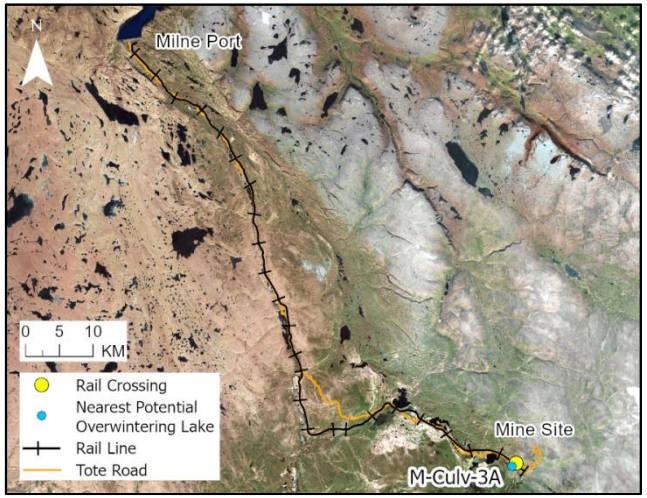
RAIL M-CULV-3A

LOCATION AND CROSSING DESCRIPTION

Site ID:	M-Culv-3A	**Dates Surveyed:**	23-Jun-19; 19-Aug-19	**Waterbody Type:**	Stream
Project Interaction:	Rail Plate Arch Culvert	**Centreline UTM Coordinates:**	17W 560706 E 7913504 N	**Culvert Length (m):**	55
Number of Barrels:	1	**Culvert Diameter/Span (mm):**	6,990	**Slope (%):**	4.1

GENERAL PHYSICAL CHARACTERISTICS

Flow Regime: Seasonal **Stream Order:** 3 **Drainage Basin Area (km^2):** 0.9022



SUMMARY

The rail alignment crosses the main inflow stream to Sheardown Lake (also known as Sheardown Lake Tributary 1) at culvert M-Culv-3A, which overlaps with the existing Tote Road culvert CV-186. This stream flows west towards Sheardown Lake approximately 470 m downstream. This stream is also crossed by a Tote Road realignment site at M-Culv-3B (approximately 40 m downstream) and an access road crossing at M-Culv-4 (40 m upstream). Plate arch culverts will be installed at both M-Culv-3A and M-Culv-3B; a CSP culvert crossing will be installed at M-Culv-4.

This stream at the M-Culv-3A site has low to moderate depths and velocities and riffle/pool morphology and has a predominantly cobble substrate. A permanent subsurface flow barrier underneath vegetation-covered boulders is present approximately 860 m upstream from the rail crossing. There are no natural downstream barriers to fish movement.

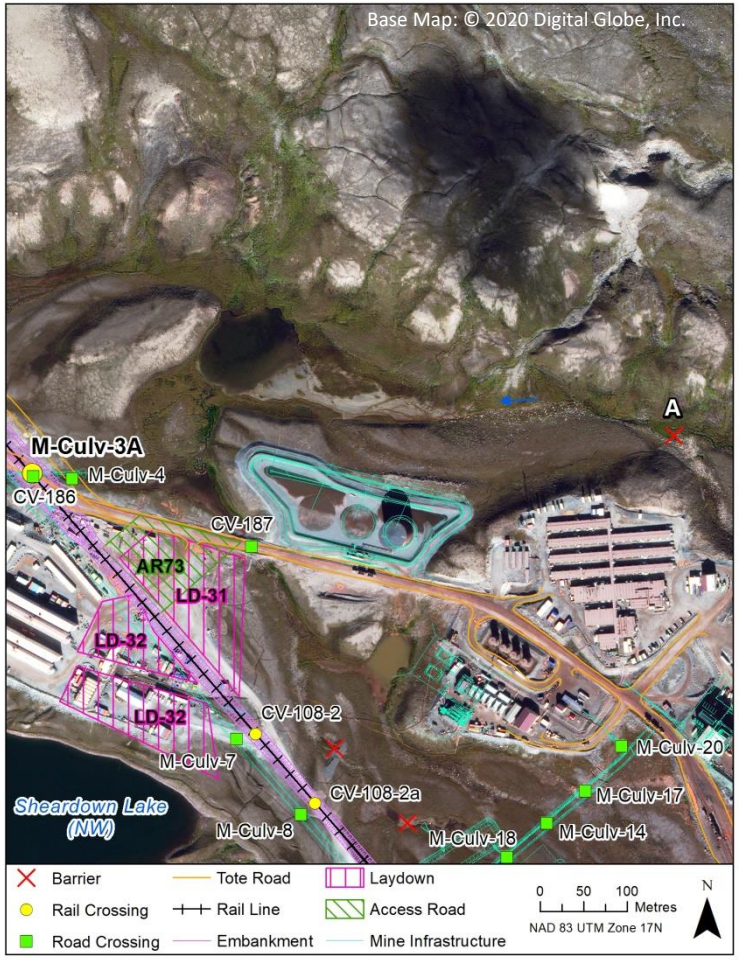
This stream provides open-water season rearing habitat for juvenile Arctic Char from Sheardown Lake upstream to the barrier. The stream does not provide overwintering or spawning habitat for char due to lack of flow and sufficient depth in winter.

Ninespine Stickleback have been captured at the confluence with Sheardown Lake downstream, but not at or upstream of the Tote Road crossing, since field studies began in 2006. The velocities are too high and the habitat generally unsuitable for stickleback to reach the Tote Road from Sheardown Lake.

RAIL M-CULV-3A

BARRIERS

Upstream/ Downstream	UTM		Barrier Type			Height (m)	Gradient (°)	Description	Site Label
	Easting	Northing	1	2	3				
Downstream	NO BARRIERS								
Upstream	561444	7913547	SSF					Permanent Barrier: Subsurface flow under boulders overgrown with vegetation	A



A

RAIL M-CULV-3A

FISH HABITAT POTENTIAL

Nearest Potential Overwintering Habitat - ARCH: Sheardown Lake

Distance to Nearest Potential Overwintering Habitat - ARCH (km): ~0.47

Overwintering Habitat Upstream of Site - ARCH (Y/N): No

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

FISHING SITES

RAIL M-CULV-3A

FISHERIES DATA

Date:	28-Jun-19	**Temperature (°C):**	NR	**Gear Used:**	Visual
Distance Fished (m):	N/A	**Duration Fished (seconds):**	N/A		

Species	Season	Pass	Effort (Seconds)	Fish Captured	Fish Observed	CPUE (No. Fish/60 Seconds)	Length Range (mm)
ARCH	Spring	-	-	0	many	-	-
NNST	Spring	-	-	0	0	-	-

Date:	19-Aug-19	**Temperature (°C):**	12.0	**Gear Used:**	Backpack Electrofisher/Visual
Distance Fished (m):	70	**Duration Fished (seconds):**	304		

Species	Season	Pass	Effort (Seconds)	Fish Captured	Fish Observed	CPUE (No. Fish/60 Seconds)	Length Range (mm)
ARCH	Summer/Fall	1	304	10	many	1.97	70 – 250 (estimated)
NNST	Summer/Fall	1	304	0	0	-	-

COMMENTS

During spring and summer/fall, char were captured upstream of the Tote Road and were observed throughout the surveyed reach from downstream of the road to as far upstream as the large upstream pond (~310 m upstream). Additional Tote Road monitoring electrofishing data from July 1, 2019 included 36 char captured downstream (CPUE 10.14 fish/minute, 44-76 mm length range) and six captured upstream (1.88 fish/minute, not measured for length) of the Tote Road culverts. Stickleback were not present in the survey area. These results are consistent with previous surveys of this stream since annual monitoring of the Tote Road crossing and baseline field programs began in 2006. Fisheries data are shared among the three sites on this stream.

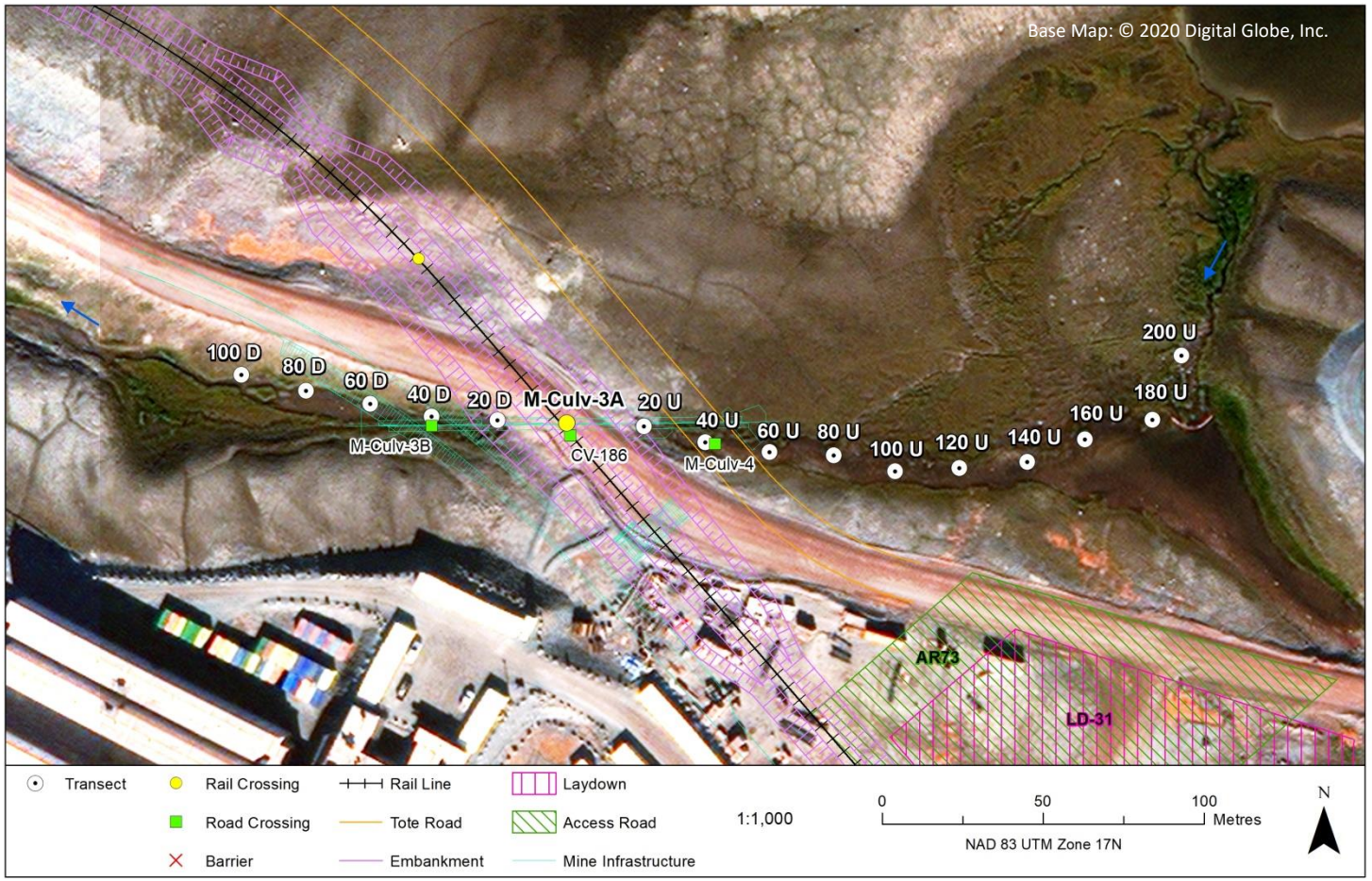
RAIL M-CULV-3A

GENERAL HABITAT CHARACTERISTICS

Channel Confinement: PC **Stream Morphology:** Sinuous **Riparian Vegetation Type (%):** Grass 90, Willow 10

Centreline	Height (m)	Stability	Materials (%)	Shape
LHB	CENTRELINE OVERLAPS WITH EXISTING TOTE ROAD			
RHB				

HABITAT SURVEY SITES



RAIL M-CULV-3A

HYDROLOGY & HABITAT CHARACTERISTICS: 23-JUN-19

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

Site	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	7.0	3.8	0.14	0.18	0.19	0.24	0.28	0.17	0.32	0.32
80D	16.0	11.0	0.05	0.04	0.11	0.23	0.18	0.44	0.58	0.58
60D	11.0	6.0	0.08	0.04	0.08	0.08	0.13	0.07	0.38	0.38
40D	11.0	4.0	0.05	0.12	0.05	0.12	0.35	0.45	0.22	0.45
20D	11.0	4.0	0.14	0.18	0.13	0.18	0.04	0.47	0.10	0.68
0 (Centreline)	CENTRELINE OVERLAPS WITH EXISTING TOTE ROAD									
20U	7.0	4.0	0.16	0.17	0.12	0.19	0.10	0.17	0.03	0.78
40u	11.0	5.0	0.05	0.09	0.07	0.09	0.31	0.08	0.11	0.50
60U	15.0	10.0	0.06	0.09	0.02	0.16	0.14	0.15	0.28	0.43
80U	14.0	10.0	0.09	0.10	0.11	0.19	0.00	0.20	0.10	0.20
100U	15.0	10.0	0.03	0.06	0.05	0.16	0.04	0.26	0.11	0.26

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	60	-	-	40	-	-	-	-	-	30	70	-
80D	80	20	-	-	-	-	-	5	10	25	60	-
60D	90	10	-	-	-	-	-	10	20	30	40	-
40D	100	-	-	-	-	-	-	10	20	40	30	-
20D	100	-	-	-	-	-	-	10	20	40	30	-
0 (Centreline)	CENTRELINE OVERLAPS WITH EXISTING TOTE ROAD											
20U	100	-	-	-	-	-	-	20	-	30	50	-
40U	30	-	-	-	70	-	-	-	-	50	50	-
60U	-	-	100	-	-	-	-	70	-	10	20	-
80U	-	-	100	-	-	-	-	70	-	10	20	-
100U	30	30	40	-	-	-	-	10	-	60	30	-

OTHER NOTES / OBSERVATIONS

This stream has generally low to moderate depths and velocities, with riffle/pool over cobble substrate. The 40 m downstream transect overlaps with the Tote Road realignment at site M-Culv-3B; the 20m upstream transect overlaps with the 100 m downstream transect for the road crossing at M-Culv-4. Data are shared among sites.

RAIL M-CULV-3A

HYDROLOGY & HABITAT CHARACTERISTICS: 19-AUG-19

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

Site	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	3.5	3.5	0.11	0.11	0.06	0.18	0.60	0.22	0.32	0.60
80D	9.0	9.0	0.06	0.04	0.05	0.06	0.60	0.06	0.38	0.60
60D	6.5	6.2	0.06	0.05	0.05	0.08	0.63	0.10	0.22	0.63
40D	2.8	2.5	0.04	0.06	0.10	0.10	0.40	0.94	0.74	0.94
20D	TRANSECT OVERLAPS WITH EXISTING TOTE ROAD									
0 (Centreline)										
20U	5.2	3.5	0.13	0.15	0.19	0.19	0.11	0.24	0.18	0.68
40U	5.0	4.8	0.06	0.05	0.07	0.12	0.23	0.10	0.33	0.42
60U	7.8	7.0	0.08	0.03	0.04	0.16	0.28	0.16	0.09	0.57
80U	7.3	7.1	0.10	0.11	0.09	0.16	0.11	0.22	0.03	0.72
100U	10.9	10.2	0.10	0.03	0.07	0.20	0.26	0.15	0.19	0.57

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	20	10	20	-	-	-	5	5	20	70	-
80D	70	30	-	-	-	-	-	5	20	50	25	-
60D	70	30	-	-	-	-	-	5	20	55	20	-
40D	70	30	-	-	-	-	-	5	20	55	20	-
20D	TRANSECT OVERLAPS WITH EXISTING TOTE ROAD											
0 (Centreline)												
20U	50	50	-	-	-	-	-	-	15	70	10	5
40U	50	35	-	-	15	-	-	5	45	40	5	5
60U	40	35	-	-	25	-	-	10	30	50	9	1
80U	40	35	-	-	25	-	-	10	25	50	10	5
100U	60	40	-	-	-	-	-	5	15	65	10	5

OTHER NOTES / OBSERVATIONS

Velocities were marginally higher in summer/fall; habitat was otherwise similar between seasons. As the 20 m downstream transect essentially overlaps with the downstream end of the road culvert, it was not assessed during summer/fall. Habitat was highly influenced by road materials and erosion at this location.

RAIL M-CULV-3A

23-JUN-19

A

B

C

D

E

F

Photos 1. Photos taken 20 m downstream (top) and 40 m downstream (bottom) in spring: (A,D) facing upstream; (B,E) facing downstream; and (C,F) across (right bank looking at left bank). The centreline of the site is the existing Tote Road.

RAIL M-CULV-3A

23-JUN-19

A

B

C

D

E

F

Photos 2. Photos taken 60 m downstream (top) and 80 m downstream (bottom) in spring: (A,D) facing upstream; (B,E) facing downstream; and (C,F) across (right bank looking at left bank).

RAIL M-CULV-3A

23-JUN-19

A

B

C

Photos 3. Photos taken 100 m downstream in spring: (A) facing upstream; (B) facing downstream; and (C) across (right bank looking at left bank).

RAIL M-CULV-3A

23-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 (right bank looking at left bank).

RAIL M-CULV-3A

23-JUN-19

A

B

C

D

E

F

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

RAIL M-CULV-3A

23-JUN-19

A

B

C

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

RAIL M-CULV-3A

19-AUG-19

A

B

C

D

E

F

Photos 7. Photos taken 40 m downstream (top) and 60 downstream (bottom) in summer/fall: (A,D) facing upstream; (B,E) facing downstream; and (C,F) across (left bank looking at right bank).

RAIL M-CULV-3A

19-AUG-19

A

B

C

D

E

F

Photos 8. Photos taken 80 m downstream (top) and 100 downstream (bottom) in summer/fall: (A,D) facing upstream; (B,E) facing downstream; and (C,F) across (left bank looking at right bank).

RAIL M-CULV-3A

19-AUG-19

A

B

C

D

E

F

Photos 9. 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 M-CULV-3A

19-AUG-19

A

B

C

D

E

F

Photos 10. 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 M-CULV-3A

19-AUG-19

A

B

C

Photos 11. Photos taken 100 m upstream in summer/fall: (A) facing upstream; (B) facing downstream; and (C) across (left bank looking at right bank).

RAIL M-CULV-3A

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	UPSTREAM DATA ARE INCLUDED IN THE ASSESSMENT FOR M-CULV-4									
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	UPSTREAM DATA ARE INCLUDED IN THE ASSESSMENT FOR M-CULV-4											
140U												
160U												
180U												
200U												

OTHER NOTES / OBSERVATIONS

Detailed habitat data for the upstream area were collected during the survey for the M-Culv-4 road crossing assessment; see the assessment sheet for information. In general, habitat from 100 m downstream of M-Culv-3B to upstream of M-Culv-4 is similar until reaching the first upstream pond located approximately 160 m upstream from the M-Culv-3A centreline. A second larger pond is present approximately 310 m upstream of the centreline; the area between this second pond and the upstream permanent barrier is comprised of a stretch of sandy flats and then boulder/riffle/pool habitat.