Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-54-2 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527529 7930869

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This site was nearly dry in 2018 with multiple soft barriers to fish movement and no connectivity with overwintering habitat under any flow condition. There is never fish habitat at this crossing.

Photographs

A

B

Figure 1. Views of CV-54-2 at the rail crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-55-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527583 7930653

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This site was a shallow, isolated, low point at the Tote Road that showed some ponding in 2018. There is never fish habitat at this crossing.

Photographs

A

B

Figure 1. Views of CV-55-1 at the rail crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-55-2 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527632 7930421

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This site was a shallow, isolated, fishless pond that had nearly dried up by fall. There is never fish habitat at this crossing.

Photographs

A

B

Figure 1. Views of CV-55-2 at the rail crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-55-3 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527650 7930339

General Physical Characteristics

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

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	6.0	- / 4.6	- / -	- / 0.45	- / -	- / 0.50	- / -	- / 0.03	- / -	- / 0.05
80D	1.5	- / 0.6	- / -	- / 0.35	- / -	- / 0.40	- / -	- / 0.51	- / -	- / 0.55
60D	6.0	- / 3.2	- / 0.09	- / 0.13	- / -	- / 0.20	- / 0.12	- / 0.40	- / -	- / 0.40
40D	TOTE ROAD CROSSING									
20D	3.5	- / 2.9	- / -	- / 0.45	- / -	- / 0.50	- / -	- / 0.18	- / -	- / 0.20
0	7.5	- / 6.2	- / -	- / 0.30	- / -	- / 0.30	- / -	- / 0.29	- / -	- / 0.30
20U	3.0	- / 1.4	- / -	- / 0.25	- / -	- / 0.25	- / -	- / 0.34	- / -	- / 0.35
40U	3.2	- / 2.3	- / -	- / 0.72	- / -	- / 0.75	- / -	- / 0.02	- / -	- / 0.05
50U	3.2	1.1 / -	- / -	0.30 / -	- / -	0.30 / -	- / -	0.11 / -	- / -	0.15 / -
60U	4.3	- / 3.2	- / -	- / 0.73	- / -	- / 0.80	- / -	- / 0.06	- / -	- / 0.10
80U	3.8	- / 3.8	- / -	- / 0.55	- / -	- / 0.55	- / -	- / 0.09	- / -	- / 0.10
100U	3.8	2.9 / 1.9	- / -	0.58 / 0.62	- / -	0.65 / 0.65	- / -	0.05 / 0.12	- / -	0.05 / 0.15

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	-	40	60	-	-	-	100	-	-	-	-
80D	30	30	40	-	-	-	40	40	20	-	-
60D	20	75	5	-	-	-	60	20	20	-	-
40D	TOTE ROAD CROSSING										
20D	10	30	60	-	-	-	20	30	50	-	-
0	10	40	50	-	-	-	50	20	30	-	-
20U	10	50	40	-	-	-	90	10	-	-	-
40U	10	20	70	-	-	-	100	-	-	-	-
50U	5	55	40				95	5			
60U	-	20	80	-	-	-	100	-	-	-	-
80U	10	25	65	-	-	-	100	-	-	-	-
100U	5	25	70	-	-	-	100	-	-	-	-

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-55-3 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527650 7930339

Fisheries Data

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

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	4.50	19	4.27	55 - 113
	Fall	N/A	-	-	-
NNST	Summer	4.50	0	-	-
	Fall	N/A	-	-	-

Fish Habitat Potential

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

Comments & Summary

This rail crossing is immediately upstream of the Tote Road crossing at CV-060. In addition, there are two proposed road diversion crossings CV-060-1 and CV-060-2. CV-60-1 is approximately 100 m downstream of the existing road crossing, while CV-60-2 is approximately 160 m upstream of the existing road crossing. Habitat data from those two assessments complement the data found here. This stream is important rearing habitat for juvenile char throughout the open water season, but particularly during summer.

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-55-3 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527650 7930339

Photographs

NO PHOTO (see CV-R060-1 50 m US transect) **NO PHOTO (see CV-R060-1 50 m US transect)** **NO PHOTO (see CV-R060-1 50 m US transect)**

A

B

C

Figure 1. Summer (top) and fall (bottom) views of CV-55-3 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

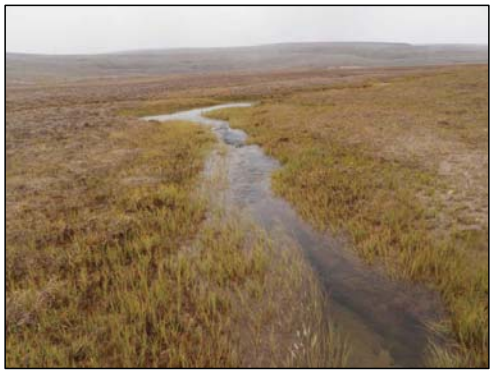
Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-55-3 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527650 7930339

Photographs

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



A **B** **C**

Figure 2. Summer (top) and fall (bottom) views of CV-55-3 at the 80 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

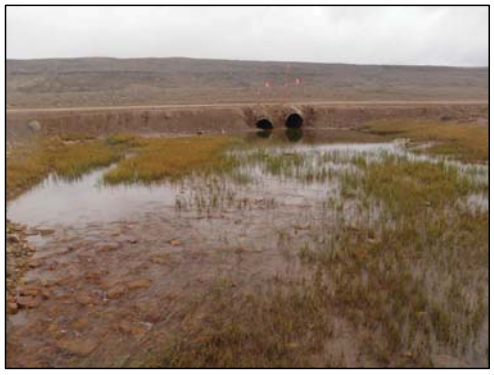
Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

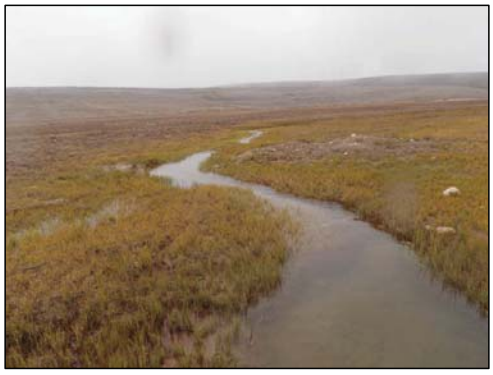
Location

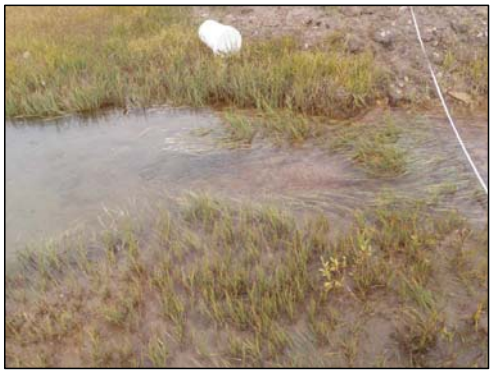
Crossing ID: CV-55-3 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527650 7930339

Photographs

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







A **B** **C**

Figure 3. Summer (top) and fall (bottom) views of CV-55-3 at the 60 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

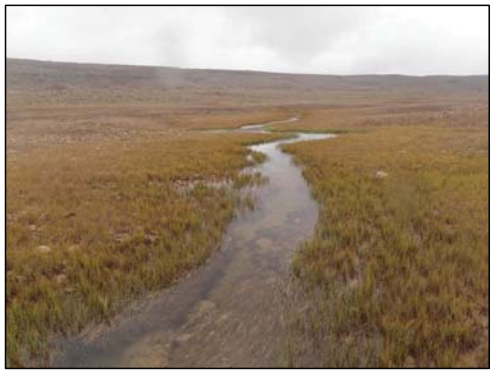
Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-55-3 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527650 7930339

Photographs

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



A **B** **C**

Figure 5. Summer (top) and fall (bottom) views of CV-55-3 at the 20 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-55-3 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527650 7930339

Photographs

A **B** **C**

Figure 6. Summer (top) and fall (bottom) views of CV-55-3 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

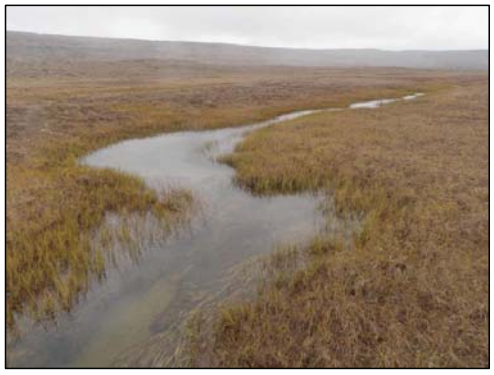
Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-55-3 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527650 7930339

Photographs

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



A

B

C

Figure 7. Summer (top) and fall (bottom) views of CV-55-3 at the 20 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

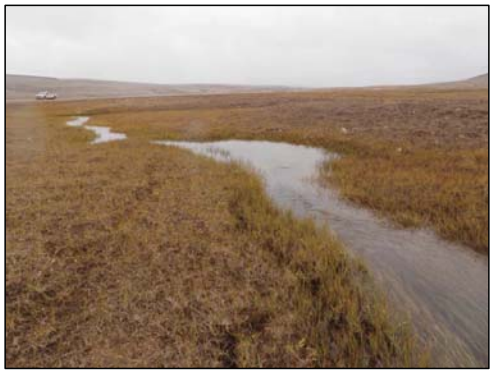
Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-55-3 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527650 7930339

Photographs

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



A **B** **C**

Figure 8. Summer (top) and fall (bottom) views of CV-55-3 at the 40 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-55-3 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527650 7930339

Photographs

NO PHOTO

NO PHOTO

NO PHOTO

A **B** **C**

Figure 9. Summer (top) and fall (bottom) views of CV-55-3 at the 50 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-55-3 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527650 7930339

Photographs

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

A **B** **C**

Figure 10. Summer (top) and fall (bottom) views of CV-55-3 at the 60 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-55-3 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527650 7930339

Photographs

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

A **B** **C**

Figure 11. Summer (top) and fall (bottom) views of CV-55-3 at the 80 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-55-3 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 527650 7930339

Photographs

A B C

Figure 12. Summer (top) and fall (bottom) views of CV-55-3 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-56-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528085 7929337

General Physical Characteristics

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

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	11.9	2.0 / 2.7	- / -	0.10 / 0.09	- / 0.06	0.10 / 0.10	- / -	0.26 / 0.26	- / 0.17	0.30 / 0.30
80D	12.0	- / 5.0	- / 0.60	- / -	- / 0.40	- / 0.60	- / 0.00	- / -	- / 0.00	- / 0.00
60D	12.0	- / 3.6	- / 0.10	- / -	- / 0.20	- / 0.20	- / 0.05	- / -	- / 0.07	- / 0.10
50D	19.9	2.1 / -	- / -	0.20 / -	- / -	0.20 / -	- / -	0.09 / -	- / -	0.10 / -
40D	10.0	- / 3.1	- / 0.30	- / -	- / 0.13	- / 0.30	- / 0.00	- / -	- / 0.00	- / 0.00
20D	8.5	- / 5.4	- / 0.07	- / -	- / 0.05	- / 0.10	- / 0.50	- / -	- / 0.00	- / 0.50
0	8.0	- / 1.0	- / -	- / 0.15	- / -	- / 0.15	- / -	- / 0.62	- / -	- / 0.65
20U	TOTE ROAD CROSSING									
40U	6.5	- / 4.2	- / -	- / 0.47	- / -	- / 0.50	- / -	- / 0.00	- / -	- / 0.00
50U	7.0	6.0 / -	- / -	- / 0.54	- / -	- / 0.55	- / -	- / 0.01	- / -	- / 0.01
60U	9.0	- / 6.2	- / -	- / 0.92	- / -	- / 1.00	- / -	- / 0.00	- / -	- / 0.00
80U	5.0	- / 3.5	- / -	- / 1.00	- / -	- / 1.00	- / -	- / 0.00	- / -	- / 0.00
100U	4.0	2.2 / 3.0	- / -	0.58 / 0.70	- / -	0.65 / 0.70	- / -	0.02 / 0.00	- / -	0.02 / 0.00

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	45	35	-	-	-	20	70	30	-	-	-
80D	60	5	15	-	-	20	80	20	-	-	-
60D	20	75	5	-	-	-	95	5	-	-	-
50D	10	85	5	-	-	-	95	5	-	-	-
40D	-	75	25	-	-	-	95	5	-	-	-
20D	40	60	-	-	-	-	50	30	20	-	-
0	50	50	-	-	-	-	20	20	60	-	-
20U	TOTE ROAD CROSSING										
40U	-	40	60	-	-	-	80	-	20	-	-
50U	-	30	70	-	-	-	50	20	30	-	-
60U	-	20	80	-	-	-	80	-	20	-	-
80U	-	20	80	-	-	-	90	10	-	-	-
100U	-	20	80	-	-	-	95	5	-	-	-

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality

Arctic Char - MARGINAL

Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-56-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528085 7929337

Fisheries Data

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

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	4.52	5	1.11	99
	Fall	N/A	-	-	-
NNST	Summer	4.52	0	-	N/A
	Fall	N/A	-	-	-

Fish Habitat Potential

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

Comments & Summary

Immediately upstream of CV-059 on the Tote Road. Provides marginal rearing habitat for smaller juvenile char throughout the open water season, but particularly during summer. Water temperatures in survey streams during fall sampling averaged approximately 5°C and fish had already begun downstream movements towards overwintering habitat.

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-56-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528085 7929337

Photographs

A B C

Figure 1. Summer (top) and fall (bottom) views of CV-56-1 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-56-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528085 7929337

Photographs

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

A

B

C

Figure 2. Summer (top) and fall (bottom) views of CV-56-1 at the 80 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

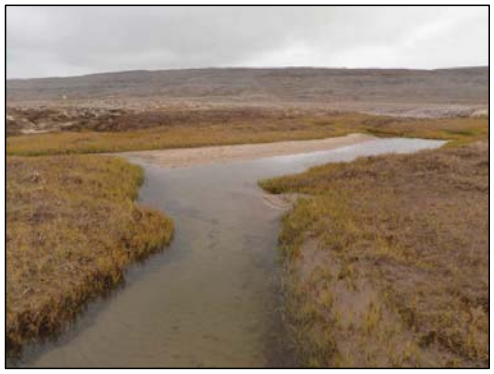
Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

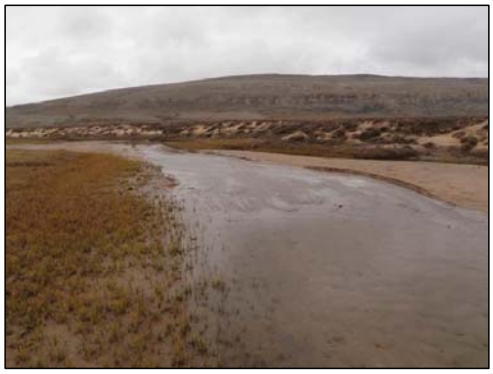
Crossing ID: CV-56-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528085 7929337

Photographs

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



A



B

C

Figure 3. Summer (top) and fall (bottom) views of CV-56-1 at the 60 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-56-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528085 7929337

Photographs

NO PHOTO

NO PHOTO

NO PHOTO

A **B** **C**

Figure 4. Summer (top) and fall (bottom) views of CV-56-1 at the 50 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-56-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528085 7929337

Photographs

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

A

B

C

Figure 5. Summer (top) and fall (bottom) views of CV-56-1 at the 40 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-56-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528085 7929337

Photographs

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

A

B

C

Figure 6. Summer (top) and fall (bottom) views of CV-56-1 at the 20 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-56-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528085 7929337

Photographs

A B C

Figure 7. Summer (top) and fall (bottom) views of CV-56-1 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-56-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528085 7929337

Photographs

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

A **B** **C**

Figure 8. Summer (top) and fall (bottom) views of CV-56-1 at the 40 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-56-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528085 7929337

Photographs

NO PHOTO

NO PHOTO

NO PHOTO

A **B** **C**

Figure 9. Summer (top) and fall (bottom) views of CV-56-1 at the 50 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-56-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528085 7929337

Photographs

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

A **B** **C**

Figure 10. Summer (top) and fall (bottom) views of CV-56-1 at the 60 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

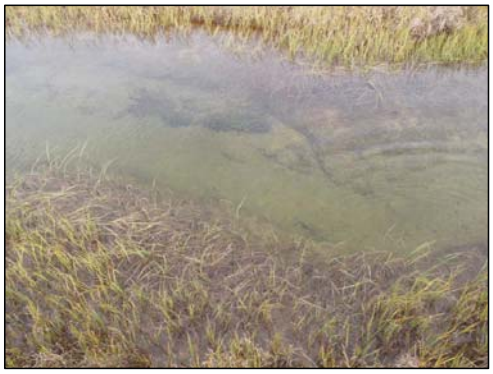
Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-56-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528085 7929337

Photographs

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



A **B** **C**

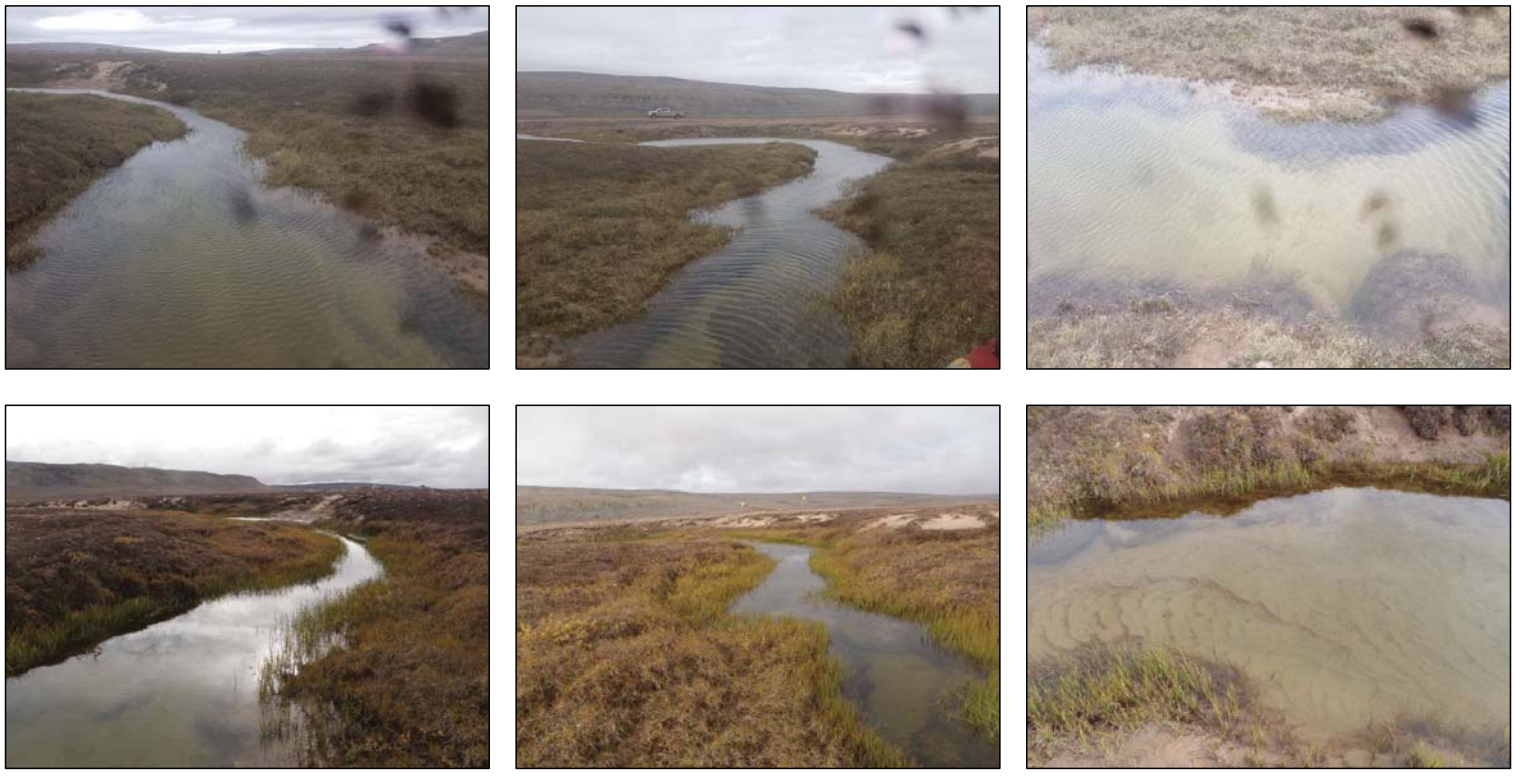
Figure 11. Summer (top) and fall (bottom) views of CV-56-1 at the 80 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-56-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528085 7929337

Photographs



A B C

Figure 12. Summer (top) and fall (bottom) views of CV-56-1 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-57-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528309 7928841

General Physical Characteristics

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

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	6.7	2.4 / 2.3	- / 0.31	0.74 / -	- / 0.15	0.20 / 0.75	- / 0.34	0.01 / -	- / 0.37	0.30 / 0.40
80D	6.0	- / 1.1	- / -	- / 0.30	- / -	- / 0.30	- / -	- / 0.32	- / -	- / 0.35
60D	10.5	- / 5.4	- / 0.40	- / -	- / 0.02	- / 0.40	- / 0.12	- / -	- / 0.15	- / 0.15
50D	12.2	1.4 / -	- / -	0.16 / -	- / -	0.30 / -	- / -	0.29 / -	- / -	0.30 / -
40D	13.0	- / 7.8	- / 0.10	- / -	- / 0.20	- / 0.25	- / 0.18	- / -	- / 0.26	- / 0.30
20D	9.5	- / 3.6	- / -	- / 0.35	- / -	- / 0.40	- / -	- / 0.07	- / -	- / 0.10
0	7.5	4.5 / 4.3	- / -	0.30 / 0.22	- / -	0.30 / 0.25	- / -	0.06 / 0.04	- / -	0.10 / 0.05
20U	9.0	8.7 / 4.3	- / 0.15	- / -	- / 0.26	- / 0.30	- / 0.10	- / -	- / 0.00	- / 0.10
40U	7.0	7.0 / 4.6	- / 0.34	- / -	- / 0.25	- / 0.35	- / 0.02	- / -	- / 0.00	- / 0.05
50U	6.3	3.5 / -	- / -	0.50 / -	- / -	0.50 / -	- / -	0.03 / -	- / -	0.05 / -
60U	7.0	12.2 / 5.1	- / -	- / 0.70	- / -	- / 0.70	- / -	- / 0.02	- / -	- / 0.05
80U	7.0	9.0 / 3.4	- / -	- / 0.32	- / -	- / 0.50	- / -	- / 0.15	- / -	- / 0.15
100U	6.8	3.1 / -	- / -	0.40 / 0.25	- / -	0.40 / 0.35	- / -	0.19 / 0.11	- / -	0.20 / 0.15

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	5	35	60	-	-	-	100	-	-	-	-
80D	20	50	30	-	-	-	100	-	-	-	-
60D	40	20	40	-	-	-	100	-	-	-	-
50D	10	60	30				90	10	-	-	-
40D	40	40	20	-	-	-	100	-	-	-	-
20D	20	30	50	-	-	-	80	15	5	-	-
0	10	60	30	-	-	-	80	15	5	-	-
20U	10	60	30	-	-	-	80	15	5	-	-
40U	-	40	60	-	-	-	90	5	5	-	-
50U	-	50	50	-	-	-	85	5	5	-	-
60U	-	30	70	-	-	-	100	-	-	-	-
80U	-	50	50	-	-	-	100	-	-	-	-
100U	10	45	45	-	-	-	100	-	-	-	-

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality

Arctic Char - MARGINAL

Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-57-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528309 7928841

Fisheries Data

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

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	3.67	6	1.64	96
	Fall	N/A	-	-	-
NNST	Summer	3.67	0	-	N/A
	Fall	N/A	-	-	-

Fish Habitat Potential

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

Comments & Summary

Immediately downstream of CV-058 on the Tote Road. Provides marginal rearing habitat for small juvenile char throughout the open water season, but particularly during summer.

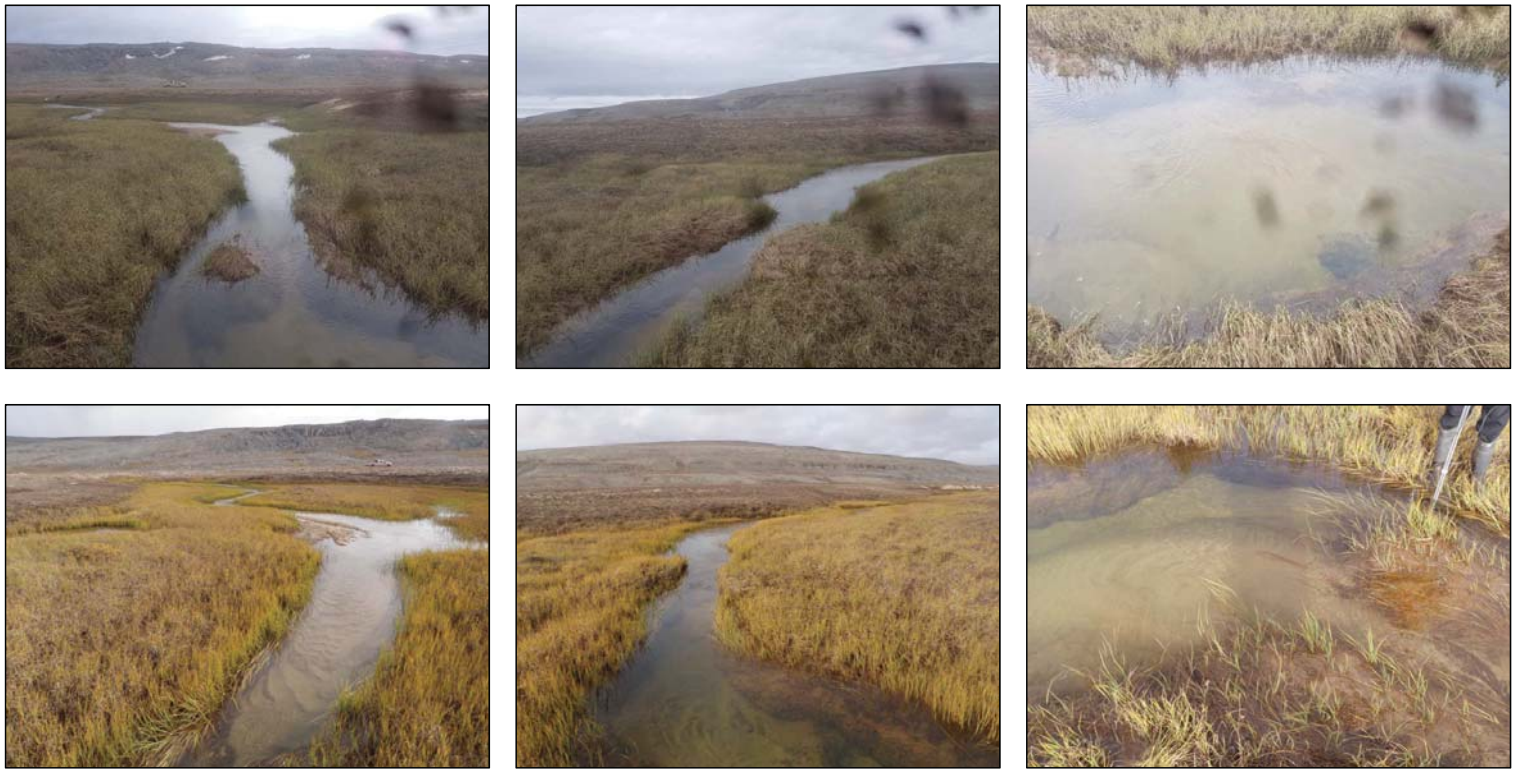
Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - MARGINAL** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-57-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528309 7928841

Photographs



A B C

Figure 1. Summer (top) and fall (bottom) views of CV-57-1 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Location

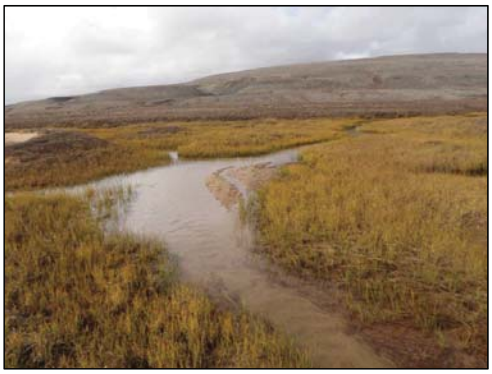
Crossing ID: CV-57-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528309 7928841

Photographs

NO PHOTO

NO PHOTO

NO PHOTO



A **B** **C**

Figure 2. Summer (top) and fall (bottom) views of CV-57-1 at the 80 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-57-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528309 7928841

Photographs

NO PHOTO

NO PHOTO

NO PHOTO

A **B** **C**

Figure 3. Summer (top) and fall (bottom) views of CV-57-1 at the 60 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Location

Crossing ID: CV-57-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528309 7928841

Photographs

NO PHOTO

NO PHOTO

NO PHOTO

A **B** **C**

Figure 4. Summer (top) and fall (bottom) views of CV-57-1 at the 50 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Location

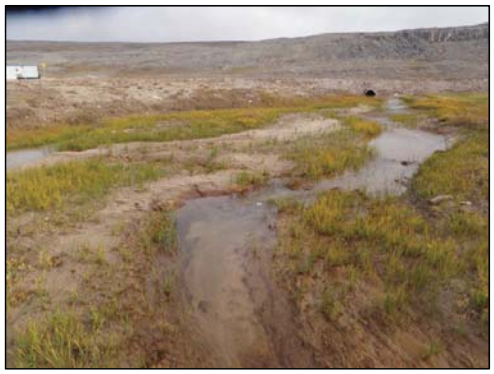
Crossing ID: CV-57-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528309 7928841

Photographs

NO PHOTO

NO PHOTO

NO PHOTO



A

B

C

Figure 5. Summer (top) and fall (bottom) views of CV-57-1 at the 40 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Location

Crossing ID: CV-57-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528309 7928841

Photographs

NO PHOTO

NO PHOTO

NO PHOTO

A B C

Figure 6. Summer (top) and fall (bottom) views of CV-57-1 at the 20 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Location

Crossing ID: CV-57-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528309 7928841

Photographs

A B C

Figure 7. Summer (top) and fall (bottom) views of CV-57-1 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Location

Crossing ID: CV-57-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528309 7928841

Photographs

NO PHOTO

NO PHOTO

NO PHOTO

A **B** **C**

Figure 8. Summer (top) and fall (bottom) views of CV-57-1 at the 20 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Location

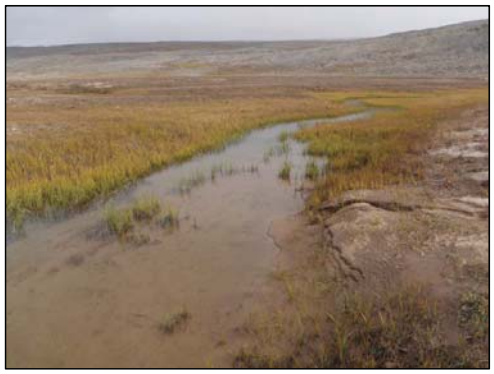
Crossing ID: CV-57-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528309 7928841

Photographs

NO PHOTO

NO PHOTO

NO PHOTO



A B C

Figure 9. Summer (top) and fall (bottom) views of CV-57-1 at the 40 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Location

Crossing ID: CV-57-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528309 7928841

Photographs

NO PHOTO

A

NO PHOTO

B

NO PHOTO

C

Figure 10. Summer (top) and fall (bottom) views of CV-57-1 at the 50 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Location

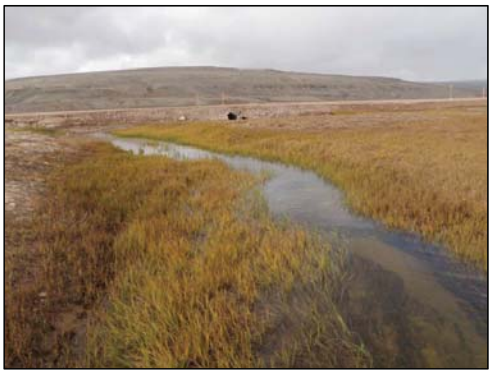
Crossing ID: CV-57-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528309 7928841

Photographs

NO PHOTO

NO PHOTO

NO PHOTO



A **B** **C**

Figure 11. Summer (top) and fall (bottom) views of CV-57-1 at the 60 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Location

Crossing ID: CV-57-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528309 7928841

Photographs

NO PHOTO

NO PHOTO

NO PHOTO

A

B

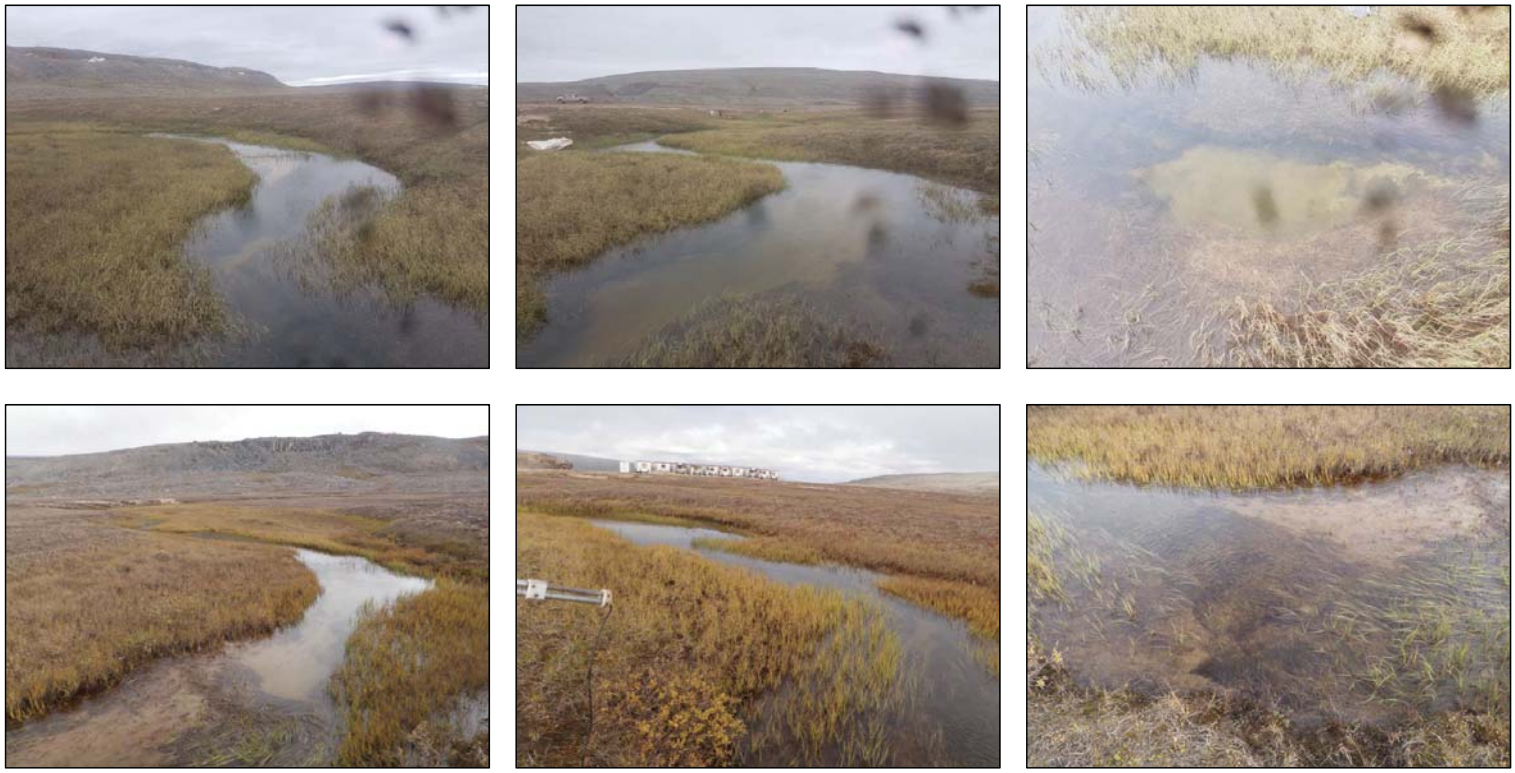
C

Figure 12. Summer (top) and fall (bottom) views of CV-57-1 at the 80 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Location

Crossing ID: CV-57-1 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528309 7928841

Photographs



A B C

Figure 13. Summer (top) and fall (bottom) views of CV-57-1 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-57-2 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528345 7928683

General Physical Characteristics

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

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	9.0	6.9 / 8.0	- / 0.60	0.50 / -	- / 0.40	0.50 / 0.60	- / 0.00	0.02 / -	- / 0.00	0.02 / 0.02
80D	7.0	- / 5.5	- / 0.17	- / -	- / 0.15	- / 0.20	- / 0.00	- / -	- / 0.00	- / 0.00
60D	8.0	- / 1.8	- / -	- / 0.50	- / -	- / 0.50	- / -	- / 0.02	- / -	- / 0.02
50D	4.8	2.4 / -	- / -	0.02 / -	- / -	0.10 / -	- / -	0.15 / -	- / -	0.15 / -
40D	6.0	- / 3.9	- / 0.55	- / -	- / 0.10	- / 0.60	- / 0.00	- / -	- / 0.07	- / 0.07
20D	5.0	- / 2.8	- / -	- / 0.08	- / -	- / 0.15	- / -	- / 0.22	- / -	- / 0.25
0	6.5	2.5 / 1.6	- / -	- / 0.10	- / -	- / 0.20	- / -	- / 0.21	- / -	- / 0.25
20U	5.0	8.7 / 2.0	- / -	- / 0.03	- / -	- / 0.10	- / -	- / 0.23	- / -	- / 0.25
40U	8.0	7.0 / 5.2	- / -	- / 0.51	- / -	- / 0.55	- / -	- / 0.00	- / -	- / 0.00
50U	6.6	5.1 / -	- / -	0.50 / -	- / -	0.50 / -	- / -	0.00 / -	- / -	0.00 / -
60U	8.0	12.2 / 6.1	- / -	- / 0.31	- / -	- / 0.40	- / -	- / 0.00	- / -	- / 0.00
80U	7.5	9.0 / 4.1	- / -	- / 0.34	- / -	- / 0.35	- / -	- / 0.00	- / -	- / 0.02
100U	5.8	1.6 / 3.6	- / -	0.10 / 0.63	- / -	0.40 / 0.65	- / -	0.05 / 0.00	- / -	0.05 / 0.00

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	10	40	50	-	-	-	100	-	-	-	-
80D	20	75	5	-	-	-	100	-	-	-	-
60D	40	30	30	-	-	-	100	-	-	-	-
50D	10	90	-	-	-	-	100	-	-	-	-
40D	10	40	50	-	-	-	100	-	-	-	-
20D	40	60	-	-	-	-	95	-	5	-	-
0	25	70	5	-	-	-	90	-	10	-	-
20U	50	50	-	-	-	-	70	20	10	-	-
40U	-	40	60	-	-	-	100	-	-	-	-
50U	-	50	50	-	-	-	95	-	5	-	-
60U	-	60	40	-	-	-	95	-	5	-	-
80U	-	70	30	-	-	-	95	-	5	-	-
100U	-	35	65	-	-	-	100	-	-	-	-

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-57-2 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528345 7928683

Fisheries Data

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

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	4.17	16	3.84	60 - 98
	Fall	N/A	-	-	-
NNST	Summer	4.17	0	-	N/A
	Fall	N/A	-	-	-

Fish Habitat Potential

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

Comments & Summary

Immediately downstream of CV-057 on the Tote Road. Typically provides important rearing habitat (depending on water levels) for small juvenile char throughout the open-water season, but particularly during summer. Periods of low water can reduce habitat quality to Marginal due to the loss of deep pools.

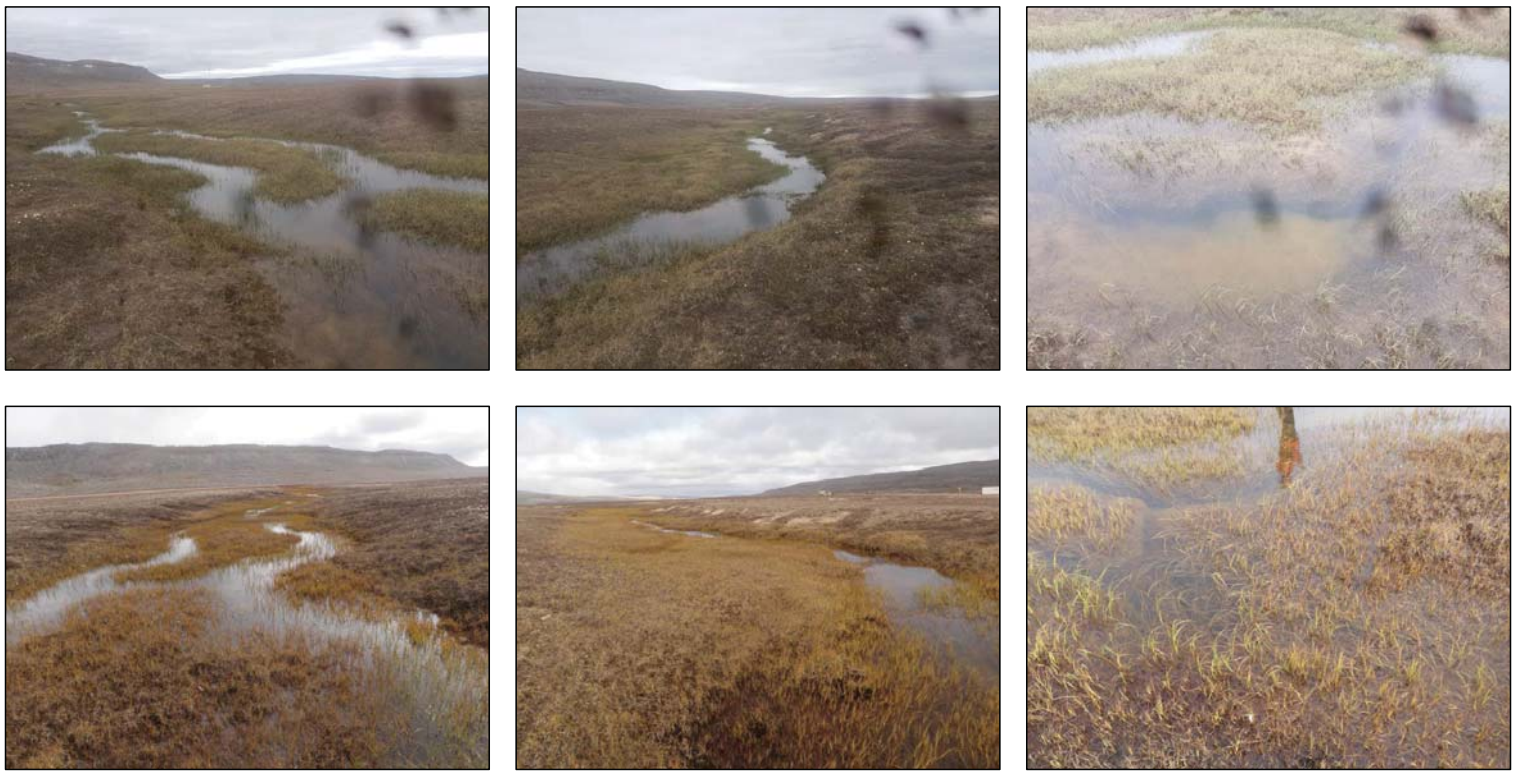
Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-57-2 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528345 7928683

Photographs



A B C

Figure 1. Summer (top) and fall (bottom) views of CV-57-2 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-57-2 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528345 7928683

Photographs

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

A

B

C

Figure 2. Summer (top) and fall (bottom) views of CV-57-2 at the 80 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

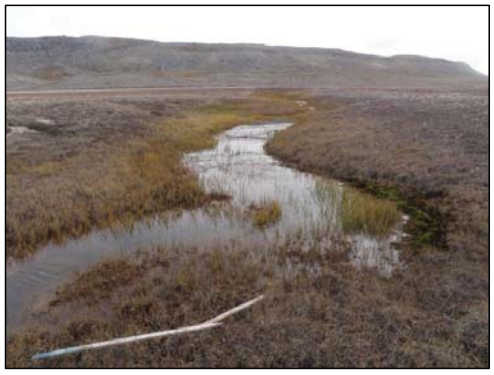
Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

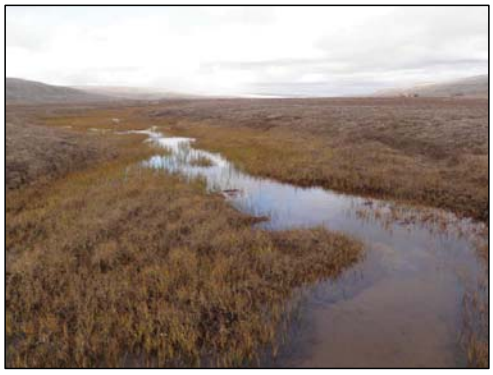
Location

Crossing ID: CV-57-2 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528345 7928683

Photographs

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





A **B** **C**

Figure 3. Summer (top) and fall (bottom) views of CV-57-2 at the 60 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-57-2 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528345 7928683

Photographs

NO PHOTO

NO PHOTO

NO PHOTO

A **B** **C**

Figure 4. Summer (top) and fall (bottom) views of CV-57-2 at the 50 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

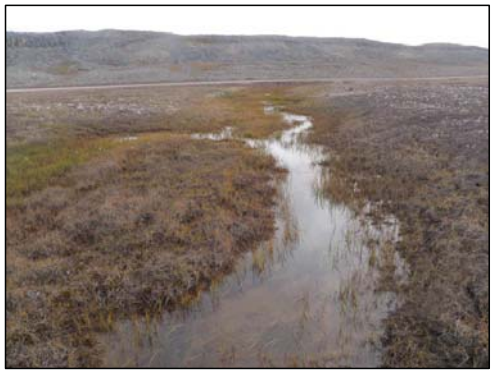
Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-57-2 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528345 7928683

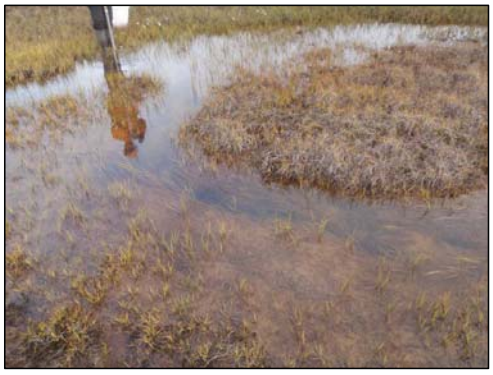
Photographs

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



A

B



C

Figure 5. Summer (top) and fall (bottom) views of CV-57-2 at the 40 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

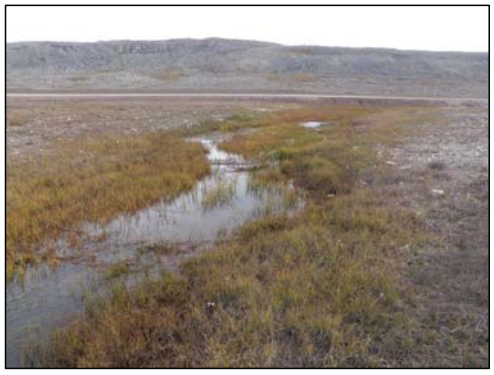
Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-57-2 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528345 7928683

Photographs

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



A **B** **C**

Figure 6. Summer (top) and fall (bottom) views of CV-57-2 at the 20 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-57-2 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528345 7928683

Photographs

A B C

Figure 7. Summer (top) and fall (bottom) views of CV-57-2 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

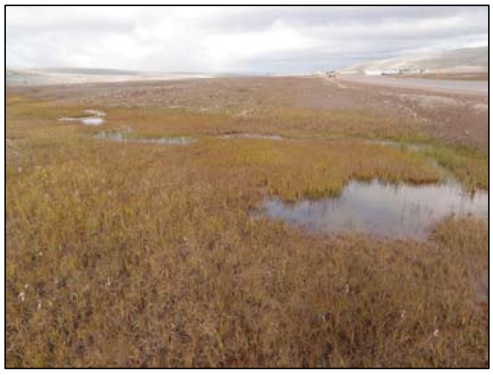
Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-57-2 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528345 7928683

Photographs

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



A **B** **C**

Figure 8. Summer (top) and fall (bottom) views of CV-57-2 at the 20 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-57-2 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528345 7928683

Photographs

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

A **B** **C**

Figure 9. Summer (top) and fall (bottom) views of CV-57-2 at the 40 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-57-2 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528345 7928683

Photographs

NO PHOTO

NO PHOTO

NO PHOTO

A **B** **C**

Figure 10. Summer (top) and fall (bottom) views of CV-57-2 at the 50 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-57-2 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528345 7928683

Photographs

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

A **B** **C**

Figure 11. Summer (top) and fall (bottom) views of CV-57-2 at the 60 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-57-2 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528345 7928683

Photographs

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

A

B

C

Figure 12. Summer (top) and fall (bottom) views of CV-57-2 at the 80 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-57-2 **Dates Surveyed:** 8 July & 27 August, 2018 **UTM Coordinates:** 17 W 528345 7928683

Photographs

A **B** **C**

Figure 13. Summer (top) and fall (bottom) views of CV-57-2 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-1 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 528241 7927966

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 4° **Flow Regime:** Intermittent

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	3.0	2.1 / -	- / -	0.03 / -	- / -	0.03 / -	- / -	0.00 / -	- / -	0.00 / -
50D	2.0	1.5 / 0.6	- / -	0.03 / 0.06	- / -	0.03 / 0.06	- / -	0.00 / 0.10	- / -	0.00 / 0.10
0	1.2	0.6 / 0.9	- / -	0.04 / 0.02	- / -	0.04 / 0.02	- / -	0.00 / 0.02	- / -	0.00 / 0.02
50U	2.0	0.9 / 1.4	- / -	0.05 / 0.01	- / -	0.05 / 0.02	- / -	0.00 / 0.04	- / -	0.00 / 0.04
100U	2.3	1.5 / 2.1	- / -	0.03 / 0.01	- / -	0.03 / 0.02	- / -	0.00 / 0.00	- / -	0.00 / 0.00

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	-	100	-	-	-	-	90	10	-	-	-
50D	5	95	-	-	-	-	70	30	-	-	-
0	5	95	-	-	-	-	100	-	-	-	-
50U	5	95	-	-	-	-	90	5	5	-	-
100U	-	100	-	-	-	-	100	-	-	-	-

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-1 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 528241 7927966

Fisheries Data

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

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	3.30	0	-	N/A
	Fall	-	N/A	N/A	N/A
NNST	Summer	3.30	0	-	N/A
	Fall	-	N/A	N/A	N/A

Fish Habitat Potential

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

Comments & Summary

There was no evidence of fish use of habitat in this stream in 2018. There was very low water with little potential to support fish except during a high freshet or periods of extensive rain. However, this site is near enough to confirmed fish habitat (CV-58-5 stream) that intermittent use during high water may be possible.

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-1 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 528241 7927966

Photographs

NO PHOTO

NO PHOTO

NO PHOTO

A **B** **C**

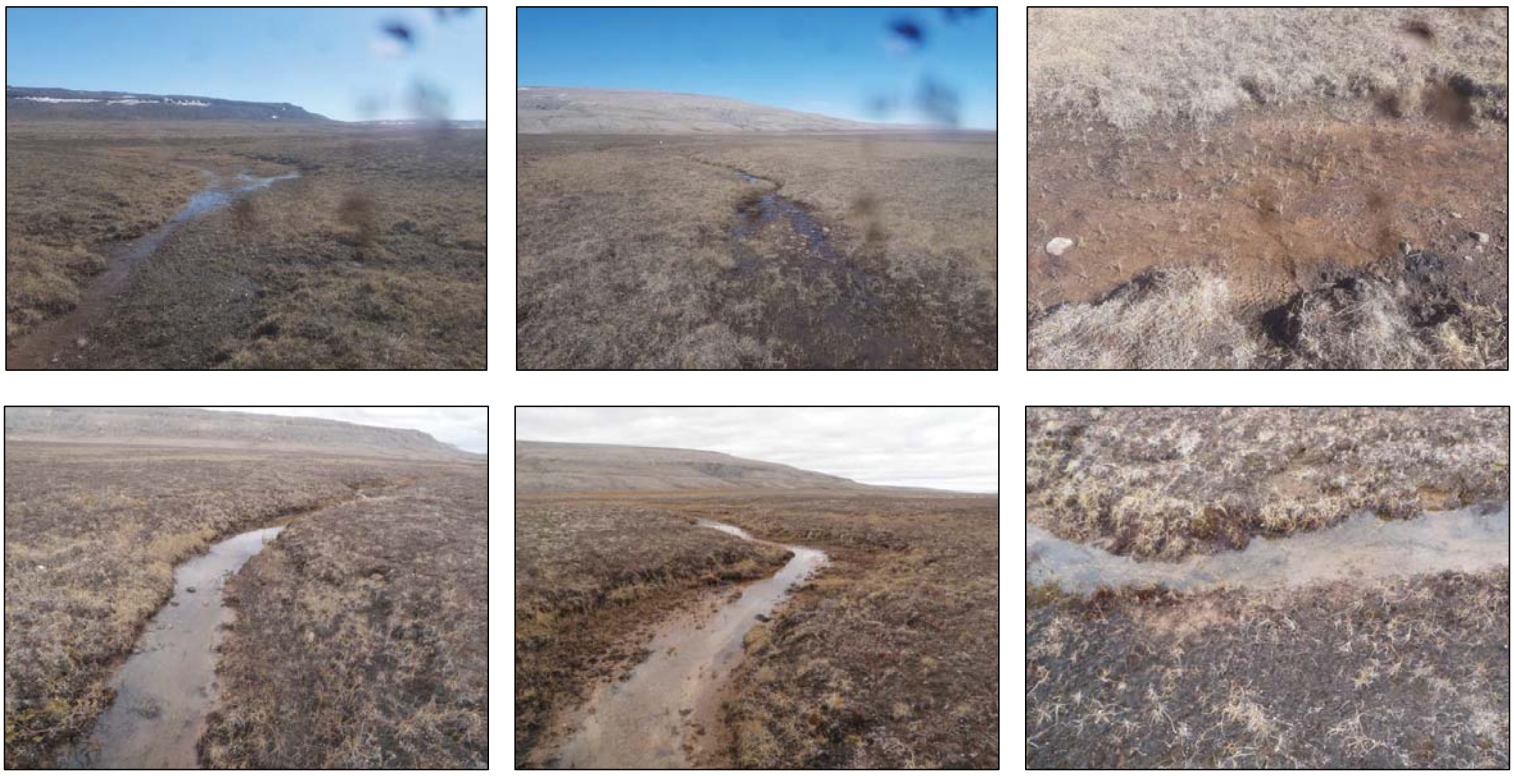
Figure 1. Summer (top) and fall (bottom) views of CV-58-1 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-1 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 528241 7927966

Photographs



A **B** **C**

Figure 2. Summer (top) and fall (bottom) views of CV-58-1 at the 50 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-1 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 528241 7927966

Photographs

A **B** **C**

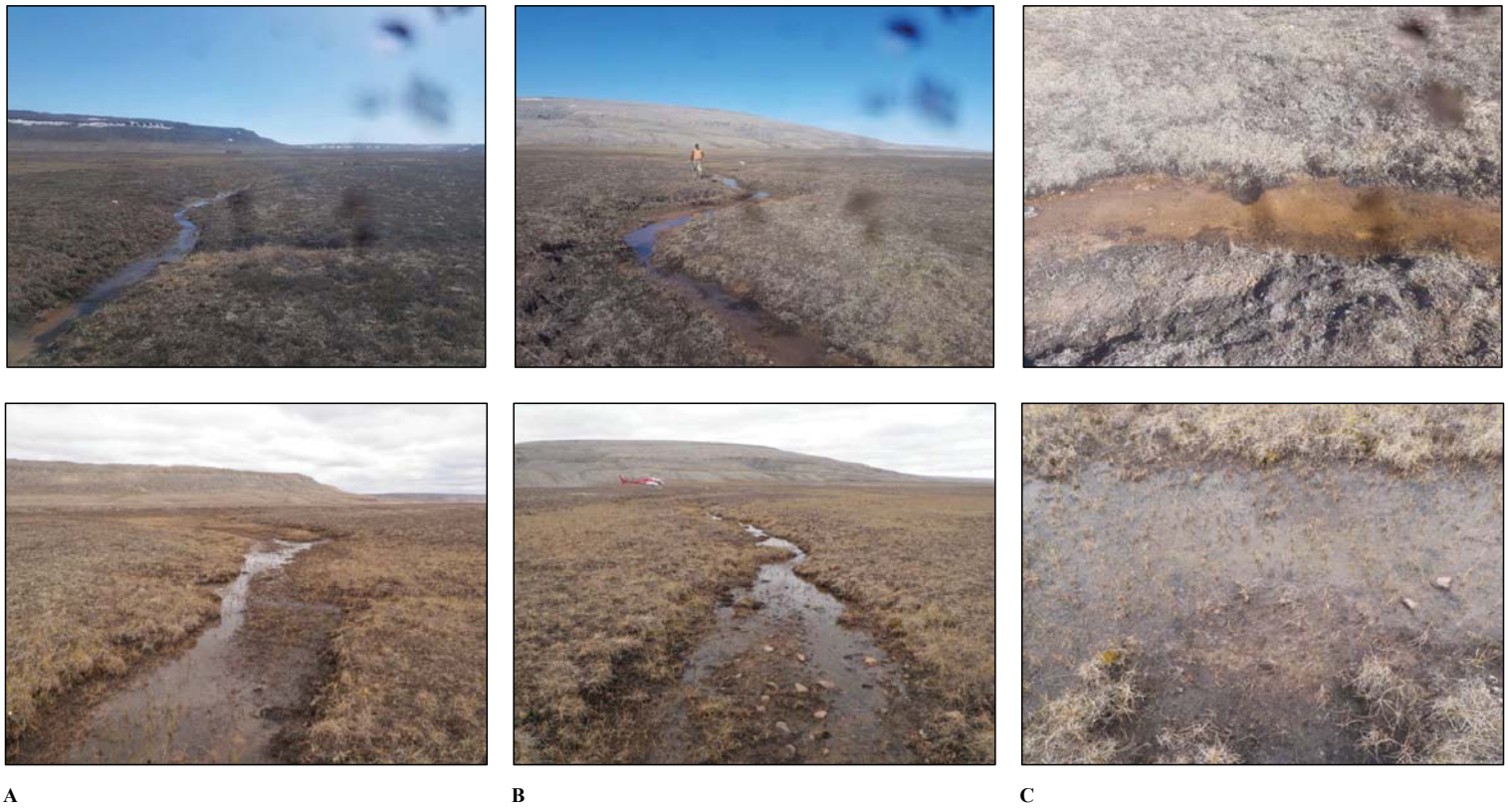
Figure 3. Summer (top) and fall (bottom) views of CV-58-1 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-1 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 528241 7927966

Photographs



A B C

Figure 4. Summer (top) and fall (bottom) views of CV-58-1 at the 50 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-1 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 528241 7927966

Photographs

A B C

Figure 5. Summer (top) and fall (bottom) views of CV-58-1 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-2 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 528168 7927807

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 1-2° **Flow Regime:** Intermittent

Fisheries Data

Gear Used: Backpack Electrofisher **Effort (min):** 2.17 **Transect Length (m):** 100

Fish Habitat Potential

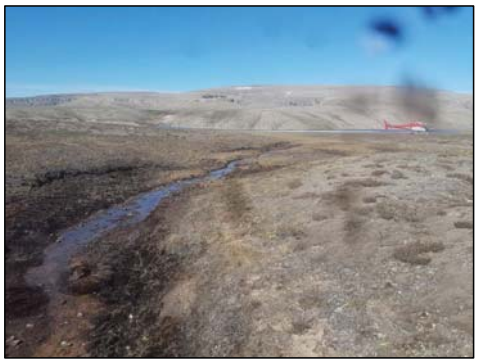
Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This stream was shallow (1 cm maximum depth) with almost no flow in 2018. In addition, there is a soft barrier downstream (lack of surface flow and no channel) preventing access from a possible overwintering lake. The barrier may be sufficient to prevent access to the rail crossing under all flow conditions.

Photographs

A



B

C

Figure 1. Views of CV-58-2 at the rail crossing during summer, looking upstream (A), downstream (B), and at the barrier near the confluence with a downstream lake (C).

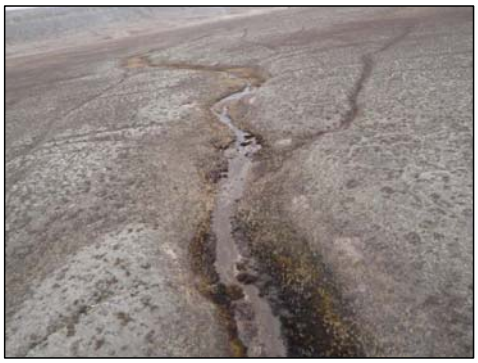
Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-2 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 528168 7927807

Photographs



A

Figure 2. Aerial view of CV-58-2 during fall.

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-3 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 528109 7927716

General Physical Characteristics

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

Fisheries Data

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

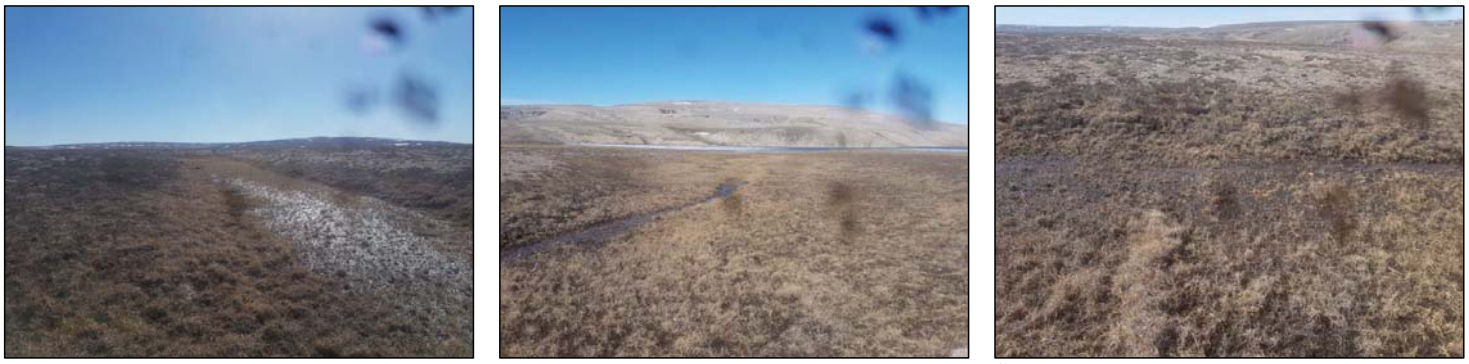
Fish Habitat Potential

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

Comments & Summary

This stream was nearly dry at the rail crossing in both June and August and no fish were observed. In addition, there were several downstream locations where there was no surface water or the channel disappeared and water dispersed across the tundra, creating a soft barrier to fish movements.

Photographs



A **B** **C**

Figure 1. Summer views of CV-58-3 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-3 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 528109 7927716

Photographs

A

Figure 2. Aerial view of CV-58-3 during fall, showing subsurface flows both upstream and downstream of the crossing (red arrows).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-4 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 528062 7927656

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 1-2° **Flow Regime:** Intermittent

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	7.0	- / 5.8	- / -	- / 0.02	- / -	- / 0.02	- / -	- / 0.01	- / -	- / 0.01
50D	1.5	- / 0.8	- / -	- / 0.02	- / -	- / 0.05	- / -	- / 0.21	- / -	- / 0.21
0	2.7	0.4 / 0.3	- / -	0.03 / 0.04	- / -	0.03 / 0.04	- / -	0.05 / 0.29	- / -	0.20 / 0.30
50U	20.0	- / 14.6	- / -	- / 0.06	- / -	- / 0.10	- / -	- / 0.01	- / -	- / 0.05
100U	11.5	- / 7.8	- / -	- / 0.01	- / -	- / 0.02	- / -	- / 0.05	- / -	- / 0.05

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	-	100	-	-	-	-	95	5	-	-	-
50D	50	50	-	-	-	-	70	30	-	-	-
0	70	30	-	-	-	-	60	35	5	-	-
50U	-	100	-	-	-	-	70	30	-	-	-
100U	70	30	-	-	-	-	40	60	-	-	-

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-4 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 528062 7927656

Fisheries Data

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

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	1.63	0	-	N/A
	Fall	-	N/A	N/A	N/A
NNST	Summer	1.63	0	-	N/A
	Fall	-	N/A	N/A	N/A

Fish Habitat Potential

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

Comments & Summary

There was no evidence of fish use of habitat in this stream in 2018. There was very low water with little potential to support fish except during a high freshet or periods of extensive rain. However, the site is near enough to confirmed fish habitat (CV-58-5 stream) that intermittent use during high water may be possible.

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

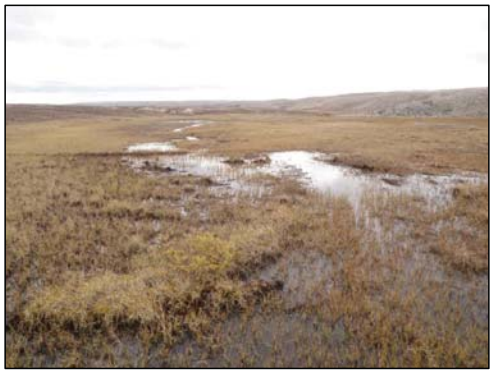
Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-4 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 528062 7927656

Photographs

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



A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of CV-58-4 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

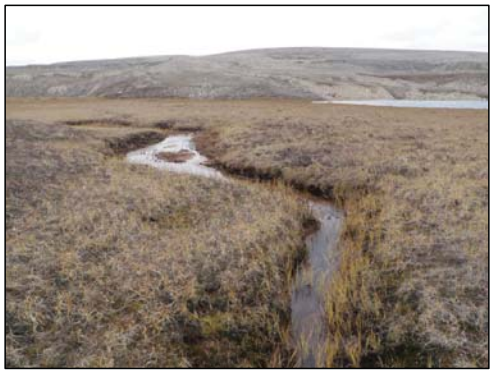
Location

Crossing ID: CV-58-4 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 528062 7927656

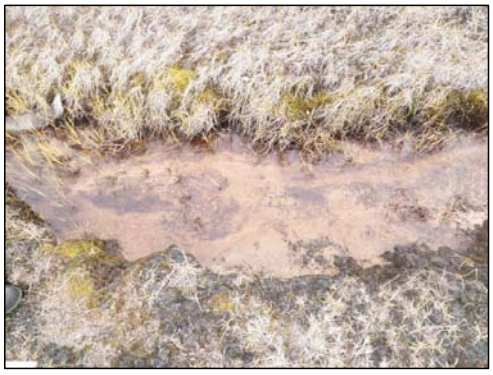
Photographs

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

A



B



C

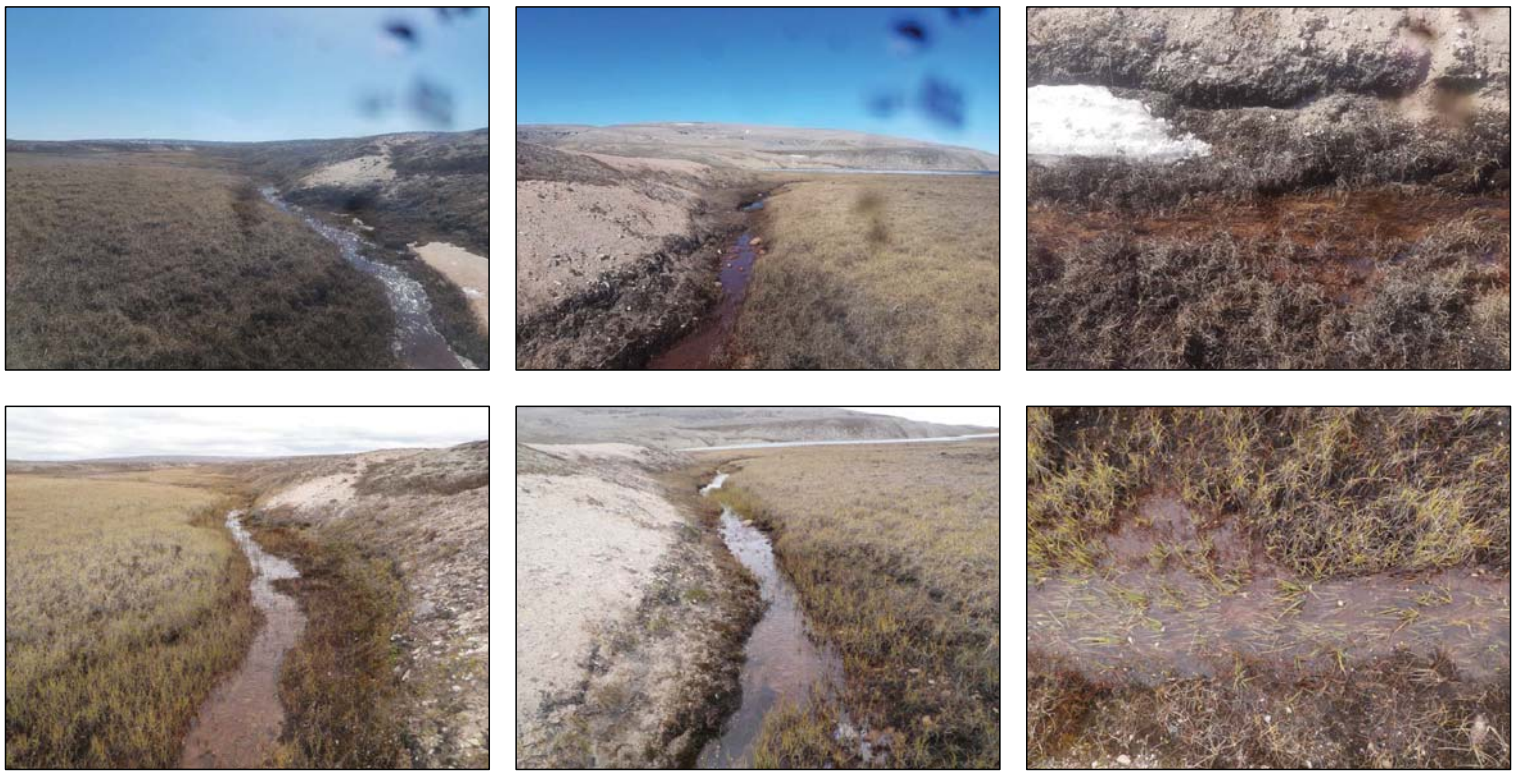
Figure 2. Summer (top) and fall (bottom) views of CV-58-4 at the 50 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-4 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 528062 7927656

Photographs



A B C

Figure 3. Summer (top) and fall (bottom) views of CV-58-4 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

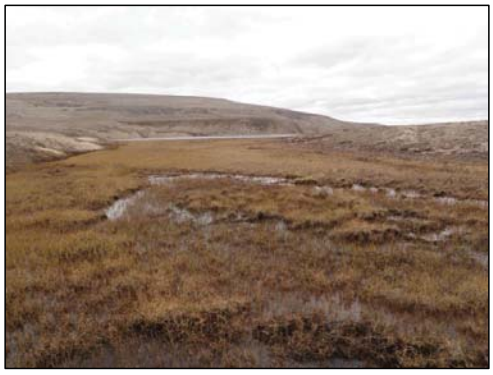
Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-4 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 528062 7927656

Photographs

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



A **B** **C**

Figure 4. Summer (top) and fall (bottom) views of CV-58-4 at the 50 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-4 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 528062 7927656

Photographs

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

A **B** **C**

Figure 5. Summer (top) and fall (bottom) views of CV-58-4 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-4a | **Dates Surveyed:** 29 June & 30 August, 2018 | **UTM Coordinates:** 17 W 527931 7927527

General Physical Characteristics

Channel Confinement: C | **Channel Gradient (range):** 1° | **Flow Regime:** Intermittent

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This stream was nearly dry at the rail crossing in 2018. In addition, there were several soft barriers downstream and no access from other waterbodies. There is likely no fish habitat at this site under all flow conditions.

Photographs

A

B

Figure 1. Views of CV-58-4a at the rail crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-5 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 527751 7927378

General Physical Characteristics

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

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	10.7	7.1 / 6.7	0.03 / 0.02	0.03 / 0.08	0.05 / 0.02	0.10 / 0.10	0.05 / 0.13	0.17 / 0.24	0.38 / 0.36	0.40 / 0.40
80D	14.7	13.0 / 12.8	0.04 / 0.03	0.08 / 0.02	0.02 / 0.10	0.10 / 0.10	0.11 / 0.15	0.14 / 0.17	0.05 / 0.13	0.20 / 0.20
60D	23.5	19.8 / 19.6	0.03 / 0.02	0.03 / 0.04	0.03 / 0.02	0.05 / 0.05	0.04 / 0.09	0.20 / 0.19	0.07 / 0.08	0.20 / 0.20
40D	12.8	9.8 / 6.8	0.04 / 0.06	0.09 / 0.08	0.03 / 0.02	0.10 / 0.10	0.21 / 0.39	0.10 / 0.22	0.08 / 0.09	0.30 / 0.40
20D	4.8	3.6 / 4.5	0.01 / 0.02	0.02 / -	0.09 / 0.03	0.10 / 0.10	0.02 / 0.09	0.14 / -	0.13 / 0.32	0.25 / 0.35
0	2.5	1.4 / 1.6	-/ 0.02	0.07 / -	- / 0.10	0.10 / 0.10	- / 0.09	0.59 / -	- / 0.18	0.60 / 0.30
20U	14.9	9.1 / 8.8	0.02 / 0.03	0.02 / -	0.09 / 0.09	0.10 / 0.10	0.01 / 0.05	0.05 / -	0.11 / 0.24	0.15 / 0.25
40U	13.7	5.5 / 12.4	0.02 / -	- / -	0.30 / 0.12	0.30 / 0.25	0.00 / -	- / -	0.00 / 0.03	0.05 / 0.05
60U	8.8	3.2 / 4.4	0.06 / 0.07	0.09 / -	0.10 / 0.08	0.10 / 0.10	0.05 / 0.06	0.12 / -	0.04 / 0.11	0.10 / 0.15
80U	10.8	5.4 / 6.6	0.12 / -	0.16 / 0.09	0.03 / -	0.20 / 0.15	0.02 / -	0.02 / 0.08	0.01 / -	0.05 / 0.10
100U	11.4	6.1 / 3.8	0.10 / -	0.09 / 0.08	0.03 / -	0.10 / 0.10	0.05 / -	0.03 / 0.13	0.02 / -	0.10 / 0.15

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	75	25	-	-	-	-	-	5	50	45	-
80D	75	25	-	-	-	-	-	5	50	45	-
60D	55	45	-	-	-	-	-	5	45	45	5
40D	60	40	-	-	-	-	10	5	45	40	-
20D	70	30	-	-	-	-	-	5	60	35	-
0	85	15	-	-	-	-	-	5	70	25	-
20U	30	70	-	-	-	-	-	5	60	35	-
40U	5	75	20	-	-	-	15	5	80	-	-
60U	10	90	-	-	-	-	5	15	80	-	-
80U	5	95	-	-	-	-	80	10	10	-	-
100U	5	95	-	-	-	-	80	10	10	-	-

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality

Arctic Char - IMPORTANT

Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-5 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 527751 7927378

Fisheries Data

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

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	4.81	6	1.25	102 - 124
	Fall	3.05	2	0.66	95 - 107
NNST	Summer	4.81	0	-	N/A
	Fall	3.05	0	-	N/A

Fish Habitat Potential

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

Comments & Summary

Provides important rearing habitat for juvenile char throughout the open water season, but particularly during summer. Large numbers of char were also captured during summer 2016. May also be a migratory route between two lakes. Water temperatures in survey streams during fall sampling averaged approximately 5°C and fish had already begun downstream movements towards overwintering habitat, reducing catches.

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-5 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 527751 7927378

Photographs

A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of CV-58-5 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-5 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 527751 7927378

Photographs

A **B** **C**

Figure 2. Summer (top) and fall (bottom) views of CV-58-5 at the 80 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-5 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 527751 7927378

Photographs

A **B** **C**

Figure 3. Summer (top) and fall (bottom) views of CV-58-5 at the 60 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-5 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 527751 7927378

Photographs

A B C

Figure 4. Summer (top) and fall (bottom) views of CV-58-5 at the 40 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-5 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 527751 7927378

Photographs

A **B** **C**

Figure 5. Summer (top) and fall (bottom) views of CV-58-5 at the 20 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-5 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 527751 7927378

Photographs

A B C

Figure 6. Summer (top) and fall (bottom) views of CV-58-5 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-5 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 527751 7927378

Photographs

A B C

Figure 7. Summer (top) and fall (bottom) views of CV-58-5 at the 20 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-5 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 527751 7927378

Photographs

A B C

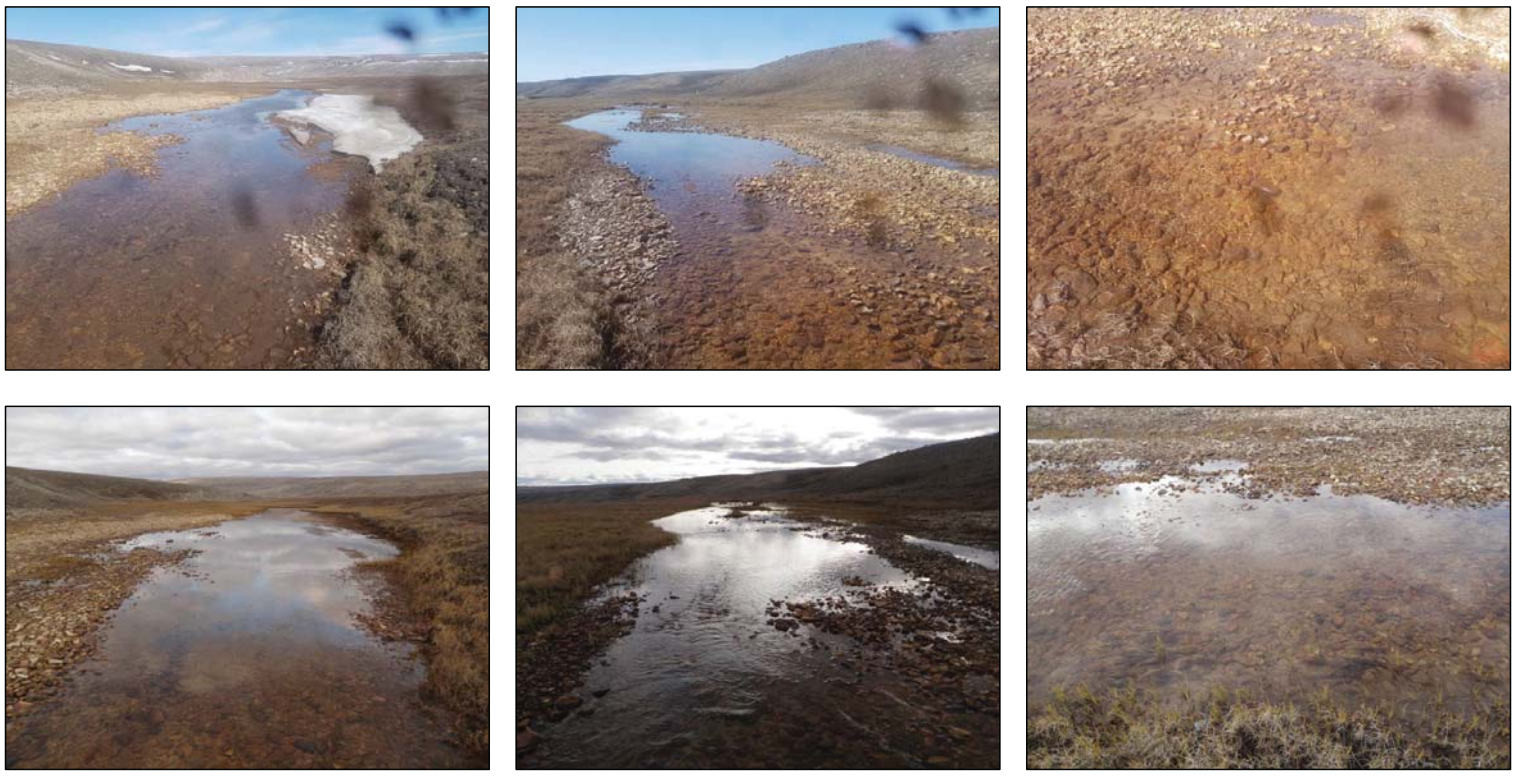
Figure 8. Summer (top) and fall (bottom) views of CV-58-5 at the 40 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-5 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 527751 7927378

Photographs



A B C

Figure 9. Summer (top) and fall (bottom) views of CV-58-5 at the 60 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-5 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 527751 7927378

Photographs

A B C

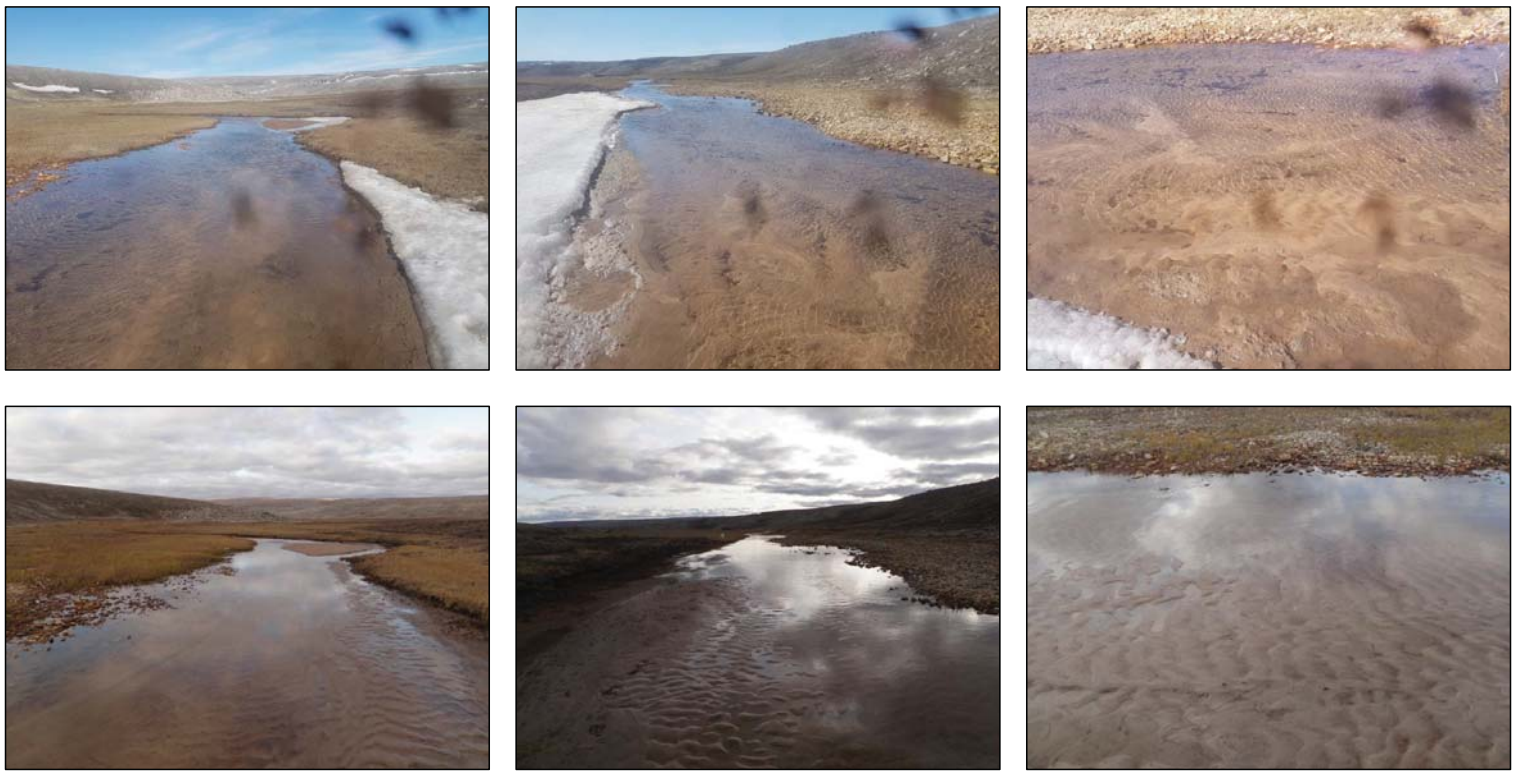
Figure 10. Summer (top) and fall (bottom) views of CV-58-5 at the 80 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-5 **Dates Surveyed:** 29 June & 30 August, 2018 **UTM Coordinates:** 17 W 527751 7927378

Photographs



A B C

Figure 11. Summer (top) and fall (bottom) views of CV-58-5 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-6 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527681 7927318

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 5-13° **Flow Regime:** Intermittent

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	CV-58-5 STREAM									
50D	8.5	2.6 / 0.8	- / -	0.07 / 0.13	- / -	0.10 / 0.15	- / -	0.17 / 0.07	- / -	0.20 / 0.15
0	8.3	2.2 / 1.2	- / 0.01	0.04 / -	- / 0.02	0.05 / 0.05	- / 0.11	0.21 / -	- / 0.09	0.25 / 0.15
50U	FISH MOVEMENT BARRIER									

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	CV-58-5 STREAM										
50D	60	40	-	-	-	-	60	15	25	-	-
0	80	20	-	-	-	-	-	10	90	-	-
50U	FISH MOVEMENT BARRIER										

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-6 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527681 7927318

Fisheries Data

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

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	2.87	0	-	N/A
	Fall	1.48	0	-	N/A
NNST	Summer	2.87	0	-	N/A
	Fall	1.48	0	-	N/A

Fish Habitat Potential

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

Comments & Summary

There was no evidence of fish use of this stream in 2018. There was very low water with little potential to support fish except during a high freshet or periods of extensive rain. In addition, there is a steep barrier to fish movement starting at approximately 50 m upstream from the crossing. This crossing is near enough to confirmed fish habitat (CV-58-5) that intermittent use during high water may be possible.

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-6 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527681 7927318

Photographs

A B C

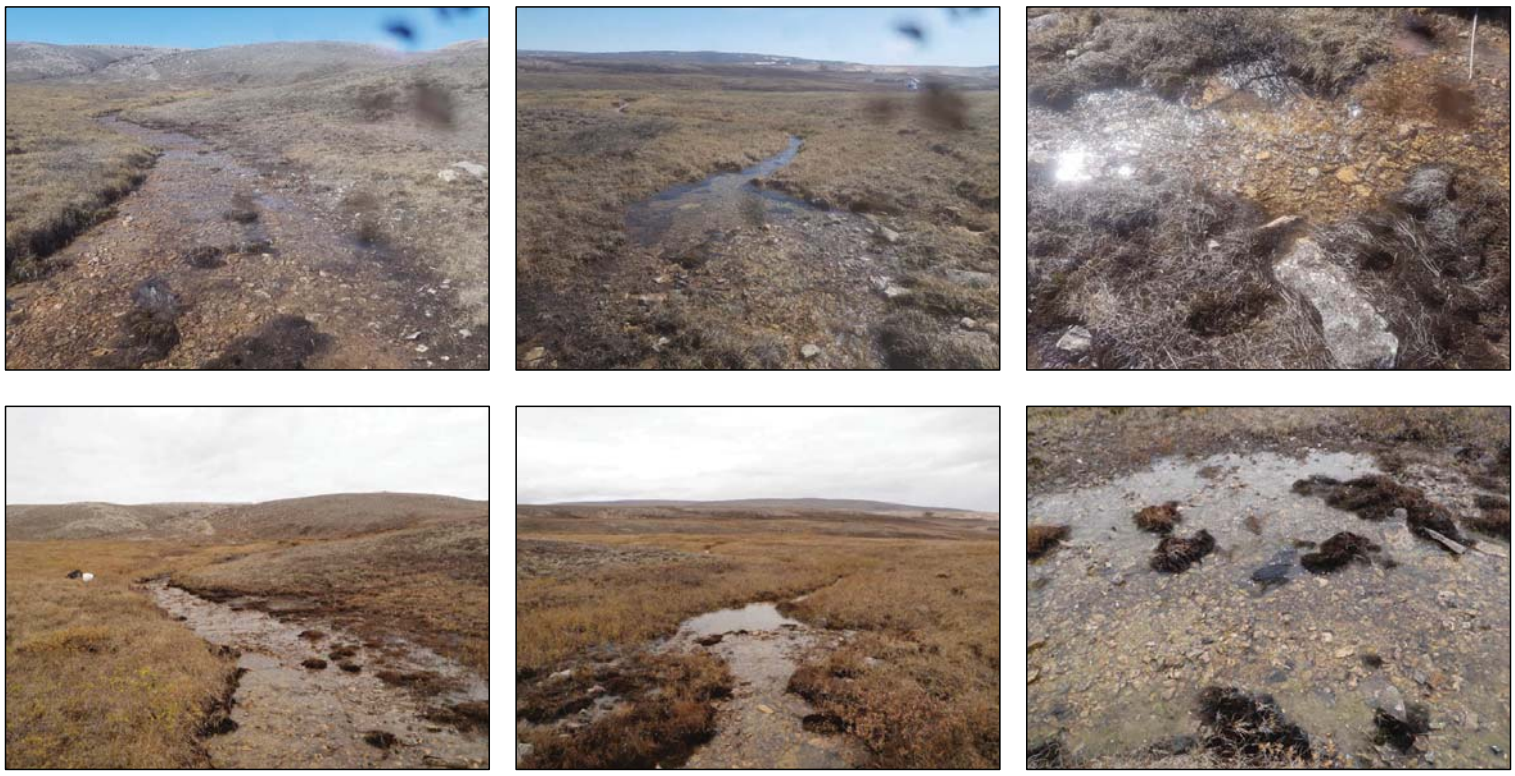
Figure 1. Summer (top) and fall (bottom) views of CV-58-6 at the 50 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-6 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527681 7927318

Photographs



A B C

Figure 2. Summer (top) and fall (bottom) views of CV-58-6 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-6 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527681 7927318

Photographs

A

Figure 3. View of the barrier to fish movement in CV-58-6 approximately 50 m upstream from the rail crossing.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-7 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527650 7927282

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** > 10° **Flow Regime:** None

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This was a dry hillside down to the confluence with fish-bearing CV-58-5. Vertical barriers would likely prevent access under all flow scenarios. There is never fish habitat at this rail crossing.

Photographs

A

B

Figure 1. Views of CV-58-7 at the rail crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-58-8 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527613 7927217

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** > 10° **Flow Regime:** None

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This was a dry, rocky hillside down to the confluence with CV-59-1 in 2018. Vertical barriers would likely prevent access to the crossing under all flow scenarios. There is never fish habitat at this rail crossing.

Photographs

A

B

Figure 1. Views of CV-58-8 at the rail crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-59-1 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527590 7927169

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 10 to > 15° **Flow Regime:** Intermittent

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This stream had low water in 2018 with multiple locations of subsurface flow. There were also permanent vertical barriers to fish movement between the rail and fish-bearing 58-5 downstream. There is never fish habitat at this rail crossing.

Photographs

A **B**

Figure 1. Views of CV-59-1 at the rail crossing during summer (A) and (B), and fall (C). Note the multiple locations where flow is subsurface.

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-59-2 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527553 7927052

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 10 to > 15° **Flow Regime:** Intermittent

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This stream had low water in 2018 with multiple locations of subsurface flow. There were also permanent vertical barriers to fish movement between the rail and fish-bearing 58-5 downstream. There is never fish habitat at this rail crossing.

Photographs

A **B**

Figure 1. Views of CV-59-2 at the rail crossing during summer (A) and (B), and fall (C). Note the locations where flow is subsurface.

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-59-3 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527529 7926917

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 10 to > 15° **Flow Regime:** Intermittent

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This was a dry hillside valley in 2018. The very steep gradient would likely prevent any access even under much higher flows. There is never fish habitat at this rail crossing.

Photographs

A

B

Figure 1. Views of CV-59-3 at the rail crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-59-4 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527395 7926734

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 8-13° **Flow Regime:** Intermittent

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	13.5	4.8 / dry	0.11 / -	0.08 / -	0.04 / -	0.15 / -	0.30 / -	0.20 / -	0.31 / -	0.35 / -
50D	9.0	2.0 / dry	0.08 / -	0.06 / -	0.10 / -	0.10 / -	0.04 / -	0.64 / -	0.50 / -	0.65 / -
0	10.8	2.9 / dry	0.07 / -	- / -	0.06 / -	0.10 / -	0.19 / -	- / -	0.20 / -	0.20 / -
50U	GRADIENT BARRIER									
100U										

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	85	15	-	-	-	-	-	-	60	40	-
50D	50	25	-	-	25	-	-	-	40	35	25
0	20	40	-	-	40	-	-	-	35	40	25
50U	GRADIENT BARRIER										
100U											

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality

Arctic Char - MARGINAL

Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-59-4 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527395 7926734

Fisheries Data

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

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	4.20	1	0.24	~150
	Fall	-	N/A	N/A	N/A
NNST	Summer	4.20	0	-	N/A
	Fall	-	N/A	N/A	N/A

Fish Habitat Potential

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

Comments & Summary

Very steep gradient at and upstream from the crossing. One juvenile Arctic Char observed 50 m downstream of the crossing, but may not have access farther upstream. By fall, surface water had disappeared in several locations within the channel. Use limited to intermittent during high water.

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-59-4 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527395 7926734

Photographs

A B C

Figure 1. Summer views of CV-59-4 at the 100 m (top) and 50 m (bottom) downstream cross-sections; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-59-4 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527395 7926734

Photographs

A **B** **C**

Figure 2. Summer (top) views of CV-59-4 at the 50 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across. Fall (bottom) aerial view of the crossing.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-59-4a | **Dates Surveyed:** 29 June & 1 September, 2018 | **UTM Coordinates:** 17 W 527329 7926595

General Physical Characteristics

Channel Confinement: C | **Channel Gradient (range):** 10 to > 15° | **Flow Regime:** Intermittent

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This stream was nearly dry in 2018. Lack of surface flow downstream and a steep gradient near the crossing likely combine to prevent access during all flow conditions. There is probably never fish habitat at this rail crossing.

Photographs

A

B

Figure 1. Views of CV-59-4a at the rail crossing during summer (A) and fall (B). Note the loss of surface flow downstream in the fall image.

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-59-4b | **Dates Surveyed:** 29 June & 1 September, 2018 | **UTM Coordinates:** 17 W 527467 7926817

General Physical Characteristics

Channel Confinement: PC | **Channel Gradient (range):** 10 to > 15° | **Flow Regime:** None

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

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

Photographs

A

B

Figure 1. Views of CV-59-4b at the rail crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-59-5 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527272 7926457

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 10 to > 15° **Flow Regime:** Intermittent

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This stream was nearly dry in 2018. Multiple movement barriers would exist downstream even under high flows. There is never fish habitat at this rail crossing.

Photographs

A

B

C

Figure 1. Views of CV-59-5 at the rail crossing during summer (A) and (B), and fall (C). Note the lack of surface flow in multiple locations.

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-60-1 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527202 7926246

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 5 to > 15° **Flow Regime:** Intermittent

Fisheries Data

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

Fish Habitat Potential

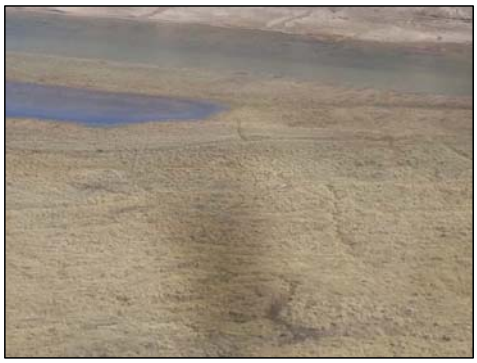
Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This stream was nearly dry in 2018. No connection with the downstream river and multiple movement barriers would exist even under high flows. There is never fish habitat at this rail crossing.

Photographs

A



B

C

Figure 1. Views of CV-60-1 at the rail crossing during summer (A) and (B), and fall (C). Note the lack of surface flow in multiple locations.

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-60-2 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527214 7926070

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This stream was nearly dry in 2018 while the adjacent pond was shallow and isolated. No connection with a downstream river and a lack of surface flow over a large area likely prevent fish access even under high flows. There is never fish habitat at this rail crossing.

Photographs

A **B**

Figure 1. Views of CV-60-2 at the rail crossing during summer (A) and fall (B). Note the general lack of surface flow.

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-60-3 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527225 7925961

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 5 to > 10° **Flow Regime:** Intermittent

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This was very little water at or near the crossing in 2018 and multiple locations with subsurface flow and steep vertical drops. These barriers likely prevent fish access even under high flows. There is never fish habitat at this rail crossing.

Photographs

A **B** **C**

Figure 1. Views of CV-60-3 at the rail crossing during summer (A) and (B), and fall (C). Note the frequent lack of surface flow.

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-60-4 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527243 7925782

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 5 to > 10° **Flow Regime:** Intermittent

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This stream had low water levels in summer and was nearly dry in fall 2018. In addition, there were multiple locations with subsurface flow and vertical drops. These barriers likely prevent fish access even under high flows. There is never fish habitat at this rail crossing.

Photographs

A **B** **C**

Figure 1. Views of CV-60-4 at the rail crossing during summer (A), a downstream barrier (B), and the crossing during fall (C).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-60-4a | **Dates Surveyed:** 29 June & 1 September, 2018 | **UTM Coordinates:** 17 W 527252 7925685

General Physical Characteristics

Channel Confinement: PC | **Channel Gradient (range):** 5 to > 10° | **Flow Regime:** None

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This site was dry in 2018 with no obvious channel and multiple barriers to movement even if there were flows. There is never fish habitat at this rail crossing.

Photographs

A

B

Figure 1. Views of CV-60-4a at the rail crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-60-5 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527273 7925480

General Physical Characteristics

Channel Confinement: UC **Channel Gradient (range):** 8-15° **Flow Regime:** Open

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	5.4	1.3 / 2.4	0.08 / 0.02	- / -	0.07 / 0.03	0.10 / 0.05	0.37 / 0.01	- / -	0.24 / 0.27	0.40 / 0.30
50D	9.8	3.2 / 2.1	0.08 / 0.07	- / -	0.05 / 0.02	0.10 / 0.10	0.66 / 0.35	- / -	0.46 / 0.05	0.70 / 0.40
0	6.3	1.4 / 1.2	0.10 / 0.03	- / -	0.09 / 0.02	0.10 / 0.05	0.08 / 0.20	- / -	0.43 / 0.06	0.50 / 0.25
50U	GRADIENT BARRIER									
100U										

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	20	35	-	-	45	-	-	-	70	30	-
50D	5	35	-	-	60	-	-	-	50	50	-
0	5	35	-	-	60	-	-	-	45	50	5
50U	GRADIENT BARRIER										
100U											

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-60-5 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527273 7925480

Fisheries Data

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

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	2.93	0	-	N/A
	Fall	1.47	0	-	N/A
NNST	Summer	2.93	0	-	N/A
	Fall	1.47	0	-	N/A

Fish Habitat Potential

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

Comments & Summary

There was no evidence of fish use of habitat within the survey transect. The stream is very steep, particularly at and upstream of the crossing, representing at least a soft barrier to movement. Fish use of this stream likely restricted to 100 m or more downstream from the rail crossing.

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-60-5 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527273 7925480

Photographs

A B C

Figure 1. Summer (top) and fall (bottom) views of CV-60-5 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-60-5 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527273 7925480

Photographs

A **B** **C**

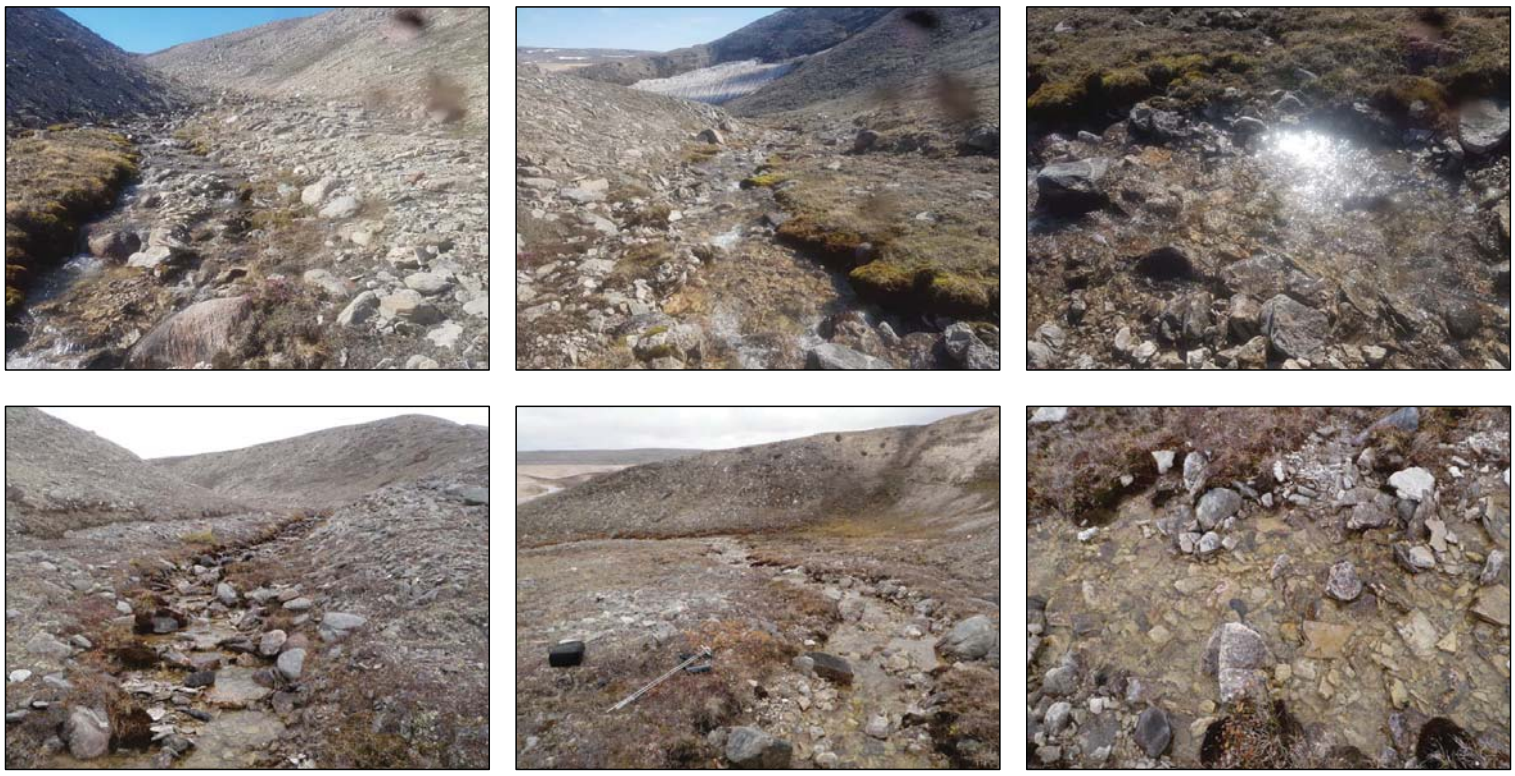
Figure 2. Summer (top) and fall (bottom) views of CV-60-5 at the 50 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-60-5 **Dates Surveyed:** 29 June & 1 September, 2018 **UTM Coordinates:** 17 W 527273 7925480

Photographs



A B C

Figure 3. Summer (top) and fall (bottom) views of CV-60-5 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-60-6 **Dates Surveyed:** 1 July & 1 September, 2018 **UTM Coordinates:** 17 W 527296 7925237

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 5 to > 15° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Backpack Electrofisher **Effort (min):** 1.32 **Transect Length (m):** 100

Fish Habitat Potential

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

Comments & Summary

This crossing was steep (~15°). There is never fish habitat at this rail crossing.

Photographs

A

B

Figure 1. Views of CV-60-6 at the rail crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-61-1 **Dates Surveyed:** 1 July & 1 September, 2018 **UTM Coordinates:** 17 W 527296 7925237

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 5 to > 15° **Flow Regime:** Open Water

Fisheries Data

Gear Used: Backpack Electrofisher **Effort (min):** 1.32 **Transect Length (m):** 100

Fish Habitat Potential

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

Comments & Summary

This crossing was shallow and steep (~15°) and the gradient continued to increase upstream. The nearest any char were captured or observed was 200 m downstream of the rail crossing. Starting approximately 125 m downstream the channel widens considerably and maximum depth is 1 cm. This likely represents a barrier to fish movements under most, if not all, flow conditions. Habitat downstream of the soft barrier is good quality for char. Fish use of habitat at or near the crossing is unlikely.

Photographs

A **B** **C**

Figure 1. Views of CV-61-1 at the rail crossing during summer, looking upstream (A), downstream (B), and across (C).

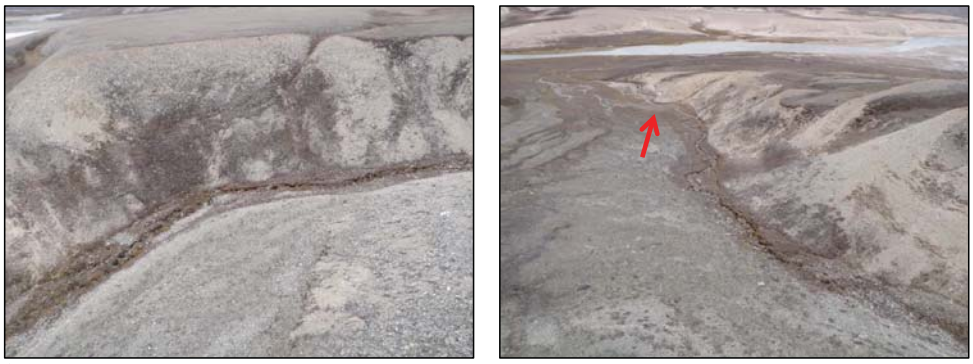
Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-61-1 **Dates Surveyed:** 1 July & 1 September, 2018 **UTM Coordinates:** 17 W 527296 7925237

Photographs



A B

Figure 2. Aerial views of CV-61-1 during fall of the crossing (A) and downstream (B) showing the barrier (arrow).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-61-2 **Dates Surveyed:** 1 July & 1 September, 2018 **UTM Coordinates:** 17 W 527181 7925009

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 5 to > 15° **Flow Regime:** Intermittent

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This crossing was very shallow and steep (~15°) and the gradient continued to increase upstream. Starting approximately 200 m downstream, the channel widens and flows become subsurface. This likely represents a barrier to fish movements under most, if not all, flow conditions. Fish use of habitat at or near the crossing is unlikely.

Photographs

A **B** **C**

Figure 1. Views of CV-61-2 at the rail crossing during summer (A), the downstream flow barrier (B), and the crossing during fall (C).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-61-3 **Dates Surveyed:** 1 July & 1 September, 2018 **UTM Coordinates:** 17 W 527023 7924876

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 5 to > 15° **Flow Regime:** Intermittent

Fisheries Data

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

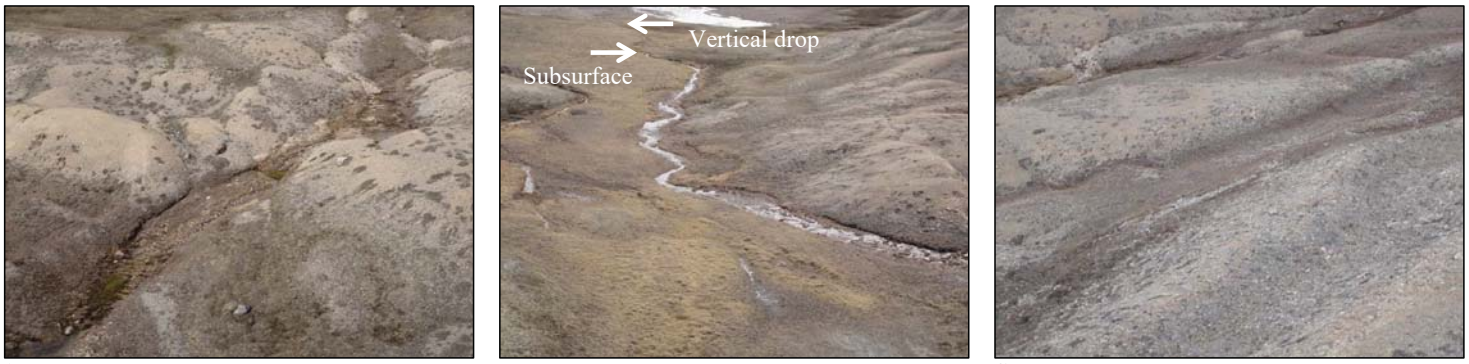
Fish Habitat Potential

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

Comments & Summary

This crossing was very shallow in 2018 and steep (~15°). There are multiple gradient and subsurface flow barriers to movement downstream that likely prevent fish movements under most, if not all, flow conditions. Fish use of habitat at or near the crossing is unlikely.

Photographs



A **B** **C**

Figure 1. Views of CV-61-3 at the rail crossing during summer (A), downstream barriers (B), and the crossing during fall (C).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-62-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 526868 7924453

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 5-8° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	21.0	19.0 / 10.3	0.09 / 0.20	0.20 / 0.16	- / 0.08	0.40 / 0.25	0.12 / 0.47	0.53/ 0.33	- / 0.19	> 2.00 / 0.55
80D	16.0	13.0 / 7.5	0.20 / 0.10	0.50 / 0.39	- / -	> 1.00 / 0.50	0.62 / 0.18	0.90 / 0.30	- / -	> 2.00 / 0.40
60D	17.0	14.0 / 5.7	0.30 / 0.12	0.20 / 0.36	- / -	0.80 / 0.40	0.82 / 0.75	0.78 / 0.43	- / -	> 2.00 / 0.80
40D	16.0	13.0 / 7.0	0.18 / 0.10	0.20 / 0.34	- / -	0.80 / 0.40	0.90 / 0.58	2.03 / 0.68	- / -	> 2.50 / 0.75
20D	19.0	14.0 / 8.5	0.48 / 0.32	0.50 / 0.26	- / -	0.70 / 0.40	0.60 / 0.44	1.52 / 0.63	- / -	> 2.00 / 0.70
0	23.0	14.0 / 6.9	0.30 / 0.26	0.30 / 0.24	- / -	0.80 / 0.35	0.94 / 0.75	0.72 / 0.45	- / -	> 2.00 / 0.80
20U	17.0	13.0 / 5.6	0.27 / 0.28	- / 0.44	- / -	0.80 / 0.50	0.65 / 0.51	- / 0.33	- / -	> 2.00 / 0.60
40U	18.0	16.0 / 7.5	0.15 / 0.15	- / 0.26	- / -	0.70 / 0.30	1.85 / 0.27	- / 0.59	- / -	> 2.00 / 0.65
60U	28.0	20.0 / 9.9	0.15 / 0.12	- / 0.13	- / 0.20	0.60 / 0.25	0.98 / 0.50	- / 0.09	- / 0.56	> 2.00 / 0.60
80U	30.0	15.0 / 6.9	0.10 / 0.18	0.16 / 0.26	- / -	0.60 / 0.30	0.97 / 0.74	- / 0.90	- / -	> 2.00 / 0.90
100U	15.0	12.0 / 4.3	0.21 / 0.14	- / 0.25	- / -	0.80 / 0.30	0.72 / 0.17	- / 0.67	- / -	> 2.00 / 0.70

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	85	5	10	-	-	-	-	-	55	40	5
80D	85	5	10	-	-	-	-	-	20	80	-
60D	75	5	15	-	5	-	-	-	15	80	5
40D	75	5	15	-	5	-	-	-	10	75	15
20D	75	5	15	-	5	-	-	-	10	80	10
0	65	10	20	-	5	-	-	-	10	70	20
20U	65	5	25	-	5	-	-	-	10	60	30
40U	75	5	15	-	5	-	-	-	10	80	10
60U	75	5	15	-	5	-	-	-	10	80	10
80U	75	5	10	-	10	-	-	-	15	80	5
100U	70	5	15	-	10	-	-	-	10	80	10

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality

Arctic Char - IMPORTANT

Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-62-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 526868 7924453

Fisheries Data

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

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	3.27	5	1.53	100 - 200
	Fall	3.63	0	-	N/A
NNST	Summer	3.27	0	-	N/A
	Fall	3.63	0	-	N/A

Fish Habitat Potential

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

Comments & Summary

Provides important rearing habitat for juvenile char throughout the open water season, but particularly during summer. High discharge rates during early summer made sampling difficult and fish use likely greater than indicated by electrofishing survey results. Fall sampling likely occurred after fish had already begun movements to overwintering lakes. May want to consider a bridge at this location.

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-62-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 526868 7924453

Photographs

A B C

Figure 1. Summer (top) and fall (bottom) views of CV-62-1 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-62-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 526868 7924453

Photographs

A B C

Figure 2. Summer (top) and fall (bottom) views of CV-62-1 at the 80 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-62-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 526868 7924453

Photographs

A **B** **C**

Figure 3. Summer (top) and fall (bottom) views of CV-62-1 at the 60 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-62-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 526868 7924453

Photographs

A B C

Figure 4. Summer (top) and fall (bottom) views of CV-62-1 at the 40 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.