbodies in the area. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-81-2 at the crossing during summer (A) and looking downstream during fall to show the loss of surface flow (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-81-3 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 538942 7920004

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 5 to > 10 **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

There was a very shallow, wide channel at the crossing in 2018, but surface flows disappeared downstream and there was no connection to other waterbodies in the area. There is no fish use of habitat at the crossing.

Photographs



A



B

Figure 1. Views of CV-81-3 near the crossing during summer, showing the lack of surface flow (A) and looking at the crossing during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-81-4 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 539077 7920175

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 5 to > 10 **Flow Regime:** Open Water

Fisheries Data

Gear Used: Backpack Electrofisher **Effort (min):** 1.57 **Transect Length (m):** 100

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was broad and shallow (max depth – 0.10 m) in 2018. No fish were captured or observed near the crossing. Fish were observed in deep pools near the confluence with a large downstream river. It is likely that the shallow, steep conditions at and near the crossing prevent all fish access to the area.

Photographs



A



B



C

Figure 1. Views of CV-81-4 near the crossing during summer, looking upstream (A) downstream (B) and across (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-81-4 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 539077 7920175

Photographs



A

Figure 2. View of CV-81-4 during fall.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-82-1 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 539131 7920244

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 5 to > 10 **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was marshy habitat with intermittent surface flows and no connections to other waterbodies in 2018. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-82-1 near the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-82-1a | **Dates Surveyed:** 3 July & 1 September, 2018 | **UTM Coordinates:** 17 W 539242 7920376

General Physical Characteristics

Channel Confinement: UC | **Channel Gradient (range):** N/A | **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished | **Effort (min):** N/A | **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was a dry low point. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-82-1a near the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-82-2 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 539376 7920489

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 5 to > 10 **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing and entire stream was dry during 2018. There is likely no access to the crossing under any flow conditions. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-82-2 near the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-82-3 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 539508 7920599

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 5 to > 10 **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was an intermittently wet spot, with no surface water upstream and very little downstream. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-82-3 near the crossing during summer (A) and fall facing downstream (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-82-4 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 539729 7920783

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 5 to > 10 **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was patches of shallow surface water with no flows or connections to other waterbodies. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-82-4 near the crossing during summer (A) and fall facing downstream (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-83-1 **Dates Surveyed:** 9 July & 2 September, 2018 **UTM Coordinates:** 17 W 539835 7920871

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1° **Flow Regime:** Open

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	2.0	0.8 / 2.6	- / -	0.18 / 0.02	- / -	0.25 / 0.05	- / -	0.05 / 0.11	- / -	0.05 / 0.30
50D	3.0	1.3 / 0.6	- / -	0.54 / 0.16	- / -	0.55 / 0.16	- / -	0.01 / 0.13	- / -	0.01 / 0.15
0	3.6	0.8 / 3.8	- / -	0.15 / 0.08	- / -	0.25 / 0.15	- / -	0.03 / 0.13	- / -	0.03 / 0.15
50U	3.0	1.2 / 1.5	- / -	0.10 / 0.21	- / -	0.30 / 0.21	- / -	0.01 / 0.02	- / -	0.01 / 0.05
100U	2.5	1.5 / 2.0	- / -	0.18 / 0.52	- / -	0.55 / 0.55	- / -	0.01 / 0.00	- / -	0.01 / 0.01

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	-	80	20	-	-	-	100	-	-	-	-
50D	-	40	60	-	-	-	100	-	-	-	-
0	-	90	10	-	-	-	100	-	-	-	-
50U	-	75	25	-	-	-	100	-	-	-	-
100U	-	90	10	-	-	-	100	-	-	-	-

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality

Arctic Char - MARGINAL

Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-83-1 **Dates Surveyed:** 9 July & 2 September, 2018 **UTM Coordinates:** 17 W 539835 7920871

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	2.00	1	0.50	126
	Fall	2.02	0	-	N/A
NNST	Summer	2.00	0	-	N/A
	Fall	2.02	0	-	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	L	N
NNST	N	N	N	N

Comments & Summary

Deeper pools are separated by shallow grassy stretches that may limit juvenile char movements, particularly during periods of low water. Use is intermittent and habitat is marginal quality.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - MARGINAL** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-83-1 **Dates Surveyed:** 9 July & 2 September, 2018 **UTM Coordinates:** 17 W 539835 7920871

Photographs



A B C

Figure 1. Summer (top) and fall (bottom) views of CV-83-1 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-83-1 **Dates Surveyed:** 9 July & 2 September, 2018 **UTM Coordinates:** 17 W 539835 7920871

Photographs



A B C

Figure 2. Summer (top) and fall (bottom) views of CV-83-1 at the 50 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-83-1 **Dates Surveyed:** 9 July & 2 September, 2018 **UTM Coordinates:** 17 W 539835 7920871

Photographs



NO PHOTO



NO PHOTO



NO PHOTO

A **B** **C**

Figure 3. Summer (top) and fall (bottom) views of CV-83-1 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-83-1 **Dates Surveyed:** 9 July & 2 September, 2018 **UTM Coordinates:** 17 W 539835 7920871

Photographs



A **B** **C**

Figure 4. Summer (top) and fall (bottom) views of CV-83-1 at the 50 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-83-1 **Dates Surveyed:** 9 July & 2 September, 2018 **UTM Coordinates:** 17 W 539835 7920871

Photographs



A B C

Figure 5. Summer (top) and fall (bottom) views of CV-83-1 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-83-1a | **Dates Surveyed:** 8 July & 2 September, 2018 | **UTM Coordinates:** 17 W 539887 7920915

General Physical Characteristics

Channel Confinement: UC | **Channel Gradient (range):** 2-5 | **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished | **Effort (min):** N/A | **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was nearly dry, particularly during fall, with no connections to other waterbodies, probably under all flow conditions. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-83-1a near the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-83-2 **Dates Surveyed:** 9 July & 2 September, 2018 **UTM Coordinates:** 17 W 540162 7921134

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1° **Flow Regime:** Open

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	3.8	2.2 / 2.3	- / -	0.12 / 0.48	- / -	0.50 / 0.50	- / -	0.02 / 0.02	- / -	0.02 / 0.02
50D	14.9	9.7 / 5.3	- / -	0.25 / 0.18	- / -	0.25 / 0.25	- / -	0.00 / 0.02	- / -	0.01 / 0.02
0	6.9	2.1 / 3.7	- / -	0.12 / 0.12	- / -	0.15 / 0.15	- / -	0.00 / 0.09	- / -	0.05 / 0.09
50U	16.9	7.9 / 9.0	- / -	0.14 / 0.08	- / -	0.15 / 0.15	- / -	0.00 / 0.03	- / -	0.01 / 0.05
100U	25.3	12.8 / 17.3	- / -	0.10 / 0.06	- / -	0.10 / 0.10	- / -	0.00 / 0.05	- / -	0.01 / 0.05

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	10	80	10	-	-	-	100	-	-	-	-
50D	-	80	20	-	-	-	100	-	-	-	-
0	10	90	-	-	-	-	100	-	-	-	-
50U	15	85	-	-	-	-	100	-	-	-	-
100U	5	95	-	-	-	-	100	-	-	-	-

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality

Arctic Char - NOT FISH-BEARING

Ninespine Stickleback – IMPORTANT

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-83-2 **Dates Surveyed:** 9 July & 2 September, 2018 **UTM Coordinates:** 17 W 540162 7921134

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	3.35	0	-	N/A
	Fall	2.58	0	-	N/A
NNST	Summer	3.35	3	0.90	53 - 70
	Fall	2.58	8	3.10	YOY (< 20 mm)

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	H	N	H	L

Comments & Summary

Shallow water combined with fine, organic substrate limit the use of this stream by juvenile char, which were not captured in 2018, but it is important for spawning and rearing of Ninespine Stickleback.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - NOT FISH-BEARING** **Ninespine Stickleback – IMPORTANT**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-83-2 **Dates Surveyed:** 9 July & 2 September, 2018 **UTM Coordinates:** 17 W 540162 7921134

Photographs



A B C

Figure 1. Summer (top) and fall (bottom) views of CV-83-2 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-83-2 **Dates Surveyed:** 9 July & 2 September, 2018 **UTM Coordinates:** 17 W 540162 7921134

Photographs



A B C

Figure 2. Summer (top) and fall (bottom) views of CV-83-2 at the 50 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-83-2 **Dates Surveyed:** 9 July & 2 September, 2018 **UTM Coordinates:** 17 W 540162 7921134

Photographs



A **B** **C**

Figure 3. Summer (top) and fall (bottom) views of CV-83-2 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-83-2 **Dates Surveyed:** 9 July & 2 September, 2018 **UTM Coordinates:** 17 W 540162 7921134

Photographs



A **B** **C**

Figure 4. Summer (top) and fall (bottom) views of CV-83-2 at the 50 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-83-2 **Dates Surveyed:** 9 July & 2 September, 2018 **UTM Coordinates:** 17 W 540162 7921134

Photographs



A **B** **C**

Figure 5. Summer (top) and fall (bottom) views of CV-83-2 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-84-1 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 540842 7921510

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1° **Flow Regime:** Open

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	27.0	15.0 / 5.5	- / -	- / 0.35	- / -	0.40 / 0.35	- / -	- / 0.12	- / -	0.10 / 0.15
50D	5.0	5.0 / 3.9	- / -	1.10 / 2.30	- / -	>2.00 / 2.30	- / -	0.03 / 0.02	- / -	0.05 / 0.05
0	5.0	5.0 / 4.4	- / -	0.04 / 1.00	- / -	>2.00 / >2.00	- / -	0.30 / 0.00	- / -	0.30 / 0.15
50U	4.5	4.5 / 2.9	- / -	1.00 / 2.38	- / -	>2.00 / 2.40	- / -	0.21 / 0.07	- / -	0.25 / 0.15
100U	2.5	2.5 / 2.4	- / -	0.20 / 1.05	- / -	>2.00 / >2.00	- / -	0.02 / 0.14	- / -	0.10 / 0.15

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	-	20	20	-	-	60	100	-	-	-	-
50D	-	10	90	-	-	-	100	-	-	-	-
0	-	10	90	-	-	-	100	-	-	-	-
50U	-	10	90	-	-	-	100	-	-	-	-
100U	-	10	90	-	-	-	90	10	-	-	-

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality

Arctic Char - IMPORTANT

Ninespine Stickleback – IMPORTANT

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-84-1 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 540842 7921510

Fisheries Data

Gear Used: Not fished **Transect Length (m):** N/A

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	-	N/A	N/A	N/A
	Fall	-	N/A	N/A	N/A
NNST	Summer	-	N/A	N/A	N/A
	Fall	-	N/A	N/A	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	L
NNST	L	N	M	N

Comments & Summary

The very deep pools in this stream minimize the effectiveness of electrofishing. However, large numbers of juvenile char are observed every time monitoring is conducted on this Tote Road stream. Stickleback have also been captured during Tote Road surveys. This stream provides important, high-quality habitat for both species.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT** **Ninespine Stickleback – IMPORTANT**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-84-1 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 540842 7921510

Photographs



A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of CV-84-1 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-84-1 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 540842 7921510

Photographs



A **B** **C**

Figure 2. Summer (top) and fall (bottom) views of CV-84-1 at the 50 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-84-1 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 540842 7921510

Photographs



A **B** **C**

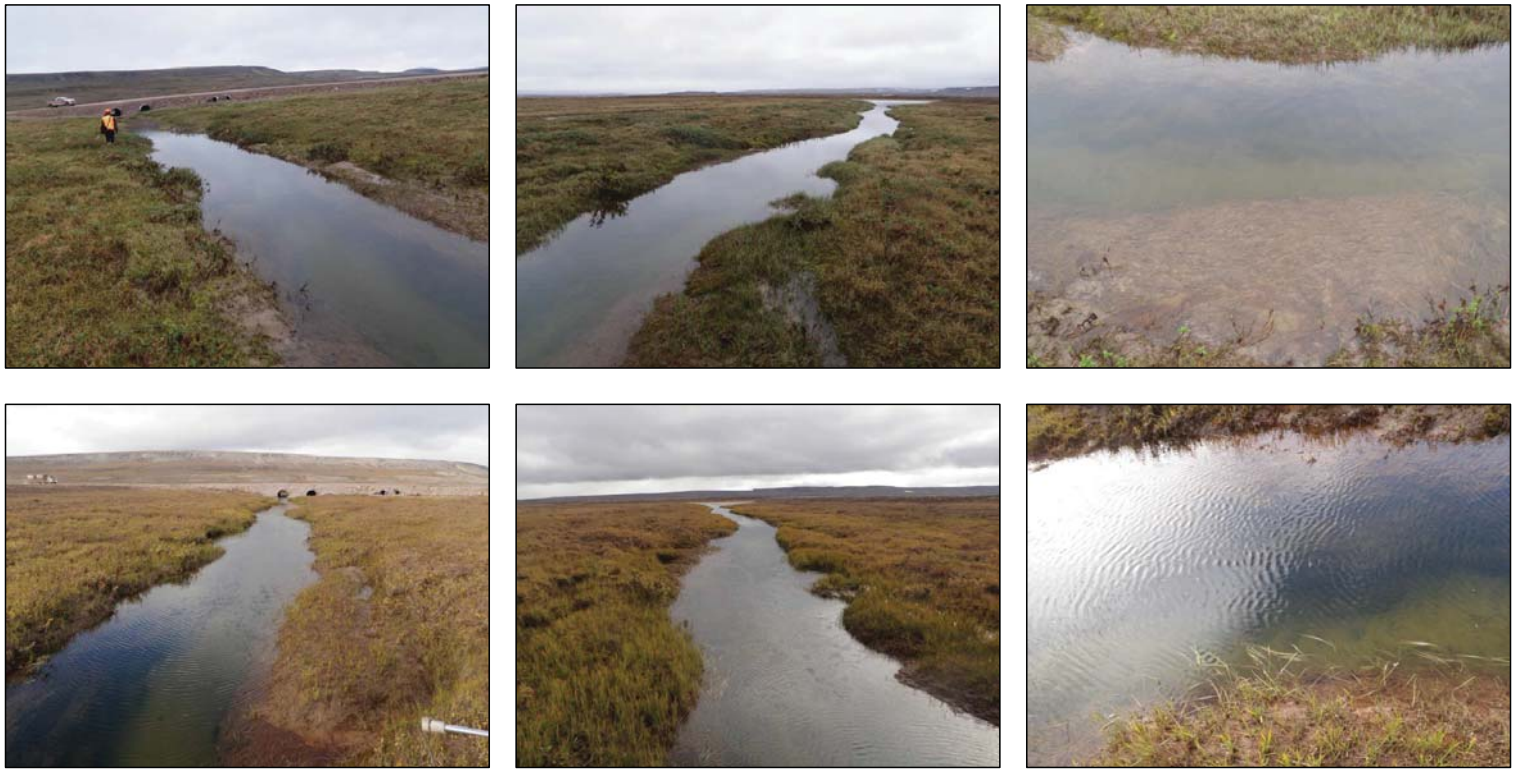
Figure 3. Summer (top) and fall (bottom) views of CV-84-1 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-84-1 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 540842 7921510

Photographs



A **B** **C**

Figure 4. Summer (top) and fall (bottom) views of CV-84-1 at the 50 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-84-1 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 540842 7921510

Photographs



A **B** **C**

Figure 5. Summer (top) and fall (bottom) views of CV-84-1 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-84-2 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 541030 7921642

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 1-3 **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Backpack Electrofisher **Effort (min):** 0.95 **Transect Length (m):** 50

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

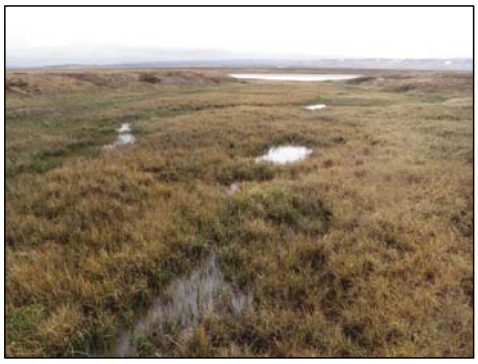
Comments & Summary

The crossing was a series of isolated pools with some nearly dry marshy, grassy areas in between. No fish were captured or observed in the isolated pools, indicating no upstream movements and subsequent stranding at peak freshet. There is likely no fish use of habitat at this crossing except under extreme high flows.

Photographs



A



B



C

Figure 1. Views of CV-84-2 at the crossing during summer, looking upstream (A) downstream (B) and across (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

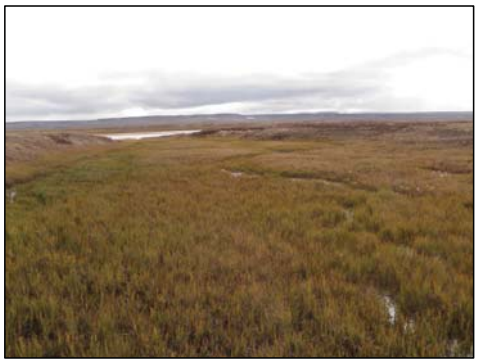
Location

Crossing ID: CV-84-2 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 541030 7921642

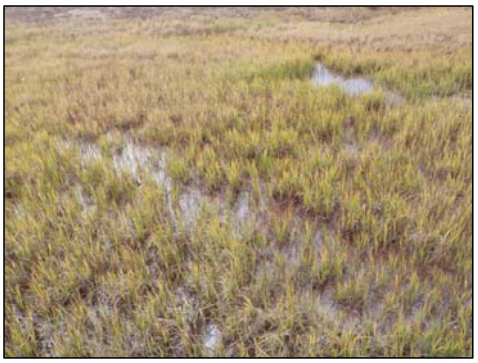
Photographs



A



B



C

Figure 2. Views of CV-84-2 at the crossing during fall, looking upstream (A) downstream (B) and across (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING**
			Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-84-3 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 541294 7921948

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1° **Flow Regime:** Open

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
50D	LARGE DOWNSTREAM RIVER									
0	8.5	6.5 / 4.9	0.06 / -	- / 0.08	0.04 / -	0.10 / 0.10	0.07 / -	- / 0.28	0.15 / -	0.15 / 0.30
50U	11.2	6.5 / 1.7	0.04 / -	0.03 / 0.05	0.15 / -	0.15 / 0.10	0.23 / -	0.20 / 0.14	0.36 / -	0.40 / 0.20
100U	6.5	2.7 / 1.2	- / -	0.10 / 0.05	- / -	0.10 / 0.10	- / -	0.28 / 0.13	- / -	0.30 / 0.20

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
50D	LARGE DOWNSTREAM RIVER										
0	40	40	-	-	-	20	90	5	5	-	-
50U	50	5	-	-	-	45	100	-	-	-	-
100U	50	5	-	-	-	45	100	-	-	-	-

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-84-3 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 541294 7921948

Fisheries Data

Gear Used: Not fished **Transect Length (m):** N/A

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	-	N/A	N/A	N/A
	Fall	-	N/A	N/A	N/A
NNST	Summer	-	N/A	N/A	N/A
	Fall	-	N/A	N/A	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

There was no evidence of fish use of crossing habitat in 2018. This broad, flat, very shallow stream does not provide ideal habitat for either species and access from the large downstream river is intermittent with water level fluctuations.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-84-3 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 541294 7921948

Photographs



NO PHOTO

A



NO PHOTO

B



NO PHOTO

C

Figure 1. Summer (top) views of CV-84-3 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across. Fall photos were not taken at this transect.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-84-3 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 541294 7921948

Photographs



A **B** **C**

Figure 2. Summer (top) and fall (bottom) views of CV-84-3 at the 50 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-84-3 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 541294 7921948

Photographs



A **B** **C**

Figure 3. Summer (top) and fall (bottom) views of CV-84-3 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-85-1 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 541514 7922054

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1-3 **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing is known to be not fish-bearing from Tote Road surveys. There is some ponding upstream of the road due to the small diameter, elevated culvert installed at a natural drop upstream from a major river. There is no fish use of habitat at this crossing.

Photographs



A



B



C

Figure 1. Views of CV-85-1 at the crossing during summer, looking upstream (A) downstream (B) and across (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-85-1 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 541514 7922054

Photographs



A



B



C

Figure 2. Views of CV-85-1 at the crossing during fall, looking upstream (A) downstream (B) and across (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-85-2 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 541921 7922236

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1° **Flow Regime:** Open

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	LARGE DOWNSTREAM RIVER									
50D	9.0	- / 6.0	0.04 / -	- / 0.07	0.02 / -	0.05 / 0.10	- / -	- / 0.27	- / -	- / 0.30
0	7.5	5.8 / 5.8	0.04 / -	- / 0.07	0.02 / -	0.05 / 0.10	0.01 / -	- / 0.18	0.16 / -	0.20 / 0.20
50U	2.9	2.4 / 2.3	0.02 / -	0.02 / 0.06	0.06 / -	0.10 / 0.10	0.08 / -	0.09 / 0.14	0.07 / -	0.10 / 0.15
100U	4.3	2.3 / 1.8	0.06 / -	- / 0.10	0.02 / -	0.10 / 0.10	0.38 / -	- / 0.20	0.16 / -	0.40 / 0.20

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	LARGE DOWNSTREAM RIVER										
50D	40	20	-	-	-	40	95	5	-	-	-
0	20	15	-	-	-	65	100	-	-	-	-
50U	5	20	-	-	-	75	100	-	-	-	-
100U	20	5	-	-	-	75	100	-	-	-	-

Baffinland Iron Mines **Mary River Project**	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-85-2 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 541921 7922236

Fisheries Data

Gear Used: Not fished **Transect length (m):** N/A

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	-	N/A	N/A	N/A
	Fall	-	N/A	N/A	N/A
NNST	Summer	-	N/A	N/A	N/A
	Fall	-	N/A	N/A	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

There was no evidence of fish use of crossing habitat in 2018. Access to the crossing area is likely intermittent and habitat is very shallow with fine substrates. Fish have not previously been noted in this stream, but it is very close to a large, overwintering lake (Muriel Lake).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-85-2 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 541921 7922236

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of CV-85-2 at the 50 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-85-2 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 541921 7922236

Photographs



A **B** **C**

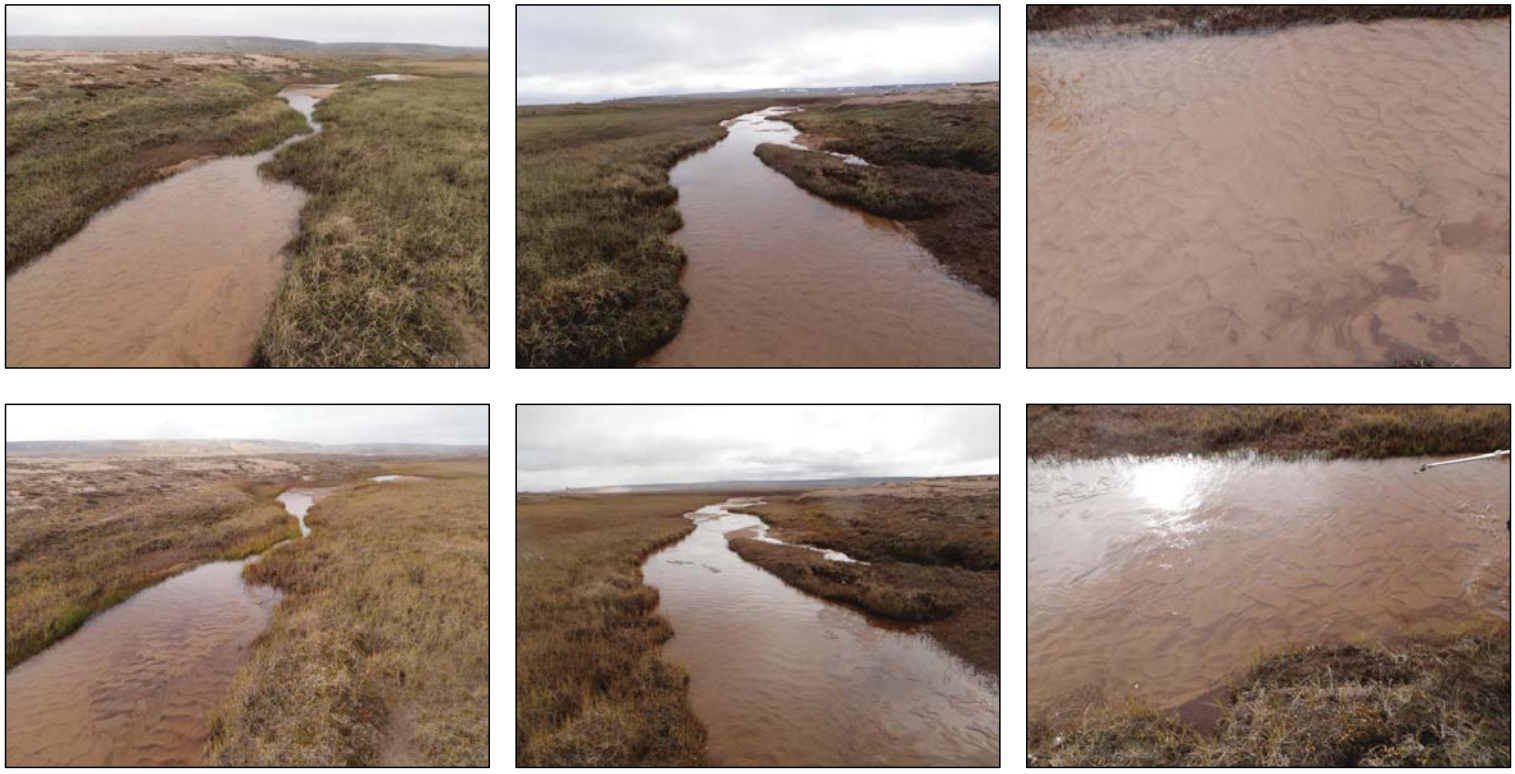
Figure 2. Summer (top) and fall (bottom) views of CV-85-2 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-85-2 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 541921 7922236

Photographs



A **B** **C**

Figure 3. Summer (top) and fall (bottom) views of CV-85-2 at the 50 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-85-2 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 541921 7922236

Photographs



A B C

Figure 4. Summer (top) and fall (bottom) views of CV-85-2 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-85-3 & CV-85-4 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 542213 7922215& 17 W 542288 7922156

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 1° **Flow Regime:** Open

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
60D	100.0	- / 90.0	- / 0.25	- / -	- / -	- / >0.50	- / 0.00	- / -	- / -	- / >0.50
40D	105.0	- / 98.0	- / 0.30	- / -	- / -	- / >0.50	- / 0.00	- / -	- / -	- / >0.50
20D	119.0	- / 107.0	- / 0.30	- / -	- / -	- / >0.50	- / 0.00	- / -	- / -	- / >0.50
0	119.0	- / 110.0	0.44 / 0.30	- / -	- / -	0.60 / >0.50	0.44 / 0.00	- / -	- / -	>0.50 / >0.50
20U	MURIEL LAKE									

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
60D	-	25	25	50	-	-	90	10	-	-	-
40D	-	25	25	50	-	-	80	10	10	-	-
20D	-	25	25	50	-	-	80	10	10	-	-
0	-	20	20	60	-	-	80	10	10	-	-
20U	MURIEL LAKE										

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT** **Ninespine Stickleback – IMPORTANT**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-85-3 & CV-85-4

Dates Surveyed: 9 July & 27 August, 2018

UTM Coordinates: 17 W 542213 7922215&
17 W 542288 7922156

Fisheries Data

Gear Used: Not fished

Transect length (m): N/A

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	-	N/A	N/A	N/A
	Fall	-	N/A	N/A	N/A
NNST	Summer	-	N/A	N/A	N/A
	Fall	-	N/A	N/A	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	H
NNST	N	N	L	L

Comments & Summary

The large size of this river, combined with a lack of cobble substrates (which char use for cover), decrease the effectiveness of backpack electrofishing. Char use of this river, both juveniles and adults, has been observed on multiple occasions during annual Tote Road monitoring. Stickleback have also been captured near the existing Tote Road bridge crossing.

Baffinland Iron Mines **Mary River Project**	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT** **Ninespine Stickleback – IMPORTANT**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-85-3 & CV-85-4

Dates Surveyed: 9 July & 27 August, 2018

UTM Coordinates: 17 W 542213 7922215&
17 W 542288 7922156

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A



B



C

Figure 1. Summer (top) and fall (bottom) views of CV-85-3 & CV-85-4 at the 60 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-85-3 & CV-85-4

Dates Surveyed: 9 July & 27 August, 2018

UTM Coordinates: 17 W 542213 7922215&
17 W 542288 7922156

Photographs

NO PHOTO

NO PHOTO

NO PHOTO



A



B



C

Figure 2. Summer (top) and fall (bottom) views of CV-85-3 & CV-85-4 at the 40 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-85-3 & CV-85-4

Dates Surveyed: 9 July & 27 August, 2018

UTM Coordinates: 17 W 542213 7922215&
17 W 542288 7922156

Photographs

NO PHOTO

NO PHOTO

NO PHOTO



A



B



C

Figure 3. Summer (top) and fall (bottom) views of CV-85-3 & CV-85-4 at the 20 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-85-3 & CV-85-4

Dates Surveyed: 9 July & 27 August, 2018

UTM Coordinates: 17 W 542213 7922215& 17 W 542288 7922156

Photographs



A **B** **C**

Figure 4. Summer (top) and fall (bottom) views of CV-85-3 & CV-85-4 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-86-1 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 542671 7921780

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Open Water

Fisheries Data

Gear Used: Backpack Electrofisher **Effort (min):** 2.15 **Transect Length (m):** 100

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing is an isolated pond with a maximum depth of approximately 1.0 m. Fish were not captured or observed in 2018 despite fishing most of its shoreline. There is no fish use of habitat at this crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-86-1 at the crossing during summer (A) and fall (B) and (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-86-2 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 542753 7921708

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 1° **Flow Regime:** Open

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	45.7	- / 39.3	0.04 / -	- / 0.19	0.02 / -	0.05 / 0.20	- / -	- / 0.00	- / -	- / 0.05
50D	39.3	- / 11.2	0.04 / -	- / 0.21	0.02 / -	0.25 / 0.25	0.01 / -	- / 0.08	0.16 / -	0.20 / 0.10
0	38.6	22.4 / 16.3	0.06 / -	0.06 / 0.06	0.05 / -	0.10 / 0.10	0.14 / -	0.20 / 0.13	0.14 / -	0.20 / 0.15
50U	29.4	15.2 / 10.4	0.03 / -	0.06 / 0.11	0.04 / -	0.10 / 0.12	0.17 / -	0.18 / 0.34	0.06 / -	0.20 / 0.35
100U	23.6	4.0 / 7.5	0.06 / 0.06	0.02 / -	0.04 / 0.18	0.10 / 0.20	0.12 / 0.14	0.05 / -	0.20 / 0.28	0.25 / 0.30

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	-	100	-	-	-	-	100	-	-	-	-
50D	-	85	5	-	-	10	100	-	-	-	-
0	45	5	-	-	-	50	95	5	-	-	-
50U	40	15	-	-	-	45	90	5	5	-	-
100U	30	15	-	-	-	55	95	5	-	-	-

Baffinland Iron Mines **Mary River Project**	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - MARGINAL** **Ninespine Stickleback – IMPORTANT**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-86-2 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 542753 7921708

Fisheries Data

Gear Used: Backpack Electrofisher **Transect length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	1.42	11	7.76	51 - 101
	Fall	-	N/A	N/A	N/A
NNST	Summer	1.42	5	3.53	26 - 59
	Fall	-	N/A	N/A	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	L
NNST	H	N	H	H

Comments & Summary

Although generally shallow with fine substrates, fish were captured in occasional deeper pools and areas with vegetation. All juvenile char in 2018 were captured in the scour pool downstream of the Tote Road culvert. The proximity to Muriel Lake promotes use of this stream by both species. Provides important habitat for stickleback spawning and rearing, and marginal to important habitat for rearing of smaller juvenile char.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - MARGINAL** **Ninespine Stickleback – IMPORTANT**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-86-2 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 542753 7921708

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of CV-86-2 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-86-2 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 542753 7921708

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A



B



C

Figure 2. Summer (top) and fall (bottom) views of CV-86-2 at the 50 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-86-2 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 542753 7921708

Photographs



A B C

Figure 3. Summer (top) and fall (bottom) views of CV-86-2 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-86-2 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 542753 7921708

Photographs



A **B** **C**

Figure 4. Summer (top) and fall (bottom) views of CV-86-2 at the 50 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-86-2 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 542753 7921708

Photographs



A **B** **C**

Figure 5. Summer (top) and fall (bottom) views of CV-86-2 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-87-1 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 543078 7921473

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing is a nearly dry puddle. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-87-1 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-87-2 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 543392 7921247

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing is a nearly dry puddle. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-87-2 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-87-3 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 543532 7921170

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 0-1 **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing is an isolated puddle/pond with no connection to other waterbodies. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-87-3 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-87-4 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 543736 7921141

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 1° **Flow Regime:** Open

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	8.1	2.9 / 0.9	- / -	0.05 / 0.07	- / -	0.10 / 0.20	- / -	0.37 / 0.27	- / -	0.40 / 0.30
50D	1.5	0.6 / 1.3	- / -	0.05 / 0.31	- / -	0.30 / 0.35	- / -	0.23 / 0.00	- / -	0.25 / 0.15
0	1.5	0.3 / 1.4	- / -	0.14 / 0.28	- / -	0.20 / 0.30	- / -	0.46 / 0.00	- / -	0.50 / 0.20
50U	18.8	7.0 / 4.2	- / -	0.03 / 0.04	- / -	0.10 / 0.10	- / -	0.09 / 0.19	- / -	0.15 / 0.20
100U	7.3	5.8 / 1.7	- / -	0.06 / 0.03	- / -	0.10 / 0.10	- / -	0.14 / 0.18	- / -	0.15 / 0.20

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	50	15	-	-	-	35	90	10	-	-	-
50D	30	35	5	-	-	30	100	-	-	-	-
0	50	40	-	-	-	10	100	-	-	-	-
50U	-	30	-	-	-	70	100	-	-	-	-
100U	-	10	-	-	-	90	100	-	-	-	-

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-87-4 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 543736 7921141

Fisheries Data

Gear Used: Not fished **Transect length (m):** N/A

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	-	N/A	N/A	N/A
	Fall	-	N/A	N/A	N/A
NNST	Summer	-	N/A	N/A	N/A
	Fall	-	N/A	N/A	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

A silt curtain was blocking entrance to this stream from Muriel Lake at the time of the summer survey, so fishing was not conducted, but previous surveys during Tote Road studies identified stickleback and juvenile char in this stream.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-87-4 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 543736 7921141

Photographs



A B C

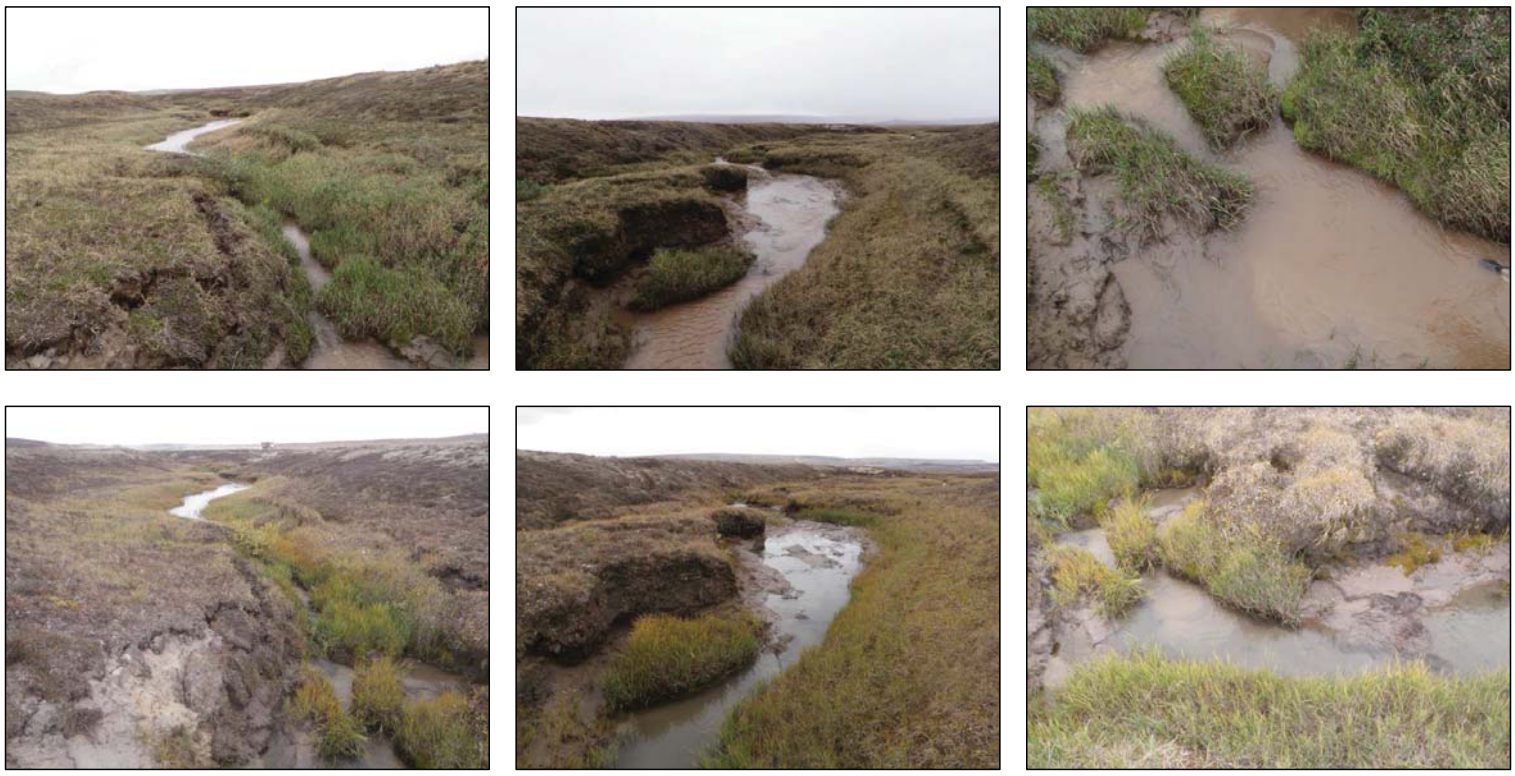
Figure 1. Summer (top) and fall (bottom) views of CV-87-4 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-87-4 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 543736 7921141

Photographs



A **B** **C**

Figure 2. Summer (top) and fall (bottom) views of CV-87-4 at the 50 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-87-4 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 543736 7921141

Photographs



A B C

Figure 3. Summer (top) and fall (bottom) views of CV-87-4 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-87-4 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 543736 7921141

Photographs



A B C

Figure 4. Summer (top) and fall (bottom) views of CV-87-4 at the 50 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-87-4 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 543736 7921141

Photographs



A **B** **C**

Figure 5. Summer (top) and fall (bottom) views of CV-87-4 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-88-1 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 543976 7921204

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 0-1 **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing is moist terrestrial with no surface water. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-88-1 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-88-2 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 544209 7921282

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 5-12° **Flow Regime:** Intermittent

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
0	-	-	-	-	-	~0.10	-	-	-	~0.25

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
0	10	90	-	-	-	-	100	-	-	-	-

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-88-2 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 544209 7921282

Fisheries Data

Gear Used: Not fished **Transect length (m):** N/A

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	-	N/A	N/A	N/A
	Fall	-	N/A	N/A	N/A
NNST	Summer	-	N/A	N/A	N/A
	Fall	-	N/A	N/A	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	L	N
NNST	N	N	N	N

Comments & Summary

This stream is shallow and only has intermittent connection to CV-88-3 downstream (none at the time of 2018 surveys). Crossing area may be used by juvenile char during periods of particularly high water.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-88-2 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 544209 7921282

Photographs









A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of CV-88-2 at the rail crossing.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-88-3 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 544259 7921299

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 1-3° **Flow Regime:** Open

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	13.5	4.2 / 0.6	0.02 / -	- / 0.04	0.01 / -	0.05 / 0.05	0.17 / -	- / 0.19	0.05 / -	0.20 / 0.20
50D	11.2	1.7 / 0.3	- / -	0.03 / 0.04	- / -	0.05 / 0.05	- / -	0.14 / 0.15	- / -	0.20 / 0.20
0	1.5	0.6 / 1.4	- / -	0.08 / 0.20	- / -	0.15 / 0.20	- / -	0.09 / 0.07	- / -	0.15 / 0.15
50U	3.0	0.9 / 1.9	- / -	0.10 / 0.06	- / -	0.10 / 0.10	- / -	0.05 / 0.03	- / -	0.10 / 0.10
100U	7.0	1.0 / 0.7	- / -	0.02 / 0.02	- / -	0.05 / 0.05	- / -	0.04 / 0.07	- / -	0.05 / 0.10

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	75	25	-	-	-	-	75	15	10	-	-
50D	80	15	-	-	-	5	70	25	5	-	-
0	50	50	-	-	-	-	90	5	5	-	-
50U	10	90	-	-	-	-	100	-	-	-	-
100U	30	70	-	-	-	-	90	10	-	-	-

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-88-3 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 544259 7921299

Fisheries Data

Gear Used: Backpack Electrofisher **Transect length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	2.08	0	-	N/A
	Fall	2.02	0	-	N/A
NNST	Summer	2.08	0	-	N/A
	Fall	2.02	0	-	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

Fish were not captured or observed in 2018, but there was no obvious barrier between the crossing and downstream overwintering habitat. Distance from overwintering habitat and low water levels may limit use by fish, creating a soft barrier to fish access.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-88-3 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 544259 7921299

Photographs



A B C

Figure 1. Summer (top) and fall (bottom) views of CV-88-3 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across. NOTE: summer and fall photos are estimated to be approximately 20 m apart due to malfunctioning GPS in summer.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-88-3 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 544259 7921299

Photographs



A **B** **C**

Figure 2. Summer (top) and fall (bottom) views of CV-88-3 at the 50 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-88-3 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 544259 7921299

Photographs



A **B** **C**

Figure 3. Summer (top) and fall (bottom) views of CV-88-3 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-88-3 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 544259 7921299

Photographs



A **B** **C**

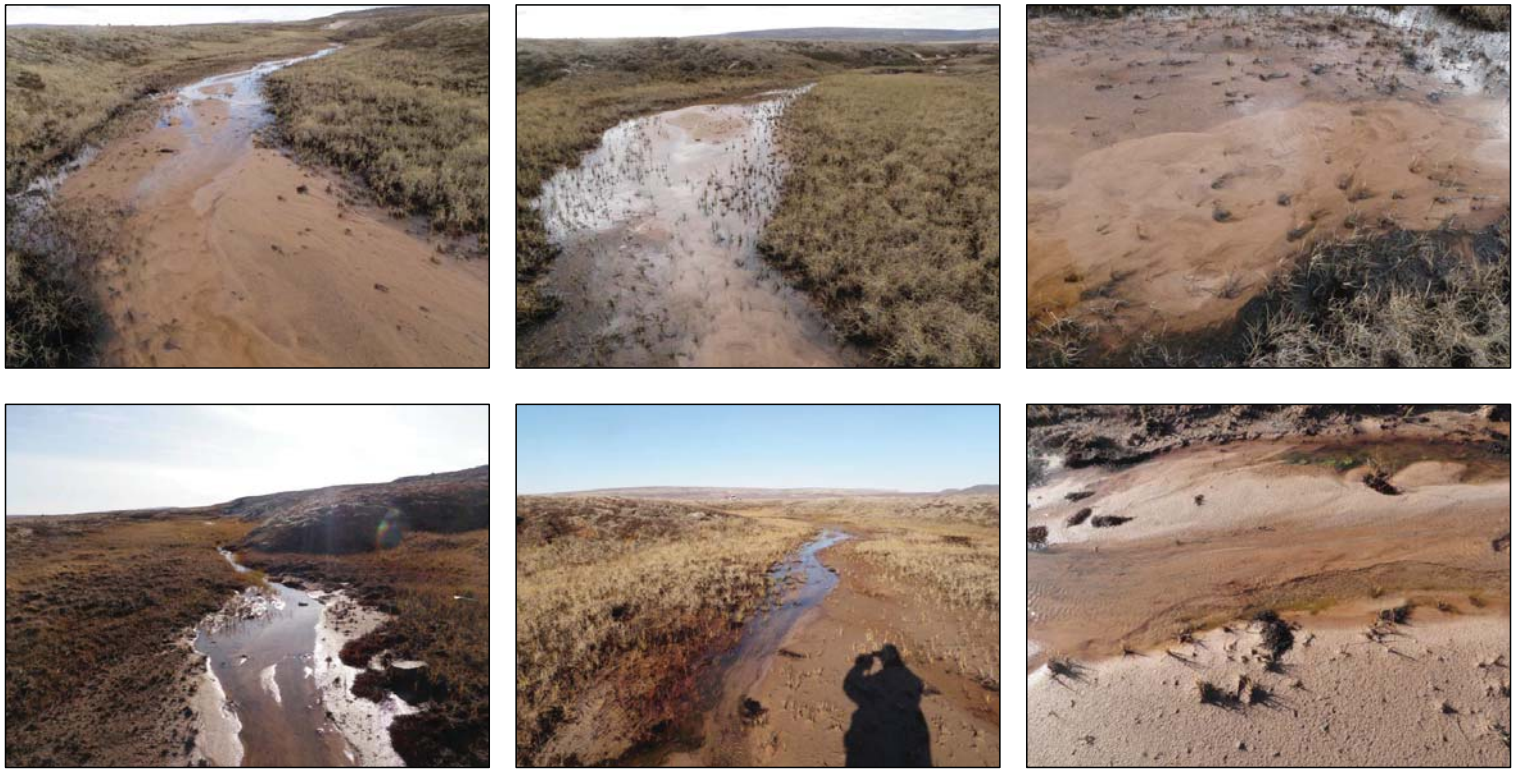
Figure 4. Summer (top) and fall (bottom) views of CV-88-3 at the 50 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-88-3 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 544259 7921299

Photographs



A **B** **C**

Figure 5. Summer (top) and fall (bottom) views of CV-88-3 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-88-4 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 545151 7921245

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

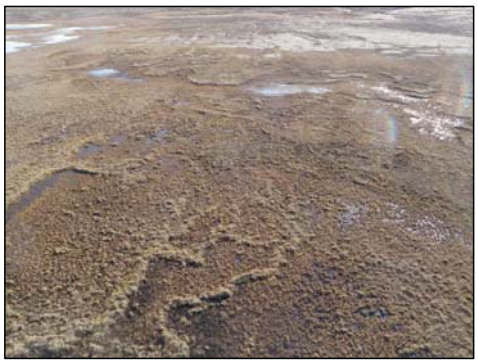
Comments & Summary

The crossing is shallow, marshy, and unconnected to other waterbodies. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-88-4 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-89-1 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 545492 7921173

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 1° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	23.8	14.7 / 11.7	0.04 / 0.06	0.13 / 0.08	0.06 / 0.06	0.15 / 0.10	0.12 / 0.15	0.15/ 0.16	0.06 / 0.13	0.20 / 0.20
80D	22.0	14.2 / 15.2	0.12 / 0.10	0.12 / 0.20	0.10 / 0.13	0.15 / 0.20	0.05 / 0.01	0.08/ 0.12	0.12 / 0.10	0.20 / 0.20
60D	17.5	8.5 / 7.0	0.18 / 0.02	0.05 / -	0.04 / 0.14	0.20 / 0.15	0.25 / 0.04	0.12/ -	0.08 / 0.18	0.30 / 0.20
40D	17.7	11.8 / 11.3	0.10 / 0.08	0.10 / -	0.06 / 0.06	0.15 / 0.10	0.11 / 0.26	0.06/ -	0.10 / 0.13	0.15 / 0.30
20D	16.1	11.3 / 10.5	- / 0.10	0.06 / 0.05	- / 0.12	0.15 / 0.15	- / 0.14	0.17/ 0.29	- / 0.09	0.20 / 0.30
0	11.1	6.8 / 6.7	- / -	0.16 / 0.10	- / 0.10	0.20 / 0.15	- / -	0.25/ 0.07	- / 0.07	0.30 / 0.15
20U	9.0	5.8 / 7.2	- / 0.18	0.12 / 0.04	- / 0.06	0.15 / 0.20	- / 0.37	0.26/ 0.24	- / 0.15	0.30 / 0.40
40U	9.0	5.4 / 4.6	- / -	0.17 / 0.16	- / 0.10	0.20 / 0.20	- / -	0.14/ 0.10	- / 0.05	0.20 / 0.15
60U	10.8	9.5 / 4.9	- / 0.10	0.18 / -	- / 0.10	0.20 / 0.15	- / 0.19	0.15/ -	- / 0.28	0.20 / 0.30
80U	11.4	8.8 / 7.6	- / 0.08	0.16 / -	- / 0.12	0.20 / 0.15	- / 0.12	0.14/ -	- / 0.10	0.20 / 0.15
100U	8.5	4.8 / 2.5	- / 0.28	0.30 / -	- / 0.18	0.30 / 0.30	- / 0.20	- / -	- / 0.41	- / 0.50

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	25	75	-	-	-	-	50	10	40	-	-
80D	20	80	-	-	-	-	65	10	25	-	-
60D	20	80	-	-	-	-	65	10	25	-	-
40D	25	75	-	-	-	-	75	10	15	-	-
20D	50	50	-	-	-	-	65	15	20	-	-
0	35	65	-	-	-	-	50	25	25	-	-
20U	50	50	-	-	-	-	15	20	65	-	-
40U	30	70	-	-	-	-	15	30	55	-	-
60U	15	85	-	-	-	-	55	30	15	-	-
80U	15	85	-	-	-	-	70	15	15	-	-
100U	25	75	-	-	-	-	20	60	20	-	-

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-89-1 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 545492 7921173

Fisheries Data

Gear Used: Backpack Electrofisher **Transect length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	5.70	11	1.93	64 - 79
	Fall	3.71	3	0.81	42 - 111
NNST	Summer	5.70	1	0.18	46
	Fall	3.71	0	-	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	H
NNST	L	N	H	H

Comments & Summary

This stream flows between two fish-bearing lakes and provides abundant habitat for stickleback and juvenile char during the open water period, particularly in summer. Fall water temperatures at the time of sampling were low and many fish had likely already returned to overwintering lakes, affecting catches.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT** **Ninespine Stickleback – IMPORTANT**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-89-1 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 545492 7921173

Photographs



A B C

Figure 1. Summer (top) and fall (bottom) views of CV-89-1 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-89-1 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 545492 7921173

Photographs



A **B** **C**

Figure 2. Summer (top) and fall (bottom) views of CV-89-1 at the 80 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-89-1 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 545492 7921173

Photographs



A **B** **C**

Figure 3. Summer (top) and fall (bottom) views of CV-89-1 at the 60 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-89-1 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 545492 7921173

Photographs



A **B** **C**

Figure 4. Summer (top) and fall (bottom) views of CV-89-1 at the 40 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-89-1 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 545492 7921173

Photographs



A B C

Figure 5. Summer (top) and fall (bottom) views of CV-89-1 at the 20 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-89-1 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 545492 7921173

Photographs



A **B** **C**

Figure 6. Summer (top) and fall (bottom) views of CV-89-1 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-89-1 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 545492 7921173

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 7. Summer (top) and fall (bottom) views of CV-89-1 at the 20 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-89-1 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 545492 7921173

Photographs



A **B** **C**

Figure 8. Summer (top) and fall (bottom) views of CV-89-1 at the 40 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-89-1 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 545492 7921173

Photographs



A B C

Figure 9. Summer (top) and fall (bottom) views of CV-89-1 at the 60 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-89-1 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 545492 7921173

Photographs



A **B** **C**

Figure 10. Summer (top) and fall (bottom) views of CV-89-1 at the 80 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-89-1 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 545492 7921173

Photographs



A B C

Figure 11. Summer (top) and fall (bottom) views of CV-89-1 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-89-2 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 545729 7921121

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Open Water

Fisheries Data

Gear Used: Backpack Electrofisher **Effort (min):** 3.17 **Transect Length (m):** 100

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing is an isolated pond with a maximum depth of 1.0 m. Fish were not captured or observed during surveys. There is no fish use of habitat at this crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-89-2 at the crossing during summer (A) and (B), and during fall (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-90-1 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 545902 7921048

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

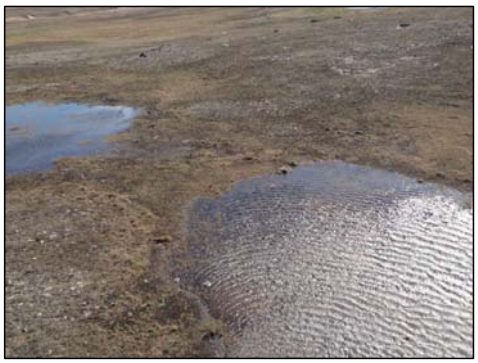
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing is a nearly dry low point adjacent to a very shallow, isolated pond. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-90-1 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-90-2 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 546181 7920409

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1-5 **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing is nearly dry with a few isolated pools and no connections to other waterbodies. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-90-2 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-90-3 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 546240 7920244

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1-5 **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing area is mostly dry or nearly so with a few short reaches of shallow surface flow and no connections to other waterbodies. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-90-3 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-90-4 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 546459 7920041

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** > 10 **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing stream is small and flows into a fish-bearing lake downstream of the Tote Road. However, only about the lowermost 20 m downstream of the road culverts is usable by fish. Avery steep gradient upstream of the road prevents fish use as noted during Tote Road surveys. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-90-4 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-91-0 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 546858 7919853

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** > 10 **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing is shallow, steep and there is intermittent surface water downstream with no connections to other waterbodies. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-91-0 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-91-1 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 546928 7919820

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** > 10 **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was nearly dry, was very steep and there is no access under all flow conditions. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-91-1 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-91-2 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 547012 7919781

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** > 10 **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing is a tributary of CV-91-0 and shares the same downstream barriers and lack of connection to overwintering habitat. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-91-2 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-92-1 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 547173 7919694

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

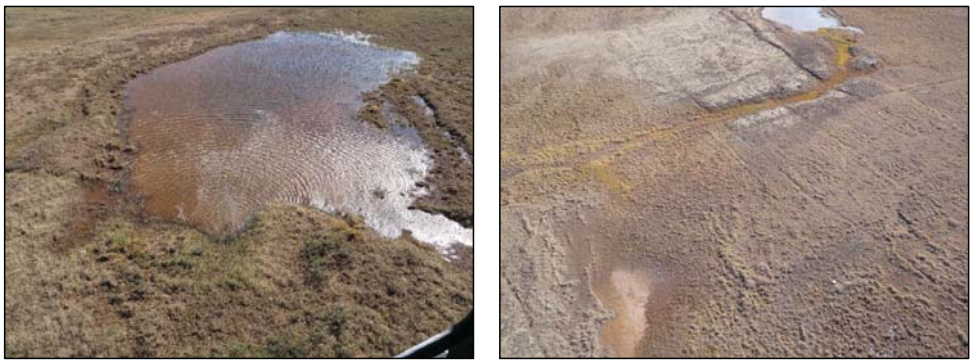
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing is a very shallow (< 0.5 m), isolated pond and adjacent dry stream. There is no fish use of habitat at this crossing.

Photographs



A **B**

Figure 1. Views of CV-92-1 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-92-1b | **Dates Surveyed:** 4 July & 2 September, 2018 | **UTM Coordinates:** 17 W 547125 7919725

General Physical Characteristics

Channel Confinement: UC | **Channel Gradient (range):** N/A | **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished | **Effort (min):** N/A | **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

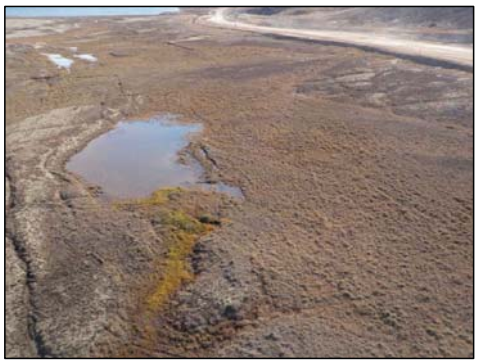
Comments & Summary

The crossing is a dry spot with no connections to overwintering habitat. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-92-1b at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-92-2 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 547416 7919506

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 5-10 **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

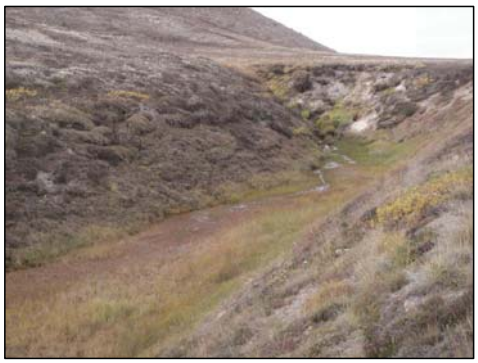
Comments & Summary

The crossing is nearly dry with frequent loss of surface flow and no connections to overwintering habitat. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-92-2 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-92-3 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 547521 7919456

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** > 10 **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was low in summer and nearly dry in fall and connected only to a shallow downstream pond. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-92-3 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-92-4 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 547721 7919363

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** > 10 **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was a dry hillside. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-92-4 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-92-5 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 547879 7919262

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 5-12° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	5.0	- / 1.9	- / 0.03	- / 0.06	- / 0.04	- / 0.10	- / 0.05	- / 0.37	- / 0.15	- / 0.40
80D	TOTE ROAD CROSSING									
60D	3.0	- / 2.7	- / 0.07	- / 0.05	- / 0.05	- / 0.10	- / 0.18	- / 0.20	- / 0.20	- / 0.25
50D	4.4	2.2 / -	0.18 / -	- / -	0.10 / -	0.20 / -	0.89 / -	- / -	0.48 / -	0.95 / -
40D	-	- / 1.8	- / 0.10	- / 0.08	- / -	- / 0.10	- / 0.31	- / 0.09	- / -	- / 0.40
20D	-	- / 1.8	- / 0.16	- / -	- / 0.05	- / 0.20	- / 0.20	- / -	- / 0.30	- / 0.40
0	7.6	3.0 / 2.1	0.12 / 0.07	- / -	0.04 / 0.05	0.15 / 0.10	0.63 / 0.26	- / -	0.19 / 0.04	0.65 / 0.35
20U	-	- / 1.5	- / -	- / 0.10	- / -	- / 0.10	- / -	- / 0.26	- / -	- / 0.30
40U	-	- / 1.2	- / -	- / 0.11	- / -	- / 0.15	- / -	- / 0.30	- / -	- / 0.40
50U	5.8	3.8 / -	0.18 / -	- / -	0.10 / -	0.20 / -	0.18 / -	- / -	0.10 / -	0.20 / -
60U	-	- / 3.2	- / 0.05	- / -	- / 0.05	- / 0.10	- / 0.75	- / -	- / 0.19	- / 0.75
80U	-	- / 2.3	- / 0.05	- / -	- / 0.07	- / 0.10	- / 0.17	- / -	- / 0.13	- / 0.25
100U	-	- / 2.2	- / 0.06	- / -	- / 0.04	- / 0.10	- / 0.09	- / -	- / 0.27	- / 0.30

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	70	20	-	-	10	-	-	10	90	-	-
80D	TOTE ROAD CROSSING										
60D	60	30	-	-	10	-	-	-	90	10	-
50D	80	10			10		-	-	80	20	-
40D	40	20	-	-	40	-	-	-	70	30	-
20D	30	30	-	-	40	-	-	-	60	40	-
0	15	25	-	-	60	-	-	-	70	30	-
20U	50	20	-	-	30	-	-	-	70	30	-
40U	40	20	-	-	40	-	-	-	70	30	-
50U	-	10	-	-	90	-	-	-	70	30	-
60U	30	20	-	-	50	-	-	-	70	30	-
80U	20	40	-	-	40	-	-	-	70	30	-
100U	20	50	-	-	30	-	-	-	70	30	-

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality

Arctic Char - IMPORTANT

Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-92-5 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 547879 7919262

Fisheries Data

Gear Used: Backpack Electrofisher **Transect length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH		2.82	25	8.88	50 - 125
		-	N/A	N/A	N/A
NNST		2.82	0	-	N/A
		-	N/A	N/A	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	N
NNST	N	N	N	N

Comments & Summary

The rail crossing is upstream of the Tote Road on a known fish-bearing stream. Good quality habitat present throughout the open water season, although periods of low flow can limit its use by juvenile char.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-92-5 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 547879 7919262

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A



B



C

Figure 1. Summer (top) and fall (bottom) views of CV-92-5 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-92-5 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 547879 7919262

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 2. Summer (top) and fall (bottom) views of CV-92-5 at the 60 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-92-5 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 547879 7919262

Photographs



NO PHOTO



NO PHOTO



NO PHOTO

A **B** **C**

Figure 3. Summer (top) and fall (bottom) views of CV-92-5 at the 50 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-92-5 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 547879 7919262

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A **B** **C**

Figure 4. Summer (top) and fall (bottom) views of CV-92-5 at the 40 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-92-5 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 547879 7919262

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A



B



C

Figure 5. Summer (top) and fall (bottom) views of CV-92-5 at the 20 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-92-5 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 547879 7919262

Photographs



A **B** **C**

Figure 6. Summer (top) and fall (bottom) views of CV-92-5 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-92-5 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 547879 7919262

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A



B



C

Figure 7. Summer (top) and fall (bottom) views of CV-92-5 at the 20 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-92-5 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 547879 7919262

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 8. Summer (top) and fall (bottom) views of CV-92-5 at the 40 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-92-5 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 547879 7919262

Photographs



NO PHOTO



NO PHOTO



NO PHOTO

A **B** **C**

Figure 9. Summer (top) and fall (bottom) views of CV-92-5 at the 50 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-92-5 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 547879 7919262

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A



B



C

Figure 10. Summer (top) and fall (bottom) views of CV-92-5 at the 60 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-92-5 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 547879 7919262

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 11. Summer (top) and fall (bottom) views of CV-92-5 at the 80 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-92-5 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 547879 7919262

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A



B



C

Figure 12. Summer (top) and fall (bottom) views of CV-92-5 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-92-6 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 547927 7919241

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** N/A **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was a nearly dry low point. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-92-6 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-92-7 & CV-92-8 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 548001 7919220 & 17 W 548033 7919215

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 5 to > 10 **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

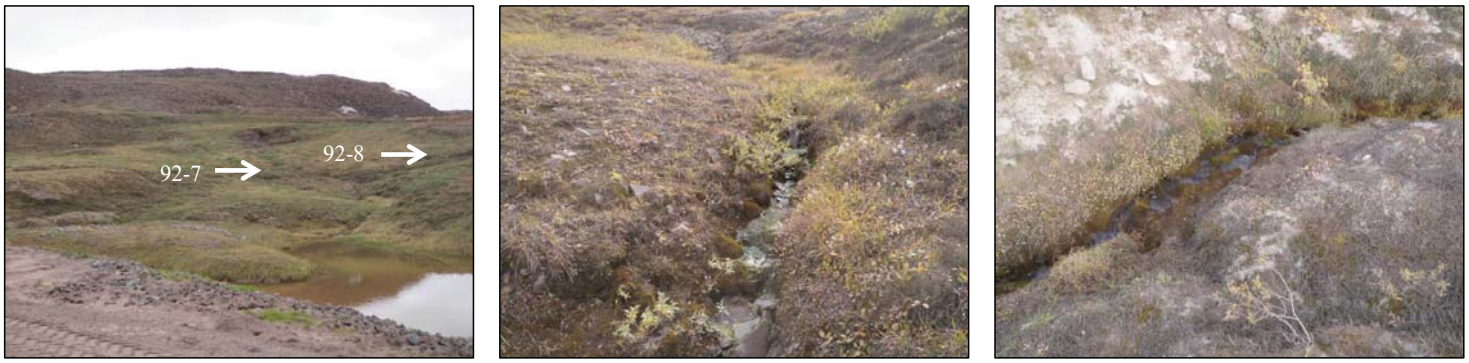
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossings were nearly dry, very small, steep trickles on a hillside upstream of the Tote Road. There is no access under all flow conditions. There is no fish use of habitat at this crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-92-7 & 92-8 at the crossing during summer (A) and fall (B) and (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-92-9 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 548062 7919211

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 5 to > 10 **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was a nearly dry, very small, steep trickle on a hillside upstream of the Tote Road. There is no access under all flow conditions. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-92-9 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-93-1 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 548228 7919188

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 5 to > 10 **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was a nearly dry, very small, steep trickle flowing into a fishless pond. There is no access under all flow conditions. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-93-1 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-93-2 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 548355 7919148

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 5 to > 10 **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was a dry hillside. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-93-2 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-93-3 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 548601 7918857

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 5 to > 10 **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was a dry hillside. There is no fish use of habitat at this crossing.

Photographs



A **B**

Figure 1. Views of CV-93-3 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-93-3a | **Dates Surveyed:** 9 July & 27 August, 2018 | **UTM Coordinates:** 17 W 548670 7918765

General Physical Characteristics

Channel Confinement: UC | **Channel Gradient (range):** 5 to > 10 | **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished | **Effort (min):** N/A | **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

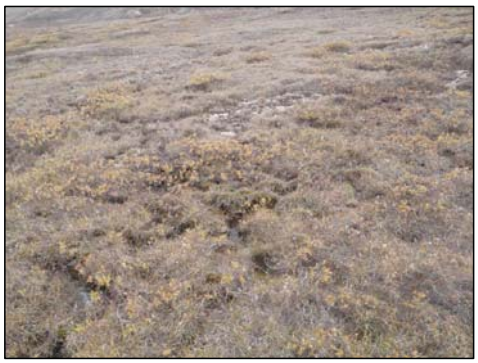
Comments & Summary

The crossing was a very small trickle on a hillside. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-93-3a at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-93-4 **Dates Surveyed:** 10 July & 27 August, 2018 **UTM Coordinates:** 17 W 548770 7918691

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 5-10° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	5.7	2.7 / 4.8	0.12 / 0.14	0.36 / -	0.20 / 0.05	0.40 / 0.20	0.54 / 0.50	1.06 / -	0.92 / 0.05	1.20 / 0.60
80D	5.3	4.9 / 4.9	0.18 / 0.10	0.18 / -	0.08 / 0.07	0.25 / 0.15	0.97 / 0.43	0.76 / -	0.10 / 0.33	1.10 / 0.55
60D	6.8	6.3 / 5.1	0.10 / 0.06	0.03 / -	0.06 / 0.16	0.20 / 0.20	0.57 / 0.15	0.20 / -	0.67 / 0.22	0.75 / 0.30
40D	16.9	11.6 / 3.7	0.04 / 0.11	0.24 / -	0.09 / 0.15	0.30 / 0.20	0.19 / 0.35	0.60 / -	0.16 / 0.13	0.70 / 0.40
20D	18.5	6.2 / 4.3	0.09 / 0.12	0.10 / -	0.15 / 0.10	0.20 / 0.15	0.71 / 0.38	0.45 / -	0.21 / 0.00	0.80 / 0.45
0	9.9	4.2 / 3.6	0.06 / -	0.15 / 0.10	0.17 / 0.10	0.20 / 0.15	0.22 / -	0.88 / 0.07	0.46 / 0.07	0.95 / 0.15
20U	12.9	11.3 / 11.3	0.16 / 0.10	0.08 / -	0.16 / 0.12	0.25 / 0.15	0.25 / 0.39	0.29 / -	0.19 / 0.06	0.40 / 0.40
40U	8.4	7.6 / 4.3	0.20 / 0.11	0.17 / -	0.03 / 0.10	0.25 / 0.15	0.45 / 0.83	0.15 / -	0.10 / 0.09	0.50 / 0.85
60U	7.6	7.0 / 4.2	0.13 / 0.10	0.25 / 0.10	0.10 / 0.12	0.30 / 0.15	1.02 / 0.31	0.57 / 0.00	0.40 / 0.10	1.10 / 0.40
80U	7.4	6.0 / 4.2	0.24 / 0.17	0.06 / 0.10	0.22 / 0.13	0.30 / 0.20	0.13 / 0.09	0.08 / 0.19	0.53 / 0.15	0.60 / 0.25
100U	4.8	4.0 / 4.0	0.08 / 0.11	0.06 / -	0.14 / 0.12	0.20 / 0.15	0.27 / 0.13	0.20 / -	0.73 / 0.20	0.80 / 0.25

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	70	25	5	-	-	-	-	-	70	30	-
80D	70	30	-	-	-	-	-	-	70	30	-
60D	60	25	-	-	15	-	-	-	70	30	-
40D	50	20	5	-	25	-	-	-	60	40	-
20D	45	25	-	-	30	-	-	-	60	40	-
0	30	30	-	-	40	-	-	-	60	40	-
20U	30	25	-	-	45	-	-	-	60	40	-
40U	30	25	5	-	40	-	-	-	60	40	-
60U	25	20	5	-	50	-	-	-	60	40	-
80U	25	25	5	-	45	-	-	-	60	40	-
100U	30	20	-	-	50	-	-	-	60	40	-

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality

Arctic Char - IMPORTANT

Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-93-4 **Dates Surveyed:** 10 July & 27 August, 2018 **UTM Coordinates:** 17 W 548770 7918691

Fisheries Data

Gear Used: Backpack Electrofisher **Transect length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	6.15	59	9.59	42 - 230
	Fall	-	N/A	N/A	N/A
NNST	Summer	6.15	0	-	N/A
	Fall	-	N/A	N/A	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	N
NNST	N	N	N	N

Comments & Summary

The rail crossing is a short distance upstream from Tote Road crossing BG-24, which has consistently provided important fish habitat throughout the open-water period. Several size classes of juvenile char use habitat in this stream. Fishing was not conducted during fall, but fewer numbers of fish were observed as most had already moved downstream to David Lake for overwintering.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-93-4 **Dates Surveyed:** 10 July & 27 August, 2018 **UTM Coordinates:** 17 W 548770 7918691

Photographs



A B C

Figure 1. Summer (top) and fall (bottom) views of CV-93-4 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-93-4 **Dates Surveyed:** 10 July & 27 August, 2018 **UTM Coordinates:** 17 W 548770 7918691

Photographs



A B C

Figure 2. Summer (top) and fall (bottom) views of CV-93-4 at the 80 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-93-4 **Dates Surveyed:** 10 July & 27 August, 2018 **UTM Coordinates:** 17 W 548770 7918691

Photographs



A **B** **C**

Figure 3. Summer (top) and fall (bottom) views of CV-93-4 at the 60 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-93-4 **Dates Surveyed:** 10 July & 27 August, 2018 **UTM Coordinates:** 17 W 548770 7918691

Photographs



A B C

Figure 4. Summer (top) and fall (bottom) views of CV-93-4 at the 40 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-93-4 **Dates Surveyed:** 10 July & 27 August, 2018 **UTM Coordinates:** 17 W 548770 7918691

Photographs



A B C

Figure 5. Summer (top) and fall (bottom) views of CV-93-4 at the 20 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-93-4 **Dates Surveyed:** 10 July & 27 August, 2018 **UTM Coordinates:** 17 W 548770 7918691

Photographs



A B C

Figure 6. Summer (top) and fall (bottom) views of CV-93-4 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-93-4 **Dates Surveyed:** 10 July & 27 August, 2018 **UTM Coordinates:** 17 W 548770 7918691

Photographs



A **B** **C**

Figure 7. Summer (top) and fall (bottom) views of CV-93-4 at the 20 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-93-4 **Dates Surveyed:** 10 July & 27 August, 2018 **UTM Coordinates:** 17 W 548770 7918691

Photographs



A B C

Figure 8. Summer (top) and fall (bottom) views of CV-93-4 at the 40 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-93-4 **Dates Surveyed:** 10 July & 27 August, 2018 **UTM Coordinates:** 17 W 548770 7918691

Photographs



A B C

Figure 9. Summer (top) and fall (bottom) views of CV-93-4 at the 60 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-93-4 **Dates Surveyed:** 10 July & 27 August, 2018 **UTM Coordinates:** 17 W 548770 7918691

Photographs



A **B** **C**

Figure 10. Summer (top) and fall (bottom) views of CV-93-4 at the 80 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

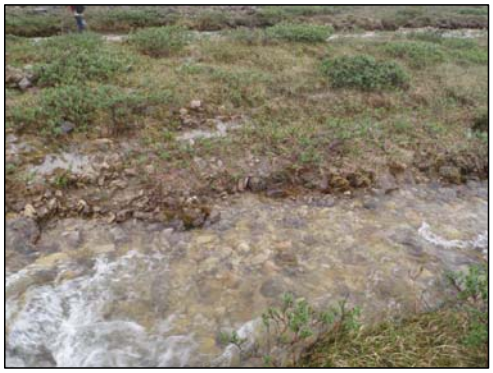
Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-93-4 **Dates Surveyed:** 10 July & 27 August, 2018 **UTM Coordinates:** 17 W 548770 7918691

Photographs






NO PHOTO



A **B** **C**

Figure 11. Summer (top) and fall (bottom) views of CV-93-4 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-93-4a **Dates Surveyed:** 10 July & 27 August, 2018 **UTM Coordinates:** 17 W 548749 7918703

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 5-10° **Flow Regime:** Intermittent

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
0	-	-	-	-	-	~0.05	-	-	-	0.00

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
0	-	100	-	-	-	-	-	10	70	20	-

Baffinland Iron Mines **Mary River Project**	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-93-4a **Dates Surveyed:** 10 July & 27 August, 2018 **UTM Coordinates:** 17 W 548749 7918703

Fisheries Data

Gear Used: Not fished **Transect length (m):** N/A

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	-	N/A	N/A	N/A
	Fall	-	N/A	N/A	N/A
NNST	Summer	-	N/A	N/A	N/A
	Fall	-	N/A	N/A	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	L	N
NNST	N	N	N	N

Comments & Summary

This branch of CV-93-4 (an important juvenile char stream) only provides habitat when flows are very high. At the time of the 2018 surveys, the channel was nearly dry and unconnected to CV-93-4. Habitat use is intermittent.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-93-4a **Dates Surveyed:** 10 July & 27 August, 2018 **UTM Coordinates:** 17 W 548749 7918703

Photographs



A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of CV-93-4a at the rail crossing.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-93-4b | **Dates Surveyed:** 10 July & 27 August, 2018 | **UTM Coordinates:** 17 W 548701 7918736

General Physical Characteristics

Channel Confinement: UC | **Channel Gradient (range):** 3-8° | **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished | **Effort (min):** N/A | **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing stream is a tributary of CV-93-4, which is known to be fish-bearing; however there is a vertical drop barrier at the confluence. The barrier prevents access under all flow conditions. There is no fish use of habitat at this crossing.

Photographs



A



B



C

Figure 1. Views of CV-93-4b at the crossing during summer, looking upstream (A) downstream (B) and across (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-93-4b **Dates Surveyed:** 10 July & 27 August, 2018 **UTM Coordinates:** 17 W 548701 7918736

Photographs



A

Figure 2. View of CV-93-4b during fall.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING**
			Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-94-1 **Dates Surveyed:** 4 July & 27 August, 2018 **UTM Coordinates:** 17 W 548899 7918649

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

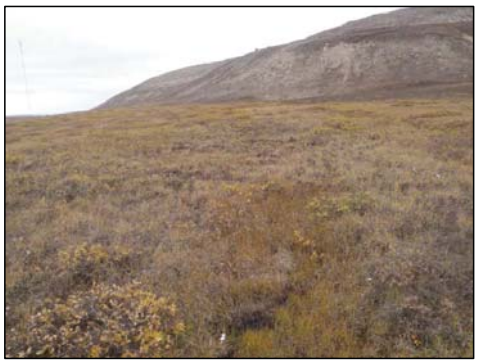
Comments & Summary

The crossing was a dry hillside. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-94-1 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-94-2 **Dates Surveyed:** 4 July & 27 August, 2018 **UTM Coordinates:** 17 W 549840 7918391

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** > 10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

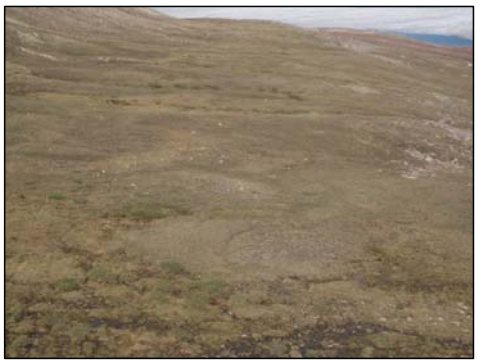
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was nearly dry in summer and dry in fall 2018. There is never a connection with overwintering habitat. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-94-2 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-95-1 **Dates Surveyed:** 10 July & 27 August, 2018 **UTM Coordinates:** 17 W 550005 7918257

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was a dry low point. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-95-1 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-95-2 **Dates Surveyed:** 10 July & 27 August, 2018 **UTM Coordinates:** 17 W 550144 7918111

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** > 10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was nearly dry in summer and dry in fall 2018. The limited amount of water flowed under rocks at the crossing and dispersed over terrestrial vegetation downstream. There would be no access under any flow conditions. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-95-2 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-95-3 **Dates Surveyed:** 10 July & 30 August, 2018 **UTM Coordinates:** 17 W 550483 7917613

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 5 to > 15° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was a small trickle flowing from the hills into a small, isolated lake. There is a large, vertical drop at the confluence with the lake that is impassable under all flow conditions. There is no fish use of habitat at this crossing.

Photographs



A



B



C

Figure 1. Views of CV-95-3 at the crossing during summer, looking upstream (A) downstream (B) and across (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-95-3 **Dates Surveyed:** 10 July & 30 August, 2018 **UTM Coordinates:** 17 W 550483 7917613

Photographs



A **B** **C**

Figure 2. Views of CV-95-3 at the crossing during fall, looking upstream (A) downstream (B) and across (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING**
			Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-95-4 **Dates Surveyed:** 10 July & 30 August, 2018 **UTM Coordinates:** 17 W 550630 7917484

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1-4° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

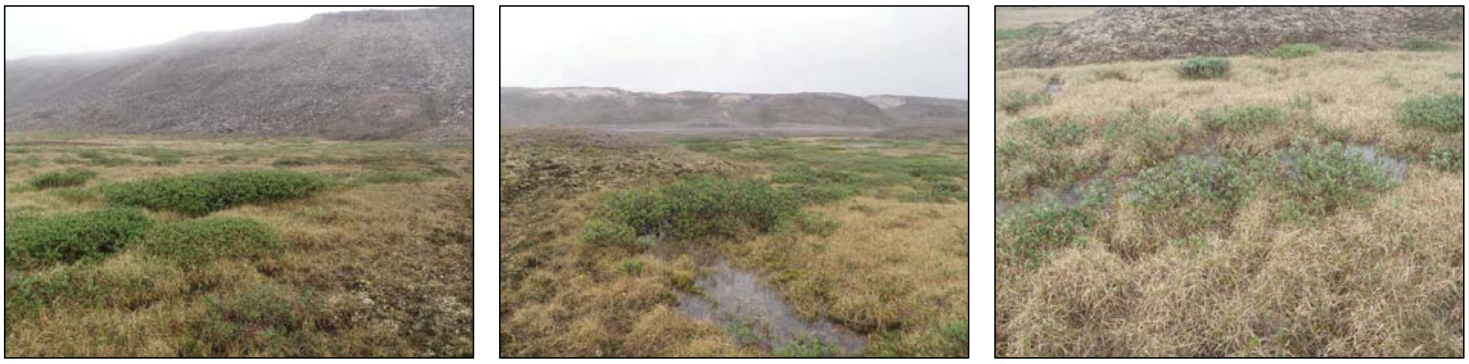
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was a small, shallow trickle flowing across the tundra towards the CV-96-1 fish-bearing stream. However, there is a vertical barrier from 50-70 m downstream of the crossing and another at the confluence with 96-1 that are impassable under all flow conditions. There is no fish use of habitat at this crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-95-4 at the crossing during summer, looking upstream (A) downstream (B) and across (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

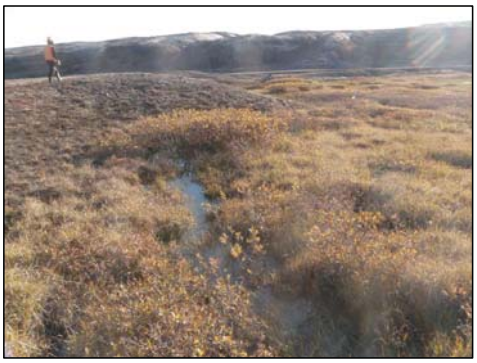
Location

Crossing ID: CV-95-4 **Dates Surveyed:** 10 July & 30 August, 2018 **UTM Coordinates:** 17 W 550630 7917484

Photographs



A



B



C

Figure 2. Views of CV-95-4 at the crossing during fall, looking upstream (A) downstream (B) and across (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-95-5 **Dates Surveyed:** 10 July & 30 August, 2018 **UTM Coordinates:** 17 W 550708 7917426

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1-4° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was a shallow marshy spot with little flow and no connections to other waterbodies. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-95-5 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-95-5a | **Dates Surveyed:** 10 July & 30 August, 2018 | **UTM Coordinates:** 17 W 550781 7917371

General Physical Characteristics

Channel Confinement: C | **Channel Gradient (range):** 5 to > 15° | **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished | **Effort (min):** N/A | **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was a steep hillside trickle with little surface flow. There may be some fish use of habitat near the downstream confluence with CV-96-1 under high flows, but fish cannot access habitat at the rail crossing due to the steep barrier. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-95-5a at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-95-6 **Dates Surveyed:** 10 July & 30 August, 2018 **UTM Coordinates:** 17 W 550832 7917333

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 5 to > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was a nearly dry to dry steep hillside trickle flowing into CV-96-1. There is no access under any flow conditions. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-95-6 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-95-7 **Dates Surveyed:** 10 July & 30 August, 2018 **UTM Coordinates:** 17 W 550885 7917294

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 5 to > 15° **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was a dry hillside. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-95-7 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-96-1 **Dates Surveyed:** 10 July & 30 August, 2018 **UTM Coordinates:** 17 W 550924 7917265

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 1-3° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	7.7	7.7 / 5.7	0.18 / 0.18	0.10 / 0.16	0.07 / 0.24	0.30 / 0.30	0.49 / 0.07	0.44 / 0.23	0.17 / 0.51	0.55 / 0.55
80D	10.5	10.0 / 5.8	0.30 / 0.30	0.13 / 0.10	0.14 / 0.12	0.40 / 0.35	0.08 / 0.49	0.13 / 0.33	0.54 / 0.17	0.60 / 0.55
60D	16.0	15.0 / 12.6	0.22 / 0.24	- / -	- / -	0.25 / 0.25	0.06 / 0.05	- / -	- / -	0.15 / 0.15
40D	14.5	13.0 / 11.6	0.14 / 0.22	0.24 / -	0.20 / -	0.30 / 0.25	0.06 / 0.06	0.08 / -	0.09 / -	0.15 / 0.10
20D	9.0	8.0 / 8.1	0.40 / 0.02	- / 0.28	- / -	0.45 / 0.35	0.12 / 0.05	- / 0.26	- / -	0.20 / 0.30
0	11.0	10.0 / 8.2	0.50 / -	- / 0.19	- / -	0.50 / 0.30	0.10 / -	- / 0.08	- / -	0.15 / 0.15
20U	10.0	9.0 / 7.0	0.30 / -	- / 0.43	- / -	0.35 / 0.50	0.36 / -	- / 0.02	- / -	0.40 / 0.15
40U	14.0	12.0 / 10.4	0.20 / 0.10	0.14 / 0.04	0.05 / 0.18	0.25 / 0.25	0.34 / 0.23	0.17 / 0.46	0.31 / 0.53	0.40 / 0.55
60U	8.0	7.5 / 6.5	0.53 / 0.52	- / 0.22	- / -	0.55 / 0.55	0.17 / 0.13	- / 0.21	- / -	0.20 / 0.25
80U	13.0	12.5 / 9.2	0.54 / 0.31	- / -	- / -	0.55 / 0.35	0.05 / 0.06	- / -	- / -	0.10 / 0.10
100U	13.0	5.0 / 4.8	0.54 / 0.61	- / -	- / -	0.55 / 0.65	0.17 / 0.16	- / -	- / -	0.20 / 0.20

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	40	30	10	20	-	-	-	10	80	10	-
80D	15	60	20	5	-	-	35	25	35	5	-
60D	-	80	20	-	-	-	55	30	15	-	-
40D	5	75	20	-	-	-	70	25	5	-	-
20D	10	60	30	-	-	-	70	5	20	5	-
0	10	55	35	-	-	-	60	20	20	-	-
20U	30	55	15	-	-	-	50	25	20	5	-
40U	55	30	5	10	-	-	10	35	45	10	-
60U	10	55	35	-	-	-	20	30	40	10	-
80U	-	50	50	-	-	-	85	10	-	5	-
100U	10	55	35	-	-	-	65	30	5	-	-

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-96-1 **Dates Surveyed:** 10 July & 30 August, 2018 **UTM Coordinates:** 17 W 550924 7917265

Fisheries Data

Gear Used: Backpack Electrofisher **Transect length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	6.82	9	1.32	29 - 126
	Fall	-	N/A	N/A	N/A
NNST	Summer	6.82	0	-	N/A
	Fall	-	N/A	N/A	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	H
NNST	M	N	H	M

Comments & Summary

The rail crossing is a short distance upstream from Tote Road crossing BG-17, which has consistently provided important fish habitat for both species throughout the open-water period. The stream also connects two large, upstream lakes with David Lake downstream, representing a potentially important migratory route. Several size classes of juvenile char use habitat in this stream. Fishing was not conducted during fall, but fish were observed.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT** **Ninespine Stickleback – IMPORTANT**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-96-1 **Dates Surveyed:** 10 July & 30 August, 2018 **UTM Coordinates:** 17 W 550924 7917265

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of CV-96-1 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-96-1 **Dates Surveyed:** 10 July & 30 August, 2018 **UTM Coordinates:** 17 W 550924 7917265

Photographs



A **B** **C**

Figure 2. Summer (top) and fall (bottom) views of CV-96-1 at the 80 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-96-1 **Dates Surveyed:** 10 July & 30 August, 2018 **UTM Coordinates:** 17 W 550924 7917265

Photographs



A **B** **C**

Figure 3. Summer (top) and fall (bottom) views of CV-96-1 at the 60 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-96-1 **Dates Surveyed:** 10 July & 30 August, 2018 **UTM Coordinates:** 17 W 550924 7917265

Photographs



A **B** **C**

Figure 4. Summer (top) and fall (bottom) views of CV-96-1 at the 40 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-96-1 **Dates Surveyed:** 10 July & 30 August, 2018 **UTM Coordinates:** 17 W 550924 7917265

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A



B



C

Figure 5. Summer (top) and fall (bottom) views of CV-96-1 at the 20 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-96-1 **Dates Surveyed:** 10 July & 30 August, 2018 **UTM Coordinates:** 17 W 550924 7917265

Photographs



A **B** **C**

Figure 6. Summer (top) and fall (bottom) views of CV-96-1 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-96-1 **Dates Surveyed:** 10 July & 30 August, 2018 **UTM Coordinates:** 17 W 550924 7917265

Photographs



A **B** **C**

Figure 7. Summer (top) and fall (bottom) views of CV-96-1 at the 20 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-96-1 **Dates Surveyed:** 10 July & 30 August, 2018 **UTM Coordinates:** 17 W 550924 7917265

Photographs



A **B** **C**

Figure 8. Summer (top) and fall (bottom) views of CV-96-1 at the 40 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-96-1 **Dates Surveyed:** 10 July & 30 August, 2018 **UTM Coordinates:** 17 W 550924 7917265

Photographs



A **B** **C**

Figure 9. Summer (top) and fall (bottom) views of CV-96-1 at the 60 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-96-1 **Dates Surveyed:** 10 July & 30 August, 2018 **UTM Coordinates:** 17 W 550924 7917265

Photographs



A **B** **C**

Figure 10. Summer (top) and fall (bottom) views of CV-96-1 at the 80 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-96-1 **Dates Surveyed:** 10 July & 30 August, 2018 **UTM Coordinates:** 17 W 550924 7917265

Photographs



A **B** **C**

Figure 11. Summer (top) and fall (bottom) views of CV-96-1 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-96-2 **Dates Surveyed:** 10 July & 30 August, 2018 **UTM Coordinates:** 17 W 550964 7917235

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 2 to > 10° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

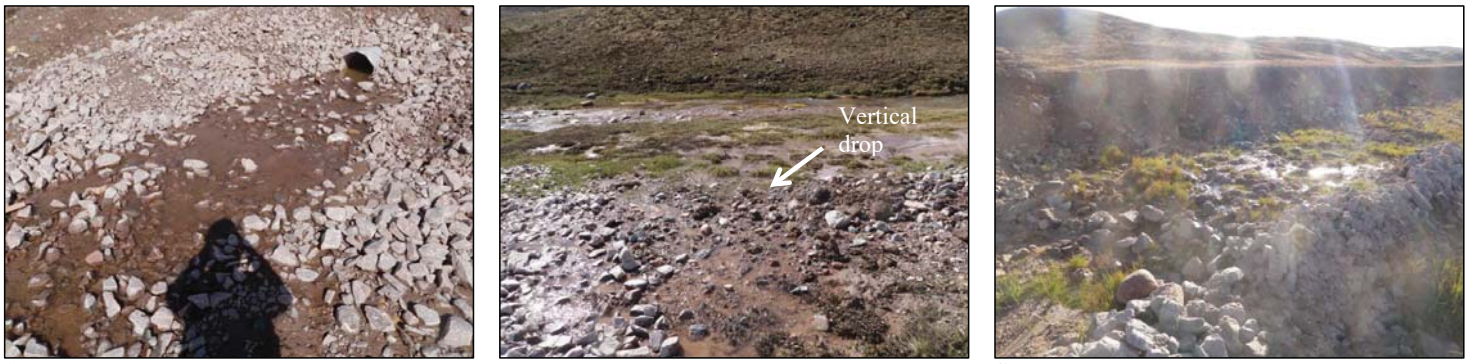
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was immediately downstream of the Tote Road, flowing into CV-96-1. There is a vertical drop preventing any access to the rail crossing or upstream of the road. There is no fish use of habitat at this crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-96-2 at the crossing (A) and downstream towards CV-96-1 (B) during summer, and the crossing during fall (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-96-3 **Dates Surveyed:** 10 July & 30 August, 2018 **UTM Coordinates:** 17 W 551117 7917101

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 5 to > 15° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was dry in 2018. The steep gradient and consistently low flows have prevented access upstream of the Tote Road as observed during road monitoring. There is no fish use of habitat at this crossing.

Photographs



A **B**

Figure 1. Views of CV-96-3 at the crossing during summer (A) and during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-97-1 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 551191 7917013

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** > 10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was dry in 2018. The steep gradient and consistently low flows have prevented access upstream of the Tote Road. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-97-1 at the crossing during summer (A) and during fall, with nearby 97-2 (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-97-2 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 551226 7916972

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** > 10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing had low water in summer and dried up by fall 2018. In addition, there is a very steep gradient and never access from downstream habitat. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-97-2 at the crossing during summer (A) and during fall, with nearby 97-1 (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-97-3 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 551254 7916940

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** > 10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing had low water in summer and dried up by fall 2018. In addition, there is a very steep gradient and never access from downstream habitat. There is no fish use of habitat at this crossing.

Photographs



A **B**

Figure 1. Views of CV-97-3 at the crossing during summer (A) and during fall, with nearby 97-4 (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-97-4 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 551292 7916898

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** > 10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing had low water in summer and dried up by fall 2018. In addition, there is a very steep gradient and never access from downstream habitat. There is no fish use of habitat at this crossing.

Photographs



A **B**

Figure 1. Views of CV-97-4 at the crossing during summer (A) and during fall, with nearby 97-3 (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-97-5 & CV-97-5b

Dates Surveyed: 4 July & 2 September, 2018

UTM Coordinates: 17 W 551351 7916843 & 17 W 551326 7916865

General Physical Characteristics

Channel Confinement: C

Channel Gradient (range): > 10°

Flow Regime: Intermittent

Fisheries Data

Gear Used: Not Fished

Effort (min): N/A

Transect Length (m): N/A

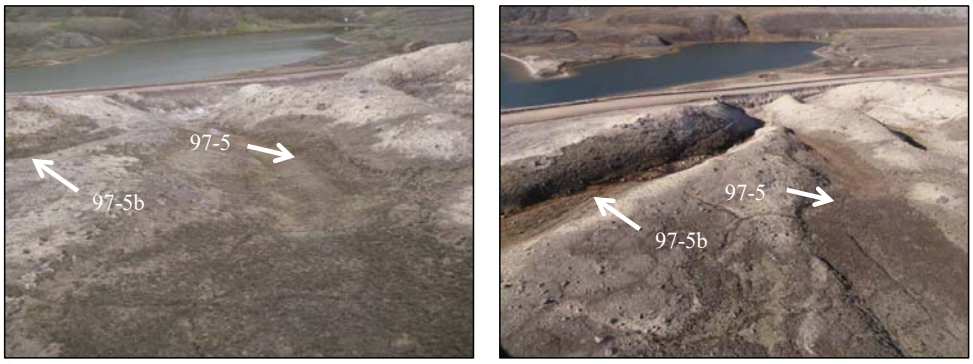
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The 97-5 crossing was dry all year while 97-5b maintained a very small flow during the open-water period. Both streams had a very steep gradient and there was never access from downstream habitat near the road. There is no fish use of habitat at this crossing.

Photographs



A **B**

Figure 1. Views of CV-97-5 and 97-5b at the crossing during summer (A) and during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-97-6 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 551457 7916754

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** > 10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing had very little water in summer and dried up by fall 2018. In addition, there is a very steep gradient and never access from downstream habitat. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-97-6 at the crossing during summer (A) and during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-97-7 & CV-97-7a

Dates Surveyed: 4 July & 2 September, 2018

UTM Coordinates: 17 W 551576 7916658 & 17 W 551560 7916671

General Physical Characteristics

Channel Confinement: C

Channel Gradient (range): > 10°

Flow Regime: Intermittent

Fisheries Data

Gear Used: Not Fished

Effort (min): N/A

Transect Length (m): N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

These crossings had very low water throughout the open-water period in 2018. Both also had very steep gradients, loss of surface flow, and there was never access from downstream habitat near the road. There is no fish use of habitat at this crossing.

Photographs



A **B**

Figure 1. Views of CV-97-7 and 97-7a at the crossing during summer (A) and during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-97-9 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 551629 7916614

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** > 10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing had very little water during the open-water period in 2018. In addition, there is a very steep gradient and never access from downstream habitat. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-97-9 at the crossing during summer (A) and during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-97-10 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 551781 7916475

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** > 10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing had very little water during the open-water period in 2018. In addition, there is a very steep gradient and never access from downstream habitat. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-97-10 at the crossing during summer (A) and during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-97-11 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 551823 7916434

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was a dry low point on a plateau. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-97-11 at the crossing during summer (A) and during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-97-12 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 551891 7916370

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was a dry low point on a plateau. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-97-12 at the crossing during summer (A) and during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-98-0 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 552001 7916266

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was a dry low point on a plateau. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-98-0 at the crossing during summer (A) and during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-98-1 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 552043 7916226

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

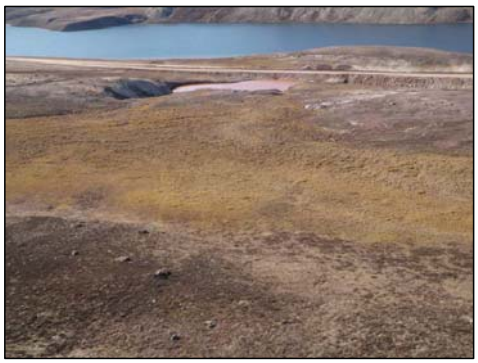
Comments & Summary

The crossing was a dry low point on a plateau. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-98-1 at the crossing during summer (A) and during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-99-1 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 552464 7915930

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Open Water

Fisheries Data

Gear Used: Backpack Electrofisher **Effort (min):** 4.23 **Transect Length (m):** 100

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was a small, shallow pond with a maximum depth of approximately 2 m. No fish were captured or observed during an electrofishing survey of approximately half the shoreline and there was no evidence of their presence. There is no fish use of habitat at this crossing.

Photographs



A



B



C

Figure 1. Views of CV-99-1 at the crossing during summer (A) and (B), and during fall (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-99-2 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 552958 7915502

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1-5° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

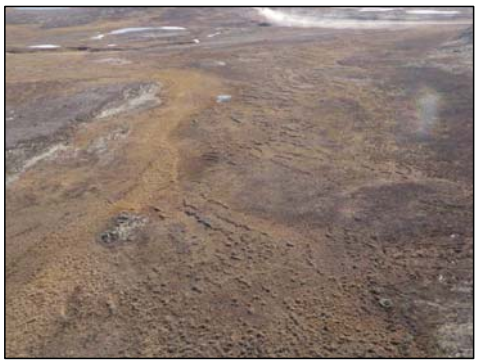
Comments & Summary

The crossing was dry in 2018 and there was no channel and no connection possible even during high water events. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-99-2 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-99-3 **Dates Surveyed:** 6 July & 2 September, 2018 **UTM Coordinates:** 17 W 553253 7915414

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1-3° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	9.3	2.3 / 5.1	0.34 / 0.38	0.18 / -	0.06 / -	0.60 / 0.60	0.26 / 0.15	0.22 / -	0.21 / -	0.30 / 0.30
80D	7.0	1.4 / 5.9	0.14 / 0.30	0.18 / -	0.10 / -	0.50 / 0.45	0.57 / 0.53	0.50 / -	0.30 / -	0.60 / 0.55
60D	4.1	1.8 / 1.8	- / -	0.53 / 0.56	- / -	0.75 / 0.70	- / -	0.10 / 0.10	- / -	0.15 / 0.15
40D	4.7	3.8 / 3.8	- / -	0.49 / 0.82	- / -	1.00 / 1.00	- / -	0.03 / 0.02	- / -	0.10 / 0.10
20D	3.8	2.6 / 3.3	0.30 / 0.20	- / -	0.30 / -	0.80 / 0.25	0.12 / 0.30	- / -	0.17 / -	0.20 / 0.30
0	7.5	5.4 / 4.8	0.51 / 0.38	- / -	- / -	0.70 / 0.65	0.01 / 0.03	- / -	- / -	0.05 / 0.05
20U	9.6	6.5 / 8.2	- / -	0.32 / 0.34	- / -	0.40 / 0.40	- / -	0.20 / 0.20	- / -	0.25 / 0.25
40U	13.0	9.0 / 4.9	- / 0.04	0.42 / -	- / 0.08	1.00 / 0.90	- / 0.28	0.00 / -	- / 0.40	0.30 / 0.40
60U	7.6	4.6 / 3.0	0.10 / -	0.18 / 0.16	0.04 / -	0.25 / 0.20	0.05 / -	0.24 / 0.42	0.18 / -	0.30 / 0.45
80U	2.6	2.3 / 1.8	- / -	0.25 / 0.52	- / -	0.40 / 0.55	- / -	0.22 / 0.11	- / -	0.30 / 0.20
100U	8.8	3.5 / 2.7	0.70 / -	- / 0.20	- / -	0.70 / 0.65	0.14 / -	- / 0.27	- / -	0.20 / 0.30

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	-	20	80	-	-	-	45	40	15	-	-
80D	10	20	70	-	-	-	90	5	5	-	-
60D	-	20	80	-	-	-	70	20	10	-	-
40D	5	15	80	-	-	-	100	-	-	-	-
20D	10	20	70	-	-	-	75	20	5	-	-
0	5	20	75	-	-	-	60	5	35	-	-
20U	10	20	70	-	-	-	95	5	-	-	-
40U	35	10	55	-	-	-	15	35	45	5	-
60U	45	45	10	-	-	-	-	5	80	15	-
80U	15	40	45	-	-	-	5	10	80	5	-
100U	30	35	35	-	-	-	5	10	80	5	-

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality

Arctic Char - IMPORTANT

Ninespine Stickleback – IMPORTANT

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-99-3 **Dates Surveyed:** 6 July & 2 September, 2018 **UTM Coordinates:** 17 W 553253 7915414

Fisheries Data

Gear Used: Backpack Electrofisher **Transect length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	5.65	57	10.09	49 - 147
	Fall	-	N/A	N/A	N/A
NNST	Summer	5.65	6	1.06	65
	Fall	-	N/A	N/A	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	M
NNST	H	N	H	M

Comments & Summary

This rail crossing is a short distance upstream from Tote Road crossing BG-04, which has consistently provided important fish habitat for both species throughout the open-water period. Abundant, deep pools with plenty of cover are ideal habitat for both species. Fishing was not conducted during fall, but many fish were observed.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT** **Ninespine Stickleback – IMPORTANT**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-99-3 **Dates Surveyed:** 6 July & 2 September, 2018 **UTM Coordinates:** 17 W 553253 7915414

Photographs



A B C

Figure 1. Summer (top) and fall (bottom) views of CV-99-3 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-99-3 **Dates Surveyed:** 6 July & 2 September, 2018 **UTM Coordinates:** 17 W 553253 7915414

Photographs



A **B** **C**

Figure 2. Summer (top) and fall (bottom) views of CV-99-3 at the 80 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-99-3 **Dates Surveyed:** 6 July & 2 September, 2018 **UTM Coordinates:** 17 W 553253 7915414

Photographs



A B C

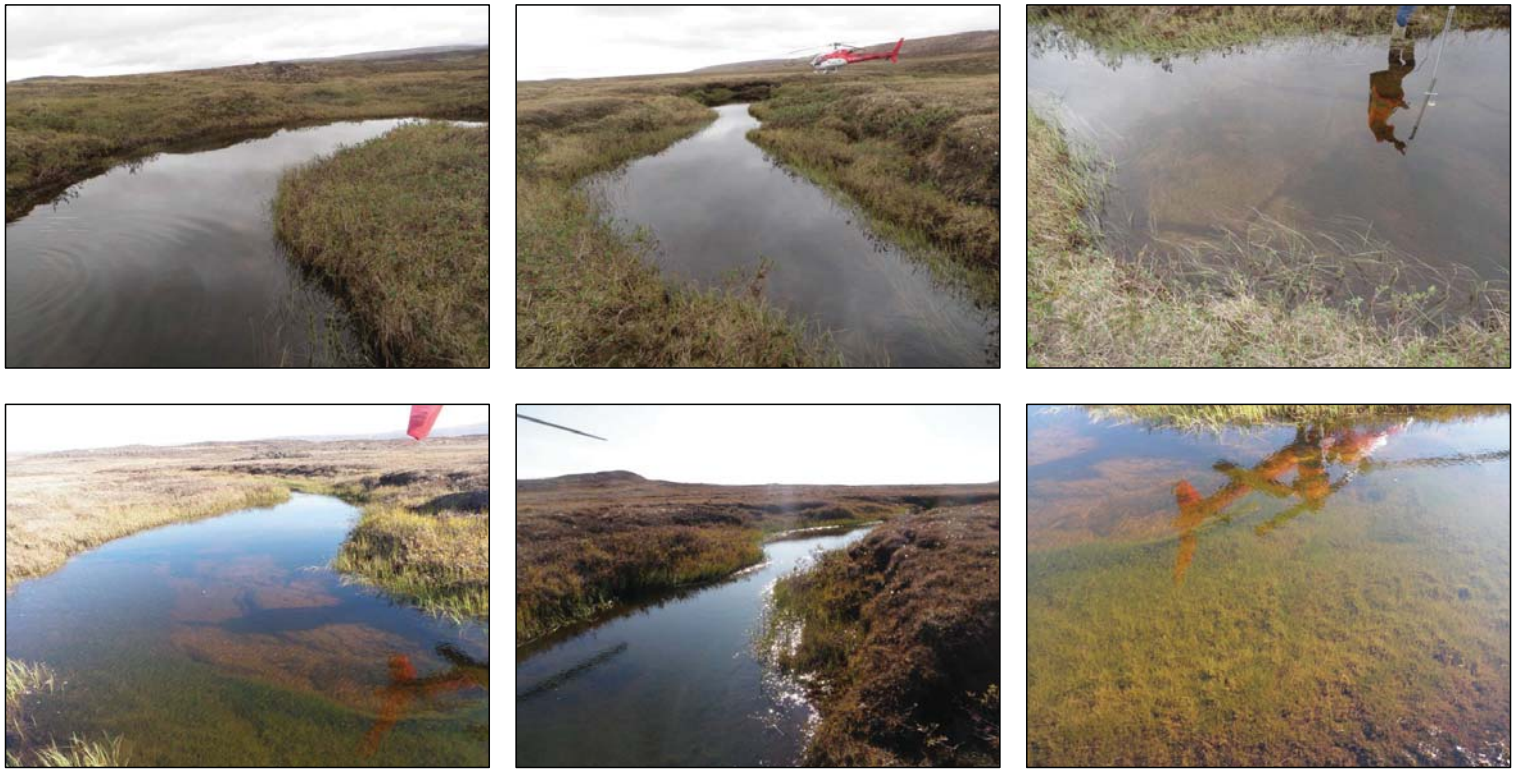
Figure 3. Summer (top) and fall (bottom) views of CV-99-3 at the 60 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-99-3 **Dates Surveyed:** 6 July & 2 September, 2018 **UTM Coordinates:** 17 W 553253 7915414

Photographs



A B C

Figure 4. Summer (top) and fall (bottom) views of CV-99-3 at the 40 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-99-3 **Dates Surveyed:** 6 July & 2 September, 2018 **UTM Coordinates:** 17 W 553253 7915414

Photographs



A **B** **C**

Figure 5. Summer (top) and fall (bottom) views of CV-99-3 at the 20 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-99-3 **Dates Surveyed:** 6 July & 2 September, 2018 **UTM Coordinates:** 17 W 553253 7915414

Photographs



A **B** **C**

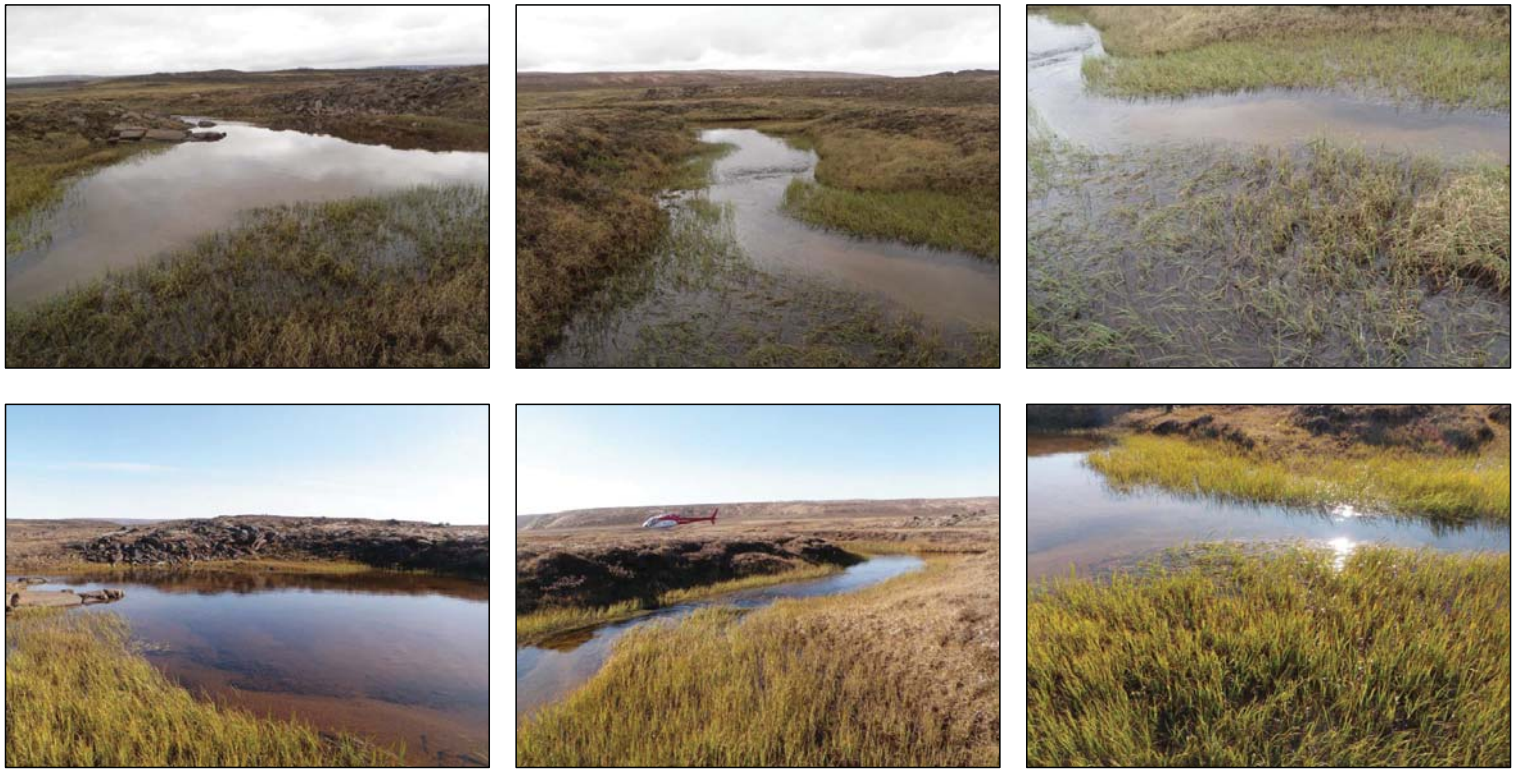
Figure 6. Summer (top) and fall (bottom) views of CV-99-3 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-99-3 **Dates Surveyed:** 6 July & 2 September, 2018 **UTM Coordinates:** 17 W 553253 7915414

Photographs



A **B** **C**

Figure 7. Summer (top) and fall (bottom) views of CV-99-3 at the 20 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-99-3 **Dates Surveyed:** 6 July & 2 September, 2018 **UTM Coordinates:** 17 W 553253 7915414

Photographs



A **B** **C**

Figure 8. Summer (top) and fall (bottom) views of CV-99-3 at the 40 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-99-3 **Dates Surveyed:** 6 July & 2 September, 2018 **UTM Coordinates:** 17 W 553253 7915414

Photographs



A **B** **C**

Figure 9. Summer (top) and fall (bottom) views of CV-99-3 at the 60 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-99-3 **Dates Surveyed:** 6 July & 2 September, 2018 **UTM Coordinates:** 17 W 553253 7915414

Photographs



A **B** **C**

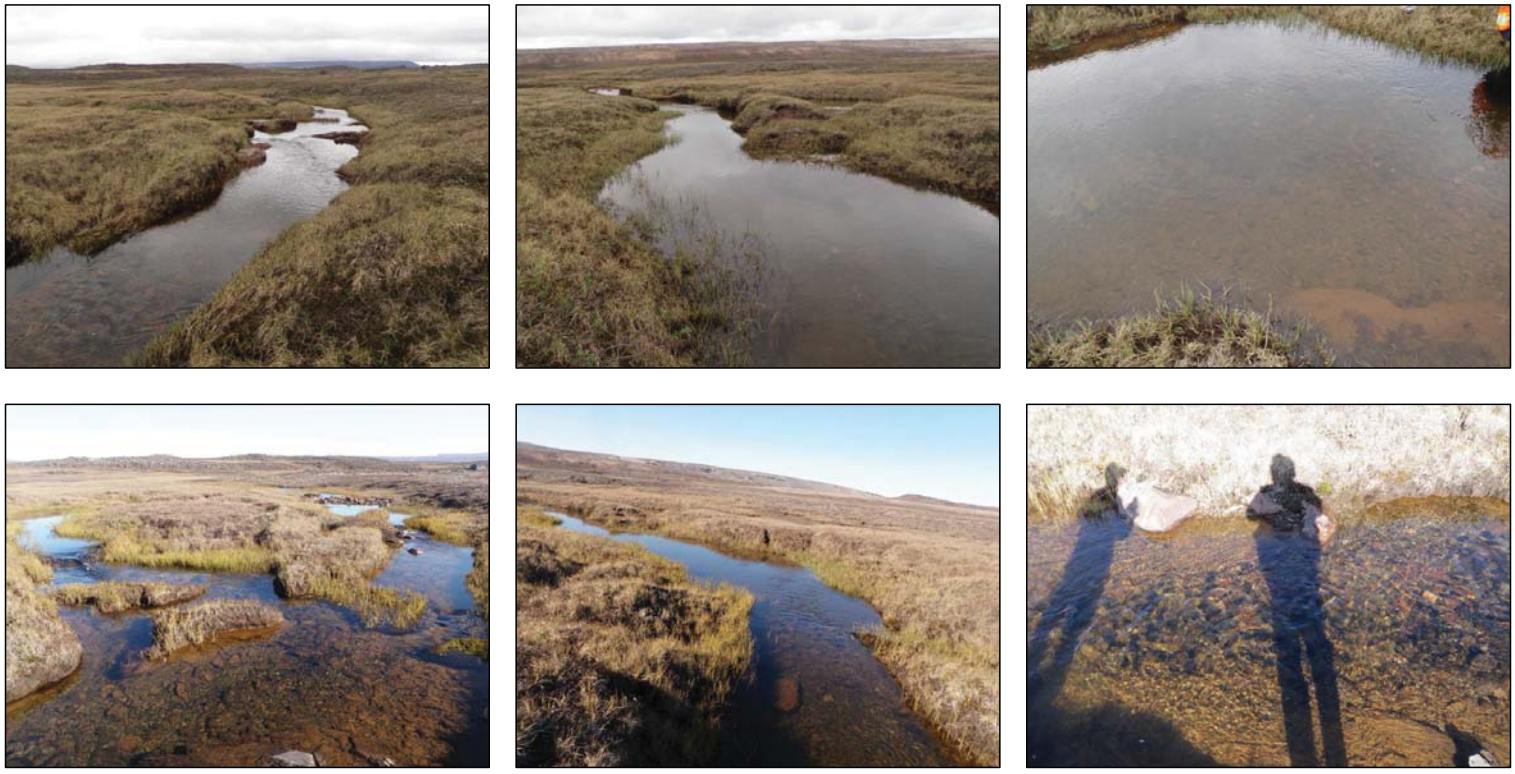
Figure 10. Summer (top) and fall (bottom) views of CV-99-3 at the 80 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-99-3 **Dates Surveyed:** 6 July & 2 September, 2018 **UTM Coordinates:** 17 W 553253 7915414

Photographs



A B C

Figure 11. Summer (top) and fall (bottom) views of CV-99-3 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-100-1 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 553579 7915319

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was a dry low point. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-100-1 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-100-2 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 553862 7915292

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

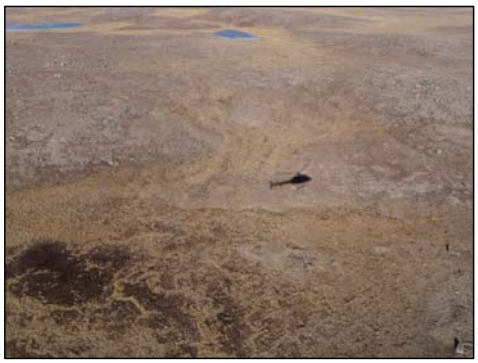
Comments & Summary

The crossing was a dry low point. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-100-2 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-100-3 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 554050 7915379

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was a dry low point. There is no fish use of habitat at this crossing.

Photographs



A

Figure 1. Views of CV-100-3 at the crossing during summer (A).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-100-4 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 554185 7915443

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 3-10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was shallow, broad, and often lacked a defined channel. In addition, surface flow periodically disappeared. There was no access from overwintering waterbodies, though there may be fish use of the pond downstream of the rail. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-100-4 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-101-1 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 554664 7915456

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 3-10° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

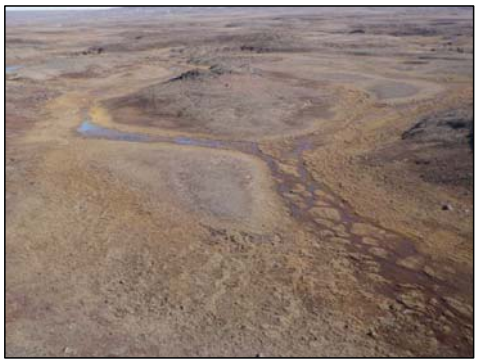
Comments & Summary

The crossing was shallow, broad, and often lacking a defined channel, particularly upstream and downstream of the rail alignment. In addition, surface flow periodically disappeared. There was no access from overwintering waterbodies. This site was also surveyed in 2017 with the same results. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-101-1 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-101-1a | **Dates Surveyed:** 4 July & 2 September, 2018 | **UTM Coordinates:** 17 W 554772 7915455

General Physical Characteristics

Channel Confinement: UC | **Channel Gradient (range):** 1-8° | **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished | **Effort (min):** N/A | **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was very shallow, marshy habitat with periodic surface flow and no connections to overwintering habitat. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-101-1a at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-101-1b | **Dates Surveyed:** 4 July & 2 September, 2018 | **UTM Coordinates:** 17 W 554885 7915454

General Physical Characteristics

Channel Confinement: UC | **Channel Gradient (range):** 1-8° | **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished | **Effort (min):** N/A | **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was very shallow, broad and rocky with periodic surface flow loss and no connections to overwintering habitat. There is no fish use of habitat at this crossing.

Photographs



A

Figure 1. Views of CV-101-1b at the crossing during summer (A).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-101-2 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 555200 7915449

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1-8° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was very shallow, broad, lacked a defined channel, and had periodic surface flow loss and no connections to overwintering habitat. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-101-2 at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-102-1 **Dates Surveyed:** 6 July & 2 September, 2018 **UTM Coordinates:** 17 W 555728 7915442

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 2-5° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
60D	55.0	23.0 / 22.0	- / -	- / -	0.30 / 0.54-	>2.00 / >2.00	- / -	- / -	0.70 / 32	>1.00 / >1.00
40D	35.0	28.0 / 26.0	- / -	- / -	- / -	>2.00 / >2.00	- / -	- / -	- / -	>1.00 / >1.00
20D	33.0	27.0 / -	- / -	- / -	0.30 / -	>2.00 / >2.00	- / -	- / -	0.17 / -	>1.00 / >1.00
0	28.0	27.0 / -	- / -	- / -	- / -	>2.00 / >2.00	- / -	- / -	- / -	>1.00 / >1.00
20U	29.0	27.0 / -	- / -	- / -	0.34 / -	>1.00 / >2.00	- / -	- / -	0.82 / -	>1.00 / >1.00
40U	26.0	26.0 / -	- / -	- / -	- / -	>1.00 / >2.00	- / -	- / -	- / -	>1.00 / >1.00
60U	6.0	4.0 / -	- / -	- / -	- / -	>1.00 / >2.00	- / -	- / -	- / -	>1.00 / >1.00

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
60D	30	10	50	10	-	-	10	10	10	55	15
40D	30	15	50	5	-	-	30	15	35	15	5
20D	60	5	25	10	-	-	40	20	20	10	10
0	60	10	30	-	-	-	40	20	20	10	10
20U	60	-	-	40	-	-	-	-	10	10	80
40U	40	5	5	50	-	-	30	25	20	20	5
60U	80	10	10	-	-	-	10	-	10	10	70

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality

Arctic Char - IMPORTANT

Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-102-1 **Dates Surveyed:** 6 July & 2 September, 2018 **UTM Coordinates:** 17 W 555728 7915442

Fisheries Data

Gear Used: Not fished **Transect length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	-	N/A	N/A	N/A
	Fall	-	N/A	N/A	N/A
NNST	Summer	-	N/A	N/A	N/A
	Fall	-	N/A	N/A	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	L	H	L
NNST	N	N	N	N

Comments & Summary

This rail crossing is a short distance upstream from Tote Road crossing CV-223 (also known as the Tom River), which has consistently provided abundant, important fish habitat for multiple size classes of juvenile char throughout the open-water period. The deep, high-velocity habitat makes backpack electrofishing this reach of the river unsafe, but many fish could be easily observed in the deep pools. NOTE: fall survey was actually conducted from 160 m DS to 40 m DS of the crossing due to a GPS issue, but this river shows negligible change from summer to early fall.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-102-1 **Dates Surveyed:** 6 July & 2 September, 2018 **UTM Coordinates:** 17 W 555728 7915442

Photographs



A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of CV-102-1 at the 60 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-102-1 **Dates Surveyed:** 6 July & 2 September, 2018 **UTM Coordinates:** 17 W 555728 7915442

Photographs



A B C

Figure 2. Summer (top) and fall (bottom) views of CV-102-1 at the 40 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-102-1 **Dates Surveyed:** 6 July & 2 September, 2018 **UTM Coordinates:** 17 W 555728 7915442

Photographs



NO PHOTO



NO PHOTO



NO PHOTO

A **B** **C**

Figure 3. Summer (top) and fall (bottom) views of CV-102-1 at the 20 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-102-1 **Dates Surveyed:** 6 July & 2 September, 2018 **UTM Coordinates:** 17 W 555728 7915442

Photographs



NO PHOTO



NO PHOTO



NO PHOTO

A **B** **C**

Figure 4. Summer (top) and fall (bottom) views of CV-102-1 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-102-1 **Dates Surveyed:** 6 July & 2 September, 2018 **UTM Coordinates:** 17 W 555728 7915442

Photographs



NO PHOTO



NO PHOTO



NO PHOTO

A **B** **C**

Figure 5. Summer (top) and fall (bottom) views of CV-102-1 at the 20 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-102-1 **Dates Surveyed:** 6 July & 2 September, 2018 **UTM Coordinates:** 17 W 555728 7915442

Photographs



NO PHOTO



NO PHOTO



NO PHOTO

A **B** **C**

Figure 6. Summer (top) and fall (bottom) views of CV-102-1 at the 40 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-102-1 **Dates Surveyed:** 6 July & 2 September, 2018 **UTM Coordinates:** 17 W 555728 7915442

Photographs



NO PHOTO



NO PHOTO



NO PHOTO

A **B** **C**

Figure 7. Summer (top) and fall (bottom) views of CV-102-1 at the 60 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-102-1a | **Dates Surveyed:** 4 July & 2 September, 2018 | **UTM Coordinates:** 17 W 555891 7915441

General Physical Characteristics

Channel Confinement: UC | **Channel Gradient (range):** 1-5° | **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished | **Effort (min):** N/A | **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was a nearly dry spot that is never connected to fish habitat. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-102-1a at the crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-102-2 **Dates Surveyed:** 06 July & 2 September, 2018 **UTM Coordinates:** 17 W 556019 7915438

General Physical Characteristics

Channel Confinement: Confined **Channel Gradient (range):** 4° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	14.8	7.8 / 7.2	0.04 / 0.08	0.02 / -	0.06 / 0.04	0.08 / 0.08	0.08 / 0.11	0.09 / -	0.15 / 0.11	0.15 / 0.12
80D	9.4	1.4 / 2.7	0.06 / -	0.14 / 0.14	0.06 / -	0.15 / 0.15	0.03 / -	0.06 / 0.20	0.40 / -	0.40 / 0.35
60D	6.8	1.9 / 1.3	0.14 / 0.06	0.08 / -	0.06 / 0.04	0.15 / 0.10	0.29 / 0.47	0.21 / -	0.02 / 0.15	0.35 / 0.50
40D	6.9	4.0 / 1.6	0.02 / 0.04	0.02 / -	0.06 / 0.10	0.10 / 0.10	0.39 / 0.21	0.33 / -	0.24 / 0.20	0.45 / 0.30
20D	14.7	3.1 / 2.0	0.06 / -	0.06 / 0.13	0.14 / -	0.18 / 0.13	0.00 / -	0.01 / 0.07	0.06 / -	0.06 / 0.07
0	9.5	5.3 / 2.8	0.10 / 0.04	0.01 / -	0.04 / 0.08	0.10 / 0.08	0.11 / 0.38	0.28 / -	0.35 / 0.37	0.35 / 0.40
20U	13.3	2.6 / 4.5	0.20 / 0.22	0.08 / -	0.02 / 0.08	0.20 / 0.22	0.06 / 0.01	0.08 / -	0.00 / 0.22	0.10 / 0.22
40U	8.6	2.0 / 2.9	0.02 / 0.02	0.06 / -	0.01 / 0.06	0.08 / 0.06	0.14 / 0.03	0.14 / -	0.00 / 0.18	0.20 / 0.20
60U	7.6	4.3 / 3.8	0.04 / 0.04	0.04 / -	0.10 / 0.04	0.10 / 0.06	0.00 / 0.12	0.05 / -	0.12 / 0.11	0.15 / 0.15
80U	6.8	5.5 / 4.0	0.10 / 0.10	0.02 / -	0.02 / 0.04	0.10 / 0.10	0.09 / 0.11	0.03 / -	0.08 / 0.04	0.10 / 0.15
100U	7.9	5.3 / 5.3	0.05 / 0.06	0.03 / -	0.03 / 0.10	0.08 / 0.10	0.09 / 0.12	0.11 / -	0.20 / 0.07	0.20 / 0.20

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	60	40	-	-	-	-	5	15	80	-	-
80D	60	40	-	-	-	-	5	10	80	5	-
60D	55	45	-	-	-	-	-	40	45	15	-
40D	78	22	-	-	-	-	-	5	80	15	-
20D	30	70	-	-	-	-	30	35	35	-	-
0	45	55	-	-	-	-	25	45	30	-	-
20U	20	80	-	-	-	-	30	65	5	-	-
40U	28	72	-	-	-	-	-	55	45	-	-
60U	50	50	-	-	-	-	-	20	80	-	-
80U	55	45	-	-	-	-	-	5	90	5	-
100U	60	40	-	-	-	-	-	5	90	5	-

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-102-2 **Dates Surveyed:** 06 July & 2 September, 2018 **UTM Coordinates:** 17 W 556019 7915438

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	3.77	12	3.19	77 - 108
	Fall	5.88	0	-	N/A
NNST	Summer	3.77	0	-	N/A
	Fall	5.88	0	-	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	L
NNST	N	N	N	N

Comments & Summary

Several hundred metres upstream of CV-224 on the Tote Road. This stream provides important rearing habitat for smaller juvenile Arctic Char throughout the open-water season, but particularly during summer. During fall sampling, water temperatures in survey streams averaged approximately 5°C and fish had already begun downstream movements towards overwintering habitat.

Baffinland Iron Mines **Mary River Project**	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-102-2 **Dates Surveyed:** 06 July & 2 September, 2018 **UTM Coordinates:** 17 W 556019 7915438

Photographs



A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of CV-102-2 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-102-2 **Dates Surveyed:** 06 July & 2 September, 2018 **UTM Coordinates:** 17 W 556019 7915438

Photographs



A B C

Figure 2. Summer (top) and fall (bottom) views of CV-102-2 at the 80 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-102-2 **Dates Surveyed:** 06 July & 2 September, 2018 **UTM Coordinates:** 17 W 556019 7915438

Photographs



A B C

Figure 3. Summer (top) and fall (bottom) views of CV-102-2 at the 60 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-102-2 **Dates Surveyed:** 06 July & 2 September, 2018 **UTM Coordinates:** 17 W 556019 7915438

Photographs



A B C

Figure 4. Summer (top) and fall (bottom) views of CV-102-2 at the 40 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-102-2 **Dates Surveyed:** 06 July & 2 September, 2018 **UTM Coordinates:** 17 W 556019 7915438

Photographs



A B C

Figure 5. Summer (top) and fall (bottom) views of CV-102-2 at the 20 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-102-2 **Dates Surveyed:** 06 July & 2 September, 2018 **UTM Coordinates:** 17 W 556019 7915438

Photographs



A **B** **C**

Figure 6. Summer (top) and fall (bottom) views of CV-102-2 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-102-2 **Dates Surveyed:** 06 July & 2 September, 2018 **UTM Coordinates:** 17 W 556019 7915438

Photographs



A B C

Figure 7. Summer (top) and fall (bottom) views of CV-102-2 at the 20 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-102-2 **Dates Surveyed:** 06 July & 2 September, 2018 **UTM Coordinates:** 17 W 556019 7915438

Photographs



A **B** **C**

Figure 8. Summer (top) and fall (bottom) views of CV-102-2 at the 40 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-102-2 **Dates Surveyed:** 06 July & 2 September, 2018 **UTM Coordinates:** 17 W 556019 7915438

Photographs



A **B** **C**

Figure 9. Summer (top) and fall (bottom) views of CV-102-2 at the 60 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-102-2 **Dates Surveyed:** 06 July & 2 September, 2018 **UTM Coordinates:** 17 W 556019 7915438

Photographs



A B C

Figure 10. Summer (top) and fall (bottom) views of CV-102-2 at the 80 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-102-2 **Dates Surveyed:** 06 July & 2 September, 2018 **UTM Coordinates:** 17 W 556019 7915438

Photographs



A **B** **C**

Figure 11. Summer (top) and fall (bottom) views of CV-102-2 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-102-3 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 556373 7915485

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 2-8° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

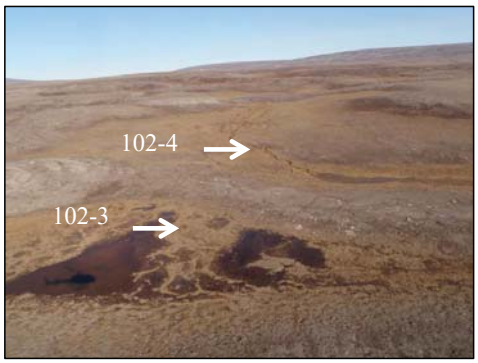
Comments & Summary

The crossing was a marshy area that has periodic surface flow loss and is never connected to fish habitat. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-102-3 at the crossing during summer (A) and during fall with nearby 102-4 (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-102-4 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 556461 7915488

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 2-10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

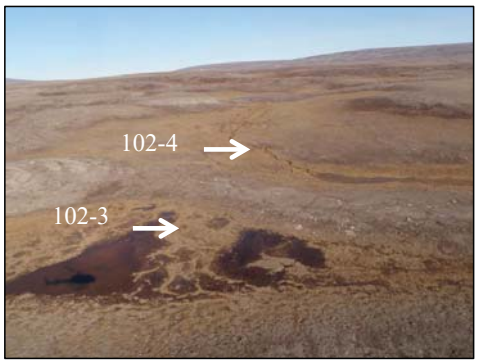
Comments & Summary

The crossing was shallow, steep and shared all the same downstream barriers (loss of surface flow) as CV-102-3. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-102-4 at the crossing during summer (A) and during fall with nearby 102-3 (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-102-5 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 557111 7915356

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 5 to > 10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was nearly dry, steep, and lacked surface flow downstream. In addition, there is a permanent vertical barrier between the crossing and the nearest overwintering habitat. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-102-5 at the crossing during summer (A) and during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-103-1 **Dates Surveyed:** 10 July & 30 August, 2018 **UTM Coordinates:** 17 W 557447 7915244

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 8-10° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	TOTE ROAD CROSSING									
80D										
60D										
40D	11.5	- / 8.0	- / 0.06	- / 0.10	- / 0.07	- / 0.20	- / 0.51	- / 0.35	- / 0.23	- / 0.60
20D	7.4	- / 4.4	- / 0.09	- / 0.14	- / 0.22	- / 0.25	- / 0.23	- / 0.75	- / 0.09	- / 0.80
0	9.0	8.0 / 5.4	0.10 / 09	0.25 / 0.15	0.12 / 0.12	0.30 / 0.20	0.23 / 0.21	1.01 / 0.24	0.50 / 0.36	1.20 / 0.50
20U	17.0	15.5 / 9.5	0.18 / 0.10	0.15 / 0.15	0.12 / 0.16	0.25 / 0.20	0.52 / 0.14	0.79 / 0.13	0.13 / 0.58	0.85 / 0.65
40U	10.0	6.5 / 4.7	0.37 / 0.17	0.20 / 0.13	0.10 / 0.14	0.40 / 0.25	0.96 / 0.75	0.21 / 0.59	0.29 / 0.46	1.10 / 0.85
60U	10.0	9.5 / 8.0	0.22 / 0.17	0.12 / 0.10	0.20 / 0.26	0.25 / 0.30	0.66 / 0.58	0.86 / 0.54	0.33 / 0.03	1.00 / 0.65
80U	7.0	6.0 / 2.9	0.28 / 0.25	0.16 / 0.08	- / 0.18	0.30 / 0.30	0.52 / 0.55	1.36 / 0.75	- / 0.32	1.50 / 0.80
100U	8.0	7.5 / 5.8	0.26 / 0.14	0.22 / 0.17	0.14 / 0.06	0.30 / 0.25	0.84 / 0.17	0.65 / 0.21	0.72 / 0.19	1.00 / 0.30

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	TOTE ROAD CROSSING										
80D											
60D											
40D	60	40	-	-	-	-	-	-	80	20	-
20D	60	35	5	-	-	-	-	-	80	20	-
0	20	10	30	-	40	-	-	-	70	25	5
20U	20	10	30	-	40	-	-	-	60	35	5
40U	10	15	15	-	60	-	-	-	55	35	10
60U	5	25	10	-	60	-	-	-	50	35	15
80U	5	15	15	-	65	-	-	-	20	65	15
100U	5	15	15	-	65	-	-	-	20	65	15

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality

Arctic Char - IMPORTANT

Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-103-1 **Dates Surveyed:** 10 July & 30 August, 2018 **UTM Coordinates:** 17 W 557447 7915244

Fisheries Data

Gear Used: Backpack Electrofisher **Transect length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	4.90	11	2.24	78 - 119
	Fall	4.53	3	0.66	88 - 153
NNST	Summer	4.90	0	-	N/A
	Fall	4.53	0	-	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	N
NNST	N	N	L	N

Comments & Summary

This rail crossing is a short distance upstream from Tote Road crossing CV-225, which has consistently provided important fish habitat for juvenile char throughout the open-water period.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-103-1 **Dates Surveyed:** 10 July & 30 August, 2018 **UTM Coordinates:** 17 W 557447 7915244

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A



B



C

Figure 1. Summer (top) and fall (bottom) views of CV-103-1 at the 40 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-103-1 **Dates Surveyed:** 10 July & 30 August, 2018 **UTM Coordinates:** 17 W 557447 7915244

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A



B



C

Figure 2. Summer (top) and fall (bottom) views of CV-103-1 at the 20 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-103-1 **Dates Surveyed:** 10 July & 30 August, 2018 **UTM Coordinates:** 17 W 557447 7915244

Photographs



A B C

Figure 3. Summer (top) and fall (bottom) views of CV-103-1 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-103-1 **Dates Surveyed:** 10 July & 30 August, 2018 **UTM Coordinates:** 17 W 557447 7915244

Photographs



A **B** **C**

Figure 4. Summer (top) and fall (bottom) views of CV-103-1 at the 20 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-103-1 **Dates Surveyed:** 10 July & 30 August, 2018 **UTM Coordinates:** 17 W 557447 7915244

Photographs



A **B** **C**

Figure 5. Summer (top) and fall (bottom) views of CV-103-1 at the 40 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-103-1 **Dates Surveyed:** 10 July & 30 August, 2018 **UTM Coordinates:** 17 W 557447 7915244

Photographs



A **B** **C**

Figure 6. Summer (top) and fall (bottom) views of CV-103-1 at the 60 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-103-1 **Dates Surveyed:** 10 July & 30 August, 2018 **UTM Coordinates:** 17 W 557447 7915244

Photographs



A **B** **C**

Figure 7. Summer (top) and fall (bottom) views of CV-103-1 at the 80 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-103-1 **Dates Surveyed:** 10 July & 30 August, 2018 **UTM Coordinates:** 17 W 557447 7915244

Photographs



A **B** **C**

Figure 8. Summer (top) and fall (bottom) views of CV-103-1 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-104-1 **Dates Surveyed:** 10 July & 30 August, 2018 **UTM Coordinates:** 17 W 557574 7915202

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 5 to > 10° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was shallow and narrow with a permanent vertical barrier downstream near the confluence with CV-103-1. There is no access to this site from overwintering habitat. There is no fish use of habitat at this crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-104-1 at the crossing during summer, looking upstream (A) downstream (B) and across (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-104-1 **Dates Surveyed:** 10 July & 30 August, 2018 **UTM Coordinates:** 17 W 557574 7915202

Photographs



A **B** **C**

Figure 2. Views of CV-104-1 at the crossing during fall, looking upstream (A) downstream (B) and across (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING**
			Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-104-2 **Dates Surveyed:** 11 July & 30 August, 2018 **UTM Coordinates:** 17 W 557882 7915099

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 4-5° **Flow Regime:** Intermittent

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	6.8	2.3 / 1.0	0.02 / -	0.07 / 0.06	0.04 / -	0.10 / 0.10	0.19 / -	0.06 / 0.29	0.24 / -	0.25 / 0.30
50D	3.7	3.4 / 3.0	0.06 / 0.04	0.05 / 0.04	- / 0.03	0.10 / 0.10	0.12 / 0.07	0.14 / 0.15	- / 0.24	0.20 / 0.25
0	3.3	1.2 / 1.3	- / -	0.11 / 0.20	- / -	0.15 / 0.15	- / -	0.62 / 0.41	- / -	0.65 / 0.50
50U	10.0	8.9 / 7.6	0.05 / 0.02	0.03 / 0.02	0.03 / 0.02	0.10 / 0.05	0.25 / 0.07	0.37 / 0.05	0.38 / 0.13	0.40 / 0.20
100U	23.2	9.0 / 7.4	0.03 / 0.06	0.08 / 0.03	0.05 / 0.08	0.10 / 0.10	0.03 / 0.11	0.18 / 0.14	0.24 / 0.31	0.30 / 0.35

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	70	30	-	-	-	-	-	25	75	-	-
50D	60	40	-	-	-	-	-	30	70	-	-
0	80	20	-	-	-	-	-	15	85	-	-
50U	30	25	-	-	45	-	-	10	80	10	-
100U	25	25	-	-	50	-	-	5	80	15	-

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality

Arctic Char - NOT FISH-BEARING

Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-104-2 **Dates Surveyed:** 11 July & 30 August, 2018 **UTM Coordinates:** 17 W 557882 7915099

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	-	N/A	N/A	N/A
	Fall	2.12	0	-	N/A
NNST	Summer	-	N/A	N/A	N/A
	Fall	2.12	0	-	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

Fish were not captured or observed in 2018, but no barrier between the crossing and downstream Tote Road stream BG-01 was identified. Fish should have access, but may be prevented by relatively low water levels compared with the much larger BG-01.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-104-2 **Dates Surveyed:** 11 July & 30 August, 2018 **UTM Coordinates:** 17 W 557882 7915099

Photographs



A B C

Figure 1. Summer (top) and fall (bottom) views of CV-104-2 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-104-2 **Dates Surveyed:** 11 July & 30 August, 2018 **UTM Coordinates:** 17 W 557882 7915099

Photographs



A B C

Figure 2. Summer (top) and fall (bottom) views of CV-104-2 at the 50 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-104-2 **Dates Surveyed:** 11 July & 30 August, 2018 **UTM Coordinates:** 17 W 557882 7915099

Photographs



A B C

Figure 3. Summer (top) and fall (bottom) views of CV-104-2 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-104-2 **Dates Surveyed:** 11 July & 30 August, 2018 **UTM Coordinates:** 17 W 557882 7915099

Photographs



A **B** **C**

Figure 4. Summer (top) and fall (bottom) views of CV-104-2 at the 50 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-104-2 **Dates Surveyed:** 11 July & 30 August, 2018 **UTM Coordinates:** 17 W 557882 7915099

Photographs



A B C

Figure 5. Summer (top) and fall (bottom) views of CV-104-2 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-104-3 **Dates Surveyed:** 11 July & 30 August, 2018 **UTM Coordinates:** 17 W 557574 7915202

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 1-5° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This is a very small side channel of CV-104-2 that likely only occasionally has sufficient water levels to support fish use. Fish were not observed during either survey in 2018. Fish use of habitat at this crossing is intermittent.

Photographs



A **B** **C**

Figure 1. Views of CV-104-3 at the crossing during summer (A), fall (B) and looking downstream towards CV-104-2 (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-104-4 **Dates Surveyed:** 11 July & 30 August, 2018 **UTM Coordinates:** 17 W 558154 7914976

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was a dry low point. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-104-4 at the crossing during summer (A) and during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-104-5 **Dates Surveyed:** 11 July & 30 August, 2018 **UTM Coordinates:** 17 W 558340 7914885

General Physical Characteristics

Channel Confinement: Confined **Channel Gradient (range):** 2-5° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	3.9	3.9 / 2.7	0.13 / 0.33	0.28 / 0.20	0.14 / 0.14	0.40 / 0.35	0.31 / 0.17	0.38 / 0.19	0.64 / 0.21	0.75 / 0.30
80D	2.8	2.8 / 2.5	0.20 / 0.10	0.26 / 0.20	0.29 / 0.18	0.35 / 0.25	0.31 / 25	0.41 / 0.27	0.38 / 0.23	0.50 / 0.35
60D	7.0	6.7 / 4.4	0.11 / 0.06	0.23 / 0.11	0.10 / 0.07	0.25 / 0.15	0.07 / 0.05	0.44 / 0.38	0.32 / 0.35	0.55 / 0.45
40D	7.0	6.8 / 4.6	0.08 / 0.10	0.25 / 0.14	0.12 / 0.15	0.30 / 0.20	0.72 / 0.29	0.59 / 0.35	0.38 / 0.24	0.75 / 0.40
20D	5.4	5.0 / 3.5	0.22 / 0.13	0.18 / 0.13	0.17 / 0.14	0.25 / 0.20	0.21 / 24	0.26 / 0.20	0.36 / 0.31	0.45 / 0.35
0	5.4	5.1 / 3.9	0.08 / 0.14	0.20 / 0.14	0.20 / 0.10	0.25 / 0.20	0.02 / 0.28	0.22 / 0.19	0.35 / 0.07	0.40 / 0.35
20U	5.2	5.0 / 4.5	0.18 / 0.02	0.22 / 0.18	0.10 / 0.09	0.25 / 0.20	0.38 / 0.12	0.38 / 0.37	0.55 / 0.05	0.60 / 0.45
40U	6.0	4.8 / 4.3	0.26 / 0.22	- / 0.22	- / -	0.30 / 0.25	0.55 / 0.10	- / 0.17	- / -	0.65 / 0.20
60U	6.0	5.5 / 4.3	0.18 / 0.23	0.19 / -	- / 0.04	0.25 / 0.25	0.61 / 1.03	1.08 / -	- / 0.34	1.10 / 1.05
80U	8.1	7.7 / 7.2	0.08 / 0.06	0.20 / 0.06	0.08 / 0.09	0.25 / 0.15	0.45 / 0.23	0.26 / 0.31	0.31 / 0.57	0.60 / 0.60
100U	5.5	5.0 / 3.9	0.18 / 0.09	0.10 / 0.18	- / 0.09	0.25 / 0.20	1.13 / 0.41	0.66 / 0.39	- / 0.16	1.15 / 0.60

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	55	25	5	15	-	-	-	-	60	40	-
80D	30	25	5	40	-	-	-	-	80	20	-
60D	60	35	5	-	-	-	-	-	80	20	-
40D	45	25	5	25	-	-	-	-	60	40	-
20D	60	25	5	10	-	-	-	-	60	40	-
0	30	35	5	30	-	-	-	5	60	35	-
20U	20	30	5	45	-	-	-	15	65	20	-
40U	35	30	5	-	30	-	-	-	50	45	5
60U	30	25	5	-	40	-	-	-	60	30	10
80U	55	35	5	-	5	-	-	5	45	45	5
100U	65	25	5	5	-	-	-	-	50	40	10

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-104-5 **Dates Surveyed:** 11 July & 30 August, 2018 **UTM Coordinates:** 17 W 558340 7914885

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	5.70	23	4.04	67 - 100
	Fall	5.18	28	5.40	85 - 157
NNST	Summer	5.70	0	-	N/A
	Fall	5.18	0	-	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	H
NNST	N	N	L	L

Comments & Summary

Upstream of BG-01 on the Tote Road. This stream is one of the most important tributaries of Camp Lake and provides important rearing habitat for juvenile Arctic Char throughout the open-water season. Stickleback have occasionally been captured in this stream during Tote Road surveys and were captured upstream of the rail crossing area in 2018.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT** **Ninespine Stickleback – MARGINAL**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-104-5 **Dates Surveyed:** 11 July & 30 August, 2018 **UTM Coordinates:** 17 W 558340 7914885

Photographs



A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of CV-104-5 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-104-5 **Dates Surveyed:** 11 July & 30 August, 2018 **UTM Coordinates:** 17 W 558340 7914885

Photographs



A B C

Figure 2. Summer (top) and fall (bottom) views of CV-104-5 at the 80 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-104-5 **Dates Surveyed:** 11 July & 30 August, 2018 **UTM Coordinates:** 17 W 558340 7914885

Photographs



A B C

Figure 3. Summer (top) and fall (bottom) views of CV-104-5 at the 60 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-104-5 **Dates Surveyed:** 11 July & 30 August, 2018 **UTM Coordinates:** 17 W 558340 7914885

Photographs



A B C

Figure 4. Summer (top) and fall (bottom) views of CV-104-5 at the 40 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-104-5 **Dates Surveyed:** 11 July & 30 August, 2018 **UTM Coordinates:** 17 W 558340 7914885

Photographs



A **B** **C**

Figure 5. Summer (top) and fall (bottom) views of CV-104-5 at the 20 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-104-5 **Dates Surveyed:** 11 July & 30 August, 2018 **UTM Coordinates:** 17 W 558340 7914885

Photographs



A **B** **C**

Figure 6. Summer (top) and fall (bottom) views of CV-104-5 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-104-5 **Dates Surveyed:** 11 July & 30 August, 2018 **UTM Coordinates:** 17 W 558340 7914885

Photographs



A B C

Figure 7. Summer (top) and fall (bottom) views of CV-104-5 at the 20 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-104-5 **Dates Surveyed:** 11 July & 30 August, 2018 **UTM Coordinates:** 17 W 558340 7914885

Photographs



A B C

Figure 8. Summer (top) and fall (bottom) views of CV-104-5 at the 40 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-104-5 **Dates Surveyed:** 11 July & 30 August, 2018 **UTM Coordinates:** 17 W 558340 7914885

Photographs



A **B** **C**

Figure 9. Summer (top) and fall (bottom) views of CV-104-5 at the 60 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-104-5 **Dates Surveyed:** 11 July & 30 August, 2018 **UTM Coordinates:** 17 W 558340 7914885

Photographs



A **B** **C**

Figure 10. Summer (top) and fall (bottom) views of CV-104-5 at the 80 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-104-5 **Dates Surveyed:** 11 July & 30 August, 2018 **UTM Coordinates:** 17 W 558340 7914885

Photographs



A B C

Figure 11. Summer (top) and fall (bottom) views of CV-104-5 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-105-1 **Dates Surveyed:** 11 July & 26 August, 2018 **UTM Coordinates:** 17 W 558521 7914785

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1-3° **Flow Regime:** Intermittent

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
0	-	-	-	-	-	~0.30	-	-	-	0.10

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
0	30	65	5	-	-	-	20	40	40	-	-

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-105-1 **Dates Surveyed:** 11 July & 26 August, 2018 **UTM Coordinates:** 17 W 558521 7914785

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 50

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	-	N/A	N/A	N/A
	Fall	265	0	-	N/A
NNST	Summer	-	N/A	N/A	N/A
	Fall	265	0	-	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	L	N
NNST	N	N	N	N

Comments & Summary

This is a branch of CV-104-5, an important juvenile char stream. However, it was disconnected during 2018 surveys and likely only supports fish during periods of flooding. Habitat use is intermittent.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-105-1 **Dates Surveyed:** 11 July & 26 August, 2018 **UTM Coordinates:** 17 W 558521 7914785

Photographs



A B C

Figure 1. Summer (top) and fall (bottom) views of CV-105-1 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-105-2 **Dates Surveyed:** 11 July & 26 August, 2018 **UTM Coordinates:** 17 W 558750 7914656

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1-2° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	POND									
20D	16.5	5.0 / 6.0	- / -	0.06 / -	- / -	0.10 / 0.10	- / -	0.07 / -	- / -	0.10 / 0.10
0	5.5	4.5 / 2.9	- / -	0.14 / -	- / -	0.15 / 0.10	- / -	0.05 / -	- / -	0.05 / 0.05
50U	3.4	3.0 / 2.7	0.26 / -	0.18 / -	- / -	0.30 / 0.25	0.00 / -	0.13 / -	- / -	0.15 / 0.15
80U	-	- / 4.3	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -
100U	POND									

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	POND										
20D	-	100	-	-	-	-	80	10	10	-	-
0	-	100	-	-	-	-	60	25	15	-	-
50U	25	75	-	-	-	-	25	20	55	-	-
80U	10	90	-	-	-	-	80	5	15	-	-
100U	POND										

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality

Arctic Char - MARGINAL

Ninespine Stickleback – IMPORTANT

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-105-2 **Dates Surveyed:** 11 July & 26 August, 2018 **UTM Coordinates:** 17 W 558750 7914656

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	3.70	6	1.62	112 - 156
	Fall	5.98	12	2.01	84 - 121
NNST	Summer	3.70	8	2.16	60 - 74
	Fall	5.98	0	-	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	H
NNST	M	N	H	H

Comments & Summary

This is a tributary in the same system as CV-104-5 and provides rearing habitat for both species throughout the open-water period. Stickleback are known to spawn in the ponds and slower moving streams in this area during summer. In addition, this stream would be part of a migratory route between Camp Lake and some large upstream ponds such as CV-106-3.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - MARGINAL** **Ninespine Stickleback – IMPORTANT**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-105-2 **Dates Surveyed:** 11 July & 26 August, 2018 **UTM Coordinates:** 17 W 558750 7914656

Photographs



A B C

Figure 1. Summer (top) and fall (bottom) views of CV-105-2 at the 20 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-105-2 **Dates Surveyed:** 11 July & 26 August, 2018 **UTM Coordinates:** 17 W 558750 7914656

Photographs



A B C

Figure 2. Summer (top) and fall (bottom) views of CV-105-2 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-105-2 **Dates Surveyed:** 11 July & 26 August, 2018 **UTM Coordinates:** 17 W 558750 7914656

Photographs



A **B** **C**

Figure 3. Summer (top) and fall (bottom) views of CV-105-2 at the 50 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-105-2 **Dates Surveyed:** 11 July & 26 August, 2018 **UTM Coordinates:** 17 W 558750 7914656

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 4. Summer (top) and fall (bottom) views of CV-105-2 at the 80 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-105-3 **Dates Surveyed:** 11 July & 26 August, 2018 **UTM Coordinates:** 17 W 558875 7914578

General Physical Characteristics

Channel Confinement: N/A **Channel Gradient (range):** N/A **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
0	N/A	N/A	N/A	N/A	N/A	0.50 – 1.00	N/A	N/A	N/A	0.00

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
0	-	50	50	-	-	-	100	-	-	-	-

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - MARGINAL** **Ninespine Stickleback – IMPORTANT**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-105-3 **Dates Surveyed:** 11 July & 26 August, 2018 **UTM Coordinates:** 17 W 558875 7914578

Fisheries Data

Gear Used: Not fished **Transect Length (m):** N/A

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	0	N/A	N/A	N/A
	Fall	0	N/A	N/A	N/A
NNST	Summer	0	N/A	N/A	N/A
	Fall	0	N/A	N/A	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	M	H
NNST	H	N	H	H

Comments & Summary

This pond provides rearing habitat for both species throughout the open-water period. Both species were observed, but not captured. Stickleback, in particular, extensively use the ponds in this area for feeding, migration and spawning during summer. This pond is part of a series of interconnected ponds and small streams that link Camp Lake with a suspected stickleback overwintering pond at CV-106-3. Habitat is considered marginal for char and important for stickleback. The encroachment itself is very shallow and likely only used by stickleback.

Baffinland Iron Mines **Mary River Project**	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - MARGINAL** **Ninespine Stickleback – IMPORTANT**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-105-3 **Dates Surveyed:** 11 July & 26 August, 2018 **UTM Coordinates:** 17 W 558875 7914578

Photographs



A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of CV-105-3; (A) crossing substrate; (B) looking downstream towards CV-105-2; and (C) looking across the pond.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-105-4 **Dates Surveyed:** 11 July & 26 August, 2018 **UTM Coordinates:** 17 W 559196 7914375

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1-2° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	2.0	1.7 / 1.2	- / -	0.11 / -	- / -	0.15 / -	- / -	0.21 / -	- / -	0.25 / -
50D	21.8	5.5 / 8.0	0.04 / -	0.08 / -	- / -	0.10 / -	0.07 / -	0.26 / -	- / -	0.30 / -
0	17.7	7.8 / 2.7	- / -	0.10 / -	- / -	0.10 / -	- / -	0.23 / -	- / -	0.25 / -
50U	15.4	8.0 / 3.9	0.03 / -	0.05 / -	- / -	0.05 / -	0.05 / -	0.10 / -	- / -	0.15 / -
100U	12.5	11.3 / 7.8	0.04 / -	0.05 / -	- / -	0.05 / -	0.12 / -	0.18 / -	- / -	0.20 / -

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	15	70	-	-	-	15	100	-	-	-	-
50D	-	35	-	-	-	65	100	-	-	-	-
0	10	20	-	-	-	70	85	10	5	-	-
50U	5	25	-	-	-	70	85	10	5	-	-
100U	55	40	-	-	-	5	65	10	15	-	-

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality

Arctic Char - MARGINAL

Ninespine Stickleback – IMPORTANT

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-105-4 **Dates Surveyed:** 11 July & 26 August, 2018 **UTM Coordinates:** 17 W 559196 7914375

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	0	N/A	N/A	N/A
	Fall	3.10	1	0.32	98
NNST	Summer	0	N/A	N/A	N/A
	Fall	3.10	0	-	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	M	H
NNST	L	N	M	H

Comments & Summary

This is a tributary in the same system as CV-104-5 and provides marginal (due primarily to the very shallow stretches) rearing habitat for both species throughout the open-water period. Stickleback are known to spawn in the nearby ponds and slower-moving streams in this area during summer, and spawning may also occur in this stream. More importantly, this stream is part of a migratory route between Camp Lake and large upstream ponds such as CV-106-3.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - MARGINAL** **Ninespine Stickleback – IMPORTANT**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-105-4 **Dates Surveyed:** 11 July & 26 August, 2018 **UTM Coordinates:** 17 W 559196 7914375

Photographs



A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of CV-105-4 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-105-4 **Dates Surveyed:** 11 July & 26 August, 2018 **UTM Coordinates:** 17 W 559196 7914375

Photographs



A B C

Figure 2. Summer (top) and fall (bottom) views of CV-105-4 at the 50 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-105-4 **Dates Surveyed:** 11 July & 26 August, 2018 **UTM Coordinates:** 17 W 559196 7914375

Photographs



A B C

Figure 3. Summer (top) and fall (bottom) views of CV-105-4 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-105-4 **Dates Surveyed:** 11 July & 26 August, 2018 **UTM Coordinates:** 17 W 559196 7914375

Photographs



A **B** **C**

Figure 4. Summer (top) and fall (bottom) views of CV-105-4 at the 50 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-105-4 **Dates Surveyed:** 11 July & 26 August, 2018 **UTM Coordinates:** 17 W 559196 7914375

Photographs

NO PHOTO











A **B** **C**

Figure 5. Summer (top) and fall (bottom) views of CV-105-4 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-106-1 **Dates Surveyed:** 11 July & 26 August, 2018 **UTM Coordinates:** 17 W 559334 7914281

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1-2° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
50D	2.0	- / 2.9	- / -	- / 1.40	- / -	- / 1.40	- / -	- / 0.10	- / -	- / 0.10
0	18.0	17.0 / 17.2	0.10 / -	0.13 / 0.30	- / -	0.20 / 0.30	0.09 / -	0.16 / 0.10	- / -	0.20 / 0.10
50U	15.4	- / 4.4	- / -	- / 0.20	- / -	- / 0.20	- / -	- / 0.30	- / -	- / 0.30

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
50D	-	40	50	10	-	-	100	-	-	-	-
0	20	50	30	-	-	-	90	-	10	-	-
50U	60	40	-	-	-	-	40	40	20	-	-

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - MARGINAL** **Ninespine Stickleback – IMPORTANT**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-106-1 **Dates Surveyed:** 11 July & 26 August, 2018 **UTM Coordinates:** 17 W 559334 7914281

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	0	N/A	N/A	N/A
	Fall	3.18	14	4.40	83 - 202
NNST	Summer	0	N/A	N/A	N/A
	Fall	3.18	1	0.31	62

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	H
NNST	M	N	H	H

Comments & Summary

Although this is designated as a pond encroachment, the crossing is really just a widening of a small stream. This is a tributary in the same system as CV-104-5 and provides marginal to important rearing habitat for both species throughout the open-water period. Stickleback are known to spawn in the nearby ponds and slower-moving streams in this area during summer, and spawning may also occur in this stream. More importantly, this stream is part of a migratory route between Camp Lake and large upstream ponds such as CV-106-3.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - MARGINAL** **Ninespine Stickleback – IMPORTANT**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-106-1 **Dates Surveyed:** 11 July & 26 August, 2018 **UTM Coordinates:** 17 W 559334 7914281

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of CV-106-1 at the 50 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-106-1 **Dates Surveyed:** 11 July & 26 August, 2018 **UTM Coordinates:** 17 W 559334 7914281

Photographs



A **B** **C**

Figure 2. Summer (top) and fall (bottom) views of CV-106-1 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-106-1 **Dates Surveyed:** 11 July & 26 August, 2018 **UTM Coordinates:** 17 W 559334 7914281

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 3. Summer (top) and fall (bottom) views of CV-106-1 at the 50 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-106-2 **Dates Surveyed:** 11 July & 26 August, 2018 **UTM Coordinates:** 17 W 559615 7914085

General Physical Characteristics

Channel Confinement: N/A **Channel Gradient (range):** N/A **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
0	N/A	N/A	N/A	N/A	N/A	0.20	N/A	N/A	N/A	0.00

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
0	-	100	-	-	-	-	100	-	-	-	-

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - MARGINAL** **Ninespine Stickleback – IMPORTANT**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-106-2 **Dates Surveyed:** 11 July & 26 August, 2018 **UTM Coordinates:** 17 W 559615 7914085

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** N/A

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	0	N/A	N/A	N/A
	Fall	3.15	0	-	N/A
NNST	Summer	0	N/A	N/A	N/A
	Fall	3.15	4	1.27	14 - 26

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	L	M
NNST	H	N	H	M

Comments & Summary

This side pond is connected to CV-106-1. It primarily provides rearing habitat for stickleback throughout the open-water period. The fall electrofishing catch consisted of young-of-the-year stickleback, suggesting that spawning occurred nearby. Char were observed in the vicinity, but not captured. Habitat is considered marginal for char and important for stickleback.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - MARGINAL** **Ninespine Stickleback – IMPORTANT**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-106-2 **Dates Surveyed:** 11 July & 26 August, 2018 **UTM Coordinates:** 17 W 559615 7914085

Photographs



A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of CV-106-2; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-106-3 **Dates Surveyed:** 11 July & 26 August, 2018 **UTM Coordinates:** 17 W 559980 7913834

General Physical Characteristics

Channel Confinement: N/A **Channel Gradient (range):** N/A **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
0	N/A	N/A	N/A	N/A	N/A	> 3.00	N/A	N/A	N/A	0.00

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
0	SEE DETAILED BATHYMETRY AND SUBSTRATE SURVEY DATA										

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - MARGINAL** **Ninespine Stickleback – IMPORTANT**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-106-3 **Dates Surveyed:** 11 July & 26 August, 2018 **UTM Coordinates:** 17 W 559980 7913834

Fisheries Data

Gear Used: Backpack Electrofisher **Transect length (m):** N/A

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	0	N/A	N/A	N/A
	Fall	3.37	0	-	N/A
NNST	Summer	0	N/A	N/A	N/A
	Fall	3.37	17	5.05	45 - 68

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	M	M	N
NNST	H	H	H	N

Comments & Summary

This large pond provides important habitat for all life history stages of Ninespine Stickleback and may also provide overwintering habitat for any juvenile char that don't return to Camp Lake. A detailed bathymetry/substrate survey (see maps) indicated that the maximum depth of the pond was about 3.5 m, which is sufficient for some overwintering. The pond does not support an adult char population.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - MARGINAL** **Ninespine Stickleback – IMPORTANT**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-106-3 **Dates Surveyed:** 11 July & 26 August, 2018 **UTM Coordinates:** 17 W 559980 7913834

Photographs



A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of CV-106-3; (A) looking downstream; (B) looking across; and (C) looking upstream.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-107-1 **Dates Surveyed:** 11 July & 30 August, 2018 **UTM Coordinates:** 17 W 560409 7913682

General Physical Characteristics

Channel Confinement: N/A **Channel Gradient (range):** N/A **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
0	N/A	N/A	N/A	N/A	N/A	0.30	N/A	N/A	N/A	0.00

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
0	-	100	-	-	-	-	80	-	-	-	20

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-107-1 **Dates Surveyed:** 11 July & 30 August, 2018 **UTM Coordinates:** 17 W 560409 7913682

Fisheries Data

Gear Used: Backpack Electrofisher **Transect length (m):** N/A

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	2.02	0	-	N/A
	Fall	0	N/A	N/A	N/A
NNST	Summer	2.02	0	-	N/A
	Fall	0	N/A	N/A	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This pond is shallow with no cover/vegetation. Fish were not captured or observed during either survey period in 2018. It is connected downstream to CV-106-3, so occasional fish use cannot be ruled out, but is likely limited to stickleback summer feeding.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-107-1 **Dates Surveyed:** 11 July & 30 August, 2018 **UTM Coordinates:** 17 W 560409 7913682

Photographs



A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of CV-107-1 from various angles.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-107-2 **Dates Surveyed:** 11 July & 30 August, 2018 **UTM Coordinates:** 17 W 560529 7913655

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was a dry low point. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-107-2 at the crossing during summer (A) and during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-107-3 **Dates Surveyed:** 11 July & 30 August, 2018 **UTM Coordinates:** 17 W 560660 7913555

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was shallow, isolated roadside ditch/pond. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-107-3 at the crossing during summer (A) and during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-107-4 **Dates Surveyed:** 11 July & 30 August, 2018 **UTM Coordinates:** 17 W 560706 7913502

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 2-5° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	2.8	- / 2.0	- / 0.09	- / 0.08	- / -	- / 0.10	- / 0.10	- / 0.31	- / -	- / 0.35
80D	9.0	- / 8.3	- / 0.02	- / -	- / 0.02	- / 0.05	- / 0.25	- / -	- / 0.35	- / 0.40
60D	7.0	- / 4.8	- / 0.02	- / -	- / 0.04	- / 0.05	- / 0.36	- / -	- / 0.54	- / 0.55
40D	4.5	- / 2.3	- / 0.02	- / -	- / 0.03	- / 0.05	- / 0.39	- / -	- / 0.47	- / 0.50
20D	TOTE ROAD CROSSING									
0										
20U										
40U	6.0	5.8 / 6.0	0.10 / 0.03	0.06 / -	0.14 / 0.06	0.15 / 0.10	0.42 / 0.29	0.27 / -	0.49 / 0.42	0.55 / 0.50
60U	7.8	5.7 / 7.1	0.10 / 0.04	0.02 / 0.02	0.04 / -	0.15 / 0.05	0.35 / 0.33	0.22 / 0.19	0.07 / -	0.40 / 0.35
80U	9.7	9.6 / 5.0	0.09 / 0.08	0.08 / 0.02	0.02 / -	0.10 / 0.10	0.38 / 0.43	0.19 / 0.16	0.08 / -	0.45 / 0.45
100U	10.6	10.6 / 9.8	0.10 / 0.03	0.12 / -	0.03 / 0.02	0.15 / 0.10	0.15 / 0.25	0.08 / -	0.17 / 0.26	0.25 / 0.30

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	70	30	-	-	-	-	-	-	40	60	-
80D	70	30	-	-	-	-	-	30	70	-	-
60D	70	30	-	-	-	-	-	40	60	-	-
40D	80	20	-	-	-	-	-	40	60	-	-
20D	TOTE ROAD CROSSING										
0											
20U											
40U	70	30	-	-	-	-	-	10	70	20	-
60U	65	35	-	-	-	-	-	10	70	20	-
80U	65	35	-	-	-	-	-	-	80	20	-
100U	55	45	-	-	-	-	-	-	80	20	-

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality

Arctic Char - IMPORTANT

Ninespine Stickleback – IMPORTANT

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-107-4 **Dates Surveyed:** 11 July & 30 August, 2018 **UTM Coordinates:** 17 W 560706 7913502

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	4.38	27	6.16	55 - 137
	Fall	3.45	9	2.61	61 - 109
NNST	Summer	4.38	0	-	N/A
	Fall	3.45	0	-	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	N
NNST	N	N	L	N

Comments & Summary

The rail crossing is on the existing Tote Road CV-186 crossing. This stream is the most important tributary for Sheardown Lake juvenile char in terms of the quality and quantity of available habitat. Stickleback have also often been captured in this stream during Tote Road surveys.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT** **Ninespine Stickleback – IMPORTANT**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-107-4 **Dates Surveyed:** 11 July & 30 August, 2018 **UTM Coordinates:** 17 W 560706 7913502

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A



B



C

Figure 1. Summer (top) and fall (bottom) views of CV-107-4 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-107-4 **Dates Surveyed:** 11 July & 30 August, 2018 **UTM Coordinates:** 17 W 560706 7913502

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 2. Summer (top) and fall (bottom) views of CV-107-4 at the 80 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-107-4 **Dates Surveyed:** 11 July & 30 August, 2018 **UTM Coordinates:** 17 W 560706 7913502

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**







A **B** **C**

Figure 3. Summer (top) and fall (bottom) views of CV-107-4 at the 60 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-107-4 **Dates Surveyed:** 11 July & 30 August, 2018 **UTM Coordinates:** 17 W 560706 7913502

Photographs

NO PHOTO **NO PHOTO** **NO PHOTO**



A



B



C

Figure 4. Summer (top) and fall (bottom) views of CV-107-4 at the 40 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-107-4 **Dates Surveyed:** 11 July & 30 August, 2018 **UTM Coordinates:** 17 W 560706 7913502

Photographs



A B C

Figure 5. Summer (top) and fall (bottom) views of CV-107-4 at the 40 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-107-4 **Dates Surveyed:** 11 July & 30 August, 2018 **UTM Coordinates:** 17 W 560706 7913502

Photographs



A **B** **C**

Figure 6. Summer (top) and fall (bottom) views of CV-107-4 at the 60 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-107-4 **Dates Surveyed:** 11 July & 30 August, 2018 **UTM Coordinates:** 17 W 560706 7913502

Photographs



A **B** **C**

Figure 7. Summer (top) and fall (bottom) views of CV-107-4 at the 80 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-107-4 **Dates Surveyed:** 11 July & 30 August, 2018 **UTM Coordinates:** 17 W 560706 7913502

Photographs



A **B** **C**

Figure 8. Summer (top) and fall (bottom) views of CV-107-4 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-108-1 & CV-108-2

Dates Surveyed: 4 July & 30 August, 2018

UTM Coordinates: 17 W 560926 7913247 & 17 W 560963 7913204

General Physical Characteristics

Channel Confinement: UC

Channel Gradient (range): N/A

Flow Regime: None

Fisheries Data

Gear Used: Not Fished

Effort (min): N/A

Transect Length (m): N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

These two crossings were assessed as not fish-bearing during mine site baseline studies and current infrastructure has already altered them. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-108-1 & 108-2 at the crossing during summer (A) and during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-108-3 **Dates Surveyed:** 4 July & 30 August, 2018 **UTM Coordinates:** 17 W 561364 7912739

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 3 to > 15° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing is upstream of a known permanent fish barrier identified during baseline studies. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-108-3 at the crossing during summer (A) and during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-109-1 **Dates Surveyed:** 4 July & 30 August, 2018 **UTM Coordinates:** 17 W 561856 7912346

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 2 to > 10° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing is upstream of a known permanent fish barrier identified during baseline studies. There is intermittent use of the low-gradient marshy/pond area at the downstream confluence with a fish-bearing lake, but the barrier prevents any further upstream access. There is no fish use of habitat at this crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-109-1 at the crossing during summer (A), during fall (B), and looking towards the downstream confluence (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-109-2 **Dates Surveyed:** 4 July & 30 August, 2018 **UTM Coordinates:** 17 W 561973 7912254

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 2 to > 10° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing is upstream of a known permanent fish barrier identified during baseline studies. The site is steep, marshy and lacks a defined channel. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-109-2 at the crossing during summer (A) and during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-109-3 **Dates Surveyed:** 4 July & 30 August, 2018 **UTM Coordinates:** 17 W 562024 7912215

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** N/A

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing is a dry low point. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-109-3 at the crossing during summer (A) and during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-110-1 **Dates Surveyed:** 4 July & 30 August, 2018 **UTM Coordinates:** 17 W 561084 7912910

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** > 10° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

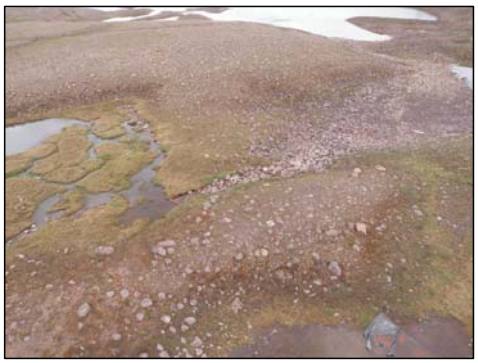
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was nearly dry in 2018. In addition, it is upstream of a known permanent barrier to fish movement. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-110-1 at the crossing during summer (A) and during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-110-2 **Dates Surveyed:** 4 July & 30 August, 2018 **UTM Coordinates:** 17 W 561266 7912241

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** N/A **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was a small, shallow (max depth of 2.0 m) fishless pond that was unconnected to any fish-bearing waterbodies in the area. It was also examined during baseline studies more than a decade ago with the same results. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-110-2 at the crossing during summer (A) and during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-110-3 **Dates Surveyed:** 4 July & 30 August, 2018 **UTM Coordinates:** 17 W 561445 7912240

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** N/A **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was a small, shallow (max depth of 0.8 m) fishless pond that was unconnected to any fish-bearing waterbodies in the area. It was also examined during baseline studies more than a decade ago with the same results. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-110-3 at the crossing during summer (A) and during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-110-4 **Dates Surveyed:** 4 July & 30 August, 2018 **UTM Coordinates:** 17 W 561546 7912425

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** N/A **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was a small, shallow (max depth of 0.5 m) fishless pond that was unconnected to any fish-bearing waterbodies in the area. It was also examined during baseline studies more than a decade ago with the same results. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-110-4 at the crossing during summer (A) and during fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: Access Road Crossing CV-169-1 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 505149 7972688

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 2 to 8° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	M	N
NNST	N	N	N	N

Comments & Summary

Although not captured in 2018, juvenile char have been occasionally observed in this stream during annual Tote Road surveys. It is thought that these char are from an anadromous population that uses Milne Inlet as the stream is not connected to any other overwintering habitat.

Photographs



A



B

Figure 1. Views of CV-169-1 downstream from the laydown access road crossing; (A) and (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – MARGINAL** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: Road Diversions CV-146-1, CV-146-2 &CV-146-3

Dates Surveyed: 28 June & 23 August, 2018

UTM Coordinates: 17 W 508928 7968816, 17 W 508726 7968858 & 17 W 508721 7968887

General Physical Characteristics

Channel Confinement: UC

Channel Gradient (range): > 10°

Flow Regime: Intermittent

Fisheries Data

Gear Used: Not Fished

Effort (min): N/A

Transect Length (m): N/A

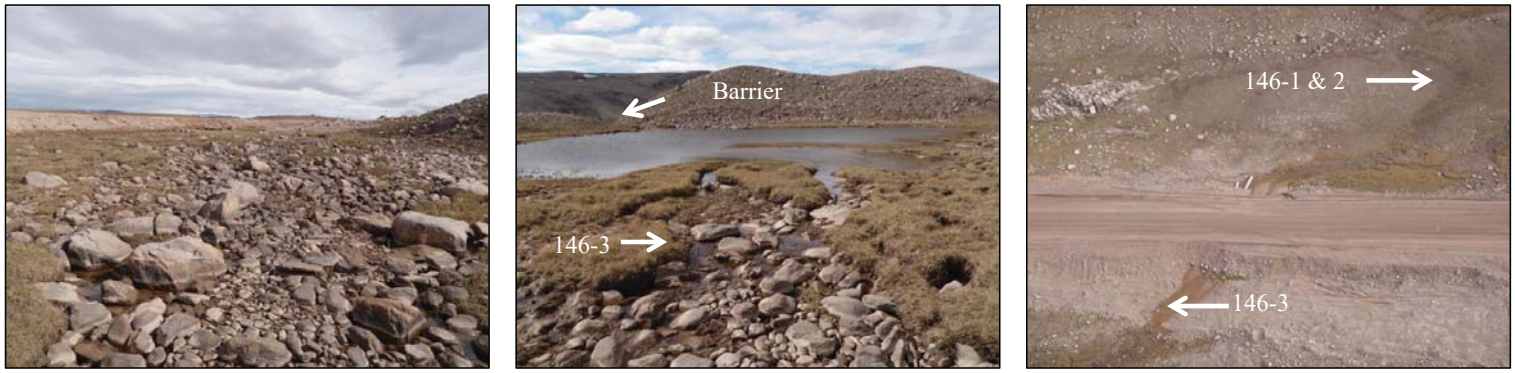
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This stream had low flows during both surveys. Downstream of the Tote Road it is connected to a fishless pond that flows into Phillips Creek. In addition to several soft barriers (subsurface flow), a permanent vertical barrier between the downstream pond and Phillips Creek prevents fish access to the rail site. There is never aquatic habitat at this crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-146-1 & CV-146-2 upstream of the rail crossing during summer (A), CV-146-3 during summer (B), and all three aerially during fall (C).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: Road Diversion CV-131-1 **Dates Surveyed:** 28 June & 23 August, 2018 **UTM Coordinates:** 17 W 511333 7967096

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 5 to > 15° **Flow Regime:** None

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

Same location as rail crossing CV-12-4. This entire area is a dry, low point on both sides of the existing Tote Road. There is never aquatic habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-131-1 at the road diversion crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: Temp Haul Road CV-060-1 **Date Surveyed:** 8 July 2018 **UTM Coordinates:** 17 W 527517 7930366

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	16.9	13.5	-	0.10	-	0.10	-	0.02	-	0.05
50D	2.7	2.4	-	0.75	-	0.75	-	0.02	-	0.02
0	12.7	5.4 / 8.8	0.11 / 0.06	0.26 / 0.12	0.06 / 0.44	0.30 / 0.44	0.60 / 0.43	0.57 / 0.58	0.77 / 0.78	0.77 / 0.78
50U	17.5	8.7 / 6.9	0.04 / 0.18	0.14 / 0.12	0.10 / 0.04	0.15 / 0.20	0.12 / 0.75	0.59 / 0.58	0.53 / 0.13	0.59 / 0.75
100U = CV-60 on road	11.5	7.6 / 7.8	0.08 / 0.22	0.12 / 0.08	0.12 / 0.10	0.15 / 0.25	0.01 / 0.61	0.41 / 0.22	0.95 / 0.31	0.95 / 0.70

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	65	35	-	-	-	-	-	5	75	20	-
50D	65	35	-	-	-	-	-	5	75	20	-
0	80	20	-	-	-	-	-	10	70	20	-
50U	70	30	-	-	-	-	-	10	70	20	-
100U= CV-60 on road	80	20	-	-	-	-	-	10	70	20	-

Baffinland Iron Mines **Mary River Project**	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: Temp Haul Road CV-060-1 **Date Surveyed:** 8 July 2018 **UTM Coordinates:** 17 W 527517 7930366

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	4.50	19	4.27	55 - 113
	Fall	-	N/A	N/A	N/A
NNST	Summer	4.50	0	-	-
	Fall	-	N/A	N/A	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	N
NNST	N	N	N	N

Comments & Summary

This temporary haul road crossing is downstream of Tote Road crossing CV-060 and proposed rail crossing CV-55-3. The 100 m upstream transect for CV-060-1 is the equivalent of the existing Tote Road crossing. This stream is important rearing habitat for juvenile char throughout the open-water season, but particularly during summer.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: Temp Haul Road CV-060-1 **Date Surveyed:** 8 July 2018 **UTM Coordinates:** 17 W 527517 7930366

Photographs



A **B** **C**

Figure 1. 100 m (top) and 50 m (bottom) downstream cross-section views of temp haul road crossing CV-060-1; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: Temp Haul Road CV-060-1 **Date Surveyed:** 8 July 2018 **UTM Coordinates:** 17 W 527517 7930366

Photographs



A **B** **C**

Figure 2. Crossing (top) and 50 m upstream (bottom) cross-section views of temp haul road crossing CV-060-1; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: Road Diversion CV-060-2 **Date Surveyed:** 8 July 2018 **UTM Coordinates:** 17 W 527756 7930278

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
20D = CV-55-3 100U	3.8	2.9	-	0.58	-	0.60	-	0.05	-	0.05
0	4.2	1.5	-	0.20	-	0.30	-	0.22	-	0.25
50U	5.1	4.1	-	0.14	-	0.25	-	0.21	-	0.25
100U	4.7	2.2	-	0.14	-	0.25	-	0.24	-	0.25

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
20D = CV-55-3 100U	-	40	60	-	-	-	100	-	-	-	-
0	5	50	45	-	-	-	100	-	-	-	-
50U	5	65	30	-	-	-	100	-	-	-	-
100U	10	65	35				95	5	-	-	-

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality

Arctic Char - IMPORTANT

Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: Road Diversion CV-060-2 **Date Surveyed:** 8 July 2018 **UTM Coordinates:** 17 W 527756 7930278

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	4.50	19	4.27	55 - 113
	Fall	-	N/A	N/A	N/A
NNST	Summer	4.50	0	-	-
	Fall	-	N/A	N/A	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	N
NNST	N	N	N	N

Comments & Summary

This diversion of the Tote Road is upstream of the existing CV-060 crossing and proposed rail CV-55-3 crossing. The 20 m downstream transect of CV-060-2 is approximately 100 m upstream of the rail crossing CV-55-3. This stream is important rearing habitat for juvenile char throughout the open water season, but particularly during summer.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: Road Diversion CV-060-2 **Date Surveyed:** 8 July 2018 **UTM Coordinates:** 17 W 527756 7930278

Photographs



A **B** **C**

Figure 1. Road crossing (top) and 50 m (bottom) upstream cross-section views of road diversion CV-060-2; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: Road Diversion CV-060-2 **Date Surveyed:** 8 July 2018 **UTM Coordinates:** 17 W 527756 7930278

Photographs



A **B** **C**

Figure 2. 100 m upstream cross-section views of road diversion CV-060-2; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: Temp Haul Road CV-059-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528010 7929251

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
0	11.9	2.0 / 2.7	- / -	0.10 / 0.09	- / 0.06	0.10 / 0.10	- / -	0.26 / 0.26	- / 0.17	0.30 / 0.30

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
0	45	35	-	-	-	20	70	30	-	-	-

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality

Arctic Char - MARGINAL

Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: Temp Haul Road CV-059-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528010 7929251

Fisheries Data

Gear Used: Backpack Electrofisher **Transect Length (m):** 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	4.52	5	1.11	99
	Fall	N/A	-	-	-
NNST	Summer	4.52	0	-	N/A
	Fall	N/A	-	-	-

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	N
NNST	N	N	N	N

Comments & Summary

This temporary haul road crossing is approximately 120 m downstream of the rail crossing at CV-56-1. Additional habitat information for this area can be obtained from the CV-56-1 assessment sheet. The site provides marginal rearing habitat for smaller juvenile char throughout the open-water season, but particularly during summer. Stickleback have never been captured in this watershed in any sampling year.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - MARGINAL** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: Temp Haul Road CV-059-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528010 7929251

Photographs



A B C

Figure 1. Summer (top) and fall (bottom) views at temporary haul road crossing CV-059-1; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: Road Diversion CV-214-1 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 541273 7921956

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1° **Flow Regime:** Open

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
50D	11.2	6.5 / 1.7	0.04 / -	0.03 / 0.05	0.15 / -	0.15 / 0.10	0.23 / -	0.20 / 0.14	0.36 / -	0.40 / 0.20
0	4.1	2.5 / 1.2	0.08 / -	-/ 0.05	0.09 / -	0.10 / 0.10	0.13 / -	- / 0.13	0.25 / -	0.30 / 0.20

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
50D	50	5	-	-	-	45	100	-	-	-	-
0	40	20	-	-	-	40	100	-	-	-	-

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: Road Diversion CV-214-1 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 541273 7921956

Fisheries Data

Gear Used: Not fished **Transect Length (m):** N/A

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	-	N/A	N/A	N/A
	Fall	-	N/A	N/A	N/A
NNST	Summer	-	N/A	N/A	N/A
	Fall	-	N/A	N/A	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The same stream as rail crossing CV-84-3. There was no evidence of fish use of stream habitat in 2018. This broad, flat, very shallow stream does not provide ideal habitat for either species and access from the large downstream river is intermittent with water level fluctuations.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: Road Diversion CV-214-1 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 541273 7921956

Photographs



A B C

Figure 1. Summer (top) and fall (bottom) views of CV-214-1 at the 50 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: Road Diversion CV-214-1 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 541273 7921956

Photographs



A B C

Figure 2. Summer (top) and fall (bottom) views of CV-214-1 at the road diversion crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: Road Diversion CV-214-2 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 541507 7922071

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1-3 **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This stream is known to be not fish-bearing from Tote Road surveys. Despite the fact that it is a tributary to a major river, the culvert at Tote Road crossing CV-85-1 was installed at a natural drop, so it is elevated above the water's surface on the downstream side. As a result, there is no fish use of habitat upstream of CV-85-1, which is where the road diversion is located.

Photographs



A B C

Figure 1. Views of CV-214-2 at the road diversion crossing during summer, looking upstream (A) downstream (B) and across (C). Fall photos were not taken.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: Road Diversion CV-215-1 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 541909 7922250

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This stream is the same as rail crossing CV-85-2. See that assessment for general habitat information, as the road diversion is adjacent to the rail. There was no evidence of fish use of crossing habitat in 2018. Access to the crossing area is likely intermittent and habitat is very shallow with fine substrates. Fish have not previously been noted in this stream, but it is very close to a large, overwintering lake (Muriel Lake) and high water may allow access.

Photographs



A B C

Figure 1. Views of CV-215-1 at the road diversion crossing during summer, looking upstream (A) downstream (B) and across (C). Fall photos were not taken, see rail sheet.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: Road Diversion CV-216-1 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 543381 7921181

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing is a very shallow (< 5 cm), fishless puddle with no connections to overwintering habitat. There is no fish use of habitat at this crossing.

Photographs



A

Figure 1. View of CV-216-1 at the road diversion crossing during summer.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: Road Diversion CV-216-2 **Dates Surveyed:** 9 July & 27 August, 2018 **UTM Coordinates:** 17 W 543524 7921151

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** N/A **Flow Regime:** Open Water

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing is an isolated, shallow, fishless puddle with no connection to overwintering waterbodies. There is no fish use of habitat at this crossing.

Photographs



A

Figure 1. Views of CV-216-2 at the road diversion crossing during summer.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-020-1 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 547094 7919813

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 2 to > 10 **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

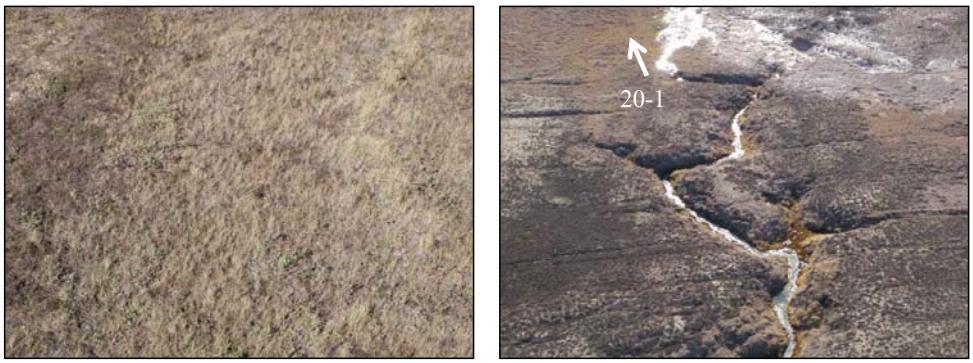
Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was moist land (terrestrial habitat) in 2018. This road diversion is in the same area as rail crossing CV-91-2 and shares the same downstream barriers and lack of connection to overwintering habitat. There is no fish use of habitat at this crossing.

Photographs



A **B**

Figure 1. Views of CV-020-1 at the road diversion crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: Road Diversion CV-20-2 **Dates Surveyed:** 4 July & 2 September, 2018 **UTM Coordinates:** 17 W 546893 7919846

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 5 to > 10 **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Not Fished **Effort (min):** N/A **Transect Length (m):** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing is on the same stream as rail crossing CV-91-0. The stream is shallow and steep, and had intermittent surface water downstream of the crossing in 2018 with no connections to overwintering waterbodies. There is no fish use of habitat at this crossing.

Photographs



A



B

Figure 1. Views of CV-020-2 at the road diversion crossing during summer (A) and fall (B).

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: Road Diversions BG-13-1 & BG-14-1 **Dates Surveyed:** 10 July & 30 August, 2018 **UTM Coordinates:** 17 W 551001 7917116 & 17 W 550839 7917414

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 1-3° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
BG-14-1 Crossing	15.2	9.3 / 9.8	0.14 / 0.14	0.16 / 0.06	0.18 / 0.02	0.25 / 0.20	0.14 / 0.19	0.19 / 0.17	0.02 / 0.14	0.25 / 0.25
BG-14-1 50 m US	7.5	6.5 / -	- / -	0.53 / -	- / -	0.60 / -	- / -	0.08 / -	- / -	0.10 / -
BG-13-1 Crossing	7.0	6.0 / 5.8	0.38 / -	0.24 / -	0.33 / -	0.45 / 0.35	0.18 / -	0.15 / -	0.09 / -	0.20 / 0.20

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
BG-14-1 Crossing	55	20	5	20	-	-	-	10	90	-	-
BG-14-1 50 m US	10	45	45	-	-	-	40	10	40	10	
BG-13-1 Crossing	5	55	40	-	-	-	25	5	70	-	

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: Road Diversions BG-13-1 & BG-14-1 **Dates Surveyed:** 10 July & 30 August, 2018 **UTM Coordinates:** 17 W 551001 7917116 & 17 W 550839 7917414

Fisheries Data

Gear Used: Backpack Electrofisher **Transect length (m):** N/A

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	6.82	9	1.32	29 - 126
	Fall	-	N/A	N/A	N/A
NNST	Summer	6.82	0	-	N/A
	Fall	-	N/A	N/A	N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H	H
NNST	M	N	H	M

Comments & Summary

These two road diversion crossings are on the same stream as rail crossing CV-96-1 (see that assessment for more habitat details). The stream consistently provides important fish habitat for both species throughout the open-water period. The stream also connects two large, upstream lakes with David Lake downstream, representing a potentially important migratory route.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT** **Ninespine Stickleback – IMPORTANT**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

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Photographs



A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of BG-14-1 at the road diversion crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: Road Diversions BG-13-1 & BG-14-1 **Dates Surveyed:** 10 July & 30 August, 2018 **UTM Coordinates:** 17 W 551001 7917116 & 17 W 550839 7917414

Photographs







NO PHOTO **NO PHOTO** **NO PHOTO**

A **B** **C**

Figure 2. Summer (top) and fall (bottom) views of BG-14-1 at 50 m upstream of the road diversion crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: Road Diversions BG-13-1 & BG-14-1 **Dates Surveyed:** 10 July & 30 August, 2018 **UTM Coordinates:** 17 W 551001 7917116 & 17 W 550839 7917414

Photographs



A **B** **C**

Figure 3. Summer (top) and fall (bottom) views of BG-13-1 at the road diversion crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.