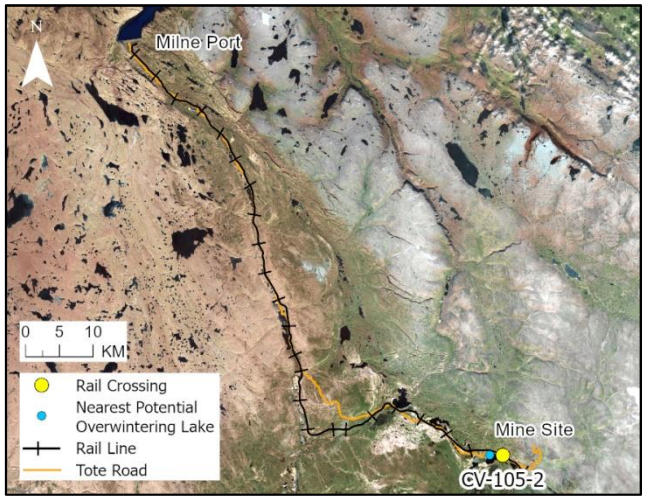
RAIL CV-105-2

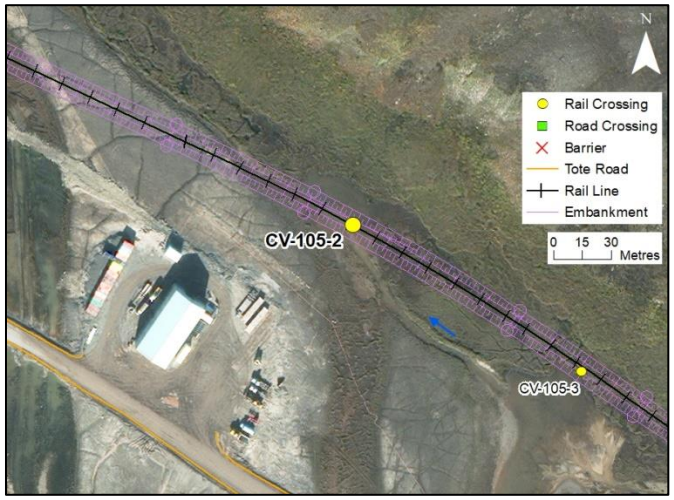
LOCATION AND CROSSING DESCRIPTION

Site ID:	CV-105-2	**Dates Surveyed:**	22-Jun-19; 19-Aug-19	**Waterbody Type:**	Stream + Pond
Project Interaction:	Rail Culvert + Stream and Pond Infilling + Stream Diversion	**Centreline UTM Coordinates:**	17W 558733 E 7914692 N	**Culvert Length (m):**	18
Number of Barrels:	1	**Culvert Diameter/Span (mm):**	900	**Slope (%):**	1

GENERAL PHYSICAL CHARACTERISTICS

Flow Regime:	Seasonal	**Stream Order:**	3	**Drainage Basin Area (km^2):**	2.273





SUMMARY

The rail crosses a small pond/stream system at CV-105-2. The small pond extends from 20 m downstream to a few metres upstream of the rail centreline while the remaining downstream and upstream habitat is riverine. This system feeds into a larger stream that is crossed by the rail at CV-104-5, which then flows west to the Tote Road crossing BG-01 and then south to Camp Lake (approximately 1.3 km from CV-105-2). This system is also crossed by the rail at CV-105-3, 105-4, 106-1, 106-1a, 106-2, and 106-3. The CV-105-2 survey area includes slow-moving cobble/gravel runs on either side of a small (40 x 30 m), shallow silty pond (max depth 0.60 m).

There is a small lake (CV-106-3) with sufficient depth to provide overwintering for Ninespine Stickleback and possibly also juvenile char approximately 1.4 km upstream of the site.

There are no upstream or downstream barriers in this stream between the potential overwintering waterbodies.

This stream provides open-water season rearing habitat for juvenile Arctic Char, particularly in the deeper runs and pools. The stream does not provide overwintering or spawning habitat for char due to lack of flow and sufficient depth in winter. This stream also provides open-water season rearing and spawning habitat for Ninespine Stickleback. Depths are insufficient to support overwintering for this species.

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BARRIERS

Upstream/ Downstream	UTM		Barrier Type			Height (m)	Gradient (°)	Description	Site Label
	Easting	Northing	1	2	3				
Downstream	NO BARRIERS								
Upstream	NO BARRIERS								

FISH HABITAT POTENTIAL

Nearest Potential Overwintering Habitat - ARCH: Camp Lake/Unnamed Lake (at CV-106-3) **Distance to Nearest Potential Overwintering Habitat - ARCH (km):** 1.3/1.4

Overwintering Habitat Upstream of Site - ARCH (Y/N): Small unnamed lake (1.4 km upstream at CV-106-3)

Species	Spawning	Overwintering	Rearing	Adults Present
ARCH	N	N	Y	N
NNST	Y	N	Y	Y

FISHING SITES

RAIL CV-105-2

FISHERIES DATA

Date: 22-Jun-19 **Temperature (°C):** 20.0 **Gear Used:** Backpack Electrofisher/Visual

Distance Fished (m): 100 **Duration Fished (seconds):** 329

Species	Season	Pass	Effort (Seconds)	Fish Captured	Fish Observed	CPUE (No. Fish/60 Seconds)	Length Range (mm)
ARCH	Spring	1	329	15	1	2.74	89 – 95 (measured)
NNST	Spring	1	329	3	0	0.55	53 – 75 (measured)

Date: 19-Aug-19 **Temperature (°C):** 6.0 **Gear Used:** Backpack Electrofisher/Visual

Distance Fished (m): 110 **Duration Fished (seconds):** 460

Species	Season	Pass	Effort (Seconds)	Fish Captured	Fish Observed	CPUE (No. Fish/60 Seconds)	Length Range (mm)
ARCH	Summer/Fall	1	460	2	0	0.26	84 – 94 (measured)
NNST	Summer/Fall	1	460	2	0	0.13	59 (measured)

COMMENTS

Char and stickleback were found throughout the survey reaches in both seasons from 100 m downstream to as far upstream as the confluence with the pond encroached by the rail at site CV-105-3 (approximately 100 m upstream). Both species were also captured in this reach in spring and summer/fall 2018. The char were most abundant in the deeper runs while stickleback were found in all habitat types within the CV-105-2 survey area.

RAIL CV-105-2

GENERAL HABITAT CHARACTERISTICS

Channel Confinement: PC **Stream Morphology:** Sinuous **Riparian Vegetation Type (%):** Grass 60, Willow 30, Other 10

Centreline	Height (m)	Stability	Materials (%)	Shape
LHB	0.20	Moderate	CGS 30, Organic 70	Sloping
RHB	0.10	Moderate	CGS 30, Organic 70	Sloping

HABITAT SURVEY SITES

RAIL CV-105-2

HYDROLOGY & HABITAT CHARACTERISTICS: 22-JUN-19

Wetted/Dry/Shallow (<0.02 m)/Unconnected Pools: Wetted **Stage:** Moderate

Site	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	2.8	1.7	0.06	0.06	0.09	0.20	0.09	0.10	0.16	0.16
80D	3.1	1.7	0.06	0.03	0.02	0.11	0.16	0.21	0.00	0.25
60D	3.1	2.1	0.03	0.03	0.02	0.25	0.16	0.21	0.00	0.28
40D	6.0	2.6	0.06	0.03	0.02	0.30	0.20	0.18	0.00	0.20
20D	22.9	21.0	0.02	0.02	0.02	0.60	0.09	0.00	0.00	0.02
0 (Centreline)	37.5	27.4	0.07	0.03	0.03	0.60	0.26	0.00	0.00	0.26
20U	15.8	3.6	0.07	0.03	0.03	0.30	0.00	0.00	0.00	0.00
40U	9.0	6.5	0.07	0.05	0.04	0.10	0.00	0.00	0.18	0.18
60U	5.0	2.3	0.02	0.03	0.04	0.10	0.00	0.05	0.10	0.14
80U	3.2	2.1	0.06	0.11	0.09	0.20	0.00	0.02	0.02	0.19
100U	5.7	3.6	0.06	0.08	NR	0.10	0.00	0.03	0.04	0.12

Site	Stream Morphology Composition (%)							Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Flat	Rapids	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	50	-	-	50	-	-	-	20	40	40	-	-
80D	50	-	-	50	-	-	-	-	50	50	-	-
60D	25	-	-	75	-	-	-	-	60	40	-	-
40D	25	-	-	75	-	-	-	20	50	30	-	-
20D	-	100	-	-	-	-	-	90	-	10	-	-
0 (Centreline)	-	100	-	-	-	-	-	95	-	5	-	-
20U	-	-	-	100	-	-	-	95	-	5	-	-
40U	-	50	-	50	-	-	-	75	20	5	-	-
60U	-	-	-	100	-	-	-	15	70	15	-	-
80U	-	50	-	50	-	-	-	30	10	40	20	-
100U	-	75	-	25	-	-	-	90	8	2	-	-

OTHER NOTES / OBSERVATIONS

Generally shallow, slow-moving stream with a small pond from 20 m downstream to a few metres upstream of the crossing centreline and a much larger pond ~ 120 m upstream. Riverine sections are mainly riffle/run. Substrate is cobble/gravel downstream transitioning to gravel/fines upstream. Nearest potential overwintering lakes are either Camp Lake downstream or the small, unnamed upstream lake at CV-106-3. The latter likely only provides overwintering for stickleback and juvenile char. There are no adult char in this stream.

RAIL CV-105-2

HYDROLOGY & HABITAT CHARACTERISTICS: 19-AUG-19

Wetted/Dry/Shallow (<0.02 m)/Unconnected Pools: Wetted **Stage:** Moderate

Site	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	2.2	1.3	0.21	0.20	0.15	0.21	0.23	0.33	0.15	0.90
80D	2.9	2.0	0.09	0.10	0.05	0.13	0.35	0.36	0.12	0.58
60D	3.3	2.1	0.05	0.06	0.02	0.12	0.28	0.21	too shallow	0.63
40D	6.9	2.4	0.10	0.05	0.02	0.11	0.30	0.18	0.11	0.30
20D	23.1	19.9	0.11	0.20	0.10	0.20	0.00	0.00	0.00	0.19
0 (Centreline)	30.0	23.3	0.07	0.20	0.05	0.20	0.00	0.00	0.20	0.34
20U	16.5	3.5	0.06	0.01	0.09	0.10	0.06	too shallow	0.06	0.24
40U	7.3	3.0	0.07	0.13	0.20	0.20	0.09	0.04	0.04	0.09
60U	4.7	2.5	0.10	0.11	0.10	0.18	0.10	0.14	0.09	0.18
80U	3.5	2.6	0.07	0.06	0.02	0.20	0.33	0.21	0.09	0.35
100U	3.6	3.5	0.04	0.05	0.06	0.20	0.02	0.11	0.43	0.43

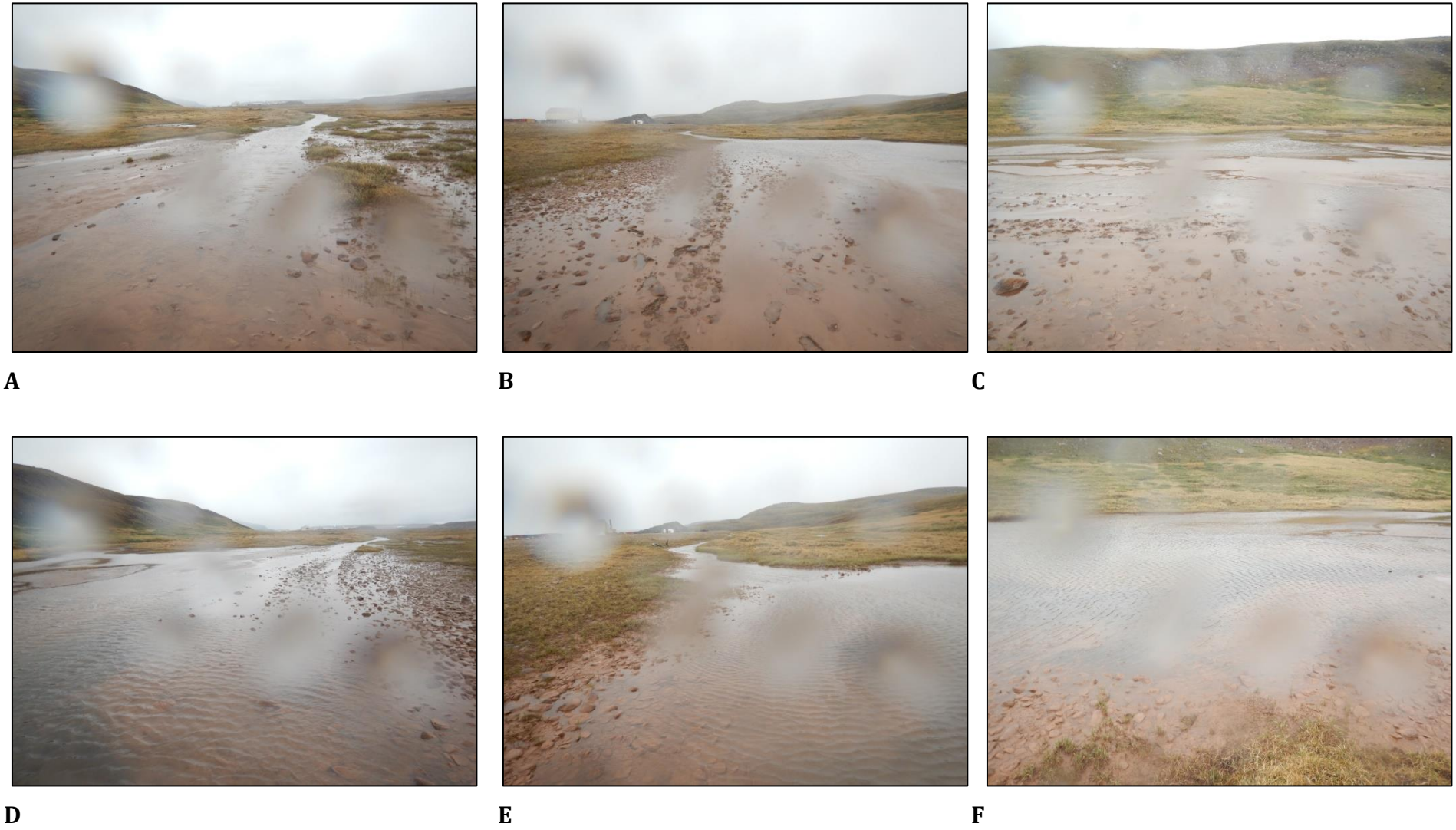
Site	Stream Morphology Composition (%)							Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Flat	Rapids	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	30	20	-	50	-	-	-	10	30	60	-	-
80D	60	10	-	30	-	-	-	-	40	60	-	-
60D	50	30	-	20	-	-	-	-	40	60	-	-
40D	10	50	-	40	-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

OTHER NOTES / OBSERVATIONS

There were no notable differences in depths or velocities between seasons. Habitat was suitable for fish in both sampling periods.

RAIL CV-105-2

22-JUN-19



A **B** **C**

D **E** **F**

Photos 1. Photos taken at the crossing centreline (top) and 20 m downstream (bottom) in spring: (A,D) facing upstream; (B,E) facing downstream; and (C,F) across (left bank looking at right bank)

RAIL CV-105-2

22-JUN-19

A

B

C

D

E

F

Photos 2. Photos taken 40 m downstream (top) and 60 m downstream (bottom) in spring: (A,D) facing upstream; (B,E) facing downstream; and (C,F) across (left bank looking at right bank)

RAIL CV-105-2

22-JUN-19

A

B

C

D

E

F

Photos 3. Photos taken 80 m downstream (top) and 100 m downstream (bottom) in spring: (A,D) facing upstream; (B,E) facing downstream; and (C,F) across (left bank looking at right bank).

RAIL CV-105-2

22-JUN-19

A

B

C

D

E

F

Photos 4. Photos taken 20 m upstream (top) and 40 m upstream (bottom) in spring: (A,D) facing upstream; (B,E) facing downstream; and (C,F) across (left bank looking at right bank).

RAIL CV-105-2

22-JUN-19

A

B

C

D

E

F

Photos 5. Photos taken 60 m upstream (top) and 80 m upstream (bottom) in spring: (A,D) facing upstream; (B,E) facing downstream; and (C,F) across (left bank looking at right bank).

RAIL CV-105-2

22-JUN-19

A

B

C

Photos 6. Photos taken 100 m upstream (top) in spring: (A) facing upstream; (B) facing downstream; and (C) across (left bank looking at right bank).

RAIL CV-105-2

19-AUG-19

A

B

C

D

E

F

Photos 7. Photos taken at the crossing centerline in summer/fall: (A) facing upstream; (B) facing downstream; (C) across (left bank looking at right bank); (D) diagonal from left bank above the centreline looking downstream; (E) across (left bank looking at left bank); and (F) diagonal from left bank below the centreline looking upstream.

RAIL CV-105-2

19-AUG-19

A

B

C

D

E

F

Photos 8. Photos taken 20 m downstream (top) and 40 downstream (bottom) in summer/fall: (A,D) facing upstream; (B,E) facing downstream; and (C,F) across (left bank looking at right bank).

RAIL CV-105-2

19-AUG-19

A

B

C

D

E

F

Photos 9. Photos taken 60 m downstream (top) and 80 m downstream (bottom) in summer/fall: (A,D) facing upstream; (B,E) facing downstream; and (C,F) across (left bank looking at right bank).

RAIL CV-105-2

19-AUG-19

A

B

C

Photos 10. Photos taken 100 m downstream in summer/fall: (A) facing upstream; (B) facing downstream; and (C) across (left bank looking at right bank)..

RAIL CV-105-2

19-AUG-19

A

B

C

D

E

F

Photos 11. Photos taken 20 m upstream (top) and 40 m upstream (bottom) in summer/fall: (A,D) facing upstream; (B,E) facing downstream; and (C,F) across (left bank looking at right bank).

RAIL CV-105-2

19-AUG-19

A

B

C

D

E

F

Photos 12. Photos taken 60 m upstream (top) and 80 m upstream (bottom) in summer/fall: (A,D) facing upstream; (B,E) facing downstream; and (C,F) across (left bank looking at right bank).

RAIL CV-105-2

19-AUG-19

A

B

C

Photos 13. Photos taken 100 m upstream in summer/fall: (A) facing upstream; (B) facing downstream; and (C) across (left bank looking at right bank).

RAIL CV-105-2

HYDROLOGY & HABITAT CHARACTERISTICS: UPSTREAM SURVEY

Date: 19-Aug-19

Site	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
120U	SEE CV-105-3 FOR ADDITIONAL UPSTREAM HABITAT DATA									
140U										
160U										
180U										
200U										

Site	Stream Morphology Composition (%)							Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Flat	Rapids	Fines	Gravel	Small Cobble	Large Cobble	Boulders
120U	SEE CV-105-3 FOR ADDITIONAL UPSTREAM HABITAT DATA											
140U												
160U												
180U												
200U												

OTHER NOTES / OBSERVATIONS

See assessment sheets for the upstream pond at CV-105-3 and additional upstream sites for details.