Cockburn Lake

AR-050a

AR-050b

LE-095-1

Cockburn Lake

COCKBURN
TUNNELS CAMP

LE-109-1

LE-117-1

SCALE 1 0.5 0 1 2 3 4 km

Path: G:\MARYRIV_GDB\EIS_GDB\EIS_Figures_2010EIS_Figures\MXD\Synthesis_RailLine_AccessRoad\Rev2Apdx\20101119_ApdxLE_sg.mxd

LEGEND:

LAKE ENCROACHMENT SURVEY YEAR
- 2008
- 2010

STREAM CROSSING

FISH BARRIER (CONFIRMED)

FISH BARRIER (AERIAL PHOTO INTERPRETATION)

CONTOUR

MILNE INLET TOTE ROAD (EXISTING)

RAILWAY ALIGNMENT (PROPOSED)

CONSTRUCTION ACCESS ROAD (PROPOSED)

WATER

INFRASTRUCTURE

NOTES:

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

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

Railway Lake Encroachment Sites (MAP D)

North/South Consultants Inc.
Aquatic Environment Specialists

P/A NO.	REF NO.
-	-

DATE: 19/11/2010

REV 2

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-095-1
UTM Coordinates: 17 W 608265 7840508
Date/Time Surveyed: 4-Aug-08 / 01:22

General Physical Characteristics

Floodplain Width (m):	N/M	**Channel Pattern:**	Lake	**Stage:**	N/M
Channel Confinement:	C	**Channel Gradient (range):**	0-15^{o}	**Flow Regime:**	PER
Bank Height (range in m):	UD	**Bank Shape:**	45^{o} S	**T_W ($^{\circ}$C):**	7.0

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
0			0.3			2				

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
0		30	70				5	20	45	25	5

Fisheries Information

Electrofishing Conducted: N **Effort (min):** N/A **Electrofisher Settings:** N/A

Fish Habitat Potential

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

Comments & Summary

Although depth barely sufficient for overwintering, this lake is accessible from other areas and provides abundant suitable habitat. Fish use is likely.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-095-1
UTM Coordinates: 17 W 608265 7840508
Date/Time Surveyed: 4-Aug-08 / 01:22

Photographs


A


B


C

Figure 1. View of habitat at crossing (A-B), and of substrate (C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-050a
UTM Coordinates: 17 W 608059 7840743
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

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

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 2.92 **Electrofisher Settings:** 990 V, 30 Hz, 12%DC

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	3	1.03	75 - 100	-
NNST	5	1.71	18 - 50	-

Fish Habitat Potential

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

Comments & Summary

Small waterbody with boulder/cobble substrate. Connected to Cockburn Lake via short channel that was dry during survey. Approximate dimensions: 40 x 55 m; < 2 meters deep. Fish stranded after higher spring water levels and would then winter kill.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-050a
UTM Coordinates: 17 W 608059 7840743

Date/Time Surveyed: 27-Aug-10

Photographs

A

B

Figure 1. Waterbody AR-050a (A), dry channel connecting AR-050a with Cockburn Lake (B).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-050b
UTM Coordinates: 17 W 608049 7840793
Date/Time Surveyed: 27-Aug-10

General Physical Characteristics

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

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 3.75 **Electrofisher Settings:** 990 V, 30 Hz, 12%DC

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	3/1	0.80	70 - 100	-
NNST	1	0.27	20	-

Fish Habitat Potential

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

Comments & Summary

Small waterbody with boulder/cobble substrate. Connected to AR-050a, which is connected to Cockburn Lake via short channel that was dry during survey. Approximate dimensions: 40 x 200 m; < 2 meters deep. Fish stranded after higher spring water levels and would then winter kill.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: AR-050b
UTM Coordinates: 17 W 608049 7840793

Date/Time Surveyed: 27-Aug-10

Photographs

A

Figure 1. Waterbody AR-050b (A).

Rail Alignment Watercourse Crossing Assessment

Crossing ID: LE-109-1
UTM Coordinates: 17 W 600834 7832070
Date/Time Surveyed: 3-August-08 / 05:00

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
0		10	90				20		30	50	

Fisheries Information

Electrofishing Conducted: N **Effort (min):** N/A **Electrofisher Settings:** N/A

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	High	High	High	Low
NNST	Moderate	High	Moderate	Low

Comments & Summary

The flow regime was permanent and the maximum water depth was > 2.0 m. The bank height was > 10.0 m. Overwintering possible and depths and substrates suitable for char spawning as well. Fish use of this lake probably extensive.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-109-1
UTM Coordinates: 17 W 600834 7832070
Date/Time Surveyed: 3-August-08 / 05:00

Photographs

A B C D

Figure 1. View of habitat at crossing (A-D).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-117-1
UTM Coordinates: 17 W 597920 7825799
Date/Time Surveyed: 3-Aug-08 / 04:40

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 5:00 **Electrofisher Settings:** 400V, 40Hz, 30%DC

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

Fish Habitat Potential

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

Comments & Summary

The water body was 26.52X16.46 m, with a permanent flow regime. The water temperature was 6.0 °C. The substrate was 10% fines, 25% gravel, 35% small cobble and 30% large cobble.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-117-1
UTM Coordinates: 17 W 597920 7825799
Date/Time Surveyed: 3-Aug-08 / 04:40

Photographs

A

B

C

Figure 1. View of habitat (A-B), and substrate (C).

Cockburn Lake

LE-121-1

COCKBURN SOUTH CAMP

LE-127-1

LE-127-2

LE-127-3

LE-128-1

LE-129-1

LE-131-1

LE-132-1

LE-133-1

LE-134-1

LE-134-2

LE-136-1

LE-142-1

LE-142-2

ST28

STEP-LE-001-1

STEP-LE-006-1

STEP-LE-002-1

STEENSBY PORT

STEENSBY INLET

SCALE 1 0.5 0 1 2 3 4 km

LEGEND:

LAKE ENCROACHMENT SURVEY YEAR
- 2008
- 2010
- STREAM CROSSING
- FISH BARRIER (CONFIRMED)
- FISH BARRIER (AERIAL PHOTO INTERPRETATION)

- CONTOUR
- MILNE INLET TOTE ROAD (EXISTING)
- RAILWAY ALIGNMENT (PROPOSED)
- CONSTRUCTION ACCESS ROAD (PROPOSED)
- WATER
- INFRASTRUCTURE

NOTES:

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6. CONTOUR INTERVAL IS 25 AND IS IN METRES.

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

Railway Lake Encroachment Sites (MAP E)

North/South Consultants Inc.
Aquatic Environment Specialists

P/A NO.	REF NO.
-	-
DATE: 19/11/2010	REV 2

Path: G:\MARYRIV_GDB\EIS_GDB\EIS_Figures_2010EIS_Figures\MXD\Synthesis_RailLine_AccessRoad\Rev2Apdx\20101119_ApdxLE_sg.mxd

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-121-1
UTM Coordinates: 17 W 598561 7822010
Date/Time Surveyed: 2-Aug-08 / 03:25

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
0	30.18X16.46		0.15	0.3	0.15	0.3				

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
0		100					100				

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 3:00 **Electrofisher Settings:** 400V, 40Hz, 30%DC

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

Fish Habitat Potential

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

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality – NO FISH HABITAT

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-121-1
UTM Coordinates: 17 W 598561 7822010
Date/Time Surveyed: 2-Aug-08 / 03:25

Comments & Summary

Under higher water conditions, would flow through CV-121-7. The flow regime of the pond is permanent and the water temperature was 12.0 °C.

Photographs

A

B

Figure 1. (A) View of habitat, and (B) substrate.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-127-1
UTM Coordinates: 17 W 598534 7816263
Date/Time Surveyed: 3-Aug-08 / 11:31

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 8:30 **Electrofisher Settings:** 700V, 70Hz, 60%DC

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	0	-	-
NNST	10	1.18	22-25	-

Fish Habitat Potential

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

Comments & Summary

The flow regime is permanent, the stage is normal and the water temperature was 12.0°C. The maximum water depth at the crossing was 0.25 m. The water body was 85% pool (< 0.2 m) and 15% ool (>0.2 m). The substrate composition was 20% fines, 10% gravel and 70% small cobble. Not overwintering habitat, but connected to other waterbodies. Habitat ideal for stickleback spawning and rearing during summer.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-127-1
UTM Coordinates: 17 W 598534 7816263
Date/Time Surveyed: 3-Aug-08 / 11:31

Photographs

A

B

Figure 1. View of habitat, inlet/outlet (A), and pond (B).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-127-2
UTM Coordinates: 17 W 598559 7816054
Date/Time Surveyed: 3-Aug-08 / 12:30

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
100D	>200					~0.5	Stagnant pool			
80D	>200					~0.5	Stagnant pool			
60D	>200					~0.5	Stagnant pool			
40D	23.5		0.1	0.25	0.1		Stagnant pool			
20D	25.0		0.1	0.25	0.1		Stagnant pool			
0	30.5		0.1	0.25	0.1		Stagnant pool			
20U	41.0		0.1	0.25	0.1		Stagnant pool			
40U	37.0		0.1	0.25	0.1		Stagnant pool			
60U	29.5		0.1	0.25	0.1		Stagnant pool			
80U	End of lake		0.1	0.25	0.1		Stagnant pool			
100U										

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D		90	10				10	20	65	5	
80D		90	10				10	20	65	5	
60D		90	10				10	20	65	5	
40D		90	10				10	20	65	5	
20D		90	10				10	20	65	5	
0		90	10				10	20	65	5	
20U		90	10				10	20	65	5	
40U		90	10				10	20	65	5	
60U		90	10				10	20	65	5	
80U		90	10				10	20	65	5	
100U											

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-127-2
UTM Coordinates: 17 W 598559 7816054
Date/Time Surveyed: 3-Aug-08 / 12:30

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 2:23 **Electrofisher Settings:** 700V, 70Hz, 20%DC

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

Fish Habitat Potential

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

Comments & Summary

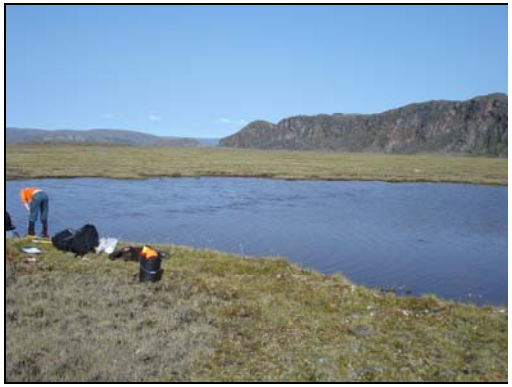
YOY NNST seen at all points along the banks in 2008. YOY NNST were also captured at this site during an electrofishing survey in 2007. The flow regime was permanent and the stage was normal in 2008. The water temperature was 18.0 °C.

Rail Alignment Watercourse Crossing Assessment

Location

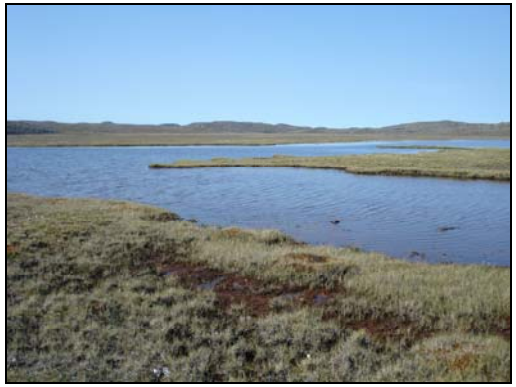
Crossing ID: LE-127-2
UTM Coordinates: 17 W 598559 7816054
Date/Time Surveyed: 3-Aug-08 / 12:30

Photographs



A

B



C

D

Figure 1. View of habitat, at crossing (A), towards the end of the bay (B), looking out toward main lake (C), and substrate (D).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-127-3
UTM Coordinates: 17 W 598579 7815814
Date/Time Surveyed: 3-Aug-08 / 14:11

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

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

Fish Habitat Potential

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

Comments & Summary

Large numbers of YOY and larger NNST observed along the shoreline. The wetted channel width and the high water channel width were each 9.14 m, and the maximum water depth at the crossing was 1.0 m. The substrate composition 50% fines, 30% small cobble, 10% large cobble and 10% boulders.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-127-3
UTM Coordinates: 17 W 598579 7815814
Date/Time Surveyed: 3-Aug-08 / 14:11

Photographs

A

B

C

D

E

Figure 1. View of habitat, at crossing (A), at the dry creek flowing into the water body (B), facing north (C) facing south (D), and substrate (E).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-128-1
UTM Coordinates: 17 W 598604 7815605
Date/Time Surveyed: 3-Aug-08 / 14:27

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 1:00 **Electrofisher Settings:** 700V, 70Hz, 20%DC

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	-	-	-
NNST	1	1.0	-	-

Fish Habitat Potential

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

Comments & Summary

The pond is elevated and not connected to any other water bodies. The flow regime is permanent, the stage is normal and the water temperature was 21.5 °C. The wetted width was 9.0 m, the high water channel width was 15 m, and the maximum water depth was 0.2 m. The stream morphology composition was a pool (< 0.2 m), substrate made up of 90% fines, and 10% gravel.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-128-1
UTM Coordinates: 17 W 598604 7815605
Date/Time Surveyed: 3-Aug-08 / 14:27

Photographs

A **B** **C**

Figure 1. View of habitat, at the crossing (A), facing south (B), and at the inlet /outlet (C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-129-1
UTM Coordinates: 17 W 599356 7814495
Date/Time Surveyed: 3-Aug-08 / 17:00

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 5:00 **Electrofisher Settings:** 800V, 70Hz, 20%DC

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	2	0.4	114-116	13-15
NNST	4	0.8	49-73	4

Fish Habitat Potential

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

Comments & Summary

Channel Characteristics and Velocity: Wetted width that'll be encroached upon is 50 m. The wetted width was 87.78 m. The flow regime was permanent and the stage was normal.
Fish Habitat: Large cobble (60%) and boulders (30%) packed together and covered in orange algae, also with 10% fines.

Rail Alignment Watercourse Crossing Assessment

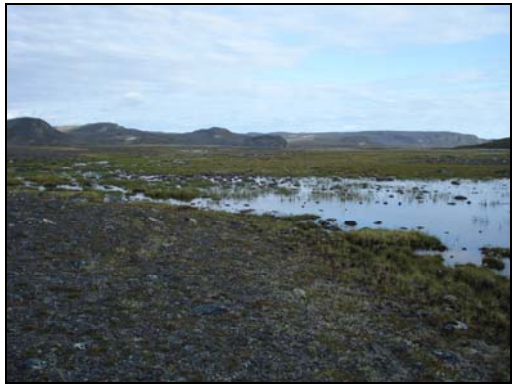
Location

Crossing ID: LE-129-1
UTM Coordinates: 17 W 599356 7814495
Date/Time Surveyed: 3-Aug-08 / 17:00

Photographs

A

B



C

D

Figure 1. View of habitat, at crossing (A), facing main lake body –NW (B) facing outlet (C), and of substrate (D).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-131-1
UTM Coordinates: 17 W 600654 7812572
Date/Time Surveyed: 3-Aug-08 / 09:30

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 3:10 **Electrofisher Settings:** 700V, 40Hz, 20%DC

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	-	-	-
NNST	2	0.63	20-45	-

Fish Habitat Potential

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

Comments & Summary

Decent spawning/rearing habitat but no way out of habitat. Many other NNST seen, but low conductivity in the pond prevented their capture.
The maximum water depth was 0.2 m, the water body was a pool (< 0.2 m) and the substrate composition was 99% fines and 1% large cobble.

Rail Alignment Watercourse Crossing Assessment

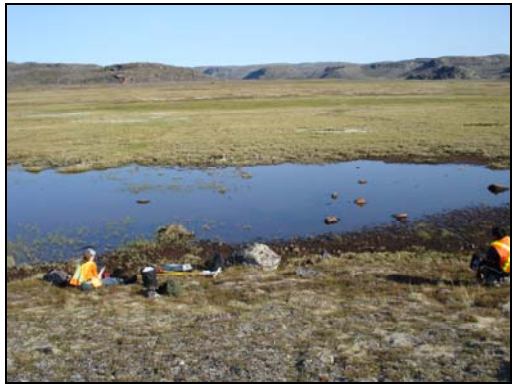
Location

Crossing ID: LE-131-1
UTM Coordinates: 17 W 600654 7812572
Date/Time Surveyed: 3-Aug-08 / 09:30

Photographs


A


B


C


D

Figure 1. View of habitat, at the crossing (A) at the outflow (B), towards outflow (C), and a YOY NNST (D).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-132-1
UTM Coordinates: 17 W 600775 7812191
Date/Time Surveyed: 3-Aug-08 / 08:29

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 1:10 **Electrofisher Settings:** 400V, 50Hz, 20%DC

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	1	0.86	~50-70	N/A
NNST	0	-	-	-

Fish Habitat Potential

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

Comments & Summary

Due to lack of cover fish saw us coming and evaded the electrofisher. Fish present in W pool (20 m W of crossing).
Didn't see any NNST YOY maybe ARCH have eaten them. Substrate too soft to enter pool.
Fish habitat Potential: ARCH Migration Corridor into a dead end pond to the W that also doesn't have good habitat of any kinds they're trapped there and will probably die.

Maximum water depth of the lake (riffle) was 0.05 m and the substrate was 100% fines. The flow regime is permanent and the stage is normal.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-132-1
UTM Coordinates: 17 W 600775 7812191
Date/Time Surveyed: 3-Aug-08 / 08:29

Photographs

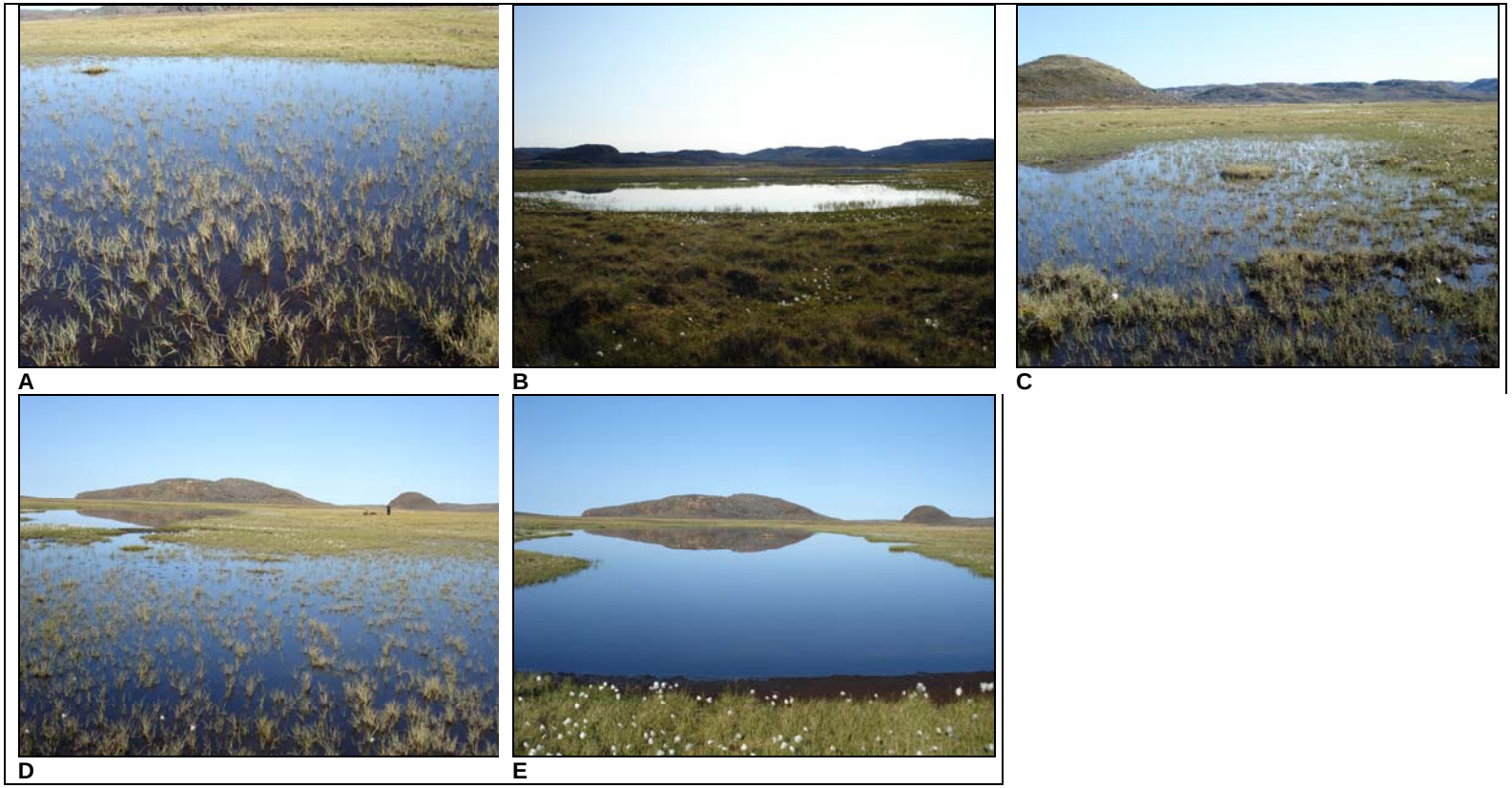


Figure 1. View of habitat, at crossing facing north (A), of the pool to the east (B), same flooded area as crossing facing east (C), same flooded area as crossing facing west (D), and west pool (E).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-133-1
UTM Coordinates: 17 W 600853 7810637
Date/Time Surveyed: 25-Jul-08 / 02:50

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

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

Fish Habitat Potential

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

Comments & Summary

There is a large DS lake ~ 75m DS with ARCH that is not accessible to this pond (DS take = 40 Bo, 30 lg Co, 30 Sm Co, and > 2 m day).
Suitable for overwintering and maybe spawning. Juveniles were observed.

The flow regime of the 10X10 water body (pool (<0.2 m**)** is intermittent and the maximum water depth was 0.10 m. The substrate was 50% small cobble, 45% large cobble and 5% boulders.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-133-1
UTM Coordinates: 17 W 600853 7810637
Date/Time Surveyed: 25-Jul-08 / 02:50

Photographs

A

B

Figure 1. View of habitat (A) and substrate (B).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-134-1
UTM Coordinates: 17 W 600381 7810342
Time Surveyed: 5-Jul-08 / 02:25

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 4:00 **Electrofisher Settings:** 600V, 60Hz, 50%DC

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

Fish Habitat Potential

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

Comments & Summary

The water body (150X100 m) was made up of 40% pool (<0.2 m) and 60% pool (> 2.0 m) and the substrate composition was made up of 5 % fines, 25% small cobble, 40% large cobble, and 30% boulders. The water temperature was 8.0 °C and the flow regime was permanent. The maximum water depth at the crossing was 0.75 m

Not deep enough for overwintering and no connection. Photos were not taken of this site.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-134-2
UTM Coordinates: 17 W 599985 7810263
Date/Time Surveyed: 25-Jul-08 / 02:00

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 5:10 **Electrofisher Settings:** 600V, 60Hz, 80%DC

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

Fish Habitat Potential

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

Comments & Summary

The water body (200X150 m) was made up of 70% pool (<0.2 m) and 30% riffle. The substrate was 15 % fines, 15% small cobble, 50% large cobble, and 20% boulders. The water temperature was 2.0 °C and the flow regime was permanent. The maximum water depth at the crossing was approximately 1 m.

Not deep enough for overwintering and not connected to anything else.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-134-2
UTM Coordinates: 17 W 599985 7810263
Date/Time Surveyed: 25-Jul-08 / 02:00

Photographs

A

B

Figure 1. View of habitat (A) and substrate (B).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-136-1
UTM Coordinates: 17 W 598899 7809533
Date/Time Surveyed: 25-Jul-08 / 01:20

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 6:00 **Electrofisher Settings:** 600V, 60Hz, 50%DC

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	5	0.83	50-104	1-9
NNST	0	-	-	-

Fish Habitat Potential

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

Comments & Summary

The water body (250X100) was a pool (< 0.2 m) and the substrate was 20% small cobble, 40% large cobble, and 40% boulders. The flow regime was permanent and the maximum water depth at the crossing was > 2.0 m.

Not as many fish as expected, but maybe further out in lake.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-136-1
UTM Coordinates: 17 W 598899 7809533
Date/Time Surveyed: 25-Jul-08 / 01:20

Photographs


A


B


C


D

Figure 1. View of habitat (A-C) and of substrate (D).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE -142-1
UTM Coordinates: 17 W 596885 7803858
Date/Time Surveyed: 24-Jul-08 /22:00

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** N/A **Electrofisher Settings:** N/A

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

Fish Habitat Potential

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

Comments & Summary

The water body (200X280) was a pool (< 0.2 m) and the substrate composition was 30% fines, 10% small cobble, 30% large cobble, and 30% boulders. The flow regime was permanent, water temperature was 9.0 °C and the maximum water depth at the crossing was approximately 1.5 m.

Fish Habitat Potential: Probably not deep enough for overwintering.
Fish Habitat: Excellent habitat.
Electrofishing: As part of fishing during CV-142-2 survey. Lots of ARCH AND NNST present.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE -142-1
UTM Coordinates: 17 W 596885 7803858
Date/Time Surveyed: 4-Jul-08 /22:00

Photographs

A

Figure 1: View of Habitat (A).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-142-2
UTM Coordinates: 17 W 597004 7803817
Date/Time Surveyed: 24-Jul-08 /22:10

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** N/A **Electrofisher Settings:** N/A

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

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	Low	High	High	Low
NNST	High	High	High	Low

Comments & Summary

The water body was a pool (> 0.2 m) and the substrate composition was 30% fines, 30% small cobble, 30% large cobble, and 100% boulders. The flow regime was permanent and the water temperature was 9.0 °C. The wetted width at the crossing was > 200 m and the maximum water depth was > 2.0 m.

Fish Habitat Potential: Deep enough for overwintering, but spawning will probably depend on resident, probably stunted population (did observe some small, very colorful char)
Fish Habitat: Excellent
Electrofishing: As part of fishing during CV-142-2. Lots of ARCH and NNST.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: LE-142-2
UTM Coordinates: 17 W 597004 7803817
Date/Time Surveyed: 24-Jul-08 /22:10

Photographs

A

Figure 1. View of habitat at crossing (A).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: ST28
UTM Coordinates: 17 W 595532 7803279
Date/Time Surveyed: 04-Aug-2008/16:53

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

N/M

Fisheries Information

Electrofishing Conducted: N **Effort (min):** **Electrofisher Settings:**

Fish Habitat Potential

Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	Low	Low	Moderate	No
NNST	**Moderate**	**Low**	**Moderate**	**No**

Comments & Summary

Gillnetting and observational studies were conducted and only one NNST was observed.

Substrate was 50% large cobble, 40% boulder and 10% fines.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: ST28
UTM Coordinates: 17 W 595532 7803279

Date/Time Surveyed: 04-Aug-2008/16:53

Photographs

A

B

C

Figure 1. Pan view of ST-028 during summer (A), shoreline view (B) and substrate (C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: STEP-LE-1-1
UTM Coordinates: 17W 595035 7802582
Date/Time Surveyed: 1-Aug-08 / 22:00

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
0	127X127		0.20	1	0.2	1-2				

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
0		30	70				95			4	1

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 15:00 **Electrofisher Settings:** 400V, 40Hz,30%DC

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	0	-	-	-
NNST	12	0.8	31-57	-

Fish Habitat Potential

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

Comments & Summary

The flow regime is permanent and the water temperature was 13.0 °C.
A stream leads to another lake that connects to the coast eventually.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: STEP-LE-1-1
UTM Coordinates: 17W 595035 7802582

Date/Time Surveyed: 1-Aug-08 / 22:00

Photographs

A

B

C

Figure 1. View of habitat (A-B), and substrate (C).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: STEP-LE-6-1
UTM Coordinates: 17 W 594607 7801558
Date/Time Surveyed: 1-Aug-08 / 21:30

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
0	205.7X153.6		0.05	2	0.05	2-3	N/M	N/M	NM	N/M

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
0		30	70				15	10	25	40	10

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 12:00 **Electrofisher Settings:** 600V, 50Hz, 40%DC

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	1	0.08	72	-
NNST	3	0.25	34-40	-

Fish Habitat Potential

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

Rail Alignment Watercourse Crossing Assessment

Location

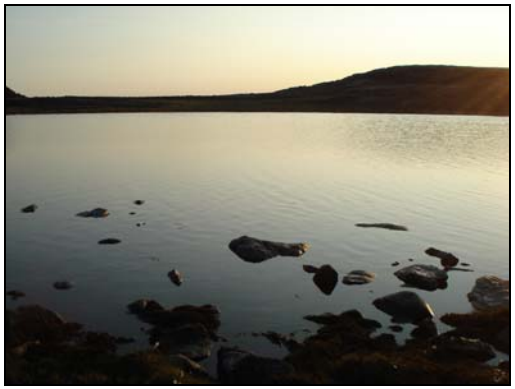
Crossing ID: STEP-LE-6-1
UTM Coordinates: 17 W 594607 7801558
Date/Time Surveyed: 1-Aug-08 / 21:30

Comments & Summary

The flow regime was permanent and the water temperature was 11.0 °C.
Stream coming from STEP-LE-02-1.

Photographs


A.


B


C


D


E


F


G

Figure 1. View of habitat (A-D), and substrate (E-G).

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: STEP-LE-2-1
UTM Coordinates: 17 W 594483 7801196
Date/Time Surveyed: 1-Aug-08 / 20:45

General Physical Characteristics

N/M

Hydrology & Habitat Characteristics

Distance and Direction from Crossing (m)	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Wetted	High Water	25%	50%	75%	Max	25%	50%	75%	Max
0	151.8 X116.1		0.10	0.45	0.15	0.50				

Distance and Direction from Crossing (m)	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
0		60	40				10	20	50	15	5

Fisheries Information

Electrofishing Conducted: Y **Effort (min):** 17:00 **Electrofisher Settings:** 600V, 40Hz, 30%DC

Species	Total Caught/Observed	CPUE	Length Range (mm)	Weight Range (g)
ARCH	17	1.0	44-123	-
NNST	6	0.35	23-71	-

Fish Habitat Potential

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

Comments & Summary

The flow regime was permanent and the water temperature was 13.0 °C.
Caught most of the fish near an outlet into a tributary stream.

Rail Alignment Watercourse Crossing Assessment

Location

Crossing ID: STEP-LE-2-1
UTM Coordinates: 17 W 594483 7801196
Date/Time Surveyed: 1-Aug-08 / 20:45

Photographs

A B C D

Figure 1. View of habitat (A-C), and substrate (D)