APPENDIX 8-1.

DETAILED AQUATIC HABITAT ASSESSMENTS FOR WATERBODIES ALONG THE MILNE INLET TOTE ROAD.

Exploration Property Aquatic Habitat Assessment

Location

Watercourse Name:	**UTM / Chainage:**
Site:	**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 (µS/cm):		
pH:		
Water Temp (˚C):		

Fish Habitat

	Spring	Fall
Spawning:	ARCH - NNST -	ARCH - NNST -
Feeding:	ARCH - NNST -	ARCH - NNST -
Migration:	ARCH - NNST -	ARCH - NNST -

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Exploration Property Aquatic Habitat Assessment

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Figure 1.

Figure 2. .

Milne Inlet

504,000
505,500
507,000
508,500

N

CV-183
CV-180
CV-181
CV-182
CV-179
CV-178
CV-177
CV-176
CV-175
CV-174
CV-173
CV-172
CV-171
CV-170
CV-169
CV-168
CV-167
CV-166
CV-165
CV-164
CV-163
CV-162
CV-161
CV-159
CV-158
CV-157
CV-156
CV-155
CV-154
CV-153
CV-152
CV-151
CV-150
CV-149

7,975,500
7,974,000
7,972,500
7,971,000
7,969,500

Phillips Creek

0.5 0.25 0 0.5 km
SCALE

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 M AND IS IN METRES.

REV	DD/MMM/10	ISSUED FOR	-	-	-	-
REV	01/09/2010	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

Milne Inlet Tote Road - 3a

North/South Consultants Inc.
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P/A NO.	REF NO.
-	-
DATE: 01/09/2010	REV 1

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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

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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

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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: Periphtyon

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

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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

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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

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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

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): Y

Location: Inaccessible from DS ~200 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

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Fish Habitat Quality – NOT FISH-BEARING

Tote Road Aquatic Habitat Assessment

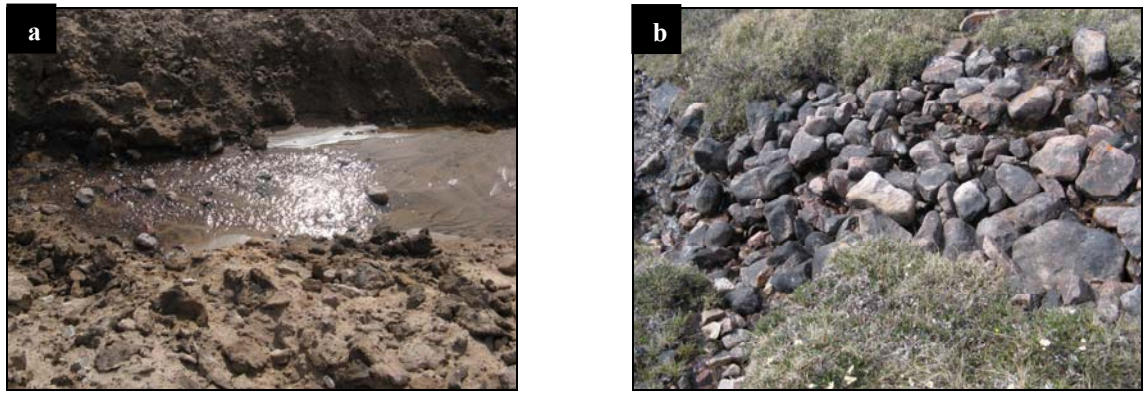

Figure 1. View across (a) and of barrier (b) at the habitat assessment site downstream of the crossing at CV-173 during spring, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name:	CV-170	**UTM / Chainage:**	17W 505015 7972923 / 5 + 267
Site:	DS	**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

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Fish Habitat Quality – NOT FISH-BEARING

Tote Road Aquatic Habitat Assessment

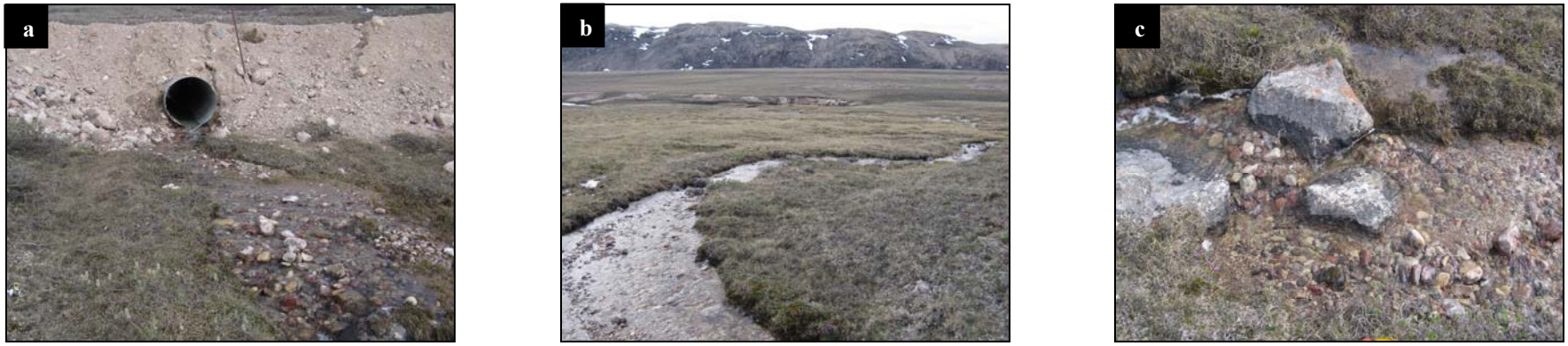

Figure 1.View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-170 during early July, 2009.

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

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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

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): Y

Location: Inaccessible from US ~30 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

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Fish Habitat Quality – NOT FISH-BEARING

Tote Road Aquatic Habitat Assessment

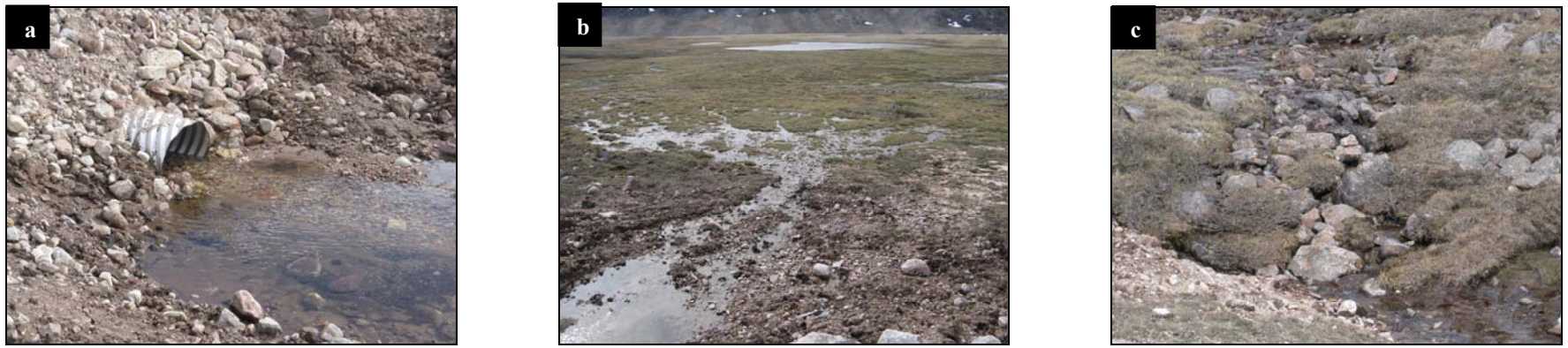

Figure 1.View upstream (a) and downstream (b) at the habitat assessment site downstream of the crossing and the upstream barrier (c) at CV-167 during spring, 2009.

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

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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

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Aquatic Environment Specialists

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	**UTM / Chainage:**	17W 506909 7970830 / 8 + 407
Site:	DS	**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

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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

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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

North/South Consultants Inc.
Aquatic Environment Specialists

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

North/South Consultants Inc.
Aquatic Environment Specialists

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

Figure 1: Downstream view from proposed crossing with Phillips Creek visible. Riffle habitat type with predominantly sand/gravel substrate.

Figure 2: Upstream view from proposed crossing showing relatively steep gradient.

Figure 3: View across CV-156.

Baffinland Iron Mines
Mary River Project
Watercourse Crossing Assessment

Location

Site: CV-156

UTM: 17W 0507580 / 7970389

Watercourse Name: Unknown River

Site Description

Watershed Size:	0.066 km^2
Regulated:	No
Channelized:	No
Bankfull Width:	0.60 m
Wetted Width:	0.26 m
Riffle Crest Depth:	0.03 m
Residual Pool Depth:	N/A
Bankfull Depth:	0.10 m
Bank Height:	0.07 m
D_{95}:	0.16 m
D:	0.001 m
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

Mesohabitat Composition:	Riffle – 100%
Substrate Composition:	Sand – 75%; Gravel – 20%; Cobble – 5%
Stream Cover:	In- and Overstream vegetation – 2%;
Riparian Vegetation:	Grasses
Aquatic Vegetation:	Submerged grasses
Unique Features:	None
Summary:	This is an extra small, nearly waterless stream with predominantly sand substrate and low-moderate erosion potential. There is relatively little significant cover.

Fish Habitat Quality

None

Potential Fish Utilization

Arctic Char

Spawning:	No
Migration:	No
Rearing:	No
Overwintering:	No

Ninespine Stickleback

Spawning:	No
Migration:	No
Rearing:	No
Overwintering:	No

Comments

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.

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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

North/South Consultants Inc.
Aquatic Environment Specialists

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	**UTM / Chainage:**	17W 507620 7970076 / 9 + 570
Site:	US	**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

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Aquatic Environment Specialists

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

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

	Spring
Spawning:	ARCH - N NNST - N
Feeding:	ARCH - N NNST - N
Migration:	ARCH - N NNST - N

Baffinland Iron Mines
Mary River Project

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Aquatic Environment Specialists

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

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Fish Habitat Quality – NOT FISH-BEARING

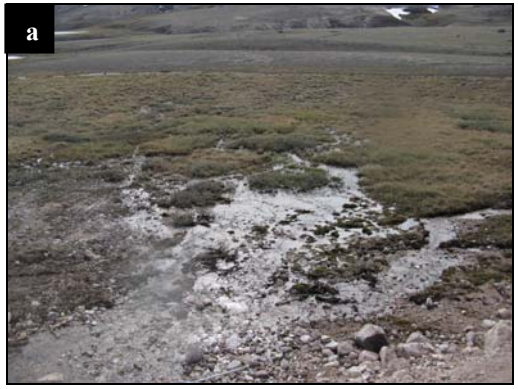

Figure 1.View downstream (a) and upstream (b) of the crossing at CV-152 during early July, 2009.

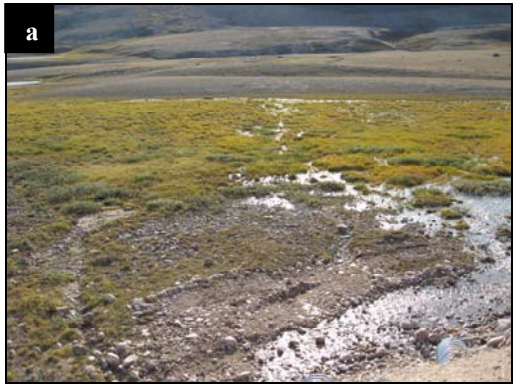

Figure 2. View downstream (a) of the crossing at CV-152 during late August, 2009.

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

Channel Gradient: N/M

Hydrology

	Spring
Bankfull Width (m):	N/M
Wetted Width (m):	N/M
Depths (m):	N/M
Culvert Depth (m):	0.01-0.07
Maximum Depth (m):	N/M
Point Velocities (m/s)	
Culvert:	0.20-0.75

Stream/Riparian Habitat

Channel Morphology: 80% cascade, 15% riffle, 5% pool

Substrate Composition: N/M

Stream Cover: N/M

Aquatic Vegetation: N/M

Riparian Vegetation: N/M

Barriers Present (Y/N): Y

Location: DS ~ 500 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

North/South Consultants Inc.
Aquatic Environment Specialists

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.

510,000

512,000

7,970,000

CV-149

CV-147

CV-148

CV-146

CV-145

CV-144

CV-142

CV-143

CV-141

CV-140

CV-139

CV-138

7,968,000

CV-137

CV-136

CV-135

CV-134

CV-133

CV-132

CV-131

CV-130

CV-195

CV-129

CV-196

Phillips Creek

7,966,000

CV-128

7,964,000

0.5 0.25 0 0.5 km

SCALE

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 M AND IS IN METRES.

REV	DDMMM10	ISSUED FOR	-	-	-	-
-	01/09/2010	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D

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

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

Bulk Sample Road Watercourse Crossing Assessment

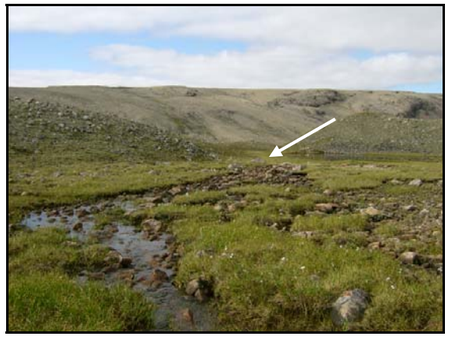

Figure 1: Downstream view from proposed crossing. Riffle-pool habitat type with predominantly cobble/sand substrate. Falls begin at the arrow.

Figure 2: Upstream view from proposed crossing showing pool habitat.

Figure 3: View across CV-146.

Baffinland Iron Mines
Mary River Project
Watercourse Crossing Assessment

Location

Site: CV-146

UTM: 17W 0508786 / 7968870

Watercourse Name: Unknown River

Site Description

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
D_{95}:	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%
Substrate Composition:	Cobble – 65%; Sand – 25%; Boulders – 5%; Silt/Organic – 5%
Stream Cover:	Boulders – 5%; In- and Overstream Vegetation - 5%
Riparian Vegetation:	Grasses
Aquatic Vegetation:	Submerged grasses
Unique Features:	None
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.

Fish Habitat Quality

None

Potential Fish Utilization

Arctic Char

Spawning:	No
Migration:	No
Rearing:	No
Overwintering:	No

Ninespine Stickleback

Spawning:	No
Migration:	No
Rearing:	No
Overwintering:	No

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.

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AQUATIC ENVIRONMENT SPECIALISTS

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name:	CV-129	**UTM / Chainage:**	17W 512381 7966783 / 15 + 650
Site:	DS	**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

North/South Consultants Inc.
Aquatic Environment Specialists

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

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	**UTM:**	17W 512381 7966765
Site:	DS	**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
D_{95} (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

North/South Consultants Inc.
Aquatic Environment Specialists

Tote Road Aquatic Habitat Assessment

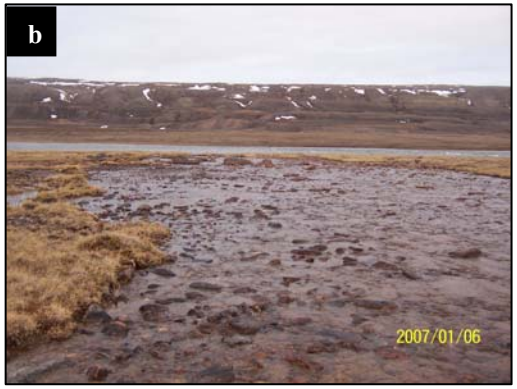

Figure 1.View upstream (a), downstream (b), and across (c) from the habitat assessment downstream of CV-129 during spring 2008.

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	**UTM:**	17W 512370 7966779
Site:	US	**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
D_{95} (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

Tote Road Aquatic Habitat Assessment

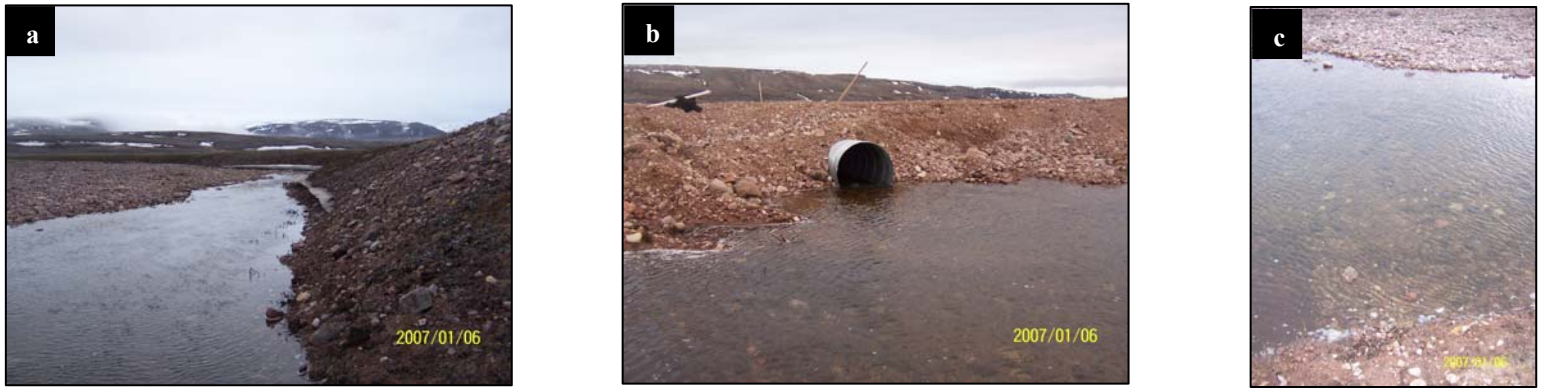

Figure 1.View upstream (a), downstream (b), and across (c) from the habitat assessment upstream of CV-129 during spring 2008.

Figure 2. View upstream (a), downstream (b), and across (c) from the habitat assessment upstream of CV-129 during summer 2008.

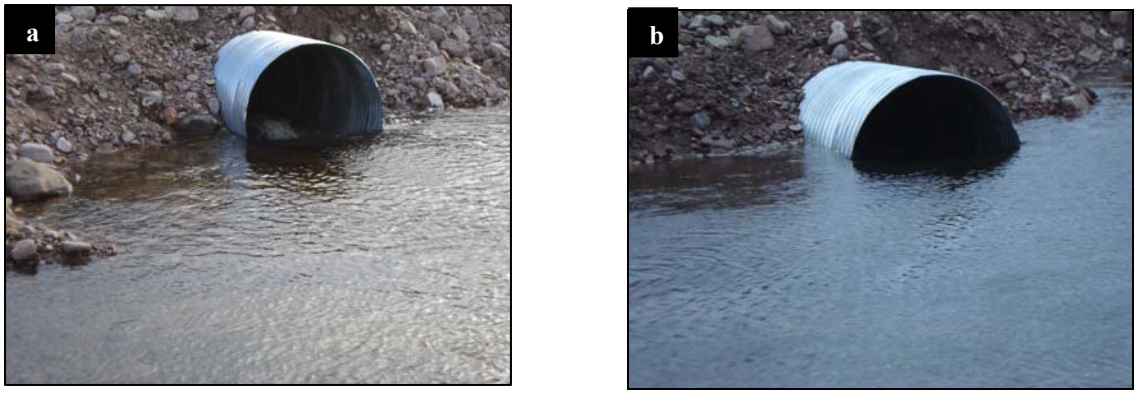

Figure 3. View from the upstream end of the culverts at crossing CV-129 during spring (a) and summer (b) 2008.

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.

Baffinland Iron Mines
Mary River Project
Watercourse Crossing Assessment

Location

Site: CV-128

UTM: 17W 0513544 / 7965894

Watercourse Name: Unknown River

Site Description

Watershed Size:	251.57 km^2
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
D_{95}:	0.51 m
D:	0.07 m
Confinement:	Unconfined
Channel Morphology:	Riffle-pool
Channel Gradient:	1^0
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.

Fish Habitat Quality

Important

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

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.

NORTH/SOUTH CONSULTANTS INC.
AQUATIC ENVIRONMENT SPECIALISTS

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

North/South Consultants Inc.
Aquatic Environment Specialists

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.

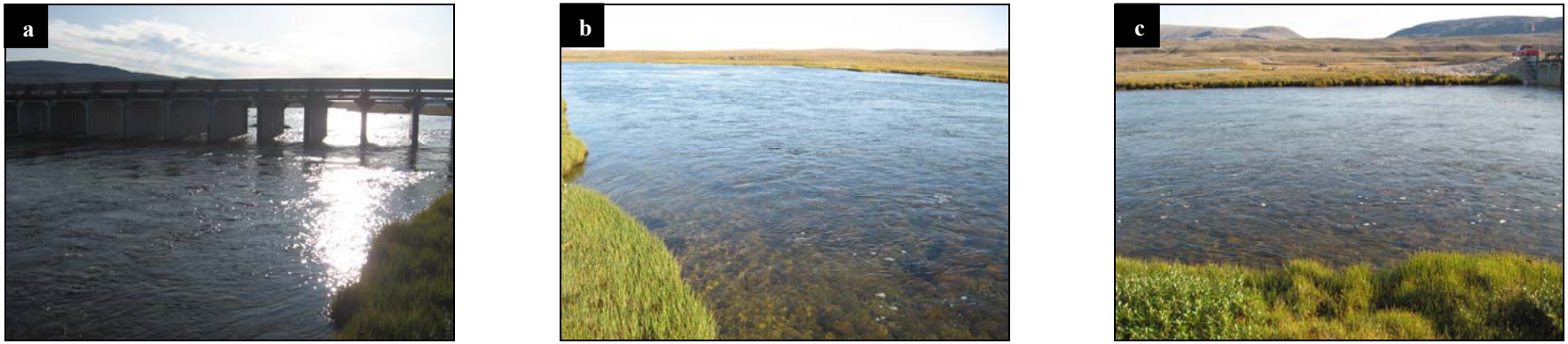

Figure 2. View upstream (a), downstream (b), and across (b) at the habitat assessment site downstream of the crossing at CV-128 during late August, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name:	CV-128	**UTM / Chainage:**	17W 513545 7965895 / 17 + 486
Site:	US	**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

Tote Road Aquatic Habitat Assessment

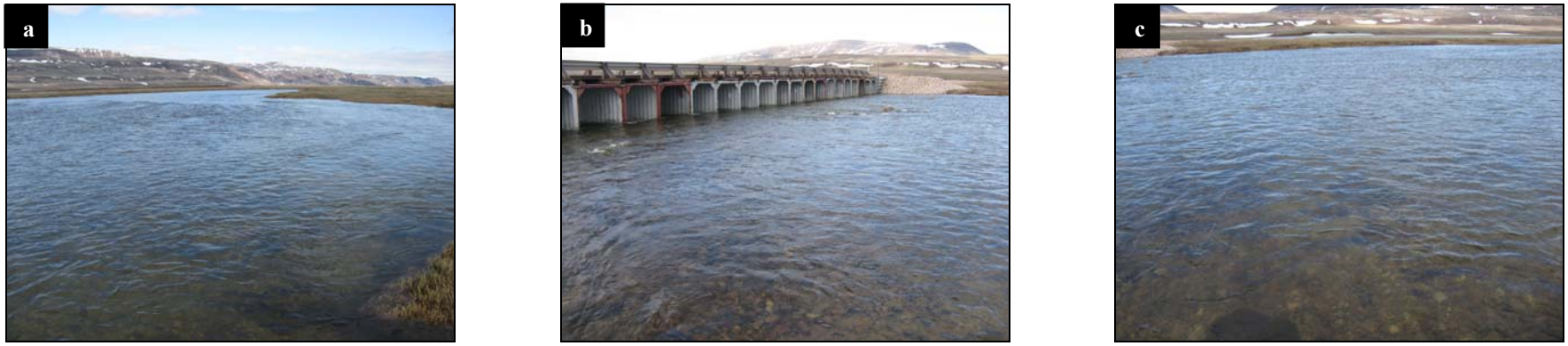

Figure 1.View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-128 during early July, 2009.

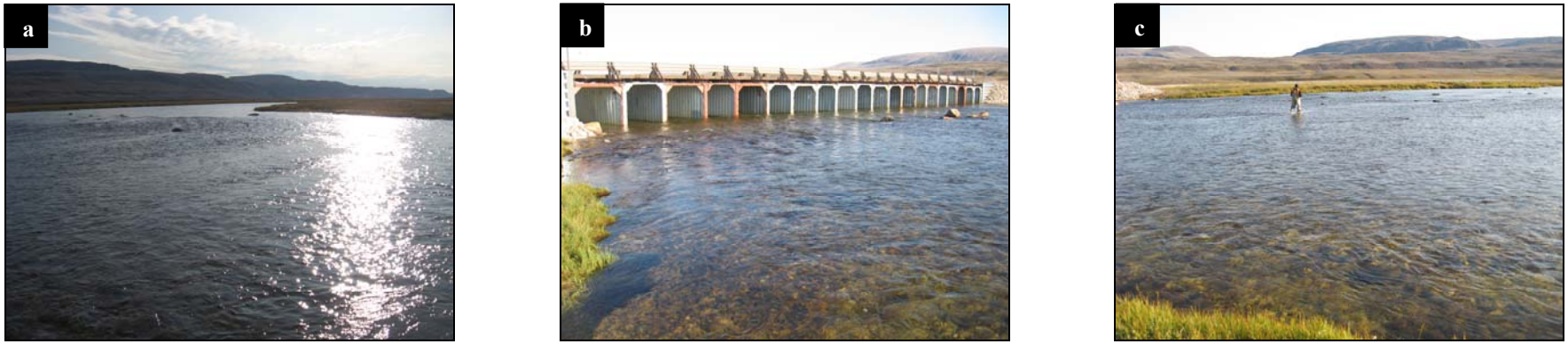

Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site upstream of the crossing at CV-128 during late August, 2009.

514,000
516,000
518,000
7,966,000
7,964,000
7,962,000
7,960,000
N
CV-128
CV-127
CV-126
CV-125
CV-124
CV-123
CV-122
CV-121
CV-120
CV-119
CV-197
CV-118
CV-198
CV-199
CV-117
CV-116
CV-115
Phillips Creek
27 km Lake
0.5 0.25 0 0.5 km
SCALE

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 M AND IS IN METRES.

REV	DD/MMM/10	ISSUED FOR	DESIGNED	DRAWN	CHK'D	APP'D
-	01/09/2010	-	-	-	-	-

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

Path: \\erastation\GIS\Projects\Other\Mary River Freshwater\2010\Cenrtd_Data\Report_Maps\ToteRD

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name:	CV-125	**UTM / Chainage:**	17W 515296 7963841 / 20 + 447
Site:	DS	**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

North/South Consultants Inc.
Aquatic Environment Specialists

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
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
Feeding:	ARCH - N NNST - N	ARCH - N NNST - N
Migration:	ARCH - N NNST - N	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 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

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): Y
Location: culvert

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

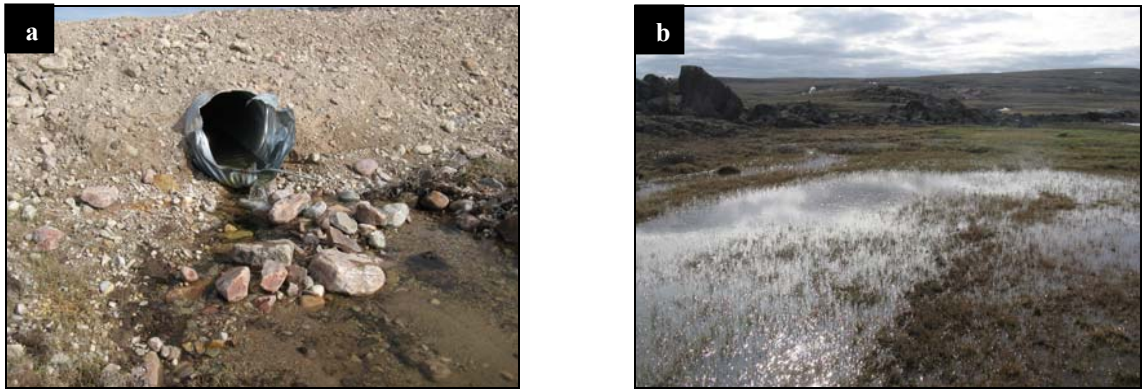

Figure 1.View upstream (a), and downstream (b) at the habitat assessment site downstream of the crossing at CV-120 during spring, 2009.

Tote Road Aquatic Habitat Assessment

Location

Watercourse Name:	CV-119	**UTM / Chainage:**	17W 517762 7961153 / 24 + 264
Site:	DS	**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

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Mary River Project

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Aquatic Environment Specialists

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	**UTM / Chainage:**	17W 517762 7961153 / 24 + 264
Site:	US	**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

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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

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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	**UTM / Chainage:**	17W 519222 7958135 / 27 + 686
Site:	US	**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

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Aquatic Environment Specialists

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.

518,000
520,000
522,000
7,958,000
7,956,000
7,954,000
7,952,000
N
CV-116
CV-115
CV-200
Phillips Creek
CV-114
CV-201
CV-113
CV-112
CV-111
CV-110
CV-109
CV-108
CV-202
CV-107
CV-106
CV-105
32 km Lake
CV-104
CV-203
CV-204
CV-103
CV-102
0.5 0.25 0 0.5 km
SCALE

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 M AND IS IN METRES.

REV	DD/MMM/10	ISSUED FOR	-	-	-	-
REV	01/09/2010	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

Milne Inlet Tote Road - 3d

North/South Consultants Inc.
Aquatic Environment Specialists

P/A NO.	REF NO.
-	-
DATE: 01/09/2010	REV 1

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

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 km^2
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
D_{95}:	0.95 m
D:	0.15 m
Confinement:	Partial confinement
Channel Morphology:	Cascade-Riffle
Channel Gradient:	4^0
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.

Fish Habitat Quality

Marginal

Potential Fish Utilization

Arctic Char

Spawning:	Unlikely
Migration:	Unlikely
Rearing:	Yes
Overwintering:	Unlikely

Ninespine Stickleback

Spawning:	Unlikely
Migration:	Unlikely
Rearing:	Unlikely
Overwintering:	Unlikely

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.

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Tote Road Aquatic Habitat Assessment

Location

Watercourse Name:	CV-114	**UTM / Chainage:**	17W 520278 7956528 / 29 + 647
Site:	DS	**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

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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	**UTM / Chainage:**	17W 520278 7956528 / 29 + 647
Site:	US	**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

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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	**UTM / Chainage:**	17W 520747 7955659 / 30 + 655
Site:	DS	**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

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Aquatic Environment Specialists

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.

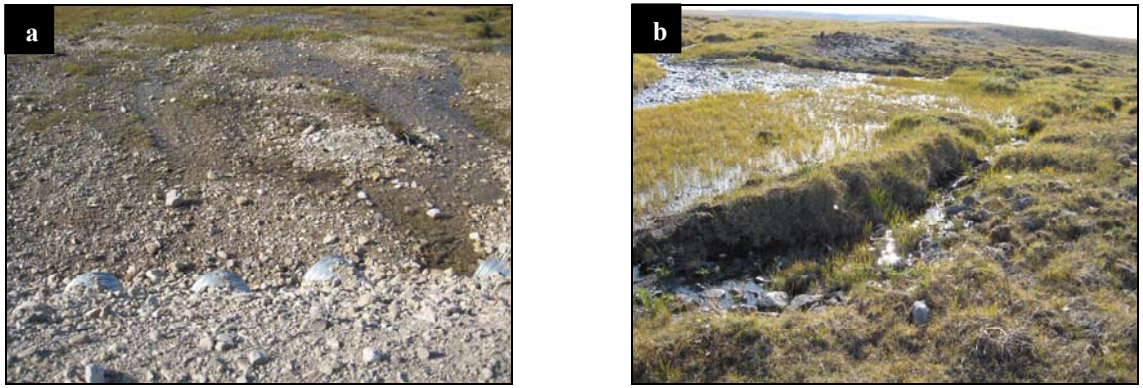

Figure 2. View of remaining wetted habitat (a) and natural barrier (b) downstream of the crossing at CV-113 during late August, 2009.

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

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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

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Aquatic Environment Specialists

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	**UTM / Chainage:**	17W 521033 7954935 / 31 + 450
Site:	US	**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

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

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	**UTM / Chainage:**	17W 521355 7954524 / 31 + 990
Site:	US	**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

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	**UTM / Chainage:**	17W 521603 7953731 / 32 + 825
Site:	DS	**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

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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	**UTM / Chainage:**	17W 521603 7953731 / 32 + 825
Site:	US	**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

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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	**UTM / Chainage:**	17W 521663 7953392 / 33 + 170
Site:	DS	**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

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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	**UTM / Chainage:**	17W 521663 7953392 / 33 + 170
Site:	US	**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

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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

Figure 1: Downstream view from proposed crossing showing cascade-riffle habitat.

Figure 2: Upstream view from proposed crossing showing more cascade-riffle habitat and cobble substrate.

Figure 3: View across CV-104.

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Mary River Project
Watercourse Crossing Assessment

Location

Site:	CV-104	**Watercourse Name:**	Unknown River
UTM:	17W 0521732 / 7952787		

Site Description

Watershed Size:	5.198 km^2
Regulated:	No
Channelized:	No
Bankfull Width:	6.0 m
Wetted Width:	6.0 m
Riffle-Crest Depth:	0.06 m
Residual Pool Depth:	N/A
Bankfull Depth:	0.31 m
Bank Height:	0.25 m
D_{95}:	0.26 m
D:	0.02 m
Confinement:	Unconfined
Channel Morphology:	Cascade-Riffle
Channel Gradient:	8^0
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 – 50%; Riffle – 50%
Substrate Composition:	Cobble – 80%; Gravel – 15%; Boulders – 5%;
Stream Cover:	Boulders – 5%; 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.

Fish Habitat Quality

Marginal

Potential Fish Utilization

Arctic Char

Spawning:	Unlikely
Migration:	Unlikely
Rearing:	Yes
Overwintering:	Unlikely

Ninespine Stickleback

Spawning:	Unlikely
Migration:	Unlikely
Rearing:	Unlikely
Overwintering:	Unlikely

Comments

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.

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Tote Road Aquatic Habitat Assessment

Location

Watercourse Name:	CV-104	**UTM / Chainage:**	17W 521732 7952788 / 33 + 794
Site:	DS	**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

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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

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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	**UTM / Chainage:**	17W 521934 7950591 / 36 + 028
Site:	DS	**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

Tote Road Aquatic Habitat Assessment

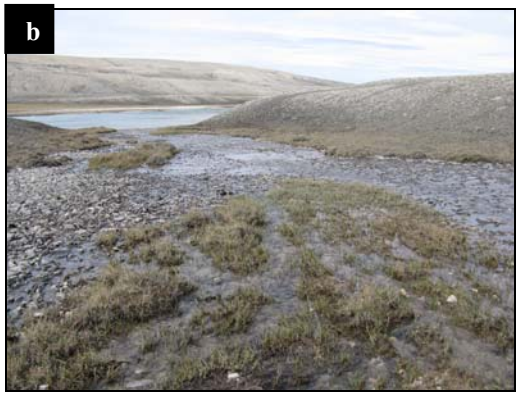

Figure 1.View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-102 during spring, 2009.

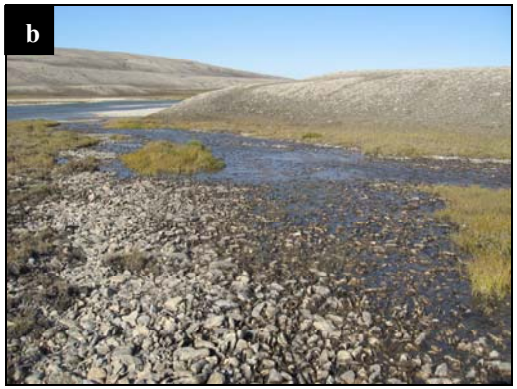

Figure 2. View upstream (a), downstream (b), and across (c) at the habitat assessment site downstream of the crossing at CV-102 during fall, 2009.

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

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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.