

TOTE ROAD CV-186

30-JUN-23



A



B



C



D



E



F

Photos 1-3. Photos taken 20 m upstream (top) and 60 m upstream (bottom) in spring 2023: (A,D) facing upstream; (B,E) facing downstream; and (C,F) across (left bank looking at right bank).

TOTE ROAD CV-186

30-JUN-23



A



B



C

Photos 1-4. Photos taken 100 m upstream in spring 2023: (A) facing upstream; (B) facing downstream; and (C) across (left bank looking at right bank).

TOTE ROAD CV-187

LOCATION AND CROSSING DESCRIPTION

Site ID:	CV-187	Dates Surveyed:	30-Jun-23	Waterbody Type:	Stream
Project Interaction:	Tote Road Culvert	UTM Coordinates:	17W 560957 E 7913414 N		

GENERAL PHYSICAL CHARACTERISTICS

Flow Regime: Seasonal Stream Order: 2



BAFFINLAND IRON MINES
MARY RIVER PROJECT

 **North/South Consultants Inc.**
Aquatic Environment Specialists

FISH HABITAT:

ARCTIC CHAR - YES

NINESPINE STICKLEBACK - YES

TOTE ROAD CV-187

SITE SUMMARY

The Tote Road crosses a small, unnamed stream at site CV-187 that flows 275 m west towards the crossing at CV-186 and then another 420 m west into Sheardown Lake. Sheardown Lake has been extensively surveyed and is known to support overwintering of both species and char spawning.

Detailed habitat data were collected for CV-186 in spring 2023. Wetted widths ranged between 0.8 and 27.6 m with the wider areas occurring downstream from the crossing at a small pond. Water depths were shallow upstream (typically <0.20 m) and deeper in the downstream pond. Measured velocities were low (typically <0.05) and often negligible. Stream morphology was almost exclusively pool. The substrate was primarily composed of fines with increasing gravel and cobble proportions upstream of the crossing.

Juvenile Arctic Char were not observed in spring 2023. However, char are known to use this stream, particularly the pond downstream of the CV-187 crossing, for rearing/feeding throughout the open-water period; however, water becomes very shallow and/or dry farther upstream from the culvert. There is no char spawning or overwintering habitat in this stream.

Ninespine Stickleback were not captured in spring 2023 but are known to use habitat in the stream for feeding and potentially spawning, though they are more common in slower-flowing areas downstream near the confluence with Sheardown Lake. There is no overwintering habitat for the species.

TOTE ROAD CV-187

FISH HABITAT POTENTIAL

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

FISHERIES DATA

Location	Species	Survey Date	Temperature (°C)	Distance Fished (m)	Effort (Seconds)	# Fish Captured	# Fish Observed	CPUE (No. Fish/60 Seconds)	Length Range (mm)
Downstream	ARCH	30-Jun-23	5.0	50	104	0	0	0.00	-
	NNST					0	0	0.00	-
Upstream	ARCH			50	92	0	0	0.00	-
	NNST					0	0	0.00	-

OTHER NOTES / OBSERVATIONS

No fish were observed or captured at this stream crossing in spring 2023. Both species use habitat near the crossing for feeding/rearing and there is potential for stickleback spawning. There is no char spawning or overwintering for either species at the crossing.

TOTE ROAD CV-187

HYDROLOGY CHARACTERISTICS: 30-JUN-23

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

Stage: High

Site	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	40	27.6	0.61	0.56	0.06	0.61	0.01	0.04	0.02	0.04
60D	16.5	14.1	0.52	0.47	0.17	0.52	0.00	0.01	0.01	0.01
20D	12.8	5.1	0.11	0.13	0.13	0.26	0.01	0.03	0.04	0.04
0 (Centreline)	UNDER TOTE ROAD									
20U	10.1	0.8	0.07	0.16	0.16	0.22	0.00	0.07	0.00	0.07
60U	16.0	4.1	0.04	0.04	0.03	0.09	0.03	0.06	0.11	0.13
100U	17.5	5.0	0.04	0.19	0.05	0.19	0.00	0.02	0.00	0.03

OTHER NOTES / OBSERVATIONS

Wetted widths ranged between 0.8 and 27.6 m, with the wider areas occurring downstream from the crossing at a small pond within the drainage. Water depths were generally shallow (typically <0.20 m) except in the downstream pond. Measured velocities were low, typically <0.05 and often negligible.

TOTE ROAD CV-187

HABITAT CHARACTERISTICS: 30-JUN-23

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

Stage: High

Site	Stream Morphology Composition (%)							Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Rapids	Flat	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	-	30	70	-	-	-	-	80	5	5	5	5
60D	-	40	55	5	-	-	-	90	5	5	-	-
20D	-	75	20	5	-	-	-	60	30	10	-	-
0 (Centreline)	UNDER TOTE ROAD											
20U	10	70	10	10	-	-	-	60	30	10	-	-
60U	-	90	-	10	-	-	-	20	30	40	10	-
100U	-	90	-	10	-	-	-	15	10	30	40	5

OTHER NOTES / OBSERVATIONS

Stream morphology was almost exclusively pool. The substrate was primarily composed of fines with increasing gravel and cobble proportions upstream of the crossing.

TOTE ROAD CV-187

30-JUN-23



A



B



C



D



E



F

Photos 1-1. Photos taken 20 m downstream (top) and 60 m downstream (bottom) in spring 2023: (A,D) facing upstream; (B,E) facing downstream; and (C,F) across (left bank looking at right bank).

TOTE ROAD CV-187

30-JUN-23



A



B



C

Photos 1-2. Photos taken 100 m downstream in spring 2023: (A) facing upstream; (B) facing downstream; and (C) across (left bank looking at right bank).

TOTE ROAD CV-187

30-JUN-23



A



B



C



D



E



F

Photos 1-3. Photos taken 20 m upstream (top) and 60 m upstream (bottom) in spring 2023: (A,D) facing upstream; (B,E) facing downstream; and (C,F) across (left bank looking at right bank).

TOTE ROAD CV-187

30-JUN-23



A



B



C

Photos 1-4. Photos taken 100 m upstream in spring 2023: (A) facing upstream; (B) facing downstream; and (C) across (left bank looking at right bank).

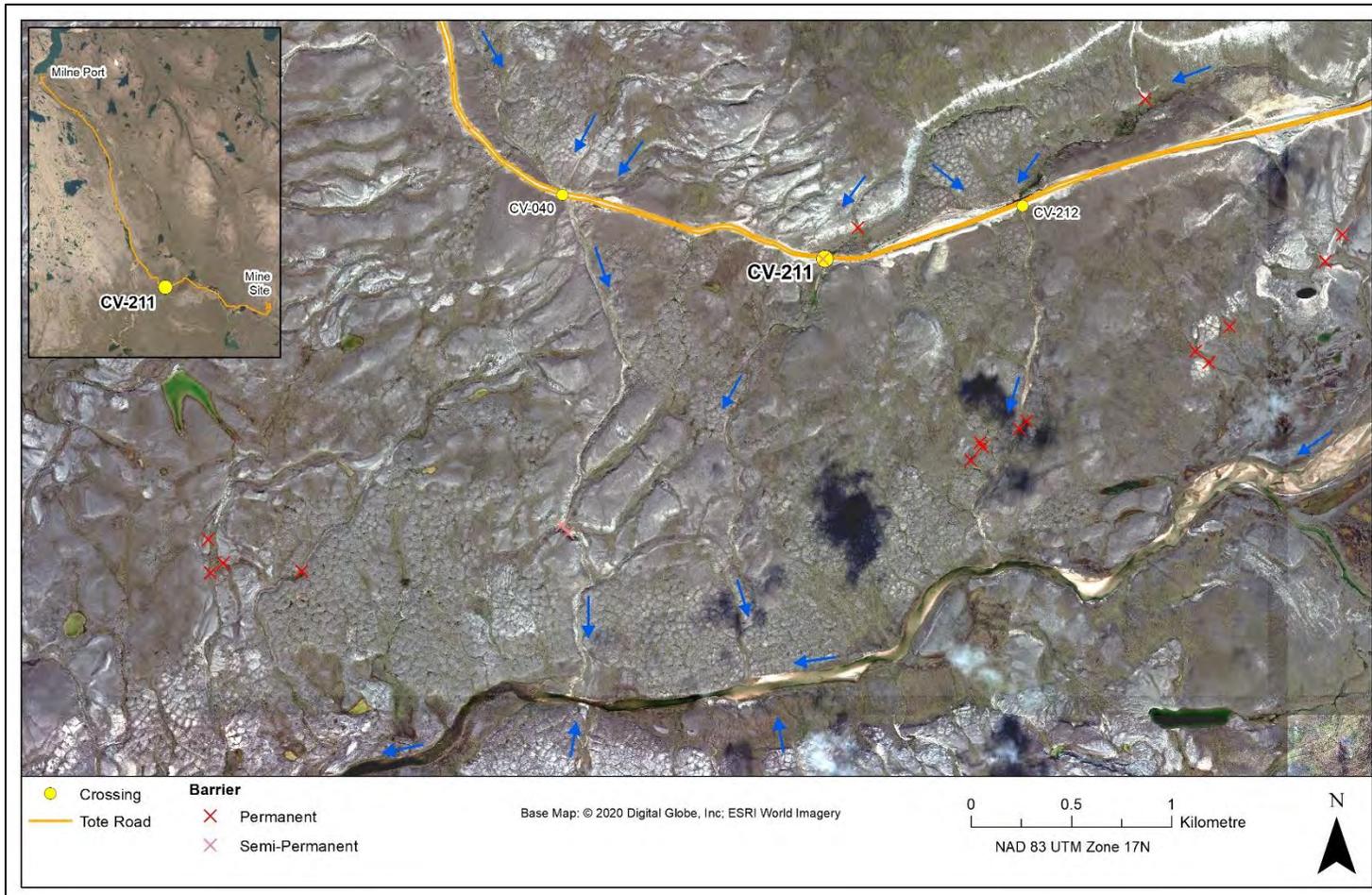
TOTE ROAD CV-211

LOCATION AND CROSSING DESCRIPTION

Site ID:	CV-211	Dates Surveyed:	4-Jul-23	Waterbody Type:	Stream
Project Interaction:	Tote Road Culvert	UTM Coordinates:	17W 536479 E 7920007 N		

GENERAL PHYSICAL CHARACTERISTICS

Flow Regime: Seasonal Stream Order: 2



BAFFINLAND IRON MINES
MARY RIVER PROJECT

 **North/South Consultants Inc.**
Aquatic Environment Specialists

FISH HABITAT:

ARCTIC CHAR - POTENTIAL

NINESPINE STICKLEBACK - POTENTIAL

TOTE ROAD CV-211

SITE SUMMARY

The Tote Road crosses a small, unnamed stream at site CV-211 that flows 2.5 km south into the main outflow river from Muriel Lake. Although a bathymetric survey has not been conducted, Muriel Lake, which is 7.0 km to the east, is believed to be of sufficient depth to support overwintering of both species.

Detailed habitat data were collected at CV-211 in spring 2023. This stream is small, shallow, and relatively slow moving. Wetted widths ranged between 4.8 to 19.0 m. Water depths were low, rarely exceeding 0.2 m. Velocities were generally low, with maximums ranging from 0.01 – 0.48 m/s. Stream morphology was primarily shallow pool and run. The substrate was mostly fine material with some gravel.

Both species of fish have never been captured or observed near the crossing. Char have been captured several hundred metres downstream during previous surveys of the area and there are no physical barriers to movement up to the crossing. If present, both species could use habitat near the crossing for rearing/feeding in the open-water season. Stickleback may also spawn in the area. There is no char spawning and no overwintering for either species.

TOTE ROAD CV-211

FISH HABITAT POTENTIAL

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

FISHERIES DATA

Location	Species	Survey Date	Temperature (°C)	Distance Fished (m)	Effort (Seconds)	# Fish Captured	# Fish Observed	CPUE (No. Fish/60 Seconds)	Length Range (mm)
Downstream	ARCH	4-Jul-23	4.0	50	86	0	0	0.00	-
	NNST					0	0	0.00	-
Upstream	ARCH			50	136	0	0	0.00	-
	NNST					0	0	0.00	-

OTHER NOTES / OBSERVATIONS

Fish have not yet been captured or observed near this road crossing.

TOTE ROAD CV-211

HYDROLOGY CHARACTERISTICS: 4-JUL-23

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

Stage: High

Site	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	34.0	11.1	-	-	-	0.08	-	-	-	0.13
60D	14.1	4.8	-	-	-	0.09	-	-	-	0.21
20D	37.5	2.2	-	-	-	0.15	-	-	-	0.48
0 (Centreline)	UNDER TOTE ROAD									
20U	22.2	14.3	-	-	-	0.31	-	-	-	0.01
60U	8.7	5.8	-	-	-	0.73	-	-	-	0.24
100U	22.8	19.0	-	-	-	0.19	-	-	-	0.06

OTHER NOTES / OBSERVATIONS

This stream is small, shallow, and relatively slow moving. Wetted widths ranged between 4.8 to 19.0 m. Depths were shallow, rarely exceeding 0.2 m. Velocities were generally low, with maximums ranging from 0.01 – 0.48 m/s.

TOTE ROAD CV-211

HABITAT CHARACTERISTICS: 4-JUL-23

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

Stage: High

Site	Stream Morphology Composition (%)							Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Rapids	Flat	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	5	50	-	45	-	-	-	100	-	-	-	-
60D	10	40	-	50	-	-	-	65	30	-	-	5
20D	5	50	-	45	-	-	-	30	60	10	-	-
0 (Centreline)	UNDER TOTE ROAD											
20U	-	50	40	10	-	-	-	100	-	-	-	-
60U	-	15	70	15	-	-	-	90	5	5	-	-
100U	-	35	55	15	-	-	-	100	-	-	-	-

OTHER NOTES / OBSERVATIONS

Stream morphology was primarily shallow pool and run. The substrate was mostly fine material with some gravel.

TOTE ROAD CV-211

4-JUL-23



A



B



C



D



E



F

Photos 1-1. Photos taken 20 m downstream (top) and 60 m downstream (bottom) in spring 2023: (A,D) facing upstream; (B,E) facing downstream; and (C,F) across (right bank looking at left bank).

TOTE ROAD CV-211

4-JUL-23



A



B



C

Photos 1-2. Photos taken 100 m downstream in spring 2023: (A) facing upstream; (B) facing downstream; and (C) across (right bank looking at left bank).

TOTE ROAD CV-211

4-JUL-23



A



B



C



D



E



F

Photos 1-3. Photos taken 20 m upstream (top) and 60 m upstream (bottom) in spring 2023: (A,D) facing upstream; (B,E) facing downstream; and (C,F) across (left bank looking at right bank).

TOTE ROAD CV-211

4-JUL-23



A



B



C

Photos 1-4. Photos taken 100 m upstream in spring 2023: (A) facing upstream; (B) facing downstream; and (C) across (left bank looking at right bank).

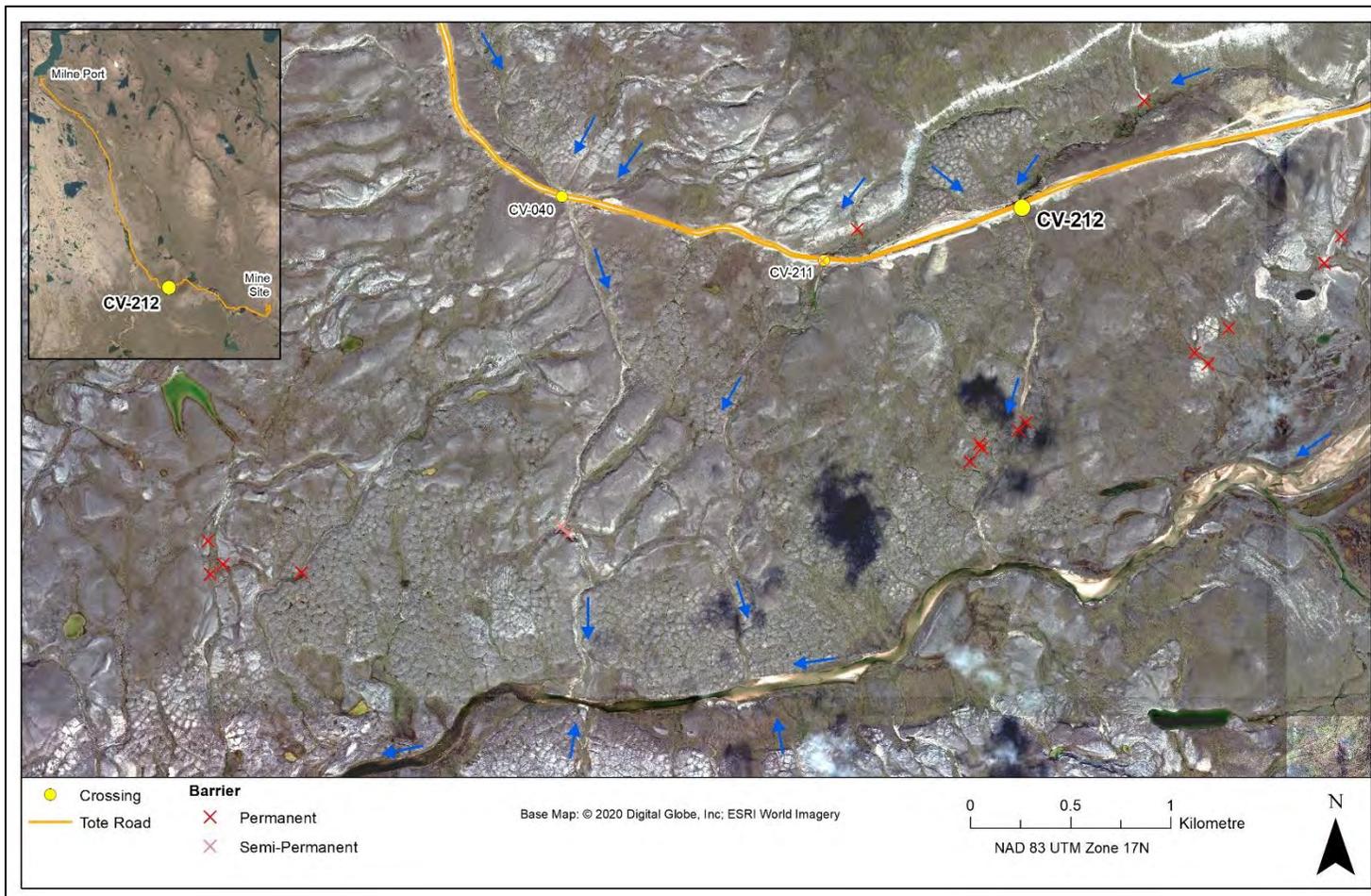
TOTE ROAD CV-212

LOCATION AND CROSSING DESCRIPTION

Site ID:	CV-212	Dates Surveyed:	4-Jul-23	Waterbody Type:	Stream
Project Interaction:	Tote Road Culvert	UTM Coordinates:	17W 537470 E 7920270 N		

GENERAL PHYSICAL CHARACTERISTICS

Flow Regime: Seasonal Stream Order: 2



BAFFINLAND IRON MINES
MARY RIVER PROJECT

 **North/South Consultants Inc.**
Aquatic Environment Specialists

FISH HABITAT:

ARCTIC CHAR - YES

NINESPINE STICKLEBACK - POTENTIAL

TOTE ROAD CV-212

SITE SUMMARY

The Tote Road crosses a small, unnamed stream at site CV-212 that flows 400 m south into the main outflow river from Muriel Lake. Although a bathymetric survey has not been conducted, Muriel Lake, which is 6.5 km to the east, is believed to be of sufficient depth to support overwintering of both species.

Detailed habitat data were collected in the crossing area in spring 2023. This stream is generally narrow, deep, and relatively fast moving below the crossing. Upstream of the crossing, the stream ponds along the road embankment and becomes significantly deeper, wider, and slower. Wetted widths ranged from 3.0 to 20.7 m. Depths were moderate to high, exceeding 1.0 m upstream of the culvert and ranging from 0.2-0.6 m downstream. Maximum velocities were higher downstream (exceeding 1.00 m/s) than upstream (<0.10 m/s). Stream morphology was generally riffle-run downstream and deep pool upstream of the crossing. The substrate consisted of mainly fines with some cobble/gravel near the road and boulder at the farthest downstream transect.

No char were captured or observed in spring 2023. Arctic Char are not abundant near this crossing; a single juvenile was captured at this site during spring 2021 monitoring. The large distance from the nearest potential overwintering location (i.e., Muriel Lake) likely limits char use of this stream to late summer/early fall periods. Char can use habitat near the crossing for rearing. There is no overwintering habitat present.

Ninespine Stickleback have never been observed or captured at this crossing. It is unknown if they are present in the drainage.

TOTE ROAD CV-212

FISH HABITAT POTENTIAL

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

FISHERIES DATA

Location	Species	Survey Date	Temperature (°C)	Distance Fished (m)	Effort (Seconds)	# Fish Captured	# Fish Observed	CPUE (No. Fish/60 Seconds)	Length Range (mm)
Downstream	ARCH	4-Jul-23	3.5	50	144	0	0	0.00	-
	NNST					0	0	0.00	-
Upstream	ARCH			50	101	0	0	0.00	-
	NNST					0	0	0.00	-

OTHER NOTES / OBSERVATIONS

No fish were observed or captured in spring 2023. Char may use habitat near the crossing for rearing. It is unknown if stickleback are present in the drainage.

TOTE ROAD CV-212

HYDROLOGY CHARACTERISTICS: 4-JUL-23

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

Stage: High

Site	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	31.5	3.0	-	-	-	0.52	-	-	-	1.42
60D	36.9	3.4	-	-	-	0.58	-	-	-	1.77
20D	38.2	11.1	-	-	-	0.28	-	-	-	1.09
0 (Centreline)	UNDER TOTE ROAD									
20U										
60U	35.0	20.7	-	-	-	>1.5	-	-	-	0.09
100U	47.5	20.1	-	-	-	>1.0	-	-	-	0.07

OTHER NOTES / OBSERVATIONS

This stream is generally narrow, deep, and relatively fast moving below the crossing. Upstream of the crossing, the stream ponds along the road embankment and gets significantly deeper, wider, and slower. Wetted widths ranged from 3.0 to 20.7 m. Depths were moderate to high, exceeding 1.0 m upstream of the crossing and 0.2-0.6 m downstream. Maximum velocities were higher downstream (exceeding 1.00 m/s) than upstream (<0.10 m/s).

TOTE ROAD CV-212

HABITAT CHARACTERISTICS: 4-JUL-23

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

Stage: High

Site	Stream Morphology Composition (%)							Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Rapids	Flat	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	85	5	-	10	-	-	-	20	-	-	10	70
60D	30	10	40	20	-	-	-	100	-	-	-	-
20D	65	20	5	10	-	-	-	60	20	20	-	-
0 (Centreline)	UNDER TOTE ROAD											
20U												
60U	-	10	80	10	-	-	-	100	-	-	-	-
100U	-	10	80	10	-	-	-	100	-	-	-	-

OTHER NOTES / OBSERVATIONS

Stream morphology was generally riffle-run downstream and deep pool upstream of the crossing. The substrate consisted of mainly fines with some cobble/gravel near the road and boulder at the farthest downstream transect.

TOTE ROAD CV-212

4-JUL-23



A



B



C



D



E



F

Photos 1-1. Photos taken 20 m downstream (top) and 60 m downstream (bottom) in spring 2023: (A,D) facing upstream; (B,E) facing downstream; and (C,F) across (right bank looking at left bank).

TOTE ROAD CV-212

4-JUL-23



A



B



C

Photos 1-2. Photos taken 100 m downstream in spring 2023: (A) facing upstream; (B) facing downstream; and (C) across (right bank looking at left bank).

TOTE ROAD CV-212

4-JUL-23



A



B



C



D



E



F

Photos 1-3. Photos taken 60 m upstream (top) and 100 m upstream (bottom) in spring 2023: (A,D) facing upstream; (B,E) facing downstream; and (C,F) across (left bank looking at right bank).

TOTE ROAD CV-214

LOCATION AND CROSSING DESCRIPTION

Site ID:	CV-214	Dates Surveyed:	5-Jul-23	Waterbody Type:	Stream
Project Interaction:	Tote Road Culvert	UTM Coordinates:	17W 541317 E 7921923 N		

GENERAL PHYSICAL CHARACTERISTICS

Flow Regime: Seasonal Stream Order: 2



**BAFFINLAND IRON MINES
MARY RIVER PROJECT**

North/South Consultants Inc.
Aquatic Environment Specialists

FISH HABITAT:

ARCTIC CHAR - YES

NINESPINE STICKLEBACK - POTENTIAL

TOTE ROAD CV-214

SITE SUMMARY

The Tote Road crosses an unnamed stream at site CV-214 flows 30 m southeast into the outflow of Muriel Lake. Although a bathymetric survey has not been conducted, Muriel Lake, which is 1 km upstream from this point, is believed to be of sufficient depth to support overwintering of both species.

Detailed habitat data were collected in the crossing area in spring 2023. This stream is generally narrow, shallow, and slow moving. Wetted widths ranged from 1.1 to 8.4 m. Maximum depths ranged from 0.25-0.68 m. Maximum velocities were low, ranging from 0.01 – 0.15 m/s. Stream morphology was dominated by shallow pools. Substrate was almost exclusively sand and silt.

Arctic Char are uncommon in this stream due to a combination of shallow depths and fine substrates with no cover. Only two juveniles have been captured since surveys began in 2019: one in 2021; and one in 2023. Char use is limited to occasional rearing. There is no overwintering or spawning habitat for this species in this stream.

Ninespine Stickleback have never been observed or captured within this stream despite habitat suitable for the species.

TOTE ROAD CV-214

FISH HABITAT POTENTIAL

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

FISHERIES DATA

Location	Species	Survey Date	Temperature (°C)	Distance Fished (m)	Effort (Seconds)	# Fish Captured	# Fish Observed	CPUE (No. Fish/60 Seconds)	Length Range (mm)
Downstream	ARCH	5-Jul-23	2.0	50	52	1	0	1.15	42
	NNST					0	0	0.00	-
Upstream	ARCH			50	63	0	0	0.00	-
	NNST					0	0	0.00	-

OTHER NOTES / OBSERVATIONS

A single char was captured downstream of the culvert in spring 2023. Char use is limited to occasional rearing. Stickleback have not been captured in this stream.

TOTE ROAD CV-214

HYDROLOGY CHARACTERISTICS: 5-JUL-23

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

Stage: High

Site	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	RIVER									
60D										
20D	16.1	8.4	-	-	-	0.68	-	-	-	0.01
0 (Centreline)	UNDER TOTE ROAD									
20U	17.7	3.0	-	-	-	0.29	-	-	-	0.04
60U	21.3	3.2	-	-	-	0.41	-	-	-	0.09
100U	14.6	1.1	-	-	-	0.25	-	-	-	0.15

OTHER NOTES / OBSERVATIONS

This stream is generally narrow, shallow, and slow moving. Wetted widths in spring 2023 ranged from 1.1 to 8.4 m. Maximum depths ranged from 0.25-0.68 m. Maximum velocities were low, ranging from 0.01 – 0.15 m/s.

TOTE ROAD CV-214

HABITAT CHARACTERISTICS: 5-JUL-23

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

Stage: High

Site	Stream Morphology Composition (%)							Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Rapids	Flat	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	RIVER											
60D												
20D	-	35	60	5	-	-	-	85	10	5	-	-
0 (Centreline)	UNDER TOTE ROAD											
20U	-	70	20	10	-	-	-	98	1	1	-	-
60U	-	70	10	20	-	-	-	100	-	-	-	-
100U	-	50	10	40	-	-	-	100	-	-	-	-

OTHER NOTES / OBSERVATIONS

Stream morphology was dominated by shallow pools. Substrate was almost exclusively sand and silt.

TOTE ROAD CV-214

5-JUL-23



A



B



C

Photos 1-1. Photos taken 20 m downstream in spring 2023: (A) facing upstream; (B) facing downstream; and (C) across (right bank looking at left bank).

TOTE ROAD CV-214

5-JUL-23



A



B



C



D



E



F

Photos 1-2. Photos taken 20 m upstream (top) and 60 m upstream (bottom) in spring 2023: (A,D) facing upstream; (B,E) facing downstream; and (C,F) across (right bank looking at left bank).

TOTE ROAD CV-214

5-JUL-23



A



B



C

Photos 1-3. Photos taken 100 m upstream in spring 2023: (A) facing upstream; (B) facing in downstream; and (C) across (right bank looking at left bank).

TOTE ROAD CV-215

LOCATION AND CROSSING DESCRIPTION

Site ID:	CV-215	Dates Surveyed:	5-Jul-23	Waterbody Type:	Stream
Project Interaction:	Tote Road Culvert	UTM Coordinates:	17W 541962 E 7922121 N		

GENERAL PHYSICAL CHARACTERISTICS

Flow Regime: Seasonal Stream Order: 2



BAFFINLAND IRON MINES
MARY RIVER PROJECT

 **North/South Consultants Inc.**
Aquatic Environment Specialists

FISH HABITAT:

ARCTIC CHAR - YES

NINESPINE STICKLEBACK - POTENTIAL

TOTE ROAD CV-215

SITE SUMMARY

The Tote Road crosses an unnamed stream at site CV-215 that flows 45 m southeast into the outflow of Muriel Lake. Although a bathymetric survey of has not been conducted, Muriel Lake, which is 280 upstream of the confluence, is believed to be of sufficient depth to support overwintering of both species.

Detailed habitat data were collected in the crossing area in spring 2023. This stream is small, shallow, and slow moving. Wetted widths ranged from 4.1 to 12.3 m and maximum water depths never exceeded 0.30 m. Maximum velocities were generally low, ranging from 0.08 to 0.30 m/s. Stream morphology generally consisted of pools downstream and riffles and runs upstream. Substrate was composed almost entirely of sand and silt.

Arctic Char Arctic Char are uncommon in this stream due to a combination of shallow depths and fine substrates with no cover. Only one juvenile has been captured (in 2021) since surveys began. Char use is limited to occasional rearing. There is no overwintering or spawning habitat for this species in this stream.

Ninespine Stickleback have never been observed or captured within this stream despite habitat suitable for the species.

TOTE ROAD CV-215

FISH HABITAT POTENTIAL

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

FISHERIES DATA

Location	Species	Survey Date	Temperature (°C)	Distance Fished (m)	Effort (Seconds)	# Fish Captured	# Fish Observed	CPUE (No. Fish/60 Seconds)	Length Range (mm)
Downstream	ARCH	5-Jul-23	4.0	50	76	0	0	0.00	-
	NNST					0	0	0.00	-
Upstream	ARCH			50	59	0	0	0.00	-
	NNST					0	0	0.00	-

OTHER NOTES / OBSERVATIONS

No fish were observed or captured in spring 2023. Small numbers of char are known to use habitat near this crossing for open-water rearing. Stickleback have not been captured in this stream.

TOTE ROAD CV-215

HYDROLOGY CHARACTERISTICS: 5-JUL-23

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

Stage: High

Site	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	RIVER									
60D										
20D	47.5	7.8	-	-	-	0.30	-	-	-	0.08
0 (Centreline)	UNDER TOTE ROAD									
20U	44.7	12.3	-	-	-	0.24	-	-	-	0.21
60U	44.4	8.7	-	-	-	0.23	-	-	-	0.30
100U	44.4	4.1	-	-	-	0.20	-	-	-	0.16

OTHER NOTES / OBSERVATIONS

This stream is small, shallow, and slow moving. Wetted widths ranged from 4.1 to 12.3 m. Maximum depths never exceeded 0.30 m. Maximum velocities were generally low, ranging from 0.08 to 0.30 m/s.

TOTE ROAD CV-215

HABITAT CHARACTERISTICS: 5-JUL-23

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

Stage: High

Site	Stream Morphology Composition (%)							Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Rapids	Flat	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	RIVER											
60D												
20D	-	40	50	10	-	-	-	85	15	-	-	-
0 (Centreline)	UNDER TOTE ROAD											
20U	20	50	10	20	-	-	-	100	-	-	-	-
60U	30	40	-	30	-	-	-	100	-	-	-	-
100U	30	10	-	60	-	-	-	100	-	-	-	-

OTHER NOTES / OBSERVATIONS

Stream morphology generally consisted of pools downstream and riffles and runs upstream. Substrate was composed almost entirely of sand and silt.

TOTE ROAD CV-215

5-JUL-23



A



B



C

Photos 1-1. Photos taken 20 m downstream in spring 2023: (A,D) facing upstream; (B,E) facing downstream; and (C,F) across (left bank looking at right bank).

TOTE ROAD CV-215

5-JUL-23



A



B



C



D



E



F

Photos 1-2. Photos taken 20 m upstream (top) and 60 m upstream (bottom) in spring 2023: (A,D) facing upstream; (B,E) facing downstream; and (C,F) across (left bank looking at right bank).

TOTE ROAD CV-215

5-JUL-23



A



B



C

Photos 1-3. Photos taken 100 m upstream in spring 2023: (A) facing upstream; (B) facing downstream; and (C) across (left bank looking at right bank).

TOTE ROAD CV-216

LOCATION AND CROSSING DESCRIPTION

Site ID:	CV-216	Dates Surveyed:	5-Jul-23	Waterbody Type:	Stream
Project Interaction:	Tote Road Culvert	UTM Coordinates:	17W 542764 E 7921724 N		

GENERAL PHYSICAL CHARACTERISTICS

Flow Regime: Seasonal Stream Order: 2



**BAFFINLAND IRON MINES
MARY RIVER PROJECT**

North/South Consultants Inc.
Aquatic Environment Specialists

FISH HABITAT:

ARCTIC CHAR - YES

NINESPINE STICKLEBACK - YES

TOTE ROAD CV-216

SITE SUMMARY

The Tote Road crosses a small, unnamed stream at site CV-216 that flows 100 m northeast into Muriel Lake. Although a bathymetric survey has not been conducted, Muriel Lake is believed to be of sufficient depth to support overwintering of both species.

Detailed habitat data were collected in the crossing area in spring 2023. This stream is generally wide, deep, and relatively slow-moving downstream from the crossing in spring. Observations from summer and fall surveys in previous years indicate the stream becomes significantly smaller and shallower shortly after freshet. Downstream of the crossing, the stream is affected by backwatering from Muriel Lake. . Upstream of the crossing, the stream is typically very shallow and braided. Wetted widths in spring 2023 ranged from 7.0 to 60.4 m with the wider areas occurring downstream of the crossing. Depths downstream often exceeded 1.0 m while upstream depths were typically <0.20 m. Velocities were generally low, ranging from 0.02 – 0.37 m/s. In wider areas, morphology was mainly shallow and deep pool, with more riffle-run in narrower areas. The stream is nearly uniformly composed of fine substrates.

Juvenile Arctic Char mainly use habitat downstream of the culvert, particularly during spring. Previous surveys have shown that young-of-the-year move into the stream from Muriel Lake during late summer. Char use habitat in the stream for rearing throughout the open-water period, but there is no char spawning and no overwintering for either species.

Ninespine Stickleback are frequently observed in this stream, particularly upstream of the culvert. Habitat in the stream is suitable for feeding and, likely, supports spawning for stickleback.

TOTE ROAD CV-216

FISH HABITAT POTENTIAL

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

FISHERIES DATA

Location	Species	Survey Date	Temperature (°C)	Distance Fished (m)	Effort (Seconds)	# Fish Captured	# Fish Observed	CPUE (No. Fish/60 Seconds)	Length Range (mm)
Downstream	ARCH	5-Jul-23	3.0	50	80	0	0	0.00	-
	NNST					0	0	0.00	-
Upstream	ARCH			50	46	0	0	0.00	-
	NNST					0	0	0.00	-

OTHER NOTES / OBSERVATIONS

Although no fish were observed or captured in spring 2023, both species are known to use habitat in this stream for rearing during the open-water period with some potential for stickleback spawning, particularly upstream of the culvert where aquatic vegetation is present.

TOTE ROAD CV-216

HYDROLOGY CHARACTERISTICS: 5-JUL-23

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

Stage: High

Site	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	84.2	60.4	-	-	-	>1.0	-	-	-	0.15
60D	51.1	37.4	-	-	-	>1.0	-	-	-	0.10
20D	49.7	40.5	-	-	-	0.57	-	-	-	0.02
0 (Centreline)	UNDER TOTE ROAD									
20U	63.5	24.5	-	-	-	0.12	-	-	-	0.32
60U	43.7	7.0	-	-	-	0.14	-	-	-	0.26
100U	30.7	19.6	-	-	-	0.11	-	-	-	0.37

OTHER NOTES / OBSERVATIONS

Wetted widths in spring 2023 ranged from 7.0 to 60.4 m with the wider areas occurring downstream of the culvert. Depths downstream exceeded 1.0 m while upstream depths were <0.20 m. Velocities were generally low, ranging from 0.02 – 0.37 m/s.

TOTE ROAD CV-216

HABITAT CHARACTERISTICS: 5-JUL-23

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

Stage: High

Site	Stream Morphology Composition (%)							Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Rapids	Flat	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	-	40	50	10	-	-	-	99	1	-	-	-
60D	-	30	60	10	-	-	-	98	1	1	-	-
20D	-	60	30	10	-	-	-	85	10	5	-	-
0 (Centreline)	UNDER TOTE ROAD											
20U	10	50	30	10	-	-	-	98	1	1	-	-
60U	40	20	-	40	-	-	-	100	-	-	-	-
100U	30	30	-	40	-	-	-	90	8	2	-	-

OTHER NOTES / OBSERVATIONS

In wider areas, morphology was mainly shallow and deep pool, with more riffle-run in narrower areas. The stream is nearly uniformly composed of fine substrates.

TOTE ROAD CV-216

5-JUL-23



A



B



C



D



E



F

Photos 1-1. Photos taken 20 m downstream (top) and 60 m downstream (bottom) in spring 2023: (A,D) facing upstream; (B,E) facing downstream; and (C,F) across (right bank looking at left bank).

TOTE ROAD CV-216

5-JUL-23



A



B



C

Photos 1-2. Photos taken 100 m downstream in spring 2023: (A) facing upstream; (B) facing downstream; and (C) across (right bank looking at left bank).

TOTE ROAD CV-216

5-JUL-23



A



B



C



D



E



F

Photos 1-3. Photos taken 20 m upstream (top) and 60 m upstream (bottom) in spring 2023: (A,D) facing upstream; (B,E) facing downstream; and (C,F) across (left bank looking at right bank).

TOTE ROAD CV-216

5-JUL-23



A



B



C

Photos 1-4. Photos taken 100 m upstream in spring 2023: (A) facing upstream; (B) facing downstream; and (C) across (left bank looking at right bank).

TOTE ROAD CV-217

LOCATION AND CROSSING DESCRIPTION

Site ID:	CV-217	Dates Surveyed:	4-Jul-23	Waterbody Type:	Stream
Project Interaction:	Tote Road Bridge + Culvert	UTM Coordinates:	17W 542321 E 7922189 N		

GENERAL PHYSICAL CHARACTERISTICS

Flow Regime: Seasonal Stream Order: 3+



BAFFINLAND IRON MINES
MARY RIVER PROJECT

 **North/South Consultants Inc.**
Aquatic Environment Specialists

FISH HABITAT:

ARCTIC CHAR - YES

NINESPINE STICKLEBACK - YES

TOTE ROAD CV-217

SITE SUMMARY

The Tote Road crosses a large river at site CV-217 that is the main outflow of Muriel Lake. Although a bathymetric survey has not been conducted, Muriel Lake is believed to be of sufficient depth to support overwintering of both species.

Although the site was visited in spring 2023, the site could not be fully assessed, and electrofishing could not be conducted due to unsafe wading conditions. The stream is a large, deep river consisting mainly of run habitat with cobble/gravel substrate.

Juvenile Arctic Char are frequently captured upstream and downstream of this bridge site, and it is suspected that adult char also use the river. The river is used in the open-water season for rearing and as a movement corridor between the smaller stream habitat and overwintering habitat. There is no char overwintering or spawning habitat in this stream.

Ninespine Stickleback are rarely observed or captured near this bridge site; however, electrofishing is limited by the size and conditions of the stream. Stickleback likely use habitat near the crossing for feeding/rearing and potentially spawning. There is no overwintering habitat for stickleback in this stream.

TOTE ROAD CV-217

FISH HABITAT POTENTIAL

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

FISHERIES DATA

Location	Species	Survey Date	Temperature (°C)	Distance Fished (m)	Effort (Seconds)	# Fish Captured	# Fish Observed	CPUE (No. Fish/60 Seconds)	Length Range (mm)
Downstream	ARCH	4-Jul-23	3.0	N/A	N/A	N/A	N/A	N/A	N/A
	NNST					N/A	N/A	N/A	N/A
Upstream	ARCH			N/A	N/A	N/A	N/A	N/A	N/A
	NNST			N/A	N/A	N/A	N/A	N/A	

OTHER NOTES / OBSERVATIONS

No electrofishing was conducted due to high water presenting unsafe conditions.

TOTE ROAD CV-217

HYDROLOGY CHARACTERISTICS: 4-JUL-23

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

Stage: High

Site	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
130D	-	120	-	-	-	-	-	-	-	-
0 (Centreline)	UNDER TOTE ROAD									

OTHER NOTES / OBSERVATIONS

Detailed habitat measurements could not be recorded due to unsafe wading conditions.

TOTE ROAD CV-216

4-JUL-23



A

No photo



C



D



E



F

Photos 1-1. Photos taken from left-hand bank (top) and right-hand bank (bottom) in spring 2023: (A,D) facing upstream; (E) facing downstream; and (C,F) across (left bank looking at right bank).

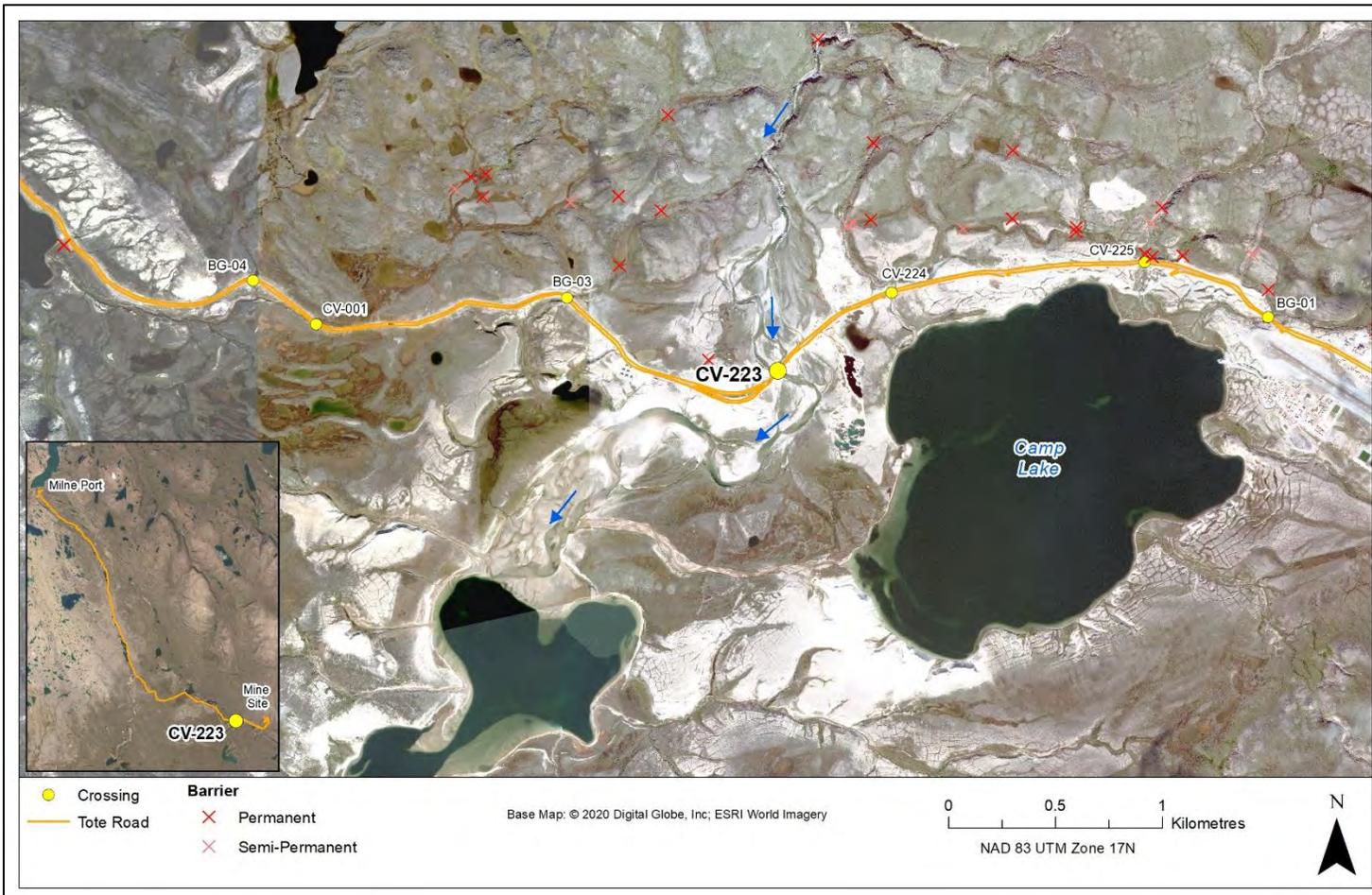
TOTE ROAD CV-223

LOCATION AND CROSSING DESCRIPTION

Site ID:	CV-223	Dates Surveyed:	4-Jul-23	Waterbody Type:	Stream
Project Interaction:	Tote Road Bridge	UTM Coordinates:	17W 555705 E 7914676 N		

GENERAL PHYSICAL CHARACTERISTICS

Flow Regime: Seasonal Stream Order: 3+



BAFFINLAND IRON MINES
MARY RIVER PROJECT

 **North/South Consultants Inc.**
Aquatic Environment Specialists

FISH HABITAT:

ARCTIC CHAR - YES

NINESPINE STICKLEBACK - POTENTIAL

TOTE ROAD CV-223

SITE SUMMARY

The Tote Road crosses a large river at site CV-223 that flows 2.7 km southwest into the north basin of Mary Lake. Mary Lake has been extensively surveyed and is known to support overwintering and char spawning.

Although the site was visited in spring 2023, the site could not be fully assessed and electrofishing could not be conducted due to unsafe wading conditions. In general, this is a wide, fast-flowing river, particularly during freshet. Morphology is mainly riffle/rapids over cobble/boulder substrate.

Juvenile Arctic Char are frequently captured upstream and downstream of this bridge site. Sub-adults and potential adults have been captured in the vicinity of the bridge in previous surveys. There is no overwintering or spawning potential for Arctic Char within this stream.

Ninespine Stickleback have never been captured or observed at this bridge site but are present downstream within Mary Lake and may be present in some slower-flowing areas within this river. There is no overwintering habitat for stickleback in this stream.

TOTE ROAD CV-223

FISH HABITAT POTENTIAL

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

FISHERIES DATA

Location	Species	Survey Date	Temperature (°C)	Distance Fished (m)	Effort (Seconds)	# Fish Captured	# Fish Observed	CPUE (No. Fish/60 Seconds)	Length Range (mm)
Downstream	ARCH	4-Jul-23	2.5	N/A	N/A	N/A	N/A	N/A	N/A
	NNST					N/A	N/A	N/A	N/A
Upstream	ARCH			N/A	N/A	N/A	N/A	N/A	N/A
	NNST			N/A	N/A	N/A	N/A	N/A	N/A

OTHER NOTES / OBSERVATIONS

Electrofishing could not be conducted due to unsafe wading conditions.

TOTE ROAD CV-223

HYDROLOGY CHARACTERISTICS: 4-JUL-23

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

Stage: High

Site	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	-	-	-	-	-	-	-	-	-	-
60D	-	-	-	-	-	-	-	-	-	-
20D	42.9	31.5	-	-	-	-	-	-	-	-
0 (Centreline)	UNDER TOTE ROAD									
20U	127.9	103.4	-	-	-	-	-	-	-	-
60U	-	-	-	-	-	-	-	-	-	-
100U	-	-	-	-	-	-	-	-	-	-

OTHER NOTES / OBSERVATIONS

A detailed habitat assessment could not be conducted due to unsafe wading conditions.

TOTE ROAD CV-223

4-JUL-23



A



B



C



D

Photos 1-1. Photos taken 20 m downstream (top) and 20 m upstream (bottom) in spring 2023: (A) facing downstream; (C) facing upstream; and (B,D) across (left bank looking at right bank).

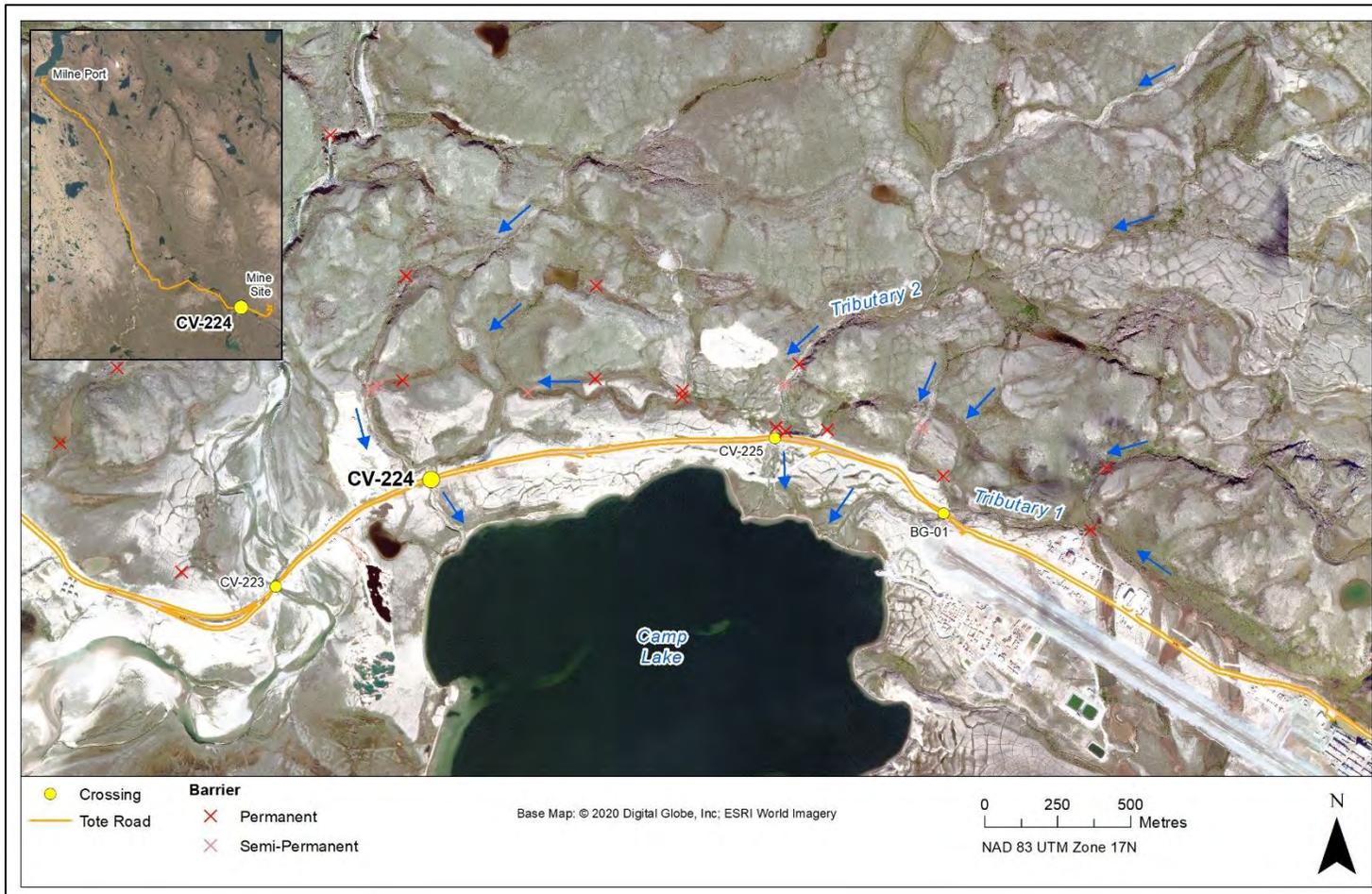
TOTE ROAD CV-224

LOCATION AND CROSSING DESCRIPTION

Site ID:	CV-224	Dates Surveyed:	8,11-Jul-23	Waterbody Type:	Stream
Project Interaction:	Tote Road Culvert	UTM Coordinates:	17W 556238 E 7915044 N		

GENERAL PHYSICAL CHARACTERISTICS

Flow Regime: Seasonal Stream Order: 2



**BAFFINLAND IRON MINES
MARY RIVER PROJECT**

North/South Consultants Inc.
Aquatic Environment Specialists

FISH HABITAT:

ARCTIC CHAR - YES

NINESPINE STICKLEBACK - YES

TOTE ROAD CV-224

SITE SUMMARY

The Tote Road crosses a small, unnamed stream at site CV-224 that flows 250 m southeast into Camp Lake. Camp Lake has been extensively surveyed and is known to support both overwintering and char spawning.

Detailed habitat data were collected in the crossing area in spring 2023. Wetted widths were generally narrow and ranged from 2.8 to 10.1 m. Maximum water depth varied between 0.15 and 0.38 m and maximum velocities ranged from 0.60 to 1.24 m/s. Stream morphology was primarily riffle with some pools. The substrate was uniform, consisting predominantly of gravel and small cobble.

Juvenile Arctic Char are frequently captured upstream and downstream of the crossing and use the area for rearing. There is no overwintering or spawning potential for Arctic Char within this stream.

Ninespine Stickleback use habitat near the crossing for rearing/feeding and potentially spawning. There is no overwintering habitat for stickleback.

TOTE ROAD CV-224

FISH HABITAT POTENTIAL

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

FISHERIES DATA

Location	Species	Survey Date	Temperature (°C)	Distance Fished (m)	Effort (Seconds)	# Fish Captured	# Fish Observed	CPUE (No. Fish/60 Seconds)	Length Range (mm)
Downstream	ARCH	8-Jul-23	7.0	50	113	5	0	2.65	59-170
	NNST					3	0	1.59	50-61
Upstream	ARCH	11-Jul-23	11.0	50	142	0	0	0.00	-
	NNST					0	0	0.00	-

OTHER NOTES / OBSERVATIONS

Both species were captured downstream of the culvert in spring 2023. Juvenile Arctic Char are frequently captured upstream and downstream of the crossing following freshet when flows decrease. There is no overwintering or spawning habitat for Arctic Char within this stream. Ninespine Stickleback use habitat near the crossing for rearing/feeding and potentially spawning. There is no overwintering habitat for stickleback.

TOTE ROAD CV-224

HYDROLOGY CHARACTERISTICS: 8,11-JUL-23

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

Stage: High

Site	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	16.2	3.3	-	-	-	0.15	-	-	-	0.60
60D	13.7	2.8	-	-	-	0.22	-	-	-	0.67
20D	31.8	5.9	-	-	-	0.16	-	-	-	0.74
0 (Centreline)	UNDER TOTE ROAD									
20U	16.2	10.1	-	-	-	0.23	-	-	-	1.24
60U	9.0	4.3	-	-	-	0.38	-	-	-	1.15
100U	16.5	8.9	-	-	-	0.29	-	-	-	1.20

OTHER NOTES / OBSERVATIONS

Wetted widths in spring 2023 were generally narrow and ranged from 2.8 to 10.1 m. Maximum water depth varied between 0.15 and 0.38 m and maximum velocities ranged from 0.60 to 1.24 m/s.

TOTE ROAD CV-224

HABITAT CHARACTERISTICS: 8,11-JUL-23

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

Stage: High

Site	Stream Morphology Composition (%)							Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Rapids	Flat	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	80	15	-	5	-	-	-	10	30	60	-	-
60D	80	13	2	5	-	-	-	10	20	65	-	5
20D	90	5	-	5	-	-	-	10	40	50	-	-
0 (Centreline)	UNDER TOTE ROAD											
20U	70	28	2	10	-	-	-	30	40	29	1	-
60U	70	20	1	9	-	-	-	35	20	40	5	-
100U	70	10	5	15	-	-	-	30	20	45	5	-

OTHER NOTES / OBSERVATIONS

Stream morphology was primarily riffle with some pools. The substrate was uniform, consisting predominantly of gravel and small cobble.

TOTE ROAD CV-224

8,11-JUL-23



A



B



C



D



E



F

Photos 1-1. Photos taken 20 m downstream (top) and 60 m downstream (bottom) in spring 2023: (A,D) facing upstream; (B,E) facing downstream; and (C,F) across (left bank looking at right bank).

TOTE ROAD CV-224

8,11-JUL-23



A



B



C

Photos 1-2. Photos taken 100 m downstream in spring 2023: (A) facing upstream; (B) facing downstream; and (C) across (left bank looking at right bank).

TOTE ROAD CV-224

8,11-JUL-23



A



B



C



D



E



F

Photos 1-3. Photos taken 20 m upstream (top) and 60 m upstream (bottom) in spring 2023: (A,D) facing upstream; (B,E) facing downstream; and (C,F) across (left bank looking at right bank).

TOTE ROAD CV-224

8,11-JUL-23



A



B



C

Photos 1-4. Photos taken 100 m upstream in spring 2023: (A) facing upstream; (B) facing downstream; and (C) across (left bank looking at right bank).