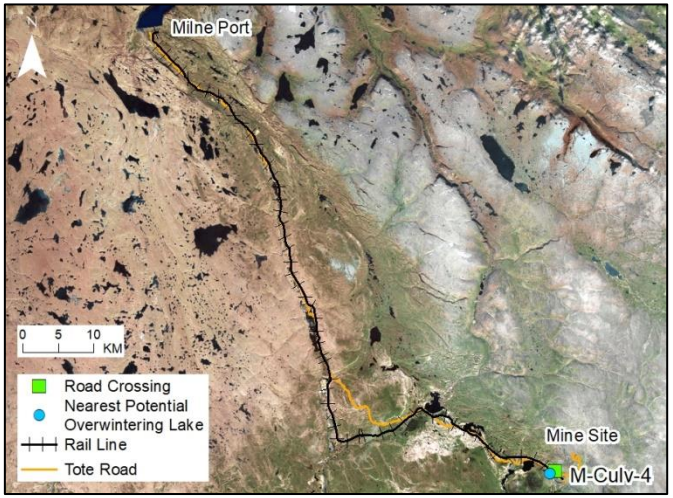
ROAD M-CULV-4

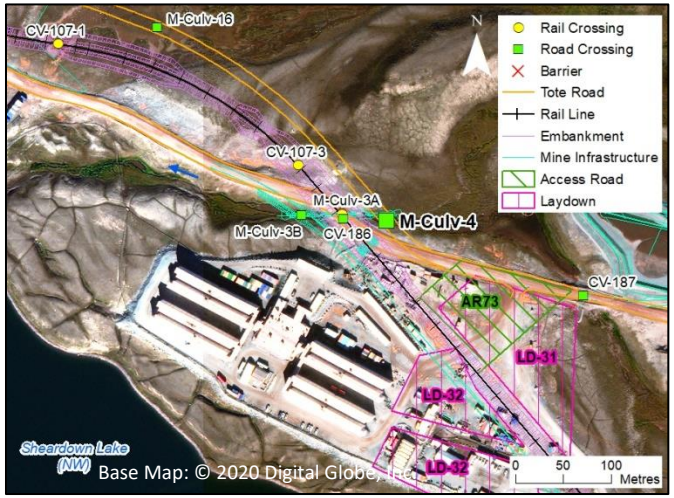
LOCATION AND CROSSING DESCRIPTION

Site ID:	M-Culv-4	**Dates Surveyed:**	28-Jun-19; 19-Aug-19	**Waterbody Type:**	Stream
Project Interaction:	Road Culvert	**Centreline UTM Coordinates:**	17W 560752 E 7913497 N	**Culvert Length (m):**	29.95
Number of Barrels:	3	**Culvert Diameter/Span (mm):**	1500	**Slope (%):**	0.7

GENERAL PHYSICAL CHARACTERISTICS

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





SUMMARY

A road crosses the main inflow stream to Sheardown Lake (also known as Sheardown Lake Tributary 1) at M-Culv-4. This stream flows west towards Sheardown Lake approximately 510 m downstream. This stream is also crossed by a rail crossing (M-Culv-3A) and a Tote Road realignment site (M-Culv-3B), approximately 40 and 80 m downstream, respectively. Plate arch culverts will be installed at both M-Culv-3A and M-Culv-3B; a CSP culvert will be installed at M-Culv-4.

This stream at the M-Culv-4 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 820 m upstream from the rail crossing. There are no natural downstream barriers to fish movement.

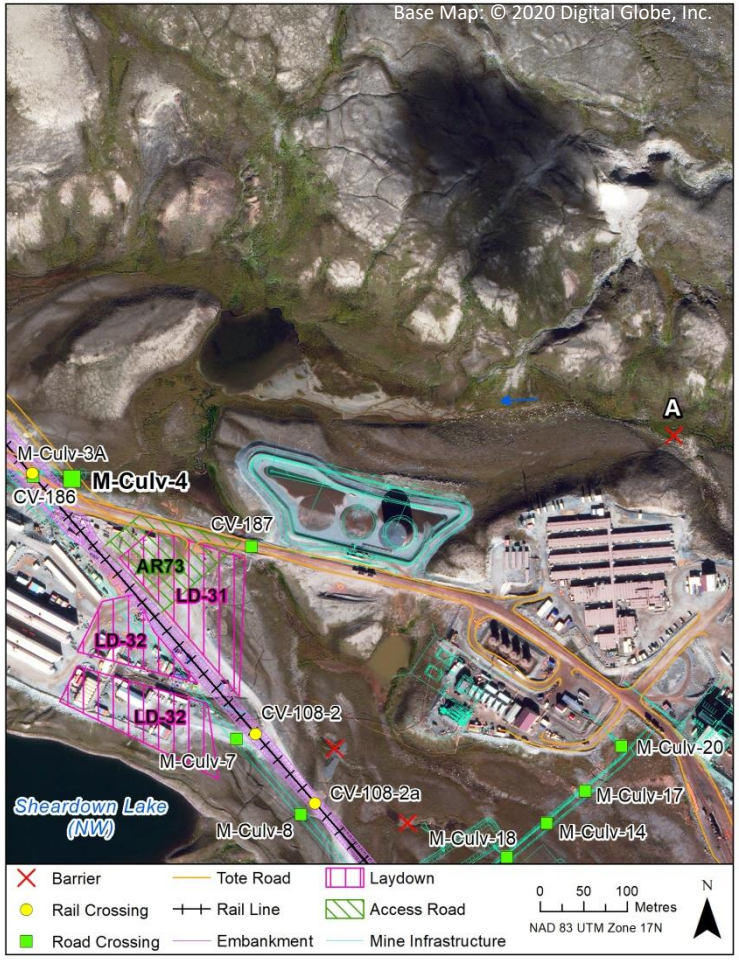
This stream provides open-water season rearing habitat for juvenile Arctic Char from Sheardown Lake upstream to the barrier. The stream does not provide overwintering or spawning habitat for char due to lack of flow and sufficient depth in winter.

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.

ROAD M-CULV-4

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



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ROAD M-CULV-4

FISH HABITAT POTENTIAL

Nearest Potential Overwintering Habitat - ARCH: Sheardown Lake

Distance to Nearest Potential Overwintering Habitat - ARCH (km): ~0.51

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

ROAD M-CULV-4

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/observed throughout the surveyed reach and observed as far upstream as the larger upstream pond (~200 m upstream). Stickleback were not present in the survey area. These results are consistent with previous surveys of this stream since the Tote Road crossing and baseline field programs began in 2006. Fisheries data are shared among the three sites on this stream.

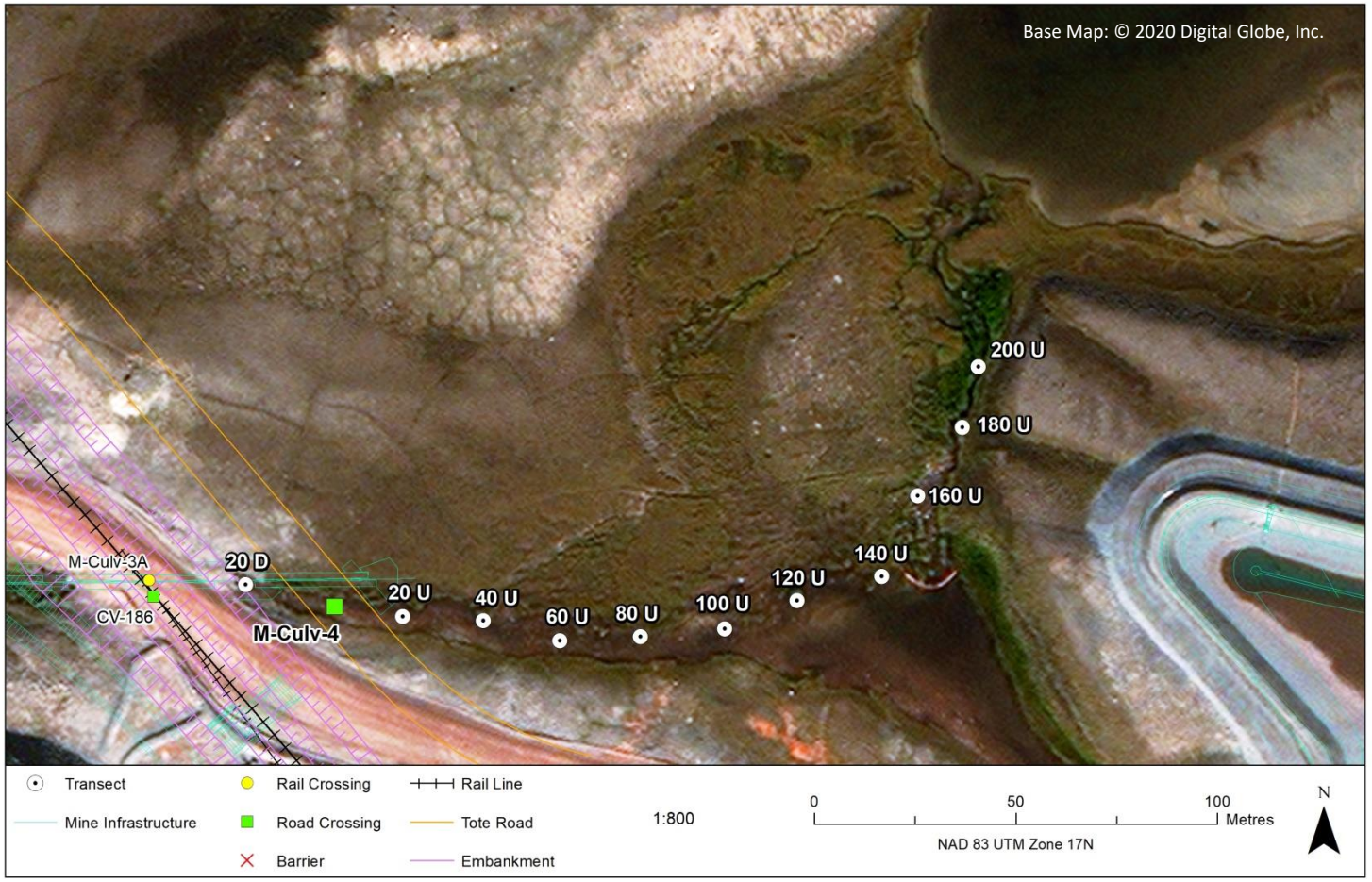
ROAD M-CULV-4

GENERAL HABITAT CHARACTERISTICS

Channel Confinement: PC **Stream Morphology:** Meandering **Riparian Vegetation Type (%):** Grass 90, Willow 5, Other 5

Centreline	Height (m)	Stability	Materials (%)	Shape
LHB	0.14	Moderate	Mineral Soil 40, Organic 60	Vertical
RHB	0.15	Moderate	Mineral Soil 40, Organic 60	Vertical

HABITAT SURVEY SITES



ROAD M-CULV-4

HYDROLOGY & HABITAT CHARACTERISTICS: 28-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										
80D										
60D										
40D	OVERLAPS WITH EXISTING TOTE ROAD									
20D	7.0	4.0	0.16	0.17	0.12	0.19	0.10	0.17	0.03	0.78
0 (Centreline)	11.0	5.0	0.05	0.09	0.07	0.09	0.31	0.08	0.11	0.50
20U	15.0	10.0	0.06	0.09	0.02	0.16	0.14	0.15	0.28	0.43
40u	14.0	10.0	0.09	0.10	0.11	0.19	0.00	0.20	0.10	0.20
60U	15.0	10.0	0.03	0.06	0.05	0.16	0.04	0.26	0.11	0.26
80U	9.0	14.0	0.07	0.08	0.09	0.18	0.05	0.05	0.06	0.10
100U	19.0	11.0	0.04	0.06	0.07	0.10	0.11	0.24	0.14	0.24

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

OTHER NOTES / OBSERVATIONS

This stream has generally low to moderate depths and velocities with riffle/ pool over cobble substrate. There is a small pond from 120-140 m upstream of the centreline. Habitat data are shared with sites M-Culv-3A and M-Culv-3B.

ROAD M-CULV-4

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										
80D										
60D										
40D	OVERLAPS WITH EXISTING TOTE ROAD									
20D	5.2	3.5	0.13	0.15	0.19	0.19	0.11	0.24	0.18	0.68
0 (Centreline)	5.0	4.8	0.06	0.05	0.07	0.12	0.23	0.10	0.33	0.42
20U	7.8	7.0	0.08	0.03	0.04	0.16	0.28	0.16	0.09	0.57
40U	7.3	7.1	0.10	0.11	0.09	0.16	0.11	0.22	0.03	0.72
60U	10.9	10.2	0.10	0.03	0.07	0.20	0.26	0.15	0.19	0.57
80U	11.0	9.1	0.07	0.05	0.03	0.18	0.27	0.13	0.07	0.34
100U	17.3	8.6	0.03	0.08	0.04	0.14	0.04	0.13	0.09	0.21

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												
80D												
60D												
40D	OVERLAPS WITH EXISTING TOTE ROAD											
20D	50	50	-	-	-	-	-	-	15	70	10	5
0 (Centreline)	50	35	-	-	15	-	-	5	45	40	5	5
20U	40	35	-	-	25	-	-	10	30	50	9	1
40U	40	35	-	-	25	-	-	10	25	50	10	5
60U	60	40	-	-	-	-	-	5	15	65	10	5
80U	50	40	-	-	10	-	-	-	20	65	14	1
100U	80	10	-	10	-	-	-	-	-	60	35	5

OTHER NOTES / OBSERVATIONS

Habitat was similar between the two surveys.

ROAD M-CULV-4

28-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; (C,F) across (right bank looking at left bank).

ROAD M-CULV-4

28-JUN-19

A

B

C

D

E

F

Photos 2. Photos taken 20 m upstream (top) and 40 m upstream (bottom) in spring: (A,D) facing upstream; (B,E) facing downstream; (C,F) across (right bank looking at left bank).

ROAD M-CULV-4

28-JUN-19

A

B

C

D

E

F

Photos 3. Photos taken 60 m upstream (top) and 80 m upstream (bottom) in spring: (A) facing upstream; (B) facing downstream; (C) across (right bank looking at left bank).

ROAD M-CULV-4

28-JUN-19

A

B

C

Photos 4. Photos taken 100 m upstream in spring: (A) facing upstream; (B) facing downstream; (C) across (right bank looking at left bank).

ROAD M-CULV-4

19-AUG-19

A

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Photos 5. Photos taken at the crossing centreline (top) and 20 m downstream (bottom) in summer/fall: (A,D) facing upstream; (B,E) facing downstream; and (C,F) across (left bank looking at right bank).

ROAD M-CULV-4

19-AUG-19

A

B

C

D

E

F

Photos 6. Photos taken 20 m upstream (top) and 40 m upstream (bottom) in summer/fall: (A,D) facing upstream; (B,E) facing downstream; (C,F) across (left bank looking at right bank).

ROAD M-CULV-4

19-AUG-19

A

B

C

D

E

F

Photos 7. Photos taken 60 m upstream (top) and 80 m upstream (bottom) in summer/fall: (A,D) facing upstream; (B,E) facing downstream; (C,F) across (left bank looking at right bank).

ROAD M-CULV-4

19-AUG-19

A

B

C

Photos 8. Photos taken 100 m upstream in summer/fall: (A) facing upstream; (B) facing downstream; (C) across (left bank looking at right bank).

ROAD M-CULV-4

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	42.0	30.0	0.37	0.04	0.14	0.28	0.00	0.00	0.00	0.00
140U	40.0	34.0	0.43	-	-	0.50	0.00	0.00	0.00	0.00
160U	6.3	6.3	0.06	0.05	0.03	0.12	0.16	0.21	0.14	0.73
180U	3.2	1.5	0.14	0.15	0.17	0.22	0.28	0.09	0.41	0.47
200U	8.1	1.7	0.17	0.36	0.21	0.36	0.00	0.36	0.17	0.36

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	-	95	5	-	-	-	-	60	-	10	25	5
140U	-	20	80	-	-	-	-	90	-	5	4	1
160U	60	20	-	20	-	-	-	-	-	70	25	5
180U	10	5	-	85	-	-	-	-	-	60	35	5
200U	-	40	-	60	-	-	-	40	-	10	50	-

OTHER NOTES / OBSERVATIONS

A detailed habitat survey was conducted from 100 to 200 m upstream of the centreline. Habitat includes a large pond from 120-140 m upstream and narrow, grassy, pool/run with fine substrate from 140-200 m upstream. Habitat near the upstream barrier is primarily boulders surrounded by interconnected pools.

ROAD M-CULV-4

19-AUG-19: UPSTREAM SURVEY

A

B

C

D

E

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Photos 9. Photos taken 120 m upstream (top) and 140 m upstream (bottom) in summer/fall: (A,D) facing upstream; (B,E) facing downstream; (C,F) across (right bank looking at left bank). Note: all photos taken while standing at the transect centreline.

ROAD M-CULV-4

19-AUG-19: UPSTREAM SURVEY

A

B

C

D

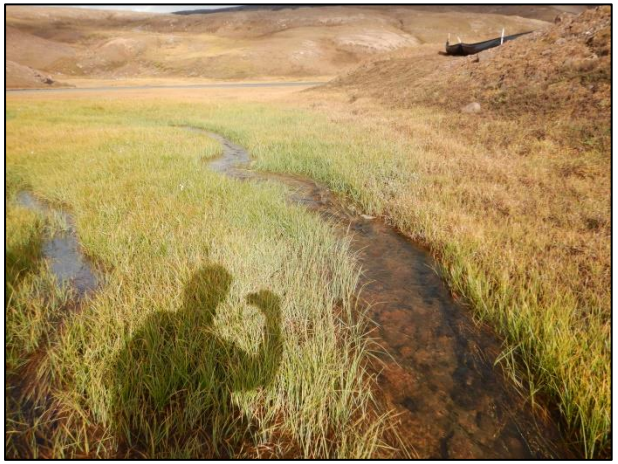
E

F

Photos 10. Photos taken 160 m upstream (top) and 180 m upstream (bottom) in summer/fall: (A,D) facing upstream; (B,E) facing downstream; (C,F) across (right bank looking at left bank). Note: all photos taken while standing at the transect centreline.

ROAD M-CULV-4

19-AUG-19: UPSTREAM SURVEY



A

B

C

Photos 11. Photos taken 200 m upstream in summer/fall: (A) facing upstream; (B) facing downstream; (C) across (right bank looking at left bank). Note: all photos taken while standing at the transect centreline.

ROAD M-CULV-4

19-AUG-19: BARRIER SURVEY

A

B

C

D

E

F

Photos 12. Photos taken at the barrier (top) and 20 m downstream (bottom) from the barrier in summer/fall: (A,D) facing upstream; (B,E) facing downstream; (C,F) across (right bank looking at left bank). Note: all photos taken while standing at the transect centreline.

ROAD M-CULV-4

19-AUG-19: BARRIER SURVEY

A

B

C

D

E

F

Photos 13. Photos taken 40 m downstream (top) and 60 m downstream (bottom) from the barrier in summer/fall: (A,D) facing upstream; (B,E) facing downstream; (C,F) across (right bank looking at left bank). Note: all photos taken while standing at the transect centreline.