

APPENDIX 5.3-1.

DETAILED HABITAT ASSESSMENTS AND SUMMARY OF RESULTS FOR WATERBODIES IN QUARRY SITES.

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Table A5.3-1.1. Summary of results from surveys and assessments that fall within Quarry boundaries.

Site	Survey Year	Survey Date	UTM Coordinates			Habitat Rating	ARCH seen ¹	NNST seen ¹	Comments
			Zone	Easting	Northing				
Q-0+500			17W	563871	7912027				Contains Railway sites 1, 1A and CV-000-1
Q-0+500	2010	27-Aug	17W	563510	7912424	None	No	No	-
1	2007	7-Aug	17W	563473	7911679	None	No	No	-
1A	2007	7-Aug	17W	563583	7911598	None	No	No	-
CV-000-1a	2007	7-Aug	17W	563768	7911403	None	No	No	-
Q4+100			17W	566420	7909555				Does not touch any waterbodies on map
Q7+500			17W	569266	7907635				Does not touch any waterbodies on map
Q10+250a			17W	572892	7905223				Does not touch any waterbodies on map
Q14+500			17W	575634	7904553				Contains Railway sites CV-013-1, CV-013-2, CV-014-1 and CV-014-2
CV-013-1	2008	23-Jul	17W	574988	7904117	Marginal	Yes	No	-
CV-013-2	2007	8-Aug	17W	575210	7904017	None	No	No	-
CV-014-1	2007	8-Aug	17W	575527	7903863	None	No	No	-
CV-014-2	2007	8-Aug	17W	575666	7903777	None	No	No	-
Q18+100			17W	579052	7902454	-	-	-	Contains Railway sites CV-017-2, CV-018-1, CV-018-2, CV-018-3
Q18+100	2008	9-Sep	17W	579052	7902454	None	No	No	-
CV-017-2	2007	9-Aug	17W	578733	7902277	None	No	No	-
CV-018-1	2007	9-Aug	17W	578855	7902210	Important	Yes	No	-
CV-018-2	2007	9-Aug	17W	579063	7902106	None	No	No	-
CV-018-3	2007	9-Aug	17W	579363	7902009	None	No	No	-
Q22+500			17W	583188	7901545				Contains Railway sites CV-021-2, -022-1, -022-2, -022-3, -022-4, -022-5
CV-021-2	2007	9-Aug	17W	582569	7901018	None	No	No	-
CV-022-1	2008	24-Jul	17W	582846	7900965	None	No	No	-
CV-022-2	2007	9-Aug	17W	583058	7900918	None	No	No	-
Q25+500			17W	586451	7900278				Contains Railway sites CV-R01, -R02 and Access Road sites AR-187b, -187c
CV-R01	2008	1-Sep	17W	585831	7899673	None	No	No	-
CV-R02	2008	1-Sep	17W	586176	7899452	None	No	No	-
AR-187b	2010	27-Aug	17W	585703	7900187	Marginal	No	No	-
AR-187c	2010	27-Aug	17W	585808	7900502	Marginal	No	No	-
Q28+400			17W	588324	7898582				Does not touch any waterbodies on map
Q31+500			17W	590918	7897799				Does not touch any waterbodies on map
Q35+000			17W	594460	7896830				Does not touch any waterbodies on map
Q35+500			17W	595362	7896249				Contains Railway site CV-R14
CV-R14	2008	2-Sep	17W	594975	7895888	None	No	No	-
Q38+700			17W	596331	7893053				Does not touch any waterbodies on map

Table A5.3-1.1. Continued.

Site	Survey Year	Survey Date	UTM Coordinates			Habitat Rating	ARCH seen ¹	NNST seen ¹	Comments
			Zone	Easting	Northing				
Q42+000			17W	598271	7890788				Contains Railway site CV-R27 and CV-R28
CV-R27	2008	11-Aug	17W	596886	7891237	Important	No	Yes	-
CV-R28	2008	11-Aug	17W	597243	7890426	None	No	No	-
Q44+300			17W	598177	7887982				Contains Railway site CV-R31
CV-R31	2008	4-Sep	17W	597364	7888229	None	No	No	-
CV-R32	2008	4-Sep	17W	597515	7887484	None	No	No	-
Q44+000			17W	596207	7885965				Does not touch any waterbodies on map
Q45+000			17W	596225	7884719				Does not touch any waterbodies on map
Q45+800			17W	597025	7884173				Does not touch any waterbodies on map
Q48+000			17W	598595	7882731				Contains Railway site CV-047-1
CV-047-1	2007	11-Aug	17W	598223	7882688	None	No	No	-
Q50+000			17W	597417	7881000				Does not touch any waterbodies on map
Q53+700			17W	597711	7877619				Does not touch any waterbodies on map
Q56+750			17W	598870	7875350				Does not touch any waterbodies on map
Q60+000			17W	598983	7871962				Contains Railway site BR-059-1
BR-059-1	2008	5-Sep	17W	598858	7872547	Marginal	No	No	-
Q64+400			17W	600174	7868669				Contains Railway site CV-063-1
Q64+400	2008	7-Sep	17W	600174	7868669	Important	No	Yes	-
CV-063-1	2007	12-Aug	17W	598618	7868739	None	No	No	-
Q67+200a			17W	600060	7865572				Contains Railway site CV-67-1
CV-067-1	2007	12-Aug	17W	600269	7866042	None	No	No	-
Q71+000			17W	602468	7863129				Does not touch any waterbodies on map
Q74+200			17W	603522	7860211				Does not touch any waterbodies on map
Q77+200			17W	604898	7857773				Contains Railway sites CV-077-1, -077-2 and Access Road sites AR-091a, -094a
AR-094a	2010	27-Aug	17W	604981	7858113	None	No	No	-
CV-077-1	2008	6-Sep	17W	605007	7857943	None	No	No	-
CV-077-2	2008	6-Sep	17W	605069	7857825	None	No	No	-
AR-091a	2010	27-Aug	17W	605221	7857810	None	No	No	-
Q79+600			17W	605364	7855480				Contains Railway site CV-079-2, CV-079-3, and CV-079-4a
CV-079-2	2007	12-Aug	17W	605517	7855672	None	No	No	-
CV-079-3	2007	12-Aug	17W	605523	7855495	None	No	No	-
CV-079-4a	2007	12-Aug	17W	605545	7855098	None	No	No	-
Q82+700			17W	606182	7852818				Contains Railway site CV-082-2a, CV-082-3a, CV-082-4a
CV-082-2a	2007	12-Aug	17W	605904	7852967	Marginal	No	No	-
CV-082-3a	2007	12-Aug	17W	605966	7852920	None	No	No	-

Table A5.3-1.1. Continued.

Site	Survey Year	Survey Date	UTM Coordinates			Habitat Rating	ARCH seen ¹	NNST seen ¹	Comments
			Zone	Easting	Northing				
CV-082-4a	2007	12-Aug	17W	606116	7852804	None	No	No	-
Q85+200			17W	606253	7850260				Contains Railway site CV-085-1, CV-085-2
CV-085-1	2007	12-Aug	17W	606352	7850306	None	No	No	-
CV-085-2	2007	12-Aug	17W	606381	7850063	None	No	No	-
Q88+800			17W	606000	7846618				Does not touch any waterbodies on map
Q92+000			17W	605868	7843546				Does not touch any waterbodies on map
Q95+400			17W	607651	7841003				Does not touch any waterbodies on map
Q96+100			17W	608562	7840516				Does not touch any waterbodies on map
Q96+700			17W	608976	7839908				Does not touch any waterbodies on map
Q110+200			17W	600294	7831190				Does not touch any waterbodies on map
Q114+600			17W	597759	7827791				Does not touch any waterbodies on map
Q116+800			17W	597570	7826076				Does not touch any waterbodies on map
Q127+800			17W	598769	7815815				Contains Railway site CV-127-2
CV-127-2	2008	3-Aug	17W	598585	7815834	None	No	No	-
Q128+000			17W	598750	7813701				Does not touch any waterbodies on map
Q131+100			17W	600240	7813576				Does not touch any waterbodies on map
Q133+500			17W	601412	7811035				Does not touch any waterbodies on map
Q138+100			17W	598794	7807534				Contains Railway site CV-138-1
CV-138-1	2007	13-Aug	17W	598855	7806965	None	No	No	-
Q139+600			17W	598770	7806171				Does not touch any waterbodies on map
QTR4A			17W	598561	7820471				Does not touch any waterbodies on map
QTR21			17W	605729	7845346				Does not touch any waterbodies on map
QTR22			17W	605269	7843323				Does not touch any waterbodies on map
QTR23			17W	606018	7841721				Does not touch any waterbodies on map
QTR10			17W	611571	7839318				Does not touch any waterbodies on map
QTR11			17W	611940	7837944				Does not touch any waterbodies on map
QTR6			17W	611404	7836488				Does not touch any waterbodies on map
QTR12			17W	610810	7836146				Does not touch any waterbodies on map
QTR13			17W	609489	7833926				Does not touch any waterbodies on map
QTR7			17W	608237	7832739				Does not touch any waterbodies on map
QTR14			17W	607626	7831592				Does not touch any waterbodies on map
QTR15			17W	606073	7830292				Does not touch any waterbodies on map
QTR16			17W	603175	7830702				Does not touch any waterbodies on map
QTR17			17W	604014	7832674				Does not touch any waterbodies on map
QTR8			17W	602064	7829996				Contains Access Road site AR-031 and AR-030a

Table A5.3-1.1. Continued.

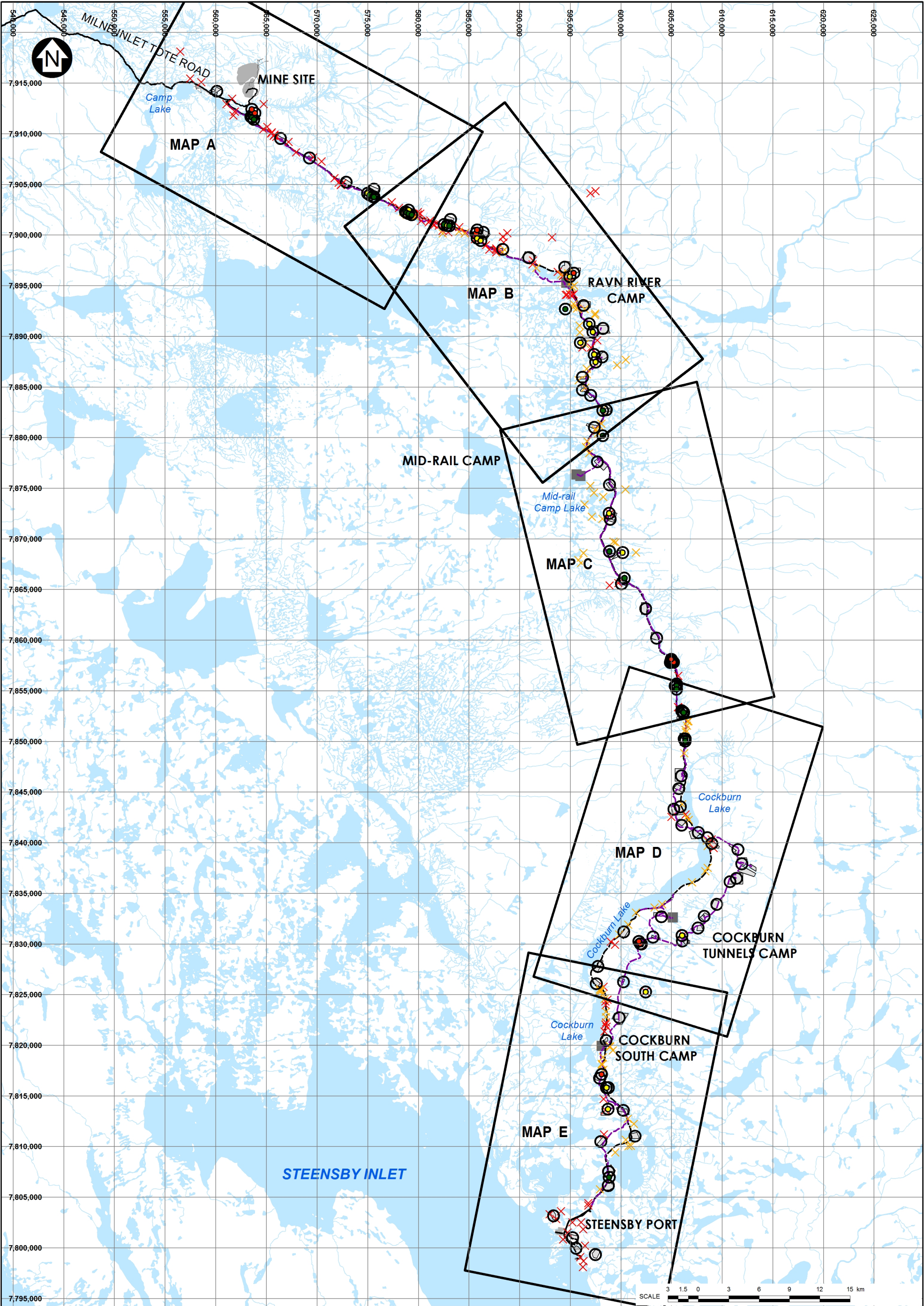
Site	Survey Year	Survey Date	UTM Coordinates			Habitat Rating	ARCH seen ¹	NNST seen ¹	Comments
			Zone	Easting	Northing				
AR-030a	2010	27-Aug	17W	601932	7830020	None	No	No	-
AR-031	2010	27-Aug	17W	601777	7830247	None	No	No	-
QTR9			17W	600279	7826243				Does not touch any waterbodies on map
QTR18			17W	599876	7822737				Does not touch any waterbodies on map
QTR19			17W	597909	7816733				Contains Railway site AR-014b
AR-014b	2010	26-Aug	17W	598116	7817121	Marginal	No	No	-
QTR20			17W	598037	7810505				Does not touch any waterbodies on map
QS1			17W	593366	7803184				Does not touch any waterbodies on map
QS2			17W	595250	7801000				Does not touch any waterbodies on map
QS3A			17W	595593	7799980				Does not touch any waterbodies on map
QS3			17W	597500	7799349				Does not touch any waterbodies on map
QMR2			17W	560128	7914203				Adjacent to Camp Lake Tributary 1; part of mine site infrastructure

¹ - includes all ARCH or NNST that were captured.

Table A5.3-1.2. List of assessments used to evaluate habitat within each Quarry.

Site	Comments
Q-0+500	See Quarry site assessment Q0+ 500, as well as Railway site assessments 1, 1A and CV-000-1a.
Q14+500	See Railway site assessments CV-013-1, CV-013-2, CV-014-1, CV-014-2.
Q18+100	See Quarry site assessment Q18+ 100, as well as Railway site assessments for CV-017-2, CV-018-1, CV-018-2 and CV-018-3.
Q22+500	See Railway site assessments CV-21-2, CV-22-1 and CV-22-2.
Q25+500	See Railway site assessments CV-R01 and CV-R02, as well as Access Road site assessments AR-187b and AR-187c.
Q35+500	See Railway site assessment CV-R14.
Q42+000	See Railway site assessments CV-R27 and CV-R28.
Q44+300	See Railway site assessments CV-R31 and CV-R32.
Q48+000	See Railway site assessment CV-047-1.
Q60+000	See Railway site assessment BR-059-1.
Q64+400	See Quarry site assessment Q64+400, as well as Railway site assessment CV-063-1.
Q67+200a	See Railway site assessment CV-067-1.
Q77+200	See Railway site assessments CV-077-1 and CV-077-2, as well as Access Road site assessments AR-094a and AR-091a.
Q79+600	See Railway site assessments CV-079-2, CV-079-3 and CV-079-4a.
Q82+700	See Railway site assessments CV-082-2a, CV-082-3a and CV-82-4a.
Q85+200	See Railway site assessments CV-085-1 and CV-085-2.
Q127+800	See Railway site assessment CV-127-2.
Q138+100	See Railway site assessment CV-138-1.
QTR8	See Access Road site assessments AR-031 and AR-030a.
QTR19	See Access Road site assessment AR-014b.
QMR2	Adjacent to Camp Lake Tributary 1; part of mine site infrastructure.

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LEGEND:

- | | |
|---|---|
| ● QUARRY SITE YEAR SURVEYED
● 2007
● 2008
● 2010 | ----- RAILWAY ALIGNMENT (PROPOSED)
..... CONSTRUCTION ACCESS ROAD (PROPOSED) |
| ○ STREAM CROSSING | ▨ POTENTIAL AREAS OF QUARRY ACCESS |
| ✕ FISH BARRIER (CONFIRMED) | ■ QUARRY SITE |
| ✕ FISH BARRIER (AERIAL PHOTO INTERPRETATION) | ■ WATER |
| — MILNE INLET TOTE ROAD (EXISTING) | ■ INFRASTRUCTURE |

NOTES:

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5. LOCATION OF PROPOSED INFRASTRUCTURE IS APPROXIMATE AND SUBJECT TO FIELD ADJUSTMENTS

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

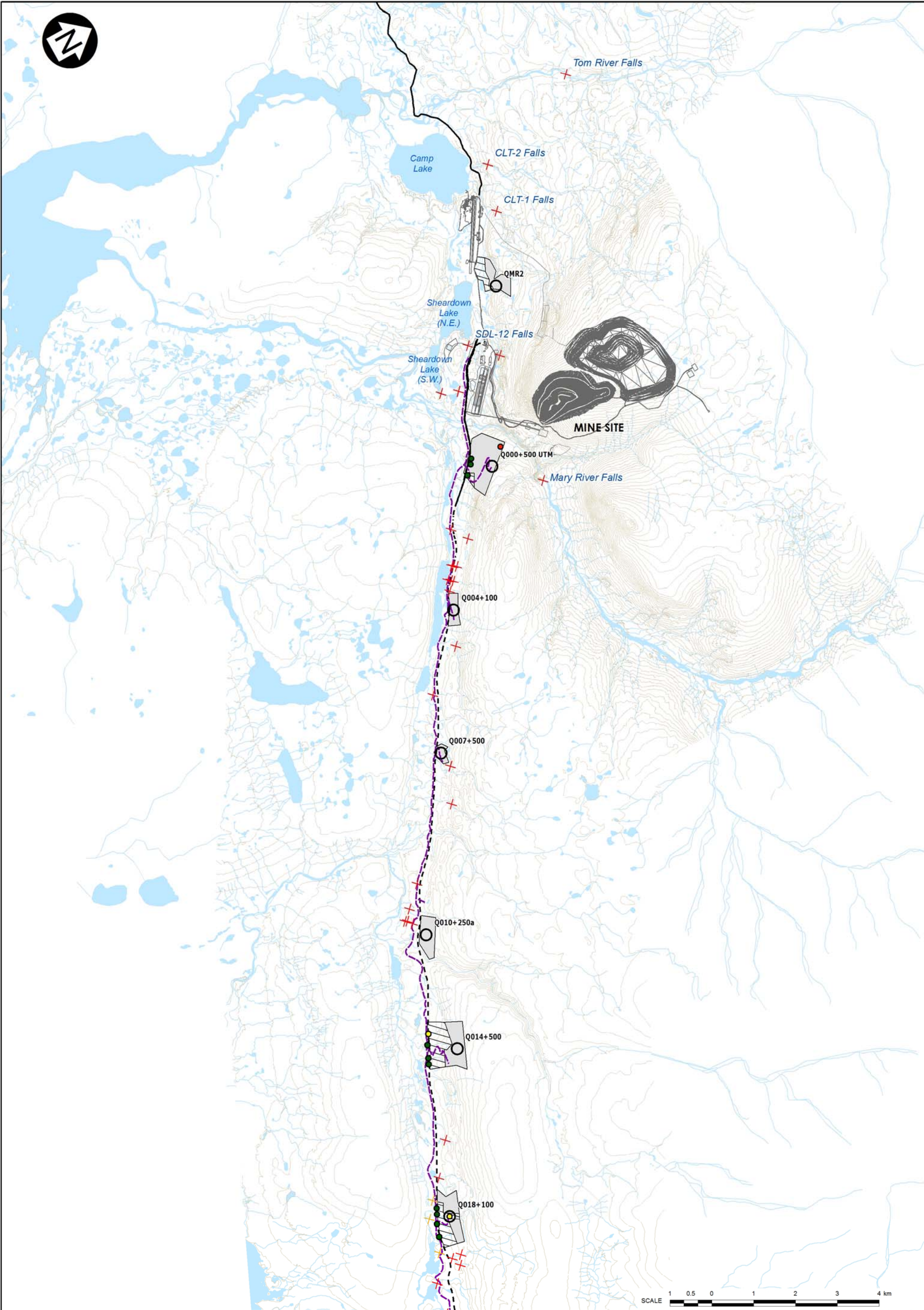
Quarry Sites



P/A NO.
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DATE: 19/11/2010

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LEGEND:

- 2007
● 2008
● 2010

○ STREAM CROSSING

✕ FISH BARRIER (CONFIRMED)

✕ FISH BARRIER (AERIAL PHOTO INTERPRETATION)

— CONTOUR
- MILNE INLET TOTE ROAD (EXISTING)

--- RAILWAY ALIGNMENT (PROPOSED)

- - - CONSTRUCTION ACCESS ROAD (PROPOSED)

▨ POTENTIAL AREAS OF QUARRY ACCESS

▭ QUARRY SITE

■ WATER

■ INFRASTRUCTURE

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5. LOCATION OF PROPOSED INFRASTRUCTURE IS APPROXIMATE AND SUBJECT TO FIELD ADJUSTMENTS
6. CONTOUR INTERVAL IS 25 AND IS IN METRES.

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

Quarry Sites (MAP A)

North/South Consultants Inc.
Aquatic Environment Specialists

P/A NO.	REF NO.
-	-
DATE: 16/12/2011	REV 2

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: Q0+500
UTM Coordinates: 17 W 563510 7912424

Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

Floodplain Width (m):	N/M	Channel Pattern:	N/M	Stage:	N/A
Channel Confinement:	N/M	Channel Gradient (range):	N/M	Flow Regime:	EPH
Bank Height (range in m):	N/M	Bank Shape:	N/M	T_w (°C):	N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted:	N	Effort (min):	N/A	Electrofisher Settings:	N/A
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Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

From UTM coordinates, watercourse was dry upstream. At the coordinates to approximately 250 m downstream the drain had a steep gradient and a poorly formed channel; no fish habitat potential. Further downstream, channel formation was evident, but disjointed/discontinuous.

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NO FISH HABITAT

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: Q0+500
UTM Coordinates: 17 W 563510 7912424

Date/Time Surveyed: 27-Aug-10

Photographs



A



B



C



D



E

Figure 1. Upstream from site coordinates (A), view near coordinates (B), view downstream from coordinates (C), view of steep gradient drop off and the beginning of some channel development approximately 250 m downstream from coordinates (D), discontinuous channel downstream of D (E).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: Q18+100
UTM Coordinates: 17 W 579052 7902454

Date/Time Surveyed: 9-Sept-2008/8:40

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: N

Effort (min): N/A

Electrofisher Settings: N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	No	No
NNST	No	No	No	No

Comments & Summary

High altitude lake attached to CV-019 at UTM 17 W 579888 7902514. The surface is frozen. Potential downstream barrier at UTM 17 W 579987 7902247 and UTM 17 W 579968 7902018. Hard to see channel. Additional small pool near quarry at UTM 17 W 579423 7902296. Cannot tell how it would drain into the large downstream river, which is currently frozen.

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NO FISH HABITAT

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: Q18+100
UTM Coordinates: 17 W 579052 7902454

Date/Time Surveyed: 9-Sept-2008/8:40

Photographs



A



B



C



D



E



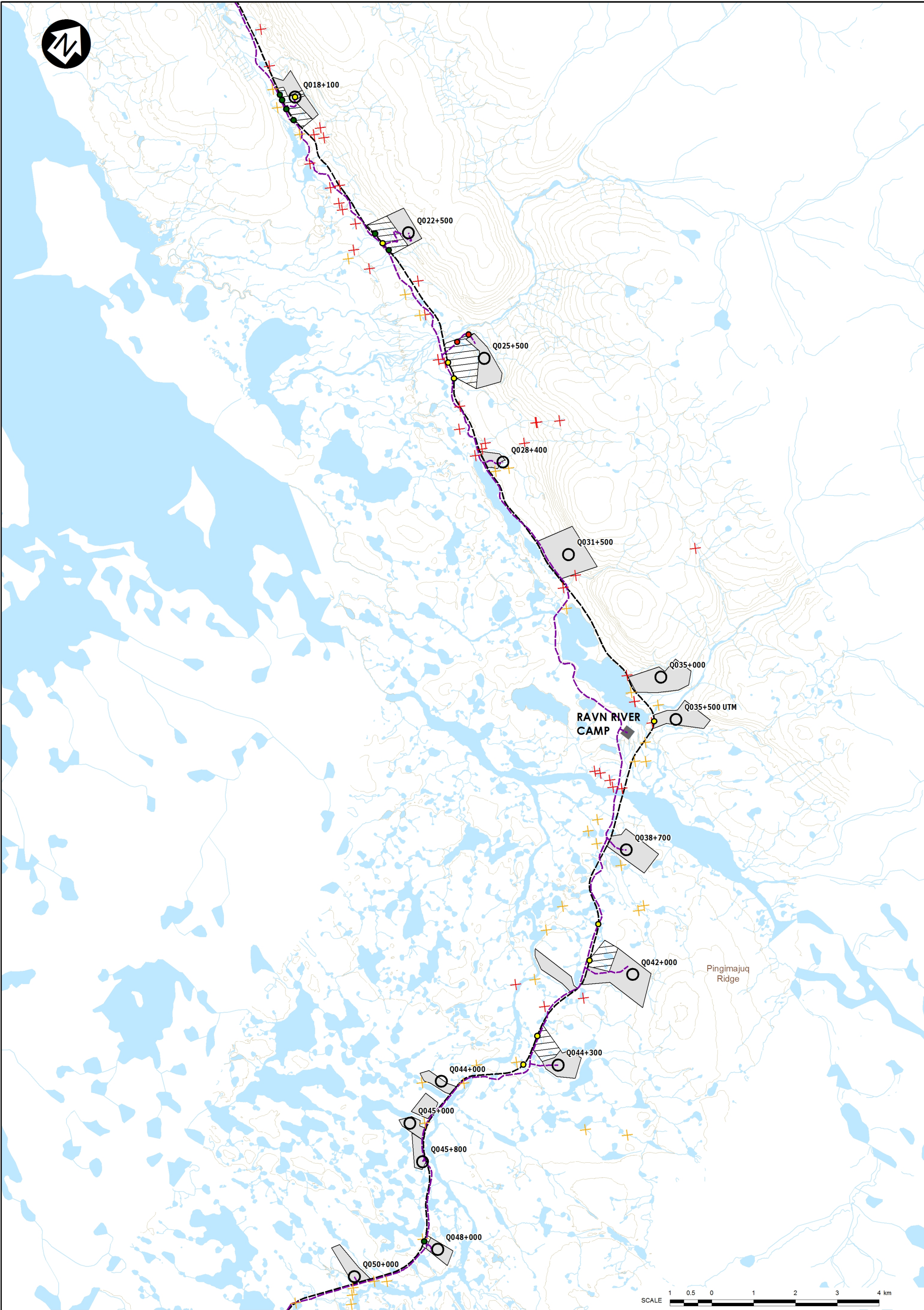
F



G

Figure 1. View of dry or frozen channel (A-C), downstream barrier (D), frozen pond (E), and high altitude lake (F-G).

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LEGEND:

- | | |
|--|---|
| ● QUARRY SITE YEAR SURVEYED | — MILNE INLET TOTE ROAD (EXISTING) |
| ● 2007 | - - - RAILWAY ALIGNMENT (PROPOSED) |
| ● 2008 | ... CONSTRUCTION ACCESS ROAD (PROPOSED) |
| ● 2010 | ▨ POTENTIAL AREAS OF QUARRY ACCESS |
| ○ STREAM CROSSING | ▨ QUARRY SITE |
| ✕ FISH BARRIER (CONFIRMED) | ■ WATER |
| ✕ FISH BARRIER (AERIAL PHOTO INTERPRETATION) | ■ INFRASTRUCTURE |
| — CONTOUR | |

NOTES:

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5. LOCATION OF PROPOSED INFRASTRUCTURE IS APPROXIMATE AND SUBJECT TO FIELD ADJUSTMENTS
6. CONTOUR INTERVAL IS 25 AND IS IN METRES.

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

Quarry Sites (MAP B)

North/South Consultants Inc.
Aquatic Environment Specialists

P/A NO.
-
DATE: 19/11/2010

REF NO.
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REV
2

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LEGEND:

- | | |
|--|---|
| ● 2007 | — MILNE INLET TOTE ROAD (EXISTING) |
| ● 2008 | - - - RAILWAY ALIGNMENT (PROPOSED) |
| ● 2010 | - - - CONSTRUCTION ACCESS ROAD (PROPOSED) |
| ○ STREAM CROSSING | ▨ POTENTIAL AREAS OF QUARRY ACCESS |
| ✕ FISH BARRIER (CONFIRMED) | ▨ QUARRY SITE |
| ✕ FISH BARRIER (AERIAL PHOTO INTERPRETATION) | ■ WATER |
| — CONTOUR | ■ INFRASTRUCTURE |

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5. LOCATION OF PROPOSED INFRASTRUCTURE IS APPROXIMATE AND SUBJECT TO FIELD ADJUSTMENTS
6. CONTOUR INTERVAL IS 25 AND IS IN METRES.

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

Quarry Sites (MAP C)

North/South Consultants Inc.
Aquatic Environment Specialists

P/A NO.
-
DATE: 19/11/2010

REF NO.
-
REV
2

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: Q64+400
UTM Coordinates: 17 W 600174 7868669

Date/Time Surveyed: 7-Sept-08 / 14:36

General Physical Characteristics

Floodplain Width (m):	N/M	Channel Pattern:	Meandering	Stage:	Normal-high
Channel Confinement:	NC	Channel Gradient (range):	0-0.25°	Flow Regime:	PER
Bank Height (range in m):	0.0-0.17	Bank Shape:	50% UD-Flooded, 50% V	T_w (°C):	2.0

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
20D	3.8	flooded	0.10	0.19	0.31	0.31	0.10	0.01	0.21	0.21
0	6.25	flooded	0.17	0.14	0.26	0.50	0.12	0.00	0.03	0.27
20U	7.2	flooded	0.07	0.18	0.24	0.26	0.00	0.01	0.04	0.13

Distance and Direction from Crossing (m)	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	20		30				10silt,40FT		20	10	20
0	30	50	20				50FT,5silt	10	5	10	20
20U	30	60	10				25FT,15sand	5	20	20	10

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 8:02 **Electrofisher Settings:** 600V, 50HZ, 30%

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	-	-	-
NNST	18	2.24	21-36	<1

Baffinland Iron Mines
Mary River Project



Fish Habitat Quality – IMPORTANT

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: Q64+400
UTM Coordinates: 17 W 600174 7868669

Date/Time Surveyed: 7-Sept-08 / 14:36

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	No	No	Low	No
NNST	High	No	High	Low

Comments & Summary

The quarry site itself is dry, but it has a couple of tiny ponds near it. Any water in the area should be considered fish habitat. There is a connection of lakes and pools at UTM 17 W 601289 7868513 with a large downstream pond at UTM 17 W 598750 7869322 that eventually connects at a large downstream river at UTM 17 W 595984 7868932. Fish will be in any waterbody that the road crosses if it leads east from the AR near AR-113. This stream may not actually be crossed at this location but it connects to all of the ponds and streams to the west where the access road will lie. The quarry site is actually 200m away from the assessed water. Waypoint 525 at the 20 U

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: Q64+400
UTM Coordinates: 17 W 600174 7868669

Date/Time Surveyed: 7-Sept-08 / 14:36

Photographs



A



B



C



D



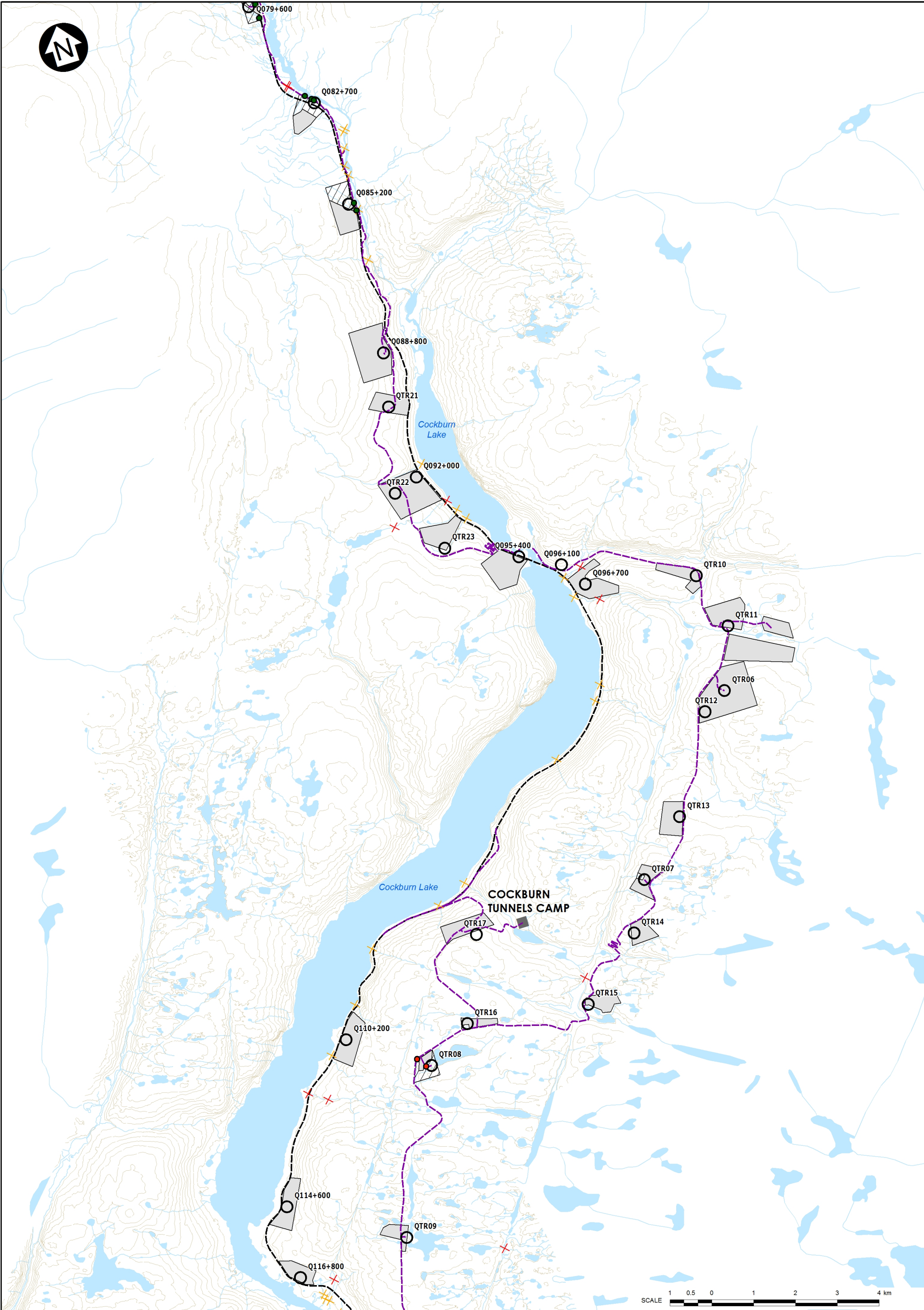
E



F

Figure 1. View of habitat at 20M DS across (A), 20m US across (B), aerial view downstream of assessment (C), aerial view of crossing (D-E), and crossing across (F).

Path: G:\MARYRIV_GDB\IEIS_Figures\2010IEIS_Figures\MXD\Synthesis_RailLine_AccessRoad\Rev2\Apx20101119_ApxQry_sg.mxd



LEGEND:

- 2007

● 2008

● 2010

○ STREAM CROSSING

✕ FISH BARRIER (CONFIRMED)

✕ FISH BARRIER (AERIAL PHOTO INTERPRETATION)

— CONTOUR
- MILNE INLET TOTE ROAD (EXISTING)

--- RAILWAY ALIGNMENT (PROPOSED)

--- CONSTRUCTION ACCESS ROAD (PROPOSED)

▨ POTENTIAL AREAS OF QUARRY ACCESS

▨ QUARRY SITE

■ WATER

■ INFRASTRUCTURE

NOTES:

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2. TOPOGRAPHY PROVIDED BY EAGLE MAPPING (2005).
3. PROPOSED RAILWAY ALIGNMENT PROVIDED BY CANRAIL CONSULTANTS INC.
4. PROPOSED RAILWAY CONSTRUCTION ACCESS ROAD ALIGNMENT PROVIDED BY CANRAIL CONSULTANTS INC. DRAWING NO. RAILWAY ALIGNMENT AND CONST ACCESS RD - MARY RIVER STEENSBY 2010 -12AUG2010.dwg
5. LOCATION OF PROPOSED INFRASTRUCTURE IS APPROXIMATE AND SUBJECT TO FIELD ADJUSTMENTS
6. CONTOUR INTERVAL IS 25 AND IS IN METRES.

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

Quarry Sites (MAP D)



P/A NO.
-
DATE: 19/11/2010

REF NO.
-
REV
2



LEGEND:

- 2007

● 2008

● 2010

○ STREAM CROSSING

✕ FISH BARRIER (CONFIRMED)

✕ FISH BARRIER (AERIAL PHOTO INTERPRETATION)

— CONTOUR
- MILNE INLET TOTE ROAD (EXISTING)

--- RAILWAY ALIGNMENT (PROPOSED)

--- CONSTRUCTION ACCESS ROAD (PROPOSED)

▨ POTENTIAL AREAS OF QUARRY ACCESS

▭ QUARRY SITE

■ WATER

■ INFRASTRUCTURE

NOTES:

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5. LOCATION OF PROPOSED INFRASTRUCTURE IS APPROXIMATE AND SUBJECT TO FIELD ADJUSTMENTS
6. CONTOUR INTERVAL IS 25 AND IS IN METRES.

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

Quarry Sites (MAP E)



P/ANO
-
DATE: 16/12/2011

REF NO.
-
REV
2

APPENDIX 6-1.

DETAILED AQUATIC HABITAT ASSESSMENTS FOR WATERBODIES IN THE STEENSBY PORT AREA.

Exploration Property Aquatic Habitat Assessment

Location

Watercourse Name:
Site:

UTM:
Dates Surveyed:

Site Description/Physical Characteristics

Confinement:

Channel Gradient:

Hydrology

Spr

Sum

Bankfull Width (m):

Wetted Width (m):

Riffle-Crest Depth (m):

Pool Depth (m):

D (m):

D₉₅ (m):

Point Velocities (m/s)

Riffle:

Pool:

Behind a rock:

Stream/Riparian Habitat

Channel Morphology:

Substrate Composition:

Stream Cover:

Aquatic Vegetation:

Riparian Vegetation:

Barriers Present (Y/N):
Location:

Lakes Present (Y/N):
Location:

L/R Bank Characteristics

Spr

Sum

Bank Height (L/R; m):

Bank Stability:

Erosion Potential:

Water Quality

Spr

Sum

Specific
Conductance
(μ S/cm):

TDS (g/l):

DO (mg/l)

%DO:

Water Temp
(°C):

Fish Habitat

Spr

Sum

Spawning:

ARCH -
NNST -

ARCH -
NNST -

Feeding:

ARCH -
NNST -

ARCH -
NNST -

Migration:

ARCH -
NNST -

ARCH -
NNST -

Baffinland Iron Mines
Mary River Project



North/South Consultants Inc.
Aquatic Environment Specialists

Exploration Property Aquatic Habitat Assessment

a

Figure 1. View upstream from habitat assessment in Tom River during spring (a) and summer (b) 2008.

a

Figure 2. View downstream from habitat assessment in Tom River during spring (a) and summer (b) 2008.

a

Figure 3. View across the habitat assessment site in Tom River during spring (a) and summer (b) 2008.

b

b

b

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-029
Site: ST-029

UTM: 17 W 594542 7801518
Dates Surveyed: 30-Jul-08, 13:32

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Sum

Bankfull Width (m): N/A

Wetted Width (m): N/A

Riffle-Crest Depth (m): N/A

Pool Depth (m): N/A

Max Depth (m): 8.20

D₉₅ (m): N/A

Point Velocities (m/s) N/A

Lake/Riparian Habitat

Substrate Composition: N: 50% lg cobble, 15% sm cobble, 15% gravel, 10% sand, 10% boulder

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Water Quality

Sum

Specific Conductance (µS/cm): N/M

TDS (g/l): N/M

DO (mg/l) N/M

%DO: N/M

Water Temp (°C): N/M

Fish Habitat Use

Spawning: ARCH - H
 NNST - H

Feeding: ARCH - H
 NNST - H

Migration: ARCH - N
 NNST - N

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 Mary River Project**



Steensby Port Site Aquatic Habitat Assessment



Figure 1. Pan view from north shore of ST-029 during summer (a and b) 2008.



Figure 2. View of substrate along north shore (c and d) of ST-029 during summer 2008.

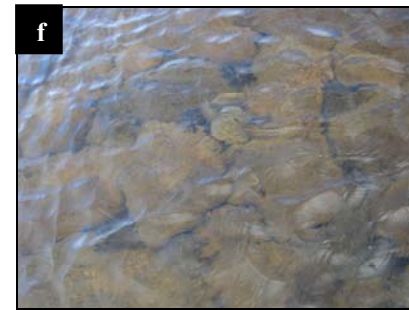


Figure 3. View of substrate near gill net set (e and f) in ST-029 during summer 2008.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-029
Site: ST-029

UTM: 17 W 594574 7801448
Date/Time Surveyed: August 7, 2010 @ 18:12

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Summer

Bankfull Width (m):	N/M
Wetted Width (m):	N/M
Riffle-Crest Depth (m):	N/A
Pool Depth (m):	N/A
Max Depth (m):	N/M
D₉₅ (m):	N/A
Point Velocities (m/s)	N/A

Lake/Stream Habitat

Channel Morphology: N/A

Substrate Composition: 20% boulders,
75% large cobble,
5% small cobble.

Stream Cover: N/A

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Lakes Present (Y/N): N/A
Location: N/A

Water Quality

Summer

Specific Conductance (mS/m):	4.0
TDS (g/L):	0.03
DO (mg/L):	11.62
Turbidity (NTU):	4.5
pH:	6.60
Water Temp (°C):	13.8

Fish Habitat Use

Spawning:	ARCH - H NNST - H
Rearing:	ARCH - H NNST - H
Wintering:	ARCH - H NNST - H
Migration Corridor:	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Photographs

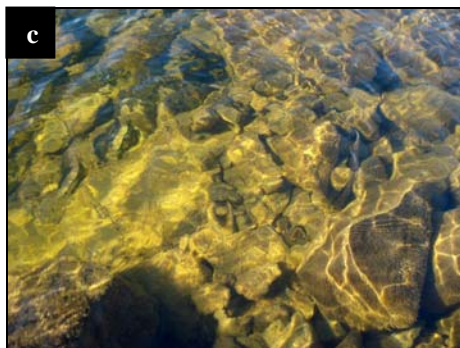


Figure 1. Aerial view of ST-029 (a), view from the shoreline (b), and substrate (c).

Fisheries Data

Gear Used:	Electrofishing
Start UTM:	17 W 594574 7801448
End UTM:	17 W 594599 7801468
Electrofisher Settings (v/Hz/duty cycle):	700/60/12
Effort (dec.min):	9.0

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	14	1.6	N/M	N/M
NNST	1 (YOY)	0.1	N/M	N/M

Comments

Lake appears to be totally isolated, but provides overwintering and spawning habitat for both species.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-030
Site: ST-030

UTM: 17 W 594592 7801254
Date/Time Surveyed: August 7, 2010 @ 17:55

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Summer

Bankfull Width (m):	N/M
Wetted Width (m):	N/M
Riffle-Crest Depth (m):	N/A
Pool Depth (m):	N/A
Max Depth (m):	N/M
D₉₅ (m):	N/A
Point Velocities (m/s)	N/A

Lake/Stream Habitat

Channel Morphology: N/A

Substrate Composition: 1% boulders,
9% large cobble,
10% small cobble,
80% sand.

Stream Cover: N/A

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Lakes Present (Y/N): N/A
Location: N/A

Water Quality

Summer

Specific Conductance (mS/m):	4.8
TDS (g/L):	0.03
DO (mg/L):	10.71
Turbidity (NTU):	40.2
pH:	6.51
Water Temp (°C):	17.3

Fish Habitat Use

Spawning:	ARCH - N NNST - H
Rearing:	ARCH - H NNST - H
Wintering:	ARCH - H NNST - H
Migration Corridor:	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Photographs



Figure 1. Aerial view of ST-030 (a), view from the shoreline (b), and substrate (c).

Fisheries Data

Gear Used:	Electrofishing
Start UTM:	17 W 594592 7801254
End UTM:	N/A
Electrofisher Settings (v/Hz/duty cycle):	400/60/12
Effort (dec.min):	8.0

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	1	0.1	~120	N/M
NNST	Many YOY	N/M	N/M	N/M

Comments

Unlikely provides any overwinter habitat and is not ideal habitat for ARCH, but provides abundant spawning habitat for NNST.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-032
Site: ST-032

UTM: 17 W 595146 7801703
Dates Surveyed: 31-Jul-08, 09:53

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Sum

Bankfull Width (m):	N/A
Wetted Width (m):	N/A
Riffle-Crest Depth (m):	N/A
Pool Depth (m):	N/A
Max Depth (m):	10.00
D₉₅ (m):	N/A
Point Velocities (m/s)	N/A

Lake/Shoreline Habitat

Substrate Composition: 35% boulder, 35% cobble, 30% sand

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Water Quality

Sum

Specific Conductance (µS/cm):	N/M
TDS (g/l):	N/M
DO (mg/l)	N/M
%DO:	N/M
Water Temp (°C):	N/M

Fish Habitat Use

Spawning:	ARCH - M NNST - L
Feeding:	ARCH - H NNST - L
Migration:	ARCH - N NNST - N

**Baffin land Iron Mines
Mary River Project**



Steensby Port Site Aquatic Habitat Assessment



Figure 1. View of ST-032 from shore during summer (a and b) 2008.



Figure 2 View of substrate (c and d) in ST-032 during summer 2008.



Figure 3. View of substrate (e) in ST-032 during summer 2008.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-032
Site: ST-032

UTM: 17 W 595167 7801567
Date/Time Surveyed: August 7, 2010 @ 17:18

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Summer

Bankfull Width (m):	N/M
Wetted Width (m):	N/M
Riffle-Crest Depth (m):	N/A
Pool Depth (m):	N/A
Max Depth (m):	N/M
D₉₅ (m):	N/A
Point Velocities (m/s)	N/A

Lake/Stream Habitat

Channel Morphology: N/A

Substrate Composition: 90% boulders,
10% large cobble.

Stream Cover: N/A

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Lakes Present (Y/N): N/A
Location: N/A

Water Quality

Summer

Specific Conductance (mS/m):	2.7
TDS (g/L):	0.02
DO (mg/L):	11.27
Turbidity (NTU):	3.8
pH:	7.35
Water Temp (°C):	12.9

Fish Habitat Use

Spawning:	ARCH - M NNST - L
Rearing:	ARCH - H NNST - L
Wintering:	ARCH - H NNST - L
Migration Corridor:	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Photographs



Figure 1. Aerial view of ST-032 (a), view from the shoreline (b), and substrate (c).

Fisheries Data

Gear Used:	Electrofishing
Start UTM:	17 W 595167 7801567
End UTM:	17 W 595210 7801573
Electrofisher Settings (v/Hz/duty cycle):	400/60/12
Effort (dec.min):	5.0

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	1 (juvenile)	0.2	~80	N/M
NNST	0	0.0	N/M	N/M

Comments

Potential overwintering in this lake.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-001a
UTM Coordinates: 17 W 594657 7801348

Date/Time Surveyed: August 7, 2010 @ 17:46

General Physical Characteristics

Floodplain Width (m):	>100	Channel Pattern:	Sinuuous	Stage:	Low
Channel Confinement:	UC	Channel Gradient (range):	1-2°	Flow Regime:	Permanent
Bank Height (range in m):	N/M	Bank Shape:	N/A		

In Situ Water Quality Data

Temperature (°C):	14.4	Specific Conductance (mS/m):	11.3	Turbidity (NTU):	3.8
Dissolved Oxygen (mg/L):	8.35	TDS (g/L):	0.07	pH:	6.88

Hydrology & Habitat Characteristics

Distance and Direction from Assessment UTM (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)				
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max	Min
0	N/M	N/M	N/M	0.08	N/M	0.08	N/M	0.00	N/M	0.05	N/M

Distance and Direction from Assessment UTM (m)	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	1	95	4				50			25	25

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-001a
UTM Coordinates: 17 W 594657 7801348

Date/Time Surveyed: August 7, 2010 @ 17:46

Fisheries Data

Gear Used: Observation **Effort (min):** N/A **Electrofisher Settings:** N/A
Start UTM: U/S of the assessment site **End UTM:** N/A

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	None	N/A	N/M	N/M
NNST	Many	N/A	N/M	N/M

Fish Habitat Potential

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

Comments & Summary

Many NNST were observed, but ARCH do not appear to have access to this site from any potential overwintering area.

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-001a
UTM Coordinates: 17 W 594657 7801348

Date/Time Surveyed: August 7, 2010 @ 17:46

Photographs



A



B



C



D

Figure 1. (A) Aerial view of stream SPS-001a; and (B) view upstream of habitat assessment; (C) view downstream of habitat assessment; (D) view across the habitat assessment site.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-018
Site: SPS-018

UTM: 17W 594683 7801483
Dates Surveyed: 27-Jul-08, 13:35

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: 5°

Hydrology

Sum

Bankfull Width (m): 39.32

Wetted Width (m): 2.46

Riffle-Crest Depth (m): 0.18

Pool Depth (m): 0.17

D (m): NM

D₉₅ (m): 3.50

Point Velocities (m/s)

Riffle: 0.23

Pool: 0.06

Behind a rock: NM

Stream/Riparian Habitat

Channel Morphology: 60% pool (50% shallow, 10% deep), 30% riffle, 10% cascade

Substrate Composition: 35% fines, 25% 1g cobble, 15% sm cobble, 15% boulder, 10% gravel

Stream Cover: 35% FT, 25% 1g cobble, 15% boulder, 10% deep pool

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grasses, willows, moss

Barriers Present (Y/N): Y
Location: US ~ 100 m

Lakes Present (Y/N): Y
Location: DS ~ 1 km

L/R Bank Characteristics

Sum

Bank Height (L/R; m): 0.14/Undef

Bank Stability: Mod-High

Erosion Potential: Low-Mod

Water Quality

Sum

Specific Conductance (µS/cm): 2.00

TDS (g/l): 0.02

DO (mg/l): 10.13

%DO: NM

Water Temp (°C): 12.75

Fish Habitat Use

Spawning: ARCH - N
 NNST - M

Feeding: ARCH - H
 NNST - H

Migration: ARCH - L
 NNST - L

**Baffinland Iron Mines
 Mary River Project**



Steensby Port Site Aquatic Habitat Assessment



Figure 1. View upstream (a) and downstream (b) from habitat assessment in reach 1 of SPS-018 during summer 2008.

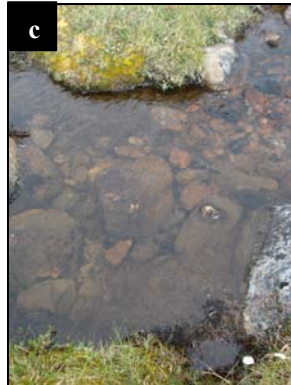


Figure 2. View across (c) the habitat assessment site in reach 1 of SPS-018 during summer 2008.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-019
Site: SPS-019 Reach 1

UTM: 17W 594402 7801209
Dates Surveyed: 27-Jul-08,15:45

Site Description/Physical Characteristics

Confinement: Partial Confinement

Channel Gradient: <1°

Hydrology

Sum	
Bankfull Width (m):	32.92
Wetted Width (m):	20.13
Riffle-Crest Depth (m):	0.20
Pool Depth (m):	0.51
D (m):	NM
D₉₅ (m):	5.3
Point Velocities (m/s)	
Riffle:	0.20
Pool:	0.00
Behind a rock:	NM

Stream/Riparian Habitat

Channel Morphology: 94% pool, 5% riffle, 1% cascade

Substrate Composition: 40% 1g cobble, 25% boulder, 20% sand, 15% sm cobble

Stream Cover: 40% 1g cobble, 30% deep pool, 25% boulder

Aquatic Vegetation: Periphyton, unique plants (pictures)

Riparian Vegetation: Grasses, willow, moss

Barriers Present (Y/N): Unknown
Location: NA

Lakes Present (Y/N): Y
Location: DS - Steensby Inlet

L/R Bank Characteristics

Sum	
Bank Height (L/R; m):	0.05/UD
Bank Stability:	Low-moderate
Erosion Potential:	Moderate-High

Water Quality

Sum	
Specific Conductance (µS/cm):	4.00
TDS (g/l):	0.03
DO (mg/l)	10.17
%DO:	NM
Water Temp (°C):	14.36

Fish Habitat Use

Spawning:	ARCH - N NNST - L
Feeding:	ARCH - H NNST - M
Migration:	ARCH - M NNST - L

**Baffinland Iron Mines
Mary River Project**



Steensby Port Site Aquatic Habitat Assessment



Figure 1. View upstream (a) and downstream (b) from habitat assessment in Reach 1 of SPS-019 during summer 2008.



Figure 2. View across (c) the habitat assessment site in Reach 1 of SPS-019 during summer 2008.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-019
Site: SPS-019 Reach 2

UTM: 17W 594388 7801110
Dates Surveyed: 27-Jul-08, 16:20

Site Description/Physical Characteristics

Confinement: Partial Confinement

Channel Gradient: 2°

Hydrology

Sum

Bankfull Width (m): 21.03

Wetted Width (m): 2.53

Riffle-Crest Depth (m): 0.07

Pool Depth (m): 0.07

D (m): NM

D₉₅ (m): 3.75

Point Velocities (m/s)

Riffle: 0.55

Pool: 0.00

Behind a rock: NM

Stream/Riparian Habitat

Channel Morphology: 70% riffle, 30% pool (all shallow)

Substrate Composition: 10% 1g cobble, 80% sm cobble, 10% gravel

Stream Cover: 10% 1g cobble

Aquatic Vegetation: Black periphyton

Riparian Vegetation: Willows, flowers, grass, moss

Barriers Present (Y/N): Unknown
Location: NA

Lakes Present (Y/N): Y
Location: DS - Steensby Inlet

L/R Bank Characteristics

Sum

Bank Height (L/R; m): 0.2/0.5; UD

Bank Stability: Low-moderate

Erosion Potential: Moderate-High

Water Quality

Sum

Specific Conductance (µS/cm): 8.00

TDS (g/l): 0.05

DO (mg/l): 9.75

%DO: NM

Water Temp (°C): 13.50

Fish Habitat Use

Spawning: ARCH - N
NNST - N

Feeding: ARCH - H
NNST - L

Migration: ARCH - L
NNST - N

**Baffin land Iron Mines
Mary River Project**



Steensby Port Site Aquatic Habitat Assessment



Figure 1. View upstream (a) and downstream (b) from habitat assessment in Reach 2 of SPS-019 during summer 2008.



Figure 3. View across (c) the habitat assessment site in Reach 2 of SPS-019 during summer 2008.

Steensby Port Site Aquatic Habitat Assessment

Location

Crossing ID: SPS-019
UTM Coordinates: 17 W 594386 7801049

Date/Time Surveyed: 7-Aug-10 / 18:33

General Physical Characteristics

Floodplain Width (m):	N/M	Channel Pattern:	Meandering	Stage:	Low
Channel Confinement:	UC	Channel Gradient (range):	1-5°	Flow Regime:	Permanent
Bank Height (range in m):	N/M	Bank Shape:	N/A		

In Situ Water Quality Data

Temperature (°C):	16.1	Specific Conductance (mS/m):	7.8	Turbidity (NTU):	2.5
Dissolved Oxygen (mg/L):	10.45	TDS (g/L):	0.05	pH:	6.45

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)				
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max	Min
20D	1.6	1.6	0.06	0.03	0.02	N/M	0.09	0.05	0.08	N/M	N/M
0	2.0	2.0	0.03	0.03	0.08	N/M	0.54	0.21	0.08	N/M	N/M
20U	5.0	5.0	0.01	0.00	0.02	N/M	0.05	0.00	0.25	N/M	N/M

Distance and Direction from Crossing (m)	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	50	50						40	40	20	
0		50			50			40	40	20	
20U		50			50			49	50		1

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Location

Crossing ID: SPS-019
UTM Coordinates: 17 W 594386 7801049

Date/Time Surveyed: 7-Aug-10 / 18:33

Fisheries Data

Gear Used: Electrofishing
Start UTM: N/A
Effort (min): 3.0
End UTM: N/A
Electrofisher Settings: 700V, 60Hz, 12%

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	2	0.7	N/M	N/M
NNST	0	0	N/M	N/M

Fish Habitat Potential

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

Comments & Summary

Barrier at waypoint: 17 W 594389 7801040. Fish probably coming from upstream due to barrier.

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – MARGINAL

Steensby Port Site Aquatic Habitat Assessment

Location

Crossing ID: SPS-019
UTM Coordinates: 17 W 594386 7801049

Date/Time Surveyed: 7-Aug-10 / 18:33

Photographs



A



B



C



D

Figure 1. (A) Aerial view of Stream SPS-019; (B) view upstream of habitat assessment; (C) view downstream of habitat assessment; and (D) view across habitat assessment.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-022
Site: ST-022

UTM: 17 W 593754 7803165
Date/Time Surveyed: August 8, 2010 @ 13:08

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Summer

Bankfull Width (m): N/M

Wetted Width (m): N/M

Riffle-Crest Depth (m): N/A

Pool Depth (m): N/A

Max Depth (m): N/M

D₉₅ (m): N/A

Point Velocities (m/s) N/A

Lake/Stream Habitat

Channel Morphology: N/A

Substrate Composition: 40% large cobble,
40% small cobble,
10% gravel,
10% fines.

Stream Cover: N/A

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Lakes Present (Y/N): N/A
Location: N/A

Water Quality

Summer

Specific Conductance (mS/m): 0.279

TDS (g/L): 1.8

DO (mg/L): 11.44

Turbidity (NTU): 3.4

pH: 6.04

Water Temp (°C): 13.8

Fish Habitat Use

Spawning: ARCH - N
NNST - N

Rearing: ARCH - N
NNST - N

Wintering: ARCH - N
NNST - N

Migration Corridor: ARCH - N
NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING

Steensby Port Site Aquatic Habitat Assessment

Photographs



Figure 1. Aerial view of ST-022 (a), view from the shoreline (b), and substrate (c).

Fisheries Data

Gear Used:	Electrofishing
Start UTM:	17 W 593754 7803165
End UTM:	17 W 593805 7803229
Electrofisher Settings (v/Hz/cycle duty):	50/20/10
Effort (dec.min):	5.0

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	0.0	N/M	N/M
NNST	0	0.0	N/M	N/M

Comments

Lake is deep enough for over-wintering. Although no fish were caught or observed, there is a very low possibility of some marine fish entering at high tide. *in situ* salinity was measured at 0.1%.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-023
Site: ST-023

UTM: 17 W 594071 7803053
Dates Surveyed: 26-Jul-08, 9:28

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Sum

Bankfull Width (m): N/A

Wetted Width (m): N/A

Riffle-Crest Depth (m): N/A

Pool Depth (m): N/A

Max D (m): 5.80

D₉₅ (m): N/A

Point Velocities (m/s) N/A

Lake/Riparian Habitat

Substrate Composition: ~ 1m: 30% 1g cobble, 25% sm cobble, 20% fines (sand/clay), 15% boulder
 1-2m: 70% fines, 20% 1g cobble, 10% boulder

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A

Location: N/A

Water Quality

Sum

Specific Conductance (µS/cm): N/M

TDS (g/l): N/M

DO (mg/l) N/M

%DO: N/M

Water Temp (°C): 9.0

Fish Habitat Use

Spawning: ARCH - M
 NNST - H

Feeding: ARCH - H
 NNST - H

Migration: ARCH - L
 NNST - N

**Baffin land Iron Mines
 Mary River Project**



Steensby Port Site Aquatic Habitat Assessment

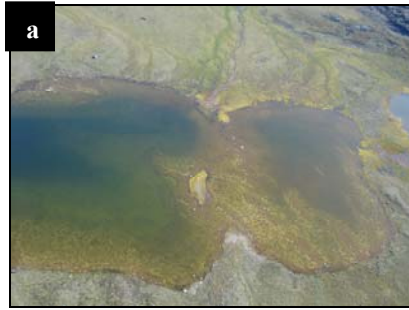


Figure 1. Aerial views of ST-023 during summer (a and b) 2008.



Figure 2. View of substrate along north shoreline of ST-023 during summer (c and d) 2008.



Figure 3. View of substrate along west shore of ST-023 during summer (e) 2008.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-024
Site: ST-024

UTM: 17 W 594419 7802579
Dates Surveyed: 04-Aug-08, 9:44

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Sum

Bankfull Width (m): N/A

Wetted Width (m): N/A

Riffle-Crest Depth (m): N/A

Pool Depth (m): N/A

Max D (m): 4.40

D₉₅ (m): N/A

Point Velocities (m/s) N/A

Lake/Riparian Habitat

Substrate Composition: E, W and S: 70% 1g cobble, 20% sand, 10% boulder
 N: 50% 1g cobble, 20% sm cobble, 20% boulder, 10% gravel

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Water Quality

Sum

Specific Conductance (µS/cm): N/M

TDS (g/l): N/M

DO (mg/l) N/M

%DO: N/M

Water Temp (°C): N/M

Fish Habitat Use

Spawning: ARCH - L
 NNST - M

Feeding: ARCH - M
 NNST - H

Migration: ARCH - N
 NNST - N

**Baffin land Iron Mines
 Mary River Project**



Steensby Port Site Aquatic Habitat Assessment



Figure 1. Pan view from shore (a and b) of ST-024 during summer 2008.



Figure 2. View of substrate (c and d) of ST-024 during summer 2008.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-026
Site: ST-026

UTM: 17 W 594736 7802832
Date/Time Surveyed: August 9, 2010 @ 11:32

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Summer

Bankfull Width (m):	N/M
Wetted Width (m):	N/M
Riffle-Crest Depth (m):	N/A
Pool Depth (m):	N/A
Max Depth (m):	N/M
D₉₅ (m):	N/A
Point Velocities (m/s)	N/A

Lake/Stream Habitat

Channel Morphology: N/A

Substrate Composition: 10 boulders,
5% large cobble,
85% fines.

Stream Cover: N/A

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Lakes Present (Y/N): N/A
Location: N/A

Water Quality

Summer

Specific Conductance (mS/m):	8.2
TDS (g/L):	0.05
DO (mg/L):	11.07
Turbidity (NTU):	3.2
pH:	6.32
Water Temp (°C):	15.5

Fish Habitat Use

Spawning:	ARCH - N NNST - H
Rearing:	ARCH - L NNST - H
Wintering:	ARCH - N NNST - L
Migration Corridor:	ARCH - N NNST - M

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Photographs



Figure 1. Aerial view of ST-026 (a), view from the shoreline (b), substrate.

Fisheries Data

Gear Used:	Electrofishing
Start UTM:	17 W 594736 7802832
End UTM:	17 W 594673 7802845
Electrofisher Settings (v/Hz/duty cycle):	N/M
Effort (dec.min):	5.5

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	0.0	N/M	N/M
NNST	15	2.7	45-65	N/M

Comments

Also observed many YOY NNST. Overwintering unlikely.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-027
Site: ST-027

UTM: 17 W 595126 7803529
Dates Surveyed: 26-Jul-08, 12:58

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Sum

Bankfull Width (m): N/A

Wetted Width (m): N/A

Riffle-Crest Depth (m): N/A

Pool Depth (m): N/A

Max Depth (m): 23.00

D₉₅ (m): N/A

Point Velocities (m/s) N/A

Lake/Riparian Habitat

Substrate Composition: 75% boulder/cobble,
25% compact sand
At shoreline: 50% boulder, 50%
cobble

Aquatic Vegetation: Stringy green
weeds

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Water Quality

Sum

Specific Conductance (µS/cm): N/M

TDS (g/l): N/M

DO (mg/l) N/M

%DO: N/M

Water Temp (°C): 9.0

Fish Habitat Use

Spawning: ARCH - H
NNST - L

Feeding: ARCH - H
NNST - M

Migration: ARCH - L
NNST - N

**Baffin land Iron Mines
Mary River Project**



Steensby Port Site Aquatic Habitat Assessment



Figure 1. Pan view from west shoreline of ST-027 during summer (a) 2008.



Figure 2. View of substrate along north (b) and west (c) shores of ST-027 during summer 2008.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-028
Site: ST-028

UTM: 17 W 595660 7803288
Dates Surveyed: 4-Aug-08, 16:53

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Sum

Bankfull Width (m): N/A

Wetted Width (m): N/A

Riffle-Crest Depth (m): N/A

Pool Depth (m): N/A

Max Depth (m): N/M

D₉₅ (m): N/A

Point Velocities (m/s) N/A

Lake/Shoreline Habitat

Substrate Composition: S: 50% lg cobble, 40% boulder, 10% fines

Aquatic Vegetation: Macrophytes

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Water Quality

Sum

Specific Conductance (µS/cm): N/M

TDS (g/l): N/M

DO (mg/l) N/M

%DO: N/M

Water Temp (°C): N/M

Fish Habitat Use

Spawning: ARCH - L
NNST - M

Feeding: ARCH - M
NNST - M

Migration: ARCH - N
NNST - N

**Baffin land Iron Mines
Mary River Project**



Steensby Port Site Aquatic Habitat Assessment



Figure 1. Pan view of ST-028 (a and b) during summer 2008.

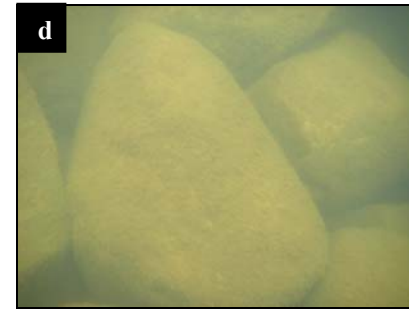


Figure 2. Shoreline view (c) and substrate view (d) of ST-028 during summer 2008.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-037
Site: ST-037

UTM: 17 W 595002 7802597
Date/Time Surveyed: August 9, 2010 @ 10:58

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Summer

Bankfull Width (m):	N/M
Wetted Width (m):	N/M
Riffle-Crest Depth (m):	N/A
Pool Depth (m):	N/A
Max Depth (m):	N/M
D₉₅ (m):	N/A
Point Velocities (m/s)	N/A

Lake/Stream Habitat

Channel Morphology: N/A

Substrate Composition: 90% fines, 10% cobble

Stream Cover: N/A

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Lakes Present (Y/N): N/A
Location: N/A

Water Quality

Summer

Specific Conductance (mS/m):	8.3
TDS (g/L):	0.05
DO (mg/L):	10.32
Turbidity (NTU):	11.9
pH:	6.35
Water Temp (°C):	15.8

Fish Habitat Use

Spawning:	ARCH - N NNST - H
Rearing:	ARCH - L NNST - H
Wintering:	ARCH - N NNST - L
Migration Corridor:	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Photographs



Figure 1. Aerial view of ST-037 (a), view from the shoreline (b), and substrate (c).

Fisheries Data

Gear Used:	Electrofishing
Start UTM:	17 W 595002 7802597
End UTM:	17 W 594965 7802530
Electrofisher Settings (v/Hz/duty cycle):	600/50/12
Effort (dec.min):	4.5

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	0.0	N/M	N/M
NNST	many YOY	N/A	N/M	N/M

Comments

YOY NNST abundant, but too small to catch. Overwintering unlikely.

Steensby Port Site Aquatic Habitat Assessment

Location	
----------	--

Watercourse Name:	ST-038
Site:	ST-038

UTM:	17 W 595557 7804633
Date/Time Surveyed:	August 9, 2010 @ 9:25

Site Description/Physical Characteristics	
1	Site Description/Physical Characteristics

Confinement:	N/A	Lake/Stream Habitat	Water Quality		
Channel Gradient:	N/A				
Hydrology					
Summer					
Bankfull Width (m):	N/M				
Wetted Width (m):	N/M				
Riffle-Crest Depth (m):	N/A				
Pool Depth (m):	N/A				
Max Depth (m):	N/M				
D₉₅ (m):	N/A				
Point Velocities (m/s)	N/A	Channel Morphology: N/A Substrate Composition: 5% boulders, 5% large cobble, 10% small cobble, 80% fines. Stream Cover: N/A Aquatic Vegetation: N/A Riparian Vegetation: N/A Barriers Present (Y/N): N/A Location: N/A Lakes Present (Y/N): N/A Location: N/A	Fish Habitat Use		
Specific Conductance (mS/m):					3.9
TDS (g/L):					0.03
DO (mg/L):					11.13
Turbidity (NTU):					2.2
pH:					4.99
Water Temp (°C):					13.2
Spawning:					ARCH - H NNST - H
Rearing:					ARCH - H NNST - H
Wintering:					ARCH - H NNST - H
Migration Corridor:		ARCH - N NNST - N			

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Photographs



Figure 1. Aerial view of ST-038 (a), view from the shoreline (b), and substrate (c).

Fisheries Data

Gear Used:	Electrofishing
Start UTM:	17 W 596012 7802648
End UTM:	17 W 596017 7802691
Electrofisher Settings (v/Hz/duty cycle):	600/60/12
Effort (dec.min):	5.0

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	3 (YOY)	0.6	30-40	N/M
NNST	4	0.8	30-65	N/M

Comments

Lake is most likely isolated. Hundreds of both fish species seen while flying over the lake.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-039
Site: ST-039

UTM: 17 W 596805 7802820
Date/Time Surveyed: August 9, 2010 @ 8:25

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Summer

Bankfull Width (m):	N/M
Wetted Width (m):	N/M
Riffle-Crest Depth (m):	N/A
Pool Depth (m):	N/A
Max Depth (m):	N/M
D₉₅ (m):	N/A
Point Velocities (m/s)	N/A

Lake/Stream Habitat

Channel Morphology: N/A

Substrate Composition: 10% fines,
10% small cobble,
60% large cobble,
20% boulders.

Stream Cover: N/A

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Lakes Present (Y/N): N/A
Location: N/A

Water Quality

Summer

Specific Conductance (mS/m):	4.4
TDS (g/L):	0.03
DO (mg/L):	9.9
Turbidity (NTU):	2.2
pH:	4.7
Water Temp (°C):	13.0

Fish Habitat Use

Spawning:	ARCH - M NNST - H
Rearing:	ARCH - H NNST - H
Wintering:	ARCH - H NNST - H
Migration Corridor:	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Photographs

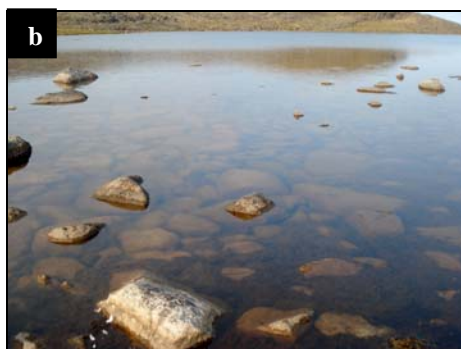


Figure 1. Aerial view of ST-039 (a), view from the shoreline (b), and substrate (c).

Fisheries Data

Gear Used:	Electrofishing
Start UTM:	17 W 596805 7802820
End UTM:	17 W 596784 7802840
Electrofischer Settings (v/Hz/duty cycle):	400/60/12
Effort (dec.min):	5.5

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	3	0.55	110-150	N/M
NNST	6	1.1	40-60	N/M

Comments

This site possibly connected to ST-038 during high water.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-040
Site: ST-040

UTM: 17 W 596307 7802236
Date/Time Surveyed: August 9, 2010 @ 8:44

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Summer

Bankfull Width (m):	N/M
Wetted Width (m):	N/M
Riffle-Crest Depth (m):	N/A
Pool Depth (m):	N/A
Max Depth (m):	N/M
D₉₅ (m):	N/A
Point Velocities (m/s)	N/A

Lake/Stream Habitat

Channel Morphology: N/A

Substrate Composition: 10% fines,
10% small cobble,
60% large cobble,
20% boulders

Stream Cover: N/A

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Lakes Present (Y/N): N/A
Location: N/A

Water Quality

Summer

Specific Conductance (mS/m):	2.7
TDS (g/L):	0.02
DO (mg/L):	10.46
Turbidity (NTU):	2.3
pH:	4.7
Water Temp (°C):	13.8

Fish Habitat Use

Spawning:	ARCH - N NNST - H
Rearing:	ARCH - L NNST - H
Wintering:	ARCH - L NNST - H
Migration Corridor:	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Photographs

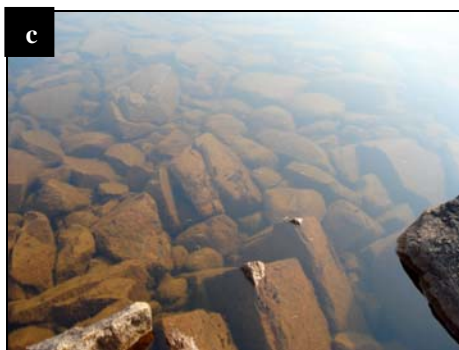


Figure 1. Aerial view of ST-040 (a), view from the shoreline (b), and substrate (c).

Fisheries Data

Gear Used:	Electrofishing
Start UTM:	17 W 596307 7802236
End UTM:	17 W 596328 7802221
Electrofisher Settings (v/Hz/duty cycle):	600/60/12
Effort (dec.min):	6.0

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	0.0	N/M	N/M
NNST	61	10.2	N/M	N/M

Comments

Never connected to ST-038 in any water condition.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-002b
UTM Coordinates: 17 W 594533 7802876

Date/Time Surveyed: August 9, 2010 @ 11:48

General Physical Characteristics

Floodplain Width (m):	>100	Channel Pattern:	Braided	Stage:	Low
Channel Confinement:	UC	Channel Gradient (range):	(U/S)1-2° (D/S)3-4°	Flow Regime:	Permanent
Bank Height (range in m):	Undefined	Bank Shape:	Undefined		

In Situ Water Quality Data

Temperature (°C):	N/M	Specific Conductance (mS/m):	N/M	Turbidity (NTU):	N/M
Dissolved Oxygen (mg/L):	N/M	TDS (g/L):	N/M	pH:	N/M

Hydrology & Habitat Characteristics

Distance and Direction from Assessment UTM (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)				
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max	Min
20D	N/M	N/M	N/M	N/M	N/M	N/M	N/M	N/M	N/M	0.50	N/M
0	N/M	N/M	0.04	0.08	0.06	0.10	0.41	0.07	0.46	0.50	N/M
20U	N/M	N/M	N/M	N/M	N/M	N/M	N/M	N/M	N/M	0.10	N/M

Distance and Direction from Assessment UTM (m)	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	50	40	10				10	10	30	45	5
0	50	40	10				10	10	30	45	5
20U	20	80					90			10	

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-002b
UTM Coordinates: 17 W 594533 7802876

Date/Time Surveyed: August 9, 2010 @ 11:48

Fisheries Data

Gear Used: Electrofishing **Effort (min):** 6 **Electrofisher Settings:** N/A
Start UTM: N/A **End UTM:** N/A

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	3	0.5	120-205	N/M
NNST	47	7.8	50-70	N/M

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	H (lower reaches)	L
NNST	M	N	H	H

Comments & Summary

Braided/marshy; downstream more channel-like. Upstream of waypoint is marshy/braided (only NNST present). Downstream of waypoint is similar to waypoint. Everything from ST-037 to large downstream lake connected. ARCH most likely do not pass upstream marshy area.

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-002b
UTM Coordinates: 17 W 594533 7802876

Date/Time Surveyed: August 9, 2010 @ 11:48

Photographs



A



B



C



D



E

Figure 1. (A) Upstream and (B) downstream aerial views of stream SPS-002b; (C) view upstream of the habitat assessment; (D) view downstream of the habitat assessment; (E) view across the habitat assessment .

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-002e
UTM Coordinates: 17 W 596037 7802623

Date/Time Surveyed: August 9, 2010 @ 9:02

General Physical Characteristics

Floodplain Width (m):	>100	Channel Pattern:	Sinuuous	Stage:	Low
Channel Confinement:	UC	Channel Gradient (range):	1-3°	Flow Regime:	Permanent
Bank Height (range in m):	0.20	Bank Shape:	Vertical		

In Situ Water Quality Data

Temperature (°C):	10.0	Specific Conductance (mS/m):	3.9	Turbidity (NTU):	1.2
Dissolved Oxygen (mg/L):	12.04	TDS (g/L):	0.03	pH:	4.38

Hydrology & Habitat Characteristics

Distance and Direction from Assessment UTM (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)				
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max	Min
0	0.2-0.5	N/M	0.17	0.17	0.17	0.30	0.00	0.01	0.15	0.47	N/M

Distance and Direction from Assessment UTM (m)	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	45	45				5	5	60	30	

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-002e

Date/Time Surveyed: August 9, 2010 @ 9:02

UTM Coordinates: 17 W 596037 7802623

Fisheries Data

Gear Used: Electrofishing

Effort (min): 6.0

Electrofisher Settings: 600V, 60Hz, 12%

Start UTM: N/M

End UTM: N/M

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	23	3.8	32-120	N/M
NNST	1	0.2	N/M	N/M

Fish Habitat Potential

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

Comments & Summary

The stream channel is fairly uniform in shape. Definite spawning in d/s lake; not connected u/s even in high water. Electrofished from lake to 50m u/s. YOY ARCH present. No fish present upstream of barrier.

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-002e
UTM Coordinates: 17 W 596037 7802623

Date/Time Surveyed: August 9, 2010 @ 9:02

Photographs



A



B



C

Figure 1. (A) view upstream of habitat assessment; (B) view downstream of habitat assessment; and (C) view across the habitat assessment site.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-002h
UTM Coordinates: 17 W 593674 7802850

Date/Time Surveyed: August 8, 2010 @ 13:31

General Physical Characteristics

Floodplain Width (m):	>100	Channel Pattern:	Sinuuous	Stage:	Low
Channel Confinement:	UC	Channel Gradient (range):	5°	Flow Regime:	Permanent
Bank Height (range in m):	Undefined	Bank Shape:	Undefined		

In Situ Water Quality Data

Temperature (°C):	19.9	Specific Conductance (mS/m):	19.5	Turbidity (NTU):	2.8
Dissolved Oxygen (mg/L):	9.34	TDS (g/L):	0.13	pH:	6.41

Hydrology & Habitat Characteristics

Distance and Direction from Assessment UTM (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)				
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max	Min
0	0.80	N/M	N/M	0.10	N/M	N/M	N/M	0.10	N/M	N/M	N/M

Distance and Direction from Assessment UTM (m)	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					95		5		5

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-002h

Date/Time Surveyed: August 8 2010 @ 13:31

UTM Coordinates: 17 W 593674 7802850

Fisheries Data

Gear Used: Electrofishing

Effort (min): 2.5

Electrofisher Settings: 400V, 50 Hz, 12%

Start UTM: N/M

End UTM: N/M

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	15	6.0	N/M	N/M
NNST	2	0.8	45-55	N/M

Fish Habitat Potential

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

Comments & Summary

Flooded vegetation entire way down.

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-002h
UTM Coordinates: 17 W 593674 7802850

Date/Time Surveyed: August 8, 2010 @ 13:31

Photographs



A



B



C

Figure 1. (A) view upstream of the habitat assessment; (B) view downstream of the habitat assessment; (C) view across the habitat assessment.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-002i (formerly SPS-023)
Site: SPS-002i

UTM: 17 W 594246 7803513
Dates Surveyed: 27-Jul-08, 11:08

Site Description/Physical Characteristics

Confinement: Unconfined to Partial

Channel Gradient: 4°

Hydrology

Sum

Bankfull Width (m): 30.18

Wetted Width (m): 3.87

Riffle-Crest Depth (m): 0.16

Pool Depth (m): 0.25

D (m): NM

D₉₅ (m): 4.20

Point Velocities (m/s)

Riffle: 0.39

Pool: 0.10

Behind a rock: NM

Stream/Riparian Habitat

Channel Morphology: 65% riffle, 35% pool

Substrate Composition: DS - 60% 1g cobble, 20% boulder, 10% sm cobble, 10% FT; US - 60% boulder, 40% 1g cobble

Stream Cover: 60% 1g cobble, 20% boulder, 20% UC banks, 15% d. pool

Aquatic Vegetation: flooded terrestrial, periphyton

Riparian Vegetation: Grasses, willow, moss, wildflowers

Barriers Present (Y/N): Unknown
Location: NA

Lakes Present (Y/N): Y
Location: DS; US

L/R Bank Characteristics

Sum

Bank Height (L/R; m): NM

Bank Stability: Low-moderate

Erosion Potential: Moderate-high

Water Quality

Sum

Specific Conductance (µS/cm): 18.00

TDS (g/l): 0.12

DO (mg/l): 10.37

%DO: NM

Water Temp (°C): 11.40

Fish Habitat Use

Spawning: ARCH - N
NNST - M

Feeding: ARCH - H
NNST - H

Migration: ARCH - M
NNST - M

**Baffin land Iron Mines
Mary River Project**



Steensby Port Site Aquatic Habitat Assessment



Figure 1. View upstream (a) and downstream (b) from habitat assessment of SPS-002i during summer 2008.



Figure 3. View across (c) the habitat assessment site of SPS-002i during summer 2008.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-017
Site: SPS-017

UTM: 17 W 595001 7802717
Dates Surveyed: 27-Jul-08, 12:17

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: <1°

Hydrology

Sum

Bankfull Width (m): 40.23

Wetted Width (m): 4.07

Riffle-Crest Depth (m): 0.16

Pool Depth (m): 0.32

D (m): NM

D₉₅ (m): 3.00

Point Velocities (m/s)

Riffle: 0.45

Pool: 0.11

Behind a rock: NM

Stream/Riparian Habitat

Channel Morphology: 60% riffle, 40% pool
(35% shallow, 5% deep)

Substrate Composition: 53% FT, 20% sm cobble, 15% 1g cobble, 10% fines, 2% boulder

Stream Cover: 53% FT, 5% 1g cobble, 5% deep pool, 2% boulder

Aquatic Vegetation: None

Riparian Vegetation: Grass, moss, wildflower, willow

Barriers Present (Y/N): Unknown
Location: NA

Lakes Present (Y/N): Y
Location: DS; US

L/R Bank Characteristics

Sum

Bank Height (L/R; m): 0.10/None

Bank Stability: Low

Erosion Potential: High

Water Quality

Sum

Specific Conductance (µS/cm): 4.00

TDS (g/l): 0.02

DO (mg/l): 10.40

%DO: NM

Water Temp (°C): 12.60

Fish Habitat Use

Spawning: ARCH - N
NNST - H

Feeding: ARCH - L
NNST - H

Migration: ARCH - N
NNST - H

**Baffinland Iron Mines
Mary River Project**



Steensby Port Site Aquatic Habitat Assessment



Figure 1. View upstream (a) and downstream (b) from habitat assessment in reach 1 of SPS-017 during summer 2008.



Figure 2. View across (c) the habitat assessment site in reach 1 of SPS-017 during summer 2008.

Steensby Port Site Aquatic Habitat Assessment

Location

Crossing ID: SPS-017
UTM Coordinates: 17 W 594978 7802736

Date/Time Surveyed: 9-Aug-10 / 11:10

General Physical Characteristics

Floodplain Width (m):	>100	Channel Pattern:	Sinuuous/braided	Stage:	Low
Channel Confinement:	UC	Channel Gradient (range):	1-3°	Flow Regime:	Permanent
Bank Height (range in m):	Undefined	Bank Shape:	Undefined		

In Situ Water Quality Data

Temperature (°C):	16.0	Specific Conductance (mS/m):	7.7	Turbidity (NTU):	3.7
Dissolved Oxygen (mg/L):	11.22	TDS (g/L):	0.05	pH:	6.08

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)				
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max	Min
0	1.7	21.7	0.17	0.09	0.08	N/M	0.20	0.09	0.00	N/M	N/M

Distance and Direction from Crossing (m)	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							40			40	20
0	10	80	10				40			40	20
20U							70			30	

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Location

Crossing ID: SPS-017
UTM Coordinates: 17 W 594978 7802736

Date/Time Surveyed: 9-Aug-10 / 11:10

Fisheries Data

Gear Used: Electrofishing
Start UTM: 50m upstream of site coordinates
Effort (min): 6.0
End UTM: 50m downstream of site coordinates
Electrofisher Settings: 600V, 50Hz, 12%

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	0	N/M	N/M
NNST	38	6.3	N/M	N/M

Fish Habitat Potential

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

Comments & Summary

Stream morphology and substrate composition is very similar downstream of assessment point.

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Location

Crossing ID: SPS-017
UTM Coordinates: 17 W 594978 7802736

Date/Time Surveyed: 9-Aug-10 / 11:10

Photographs



A



B



C

Figure 1. (A) view upstream of habitat assessment; (B) view downstream of habitat assessment; and (C) view across habitat assessment.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-022
Site: SPS-022

UTM: 17 W 593838 7803137
Dates Surveyed: 27-Jul-08, 10:27

Site Description/Physical Characteristics

Confinement: Unconfined to Partial Confinement

Channel Gradient: 3°

Hydrology

Sum

Bankfull Width (m): 121.62

Wetted Width (m): 12.20

Riffle-Crest Depth (m): 0.11

Pool Depth (m): 0.31

D (m): NM

D₉₅ (m): 4.10

Point Velocities (m/s)

Riffle: 0.37

Pool: 0.00

Behind a rock: 0.02

Stream/Riparian Habitat

Channel Morphology: 65% riffle, 30% pool, 5% cascade

Substrate Composition: 50% boulder, 50% 1g cobble

Stream Cover: 50% boulder, 40% 1g cobble, 10% deep pool

Aquatic Vegetation: Periphyton (orange and green)

Riparian Vegetation: Grasses, willow, moss, wildflowers

Barriers Present (Y/N): Unknown
Location: NA

Lakes Present (Y/N): Y
Location: DS; US

L/R Bank Characteristics

Sum

Bank Height (L/R; m): No banks – FT

Bank Stability: Undefined

Erosion Potential: moderate

Water Quality

Sum

Specific Conductance (µS/cm): 15.00

TDS (g/l): 0.09

DO (mg/l): 10.25

%DO: NM

Water Temp (°C): 11.42

Fish Habitat Use

Spawning: ARCH - N
 NNST - H

Feeding: ARCH - M
 NNST - H

Migration: ARCH - L
 NNST - H

**Baffin land Iron Mines
 Mary River Project**



Steensby Port Site Aquatic Habitat Assessment



Figure 1. View upstream (a) and downstream (b) from habitat assessment of SPS-022 during summer 2008.

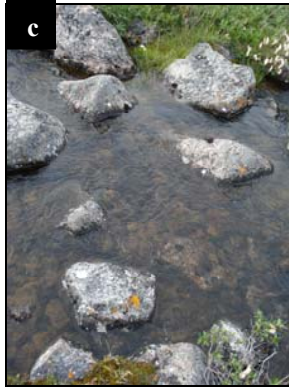


Figure 2. View across (c) the habitat assessment site of SPS-022 during summer 2008.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-085
Site: ST-085

UTM: 17 W 594859 7804478
Date/Time Surveyed: August 9, 2010 @ 10:41

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Summer

Bankfull Width (m):	N/M
Wetted Width (m):	N/M
Riffle-Crest Depth (m):	N/A
Pool Depth (m):	N/A
Max Depth (m):	N/M
D₉₅ (m):	N/A
Point Velocities (m/s)	N/A

Lake/Stream Habitat

Channel Morphology: N/A

Substrate Composition: 40% large cobble, 10% small cobble, 5% gravel, 45% fines.

Stream Cover: N/A

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Lakes Present (Y/N): N/A
Location: N/A

Water Quality

Summer

Specific Conductance (mS/m):	2.5
TDS (g/L):	0.02
DO (mg/L):	10.82
Turbidity (NTU):	5.9
pH:	6.57
Water Temp (°C):	14.9

Fish Habitat Use

Spawning:	ARCH - N NNST - N
Rearing:	ARCH - N NNST - N
Wintering:	ARCH - N NNST - N
Migration Corridor:	ARCH - N NNST - N

**Baffinland Iron Mines
 Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING

Steensby Port Site Aquatic Habitat Assessment

Photographs



Figure 1. View from the shoreline of ST-085 (a,b) and substrate (c).

Fisheries Data

Gear Used:	Electrofishing
Start UTM:	17W 594859 7804478
End UTM:	17W 594819 7804506
Electrofisher Settings (v/Hz/duty cycle):	600/50/12
Effort (dec.min):	5.0

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	0.0	N/M	N/M
NNST	0	0.0	N/M	N/M

Comments

Over-wintering possible but no fish were caught/observed.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-086
Site: ST-086

UTM: 17 W 595557 7804633
Date/Time Surveyed: August 9, 2010 @ 10:05

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Summer

Bankfull Width (m):	N/M
Wetted Width (m):	N/M
Riffle-Crest Depth (m):	N/A
Pool Depth (m):	N/A
Max Depth (m):	N/M
D₉₅ (m):	N/A
Point Velocities (m/s)	N/A

Lake/Stream Habitat

Channel Morphology: N/A

Substrate Composition: 30% boulders,
10% large cobble,
10% small cobble,
50% fines.

Stream Cover: N/A

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Lakes Present (Y/N): N/A
Location: N/A

Water Quality

Summer

Specific Conductance (mS/m):	24.7
TDS (g/L):	0.16
DO (mg/L):	10.54
Turbidity (NTU):	5.1
pH:	6.15
Water Temp (°C):	14.2

Fish Habitat Use

Spawning:	ARCH - N NNST - H
Rearing:	ARCH - N NNST - H
Wintering:	ARCH - N NNST - L
Migration Corridor:	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Photographs



Figure 1. View from the shoreline of ST-086 (a,b,c).

Fisheries Data

Gear Used:	Electrofishing
Start UTM:	17W 595519 7804590
End UTM:	17W 595557 7804633
Electrofisher Settings (v/Hz/duty cycle):	200/20/10
Effort (dec.min):	6.5

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	0.0	N/M	N/M
NNST	17	2.6	N/M	N/M

Comments

ARCH not present and overwintering unlikely, but it does provide suitable NNST spawning and rearing habitat.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-003b
UTM Coordinates: 17 W 595647 7804645

Date/Time Surveyed: August 9, 2010 @ 10:19

General Physical Characteristics

Floodplain Width (m):	>100	Channel Pattern:	Meandering	Stage:	Low
Channel Confinement:	UC	Channel Gradient (range):	1- 5/6°	Flow Regime:	Permanent
Bank Height (range in m):	Undefined	Bank Shape:	Undefined		

In Situ Water Quality Data

Temperature (°C):	15.1	Specific Conductance (mS/m):	25.2	Turbidity (NTU):	3.7
Dissolved Oxygen (mg/L):	11.35	TDS (g/L):	0.16	pH:	6.26

Hydrology & Habitat Characteristics

Distance and Direction from Assessment UTM (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)				
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max	Min
0	N/M	N/M	N/M	N/M	N/M	0.25	N/M	N/M	N/M	0.05	N/M

Distance and Direction from Assessment UTM (m)	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	1	94	5				100				

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-003b **Date/Time Surveyed:** August 9, 2010 @ 10:19
UTM Coordinates: 17 W 595647 7804645

Fisheries Data

Gear Used: Electrofishing **Effort (min):** 3.5 **Electrofisher Settings:** 200V, 20Hz, 10%
Start UTM: 17 W 595647 7804645 **End UTM:** 17 W 595577 7804660

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	0	N/M	N/M
NNST	~50 (including YOY)	~14.3	YOY - 60	N/M

Fish Habitat Potential

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

Comments & Summary

Stream dries up half way between big lake and ST-086.

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-003b
UTM Coordinates: 17 W 595647 7804645

Date/Time Surveyed: August 9, 2010 @ 10:19

Photographs



A



B



C

Figure 1. (A) view upstream of habitat assessment; (B) view downstream of habitat assessment; and (C) view across habitat assessment of SPS-003b.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-090
Site: ST-090

UTM: 17 W 597829 7803135
Date/Time Surveyed: August 8, 2010 @ 8:35

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Summer

Bankfull Width (m):	N/M
Wetted Width (m):	N/M
Riffle-Crest Depth (m):	N/A
Pool Depth (m):	N/A
Max Depth (m):	N/M
D₉₅ (m):	N/A
Point Velocities (m/s)	N/A

Lake/Stream Habitat

Channel Morphology: N/A

Substrate Composition: 20% boulders,
20% large cobble,
5% small cobble,
5% gravel,
50% fines.

Stream Cover: N/A

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Lakes Present (Y/N): N/A
Location: N/A

Water Quality

Summer

Specific Conductance (mS/m):	6.8
TDS (g/L):	0.04
DO (mg/L):	11.58
Turbidity (NTU):	2.2
pH:	4.25
Water Temp (°C):	12.6

Fish Habitat Use

Spawning:	ARCH - H NNST - H
Rearing:	ARCH - H NNST - H
Wintering:	ARCH - H NNST - H
Migration Corridor:	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Photographs



Figure 1. View from the shoreline of ST-090 (a,b,c).

Fisheries Data

Gear Used:	Electrofishing
Start UTM:	17 W 597829 7803135
End UTM:	17 W 597811 7803099
Electrofisher Settings (v/Hz/duty cycle):	700/60/12
Effort (dec.min):	5.5

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	7	1.3	60-120	N/M
NNST	6	1.1	40-65	N/M

Comments

Deep enough for over-wintering and provides suitable spawning habitat for both species.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-092
Site: ST-092

UTM: 17 W 597272 7803425
Dates Surveyed: 30-Jul-08, 08:01

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Sum

Bankfull Width (m): N/A

Wetted Width (m): N/A

Riffle-Crest Depth (m): N/A

Pool Depth (m): N/A

Max D (m): N/M

D₉₅ (m): N/A

Point Velocities (m/s) N/A

Lake/Riparian Habitat

Substrate Composition: SE: 30% boulders, 30% 1g cobble, 30% sand/silt, 10% sm cobble
S: 70% sand, 30% boulder

Aquatic Vegetation: macrophytes

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Water Quality

Sum

Specific Conductance (µS/cm): N/M

TDS (g/l): N/M

DO (mg/l) N/M

%DO: N/M

Water Temp (°C): N/M

Fish Habitat Use

Spawning: ARCH - H
NNST - H

Feeding: ARCH - H
NNST - H

Migration: ARCH - L
NNST - L

**Baffin land Iron Mines
Mary River Project**



Steensby Port Site Aquatic Habitat Assessment

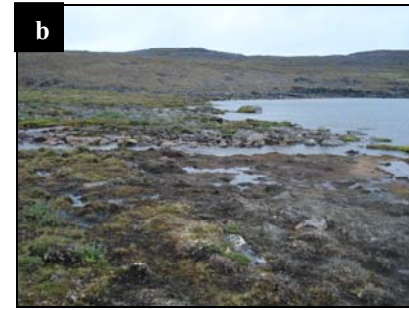


Figure 1. Pan view from SE shore of ST-092 during summer (a and b) 2008.



Figure 2. View of substrate along SE shore (c) and of the south shore substrate and macrophytes (d) of ST-092 during summer 2008.

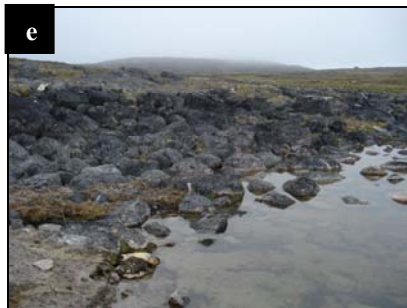


Figure 3. View of south shoreline (e) and south shoreline clay (f) of ST-092 during summer 2008.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-092
Site: ST-092

UTM: 17 W 597628 7803035
Date/Time Surveyed: August 8, 2010 @ 9:32

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Summer

Bankfull Width (m):	N/M
Wetted Width (m):	N/M
Riffle-Crest Depth (m):	N/A
Pool Depth (m):	N/A
Max Depth (m):	N/M
D₉₅ (m):	N/A
Point Velocities (m/s)	N/A

Lake/Stream Habitat

Channel Morphology: N/A

Substrate Composition: 5% boulders,
5% large cobble,
10% gravel,
80% fines.

Stream Cover: N/A

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Lakes Present (Y/N): N/A
Location: N/A

Water Quality

Summer

Specific Conductance (mS/m):	9.0
TDS (g/L):	0.06
DO (mg/L):	11.86
Turbidity (NTU):	3.5
pH:	5.37
Water Temp (°C):	13.2

Fish Habitat Use

Spawning:	ARCH - H NNST - H
Rearing:	ARCH - H NNST - H
Wintering:	ARCH - H NNST - H
Migration Corridor:	ARCH - L NNST - L

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Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Photographs



Figure 1. View from the shoreline of ST-092 (a,b) and substrate (c).

Fisheries Data

Gear Used:	Electrofishing
Start UTM:	17 W 597628 7803035
End UTM:	17 W 597613 7803079
Electrofisher Settings (v/Hz/duty cycle):	700/60/12
Effort (dec.min):	5.5

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	12	2.2	30-45	N/M
NNST	4	0.7	30-40	N/M

Comments

Overwintering site; confirmed spawning for both species in this lake (presence of YOY ARCH and NNST).

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-093
Site: ST-093

UTM: 17 W 596856 7803902
Date/Time Surveyed: August 8, 2010 @ 10:16

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Summer

Bankfull Width (m):	N/M
Wetted Width (m):	N/M
Riffle-Crest Depth (m):	N/A
Pool Depth (m):	N/A
Max Depth (m):	N/M
D₉₅ (m):	N/A
Point Velocities (m/s)	N/A

Lake/Stream Habitat

Channel Morphology: N/A

Substrate Composition: 5% boulders,
5% large cobble,
5% small cobble,
5% gravel,
80% fines.

Stream Cover: N/A

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Lakes Present (Y/N): N/A
Location: N/A

Water Quality

Summer

Specific Conductance (mS/m):	9.5
TDS (g/L):	0.06
DO (mg/L):	11.80
Turbidity (NTU):	20.1
pH:	5.54
Water Temp (°C):	14.1

Fish Habitat Use

Spawning:	ARCH - M NNST - H
Rearing:	ARCH - H NNST - H
Wintering:	ARCH - M NNST - M
Migration Corridor:	ARCH - L NNST - L

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Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Photographs

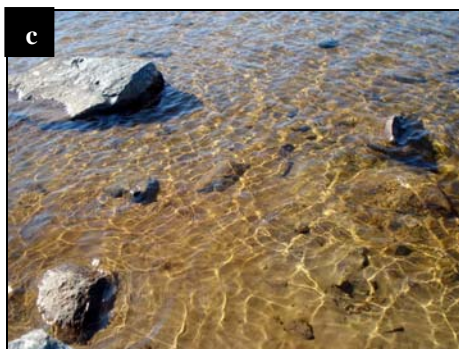


Figure 1. View from the shoreline of ST-093 (a,b) and substrate.

Fisheries Data

Gear Used:	Electrofishing
Start UTM:	17 W 597856 7803902
End UTM:	17 W 596830 7803981
Electrofisher Settings (v/Hz/duty cycle):	700/60/12
Effort (dec.min):	7.0

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	5	0.7	N/M	N/M
NNST	1	0.1	N/M	N/M

Comments

This lake is connected to upstream lake ST-092 and provides abundant habitat for both species.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-004a
UTM Coordinates: 17 W 596789 7804142

Date/Time Surveyed: August 8, 2010 @ 10:37

General Physical Characteristics

Floodplain Width (m):	N/M	Channel Pattern:	Sinuuous	Stage:	Low
Channel Confinement:	UC	Channel Gradient (range):	1-10°	Flow Regime:	Permanent
Bank Height (range in m):	undefined	Bank Shape:	undefined		

In Situ Water Quality Data

Temperature (°C):	13.8	Specific Conductance (mS/m):	9.6	Turbidity (NTU):	1.9
Dissolved Oxygen (mg/L):	11.10	TDS (g/L):	0.06	pH:	5.60

Hydrology & Habitat Characteristics

Distance and Direction from Assessment UTM (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)				
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max	Min
0	50.6	4.3	0.11	0.10	0.09	N/M	0.17	0.17	0.00	N/M	N/M
20U	2.7	2.7	0.16	0.18	0.21	N/M	0.00	0.17	0.07	N/M	N/M

Distance and Direction from Assessment UTM (m)	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	45	5					40	30	20	10
20U		15	60		25			5	70	20	5

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-004a

Date/Time Surveyed: August 8, 2010 @ 10:37

UTM Coordinates: 17 W 596789 7804142

Fisheries Data

Gear Used: Electrofishing

Electrofisher Settings: 700V, 60Hz, 12%

Effort 1 (min): 2.0

Start UTM: 17 W 596796 7804048

End UTM: N/A

Effort 2 (min): 4.0

Start UTM: 17 W 596789 7804142

End UTM: 17W 596780 7804084

Effort 3 (min): 3.0

Start UTM: N/A

End UTM: N/A

1

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	17	8.5	70-250	N/M
NNST	0	0.0	N/M	N/M

2

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	53	13.3	60-200 (75%<100)	N/M
NNST	0	0.0	N/M	N/M

3

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	42	14.0	~50-100	N/M
NNST	1	0.3	N/M	N/M

Fish Habitat Potential

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

Comments & Summary

Potential waterfall barriers at 17 W 596791 7804077 and 17 W 596780 7804084. Fish definitely coming from upstream.

Subterranean flow at 17 W 596789 7804142 then resumes at surface at 17 W 596815 7804175, then is connected to d/s lake.

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Fish Habitat Quality – IMPORTANT

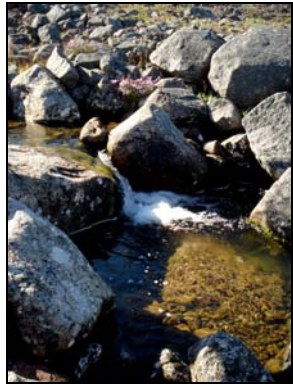
Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-004a
UTM Coordinates: 17 W 596789 7804142

Date/Time Surveyed: August 8, 2010 @ 10:37

Photographs



A



B



C



D



E



F



G

Figure 1. (A) view of potential barrier upstream of habitat assessment 1; (B) view upstream of habitat assessment 1; (C) view downstream of habitat assessment 1(including start of subterranean flow); (D) view across habitat assessment 1; (E) view upstream of habitat assessment 2 (and resumed surface flow); (F) view downstream of habitat assessment 2; (G) view across habitat assessment 2.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-004c

Date/Time Surveyed: August 8, 2010 @ 8:54

UTM Coordinates: half way between 17 W 597628 7803035 and 17 W 597613 7803079

General Physical Characteristics

Floodplain Width (m):	N/M	Channel Pattern:	Straight	Stage:	Low
Channel Confinement:	UC	Channel Gradient (range):	1°	Flow Regime:	Permanent
Bank Height (range in m):	undefined	Bank Shape:	undefined		

In Situ Water Quality Data

Temperature (°C):	12.5	Specific Conductance (mS/m):	6.6	Turbidity (NTU):	5.8
Dissolved Oxygen (mg/L):	12.22	TDS (g/L):	0.04	pH:	5.13

Hydrology & Habitat Characteristics

Distance and Direction from Assessment UTM (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)				
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max	Min
20D	18.0	30.7	0.17	0.07	0.06	N/M	0.50	0.19	0.00	N/M	N/M
0	18.7	29.5	0.15	0.06	0.12	N/M	0.05	0.08	0.02	N/M	N/M
20U	30.2	34.4	0.20	0.12	0.06	N/M	0.00	0.13	0.00	N/M	N/M

Distance and Direction from Assessment UTM (m)	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	50	45	5				30			60	10
0	30	70					30			50	20
20U	10	90					30			60	10

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Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-004c **Date/Time Surveyed:** August 8, 2010 @ 8:54
UTM Coordinates: half way between 17 W 597628 7803035 and 17 W 597613 7803079

Fisheries Data

Gear Used: Electrofishing **Effort (min):** 6.0 **Electrofisher Settings:** 700V, 60Hz, 12%
Start UTM: 17 W 596796 7804048 **End UTM:** N/A

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	18	3	63-106	N/M
NNST	3	0.5	52-79	N/M

Fish Habitat Potential

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

Comments & Summary

40m d/s is lake; ~40m u/s is lake - accessible to both u/s and d/s. Electrofished entire stream.

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Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

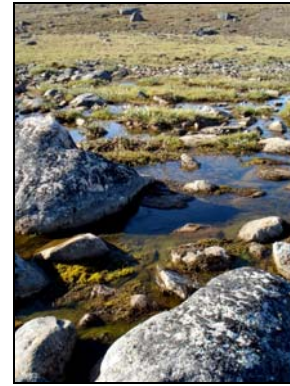
Location

Watercourse Name: SPS-004c

Date/Time Surveyed: August 8, 2010 @ 8:54

UTM Coordinates: half way between 17 W 597628 7803035 and 17 W 597613 7803079

Photographs



A

B

C

Figure 1. (A) view upstream from habitat assessment; (B) view downstream of habitat assessment; and (C) view across habitat assessment.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-353 (formerly 3km Lake)
Site: ST-353

UTM: 17W 596720 7800132
Dates Surveyed: 6-Aug-08, 10:32

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Sum

Bankfull Width (m):

N/A

Wetted Width (m):

N/A

Riffle-Crest Depth (m):

N/A

Pool Depth (m):

N/A

Max Depth (m):

See bathymetry/substrate mapping results

D₉₅ (m):

N/A

Point Velocities (m/s)

N/A

Lake/Shoreline Habitat

Substrate Composition: 30% sm cobble, 30% 1g cobble, 25% boulder, 15% gravel

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Water Quality

Sum

Specific Conductance (µS/cm):

N/M

TDS (g/l):

N/M

DO (mg/l)

N/M

%DO:

N/M

Water Temp (°C):

N/M

Fish Habitat Use

Spawning:

ARCH - H
NNST - M

Feeding:

ARCH - H
NNST - M

Migration:

ARCH - N/A
NNST - N/A

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North/South Consultants Inc.
Aquatic Environment Specialists

Steensby Port Site Aquatic Habitat Assessment



Figure 1. Aerial view of ST-353 during summer 2008.

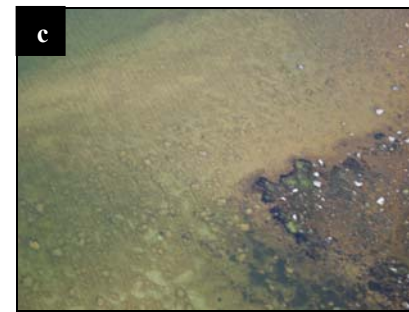


Figure 2. Aerial views (b and c) of ST-353 shoreline substrate during summer 2008.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-051
Site: ST-051

UTM: 17 W 597930 7800470
Date/Time Surveyed: August 8, 2010 @ 16:36

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Summer

Bankfull Width (m):	N/M
Wetted Width (m):	N/M
Riffle-Crest Depth (m):	N/A
Pool Depth (m):	N/A
Max Depth (m):	N/M
D₉₅ (m):	N/A
Point Velocities (m/s)	N/A

Lake/Stream Habitat

Channel Morphology: N/A

Substrate Composition: 5% boulders,
5% large cobble,
5% small cobble,
85% fines.

Stream Cover: N/A

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Lakes Present (Y/N): N/A
Location: N/A

Water Quality

Summer

Specific Conductance (mS/m):	17.6
TDS (g/L):	0.11
DO (mg/L):	10.93
Turbidity (NTU):	14.6
pH:	5.89
Water Temp (°C):	15.5

Fish Habitat Use

Spawning:	ARCH - N NNST - H
Rearing:	ARCH - L NNST - H
Wintering:	ARCH - L NNST - L
Migration Corridor:	ARCH - L NNST - M

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Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Photographs



Figure 1. Aerial view of ST-051 (a), view from the shoreline (b), and substrate (c).

Fisheries Data

Gear Used:	Observation
Start UTM:	17 W 598004 7800487
End UTM:	17 W 597930 7800470
Electrofisher Settings (v/Hz/duty cycle):	N/A
Effort (dec.min):	N/A

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	N/A	N/A	N/M	N/M
NNST	~20	N/A	N/M	N/M

Comments

Overwintering potential low, but it may be connected to more ideal locations.

Steensby Port Site Aquatic Habitat Assessment

Location	
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Watercourse Name:	ST-052
Site:	ST-052

UTM:	17 W 598190 7800274
Date/Time Surveyed:	August 8, 2010 @ 16:18

Site Description/Physical Characteristics	
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Confinement:	N/A	Lake/Stream Habitat		Water Quality	
Channel Gradient:	N/A	Channel Morphology:	N/A	Summer	
Hydrology		Substrate Composition:	1% boulders, 4% large cobble, 10% small cobble, 85% fines.	Specific Conductance (mS/m):	21.0
Summer		Stream Cover:	N/A	TDS (g/L):	0.14
Bankfull Width (m):	N/M	Aquatic Vegetation:	N/A	DO (mg/L):	11.60
Wetted Width (m):	N/M	Riparian Vegetation:	N/A	Turbidity (NTU):	2.4
Riffle-Crest Depth (m):	N/A	Barriers Present (Y/N):	N/A	pH:	6.68
Pool Depth (m):	N/A	Location:	N/A	Water Temp (°C):	16.6
Max Depth (m):	N/M	Lakes Present (Y/N):	N/A	Fish Habitat Use	
D₉₅ (m):	N/A	Location:	N/A	Spawning:	ARCH - M NNST - H
Point Velocities (m/s)	N/A			Rearing:	ARCH - H NNST - H
				Wintering:	ARCH - L NNST - L
				Migration Corridor:	ARCH - M NNST - M

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Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Photographs



Figure 1. Aerial view of ST-052 (a), view from shoreline (b), and substrate (c).

Fisheries Data

Gear Used:	Observation
Start UTM:	17 W 598190 7800274
End UTM:	17 W 598104 7800372
Electrofisher Settings (v/Hz/duty cycle):	N/A
Effort (dec.min):	N/A

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	70	N/A	N/M	N/M
NNST	>30	N/A	N/M	N/M

Comments

Overwintering potential low, but connections to more ideal habitat likely.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-053
Site: ST-053

UTM: 17 W 598218 7800339
Date/Time Surveyed: August 8, 2010 @ 16:09

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Summer

Bankfull Width (m):	N/M
Wetted Width (m):	N/M
Riffle-Crest Depth (m):	N/A
Pool Depth (m):	N/A
Max Depth (m):	N/M
D₉₅ (m):	N/A
Point Velocities (m/s)	N/A

Lake/Stream Habitat

Channel Morphology: N/A

Substrate Composition: 5% boulders,
15% small cobble,
80% fines.

Stream Cover: N/A

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Lakes Present (Y/N): N/A
Location: N/A

Water Quality

Summer

Specific Conductance (mS/m):	22.1
TDS (g/L):	0.14
DO (mg/L):	11.27
Turbidity (NTU):	3.3
pH:	7.09
Water Temp (°C):	16.8

Fish Habitat Use

Spawning:	ARCH - M NNST - H
Rearing:	ARCH - H NNST - H
Wintering:	ARCH - L NNST - L
Migration Corridor:	ARCH - M NNST - M

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Photographs



Figure 1. Aerial view of ST-053 (a), view from the shoreline (b), and substrate (c).

Fisheries Data

Gear Used:	Observation
Start UTM:	17 W 598218 7800339
End UTM:	17 W 598207 7800285
Electrofisher Settings (v/Hz/duty cycle):	N/A
Effort (dec.min):	N/A

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	2	N/A	65-90	N/M
NNST	>70	N/A	YOY-50	N/M

Comments

Appears to be mainly used for NNST spawning and rearing.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-055
Site: ST-055

UTM: 17 W 598200 7799659
Date/Time Surveyed: August 8, 2010 @ 15:52

Site Description/Physical Characteristics

Hydrology		Lake/Stream Habitat		Water Quality	
Confinement: N/A		Channel Morphology: N/A		Summer	
Channel Gradient: N/A		Substrate Composition: 5% boulders, 10% large cobble, 10% small cobble, 75% fines.		Specific Conductance (mS/m):	17.5
		Stream Cover: N/A		TDS (g/L):	0.11
		Aquatic Vegetation: N/A		DO (mg/L):	11.45
		Riparian Vegetation: N/A		Turbidity (NTU):	3.2
		Barriers Present (Y/N): N/A Location: N/A		pH:	6.95
		Lakes Present (Y/N): N/A Location: N/A		Water Temp (°C):	17.0
		Fish Habitat Use			
				Spawning:	ARCH - M NNST - H
				Rearing:	ARCH - H NNST - H
				Wintering:	ARCH - N NNST - L
				Migration Corridor:	ARCH - H NNST - H

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Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Photographs



Figure 1. Aerial view of ST-055 (a).

Fisheries Data

Gear Used:	Observation
Start UTM:	17 W 598200 7799659
End UTM:	17 W 598095 7799702
Electrofisher Settings (v/Hz/duty cycle):	N/A
Effort (dec.min):	N/A

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	3	N/A	70-95	N/M
NNST	9	N/A	YOY-60	N/M

Comments

This lake is a probable migratory pathway in this catchment and appears to provide NNST spawning habitat.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-061 & 062
Site: ST-061 & 062

UTM: 17W 598027 7798204
Date/Time Surveyed: August 7, 2010 @ 14:17

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Summer

Bankfull Width (m):	N/M
Wetted Width (m):	N/M
Riffle-Crest Depth (m):	N/A
Pool Depth (m):	N/A
Max Depth (m):	(NE) ~0.20
D₉₅ (m):	N/A
Point Velocities (m/s)	N/A

Lake/Stream Habitat

Channel Morphology: N/A

Substrate Composition: (NE) 100% silt/organics;
 (SW) 10% boulders,
 20% large cobble,
 20% gravel,
 50% silt/organics.

Stream Cover: N/A

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Lakes Present (Y/N): N/A
Location: N/A

Water Quality

	NE	SW
Specific Conductance (mS/m):	31.0	25.0
TDS (g/L):	0.20	0.16
DO (mg/L):	13.21	11.75
Turbidity (NTU):	5.5	2.4
pH:	6.33	6.46
Water Temp (°C):	15.9	15.4

Fish Habitat Use

Spawning:	ARCH - N NNST - H
Rearing:	ARCH - H NNST - H
Wintering:	ARCH - N NNST - N
Migration Corridor:	ARCH - M NNST - H

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Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Photographs



Figure 1. View from the shoreline of ST-061-062 (a,b), and substrate (c,d).

Fisheries Data

Gear Used:	Electrofishing
Start UTM:	N/A
End UTM:	N/A
Electrofisher Settings (v/Hz/duty cycle):	400/60/12
Effort (dec.min):	2.0

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	N/A	N/A	N/M	N/M
NNST	N/A	N/A	N/M	N/M

Comments

NE: abundant macrophytes, no over-wintering.

SW: no over-wintering.

No catch but observed NNST (juvenile + adult); some ARCH (all juvenile) while walking the perimeter.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-063
Site: ST-063

UTM: 17 W 597434 7797811
Dates Surveyed: 28-Jul-08, 09:45

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Sum

Bankfull Width (m): N/A

Wetted Width (m): N/A

Riffle-Crest Depth (m): N/A

Pool Depth (m): N/A

Max Depth (m): N/M

D₉₅ (m): N/A

Point Velocities (m/s) N/A

Lake/Riparian Habitat

Substrate Composition: E: 65% fines, 15% 1g cobble, 10% sm cobble, 10% boulder

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Water Quality

Sum

Specific Conductance (µS/cm): N/M

TDS (g/l): N/M

DO (mg/l) N/M

%DO: N/M

Water Temp (°C): 9.5

Fish Habitat Use

Spawning: ARCH - H
 NNST - H

Feeding: ARCH - H
 NNST - H

Migration: ARCH - N
 NNST - N

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 Mary River Project**



Steensby Port Site Aquatic Habitat Assessment



Figure 1. Pan view from SE shore of ST-063 during summer (a and b) 2008.



Figure 2. View of substrate along SE shore (c and d) of ST-063 during summer 2008.



Figure 3. View of SE shore bedrock (e) and SE shore macrophytes (f) of ST-063 during summer 2008.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-063
Site: ST-063

UTM: 17 W 597869 7797910
Date/Time Surveyed: August 7, 2010 @ 15:25

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Summer

Bankfull Width (m):	N/M
Wetted Width (m):	N/M
Riffle-Crest Depth (m):	N/A
Pool Depth (m):	N/A
Max Depth (m):	N/M
D₉₅ (m):	N/A
Point Velocities (m/s)	N/A

Lake/Stream Habitat

Channel Morphology: N/A

Substrate Composition: 5% boulders,
20% large cobble,
10% small cobble,
65% fines

Stream Cover: N/A

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Lakes Present (Y/N): N/A
Location: N/A

Water Quality

Summer

Specific Conductance (mS/m):	36.6
TDS (g/L):	0.24
DO (mg/L):	12.06
Turbidity (NTU):	2.1
pH:	6.54
Water Temp (°C):	17.4

Fish Habitat Use

Spawning:	ARCH - H NNST - H
Rearing:	ARCH - H NNST - H
Wintering:	ARCH - H NNST - H
Migration Corridor:	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Photographs

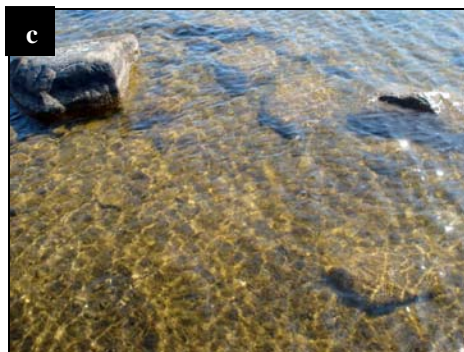


Figure 1. View from the shoreline of ST-063 (a,b) and substrate (c).

Fisheries Data

Gear Used:	Observation
Start UTM:	N/A
End UTM:	N/A
Electrofisher Settings (v/Hz/duty cycle):	N/A
Effort (dec.min):	N/A

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	Many	N/A	N/M	N/M
NNST	Many	N/A	N/M	N/M

Comments

No need to electrofish, many juvenile ARCH and NNST observed along the shore.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-064
Site: ST-064

UTM: 17W 598004 7797427
Date/Time Surveyed: August 7, 2010 @ 13:40

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Summer

Bankfull Width (m):	N/M
Wetted Width (m):	N/M
Riffle-Crest Depth (m):	N/A
Pool Depth (m):	N/A
Max Depth (m):	N/M
D₉₅ (m):	N/A
Point Velocities (m/s)	N/A

Lake/Stream Habitat

Channel Morphology: N/A

Substrate Composition: 10% boulders,
40% large cobble,
40% small cobble,
10% gravel.

Stream Cover: N/A

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Lakes Present (Y/N): N/A
Location: N/A

Water Quality

Summer

Specific Conductance (mS/m):	26.5
TDS (g/L):	0.17
DO (mg/L):	11.76
Turbidity (NTU):	5.9
pH:	6.20
Water Temp (°C):	15.3

Fish Habitat Use

Spawning:	ARCH - M NNST - M
Rearing:	ARCH - H NNST - H
Wintering:	ARCH - N NNST - N
Migration Corridor:	ARCH - M NNST - M

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Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Photographs



Figure 1. Aerial view of ST-064 (a).

Fisheries Data

Gear Used:	Electrofishing
Start UTM:	N/A
End UTM:	N/A
Electrofisher Settings (v/Hz/duty cycle):	400/60/12
Effort (dec.min):	6.0

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	22	3.7	N/M	N/M
NNST	4	0.7	60-70	N/M

Comments

Too shallow for overwintering, but provides suitable rearing habitat for both species and has probable connections with other systems.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-072
Site: ST-072

UTM: 17 W 598965 7796941
Dates Surveyed: 28-Jul-08, 11:54

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Sum

Bankfull Width (m): N/A

Wetted Width (m): N/A

Riffle-Crest Depth (m): N/A

Pool Depth (m): N/A

Max Depth (m): N/M

D₉₅ (m): N/A

Point Velocities (m/s) N/A

Lake/Riparian Habitat

Substrate Composition: 30% 1g cobble,
30% boulder
20% clay/sand, 10%
gravel, 10% sm
cobble

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A

Location: N/A

Water Quality

Sum

Specific Conductance (µS/cm): N/M

TDS (g/l): N/M

DO (mg/l) N/M

%DO: N/M

Water Temp (°C): N/M

Fish Habitat Use

Spawning: ARCH - H
NNST - M

Feeding: ARCH - H
NNST - H

Migration: ARCH - N
NNST - N

**Baffin land Iron Mines
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Steensby Port Site Aquatic Habitat Assessment

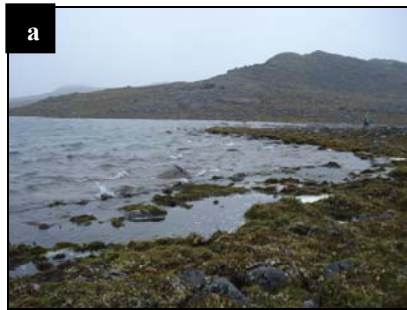


Figure 1. Pan view from west shore of ST-072 during summer (a and b) 2008.



Figure 2. View of substrate along west shore (c and d) of ST-072 during summer 2008.



Figure 3. View of substrate along NW shore (e and f) of ST-072 during summer 2008.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-072
Site: ST-072

UTM: 17 W 598427 7797080 and 17 W 598429 7797098
Date/Time Surveyed: August 7, 2010 @ 13:21

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Summer

Bankfull Width (m):	N/M
Wetted Width (m):	N/M
Riffle-Crest Depth (m):	N/A
Pool Depth (m):	N/A
Max Depth (m):	N/M
D₉₅ (m):	N/A
Point Velocities (m/s)	N/A

Lake/Stream Habitat

Channel Morphology: N/A
Substrate Composition: N/A
Stream Cover: N/A
Aquatic Vegetation: N/A
Riparian Vegetation: N/A
Barriers Present (Y/N): N/A
Location: N/A
Lakes Present (Y/N): N/A
Location: N/A

Water Quality

Summer

Specific Conductance (mS/m):	15.9
TDS (g/L):	0.10
DO (mg/L):	10.92
Turbidity (NTU):	1.4
pH:	5.65
Water Temp (°C):	12.3

Fish Habitat Use

Spawning:	ARCH - H NNST - M
Rearing:	ARCH - H NNST - H
Wintering:	ARCH - H NNST - M
Migration Corridor:	ARCH - N NNST - N

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Fish Habitat Quality – IMPORTANT

Exploration Property Aquatic Habitat Assessment

Photographs



Figure 1. View from the shoreline of ST-072 (a,b) and substrate (c).

Fisheries Data

Gear Used:	Electrofishing
Start UTM:	17W 598427 7797080
End UTM:	17W 598429 7797098
Electrofisher Settings (v/Hz/duty cycle):	400/60/12
Effort (dec.min):	3.5

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	43	12.3	80-170	N/M
NNST	57	16.3	N/M	N/M

Comments

Lake provides abundant suitable habitat for both species.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-005b
UTM Coordinates: 17 W 597907 7798003

Date/Time Surveyed: August 7, 2010 @ 15:04

General Physical Characteristics

Floodplain Width (m):	N/M	Channel Pattern:	Straight	Stage:	Low
Channel Confinement:	N/A	Channel Gradient (range):	1-5°	Flow Regime:	Permanent
Bank Height (range in m):	N/M	Bank Shape:	N/A		

In Situ Water Quality Data

Temperature (°C):	16.2	Specific Conductance (mS/m):	25.5	Turbidity (NTU):	2.9
Dissolved Oxygen (mg/L):	11.06	TDS (g/L):	0.17	pH:	6.32

Hydrology & Habitat Characteristics

Distance and Direction from Assessment UTM (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)				
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max	Min
20D	2.3	2.3	0.16	0.14	0.11	N/M	0.05	0.04	0.03	N/M	N/M
0	1.5	7.5	0.04	0.07	0.14	N/M	0.22	0.08	0.61	N/M	N/M
20U	1.0	2.8	0.11	0.10	0.11	N/M	0.26	0.60	0.11	N/M	N/M

Distance and Direction from Assessment UTM (m)	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	50	40	10					5	40	50	5
0	25	40	10		25			5	40	50	5
20U	25	25	25	25				20	50	30	

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-005b
UTM Coordinates: 17 W 597907 7798003

Date/Time Surveyed: August 7, 2010 @ 15:04

Fisheries Data

Gear Used: Electrofishing **Effort (min):** 4.0 **Electrofisher Settings:** N/M
Start UTM: N/A **End UTM:** N/A

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	27	6.8	55-180	N/M
NNST	7	1.8	58-70	N/M

Fish Habitat Potential

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

Comments & Summary

High quality habitat for both species.

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-005b
UTM Coordinates: 17 W 597907 7798003

Date/Time Surveyed: August 7, 2010 @ 15:04

Photographs



A



B



C

Figure 1. (A) view upstream of habitat assessment; (B) view downstream of habitat assessment; and (C) view across habitat assessment.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-005f **Date/Time Surveyed:** August 7, 2010 @ 14:00
UTM Coordinates: halfway between 17 W 598295 7798445 and 17 W 598156 7798364

General Physical Characteristics

Floodplain Width (m): N/M **Channel Pattern:** Sinous **Stage:** Low
Channel Confinement: PC **Channel Gradient (range):** 1-3° **Flow Regime:** Permanent
Bank Height (range in m): Undefined **Bank Shape:** Undefined

In Situ Water Quality Data

Temperature (°C): 19.5 **Specific Conductance (mS/m):** 40.1 **Turbidity (NTU):** 1.6
Dissolved Oxygen (mg/L): 9.12 **TDS (g/L):** 0.26 **pH:** 5.92

Hydrology & Habitat Characteristics

Distance and Direction from Assessment UTM (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)				
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max	Min
0	N/M	N/M	N/M	N/M	N/M	0.05	N/M	N/M	N/M	0.05	N/M

Distance and Direction from Assessment UTM (m)	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**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-005f **Date/Time Surveyed:** August 7, 2010 @ 14:00
UTM Coordinates: halfway between 17 W 598295 7798445 and 17 W 598156 7798364

Fisheries Data

Gear Used: Electrofishing **Effort (min):** 3.0 **Electrofisher Settings:** 400V, 60Hz, 12%
Start UTM: 17 W 598295 7798445 **End UTM:** 17 W 598156 7798364

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	0	N/M	N/M
NNST	>100 (observed)	>33.3	N/M	N/M

Fish Habitat Potential

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

Comments & Summary

Habitat characteristics: 100% marshy flooded terrestrial throughout. No catch but saw >100 YOY NNST (too small to catch). No connection upstream, connected downstream to ST-061/062.

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Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-005f

Date/Time Surveyed: August 7, 2010 @ 14:00

UTM Coordinates: halfway between 17 W 598295 7798445 and 17 W 598156 7798364

Photographs



A



B



C

Figure 1. (A) view upstream of habitat assessment; (B) view downstream of habitat assessment; and (C) view across habitat assessment.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-005j
UTM Coordinates: 17 W 597847 7800461

Date/Time Surveyed: August 8, 2010 @ 16:49

General Physical Characteristics

Floodplain Width (m):	>100	Channel Pattern:	Sinuuous	Stage:	Low
Channel Confinement:	UC	Channel Gradient (range):	2-3°	Flow Regime:	Permanent
Bank Height (range in m):	0.3-0.4	Bank Shape:	Vertical		

In Situ Water Quality Data

Temperature (°C):	17.1	Specific Conductance (mS/m):	19.5	Turbidity (NTU):	3.5
Dissolved Oxygen (mg/L):	11.20	TDS (g/L):	0.13	pH:	6.26

Hydrology & Habitat Characteristics

Distance and Direction from Assessment UTM (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)				
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max	Min
0	2.0	2.0	0.04	0.12	0.16	N/M	0.04	0.00	0.00	N/M	N/M

Distance and Direction from Assessment UTM (m)	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	45	45				20	20	30	29	1

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-005j
UTM Coordinates: 17 W 597847 7800461

Date/Time Surveyed: August 8, 2010 @ 16:49

Fisheries Data

Gear Used: Observation **Effort (min):** N/M **Electrofisher Settings:** N/A
Start UTM: N/A **End UTM:** N/A

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	N/A	N/M	N/M
NNST	>100	N/A	YOY - 50	N/M

Fish Habitat Potential

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

Comments & Summary

Visual observation of NNST >100 (YOY-50). Flows between two lakes (ST-051 and 3 km lakes). Does not appear to be suitable habitat for ARCH.

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-005j
UTM Coordinates: 17 W 597847 7800461

Date/Time Surveyed: August 8, 2010 @ 16:49

Photographs



A



B



C



D

Figure 1. (A) Aerial view of stream SPS-005j; (B) view upstream of habitat assessment; (C) view downstream of habitat assessment; and (D) view across habitat assessment.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-005k
UTM Coordinates: 17 W 598046 7800482

Date/Time Surveyed: August 8, 2010 @ 16:28

General Physical Characteristics

Floodplain Width (m):	>100	Channel Pattern:	Sinuuous/braided	Stage:	Low
Channel Confinement:	UC	Channel Gradient (range):	5°	Flow Regime:	Permanent
Bank Height (range in m):	undefined	Bank Shape:	Undefined		

In Situ Water Quality Data

Temperature (°C):	9.0	Specific Conductance (mS/m):	32.1	Turbidity (NTU):	9.1
Dissolved Oxygen (mg/L):	4.56	TDS (g/L):	0.21	pH:	6.27

Hydrology & Habitat Characteristics

Distance and Direction from Assessment UTM (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)				
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max	Min
0	6.5	26.5	N/M	0.05	N/M	0.05	N/M	0.00	N/M	0.05	N/M

Distance and Direction from Assessment UTM (m)	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**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-005k **Date/Time Surveyed:** August 8, 2010 @ 16:28
UTM Coordinates: 17 W 598046 7800482

Fisheries Data

Gear Used: Observation **Effort (min):** N/M **Electrofisher Settings:** N/A
Start UTM: N/A **End UTM:** N/A

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	N/A	N/A	N/M	N/M
NNST	YOY	N/A	N/M	N/M

Fish Habitat Potential

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

Comments & Summary

Similar to other streams in the area, it provides suitable NNST habitat, but not ARCH.

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-005k
UTM Coordinates: 17 W 598046 7800482

Date/Time Surveyed: August 8, 2010 @ 16:28

Photographs



A



B



C

Figure 1. (A) view upstream of habitat assessment; (B) view downstream of habitat assessment; and (C) view across habitat assessment.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-005q
UTM Coordinates: 17 W 598106 7798437

Date/Time Surveyed: August 7, 2010 @ 14:26

General Physical Characteristics

Floodplain Width (m):	N/M	Channel Pattern:	Sinuuous/braided	Stage:	Low
Channel Confinement:	UC	Channel Gradient (range):	1°	Flow Regime:	Permanent
Bank Height (range in m):	Undefined	Bank Shape:	Undefined		

In Situ Water Quality Data

Temperature (°C):	17.6	Specific Conductance (mS/m):	20.3	Turbidity (NTU):	6.8
Dissolved Oxygen (mg/L):	10.97	TDS (g/L):	0.13	pH:	6.34

Hydrology & Habitat Characteristics

Distance and Direction from Assessment UTM (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)				
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max	Min
20U	N/M	N/M	0.13	0.30	0.10	N/M	0.01	0.10	0.00	N/M	N/M
20D	N/M	N/M	0.13	0.16	0.11	N/M	0.02	0.04	0.00	N/M	N/M
0	>20.0	>50.0	0.13	0.31	0.11	N/M	0.04	0.07	0.00	N/M	N/M

Distance and Direction from Assessment UTM (m)	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	40	35				85(silt/org)			10	5

**Baffinland Iron Mines
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Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-005q
UTM Coordinates: 17 W 598106 7798437

Date/Time Surveyed: August 7, 2010 @ 14:26

Fisheries Data

Gear Used: Electrofishing **Effort (min):** 4.0 **Electrofisher Settings:** 400V, 60Hz, 12%
Start UTM: 17 W 598108 7798430 **End UTM:** 17 W 598110 7798455

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	23	5.8	80-170	N/M
NNST	11	2.8	50-80	N/M

Fish Habitat Potential

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

Comments & Summary

Provides important habitat for both species and connects two lakes.

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-005q
UTM Coordinates: 17 W 598106 7798437

Date/Time Surveyed: August 7, 2010 @ 14:26

Photographs



A



B



C



D

Figure 1. (A) Aerial photo of SPS-005q; (B) view upstream from habitat assessment; (C) view downstream from habitat assessment; (D) view across the habitat assessment.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-176
Site: ST-176

UTM: 17 W 598837 7804979
Dates Surveyed: 26-Jul-08, 11:55

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Sum

Bankfull Width (m): N/A

Wetted Width (m): N/A

Riffle-Crest Depth (m): N/A

Pool Depth (m): N/A

Max Depth (m): N/M

D₉₅ (m): N/A

Point Velocities (m/s) N/A

Lake/Riparian Habitat

Substrate Composition: S: 70% sand, 10% gravel, 10% 1g cobble, 10% boulder
W: 70% boulder, 30% 1g cobble

Aquatic Vegetation: green and brown macrophytes

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Water Quality

Sum

Specific Conductance (µS/cm):

N/M

TDS (g/l):

N/M

DO (mg/l)

N/M

%DO:

N/M

Water Temp (°C):

N/M

Fish Habitat Use

Spawning:

ARCH - M
NNST - L

Feeding:

ARCH - H
NNST - H

Migration:

ARCH - N
NNST - N

**Baffin land Iron Mines
Mary River Project**



Steensby Port Site Aquatic Habitat Assessment



Figure 1. Aerial view (a) and view from shore (b) of ST-176 during summer 2008.



Figure 2. View of substrate from south shoreline (c and d) of ST-176 during summer 2008.



Figure 3. View of substrate from SW shoreline in ST-176 during summer 2008.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-195
Site: ST-195

UTM: 17 W 600415 7800548
Dates Surveyed: 30-Jul-08, 10:15

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Sum

Bankfull Width (m): N/A

Wetted Width (m): N/A

Riffle-Crest Depth (m): N/A

Pool Depth (m): N/A

Max D (m): N/M

D₉₅ (m): N/A

Point Velocities (m/s) N/A

Lake/Riparian Habitat

Substrate Composition: SE: 50% sm cobble, 30% 1g cobble, 20% sand
S: 40% 1g cobble, 20% sm cobble, 20% sand, 10% boulder, 10% gravel

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A

Location: N/A

Water Quality

Sum

Specific Conductance (µS/cm): N/M

TDS (g/l): N/M

DO (mg/l) N/M

%DO: N/M

Water Temp (°C): N/M

Fish Habitat Use

Spawning: ARCH - M
NNST - L

Feeding: ARCH - H
NNST - M

Migration: ARCH - N
NNST - N

**Baffin land Iron Mines
Mary River Project**



Steensby Port Site Aquatic Habitat Assessment



Figure 1. Pan view of east shore of ST-195 during summer (a and b) 2008.



Figure 2. View of substrate along SE shore (c) and east shore (d) of ST-195 during summer 2008.



Figure 3. View of substrate along ESE shore (e and f) of ST-195 during summer 2008.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-352 (formerly 10km Lake)
Site: ST-352

UTM: 17 W 600859 7808049
Dates Surveyed: 6-Aug-08, 13:32

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Sum

Bankfull Width (m): N/A

Wetted Width (m): N/A

Riffle-Crest Depth (m): N/A

Pool Depth (m): N/A

Max D (m): > 5 m

D₉₅ (m): N/A

Point Velocities (m/s) N/A

Lake/Riparian Habitat

Substrate Composition: 75% 1g cobble, 25% boulders

Aquatic Vegetation: NA

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Water Quality

Sum

Specific Conductance (µS/cm): N/M

TDS (g/l): N/M

DO (mg/l) N/M

%DO: N/M

Water Temp (°C): N/M

Fish Habitat Use

Spawning: ARCH - H
NNST - M

Feeding: ARCH - H
NNST - M

Migration: ARCH - N
NNST - N

**Baffin land Iron Mines
Mary River Project**



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 Aquatic Environment Specialists

Steensby Port Site Aquatic Habitat Assessment



Figure 1. View of ST-352 from shore during summer (a) 2008.



Figure 2. View of substrate in ST-352 (b & c) 2008.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-077
Site: ST-077

UTM: 17 W 596523 7798153
Date/Time Surveyed: August 7, 2010 @ 16:08

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Summer

Bankfull Width (m):	N/M
Wetted Width (m):	N/M
Riffle-Crest Depth (m):	N/A
Pool Depth (m):	N/A
Max Depth (m):	N/M
D₉₅ (m):	N/A
Point Velocities (m/s)	N/A

Lake/Stream Habitat

Channel Morphology: N/A

Substrate Composition: 10% boulders,
20% large cobble,
20% small cobble,
50% fines.

Stream Cover: N/A

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Lakes Present (Y/N): N/A
Location: N/A

Water Quality

Summer

Specific Conductance (mS/m):	0.099
TDS (g/L):	0.60
DO (mg/L):	12.25
Turbidity (NTU):	2.8
pH:	7.60
Water Temp (°C):	14.8

Fish Habitat Use

Spawning:	ARCH - N NNST - H
Rearing:	ARCH - N NNST - H
Wintering:	ARCH - N NNST - H
Migration Corridor:	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Photographs



Figure 1. View from the shoreline of ST-077 (a,b) and substrate (c).

Fisheries Data

Gear Used:	Electrofishing
Start UTM:	17 W 596523 7798153
End UTM:	17 W 596521 7798134
Electrofisher Settings (v/Hz/duty cycle):	200/30/10
Effort (dec.min):	N/M

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	0.0	N/M	N/M
NNST	>100 (YOY)	N/A	N/M	N/M

Comments

Lots of clam shrimp observed, which seems to correlate with no ARCH in this area.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-081
Site: ST-081

UTM: 17 W 596840 7799650
Dates Surveyed: 4-Aug-08, 11:41

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Sum

Bankfull Width (m): N/A

Wetted Width (m): N/A

Riffle-Crest Depth (m): N/A

Pool Depth (m): N/A

Max Depth (m): N/M

D₉₅ (m): N/A

Point Velocities (m/s) N/A

Lake/Riparian Habitat

Substrate Composition: N: 50% broken bedrock, 30% boulder, 10% lg cobble, 10% sm cobble.
E: 45% lg cobble, 30% fines, 20% sm cobble, 5% boulder.
S: 50% sm cobble, 30% fines, 15% lg cobble, 5% boulder.
W: 40% sm cobble, 30% lg cobble, 20% boulder, 10% gravel.

Aquatic Vegetation: Macrophytes and thick, orange, clumpy algae

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A

Location: N/A

Water Quality

Sum

Specific Conductance (µS/cm): N/M

TDS (g/l): N/M

DO (mg/l) N/M

%DO: N/M

Water Temp (°C): N/M

Fish Habitat Use

Spawning: ARCH - N
NNST - L

Feeding: ARCH - N
NNST - L

Migration: ARCH - N
NNST - N

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Mary River Project**



North/South Consultants Inc.
Aquatic Environment Specialists

Steensby Port Site Aquatic Habitat Assessment



Figure 1. Pan views of ST-081 during summer (a and b) 2008.



Figure 2. Views of substrate along shore of ST-081 (a and b) during summer 2008.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-083
Site: ST-083

UTM: 17 W 596576 7799157
Dates Surveyed: 26-Jul-08, 15:52

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Sum

Bankfull Width (m):	N/A
Wetted Width (m):	N/A
Riffle-Crest Depth (m):	N/A
Pool Depth (m):	N/A
Max Depth (m):	21.00
D₉₅ (m):	N/A
Point Velocities (m/s)	N/A

Lake/Riparian Habitat

Substrate Composition:
W: 50% boulder, 50% 1g cobble
E: 50% boulder, 50% cobble
SW: 40% sand, 20% boulder, 20% bedrock, 20% cobble

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Water Quality

Sum

Specific Conductance (µS/cm):	N/M
TDS (g/l):	N/M
DO (mg/l)	N/M
%DO:	N/M
Water Temp (°C):	9.0

Fish Habitat Use

Spawning:	ARCH - M NNST - L
Feeding:	ARCH - H NNST - L
Migration:	ARCH - L NNST - L

**Baffin land Iron Mines
 Mary River Project**



Steensby Port Site Aquatic Habitat Assessment



Figure 1. Pan view from south shore of ST-083 during summer (a and b) 2008.



Figure 2. View of substrate along south shore (c) and east shore (d) of ST-083 during summer 2008.

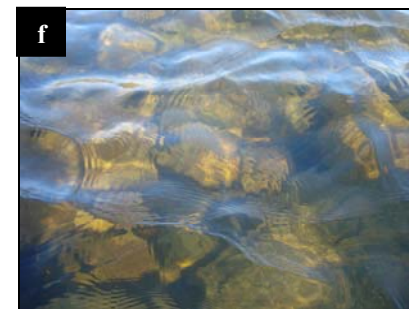


Figure 3. View of substrate along west shore (e and f) of ST-083 during summer 2008.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-083
Site: ST-083

UTM: 17 W 596499 7799013
Date/Time Surveyed: August 8, 2010 @ 11:30

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Summer

Bankfull Width (m):	N/M
Wetted Width (m):	N/M
Riffle-Crest Depth (m):	N/A
Pool Depth (m):	N/A
Max Depth (m):	>3.0
D₉₅ (m):	N/A
Point Velocities (m/s)	N/A

Lake/Stream Habitat

Channel Morphology: N/A

Substrate Composition: 25% large cobble,
25% small cobble,
25% gravel,
25% fines.

Stream Cover: N/A

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Lakes Present (Y/N): N/A
Location: N/A

Water Quality

Summer

Specific Conductance (mS/m):	6.2
TDS (g/L):	0.04
DO (mg/L):	11.61
Turbidity (NTU):	1.6
pH:	5.77
Water Temp (°C):	13.2

Fish Habitat Use

Spawning:	ARCH - M NNST - L
Rearing:	ARCH - H NNST - L
Wintering:	ARCH - H NNST - L
Migration Corridor:	ARCH - L NNST - L

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Photographs



Figure 1. View from the shoreline of ST-083 (a,b,c).

Fisheries Data

Gear Used:	Electrofishing
Start UTM:	17 W 596499 7799013
End UTM:	50m east of start
Electrofisher Settings (v/Hz/duty cycle):	700/60/12
Effort (dec.min):	5.0

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	3	0.6	79-91	N/M
NNST	0	N/M	N/M	N/M

Comments

Isolated lake but deep enough for over-wintering; fish present.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-011a
UTM Coordinates: 17 W 596420 7798030

Date/Time Surveyed: August 7, 2010 @ 15:52

General Physical Characteristics

Floodplain Width (m):	N/M	Channel Pattern:	Sinuuous	Stage:	Low
Channel Confinement:	PC	Channel Gradient (range):	1-3°	Flow Regime:	Permanent
Bank Height (range in m):	N/M	Bank Shape:	N/A		

In Situ Water Quality Data

Temperature (°C):	18.3	Specific Conductance (mS/m):	0.140	Turbidity (NTU):	2.4
Dissolved Oxygen (mg/L):	12.08	TDS (g/L):	0.90	pH:	6.95

Hydrology & Habitat Characteristics

Distance and Direction from Assessment UTM (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)				
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max	Min
0	0.10-1.50	N/M	N/M	N/M	N/M	N/M	N/M	N/M	N/M	N/M	N/M

Distance and Direction from Assessment UTM (m)	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	5	95					30		30	30	10

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-011a **Date/Time Surveyed:** August 7, 2010 @ 15:52
UTM Coordinates: 17 W 596420 7798030

Fisheries Data

Gear Used: Electrofishing **Effort (min):** 2.0 **Electrofisher Settings:** 400V, 60Hz, 12%
Start UTM: N/A **End UTM:** N/A

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	0	N/M	N/M
NNST	~12 YOY (all observed)	~6.0	~10	N/M

Fish Habitat Potential

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

Comments & Summary

Habitat is the same upstream as it is downstream. Water velocity too shallow to measure. No catch but observed ~12 YOY NNST. Unlikely to be used by ARCH

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

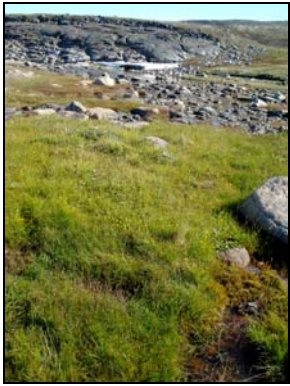
Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-011a
UTM Coordinates: 17 W 596420 7798030

Date/Time Surveyed: August 7, 2010 @ 15:52

Photographs



A



B



C

Figure 1. (A) view upstream of habitat assessment; (B) view downstream of habitat assessment; (C) view across habitat assessment.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-025
Site: SPS-025

UTM: 17 W 596935 7799436
Dates Surveyed: 27-Jul-08, 14:05

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: 3°

Hydrology

Sum

Bankfull Width (m): 45.72

Wetted Width (m): 2.27

Riffle-Crest Depth (m): 0.11

Pool Depth (m): 0.13

D (m): NM

D₉₅ (m): 1.35

Point Velocities (m/s)

Riffle: 0.24

Pool: 0.06

Behind a rock: NM

Stream/Riparian Habitat

Channel Morphology: 75% pool (shallow),
25% riffle

Substrate Composition: 48% FT, 35% sand,
10% silt, 5%
boulder, 2% 1g
cobble

Stream Cover: ~5% UC banks

Aquatic Vegetation: thick periphyton in
places

Riparian Vegetation: Grasses, willow,
moss, wildflowers

Barriers Present (Y/N): Unknown
Location: NA

Lakes Present (Y/N): Y
Location: US; DS

L/R Bank Characteristics

Sum

Bank Height (L/R; m): 0.15

Bank Stability: low-moderate (often UD flooded)

Erosion Potential: high

Water Quality

Sum

Specific Conductance (µS/cm): 3.00

TDS (g/l): 0.02

DO (mg/l): 9.94

%DO: NM

Water Temp (°C): 17.97

Fish Habitat Use

Spawning: ARCH - N
NNST - N

Feeding: ARCH - N
NNST - L

Migration: ARCH - M
NNST - N

**Baffin land Iron Mines
Mary River Project**



Steensby Port Site Aquatic Habitat Assessment



Figure 1. View upstream (a) and downstream (b) from habitat assessment of SPS-025 during summer 2008.



Figure 2. View across (c) the habitat assessment site of SPS-025 during summer 2008.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-024
Site: SPS-024

UTM: 17 W 594807 7800428
Dates Surveyed: 01-Aug-08, 08:05

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: 4°

Hydrology

Sum

Bankfull Width (m): 41.15

Wetted Width (m): 0.58

Riffle-Crest Depth (m): 0.02

Pool Depth (m): 0.13

D (m): NM

D₉₅ (m): 2.49

Point Velocities (m/s)

Riffle: 0.31

Pool: 0.07

Behind a rock: NM

Stream/Riparian Habitat

Channel Morphology: 65% riffle, 25% pool, 10% cascade

Substrate Composition: 40% gravel, 35% sand, 15% boulder, 5% 1g cobble, 5% sm cobble

Stream Cover: 15% boulder, 10% UC banks, 10% cobble

Aquatic Vegetation: Reeds, periphyton

Riparian Vegetation: Grasses, willow, moss

Barriers Present (Y/N): Unknown
Location: NA

Lakes Present (Y/N): Y
Location: DS – Steensby Inlet

L/R Bank Characteristics

Sum

Bank Height (L/R; m): 0.12

Bank Stability: Moderate-high

Erosion Potential: Low-moderate

Water Quality

Sum

Specific Conductance (µS/cm): 45.00

TDS (g/l): 0.30

DO (mg/l): 11.26

%DO: NM

Water Temp (°C): 5.79

Fish Habitat Use

Spawning: ARCH - N
NNST - L

Feeding: ARCH - N
NNST - L

Migration: ARCH - N
NNST - N

**Baffin land Iron Mines
Mary River Project**



Steensby Port Site Aquatic Habitat Assessment



Figure 1. View upstream (a) and downstream (b) from habitat assessment of SPS-024 during summer 2008.



Figure 2. View across (c) the habitat assessment site of SPS-024 during summer 2008.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-007
Site: ST-007

UTM: 17 W 592884 7802114
Date/Time Surveyed: August 8, 2010 @ 15:05

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Summer

Bankfull Width (m):	N/M
Wetted Width (m):	N/M
Riffle-Crest Depth (m):	N/A
Pool Depth (m):	N/A
Max Depth (m):	N/M
D₉₅ (m):	N/A
Point Velocities (m/s)	N/A

Lake/Stream Habitat

Channel Morphology: N/A

Substrate Composition: 10% large cobble,
50% small cobble,
10% gravel,
30% fines.

Stream Cover: N/A

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Lakes Present (Y/N): N/A
Location: N/A

Water Quality

Summer

Specific Conductance (mS/m):	15.6
TDS (g/L):	0.10
DO (mg/L):	12.05
Turbidity (NTU):	3.4
pH:	7.41
Water Temp (°C):	14.5

Fish Habitat Use

Spawning:	ARCH - N NNST - N
Rearing:	ARCH - N NNST - N
Wintering:	ARCH - N NNST - N
Migration Corridor:	ARCH - N NNST - N

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Fish Habitat Quality – NOT FISH-BEARING

Steensby Port Site Aquatic Habitat Assessment

Photographs



Figure 1. Aerial view of ST-007 (a), view from the shoreline (b), and substrate.

Fisheries Data

Gear Used:	Electrofishing
Start UTM:	N/A
End UTM:	N/A
Electrofisher Settings (v/Hz/duty cycle):	400/50/12
Effort (dec.min):	N/M

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	N/A	N/A	N/M	N/M
NNST	N/A	N/A	N/M	N/M

Comments

Many mysid shrimp observed (walked entire perimeter and observed no fish).

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-005
Site: ST-005

UTM: 17 W 592785 7802431
Date/Time Surveyed: August 8, 2010 @ 14:43

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Summer

Bankfull Width (m):	N/M
Wetted Width (m):	N/M
Riffle-Crest Depth (m):	N/A
Pool Depth (m):	N/A
Max Depth (m):	N/M
D₉₅ (m):	N/A
Point Velocities (m/s)	N/A

Lake/Stream Habitat

Channel Morphology: N/A

Substrate Composition: 5% boulders,
20% large cobble,
20% small cobble,
5% gravel,
50% fines.

Stream Cover: N/A

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Lakes Present (Y/N): N/A
Location: N/A

Water Quality

Summer

Specific Conductance (mS/m):	75.7
TDS (g/L):	0.48
DO (mg/L):	12.38
Turbidity (NTU):	4.3
pH:	7.18
Water Temp (°C):	14.5

Fish Habitat Use

Spawning:	ARCH - N NNST - H
Rearing:	ARCH - N NNST - H
Wintering:	ARCH - N NNST - H
Migration Corridor:	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Photographs

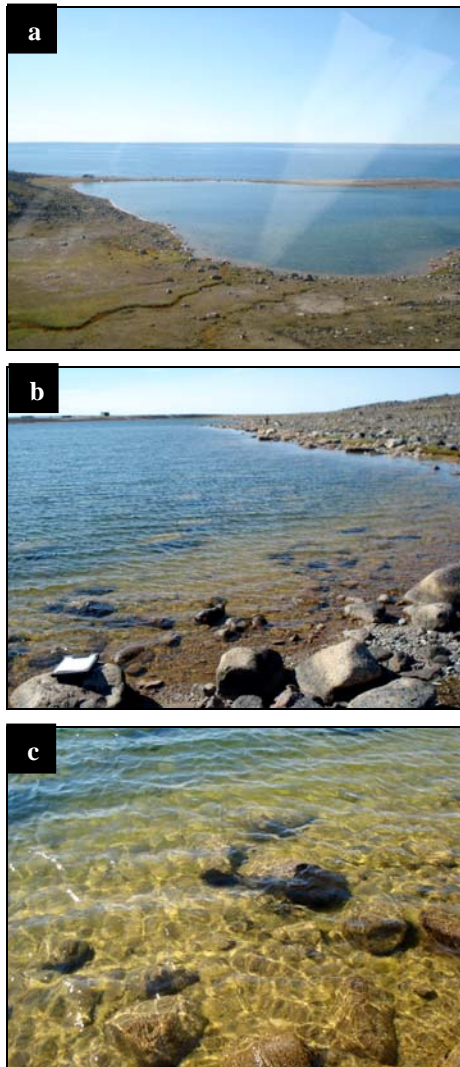


Figure 1. Aerial view of ST-005 (a), view from shoreline (b), and substrate (c).

Fisheries Data

Gear Used:	Observation
Start UTM:	17 W 592785 7802431
End UTM:	17 W 592711 7802435
Electrofisher Settings (v/Hz/duty cycle):	N/A
Effort (dec.min):	N/A

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	N/A	N/A	N/M	N/M
NNST	14 (observed)	N/A	40-65	N/M

Comments

Some potential for overwintering of ninespine stickleback.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-006
Site: ST-006

UTM: 17 W 593058 7802419
Dates Surveyed: 29-Jul-08, 13:05

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Sum

Bankfull Width (m): N/A

Wetted Width (m): N/A

Riffle-Crest Depth (m): N/A

Pool Depth (m): N/A

Max D (m): 4.00

D₉₅ (m): N/A

Point Velocities (m/s) N/A

Lake/Riparian Habitat

Substrate Composition: 70% sand, 20% cobble, 10% boulder

Aquatic Vegetation: macrophytes

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Water Quality

Sum

Specific Conductance (µS/cm): N/M

TDS (g/l): N/M

DO (mg/l) N/M

%DO: N/M

Water Temp (°C): 9.0

Fish Habitat Use

Spawning: ARCH - N
NNST - H

Feeding: ARCH - N
NNST - H

Migration: ARCH - N
NNST - N

**Baffin land Iron Mines
Mary River Project**



Steensby Port Site Aquatic Habitat Assessment



Figure 1. Pan view from NW corner shoreline (a) and west shore pan (b) of ST-006 during summer 2008.



Figure 2. View of substrate along west shore (c) and substrate near gill net set (d) of ST-006 during summer 2008.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-006
Site: ST-006

UTM: 17 W 593020 7802481
Date/Time Surveyed: August 8, 2010 @ 14:30

Site Description/Physical Characteristics

Hydrology		Lake/Stream Habitat		Water Quality	
Confinement: N/A		Channel Morphology: N/A		Summer	
Channel Gradient: N/A		Substrate Composition: 45% fines, 5% gravel, 20% small cobble, 35% large cobble		Specific Conductance (mS/m):	13.9
		Stream Cover: N/A		TDS (g/L):	0.09
		Aquatic Vegetation: N/A		DO (mg/L):	11.41
		Riparian Vegetation: N/A		Turbidity (NTU):	4.1
		Barriers Present (Y/N): N/A Location: N/A		pH:	7.04
		Lakes Present (Y/N): N/A Location: N/A		Water Temp (°C):	15.8
		Fish Habitat Use			
				Spawning:	ARCH - N NNST - H
				Rearing:	ARCH - N NNST - H
				Wintering:	ARCH - N NNST - H
				Migration Corridor:	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Photographs



Figure 1. Aerial view of ST-006 (a), view from the shoreline (b), and substrate (c).

Fisheries Data

Gear Used:	Electrofishing
Start UTM:	17 W 593020 7802481
End UTM:	17 W 592969 7802466
Electrofisher Settings (v/Hz/duty cycle):	400/50/12
Effort (dec.min):	5.0

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	0.0	N/M	N/M
NNST	~54	~10.8	YOY-55	N/M

Comments

Does not appear to provide overwintering habitat, but does provide rearing and spawning habitat for ninespine stickleback.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-003
Site: ST-003

UTM: 17W 593101 7803122
Dates Surveyed: 29-Jul-08, 9:49

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Sum

Bankfull Width (m): N/A

Wetted Width (m): N/A

Riffle-Crest Depth (m): N/A

Pool Depth (m): N/A

Max Depth (m): 6.6

D₉₅ (m): N/A

Point Velocities (m/s) N/A

Lake/Riparian Habitat

Substrate Composition: 40% boulder, 40%
1g cobble, 20%
sand

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Water Quality

Sum

Specific Conductance (µS/cm): N/M

TDS (g/l): N/M

DO (mg/l) N/M

%DO: N/M

Water Temp (°C): 9.0

Fish Habitat Use

Spawning: ARCH - N
NNST - H

Feeding: ARCH - N
NNST - H

Migration: ARCH - N
NNST - N

**Baffin land Iron Mines
Mary River Project**



Steensby Port Site Aquatic Habitat Assessment



Figure 1. Pan view from NE shore (a and b) of ST-003 during summer 2008.

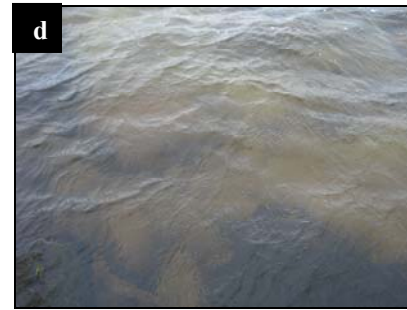


Figure 2. View of substrate (c and d) of ST-003 during summer 2008.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-003
Site: ST-003

UTM: 17 W 593147 7802840
Date/Time Surveyed: August 8, 2010 @ 14:14

Site Description/Physical Characteristics

Confinement: N/A Channel Gradient: N/A		Lake/Stream Habitat		Water Quality	
Hydrology		Channel Morphology: N/A		Summer	
Bankfull Width (m): N/M		Substrate Composition: 10% boulders, 25% large cobble, 20% small cobble, 5% gravel, 40% fines.		Specific Conductance (mS/m):	34.2
Wetted Width (m): N/M		Stream Cover: N/A		TDS (g/L):	0.22
Riffle-Crest Depth (m): N/A		Aquatic Vegetation: N/A		DO (mg/L):	11.29
Pool Depth (m): N/A		Riparian Vegetation: N/A		Turbidity (NTU):	3.2
Max Depth (m): N/M		Barriers Present (Y/N): N/A Location: N/A		pH:	6.37
D₉₅ (m): N/A		Lakes Present (Y/N): N/A Location: N/A		Water Temp (°C):	15.6
Point Velocities (m/s) N/A				Fish Habitat Use	
				Spawning:	ARCH - N NNST - H
				Rearing:	ARCH - N NNST - H
				Wintering:	ARCH - N NNST - H
				Migration Corridor:	ARCH - N NNST - N

Baffinland Iron Mines



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Photographs

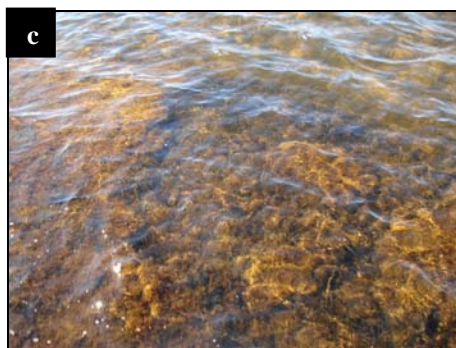


Figure 1. Aerial view of ST-003 (a), view from the shoreline (b), and substrate (c).

Fisheries Data

Gear Used:	Electrofishing
Start UTM:	17 W 593147 7802840
End UTM:	17 W 593117 7802794
Electrofisher Settings (v/Hz/duty cycle):	300/30/10
Effort (dec.min):	4.0

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	0.0	N/M	N/M
NNST	6	1.5	60-70	N/M

Comments

Suitable habitat for NNST, but ARCH do not appear to have access.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-004
Site: ST-004

UTM: 17 W 593346 7802773
Date/Time Surveyed: August 8, 2010 @ 13:55

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Summer

Bankfull Width (m):	N/M
Wetted Width (m):	N/M
Riffle-Crest Depth (m):	N/A
Pool Depth (m):	N/A
Max Depth (m):	N/M
D₉₅ (m):	N/A
Point Velocities (m/s)	N/A

Lake/Stream Habitat

Channel Morphology: N/A

Substrate Composition: 15% large cobble,
15% small cobble,
70% fines.

Stream Cover: N/A

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Lakes Present (Y/N): N/A
Location: N/A

Water Quality

Summer

Specific Conductance (mS/m):	48.2
TDS (g/L):	0.32
DO (mg/L):	5.38
Turbidity (NTU):	0.0
pH:	6.08
Water Temp (°C):	11.3

Fish Habitat Use

Spawning:	ARCH - N NNST - H
Rearing:	ARCH - N NNST - H
Wintering:	ARCH - N NNST - H
Migration Corridor:	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Photographs



Figure 1. View of the shoreline (a & b), and substrate (c) of ST-004.

Fisheries Data

Gear Used:	Electrofishing
Start UTM:	17 W 593346 7802773
End UTM:	17 W 593327 7802779
Electrofisher Settings (v/Hz/duty cycle):	300/30/10
Effort (dec.min):	2.0

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	0.0	N/M	N/M
NNST	>20 (observed)	>10.0	N/M	N/M

Comments

Lots of clam shrimp and no Arctic char.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-021
Site: SPS-021

UTM: 17W 593024 7803302
Dates Surveyed: 27-Jul-08, 08:49

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: 10°

Hydrology

Sum

Bankfull Width (m): > 0.91

Wetted Width (m): 1.27

Riffle-Crest Depth (m): 0.12

Pool Depth (m): 0.18

D (m): NM

D₉₅ (m): US- ~ 0.35
DS- ~5.00

Point Velocities (m/s)

Riffle: 0.25

Pool: 0.00

Behind a rock: NM

Stream/Riparian Habitat

Channel Morphology: 85% riffle, 15% pool

Substrate Composition: 70% FT, 15% gravel, 10% sand, 5% sm cobble

Stream Cover: none

Aquatic Vegetation: Periphyton (green)

Riparian Vegetation: Grasses, willow, moss, wildflowers

Barriers Present (Y/N): Y
Location: ~ 100 m US

Lakes Present (Y/N): Y
Location: US (Steensby DS)

L/R Bank Characteristics

Sum

Bank Height (L/R; m): 0.08

Bank Stability: No bank

Erosion Potential: NA

Water Quality

Sum

Specific Conductance (µS/cm): 22.00

TDS (g/l): 0.14

DO (mg/l): 10.00

%DO: NM

Water Temp (°C): 11.53

Fish Habitat Use

Spawning: ARCH - N
NNST - N

Feeding: ARCH - N
NNST - L

Migration: ARCH - N
NNST - N

**Baffin land Iron Mines
Mary River Project**



Steensby Port Site Aquatic Habitat Assessment



Figure 1. View upstream (a) and downstream (b) from habitat assessment of SPS-021 during summer 2008.



Figure 2. View across (c) the habitat assessment site of SPS-021 during summer 2008.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-020
Site: SPS-020

UTM: 17W 594665 7801213
Dates Surveyed: 27-Jul-08, 14:56

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: 4°

Hydrology

Sum

Bankfull Width (m): 76.81

Wetted Width (m): Flooded terrestrial w/ many isolated pools

Riffle-Crest Depth (m): 0.07

Pool Depth (m): 0.20

D (m): NM

D₉₅ (m): 6.25

Point Velocities (m/s)

Riffle: 0.13

Pool: 0.01

Behind a rock: NM

Stream/Riparian Habitat

Channel Morphology: 90% pool, 10% riffle

Substrate Composition: 85% fines/FT, 5% 1g cobble, 5% gravel, 5% sand

Stream Cover: 85% FT, 15% 1g cobble

Aquatic Vegetation: None

Riparian Vegetation: Grasse, willow, moss, wildflowers

Barriers Present (Y/N): Unknown
Location: NA

Lakes Present (Y/N): Y
Location: DS

L/R Bank Characteristics

Sum

Bank Height (L/R; m): none

Bank Stability: No bank

Erosion Potential: high

Water Quality

Sum

Specific Conductance (µS/cm): 4.00

TDS (g/l): 0.03

DO (mg/l) 9.36

%DO: NM

Water Temp (°C): 15.50

Fish Habitat Use

Spawning: ARCH - N
NNST - H

Feeding: ARCH - L
NNST - H

Migration: ARCH - N
NNST - M

**Baffin land Iron Mines
Mary River Project**



Steensby Port Site Aquatic Habitat Assessment



Figure 1. View upstream (a) and downstream (b) from habitat assessment of SPS-020 during summer 2008.



Figure 2. View across (c) the habitat assessment site of SPS-020 during summer 2008.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-087
Site: ST-087

UTM: 17 W 595766 7805305
Date/Time Surveyed: August 9, 2010 @ 9:44

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Summer

Bankfull Width (m):	N/M
Wetted Width (m):	N/M
Riffle-Crest Depth (m):	N/A
Pool Depth (m):	N/A
Max Depth (m):	N/M
D₉₅ (m):	N/A
Point Velocities (m/s)	N/A

Lake/Stream Habitat

Channel Morphology: N/A

Substrate Composition: 1% boulders,
40% large cobble,
9% small cobble,
50% fines.

Stream Cover: N/A

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Lakes Present (Y/N): N/A
Location: N/A

Water Quality

Summer

Specific Conductance (mS/m):	95.3
TDS (g/L):	0.61
DO (mg/L):	10.64
Turbidity (NTU):	3.4
pH:	5.60
Water Temp (°C):	13.3

Fish Habitat Use

Spawning:	ARCH - N NNST - N
Rearing:	ARCH - N NNST - N
Wintering:	ARCH - N NNST - N
Migration Corridor:	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING

Steensby Port Site Aquatic Habitat Assessment

Photographs



Figure 1. View from the shoreline of ST-087 (a,b) and substrate (c).

Fisheries Data

Gear Used:	Electrofishing
Start UTM:	17 W 595766 7805305
End UTM:	17 W 595753 7805390
Electrofisher Settings (v/Hz/duty cycle):	200/20/10
Effort (dec.min):	6.0

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	0.0	N/M	N/M
NNST	0	0.0	N/M	N/M

Comments

Lake is completely isolated. Observed some clam shrimp, which is usually associated with at least not ARCH in a lake.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: ST-036
Site: ST-036

UTM: 17 W 595813 7800206
Date/Time Surveyed: August 8, 2010 @ 12:25

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Summer

Bankfull Width (m):	N/M
Wetted Width (m):	N/M
Riffle-Crest Depth (m):	N/A
Pool Depth (m):	N/A
Max Depth (m):	>3.0
D₉₅ (m):	N/A
Point Velocities (m/s)	N/A

Lake/Stream Habitat

Channel Morphology: N/A

Substrate Composition: 10% boulders,
45% large cobble,
45% small cobble.

Stream Cover: N/A

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Lakes Present (Y/N): N/A
Location: N/A

Water Quality

Summer

Specific Conductance (mS/m):	12.6
TDS (g/L):	0.08
DO (mg/L):	11.03
Turbidity (NTU):	2.8
pH:	6.21
Water Temp (°C):	13.0

Fish Habitat Use

Spawning:	ARCH - M NNST - H
Rearing:	ARCH - H NNST - H
Wintering:	ARCH - H NNST - H
Migration Corridor:	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Photographs

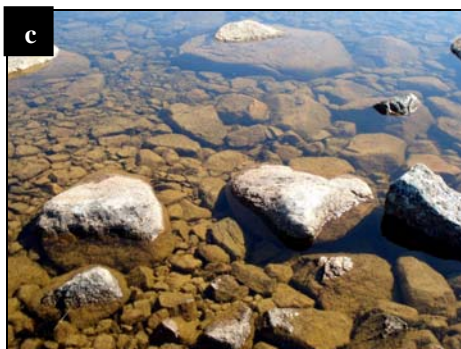


Figure 1. Aerial view of ST-036 (a), view from the shoreline (b), and substrate (c).

Fisheries Data

Gear Used:	Electrofishing
Start UTM:	17 W 595818 7800226
End UTM:	17 W 595813 7800206
Electrofisher Settings (v/Hz/duty cycle):	350/60/12
Effort (dec.min):	5.0

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	7	1.4	90-200	N/M
NNST	4	0.8	40-60	N/M

Comments

Lake provides probable overwintering and spawning habitat for both species.

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-029
UTM Coordinates: 17 W 595637 7800239

Date/Time Surveyed: August 8, 2010 @ 12:00

General Physical Characteristics

Floodplain Width (m):	>100	Channel Pattern:	Sinuuous	Stage:	Low
Channel Confinement:	UC	Channel Gradient (range):	1°	Flow Regime:	Permanent
Bank Height (range in m):	0-0.20	Bank Shape:	Sloped		

In Situ Water Quality Data

Temperature (°C):	15.8	Specific Conductance (mS/m):	16.4	Turbidity (NTU):	1.9
Dissolved Oxygen (mg/L):	11.90	TDS (g/L):	0.11	pH:	6.08

Hydrology & Habitat Characteristics

Distance and Direction from Assessment UTM (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)				
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max	Min
20D	25.5	50.0	0.08	0.02	0.06	0.10	0.00	0.01	0.16	0.16	0.00
0	21.6	45.0	0.14	0.22	0.10	0.30	0.00	0.00	0.00	0.00	N/M
20U	15.0	30.0	0.10	0.18	0.05	0.20	0.00	0.00	0.00	0.00	N/M

Distance and Direction from Assessment UTM (m)	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	5	95					50	25	15	5	5
0		100					50	25	15	5	5
20U		100					50	25	15	5	5

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-029

Date/Time Surveyed: August 8, 2010 @ 12:00

UTM Coordinates: 17 W 595637 7800239

Fisheries Data

Gear Used: Electrofishing

Effort (min): 2.0

Electrofisher Settings: 700V, 60Hz, 12%

Start UTM: 17 W 595626 7800237

End UTM: 17 W 595637 7800239

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	4	2	~100	N/M
NNST	1	0.5	49	N/M

Fish Habitat Potential

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

Comments & Summary

Many YOY NNST also observed.

**Baffinland Iron Mines
Mary River Project**



North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality – IMPORTANT

Steensby Port Site Aquatic Habitat Assessment

Location

Watercourse Name: SPS-029
UTM Coordinates: 17 W 595637 7800239

Date/Time Surveyed: August 8, 2010 @ 12:00

Photographs



A

B

C

Figure 1. (A) view upstream of habitat assessment; (B) view downstream of habitat assessment; (C) view across habitat assessment.

Steensby Port Site Habitat Assessment

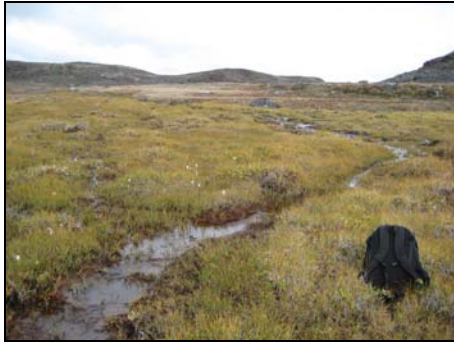


Figure 1: View upstream of crossing SPS-029.



Figure 2: View across crossing SPS-029 from right bank.



Figure 3: View downstream of crossing SPS-029.

Baffinland Iron Mines
Mary River Project



Location	
Crossing ID: SPS-029 (formerly AR-1) UTM: 17W 595383 / 7800119	Date/Time Surveyed: 29-Aug-07 / 16:15
Site Description/Physical Characteristics	Biotic Characteristics
Floodplain Width (m): > 200.00 Channel Pattern: braided Channel Confinement: NC Channel Gradient: N/M	Fisheries Electrofishing Conducted (Y/N): Y Effort: 300 s Settings: 500V 60Hz Fish Observed (Y/N): Y Species/Totals: NNST - 10 (YOY), ARCH - 1 (Juv) Length Range: N/M
Hydrology	Potential Fish Utilization
Bankfull Width (m): N/M (many small channels) Wetted Width (m): N/M (many small channels) Depth Profile (25%, 50%, 75%; m): N/M Max Depth (m): 0.20 Flow Regime: per	Arctic char (ARCH) Spawning: N Rearing: M Overwintering: N Migration: L Ninespine stickleback (NNST) Spawning: H Rearing: H Overwintering: N Migration: M
Bank Characteristics	Habitat Assessment Summary & Potential Habitat Compensation Notes
Bank Height (L/R; m): 0.13/0.16 Bank Shape (L/R): UC / UC Bank Stability: moderate	<p>This stream provides suitable habitat during the entire open water season for ARCH and, in particular, NNST. There may also be some movement between Steensby Inlet and a small upstream lake, though these movements would likely be restricted to small fish.</p> <p>Diverting all flow from the multiple channels through a single culvert may increase available habitat for ARCH but may also decrease available refuge habitat for YOY NNST.</p>
Stream/Riparian Habitat	Fish Habitat Quality
Channel Morphology: 70% Po, 25% Ri, 5% Ca Substrate Composition: 70% Fi, 20% Co, 10% Gr Stream Cover: 60% UC Barriers Present (Y/N): N Description/Location: N/A Lakes Present (Y/N): Y Description/Location: US ~ 100 m, DS – Steensby I.	Important

Steensby Port Site Habitat Assessment



Figure 1: View of lake near site SPS-011k.



Figure 2: Another view of lake near site SPS-011k.



Figure 3: View of shoreline habitat near site SPS-011k.

Baffinland Iron Mines
Mary River Project



Location	
Crossing ID: SPS-011k (formerly AR-2) UTM: 17W 596319 / 7798910	
Date/Time Surveyed: 29-Aug-07 / 16:31	
Site Description/Physical Characteristics	Biotic Characteristics
Floodplain Width (m): N/A Channel Pattern: N/A Channel Confinement: N/A Channel Gradient: N/A	Fisheries Electrofishing Conducted (Y/N): Y Effort: 300 s Settings: 500V 60Hz Fish Observed (Y/N): Y Species/Totals: a few ARCH Length Range: N/M
Hydrology	Potential Fish Utilization
Bankfull Width (m): N/A Wetted Width (m): N/A Depth Profile (25%, 50%, 75%; m): N/A Max Depth (m): 1.0 (lake) Flow Regime: per	Arctic char (ARCH) Spawning: N Rearing: L Overwintering: N Migration: N Ninespine stickleback (NNST) Spawning: N Rearing: M Overwintering: N Migration: N
Bank Characteristics	Habitat Assessment Summary & Potential Habitat Compensation Notes
Bank Height (L/R; m): N/M Bank Shape (L/R): N/A Bank Stability: moderate	<p>This site impinges on shoreline habitat of a nearby lake in addition to stream SPS-011k. The lake is not suitable for overwintering but does have an existing connection with a DS lake that may be deep enough. This lake provides only marginal, open water season habitat for small fish</p> <p>Mitigation requirements can be met by creating cobble/boulder habitat either in other littoral areas of this small lake or in the larger, DS lake.</p>
Stream/Riparian Habitat	Fish Habitat Quality
Channel Morphology: Lake Substrate Composition: 90% Fi, 5% Co, 5% Gr Stream Cover: N/A Barriers Present (Y/N): N Description/Location: N/A Lakes Present (Y/N): Y Description/Location: DS ~ 100-200 m	Marginal

Steensby Port Site Habitat Assessment



Figure 1: View upstream of crossing SPS-005c.



Figure 2: View across crossing SPS-005c from left bank.



Figure 3: View downstream of crossing SPS-005c.

Baffinland Iron Mines
Mary River Project



Location	
Crossing ID: SPS-005c (formerly AR-3) UTM: 17W 597563 / 7798697	Date/Time Surveyed: 29-Aug-07 / 16:43
Site Description/Physical Characteristics	Biotic Characteristics
Floodplain Width (m): > 200.0 Channel Pattern: flooded terrestrial Channel Confinement: NC Channel Gradient: N/M	Fisheries Electrofishing Conducted (Y/N): Y Effort: 60 s Settings: 500V 60Hz Fish Observed (Y/N): N Species/Totals: N/A Length Range: N/A
Hydrology	Potential Fish Utilization
Bankfull Width (m): UD Wetted Width (m): N/M Depth Profile (25%, 50%, 75%; m): N/A Max Depth (m): < 0.10 Flow Regime: eph	Arctic char (ARCH) Spawning: N Rearing: N Overwintering: N Migration: N Ninespine stickleback (NNST) Spawning: N Rearing: N Overwintering: N Migration: N
Bank Characteristics	Habitat Assessment Summary & Potential Habitat Compensation Notes
Bank Height (L/R; m): no banks Bank Shape (L/R): N/A Bank Stability: N/A	Habitat at this crossing is entirely flooded terrestrial vegetation and it is too far from any overwintering habitat to be suitable for fish.
Stream/Riparian Habitat	Fish Habitat Quality
Channel Morphology: 100% Po Substrate Composition: 100% FT Stream Cover: N/A Barriers Present (Y/N): N Description/Location: N/A Lakes Present (Y/N): N Description/Location: N/A	No Fish Habitat

Steensby Port Site Habitat Assessment



Figure 1: Aerial view upstream of crossing SPS-005q.



Figure 2: Aerial view across crossing SPS-005q.



Figure 3: Aerial view downstream of crossing SPS-005q.

Baffinland Iron Mines
Mary River Project



Location	
Crossing ID: SPS-005q (formerly AR-3b) UTM: 17W 598129 / 7799215	Date/Time Surveyed: 29-Aug-07 / 16:51
Site Description/Physical Characteristics	Biotic Characteristics
Floodplain Width (m): > 200.0 Channel Pattern: straight, braided Channel Confinement: NC Channel Gradient: N/M	Fisheries Electrofishing Conducted (Y/N): N Effort: N/A Settings: N/A Fish Observed (Y/N): N Species/Totals: N/A Length Range: N/A
Hydrology	Potential Fish Utilization
Bankfull Width (m): N/M Wetted Width (m): N/M Depth Profile (25%, 50%, 75%; m): N/A Max Depth (m): ~ 0.30 Flow Regime: per	Arctic char (ARCH) Spawning: N Rearing: H Overwintering: N Migration: M Ninespine stickleback (NNST) Spawning: M Rearing: H Overwintering: N Migration: M
Bank Characteristics	Habitat Assessment Summary & Potential Habitat Compensation Notes
Bank Height (L/R; m): N/M Bank Shape (L/R): N/M Bank Stability: N/M	Habitat at this crossing is suitable for feeding and rearing of both species, and there may also be NNST spawning in the pools during summer. Fish could also use this area as a migratory corridor between the US and DS lakes.
Stream/Riparian Habitat	Fish Habitat Quality
Channel Morphology: 75% Po, 25% Ri Substrate Composition: 75% Co, 25% Fi Stream Cover: Large cobble Barriers Present (Y/N): N Description/Location: N/A Lakes Present (Y/N): Y Description/Location: US & DS - < 500 m each	Important

Steensby Port Site Habitat Assessment



Figure 1: Aerial view upstream of crossing SPS-005e.



Figure 2: Aerial view across crossing SPS-005e.

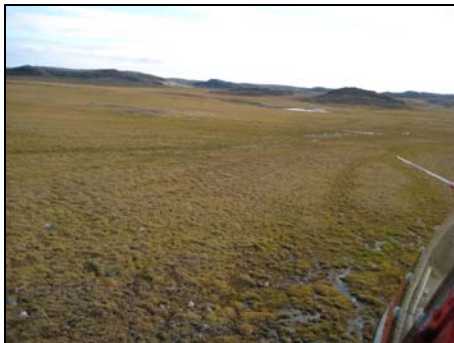


Figure 3: Aerial view downstream of crossing SPS-005e.

Baffinland Iron Mines
Mary River Project



Location

Crossing ID: SPS-005e (formerly AR-5)
UTM: 17W 598570 / 7799072

Date/Time Surveyed: 29-Aug-07 / 16:50

Site Description/Physical Characteristics

Floodplain Width (m): > 200.0
Channel Pattern: flooded terrestrial
Channel Confinement: NC
Channel Gradient: N/M

Hydrology

Bankfull Width (m): N/A
Wetted Width (m): N/A
Depth Profile (25%, 50%, 75%; m): N/A
Max Depth (m): N/M
Flow Regime: eph

Bank Characteristics

Bank Height (L/R; m): no banks
Bank Shape (L/R): N/A
Bank Stability: N/A

Stream/Riparian Habitat

Channel Morphology: 100% Po
Substrate Composition: 100% FT
Stream Cover: None
Barriers Present (Y/N): N
Description/Location: N/A
Lakes Present (Y/N): N
Description/Location: N/A

Biotic Characteristics

Fisheries

Electrofishing Conducted (Y/N): N
Effort: N/A
Settings: N/A
Fish Observed (Y/N): N
Species/Totals: N/A
Length Range: N/A

Potential Fish Utilization

Arctic char (ARCH)
Spawning: N Rearing: N
Overwintering: N Migration: N
Ninespine stickleback (NNST)
Spawning: N Rearing: N
Overwintering: N Migration: N

Habitat Assessment Summary & Potential Habitat Compensation Notes

Even during high water it is unlikely that there is suitable fish habitat at either of these crossings.

Fish Habitat Quality

No Fish Habitat

Steensby Port Site Habitat Assessment

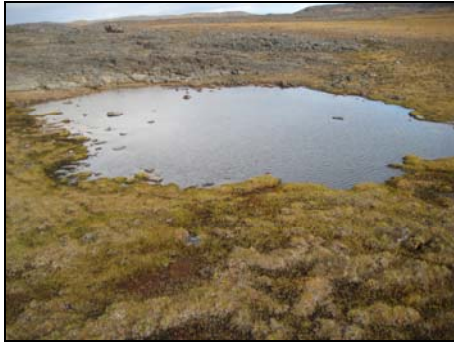


Figure 1: Aerial view of lake near crossing SPS-005v.



Figure 2: View of substrate in lake near crossing SPS-005v.

Location	
Crossing ID: SPS-005v (formerly AR-6)	
UTM: 17W 599217 / 7798908	
Date/Time Surveyed: 29-Aug-07 / 16:55	
Site Description/Physical Characteristics	Biotic Characteristics
Floodplain Width (m): N/A	Fisheries
Channel Pattern: N/A	Electrofishing Conducted (Y/N): N
Channel Confinement: N/A	Effort: N/A
Channel Gradient: N/A	Settings: N/A
	Fish Observed (Y/N): N
	Species/Totals: N/A
	Length Range: N/A
Hydrology	Potential Fish Utilization
Bankfull Width (m): N/A	Arctic char (ARCH)
Wetted Width (m): N/A	Spawning: N Rearing: N
Depth Profile (25%, 50%, 75%; m): N/A	Overwintering: N Migration: N
Max Depth (m): ~ 0.20	Ninespine stickleback (NNST)
Flow Regime: per	Spawning: N Rearing: N
	Overwintering: N Migration: N
Bank Characteristics	Habitat Assessment Summary & Potential Habitat Compensation Notes
Bank Height (L/R; m): N/M	This crossing also impinges on the shoreline of a small lake/pond (ST-074). This lake is unsuitable for overwintering and does not appear to have existing connections with overwintering sites. The stream bed connected to this pond is currently dry and does not provide fish habitat or access to habitat elsewhere.
Bank Shape (L/R): N/M	
Bank Stability: N/M	
Stream/Riparian Habitat	
Channel Morphology: Lake/pond	
Substrate Composition: 95% Fi, 5% Co	
Stream Cover: None	
Barriers Present (Y/N): N	
Description/Location: N/A	
Lakes Present (Y/N): N	
Description/Location: N/A	
	Fish Habitat Quality
	No Fish Habitat

Steensby Port Site Habitat Assessment



Figure 1: View across ST-019.



Figure 2: View along shoreline of ST-019.

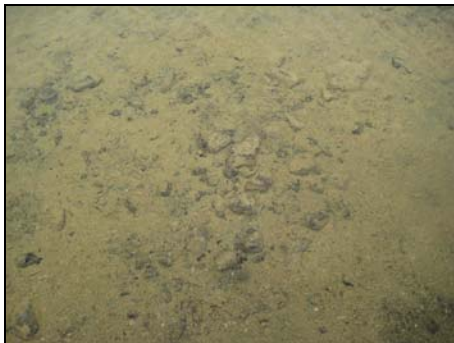


Figure 3: View of substrate in ST-019.

Baffinland Iron Mines
Mary River Project



Location	
Crossing ID: ST-019 (formerly IP-1) UTM: 17W 594117 / 7800129	Date/Time Surveyed: 29-Aug-07 / 14:25
Site Description/Physical Characteristics	Biotic Characteristics
Floodplain Width (m): N/A Channel Pattern: N/A Channel Confinement: N/A Channel Gradient: N/A	Fisheries Electrofishing Conducted (Y/N): Y Effort: 300 s Settings: 400V 30Hz Fish Observed (Y/N): N Species/Totals: N/A Length Range: N/A
Hydrology	Potential Fish Utilization
Bankfull Width (m): N/M Wetted Width x Length (m): ~ 50 x 40 Depth Profile (25%, 50%, 75%; m): N/M Max Depth (m): ~ 0.40 Flow Regime: per	Arctic char (ARCH) Spawning: N Rearing: N Overwintering: N Migration: N Ninespine stickleback (NNST) Spawning: N Rearing: N Overwintering: N Migration: N
Bank Characteristics	Habitat Assessment Summary & Potential Habitat Compensation Notes
Bank Height (L/R; m): N/M Bank Shape (L/R): N/M Bank Stability: N/M	Surface area = ~3000m ² This pond does not provide overwintering habitat, nor is it connected to any waterbody that does. The substrate is comprised of soft, organic fines; not preferred substrate for local freshwater fish species.
Stream/Riparian Habitat	Fish Habitat Quality
Channel Morphology: Pond Substrate Composition: 90% Fi, 9% Co, 1% Bo Stream Cover: 1% Bo Barriers Present (Y/N): N Description/Location: N/A Lakes Present (Y/N): N Description/Location: N/A	No Fish Habitat

Steensby Port Site Habitat Assessment



Figure 1: View across ST-018.



Figure 2: View along shoreline of ST-018.

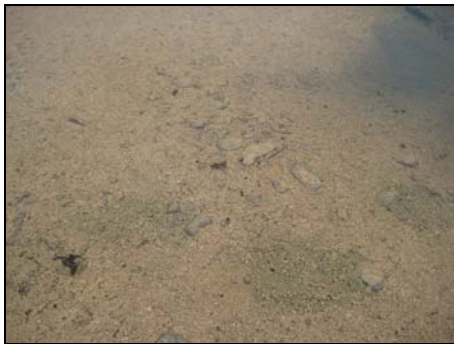


Figure 3: View of substrate in ST-018.

Baffinland Iron Mines
Mary River Project



Location			
Crossing ID: ST-018 (formerly IP-2)		Date/Time Surveyed: 29-Aug-07 / 14:26	
UTM: 17W 593930 / 7800061			
Site Description/Physical Characteristics		Biotic Characteristics	
Floodplain Width (m): N/A		Fisheries	
Channel Pattern: N/A		Electrofishing Conducted (Y/N): Y	
Channel Confinement: N/A		Effort: 300 s	
Channel Gradient: N/A		Settings: 400V 30Hz	
		Fish Observed (Y/N): N	
		Species/Totals: N/A	
		Length Range: N/A	
Hydrology		Potential Fish Utilization	
Bankfull Width (m): N/M		Arctic char (ARCH)	
Wetted Width x Length (m): ~ 40 x 25		Spawning: N Rearing: N	
Depth Profile (25%, 50%, 75%; m): N/M		Overwintering: N Migration: N	
Max Depth (m): ~ 0.25		Ninespine stickleback (NNST)	
Flow Regime: per		Spawning: N Rearing: N	
		Overwintering: N Migration: N	
Bank Characteristics		Habitat Assessment Summary & Potential Habitat Compensation Notes	
Bank Height (L/R; m): N/M		This pond does not provide overwintering habitat, nor is it connected to any waterbody that does. The substrate is comprised of soft, organic fines; not preferred substrate for local freshwater fish species.	
Bank Shape (L/R): N/M			
Bank Stability: N/M			
Stream/Riparian Habitat			
Channel Morphology: Pond			
Substrate Composition: 90% Fi, 10% Co			
Stream Cover: None			
Barriers Present (Y/N): N			
Description/Location: N/A			
Lakes Present (Y/N): N		Fish Habitat Quality	
Description/Location: N/A		No Fish Habitat	

Steensby Port Site Habitat Assessment



Figure 1: View across ST-017.



Figure 2: View along shoreline of ST-017.



Figure 3: View of substrate in ST-017.

Baffinland Iron Mines
Mary River Project



Location

Crossing ID: ST-017 (formerly IP-3)
UTM: 17W 593780 / 7799933

Date/Time Surveyed: 29-Aug-07 / 14:38

Site Description/Physical Characteristics

Floodplain Width (m): N/A
Channel Pattern: N/A
Channel Confinement: N/A
Channel Gradient: N/A

Hydrology

Bankfull Width (m): N/M
Wetted Width x Length (m): ~ 150 x 60
Depth Profile (25%, 50%, 75%; m): N/M
Max Depth (m): ~ 1.00
Flow Regime: per

Bank Characteristics

Bank Height (L/R; m): N/M
Bank Shape (L/R): N/M
Bank Stability: N/M

Stream/Riparian Habitat

Channel Morphology: Pond
Substrate Composition: 70% Fi, 20% Co, 10% Bo
Stream Cover: 10% Bo
Barriers Present (Y/N): N
Description/Location: N/A
Lakes Present (Y/N): N
Description/Location: N/A

Biotic Characteristics

Fisheries

Electrofishing Conducted (Y/N): Y
Effort: 120 s
Settings: 400V 30Hz
Fish Observed (Y/N): N
Species/Totals: N/A
Length Range: N/A

Potential Fish Utilization

Arctic char (ARCH)
Spawning: N Rearing: N
Overwintering: N Migration: N
Ninespine stickleback (NNST)
Spawning: N Rearing: N
Overwintering: N Migration: N

Habitat Assessment Summary & Potential Habitat Compensation Notes

Although the substrate in this pond would be suitable for local freshwater fish species, the pond does not provide overwintering habitat, nor is it connected to any waterbody that does.

Fish Habitat Quality

No Fish Habitat

Steensby Port Site Habitat Assessment



Figure 1: View across ST-012.



Figure 2: View along shoreline of ST-012.



Figure 3: View of substrate in ST-012.

Baffinland Iron Mines
Mary River Project



Location	
Crossing ID: ST-012 (formerly IP-4) UTM: 17W 593604 / 7800078	
Date/Time Surveyed: 29-Aug-07 / 14:50	
Site Description/Physical Characteristics	Biotic Characteristics
Floodplain Width (m): N/A	Fisheries Electrofishing Conducted (Y/N): Y Effort: 180 s Settings: 400V 30Hz Fish Observed (Y/N): N Species/Totals: N/A Length Range: N/A
Channel Pattern: N/A	
Channel Confinement: N/A	
Channel Gradient: N/A	
Hydrology	Potential Fish Utilization Arctic char (ARCH) Spawning: N Rearing: N Overwintering: N Migration: N Ninespine stickleback (NNST) Spawning: N Rearing: N Overwintering: N Migration: N
Bankfull Width (m): N/M	
Wetted Width x Length (m): ~ 50 x 50	
Depth Profile (25%, 50%, 75%; m): N/M	
Max Depth (m): ~ 0.50	
Flow Regime: per	Habitat Assessment Summary & Potential Habitat Compensation Notes This pond does not provide overwintering habitat, nor is it connected to any waterbody that does. The substrate is comprised of soft, organic fines; not preferred substrate for local freshwater fish species.
Bank Characteristics	
Bank Height (L/R; m): N/M	
Bank Shape (L/R): N/M	
Bank Stability: N/M	
Stream/Riparian Habitat	Fish Habitat Quality
Channel Morphology: Pond	
Substrate Composition: 85% Fi, 14% Co, 1% Bo	
Stream Cover: 1% Bo	
Barriers Present (Y/N): N Description/Location: N/A	
Lakes Present (Y/N): N Description/Location: N/A	No Fish Habitat

Steensby Port Site Habitat Assessment



Figure 1: View across ST-010.



Figure 2: View along shoreline of ST-10.



Figure 3: View of substrate in ST-010.

Baffinland Iron Mines
Mary River Project



Location

Crossing ID: ST-010 (formerly IP-5)
UTM: 17W 593553 / 7799992

Date/Time Surveyed: 29-Aug-07 / 14:55

Site Description/Physical Characteristics

Floodplain Width (m): N/A
Channel Pattern: N/A
Channel Confinement: N/A
Channel Gradient: N/A

Hydrology

Bankfull Width (m): N/M
Wetted Width x Length (m): ~ 150 x 100
Depth Profile (25%, 50%, 75%; m): N/M
Max Depth (m): ~ 1.00
Flow Regime: per

Bank Characteristics

Bank Height (L/R; m): N/M
Bank Shape (L/R): N/M
Bank Stability: N/M

Stream/Riparian Habitat

Channel Morphology: Pond
Substrate Composition: 30% Fi, 69% Co, 1% Bo
Stream Cover: 1% Bo, some large cobble
Barriers Present (Y/N): N
Description/Location: N/A
Lakes Present (Y/N): N
Description/Location: N/A

Biotic Characteristics

Fisheries

Electrofishing Conducted (Y/N): Y
Effort: 120 s
Settings: 400V 30Hz
Fish Observed (Y/N): N
Species/Totals: N/A
Length Range: N/A

Potential Fish Utilization

Arctic char (ARCH)
Spawning: N Rearing: N
Overwintering: N Migration: N
Ninespine stickleback (NNST)
Spawning: N Rearing: N
Overwintering: N Migration: N

Habitat Assessment Summary & Potential Habitat Compensation Notes

Although this is one of the larger ponds on the island, it does not provide overwintering habitat, nor is it connected to any waterbody that does. The substrate is suitable but inaccessible.

Fish Habitat Quality

No Fish Habitat

Steensby Port Site Habitat Assessment



Figure 1: View across ST-010a.



Figure 2: View along shoreline of ST-010a.



Figure 3: View of substrate in ST-010a.

Baffinland Iron Mines
Mary River Project



Location		
Crossing ID: ST-010a (formerly IP-6) UTM: 17W 593349 / 7799929		
Date/Time Surveyed: 29-Aug-07 / 15:03		
Site Description/Physical Characteristics	Biotic Characteristics	
Floodplain Width (m): N/A	Fisheries Electrofishing Conducted (Y/N): Y Effort: 120 s Settings: 400V 30Hz Fish Observed (Y/N): N Species/Totals: N/A Length Range: N/A	
Channel Pattern: N/A		
Channel Confinement: N/A		
Channel Gradient: N/A		
Hydrology		
Bankfull Width (m): N/M	Potential Fish Utilization Arctic char (ARCH) Spawning: N Rearing: N Overwintering: N Migration: N Ninespine stickleback (NNST) Spawning: N Rearing: N Overwintering: N Migration: N	
Wetted Width x Length (m): ~ 35 x 40		
Depth Profile (25%, 50%, 75%; m): N/M		
Max Depth (m): ~ 0.35		
Flow Regime: per		
Bank Characteristics		
Bank Height (L/R; m): N/M	Habitat Assessment Summary & Potential Habitat Compensation Notes This pond does not provide overwintering habitat, nor is it connected to any waterbody that does. The substrate is comprised of soft, organic fines; not preferred substrate for local freshwater fish species.	
Bank Shape (L/R): N/M		
Bank Stability: N/M		
Stream/Riparian Habitat		
Channel Morphology: Pond		
Substrate Composition: 95% Fi, 4% Co, 1% Bo		
Stream Cover: 1% Bo		
Barriers Present (Y/N): N		
Description/Location: N/A		
Lakes Present (Y/N): N		
Description/Location: N/A		
Fish Habitat Quality		
No Fish Habitat		

Steensby Port Site Habitat Assessment



Figure 1: View across ST-009.



Figure 2: View along shoreline of ST-009.



Figure 3: View of substrate in ST-009.

Baffinland Iron Mines
Mary River Project



Location

Crossing ID: ST-009 (formerly IP-7)
UTM: 17W 593254 / 7800022

Date/Time Surveyed: 29-Aug-07 / 15:06

Site Description/Physical Characteristics

Floodplain Width (m): N/A
Channel Pattern: N/A
Channel Confinement: N/A
Channel Gradient: N/A

Hydrology

Bankfull Width (m): N/M
Wetted Width x Length (m): ~ 75 x 50
Depth Profile (25%, 50%, 75%; m): N/M
Max Depth (m): ~ 0.90
Flow Regime: per

Bank Characteristics

Bank Height (L/R; m): N/M
Bank Shape (L/R): N/M
Bank Stability: N/M

Stream/Riparian Habitat

Channel Morphology: Pond
Substrate Composition: 94% Fi, 5% Co, 1% Bo
Stream Cover: 1% Bo
Barriers Present (Y/N): N
Description/Location: N/A
Lakes Present (Y/N): N
Description/Location: N/A

Biotic Characteristics

Fisheries

Electrofishing Conducted (Y/N): Y
Effort: 120 s
Settings: 400V 30Hz
Fish Observed (Y/N): N
Species/Totals: N/A
Length Range: N/A

Potential Fish Utilization

Arctic char (ARCH)
Spawning: N Rearing: N
Overwintering: N Migration: N
Ninespine stickleback (NNST)
Spawning: N Rearing: N
Overwintering: N Migration: N

Habitat Assessment Summary & Potential Habitat Compensation Notes

This pond does not provide overwintering habitat, nor is it connected to any waterbody that does. The substrate is comprised of soft, organic fines; not preferred substrate for local freshwater fish species.

Fish Habitat Quality

No Fish Habitat

Steensby Port Site Habitat Assessment



Figure 1: View of substrate in ST-016.

Location	
Crossing ID: ST-016 (formerly IP-8) UTM: 17W 593596 / 7799703	
Date/Time Surveyed: 29-Aug-07 / 15:18	
Site Description/Physical Characteristics	Biotic Characteristics
Floodplain Width (m): N/A	Fisheries
Channel Pattern: N/A	
Channel Confinement: N/A	
Channel Gradient: N/A	
Hydrology	Electrofishing Conducted (Y/N): Y Effort: 180 s Settings: 400V 30Hz
Bankfull Width (m): N/M	Fish Observed (Y/N): N Species/Totals: N/A Length Range: N/A
Wetted Width x Length (m): ~ 80 x 80	Potential Fish Utilization
Depth Profile (25%, 50%, 75%; m): N/M	Arctic char (ARCH) Spawning: N Rearing: N Overwintering: N Migration: N
Max Depth (m): ~ 0.75	Ninespine stickleback (NNST) Spawning: N Rearing: N Overwintering: N Migration: N
Flow Regime: per	Habitat Assessment Summary & Potential Habitat Compensation Notes
Bank Characteristics	This pond does not provide overwintering habitat, nor is it connected to any waterbody that does. The substrate is comprised of soft, organic fines; not preferred substrate for local freshwater fish species.
Bank Height (L/R; m): N/M	
Bank Shape (L/R): N/M	
Bank Stability: N/M	
Stream/Riparian Habitat	
Channel Morphology: Pond	
Substrate Composition: 65% Gr, 30% Fi, 5% Co	
Stream Cover: None	
Barriers Present (Y/N): N	
Description/Location: N/A	
Lakes Present (Y/N): N	
Description/Location: N/A	
	Fish Habitat Quality
	No Fish Habitat

Steensby Port Site Habitat Assessment



Figure 1: View across ST-013.



Figure 2: View along shoreline of ST-013.



Figure 3: View of substrate in ST-013.

Baffinland Iron Mines
Mary River Project



Location	
Crossing ID: ST-013 (formerly IP-9)	
UTM: 17W 593336 / 7799540	
Date/Time Surveyed: 29-Aug-07 / 15:06	
Site Description/Physical Characteristics	Biotic Characteristics
Floodplain Width (m): N/A	Fisheries
Channel Pattern: N/A	Electrofishing Conducted (Y/N): Y
Channel Confinement: N/A	Effort: 60 s
Channel Gradient: N/A	Settings: 400V 30Hz
	Fish Observed (Y/N): N
	Species/Totals: N/A
	Length Range: N/A
Hydrology	Potential Fish Utilization
Bankfull Width (m): N/M	Arctic char (ARCH)
Wetted Width x Length (m): ~ 75 x 50	Spawning: N Rearing: N
Depth Profile (25%, 50%, 75%; m): N/M	Overwintering: N Migration: N
Max Depth (m): ~ 0.15	Ninespine stickleback (NNST)
Flow Regime: per	Spawning: N Rearing: N
	Overwintering: N Migration: N
Bank Characteristics	Habitat Assessment Summary & Potential Habitat Compensation Notes
Bank Height (L/R; m): N/M	This pond does not provide overwintering habitat, nor is it connected to any waterbody that does. The substrate is comprised of soft, organic fines; not preferred substrate for local freshwater fish species.
Bank Shape (L/R): N/M	
Bank Stability: N/M	
Stream/Riparian Habitat	
Channel Morphology: Pond	
Substrate Composition: 89% Fi, 10% Co, 1% Bo	
Stream Cover: 1% Bo	
Barriers Present (Y/N): N	
Description/Location: N/A	
Lakes Present (Y/N): N	
Description/Location: N/A	
	Fish Habitat Quality
	No Fish Habitat

Steensby Port Site Habitat Assessment



Figure 1: View across ST-014.

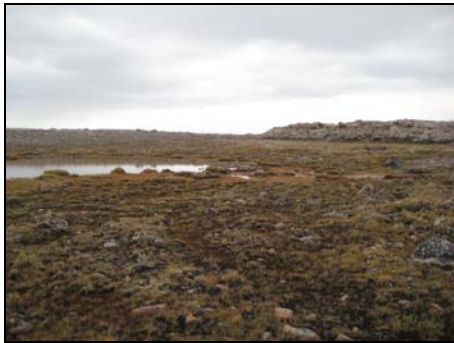


Figure 2: View along shoreline of ST-014.



Figure 3: View of substrate in ST-014.

Baffinland Iron Mines
Mary River Project



Location	
Crossing ID: ST-014 (formerly IP-10) UTM: 17W 593295 / 7799451	
Date/Time Surveyed: 29-Aug-07 / 15:30	
Site Description/Physical Characteristics	Biotic Characteristics
Floodplain Width (m): N/A	Fisheries
Channel Pattern: N/A	Electrofishing Conducted (Y/N): Y
Channel Confinement: N/A	Effort: 120 s
Channel Gradient: N/A	Settings: 400V 30Hz
	Fish Observed (Y/N): N
	Species/Totals: N/A
	Length Range: N/A
Hydrology	Potential Fish Utilization
Bankfull Width (m): N/M	Arctic char (ARCH)
Wetted Width x Length (m): ~ 80 x 60	Spawning: N Rearing: N
Depth Profile (25%, 50%, 75%; m): N/M	Overwintering: N Migration: N
Max Depth (m): ~ 0.40	Ninespine stickleback (NNST)
Flow Regime: per	Spawning: N Rearing: N
	Overwintering: N Migration: N
Bank Characteristics	Habitat Assessment Summary & Potential Habitat Compensation Notes
Bank Height (L/R; m): N/M	This pond does not provide overwintering habitat, nor is it connected to any waterbody that does. The substrate is comprised of soft, organic fines; not preferred substrate for local freshwater fish species.
Bank Shape (L/R): N/M	
Bank Stability: N/M	
Stream/Riparian Habitat	
Channel Morphology: Pond	
Substrate Composition: 98% Fi, 1% Co, 1% Bo	
Stream Cover: 1% Bo	
Barriers Present (Y/N): N	
Description/Location: N/A	
Lakes Present (Y/N): N	Fish Habitat Quality
Description/Location: N/A	No Fish Habitat

Steensby Port Site Habitat Assessment



Figure 1: View across ST-015.



Figure 2: View of substrate in ST-015.

Location		
Crossing ID: ST-015 (formerly IP-11) UTM: 17W 593315 / 7799411		
Date/Time Surveyed: 29-Aug-07 / 15:46		
Site Description/Physical Characteristics	Biotic Characteristics	
Floodplain Width (m): N/A	Fisheries Electrofishing Conducted (Y/N): Y Effort: 60 s Settings: 400V 30Hz Fish Observed (Y/N): N Species/Totals: N/A Length Range: N/A	
Channel Pattern: N/A		
Channel Confinement: N/A		
Channel Gradient: N/A		
Hydrology		
Bankfull Width (m): N/M	Potential Fish Utilization Arctic char (ARCH) Spawning: N Rearing: N Overwintering: N Migration: N Ninespine stickleback (NNST) Spawning: N Rearing: N Overwintering: N Migration: N	
Wetted Width x Length (m): ~ 30 x 30		
Depth Profile (25%, 50%, 75%; m): N/M		
Max Depth (m): ~ 0.15		
Flow Regime: per		
Bank Characteristics		
Bank Height (L/R; m): N/M	Habitat Assessment Summary & Potential Habitat Compensation Notes This pond does not provide overwintering habitat, nor is it connected to any waterbody that does. The substrate is comprised of soft, organic fines; not preferred substrate for local freshwater fish species.	
Bank Shape (L/R): N/M		
Bank Stability: N/M		
Stream/Riparian Habitat		
Channel Morphology: Pond		
Substrate Composition: 100% Fi		
Stream Cover: None		
Barriers Present (Y/N): N		
Description/Location: N/A		
Lakes Present (Y/N): N		
Description/Location: N/A		
Fish Habitat Quality		
No Fish Habitat		

Steensby Port Site Habitat Assessment



Figure 1: View across ST-015a.



Figure 2: View along shoreline of ST-015a.



Figure 3: View of substrate in ST-015a.

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Location	
Crossing ID: ST-015a (formerly IP-12) UTM: 17W 593222 / 7799203	Date/Time Surveyed: 29-Aug-07 / 15:38
Site Description/Physical Characteristics	Biotic Characteristics
Floodplain Width (m): N/A Channel Pattern: N/A Channel Confinement: N/A Channel Gradient: N/A	Fisheries Electrofishing Conducted (Y/N): Y Effort: 600 s Settings: 100V 30Hz Fish Observed (Y/N): N Species/Totals: N/A Length Range: N/A
Hydrology	Potential Fish Utilization
Bankfull Width (m): N/M Wetted Width x Length (m): ~ 200 x 200 Depth Profile (25%, 50%, 75%; m): N/M Max Depth (m): > 1.00 Flow Regime: tidal	Arctic char (ARCH) Spawning: N Rearing: M Overwintering: M Migration: N Ninespine stickleback (NNST) Spawning: N Rearing: N Overwintering: N Migration: N
Bank Characteristics	Habitat Assessment Summary & Potential Habitat Compensation Notes
Bank Height (L/R; m): N/M Bank Shape (L/R): N/M Bank Stability: N/M	This is a marine tidal pool with periodic connections to Steensby Inlet. This pool can provide habitat for several species of nearshore marine fish, including adult anadromous ARCH. Although no fish were captured during electrofishing surveys, several large fish were observed from the air. This pool should be revisited and extensively characterized.
Stream/Riparian Habitat	Fish Habitat Quality
Channel Morphology: Tidal pool Substrate Composition: 80% Fi, 10% Co, 9% Gr, 1% Bo Stream Cover: 1% Bo, deep Po Barriers Present (Y/N): N Description/Location: N/A Lakes Present (Y/N): N Description/Location: N/A	Important

Steensby Port Site Habitat Assessment



Figure 1: Aerial view across ST-015b.



Figure 2: Another aerial view of ST-015b.

Location	
Crossing ID: ST-015b (formerly IP-13) UTM: 17W 593085 / 7798516	Date/Time Surveyed: 29-Aug-07 / 15:56
Site Description/Physical Characteristics	Biotic Characteristics
Floodplain Width (m): N/A Channel Pattern: N/A Channel Confinement: N/A Channel Gradient: N/A	Fisheries Electrofishing Conducted (Y/N): N Effort: N/A Settings: N/A Fish Observed (Y/N): N Species/Totals: N/A Length Range: N/A
Hydrology	Potential Fish Utilization
Bankfull Width (m): N/M Wetted Width x Length (m): N/M Depth Profile (25%, 50%, 75%; m): N/M Max Depth (m): ~ 0.40 Flow Regime: per	Arctic char (ARCH) Spawning: N Rearing: N Overwintering: N Migration: N Ninespine stickleback (NNST) Spawning: N Rearing: N Overwintering: N Migration: N
Bank Characteristics	Habitat Assessment Summary & Potential Habitat Compensation Notes
Bank Height (L/R; m): N/M Bank Shape (L/R): N/M Bank Stability: N/M	Assessment of this pond was limited to aerial observations. This pond does not provide overwintering habitat, nor is it connected to any waterbody that does. The substrate is comprised of soft, organic fines; not preferred substrate for local freshwater fish species.
Stream/Riparian Habitat	Fish Habitat Quality
Channel Morphology: Pond Substrate Composition: 95% Fi, 4% Co, 1% Bo Stream Cover: 1% Bo Barriers Present (Y/N): N Description/Location: N/A Lakes Present (Y/N): N Description/Location: N/A	No Fish Habitat

APPENDIX 7-1.

DETAILED AQUATIC HABITAT ASSESSMENTS FOR WATERBODIES IN THE MILNE PORT AREA.

Exploration Property Aquatic Habitat Assessment

Location

Watercourse Name:
Site:

UTM:
Dates Surveyed:

Site Description/Physical Characteristics

Confinement:

Channel Gradient:

Hydrology

Spr

Sum

Bankfull Width (m):

Wetted Width (m):

Riffle-Crest Depth (m):

Pool Depth (m):

D (m):

D₉₅ (m):

Point Velocities (m/s)

Riffle:

Pool:

Behind a rock:

Stream/Riparian Habitat

Channel Morphology:

Substrate Composition:

Stream Cover:

Aquatic Vegetation:

Riparian Vegetation:

Barriers Present (Y/N):
Location:

Lakes Present (Y/N):
Location:

L/R Bank Characteristics

Spr

Sum

Bank Height (L/R; m):

Bank Stability:

Erosion Potential:

Water Quality

Spr

Sum

Specific
Conductance
(μ S/cm):

TDS (g/l):

DO (mg/l)

%DO:

Water Temp
(°C):

Fish Habitat

Spr

Sum

Spawning:

ARCH -
NNST -

ARCH -
NNST -

Feeding:

ARCH -
NNST -

ARCH -
NNST -

Migration:

ARCH -
NNST -

ARCH -
NNST -

Baffinland Iron Mines
Mary River Project



North/South Consultants Inc.
Aquatic Environment Specialists

Exploration Property Aquatic Habitat Assessment

a

Figure 1. View upstream from habitat assessment in Tom River during spring (a) and summer (b) 2008.

a

Figure 2. View downstream from habitat assessment in Tom River during spring (a) and summer (b) 2008.

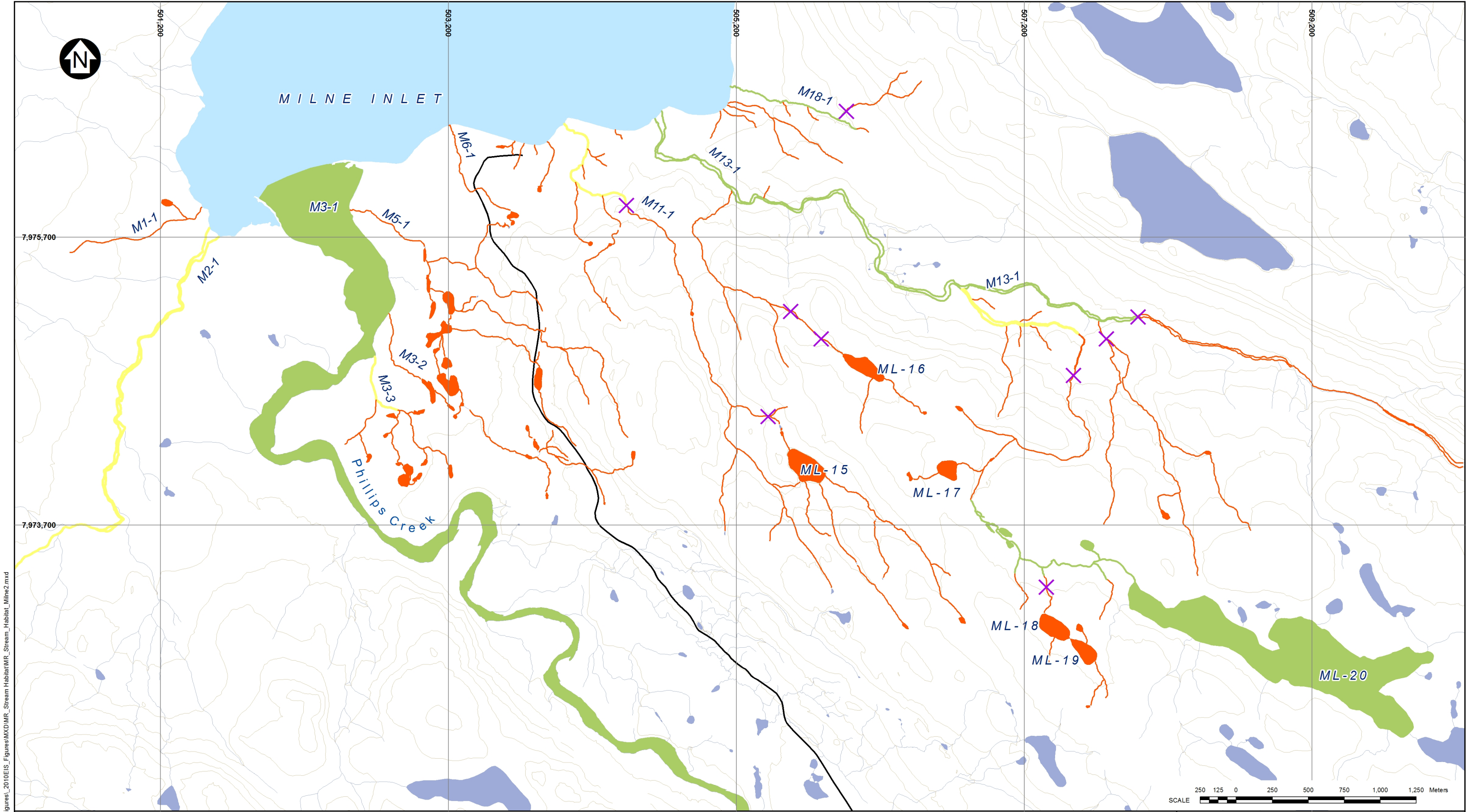
a

Figure 3. View across the habitat assessment site in Tom River during spring (a) and summer (b) 2008.

b

b

b



Path: G:\MARYRIV_GDB\EIS_Figures\2010EIS_Figures\MXD\MR_Stream_Habitat\MR_Stream_Habitat_Milne2.mxd

LEGEND:

Status of Arctic Char

- Present
- Potential
- Not Present
- Unknown

- MILNE INLET TOTE ROAD
- WATER
- INFRASTRUCTURE (PROPOSED FOR OPERATIONS PERIOD)
- FISH BARRIER (CONFIRMED)

REV	DDMMYY'10	ISSUED FOR --	DESCRIPTION	DESIGNED	DRAWN	CHKD	APPD
-	01/09/2010	-	-	-	-	-	-

NOTES:

1. BASE MAP 1:50,000. © HER MAJESTY THE QUEEN IN RIGHTS OF CANADA. DEPARTMENT OF NATURAL RESOURCES (2009.) ALL RIGHTS RESERVED.
2. TOPOGRAPHY PROVIDED BY EAGLE MAPPING (2005).
3. PROPOSED RAILWAY ALIGNMENT PROVIDED BY CANRAIL CONSULTANTS INC.
4. PROPOSED RAILWAY CONSTRUCTION ACCESS ROAD ALIGNMENT PROVIDED BY CANRAIL CONSULTANTS INC. DRAWING NO.: RAILWAY ALIGNMENT AND CONST ACCESS RD - MARY RIVER STEENSBY 2010 - 12AUG2010.dwg
5. MINE SITE INFRASTRUCTURE PROVIDED BY AMEC DRAWING NO.: MINE SITE - CONSTRUCTION PHASE - 01 - MAR 09 2009.dwg
6. CONTOUR INTERVAL IS 50 M AND IS IN METRES.

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

PRESENCE AND ABSENCE OF ARCTIC CHAR IN MILNE INLET TRIBUTARIES

PIA NO.	REF NO.
-	-
DATE: 01/09/2010	
REV	
-	

Milne Inlet Site Aquatic Habitat Assessment

Location

Watercourse Name: ML-03
Site: ML-03

UTM: 17 W 503095 7975200
Date/Time Surveyed: August 11, 2010 @ 11:12

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Summer

Bankfull Width (m): N/M

Wetted Width (m): N/M

Pool Depth (m): N/A

Max Depth (m): 0.2

Point Velocities (m/s) N/A

Lake/Stream Habitat

Channel Morphology: N/A

Substrate Composition: 100% fines

Stream Cover: N/A

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A

Location: N/A

Lakes Present (Y/N): N/A

Location: N/A

Water Quality

Summer

Specific Conductance (mS/m): N/M

TDS (g/L): N/M

DO (mg/L): N/M

Turbidity (NTU): N/M

pH: N/M

Water Temp (°C): N/M

Fish Habitat Quality

Summer

Spawning: ARCH – N
NNST – N

Rearing: ARCH – N
NNST – N

Wintering: ARCH – N
NNST – N

Migration Corridor: ARCH – N
NNST – N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING

Milne Inlet Site Aquatic Habitat Assessment

Photographs

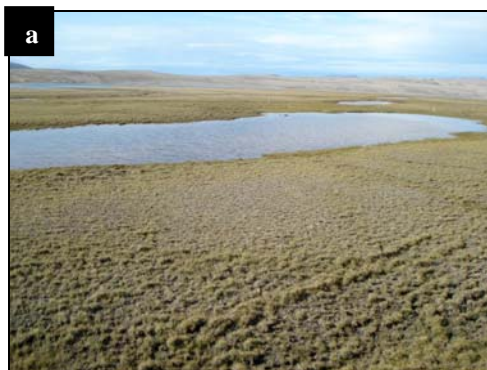


Figure 1. Aerial view of ML-03 (a) and substrate (b).

Fisheries Data

Gear Used:	Observation
Start UTM:	N/A
End UTM:	N/A
Electrofisher Settings (v/Hz/duty cycle):	N/A
Effort (dec.min):	N/A

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	N/A	N/M	N/M
NNST	0	N/A	N/M	N/M

Comments

Made observations of ML-04; no habitat – no fish (same as ML-03).

Electrofishing not necessary due to shallow water depth and zero cover for fish (i.e., they would easily be spotted if present.)

Milne Inlet Site Aquatic Habitat Assessment

Location

Watercourse Name: ML-15
Site: ML-15

UTM: 17 W 505741 7974008
Date/Time Surveyed: August 10, 2010 @ 15:05

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Summer

Bankfull Width (m): N/M

Wetted Width (m): N/M

Pool Depth (m): N/A

Max Depth (m): N/M

Point Velocities (m/s) N/A

Lake/Stream Habitat

Channel Morphology: N/A

Substrate Composition: 10% large cobble,
50% small cobble,
40% fines.

Stream Cover: N/A

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A

Location: N/A

Lakes Present (Y/N): N/A

Location: N/A

Water Quality

Summer

Specific Conductance (mS/m): N/M

TDS (g/L): N/M

DO (mg/L): N/M

Turbidity (NTU): N/M

pH: N/M

Water Temp (°C): N/M

Fish Habitat Quality

Summer

Spawning: ARCH – N
NNST – N

Rearing: ARCH - N
NNST – N

Wintering: ARCH - N
NNST – N

Migration Corridor: ARCH - N
NNST – N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING

Milne Inlet Site Aquatic Habitat Assessment

Photographs

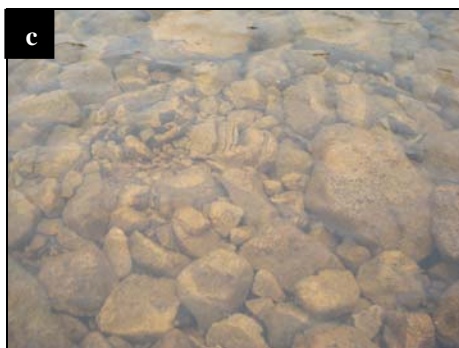


Figure 1. Aerial view of ML-15 (a), view from the shoreline (b), and substrate (c).

Fisheries Data

Gear Used:	Electrofishing
Start UTM:	17 W 505741 7974008
End UTM:	17 W 505779 7973996
Electrofisher Settings (v/Hz/duty cycle):	600/50/12
Effort (dec.min):	3.5

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	0.0	N/M	N/M
NNST	0	0.0	N/M	N/M

Comments

Excellent habitat but no fish caught or observed. No access to other waterbodies. No *in situ* water quality recorded.

Milne Inlet Site Aquatic Habitat Assessment

Location

Watercourse Name: ML-16
Site: ML-16

UTM: 17 W 506007 7974795
Date/Time Surveyed: August 10, 2010 @ 15:20

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Summer

Bankfull Width (m): N/M

Wetted Width (m): N/M

Pool Depth (m): N/A

Max Depth (m): N/M

Point Velocities (m/s) N/A

Lake/Stream Habitat

Channel Morphology: N/A

Substrate Composition: 10% large cobble,
10% small cobble,
5% gravel,
75% fines.

Stream Cover: N/A

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Lakes Present (Y/N): N/A
Location: N/A

Water Quality

Summer

Specific Conductance (mS/m): N/M

TDS (g/L): N/M

DO (mg/L): N/M

Turbidity (NTU): N/M

pH: N/M

Water Temp (°C): N/M

Fish Habitat Quality

Summer

Spawning: ARCH - N
NNST - N

Rearing: ARCH - N
NNST - N

Wintering: ARCH - N
NNST - N

Migration Corridor: ARCH - N
NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING

Milne Inlet Site Aquatic Habitat Assessment

Photographs

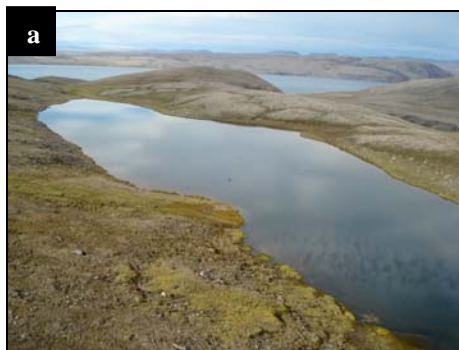


Figure 1. Aerial view of ML-16 (a), view from the shoreline (b), and substrate (c).

Fisheries Data

Gear Used:	Electrofishing
Start UTM:	17 W 506007 7974795
End UTM:	17 W 506071 7974759
Electrofisher Settings (v/Hz/duty cycle):	600/50/12
Effort (dec.min):	3.5

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	0.0	N/M	N/M
NNST	0	0.0	N/M	N/M

Comments

High quality habitat but no fish caught or observed. No connections with other waterbodies. No *in situ* water quality recorded.

Milne Inlet Site Aquatic Habitat Assessment

Location

Watercourse Name: ML-18
Site: ML-18

UTM: 17 W 507504 7972911
Date/Time Surveyed: August 10, 2010 @ 14:51

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Summer

Bankfull Width (m): N/M

Wetted Width (m): N/M

Pool Depth (m): N/A

Max Depth (m): N/M

Point Velocities (m/s) N/A

Lake/Stream Habitat

Channel Morphology: N/A

Substrate Composition: 5% small cobble,
95% fines.

Stream Cover: N/A

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Lakes Present (Y/N): N/A
Location: N/A

Water Quality

Summer

Specific Conductance (mS/m): 33.5

TDS (g/L): 0.23

DO (mg/L): 8.23

Turbidity (NTU): 7.3

pH: 6.77

Water Temp (°C): 10.9

Fish Habitat Quality

Summer

Spawning: ARCH – N
NNST – N

Rearing: ARCH - N
NNST – N

Wintering: ARCH - N
NNST – N

Migration Corridor: ARCH - N
NNST – N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING

Milne Inlet Site Aquatic Habitat Assessment

Photographs



Figure 1. Aerial view of ML-18 and Lake ML-19 in the background (a).

Fisheries Data

Gear Used:	Electrofishing
Start UTM:	17 W 507504 7972911
End UTM:	17 W 507515 7972952
Electrofisher Settings (v/Hz/duty cycle):	600/50/12
Effort (dec.min):	2.5

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	0.0	N/M	N/M
NNST	0	0.0	N/M	N/M

Comments

No fish caught or observed. Connected to ML-19, but nothing else.

Milne Inlet Site Aquatic Habitat Assessment

Location

Watercourse Name: ML-19
Site: ML-19

UTM: 17 W 507526 7972904
Date/Time Surveyed: August 10, 2010 @ 14:58

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Summer

Bankfull Width (m): N/M

Wetted Width (m): N/M

Riffle-Crest Depth (m): N/M

Pool Depth (m): N/M

Max Depth (m): N/M

D₉₅ (m): N/M

Point Velocities (m/s)

Riffle: N/M

Pool: N/M

Behind a rock: N/M

Lake/Stream Habitat

Channel Morphology: N/A

Substrate Composition: 5% small cobble,
95% fines.

Stream Cover: N/A

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Lakes Present (Y/N): N/A
Location: N/A

Water Quality

Specific Conductance (mS/m): N/M

TDS (g/L): N/M

DO (mg/L): N/M

Turbidity (NTU): N/M

pH: N/M

Water Temp (°C): N/M

Fish Habitat Quality

Summer

Spawning: ARCH - N
NNST - N

Rearing: ARCH - N
NNST - N

Wintering: ARCH - N
NNST - N

Migration Corridor: ARCH - N
NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING

Milne Inlet Site Aquatic Habitat Assessment

Photographs



Figure 1. Aerial view of ML-19 in the background and ML-18 in the forefront (a).

Fisheries Data

Gear Used:	Electrofishing
Start UTM:	17 W 507526 7972904
End UTM:	17 W 507540 7972864
Electrofisher Settings (v/Hz/duty cycle):	600/50/12
Effort (dec.min):	2.5

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	0.0	N/M	N/M
NNST	0	0.0	N/M	N/M

Comments

No water quality data recorded. No fish caught or observed. Connected to ML-18, but nothing else.

Milne Inlet Site Aquatic Habitat Assessment

Location

Watercourse Name: ML-20
Site: ML-20

UTM: 17 W 509096 7972581
Date/Time Surveyed: August 18, 2010 @ 14:23

Site Description/Physical Characteristics

Confinement: N/A

Channel Gradient: N/A

Hydrology

Summer

Bankfull Width (m):	N/M
Wetted Width (m):	N/M
Pool Depth (m):	N/A
Max Depth (m):	> 10.0
Point Velocities (m/s)	N/A

Lake/Stream Habitat

Channel Morphology: N/A

Substrate Composition: 10% large cobble,
5% small cobble,
5% gravel,
80% fines.

Stream Cover: N/A

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N/A
Location: N/A

Lakes Present (Y/N): N/A
Location: N/A

Water Quality

Summer

Specific Conductance (mS/m):	22.8
TDS (g/L):	0.15
DO (mg/L):	11.59
Turbidity (NTU):	3.4
pH:	6.80
Water Temp (°C):	11.8

Fish Habitat Quality

Summer

Spawning:	ARCH - M NNST - L
Rearing:	ARCH - H NNST - L
Wintering:	ARCH - H NNST - L
Migration Corridor:	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Milne Inlet Site Aquatic Habitat Assessment

Photographs



Figure 1. Aerial view of ML-20 (a, b).

Fisheries Data

Gear Used:	Electrofishing
Start UTM:	17 W 509096 7972581
End UTM:	17 W 509176 7972580
Electrofisher Settings (v/Hz/duty cycle):	600/50/12
Effort (dec.min):	5.0

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	43	8.6	50-90	N/M
NNST	0	0.0	N/A	N/A

Comments

A few hundred meters of M13-9 accessible from lake, but significant barriers prevent access further downstream. Probably an isolated population of char in this lake. Surface water sample collected, ID= ML-20-S.

Milne Inlet Site Aquatic Habitat Assessment

Location

Watercourse Name: M02-1
UTM Coordinates: 17 W 501469 7975542

Date/Time Surveyed: August 10, 2010 @ 16:30

General Physical Characteristics

Floodplain Width (m):	N/M	Channel Pattern:	N/M	Stage:	N/M
Channel Confinement:	N/M	Channel Gradient (range):	N/M	Flow Regime:	N/M
Bank Height (range in m):	N/M	Bank Shape:	N/M		

In Situ Water Quality Data

Temperature (°C):	1143	Specific Conductance (mS/m):	35.5	Turbidity (NTU):	4.7
Dissolved Oxygen (mg/L):	11.44	TDS (g/L):	0.23	pH:	7.45

Hydrology & Habitat Characteristics

Distance and Direction from Assessment UTM (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)				
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max	Min
0	3.5	60.0	0.06	0.21	0.08	0.30	0.08	0.11	0.02	0.15	N/M

Distance and Direction from Assessment UTM (m)	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	70	5				10	90			

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – MARGINAL

Milne Inlet Site Aquatic Habitat Assessment

Location

Watercourse Name: M02-1
UTM Coordinates: 17 W 501469 7975542

Date/Time Surveyed: August 10, 2010 @ 16:30

Fisheries Data

Gear Used: Electrofishing **Effort (min):** 4.5 **Electrofisher Settings:** N/M
Start UTM: N/M **End UTM:** N/M

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	0.0	N/A	N/A
NNST	0	0.0	N/A	N/A

Fish Habitat Potential

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

Comments & Summary

No fish observed but potential for sea run visitors.

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – MARGINAL

Milne Inlet Site Aquatic Habitat Assessment

Location

Watercourse Name: M02-1
UTM Coordinates: 17 W 501469 7975542

Date/Time Surveyed: August 10, 2010 @ 16:30

Photographs



A



B



C

Figure 1. (A) View upstream of habitat assessment; (B) view downstream of habitat assessment; and (C) view across habitat assessment.

Milne Inlet Site Aquatic Habitat Assessment

Location

Watercourse Name: M03-1
UTM Coordinates: 17 W 502694 7974845

Date/Time Surveyed: August 11, 2010 @ 10:08

General Physical Characteristics

Floodplain Width (m):	>100	Channel Pattern:	Sinuuous	Stage:	Low
Channel Confinement:	PC	Channel Gradient (range):	1°	Flow Regime:	Permanent
Bank Height (range in m):	0-10	Bank Shape:	Sloped		

In Situ Water Quality Data

Temperature (°C):	10.5	Specific Conductance (mS/m):	20.8	Turbidity (NTU):	3.0
Dissolved Oxygen (mg/L):	11.93	TDS (g/L):	0.14	pH:	6.57

Hydrology & Habitat Characteristics

Distance and Direction from Assessment UTM (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)				
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max	Min
0	54.86	>100	0.53	0.68	0.34	0.80	0.78	0.87	0.70	1.00	N/M

Distance and Direction from Assessment UTM (m)	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			10	45	45		

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Milne Inlet Site Aquatic Habitat Assessment

Location

Watercourse Name: M03-1
UTM Coordinates: 17 W 502694 7974845

Date/Time Surveyed: August 11, 2010 @ 10:08

Fisheries Data

Gear Used: Electrofishing **Effort (min):** 5.0 **Electrofisher Settings(v/Hz/duty cycle):** 600/50/12
Start UTM: 17 W 502816 7975349 **End UTM:** ~50 m upstream of start UTM

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	0	N/M	N/M
NNST	0	0	N/M	N/M

Fish Habitat Potential

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

Comments & Summary

No fish, but potential is there because searun char were observed in the lower reaches of M13-1 and M18-1.
 Water quality sample collected, ID= M3-1 at 10:15 @ 0.60m depth.

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Milne Inlet Site Aquatic Habitat Assessment

Location

Watercourse Name: M03-1
UTM Coordinates: 17 W 502694 7974845

Date/Time Surveyed: August 11, 2010 @ 10:08

Photographs



A



B



C



D



E

Figure 1. (A) Aerial view of stream M03-1; (B) view upstream of habitat assessment; (C) view downstream of habitat assessment; (D) view across habitat assessment; and (E) view of substrate along bank of habitat assessment.

Milne Inlet Site Aquatic Habitat Assessment

Location

Watercourse Name: M03-3
UTM Coordinates: 17 W 502694 7974845

Date/Time Surveyed: August 11, 2010 @ 10:44

General Physical Characteristics

Floodplain Width (m):	>100	Channel Pattern:	Meandering/braided	Stage:	Low
Channel Confinement:	UC	Channel Gradient (range):	1°	Flow Regime:	Permanent
Bank Height (range in m):	0-1.2	Bank Shape:	Sloped		

In Situ Water Quality Data

Temperature (°C):	11.0	Specific Conductance (mS/m):	76.8	Turbidity (NTU):	0.3
Dissolved Oxygen (mg/L):	11.46	TDS (g/L):	0.49	pH:	6.37

Hydrology & Habitat Characteristics

Distance and Direction from Assessment UTM (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)				
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max	Min
0	0.80	45.72	N/M	N/M	N/M	0.02	N/M	N/M	N/M	0.20	N/M

Distance and Direction from Assessment UTM (m)	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	80	20					10	90			

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – MARGINAL

Milne Inlet Site Aquatic Habitat Assessment

Location

Watercourse Name: M03-3 **Date/Time Surveyed:** August 11, 2010 @ 10:44
UTM Coordinates: 17 W 502694 7974845

Fisheries Data

Gear Used: Electrofishing **Effort (min):** 4.0 **Electrofisher Settings(v/Hz/duty cycle):** 600/50/12
Start UTM: 17 W 502694 7974845 **End UTM:** ~50 m upstream of start UTM

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	0	N/A	N/A
NNST	0	0	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

No fish, but there are at least intermittent connections with M03-1, which has the potential to support sea run char during the open water season.

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – MARGINAL

Milne Inlet Site Aquatic Habitat Assessment

Location

Watercourse Name: M03-3
UTM Coordinates: 17 W 502694 7974845

Date/Time Surveyed: August 11, 2010 @ 10:44

Photographs



A



B



C



D



E

Figure 1. (A) Aerial view of stream M03-3; (B) view upstream of habitat assessment; (C) view downstream of habitat assessment; (D) view across habitat assessment; and (E) view of substrate along the bank of habitat assessment.

Milne Inlet Site Aquatic Habitat Assessment

Location

Watercourse Name: M11-1
UTM Coordinates: 17 W 504137 7976415

Date/Time Surveyed: August 10, 2010 @ 16:15

General Physical Characteristics

Floodplain Width (m):	N/M	Channel Pattern:	Sinuuous/braided	Stage:	Low
Channel Confinement:	PC	Channel Gradient (range):	1-3°	Flow Regime:	Permanent
Bank Height (range in m):	N/M	Bank Shape:	N/A		

In Situ Water Quality Data

Temperature (°C):	11.1	Specific Conductance (mS/m):	42.5	Turbidity (NTU):	2.1
Dissolved Oxygen (mg/L):	11.50	TDS (g/L):	0.28	pH:	7.45

Hydrology & Habitat Characteristics

Distance and Direction from Assessment UTM (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)				
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max	Min
0	0.80	15.00	N/M	0.12	N/M	0.15	N/M	0.44	N/M	0.50	N/M

Distance and Direction from Assessment UTM (m)	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	90	10						75	25		

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – MARGINAL

Milne Inlet Site Aquatic Habitat Assessment

Location

Watercourse Name: M11-1
UTM Coordinates: 17 W 504137 7976415

Date/Time Surveyed: August 10, 2010 @ 16:15

Fisheries Data

Gear Used: Electrofishing **Effort (min):** 5.5 **Electrofisher Settings(v/Hz/duty cycle):** 600/50/12
Start UTM: 50m u/s of site **End UTM:** 50m d/s of site

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	0	N/A	N/A
NNST	0	0	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

No fish, but searun potential based on results from M18-1 and M13-1.

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – MARGINAL

Milne Inlet Site Aquatic Habitat Assessment

Location

Watercourse Name: M11-1
UTM Coordinates: 17 W 504137 7976415

Date/Time Surveyed: August 10, 2010 @ 16:15

Photographs



A



B



C



D

Figure 1. (A) Aerial view of stream M11-1; (B) view upstream of habitat assessment; (C) view downstream of habitat assessment; and (D) view across habitat assessment.

Milne Inlet Site Aquatic Habitat Assessment

Location

Watercourse Name: M13-1
UTM Coordinates: 17 W 504653 7976492

Date/Time Surveyed: August 10, 2010 @ 15:33

General Physical Characteristics

Floodplain Width (m):	N/M	Channel Pattern:	Sinuuous	Stage:	Low
Channel Confinement:	PC	Channel Gradient (range):	1-5°	Flow Regime:	Permanent
Bank Height (range in m):	N/M	Bank Shape:	N/A		

In Situ Water Quality Data

Temperature (°C):	11.3	Specific Conductance (mS/m):	27.9	Turbidity (NTU):	4.5
Dissolved Oxygen (mg/L):	11.18	TDS (g/L):	0.18	pH:	7.17

Hydrology & Habitat Characteristics

Distance and Direction from Assessment UTM (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)				
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max	Min
0	6.5	N/M	0.17	0.20	0.20	0.25	0.27	0.67	0.03	1.00	N/M

Distance and Direction from Assessment UTM (m)	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	80	15	5				10		90		

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Milne Inlet Site Aquatic Habitat Assessment

Location

Watercourse Name: M13-1
UTM Coordinates: 17 W 504653 7976492

Date/Time Surveyed: August 10, 2010 @ 15:33

Fisheries Data

Gear Used: Electrofishing **Effort (min):** 7.5 **Electrofisher Settings(v/Hz/duty cycle):** 600/50/12
Start UTM: 17 W 504653 7976492 **End UTM:** 17 W 504679 7976446

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	4	0.5	140-170	N/A
NNST	0	0	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

Water quality triplicate sample collected: M13-1-A / B / C.

Arctic char caught - very silver in color; suspected from Milne - lack of access to upstream lakes would also suggest this.

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Milne Inlet Site Aquatic Habitat Assessment

Location

Watercourse Name: M13-1
UTM Coordinates: 17 W 504653 7976492

Date/Time Surveyed: August 10, 2010 @ 15:33

Photographs



A



B



C



D

Figure 1. (A) View upstream of habitat assessment; (B) view downstream of habitat assessment; (C) view across habitat assessment; and (D) photo of arctic char caught during habitat assessment (~150 mm).

Milne Inlet Site Aquatic Habitat Assessment

Location

Watercourse Name: M18-1
UTM Coordinates: 17 W 505207 7976744

Date/Time Surveyed: August 10, 2010 @ 16:05

General Physical Characteristics

Floodplain Width (m):	N/M	Channel Pattern:	Sinuuous	Stage:	Low
Channel Confinement:	PC	Channel Gradient (range):	1-5°	Flow Regime:	Permanent
Bank Height (range in m):	N/M	Bank Shape:	N/A		

In Situ Water Quality Data

Temperature (°C):	11.3	Specific Conductance (mS/m):	66.2	Turbidity (NTU):	29.1
Dissolved Oxygen (mg/L):	10.82	TDS (g/L):	0.42	pH:	7.46

Hydrology & Habitat Characteristics

Distance and Direction from Assessment UTM (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)				
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max	Min
0	0.50	7.50	N/M	N/M	N/M	0.10	N/M	N/M	N/M	0.50	N/M

Distance and Direction from Assessment UTM (m)	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	90	10						20	70	10	

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – MARGINAL

Milne Inlet Site Aquatic Habitat Assessment

Location

Watercourse Name: M18-1
UTM Coordinates: 17 W 505207 7976744

Date/Time Surveyed: August 10, 2010 @ 16:05

Fisheries Data

Gear Used: Electrofishing **Effort (min):** 6.5 **Electrofisher Settings(v/Hz/duty cycle):** 600/50/12
Start UTM: 17 W 505207 7976744 **End UTM:** 17 W 505248 7976719

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	1	0.2	~100	N/M
NNST	0	0.0	N/A	N/A

Fish Habitat Potential

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

Comments & Summary

Arctic char caught appears to be sea-run. No connections with headwater, overwintering lakes.

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – MARGINAL

APPENDIX 8-1.

**DETAILED AQUATIC HABITAT ASSESSMENTS FOR
WATERBODIES ALONG THE MILNE INLET TOTE ROAD.**

Exploration Property Aquatic Habitat Assessment

Location

Watercourse Name:
Site:

UTM / Chainage:
Dates Surveyed:

Site Description/Physical Characteristics

Confinement:

Channel Gradient:

Hydrology

Spring

Fall

Bankfull Width (m):

Wetted Width (m):

Rapids Depths (m):

Pool Depth (m):

Sea Can Depths (from
left #'s 5, 8, & last) (m):

Centre Culvert Depth
(m):

Maximum Depth (m):

Point Velocities (m/s)

Rapids:

Pool:

Sea Cans:

Centre Culvert:

Stream/Riparian Habitat

Channel Morphology:

Substrate Composition:

Stream Cover:

Aquatic Vegetation:

Riparian Vegetation:

Barriers Present (Y/N):
Location:

L/R Bank Characteristics

Spring

Fall

Bank Height (m):

Bank Stability:

Erosion Potential:

Water Quality

Spring

Fall

Specific
Conductance
($\mu\text{S}/\text{cm}$):

pH:

Water Temp
($^{\circ}\text{C}$):

Fish Habitat

Spring

Fall

Spawning:

Feeding:

Migration:

ARCH -
NNST -

ARCH -
NNST -

ARCH -
NNST -

ARCH -
NNST -

ARCH -
NNST -

ARCH -
NNST -

Baffinland Iron Mines
Mary River Project



North/South Consultants Inc.
Aquatic Environment Specialists

Exploration Property Aquatic Habitat Assessment

a

Figure 1.

b

c

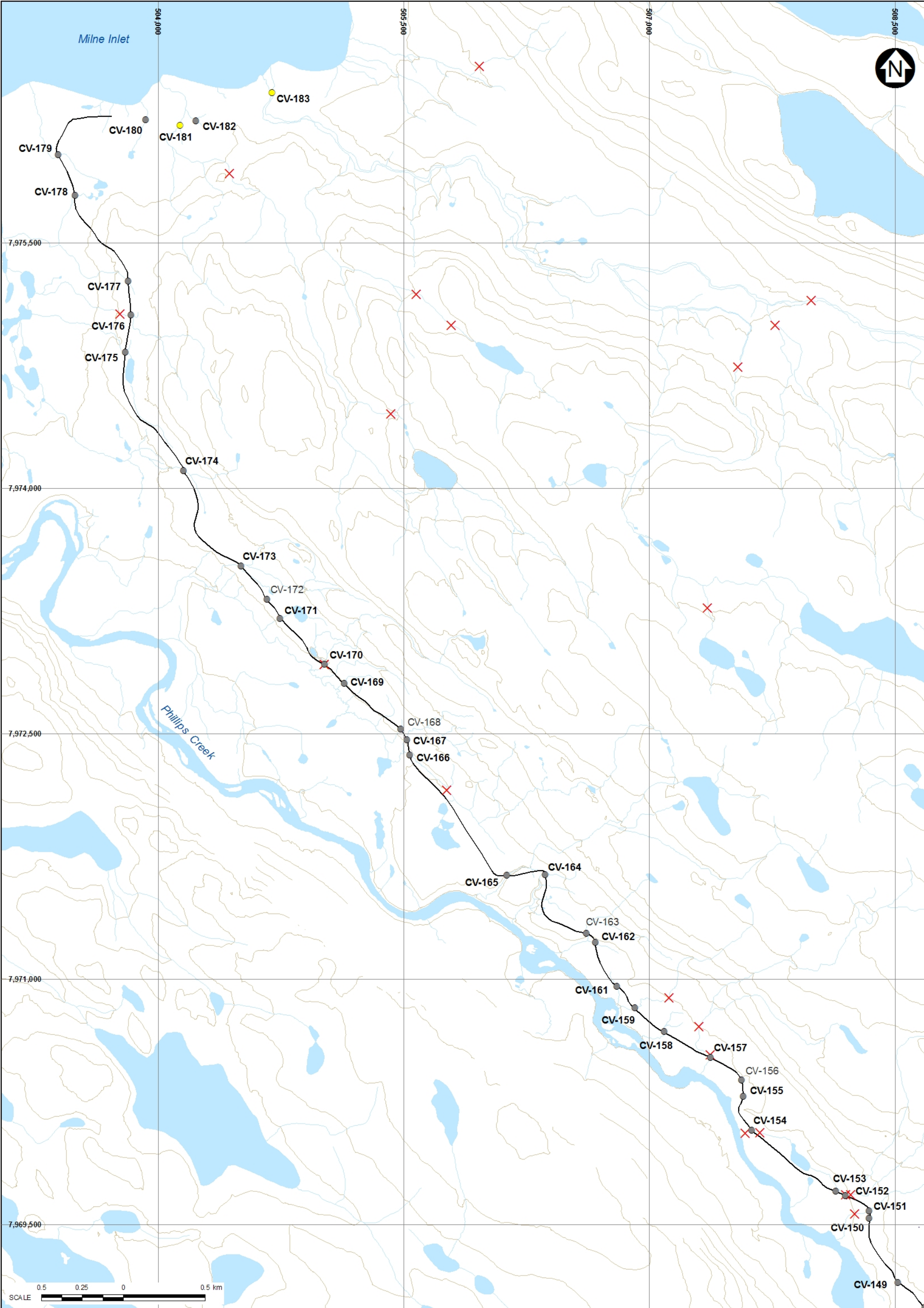
a

Figure 2. .

b

c

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



LEGEND:

- IMPORTANT FISH HABITAT
- MARGINAL FISH HABITAT
- NOT FISH BEARING HABITAT
- * FALLS
- ✕ FISH BARRIER
- TOTE ROAD (EXISTING)
- CONTOUR
- WATER

REV	DDMMYY10	ISSUED FOR	DESIGNED	DRAWN	CHK'D	APP'D
-	01/09/2010					

NOTES:

1. BASE MAP: © HER MAJESTY THE QUEEN IN RIGHTS OF CANADA A 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 25 MAND IS IN METRES.

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BAFFINLAND IRON MINES CORPORATION
MARY RIVER PROJECT
Milne Inlet Tote Road - 3a

	P/A NO.	REF NO.
	DATE: 01/09/2010	REV 1

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-183
Site: DS

UTM / Chainage: 17W 504696 7976417 / 0 + 145
Dates Surveyed: 2-Jul-09, 26-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 5°

Hydrology

	Spring	Fall
Bankfull Width (m):	20.11	20.11
Wetted Width (m):	17.37	16.47
Riffle Depths (m):	0.53, 0.25	0.55, 0.06
Pool Depth (m):	0.22	0.16
Culvert Depth (m):	N/A (culvert removed)	N/A (culvert removed)
Maximum Depth (m):	0.65	0.55
Point Velocities (m/s)		
Riffles:	1.43, 0.27	0.81, 0.51
Pool:	0.08	0.00
Culvert:	N/A	N/A

Stream/Riparian Habitat

Channel Morphology: 90% riffle, 10% pool
Substrate Composition: 75% sm. cobble, 10% sand, 7% lg. cobble, 5% gravel, 3% boulder
Stream Cover: 10% lg. cobble/ boulder, 5% deep pool
Aquatic Vegetation: Periphyton
Riparian Vegetation: Grasses, willow
Barriers Present (Y/N): N
Location: N/A

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	0.80	0.80
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	140	216
pH:	8.40	7.24
Water Temp (°C):	7.0	7.5

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - M NNST - N	ARCH - M NNST - N
Migration:	ARCH - N NNST - N	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – MARGINAL

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) from the removed culvert location at CV-183 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (b) from the removed culvert location at CV-183 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-181
Site: DS

UTM / Chainage: 17W 504133 7976216 / 0 + 480
Dates Surveyed: 2-Jul-09, 26-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 1°

Hydrology

	Spring	Fall
Bankfull Width (m):	9.00	9.00
Wetted Width (m):	8.10	7.70
Riffle Depth (m):	0.11	0.04
Pool Depth (m):	0.36	0.34
Culvert Depth (m):	0.15	N/A (culvert removed)
Maximum Depth (m):	0.48	0.34
Point Velocities (m/s)		
Riffle:	0.27	0.22
Pool:	0.00	0.00
Culvert:	1.56	N/A

Stream/Riparian Habitat

Channel Morphology: 80% riffle, 20% pool
Substrate Composition: 50% gravel, 35% sand, 10% sm. cobble, 5% lg. cobble
Stream Cover: 5% lg. cobble, 5% deep pool
Aquatic Vegetation: Periphyton
Riparian Vegetation: Grasses, willow
Barriers Present (Y/N): N
Location: N/A

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	0.15	0.15
Bank Stability:	Low	Low
Erosion Potential:	High	High

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	113	301
pH:	8.38	7.85
Water Temp (°C):	8.9	7.7

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - U NNST - N	ARCH - N NNST - N
Migration:	ARCH - U NNST - N	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – MARGINAL

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-181 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (b) from the removed culvert location at CV-181 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-181
Site: US

UTM / Chainage: 17W 504133 7976216 / 0 + 480
Dates Surveyed: 2-Jul-09, 26-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 1°

Hydrology

	Spring	Fall
Bankfull Width (m):	13.00	13.00
Wetted Width (m):	10.20	N/M
Riffle Depth (m):	0.12	0.12
Pool Depth (m):	0.16	-
Culvert Depth (m):	0.21	N/A (culvert removed)
Maximum Depth (m):	0.40	N/M
Point Velocities (m/s)		
Riffle:	0.40	0.60
Pool:	0.02	-
Culvert:	0.51	N/A

Stream/Riparian Habitat

Channel Morphology: 50% riffle, 50% pool
Substrate Composition: 80% sm. cobble, 10% gravel, 5% sand, 5% lg. cobble
Stream Cover: 5% lg. cobble, 5% deep pool
Aquatic Vegetation: Periphyton
Riparian Vegetation: Grasses, willows
Barriers Present (Y/N): N
Location: N/A

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	0.20	0.20
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	117	-
pH:	8.33	-
Water Temp (°C):	8.7	-

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - U NNST - N	ARCH - N NNST - N
Migration:	ARCH - U NNST - N	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – MARGINAL

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-181 during early July, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-176
Site: DS

UTM / Chainage: 17W 503834 7975057 / 2 + 638
Dates Surveyed: 2-Jul-09, 26-Aug-09

Site Description/Physical Characteristics

Confinement: Confined

Channel Gradient: 2-10°

Hydrology

	Spring	Fall
Bankfull Width (m):	2.50	2.50
Wetted Width (m):	1.90	1.20
Riffle Depth (m):	0.05	0.04
Pool Depth (m):	0.06	-
Culvert Depth (m):	0.04	0.06
Maximum Depth (m):	0.10	0.06
Point Velocities (m/s)		
Riffle:	0.33	0.32
Pool:	0.00	-
Culvert:	0.61	0.17

Stream/Riparian Habitat

Channel Morphology: 95% riffle, 5% pool
Substrate Composition: 60% gravel, 30% sand, 10% sm. cobble
Stream Cover: None
Aquatic Vegetation: None
Riparian Vegetation: Grasses, willow
Barriers Present (Y/N): Y
Location: Inaccessible from steep DS gradient

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	0.20	0.20
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	120	295
pH:	8.21	7.87
Water Temp (°C):	6.5	4.7

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - N NNST - N	ARCH - N NNST - N
Migration:	ARCH - N NNST - N	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-176 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (b) at the habitat assessment site downstream of the crossing at CV-176 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-176
Site: US

UTM / Chainage: 17W 503834 7975057 / 2 + 638
Dates Surveyed: 2-Jul-09, 26-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 2-10°

Hydrology

	Spring	Fall
Bankfull Width (m):	3.60	3.60
Wetted Width (m):	2.00	0.80
Riffle Depth (m):	0.05	0.05
Pool Depth (m):	0.12	0.13
Culvert Depth (m):	0.05	0.05
Maximum Depth (m):	0.15	0.13
Point Velocities (m/s)		
Riffle:	0.32	0.25
Pool:	0.02	0.00
Culvert:	0.20	0.31

Stream/Riparian Habitat

Channel Morphology: 80% riffle, 20% pool
Substrate Composition: 50% gravel, 25% sand, 20% sm. cobble, 5% lg. cobble
Stream Cover: 5% lg. cobble
Aquatic Vegetation: None
Riparian Vegetation: Grasses, willows
Barriers Present (Y/N): Y
Location: Inaccessible gradient DS of crossing

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	0.25	0.25
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	115	-
pH:	8.17	-
Water Temp (°C):	5.9	-

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - N NNST - N	ARCH - N NNST - N
Migration:	ARCH - N NNST - N	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-176 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-176 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name:	CV-173	UTM / Chainage:	17W 504465 7973535 / 4 + 430
Site:	DS (US not needed)	Dates Surveyed:	2-Jul-09

Site Description/Physical Characteristics

Confinement:		N/M		Stream/Riparian Habitat		Water Quality	
Channel Gradient:		N/M		Channel Morphology:		Spring	
Hydrology				Substrate Composition:		Specific Conductance (µS/cm):	
Spring				Stream Cover:		pH:	
Bankfull Width (m):	N/M			Aquatic Vegetation:		Water Temp (°C):	
Wetted Width (m):	N/M			Riparian Vegetation:			
Depths (m):	N/M			Barriers Present (Y/N):			
Culvert Depth (m):	N/M			Location:			
Maximum Depth (m):	N/M						
Point Velocities (m/s)	N/M			L/R Bank Characteristics			
				Spring			
				Bank Height (m):	N/M		Spawning:
				Bank Stability:	N/M		Feeding:
				Erosion Potential:	N/M		Migration:

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING

Tote Road Aquatic Habitat Assessment



Figure 1. View across (a) and of barrier (b) at the habitat assessment site downstream of the crossing at CV-173 during spring, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-170
Site: DS

UTM / Chainage: 17W 505015 7972923 / 5 + 267
Dates Surveyed: 2-Jul-09, 26-Aug-09

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: 1°

Hydrology

	Spring	Fall
Bankfull Width (m):	4.30	4.30
Wetted Width (m):	1.10	1.10
Riffle Depth (m):	0.03	0.02
Cascade Depth (m):	0.02	0.01
Pool Depth (m):	0.08	0.11
Culvert Depth (m):	0.02	0.02
Maximum Depth (m):	0.10	0.11

Point Velocities (m/s)

Riffle:	0.35	0.38
Cascade:	0.85	0.79
Pool:	0.08	0.00
Culvert:	1.09	0.60

Stream/Riparian Habitat

Channel Morphology: 90% riffle, 5% pool, 5% cascade

Substrate Composition: 50% sm. cobble, 20% gravel, 20% sand, 5% lg. cobble, 5% boulder

Stream Cover: 10% lg. cobble/ boulder

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grasses, willows, moss

Barriers Present (Y/N): Y
Location: Inaccessible from DS ~200-250m

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	0.10-0.15	0.10-0.15
Bank Stability:	High	High
Erosion Potential:	Low	Low

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	83	247
pH:	8.22	7.94
Water Temp (°C):	10.3	7.1

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - N NNST - N	ARCH - N NNST - N
Migration:	ARCH - N NNST - N	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-170 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (b) at the habitat assessment site downstream of the crossing at CV-170 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-170
Site: US

UTM / Chainage: 17W 505015 7972923 / 5 + 267
Dates Surveyed: 2-Jul-09, 26-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 2->10°

Hydrology

	Spring	Fall
Bankfull Width (m):	12.50	12.50
Wetted Width (m):	2.70	2.70
Pool Depth (m):	0.15	0.24
Culvert Depth (m):	0.05	0.03
Maximum Depth (m):	0.25	0.24
Point Velocities (m/s)		
Pool:	0.01	0.00
Culvert:	0.69	0.25

Stream/Riparian Habitat

Channel Morphology: 50% pool, 50% cascade

Substrate Composition: 40% sand/silt, 40% gravel, 20% sm. cobble

Stream Cover: 5% deep. pool

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grasses, willows, moss

Barriers Present (Y/N): Y
Location: Inaccessible gradient ~25 m US

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	0.10-0.20	0.10-0.20
Bank Stability:	High	High
Erosion Potential:	Low	Low

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	82	-
pH:	8.26	-
Water Temp (°C):	10.3	-

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - N NNST - N	ARCH - N NNST - N
Migration:	ARCH - N NNST - N	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-170 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-170 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name:	CV-167	UTM / Chainage:	17W 505519 7972462 / 5 + 960
Site:	US (not needed)	Dates Surveyed:	2-Jul-09

Site Description/Physical Characteristics

Confinement:		N/M		Stream/Riparian Habitat		Water Quality	
Channel Gradient:		N/M		Channel Morphology:		Spring	
Hydrology				Substrate Composition:		Specific Conductance (µS/cm):	
Spring				Stream Cover:		pH:	
Bankfull Width (m):	N/M			Aquatic Vegetation:		Water Temp (°C):	
Wetted Width (m):	N/M			Riparian Vegetation:			
Depths (m):	N/M			Barriers Present (Y/N):			
Culvert Depth (m):	N/M			Location:			
Maximum Depth (m):	N/M						
Point Velocities (m/s)	N/M			L/R Bank Characteristics			
				Spring			
				Bank Height (m):	N/M		Spawning:
				Bank Stability:	N/M		Feeding:
				Erosion Potential:	N/M		Migration:

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a) and downstream (b) at the habitat assessment site downstream of the crossing and the upstream barrier (c) at CV-167 during spring, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-166
Site: DS

UTM / Chainage: 17W 505538 7972370 / 6 + 056
Dates Surveyed: 2-Jul-09, 26-Aug-09

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: 1°

Hydrology

	Spring	Fall
Bankfull Width (m):	7.00	7.00
Wetted Width (m):	1.40	1.32
Riffle Depth (m):	0.07	0.06
Pool Depth (m):	0.25	0.38
Left Culvert Depth (m):	0.15	0.17
Maximum Depth (m):	0.40	0.38
Point Velocities (m/s)		
Riffle:	0.30	0.89
Pool:	0.00	0.00
Left Culvert:	0.11	0.00

Stream/Riparian Habitat

Channel Morphology: 75% pool, 25% riffle
Substrate Composition: 60% sm. cobble, 20% gravel, 10% lg. cobble, 10% sand
Stream Cover: 10% lg. cobble, 20% deep pool
Aquatic Vegetation: Periphyton
Riparian Vegetation: Grasses, willows
Barriers Present (Y/N): Y
Location: Inaccessible from DS, low water and steep gradient > 500 m DS

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	0.15-0.25	0.15-0.25
Bank Stability:	Low	Low
Erosion Potential:	High	High

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	130	275
pH:	8.21	7.85
Water Temp (°C):	7.0	5.1

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - N NNST - N	ARCH - N NNST - N
Migration:	ARCH - N NNST - N	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-166 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (b) at the habitat assessment site downstream of the crossing at CV-166 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-166
Site: US

UTM / Chainage: 17W 505538 7972370 / 6 + 056
Dates Surveyed: 2-Jul-09, 26-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 2-5°

Hydrology

	Spring	Fall
Bankfull Width (m):	8.50	8.50
Wetted Width (m):	3.10	3.10
Riffle Depth (m):	0.04	0.03
Pool Depth (m):	0.18	0.20
Left Culvert Depth (m):	0.09	0.09
Maximum Depth (m):	0.20	0.20
Point Velocities (m/s)		
Riffle:	0.30	0.26
Pool:	0.00	0.02
Left Culvert:	0.22	0.08

Stream/Riparian Habitat

Channel Morphology: 90% pool, 10% riffle
Substrate Composition: 30% sm. cobble, 25% sand, 15% gravel, 15% lg. cobble, 15% boulder
Stream Cover: 30% lg. cobble/ boulder, 5% deep pool
Aquatic Vegetation: Periphyton
Riparian Vegetation: Grasses, willows
Barriers Present (Y/N): Y
Location: Inaccessible steep gradient > 500 m DS

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	0.05-0.30	0.05-0.30
Bank Stability:	Low	Low
Erosion Potential:	High	High

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	132	-
pH:	8.21	-
Water Temp (°C):	6.6	-

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - N NNST - N	ARCH - N NNST - N
Migration:	ARCH - N NNST - N	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-166 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-166 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-159
Site: DS

UTM / Chainage: 17W 506909 7970830 / 8 + 407
Dates Surveyed: 2-Jul-09, 26-Aug-09

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: 1°

Hydrology

	Spring	Fall
Bankfull Width (m):	4.50	4.50
Wetted Width (m):	1.20	1.20
Riffle Depth (m):	0.02	0.03
Pool Depth (m):	0.02	0.07
Culvert Depth (m):	0.08	0.03
Maximum Depth (m):	0.08	0.07
Point Velocities (m/s)		
Riffle:	0.22	0.65
Pool:	0.00	0.01
Culvert:	0.56	0.40

Stream/Riparian Habitat

Channel Morphology: 95% riffle, 5% pool
Substrate Composition: 50% sm. cobble, 40% gravel, 5% lg. cobble, 5% sand
Stream Cover: 5% lg. cobble
Aquatic Vegetation: Periphyton, FT
Riparian Vegetation: Grasses, willows
Barriers Present (Y/N): Y
Location: Inaccessible gradient > 500 m DS

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	0.10	0.10
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	153	335
pH:	8.41	8.00
Water Temp (°C):	9.9	7.0

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - N NNST - N	ARCH - N NNST - N
Migration:	ARCH - N NNST - N	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-159 during early July, 2009.

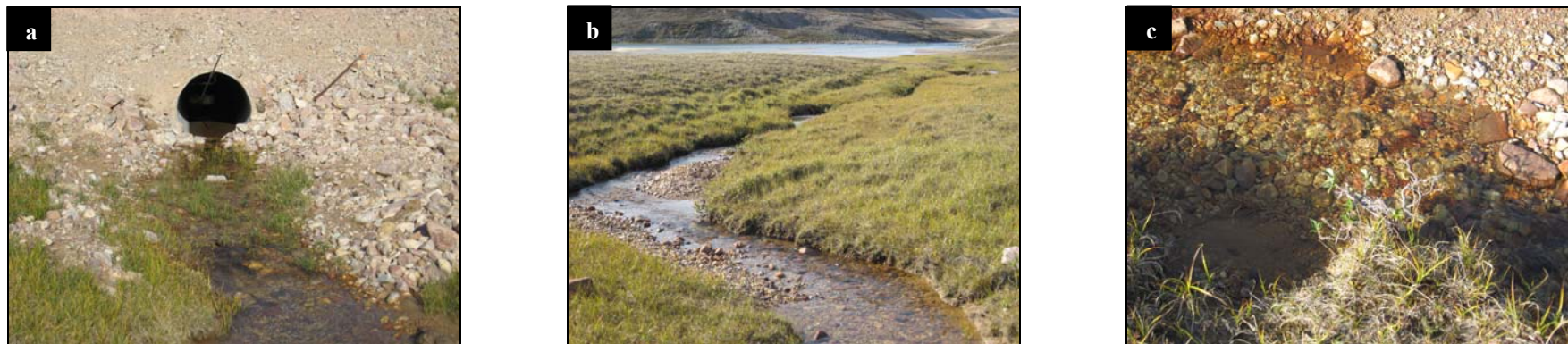


Figure 2. View upstream (a), downstream (b), and across (b) at the habitat assessment site downstream of the crossing at CV-159 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-159
Site: US

UTM / Chainage: 17W 506909 7970830 / 8 + 407
Dates Surveyed: 2-Jul-09, 26-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 1°

Hydrology

	Spring	Fall
Bankfull Width (m):	3.90	3.90
Wetted Width (m):	3.90	3.90
Pool Depth (m):	0.41	0.41
Culvert Depth (m):	0.02	0.08
Maximum Depth (m):	0.50	0.41
Point Velocities (m/s)		
Pool:	0.01	0.00
Culvert:	0.49	0.11

Stream/Riparian Habitat

Channel Morphology: 100% pool
Substrate Composition: 40% sm. cobble, 30% gravel, 25% sand, 5% lg. cobble
Stream Cover: 5% lg. cobble
Aquatic Vegetation: Periphyton, FT
Riparian Vegetation: Grasses, willows
Barriers Present (Y/N): Y
Location: Inaccessible gradient > 500 m DS of crossing

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	0.05-0.15	0.05-0.15
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	153	-
pH:	8.41	-
Water Temp (°C):	10.1	-

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - N NNST - N	ARCH - N NNST - N
Migration:	ARCH - N NNST - N	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-159 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-159 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-157
Site: DS

UTM / Chainage: 17W 507374 7970538 / 8 + 960
Dates Surveyed: 2-Jul-09, 26-Aug-09

Site Description/Physical Characteristics

Confinement: Confined

Channel Gradient: 2-5°

Hydrology

	Spring	Fall
Bankfull Width (m):	2.00	2.00
Wetted Width (m):	1.50	1.15
Riffle Depth (m):	0.02	0.05
Pool Depth (m):	0.06	0.05
Culvert Depth (m):	0.03	0.05
Maximum Depth (m):	0.08	0.05
Point Velocities (m/s)		
Riffle:	0.53	1.18
Pool:	0.02	0.00
Culvert:	0.30	0.40

Stream/Riparian Habitat

Channel Morphology: 90% riffle, 5% pool, 5% cascade

Substrate Composition: 50% sm. cobble, 20% gravel, 20% lg. cobble, 5% sand, 5% boulder

Stream Cover: 25% lg. cobble/ boulder

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grasses, willows

Barriers Present (Y/N): Y
Location: Inaccessible gradient DS

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	0.30	0.30
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	151	307
pH:	8.43	7.96
Water Temp (°C):	8.5	7.0

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - N NNST - N	ARCH - N NNST - N
Migration:	ARCH - N NNST - N	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-157 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (b) at the habitat assessment site downstream of the crossing at CV-157 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-157
Site: US

UTM / Chainage: 17W 507374 7970538 / 8 + 960
Dates Surveyed: 2-Jul-09, 26-Aug-09

Site Description/Physical Characteristics

Confinement: Confined

Channel Gradient: 5-10°

Hydrology

	Spring	Fall
Bankfull Width (m):	6.00	6.00
Wetted Width (m):	5.00	5.20
Riffle Depth (m):	0.01	0.01
Pool Depth (m):	0.20	0.31
Culvert Depth (m):	0.10	0.22
Maximum Depth (m):	0.30	0.31
Point Velocities (m/s)		
Riffle:	0.32	0.14
Pool:	0.01	0.01
Culvert:	0.38	0.16

Stream/Riparian Habitat

Channel Morphology: 90% riffle, 5% pool, 5% cascade

Substrate Composition: 60% gravel, 25% sm. cobble, 10% sand, 5% lg. cobble/ boulder

Stream Cover: 5% lg. cobble/ boulder

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grasses, willows

Barriers Present (Y/N): Y
Location: Inaccessible gradient DS & US

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	0.10-0.20	0.10-0.20
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	193	-
pH:	8.30	-
Water Temp (°C):	10.5	-

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - N NNST - N	ARCH - N NNST - N
Migration:	ARCH - N NNST - N	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING





Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-157 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-157 during late August, 2009.

Bulk Sample Road Watercourse Crossing Assessment					
<div></div> <p>Figure 1: Downstream view from proposed crossing with Phillips Creek visible. Riffle habitat type with predominantly sand/gravel substrate.</p> <div></div> <p>Figure 2: Upstream view from proposed crossing showing relatively steep gradient.</p> <div></div> <p>Figure 3: View across CV-156.</p>	Location				
	Site: CV-156		Watercourse Name: Unknown River		
	UTM: 17W 0507580 / 7970389				
	Site Description			Potential Fish Utilization	
	Watershed Size: 0.066 km ²		Mesohabitat Composition: Riffle – 100%		Arctic Char
	Regulated: No		Substrate Composition: Sand – 75%; Gravel – 20%; Cobble – 5%		Spawning: No
	Channelized: No		Stream Cover: In- and Overstream vegetation – 2%;		Migration: No
	Bankfull Width: 0.60 m		Riparian Vegetation: Grasses		Rearing: No
	Wetted Width: 0.26 m		Aquatic Vegetation: Submerged grasses		Overwintering: No
	Riffle Crest Depth: 0.03 m		Unique Features: None		
Residual Pool Depth: N/A		Summary: This is an extra small, nearly waterless stream with predominantly sand substrate and low-moderate erosion potential. There is relatively little significant cover.		Ninespine Stickleback	
Bankfull Depth: 0.10 m				Spawning: No	
Bank Height: 0.07 m				Migration: No	
D ₉₅ : 0.16 m				Rearing: No	
D: 0.001 m				Overwintering: No	
Confinement: Unconfined					
Channel Morphology: Riffle					
Channel Gradient: 15 ⁰					
Turbidity: 0.00 FTU					
Side Slope R – 5%; L – 5%					
Approach: R – 95%; L – 95%					
Bank Stability: Moderate-High					
Erosion Potential: Low-Moderate					
Undercut Banks: None					
		Fish Habitat Quality		Comments	
		None		This waterbody is likely significant only as a spring runoff stream. Even at peak flows, the gradient is likely too steep and water levels too low to offer useful habitat even for stickleback or young-of-the-year char from nearby Phillips Creek.	
Baffinland Iron Mines Mary River Project Watercourse Crossing Assessment				 NORTH/SOUTH CONSULTANTS INC. AQUATIC ENVIRONMENT SPECIALISTS	

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-154
Site: DS

UTM / Chainage: 17W 507620 7970076 / 9 + 570
Dates Surveyed: 2-Jul-09, 26-Aug-09

Site Description/Physical Characteristics

Confinement: Confined

Channel Gradient: 2-5°

Hydrology

	Spring	Fall
Bankfull Width (m):	4.30	4.30
Wetted Width (m):	2.60	3.00
Riffle Depth (m):	0.05	0.02
Cascade Depth (m):	0.01	0.02
Pool Depth (m):	0.05	0.06
Culvert Depth (m):	0.14	0.05
Maximum Depth (m):	0.14	0.10

Point Velocities (m/s)

Riffle:	0.47	0.63
Cascade:	0.67	0.49
Pool:	0.01	0.00
Culvert:	0.09	0.26

Stream/Riparian Habitat

Channel Morphology: 90% riffle, 5% pool, 5% cascade

Substrate Composition: 50% sm. cobble, 25% gravel, 19% lg. cobble, 5% sand, 1% boulder

Stream Cover: 20% lg. cobble/ boulder

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grasses

Barriers Present (Y/N): Y
Location: Water levels DS insufficient for passage

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	0.20-0.30	0.20-0.30
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	177	429
pH:	8.42	8.01
Water Temp (°C):	6.1	7.1

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - N NNST - N	ARCH - N NNST - N
Migration:	ARCH - N NNST - N	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-154 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (b) at the habitat assessment site downstream of the crossing at CV-154 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-154
Site: US

UTM / Chainage: 17W 507620 7970076 / 9 + 570
Dates Surveyed: 2-Jul-09, 26-Aug-09

Site Description/Physical Characteristics

Confinement: Confined

Channel Gradient: 5-10°

Hydrology

	Spring	Fall
Bankfull Width (m):	4.50	4.50
Wetted Width (m):	4.50	4.50
Pool Depth (m):	0.43	0.46
Culvert Depth (m):	0.01	0.08
Maximum Depth (m):	0.55	0.50
Point Velocities (m/s)		
Pool:	0.01	0.00
Culvert:	0.57	0.30

Stream/Riparian Habitat

Channel Morphology: 100% pool until ~25m US and then 95% cascade, 5% pool

Substrate Composition: 40% gravel, 20% sm. cobble, 20% lg. cobble, 20% sand

Stream Cover: 40% deep pool, 20% lg. cobble/boulder

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grasses

Barriers Present (Y/N): Y
Location: Water levels DS insufficient for passage

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	0.20-0.30	0.20-0.30
Bank Stability:	High	High
Erosion Potential:	Low	Low

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	201	-
pH:	8.43	-
Water Temp (°C):	5.6	-

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - N NNST - N	ARCH - N NNST - N
Migration:	ARCH - N NNST - N	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site 50 m upstream of the crossing at CV-154 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site 50 m upstream of the crossing at CV-154 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name:	CV-153	UTM / Chainage:	17W 508152 7969718 / 10 + 218
Site:	DS (US not needed)	Dates Surveyed:	2-Jul-09

Site Description/Physical Characteristics

Confinement:		N/M		Stream/Riparian Habitat		Water Quality	
Channel Gradient:		N/M		Channel Morphology:		Spring	
Hydrology				Substrate Composition:		Specific Conductance (µS/cm):	
Spring				Stream Cover:		pH:	
Bankfull Width (m):	N/M			Aquatic Vegetation:		Water Temp (°C):	
Wetted Width (m):	N/M			Riparian Vegetation:			
Depths (m):	N/M			Barriers Present (Y/N):			
Culvert Depth (m):	N/M			Location:			
Maximum Depth (m):	N/M			L/R Bank Characteristics			
Point Velocities (m/s)	N/M			Spring			
				Bank Height (m):	N/M		
				Bank Stability:	N/M		
				Erosion Potential:	N/M		
						Fish Habitat	
						Spring	
						Spawning:	ARCH - N NNST - N
						Feeding:	ARCH - N NNST - N
						Migration:	ARCH - N NNST - N

Baffinland Iron Mines
Mary River Project



Fish Habitat Quality – NOT FISH-BEARING

Tote Road Aquatic Habitat Assessment



Figure 1. View across (a) at the habitat assessment site downstream of the crossing at CV-153 during spring, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name:	CV-152	UTM / Chainage:	17W 508201 7969684 / 10 + 280
Site:	DS & US	Dates Surveyed:	2-Jul-09, 26-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: > 10°

Hydrology

	Spring	Fall
Bankfull Width (m):	No Habitat	No Habitat
Wetted Width (m):	N/M	N/M
Riffle Depth (m):	N/M	N/M
Pool Depth (m):	N/M	N/M
Culvert Depth (m):	N/M	N/M
Maximum Depth (m):	N/M	N/M
Point Velocities (m/s)		
Riffle:	N/M	N/M
Pool:	N/M	N/M
Culvert:	N/M	N/M

Stream/Riparian Habitat

Channel Morphology: No fish habitat

Substrate Composition: No fish habitat

Stream Cover: N/A

Aquatic Vegetation: N/M

Riparian Vegetation: N/M

Barriers Present (Y/N): Y
Location: Flat area of flooded terrestrial disconnected from river DS
 Steep, impassable barrier US

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	N/M	N/M
Bank Stability:	N/M	N/M
Erosion Potential:	N/M	N/M

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	N/M	N/M
pH:	N/M	N/M
Water Temp (°C):	N/M	N/M

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - N NNST - N	ARCH - N NNST - N
Migration:	ARCH - N NNST - N	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING

Tote Road Aquatic Habitat Assessment

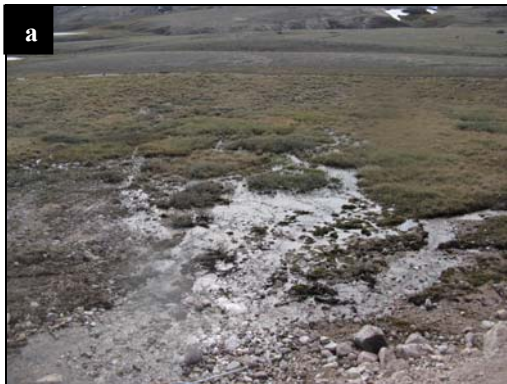


Figure 1. View downstream (a) and upstream (b) of the crossing at CV-152 during early July, 2009.

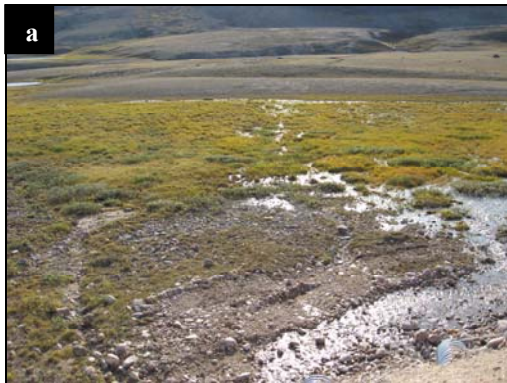


Figure 2. View downstream (a) of the crossing at CV-152 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-151	UTM / Chainage: 17W 508341 7969584 / 10 + 460
Site: DS (US not needed)	Dates Surveyed: 2-Jul-09

Site Description/Physical Characteristics

Confinement:		N/M		Stream/Riparian Habitat		Water Quality	
Channel Gradient:		N/M		Channel Morphology:		Spring	
Hydrology				80% cascade, 15% riffle, 5% pool		Specific Conductance (µS/cm):	
Spring				Substrate Composition:		pH:	
Bankfull Width (m):		N/M		Stream Cover:		Water Temp (°C):	
Wetted Width (m):		N/M		Aquatic Vegetation:		N/M	
Depths (m):		N/M		Riparian Vegetation:		N/M	
Culvert Depth (m):		0.01-0.07		Barriers Present (Y/N):		Y	
Maximum Depth (m):		N/M		Location:		DS ~ 500 m	
Point Velocities (m/s)				L/R Bank Characteristics			
Culvert:		0.20-0.75		Spring			
				Bank Height (m):		N/M	
				Bank Stability:		N/M	
				Erosion Potential:		N/M	

Baffinland Iron Mines
Mary River Project



Fish Habitat Quality – NOT FISH-BEARING

Tote Road Aquatic Habitat Assessment

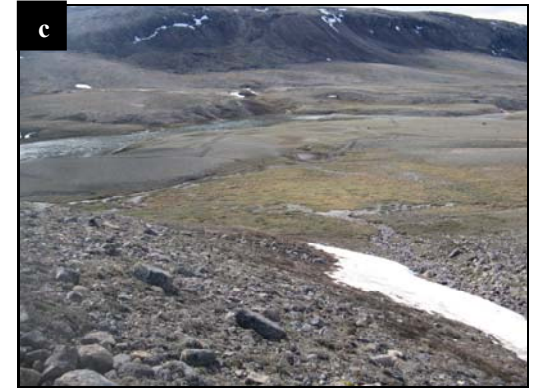


Figure 1. View upstream (a) and barriers (b,c) at the habitat assessment site downstream of the crossing at CV-151 during spring, 2009.



LEGEND:

IMPORTANT FISH HABITAT

MARGINAL FISH HABITAT

NOT FISH BEARING HABITAT

FALLS

FISH BARRIER

TOTE ROAD (EXISTING)

CONTOUR

WATER

NOTES:

1. BASE MAP: © HER MAJESTY THE QUEEN IN RIGHTS OF CANADA A 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 25 M AND IS IN METRES.

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

Milne Inlet Tote Road - 3b

North/South Consultants Inc.

Aquatic Environment Specialists

P/A NO.

-

REF NO.

-

DATE: 01/09/2010

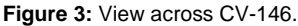
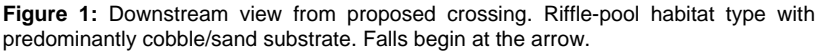
REV

1


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-	DDMMYY10	ISSUED FOR	-	-	-	-
REV	01/09/2010	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D

Bulk Sample Road Watercourse Crossing Assessment



Baffinland Iron Mines Mary River Project Watercourse Crossing Assessment

Location			
Site: CV-146		Watercourse Name: Unknown River	
UTM: 17W 0508786 / 7968870			
Site Description		Potential Fish Utilization	
Watershed Size: 1.021 km ² Regulated: No Channelized: No Bankfull Width: 2.40 m Wetted Width: 2.40 m Pool Depth: 0.18 m Residual Pool Depth: 0.08 m Bankfull Depth: 0.18 m Bank Height: 0.00 m D₉₅: 0.57 m D: 0.001 m Confinement: Unconfined Channel Morphology: Riffle-pool Channel Gradient: 2 ⁰ Turbidity: 0.00 FTU Side Slope R – 0%; L – 0% Approach: R – 100%; L – 100% Bank Stability: Low Erosion Potential: Moderate-High Undercut Banks: None	Mesohabitat Composition: Riffle – 60%; Pool – 40%		Arctic Char
	Substrate Composition: Cobble – 65%; Sand – 25%; Boulders – 5%; Silt/Organic – 5%		Spawning: No
	Stream Cover: Boulders – 5%; In- and Overstream Vegetation - 5%		Migration: No
	Riparian Vegetation: Grasses		Rearing: No
	Aquatic Vegetation: Submerged grasses		Overwintering: No
	Unique Features: None		Ninespine Stickleback
	Summary: This is a small, meandering stream with relatively little water, characterized by a series of riffles and pools. Substrate is predominantly cobble-sand and the banks have moderate-high erosion potential. There is relatively little significant cover.		Spawning: No
			Migration: No
			Rearing: No
			Overwintering: No
		Fish Habitat Quality	
		None	
		Comments	
		This waterbody is likely significant only as a spring runoff stream. Though the gradient at the proposed crossing is low, there is a set of falls downstream before this creek enters Phillips Creek. In addition, this creek dries up approximately 200 m further upstream from the crossing. Although the habitat may be suitable for small fish, there appears to be no access from areas where overwintering is possible.	
		 NORTH/SOUTH CONSULTANTS INC. AQUATIC ENVIRONMENT SPECIALISTS	

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-129
Site: DS

UTM / Chainage: 17W 512381 7966783 / 15 + 650
Dates Surveyed: 2-Jul-09, 26-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 1°

Hydrology

	Spring	Fall
Bankfull Width (m):	25.00	25.00
Wetted Width (m):	23.76	23.76
Riffle Depths (m):	0.07, 0.04	0.03, 0.07
Pool Depth (m):	0.91	0.90
Culvert Depth (m):	0.15	0.17
Maximum Depth (m):	1.00	0.90
Point Velocities (m/s)		
Riffles:	0.76, 0.40	0.94, 0.38
Pool:	0.06	-
Culvert:	1.41	1.57

Stream/Riparian Habitat

Channel Morphology: 90% riffle, 10% pool
Substrate Composition: 80% sm. cobble, 10% gravel, 5% lg. cobble, 5% boulder
Stream Cover: 10% lg. cobble/ boulder, 10% deep pool
Aquatic Vegetation: Periphyton
Riparian Vegetation: Grasses, willows
Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	0.10	0.15
Bank Stability:	High	High
Erosion Potential:	Low	Low

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	149	225
pH:	8.45	8.39
Water Temp (°C):	10.8	11.1

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - H NNST - L	ARCH - H NNST - L
Migration:	ARCH - H NNST - L	ARCH - H NNST - L

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-129 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (b) at the habitat assessment site downstream of the crossing at CV-129 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-129
Site: US

UTM / Chainage: 17W 512381 7966783 / 15 + 650
Dates Surveyed: 2-Jul-09, 26-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 1°

Hydrology

	Spring	Fall
Bankfull Width (m):	35.65	35.65
Wetted Width (m):	10.97	10.97
Pool Depth (m):	0.40	0.48
Culvert Depth (m):	0.25	0.30
Maximum Depth (m):	0.50	0.50
Point Velocities (m/s)		
Pool:	0.08	0.07
Culvert:	0.75	0.45

Stream/Riparian Habitat

Channel Morphology: 100% pool for 40m, further US 90% riffle, 10% pool

Substrate Composition: 70% sm. cobble, 10% lg. cobble, 10% gravel, 10% sand

Stream Cover: 20% deep pool, 10% lg. cobble

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grasses, willows

Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undef-0.15	Undef-0.15
Bank Stability:	High	High
Erosion Potential:	Low	Low

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	151	-
pH:	8.46	-
Water Temp (°C):	11.1	-

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - H NNST - L	ARCH - H NNST - L
Migration:	ARCH - H NNST - L	ARCH - H NNST - L

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-129 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-129 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-129
Site: DS

UTM: 17W 512381 7966765
Dates Surveyed: 24-Jun-08, 23-Jul-08

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 1°

Hydrology

	Spr	Sum
Bankfull Width (m):	25.60	25.60
Wetted Width (m):	22.60	25.60
Riffle-Crest Depth (m):	0.05	0.08
Pool Depth (m):	0.15	0.84
D₉₅ (m):	0.57	0.57
Point Velocities (m/s)		
Riffle:	0.55	0.67
Pool:	NM	0.17
Culvert:	1.93	2.51

Stream/Riparian Habitat

Channel Morphology: 70% riffle, 30% pool

Substrate Composition: 50% gravel, 40% cobble, 8% sand, 2% boulder

Stream Cover: 10% lg cobble, 2% boulders

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grasses, moss, willows, flowers

Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spr	Sum
Bank Height (L/R; m):	0.30/0.10	Undef
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spr	Sum
Specific Conductance (µS/cm):	119.0	18.1
TDS (g/l):	0.08	0.12
DO (mg/l)	13.28	11.30
%DO:	101.6	NM
Water Temp (°C):	4.1	9.8

Fish Habitat

	Spr	Sum
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - H NNST - L	ARCH - H NNST - L
Migration:	ARCH - H NNST - L	ARCH - M NNST - N

**Baffinland Iron Mines
Mary River Project**



Tote Road Aquatic Habitat Assessment

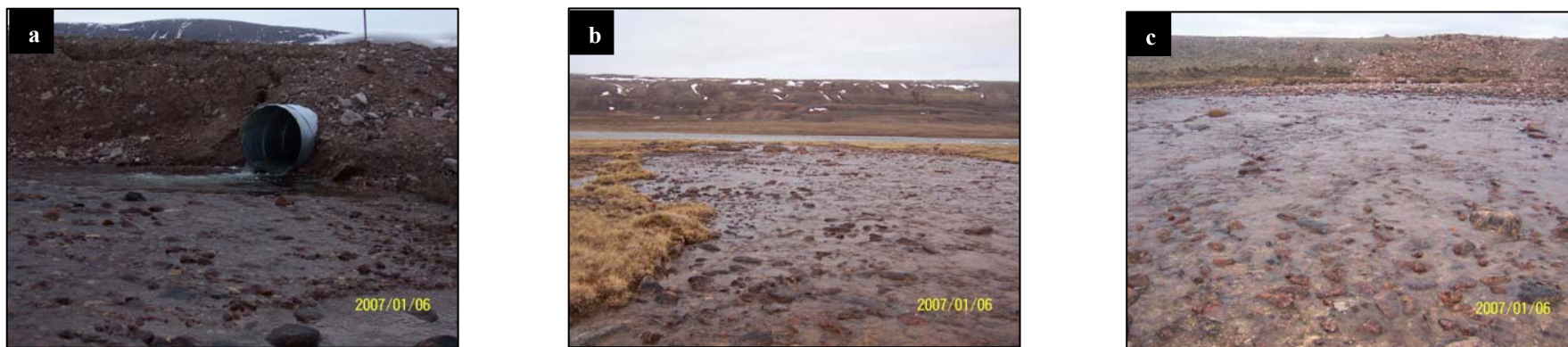


Figure 1. View upstream (a), downstream (b), and across (c) from the habitat assessment downstream of CV-129 during spring 2008.



Figure 2. View upstream (a), downstream (b), and across (c) from the habitat assessment downstream of CV-129 during summer 2008.

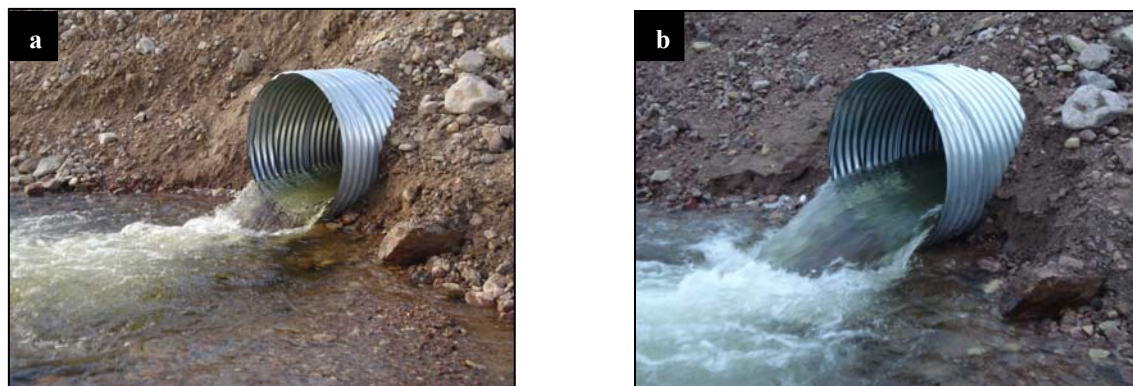


Figure 3. View from the downstream end of the culvert at crossing CV-129 during spring (a) and summer (b) 2008.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-129
Site: US

UTM: 17W 512370 7966779
Dates Surveyed: 24-Jun-08, 23-Jul-08

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 1°

Hydrology

	Spr	Sum
Bankfull Width (m):	35.70	35.70
Wetted Width (m):	9.80	12.80
Riffle-Crest Depth (m):	0.15	NA
Pool Depth (m):	0.45	0.21
D₉₅ (m):	0.61	0.61
Point Velocities (m/s)		
Riffle:	0.81	NA
Pool:	0.12	0.00
Flat:	0.06	0.22

Stream/Riparian Habitat

Channel Morphology: 50% riffle, 50% pool (spring); 50% flat, 25% riffle, 25% pool (summer)

Substrate Composition: 70% cobble, 15% gravel, 15% sand

Stream Cover: 5% lg cobble

Aquatic Vegetation: Periphyton,

Riparian Vegetation: Grasses, willows, flowers

Barriers Present (Y/N): Y
Location: Partial culvert block

L/R Bank Characteristics

	Spr	Sum
Bank Height (L/R; m):	Flooded	Undef
Bank Stability:	Low	Low
Erosion Potential:	High	High

Water Quality

	Spr	Sum
Specific Conductance (µS/cm):	119.0	18.4
TDS (g/l):	0.08	0.12
DO (mg/l)	13.97	11.33
%DO:	107.7	NM
Water Temp (°C):	3.9	9.7

Fish Habitat

	Spr	Sum
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - L NNST - N	ARCH - L NNST - N
Migration:	ARCH - L NNST - N	ARCH - L NNST - N

**Baffinland Iron Mines
Mary River Project**



Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) from the habitat assessment upstream of CV-129 during spring 2008.



Figure 2. View upstream (a), downstream (b), and across (c) from the habitat assessment upstream of CV-129 during summer 2008.

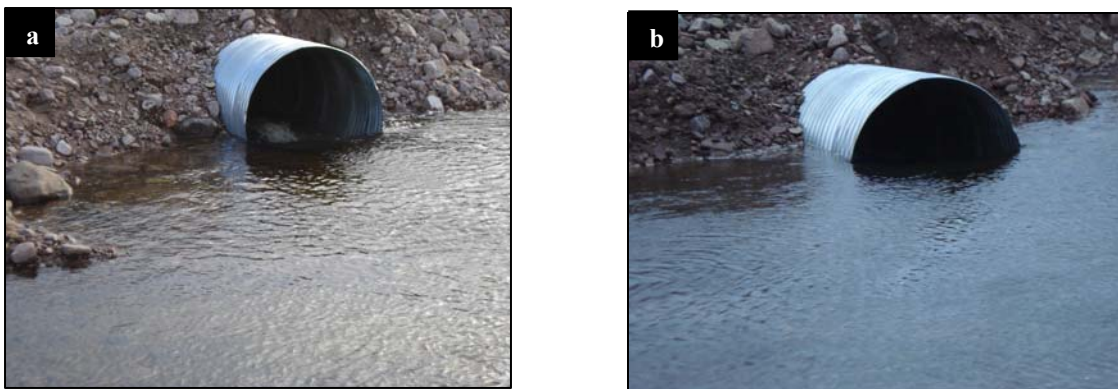


Figure 3. View from the upstream end of the culverts at crossing CV-129 during spring (a) and summer (b) 2008.

Bulk Sample Road Watercourse Crossing Assessment



Figure 1: Downstream view from proposed crossing showing predominantly run habitat.



Figure 2: Upstream view from proposed crossing showing riffle-pool habitat and cobble substrate.



Figure 3: View across CV-128.

Location

Site: CV-128
UTM: 17W 0513544 / 7965894

Watercourse Name: Unknown River

Site Description

Watershed Size: 251.57 km²
Regulated: No
Channelized: No
Bankfull Width: 44.0 m
Wetted Width: 44.0 m
Pool Depth: 0.20 m
Residual Pool Depth: 0.05 m
Bankfull Depth: 0.55 m
Bank Height: 0.35 m
D₉₅: 0.51 m
D: 0.07 m
Confinement: Unconfined
Channel Morphology: Riffle-pool
Channel Gradient: 1⁰
Turbidity: 0.00 FTU
Side Slope: R – 0%; L – 0%
Approach: R – 100%; L – 100%
Bank Stability: Low-Moderate
Erosion Potential: Low-Moderate
Undercut Banks: Some

Mesohabitat Composition: Riffle – 25%; Pool – 25%; Run – 50%
Substrate Composition: Cobble – 85%; Boulders – 10%; Gravel – 5%;
Stream Cover: Boulders – 10%; Undercut – 2%; In- and Overstream Vegetation - 2%
Riparian Vegetation: Grasses
Aquatic Vegetation: None
Unique Features: None
Summary: This is an extra large stream characterized by riffles, pools, and runs. Substrate is predominantly cobble and the banks have low-moderate erosion potential. There is a variety of potential cover with boulders the main type.

Potential Fish Utilization

Arctic Char

Spawning: Possible (land-locked char)
Migration: Possible
Rearing: Yes
Overwintering: Unlikely

Ninespine Stickleback

Spawning: Possible but unlikely
Migration: Possible but unlikely
Rearing: Possible but unlikely
Overwintering: Unlikely

Fish Habitat Quality

Important

Comments

This large stream has suitable habitat for all life-cycle stages of char and stickleback though only juvenile char were observed during fisheries investigations. The water may be too fast and too clear for stickleback. In addition, accessibility to larger char may decrease the value of the stream as refuge habitat for juveniles.



Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-128
Site: DS

UTM / Chainage: 17W 513545 7965895 / 17 + 486
Dates Surveyed: 2-Jul-09, 27-Aug-09

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: 1°

Hydrology

	Spring	Fall
Bankfull Width (m):	45.70	45.70
Wetted Width (m):	45.70	41.13
Pool Depth (m):	-	0.16
Run Depth (m):	0.37	0.96
Sea Can Depths (from left #'s 1, 3, 5, 7, 9, 16, 18) (m):	-	0.46, 0.36, 0.28, 0.33, 0.42, 0.29, 0.29
Maximum Depth (m):	> 1.00	> 1.00
Point Velocities (m/s)		
Pool:	-	0.11
Run:	0.51	0.51
Sea Cans (1, 3, 5, 7, 9, 16, 18):	< 0.50 - > 1.50	0.21, 0.59, 0.40, 1.01, 1.25, 0.98, 1.21

Stream/Riparian Habitat

Channel Morphology: 80% run, 20% riffle
Substrate Composition: 45% sm. cobble, 45% lg. cobble, 5% gravel, 5% boulder
Stream Cover: 50% lg. cobble/ boulder, 20% deep. run
Aquatic Vegetation: Periphyton
Riparian Vegetation: Grasses, willows
Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	0.20-0.30	0.30-0.40
Bank Stability:	High	High
Erosion Potential:	Low	Low

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	76	168
pH:	8.25	8.22
Water Temp (°C):	6.7	5.3

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - L	ARCH - N NNST - N
Feeding:	ARCH - H NNST - M	ARCH - H NNST - M
Migration:	ARCH - H NNST - M	ARCH - H NNST - M

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-128 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (b) at the habitat assessment site downstream of the crossing at CV-128 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-128
Site: US

UTM / Chainage: 17W 513545 7965895 / 17 + 486
Dates Surveyed: 2-Jul-09, 27-Aug-09

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: 1°

Hydrology

	Spring	Fall
Bankfull Width (m):	63.98	63.98
Wetted Width (m):	63.98	63.98
Riffle Depth (m):	-	0.24
Run Depth (m):	0.50	0.22
Pool Depth (m):	-	0.33
Sea Can Depths (m):	-	-
Maximum Depth (m):	> 1.00	> 1.00

Point Velocities (m/s)

Riffle:	-	1.11
Pool:	-	0.01
Run:	0.80	0.79
Sea Cans:	-	-

Stream/Riparian Habitat

Channel Morphology: 80% run, 20% riffle
Substrate Composition: 45% sm. cobble, 45% lg. cobble, 5% gravel, 5% boulder
Stream Cover: 50% lg. cobble/ boulder, 20% deep run
Aquatic Vegetation: Periphyton
Riparian Vegetation: Grasses, willows
Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	0.20-0.30	0.30-0.40
Bank Stability:	High	High
Erosion Potential:	Low	Low

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	75	-
pH:	8.26	-
Water Temp (°C):	6.7	-

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - M	ARCH - N NNST - N
Feeding:	ARCH - H NNST - M	ARCH - H NNST - M
Migration:	ARCH - H NNST - M	ARCH - H NNST - M

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment

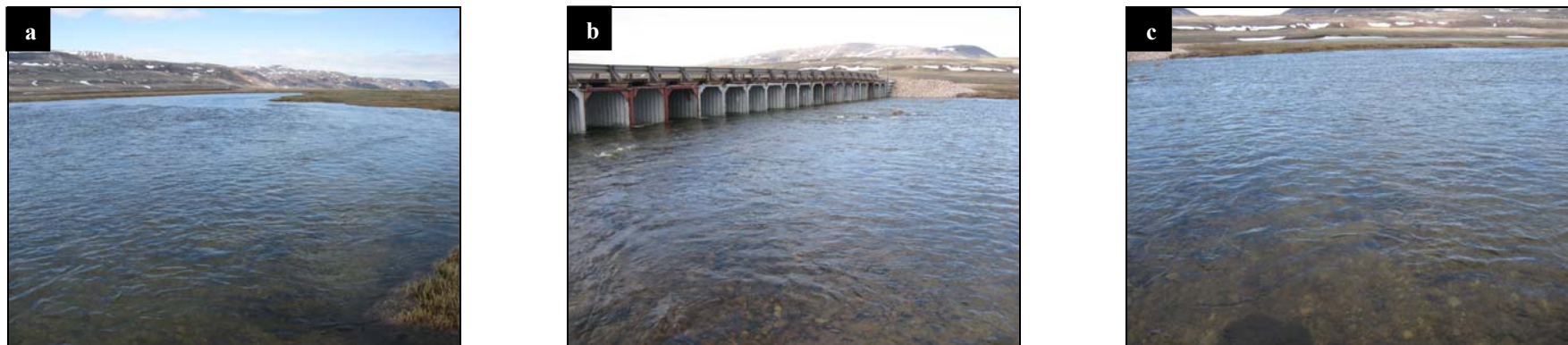


Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-128 during early July, 2009.

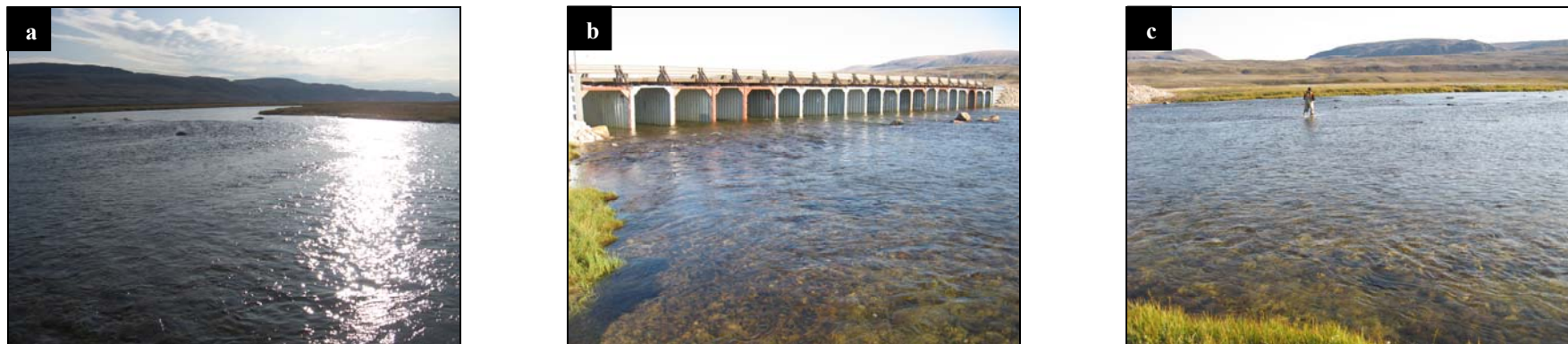
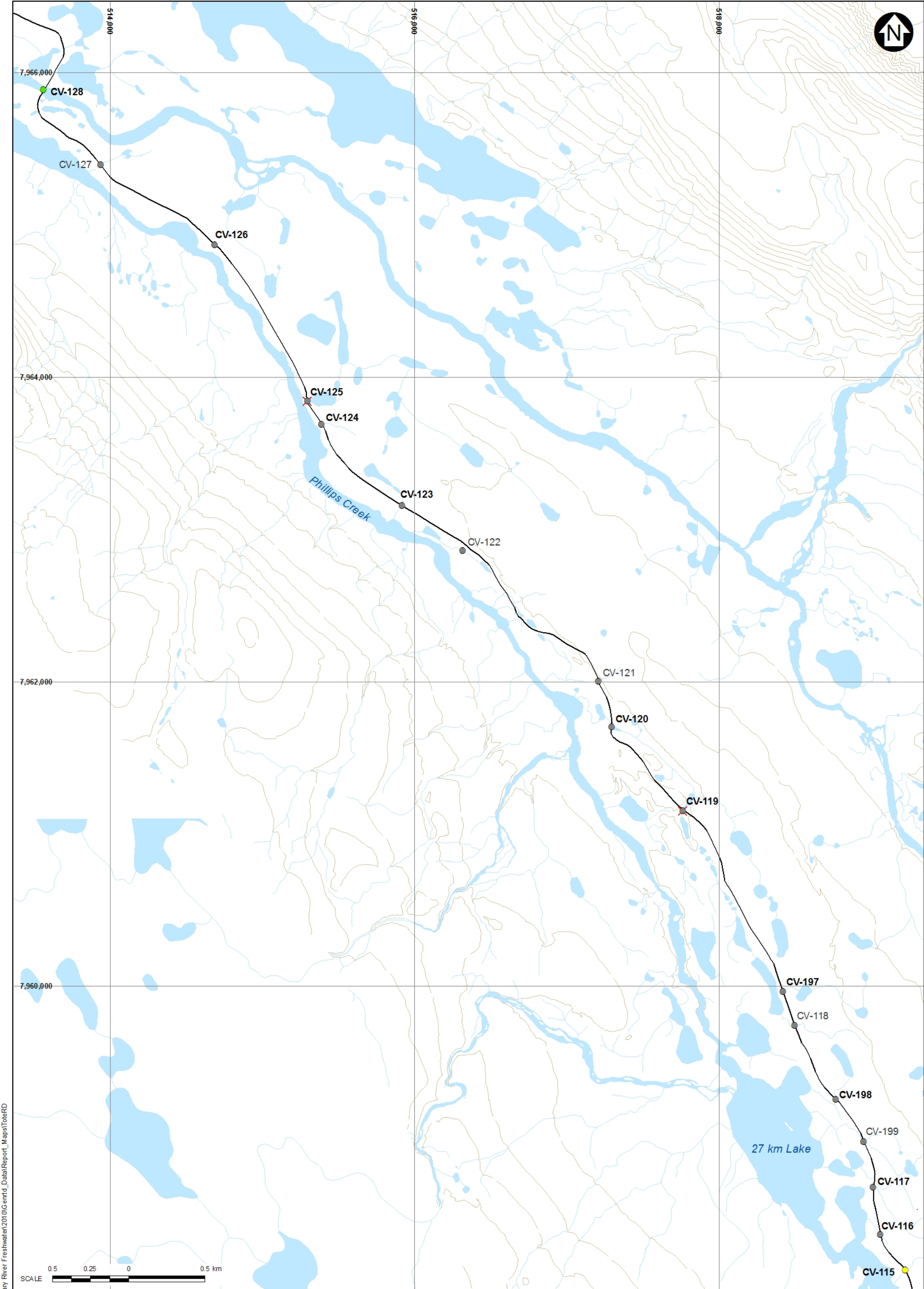


Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-128 during late August, 2009.



LEGEND:

- IMPORTANT FISH HABITAT
- MARGINAL FISH HABITAT
- NOT FISH BEARING HABITAT
- FALLS
- FISH BARRIER
- TOTE ROAD (EXISTING)
- CONTOUR
- WATER

NOTES:

1. BASE MAP: © HER MAJESTY THE QUEEN IN RIGHTS OF CANADA A 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 25 MAND IS IN METRES.

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

Milne Inlet Tote Road - 3c

North/South Consultants Inc.
Aquatic Environment Specialists

P/A NO.	REF NO.
-	-
DATE: 01/09/2010	REV 1

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-125
Site: DS

UTM / Chainage: 17W 515296 7963841 / 20 + 447
Dates Surveyed: 2-Jul-09, 27-Aug-09

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: N/M

Hydrology

Spring

Fall

Bankfull Width (m): 2.5 2.5

Wetted Width (m): 2.0 1.5

Riffle Depth (m): 0.02 N/M

Pool Depth (m): N/M N/M

Culvert Depth (m): 0.31 0.3

Maximum Depth (m): N/M N/M

Point Velocities (m/s)

Riffle: 0.17 N/M

Pool: N/M N/M

Culvert: 0.01 0.0

Stream/Riparian Habitat

Channel Morphology: 75% riffle, 25% pool

Substrate Composition: 70% gravel, 25% sm. cobble, 5% sand

Stream Cover: N/A

Aquatic Vegetation: Some submergents

Riparian Vegetation: grass, willow

Barriers Present (Y/N): Y
Location: ~ 25 m DS

L/R Bank Characteristics

Spring

Fall

Bank Height (m): Undefined Undefined

Bank Stability: Moderate Moderate

Erosion Potential: Moderate Moderate

Water Quality

Spring

Fall

Specific Conductance (µS/cm): 154 249

pH: 8.54 8.3

Water Temp (°C): 5.3 8.5

Fish Habitat Use

Spring

Fall

Spawning: ARCH - N
NNST - N ARCH - N
NNST - N

Feeding: ARCH - N
NNST - H ARCH - N
NNST - N

Migration: ARCH - N
NNST - N ARCH - N
NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-125 during spring, 2009.



Figure 2. View upstream (a), downstream (b), and across (b) at the habitat assessment site downstream of the crossing at CV-125 during fall, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-125
Site: US

UTM / Chainage: 17W 515296 7963841 / 20 + 447
Dates Surveyed: 2-Jul-09, 27-Aug-09

Site Description/Physical Characteristics

Confinement:			N/M		
Channel Gradient:			N/M		
Hydrology					
			Spring		Fall
Bankfull Width (m):			N/M		N/M
Wetted Width (m):			N/M		N/M
Pool Depth (m):			N/M		N/M
Culvert Depth (m):			N/M		N/M
Maximum Depth (m):			1-2		N/M
Point Velocities (m/s)					
Pool:			0.0		N/M
Culvert:			N/M		N/M

Stream/Riparian Habitat			
Channel Morphology:		100% pool	
Substrate Composition:		90% sand, 5% sm. cobble, 5% gravel	
Stream Cover:		N/M	
Aquatic Vegetation:		N/M	
Riparian Vegetation:		N/M	
Barriers Present (Y/N):		N	
Location:		N/A	
L/R Bank Characteristics			
		Spring	Fall
Bank Height (m):		N/M	N/M
Bank Stability:		N/M	N/M
Erosion Potential:		N/M	N/M

Water Quality		
Spring		Fall
Specific Conductance (µS/cm):	N/M	N/M
	N/M	N/M
pH:	N/M	N/M
Water Temp (°C):	N/M	N/M
Fish Habitat Use		
Spring		Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - N NNST - N	ARCH - N NNST - N
Migration:	ARCH - N NNST - N	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-125 during spring, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-125 during fall, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name:	CV-120	UTM / Chainage:	17W 517294 7961707 / 23 + 515
Site:	DS (US not necessary)	Dates Surveyed:	2-Jul-09

Site Description/Physical Characteristics

Confinement:		N/M		Stream/Riparian Habitat		Water Quality	
Channel Gradient:		N/M		Channel Morphology:		Spring	
Hydrology				Substrate Composition:		Specific Conductance (µS/cm):	
Spring				Stream Cover:		pH:	
Bankfull Width (m):		N/M		Aquatic Vegetation:		Water Temp (°C):	
Wetted Width (m):		N/M		Riparian Vegetation:			
Depths (m):		N/M		Barriers Present (Y/N):			
Culvert Depth (m):		N/M		Location:		culvert	
Maximum Depth (m):		N/M		L/R Bank Characteristics			
Point Velocities (m/s)		N/M		Spring			
				Bank Height (m):		N/M	
				Bank Stability:		N/M	
				Erosion Potential:		N/M	

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), and downstream (b) at the habitat assessment site downstream of the crossing at CV-120 during spring, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-119
Site: DS

UTM / Chainage: 17W 517762 7961153 / 24 + 264
Dates Surveyed: 2-Jul-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: N/M

Hydrology

Spring

Bankfull Width (m):	27.4
Wetted Width (m):	N/M
Riffle Depth (m):	0.03
Pool Depth (m):	~ 1.0
Culvert Depth (m):	N/M
Maximum Depth (m):	N/M
Point Velocities (m/s)	
Riffle:	0.40
Pool:	0.00
Culvert:	N/M

Stream/Riparian Habitat

Channel Morphology: 90% pool, 10% riffle
Substrate Composition: 95% sand/silt, 5% sm. cobble (pool); 50% boulder, 25% lg. cobble, 10% gravel, 10% sand, 5% sm. cobble
Stream Cover: 75% d. pool, 10% lg. cobble/boulder
Aquatic Vegetation: N/M
Riparian Vegetation: grass
Barriers Present (Y/N): Y
Location: 100 m DS

L/R Bank Characteristics

Spring

Bank Height (m):	Undefined
Bank Stability:	N/M
Erosion Potential:	N/M

Water Quality

Spring

Specific Conductance (µS/cm):	130
pH:	8.25
Water Temp (°C):	8.5

Fish Habitat Use

Spring

Spawning:	ARCH - N NNST - N
Feeding:	ARCH - N NNST - N
Migration:	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-119 during spring, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-119
Site: US

UTM / Chainage: 17W 517762 7961153 / 24 + 264
Dates Surveyed: 2-Jul-09

Site Description/Physical Characteristics

Confinement: N/M

Channel Gradient: N/M

Hydrology

Spring

Bankfull Width (m): N/M

Wetted Width (m): N/M

Pool Depth (m): N/M

Culvert Depth (m): N/M

Maximum Depth (m): N/M

Point Velocities (m/s)

Pool: N/M

Culvert: N/M

Stream/Riparian Habitat

Channel Morphology: N/M

Substrate Composition: N/M

Stream Cover: N/M

Aquatic Vegetation: N/M

Riparian Vegetation: N/M

Barriers Present (Y/N): N
Location: N/A

L/R Bank Characteristics

Spring

Bank Height (m): N/M

Bank Stability: N/M

Erosion Potential: N/M

Water Quality

Spring

Specific Conductance (µS/cm): N/M

pH: N/M

Water Temp (°C): N/M

Fish Habitat

Spring

Spawning: ARCH - N
NNST - N

Feeding: ARCH - N
NNST - N

Migration: ARCH - N
NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a) at the habitat assessment site upstream of the crossing at CV-119 during spring, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-115
Site: DS

UTM / Chainage: 17W 519222 7958135 / 27 + 686
Dates Surveyed: 3-Jul-09, 27-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: N/M

Hydrology

Spring

Fall

Bankfull Width (m): 13.2 13.2

Wetted Width (m): 1.6 1.6

Riffle Depth (m): 0.07 0.07

Pool Depth (m): ~ 1 N/M

Culvert Depth (m): 0.02 0.06

Maximum Depth (m): N/M N/M

Point Velocities (m/s)

Riffle: 0.18 0.36

Pool: 0.00 N/M

Culvert: 0.28 0.39

Stream/Riparian Habitat

Channel Morphology: 95% riffle, 5% pool

Substrate Composition: 75% sm. cobble,
25% gravel

Stream Cover: N/A

Aquatic Vegetation: N/M

Riparian Vegetation: N/A

Barriers Present (Y/N): Y
Location: silt screen

L/R Bank Characteristics

Spring

Fall

Bank Height (m): Undefined Undefined

Bank Stability: Moderate Moderate

Erosion Potential: Moderate Moderate

Water Quality

Spring

Fall

Specific Conductance (µS/cm): 242 340

pH: 8.44 8.32

Water Temp (°C): 9.0 5.3

Fish Habitat Use

Spring

Fall

Spawning: ARCH - N
NNST - N ARCH - N
NNST - N

Feeding: ARCH - L
NNST - N ARCH - L
NNST - N

Migration: ARCH - N
NNST - N ARCH - N
NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – MARGINAL

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-115 during spring, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-115 during fall, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-115
Site: US

UTM / Chainage: 17W 519222 7958135 / 27 + 686
Dates Surveyed: 3-Jul-09, 27-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: N/M

Hydrology

	Spring	Fall
Bankfull Width (m):	8.0	8.0
Wetted Width (m):	2.7	2.7
Riffle Depth (m):	0.04	0.03
Cascade Depth (m):	0.01	0.02
Culvert Depth (m):	0.10	0.14
Maximum Depth (m):	0.25	N/M
Point Velocities (m/s)		
Riffle:	0.28	0.47
Cascade:	0.24	0.90
Culvert:	0.01	0.20

Stream/Riparian Habitat

Channel Morphology: 90% riffle, 5% cascade, 5% pool
Substrate Composition: 75% sm. cobble, 25% gravel
Stream Cover: N/A
Aquatic Vegetation: N/M
Riparian Vegetation: willow
Barriers Present (Y/N): N
Location: N/A

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undefined	Undefined
Bank Stability:	Moderate	Moderate
Erosion Potential:	Moderate	Moderate

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	241	N/M
pH:	8.41	N/M
Water Temp (°C):	9.4	N/M

Fish Habitat Use

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - L NNST - N	ARCH - L NNST - N
Migration:	ARCH - N NNST - N	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – MARGINAL

Tote Road Aquatic Habitat Assessment

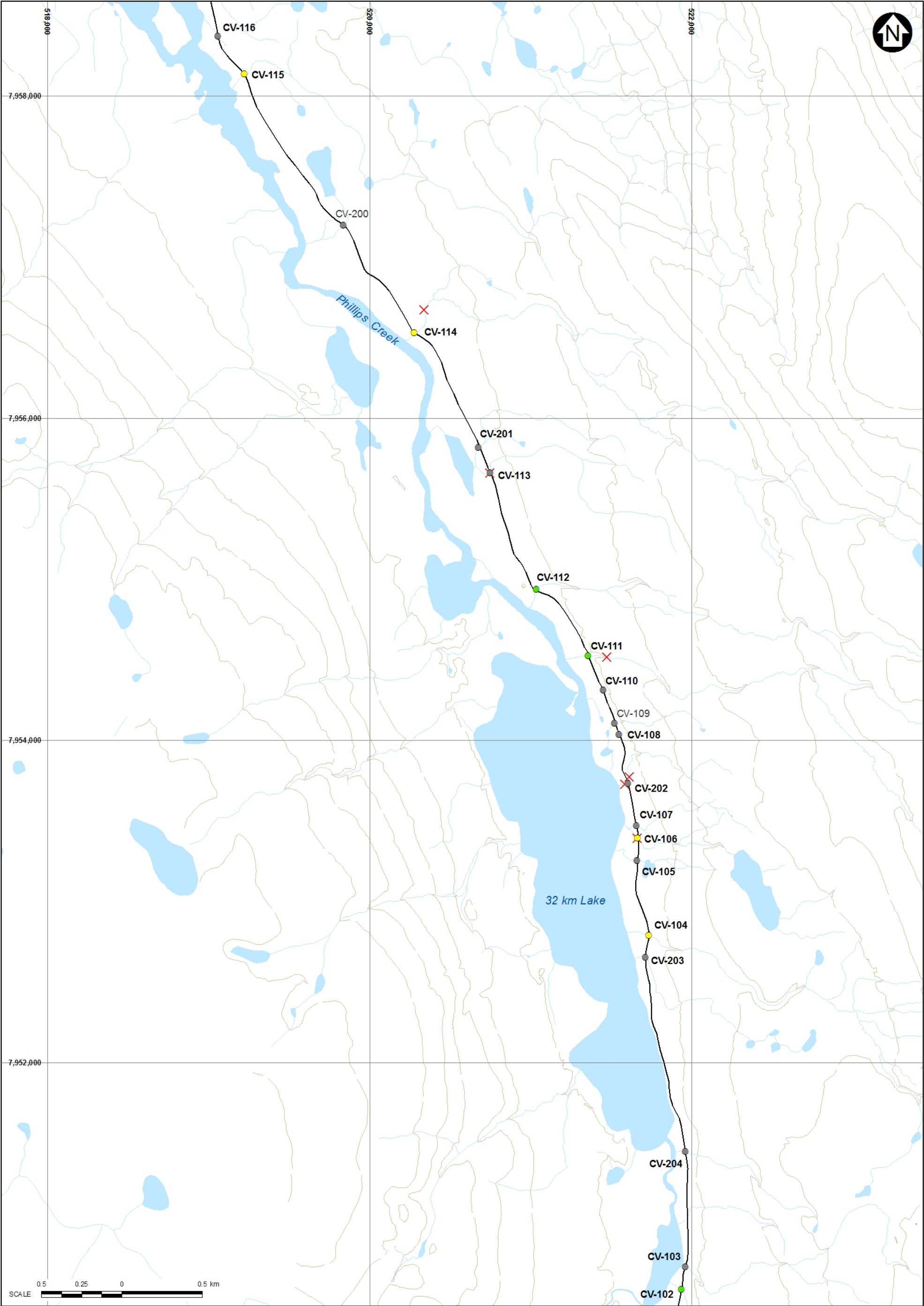


Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-115 during spring, 2009.











Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-115 during fall, 2009.

Path: \\terastation\GIS\Projects\Other\Mary_River_Freshwater\2010\Genrtd_Data\Report_Maps\ToteRD



LEGEND:

 IMPORTANT FISH HABITAT
  MARGINAL FISH HABITAT
  NOT FISH BEARING HABITAT
  FALLS
  FISH BARRIER
  TOTE ROAD (EXISTING)

 CONTOUR
  WATER

-	DDMMYY10	ISSUED FOR	-	-	-	-
REV	01/09/2010	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D

NOTES:						
1. BASE MAP: © HER MAJESTY THE QUEEN IN RIGHTS OF CANADA A 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 25 MAND IS IN METRES.						

BAFFINLAND IRON MINES CORPORATION		
MARY RIVER PROJECT		
Milne Inlet Tote Road - 3d		
	P/A NO.	REF NO.
	-	-
DATE: 01/09/2010		REV
		1

Bulk Sample Road Watercourse Crossing Assessment



Figure 1: Downstream view from proposed crossing showing predominantly cascade habitat.



Figure 2: Upstream view from proposed crossing showing more cascade-riffle habitat and cobble substrate.



Figure 3: View across CV-114.

Baffinland Iron Mines
Mary River Project
Watercourse Crossing Assessment

Location

Site: CV-114
UTM: 17W 0520291 / 7956538

Watercourse Name: Unknown River

Site Description

Watershed Size: 3.145 km²
Regulated: No
Channelized: No
Bankfull Width: 17.0 m
Wetted Width: 8.0 m
Riffle-Crest Depth: 0.02 m
Residual Pool Depth: N/A
Bankfull Depth: 0.05 m
Bank Height: 0.03 m
D₉₅: 0.95 m
D: 0.15 m
Confinement: Partial confinement
Channel Morphology: Cascade-Riffle
Channel Gradient: 4⁰
Turbidity: 0.00 FTU
Side Slope: R – 1%; L – 1%
Approach: R – 99%; L – 99%
Bank Stability: Moderate-High
Erosion Potential: Low-Moderate
Undercut Banks: None

Mesohabitat Composition: Cascade – 80%; Riffle – 20%
Substrate Composition: Cobble – 80%; Gravel – 10%; Boulders – 10%;
Stream Cover: Boulders – 10%; In- and Overstream Vegetation - 5%
Riparian Vegetation: Grasses, willows, fireweed
Aquatic Vegetation: Algae
Unique Features: None
Summary: This is a medium-sized stream characterized by cascades. Substrate is predominantly cobble and the banks have low-moderate erosion potential. Cover is relatively limited.

Potential Fish Utilization

Arctic Char

Spawning: Unlikely
Migration: Unlikely
Rearing: Yes
Overwintering: Unlikely

Ninespine Stickleback

Spawning: Unlikely
Migration: Unlikely
Rearing: Unlikely
Overwintering: Unlikely

Fish Habitat Quality

Marginal

Comments

This waterbody has suitable habitat for juvenile and young-of-the-year char. A single YOY char was observed during fisheries investigations. The lack of calm, slow-flowing water may prevent extensive use by char or stickleback. The proximity of Phillips Creek also indicates that there should be at least occasional use by young char for feeding and refuge.



NORTH/SOUTH
CONSULTANTS INC.
AQUATIC ENVIRONMENT SPECIALISTS

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-114
Site: DS

UTM / Chainage: 17W 520278 7956528 / 29 + 647
Dates Surveyed: 3-Jul-09, 27-Aug-09

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: 1°

Hydrology

	Spring	Fall
Bankfull Width (m):	10.50	10.50
Wetted Width (m):	6.00	6.00
Riffle Depths (m):	0.02, 0.04	0.09, 0.04
Pool Depth (m):	0.10	0.09
Culvert Depth (m):	0.06	0.10
Maximum Depth (m):	0.10	0.10
Point Velocities (m/s)		
Riffles:	0.38, 0.31	0.81, 0.43
Pool:	0.02	0.01
Culvert:	0.74	1.10

Stream/Riparian Habitat

Channel Morphology: 90% riffle, 10% pool
Substrate Composition: 60% sm. cobble, 30% gravel, 9% lg. cobble, 1% boulder
Stream Cover: 10% lg. cobble/ boulder
Aquatic Vegetation: Periphyton
Riparian Vegetation: Grasses, willows
Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undef-0.40	Undef-0.40
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	147	287
pH:	8.49	8.67
Water Temp (°C):	7.4	5.2

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - M NNST - L	ARCH - M NNST - L
Migration:	ARCH - M NNST - L	ARCH - M NNST - L

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – MARGINAL

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-114 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (b) at the habitat assessment site downstream of the crossing at CV-114 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-114
Site: US

UTM / Chainage: 17W 520278 7956528 / 29 + 647
Dates Surveyed: 3-Jul-09, 27-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 2-10°

Hydrology

	Spring	Fall
Bankfull Width (m):	12.20	12.20
Wetted Width (m):	12.20	12.20
Riffle Depth (m):	0.04	0.04
Cascade Depth (m):	0.01	0.01
Pool Depth (m):	0.20	0.25
Culvert Depth (m):	0.13	0.15
Maximum Depth (m):	0.28	0.25

Point Velocities (m/s)

Riffle:	0.45	0.45
Cascade:	0.51	0.47
Pool:	0.00	0.00
Culvert:	0.54	1.06

Stream/Riparian Habitat

Channel Morphology: 50% cascade, 25% riffle, 25% pool

Substrate Composition: 50% sm. cobble, 40% lg. cobble, 5% gravel, 5% boulder

Stream Cover: 45% lg. cobble/ boulder

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grasses, willows

Barriers Present (Y/N): Y
Location: Naturally steep gradient further upstream

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undef-0.15	Undef-0.15
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	145	-
pH:	8.46	-
Water Temp (°C):	7.6	-

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - M NNST - L	ARCH - M NNST - L
Migration:	ARCH - M NNST - L	ARCH - M NNST - L

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – MARGINAL

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-114 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-114 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-113
Site: DS

UTM / Chainage: 17W 520747 7955659 / 30 + 655
Dates Surveyed: 3-Jul-09, 27-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 2°

Hydrology

	Spring	Fall
Bankfull Width (m):	10.00	N/M
Wetted Width (m):	3.50	N/M
Riffle Depth (m):	0.01	N/M
Left Culvert Depth (m):	0.06	N/M
Maximum Depth (m):	0.06	N/M
Point Velocities (m/s)		
Riffle:	0.37	N/M
Left Culvert:	0.24	N/M

Stream/Riparian Habitat

Channel Morphology: 95% riffle, 5% pool

Substrate Composition: 55% gravel, 40% sm. cobble, 5% lg. cobble

Stream Cover: 5% lg. cobble

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grasses, willows

Barriers Present (Y/N): Y
Location: ~150m DS disconnected from lake

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undef-0.25	N/M
Bank Stability:	Mod	N/M
Erosion Potential:	Mod	N/M

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	180	N/M
pH:	8.33	N/M
Water Temp (°C):	7.1	N/M

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - N NNST - N	ARCH - N NNST - N
Migration:	ARCH - N NNST - N	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-113 during early July, 2009.



Figure 2. View of remaining wetted habitat (a) and natural barrier (b) downstream of the crossing at CV-113 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-113
Site: US

UTM / Chainage: 17W 520747 7955659 / 30 + 655
Dates Surveyed: 3-Jul-09, 27-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 5°

Hydrology

	Spring	Fall
Bankfull Width (m):	3.50	3.50
Wetted Width (m):	1.00	Dry
Riffle Depth (m):	0.02	N/A
Pool Depth (m):	0.15	N/A
Left Culvert Depth (m):	0.02	N/A
Maximum Depth (m):	0.15	N/A
Point Velocities (m/s)		
Riffle:	0.38	N/A
Pool:	0.02	N/A
Left Culvert:	0.49	N/A

Stream/Riparian Habitat

Channel Morphology: 40% riffle, 30% cascade, 30% pool
Substrate Composition: 75% sm. cobble, 25% gravel
Stream Cover: None
Aquatic Vegetation: Periphyton
Riparian Vegetation: Grasses, willows
Barriers Present (Y/N): Y
Location: Steep gradient US

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undef	Undef
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	185	-
pH:	8.32	-
Water Temp (°C):	7.2	-

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - N NNST - N	ARCH - N NNST - N
Migration:	ARCH - N NNST - N	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-113 during early July, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-112
Site: DS

UTM / Chainage: 17W 521033 7954935 / 31 + 450
Dates Surveyed: 3-Jul-09, 27-Aug-09

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: N/M

Hydrology

Spring

Fall

Bankfull Width (m):	5.7	5.7
Wetted Width (m):	2.1	1.9
Riffle Depth (m):	0.08-0.11	0.03-0.11
Cascade Depth (m):	N/A	0.01
Pool Depth (m):	0.36	0.35
Culvert Depth (m):	0.12	0.08
Maximum Depth (m):	N/M	N/M
Point Velocities (m/s)		
Riffle:	0.92-0.98	0.49-0.72
Cascade:	N/A	0.61
Pool:	0.01	0.06
Culvert:	0.44	1.26

Stream/Riparian Habitat

Channel Morphology: 75% riffle, 5% pool
Substrate Composition: 75% sm. cobble, 10% gravel, 10% lg. cobble, 5% sand
Stream Cover: 5% d. pool, 10% lg. cobble
Aquatic Vegetation: N/M
Riparian Vegetation: grass, willow, moss
Barriers Present (Y/N): Y
Location: culvert

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	0.2-0.25	N/M
Bank Stability:	High	High
Erosion Potential:	Low	Low

Water Quality

Spring

Fall

Specific Conductance (µS/cm):	158	327
pH:	8.49	8.57
Water Temp (°C):	7.6	6.7

Fish Habitat Use

Spring

Fall

Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - H NNST - N	ARCH - H NNST - N
Migration:	ARCH - L NNST - N	ARCH - L NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-112 during spring, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-112 during fall, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-112
Site: US

UTM / Chainage: 17W 521033 7954935 / 31 + 450
Dates Surveyed: 3-Jul-09, 27-Aug-09

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: N/M

Hydrology

	Spring	Fall
Bankfull Width (m):	15.0	15.0
Wetted Width (m):	3.5	3.1
Riffle Depth (m):	0.07	0.08
Cascade Depth (m):	0.02	N/M
Pool Depth (m):	0.13	0.13
Culvert Depth (m):	0.08	0.13
Maximum Depth (m):	0.25	0.24
Point Velocities (m/s)		
Riffle:	0.37	0.68
Cascade:	0.67	N/M
Pool:	0.10	0.03
Culvert:	0.62	0.54

Stream/Riparian Habitat

Channel Morphology: 40% riffle, 40% cascade, 20% pool

Substrate Composition: 60% sm. cobble, 20% gravel, 10% lg. cobble, 10% sand

Stream Cover: 10% lg. cobble

Aquatic Vegetation: N/M

Riparian Vegetation: grass, willow, moss

Barriers Present (Y/N): Y
Location: culvert

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	0.15	N/M
Bank Stability:	High	High
Erosion Potential:	Low	Low

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	156	N/M
pH:	8.49	N/M
Water Temp (°C):	7.3	N/M

Fish Habitat Use

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - H NNST - N	ARCH - H NNST - N
Migration:	ARCH - L NNST - N	ARCH - L NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-112 during spring, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-112 during fall, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-111
Site: DS

UTM / Chainage: 17W 521355 7954524 / 31 + 990
Dates Surveyed: 3-Jul-09, 27-Aug-09

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: 1-2°

Hydrology

	Spring	Fall
Bankfull Width (m):	7.50	7.50
Wetted Width (m):	6.40	5.50
Riffle Depths (m):	0.05, 0.05	0.06, 0.05
Cascade Depth (m):	0.01	0.01
Culvert Depth (m):	0.08	0.08
Maximum Depth (m):	0.10	0.10
Point Velocities (m/s)		
Riffles:	0.79, 0.66	0.63, 0.43
Cascade:	0.49	0.89
Culvert:	1.33	1.34

Stream/Riparian Habitat

Channel Morphology: 80% riffle, 10% pool, 10% cascade

Substrate Composition: 65% sm. cobble, 20% lg. cobble, 10% gravel, 5% boulder

Stream Cover: 25% lg. cobble/ boulder

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grasses, willows, moss

Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undef	Undef
Bank Stability:	High	High
Erosion Potential:	Low	Low

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	147	257
pH:	8.49	8.59
Water Temp (°C):	5.5	6.4

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - H NNST - L	ARCH - H NNST - L
Migration:	ARCH - H NNST - L	ARCH - H NNST - L

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment

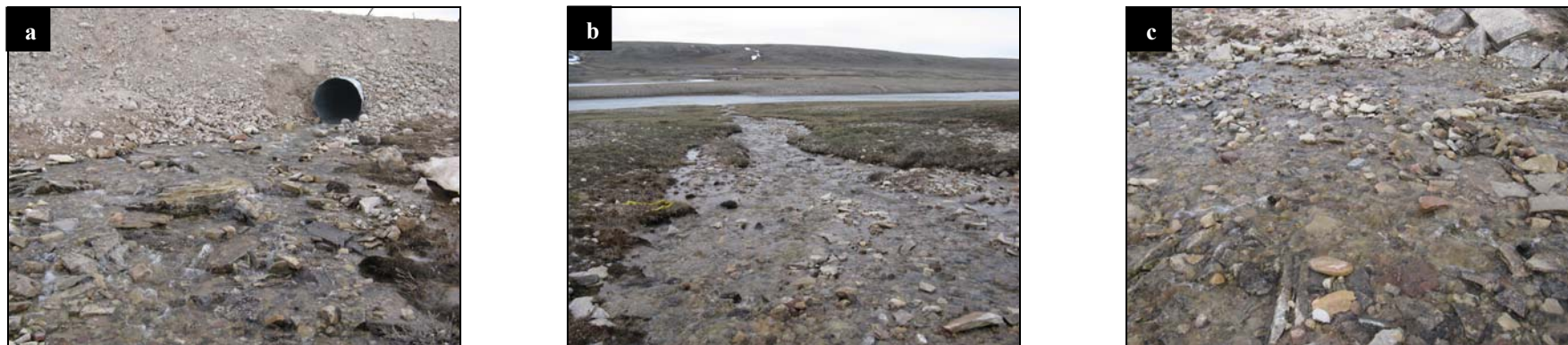


Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-111 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (b) at the habitat assessment site downstream of the crossing at CV-111 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-111
Site: US

UTM / Chainage: 17W 521355 7954524 / 31 + 990
Dates Surveyed: 3-Jul-09, 27-Aug-09

Site Description/Physical Characteristics

Confinement: Confined

Channel Gradient: 2-10°

Hydrology

	Spring	Fall
Bankfull Width (m):	13.50	13.50
Wetted Width (m):	7.00	6.15
Riffle Depth (m):	0.06	0.06
Cascade Depth (m):	0.01	0.05
Pool Depth (m):	0.05	-
Culvert Depth (m):	0.15	0.15
Maximum Depth (m):	0.15	0.15

Point Velocities (m/s)

Riffle:	0.94	1.17
Cascade:	0.42	0.76
Pool:	0.07	-
Culvert:	0.62	0.16

Stream/Riparian Habitat

Channel Morphology: 75% cascade, 20% riffle, 5% pool

Substrate Composition: 50% lg. cobble, 40% sm. cobble, 10% gravel

Stream Cover: 50% cobble

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grasses, willows, moss

Barriers Present (Y/N): Y
Location: Naturally steep gradient further upstream

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undef	Undef
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	147	-
pH:	8.48	-
Water Temp (°C):	5.5	-

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - H NNST - N	ARCH - H NNST - N
Migration:	ARCH - H NNST - N	ARCH - H NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-111 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-111 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-202
Site: DS

UTM / Chainage: 17W 521603 7953731 / 32 + 825
Dates Surveyed: 3-Jul-09

Site Description/Physical Characteristics

Confinement: N/M

Channel Gradient: N/M

Hydrology

Spring

Bankfull Width (m):	N/M
Wetted Width (m):	N/M
Depths (m):	N/M
Culvert Depth (m):	N/M
Maximum Depth (m):	N/M
Point Velocities (m/s)	N/M

Stream/Riparian Habitat

Channel Morphology: N/M
Substrate Composition: N/M
Stream Cover: N/M
Aquatic Vegetation: N/M
Riparian Vegetation: N/M
Barriers Present (Y/N): N
Location: N/A

L/R Bank Characteristics

Spring

Bank Height (m):	N/M
Bank Stability:	N/M
Erosion Potential:	N/M

Water Quality

Spring

Specific Conductance (µS/cm):	N/M
pH:	N/M
Water Temp (°C):	N/M

Fish Habitat Use

Spring

Spawning:	ARCH - N NNST - N
Feeding:	ARCH - N NNST - N
Migration:	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality – NOT FISH-BEARING

Tote Road Aquatic Habitat Assessment



Figure 1. View downstream from the crossing site at CV-202 during spring, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-202
Site: US

UTM / Chainage: 17W 521603 7953731 / 32 + 825
Dates Surveyed: 3-Jul-09

Site Description/Physical Characteristics

Confinement:		N/M		Stream/Riparian Habitat		Water Quality	
Channel Gradient:		N/M		Channel Morphology:		Spring	
Hydrology				Substrate Composition:		Specific Conductance (µS/cm):	N/M
Spring				Stream Cover:			N/M
Bankfull Width (m):		N/M		Aquatic Vegetation:			N/M
Wetted Width (m):		N/M		Riparian Vegetation:		Water Temp (°C):	N/M
Depths (m):		N/M		Barriers Present (Y/N):			N
Culvert Depth (m):		N/M		Location:			N/A
Maximum Depth (m):		N/M		L/R Bank Characteristics			
Point Velocities (m/s)				Spring			
Point Velocities (m/s)		N/M		Bank Height (m):		N/M	
				Bank Stability:		N/M	
				Erosion Potential:		N/M	

Fish Habitat Use	
Spring	
Spawning:	ARCH - N NNST - N
	ARCH - N NNST - N
	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream from the crossing site at CV-202 during spring, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-106
Site: DS

UTM / Chainage: 17W 521663 7953392 / 33 + 170
Dates Surveyed: 3-Jul-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: N/M

Hydrology

Spring

Bankfull Width (m): N/M

Wetted Width (m): 1.0

Riffle Depth (m): 0.05

Cascade Depth (m): N/M

Pool Depth (m): N/M

Culvert Depth (m): 0.03

Maximum Depth (m): N/M

Point Velocities (m/s)

Riffle: 0.41

Cascade: N/M

Pool: N/M

Culvert: 0.43

Stream/Riparian Habitat

Channel Morphology: 80% riffle, 15% cascade, 5% pool

Substrate Composition: 45% sand, 30% gravel, 20% sm. cobble, 5% lg. cobble

Stream Cover: 5% lg. cobble

Aquatic Vegetation: N/M

Riparian Vegetation: grass, willow, moss

Barriers Present (Y/N): N
Location: N/A

L/R Bank Characteristics

Spring

Bank Height (m): 0.05-0.30

Bank Stability: High

Erosion Potential: Low

Water Quality

Spring

Specific Conductance (µS/cm): 153

pH: 8.38

Water Temp (°C): 7.2

Fish Habitat Use

Spring

Spawning: ARCH - N
NNST - N

Feeding: ARCH - H
NNST - N

Migration: ARCH - L
NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – MARGINAL

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-106 during spring, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-106
Site: US

UTM / Chainage: 17W 521663 7953392 / 33 + 170
Dates Surveyed: 3-Jul-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: N/M

Hydrology

Spring

Bankfull Width (m):	2.0
Wetted Width (m):	1.4
Riffle Depth (m):	0.02
Pool Depth (m):	0.15
Culvert Depth (m):	0.02
Maximum Depth (m):	0.25
Point Velocities (m/s)	
Riffle:	0.20
Pool:	0.01
Culvert:	0.38

Stream/Riparian Habitat

Channel Morphology: 50% riffle, 40% pool, 10% cascade

Substrate Composition: 80% sand, 10% gravel, 10% sm. cobble

Stream Cover: N/A

Aquatic Vegetation: N/M

Riparian Vegetation: grass, willow, moss

Barriers Present (Y/N): N
Location: N/A

L/R Bank Characteristics

Spring

Bank Height (m):	0.15-0.20
Bank Stability:	Low
Erosion Potential:	High

Water Quality

Spring

Specific Conductance (µS/cm):	155
pH:	8.37
Water Temp (°C):	7.0

Fish Habitat Use

Spring

Spawning:	ARCH - N NNST - N
Feeding:	ARCH - M NNST - N
Migration:	ARCH - L NNST - N

**Baffinland Iron Mines
Mary River Project**







Fish Habitat Quality – MARGINAL

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-106 during spring, 2009.

Bulk Sample Road Watercourse Crossing Assessment					
<div></div> <p>Figure 1: Downstream view from proposed crossing showing cascade-riffle habitat.</p> <div></div> <p>Figure 2: Upstream view from proposed crossing showing more cascade-riffle habitat and cobble substrate.</p> <div></div> <p>Figure 3: View across CV-104.</p>	Location				
	Site: CV-104		Watercourse Name: Unknown River		
	UTM: 17W 0521732 / 7952787				
	Site Description			Potential Fish Utilization	
	<div><div><div>Watershed Size:</div><div>5.198 km²</div></div><div><div>Regulated:</div><div>No</div></div><div><div>Channelized:</div><div>No</div></div><div><div>Bankfull Width:</div><div>6.0 m</div></div><div><div>Wetted Width:</div><div>6.0 m</div></div><div><div>Riffle-Crest Depth:</div><div>0.06 m</div></div><div><div>Residual Pool Depth:</div><div>N/A</div></div><div><div>Bankfull Depth:</div><div>0.31 m</div></div><div><div>Bank Height:</div><div>0.25 m</div></div><div><div>D₉₅:</div><div>0.26 m</div></div><div><div>D:</div><div>0.02 m</div></div><div><div>Confinement:</div><div>Unconfined</div></div><div><div>Channel Morphology:</div><div>Cascade-Riffle</div></div><div><div>Channel Gradient:</div><div>8⁰</div></div><div><div>Turbidity:</div><div>0.00 FTU</div></div><div><div>Side Slope</div><div>R – 1%; L – 1%</div></div><div><div>Approach:</div><div>R – 99%; L – 99%</div></div><div><div>Bank Stability:</div><div>Moderate-High</div></div><div><div>Erosion Potential:</div><div>Low-Moderate</div></div><div><div>Undercut Banks:</div><div>None</div></div></div> <div><div><div>Mesohabitat Composition:</div><div>Cascade – 50%; Riffle – 50%</div></div><div><div>Substrate Composition:</div><div>Cobble – 80%; Gravel – 15%; Boulders – 5%;</div></div><div><div>Stream Cover:</div><div>Boulders – 5%; In- and Overstream Vegetation - 5%</div></div><div><div>Riparian Vegetation:</div><div>Grasses, willows, fireweed</div></div><div><div>Aquatic Vegetation:</div><div>Algae</div></div><div><div>Unique Features:</div><div>None</div></div><div><div>Summary:</div><div>This is a medium-sized stream characterized by cascades. Substrate is predominantly cobble and the banks have low-moderate erosion potential. Cover is relatively limited.</div></div></div>			Arctic Char	
				Spawning: Unlikely	
				Migration: Unlikely	
				Rearing: Yes	
				Overwintering: Unlikely	
	Ninespine Stickleback				
Spawning: Unlikely					
Migration: Unlikely					
Rearing: Unlikely					
Overwintering: Unlikely					
Fish Habitat Quality			Comments		
Marginal			This waterbody has suitable habitat for juvenile and young-of-the-year char. A few YOY char were observed during fisheries investigations. The lack of calm, slow-flowing water may prevent extensive use by char or stickleback. Juvenile char from Phillips Creek likely use this creek for feeding and refuge during the open water season.		
Baffinland Iron Mines Mary River Project Watercourse Crossing Assessment			<div> NORTH/SOUTH CONSULTANTS INC. AQUATIC ENVIRONMENT SPECIALISTS</div>		

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-104
Site: DS

UTM / Chainage: 17W 521732 7952788 / 33 + 794
Dates Surveyed: 3-Jul-09, 27-Aug-09

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: 1°

Hydrology

	Spring	Fall
Bankfull Width (m):	9.40	9.40
Wetted Width (m):	4.00	3.00
Riffle Depth (m):	0.06	0.04
Pool Depth (m):	0.10	0.09
Right Culvert Depth (m):	0.16	0.16
Maximum Depth (m):	0.16	0.16
Point Velocities (m/s)		
Riffle:	0.54	0.43
Pool:	0.03	0.01
Right Culvert:	0.10	0.21

Stream/Riparian Habitat

Channel Morphology: 80% riffle, 20% pool
Substrate Composition: 50% sm. cobble, 25% lg. cobble, 25% gravel
Stream Cover: 25% lg. cobble
Aquatic Vegetation: Periphyton
Riparian Vegetation: Grasses, willows, moss
Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	0.10-0.15	0.10-0.15
Bank Stability:	High	High
Erosion Potential:	Low	Low

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	142	299
pH:	8.48	8.62
Water Temp (°C):	9.0	6.3

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - H NNST - L	ARCH - H NNST - L
Migration:	ARCH - H NNST - L	ARCH - H NNST - L

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – MARGINAL

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-104 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (b) at the habitat assessment site downstream of the crossing at CV-104 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-104
Site: US

UTM / Chainage: 17W 521732 7952788 / 33 + 794
Dates Surveyed: 3-Jul-09, 27-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 2-5°

Hydrology

	Spring	Fall
Bankfull Width (m):	6.50	6.50
Wetted Width (m):	5.70	5.70
Riffle Depths (m):	0.07, 0.02	0.08, 0.09
Pool Depth (m):	0.15	0.13
Right Culvert Depth (m):	0.14	0.14
Maximum Depth (m):	0.15	0.14
Point Velocities (m/s)		
Riffles:	0.60, 0.19	0.53, 0.27
Pool:	0.04	0.00
Right Culvert:	0.38	0.44

Stream/Riparian Habitat

Channel Morphology: 80% riffle, 20% pool
Substrate Composition: 60% sm. cobble, 30% lg. cobble, 10% gravel
Stream Cover: 30% lg. cobble
Aquatic Vegetation: Periphyton
Riparian Vegetation: Grasses, willows, moss
Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	0.10-0.25	0.10-0.25
Bank Stability:	High	High
Erosion Potential:	Low	Low

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	143	-
pH:	8.45	-
Water Temp (°C):	9.1	-

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - H NNST - L	ARCH - H NNST - L
Migration:	ARCH - H NNST - L	ARCH - H NNST - L

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – MARGINAL

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-104 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-104 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-102
Site: DS

UTM / Chainage: 17W 521934 7950591 / 36 + 028
Dates Surveyed: 3-Jul-09, 27-Aug-09

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: N/M

Hydrology

	Spring	Fall
Bankfull Width (m):	21.9	21.9
Wetted Width (m):	12.8	12.8
Riffle Depth (m):	0.01	0.06
Pool Depth (m):	N/M	N/M
Culvert Depth (m):	0.02	0.04
Maximum Depth (m):	N/M	N/M
Point Velocities (m/s)		
Riffle:	0.23	0.35
Pool:	N/M	N/M
Culvert:	0.35	0.52

Stream/Riparian Habitat

Channel Morphology: 90% riffle, 10% pool
Substrate Composition: 50% gravel, 39% sm. cobble, 10% sand, 1% lg. cobble
Stream Cover: 1% lg. cobble
Aquatic Vegetation: N/M
Riparian Vegetation: grass, willow
Barriers Present (Y/N): N
Location: N/A

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undefined	Undefined
Bank Stability:	High	High
Erosion Potential:	Low	Low

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	203	306
pH:	8.50	8.40
Water Temp (°C):	10.0	8.4

Fish Habitat Use

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - H NNST - N	ARCH - H NNST - N
Migration:	ARCH - M NNST - N	ARCH - M NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-102 during spring, 2009.

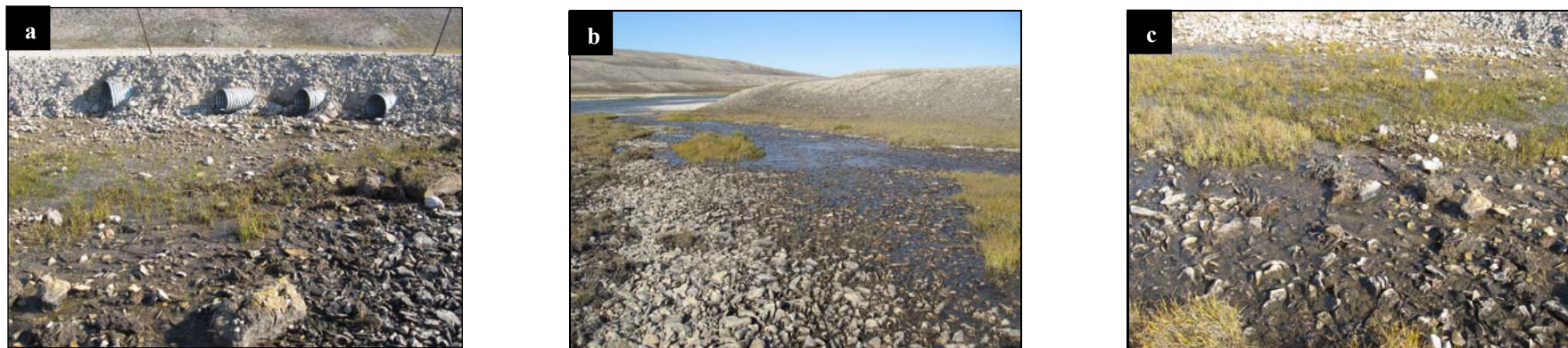


Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-102 during fall, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-102
Site: US

UTM / Chainage: 17W 521934 7950591 / 36 + 028
Dates Surveyed: 3-Jul-09, 27-Aug-09

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: N/M

Hydrology

	Spring	Fall
Bankfull Width (m):	20.1	20.1
Wetted Width (m):	11.9	11.9
Pool Depth (m):	0.12	0.16
Culvert Depth (m):	0.04	0.04
Maximum Depth (m):	0.25	0.24
Point Velocities (m/s)		
Pool:	0.00	0.00
Culvert:	0.33	0.57

Stream/Riparian Habitat

Channel Morphology: 90% pool, 10% riffle
Substrate Composition: 65% sand/silt, 24% sm. cobble, 10% gravel, 1% lg. cobble
Stream Cover: 1% lg. cobble
Aquatic Vegetation: N/M
Riparian Vegetation: grass, willow
Barriers Present (Y/N): Y
Location: Inaccessible gradient ~25 m US

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undefined	Undefined
Bank Stability:	High	High
Erosion Potential:	Low	Low

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	200	N/M
pH:	8.50	N/M
Water Temp (°C):	9.9	N/M

Fish Habitat Use

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - H NNST - N	ARCH - H NNST - N
Migration:	ARCH - M NNST - N	ARCH - M NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

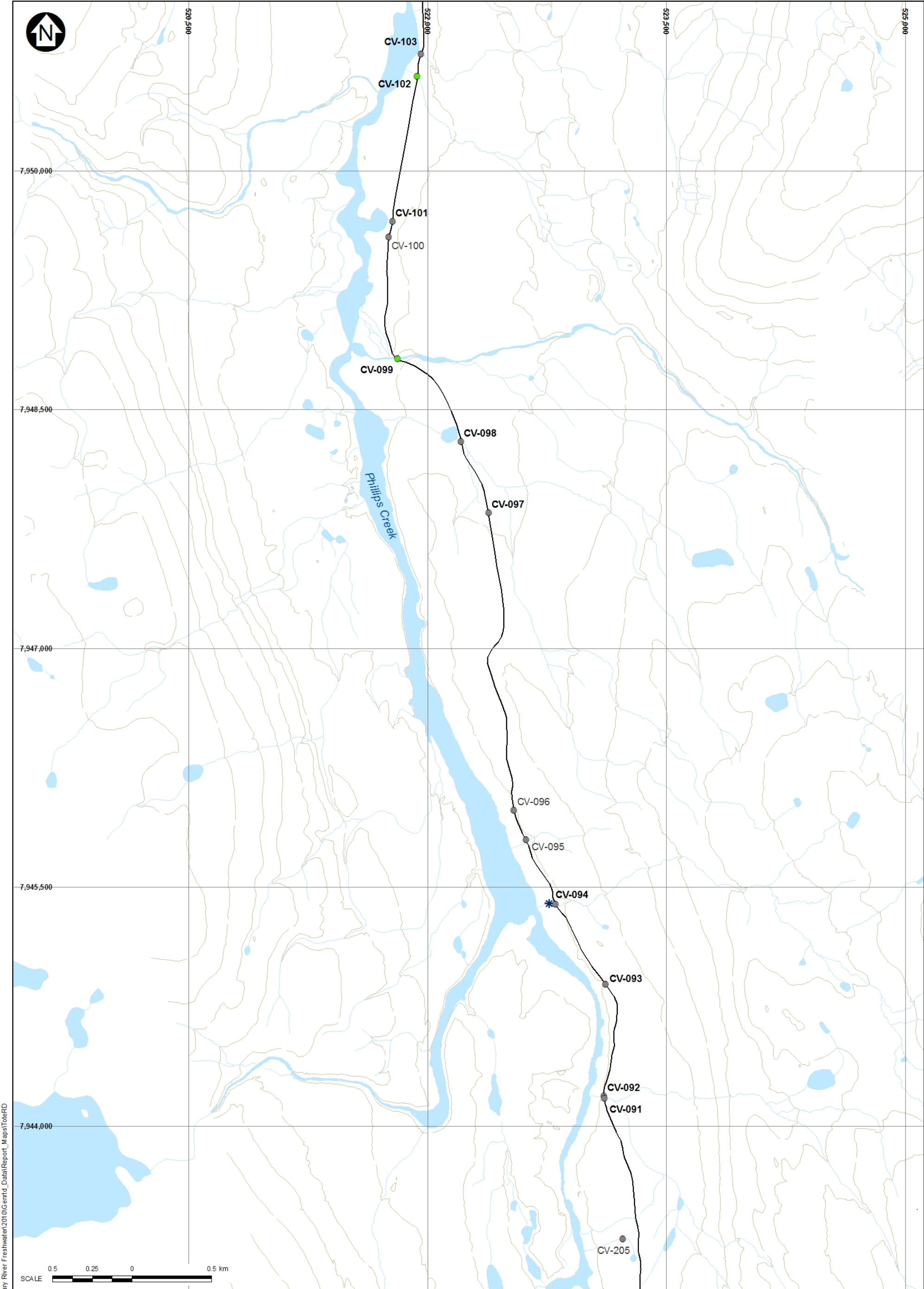
Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-102 during spring, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-102 during fall, 2009.



Path: \\terastation\GIS\Projects\Other\Mary River Freshwater\2010\Genrtd_Data\Report_Map\ToteRD

LEGEND:

- IMPORTANT FISH HABITAT
- MARGINAL FISH HABITAT
- NOT FISH BEARING HABITAT
- * FALLS
- ✕ FISH BARRIER
- TOTE ROAD (EXISTING)
- CONTOUR
- WATER

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 25 MAND IS IN METRES.

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

Milne Inlet Tote Road - 3e

North/South Consultants Inc.
Aquatic Environment Specialists

P/A NO.
-
DATE: 01/09/2010

REF NO.
-
REV
1

REV	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
-	ISSUED FOR	-	-	-	-
01/09/2010					

Bulk Sample Road Watercourse Crossing Assessment



Figure 1: Downstream view from proposed crossing showing pool habitat.




Figure 2: Upstream view from proposed crossing showing more cascade-riffle habitat and cobble substrate.



Figure 3: View across CV-99.

Baffinland Iron Mines
Mary River Project
Watercourse Crossing Assessment

Location				
Site:	CV-99		Watercourse Name:	Unknown River
UTM:	17W 0521811 / 7948819			
Site Description			Potential Fish Utilization	
<div><div>Watershed Size:</div><div>28.559 km²</div><div>Regulated:</div><div>No</div><div>Channelized:</div><div>No</div><div>Bankfull Width:</div><div>24.0 m</div><div>Wetted Width:</div><div>8.0 m</div><div>Riffle-Crest Depth:</div><div>0.15 m</div><div>Pool Depth:</div><div>0.51 m</div><div>Residual Pool Depth:</div><div>0.36 m</div><div>Bankfull Depth:</div><div>0.44 m</div><div>Bank Height:</div><div>0.12 m</div><div>D₉₅:</div><div>0.88 m</div><div>D:</div><div>0.04 m</div><div>Confinement:</div><div>Moderately Confined</div><div>Channel Morphology:</div><div>Riffle-Pool</div><div>Channel Gradient:</div><div>1⁰</div><div>Turbidity:</div><div>0.00 FTU</div><div>Side Slope</div><div>R – 5%; L – 5%</div><div>Approach:</div><div>R – 95%; L – 95%</div><div>Bank Stability:</div><div>High</div><div>Erosion Potential:</div><div>Low</div><div>Undercut Banks:</div><div>None</div></div>	<div><div>Mesohabitat Composition:</div><div>Riffle – 60%; Pool – 40%</div><div>Substrate Composition:</div><div>Cobble – 80%; Boulder – 10%; Gravel – 5%; Sand; 5% Boulders – 10%</div><div>Stream Cover:</div><div>Boulders – 10%</div><div>Riparian Vegetation:</div><div>Moss, willows, fireweed</div><div>Aquatic Vegetation:</div><div>None</div><div>Unique Features:</div><div>None</div><div>Summary:</div><div>This is a large-sized stream characterized by riffles and pools. Substrate is predominantly cobble and the banks have low erosion potential. Cover is relatively limited.</div></div>		<div>Arctic Char</div> <div><div>Spawning:</div><div>Possible</div><div>Migration:</div><div>Possible</div><div>Rearing:</div><div>Yes</div><div>Overwintering:</div><div>Unlikely</div></div>	
			<div>Ninespine Stickleback</div> <div><div>Spawning:</div><div>Possible</div><div>Migration:</div><div>Possible</div><div>Rearing:</div><div>Possible</div><div>Overwintering:</div><div>Unlikely</div></div>	
	<div>Fish Habitat Quality</div>		<div>Comments</div>	
	<div>Important</div>		<div>This waterbody has suitable habitat for several life cycle stages of char though it is likely used primarily for rearing of young fish. Many YOY and juvenile char were observed and captured during fisheries investigations. Reduced turbidity may prevent extensive use by stickleback.</div>	
			<div><div>NORTH/SOUTH CONSULTANTS INC. AQUATIC ENVIRONMENT SPECIALISTS</div></div>	

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-099
Site: DS

UTM: 17W 521769 7948817
Dates Surveyed: 24-Jun-08, 22-Jul-08

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 1°

Hydrology

	Spr	Sum
Bankfull Width (m):	12.80	12.80
Wetted Width (m):	12.54	10.90
Riffle-Crest Depth (m):	0.40	0.41
Pool Depth (m):	0.16	0.10
D (m):	NM	NM
D₉₅ (m):	0.86	0.86
Point Velocities (m/s)		
Riffle:	1.84	1.58
Pool:	0.17	0.03
Left culvert:	1.56	1.89

Stream/Riparian Habitat

Channel Morphology: 60% riffle, 20% run, 20% pool

Substrate Composition: 70% cobble, 15% sand, 14% gravel, 1% boulder

Stream Cover: 21% lg. cobble/boulders

Aquatic Vegetation: None

Riparian Vegetation: Willows & grasses

Barriers Present (Y/N): N
Location: NA

Lakes Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spr	Sum
Bank Height (L/R; m):	NM	0.25/0.25
Bank Stability:	Low	Low
Erosion Potential:	High	High

Water Quality

	Spr	Sum
Specific Conductance (µS/cm):	114.0	22.3
TDS (g/l):	0.07	0.14
DO (mg/l)	13.48	11.82
%DO:	104.1	NM
Water Temp (°C):	4.0	7.9

Fish Habitat

	Spr	Sum
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - H NNST - N	ARCH - H NNST - N
Migration:	ARCH - H NNST - N	ARCH - M NNST - N

**Baffinland Iron Mines
Mary River Project**



Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) from the habitat assessment downstream of CV-099 during spring 2008.



Figure 2. View upstream (a), downstream (b), and across (c) from the habitat assessment downstream of CV-099 during summer 2008.



Figure 3. View from the downstream end of the culvert at crossing CV-099 during spring (a) and summer (b) 2008.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-099
Site: US

UTM: 17W 521835 7948814
Dates Surveyed: 24-Jun-08, 22-Jul-08

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 1°

Hydrology

	Spr	Sum
Bankfull Width (m):	36.56	36.56
Wetted Width (m):	35.65	25.45
Riffle-Crest Depth (m):	0.25	0.22
Pool Depth (m):	0.50	0.45
D (m):	NM	NM
D₉₅ (m):	0.64	0.64
Point Velocities (m/s)		
Riffle:	1.43	0.91
Pool:	0.01	0.00
Behind a rock:	NM	0.21

Stream/Riparian Habitat

Channel Morphology: 80% riffle, 20% pool

Substrate Composition: 85% cobble, 10% sand, 4% gravel, 1% boulder

Stream Cover: 26% lg. cobble/ boulder, 20% deep pools

Aquatic Vegetation: None

Riparian Vegetation: Grasses and mosses

Barriers Present (Y/N): N
Location: NA

Lakes Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spr	Sum
Bank Height (L/R; m):	NM	0.20/0.20
Bank Stability:	Low	Low
Erosion Potential:	High	High

Water Quality

	Spr	Sum
Specific Conductance (µS/cm):	113.0	22.6
TDS (g/l):	0.07	0.15
DO (mg/l)	13.50	12.03
%DO:	104.2	NM
Water Temp (°C):	4.0	8.0

Fish Habitat

	Spr	Sum
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - L NNST - N	ARCH - M NNST - N
Migration:	ARCH - N NNST - N	ARCH - L NNST - N

**Baffinland Iron Mines
Mary River Project**



Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) from the habitat assessment upstream of CV-099 during spring 2008.



Figure 2. View upstream (a), downstream (b), and across (c) from the habitat assessment upstream of CV-099 during summer 2008.



Figure 3. View from the upstream end of the culverts at crossing CV-099 during spring (a) and summer (b) 2008.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-099
Site: DS

UTM / Chainage: 17W 521811 7948820 / 37 + 840
Dates Surveyed: 3-Jul-09, 27-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 1°

Hydrology

	Spring	Fall
Bankfull Width (m):	12.80	12.80
Wetted Width (m):	9.14	7.31
Riffle Depths (m):	0.08, 0.10	0.11, 0.10
Pool Depth (m):	0.32	0.22
Culvert Depths (L,C) (m):	0.48, -	0.44, 0.20
Maximum Depth (m):	1.30	1.20
Point Velocities (m/s)		
Riffles:	0.76, 0.82	1.04, 1.10
Pool:	0.00	0.01
Culverts (L,C):	0.58, -	0.38, 1.74

Stream/Riparian Habitat

Channel Morphology: 50% flat, 25% riffle, 25% pool

Substrate Composition: 70% lg. cobble, 15% sm. cobble, 10% boulder, 5% sand

Stream Cover: 80% lg. cobble/ boulder, 10% deep pool

Aquatic Vegetation: Periphyton

Riparian Vegetation: Willows, moss

Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undef	Undef
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	122	343
pH:	8.52	8.63
Water Temp (°C):	7.7	6.8

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - H NNST - N	ARCH - H NNST - N
Migration:	ARCH - H NNST - N	ARCH - H NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-099 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (b) at the habitat assessment site downstream of the crossing at CV-099 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-099
Site: US

UTM / Chainage: 17W 521811 7948820 / 37 + 840
Dates Surveyed: 3-Jul-09, 27-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 1°

Hydrology

	Spring	Fall
Bankfull Width (m):	36.56	36.56
Wetted Width (m):	36.56	17.37
Riffle Depths (m):	0.09, 0.22	0.10, 0.15
Culvert Depths (L,C) (m):	0.37, -	0.30, 0.38
Maximum Depth (m):	0.40	0.38
Point Velocities (m/s)		
Riffles:	0.49, 1.25	0.55, 1.18
Culverts (L,C):	0.87, -	0.77, 0.85

Stream/Riparian Habitat

Channel Morphology: 80% riffle, 20% pool
Substrate Composition: 50% sm. cobble, 25% lg. cobble, 10% gravel, 10% sand, 5% boulder
Stream Cover: 30% lg. cobble/ boulder
Aquatic Vegetation: Periphyton
Riparian Vegetation: Willows, moss
Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undef	Undef
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	124	-
pH:	8.52	-
Water Temp (°C):	7.6	-

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - H NNST - N	ARCH - H NNST - N
Migration:	ARCH - H NNST - N	ARCH - H NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment

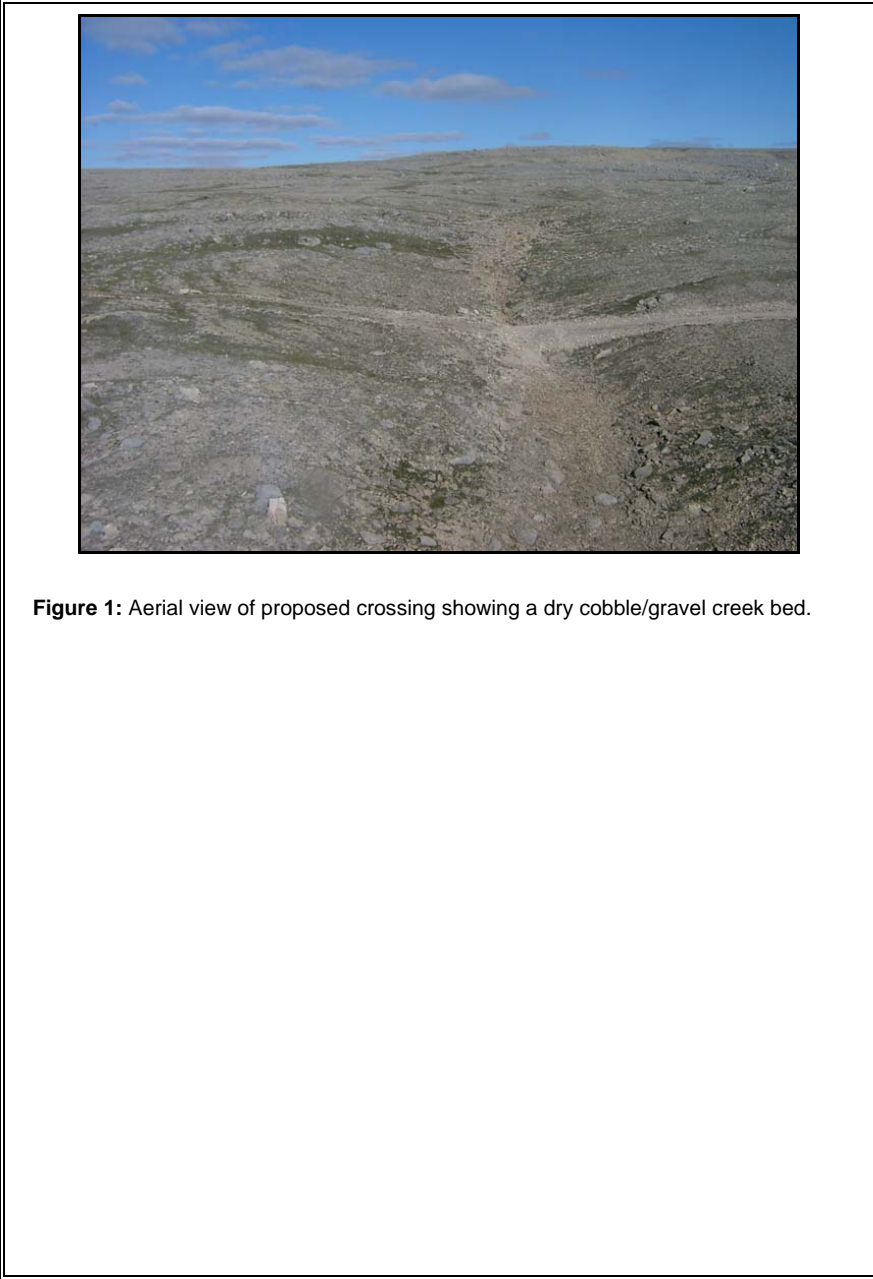


Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-099 during early July, 2009.




Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-099 during late August, 2009.

Bulk Sample Road Watercourse Crossing Assessment



**Baffinland Iron Mines
Mary River Project
Watercourse Crossing Assessment**

Bulk Sample Road Watercourse Crossing Assessment				
Location				
Site:		CV-95		Watercourse Name: Unknown River
UTM:		17W 0522618 / 7945799		
Site Description			Potential Fish Utilization	
Watershed Size:		0.119 km ²	Arctic Char	
Regulated:		No	Spawning: None	
Channelized:		No	Migration: None	
Bankfull Width:		N/A	Rearing: None	
Wetted Width:		N/A	Overwintering: None	
Riffle-Crest Depth:		N/A		
Pool Depth:		N/A	Ninespine Stickleback	
Residual Pool Depth:		N/A	Spawning: None	
Bankfull Depth:		N/A	Migration: None	
Bank Height:		N/A	Rearing: None	
D ₉₅ :		N/A	Overwintering: None	
D:		N/A		
Confinement:		N/A		
Channel Morphology:		N/A		
Channel Gradient:		N/A	Fish Habitat Quality	
Turbidity:		N/A	None	
Side Slope		N/A		
Approach:		N/A		
Bank Stability:		N/A		
Erosion Potential:		N/A	This waterbody is ephemeral and provides no suitable fish habitat. Even during high water in spring there is not likely any fish use.	
Undercut Banks:		N/A		
			 NORTH/SOUTH CONSULTANTS INC. AQUATIC ENVIRONMENT SPECIALISTS	

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-094
Site: DS

UTM: 17W 522780 7945398
Dates Surveyed: 24-Jun-08, 23-Jul-08

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 8°

Hydrology

	Spr	Sum
Bankfull Width (m):	16.45	16.45
Wetted Width (m):	7.20	6.80
Cascade-Crest Depth (m):	0.24	0.30
Pool Depth (m):	NA	0.35
D (m):	NM	NM
D₉₅ (m):	1.80	1.80
Point Velocities (m/s)		
Cascade:	1.18	1.20
Pool:	NA	0.11
Culvert:	2.48	1.60

Stream/Riparian Habitat

Channel Morphology: 60 cascade 40% pool

Substrate Composition: 40% cobble, 30% gravel, 20% boulder, 10% sand

Stream Cover: 50% lg. cobble/ boulders, 20% d. pool

Aquatic Vegetation: None

Riparian Vegetation: Grasses and willow

Barriers Present (Y/N): Y
Location: 30m DS

Lakes Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spr	Sum
Bank Height (L/R; m):	Undef	Undef
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spr	Sum
Specific Conductance (µS/cm):	136.0	22.4
TDS (g/l):	0.09	0.15
DO (mg/l)	13.52	11.81
%DO:	105.0	NM
Water Temp (°C):	4.5	7.5

Fish Habitat

	Spr	Sum
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - N NNST - N	ARCH - N NNST - N
Migration:	ARCH - N NNST - N	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) from the habitat assessment downstream of CV-094 during spring 2008.



Figure 2. View upstream (a), downstream (b), and across (c) from the habitat assessment downstream of CV-094 during summer 2008.



Figure 3. View from the downstream end of the culvert at crossing CV-094 during spring (a) and summer (b) 2008. View of the natural fish barrier 30 m downstream from the crossing at CV-094 (c).

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-094
Site: US

UTM: 17W 522817 7945391
Dates Surveyed: 24-Jun-08, 23-Jul-08

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 8°

Hydrology

	Spr	Sum
Bankfull Width (m):	42.96	42.96
Wetted Width (m):	6.70	10.40
Cascade-Crest Depth (m):	0.24	0.19
Pool Depth (m):	0.30	0.20
D (m):	NM	NM
D₉₅ (m):	1.34	1.34
Point Velocities (m/s)		
Cascade:	1.04	0.94
Pool:	0.17	0.00
Behind a rock:	NM	NM

Stream/Riparian Habitat

Channel Morphology: 50% cascade, 50% pool
Substrate Composition: 70% cobble, 20% boulder, 10% gravel
Stream Cover: 50% lg. cobble/ boulder, 20% deep pools
Aquatic Vegetation: None
Riparian Vegetation: Willows
Barriers Present (Y/N): N
Location: NA
Lakes Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spr	Sum
Bank Height (L/R; m):	Undef	Undef
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spr	Sum
Specific Conductance (µS/cm):	136.0	22.9
TDS (g/l):	0.09	0.15
DO (mg/l)	13.65	11.86
%DO:	106.2	NM
Water Temp (°C):	4.5	7.5

Fish Habitat

	Spr	Sum
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - N NNST - N	ARCH - N NNST - N
Migration:	ARCH - N NNST - N	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) from the habitat assessment upstream of CV-094 during spring 2008.



Figure 2. View upstream (a), downstream (b), and across (c) from the habitat assessment upstream of CV-094 during summer 2008.

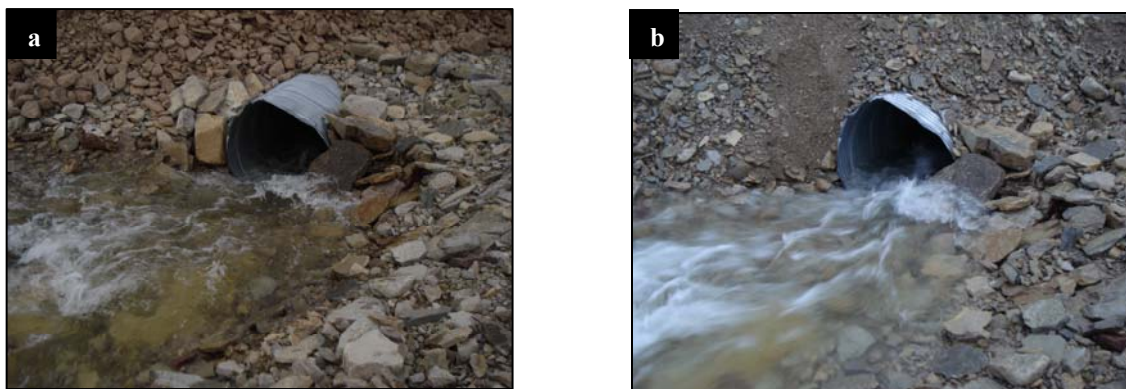


Figure 3. View from the upstream end of the culverts at crossing CV-094 during spring (a) and summer (b) 2008.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-094
Site: DS

UTM / Chainage: 17W 522805 7945397 / 41 + 613
Dates Surveyed: 3-Jul-09, 27-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 8°

Hydrology

	Spring	Fall
Bankfull Width (m):	16.45	16.45
Wetted Width (m):	N/M	8.23
Riffle Depth (m):	N/M	0.21
Cascade Depth (m)	N/M	0.06
Pool Depth (m)	N/M	0.15
Left Culvert Depth (m):	N/M	0.08
Maximum Depth (m):	N/M	0.25

Point Velocities (m/s)

Riffle:	N/M	0.55
Cascade:	N/M	0.87
Pool:	N/M	0.00
Left Culvert:	N/M	0.20

Stream/Riparian Habitat

Channel Morphology: 60% cascade/riffle, 40% pool

Substrate Composition: 30% gravel, 30% lg. cobble, 20% boulder, 10% sm. cobble, 10% sand

Stream Cover: 50% lg. cobble/boulder, 20% deep pool

Aquatic Vegetation: Periphyton

Riparian Vegetation: Moss, willows

Barriers Present (Y/N): Y
Location: Natural falls barrier ~50 m DS

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undef	Undef
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	N/M	355
pH:	N/M	8.62
Water Temp (°C):	N/M	6.3

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - N NNST - N	ARCH - N NNST - N
Migration:	ARCH - N NNST - N	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING

Tote Road Aquatic Habitat Assessment



Figure 1. View of the natural downstream barrier (a) and habitat downstream of the crossing (b) at CV-094 during early July, 2009.

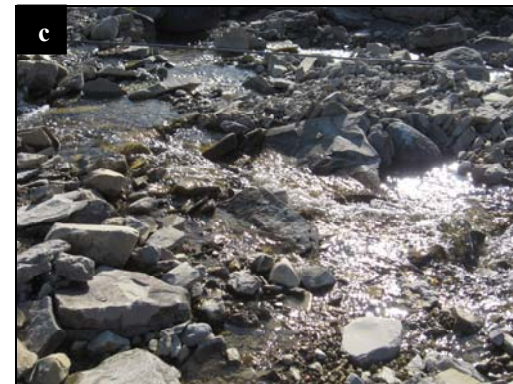


Figure 2. View upstream (a), downstream (b), and across (b) at the habitat assessment site downstream of the crossing at CV-094 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-094
Site: US

UTM / Chainage: 17W 522805 7945397 / 41 + 613
Dates Surveyed: 3-Jul-09, 27-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 8°

Hydrology

	Spring	Fall
Bankfull Width (m):	42.96	42.96
Wetted Width (m):	N/M	2.00
Riffle Depth (m):	N/M	0.02
Left Culvert Depth (m):	N/M	0.03
Maximum Depth (m):	N/M	0.35
Point Velocities (m/s)		
Riffle:	N/M	0.32
Left Culvert:	N/M	0.89

Stream/Riparian Habitat

Channel Morphology: 50% cascade/riffle, 50% pool

Substrate Composition: 40% sm. cobble, 30% lg. cobble, 20% boulder, 10% gravel

Stream Cover: 50% lg. cobble/ boulder, 20% deep pool

Aquatic Vegetation: Periphyton

Riparian Vegetation: Moss, willows

Barriers Present (Y/N): Y
Location: Natural falls barrier ~50 m DS

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undef	Undef
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	-	-
pH:	-	-
Water Temp (°C):	-	-

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - N NNST - N	ARCH - N NNST - N
Migration:	ARCH - N NNST - N	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING

Tote Road Aquatic Habitat Assessment

Figure 1. No pictures taken upstream of the crossing at CV-094 during early July, 2009 because this area was identified as not fish-bearing.




Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-094 during late August, 2009.

Bulk Sample Road Watercourse Crossing Assessment




Figure 1: Aerial view of proposed crossing showing an almost completely dry cobble/gravel creek bed.

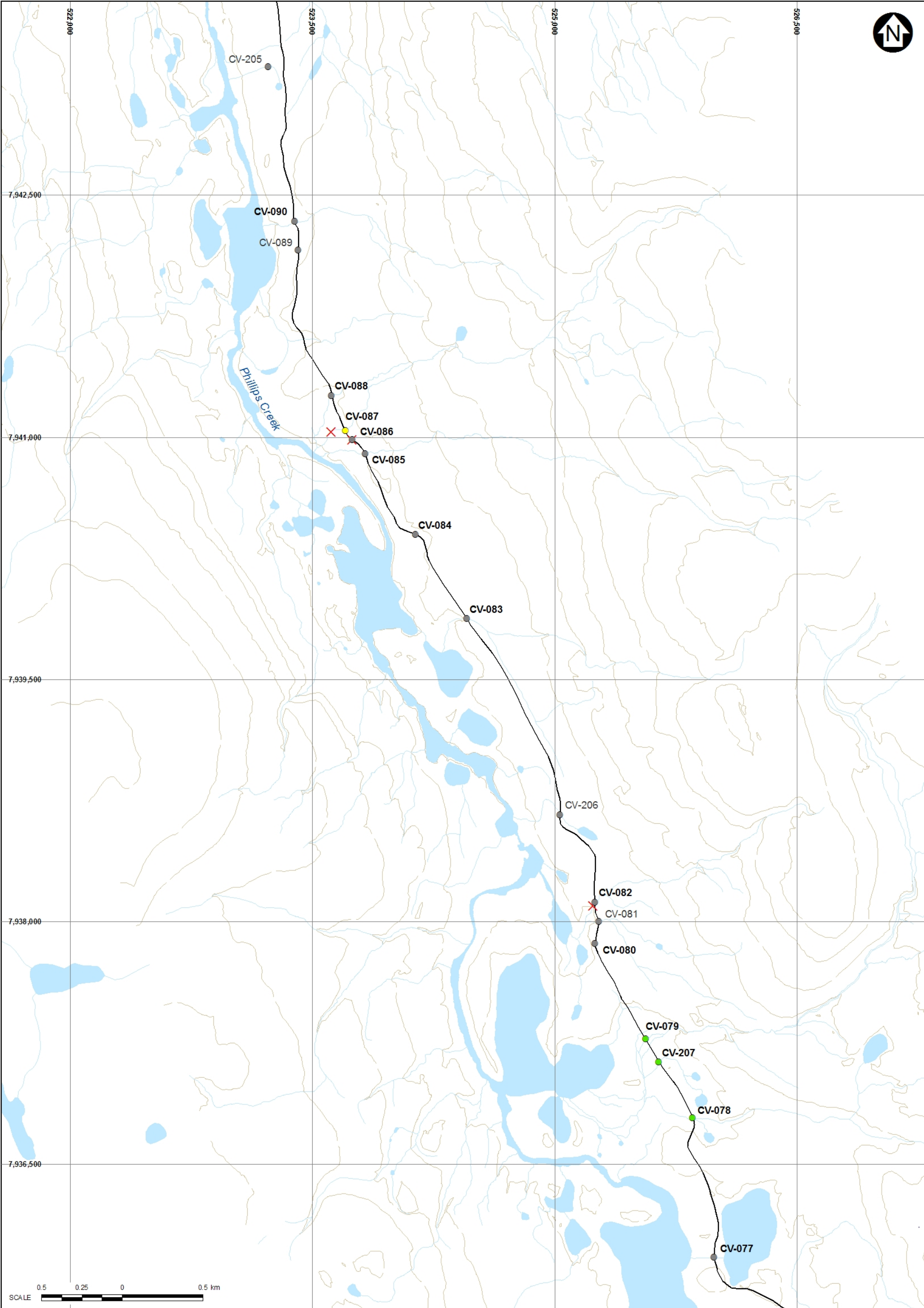
Location				
Site:	CV-93	Watercourse Name:	Unknown River	
UTM:	17W 0523116 / 7944890			
Site Description		Potential Fish Utilization		
Watershed Size: 0.880 km ² Regulated: No Channelized: No Bankfull Width: N/A Wetted Width: N/A Riffle-Crest Depth: N/A Pool Depth: N/A Residual Pool Depth: N/A Bankfull Depth: N/A Bank Height: N/A D ₉₅ : N/A D: N/A Confinement: N/A Channel Morphology: N/A Channel Gradient: N/A Turbidity: N/A Side Slope: N/A Approach: N/A Bank Stability: N/A Erosion Potential: N/A Undercut Banks: N/A	Mesohabitat Composition:	N/A	Arctic Char	
	Substrate Composition:	N/A	Spawning:	None
	Stream Cover:	N/A	Migration:	None
	Riparian Vegetation:	N/A	Rearing:	None
	Aquatic Vegetation:	N/A	Overwintering:	None
	Unique Features:	N/A	Ninespine Stickleback	
	Summary:	This is a small waterbody that was almost completely dry at the time of sampling in August. It is exclusively a spring run-off stream	Spawning:	None
			Migration:	None
			Rearing:	None
			Overwintering:	None
	Fish Habitat Quality		Comments	
	None		This waterbody is ephemeral and provides no suitable fish habitat. Even during high water in spring there is not likely any fish use. There is a cliff downstream of the crossing that would represent a significant barrier to fish passage even if water levels were sufficient.	
			 NORTH/SOUTH CONSULTANTS INC. AQUATIC ENVIRONMENT SPECIALISTS	

Bulk Sample Road Watercourse Crossing Assessment



Figure 1: Aerial view of proposed crossing showing a completely dry cobble/gravel creek bed.

Location			
Site:	CV-92	Watercourse Name:	Unknown River
UTM:	17W 0523106 / 7944186		
Site Description		Potential Fish Utilization	
Watershed Size:	3.453 km ²	Arctic Char	
Regulated:	No	Spawning:	None
Channelized:	No	Migration:	None
Bankfull Width:	N/A	Rearing:	None
Wetted Width:	N/A	Overwintering:	None
Riffle-Crest Depth:	N/A	Ninespine Stickleback	
Pool Depth:	N/A	Spawning:	None
Residual Pool Depth:	N/A	Migration:	None
Bankfull Depth:	N/A	Rearing:	None
Bank Height:	N/A	Overwintering:	None
D ₉₅ :	N/A	Comments	
D:	N/A		
Confinement:	N/A	None	
Channel Morphology:	N/A		
Channel Gradient:	N/A	None	
Turbidity:	N/A		
Side Slope	N/A	None	
Approach:	N/A		
Bank Stability:	N/A	None	
Erosion Potential:	N/A		
Undercut Banks:	N/A	None	
Baffinland Iron Mines Mary River Project Watercourse Crossing Assessment		 NORTH/SOUTH CONSULTANTS INC. AQUATIC ENVIRONMENT SPECIALISTS	



LEGEND:

- IMPORTANT FISH HABITAT
- MARGINAL FISH HABITAT
- NOT FISH BEARING HABITAT
- * FALLS
- ✕ FISH BARRIER
- TOTE ROAD (EXISTING)

- CONTOUR
- WATER


NOTES:

1. BASE MAP: © HER MAJESTY THE QUEEN IN RIGHTS OF CANADA A 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 25 M AND IS IN METRES.

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

Milne Inlet Tote Road - 3f

 **North/South Consultants Inc.**
Aquatic Environment Specialists

P/A NO.	REF NO.
-	-
DATE: 01/09/2010	

REV	1
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REV	01/09/2010	ISSUED FOR	DESIGNED	DRAWN	CHK'D	APP'D
-		DESCRIPTION				

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

Bulk Sample Road Watercourse Crossing Assessment




Figure 1: Downstream view from proposed crossing showing cascade habitat with cobble and boulders.



Figure 2: Upstream view from proposed crossing showing more cascade habitat and cobble substrate.



Figure 3: View across CV-87.

Location			
Site:	CV-87	Watercourse Name:	Unknown River
UTM:	17W 0523704 / 7941040		
Site Description		Potential Fish Utilization	
Watershed Size:	9.873 km ²	Arctic Char	
Regulated:	No	Spawning:	None
Channelized:	No	Migration:	None
Bankfull Width:	55.0 m	Rearing:	Possible but Unlikely
Wetted Width:	10.0 m	Overwintering:	None
Riffle-Crest Depth:	0.20 m	Ninespine Stickleback	
Pool Depth:	N/A	Spawning:	None
Residual Pool Depth:	N/A	Migration:	None
Bankfull Depth:	0.52 m	Rearing:	None
Bank Height:	0.32 m	Overwintering:	None
D ₉₅ :	0.72 m	Comments	
D:	0.04 m		
Confinement:	N/A (braided stream)	Marginal	
Channel Morphology:	Cascade		
Channel Gradient:	11 ⁰		
Turbidity:	0.00 FTU		
Side Slope	R – 10%; L – 10%		
Approach:	R – 90%; L – 90%		
Bank Stability:	High		
Erosion Potential:	Low-Moderate		
Undercut Banks:	None		
Summary:		This is a large-sized waterbody but it has relatively shallow depths and higher velocities characterized by cascades. Substrate is predominantly cobble and the banks have low erosion potential.	
Fish Habitat Quality		Comments	
		Though a large watershed, habitat in this waterbody is likely unsuitable for fish. It lacks areas of slow flow that char seem to prefer and has relatively little wetted width at the time of sampling. It is marginal fish habitat at best but more likely provides no fish habitat.	
		 NORTH/SOUTH CONSULTANTS INC. AQUATIC ENVIRONMENT SPECIALISTS	

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-086
Site: DS

UTM / Chainage: 17W 523746 7941983 / 46 + 300
Dates Surveyed: 3-Jul-09

Site Description/Physical Characteristics

Confinement: N/M

Channel Gradient: N/M

Hydrology

Spring

Bankfull Width (m):	N/M
Wetted Width (m):	N/M
Depths (m):	N/M
Culvert Depth (m):	N/M
Maximum Depth (m):	N/M
Point Velocities (m/s)	N/M

Stream/Riparian Habitat

Channel Morphology: N/M
Substrate Composition: N/M
Stream Cover: N/M
Aquatic Vegetation: N/M
Riparian Vegetation: N/M
Barriers Present (Y/N): N/M
Location: N/M

L/R Bank Characteristics

Spring

Bank Height (m):	N/M
Bank Stability:	N/M
Erosion Potential:	N/M

Water Quality

Spring

Specific Conductance (µS/cm):	N/M
pH:	N/M
Water Temp (°C):	N/M

Fish Habitat Use

Spring

Spawning:	ARCH - N NNST - N
Feeding:	ARCH - N NNST - N
Migration:	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING

Tote Road Aquatic Habitat Assessment



Figure 1. View downstream from the crossing site at CV-086 during spring, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-086
Site: US

UTM / Chainage: 17W 523746 7941983 / 46 + 300
Dates Surveyed: 3-Jul-09

Site Description/Physical Characteristics

Confinement: N/M

Channel Gradient: N/M

Hydrology

Spring

Bankfull Width (m):	N/M
Wetted Width (m):	N/M
Depths (m):	N/M
Culvert Depth (m):	N/M
Maximum Depth (m):	N/M
Point Velocities (m/s)	N/M

Stream/Riparian Habitat

Channel Morphology: N/M
Substrate Composition: N/M
Stream Cover: N/M
Aquatic Vegetation: N/M
Riparian Vegetation: N/M
Barriers Present (Y/N): N
Location: N/A

L/R Bank Characteristics

Spring

Bank Height (m):	0.10-0.20
Bank Stability:	High
Erosion Potential:	Low

Water Quality

Spring

Specific Conductance (µS/cm):	N/M
pH:	N/M
Water Temp (°C):	N/M

Fish Habitat Use

Spring

Spawning:	ARCH - N NNST - N
Feeding:	ARCH - N NNST - N
Migration:	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a) from the crossing site at CV-086 during spring, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-082
Site: DS

UTM / Chainage: 17W 525254 7938131 / 49 + 655
Dates Surveyed: 3-Jul-09

Site Description/Physical Characteristics

Confinement: N/M

Channel Gradient: N/M

Hydrology

Spring

Bankfull Width (m): N/M

Wetted Width (m): N/M

Depths (m): N/M

Culvert Depth (m): N/M

Maximum Depth (m): N/M

Point Velocities (m/s) N/M

Stream/Riparian Habitat

Channel Morphology: N/M

Substrate Composition: N/M

Stream Cover: N/M

Aquatic Vegetation: N/M

Riparian Vegetation: N/M

Barriers Present (Y/N): N/M
Location: N/M

L/R Bank Characteristics

Spring

Bank Height (m): N/M

Bank Stability: N/M

Erosion Potential: N/M

Water Quality

Spring

Specific Conductance ($\mu\text{S}/\text{cm}$): N/M

pH: N/M

Water Temp ($^{\circ}\text{C}$): N/M

Fish Habitat Use

Spring

Spawning: ARCH - N
NNST - N

Feeding: ARCH - N
NNST - N

Migration: ARCH - N
NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING

Tote Road Aquatic Habitat Assessment



Figure 1. View downstream from the crossing site at CV-082 during spring, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-082
Site: US

UTM / Chainage: 17W 525254 7938131 / 49 + 655
Dates Surveyed: 3-Jul-09

Site Description/Physical Characteristics

Confinement: N/M

Channel Gradient: N/M

Hydrology

Spring

Bankfull Width (m):	N/M
Wetted Width (m):	N/M
Depths (m):	N/M
Culvert Depth (m):	N/M
Maximum Depth (m):	N/M
Point Velocities (m/s)	N/M

Stream/Riparian Habitat

Channel Morphology: N/M
Substrate Composition: N/M
Stream Cover: N/M
Aquatic Vegetation: N/M
Riparian Vegetation: N/M
Barriers Present (Y/N): N
Location: N/A

L/R Bank Characteristics

Spring

Bank Height (m):	N/M
Bank Stability:	N/M
Erosion Potential:	N/M

Water Quality

Spring

Specific Conductance (µS/cm):	N/M
pH:	N/M
Water Temp (°C):	N/M

Fish Habitat Use

Spring

Spawning:	ARCH - N NNST - N
Feeding:	ARCH - N NNST - N
Migration:	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream from the crossing site at CV-082 during spring, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-079
Site: DS

UTM: 17W 525562 7937276
Dates Surveyed: 27-Jul-08

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 3°

Hydrology

Sum

Bankfull Width (m): 28.00

Wetted Width (m): 19.60

Riffle-Crest Depth (m): 0.10

Pool Depth (m): 0.06

D₉₅ (m): 0.65

Point Velocities (m/s)

Riffle: 0.28

Pool: 0.11

Maximum: 0.35

Stream/Riparian Habitat

Channel Morphology: 70% riffle, 30% pool

Substrate Composition: 50% sand, 25% sm cobble, 20% gravel, 5% lg cobble

Stream Cover: 5% lg cobble

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grass, moss, wildflowers

Barriers Present (Y/N): N
Location: NA

Lakes Present (Y/N): Y
Location: DS

L/R Bank Characteristics

Sum

Bank Height (L/R; m): 0.25/0.25

Bank Stability: Mod

Erosion Potential: Mod

Water Quality

Sum

Specific Conductance (µS/cm): 22.3

TDS (g/l): 0.14

DO (mg/l): 11.82

%DO: NM

Water Temp (°C): 7.9

Fish Habitat

Sum

Spawning: ARCH - N
NNST - N

Feeding: ARCH - H
NNST - L

Migration: ARCH - M
NNST - N

**Baffinland Iron Mines
Mary River Project**



Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) from the habitat assessment downstream of CV-079 during summer 2008.



b

Figure 2. View from the downstream end of the culvert at crossing CV-079 during summer 2008.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-079
Site: US

UTM: 17W 525562 7937276
Dates Surveyed: 27-Jul-08

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: 3°

Hydrology

Sum

Bankfull Width (m): 7.30

Wetted Width (m): 3.90

Riffle-Crest Depth (m): 0.24

Pool Depth (m): 0.14

D₉₅ (m): 0.65

Point Velocities (m/s)

Riffle: 1.08

Pool: 0.10

Flat: 0.17

Stream/Riparian Habitat

Channel Morphology: 30% riffle, 30% flat, 20% cascade, 20% pool

Substrate Composition: 55% sm cobble, 40% lg cobble, 5% sand

Stream Cover: 40% lg cobble, 5% deep pool

Aquatic Vegetation: Some periphyton,

Riparian Vegetation: Grasses and moss

Barriers Present (Y/N): N
Location: NA

Lakes Present (Y/N): Y
Location: DS

L/R Bank Characteristics

Sum

Bank Height (L/R; m): 0.20/1.25

Bank Stability: High

Erosion Potential: Low

Water Quality

Sum

Specific Conductance (µS/cm): 26.9

TDS (g/l): 0.17

DO (mg/l): 11.57

%DO: NM

Water Temp (°C): 6.3

Fish Habitat

Sum

Spawning: ARCH - N
NNST - N

Feeding: ARCH - H
NNST - N

Migration: ARCH - M
NNST - N

**Baffinland Iron Mines
Mary River Project**



Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) from the habitat assessment upstream of CV-079 during summer 2008.



Figure 2. View from the upstream end of the culverts at crossing CV-079 during summer 2008.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-079
Site: DS

UTM / Chainage: 17W 525562 7937276 / 50 + 600
Dates Surveyed: 3-Jul-09, 27-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 2-5°

Hydrology

	Spring	Fall
Bankfull Width (m):	60.32	60.32
Wetted Width (m):	13.71	13.71
Riffle Depths (m):	0.07, 0.04	0.10, 0.05
Pool Depth (m):	0.28	0.22
Right Culvert Depth (m):	0.25	0.20
Maximum Depth (m):	0.50	0.40
Point Velocities (m/s)		
Riffles:	0.36, 0.35	0.62, 0.55
Pool:	0.05	0.00
Right Culvert:	1.32	1.05

Stream/Riparian Habitat

Channel Morphology: 60% riffle, 40% pool
Substrate Composition: 60% sm. cobble, 15% gravel, 15% sand, 10% lg. cobble
Stream Cover: 10% lg. cobble
Aquatic Vegetation: Periphyton
Riparian Vegetation: Grasses, willows
Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undef	Undef
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	136	295
pH:	8.53	8.72
Water Temp (°C):	7.6	6.8

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - H NNST - L	ARCH - H NNST - L
Migration:	ARCH - H NNST - L	ARCH - H NNST - L

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-079 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (b) at the habitat assessment site downstream of the crossing at CV-079 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-079
Site: US

UTM / Chainage: 17W 525562 7937276 / 50 + 600
Dates Surveyed: 3-Jul-09, 27-Aug-09

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: 2-5°

Hydrology

	Spring	Fall
Bankfull Width (m):	15.54	15.54
Wetted Width (m):	8.68	6.40
Riffle Depth (m):	0.13	0.13
Run Depth (m):	0.34	0.30
Right Culvert Depth (m):	0.36	0.29
Maximum Depth (m):	0.40	0.30
Point Velocities (m/s)		
Riffle:	0.86	1.16
Run:	0.14	0.12
Right Culvert:	0.91	0.96

Stream/Riparian Habitat

Channel Morphology: 60% run, 20% riffle, 20% cascade
Substrate Composition: 50% sand, 40% sm. cobble, 5% lg. cobble, 5% gravel
Stream Cover: 5% lg. cobble
Aquatic Vegetation: Periphyton
Riparian Vegetation: Grasses, willows
Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undef	Undef
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	136	-
pH:	8.55	-
Water Temp (°C):	7.5	-

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - H NNST - L	ARCH - H NNST - L
Migration:	ARCH - H NNST - L	ARCH - H NNST - L

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-079 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-079 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-207
Site: DS

UTM: 17W 525640 7937120
Dates Surveyed: 08-Sept-08, 11:41

Site Description/Physical Characteristics

Confinement: Unconfined - Partial

Channel Gradient: 0.5°

Hydrology

Fall

Bankfull Width (m): 12.17

Wetted Width (m): 4.05

Riffle-Crest Depth (m): 0.11

Pool Depth (m): 0.22

Pool DS of culvert depth (m): 0.32

D₉₅ (m): 0.50

Point Velocities (m/s)

Riffle: 0.12

Pool: 0.00

Culvert: 0.20

Stream/Riparian Habitat

Channel Morphology: 70% riffle, 20% deep pool, 10% pool

Substrate Composition: 50% sm cobble, 20% lg cobble, 20% gravel, 10% sand

Stream Cover: 20% lg cobble, 20% deep pool

Aquatic Vegetation: None

Riparian Vegetation: Willow

Barriers Present (Y/N): N
Location: N/A

Lakes Present (Y/N): Y
Location: DS

L/R Bank Characteristics

Fall

Bank Height (L/R; m): 0.30/0.30

Bank Stability: Low

Erosion Potential: High

Water Quality

Fall

Specific Conductance (µS/cm): 31.5

TDS (g/l): 0.20

DO (mg/l): 14.58

%DO: N/M

Water Temp (°C): 2.2

Turb: 6.9

Fish Habitat

Fall

Spawning: ARCH - N
NNST - N

Feeding: ARCH - M
NNST - N

Migration: ARCH - L
NNST - N

**Baffinland Iron Mines
Mary River Project**



Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) from habitat assessment in reach 1 of CV-207 during fall 2008.



Figure 1. Views of the culverts at CV-207 from the downstream end (a, b, & c) during fall 2008.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-207
Site: Reach 2 (upstream of culverts)

UTM: 17W 525640 7937120
Dates Surveyed: 08-Sept-08, 12:19

Site Description/Physical Characteristics

Confinement:	Unconfined
Channel Gradient:	0.5°
Hydrology	
	Fall
Bankfull Width (m):	21.70
Wetted Width (m):	3.93
Riffle-Crest Depth (m):	0.10
Pool Depth (m):	0.18
Pool US of culvert depth (m):	0.18
D₉₅ (m):	0.14
Point Velocities (m/s)	
Riffle:	0.45
Pool:	0.12
Culvert:	0.55

Stream/Riparian Habitat	
Channel Morphology:	60% pool, 35% riffle, 5% deep pool
Substrate Composition:	50% gravel, 35% sm cobble, 10% sand, 5% lg cobble
Stream Cover:	15% UC banks, 5% deep pool, 5% lg cobble
Aquatic Vegetation:	Periphyton
Riparian Vegetation:	Grass
Barriers Present (Y/N):	N
Location:	N/A
Lakes Present (Y/N):	Y
Location:	DS

L/R Bank Characteristics	
	Fall
Bank Height (L/R; m):	0.25/0.25
Bank Stability:	Moderate-High
Erosion Potential:	Moderate-Low

Water Quality	
	Fall
Specific Conductance (µS/cm):	31.3
TDS (g/l):	0.20
DO (mg/l)	13.97
%DO:	N/M
Water Temp (°C):	2.4
Turb:	9.0
Fish Habitat	
	Fall
Spawning:	ARCH - N NNST - N
Feeding:	ARCH - M NNST - N
Migration:	ARCH - L NNST - N

**Baffinland Iron Mines
Mary River Project**



Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) from habitat assessment in reach 2 of CV-207 during fall 2008.



Figure 1. Views of the culverts at CV-207 from the upstream end (a, b, & c) during fall 2008.

Bulk Sample Road Watercourse Crossing Assessment



Figure 1: Downstream view from proposed crossing showing riffle-pool habitat with cobble and boulders.



Figure 2: Upstream view from proposed crossing showing more cascade habitat and cobble substrate.



Figure 3: View across CV-78.

Baffinland Iron Mines
Mary River Project
Watercourse Crossing Assessment

Location				
Site:	CV-78		Watercourse Name:	Unknown River
UTM:	17W 0525852 / 7936787			
Site Description			Potential Fish Utilization	
Watershed Size: 19.440 km ² Regulated: No Channelized: No Bankfull Width: 31.0 m Wetted Width: 21.0 m Riffle-Crest Depth: 0.06 m Pool Depth: 0.38 m Residual Pool Depth: 0.44 m Bankfull Depth: 0.55 m Bank Height: 0.49 m D₉₅: 0.30 m D: 0.02 m Confinement: Partially Confined Channel Morphology: Riffle-Pool Channel Gradient: 2 ⁰ Turbidity: 0.00 FTU Side Slope R – 5%; L – 5% Approach: R – 95%; L – 95% Bank Stability: High Erosion Potential: Low-Moderate Undercut Banks: None	Mesohabitat Composition: Riffle – 50%; Pool – 50% Substrate Composition: Cobble – 80%; Gravel – 15%; Boulder – 5% Stream Cover: Boulders – 5% Riparian Vegetation: Moss, small plants, grasses Aquatic Vegetation: None Unique Features: None Summary: This is a large-sized waterbody with typical riffle-pool habitat. Substrate is predominantly cobble and the banks have low erosion potential.		Arctic Char	
			Spawning: Possible but Unlikely	
			Migration: Possible	
			Rearing: Yes	
			Overwintering: None	
			Ninespine Stickleback	
			Spawning: Possible	
			Migration: Possible	
			Rearing: Possible	
			Overwintering: None	

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-078
Site: DS

UTM: 17W 525823 7936786
Dates Surveyed: 01-Sept-08, 10:38

Site Description/Physical Characteristics

Confinement: Partial - Confined

Channel Gradient: 0.5°

Hydrology

Fall

Bankfull Width (m): 33.82

Wetted Width (m): 25.75

Riffle-Crest Depth (m): 0.13

Pool Depth (m): 0.11

Pool DS of culvert depth (m): > 1.00

D₉₅ (m): 0.51

Point Velocities (m/s)

Riffle: 1.18

Pool: 0.43

Culvert: 0.87

Stream/Riparian Habitat

Channel Morphology: 80% riffle, 20% pool

Substrate Composition: 35% gravel, 30% sm cobble, 15% lg cobble, 10% FT, 10% sand

Stream Cover: 15% lg cobble, 10% UC banks, 5% deep pool

Aquatic Vegetation: Periphyton

Riparian Vegetation: moss, willow

Barriers Present (Y/N): N
Location: N/A

Lakes Present (Y/N): Y
Location: DS

L/R Bank Characteristics

Fall

Bank Height (L/R; m): Undef/Flooded

Bank Stability: Low-mod

Erosion Potential: Mod-high

Water Quality

Fall

Specific Conductance (µS/cm): 27.6

TDS (g/l): 0.15

DO (mg/l): 14.50

%DO: N/M

Water Temp (°C): 3.5

Turb: 4.2

Fish Habitat

Fall

Spawning: ARCH - N
NNST - N

Feeding: ARCH - M
NNST - L

Migration: ARCH - M
NNST - N

**Baffinland Iron Mines
Mary River Project**



Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) from the habitat assessment downstream of CV-078 during fall 2008.



Figure 2. View upstream of culvert #1 (a) and culvert #2 (b) downstream of CV-078 during fall 2008.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-078
Site: US

UTM: 17W 525883 7936793
Dates Surveyed: 01-Sept-08

Site Description/Physical Characteristics

Confinement: Partial - Unconfined
Channel Gradient: 0.5°

Hydrology

Fall

Bankfull Width (m):	21.03
Wetted Width (m):	21.03
Riffle-Crest Depth (m):	0.20
Pool Depth (m):	0.10
D₉₅ (m):	0.45

Point Velocities (m/s)

Riffle:	0.88
Pool:	0.00
Culvert:	0.91

Stream/Riparian Habitat

Channel Morphology: 90% riffle, 10% pool

Substrate Composition: 20% lg cobble, 60% sm cobble, 20% gravel.

Stream Cover: 20% lg cobble, 30% UC banks, 2% deep pool

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grass, moss, wildflowers

Barriers Present (Y/N): N
Location: N/A

Lakes Present (Y/N): Y
Location: DS

L/R Bank Characteristics

Fall

Bank Height (L/R; m):	0.40/0.30
Bank Stability:	High
Erosion Potential:	Low

Water Quality

Fall

Specific Conductance (µS/cm):	28.2
TDS (g/l):	0.18
DO (mg/l)	14.18
%DO:	N/M
Water Temp (°C):	3.4
Turb:	1.8

Fish Habitat

Fall

Spawning:	ARCH - N NNST - N
Feeding:	ARCH - H NNST - N
Migration:	ARCH - M NNST - N

**Baffinland Iron Mines
Mary River Project**



Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) from the habitat assessment upstream of CV-078 during fall 2008.

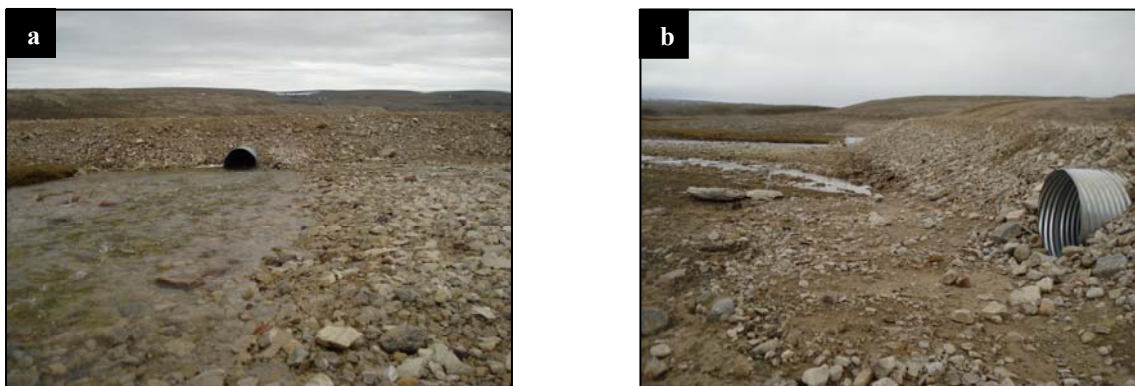


Figure 2. View of the culverts from the upstream end (a & b) upstream of CV-078 during fall 2008.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-078
Site: DS

UTM / Chainage: 17W 525852 7936787 / 51 + 171
Dates Surveyed: 3-Jul-09, 27-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 2-5°

Hydrology

	Spring	Fall
Bankfull Width (m):	31.99	31.99
Wetted Width (m):	22.85	17.37
Riffle Depths (m):	0.19, 0.09	0.07, 0.05
Pool Depth (m):	1.00-2.00	> 1.00
Right Culvert Depth (m):	0.50	0.53
Maximum Depth (m):	1.00-2.00	> 1.00
Point Velocities (m/s)		
Riffles:	0.96, 1.19	0.69, 0.76
Pool:	0.01	0.01
Right Culvert:	1.19	0.76

Stream/Riparian Habitat

Channel Morphology: 75% riffle, 25% pool
Substrate Composition: 40% sm. cobble, 40% lg. cobble, 10% gravel, 10% boulder
Stream Cover: 50% lg. cobble/ boulder, 15% deep pool
Aquatic Vegetation: Periphyton
Riparian Vegetation: Grasses, willows, moss
Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undef	Undef
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	140	285
pH:	8.50	8.56
Water Temp (°C):	7.8	7.3

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - H NNST - L	ARCH - H NNST - L
Migration:	ARCH - H NNST - N	ARCH - H NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-078 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (b) at the habitat assessment site downstream of the crossing at CV-078 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-078
Site: US

UTM / Chainage: 17W 525852 7936787 / 51 + 171
Dates Surveyed: 3-Jul-09, 27-Aug-09

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: 2-10°

Hydrology

Spring

Fall

Bankfull Width (m):	26.51	26.51
Wetted Width (m):	19.19	9.14
Riffle Depths (m):	0.21, 0.13	0.16, 0.14
Right Culvert Depth (m):	0.70	0.42
Maximum Depth (m):	0.75	0.45
Point Velocities (m/s)		
Riffles:	0.47, 1.38	0.41, 0.57
Right Culvert:	0.78	0.90

Stream/Riparian Habitat

Channel Morphology: 90% riffle, 10% pool
Substrate Composition: 45% sm. cobble, 45% lg. cobble, 5% gravel, 5% boulder
Stream Cover: 50% boulder/ lg. cobble
Aquatic Vegetation: Periphyton
Riparian Vegetation: Grasses, willows, moss
Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undef-0.25	Undef-0.25
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

Spring

Fall

Specific Conductance (µS/cm):	141	-
pH:	8.48	-
Water Temp (°C):	7.8	-

Fish Habitat

Spring

Fall

Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - H NNST - L	ARCH - H NNST - L
Migration:	ARCH - H NNST - L	ARCH - H NNST - L

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment

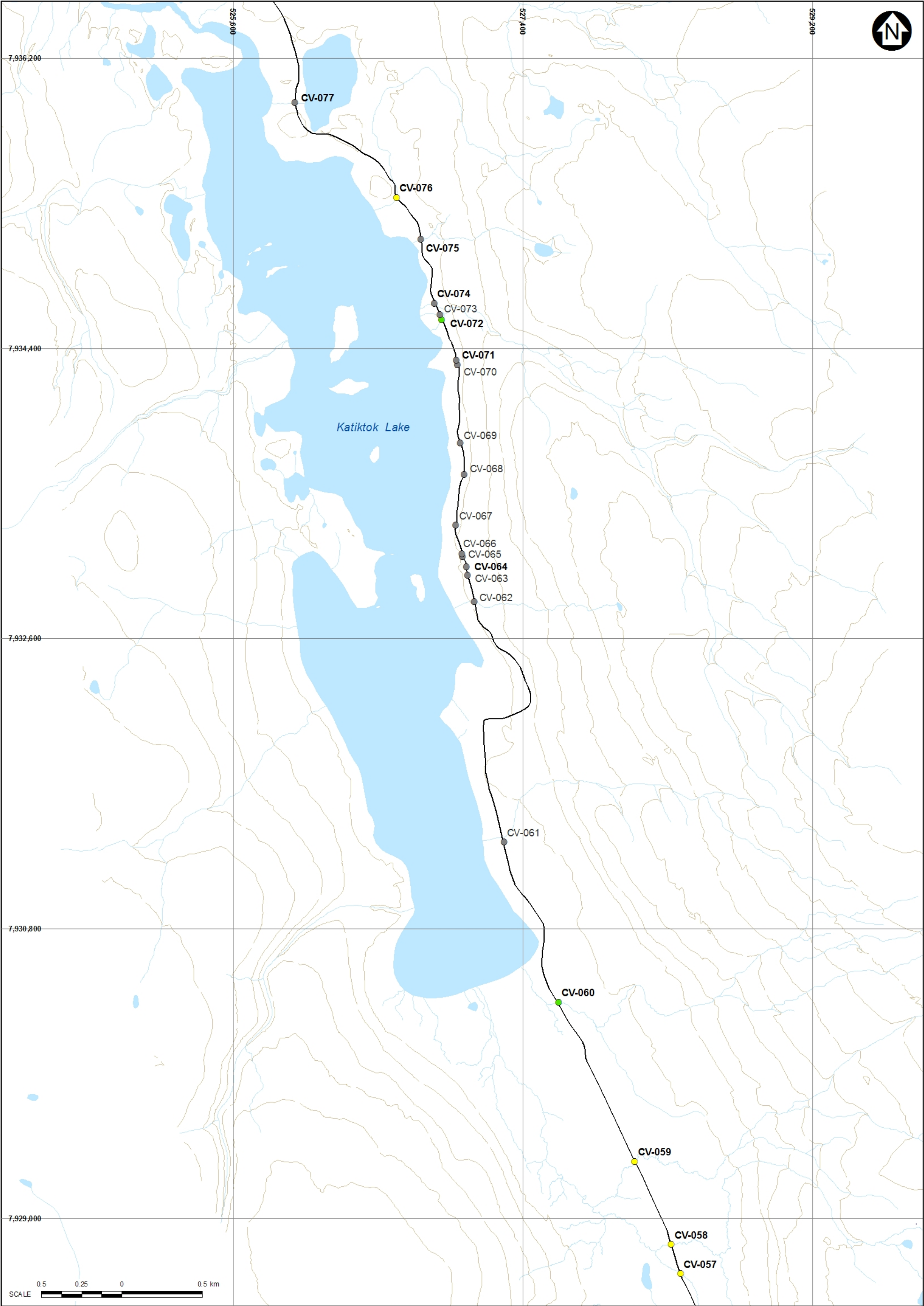


Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-078 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-078 during late August, 2009.

Path: \\terastation\GIS\Projects\Other\Mary River Freshwater\2010\Gent\Map\Report_Maps\ToteRD



LEGEND:			
●	IMPORTANT FISH HABITAT	—	CONTOUR
●	MARGINAL FISH HABITAT	■	WATER
●	NOT FISH BEARING HABITAT		
✱	FALLS		
✕	FISH BARRIER		
—	TOTE ROAD (EXISTING)		

REV	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
-	ISSUED FOR	-	-	-	-
01/09/2010					

NOTES:	
1.	BASE MAP: © HER MAJESTY THE QUEEN IN RIGHTS OF CANADA A 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 25 MAND IS IN METRES.

BAFFINLAND IRON MINES CORPORATION	
MARY RIVER PROJECT	
Milne Inlet Tote Road - 3g	
 North/South Consultants Inc. Aquatic Environment Specialists	P/A NO. -
	REF NO. -
DATE: 01/09/2010	
REV 1	

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-076
Site: DS

UTM / Chainage: 17W 526617 7935335 / 53 + 028
Dates Surveyed: 3-Jul-09, 27-Aug-09

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: N/M

Hydrology

	Spring	Fall
Bankfull Width (m):	20.0	20.0
Wetted Width (m):	6.2	6.4
Riffle Depth (m):	0.06	0.05
Pool Depth (m):	0.31	0.31
Culvert Depth (m):	0.24	0.24
Maximum Depth (m):	0.31	N/M

Point Velocities (m/s)

Riffle:	0.56	0.28
Pool:	0.0	0.00
Culvert:	0.09	0.07

Stream/Riparian Habitat

Channel Morphology: 60% pool, 40% riffle

Substrate Composition: 40% gravel, 40% sand, 20% sm. cobble

Stream Cover: 5% d. pool

Aquatic Vegetation: N/M

Riparian Vegetation: grass

Barriers Present (Y/N): N
Location: N/A

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undefined	Undefined
Bank Stability:	Moderate	Moderate
Erosion Potential:	Moderate	Moderate

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	184	290
pH:	8.54	8.41
Water Temp (°C):	10.1	9.3

Fish Habitat Use

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - M NNST - N	ARCH - M NNST - N
Migration:	ARCH - L NNST - N	ARCH - L NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – MARGINAL

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-076 during spring, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-076 during fall, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-076
Site: US

UTM / Chainage: 17W 526617 7935335 / 53 + 028
Dates Surveyed: 3-Jul-09, 27-Aug-09

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: N/M

Hydrology

	Spring	Fall
Bankfull Width (m):	2.5	2.5
Wetted Width (m):	1.9	1.9
Riffle Depth (m):	0.06	0.03
Pool Depth (m):	N/M	N/M
Culvert Depth (m):	0.16	0.15
Maximum Depth (m):	0.16	0.24
Point Velocities (m/s)		
Riffle:	0.46	0.56
Pool:	N/M	N/M
Culvert:	0.13	0.16

Stream/Riparian Habitat

Channel Morphology: 50% riffle, 50% pool

Substrate Composition: 70% gravel, 20% sm. cobble, 5% sand

Stream Cover: 5% d. pool

Aquatic Vegetation: N/M

Riparian Vegetation: grass

Barriers Present (Y/N): N
Location: N/A

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	0.10	N/M
Bank Stability:	Moderate	Moderate
Erosion Potential:	Moderate	Moderate

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	180	N/M
pH:	8.53	N/M
Water Temp (°C):	10.0	N/M

Fish Habitat Use

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - M NNST - N	ARCH - M NNST - N
Migration:	ARCH - L NNST - N	ARCH - L NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – MARGINAL

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-076 during spring, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-076 during fall, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-072
Site: DS

UTM / Chainage: 17W 526897 7934576 / 53 + 878
Dates Surveyed: 3-Jul-09, 27-Aug-09

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: 2-5°

Hydrology

	Spring	Fall
Bankfull Width (m):	22.85	22.85
Wetted Width (m):	15.54	2.8
Riffle Depths (m):	0.10, 0.26	-, 0.13
Pool Depth (m):	0.30	0.15
Culvert Depths (L, R) (m):	0.36, -	Dry, 0.35
Maximum Depth (m):	0.80	0.35
Point Velocities (m/s)		
Riffles:	0.39, 0.36	-, 0.43
Pool:	0.10	0.01
Culverts (L, R):	0.03, -	Dry, 0.20

Stream/Riparian Habitat

Channel Morphology: 90% riffle, 10% pool
Substrate Composition: 70% sm. cobble, 15% lg. cobble, 10% gravel, 5% sand
Stream Cover: 15% lg. cobble, 5% deep pool
Aquatic Vegetation: Periphyton
Riparian Vegetation: Grasses, willows, moss
Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undef	Undef
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	110	249
pH:	8.44	8.49
Water Temp (°C):	4.2	5.4

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - L	ARCH - N NNST - N
Feeding:	ARCH - M NNST - L	ARCH - M NNST - L
Migration:	ARCH - M NNST - L	ARCH - M NNST - L

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-072 during early July, 2009.

Figure 2. No photos taken of the crossing at CV-072 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-072
Site: US

UTM / Chainage: 17W 526897 7934576 / 53 + 878
Dates Surveyed: 3-Jul-09, 27-Aug-09

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: 2-10°

Hydrology

	Spring	Fall
Bankfull Width (m):	18.28	18.28
Wetted Width (m):	12.80	4.10
Riffle Depth (m):	0.08	0.08
Pool Depth (m):	0.13	0.11
Culvert Depths (L, R) (m):	0.10, -	Dry, 0.17
Maximum Depth (m):	0.20	0.17
Point Velocities (m/s)		
Riffle:	0.75	0.70
Pool:	0.04	0.01
Culverts (L, R):	0.38, -	Dry, 0.70

Stream/Riparian Habitat

Channel Morphology: 80% riffle, 10% pool, 10% cascade

Substrate Composition: 75% sm. cobble, 20% lg. cobble, 5% gravel

Stream Cover: 20% lg. cobble

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grasses, willows, moss

Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undef	Undef
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	111	-
pH:	8.45	-
Water Temp (°C):	4.2	-

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - L	ARCH - N NNST - N
Feeding:	ARCH - M NNST - L	ARCH - M NNST - L
Migration:	ARCH - M NNST - L	ARCH - M NNST - L

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-072 during early July, 2009.

Figure 2. No photos taken of the crossing at CV-072 during late August, 2009.

Bulk Sample Road Watercourse Crossing Assessment



Figure 1: Downstream view from proposed crossing showing abundant pool habitat and vegetation.



Figure 2: Upstream view from proposed crossing showing more pool habitat.



Figure 3: View across CV-60.

Baffinland Iron Mines
Mary River Project
Watercourse Crossing Assessment

Location

Site: CV-60
UTM: 17W 0527621 / 7930342

Watercourse Name: Unknown River

Site Description

Watershed Size: 5.257 km²
Regulated: No
Channelized: No
Bankfull Width: 12.0 m
Wetted Width: 3.6 m
Riffle-Crest Depth: 0.12 m
Pool Depth: 0.62 m
Residual Pool Depth: 0.50 m
Bankfull Depth: 0.62 m
Bank Height: N/A
D₉₅: N/A
D: <0.001 m
Confinement: Unconfined
Channel Morphology: Riffle-Pool
Channel Gradient: 0⁰
Turbidity: 0.00 FTU
Side Slope: R – 5%; L – 5%
Approach: R – 95%; L – 95%
Bank Stability: Low-Moderate
Erosion Potential: Low-Moderate
Undercut Banks: Some

Mesohabitat Composition: Pool – 90%; Riffle – 10%
Substrate Composition: Sand – 90%; Gravel – 10%
Stream Cover: Undercut – 5%; In- and Overstream Vegetation – 20%
Riparian Vegetation: Moss, grasses, willows
Aquatic Vegetation: None
Unique Features: None
Summary: This is a medium-sized, low-velocity waterbody with predominantly sand substrate. The banks have moderate erosion potential and there is relatively abundant vegetative cover.

Potential Fish Utilization

Arctic Char

Spawning: Unlikely
Migration: Unlikely
Rearing: Yes
Overwintering: None

Ninespine Stickleback

Spawning: Possible
Migration: Possible
Rearing: Possible
Overwintering: None

Fish Habitat Quality

Important

Comments

This waterbody has abundant pool habitat for juvenile char. Many small char were observed or captured during fisheries studies. There is likely little to no use by adult char. Though not captured ninespine stickleback may also use this creek as both a feeding and refuge area.



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Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-060
Site: DS

UTM / Chainage: 17W 527622 7930342 / 58 + 856
Dates Surveyed: 3-Jul-09, 27-Aug-09

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: 1°

Hydrology

	Spring	Fall
Bankfull Width (m):	8.50	8.50
Wetted Width (m):	8.50	7.40
Riffle Depth (m):	0.04	0.03
Pool Depth (m):	0.75	0.68
Left Culvert Depth (m):	0.11	0.11
Maximum Depth (m):	0.75	0.70
Point Velocities (m/s)		
Riffle:	0.66	0.22
Pool:	0.00	0.00
Left Culvert:	0.54	0.48

Stream/Riparian Habitat

Channel Morphology: 70% pool, 30% riffle
Substrate Composition: 60% silt/sand, 30% gravel, 10% sm. cobble
Stream Cover: 35% deep pool
Aquatic Vegetation: Periphyton
Riparian Vegetation: Grasses, willows
Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undef	Undef
Bank Stability:	Low	Low
Erosion Potential:	High	High

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	171	266
pH:	8.47	8.36
Water Temp (°C):	9.9	9.7

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - H NNST - L	ARCH - H NNST - L
Migration:	ARCH - H NNST - N	ARCH - H NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-060 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (b) at the habitat assessment site downstream of the crossing at CV-060 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-060
Site: US

UTM / Chainage: 17W 527622 7930342 / 58 + 856
Dates Surveyed: 3-Jul-09, 27-Aug-09

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: 1°

Hydrology

	Spring	Fall
Bankfull Width (m):	6.00	6.00
Wetted Width (m):	6.00	5.70
Pool Depth (m):	0.63	0.62
Left Culvert Depth (m):	0.14	0.14
Maximum Depth (m):	0.70	0.62
Point Velocities (m/s)		
Pool:	0.00	0.06
Left Culvert:	0.46	0.56

Stream/Riparian Habitat

Channel Morphology: 90% pool, 10% riffle

Substrate Composition: 60% sm. cobble, 15% gravel, 15% sand/silt, 10% lg. cobble

Stream Cover: 75% deep pool, 10% lg. cobble,

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grasses, willows

Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undef	Undef
Bank Stability:	Low	Low
Erosion Potential:	High	High

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	175	-
pH:	8.48	-
Water Temp (°C):	10.0	-

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - L	ARCH - N NNST - N
Feeding:	ARCH - H NNST - L	ARCH - H NNST - L
Migration:	ARCH - H NNST - L	ARCH - H NNST - L

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-060 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-060 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-059
Site: DS

UTM / Chainage: 17W 528102 7929356 / 59 + 960
Dates Surveyed: 3-Jul-09, 27-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: N/M

Hydrology

	Spring	Fall
Bankfull Width (m):	4.1	4.1
Wetted Width (m):	4.1	4.1
Riffle Depth (m):	0.05-0.07	0.03-0.06
Pool Depth (m):	0.25	0.22
Culvert Depth (m):	0.14	0.11
Maximum Depth (m):	0.25	N/M
Point Velocities (m/s)		
Riffle:	0.66-0.94	0.31-0.66
Pool:	0.00	0.0
Culvert:	0.57	0.38

Stream/Riparian Habitat

Channel Morphology: 50% riffle, 50% pool
Substrate Composition: 40% sand, 30% gravel, 25% sm. cobble, 5% l. cobble
Stream Cover: 25% d. pool, 5% cobble
Aquatic Vegetation: N/M
Riparian Vegetation: grass
Barriers Present (Y/N): N
Location: N/A

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undefined	Undefined
Bank Stability:	Low	Low
Erosion Potential:	Moderate	Moderate

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	142	275
pH:	8.43	8.42
Water Temp (°C):	8.4	7.6

Fish Habitat Use

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - M NNST - N	ARCH - H NNST - N
Migration:	ARCH - L NNST - N	ARCH - L NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – MARGINAL

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-059 during spring, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-059 during fall, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-059
Site: US

UTM / Chainage: 17W 528102 7929356 / 59 + 960
Dates Surveyed: 3-Jul-09, 27-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: N/M

Hydrology

	Spring	Fall
Bankfull Width (m):	5.5	5.5
Wetted Width (m):	5.5	5.5
Pool Depth (m):	0.35	0.3
Culvert Depth (m):	0.35	0.49
Maximum Depth (m):	0.35	0.24
Point Velocities (m/s)		
Pool:	0.00	0.00
Culvert:	0.02	0.04

Stream/Riparian Habitat

Channel Morphology: 100% pool
Substrate Composition: 85% sand/silt, 10% gravel, 5% sm. cobble
Stream Cover: 50% d. pool
Aquatic Vegetation: N/M
Riparian Vegetation: grass
Barriers Present (Y/N): N
Location: N/A

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undef	Undef
Bank Stability:	Low	Low
Erosion Potential:	High	High

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	142	N/M
pH:	8.45	N/M
Water Temp (°C):	8.4	N/M

Fish Habitat Use

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - M NNST - N	ARCH - H NNST - N
Migration:	ARCH - L NNST - N	ARCH - L NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – MARGINAL

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-059 during spring, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-059 during fall, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-058
Site: DS

UTM / Chainage: 17W 528322 7928839 / 60 + 523
Dates Surveyed: 4-Jul-09, 27-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: N/M

Hydrology

Spring

Fall

Bankfull Width (m): 4.8 4.8

Wetted Width (m): 1.8 2.0

Riffle Depth (m): 0.11 0.08

Pool Depth (m): 0.31 0.46

Culvert Depth (m): 0.16 0.14

Maximum Depth (m): 0.31 N/M

Point Velocities (m/s)

Riffle: 0.59 0.52

Pool: 0.04 0.1

Culvert: 0.19 0.10

Stream/Riparian Habitat

Channel Morphology: 50% riffle, 50% pool

Substrate Composition: 90% sand, 10% gravel

Stream Cover: 10% d. pool

Aquatic Vegetation: N/M

Riparian Vegetation: grass

Barriers Present (Y/N): N
Location: N/A

L/R Bank Characteristics

Spring

Fall

Bank Height (m): N/A N/M

Bank Stability: Low Low

Erosion Potential: High High

Water Quality

Spring

Fall

Specific Conductance (µS/cm): 167 250

pH: 8.34 8.42

Water Temp (°C): 4.0 8.0

Fish Habitat Use

Spring

Fall

Spawning: ARCH - N
NNST - N ARCH - N
NNST - N

Feeding: ARCH - M
NNST - N ARCH - H
NNST - N

Migration: ARCH - L
NNST - N ARCH - L
NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – MARGINAL

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-058 during spring, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-058 during spring, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-058
Site: US

UTM / Chainage: 17W 528322 7928839 / 60 + 523
Dates Surveyed: 4-Jul-09, 27-Aug-09

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: N/M

Hydrology

	Spring	Fall
Bankfull Width (m):	12.50	12.50
Wetted Width (m):	6.5	2.70
Riffle Depth (m):	0.14	0.08
Pool Depth (m):	0.81	0.46
Culvert Depth (m):	0.32	0.30
Maximum Depth (m):	0.81	N/M
Point Velocities (m/s)		
Riffle:	0.45	1.18
Pool:	0.00	0.00
Culvert:	0.40	0.33

Stream/Riparian Habitat

Channel Morphology: 90% pool, 10% riffle
Substrate Composition: 90% sand, 5% gravel, 5% sm. cobble
Stream Cover: 50% d. pool
Aquatic Vegetation: N/M
Riparian Vegetation: grass
Barriers Present (Y/N): N
Location: N/A

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	N/A	N/M
Bank Stability:	Low	Low
Erosion Potential:	High	High

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	166	N/M
pH:	8.31	N/M
Water Temp (°C):	4.0	N/M

Fish Habitat Use

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - M NNST - N	ARCH - H NNST - N
Migration:	ARCH - L NNST - N	ARCH - L NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – MARGINAL

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-058 during spring, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-058 during fall, 2009.

Bulk Sample Road Watercourse Crossing Assessment



Figure 1: Downstream view from proposed crossing showing pool habitat with vegetation.



Figure 2: Upstream view from proposed crossing showing more pool habitat.



Figure 3: View across CV-57.

Baffinland Iron Mines
Mary River Project
Watercourse Crossing Assessment

Location

Site: CV-57
UTM: 17W 0528378 / 7928656

Watercourse Name: Unknown River

Site Description

Watershed Size: 0.563 km²
Regulated: No
Channelized: No
Bankfull Width: 8.0 m
Wetted Width: 1.0 m
Riffle-Crest Depth: N/A
Pool Depth: 0.60 m
Residual Pool Depth: N/A
Bankfull Depth: 0.60 m
Bank Height: N/A
D₉₅: N/A
D: <0.001 m
Confinement: Unconfined
Channel Morphology: Pool
Channel Gradient: 0⁰
Turbidity: 0.00 FTU
Side Slope: R – 5%; L – 5%
Approach: R – 95%; L – 95%
Bank Stability: Low-Moderate
Erosion Potential: Low-Moderate
Undercut Banks: Some

Mesohabitat Composition: Pool – 100%
Substrate Composition: Sand – 95%; Gravel – 5%
Stream Cover: Undercut – 5%; In- and Overstream Vegetation – 20%
Riparian Vegetation: Moss, grasses, Arctic cotton
Aquatic Vegetation: None
Unique Features: None
Summary: This is a small-sized waterbody composed almost entirely of pool habitat with sand substrate. The banks have moderate erosion potential and there is relatively abundant vegetative cover.

Potential Fish Utilization

Arctic Char

Spawning: Unlikely
Migration: Unlikely
Rearing: Yes
Overwintering: None

Ninespine Stickleback

Spawning: Possible
Migration: Possible
Rearing: Possible
Overwintering: None

Fish Habitat Quality

Important

Comments

This waterbody has abundant pool habitat for juvenile char. Several small char were observed or captured during fisheries studies. There is likely little to no use by adult char. Though not captured ninespine stickleback may also use this creek as both a feeding and refuge area.



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AQUATIC ENVIRONMENT SPECIALISTS

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-057
Site: DS

UTM / Chainage: 17W 528379 7928657 / 60 + 712
Dates Surveyed: 4-Jul-09, 27-Aug-09

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: N/M

Hydrology

Spring

Fall

Bankfull Width (m): 5.5 5.5

Wetted Width (m): 5.5 4.0

Riffle Depth (m): 0.02 0.02

Pool Depth (m): 0.36 0.35

Culvert Depth (m): 0.33 0.28

Maximum Depth (m): 0.38 N/M

Point Velocities (m/s)

Riffle: 0.28 0.36

Pool: 0.00 0.1

Culvert: 0.00 0.0

Stream/Riparian Habitat

Channel Morphology: 70% pool, 30% riffle

Substrate Composition: 50% sand, 40% gravel, 10% sm. cobble

Stream Cover: 10% d. pool

Aquatic Vegetation: N/M

Riparian Vegetation: grass

Barriers Present (Y/N): N
Location: N/A

L/R Bank Characteristics

Spring

Fall

Bank Height (m): N/A N/M

Bank Stability: Moderate Moderate

Erosion Potential: Moderate Moderate

Water Quality

Spring

Fall

Specific Conductance (µS/cm): 197 278

pH: 8.34 8.31

Water Temp (°C): 7.0 8.5

Fish Habitat Use

Spring

Fall

Spawning: ARCH - N
NNST - N ARCH - N
NNST - N

Feeding: ARCH - M
NNST - N ARCH - M
NNST - N

Migration: ARCH - N
NNST - N ARCH - N
NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – MARGINAL

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-057 during spring, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-057 during fall, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-057
Site: US

UTM / Chainage: 17W 528379 7928657 / 60 + 712
Dates Surveyed: 4-Jul-09, 27-Aug-09

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: N/M

Hydrology

	Spring	Fall
Bankfull Width (m):	12.8	12.8
Wetted Width (m):	12.8	11.8
Pool Depth (m):	0.15	0.15
Culvert Depth (m):	0.05	0.40
Maximum Depth (m):	0.6	0.24
Point Velocities (m/s)		
Pool:	0.01	N/M
Culvert:	0.69	0.00

Stream/Riparian Habitat

Channel Morphology: 100% pool
Substrate Composition: 90% sand/silt, 5% gravel, 5% sm. cobble
Stream Cover: 50% d. pool, 20% sub. veg.
Aquatic Vegetation: N/M
Riparian Vegetation: grass
Barriers Present (Y/N): N
Location: N/A

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	N/A	N/M
Bank Stability:	Moderate	N/M
Erosion Potential:	Moderate	N/M

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	195	N/M
pH:	8.34	N/M
Water Temp (°C):	7.0	N/M

Fish Habitat Use

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - M NNST - N	ARCH - M NNST - N
Migration:	ARCH - N NNST - N	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – MARGINAL

Tote Road Aquatic Habitat Assessment

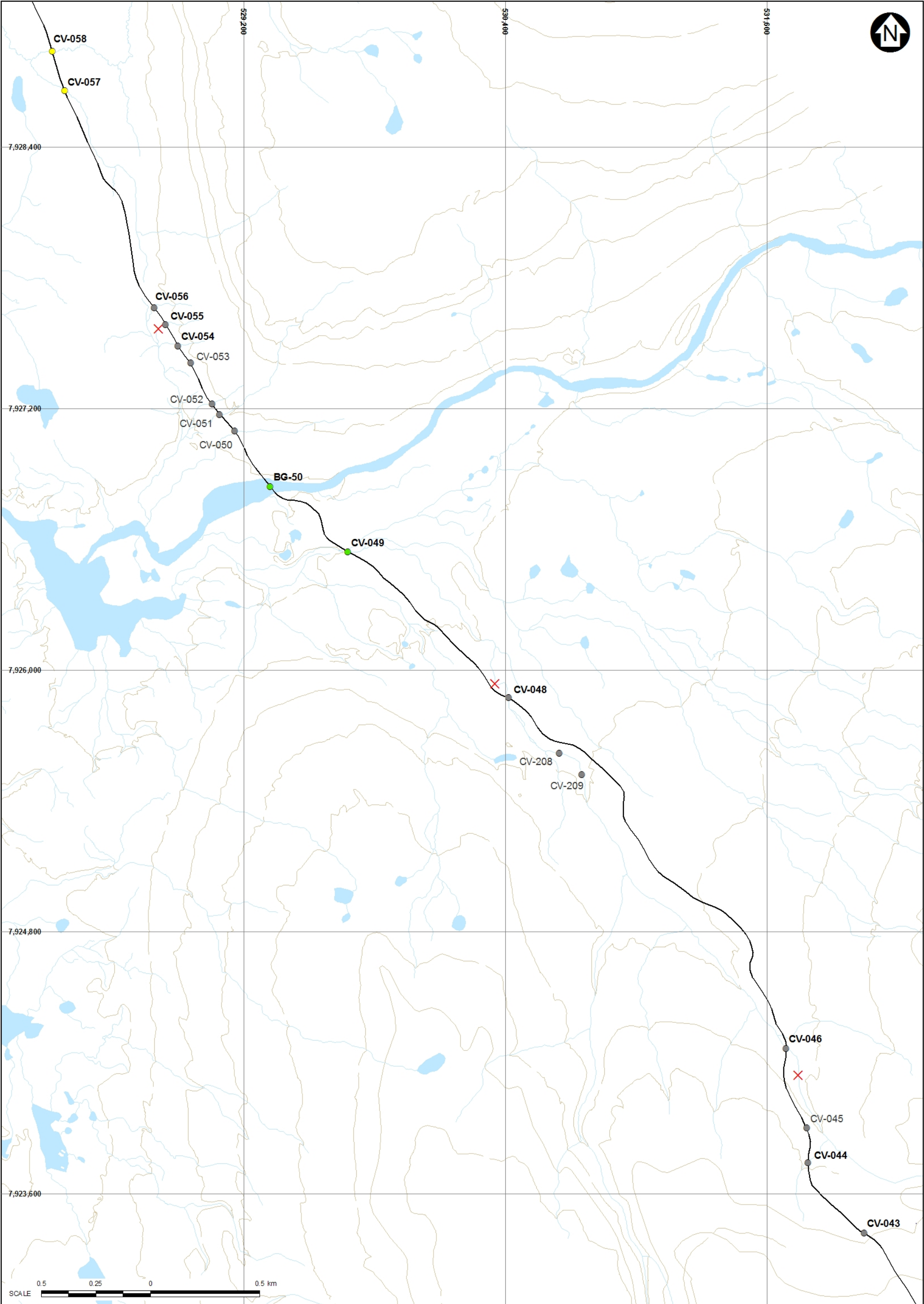


Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-057 during spring, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-057 during fall, 2009.

Path: \\terastation\GIS\Projects\Other\Mary_River_Freshwater\2010\Genrtd_Data\Report_Map\ToteRD



LEGEND:

IMPORTANT FISH HABITAT
 MARGINAL FISH HABITAT
 NOT FISH BEARING HABITAT

FALLS
 FISH BARRIER

TOTE ROAD (EXISTING)

CONTOUR
 WATER

-	DDMM/M10	ISSUED FOR	-	-	-	-
REV	01/09/2010	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D

NOTES:	
1.	BASE MAP: © HER MAJESTY THE QUEEN IN RIGHTS OF CANADA A 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 25 MAND IS IN METRES.

BAFFINLAND IRON MINES CORPORATION		
MARY RIVER PROJECT		
Milne Inlet Tote Road - 3h		
	P/A NO.	REF NO.
	-	-
DATE: 01/09/2010		REV
		1

Bulk Sample Road Watercourse Crossing Assessment




Figure 1: Downstream view from proposed crossing showing riffle habitat with steep drop where the field crew is standing.



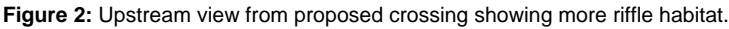
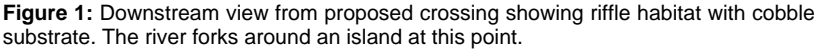
Figure 2: Upstream view from proposed crossing showing more cascade-riffle habitat.






Figure 3: View across CV-55.

Location								
Site:		CV-55		Watercourse Name:	Unknown River			
UTM:		17W 0528842 / 7927584						
Site Description				Potential Fish Utilization				
<div><div>Watershed Size:</div><div>Regulated:</div><div>Channelized:</div><div>Bankfull Width:</div><div>Wetted Width:</div><div>Riffle-Crest Depth:</div><div>Pool Depth:</div><div>Residual Pool Depth:</div><div>Bankfull Depth:</div><div>Bank Height:</div><div>D₉₅:</div><div>D:</div><div>Confinement:</div><div>Channel Morphology:</div><div>Channel Gradient:</div><div>Turbidity:</div><div>Side Slope</div><div>Approach:</div><div>Bank Stability:</div><div>Erosion Potential:</div><div>Undercut Banks:</div></div>	<div><div>0.036 km²</div><div>No</div><div>No</div><div>3.2 m</div><div>1.1 m</div><div>0.01 m</div><div>N/A</div><div>N/A</div><div>N/A</div><div>N/A</div><div>0.32 m</div><div>0.01 m</div><div>Unconfined</div><div>Cascade-Riffle</div><div>7⁰</div><div>0.00 FTU</div><div>R – 7%; L – 7%</div><div>R – 93%; L – 93%</div><div>Moderate</div><div>Moderate</div><div>None</div></div>	Mesohabitat Composition:		Riffle – 50%; Cascade – 50%				
		Substrate Composition:		Sand – 60%; Cobble – 20%; Gravel – 10%; Boulders – 10%				
		Stream Cover:		Boulders – 10%; In- and Overstream Vegetation – 40%				
		Riparian Vegetation:		Moss, grasses, willows				
		Aquatic Vegetation:		None				
		Unique Features:		None				
		Summary:		This is an extra small-sized waterbody consisting of riffles and cascades with sand and cobble substrate. The banks have moderate erosion potential and there is relatively abundant cover.				
		Fish Habitat Quality				Arctic Char		
		None				Spawning:		None
						Migration:		None
						Rearing:		None
						Overwintering:		None
						Ninespine Stickleback		
		None				Spawning:		None
Migration:						None		
Rearing:						None		
Overwintering:						None		
Comments								
None				Although habitat at the proposed crossing may be marginally suitable for juvenile char, there is a steep drop downstream. This site is, therefore, likely inaccessible from further downstream. In addition, there are no suitable overwintering locations upstream.				
				<div><div></div><div><div>NORTH/SOUTH CONSULTANTS INC.</div><div>AQUATIC ENVIRONMENT SPECIALISTS</div></div></div>				

Bulk Sample Road Watercourse Crossing Assessment



	Location					
	Site: BG-50 UTM: 17W 0529334 / 7926845		Watercourse Name: Unknown River			
	Site Description Watershed Size: 180.263 km ² Regulated: No Channelized: No Bankfull Width: 77.0 m Wetted Width: 61.0 m Riffle-Crest Depth: 0.20 m Pool Depth: N/A Residual Pool Depth: N/A Bankfull Depth: 0.70 m Bank Height: 0.50 m D₉₅: 1.56 m D: 0.02 m Confinement: Unconfined Channel Morphology: Riffle Channel Gradient: 1 ⁰ Turbidity: 0.00 FTU Side Slope R – 5%; L – 5% Approach: R – 95%; L – 95% Bank Stability: High Erosion Potential: Low Undercut Banks: None		Mesohabitat Composition: Riffle – 100% Substrate Composition: Cobble – 80%; Boulders – 20% Stream Cover: Boulders – 20%; In- and Overstream Vegetation – 40% Riparian Vegetation: Moss, grasses, willows Aquatic Vegetation: None Unique Features: None Summary: This is an extra large-sized waterbody consisting of riffles and primarily cobble substrate. The banks have low erosion potential and there is relatively abundant rocky cover.		Potential Fish Utilization	
					Arctic Char	
					Spawning:	Possible
					Migration:	Possible
					Rearing:	Yes
					Overwintering:	None
					Ninespine Stickleback	
					Spawning:	Possible but Unlikely
					Migration:	Possible but Unlikely
					Rearing:	Possible but Unlikely
	Overwintering:	None				
	Fish Habitat Quality		Comments			
Important		The river forks around an island at the crossing. Although aquatic habitat is abundant at the proposed crossing, water velocities may be too consistently high for significant use by juvenile char. Only a single young char was captured during fisheries studies. However, since this crossing is a relatively short distance upstream of a lake, summer foraging by adults may also occur. This habitat is likely unsuitable for stickleback.				
Baffinland Iron Mines Mary River Project Watercourse Crossing Assessment		 NORTH/SOUTH CONSULTANTS INC. AQUATIC ENVIRONMENT SPECIALISTS				

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: BG-50
Site: DS

UTM: 17W 529321 7926807
Dates Surveyed: 24-Jun-08, 23-Jul-08

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: 1°

Hydrology (culvert channel only)

	Spr	Sum
Bankfull Width (m):	9.50	9.50
Wetted Width (m):	9.50	9.20
Riffle-Crest Depth (m):	0.26	0.12
Pool Depth (m):	NA	0.22-0.50
D₉₅ (m):	0.51	0.51
Point Velocities (m/s)		
Riffle:	1.42	0.81
Pool:	NA	0.11
Culvert:	2.79	1.40

Stream/Riparian Habitat

Channel Morphology: 100% riffle (spring);
80% riffle, 20% pool (summer)

Substrate Composition: 80% cobble,
10% boulder,
10% gravel

Stream Cover: 20% lg cobble, 10% boulders

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grasses and moss

Barriers Present (Y/N): Y
Location: Partial culvert barrier

L/R Bank Characteristics

	Spr	Sum
Bank Height (L/R; m):	0.50/0.20	0.50/0.20
Bank Stability:	High	High
Erosion Potential:	Low	Low

Water Quality

	Spr	Sum
Specific Conductance (µS/cm):	119.0	17.5
TDS (g/l):	0.08	0.11
DO (mg/l)	13.82	11.62
%DO:	102.7	NM
Water Temp (°C):	3.0	7.8

Fish Habitat

	Spr	Sum
Spawning:	ARCH - N NNST - L	ARCH - N NNST - M
Feeding:	ARCH - H NNST - L	ARCH - H NNST - H
Migration:	ARCH - H NNST - L	ARCH - M NNST - N

**Baffinland Iron Mines
Mary River Project**



Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) from the habitat assessment downstream of BG-50 during spring 2008.



Figure 2. View upstream (a), downstream (b), and across (c) from the habitat assessment downstream of BG-50 during summer 2008.

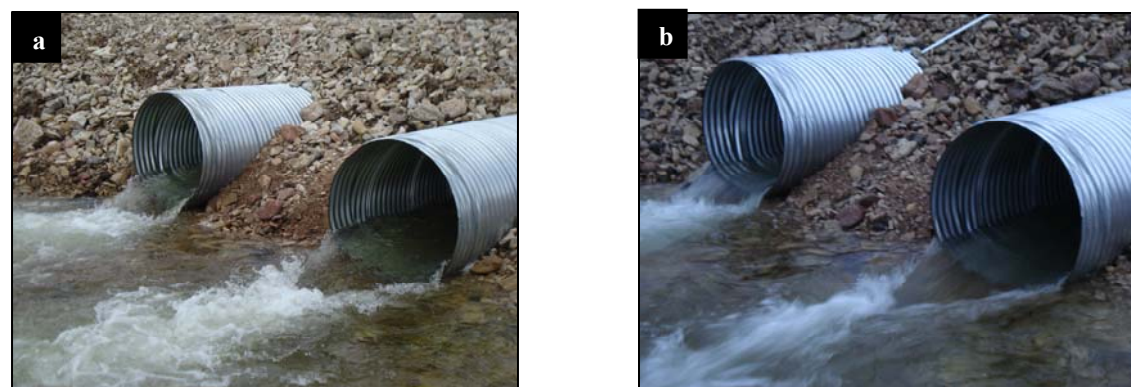


Figure 3. View from the downstream end of the culvert at crossing BG-50 during spring (a) and summer (b) 2008.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: BG-50
Site: US

UTM: 17W 529366 7926822
Dates Surveyed: 24-Jun-08, 23-Jul-08

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 1°

Hydrology

	Spr	Sum
Bankfull Width (m):	60.35	60.35
Wetted Width (m):	46.63	53.04
Riffle-Crest Depth (m):	0.25	0.28
Pool Depth (m):	NA	NA
D₉₅ (m):	0.83	0.83

Point Velocities (m/s)

Riffle:	1.31	0.67
Pool:	NA	NA
Behind a rock:	NM	0.06

Stream/Riparian Habitat

Channel Morphology: 100% riffle
Substrate Composition: 75% cobble, 20% gravel, 5% boulder
Stream Cover: 40% lg cobble, 5% boulder
Aquatic Vegetation: Periphyton
Riparian Vegetation: Grasses, willows, moss
Barriers Present (Y/N): Y
Location: Partial culvert barrier

L/R Bank Characteristics

	Spr	Sum
Bank Height (L/R; m):	0.40/0.40	0.35/0.35
Bank Stability:	High	High
Erosion Potential:	Low	Low

Water Quality

	Spr	Sum
Specific Conductance (µS/cm):	119.0	17.6
TDS (g/l):	0.08	0.11
DO (mg/l)	14.68	11.65
%DO:	109.1	NA
Water Temp (°C):	3.0	7.9

Fish Habitat

	Spr	Sum
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - M NNST - M	ARCH - H NNST - M
Migration:	ARCH - N NNST - N	ARCH - M NNST - L

**Baffinland Iron Mines
Mary River Project**



Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a) and downstream (b) from the habitat assessment upstream of BG-50 during spring 2008.

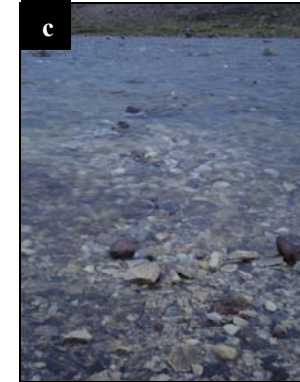


Figure 2. View upstream (a), downstream (b), and across (c) from the habitat assessment upstream of BG-50 during summer 2008.



Figure 3. View from the upstream end of the culverts at crossing BG-50 during spring (a) and summer (b) 2008.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: BG-50
Site: DS

UTM / Chainage: 17W 529334 7926846 / 62 + 804
Dates Surveyed: 4-Jul-09, 28-Aug-09

Site Description/Physical Characteristics

Confinement: Unconfined-Partial

Channel Gradient: 2-5°

Hydrology

Spring

Fall

Bankfull Width (m): 62.15 62.15

Wetted Width (m): 57.58 44.79

Riffle Depths (m): 0.10, 0.11, 0.18 0.10, 0.10, 0.14

Pool Depths (m): 1.20, 0.27 0.80, 0.10

Sea Can Depths (from right #'s 4, 5, 7) (m): -, -, - 0.20, 0.40, 0.30

Culvert Depths (L, R) (m): 0.33, - 0.19, 0.28

Maximum Depth (m): > 1.00 > 1.00

Point Velocities (m/s)

Riffles: 0.86, 0.81, 1.02 1.09, 0.75, 0.88

Pools: 0.01, 0.05 0.01, 0.00

Sea Cans (4, 5, 7): -, -, - 0.35, 0.75, 1.01

Culverts (L, R): 1.82, - 1.83, 2.14

Stream/Riparian Habitat

Channel Morphology: 90% riffle, 10% pool

Substrate Composition: 80% lg. cobble, 15% sm. cobble, 5% boulder

Stream Cover: 85% lg. cobble/ boulder, 1% deep. pool

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grasses, willows, moss

Barriers Present (Y/N): Y - partial
Location: Culverts are slightly perched, but sea cans are passable

L/R Bank Characteristics

Spring

Fall

Bank Height (m): 0.20-0.40 0.20-0.40

Bank Stability: High High

Erosion Potential: Low Low

Water Quality

Spring

Fall

Specific Conductance (µS/cm): 118 175

pH: 8.49 8.12

Water Temp (°C): 4.0 5.0

Fish Habitat

Spring

Fall

Spawning: ARCH - N
NNST - L ARCH - N
NNST - N

Feeding: ARCH - H
NNST - L ARCH - H
NNST - L

Migration: ARCH - H
NNST - L ARCH - H
NNST - L

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the sea can crossing at BG-50 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (b) at the habitat assessment site downstream of the sea can crossing at BG-50 during late August, 2009.

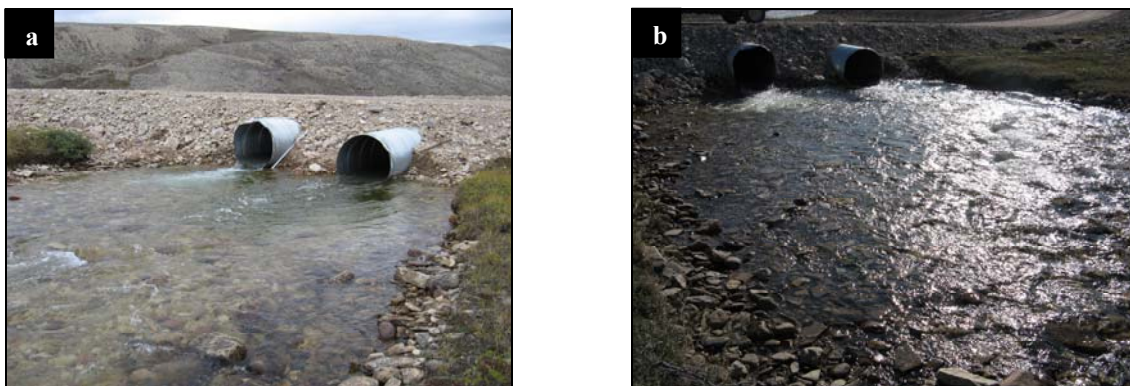


Figure 3. View upstream in early July (a) and late August (b) at the habitat assessment site downstream of the culvert crossing at BG-50.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: BG-50
Site: US

UTM / Chainage: 17W 529334 7926846 / 62 + 804
Dates Surveyed: 4-Jul-09, 28-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 2-5°

Hydrology

	Spring	Fall
Bankfull Width (m):	52.10	52.10
Wetted Width (m):	50.27	45.70
Riffle Depths (m):	0.24, 0.20	0.14, 0.17
Pool Depth (m):	0.21	-
Sea Can Depths (from right #'s 4, 5, 7) (m):	-, -, -	0.42, 0.47, 0.42
Culvert Depths (L, R) (m):	0.40, -	0.35, 0.46
Maximum Depth (m):	0.50	0.47

Point Velocities (m/s)

Riffles:	0.84, 0.65	0.98, 0.72
Pool:	0.02	0.00
Sea Cans (4, 5, 7):	-, -, -	0.25, 1.38, 1.26
Culverts (L, R):	0.71, -	0.63, 0.95

Stream/Riparian Habitat

Channel Morphology: 90% riffle, 10% pool

Substrate Composition: 80% lg. cobble, 15% sm. cobble, 5% boulder

Stream Cover: 85% lg. cobble/ boulder, 1% deep pool

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grasses, willows, moss

Barriers Present (Y/N): Y - partial
Location: Culverts are slightly perched, but sea cans are passable

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	0.00-0.35	0.00-0.35
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	120	-
pH:	8.48	-
Water Temp (°C):	4.0	-

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - L	ARCH - N NNST - N
Feeding:	ARCH - H NNST - L	ARCH - H NNST - L
Migration:	ARCH - H NNST - L	ARCH - H NNST - L

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT




Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at BG-50 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at BG-50 during late August, 2009.

Bulk Sample Road Watercourse Crossing Assessment						
 Figure 1: Downstream view from proposed crossing showing riffle habitat with cobble substrate.	Location					
	Site: CV-49		Watercourse Name: Unknown River			
	UTM: 17W 0529676 / 7926541					
	Site Description			Potential Fish Utilization		
				Arctic Char		
	Watershed Size: 11.984 km ²			Spawning: Unlikely		
	Regulated: No			Migration: Possible		
	Channelized: No			Rearing: Possible		
	Bankfull Width: 14.0 m			Overwintering: None		
	Wetted Width: 12.0 m					
 Figure 2: Upstream view from proposed crossing showing more riffle habitat.	Riffle-Crest Depth: 0.10 m			Ninespine Stickleback		
	Pool Depth: N/A			Spawning: Unlikely		
	Residual Pool Depth: N/A			Migration: Unlikely		
	Bankfull Depth: 0.70 m			Rearing: Unlikely		
	Bank Height: 0.60 m			Overwintering: None		
	D ₉₅ : 1.24 m					
	D: 0.004 m					
	Confinement: Partially Confined					
	Channel Morphology: Riffle					
	Channel Gradient: 1 ⁰					
Turbidity: 0.00 FTU			Fish Habitat Quality			
Side Slope R – 7%; L – 7%			Important			
Approach: R – 93%; L – 93%						
Bank Stability: Moderate						
Erosion Potential: Low-Moderate						
Undercut Banks: None						
			Comments			
			Although habitat at the proposed crossing appears to be potentially suitable for several life cycle stages of char, none were captured or observed during fisheries investigations. Use by juveniles may be limited due to a lack of low velocity areas while adults may potentially only use the site for spawning in the fall and maybe some early spring feeding activity. However, this river is still potentially important for char. Stickleback use is also restricted by velocity.			
Baffinland Iron Mines Mary River Project Watercourse Crossing Assessment			 NORTH/SOUTH CONSULTANTS INC. AQUATIC ENVIRONMENT SPECIALISTS			

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-049
Site: DS

UTM / Chainage: 17W 529677 7926542 / 63 + 302
Dates Surveyed: 4-Jul-09, 28-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 2-5°

Hydrology

	Spring	Fall
Bankfull Width (m):	21.94	21.94
Wetted Width (m):	12.80	12.80
Riffle Depths (m):	0.12, 0.07	0.10, 0.08
Pool Depth (m):	0.08	0.68
Culvert Depths (L, R) (m):	0.47, -	0.43, 0.15
Maximum Depth (m):	0.70	0.68
Point Velocities (m/s)		
Riffles:	0.42, 0.75	0.86, 0.63
Pool:	0.10	0.03
Culverts (L, R):	0.60, -	0.39, 0.27

Stream/Riparian Habitat

Channel Morphology: 90% riffle, 10% pool
Substrate Composition: 75% sm. cobble, 19% lg. cobble, 5% gravel, 1% boulder
Stream Cover: 20% lg. cobble/ boulder, 1% deep pool
Aquatic Vegetation: Periphyton
Riparian Vegetation: Grasses
Barriers Present (Y/N): N
Location: N/A

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undef-0.15	Undef-0.15
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	136	293
pH:	8.48	8.18
Water Temp (°C):	4.4	4.5

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - L	ARCH - N NNST - N
Feeding:	ARCH - H NNST - L	ARCH - H NNST - L
Migration:	ARCH - H NNST - L	ARCH - H NNST - L

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-049 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (b) at the habitat assessment site downstream of the crossing at CV-049 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-049
Site: US

UTM / Chainage: 17W 529677 7926542 / 63 + 302
Dates Surveyed: 4-Jul-09, 28-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 2-5°

Hydrology

	Spring	Fall
Bankfull Width (m):	36.56	36.56
Wetted Width (m):	27.42	21.94
Riffle Depths (m):	0.04, 0.06	0.10, 0.03
Pool Depth (m):	0.15	0.02
Culvert Depths (L, R) (m):	0.34, -	0.24, 0.10
Maximum Depth (m):	0.40	0.30

Point Velocities (m/s)

Riffles:	0.89, 0.75	0.73, 0.48
Pool:	0.00	0.00
Culverts (L, R):	1.00, -	1.04, 0.47

Stream/Riparian Habitat

Channel Morphology: 80% riffle, 20% pool

Substrate Composition: 75% sm. cobble, 19% lg. cobble, 5% gravel, 1% boulder

Stream Cover: 20% lg. cobble/ boulder, 1% deep pool

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grasses

Barriers Present (Y/N): N
Location: N/A

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undef	Undef
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	135	-
pH:	8.50	-
Water Temp (°C):	4.3	-

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - L	ARCH - N NNST - N
Feeding:	ARCH - H NNST - L	ARCH - H NNST - L
Migration:	ARCH - H NNST - L	ARCH - H NNST - L

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-049 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-049 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-048
Site: DS

UTM / Chainage: 17W 530415 7925875 / 64 + 312
Dates Surveyed: 4-Jul-09, 28-Aug-09

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: 2-5°

Hydrology

	Spring	Fall
Bankfull Width (m):	10.05	36.56
Wetted Width (m):	10.05	8.80
Riffle Depths (m):	0.03, 0.08	0.04, 0.07
Pool Depth (m):	0.11	0.11
Right Culvert Depth (m):	0.32	0.28
Maximum Depth (m):	0.32	0.28
Point Velocities (m/s)		
Riffles:	0.64, 0.65	0.49, 0.70
Pool:	0.03	0.02
Right Culvert:	0.55	0.46

Stream/Riparian Habitat

Channel Morphology: 85% riffle, 15% pool
Substrate Composition: 60% sm. cobble, 20% lg. cobble, 10% gravel, 10% boulder
Stream Cover: 30% lg. cobble/ boulder, 1% deep pool
Aquatic Vegetation: Periphyton
Riparian Vegetation: Grasses, willows, moss
Barriers Present (Y/N): Unknown
Location: Fish not captured here; reason unknown

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	0.20	0.20-0.25
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	112	316
pH:	8.41	8.48
Water Temp (°C):	5.2	2.0

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - N NNST - N	ARCH - N NNST - N
Migration:	ARCH - N NNST - N	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT-FISH BEARING

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-048 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (b) at the habitat assessment site downstream of the crossing at CV-048 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-048
Site: US

UTM / Chainage: 17W 530415 7925875 / 64 + 312
Dates Surveyed: 4-Jul-09, 28-Aug-09

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: 2-5°

Hydrology

	Spring	Fall
Bankfull Width (m):	6.40	6.40
Wetted Width (m):	6.40	3.3
Riffle Depth (m):	0.05	0.06
Pool Depth (m):	0.23	0.11
Right Culvert Depth (m):	0.29	0.33
Maximum Depth (m):	0.30	0.33
Point Velocities (m/s)		
Riffle:	0.29	0.59
Pool:	0.13	0.01
Right Culvert:	0.55	0.43

Stream/Riparian Habitat

Channel Morphology: 80% riffle, 20% pool

Substrate Composition: 49% lg. cobble, 45% sm. cobble, 5% gravel, 1% boulder

Stream Cover: 50% lg. cobble/ boulder, 5% deep pool

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grasses, willows, moss

Barriers Present (Y/N): Unknown
Location: Fish not captured here; reason unknown

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	0.10-0.20	0.10-0.20
Bank Stability:	High	High
Erosion Potential:	Low	Low

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	115	-
pH:	8.40	-
Water Temp (°C):	5.2	-

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - N NNST - N	ARCH - N NNST - N
Migration:	ARCH - N NNST - N	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT-FISH BEARING

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-048 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-048 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-046
Site: DS

UTM / Chainage: 17W 531686 7924265 / 66 + 490
Dates Surveyed: 4-Jul-09, 28-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: N/M

Hydrology

	Spring	Fall
Bankfull Width (m):	2.6	2.6
Wetted Width (m):	2.6	2.2
Riffle Depth (m):	0.09	0.06
Pool Depth (m):	0.15	0.11
Culvert Depth (m):	0.13	0.13
Maximum Depth (m):	0.25	N/M
Point Velocities (m/s)		
Riffle:	0.55	0.35
Pool:	0.13	0.00
Culvert:	1.14	0.82

Stream/Riparian Habitat

Channel Morphology: 90% riffle, 10% pool

Substrate Composition: 50% sm. cobble, 30% lg. cobble, 10% boulder, 10% gravel

Stream Cover: 40% cobble/boulder, 10% d. pool

Aquatic Vegetation: N/M

Riparian Vegetation: grass, moss

Barriers Present (Y/N): N
Location: N/A

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	0.15-22	N/M
Bank Stability:	Moderate	Moderate
Erosion Potential:	Moderate	Moderate

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	93	299
pH:	8.41	8.42
Water Temp (°C):	3.3	1.8

Fish Habitat Use

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - N NNST - N	ARCH - N NNST - N
Migration:	ARCH - N NNST - N	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-046 during spring, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-046 during fall, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-046
Site: US

UTM / Chainage: 17W 531686 7924265 / 66 + 490
Dates Surveyed: 4-Jul-09, 28-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: N/M

Hydrology

	Spring	Fall
Bankfull Width (m):	2.0	2.0
Wetted Width (m):	2.0	1.7
Riffle Depth (m):	0.14	0.04
Pool Depth (m):	0.12	0.23
Culvert Depth (m):	0.13	0.07
Maximum Depth (m):	0.2	0.24
Point Velocities (m/s)		
Riffle:	1.05	0.31
Pool:	0.00	0.00
Culvert:	0.80	0.36

Stream/Riparian Habitat

Channel Morphology: 60% riffle, 40% pool
Substrate Composition: 40% lg. cobble, 30% boulder, 25% sm. cobble, 5% gravel
Stream Cover: 20% boulder, 1% d. pool
Aquatic Vegetation: N/M
Riparian Vegetation: grass, moss
Barriers Present (Y/N): N
Location: N/A

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	0.10-0.20	N/M
Bank Stability:	Moderate	Moderate
Erosion Potential:	Moderate	Moderate

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	93	N/M
pH:	8.43	N/M
Water Temp (°C):	3.2	N/M

Fish Habitat Use

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - N NNST - N	ARCH - N NNST - N
Migration:	ARCH - N NNST - N	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING

Tote Road Aquatic Habitat Assessment

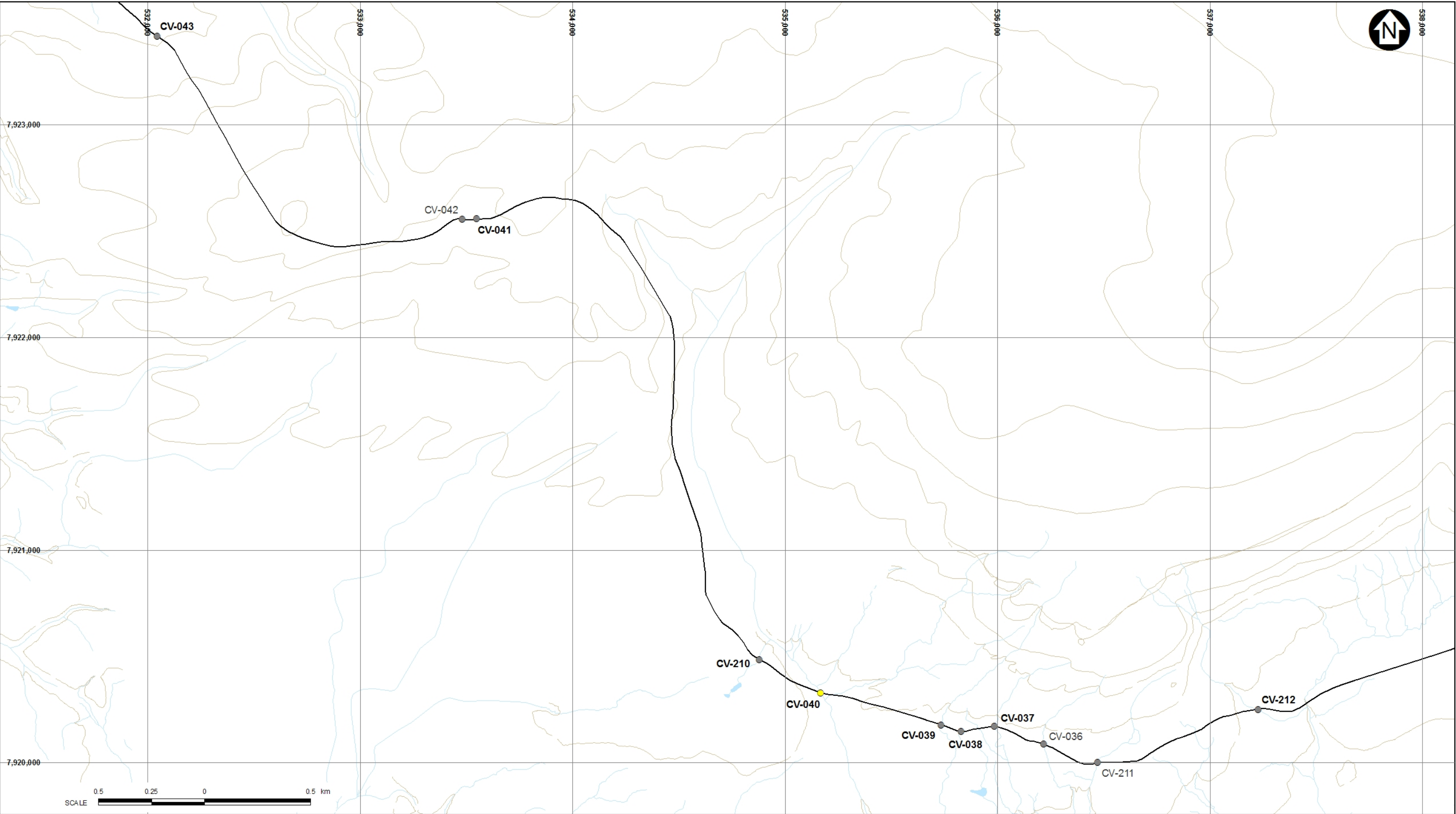


Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-046 during spring, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-046 during fall, 2009.

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LEGEND:

IMPORTANT FISH HABITAT

TOTE ROAD (EXISTING)

MARGINAL FISH HABITAT

CONTOUR

NOT FISH BEARING HABITAT

WATER

FISH BARRIER

FALLS

-	DDMMYY10	ISSUED FOR ---	-	-	-	-
REV	01/09/2010	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D

- NOTES:**
1. BASE MAP: © (1:50 000) 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 MAND IS IN METRES.

BAFFINLAND IRON MINES CORPORATION		
MARY RIVER PROJECT		
Milne Inlet Tote Road - 3i		
	PIA NO. -	REF NO. -
Aquatic Environment Specialists	DATE: 01/09/2010	REV -


Bulk Sample Road Watercourse Crossing Assessment



Figure 1: Downstream view from proposed crossing showing riffle habitat with cobble substrate.



Figure 2: Upstream view from proposed crossing showing more riffle habitat.

<p align="center">Baffinland Iron Mines Mary River Project Watercourse Crossing Assessment</p>	<p>Approach: R = 95%, L = 95%</p> <p>Bank Stability: Low-Moderate</p> <p>Erosion Potential: Moderate</p> <p>Undercut Banks: None</p>	<p>during fisheries investigations. This crossing may be too far removed from more suitable habitat (ie. abundant pools) thus significantly reducing use by smaller fish.</p>
	<div>  <div> <p>NORTH/SOUTH CONSULTANTS INC.</p> <p>AQUATIC ENVIRONMENT SPECIALISTS</p> </div> </div>	

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-040
Site: DS

UTM: 17W 535170 7920316
Dates Surveyed: 24-Jun-08; 23-Jul-08

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 2-5°

Hydrology

	Spr	Sum
Bankfull Width (m):	36.56	36.56
Wetted Width (m):	25.59	6.80
Riffle-Crest Depth (m):	0.31	0.18
Pool Depth (m):	0.20	0.12
D (m):	NM	NM
D₉₅ (m):	2.00	2.00
Point Velocities (m/s)		
Riffle:	0.94	0.16
Pool:	0.37	0.00
Culverts (L/R):	1.45/0.88	0.43

Stream/Riparian Habitat

Channel Morphology: 80% riffle, 20% pool

Substrate Composition: 80% cobble, 19% gravel, 1% boulder

Stream Cover: 41% lg. cobble/boulder

Aquatic Vegetation: Flooded terrestrial

Riparian Vegetation: Grasses and moss

Barriers Present (Y/N): Y
Location: DS ~ 1 km

Lakes Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spr	Sum
Bank Height (L/R; m):	Flooded	0.10/0.10
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spr	Sum
Specific Conductance (µS/cm):	71.0	26.8
TDS (g/l):	0.05	0.17
DO (mg/l)	14.35	11.62
%DO:	102.5	NM
Water Temp (°C):	1.0	6.9

Fish Habitat

	Spr	Sum
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - N NNST - N	ARCH - L NNST - N
Migration:	ARCH - N NNST - N	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) from the habitat assessment downstream of CV-040 during spring 2008.



Figure 2. View upstream (a), downstream (b), and across (c) from the habitat assessment downstream of CV-040 during summer 2008.



Figure 3. View from the downstream end of the culvert at crossing CV-040 during spring (a) and summer (b) 2008. View of the road washout that occurred at crossing CV-040 during spring 2008 (c).

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-040
Site: US

UTM: 17W 535154 7920361
Dates Surveyed: 24-Jun-08, 23-Jul-08

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 2-5°

Hydrology

	Spr	Sum
Bankfull Width (m):	29.25	29.25
Wetted Width (m):	20.11	15.70
Riffle-Crest Depth (m):	0.37	0.18
Pool Depth (m):	0.35	0.10
D (m):	NM	NM
D₉₅ (m):	1.30	1.30
Point Velocities (m/s)		
Riffle:	0.47	0.31
Pool:	0.18	0.00
Behind a rock:	NM	NM

Stream/Riparian Habitat

Channel Morphology: 75% riffle, 25% pool
Substrate Composition: 69% cobble, 20% sand, 10% gravel, 1% boulder
Stream Cover: 60% lg. cobble
Aquatic Vegetation: Flooded terrestrial
Riparian Vegetation: Grasses and mosses
Barriers Present (Y/N): N
Location: NA
Lakes Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spr	Sum
Bank Height (L/R; m):	Flooded	0.05/0.05
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spr	Sum
Specific Conductance (µS/cm):	71.0	27.0
TDS (g/l):	0.05	0.18
DO (mg/l)	14.67	11.61
%DO:	103.9	NM
Water Temp (°C):	1.0	7.0

Fish Habitat

	Spr	Sum
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - N NNST - N	ARCH - L NNST - N
Migration:	ARCH - N NNST - N	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) from the habitat assessment upstream of CV-040 during spring 2008.

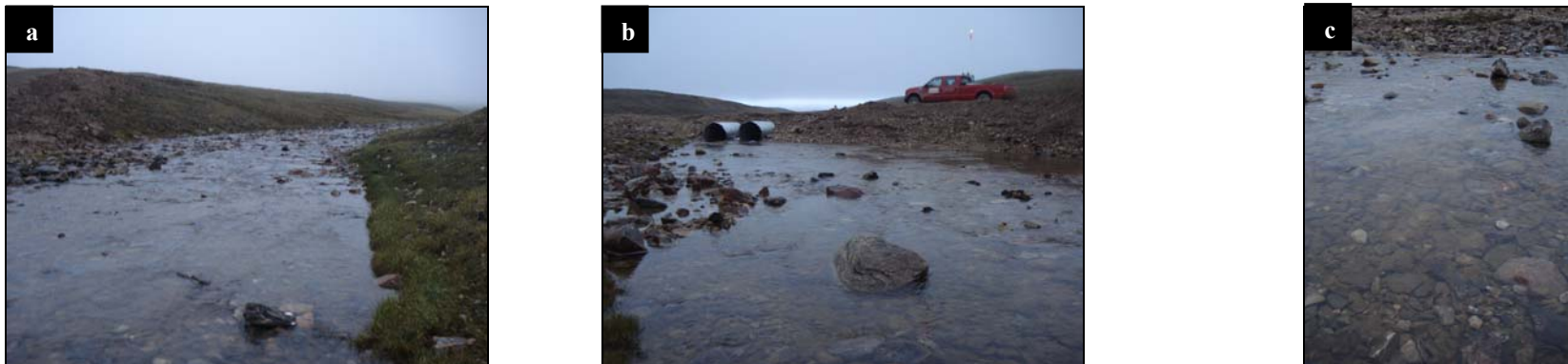


Figure 2. View upstream (a), downstream (b), and across (c) from the habitat assessment upstream of CV-040 during summer 2008.



Figure 3. View from the upstream end of the culverts at crossing CV-040 during spring (a) 2008.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-040
Site: DS

UTM / Chainage: 17W 535175 7920305 / 72 + 263
Dates Surveyed: 4-Jul-09, 28-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 2-5°

Hydrology

	Spring	Fall
Bankfull Width (m):	36.56	36.56
Wetted Width (m):	27.42	8.60
Riffle Depths (m):	0.11, 0.08	0.05, 0.05
Pool Depth (m):	0.12	0.10
Culvert Depths (L, R) (m):	-, 0.46	0.31, 0.45
Maximum Depth (m):	0.65	0.60
Point Velocities (m/s)		
Riffles:	0.33, 0.50	0.19, 0.35
Pool:	0.01	0.00
Culverts (L, R):	-, 0.17	0.09, 0.07

Stream/Riparian Habitat

Channel Morphology: 80% riffle, 20% pool

Substrate Composition: 50% sm. cobble, 25% lg. cobble, 15% gravel, 5% sand, 5% boulder

Stream Cover: 30% lg. cobble/ boulder, 5% deep pool

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grasses, moss

Barriers Present (Y/N): Y
Location: Somewhere between crossing and DS overwintering site

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undef-0.20	Undef-0.20
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	102	363
pH:	8.42	8.59
Water Temp (°C):	8.1	3.2

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - N NNST - N	ARCH - N NNST - N
Migration:	ARCH - N NNST - N	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – MARGINAL

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-040 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (b) at the habitat assessment site downstream of the crossing at CV-040 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-040
Site: US

UTM / Chainage: 17W 535175 7920305 / 72 + 263
Dates Surveyed: 4-Jul-09, 28-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 2-5°

Hydrology

	Spring	Fall
Bankfull Width (m):	29.25	29.25
Wetted Width (m):	22.85	8.70
Riffle Depths (m):	0.09, 0.12	0.06, 0.01
Pool Depth (m):	0.20	0.08
Culvert Depths (L,R) (m):	-, 0.26	0.09, 0.15
Maximum Depth (m):	0.30	0.20
Point Velocities (m/s)		
Riffles:	0.19, 0.40	0.29, 0.36
Pool:	0.09	0.00
Culverts (L, R):	-, 0.44	0.26, 0.47

Stream/Riparian Habitat

Channel Morphology: 60% riffle, 40% pool

Substrate Composition: 40% sm. cobble, 35% lg. cobble, 10% gravel, 10% sand, 5% boulder

Stream Cover: 40% lg. cobble/ boulder, 5% deep pool

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grasses, moss

Barriers Present (Y/N): Y
Location: Somewhere between crossing and DS overwintering site

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undef-0.20	Undef-0.20
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	100	-
pH:	8.43	-
Water Temp (°C):	8.0	-

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - N NNST - N	ARCH - N NNST - N
Migration:	ARCH - N NNST - N	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – MARGINAL

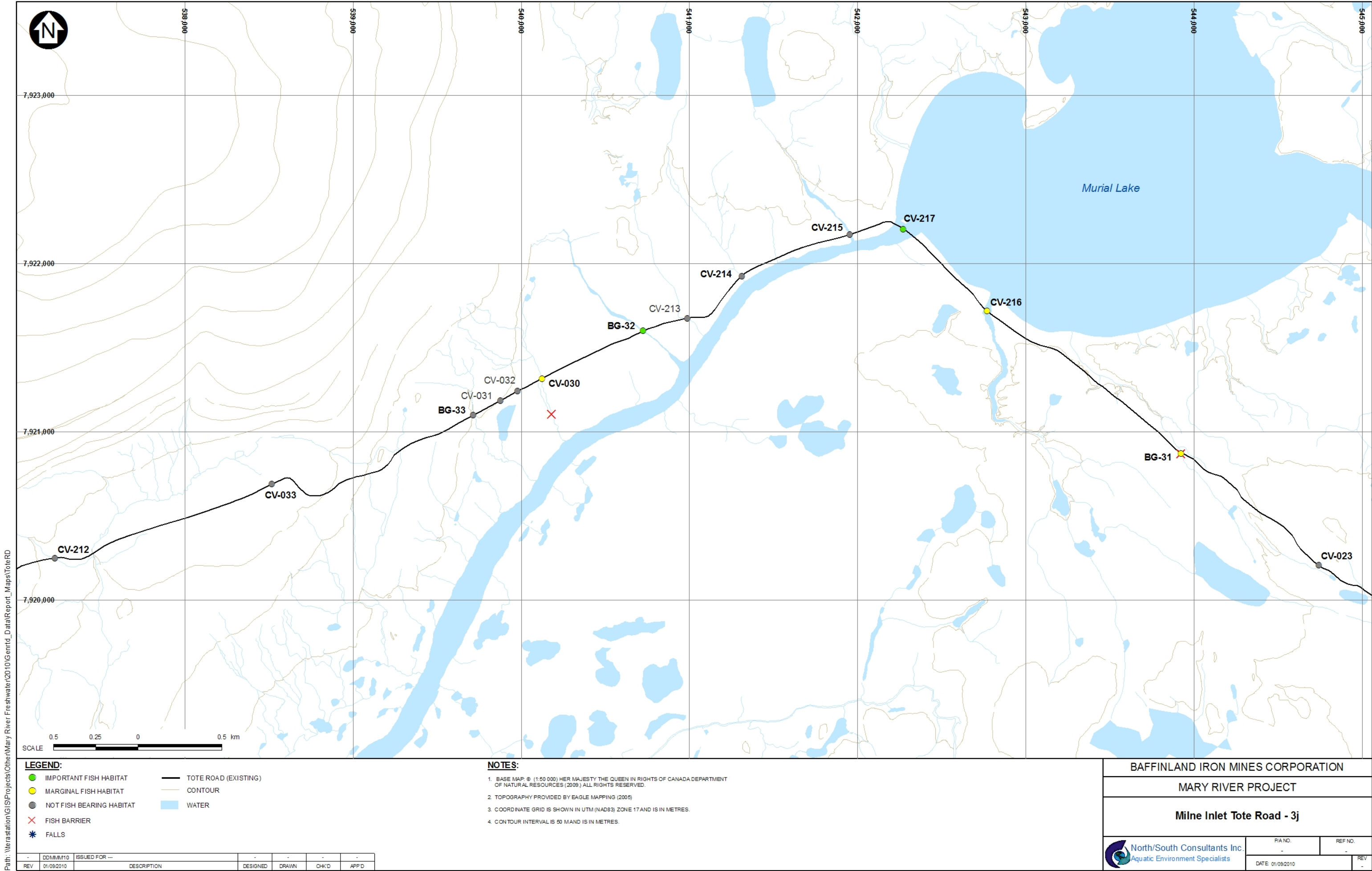
Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-040 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-040 during late August, 2009.



Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-030
Site: DS

UTM / Chainage: 17W 540123 7921310 / 77 + 506
Dates Surveyed: 4-Jul-09

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: N/M

Hydrology

Spring

Bankfull Width (m): 8.6

Wetted Width (m): 8.6

Riffle Depth (m): 0.09

Cascade Depth (m): N/A

Pool Depth (m): 0.15

Culvert Depth (m): 0.13

Maximum Depth (m): 0.25

Point Velocities (m/s)

Riffle: 0.55

Cascade: N/A

Pool: 0.13

Culvert: 1.14

Stream/Riparian Habitat

Channel Morphology: 100% pool

Substrate Composition: 90% sand/silt, 5% sm. cobble, 5% gravel

Stream Cover: 40% d. pool, 20% sub. terr.

Aquatic Vegetation: N/M

Riparian Vegetation: all

Barriers Present (Y/N): N
Location: N/A

L/R Bank Characteristics

Spring

Bank Height (m): N/A

Bank Stability: Low

Erosion Potential: High

Water Quality

Spring

Specific Conductance (µS/cm): 214

pH: 8.08

Water Temp (°C): 8.5

Fish Habitat Use

Spring

Spawning: ARCH - N
NNST - N

Feeding: ARCH - M
NNST - L

Migration: ARCH - L
NNST - L

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – MARGINAL

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-030 during spring, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-030
Site: US

UTM / Chainage: 17W 540123 7921310 / 77 + 506
Dates Surveyed: 4-Jul-09

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: N/M

Hydrology

Spring

Bankfull Width (m):	1.0
Wetted Width (m):	1.0
Riffle Depth (m):	0.05
Pool Depth (m):	N/M
Culvert Depth (m):	0.05
Maximum Depth (m):	0.25

Point Velocities (m/s)

Riffle:	0.15
Pool:	0.00
Culvert:	0.69

Stream/Riparian Habitat

Channel Morphology:	95% pool, 5% riffle
Substrate Composition:	90% sand/silt, 5% sm. cobble, 5% gravel
Stream Cover:	25% d. pool, 10% undercut
Aquatic Vegetation:	N/M
Riparian Vegetation:	all
Barriers Present (Y/N):	N
Location:	N/A

L/R Bank Characteristics

Spring

Bank Height (m):	0.00-0.15
Bank Stability:	Low
Erosion Potential:	High

Water Quality

Spring

Specific Conductance (µS/cm):	210
pH:	8.09
Water Temp (°C):	8.5

Fish Habitat Use

Spring

Spawning:	ARCH - N NNST - N
Feeding:	ARCH - M NNST - L
Migration:	ARCH - L NNST - L

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – MARGINAL

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-030 during early July, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: BG-32
Site: DS

UTM / Chainage: 17W 540706 7921622 / 78 + 161
Dates Surveyed: 4-Jul-09, 28-Aug-09

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: 1°

Hydrology

	Spring	Fall
Bankfull Width (m):	3.80	3.80
Wetted Width (m):	3.80	3.80
Pool Depth (m):	0.88	0.83
Left Culvert Depth (m):	0.80	0.80
Maximum Depth (m):	> 2.00	> 2.00
Point Velocities (m/s)		
Pool:	0.05	0.00
Left Culvert:	0.02	0.09

Stream/Riparian Habitat

Channel Morphology: 100% pool
Substrate Composition: 95% sand, 5% sm. cobble
Stream Cover: 90% deep pool, 5% under-cut banks
Aquatic Vegetation: None
Riparian Vegetation: Grasses, willows, moss
Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	0.35-0.40	0.35-0.40
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	248	450
pH:	8.35	8.31
Water Temp (°C):	8.5	4.2

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - M	ARCH - N NNST - N
Feeding:	ARCH - H NNST - H	ARCH - H NNST - H
Migration:	ARCH - H NNST - H	ARCH - H NNST - H

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at BG-32 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (b) at the habitat assessment site downstream of the crossing at BG-32 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: BG-32
Site: US

UTM / Chainage: 17W 540706 7921622 / 78 + 161
Dates Surveyed: 4-Jul-09, 28-Aug-09

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: 1°

Hydrology

	Spring	Fall
Bankfull Width (m):	4.00	4.00
Wetted Width (m):	4.00	4.00
Pool Depth (m):	0.85	0.80
Left Culvert Depth (m):	0.75	0.79
Maximum Depth (m):	1.50	1.50
Point Velocities (m/s)		
Pool:	0.05	0.05
Left Culvert:	0.05	0.06

Stream/Riparian Habitat

Channel Morphology: 95% pool, 5% run

Substrate Composition: 95% sand, 5% sm. cobble

Stream Cover: 90% deep pool, 5% under-cut banks

Aquatic Vegetation: None

Riparian Vegetation: Grasses, willows, moss

Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	0.35-0.40	0.35-0.40
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	253	-
pH:	8.35	-
Water Temp (°C):	8.4	-

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - M	ARCH - N NNST - N
Feeding:	ARCH - H NNST - H	ARCH - H NNST - H
Migration:	ARCH - H NNST - H	ARCH - H NNST - H

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT





Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at BG-32 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at BG-32 during late August, 2009.

Bulk Sample Road Watercourse Crossing Assessment						
<div></div> <p>Figure 1: Downstream view from proposed crossing showing flat, sandy habitat with large, unnamed lake visible.</p> <div></div> <p>Figure 2: Upstream view from proposed crossing showing flat, sandy habitat.</p> <div></div> <p>Figure 3: View across CV-217.</p>	Location					
	Site: CV-217		Watercourse Name: Unknown River			
	UTM: 17W 0542218 / 7922157					
	Site Description				Potential Fish Utilization	
	Watershed Size: 153.045 km ²		Mesohabitat Composition: Flat – 100%		Arctic Char	
	Regulated: No		Substrate Composition: Sand – 60%; Gravel – 40%		Spawning: Unlikely	
	Channelized: No		Stream Cover: None		Migration: Yes	
	Bankfull Width: 162.0 m		Riparian Vegetation: Small intermittent patches of small plants, willows and grasses		Rearing: Possible	
	Wetted Width: 124.0 m		Aquatic Vegetation: None		Overwintering: Possible	
	Flat Depth: 0.42 m		Unique Features: None			
Pool Depth: N/A		Summary: This is an extra large-sized waterbody consisting almost exclusively of flat habitat with fine substrates. The banks have high erosion potential and there is no significant cover.		Ninespine Stickleback		
Residual Pool Depth: N/A				Spawning: Possible		
Bankfull Depth: 7.37 m				Migration: Possible		
Bank Height: 6.95 m				Rearing: Yes		
D ₉₅ : 0.05 m				Overwintering: Possible		
D: <0.001 m						
Confinement: Partially Confined						
Channel Morphology: Flat						
Channel Gradient: 0 ⁰						
Turbidity: 0.00 FTU						
Side Slope R – 15%; L – 15%						
Approach: R – 85%; L – 85%						
Bank Stability: Low						
Erosion Potential: High						
Undercut Banks: None						
		Fish Habitat Quality		Comments		
		Important		This waterbody, which is the major outlet of a large lake, is unlike most crossings along the bulk transport road. It is deep and relatively slow-moving and may not freeze entirely during winter, thus allowing for potential overwintering. However, a lack of cover and fine substrates are not ideal conditions for juveniles in a river that is accessible to adult char. Therefore juvenile use is likely limited and possibly migratory only. Spawning may occur near the crossing or further upstream so this area could be important during fall. In addition, this habitat is more suitable for stickleback use and one was captured during fisheries investigations.		
Baffinland Iron Mines Mary River Project Watercourse Crossing Assessment				 NORTH/SOUTH CONSULTANTS INC. AQUATIC ENVIRONMENT SPECIALISTS		

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-217
Site: DS

UTM / Chainage: 17W 542219 7922158 / 79 + 915
Dates Surveyed: 4-Jul-09, 28-Aug-09

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: 1°

Hydrology

	Spring	Fall
Bankfull Width (m):	155.38	155.38
Wetted Width (m):	137.10	71.29
Run Depths (m):	0.38, -	0.22, 0.25
Pool Depth (m):	0.50	-
Culvert Depths (L, C, R) (m):	Unsafe	0.62, 0.95, 0.86
Sea Can Depths (from left #'s 1, 2, 7, 8) (m):	-, 0.75, -, -	0.88, -, 0.50, 0.34
Maximum Depth (m):	> 2.00	~ 1.00
Point Velocities (m/s)		
Runs:	0.21, -	0.40, 0.76
Pool:	0.00	-
Culverts (L, C, R):	Unsafe	1.11, 0.96, 1.09
Sea Cans (1, 2, 7, 8):	-, 0.25, -, -	0.04, -, 0.14, 0.21

Stream/Riparian Habitat

Channel Morphology: 70% run, 30% pool

Substrate Composition: 50% gravel, 40% sand, 10% sm. cobble

Stream Cover: 60% deep run, 10% deep pool

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grasses, willows, moss

Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undef	Undef
Bank Stability:	Low	Low
Erosion Potential:	High	High

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	77	80
pH:	8.05	8.11
Water Temp (°C):	4.3	7.2

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - L	ARCH - N NNST - N
Feeding:	ARCH - L NNST - L	ARCH - L NNST - L
Migration:	ARCH - H NNST - H	ARCH - H NNST - H

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the sea can crossing at CV-217 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (b) at the habitat assessment site downstream of the sea can crossing at CV-217 during late August, 2009.



Figure 3. View during early July (a) and late August (b) at the habitat assessment site downstream of the culvert crossing at CV-217.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-217
Site: US

UTM / Chainage: 17W 542219 7922158 / 79 + 915
Dates Surveyed: 4-Jul-09, 28-Aug-09

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: N/A

Hydrology

Spring

Fall

Bankfull Width (m): N/A N/A

Wetted Width (m): N/A N/A

Maximum Depth (m): N/A N/A

Point Velocities (m/s) N/A N/A

Stream/Riparian Habitat

Channel Morphology: 100% lake

Substrate Composition: 90% sand, 10% gravel

Stream Cover: N/A

Aquatic Vegetation: N/A

Riparian Vegetation: N/A

Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

Spring

Fall

Bank Height (m): Undef-0.20 Undef-0.40

Bank Stability: Low Low

Erosion Potential: High High

Water Quality

Spring

Fall

Specific Conductance (µS/cm): N/M -

pH: N/M -

Water Temp (°C): N/M -

Fish Habitat

Spring

Fall

Spawning: ARCH - H
NNST - H ARCH - H
NNST - H

Feeding: ARCH - H
NNST - H ARCH - H
NNST - H

Migration: ARCH - H
NNST - H ARCH - H
NNST - H

**Baffinland Iron Mines
Mary River Project**

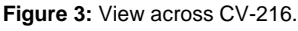
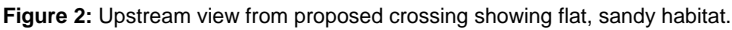
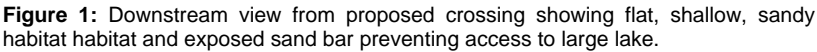


Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment

Figure 1. Photos not taken of upstream lake.

Bulk Sample Road Watercourse Crossing Assessment



Location	
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Watercourse Name: Unknown River

Site Description	
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Mesohabitat Composition:	Flat – 98%; Riffle – 2%
Substrate Composition:	Sand – 95%; Gravel – 5%
Stream Cover:	None
Riparian Vegetation:	Small plants and grasses
Aquatic Vegetation:	None
Unique Features:	None
Summary:	This is a large-sized waterbody consisting almost exclusively of flat habitat with fine substrates. The banks have high erosion potential and there is no significant cover.

Potential Fish Utilization	
1	2
3	4
5	6
7	8
9	10
11	12
13	14
15	16
17	18
19	20
21	22
23	24
25	26
27	28
29	30
31	32
33	34
35	36
37	38
39	40
41	42
43	44
45	46
47	48
49	50
51	52
53	54
55	56
57	58
59	60
61	62
63	64
65	66
67	68
69	70
71	72
73	74
75	76
77	78
79	80
81	82
83	84
85	86
87	88
89	90
91	92
93	94
95	96
97	98
99	100

Arctic Char

Spawning:	None
Migration:	Unlikely
Rearing:	Unlikely
Overwintering:	None

Ninespine Stickleback

Spawning:	Unlikely
Migration:	Unlikely
Rearing:	Unlikely
Overwintering:	None

Fish Habitat Quality

Comments	
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This waterbody is a smaller outlet of the same lake CV-217 drains. However, at the time of sampling there was no actual connection with the lake as water levels were too low. It is highly unlikely that adult fish use this tributary, particularly for fall spawning migrations. Due to a lack of preferred habitat (larger substrate sizes and deeper pools) juvenile use is likely also limited. There is also likely little use by sticklebacks.

<p align="center">Baffinland Iron Mines Mary River Project Watercourse Crossing Assessment</p>



Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-216
Site: DS

UTM / Chainage: 17W 542774 7921700 / 80 + 646
Dates Surveyed: 4-Jul-09, 28-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 1°

Hydrology

	Spring	Fall
Bankfull Width (m):	46.61	46.61
Wetted Width (m):	6.40	7.31
Riffle Depth (m):	0.05	0.05
Right Culvert Depth (m):	0.07	0.11
Maximum Depth (m):	0.07	0.11

Point Velocities (m/s)

Riffle:	0.26	0.26
Right Culvert:	0.33	1.06

Stream/Riparian Habitat

Channel Morphology: 80% flat, 20% riffle

Substrate Composition: 90% sand, 10% gravel

Stream Cover: None

Aquatic Vegetation: None

Riparian Vegetation: Grasses

Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undef	Undef
Bank Stability:	Low	Low
Erosion Potential:	High	High

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	1078	2035
pH:	8.30	8.26
Water Temp (°C):	13.4	6.1

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - M NNST - N	ARCH - M NNST - N
Migration:	ARCH - M NNST - N	ARCH - M NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – MARGINAL

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-216 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (b) at the habitat assessment site downstream of the crossing at CV-216 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-216
Site: US

UTM / Chainage: 17W 542774 7921700 / 80 + 646
Dates Surveyed: 4-Jul-09, 28-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 1°

Hydrology

	Spring	Fall
Bankfull Width (m):	40.22	40.22
Wetted Width (m):	29.25	22.85
Flat Depth (m):	0.03	0.06
Right Culvert Depth (m):	0.07	0.16
Maximum Depth (m):	0.10	0.16
Point Velocities (m/s)		
Flat:	0.16	0.18
Right Culvert:	0.59	0.78

Stream/Riparian Habitat

Channel Morphology: 90% flat, 10% riffle
Substrate Composition: 90% sand, 10% gravel
Stream Cover: None
Aquatic Vegetation: None
Riparian Vegetation: Grasses
Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undef-0.20	Undef-0.20
Bank Stability:	Low	Low
Erosion Potential:	High	High

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	1050	-
pH:	8.31	-
Water Temp (°C):	13.3	-

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - M NNST - N	ARCH - M NNST - N
Migration:	ARCH - M NNST - N	ARCH - M NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – MARGINAL

Tote Road Aquatic Habitat Assessment

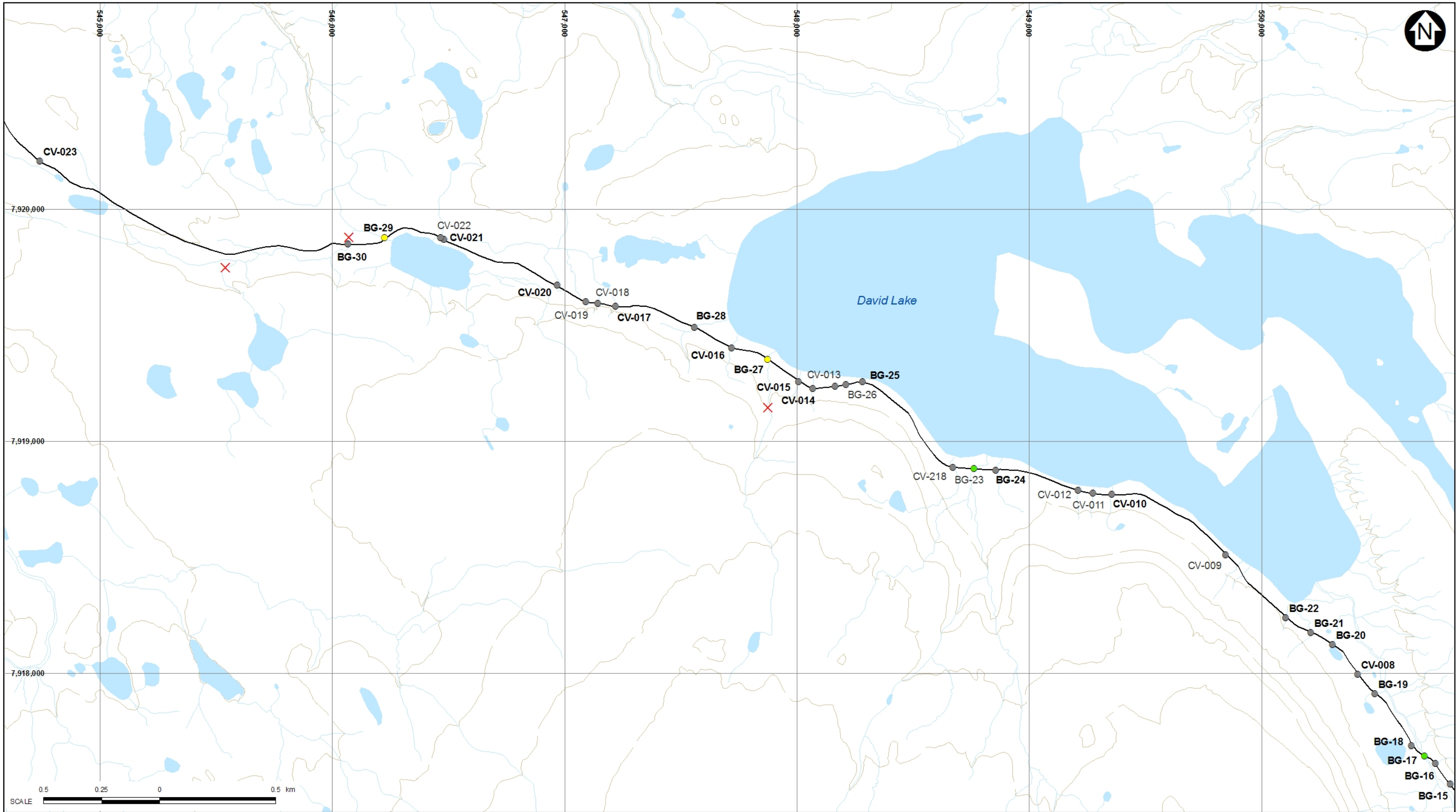


Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-216 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-216 during late August, 2009.

Path: \\era-station\GIS\Projects\Other\Mary River\Freshwater\2010\Genrtd_Data\Report_Maps\ToteRD



LEGEND:

●

IMPORTANT FISH HABITAT

●

MARGINAL FISH HABITAT

●

NOT FISH BEARING HABITAT

×

FISH BARRIER

*

FALLS

TOTE ROAD (EXISTING)

CONTOUR

WATER

NOTES:

1. BASE MAP: © (1:50 000) 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 25 M AND IS IN METRES.

DDMM/M10	ISSUED FOR --				
REV	01/09/2010	DESCRIPTION	DESIGNED	DRAWN	CHK'D
					APP'D

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

Milne Inlet Tote Road - 3k

North/South Consultants Inc.

Aquatic Environment Specialists

PIA NO.

REF NO.

DATE: 01/09/2010

REV

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: BG-29
Site: DS

UTM / Chainage: 17W 546229 7919877 / 84 + 805
Dates Surveyed: 4-Jul-09, 28-Aug-09

Site Description/Physical Characteristics

Confinement: Confined

Channel Gradient: N/M

Hydrology

Spring

Fall

Bankfull Width (m): 2.3 2.3

Wetted Width (m): 2.3 2.3

Riffle Depth (m): 0.05 0.05

Cascade Depth (m): N/A N/A

Pool Depth (m): 0.52 0.68

Culvert Depth (m): 0.10 0.07

Maximum Depth (m): 0.52 N/M

Point Velocities (m/s)

Riffle: 0.26 0.24

Cascade: N/A N/A

Pool: 0.00 0.01

Culvert: 0.68 0.62

Stream/Riparian Habitat

Channel Morphology: 70% pool, 30% riffle

Substrate Composition: 60% sand, 25% gravel, 10% sm. cobble, 5% lg. cobble

Stream Cover: 35% d. pool, 10% undercut

Aquatic Vegetation: N/M

Riparian Vegetation: grass

Barriers Present (Y/N): N
Location: N/A

L/R Bank Characteristics

Spring

Fall

Bank Height (m): 0.2-0.4 N/M

Bank Stability: High High

Erosion Potential: Low Low

Water Quality

Spring

Fall

Specific Conductance (µS/cm): 177 205

pH: 8.25 8.42

Water Temp (°C): 5.6 8.8

Fish Habitat Use

Spring

Fall

Spawning: ARCH - N
NNST - N ARCH - N
NNST - N

Feeding: ARCH - M
NNST - M ARCH - M
NNST - M

Migration: ARCH - L
NNST - L ARCH - L
NNST - L

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – MARGINAL

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at BG-29 during spring, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at BG-29 during fall, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: BG-29
Site: US

UTM / Chainage: 17W 546229 7919877 / 84 + 805
Dates Surveyed: 4-Jul-09, 28-Aug-09

Site Description/Physical Characteristics

Confinement: Confined

Channel Gradient: N/M

Hydrology

	Spring	Fall
Bankfull Width (m):	12.8	12.8
Wetted Width (m):	5.6	5.1
Pool Depth (m):	0.31	0.27
Culvert Depth (m):	0.15	0.12
Maximum Depth (m):	0.35	0.24
Point Velocities (m/s)		
Pool:	0.02	0.01
Culvert:	0.70	0.78

Stream/Riparian Habitat

Channel Morphology: 95% pool, 5% riffle

Substrate Composition: 40% sand/silt, 40% gravel, 20% sm. cobble

Stream Cover: 20% d. pool, 5% cobble, 10% sub. veg.

Aquatic Vegetation: N/M

Riparian Vegetation: grass

Barriers Present (Y/N): N
Location: N/A

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	N/A	N/M
Bank Stability:	Moderate	Moderate
Erosion Potential:	Moderate	Moderate

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	175	N/M
pH:	8.26	N/M
Water Temp (°C):	5.6	N/M

Fish Habitat Use

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - M NNST - M	ARCH - M NNST - M
Migration:	ARCH - L NNST - L	ARCH - L NNST - L

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – MARGINAL


Tote Road Aquatic Habitat Assessment






Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at BG-29 during spring, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at BG-29 during fall, 2009.

Bulk Sample Road Watercourse Crossing Assessment														
No Figure Available	Location													
	Site:		BG-28				Watercourse Name:		Unknown River					
	UTM:		17W 0547567 / 7919479											
	Site Description						Potential Fish Utilization							
	Watershed Size:		0.166 km ²		Mesohabitat Composition:		N/A		Arctic Char					
	Regulated:		No		Substrate Composition:		N/A		Spawning:		None			
	Channelized:		No		Stream Cover:		N/A		Migration:		None			
	Bankfull Width:		N/A		Riparian Vegetation:		N/A		Rearing:		None			
	Wetted Width:		N/A		Aquatic Vegetation:		N/A		Overwintering:		None			
	Flat Depth:		N/A		Unique Features:		N/A							
	Pool Depth:		N/A		Summary:		This is an extra-small-sized waterbody that is almost completely dry with no existing connection to a lake downstream.		Ninespine Stickleback					
	Residual Pool Depth:		N/A								Spawning:		None	
	Bankfull Depth:		N/A								Migration:		None	
	Bank Height:		N/A								Rearing:		None	
	D ₉₅ :		N/A								Overwintering:		None	
	D:		N/A											
	Confinement:		N/A											
Channel Morphology:		N/A												
Channel Gradient:		N/A		Fish Habitat Quality						Comments				
Turbidity:		N/A		None						This waterbody is likely only a spring runoff stream and provides no suitable fish habitat for any life cycle stage or species.				
Side Slope		N/A												
Approach:		N/A												
Bank Stability:		N/A												
Erosion Potential:		N/A												
Undercut Banks:		N/A								<div> NORTH/SOUTH CONSULTANTS INC. AQUATIC ENVIRONMENT SPECIALISTS</div>				

Bulk Sample Road Watercourse Crossing Assessment

<div></div> <div></div> <div><p>Baffinland Iron Mines Mary River Project Watercourse Crossing Assessment</p></div>	Location			
	Site: BG-27		Watercourse Name: Unknown River	
	UTM: 17W 0547876 / 7919342			
	Site Description			Potential Fish Utilization
				Arctic Char
				Spawning: None
				Migration: None
				Rearing: Possible
				Overwintering: None
				Ninespine Stickleback
				Spawning: Unlikely
				Migration: Unlikely
				Rearing: Unlikely
				Overwintering: None
				Comments
				Relatively low water levels and higher velocities likely limit use of this habitat by both stickleback and juvenile char. It is accessible from a nearby lake downstream so there is probably some intermittent use. Adult char do not use this habitat at any time.
				 NORTH/SOUTH CONSULTANTS INC. AQUATIC ENVIRONMENT SPECIALISTS

Bulk Sample Road Watercourse Crossing Assessment

Location

Site: BG-27

UTM: 17W 0547876 / 7919342

Watercourse Name: Unknown River

Site Description

Watershed Size: 0.553 km²

Regulated: No

Channelized: No

Bankfull Width: 7.0 m

Wetted Width: 5.0 m

Riffle-Crest Depth: 0.05 m

Pool Depth: N/A

Residual Pool Depth: N/A

Bankfull Depth: 0.50 m

Bank Height: 0.45 m

D₉₅: 0.27 m

D: 0.05 m

Confinement: Partially Confined

Channel Morphology: Cascade-Pool

Channel Gradient: 7⁰

Turbidity: 0.00 FTU

Side Slope R – 2%; L – 2%

Approach: R – 98%; L – 98%

Bank Stability: Moderate

Erosion Potential: Moderate

Undercut Banks: Some

Mesohabitat Composition: Cascade – 90%; Pool – 10%

Substrate Composition: Cobble – 70%; Gravel – 10%; Sand – 10%; Boulders – 10%

Stream Cover: Boulders – 10%; Undercut – 2%; Overstream Vegetation – 2%

Riparian Vegetation: Moss, small plants, willows and grasses

Aquatic Vegetation: None

Unique Features: None

Summary: This is a small-sized waterbody consisting almost exclusively of cascade habitat with cobble substrate. The banks have moderate erosion potential and there is a variety of available cover.

Fish Habitat Quality

Marginal

Potential Fish Utilization

Arctic Char

Spawning: None

Migration: None

Rearing: Possible

Overwintering: None

Ninespine Stickleback

Spawning: Unlikely

Migration: Unlikely

Rearing: Unlikely

Overwintering: None

Comments

Relatively low water levels and higher velocities likely limit use of this habitat by both stickleback and juvenile char. It is accessible from a nearby lake downstream so there is probably some intermittent use. Adult char do not use this habitat at any time.



NORTH/SOUTH CONSULTANTS INC.
AQUATIC ENVIRONMENT SPECIALISTS

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: BG-27
Site: DS

UTM / Chainage: 17W 547876 7919342 / 86 + 609
Dates Surveyed: 4-Jul-09, 28-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: N/M

Hydrology

Spring

Fall

Bankfull Width (m): 5.6 5.6

Wetted Width (m): 1.3 1.3

Riffle Depth (m): 0.05 0.03

Cascade Depth (m): 0.02 0.01

Pool Depth (m): N/A N/A

Culvert Depth (m): 0.05 0.04

Maximum Depth (m): 0.20 N/M

Point Velocities (m/s)

Riffle: 0.43 0.38

Cascade: 0.81 0.45

Pool: N/A N/A

Culvert: 1.04 0.83

Stream/Riparian Habitat

Channel Morphology: 55% cascade, 40% riffle, 5% pool

Substrate Composition: 65% sm. cobble, 15% lg. cobble, 10% gravel, 10% sand

Stream Cover: 15% cobble

Aquatic Vegetation: N/M

Riparian Vegetation: grass, willow

Barriers Present (Y/N): N
Location: N/A

L/R Bank Characteristics

Spring

Fall

Bank Height (m): 0.30 N/M

Bank Stability: Moderate N/M

Erosion Potential: Moderate N/M

Water Quality

Spring

Fall

Specific Conductance (µS/cm): 59 496

pH: 8.33 8.57

Water Temp (°C): 6.4 5.1

Fish Habitat Use

Spring

Fall

Spawning: ARCH - N
NNST - N ARCH - N
NNST - N

Feeding: ARCH - M
NNST - N ARCH - M
NNST - N

Migration: ARCH - N
NNST - N ARCH - N
NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – MARGINAL

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at BG-27 during spring, 2009.

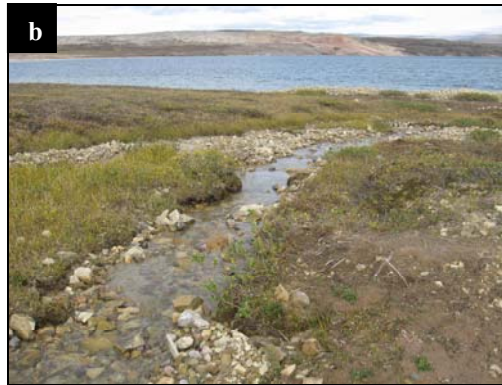


Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at BG-27 during fall, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: BG-27
Site: US

UTM / Chainage: 17W 547876 7919342 / 86 + 609
Dates Surveyed: 4-Jul-09, 28-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: N/M

Hydrology

	Spring	Fall
Bankfull Width (m):	4.5	N/M
Wetted Width (m):	1.4	1.0
Riffle Depth (m):	0.08	0.02
Cascade Depth (m):	0.03	0.01
Pool Depth (m):	0.09	0.1
Culvert Depth (m):	0.09	0.06
Maximum Depth (m):	0.10	0.24
Point Velocities (m/s)		
Riffle:	0.67	0.36
Cascade:	0.96	0.96
Pool:	0.01	0.00
Culvert:	0.75	0.72

Stream/Riparian Habitat

Channel Morphology: 45% riffle, 45% cascade, 10% pool

Substrate Composition: 40% lg. cobble, 40% sm. cobble, 10% gravel, 10% sand

Stream Cover: 40% cobble

Aquatic Vegetation: N/M

Riparian Vegetation: grass, willow

Barriers Present (Y/N): N
Location: N/A

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	0.05-0.02	N/M
Bank Stability:	Moderate	N/M
Erosion Potential:	Moderate	N/M

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	60	N/M
pH:	8.30	N/M
Water Temp (°C):	6.4	N/M

Fish Habitat Use

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - N NNST - N	ARCH - N NNST - N
Migration:	ARCH - N NNST - N	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – MARGINAL

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at BG-27 during spring, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at BG-27 during fall, 2009.

Bulk Sample Road Watercourse Crossing Assessment



Figure 1: Downstream view from proposed crossing showing riffle and cobble habitat and downstream lake.



Figure 2: Upstream view from proposed crossing showing riffle-pool habitat.



Figure 3: Aerial view of BG-24 showing braided channel.

Baffinland Iron Mines
Mary River Project
Watercourse Crossing Assessment

Location

Site: BG-24
UTM: 17W 0548766 / 7918877

Watercourse Name: Unknown River

Site Description

Watershed Size: 5.506 km²
Regulated: No
Channelized: No
Bankfull Width: 62.0 m
Wetted Width: 5.5 m
Riffle-Crest Depth: 0.12 m
Pool Depth: 0.30 m
Residual Pool Depth: 0.18 m
Bankfull Depth: 0.63 m
Bank Height: 0.45 m
D₉₅: 0.35 m
D: 0.02 m
Confinement: N/A (braided channel)
Channel Morphology: Riffle-Pool
Channel Gradient: 4.5⁰
Turbidity: 0.00 FTU
Side Slope: R – 2%; L – 2%
Approach: R – 98%; L – 98%
Bank Stability: Moderate-High
Erosion Potential: Moderate
Undercut Banks: Moderate

Mesohabitat Composition: Riffle – 95%; Pool – 5%
Substrate Composition: Cobble – 90%; Gravel – 5%; Boulders – 5%
Stream Cover: Boulders – 5%; Undercut – 10%
Riparian Vegetation: Moss, willows and grasses
Aquatic Vegetation: None
Unique Features: None
Summary: This is a medium-sized waterbody consisting almost exclusively of riffle habitat with cobble substrate. The banks have moderate-high erosion potential and there is a variety of available cover. The stream is split into three separate wetted channels (3.5, 1, and 1 m wetted widths) at the proposed crossing.

Potential Fish Utilization

Arctic Char

Spawning: None
Migration: None
Rearing: Yes
Overwintering: None

Ninespine Stickleback

Spawning: Unlikely
Migration: Unlikely
Rearing: Unlikely
Overwintering: None

Fish Habitat Quality

Important

Comments

Though the wetted areas are relatively small, there is sufficient suitable habitat for juvenile char. This area is likely an important rearing/refuge area from the lake downstream. Several small char were observed or captured during fisheries investigations. Water levels are probably not high enough even during spring for any significant use by adult char.



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Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: BG-24
Site: DS

UTM: 17W 548793 7918898
Dates Surveyed: 23-Jun-08, 23-Jul-08

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: 1°

Hydrology

	Spr	Sum
Bankfull Width (m):	4.50	4.50
Wetted Width (m):	3.00	3.40
Riffle-Crest Depth (m):	0.16	0.22
Pool Depth (m):	0.65	0.06-0.45
D₉₅ (m):	0.38	0.38
Point Velocities (m/s)		
Riffle:	0.99	0.80
Pool:	0.03	0.00
Culvert:	2.20	2.12

Stream/Riparian Habitat

Channel Morphology: 70% riffle, 30% pool

Substrate Composition: 50% gravel, 40% cobble, 10% sand

Stream Cover: 30% UC banks, 30% deep pool

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grasses, moss, willows

Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spr	Sum
Bank Height (L/R; m):	Undef/0.45	Undef/0.45
Bank Stability:	Low	Low
Erosion Potential:	High	High

Water Quality

	Spr	Sum
Specific Conductance (µS/cm):	100.0	22.7
TDS (g/l):	0.07	0.15
DO (mg/l)	14.06	12.61
%DO:	102.3	NM
Water Temp (°C):	2.0	4.3

Fish Habitat

	Spr	Sum
Spawning:	ARCH - N NNST - L	ARCH - N NNST - L
Feeding:	ARCH - H NNST - L	ARCH - H NNST - L
Migration:	ARCH - M NNST - N	ARCH - M NNST - N

**Baffinland Iron Mines
Mary River Project**



Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) from the habitat assessment downstream of BG-24 during spring 2008.



Figure 2. View upstream (a), downstream (b), and across (c) from the habitat assessment downstream of BG-24 during summer 2008.

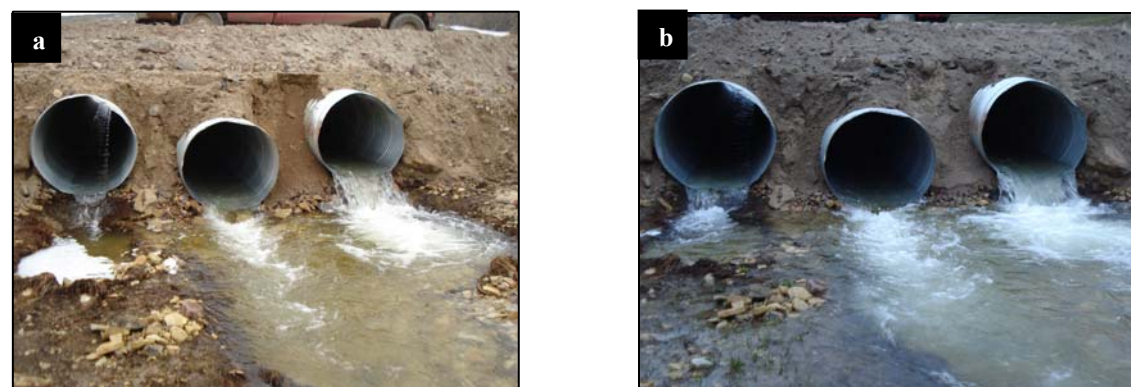


Figure 3. View from the downstream end of the culverts at crossing BG-24 during spring (a) and summer (b) 2008.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: BG-24
Site: US

UTM: 17W 548770 7918871
Dates Surveyed: 23-Jun-08, 23-Jul-08

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 2°

Hydrology

	Spr	Sum
Bankfull Width (m):	6.50	6.50
Wetted Width (m):	6.50	6.00
Riffle-Crest Depth (m):	0.15	0.18
Pool Depth (m):	0.26	0.40
D₉₅ (m):	0.38	0.38
Point Velocities (m/s)		
Riffle:	0.40	0.52
Pool:	0.20	0.20
Cascade:	1.40	NM

Stream/Riparian Habitat

Channel Morphology: 40% pool, 30% riffle, 30% cascade

Substrate Composition: 50% gravel, 35% cobble, 15% sand

Stream Cover: 10% undercut banks
10% deep pools

Aquatic Vegetation: Periphyton,

Riparian Vegetation: Moss, grasses, and willows

Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spr	Sum
Bank Height (L/R; m):	Undef	Undef
Bank Stability:	Low	Low
Erosion Potential:	High	High

Water Quality

	Spr	Sum
Specific Conductance (µS/cm):	96.0	22.6
TDS (g/l):	0.06	0.15
DO (mg/l)	14.35	12.49
%DO:	105.3	NM
Water Temp (°C):	2.0	4.2

Fish Habitat

	Spr	Sum
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - M NNST - L	ARCH - M NNST - N
Migration:	ARCH - L NNST - N	ARCH - M NNST - N

**Baffinland Iron Mines
Mary River Project**



Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) from the habitat assessment upstream of BG-24 during spring 2008.



Figure 2. View upstream (a), downstream (b), and across (c) from the habitat assessment upstream of BG-24 during summer 2008.

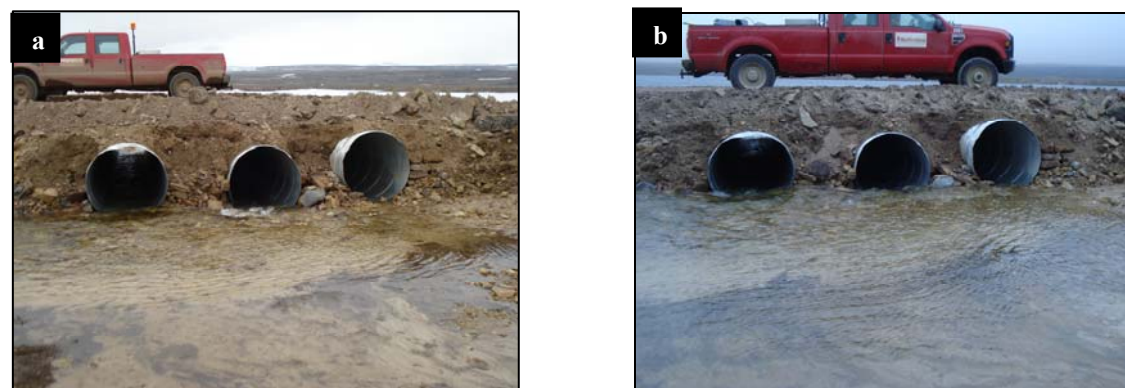


Figure 3. View from the upstream end of the culverts at crossing BG-24 during spring (a) and summer (b) 2008.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: BG-24
Site: DS

UTM / Chainage: 17W 548766 7918878 / 87 + 710
Dates Surveyed: 4-Jul-09, 28-Aug-09

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: 2-5°

Hydrology

	Spring	Fall
Bankfull Width (m):	3.80	3.80
Wetted Width (m):	1.80	1.80
Riffle Depth (m):	0.15	0.03
Pool Depth (m):	0.36	0.38
Cascade Depth (m):	0.09	0.08
Right Culvert Depth (m):	0.26	0.18
Maximum Depth (m):	0.40	0.38
Point Velocities (m/s)		
Riffle:	0.45	0.55
Pool:	0.01	0.05
Cascade:	1.41	1.33
Right Culvert:	0.67	0.49

Stream/Riparian Habitat

Channel Morphology: 70% riffle , 20% pool, 10% cascade

Substrate Composition: 70% sm. cobble, 20% lg. cobble , 10% gravel

Stream Cover: 30% under-cut banks, 20% lg. cobble, 10% deep pool

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grasses, willows, moss

Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	0.10-0.40	0.10-0.40
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	130	515
pH:	8.38	8.45
Water Temp (°C):	5.5	4.6

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - L	ARCH - N NNST - N
Feeding:	ARCH - H NNST - L	ARCH - H NNST - L
Migration:	ARCH - H NNST - L	ARCH - H NNST - L

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at BG-24 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at BG-24 during late August, 2009.

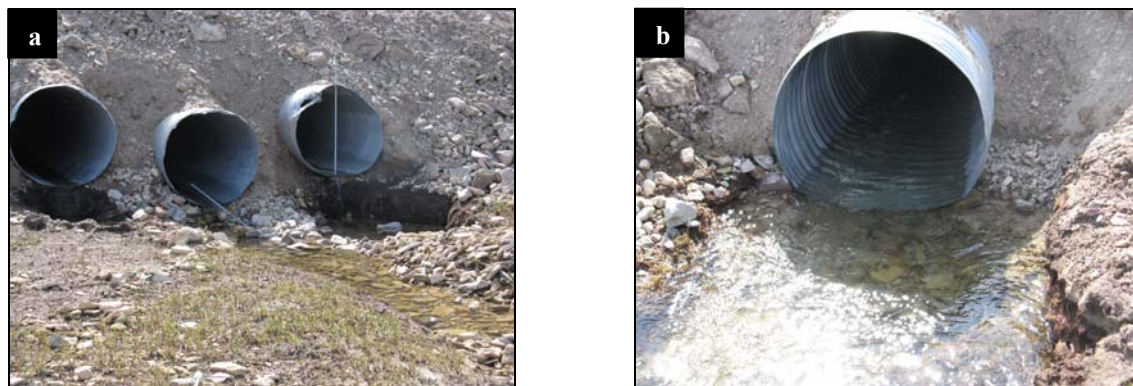


Figure 3. View of old (a) and new culvert(s) (b) installed at crossing at BG-24.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: BG-24
Site: US

UTM / Chainage: 17W 548766 7918878 / 87 + 710
Dates Surveyed: 4-Jul-09, 28-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 5-10°

Hydrology

	Spring	Fall
Bankfull Width (m):	20.00	20.00
Wetted Width (m):	2.50	2.30
Riffle Depth (m):	0.20	0.09
Cascade Depth (m):	0.03	0.04
Pool Depth (m):	0.60	0.49
Right Culvert Depth (m):	0.24	0.14
Maximum Depth (m):	0.60	0.49
Point Velocities (m/s)		
Riffle:	0.50	0.86
Cascade:	0.97	0.64
Pool:	0.00	0.00
Right Culvert:	0.54	0.55

Stream/Riparian Habitat

Channel Morphology: 40% riffle, 40% cascade, 20% pool

Substrate Composition: 50% sm. cobble, 40% lg. cobble, 10% gravel

Stream Cover: 40% lg. cobble, 10% deep pool

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grasses, willows, moss

Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undef-0.20	Undef-0.20
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	127	-
pH:	8.36	-
Water Temp (°C):	5.6	-

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - H NNST - L	ARCH - H NNST - L
Migration:	ARCH - H NNST - L	ARCH - H NNST - L

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at BG-24 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at BG-24 during late August, 2009.

Bulk Sample Road Watercourse Crossing Assessment



Figure 1: Downstream view from proposed crossing showing riffle-pool habitat, cobble/gravel/sand substrate.



Figure 2: Upstream view from proposed crossing showing more riffle-pool habitat.



Figure 3: View across BG-17.

Baffinland Iron Mines
Mary River Project
Watercourse Crossing Assessment

Location

Site: BG-17
UTM: 17W 0550703 / 7917643

Watercourse Name: Unknown River

Site Description

Watershed Size: 13.767 km²
Regulated: No
Channelized: No
Bankfull Width: 9.0 m
Wetted Width: 8.0 m
Riffle-Crest Depth: 0.19 m
Pool Depth: 0.30 m
Residual Pool Depth: 0.11 m
Bankfull Depth: 0.95 m
Bank Height: 0.65 m
D₉₅: 0.10 m
D: 0.06 m
Confinement: Partially Confined
Channel Morphology: Riffle-Pool
Channel Gradient: 1⁰
Turbidity: 22.95 FTU
Side Slope: R – 10%; L – 10%
Approach: R – 90%; L – 90%
Bank Stability: Low
Erosion Potential: High
Undercut Banks: Some

Mesohabitat Composition: Riffle – 50%; Pool – 50%
Substrate Composition: Cobble – 40%; Gravel – 30%; Sand – 30%
Stream Cover: Instream Vegetation – 3%
Riparian Vegetation: Grasses, moss, thrift, small plants, and willows
Aquatic Vegetation: Submerged grasses
Unique Features: None
Summary: This is a large-sized waterbody with abundant riffle and pool habitat and a mixture of cobble, gravel, and sand substrate. The banks have high erosion potential. There is some flooded vegetation providing potential cover.

Potential Fish Utilization

Arctic Char

Spawning: None
Migration: Possible
Rearing: Yes
Overwintering: None

Ninespine Stickleback

Spawning: Possible
Migration: Possible
Rearing: Possible
Overwintering: None

Fish Habitat Quality

Important

Comments

This site provides abundant, suitable habitat for juvenile char. The extent of use by adults is unknown though the area at the proposed crossing is unlikely to be used for spawning. Increased turbidity levels and pool habitat may provide suitable habitat for stickleback though only small char were captured in fisheries investigations.



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AQUATIC ENVIRONMENT SPECIALISTS

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: BG-17
Site: DS

UTM / Chainage: 17W 550703 7917643 / 90 + 167
Dates Surveyed: 4-Jul-09, 28-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 1°

Hydrology

	Spring	Fall
Bankfull Width (m):	9.14	9.14
Wetted Width (m):	5.48	3.30
Riffle Depth (m):	0.08	0.11
Pool Depth (m):	0.38	0.40
Run Depth (m):	0.30	0.28
Left Culvert Depth (m):	0.36	0.32
Maximum Depth (m):	0.50	0.45
Point Velocities (m/s)		
Riffle:	0.63	0.67
Pool:	0.12	0.00
Run:	0.39	0.62
Left Culvert:	0.39	0.70

Stream/Riparian Habitat

Channel Morphology: 50% run, 30% riffle , 20% pool

Substrate Composition: 50% sm. cobble, 30% gravel, 15% lg. cobble, 5% sand

Stream Cover: 20% deep run, 10% deep pool, 15% lg. cobble

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grasses, willows, moss

Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undef-0.20	Undef-0.20
Bank Stability:	Low	Low
Erosion Potential:	High	High

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	93	97
pH:	8.08	8.12
Water Temp (°C):	6.5	8.8

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - M	ARCH - N NNST - N
Feeding:	ARCH - H NNST - M	ARCH - H NNST - M
Migration:	ARCH - H NNST - M	ARCH - H NNST - M

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at BG-17 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at BG-17 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: BG-17
Site: US

UTM / Chainage: 17W 550703 7917643 / 90 + 167
Dates Surveyed: 4-Jul-09, 28-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 1°

Hydrology

	Spring	Fall
Bankfull Width (m):	15.54	15.54
Wetted Width (m):	11.88	10.97
Run Depth (m):	0.28	0.24
Left Culvert Depth (m):	0.24	0.29
Maximum Depth (m):	0.35	0.30
Point Velocities (m/s)		
Run:	0.13	0.17
Left Culvert:	0.81	0.43

Stream/Riparian Habitat

Channel Morphology: 100% run

Substrate Composition: 75% sand/silt, 15% sm. cobble, 5% lg. cobble, 5% gravel

Stream Cover: 20% deep pool, 10% submerged veg., 5% lg. cobble

Aquatic Vegetation: Periphyton, submerged veg.

Riparian Vegetation: Grasses, willows, moss

Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undef	Undef
Bank Stability:	Low	Low
Erosion Potential:	High	High

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	94	-
pH:	8.08	-
Water Temp (°C):	6.4	-

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - M	ARCH - N NNST - N
Feeding:	ARCH - H NNST - M	ARCH - H NNST - M
Migration:	ARCH - H NNST - M	ARCH - H NNST - M

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment





Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at BG-17 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at BG-17 during late August, 2009.

Bulk Sample Road Watercourse Crossing Assessment

	Location			
	Site:	BG-16	Watercourse Name:	Unknown River
	UTM:	17W 0550742 / 7917611		
	Site Description			Potential Fish Utilization
	Watershed Size:	0.064 km ²	Mesohabitat Composition:	N/A
	Regulated:	No	Substrate Composition:	N/A
	Channelized:	No	Stream Cover:	N/A
	Bankfull Width:	N/A	Riparian Vegetation:	N/A
	Wetted Width:	N/A	Aquatic Vegetation:	N/A
	Riffle-Crest Depth:	N/A	Unique Features:	N/A
Baffinland Iron Mines Mary River Project Watercourse Crossing Assessment	Pool Depth:	N/A	Summary:	This is an extra small-sized waterbody that is steep and nearly dry at the time of sampling It is likely only a spring run-off stream
	Residual Pool Depth:	N/A		
	Bankfull Depth:	N/A		
	Bank Height:	N/A		
	D ₉₅ :	N/A		
	D:	N/A		
	Confinement:	N/A		
	Channel Morphology:	N/A		
	Channel Gradient:	N/A		
	Turbidity:	N/A		
	Side Slope	N/A		
	Approach:	N/A		
	Bank Stability:	N/A		
	Erosion Potential:	N/A		
	Undercut Banks:	N/A		
			Fish Habitat Quality	
			None	
			Comments	
			This site is a tributary of BG-17 and likely only contributes runoff to the much larger BG-17. There appears to be little available fish habitat and, therefore little to no importance for fish populations. There are also empty fuel drums rusting in the stream.	
			 NORTH/SOUTH CONSULTANTS INC. AQUATIC ENVIRONMENT SPECIALISTS	

Exploration Property Aquatic Habitat Assessment

Location

Watercourse Name:	BG-16	UTM / Chainage:	17W 550742 7917611 / 90 + 218
Site:	Entire stream	Dates Surveyed:	4-Jul-09, 28-Aug-09

Site Description/Physical Characteristics

Confinement: Partial			Stream/Riparian Habitat			Water Quality		
Channel Gradient: 2-10°						Spring Fall		
Hydrology						Specific Conductance (µS/cm): N/M N/M		
Spring Fall						pH: N/M N/M		
Bankfull Width (m): N/M N/M						Water Temp (°C): N/M N/M		
Wetted Width (m): N/M N/M			Stream Cover: N/A					
Pool Depth (m): N/M N/M			Aquatic Vegetation: None					
Maximum Depth (m): N/M N/M			Riparian Vegetation: Grasses					
Point Velocities (m/s)			Barriers Present (Y/N): Y					
Pool: N/M N/M			Location: Drains from hills into BG-17; inaccessible from BG-17 DS					
			L/R Bank Characteristics			Fish Habitat		
			Spring Fall			Spring Fall		
			Bank Height (L/R; m): N/M N/M			Spawning: ARCH - N NNST - N ARCH - N NNST - N		
			Bank Stability: N/M N/M			Feeding: ARCH - N NNST - N ARCH - N NNST - N		
			Erosion Potential: N/M N/M			Migration: ARCH - N NNST - N ARCH - N NNST - N		

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – NOT FISH-BEARING

Exploration Property Aquatic Habitat Assessment

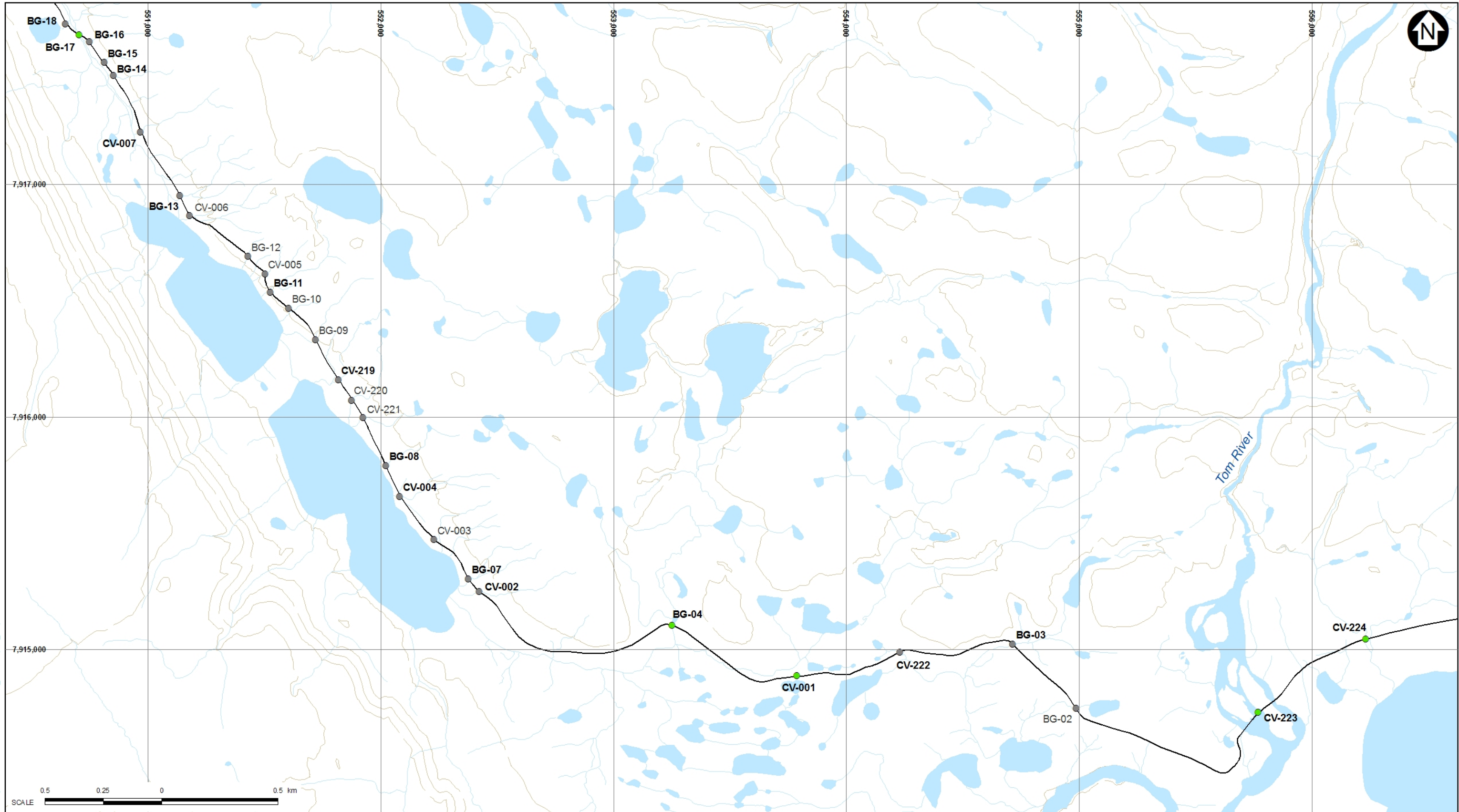


Figure 1. View of downstream (a) and upstream (b) steep gradient barriers and turbid pond below the upstream barrier (c) at BG-16 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site for crossing BG-16 during late August, 2009.

Path: \\era-station\GIS\Projects\Other\Mary River\Freshwater\2010\Genrtd_Data\Report_Maps\ToteRD



LEGEND:

- IMPORTANT FISH HABITAT
- MARGINAL FISH HABITAT
- NOT FISH BEARING HABITAT
- ✕ FISH BARRIER
- ✱ FALLS
- TOTE ROAD (EXISTING)
- CONTOUR
- WATER

REV	DDMMYY10	ISSUED FOR	DESCRIPTION	DESIGNED	DRAWN	CHECKED	APPROVED
-	01/09/2010						

NOTES:

1. BASE MAP: © (1:50 000) HER MAJESTY THE QUEEN IN RIGHTS OF CANADA DEPARTMENT OF NATURAL RESOURCES (2005) 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 25 M AND IS IN METRES.

BAFFINLAND IRON MINES CORPORATION		
MARY RIVER PROJECT		
Milne Inlet Tote Road - 3I		
	PIA NO.	REF NO.
	DATE: 01/09/2010	REV

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: BG-04
Site: DS

UTM / Chainage: 17W 553250 7915113 / 94 + 148
Dates Surveyed: 4-Jul-09, 28-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 1°

Hydrology

	Spring	Fall
Bankfull Width (m):	20.11	20.11
Wetted Width (m):	12.80	9.14
Riffle Depth (m):	0.09	0.09
Pool Depth (m):	0.34	0.25
Culvert Depths (L, R) (m):	-, 0.16	0.04, 0.14
Maximum Depth (m):	0.40	0.35
Point Velocities (m/s)		
Riffle:	0.42	0.44
Pool:	0.08	0.00
Culverts (L,R):	-, 0.89	0.33, 1.26

Stream/Riparian Habitat

Channel Morphology: 90% pool, 10% riffle

Substrate Composition: 60% sand, 25% gravel, 10% sm. cobble, 5% lg. cobble

Stream Cover: 30% deep pool, 5% lg. cobble

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grasses

Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	0.00-0.50	0.00-0.50
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	102	116
pH:	8.13	8.15
Water Temp (°C):	11.8	9.0

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - L	ARCH - N NNST - N
Feeding:	ARCH - M NNST - L	ARCH - M NNST - L
Migration:	ARCH - H NNST - L	ARCH - H NNST - L

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at BG-04 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at BG-04 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: BG-04
Site: US

UTM / Chainage: 17W 553250 7915113 / 94 + 148
Dates Surveyed: 4-Jul-09, 28-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 1°

Hydrology

	Spring	Fall
Bankfull Width (m):	27.42	27.42
Wetted Width (m):	20.11	20.11
Pool Depth (m):	0.80	0.70
Culvert Depths (L, R) (m):	-, 0.20	0.08, 0.20
Maximum Depth (m):	> 1.00	> 1.00
Point Velocities (m/s)		
Pool:	0.00	0.00
Culverts (L, R):	-, 0.96	0.24, 1.09

Stream/Riparian Habitat

Channel Morphology: 95% pool, 5% riffle
Substrate Composition: 60% sand, 25% gravel, 10% sm. cobble, 5% lg. cobble
Stream Cover: 80% deep pool, 5% lg. cobble
Aquatic Vegetation: Periphyton
Riparian Vegetation: Grasses
Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	0.00-0.50	0.00-0.50
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	102	-
pH:	8.15	-
Water Temp (°C):	11.9	-

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - L	ARCH - N NNST - N
Feeding:	ARCH - H NNST - L	ARCH - H NNST - L
Migration:	ARCH - H NNST - L	ARCH - H NNST - L

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at BG-04 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at BG-04 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-001
Site: DS

UTM / Chainage: 17W 553782 7914922 / 94 + 728
Dates Surveyed: 30-Aug-09

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: 1°

Hydrology

Fall

Bankfull Width (m):	3.80
Wetted Width (m):	1.40
Riffle Depths (m):	0.12, 0.04
Pool Depth (m):	0.26
Centre Culvert Depth (m):	0.11
Maximum Depth (m):	0.26
Point Velocities (m/s)	
Riffles:	0.52, 0.63
Pool:	0.02
Centre Culvert:	0.36

Stream/Riparian Habitat

Channel Morphology:	50% riffle, 50% pool
Substrate Composition:	50% sand, 40% gravel, 9% sm. cobble, 1% lg. cobble
Stream Cover:	50% UC banks, 1% lg. cobble
Aquatic Vegetation:	Periphyton, FT
Riparian Vegetation:	Grasses, Arctic cotton
Barriers Present (Y/N):	N
Location:	NA

L/R Bank Characteristics

Fall

Bank Height (m):	0.40
Bank Stability:	Mod
Erosion Potential:	Mod

Water Quality

Fall

Specific Conductance (µS/cm):	159
pH:	7.60
Water Temp (°C):	8.1

Fish Habitat

Fall

Spawning:	ARCH - N NNST - M
Feeding:	ARCH - H NNST - H
Migration:	ARCH - M NNST - H

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-001 during late August, 2009.



Figure 2. View from the downstream end of the culverts at crossing CV-001 during late August (a), 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-001
Site: US

UTM / Chainage: 17W 553782 7914922 / 94 + 728
Dates Surveyed: 30-Aug-09

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: 1°

Hydrology

Fall

Bankfull Width (m): 22.90

Wetted Width (m): 22.90

Pool Depth (m): 0.75

Centre Culvert Depth (m): 0.22

Maximum Depth (m): 0.75

Point Velocities (m/s)

Pool: 0.00

Centre Culvert: 0.00

Stream/Riparian Habitat

Channel Morphology: 100% pool

Substrate Composition: 90% sand/silt/FT, 5% sm. cobble, 5% gravel

Stream Cover: 60% FT, 25% deep pools

Aquatic Vegetation: Periphyton, FT

Riparian Vegetation: Grasses, Arctic cotton

Barriers Present (Y/N): Y
Location: ~200 m US no more surface water

L/R Bank Characteristics

Fall

Bank Height (m): Undef.

Bank Stability: Mod

Erosion Potential: Mod

Water Quality

Fall

Specific Conductance (µS/cm):

-

pH:

-

Water Temp (°C):

-

Fish Habitat

Fall

Spawning:

ARCH - N
NNST - H

Feeding:

ARCH - M
NNST - H

Migration:

ARCH - N
NNST - M

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-001 during late August, 2009.



Figure 2. View from the upstream end of the culverts at crossing CV-001 during late August, 2009.

Bulk Sample Road Watercourse Crossing Assessment



Figure 1: Downstream aerial view from proposed crossing showing riffle-pool habitat and multiple wetted channels.



Figure 2: Upstream aerial view from proposed crossing showing the braided channel.

Baffinland Iron Mines
Mary River Project
Watercourse Crossing Assessment

Location					
Site:		CV-223		Watercourse Name:	
UTM:		17W 0555817 / 7914691		Unknown River	
Site Description				Potential Fish Utilization	
Watershed Size:		59.240 km ²		Arctic Char	
Regulated:		No		Spawning:	
Channelized:		No		Migration:	
Bankfull Width:		195.0 m		Rearing:	
Wetted Width:		117.0 m		Overwintering:	
Riffle-Crest Depth:		0.27 m			
Pool Depth:		0.30 m		Ninespine Stickleback	
Residual Pool Depth:		0.03 m		Spawning:	
Bankfull Depth:		1.40 m		Migration:	
Bank Height:		1.1 m		Rearing:	
D ₉₅ :		0.49 m		Overwintering:	
D:		0.03 m			
Confinement:		N/A (braided channel)			
Channel Morphology:		Riffle-Pool			
Channel Gradient:		1 ⁰		Comments	
Turbidity:		8.67 FTU		This river is a major tributary of Mary Lake. This site provides suitable habitat for juvenile and occasionally adult char. The site provides suitable rearing and refuge habitat and may also be used for spawning or feeding of adults from Mary Lake. The habitat is probably unsuitable for significant stickleback use.	
Side Slope		R – 15%; L – 15%			
Approach:		R – 85%; L – 85%			
Bank Stability:		Low			
Erosion Potential:		High			
Undercut Banks:		None			

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-223
Site: DS

UTM / Chainage: 17W 555818 7914691 / 97 + 155
Dates Surveyed: 4-Jul-09, 28-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 1°

Hydrology

	Spring	Fall
Bankfull Width (m):	84.09	84.09
Wetted Width (m):	69.46	39.10
Rapids Depths (m):	0.40, 0.25	0.12, 0.16
Pool Depth (m):	-	0.27
Sea Can Depths (from left #'s 5, 8, & last) (m):	0.32, -, -	0.15, 0.03, 0.09
Centre Culvert Depth (m):	-	0.58
Maximum Depth (m):	0.50-1.00	0.50-1.00
Point Velocities (m/s)		
Rapids:	1.26, 0.93	0.39, 0.44
Pool:	-	0.01
Sea Cans:	0.24, -, -	1.35, 0.66, 0.71
Centre Culvert:	-	0.57

Stream/Riparian Habitat

Channel Morphology: 90% rapid/riffle, 10% pool

Substrate Composition: 45% lg. cobble, 35% sm. cobble, 10% gravel, 5% sand, 5% boulder

Stream Cover: 50% lg. cobble/ boulder

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grasses

Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undef	Undef
Bank Stability:	High	High
Erosion Potential:	Low	Low

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	32	182
pH:	8.09	8.32
Water Temp (°C):	7.8	6.2

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - H NNST - N	ARCH - H NNST - N
Migration:	ARCH - H NNST - N	ARCH - H NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-223 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-223 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-223
Site: US

UTM / Chainage: 17W 555818 7914691 / 97 + 155
Dates Surveyed: 4-Jul-09, 28-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 1°

Hydrology

	Spring	Fall
Bankfull Width (m):	125.22	125.22
Wetted Width (m):	54.84	58.50
Pool Depth (m):	-	-
CentreCulvert Depth (m):	-	-
Sea Can Depths (m):	-	-
Maximum Depth (m):	> 1.50	~ 1.00

Point Velocities (m/s)

Pool:	-	-
Centre Culvert:	-	-
Sea Cans:	-	-

Stream/Riparian Habitat

Channel Morphology: 75% run, 25% rapid/riffle

Substrate Composition: 45% lg. cobble, 35% sm. cobble, 10% gravel, 5% sand, 5% boulder

Stream Cover: 50% lg. cobble/ boulder

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grasses

Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undef	Undef
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	-	-
pH:	-	-
Water Temp (°C):	-	-

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - H NNST - N	ARCH - H NNST - N
Migration:	ARCH - H NNST - N	ARCH - H NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-223 during early July, 2009.

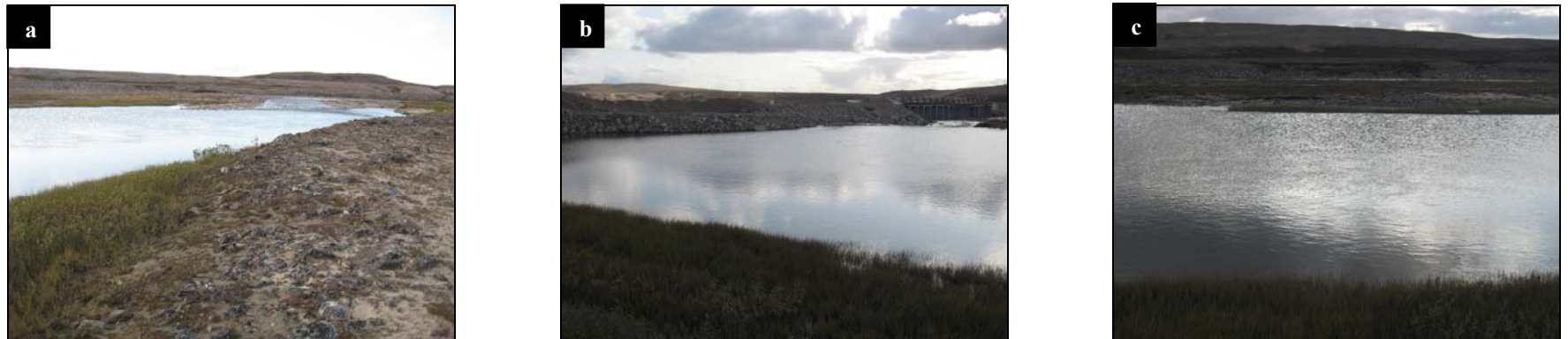


Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-223 during late August, 2009.

Bulk Sample Road Watercourse Crossing Assessment



Figure 1: Downstream view from proposed crossing showing riffle-pool habitat and cobble substrate.



Figure 2: Upstream view from proposed crossing showing more riffle habitat.



Figure 3: View across CV-224.

Baffinland Iron Mines
Mary River Project
Watercourse Crossing Assessment

Location

Site: CV-224
UTM: 17W 0556238 / 7915043
Watercourse Name: Unknown River

Site Description

Watershed Size: 2.835 km²
Regulated: No
Channelized: No
Bankfull Width: 33.0 m
Wetted Width: 9.5 m
Riffle-Crest Depth: 0.03 m
Pool Depth: 0.22 m
Residual Pool Depth: 0.19 m
Bankfull Depth: 1.22 m (left), 1.44 (right)
Bank Height: 1.00 m (left), 1.22 (right)
D₉₅: 0.45 m
D: 0.01 m
Confinement: Partially Confined
Channel Morphology: Riffle-Pool
Channel Gradient: 2⁰
Turbidity: 0.00 FTU
Side Slope: R – 20%; L – 5%
Approach: R – 80%; L – 95%
Bank Stability: Low
Erosion Potential: High
Undercut Banks: None

Mesohabitat Composition: Riffle – 95%; Pool – 5%
Substrate Composition: Cobble – 60%; Gravel – 25%; Sand – 10%; Boulders – 5%
Stream Cover: Boulders – 5%, Instream Vegetation – 1%
Riparian Vegetation: Grasses and willows
Aquatic Vegetation: Submerged grasses
Unique Features: None
Summary: This is a medium-sized waterbody with dominant riffle and mostly cobble habitat. The banks have high erosion potential, particularly on the right bank. Vegetation and boulders are the only significant available cover.

Potential Fish Utilization

Arctic Char

Spawning: None
Migration: None
Rearing: Yes
Overwintering: None

Ninespine Stickleback

Spawning: Unlikely
Migration: Unlikely
Rearing: Unlikely
Overwintering: None

Fish Habitat Quality

Important

Comments

This site provides suitable habitat for juvenile char to rear or take refuge from larger char in the lake downstream. However, due to the relatively low water levels, adult use is unlikely. Higher velocities also probably limit stickleback presence.



NORTH/SOUTH
CONSULTANTS INC.
AQUATIC ENVIRONMENT SPECIALISTS

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-224
Site: DS

UTM / Chainage: 17W 556238 7915044 / 97 + 758
Dates Surveyed: 4-Jul-09, 28-Aug-09

Site Description/Physical Characteristics

Confinement: Confined

Channel Gradient: 2°

Hydrology

	Spring	Fall
Bankfull Width (m):	7.60	7.60
Wetted Width (m):	4.00	3.60
Riffle Depths (m):	0.06, -	0.05, 0.11
Pool Depth (m):	0.12	0.12
Left Culvert Depth (m):	0.12	0.10
Maximum Depth (m):	0.25	0.22

Point Velocities (m/s)

Riffles:	0.35, -	0.12, 0.27
Pool:	0.03	0.00
Left Culvert:	0.31	0.89

Stream/Riparian Habitat

Channel Morphology: 80% riffle, 20% pool

Substrate Composition: 40% gravel, 39% sm. cobble, 20% sand, 1% lg. cobble

Stream Cover: 1% lg. cobble, 1% deep pool

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grasses

Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undef	Undef
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	110	222
pH:	8.25	8.32
Water Temp (°C):	13.3	7.5

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - M NNST - N	ARCH - H NNST - N
Migration:	ARCH - M NNST - N	ARCH - H NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-224 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-224 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-224
Site: US

UTM / Chainage: 17W 556238 7915044 / 97 + 758
Dates Surveyed: 4-Jul-09, 28-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 2°

Hydrology

	Spring	Fall
Bankfull Width (m):	18.40	18.40
Wetted Width (m):	10.80	6.70
Riffle Depths (m):	0.07, 0.04	0.07, 0.04
Pool Depth (m):	0.12	0.10
Left Culvert Depth (m):	0.03	0.06
Maximum Depth (m):	0.12	0.10
Point Velocities (m/s)		
Riffles:	0.23, 0.25	0.29, 0.38
Pool:	0.00	0.00
Left Culvert:	1.07	0.89

Stream/Riparian Habitat

Channel Morphology: 70% riffle, 30% pool
Substrate Composition: 70% sm. cobble, 20% gravel, 5% lg. cobble, 5% sand
Stream Cover: 5% lg. cobble
Aquatic Vegetation: Periphyton
Riparian Vegetation: Grasses
Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undef-0.40	Undef-0.40
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	110	-
pH:	8.26	-
Water Temp (°C):	13.4	-

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - M NNST - N	ARCH - H NNST - N
Migration:	ARCH - M NNST - N	ARCH - H NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment

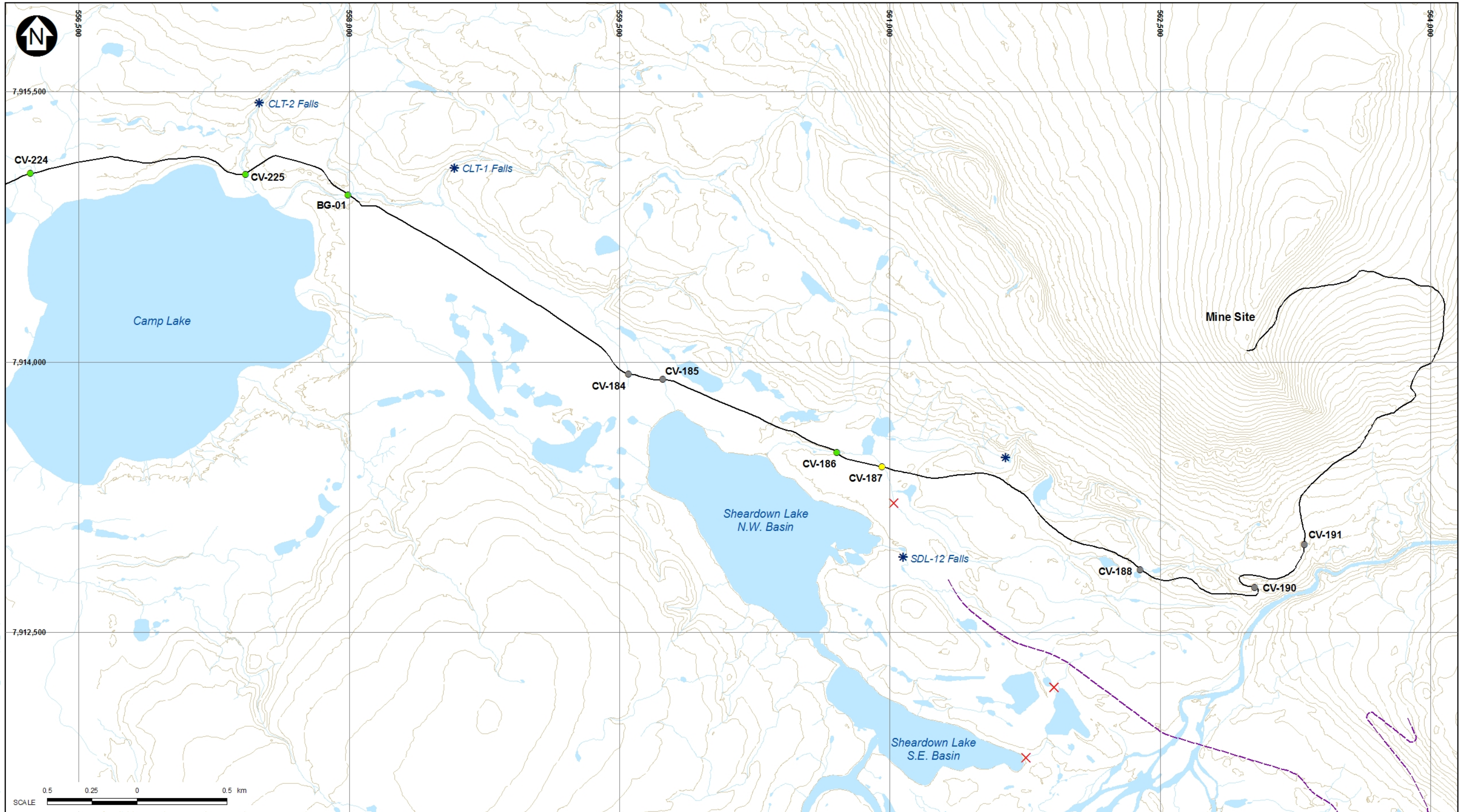


Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-224 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-224 during late August, 2009.

Path: \\era-station\GIS\Projects\Other\Mary River\Freshwater\2010\Genrtd_Data\Report_Maps\ToteRD



LEGEND:						
●	IMPORTANT FISH HABITAT	—	TOTE ROAD (EXISTING)			
●	MARGINAL FISH HABITAT	—	CONTOUR			
●	NOT FISH BEARING HABITAT	■	WATER			
✕	FISH BARRIER					
✱	FALLS					
---	CONSTRUCTION ACCESS ROAD (PROPOSED)					
REV	DDMMYY10	ISSUED FOR		DESIGNED	DRAWN	CHK'D
	01/09/2010	DESCRIPTION				APP'D

NOTES:

1. BASE MAP: © (1:50 000) HER MAJESTY THE QUEEN IN RIGHTS OF CANADA DEPARTMENT OF NATURAL RESOURCES (2009). ALL RIGHTS RESERVED.

2. TOPOGRAPHY PROVIDED BY EAGLE MAPPING (2009)

3. COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 17 AND IS IN METRES.

4. CONTOUR INTERVAL IS 10 MAND IS IN METRES.

5. PROPOSED RAILWAY CONSTRUCTION ACCESS ROAD ALIGNMENT PROVIDED BY CANRAIL CONSULTANTS INC. DRAWING NO. RAILWAY ALIGNMENT AND CONST ACCESS RD - MARY RIVER STEENSBY 2010 -12AUG2010.dwg

BAFFINLAND IRON MINES CORPORATION		
MARY RIVER PROJECT		
Milne Inlet Tote Road - 3m		
	PIA NO.	REF NO.
	DATE: 01/09/2010	REV

Bulk Sample Road Watercourse Crossing Assessment




Figure 1: Downstream view from proposed crossing showing riffle-pool habitat, cobble substrate, and Camp Lake.



Figure 2: Upstream view from proposed crossing showing more riffle-pool habitat.



Figure 3: View across CV-225.

Location				
Site:	CV-225		Watercourse Name:	Unknown River
UTM:	17W 0557406 / 7915137			
Site Description			Potential Fish Utilization	
<div>Watershed Size: 12.180 km²</div> <div>Regulated: No</div> <div>Channelized: No</div> <div>Bankfull Width: 31.0 m</div> <div>Wetted Width: 7.0 m</div> <div>Riffle-Crest Depth: 0.12 m</div> <div>Pool Depth: 0.28 m</div> <div>Residual Pool Depth: 0.16 m</div> <div>Bankfull Depth: 0.83 m</div> <div>Bank Height: 0.55 m</div> <div>D₉₅: 0.86 m</div> <div>D: 0.03 m</div> <div>Confinement: Partially Confined</div> <div>Channel Morphology: Riffle-Pool</div> <div>Channel Gradient: 3⁰</div> <div>Turbidity: 0.00 FTU</div> <div>Side Slope: R – 1%; L – 1%</div> <div>Approach: R – 99%; L – 99%</div> <div>Bank Stability: Low-Moderate</div> <div>Erosion Potential: Moderate</div> <div>Undercut Banks: None</div>	<div>Mesohabitat Composition: Riffle – 60%; Pool – 40%</div> <div>Substrate Composition: Cobble – 75%; Gravel – 15%; Boulders – 10%</div> <div>Stream Cover: Boulders – 10%</div> <div>Riparian Vegetation: Grasses and moss</div> <div>Aquatic Vegetation: None</div> <div>Unique Features: None</div> <div>Summary: This is a large-sized waterbody consisting of riffle-pool habitat with mostly cobble substrate. The banks have moderate erosion potential and boulders are the only significant available cover.</div>		Arctic Char	
			Spawning: Unlikely	
			Migration: Unlikely	
			Rearing: Yes	
			Overwintering: None	
			Ninespine Stickleback	
			Spawning: Unlikely	
			Migration: Unlikely	
			Rearing: Unlikely	
			Overwintering: None	
	Fish Habitat Quality		Comments	
	Important		Another tributary of Camp Lake, this site provides suitable habitat for juvenile char to rear or take refuge from larger char in the lake. Spawning likely doesn't occur at the proposed crossing due to low water levels but may occur further downstream closer to the lake. Several small char were captured during fisheries investigations of this creek. The habitat is less suitable for sticklebacks.	
			<div> NORTH/SOUTH CONSULTANTS INC. AQUATIC ENVIRONMENT SPECIALISTS</div>	

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-225
Site: DS

UTM: 17W 557466 7914968
Dates Surveyed: 23-Jun-08, 23-Jul-08

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 1.5°

Hydrology

	Spr	Sum
Bankfull Width (m):	19.20	19.20
Wetted Width (m):	14.60	19.20
Riffle-Crest Depth (m):	0.26	0.25
Pool Depth (m):	0.20	0.25
D₉₅ (m):	0.40	0.40
Point Velocities (m/s)		
Riffle:	0.92	1.03
Pool:	0.12	0.00
Culvert:	2.23	2.85

Stream/Riparian Habitat

Channel Morphology: 70% riffle, 30% pool
Substrate Composition: 40% cobble, 40% sand, 20% gravel
Stream Cover: 30% deep pools, 25% UC banks, 20% lg cobble
Aquatic Vegetation: Periphyton
Riparian Vegetation: Grasses, moss, flowers, willows
Barriers Present (Y/N): Y
Location: Culvert

L/R Bank Characteristics

	Spr	Sum
Bank Height (L/R; m):	0.05/0.05	Flooded
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spr	Sum
Specific Conductance (µS/cm):	31.0	12.2
TDS (g/l):	0.02	0.08
DO (mg/l)	14.13	11.77
%DO:	104.1	NM
Water Temp (°C):	2.5	7.2

Fish Habitat

	Spr	Sum
Spawning:	ARCH - N NNST - N	ARCH - N NNST - L
Feeding:	ARCH - H NNST - L	ARCH - H NNST - M
Migration:	ARCH - H NNST - L	ARCH - M NNST - L

**Baffinland Iron Mines
Mary River Project**



Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) from the habitat assessment downstream of CV-225 during spring 2008.



Figure 2. View upstream (a), downstream (b), and across (c) from the habitat assessment downstream of CV-225 during summer 2008.

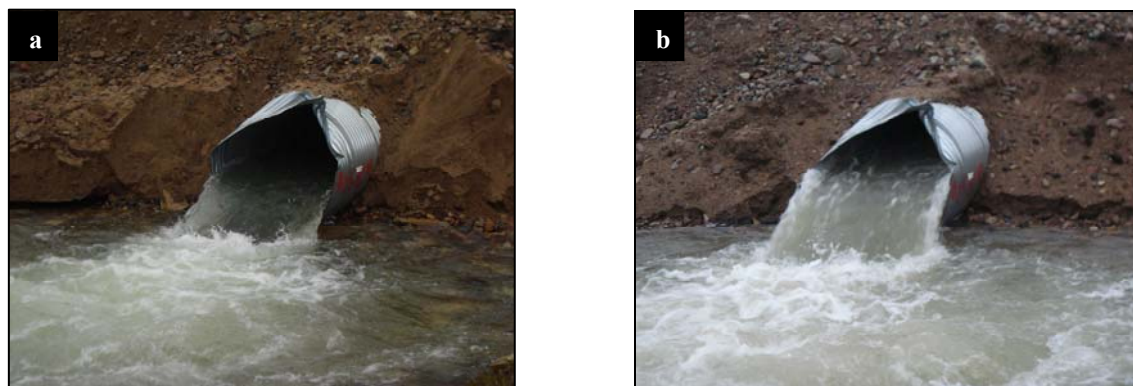


Figure 3. View from the downstream end of the culvert at crossing CV-225 during spring (a) and summer (b) 2008.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-225
Site: US

UTM: 17W 557405 7915080
Dates Surveyed: 23-Jun-08, 23-Jul-08

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 2.5°

Hydrology

	Spr	Sum
Bankfull Width (m):	27.50	27.50
Wetted Width (m):	7.80	27.43
Riffle-Crest Depth (m):	0.20	0.18
Pool Depth (m):	0.31	>1.00
D₉₅ (m):	0.43	0.43
Point Velocities (m/s)		
Riffle/rapid:	1.35	0.47
Pool:	0.01	0.00
Behind a rock:	NA	NA

Stream/Riparian Habitat

Channel Morphology: 75% riffle, 25% pool (spring); 50% run, 25% riffle, 25% pool (summer)

Substrate Composition: 70% cobble, 20% boulder, 10% sand

Stream Cover: 10% deep pools

Aquatic Vegetation: Periphyton,

Riparian Vegetation: Moss, grasses and willows

Barriers Present (Y/N): Y
Location: Culvert

L/R Bank Characteristics

	Spr	Sum
Bank Height (L/R; m):	Undef	Undef
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spr	Sum
Specific Conductance (µS/cm):	32.0	12.3
TDS (g/l):	0.02	0.08
DO (mg/l)	14.05	11.50
%DO:	102.9	NM
Water Temp (°C):	2.0	7.2

Fish Habitat

	Spr	Sum
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - N NNST - N	ARCH - N NNST - N
Migration:	ARCH - N NNST - N	ARCH - N NNST - N

**Baffinland Iron Mines
Mary River Project**



Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) from the habitat assessment upstream of CV-225 during spring 2008.



Figure 2. View upstream (a), downstream (b), and across (c) from the habitat assessment upstream of CV-225 during summer 2008.



Figure 3. View from the upstream end of the culverts at crossing CV-225 during spring (a) and summer (b) 2008.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-225
Site: DS

UTM / Chainage: 17W 557407 7915138 / 98 + 989
Dates Surveyed: 3-Jul-09, 28-Aug-09

Site Description/Physical Characteristics

Confinement: Unconfined

Channel Gradient: 1.5°

Hydrology

	Spring	Fall
Bankfull Width (m):	14.60	14.60
Wetted Width (m):	7.20	7.20
Riffle Depths (m):	0.10, 0.07	0.12, 0.13
Culvert Depth (m):	0.23	0.16
Maximum Depth (m):	>1.00	1.20
Point Velocities (m/s)		
Riffles:	0.38, 0.98	0.34, 0.50
Culvert:	1.79	1.61

Stream/Riparian Habitat

Channel Morphology: 80% riffle, 20% pool

Substrate Composition: 49% lg. cobble, 40% sm. cobble, 5% gravel, 1% boulder

Stream Cover: 50% lg. cobble/ boulder, 20% deep pool

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grasses, willows

Barriers Present (Y/N): Y
Location: Perched culvert prevents access for YOY ARCH

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	0.30	0.30
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	48	227
pH:	8.23	8.46
Water Temp (°C):	5.0	7.2

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - L	ARCH - N NNST - N
Feeding:	ARCH - H NNST - L	ARCH - H NNST - M
Migration:	ARCH - H NNST - L	ARCH - H NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at habitat assessment site downstream of crossing at CV-225 during early July, 2009.

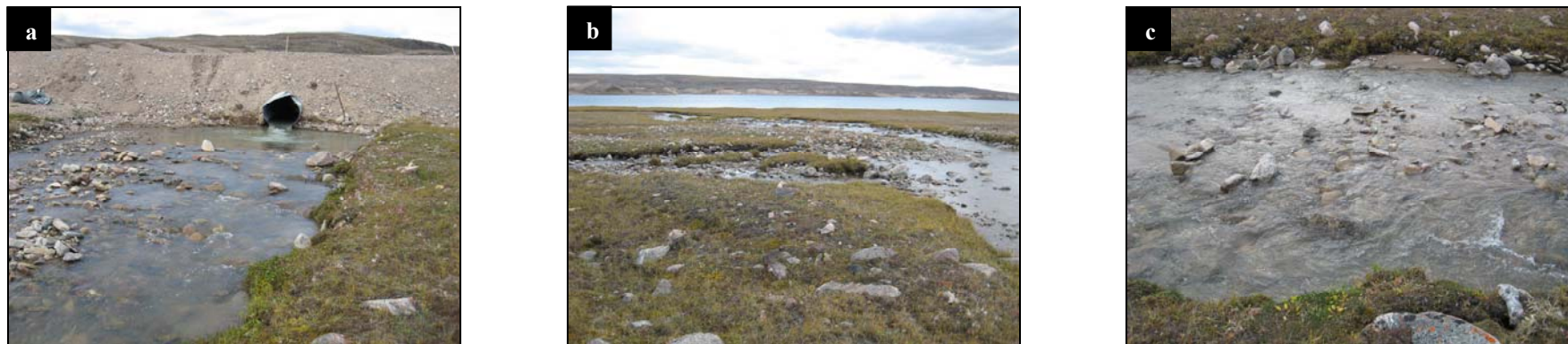


Figure 2. View upstream (a), downstream (b), and across (c) at habitat assessment site downstream of crossing at CV-225 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-225
Site: US

UTM / Chainage: 17W 557407 7915138 / 98 + 989
Dates Surveyed: 3-Jul-09, 28-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 2.5°

Hydrology

	Spring	Fall
Bankfull Width (m):	27.50	27.50
Wetted Width (m):	6.10	3.80
Riffle Depths (m):	0.20, -	0.11, 0.08
Run Depth (m):	0.19	0.35
Culvert Depth (m):	-	0.20
Maximum Depth (m):	0.50	-
Point Velocities (m/s)		
Riffles:	0.86, -	0.86, 0.29
Run:	0.54	0.30
Culvert:	-	1.27

Stream/Riparian Habitat

Channel Morphology: 50% run, 40% cascade, 10% pool

Substrate Composition: 50% sand, 35% lg. cobble, 10% boulder, 5% sm. cobble

Stream Cover: 45% lg. cobble/ boulder, 5% deep pool

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grasses & willows

Barriers Present (Y/N): Y
Location: Perched culvert prevents access for YOY ARCH and NNST

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undef-0.30	Undef-0.30
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	49	-
pH:	8.20	-
Water Temp (°C):	5.0	-

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - H NNST - N	ARCH - H NNST - N
Migration:	ARCH - H NNST - N	ARCH - H NNST - N

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at habitat assessment site upstream of crossing at CV-225 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at habitat assessment site upstream of crossing at CV-225 during late August, 2009.

Bulk Sample Road Watercourse Crossing Assessment



Figure 1: Downstream view from proposed crossing showing riffle-pool habitat and cobble substrate.



Figure 2: Upstream view from proposed crossing showing more riffle-pool habitat.



Figure 3: View across BG-01.

Baffinland Iron Mines
Mary River Project
Watercourse Crossing Assessment

Location

Site: BG-01
UTM: 17W 0557991 / 7914918

Watercourse Name: Unknown River

Site Description

Watershed Size: 5.612 km²
Regulated: No
Channelized: No
Bankfull Width: 5.0 m
Wetted Width: 5.0 m
Riffle-Crest Depth: 0.18 m
Pool Depth: 0.30 m
Residual Pool Depth: 0.12 m
Bankfull Depth: 0.58 m
Bank Height: 0.40 m
D₉₅: 0.80 m
D: 0.06 m
Confinement: Confined
Channel Morphology: Riffle-Pool
Channel Gradient: 3.5⁰
Turbidity: 0.00 FTU
Side Slope: R – 1%; L – 1%
Approach: R – 99%; L – 99%
Bank Stability: Low-Moderate
Erosion Potential: Moderate-High
Undercut Banks: None

Mesohabitat Composition: Riffle – 95%; Pool – 5%
Substrate Composition: Cobble – 70%; Boulders – 20%; Gravel – 5%; Sand – 5%
Stream Cover: Boulders – 20%
Riparian Vegetation: Arctic cotton, moss, willows, and grasses
Aquatic Vegetation: None
Unique Features: None
Summary: This is a medium-sized waterbody consisting largely of riffle habitat with cobble substrate. The banks have moderate-high erosion potential and boulders are the only significant available cover.

Potential Fish Utilization

Arctic Char

Spawning: Unlikely
Migration: Unlikely
Rearing: Yes
Overwintering: None

Ninespine Stickleback

Spawning: Unlikely
Migration: Unlikely
Rearing: Unlikely
Overwintering: None

Fish Habitat Quality

Important

Comments

Site is upstream of Camp Lake and has suitable habitat for juvenile char to rear or take refuge from larger char in the lake. It is unlikely spawning occurs in this tributary since water levels are relatively low during the fall, however it cannot be ruled out completely. Several small char were captured during fisheries investigations of this creek. The habitat is less suitable for sticklebacks.



NORTH/SOUTH
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Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: BG-01
Site: DS

UTM: 17W 557924 7914921
Dates Surveyed: 23-Jun-08, 23-Jul-08

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 1.5°

Hydrology

	Spr	Sum
Bankfull Width (m):	24.00	24.00
Wetted Width (m):	18.40	23.77
Riffle-Crest Depth (m):	0.20	0.30
Pool Depth (m):	0.10	NA
D₉₅ (m):	0.57	0.57
Point Velocities (m/s)		
Pool:	0.13	NA
Riffle:	1.34	1.00
Culvert:	2.93	2.67

Stream/Riparian Habitat

Channel Morphology: 80% riffle, 15% pool, 5% cascade (spring); 100% riffle (summer)

Substrate Composition: 60% cobble, 20% sand, 15% gravel, 5% boulder

Stream Cover: 10% lg cobble, 5% boulders, 1% deep pool

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grasses and moss

Barriers Present (Y/N): Y
Location: Culvert prevents US access by some ARCH

L/R Bank Characteristics

	Spr	Sum
Bank Height (L/R; m):	Undef	Undef
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spr	Sum
Specific Conductance (µS/cm):	64.0	14.1
TDS (g/l):	0.04	0.09
DO (mg/l)	13.69	12.02
%DO:	103.7	NM
Water Temp (°C):	3.5	6.6

Fish Habitat

	Spr	Sum
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - M NNST - N	ARCH - H NNST - L
Migration:	ARCH - L NNST - N	ARCH - L NNST - N

**Baffinland Iron Mines
Mary River Project**



North/South Consultants Inc.
Aquatic Environment Specialists

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across the left and right channels (c) from the habitat assessment downstream of BG-01 during spring 2008.



Figure 2. View upstream (a), downstream (b), and across the left and right channels (c) from the habitat assessment downstream of BG-01 during summer 2008.

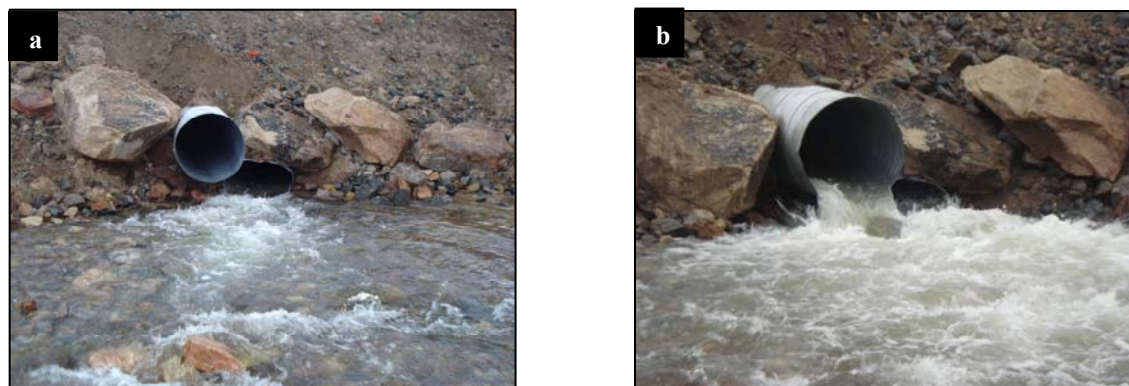


Figure 3. View from the downstream end of the culverts at crossing BG-01 during spring (a) and summer (b) 2008.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: BG-01
Site: US

UTM: 17W 558020 7914937
Dates Surveyed: 23-Jun-08, 23-Jul-08

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 2°

Hydrology

	Spr	Sum
Bankfull Width (m):	25.60	25.60
Wetted Width (m):	4.00	25.60
Riffle-Crest Depth (m):	0.15	0.22
Pool Depth (m):	0.35	1.05
D₉₅ (m):	0.29	0.29
Point Velocities (m/s)		
Riffle:	0.79	0.68
Pool:	0.06	0.06
Run:	NA	0.19

Stream/Riparian Habitat

Channel Morphology: 90% riffle, 10% pool (spring); 50% run, 30% pool, 20% riffle (summer)

Substrate Composition: 90% cobble, 10% gravel

Stream Cover: 25% UC banks, 20% lg cobble, 5% deep pools

Aquatic Vegetation: Periphyton,

Riparian Vegetation: Grasses, willows & moss

Barriers Present (Y/N): Y
Location: Partial culvert barrier

L/R Bank Characteristics

	Spr	Sum
Bank Height (L/R; m):	0.20/0.12	Flooded
Bank Stability:	High	High
Erosion Potential:	Low	Low

Water Quality

	Spr	Sum
Specific Conductance (µS/cm):	64.0	13.6
TDS (g/l):	0.04	0.09
DO (mg/l)	13.70	11.97
%DO:	103.0	NM
Water Temp (°C):	3.3	6.5

Fish Habitat

	Spr	Sum
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - L NNST - N	ARCH - L NNST - N
Migration:	ARCH - L NNST - N	ARCH - L NNST - N

**Baffinland Iron Mines
Mary River Project**



Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) from the habitat assessment upstream of BG-01 during spring 2008.



Figure 2. View upstream (a), downstream (b), and across (c) from the habitat assessment upstream of BG-01 during summer 2008.



Figure 3. View from the upstream end of the culverts at crossing BG-01 during spring (a) and summer (b) 2008.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: BG-01
Site: DS

UTM / Chainage: 17W 557991 7914919 / 99 + 672
Dates Surveyed: 4-Jul-09, 28-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 1.5°

Hydrology

	Spring	Fall
Bankfull Width (m):	23.76	23.76
Wetted Width (m):	17.37	10.10
Riffle Depths (m):	0.11, 0.22, -	0.05, 0.14, 0.12
Pool Depth (m):	0.17	0.14
Culvert Depth (m):	0.20	0.15
Maximum Depth (m):	~ 1.00	0.75
Point Velocities (m/s)		
Riffles:	0.44, 0.53	0.14, 0.67, 0.55
Pool:	0.06	0.00
Culvert:	2.24	2.08

Stream/Riparian Habitat

Channel Morphology: 60% riffle, 40% pool

Substrate Composition: 45% sm. cobble, 30% lg. cobble, 10% sand, 10% gravel, 5% boulder

Stream Cover: 35% lg. cobble/ boulder, 10% deep pool

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grasses, moss, & willow

Barriers Present (Y/N): Y
Location: Perched culvert prevents US access by YOY ARCH

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undef-0.20	Undef-0.20
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	88	237
pH:	8.26	8.34
Water Temp (°C):	12.1	6.7

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - M NNST - N	ARCH - H NNST - L
Migration:	ARCH - L NNST - N	ARCH - L NNST - L

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at BG-01 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at BG-01 during late August, 2009.

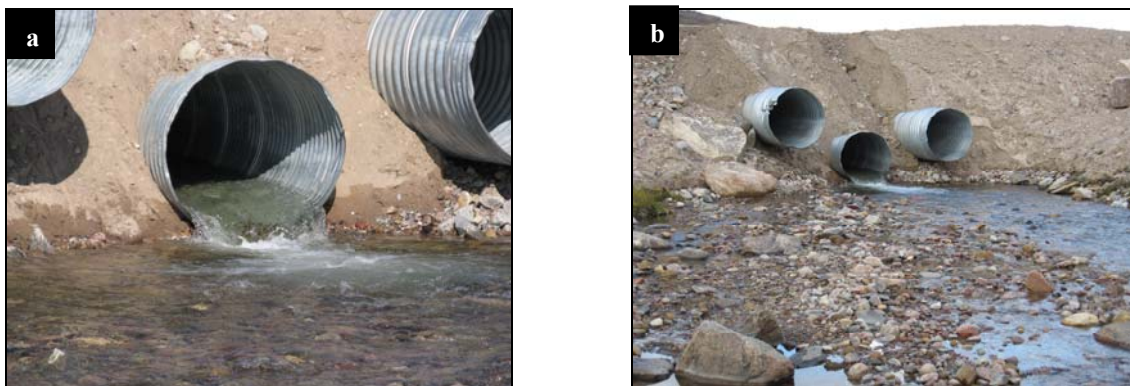


Figure 3. View from the downstream end of the culverts at crossing BG-01 during early July (a) and late August (b), 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: BG-01
Site: US

UTM: 17W 558020 7914937
Dates Surveyed: 4-Jul-09, 28-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 2°

Hydrology

	Spring	Fall
Bankfull Width (m):	23.76	23.76
Wetted Width (m):	6.40	6.40
Riffle Depth (m):	0.20	0.04
Pool Depth (m):	0.42	0.55
Run Depth (m):	0.60	0.23
Culvert Depth (m):	-	0.30
Maximum Depth (m):	0.75	0.55

Point Velocities (m/s)

Riffle:	0.65	0.90
Pool:	0.02	0.05
Run:	0.16	0.23
Culvert:	-	0.74

Stream/Riparian Habitat

Channel Morphology: 40% riffle, 40% run
20% pool

Substrate Composition: 50% lg. cobble, 45%
sm. cobble, 5% gravel

Stream Cover: 30% under-cut
banks, 50% lg.
cobble, 20% deep
pool

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grasses, willows &
moss

Barriers Present (Y/N): Y
Location: Perched culvert
barrier DS

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	0.15-0.30	0.15-0.30
Bank Stability:	High	High
Erosion Potential:	Low	Low

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	82	-
pH:	8.28	-
Water Temp (°C):	12.0	-

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - M NNST - N	ARCH - M NNST - L
Migration:	ARCH - L NNST - N	ARCH - M NNST - L

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at BG-01 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at BG-01 during late August, 2009.



Figure 3. View from the upstream end of the culverts at crossing BG-01 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-186
Site: DS

UTM / Chainage: 17W 560753 7913507 / 102 + 812
Dates Surveyed: 4-Jul-09, 28-Aug-09

Site Description/Physical Characteristics

Confinement: Confined

Channel Gradient: 1.5°

Hydrology

	Spring	Fall
Bankfull Width (m):	7.90	7.90
Wetted Width (m):	4.70	4.60
Riffle Depths (m):	0.08, 0.07	0.04, 0.08
Pool Depth (m):	0.25	0.08
Centre Culvert Depth (m):	0.31	0.25
Maximum Depth (m):	0.31	0.25
Point Velocities (m/s)		
Riffles:	0.42;0.44	0.44, 0.73
Pool:	0.00	0.01
Centre Culvert:	0.13	0.55

Stream/Riparian Habitat

Channel Morphology: 80% riffle, 15% pool, 5% cascade

Substrate Composition: 55% sm. cobble, 29% lg. cobble, 10% gravel, 5% sand, 1% boulder

Stream Cover: 30% lg. cobble/ boulder, 1% deep pool

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grasses, moss, & willow

Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	0.10-0.20	0.10-0.20
Bank Stability:	High	High
Erosion Potential:	Low	Low

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	143	210
pH:	8.35	8.32
Water Temp (°C):	13.6	7.5

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - M NNST - L	ARCH - H NNST - L
Migration:	ARCH - H NNST - L	ARCH - H NNST - L

**Baffinland Iron Mines
Mary River Project**



Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-186 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-186 during late August, 2009.



Figure 3. View from the downstream end of the culverts at crossing CV-186 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-186
Site: US

UTM / Chainage: 17W 560753 7913507 / 102 + 812
Dates Surveyed: 4-Jul-09, 28-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 1.5°

Hydrology

	Spring	Fall
Bankfull Width (m):	4.00	4.00
Wetted Width (m):	3.80	3.20
Riffle Depths (m):	0.09, 0.10	0.09, 0.10
Pool Depth (m):	0.12	0.15
Centre Culvert Depth (m):	0.13	0.17
Maximum Depth (m):	0.15	0.17
Point Velocities (m/s)		
Riffles:	0.44, 0.23	0.26, 0.62
Pool:	0.03	0.01
Centre Culvert:	0.82	1.03

Stream/Riparian Habitat

Channel Morphology: 80% riffle, 10% cascade, 10% pool

Substrate Composition: 60% sm. cobble, 30% lg. cobble, 5% gravel, 5% sand

Stream Cover: 30% lg. cobble

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grasses, willows & moss

Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	0.05-0.30	0.05-0.30
Bank Stability:	High	High
Erosion Potential:	Low	Low

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	144	-
pH:	8.37	-
Water Temp (°C):	13.7	-

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - N	ARCH - N NNST - N
Feeding:	ARCH - M NNST - L	ARCH - H NNST - L
Migration:	ARCH - H NNST - L	ARCH - H NNST - L

**Baffinland Iron Mines
Mary River Project**



Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-186 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-186 during late August, 2009.

Bulk Sample Road Watercourse Crossing Assessment



Figure 1: Downstream view from proposed crossing showing pool habitat and existing culvert.




Figure 2: Upstream view from proposed crossing showing riffle-pool habitat.



Figure 3: View across CV-187.

Baffinland Iron Mines
Mary River Project
Watercourse Crossing Assessment

Location					
Site:	CV-187	Watercourse Name: Unknown River			
UTM:	17W 0562392 / 7912843				
Site Description			Potential Fish Utilization		
<div><div>Watershed Size:</div><div>Regulated:</div><div>Channelized:</div><div>Bankfull Width:</div><div>Wetted Width:</div><div>Riffle-Crest Depth:</div><div>Pool Depth:</div><div>Residual Pool Depth:</div><div>Bankfull Depth:</div><div>Bank Height:</div><div>D₉₅:</div><div>D:</div><div>Confinement:</div><div>Channel Morphology:</div><div>Channel Gradient:</div><div>Turbidity:</div><div>Side Slope</div><div>Approach:</div><div>Bank Stability:</div><div>Erosion Potential:</div><div>Undercut Banks:</div></div>	<div><div>Mesohabitat Composition:</div><div>Substrate Composition:</div><div>Stream Cover:</div><div>Riparian Vegetation:</div><div>Aquatic Vegetation:</div><div>Unique Features:</div><div>Summary:</div></div>	Arctic Char			
		Spawning:	None		
		Migration:	None		
		Rearing:	Yes		
		Overwintering:	None		
		Ninespine Stickleback			
		Spawning:	Unlikely		
		Migration:	Unlikely		
		Rearing:	Unlikely		
		Overwintering:	None		
		Fish Habitat Quality		Comments	
		Important		Abundant pools with some larger substrates represent ideal habitat for juvenile char. Several young char were captured during fisheries investigations There is probably little use by adult char or by sticklebacks.	
		<div><div></div><div><div>NORTH/SOUTH CONSULTANTS INC.</div><div>AQUATIC ENVIRONMENT SPECIALISTS</div></div></div>			

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-187
Site: DS

UTM / Chainage: 17W 560957 7913414 / 103 + 078
Dates Surveyed: 4-Jul-09, 28-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 1°

Hydrology

	Spring	Fall
Bankfull Width (m):	13.71	13.71
Wetted Width (m):	10.97	10.97
Pool Depth (m):	0.30	0.20
Left Culvert Depth (m):	0.26	0.25
Maximum Depth (m):	0.40	0.30
Point Velocities (m/s)		
Pool:	0.00	0.00
Left Culvert:	0.01	0.03

Stream/Riparian Habitat

Channel Morphology: 100% pool

Substrate Composition: 80% sand, 10% gravel, 5% sm. cobble, 5% lg. cobble

Stream Cover: 5% lg. cobble, 40% deep pool

Aquatic Vegetation: Periphyton

Riparian Vegetation: Grasses

Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	0.10-0.20	0.15-0.25
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	160	268
pH:	8.56	8.34
Water Temp (°C):	15.3	7.1

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - L	ARCH - N NNST - N
Feeding:	ARCH - M NNST - L	ARCH - H NNST - L
Migration:	ARCH - L NNST - L	ARCH - L NNST - L

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-187 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-187 during late August, 2009.



Figure 3. View from the downstream end of the culverts at crossing CV-187 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name: CV-187
Site: US

UTM / Chainage: 17W 560957 7913414 / 103 + 078
Dates Surveyed: 4-Jul-09, 28-Aug-09

Site Description/Physical Characteristics

Confinement: Partial

Channel Gradient: 1°

Hydrology

	Spring	Fall
Bankfull Width (m):	10.97	10.97
Wetted Width (m):	9.14	4.30
Pool Depth (m):	0.14	0.22
Left Culvert Depth (m):	0.04	0.06
Maximum Depth (m):	0.25	0.25
Point Velocities (m/s)		
Pool:	0.01	0.00
Left Culvert:	0.25	0.48

Stream/Riparian Habitat

Channel Morphology: 99% pool, 1% riffle
Substrate Composition: 49% lg. cobble, 45% sm. cobble, 5% sand/silt, 1% boulder
Stream Cover: 50% lg cobble/ boulder
Aquatic Vegetation: Periphyton
Riparian Vegetation: Grasses
Barriers Present (Y/N): N
Location: NA

L/R Bank Characteristics

	Spring	Fall
Bank Height (m):	Undef	Undef
Bank Stability:	Mod	Mod
Erosion Potential:	Mod	Mod

Water Quality

	Spring	Fall
Specific Conductance (µS/cm):	165	-
pH:	8.56	-
Water Temp (°C):	15.0	-

Fish Habitat

	Spring	Fall
Spawning:	ARCH - N NNST - L	ARCH - N NNST - N
Feeding:	ARCH - L NNST - L	ARCH - L NNST - L
Migration:	ARCH - L NNST - L	ARCH - L NNST - L

**Baffinland Iron Mines
Mary River Project**



Fish Habitat Quality – IMPORTANT

Tote Road Aquatic Habitat Assessment



Figure 1. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-187 during early July, 2009.



Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-187 during late August, 2009.

Milne Inlet Site Aquatic Habitat Assessment

Location

Watercourse Name: M18-1
UTM Coordinates: 17 W 505207 7976744

Date/Time Surveyed: August 10, 2010 @ 16:05

Photographs



A



B



C



D

Figure 1. (A) Aerial view of stream M18-1; (B) view upstream of habitat assessment; (C) view downstream of habitat assessment; and (D) view across habitat assessment.

APPENDIX 8-2.

DETAILED FISHERIES DATA COLLECTED FROM WATERBODIES ALONG THE MILNE INLET TOTE ROAD, 2006-2010.

Page

Table A8-2.1. Detailed fisheries catch/observation data collected during Tote Road surveys, 2006-2010.....	A8-2_1
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Table A8-2.1. Detailed fisheries catch/observation data collected during Tote Road surveys, 2006-2010.

Crossing ID	Road Chainage (km)	Date	Gear ¹	Duration ²		Species	Total Caught / Observed	CPUE ³	Fork Length (mm)	
				dec.hrs	sec				Mean	Range
CV-183	0.145	07-Aug-06	MT	119.2	-	None	0	0.00	-	-
		07-Aug-06	EF	-	510	ARCH	1	0.12	-	-
		02-Jul-09	OB	-	-	None	0	-	-	-
		26-Aug-09	EF	-	259	None	0	0.00	-	-
CV-181	0.583	02-Jul-09	OB	-	-	None	0	-	-	-
		26-Aug-09	EF	-	168	None	0	0.00	-	-
CV-176	2.638	02-Jul-09	OB	-	-	None	0	-	-	-
		26-Aug-09	EF	-	288	None	0	0.00	-	-
CV-173	4.430	02-Jul-09	OB	-	-	None	0	-	-	-
CV-170	5.267	02-Jul-09	OB	-	-	ARCH ⁴	2	-	-	-
		26-Aug-09	EF	-	357	None	0	0.00	-	-
CV-167	5.960	02-Jul-09	OB	-	-	None	0	-	-	-
CV-166	6.056	02-Jul-09	OB	-	-	None	0	-	-	-
		26-Aug-09	EF	-	366	None	0	0.00	-	-
CV-159	8.407	02-Jul-09	OB	-	-	None	0	-	-	-
		26-Aug-09	EF	-	300	None	0	0.00	-	-
CV-157	8.960	02-Jul-09	OB	-	-	None	0	-	-	-
		26-Aug-09	EF	-	300	None	0	0.00	-	-
CV-156	9.223	07-Aug-06	OB	-	-	None	0	-	-	-
CV-154	9.570	02-Jul-09	OB	-	-	None	0	-	-	-
		26-Aug-09	EF	-	324	None	0	0.00	-	-
CV-153	10.218	02-Jul-09	OB	-	-	None	0	-	-	-
CV-152	10.280	02-Jul-09	OB	-	-	None	0	-	-	-
CV-151	10.460	02-Jul-09	OB	-	-	None	0	-	-	-
CV-146	11.348	07-Aug-06	OB	-	-	None	0	-	-	-
CV-129	15.650	24-Jun-08	EF	-	541	ARCH	4	0.44	160	83-203
		23-Jul-08	EF	-	540	ARCH	1	0.11	98	-
		02-Jul-09	OB	-	-	ARCH	2	-	-	-
		26-Aug-09	EF	-	582	ARCH	3	0.31	131	95-163
		06-Aug-10	EF	-	420	ARCH	9	1.29	135	94-187
		06-Aug-10	EF	-	420	NNST	1	0.14	42	-

Table A8-2.1. - Continued -

Crossing ID	Road Chainage (km)	Date	Gear ¹	Duration ²		Species	Total Caught / Observed	CPUE ³	Fork Length (mm)	
				dec.hrs	sec				Mean	Range
CV-128	17.486	07-Aug-06	MT	117.0	-	ARCH	1	0.01	84	-
		07-Aug-06	EF	-	655	None	0	0.00	-	-
		02-Jul-09	OB	-	-	ARCH	1	-	-	-
		27-Aug-09	OB	-	-	ARCH	1	-	-	-
CV-125	20.447	02-Jul-09	OB	-	-	None	0	-	-	-
CV-120	23.515	02-Jul-09	OB	-	-	None	0	-	-	-
CV-119	24.264	02-Jul-09	OB	-	-	None	0	-	-	-
		27-Aug-09	OB	-	-	None	0	-	-	-
CV-115	27.686	03-Jul-09	OB	-	-	None	0	-	-	-
		27-Aug-09	EF	-	403	None	0	0.00	-	-
CV-114	29.647	07-Aug-06	EF	-	170	ARCH	1	0.35	63	-
		03-Jul-09	OB	-	-	None	0	-	-	-
		27-Aug-09	EF	-	487	ARCH	4	0.49	75	55-108
		06-Aug-10	EF	-	480	ARCH	8	1.00	70	55-97
CV-113	30.655	03-Jul-09	OB	-	-	None	0	-	-	-
		27-Aug-09	OB	-	-	None	0	-	-	-
CV-112	31.450	03-Jul-09	OB	-	-	ARCH	Several	-	-	-
		27-Aug-09	OB	-	-	ARCH	Several	-	-	-
		27-Aug-09	EF	-	260	None	0	0.00	-	-
		06-Aug-10	EF	-	420	ARCH	6	0.86	65	55-83
		10-Aug-10	EF	-	390	ARCH	16	2.46	58	40-83
CV-111	31.990	03-Jul-09	OB	-	-	None	0	-	-	-
		27-Aug-09	EF	-	462	ARCH	9	1.17	78	53-114
CV-202	32.825	03-Jul-09	OB	-	-	None	0	-	-	-
		27-Aug-09	OB	-	-	None	0	-	-	-
CV-106	33.170	03-Jul-09	OB	-	-	ARCH	1	-	-	-
		27-Aug-09	OB	-	-	None	0	-	-	-
CV-104	33.794	07-Aug-06	EF	-	345	ARCH	3	0.52	-	-
		03-Jul-09	OB	-	-	ARCH	Many	-	-	-
		27-Aug-09	OB	-	-	None	0	-	-	-

Table A8-2.1. - Continued -

Crossing ID	Road Chainage (km)	Date	Gear ¹	Duration ²		Species	Total Caught / Observed	CPUE ³	Fork Length (mm)	
				dec.hrs	sec				Mean	Range
CV-203	34.153	23-Jun-08	OB	NM - Not fish bearing						
		03-Jul-09	OB	-	-	None	0	-	-	-
CV-102	36.028	03-Jul-09	OB	-	-	None	0	-	-	-
		27-Aug-09	EF	-	335	ARCH	4	0.72	46	45-48
CV-099	37.840	07-Aug-06	MT	229.4	-	ARCH	19	0.08	97	68-122
		24-Jun-08	EF	-	558	ARCH	10	1.08	137	126-148
		22-Jul-08	EF	-	990	ARCH	16	0.97	83	64-129
		03-Jul-09	OB	-	-	None	0	-	-	-
		27-Aug-09	EF	-	368	ARCH	12	1.96	103	90-145
		06-Aug-10	OB	-	-	ARCH	1	-	-	80
CV-095	41.100	07-Aug-06	OB	-	-	None	0	-	-	-
CV-094	41.613	24-Jun-08	EF	-	720	ARCH ⁵	3	0.25	141	130-151
		23-Jul-08	EF	-	600	ARCH ⁵	2	0.20	122	119-125
		03-Jul-09	OB	-	-	None	0	-	-	-
		27-Aug-09	OB	-	-	None	0	-	-	-
CV-093	42.216	07-Aug-06	OB	-	-	None	0	-	-	-
CV-092	42.949	07-Aug-06	OB	-	-	None	0	-	-	-
CV-087	46.223	07-Aug-06	OB	-	-	None	0	-	-	-
CV-086	46.300	03-Jul-09	OB	-	-	None	0	-	-	-
CV-082	49.655	03-Jul-09	OB	-	-	None	0	-	-	-
CV-079	50.600	27-Jul-08	EF	-	1380	ARCH	48	2.09	93	38-158
		03-Jul-09	OB	-	-	None	0	-	-	-
		27-Aug-09	OB	-	-	ARCH	Many	-	-	90-150
CV-207	50.762	08-Sep-08	EF	-	772	ARCH	2	0.16	132	131-133
CV-078	51.171	07-Aug-06	MT	113.0		ARCH	20	0.18	114	80-150
		03-Jul-09	OB	-	-	ARCH	Many	-	-	-
		27-Aug-09	OB	-	-	ARCH	Many	-	-	90-200
		05-Aug-10	EF	-	600	ARCH	27	2.70	97	63-143
CV-076	53.028	03-Jul-09	OB	-	-	ARCH	Many	-	-	-
		27-Aug-09	OB	-	-	ARCH	Many	-	-	50-70

Table A8-2.1. - Continued -

Crossing ID	Road Chainage (km)	Date	Gear ¹	Duration ²		Species	Total Caught / Observed	CPUE ³	Fork Length (mm)	
				dec.hrs	sec				Mean	Range
CV-072	53.878	03-Jul-09	OB	-	-	None	0	-	-	-
		27-Aug-09	EF	-	614	ARCH	10	0.98	77	63-105
CV-060	58.856	07-Aug-06	MT	112.1	-	ARCH	25	0.22	100	75-120
		03-Jul-09	OB	-	-	ARCH	Many	-	-	-
		27-Aug-09	OB	-	-	ARCH	Many	-	-	60-100
		03-Jul-09	OB	-	-	None	0	-	-	-
CV-059	59.960	27-Aug-09	EF	-	384	ARCH	4	0.63	84	80-87
		04-Jul-09	OB	-	-	None	0	-	-	-
CV-058	60.523	27-Aug-09	EF	-	326	ARCH	3	0.55	92	85-100
		07-Aug-06	MT	111.4	-	ARCH	10	0.09	118	95-135
CV-057	60.712	04-Jul-09	OB	-	-	None	0	-	-	-
		27-Aug-09	EF	-	316	ARCH	3	0.57	99	70-120
		07-Aug-06	OB	-	-	None	0	-	-	-
CV-055	61.904	08-Aug-06	MT	95.8	-	ARCH	1	0.01	114	-
		24-Jun-08	EF	-	518	ARCH	6	0.69	149	95-178
BG-50	62.804	23-Jul-08	EF	-	540	ARCH	4	0.44	93	71-107
		23-Jul-08	EF	-	540	NNST	3	0.33	52	51-53
		04-Jul-09	OB	-	-	None	0	-	-	-
		28-Aug-09	EF	-	617	ARCH	18	1.75	153	74-280
		05-Aug-10	EF	-	480	ARCH	4	0.50	133	101-160
		08-Aug-06	MT	95.1	-	None	0	0.00	-	-
		04-Jul-09	OB	-	-	ARCH	2	-	-	-
		28-Aug-09	OB	-	-	ARCH	Several	-	-	-
CV-048	64.312	04-Jul-09	OB	-	-	None	0	-	-	-
		28-Aug-09	EF	-	348	None	0	0.00	-	-
CV-046	66.490	04-Jul-09	OB	-	-	None	0	-	-	-
		28-Aug-09	EF	-	273	None	0	0.00	-	-

Table A8-2.1. - Continued -

Crossing ID	Road Chainage (km)	Date	Gear ¹	Duration ²		Species	Total Caught / Observed	CPUE ³	Fork Length (mm)	
				dec.hrs	sec				Mean	Range
CV-040	72.263	08-Aug-06	MT	94.6	-	None	0	0.00	-	-
		24-Jun-08	EF	-	415	None	0	0.00	-	-
		23-Jul-08	EF	-	340	None	0	0.00	-	-
		04-Jul-09	OB	-	-	None	0	-	-	-
		28-Aug-09	OB	-	-	None	0	-	-	-
		05-Aug-10	OB	-	-	None	0	-	-	-
CV-030	77.506	04-Jul-09	OB	-	-	ARCH	1	-	-	-
		04-Jul-09	OB	-	-	NNST	1	-	-	-
		28-Aug-09	OB	-	-	None	0	-	-	-
BG-32	78.161	04-Jul-09	OB	-	-	ARCH	1	-	-	-
		28-Aug-09	OB	-	-	ARCH	Many	-	-	50-60
		05-Aug-10	OB	-	-	ARCH	Many	-	-	50-150
		05-Aug-10	OB	-	-	NNST	Several	-	-	50-60
CV-217	79.915	08-Aug-06	MT	186.0	-	NNST	1	0.01	50	-
		04-Jul-09	OB	-	-	ARCH	Many	-	-	-
		28-Aug-09	OB	-	-	ARCH	Many	-	-	YOY-300
		06-Aug-10	EF	-	420	ARCH	24	3.43	72	55-141
		06-Aug-10	EF	-	420	NNST	7	1.00	49	38-60
CV-216	80.646	08-Aug-06	OB	-	-	None	0	-	-	-
		04-Jul-09	OB	-	-	None	0	-	-	-
		28-Aug-09	OB	-	-	ARCH	Many	-	-	50-70
BG-31	82.076	05-Aug-10	OB	-	-	ARCH	3	-	-	80-100
BG-30	84.636	05-Aug-10	OB	-	-	None	0	-	-	-
BG-29	84.805	04-Jul-09	OB	-	-	ARCH	Several	-	-	-
		04-Jul-09	OB	-	-	NNST	Several	-	-	-
		28-Aug-09	OB	-	-	ARCH	Many	-	-	-
BG-28	86.263	08-Aug-06	OB	-	-	None	0	-	-	-

Table A8-2.1. - Continued -

Crossing ID	Road Chainage (km)	Date	Gear ¹	Duration ²		Species	Total Caught / Observed	CPUE ³	Fork Length (mm)	
				dec.hrs	sec				Mean	Range
BG-27	86.609	08-Aug-06	OB	-	-	None	0	-	-	-
		04-Jul-09	OB	-	-	ARCH	1	-	-	-
		28-Aug-09	EF	-	290	ARCH	2	0.41	73	72-73
		06-Aug-10	EF	-	600	ARCH	20	2.00	71	55-106
		10-Aug-10	EF	-	480	ARCH	11	1.38	71	49-97
BG-24	87.710	08-Aug-06	MT	90.3	-	ARCH	15	0.17	109	93-138
		23-Jun-08	EF	-	727	ARCH	12	0.99	101	78-145
		23-Jul-08	EF	-	960	ARCH	32	2.00	94	50-378
		04-Jul-09	OB	-	-	ARCH	Many	-	-	-
		28-Aug-09	EF	-	642	ARCH	38	3.55	110	75-185
BG-17	90.167	10-Aug-06	MT	43.8	-	ARCH	3	0.07	111	90-137
		04-Jul-09	OB	-	-	None	0	-	-	-
		28-Aug-09	EF	-	591	ARCH	21	2.13	114	46-179
		28-Aug-09	EF	-	591	NNST	2	0.20	67	61-72
BG-16	90.218	10-Aug-06	OB	-	-	None	0	-	-	-
		04-Jul-09	OB	-	-	None	0	-	-	-
		28-Aug-09	OB	-	-	None	0	-	-	-
BG-04	94.148	04-Jul-09	OB	-	-	ARCH	Many	-	-	-
		28-Aug-09	OB	-	-	None	0	-	-	-
CV-001	94.728	30-Aug-09	OB	-	-	ARCH	Several	-	-	50-100
		30-Aug-09	OB	-	-	NNST	Many	-	-	YOY
		05-Aug-10	OB	-	-	ARCH	Several	-	-	50-100
		05-Aug-10	OB	-	-	NNST	Many	-	-	YOY
CV-223	97.155	27-Jul-06	MT	19.3	-	None	0	0.00	-	-
		27-Jul-06	EF	-	1125	ARCH	5 to 10	-	-	-
		04-Jul-09	OB	-	-	None	0	-	-	-
		28-Aug-09	EF	-	380	ARCH	22	3.47	145	95-232
CV-224	97.758	27-Jul-06	OB	-	-	ARCH	>10	-	-	-
		04-Jul-09	OB	-	-	ARCH	Many	-	-	-
		28-Aug-09	OB	-	-	ARCH	Many	-	-	50-60

Table A8-2.1. - Continued -

Crossing ID	Road Chainage (km)	Date	Gear ¹	Duration ²		Species	Total Caught / Observed	CPUE ³	Fork Length (mm)	
				dec.hrs	sec				Mean	Range
CV-225	98.989	28-Jul-06	EF	-	755	ARCH	11	0.87	51	36-123
		23-Jun-08	EF	-	527	ARCH	8	0.91	85	75-90
		23-Jun-08	EF	-	527	NNST	1	0.11	-	-
		23-Jul-08	EF	-	720	ARCH	33	2.75	90	45-145
		04-Jul-09	OB	-	-	None	0	-	-	-
		28-Aug-09	EF	-	681	ARCH	98	8.63	121	47-181
		06-Aug-10	EF	-	540	ARCH	87	9.67	-	52-177
BG-01	99.672	27-Jul-06	MT	161.4	-	ARCH	4	0.02	103	90-117
		27-Jul-06	EF	-	495	ARCH	4	0.48	135	84-158
		23-Jun-08	EF	-	661	ARCH	13	1.18	88	70-127
		23-Jul-08	EF	-	650	ARCH	16	1.48	107	70-139
		04-Jul-09	OB	-	-	ARCH	Many	-	-	-
		28-Aug-09	EF	-	528	ARCH	55	6.25	147	71-227
		28-Aug-09	EF	-	528	NNST	2	0.23	53	45-61
		06-Aug-10	EF	-	480	ARCH	317	39.63	-	50-209
		06-Aug-10	EF	-	480	NNST	1	0.13	-	-
		04-Jul-09	OB	-	-	ARCH	Many	-	-	-
CV-186	102.812	28-Aug-09	OB	-	-	ARCH	Many	-	-	-
		28-Jul-06	MT	139.1	-	ARCH	2	0.01	114	112-115
CV-187	103.078	28-Jul-06	EF	-	660	ARCH	5	0.45	94	75-110
		04-Jul-09	OB	-	-	ARCH	2	-	-	-
		28-Aug-09	OB	-	-	ARCH	2	-	-	100-150
		05-Aug-10	OB	-	-	ARCH	3	-	-	100-150

1 - EF = electrofishing, MT = minnow traps, OB = observational surveys

2 - Duration described as decimal hours for minnow trap sets and seconds for backpack electrofishing

3 - Catch-per-unit-effort (CPUE) calculated as #fish/hour of minnowtrapping or #fish/minute of electrofishing

4 - Arctic char recorded in CV-170 were all captured/observed ~300m downstream, below a probable barrier

5 - Arctic char recorded in CV-094 were all captured/observed downstream of the falls at 30 m DS from the crossing