Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

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

Photographs

A B C

Figure 5. Summer (top) and fall (bottom) views of CV-62-1 at the 20 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

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

Photographs

A **B** **C**

Figure 6. Summer (top) and fall (bottom) views of CV-62-1 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

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

Photographs

A B C

Figure 7. Summer (top) and fall (bottom) views of CV-62-1 at the 20 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

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

Photographs

A B C

Figure 8. Summer (top) and fall (bottom) views of CV-62-1 at the 40 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

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

Photographs

A **B** **C**

Figure 9. Summer (top) and fall (bottom) views of CV-62-1 at the 60 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

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

Photographs

A **B** **C**

Figure 10. Summer (top) and fall (bottom) views of CV-62-1 at the 80 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

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

Photographs

A B C

Figure 11. Summer (top) and fall (bottom) views of CV-62-1 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-62-2 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 526897 7924167

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

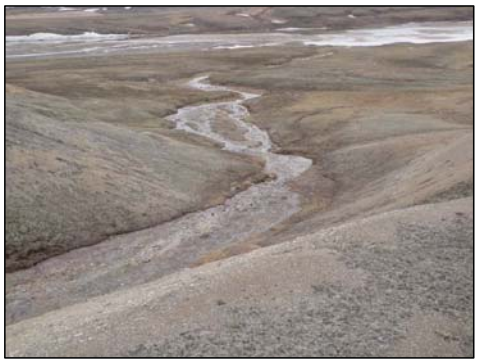
Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing was very shallow in 2018 and steep (~15°). The channel widens downstream with very shallow (1 cm) and occasionally subsurface flows. These barriers to movement in 2018 likely prevent fish movements under most, if not all, flow conditions. Fish use of habitat at or near the crossing is unlikely.

Photographs

A



B

C

Figure 1. Views of CV-62-2 at the rail crossing during summer (A), downstream (B), and the crossing during fall (C).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-62-3 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 526951 7923938

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This crossing was dry in 2018 and steep. There are multiple potential soft barriers to movement even under very high flows. There is no fish use of habitat at the crossing.

Photographs

A

B

Figure 1. Views of CV-62-3 at the rail crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-62-4 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 526975 7923621

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This crossing was marshy/moist terrain with no channel and minimal flow in 2018. There are no connections with fish-bearing habitat. There is no fish use of habitat at the crossing.

Photographs

A **B**

Figure 1. Views of CV-62-4 at the rail crossing during summer, with 62-5 (A), and during fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-62-5 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 526982 7923557

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This crossing was marshy/moist terrain with no channel and minimal flow in 2018. There are no connections with fish-bearing habitat. There is no fish use of habitat at the crossing.

Photographs

A **B**

Figure 1. Views of CV-62-5 at the rail crossing during summer, with 62-4 (A), and during fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-62-6 & CV-62-6b

Dates Surveyed: 2 July & 1 September, 2018

UTM Coordinates: 17 W 527016 7923383 & 17 W 527011 7923411

General Physical Characteristics

Channel Confinement: PC

Channel Gradient (range): 5 to > 15°

Flow Regime: Open Water

Fisheries Data

Gear Used: Not Fished

Effort (min): N/A

Transect Length (m): N/A

Fish Habitat Potential

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

Comments & Summary

These are two branches of the same stream. Water was low in summer and nearly dry by fall, combined with a vertical drop barrier ~150 m downstream of the crossing, upstream access is prevented under any flow conditions. A subsurface flow barrier may exist at the downstream confluence. There is no fish use of habitat at the crossing.

Photographs

A

B

C

Figure 1. Views of CV-62-6 (A) and 62-6b (B) during summer, and both crossings during fall (C).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

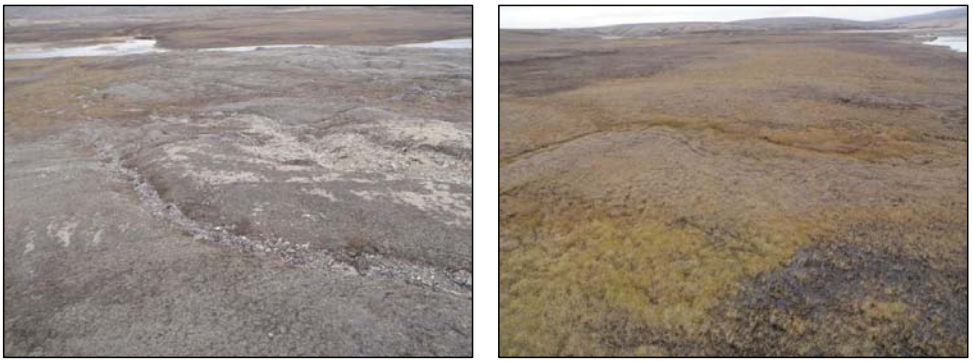
Location

Crossing ID: CV-62-6 & CV-62-6b

Dates Surveyed: 2 July & 1 September, 2018

UTM Coordinates: 17 W 527016 7923383 & 17 W 527011 7923411

Photographs



A **B**

Figure 2. Views of CV-62-6 and 62-6b at the crossing during fall (A) and near the downstream confluence (B) showing loss of surface flow.

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-63-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 527058 7923177

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This crossing had flows during summer, but was nearly dry by fall 2018. There was an impassable vertical drop barrier 100 m downstream of the crossing. There is no fish use of habitat at the crossing.

Photographs

A **B** **C**

Figure 1. Views of CV-63-1 at the crossing during summer (A), at the downstream barrier (B), and during fall looking upstream towards the crossing (C).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-63-2 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 527100 7923086

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This crossing had similar habitat to CV-63-1 and shared the same impassable downstream barrier. There is no fish use of habitat at this crossing.

Photographs

A

B

Figure 1. Views of CV-63-2 at the crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-63-3 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 527162 7922964

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This crossing was steep, but had sufficient water levels. However, there is an impassable vertical barrier 100 m downstream. There is no fish use of habitat at the crossing.

Photographs

A **B** **C**

Figure 1. Views of CV-63-3 at the crossing during summer (A), at the downstream barrier (B), and at the crossing during fall (C).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-63-3a | **Dates Surveyed:** 2 July & 1 September, 2018 | **UTM Coordinates:** 17 W 527179 7922796

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This crossing was nearly dry with no channel and was not connected to other waterbodies. There is no fish use of habitat at the crossing.

Photographs

A

B

Figure 1. Views of CV-63-3a at the crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-63-4 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 527204 7922667

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This crossing was very steep with low water levels in 2018. There were multiple subsurface flow barriers downstream of the crossing. The combined effects of all soft barriers likely prevent access under any flow condition. There is no fish use of habitat at the crossing.

Photographs

A

B

Figure 1. Views of CV-63-4 at the crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-63-4a & CV-63-5

Dates Surveyed: 2 July & 1 September, 2018

UTM Coordinates: 17 W 527229 7922619 & 17 W 527241 7922603

General Physical Characteristics

Channel Confinement: PC

Channel Gradient (range): 5 to > 15°

Flow Regime: Intermittent

Fisheries Data

Gear Used: Not Fished

Effort (min): N/A

Transect Length (m): N/A

Fish Habitat Potential

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

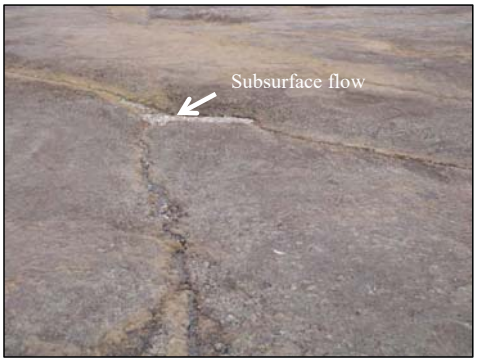
Comments & Summary

These are two branches of the same stream. Both crossings were steep with low water levels. In addition, there were multiple subsurface flow barriers downstream including at the confluence of these two branches. The combined effects of all soft barriers likely prevent access under any flow condition. There is no fish use of habitat at the crossing.

Photographs

A

B



C

Figure 1. Views of CV-63-4a (A) and 63-5 (B) at the crossing during summer, and both crossings during fall (C).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-64-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 527295 7922538

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This was a moist, steep hillside valley with multiple subsurface flow barriers downstream of the crossing. There is no fish use of habitat at the crossing.

Photographs

A **B**

Figure 1. Views of CV-64-1 during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-64-2 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 527414 7922399

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This site was steep, had patchy surface flow and had multiple vertical barriers downstream of the crossing. There is no fish use of habitat at the crossing.

Photographs

A

B

Figure 1. Views of CV-64-2 during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-64-3 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 527482 7922239

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This crossing was steep, but wetted in 2018. However, starting at 160 m downstream from the crossing, there were multiple vertical barriers and occasional loss of surface flow. There is no fish use of habitat at the crossing.

Photographs

A **B** **C**

Figure 1. Views of CV-64-3 during summer at the crossing (A), at the downstream barrier (B), and during fall at the crossing (C).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-64-4 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 527625 7921956

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This crossing was very steep with no flows in summer (still snow-covered) and nearly dry in fall 2018. There were multiple vertical barriers and occasional loss of surface flow downstream. There is no fish use of habitat at the crossing.

Photographs

A **B**

Figure 1. Views of CV-64-4 at the crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-64-5 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 527743 7921726

General Physical Characteristics

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

Fisheries Data

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

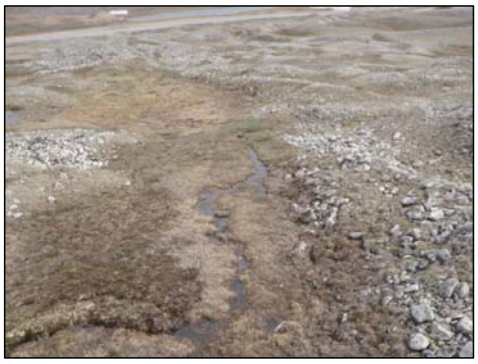
Fish Habitat Potential

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

Comments & Summary

This crossing was very steep and surface flows were intermittent in 2018. There are additional vertical barriers and loss of surface flow downstream. There is no fish use of habitat at the crossing.

Photographs



A

B

Figure 1. Views of CV-64-5 at the crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-64-5a | **Dates Surveyed:** 2 July & 1 September, 2018 | **UTM Coordinates:** 17 W 527688 7921835

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This crossing was a dry low point. There is no fish use of habitat at the crossing.

Photographs

A

B

Figure 1. Views of CV-64-5a at the crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-64-6 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 527757 7921691

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This crossing was nearly dry and steep. Additional vertical barriers and lack of surface flow were observed downstream. There is no fish use of habitat at the crossing.

Photographs

A

B

Figure 1. Views of CV-64-6 at the crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-65-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 527793 7921396

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This crossing was a dry and steep rocky valley. There is no fish use of habitat at the crossing.

Photographs

A

B

Figure 1. Views of CV-65-1 at the crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-65-2 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 527828 7920934

General Physical Characteristics

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

Fisheries Data

Gear Used: Backpack Electrofisher **Effort (min):** 0.95 **Transect Length (m):** 50

Fish Habitat Potential

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

Comments & Summary

This was a shallow (0.40 m maximum depth), isolated pond. No fish were captured or observed during the survey. There is no fish use of habitat at the crossing.

Photographs

A **B** **C**

Figure 1. Views of CV-65-2 at the crossing during summer (A) and (B), and during fall (C).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-65-2a | **Dates Surveyed:** 2 July & 1 September, 2018 | **UTM Coordinates:** 17 W 527803 7921140

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This was some moist terrain on a steep hill. Some downstream portions were channelized, but flows were low and frequently subsurface. There is no fish use of habitat at the crossing.

Photographs

A **B** **C**

Figure 1. Views of CV-65-2a at the crossing during summer (A), at the crossing during fall (B), and downstream of the crossing during fall (C).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-66-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 527959 7920627

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

There was shallow water present at the crossing in 2018. However, there were multiple vertical barriers downstream, preventing all access. There is no fish use of habitat at the crossing.

Photographs

A

B

C

Figure 1. Views of CV-66-1 at the crossing during summer (A), at one of the downstream barriers (B), and at the crossing during fall (C).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-66-2 & CV-66-2a

Dates Surveyed: 2 July & 1 September, 2018

UTM Coordinates: 17 W 528063 7920532 & 17 W 528013 7920571

General Physical Characteristics

Channel Confinement: C

Channel Gradient (range): > 10°

Flow Regime: Intermittent

Fisheries Data

Gear Used: Not Fished

Effort (min): N/A

Transect Length (m): N/A

Fish Habitat Potential

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

Comments & Summary

This crossing and 66-2a were contained within a small depression at the top of a hill. There was no access from any downstream habitat. There is no fish use of habitat at the crossing.

Photographs

A **B** **C**

Figure 1. Views of CV-66-2 (A) and 66-2a (B) at the crossing during summer, and 66-2 at the crossing during fall (C).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-66-3 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528328 7920342

General Physical Characteristics

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

Fisheries Data

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

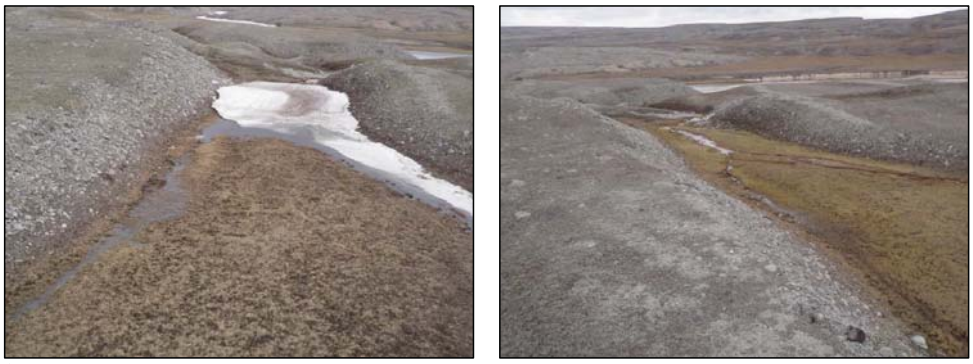
Fish Habitat Potential

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

Comments & Summary

This site was nearly dry in 2018 and had a very steep gradient almost immediately downstream of the crossing. The barrier would prevent access under all flow conditions. There is no fish use of habitat at the crossing.

Photographs



A **B**

Figure 1. Views of CV-66-3 at the crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-66-4 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528359 7920292

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This site was a very shallow, marshy spot on top of a hill, lacking any noticeable downstream flow or connections to other waterbodies. There is no fish use of habitat at the crossing.

Photographs

A

Figure 1. Views of CV-66-4 at the crossing during summer.

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-66-5 & CV-66-6 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528389 7920187 & 17 W 528390 7920161

General Physical Characteristics

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

Fisheries Data

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

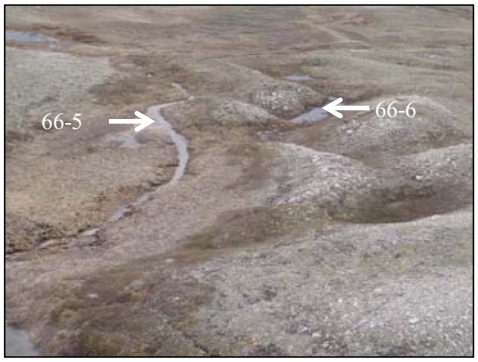
Fish Habitat Potential

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

Comments & Summary

These are two branches of the same stream. Water levels were low in summer and even lower during fall when 66-6 was nearly dry. In addition, there were several patches of subsurface flow in both seasons, starting at 50 m downstream from the crossing. These barriers are likely impassable in all flows. There is no fish use of habitat at the crossing.

Photographs



A

B

Figure 1. Views of CV-66-5 and 66-6 at the crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-66-7 & CV-66-8

Dates Surveyed: 2 July & 1 September, 2018

UTM Coordinates: 17 W 528378 7920014 & 17 W 528376 7919987

General Physical Characteristics

Channel Confinement: C

Channel Gradient (range): 5 to > 15°

Flow Regime: Intermittent

Fisheries Data

Gear Used: Not Fished

Effort (min): N/A

Transect Length (m): N/A

Fish Habitat Potential

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

Comments & Summary

These are two branches of the same stream. Water levels were low in summer and even lower during fall. In addition, there were several patches of subsurface flow in both seasons. These barriers are likely impassable in all flows. There is no fish use of habitat at the crossing.

Photographs

A

B

C

Figure 1. Views of CV-66-7 (A) and 66-8 (B) at the crossing during summer, and 66-7 at the crossing during fall (C).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-67-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528299 7919743

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This crossing is steep, but had sufficient flows throughout the open-water period in 2018. However, there is a large boulder almost completely blocking the channel 100 m downstream of the crossing, creating a high vertical drop. There are additional vertical barriers downstream. There is likely never fish use of habitat at the crossing.

Photographs

A B C

Figure 1. Views of CV-67-1 at the crossing during summer (A), one of the barriers (B), and at the crossing during fall (C).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-67-2 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528226 7918995

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This crossing was nearly dry in summer and dry in fall, 2018. The crossing is also atop a plateau with a very steep drop downstream. There is no fish use of habitat at the crossing.

Photographs

A **B**

Figure 1. Views of CV-67-2 at the crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-1 & 68-1a

Dates Surveyed: 2 July & 1 September, 2018

UTM Coordinates: 17 W 528199 7918838 & 17 W 528200 7918864

General Physical Characteristics

Channel Confinement: C

Channel Gradient (range): 4-8°

Flow Regime: Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	15.4	7.7 / 2.4	0.25 / 0.17	0.26 / 0.12	0.50 / 0.08	0.50 / 0.25	0.15 / 0.70	0.87/ 0.51	0.26 / 0.58	1.00 / 0.75
80D	10.0	8.0 / 4.8	0.10 / 0.09	0.22 / 0.26	- / 0.11	0.30 / 0.30	0.80 / 0.15	0.00 / 0.29	- / 0.33	0.80 / 0.40
60D	10.0	7.5 / 4.5	0.10 / 0.12	0.24 / 0.14	- / -	0.30 / 0.20	0.73 / 0.26	0.84 / 0.40	- / -	0.85 / 0.45
40D	9.0	8.0 / 5.9	0.14 / 0.10	0.19 / 0.13	- / 0.11	0.25 / 0.20	0.49 / 0.17	0.81 / 0.26	- / 0.79	0.85 / 0.80
20D	8.0	7.5 / 6.0	0.22 / 0.02	0.15 / 0.16	0.07 / 0.03	0.25 / 0.20	0.80 / 0.37	0.95 / 0.52	0.36 / 0.36	1.00 / 0.60
0	11.0	5.0 / 4.0	0.30 / 0.06	0.28 / 0.12	0.07 / 0.17	0.35 / 0.20	0.36 / 0.18	1.04 / 0.21	0.18 / 0.19	1.10 / 0.25
20U	10.0	8.9 / 7.0	0.26 / 0.02	0.21 / 0.04	0.04 / 0.10	0.30 / 0.15	0.71 / 0.48	0.52 / 0.26	0.27 / 0.93	0.80 / 0.95
40U	10.0	7.0 / 7.8	0.20 / 0.11	0.22 / 0.06	- / 0.12	0.30 / 0.20	0.41 / 0.45	0.59 / 0.18	- / 0.07	0.70 / 0.50
60U	9.3	8.1 / 5.8	0.24 / 0.10	0.25 / 0.11	- / 0.06	0.30 / 0.15	0.63 / 0.25	0.57 / 0.26	- / 0.21	0.70 / 0.30
80U	7.0	6.0 / 3.7	0.38 / 0.09	0.16 / 0.14	- / 0.21	0.40 / 0.25	0.40 / 0.33	0.87 / 0.23	- / 0.55	0.90 / 0.60
100U	6.1	5.0 / 4.5	0.33 / 0.08	0.10 / 0.07	- / 0.14	0.40 / 0.20	0.81 / 0.52	0.22 / 0.43	- / 0.39	0.90 / 0.55

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	85	5	10	-	-	-	-	5	10	80	5
80D	70	15	15	-	-	-	-	5	10	80	5
60D	25	35	10	-	30	-	-	5	10	80	5
40D	50	30	5	-	15	-	-	-	25	70	5
20D	50	30	5	-	15	-	-	-	10	70	20
0	70	10	10	-	10	-	-	5	15	80	-
20U	80	10	5	-	5	-	-	5	15	80	-
40U	65	10	10	-	15	-	-	5	25	70	-
60U	60	20	5	-	15	-	-	5	35	60	-
80U	50	15	15	-	20	-	-	-	20	60	20
100U	30	20	10	-	40	-	-	-	20	60	20

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality

Arctic Char - IMPORTANT

Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-1 & 68-1a

Dates Surveyed: 2 July & 1 September, 2018

UTM Coordinates: 17 W 528199 7918838 & 17 W 528200 7918864

Fisheries Data

Gear Used: Backpack Electrofisher

Transect Length (m): 100

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	4.62	3	0.65	123
	Fall	3.37	0	-	N/A
NNST	Summer	4.62	0	-	N/A
	Fall	3.37	0	-	N/A

Fish Habitat Potential

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

Comments & Summary

Provides important rearing habitat for juvenile char throughout the open water season, but particularly during summer. High discharge rates during early summer made sampling difficult and fish use was likely greater than indicated by electrofishing survey results. Fall sampling likely occurred after fish had begun downstream movements to overwintering locations.

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-1 & 68-1a

Dates Surveyed: 2 July & 1 September, 2018

UTM Coordinates: 17 W 528199 7918838 & 17 W 528200 7918864

Photographs

A B C

Figure 1. Summer (top) and fall (bottom) views of CV-68-1 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-1 & 68-1a

Dates Surveyed: 2 July & 1 September, 2018

UTM Coordinates: 17 W 528199 7918838 & 17 W 528200 7918864

Photographs

A B C

Figure 2. Summer (top) and fall (bottom) views of CV-68-1 at the 80 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-1 & 68-1a

Dates Surveyed: 2 July & 1 September, 2018

UTM Coordinates: 17 W 528199 7918838 & 17 W 528200 7918864

Photographs

A B C

Figure 3. Summer (top) and fall (bottom) views of CV-68-1 at the 60 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-1 & 68-1a

Dates Surveyed: 2 July & 1 September, 2018

UTM Coordinates: 17 W 528199 7918838 & 17 W 528200 7918864

Photographs

A **B** **C**

Figure 4. Summer (top) and fall (bottom) views of CV-68-1 at the 40 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-1 & 68-1a

Dates Surveyed: 2 July & 1 September, 2018

UTM Coordinates: 17 W 528199 7918838 & 17 W 528200 7918864

Photographs

A B C

Figure 5. Summer (top) and fall (bottom) views of CV-68-1 at the 20 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-1 & 68-1a

Dates Surveyed: 2 July & 1 September, 2018

UTM Coordinates: 17 W 528199 7918838 & 17 W 528200 7918864

Photographs

A B C

Figure 6. Summer (top) and fall (bottom) views of CV-68-1 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-1 & 68-1a

Dates Surveyed: 2 July & 1 September, 2018

UTM Coordinates: 17 W 528199 7918838 & 17 W 528200 7918864

Photographs

A B C

Figure 7. Summer (top) and fall (bottom) views of CV-68-1 at the 20 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across. Note the smaller channel of 68-1a appearing in the downstream-facing photos.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-1 & 68-1a

Dates Surveyed: 2 July & 1 September, 2018

UTM Coordinates: 17 W 528199 7918838 & 17 W 528200 7918864

Photographs

A B C

Figure 8. Summer (top) and fall (bottom) views of CV-68-1 at the 40 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-1 & 68-1a

Dates Surveyed: 2 July & 1 September, 2018

UTM Coordinates: 17 W 528199 7918838 & 17 W 528200 7918864

Photographs

A B C

Figure 9. Summer (top) and fall (bottom) views of CV-68-1 at the 60 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-1 & 68-1a

Dates Surveyed: 2 July & 1 September, 2018

UTM Coordinates: 17 W 528199 7918838 & 17 W 528200 7918864

Photographs

A B C

Figure 10. Summer (top) and fall (bottom) views of CV-68-1at the 80 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-1 & 68-1a

Dates Surveyed: 2 July & 1 September, 2018

UTM Coordinates: 17 W 528199 7918838 & 17 W 528200 7918864

Photographs

A B C

Figure 11. Summer (top) and fall (bottom) views of CV-68-1 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-2 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528194 7918768

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This crossing was dry throughout 2018. There is no fish use of habitat at the crossing.

Photographs

A

B

Figure 1. Views of CV-68-2 at the crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-3 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528059 7918496

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 2-12° **Flow Regime:** Open

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	0.5	0.4 / -	- / -	0.22 / -	- / -	0.25 / -	- / -	0.54 / -	- / -	0.55 / -
50D	16.5	12.3 / -	0.03 / -	0.02 / -	0.02 / -	0.03 / -	0.24 / -	0.22 / -	0.26 / -	0.30 / -
0	0.6	0.6 / -	0.22 / -	- / -	0.06 / -	0.25 / -	0.62 / -	- / -	1.32 / -	1.35 / -
50U	8.7	3.6 / -	0.04 / -	0.04 / -	0.05 / -	0.10 / -	0.30 / -	0.29 / -	0.34 / -	0.35 / -
100U	GRADIENT BARRIER									

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

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-3 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528059 7918496

Fisheries Data

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

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	3.98	0	-	N/A
	Fall	-	N/A	N/A	N/A
NNST	Summer	3.98	0	-	N/A
	Fall	-	N/A	N/A	N/A

Fish Habitat Potential

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

Comments & Summary

There was no evidence of fish use of habitat within 100 m of the rail crossing in 2018. A very steep gradient was measured upstream from the crossing while downstream, the channel is widens considerably and depths become too shallow for fish use. One juvenile char was observed downstream of the electrofishing transect in a deeper pool, but it likely does not have access farther upstream due to the combination of very shallow water and increasing gradient. Use limited, at best, to intermittent during very high water.

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-3 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528059 7918496

Photographs

A **B** **C**

Figure 1. 100 m (top) and 50 m (bottom) downstream cross-section views of CV-68-3 during summer; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-3 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528059 7918496

Photographs

A B C

Figure 2. Rail crossing (top) and 50 m (bottom) upstream cross-section views of CV-68-3 during summer; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-3 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528059 7918496

Photographs

Figure 3. Rail crossing (A) and downstream (B) aerial views during fall.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-4 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528055 7918461

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This crossing was a moist hillside in summer and dry in fall during 2018. There is no fish use of habitat at the crossing.

Photographs

A

B

Figure 1. Views of CV-68-4 at the crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-68-5 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528081 7918334

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This crossing was broad and very shallow in summer with even less water in fall. The channel narrows downstream, but there is also a near vertical drop at approximately 150 m downstream of the crossing. The gradient is likely sufficiently high to prevent access under all flows. There is no fish use of habitat at the crossing.

Photographs

A

B

Figure 1. Views of CV-68-5 at the crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-69-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528322 7917862

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This crossing was shallow and marshy with no channel and no connections to other waterbodies. There is no fish use of habitat at the crossing.

Photographs

A

B

Figure 1. Views of CV-69-1 at the crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-69-2 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528438 7917517

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 2-5° **Flow Regime:** Open

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	11.0	4.5 / 2.6	0.05 / 0.03	0.06 / 0.02	0.02 / 0.02	0.10 / 0.05	0.26 / 0.17	0.25 / 0.11	0.10 / 0.29	0.30 / 0.30
50D	9.4	3.1 / 0.6	0.04 / -	0.01 / 0.16	0.14 / -	0.15 / 0.16	0.05 / -	0.00 / 0.13	0.12 / -	0.15 / 0.15
0	7.6	4.6 / 3.8	0.16 / -	0.03 / 0.08	0.18 / 0.15	0.20 / 0.15	0.00 / -	0.15 / 0.13	0.03 / 0.02	0.15 / 0.15
50U	6.3	3.4 / 1.5	- / -	0.04 / 0.21	- / -	0.15 / 0.21	- / -	0.05 / 0.02	- / -	0.05 / 0.05
100U	SUBSURFACE FLOW BARRIER – FALL ONLY @ 70 m US									

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	65	35	-	-	-	-	45	10	35	5	5
50D	20	75	-	-	-	5	80	15	-	5	-
0	15	85	-	-	-	-	90	-	10	-	-
50U	25	65	-	-	10	-	60	10	-	30	-
100U	SUBSURFACE FLOW BARRIER – FALL ONLY @ 70 m US										

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-69-2 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528438 7917517

Fisheries Data

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

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	3.05	0	-	N/A
	Fall	3.50	0	-	N/A
NNST	Summer	3.05	0	-	N/A
	Fall	3.50	0	-	N/A

Fish Habitat Potential

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

Comments & Summary

There are no obvious barriers to prevent fish in the large downstream river from accessing the crossing, and the habitat is suitable for both species. It is unknown why no fish were captured during either sampling period in 2018. Sampling additional years and/or seasons could help determine overall fish use.

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-69-2 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528438 7917517

Photographs

A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of CV-69-2 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-69-2 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528438 7917517

Photographs

A **B** **C**

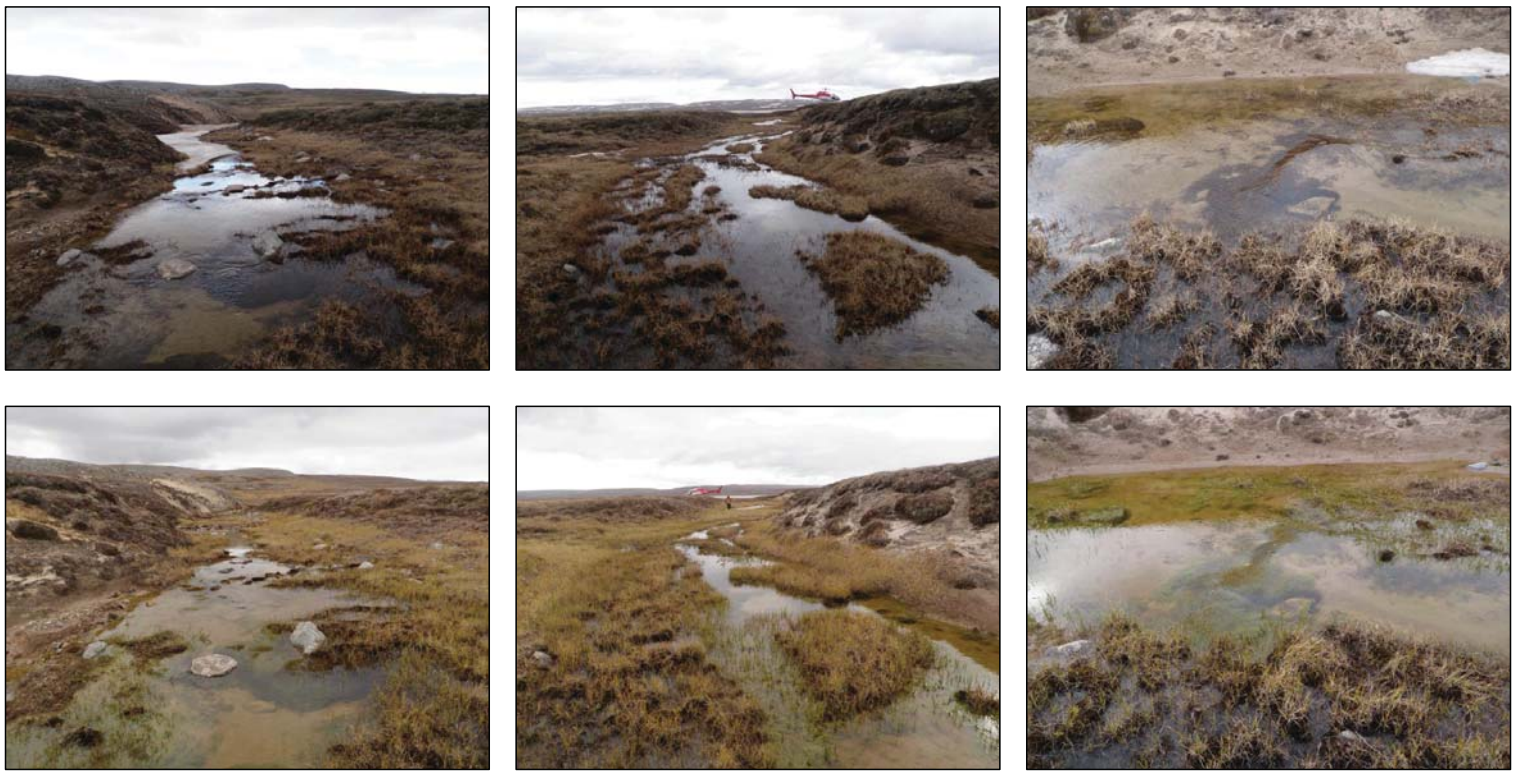
Figure 2. Summer (top) and fall (bottom) views of CV-69-2 at the 50 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-69-2 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528438 7917517

Photographs



A **B** **C**

Figure 3. Summer (top) and fall (bottom) views of CV-69-2 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-69-2 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528438 7917517

Photographs

A **B** **C**

Figure 4. Summer (top) and fall (bottom) views of CV-69-2 at the 50 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-69-2 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528438 7917517

Photographs

A

Figure 5. Subsurface flow barrier at 70 m upstream from the CV-69-2 rail crossing.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-69-3 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528458 7917456

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This crossing was shallow in 2018, but had a relatively low gradient. However, there was a vertical drop near the downstream confluence with CV-69-2 that is likely impassable by the small juveniles that could be using 69-2 (though none were captured in 2018). There is likely no fish use of habitat at the crossing.

Photographs

A B C

Figure 1. Views of CV-69-3 at the crossing during summer, looking upstream (A), looking downstream (B), and looking across (C).

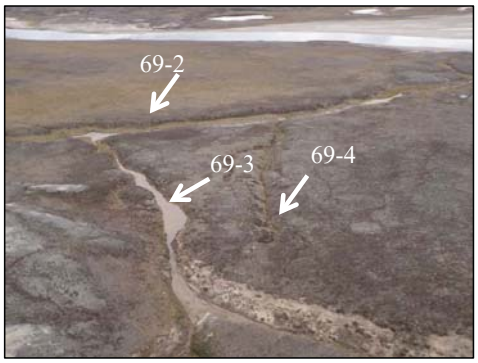
Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-69-3 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528458 7917456

Photographs



A

Figure 2. View of CV-69-3 and nearby 69-2 and 69-4 during fall.

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-69-4 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528474 7917407

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This crossing was nearly dry in summer and dry in fall 2018. There is no connection or access from CV-69-2. There is no fish use of habitat at the crossing.

Photographs

A

B

C

Figure 1. Views of CV-69-4 at the crossing during summer, looking upstream (A), looking downstream (B), and looking across (C).

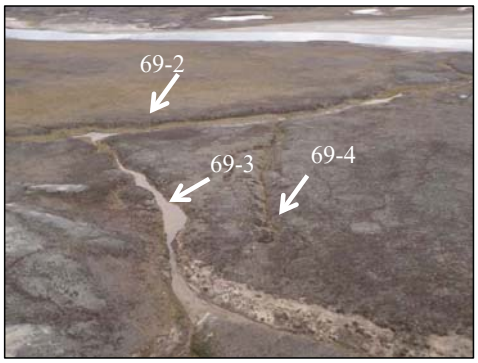
Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-69-4 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528474 7917407

Photographs



A

Figure 2. View of CV-69-4 and nearby 69-2 and 69-3 during fall.

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-70-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 528704 7916939

General Physical Characteristics

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

Fisheries Data

Gear Used: Backpack Electrofisher **Effort (min):** 2.15 **Transect Length (m):** 100

Fish Habitat Potential

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

Comments & Summary

This was a shallow (maximum 1.0-1.5 m), isolated pond atop a hill. Fish were not captured or observed during the survey. There is no fish use of habitat at the crossing.

Photographs

A **B** **C**

Figure 1. Views of CV-70-1 at the crossing during summer (A) and (B), and during the fall (C).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-70-2 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 529030 7916745

General Physical Characteristics

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

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
0	-	-	- / -	0.04 / -	- / -	0.05 / -	- / -	0.08 / -	- / -	0.10 / -

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
0	40	60	-	-	-	-	100	-	-	-	-

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-70-2 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 529030 7916745

Fisheries Data

Gear Used: Not fished **Transect Length (m):** N/A

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

Fish Habitat Potential

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

Comments & Summary

Fishing was not attempted in this stream because the shallow, sandy habitat means that visual assessment is highly accurate and char are typically able to maintain sufficient distance away from the electrofisher to render it ineffective. This is based on years of experience sampling in the Mary River area. In addition, this habitat type typically limits fish use to migration between waterbodies with preferred habitat. This particular stream is almost certainly used by fish as a migration corridor between the large downstream river and a small upstream lake throughout the open water season.

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-70-2 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 529030 7916745

Photographs

A **B** **C**

Figure 1. Summer (top) views of CV-70-2 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across. Fall (bottom) aerial view of the crossing.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-70-3 **Dates Surveyed:** 2 July & 1 September 2018 **UTM Coordinates:** 17 W 529120 7916693

General Physical Characteristics

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

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
0	-	-	- / -	- / -	0.20 / -	> 1.00 / -	- / -	- / -	0.38 / -	> 0.50 / -

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
0	-	25	-	-	-	75	100	-	-	-	-

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-70-3 **Dates Surveyed:** 2 July & 1 September 2018 **UTM Coordinates:** 17 W 529120 7916693

Fisheries Data

Gear Used: Not fished **Transect Length (m):** N/A

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

Fish Habitat Potential

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

Comments & Summary

The depth and width of this river, combined with the substrate (sand), make electrofishing generally ineffective as the fish would see the surveyors and avoid the area without entering the effective range of the equipment. This major river provides abundant fish habitat and, particularly in the vicinity of the crossing, is a major migratory route for fish in this watershed.

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-70-3 **Dates Surveyed:** 2 July & 1 September 2018 **UTM Coordinates:** 17 W 529120 7916693

Photographs

A **B** **C**

Figure 1. Summer (top) views of CV-70-3 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across. Fall (bottom) aerial view of the crossing.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-71-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 529451 7916535

General Physical Characteristics

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

Habitat Description

The north basin has a maximum depth of approximately 0.50 m and substrate is 100% sand/silt/clay. The south basin, including the encroachment area, has a maximum depth of approximately 1.50 m and similar substrate composition with patches of algae/aquatic vegetation.

Fish Habitat Potential

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

Comments & Summary

Several juvenile Arctic Char were observed in the south basin of this lake during early summer surveys.This lake has a short downstream connection to a large river and an upstream connection to a smaller, but deeper lake. The CV-71-1 lake does not provide sufficient depth for char overwintering or spawning. Use by char is restricted to juvenile rearing during the open-water period with fish migrating to other overwintering waterbodies (e.g., the nearby upstream lake).

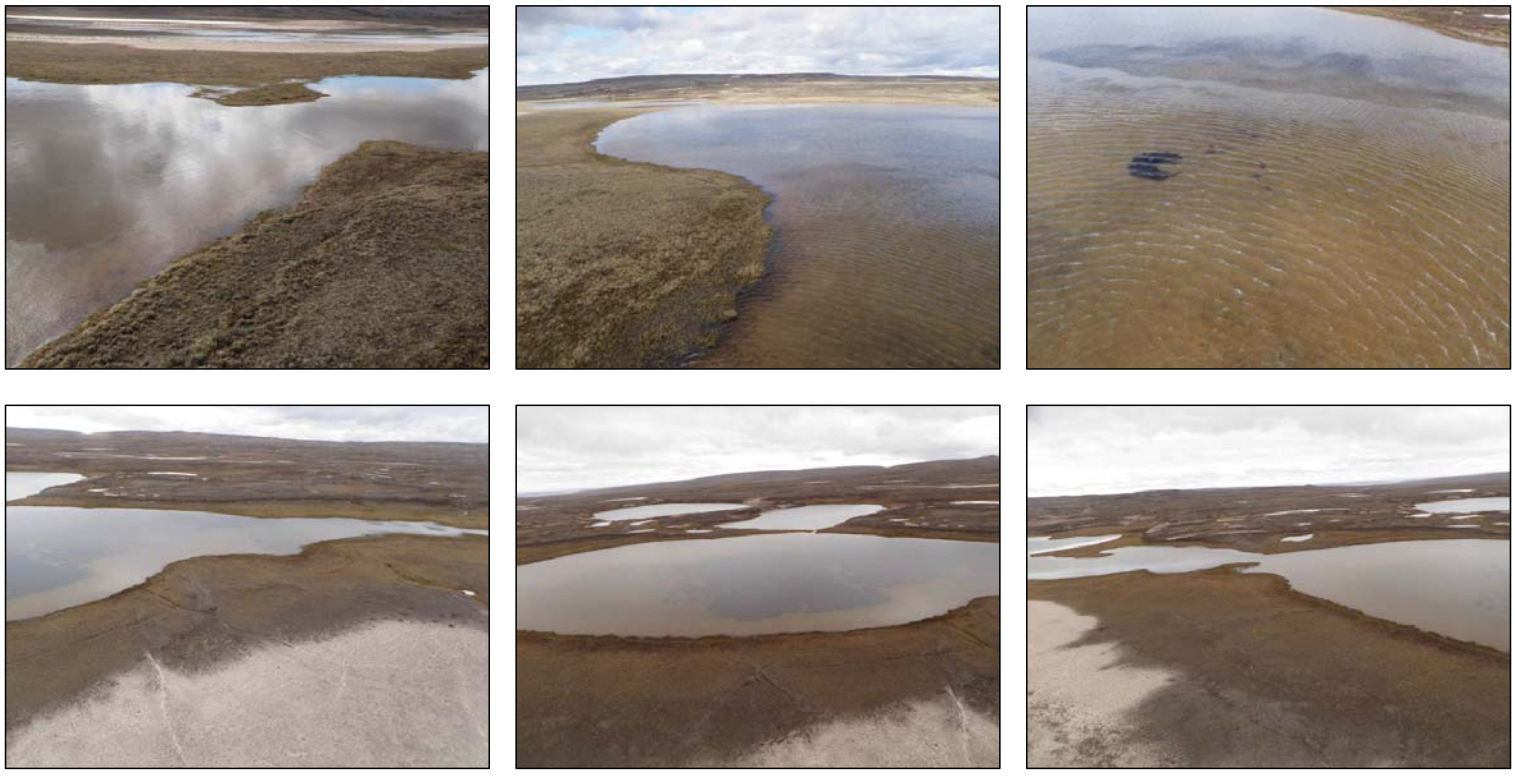
Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char - IMPORTANT** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-71-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 529451 7916535

Photographs



A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of CV-71-1.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-71-2a | **Dates Surveyed:** 2 July & 1 September, 2018 | **UTM Coordinates:** 17 W 529708 7916558

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This was a shallow (maximum 0.3 m), isolated pond. The pond is too shallow for overwintering and it likely remains disconnected from other waterbodies in the area during all flow conditions. There is no fish use of habitat at the crossing.

Photographs

A **B**

Figure 1. Views of CV-71-2a at the crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-71-3 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 529965 7916706

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This is shallow, marshy, unconnected terrain. There is no fish use of habitat at the crossing.

Photographs

A

B

Figure 1. Views of CV-71-3 at the crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-71-4 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 530214 7916862

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This is shallow, marshy, terrain adjacent to a fishless pond. It may occasionally become connected to the pond in high water conditions, but not to any fish-bearing waterbodies. There is no fish use of habitat at the crossing.

Photographs

A

B

Figure 1. Views of CV-71-4 at the crossing during summer (A) and fall, with the nearby pond in the background (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-72-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 530370 7916951

General Physical Characteristics

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

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
0	-	-	-	-	-	~0.15	-	-	-	~0.20

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
0	20	80	-	-	-	-	100	-	-	-	-

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-72-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 530370 7916951

Fisheries Data

Gear Used: Not fished **Transect Length (m):** N/A

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

Fish Habitat Potential

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

Comments & Summary

There was no evidence of fish use of habitat near the crossing during 2018. The crossing was shallow with water dispersed over a wide area, which may represent a soft barrier to fish access. Any fish use of this stream originating in the nearby downstream lake is likely restricted to no closer than 50 m downstream of the rail crossing where water depth is greater. During periods of higher flows, habitat would be marginal with intermittent use.

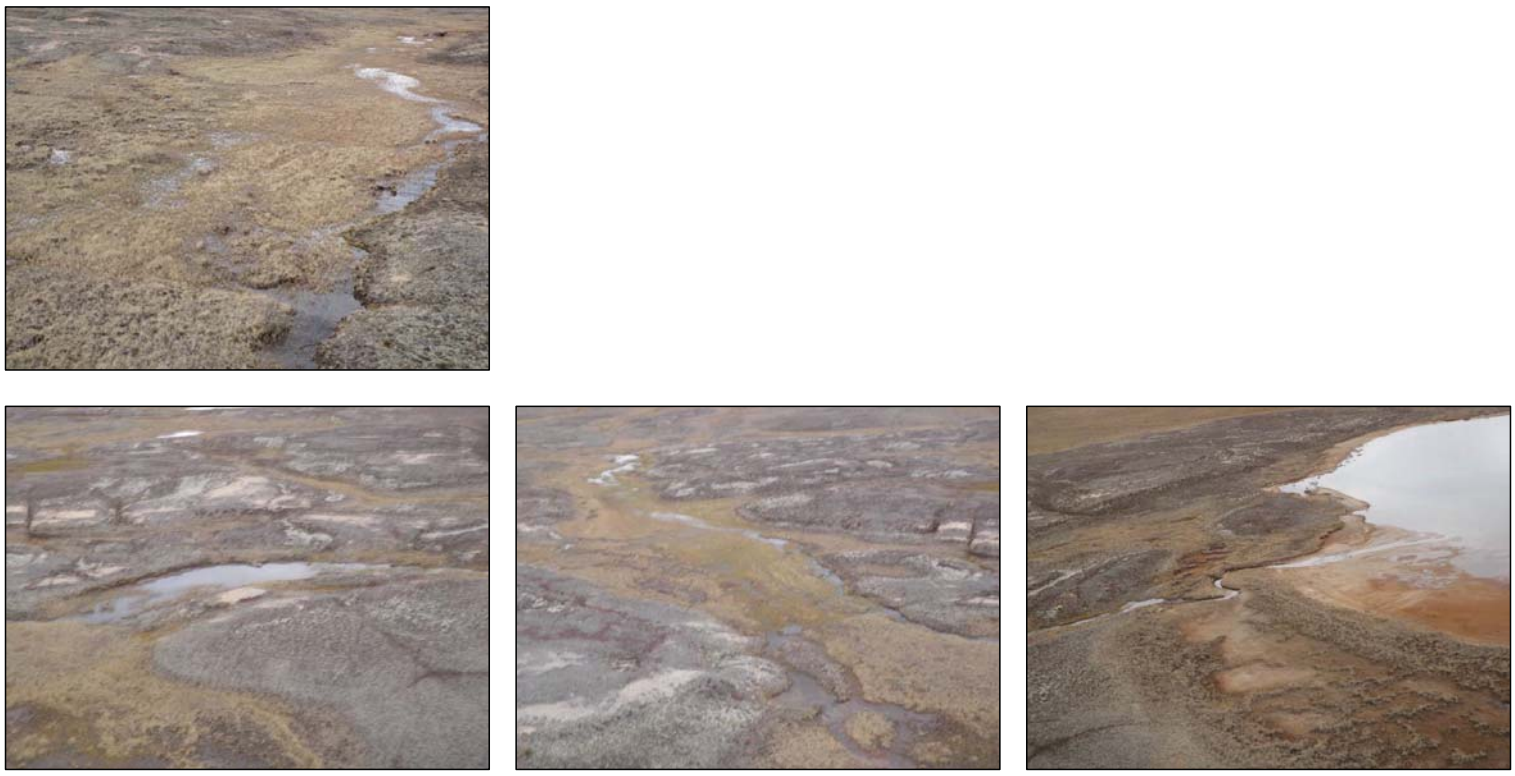
Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat Quality**	**Arctic Char – NOT FISH-BEARING** **Ninespine Stickleback – NOT FISH-BEARING**

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-72-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 530370 7916951

Photographs



A **B** **C**

Figure 1. Summer (top) and fall (bottom) views of CV-72-1 at the rail crossing.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-72-1a | **Dates Surveyed:** 2 July & 1 September, 2018 | **UTM Coordinates:** 17 W 530587 7917015

General Physical Characteristics

Channel Confinement: UC | **Channel Gradient (range):** N/A | **Flow Regime:** Intermittent

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This is shallow, marshy, isolated terrain. There is no fish use of habitat at the crossing.

Photographs

A

B

Figure 1. Views of CV-72-1a at the crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-72-2 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 530784 7917069

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

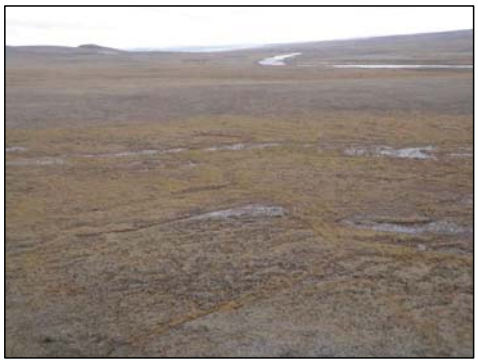
Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This is shallow, marshy, isolated terrain. There is some minor flow at the crossing, but no sustained channel and no connection to fish habitat due to a general lack of surface flow over large areas. There is no fish use of habitat at the crossing.

Photographs

A



B

Figure 1. Views of CV-72-2 at the crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-72-3 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 531048 7917142

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

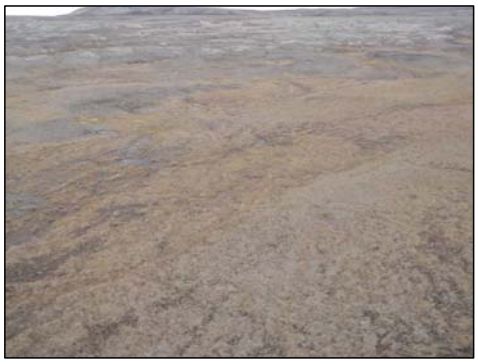
Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This is shallow, marshy, isolated terrain. There is no sustained channel and no connection to fish habitat due to a general lack of surface flow over large areas. There is no fish use of habitat at the crossing.

Photographs

A



B

Figure 1. Views of CV-72-3 at the crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-72-3a & CV-72-4 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 531130 7917165 & 17 W 531160 7917173

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

These crossings are part of a broad, shallow, marshy, area. There is no sustained channel and no connection to fish habitat due to a general lack of surface flow at several intervals. There is also no access from the downstream river. There is no fish use of habitat at the crossing.

Photographs

A

B

Figure 1. Views of CV-72-3a and 72-4 at the crossing during summer (A) and fall (B). Note that accurately pinpointing the specific crossings is difficult at this location.

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-73-1 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 531795 7917555

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This crossing was nearly dry in 2018. There is no fish use of habitat at the crossing.

Photographs

A

B

Figure 1. Views of CV-73-1 at the crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-73-2 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 532007 7918051

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

There was a wetted channel at the crossing in 2018; however the channel disappears downstream and the water disperses over the tundra. Subsurface flows are common. There is no fish use of habitat at the crossing.

Photographs

A

B

Figure 1. Views of CV-73-2 at the crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-73-3 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 532156 7918212

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

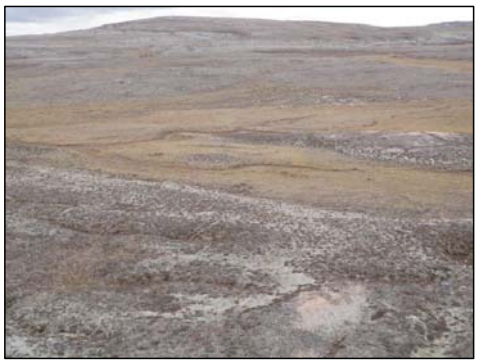
Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

This crossing is part of the same system as CV-73-2 with the same downstream barriers preventing fish access to the site. There is no fish use of habitat at the crossing.

Photographs

A



B

Figure 1. Views of CV-73-3 at the crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-73-4 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 532303 7918244

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This crossing is part of the same system as CV-73-2 and CV-73-3 with the same downstream barriers preventing fish access to the site. There is no fish use of habitat at the crossing.

Photographs

A

B

Figure 1. Views of CV-73-4 at the crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-1 **Dates Surveyed:** 2 July & 1 September 2018 **UTM Coordinates:** 17 W 532376 7918246

General Physical Characteristics

Channel Confinement: PC **Channel Gradient (range):** 4-5° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	19.6	11.9 / 7.4	0.10 / 0.10	0.04 / 0.09	0.05 / 0.14	0.20 / 0.20	0.54 / 0.21	0.42/ 0.31	0.75 / 0.15	0.80 / 0.40
80D	-	- / 12.5	- / 0.06	- / 0.04	- / 0.09	- / 0.15	- / 0.27	- / 0.11	- / 0.65	- / 0.70
60D	-	- / 16.2	- / 0.10	- / 0.17	- / 0.09	- / 0.20	- / 0.12	- / 0.33	- / 0.42	- / 0.50
50D	33.6	17.7 / -	0.06 / -	0.04 / -	0.08 / -	0.15 / -	0.69 / -	0.27 / -	0.37 / -	0.75 / -
40D	-	- / 13.6	- / 0.08	- / 0.08	- / 0.02	- / 0.10	- / 0.16	- / 0.21	- / 0.23	- / 0.25
20D	-	- / 17.1	- / 0.06	- / 0.06	- / 0.09	- / 0.10	- / 0.25	- / 0.22	- / 0.29	- / 0.35
0	29.3	18.4 / 13.5	0.06 / 0.03	0.08 / 0.04	0.06 / 0.02	0.15 / 0.10	0.32 / 0.13	0.48 / 0.54	0.27 / 0.13	0.50 / 0.60
20U	-	- / 16.3	- / 0.02	- / 0.08	- / 0.02	- / 0.10	- / 0.13	- / 0.44	- / 0.23	- / 0.50
40U	-	- / 15.0	- / 0.07	- / 0.08	- / 0.09	- / 0.10	- / 0.26	- / 0.22	- / 0.46	- / 0.50
50U	34.4	20.4 / -	0.08 / -	0.04 / -	0.20 / -	0.20 / -	0.02 / -	0.24 / -	0.41 / -	0.45 / -
60U	-	- / 20.9	- / 0.02	- / 0.03	- / 0.07	- / 0.10	- / 0.17	- / 0.22	- / 0.53	- / 0.60
80U	-	- / 26.0	- / 0.11	- / 0.02	- / 0.09	- / 0.15	- / 0.16	- / 0.18	- / 0.15	- / 0.25
100U	28.4	24.3 / 23.7	0.26 / 0.18	0.08 / 0.07	0.05 / 0.15	0.30 / 0.20	0.09 / 0.12	0.14 / 0.16	0.20 / 0.14	0.25 / 0.20

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	65	35	-	-	-	-	-	-	30	55	15
80D	70	30	-	-	-	-	-	-	30	60	10
60D	70	30	-	-	-	-	-	-	20	60	20
50D	75	25	-	-	-	-	-	-	35	40	25
40D	70	30	-	-	-	-	-	-	20	60	20
20D	60	40	-	-	-	-	-	-	20	70	10
0	70	30	-	-	-	-	-	-	30	60	10
20U	60	40	-	-	-	-	-	-	30	60	10
40U	60	40	-	-	-	-	-	-	30	60	10
50U	40	60	-	-	-	-	-	-	35	40	25
60U	40	60	-	-	-	-	-	5	30	55	10
80U	30	70	-	-	-	-	-	5	30	55	10
100U	30	60	10	-	-	-	-	-	30	60	10

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality

Arctic Char - NOT FISH-BEARING

Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-1 **Dates Surveyed:** 2 July & 1 September 2018 **UTM Coordinates:** 17 W 532376 7918246

Fisheries Data

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

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	4.05	0	-	N/A
	Fall	3.70	0	-	N/A
NNST	Summer	4.05	0	-	N/A
	Fall	3.70	0	-	N/A

Fish Habitat Potential

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

Comments & Summary

Provides suitable rearing habitat for juvenile char throughout the open water season, but fish were not captured during either survey. No obvious downstream barriers were identified. Use may primarily occur during mid-summer. Fall sampling likely occurred after fish had already begun movements to overwintering lakes.

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-1 **Dates Surveyed:** 2 July & 1 September 2018 **UTM Coordinates:** 17 W 532376 7918246

Photographs

A B C

Figure 1. Summer (top) and fall (bottom) views of CV-74-1 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-1 **Dates Surveyed:** 2 July & 1 September 2018 **UTM Coordinates:** 17 W 532376 7918246

Photographs

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

A

B

C

Figure 2. Summer (top) and fall (bottom) views of CV-74-1 at the 80 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-1 **Dates Surveyed:** 2 July & 1 September 2018 **UTM Coordinates:** 17 W 532376 7918246

Photographs

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

A

B

C

Figure 3. Summer (top) and fall (bottom) views of CV-74-1 at the 60 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-1 **Dates Surveyed:** 2 July & 1 September 2018 **UTM Coordinates:** 17 W 532376 7918246

Photographs

NO PHOTO

NO PHOTO

NO PHOTO

A **B** **C**

Figure 4. Summer (top) and fall (bottom) views of CV-74-1 at the 50 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-1 **Dates Surveyed:** 2 July & 1 September 2018 **UTM Coordinates:** 17 W 532376 7918246

Photographs

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

A **B** **C**

Figure 5. Summer (top) and fall (bottom) views of CV-74-1 at the 40 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-1 **Dates Surveyed:** 2 July & 1 September 2018 **UTM Coordinates:** 17 W 532376 7918246

Photographs

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

A

B

C

Figure 6. Summer (top) and fall (bottom) views of CV-74-1 at the 20 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-1 **Dates Surveyed:** 2 July & 1 September 2018 **UTM Coordinates:** 17 W 532376 7918246

Photographs

A **B** **C**

Figure 7. Summer (top) and fall (bottom) views of CV-74-1 at the rail crossing; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-1 **Dates Surveyed:** 2 July & 1 September 2018 **UTM Coordinates:** 17 W 532376 7918246

Photographs

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

A

B

C

Figure 8. Summer (top) and fall (bottom) views of CV-74-1 at the 20 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-1 **Dates Surveyed:** 2 July & 1 September 2018 **UTM Coordinates:** 17 W 532376 7918246

Photographs

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

A

B

C

Figure 9. Summer (top) and fall (bottom) views of CV-74-1 at the 40 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-1 **Dates Surveyed:** 2 July & 1 September 2018 **UTM Coordinates:** 17 W 532376 7918246

Photographs

NO PHOTO

NO PHOTO

NO PHOTO

A **B** **C**

Figure 10. Summer (top) and fall (bottom) views of CV-74-1 at the 50 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

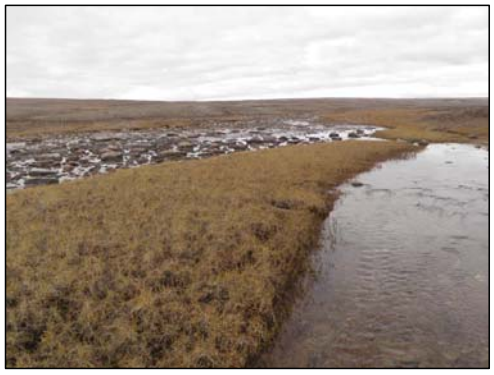
Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-1 **Dates Surveyed:** 2 July & 1 September 2018 **UTM Coordinates:** 17 W 532376 7918246

Photographs

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



A **B** **C**

Figure 11. Summer (top) and fall (bottom) views of CV-74-1 at the 60 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-1 **Dates Surveyed:** 2 July & 1 September 2018 **UTM Coordinates:** 17 W 532376 7918246

Photographs

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

A **B** **C**

Figure 12. Summer (top) and fall (bottom) views of CV-74-1at the 80 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-1 **Dates Surveyed:** 2 July & 1 September 2018 **UTM Coordinates:** 17 W 532376 7918246

Photographs

A B C

Figure 13. Summer (top) and fall (bottom) views of CV-74-1 at the 100 m upstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-2 **Dates Surveyed:** 2 July & 1 September, 2018 **UTM Coordinates:** 17 W 532406 7918246

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This was a dry low point in 2018. There is no fish use of habitat at the crossing.

Photographs

A

B

Figure 1. Views of CV-74-2 at the crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-3 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 532735 7918374

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This was nearly dry tundra in 2018. There is no fish use of habitat at the crossing.

Photographs

A

B

Figure 1. Views of CV-74-3 at the crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-4 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 532888 7918494

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This was a nearly dry hillside in summer and dry in fall, 2018. There is no fish use of habitat at the crossing.

Photographs

A

B

Figure 1. Views of CV-74-4 at the crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-6 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 532988 7918553

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

This crossing was nearly dry in 2018 with no access for fish due to the lack of channel and surface flow downstream. There is no fish use of habitat at the crossing.

Photographs

A

B

Figure 1. Views of CV-74-6 at the crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-74-7 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 533258 7918549

General Physical Characteristics

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

Fisheries Data

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

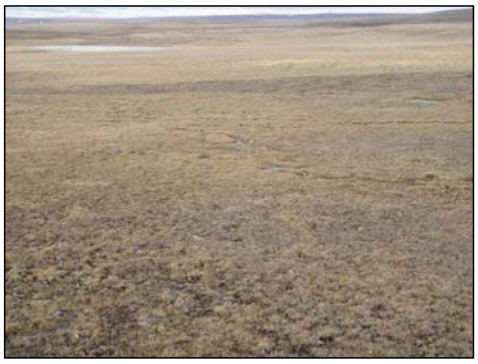
Fish Habitat Potential

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

Comments & Summary

This crossing had some shallow flows in 2018, but the channel disappeared downstream and flows dispersed. There was no access for fish due to the lack of channel and surface flow downstream to the confluence with a large river. There is no fish use of habitat at the crossing.

Photographs



A

B

Figure 1. Views of CV-74-7 at the crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-75-1 & CV-75-1a

Dates Surveyed: 3 July & 1 September, 2018

UTM Coordinates: 17 W 533398 7918521 & 17 W 533444 7918512

General Physical Characteristics

Channel Confinement: UC

Channel Gradient (range): N/A

Flow Regime: None

Fisheries Data

Gear Used: Backpack Electrofisher

Effort (min): 3.37

Transect Length (m): 100

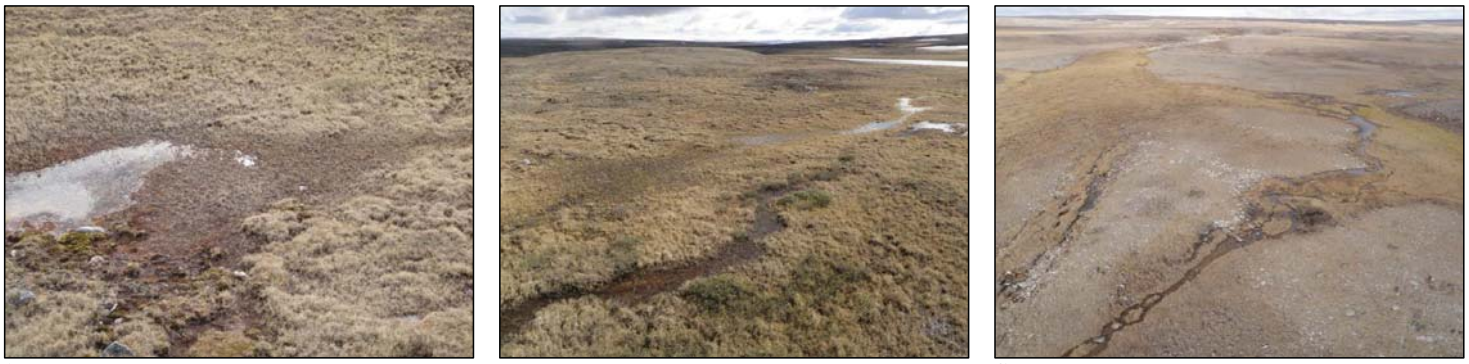
Fish Habitat Potential

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

Comments & Summary

These are two branches of the same waterbody. They are mostly wet puddles with a few longer reaches of surface water with flow. However, no fish were captured in these areas and there was a lack of surface flow/connectivity at the downstream confluence with a large river. There is no fish use of habitat at the crossing.

Photographs



A **B** **C**

Figure 1. Views of CV-75-1 at the crossing during summer (A), the loss of surface flow downstream (B), and both crossings during fall (C)

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-75-1 & CV-75-1a

Dates Surveyed: 3 July & 1 September, 2018

UTM Coordinates: 17 W 533398 7918521 & 17 W 533444 7918512

Photographs

A **B** **C**

Figure 2. Views of CV-75-1a at the crossing during summer, looking upstream (A), downstream (B), and across (C).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-75-2 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 533559 7918501

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

The crossing was broad and shallow with minor flows during 2018. However, there is no connection to either upstream or downstream habitat due to lengthy patches of subsurface flow. There is no fish use of habitat at the crossing.

Photographs

A

B

Figure 1. Views of CV-75-2 at the crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-76-1 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 533900 7918535

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

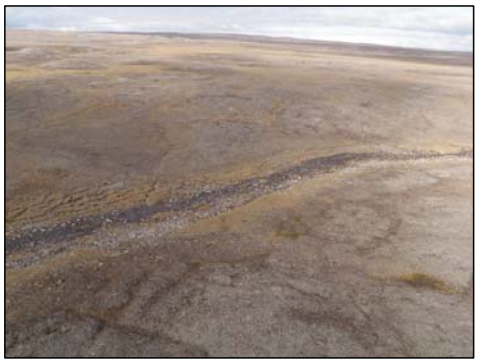
Species	Spawning	Overwintering	Rearing	Migration Corridor
ARCH	N	N	N	N
NNST	N	N	N	N

Comments & Summary

The crossing was shallow with water trickling among the rocks in 2018. However, there were multiple soft subsurface flow barriers between the crossing and the nearest overwintering site. There is no fish use of habitat at the crossing.

Photographs

A



B

Figure 1. Views of CV-76-1 at the crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-76-1a | **Dates Surveyed:** 3 July & 1 September, 2018 | **UTM Coordinates:** 17 W 534333 7918581

General Physical Characteristics

Channel Confinement: UC | **Channel Gradient (range):** N/A | **Flow Regime:** Intermittent

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

The crossing was nearly dry in 2018 with no connection to other waterbodies. There is no fish use of habitat at the crossing.

Photographs

A

Figure 1. Views of CV-76-1a at the crossing during summer (A).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-76-2 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 534506 7918563

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

The crossing was nearly dry in 2018 with no connection to other waterbodies. There is no fish use of habitat at the crossing.

Photographs

A

B

Figure 1. Views of CV-76-2 at the crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-76-3 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 534825 7918511

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

The crossing was nearly dry in 2018 with no connection to other waterbodies. There is no fish use of habitat at the crossing.

Photographs

A

B

Figure 1. Views of CV-76-3 at the crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-77-1 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 534992 7918491

General Physical Characteristics

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

Fisheries Data

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

Fish Habitat Potential

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

Comments & Summary

The crossing was nearly dry in 2018 with no connection to other waterbodies. There is no fish use of habitat at the crossing.

Photographs

A

B

Figure 1. Views of CV-77-1 at the crossing during summer (A) and fall (B).

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-77-2 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 535267 7918560

General Physical Characteristics

Channel Confinement: C **Channel Gradient (range):** 4-5° **Flow Regime:** Open Water

Hydrology & Habitat Characteristics

Site	Channel Width (m)		Water Depth (m) (Summer/Fall)				Water Velocity (m/s) (Summer/Fall)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	17.1	9.4 / 8.0	0.22 / 0.14	0.06 / 0.02	0.07 / 0.02	0.30 / 0.20	0.84 / 0.69	0.78/ 0.08	0.36 / 0.22	0.90 / 0.75
80D	21.8	11.7 / 10.0	0.11 / 0.14	0.12 / 0.10	0.16 / 0.15	0.20 / 0.20	0.19 / 0.25	0.27/ 0.18	0.37 / 0.13	0.45 / 0.30
60D	11.5	5.1 / 4.8	0.30 / 0.34	0.22 / -	0.12 / 0.15	0.35 / 0.40	0.00 / 0.20	0.68/ -	0.24 / 0.00	0.75 / 0.30
40D	17.2	8.3 / 7.5	0.10 / 0.04	0.21 / 0.17	0.12 / 0.14	0.30 / 0.20	0.05 / 0.30	0.45/ 0.65	0.11 / 0.59	0.55 / 0.70
20D	17.4	9.4 / 7.5	0.22 / 0.14	0.20 / 0.04	0.04 / 0.05	0.30 / 0.20	0.34 / 0.52	0.62/ 0.47	0.21 / 0.17	0.65 / 0.55
0	11.8	6.7 / 6.4	0.14 / 0.19	0.10 / 0.16	0.02 / 0.04	0.20 / 0.20	0.70 / 0.08	0.41/ 0.24	0.36 / 0.08	0.75 / 0.30
20U	7.7	5.7 / 2.7	0.18 / 0.16	0.33 / -	0.03 / 0.18	0.35 / 0.25	0.33 / 0.33	0.30/ -	0.10 / 0.39	0.40 / 0.40
40U	12.1	5.3 / 2.8	0.12 / -	0.30 / 0.13	0.10 / -	0.35 / 0.20	0.26 / -	0.60/ 0.82	0.18 / -	0.65 / 0.85
60U	8.5	3.3 / 2.2	0.16 / 0.12	0.12 / -	0.08 / 0.15	0.20 / 0.20	0.66 / 0.60	0.49/ -	0.19 / 0.18	0.70 / 0.65
80U	11.0	6.6 / 4.6	0.12 / 0.06	0.20 / -	0.10 / 0.04	0.25 / 0.15	0.50 / 0.31	0.10/ -	0.33 / 0.27	0.55 / 0.40
100U	5.7	4.8 / -	0.11 / -	0.08 / -	0.04 / -	0.15 / -	0.45 / -	0.23/ -	0.75 / -	0.80 / -

Site	Stream Morphology Composition (%)						Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Other	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	70	25	5	-	-	-	-	5	30	60	5
80D	65	35	-	-	-	-	-	5	30	60	5
60D	40	40	10	-	10	-	-	5	15	70	10
40D	50	30	5	-	15	-	-	5	15	65	15
20D	45	30	5	-	20	-	-	5	20	65	10
0	45	40	5	-	10	-	-	5	20	65	10
20U	30	35	5	-	30	-	-	-	-	60	40
40U	35	25	5	-	35	-	-	-	-	70	30
60U	15	50	-	-	35	-	-	-	-	50	50
80U	15	50	-	-	35	-	-	5	15	50	30
100U	10	40	-	-	50	-	-	5	20	35	40

Baffinland Iron Mines
Mary River Project

North/South Consultants Inc.
Aquatic Environment Specialists

Fish Habitat Quality

Arctic Char - IMPORTANT

Ninespine Stickleback – NOT FISH-BEARING

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-77-2 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 535267 7918560

Fisheries Data

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

Species	Season	Effort (min)	Total Caught/Observed	CPUE	Length Range (mm)
ARCH	Summer	4.47	2	0.45	189 - 221
	Fall	2.83	0	-	N/A
NNST	Summer	4.05	0	-	N/A
	Fall	2.83	0	-	N/A

Fish Habitat Potential

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

Comments & Summary

Provides important rearing habitat for juvenile char throughout the open water season, particularly during summer. Fall water temperatures likely already triggered movements to overwintering areas, affecting catches.

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

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-77-2 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 535267 7918560

Photographs

A B C

Figure 1. Summer (top) and fall (bottom) views of CV-77-2 at the 100 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-77-2 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 535267 7918560

Photographs

A **B** **C**

Figure 2. Summer (top) and fall (bottom) views of CV-77-2 at the 80 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-77-2 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 535267 7918560

Photographs

A **B** **C**

Figure 3. Summer (top) and fall (bottom) views of CV-77-2 at the 60 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.

Phase 2 Milne Rail Corridor Aquatic Habitat Assessment

Location

Crossing ID: CV-77-2 **Dates Surveyed:** 3 July & 1 September, 2018 **UTM Coordinates:** 17 W 535267 7918560

Photographs

A **B** **C**

Figure 4. Summer (top) and fall (bottom) views of CV-77-2 at the 40 m downstream cross-section; (A) looking upstream; (B) looking downstream; and (C) looking across.