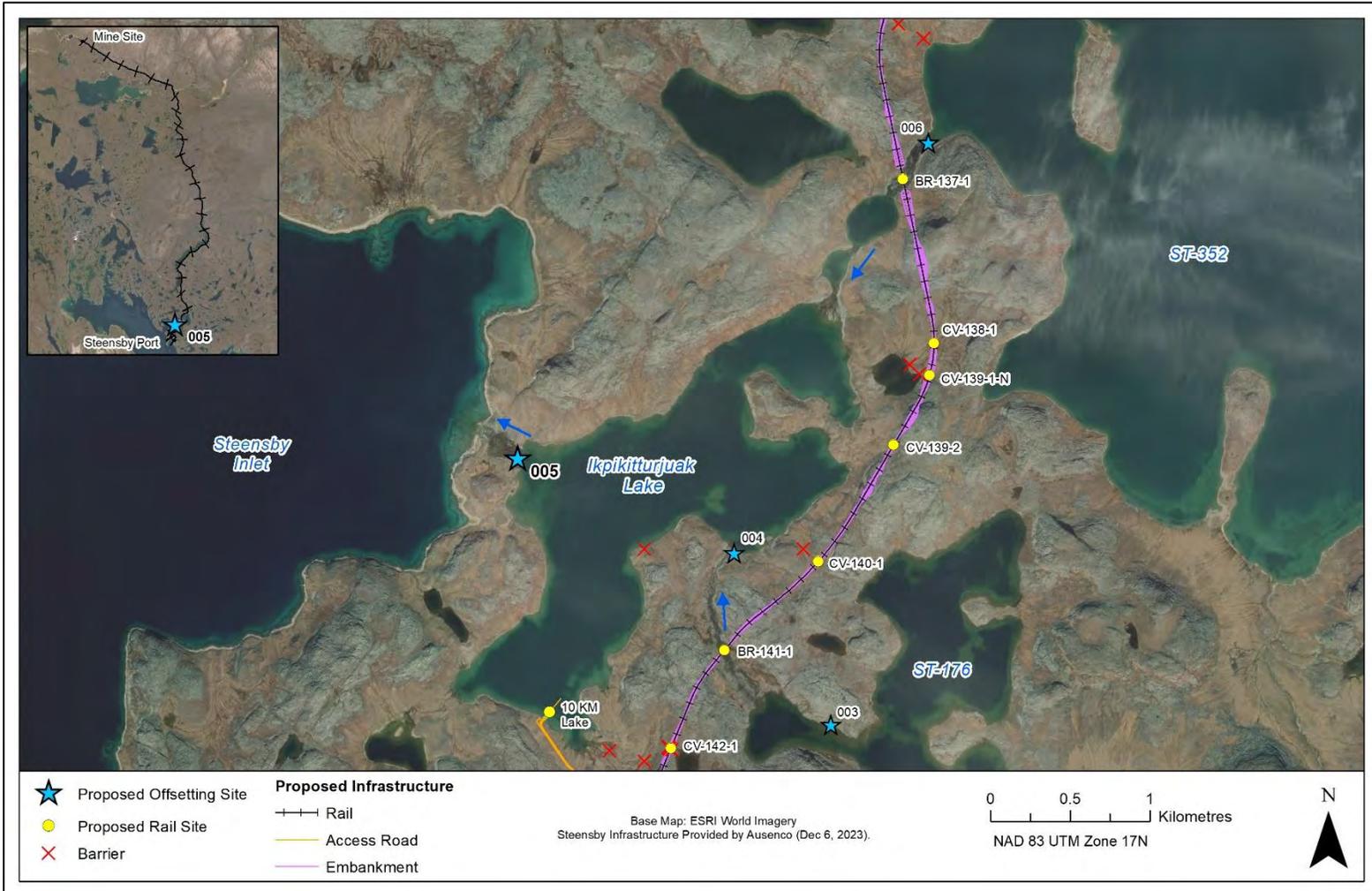


# POTENTIAL OFFSETTING SITE 005

## LOCATION AND SITE DESCRIPTION

Site ID: 005      Site General UTM Coordinates: 17W 596239 E 7806246 N      Date Surveyed: 31-Aug-23      Waterbody Type: Lake

## SITE MAP



**BAFFINLAND IRON MINES  
MARY RIVER PROJECT**

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

**FISH HABITAT:**

**ARCTIC CHAR - YES**

**NINESPINE STICKLEBACK - YES**

# POTENTIAL OFFSETTING SITE 005

## SITE SUMMARY

Potential Offsetting Site 005 is located on the west shoreline of Ikpikitturjuak Lake (also referred to as 10 km Lake and Lake ST-347) near its 250 m long outflow to Steensby Inlet. The lake has an approximate surface area of 2,689,744 m<sup>2</sup> and shoreline length of 12,297 m. There are no barriers to fish movements between the lake and Steensby Inlet or several upstream lakes. In addition, Ikpikitturjuak Lake is known to support an anadromous population of char. It is unknown if other lakes in the system also support anadromous populations, though limited strontium analyses of adult char captured in lakes ST-176 and ST-352 found no evidence of anadromy.

Aquatic habitat at Site 005 is comprised mainly of cobble and boulder. There was no aquatic vegetation in the surveyed area and riparian vegetation was mainly grass, moss, lichens, and willows. The area has a moderate slope with depths  $\leq 0.75$  m within approximately 5-15 m of the shoreline for much of the surveyed area. Specific conductance was very low (30.5-31.9  $\mu\text{S}/\text{cm}$ ).

Small numbers of both species were captured in the surveyed area in August 2023. Habitat within the survey polygon is used for open-water rearing/feeding by both species. Depths ( $<0.75$  m) are insufficient for overwintering or char spawning, both of which likely occur farther offshore in this lake, though bathymetry and substrate data for the lake are lacking. Stickleback spawning is unlikely given the lack of vegetation at this site for nest building, though there is sufficient cover in the form of boulders.

# POTENTIAL OFFSETTING SITE 005

## HYDROLOGY & HABITAT CHARACTERISTICS

Habitat Transect	General Habitat Characteristics				Substrate Composition (%)				
	Depth at Offshore Edge of Polygon (m)	Distance from Shore at Offshore Edge (m)	Water Temperature (°C)	Specific Conductance (µS/cm)	Fines	Gravel	Small Cobble	Large Cobble	Boulders
1	0.75	5.85	6.2	30.5	-	-	20	60	20
2	0.75	9.29	-	-	-	30	50	10	10
3	0.75	14.59	5.8	31.9	-	5	25	50	20

## FISH HABITAT POTENTIAL

Nearest Potential Overwintering Habitat - ARCH: This lake

Distance to Nearest Potential Overwintering Habitat - ARCH (km): 0

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

# POTENTIAL OFFSETTING SITE 005

## FISHING AND HABITAT SURVEY SITES



# POTENTIAL OFFSETTING SITE 005

## ELECTROFISHING DATA

Date: 31-Aug-23 Temperature (°C): 6.2 Distance of Shoreline Fished (m): 100  
Duration Fished (seconds): 826 Area Fished (m<sup>2</sup>): 991

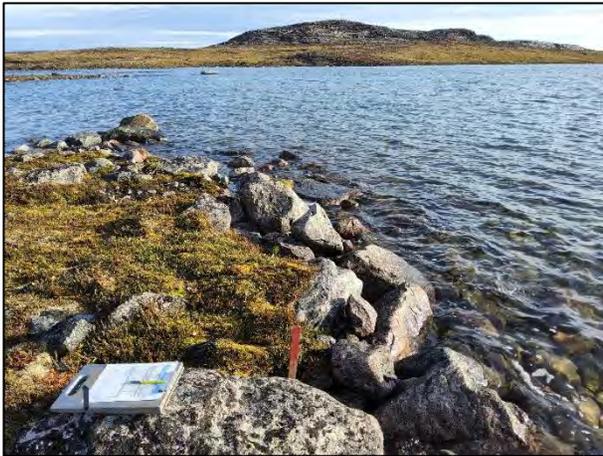
Species	Pass	Effort (Seconds)	Fish Captured	Fish Observed	CPUE (No. Fish/60 Seconds)	Mean Length (mm)	Length Range (mm)
ARCH	1	826	2	0	0.145	72	59 - 85
NNST	1	826	1	0	0.073	51	51

## COMMENTS

Two juvenile Arctic Char and one Ninespine Stickleback were captured via electrofishing at Site 005.

# POTENTIAL OFFSETTING SITE 005

31-AUG-23



**A**



**B**



**C**



**D**



**E**



**F**

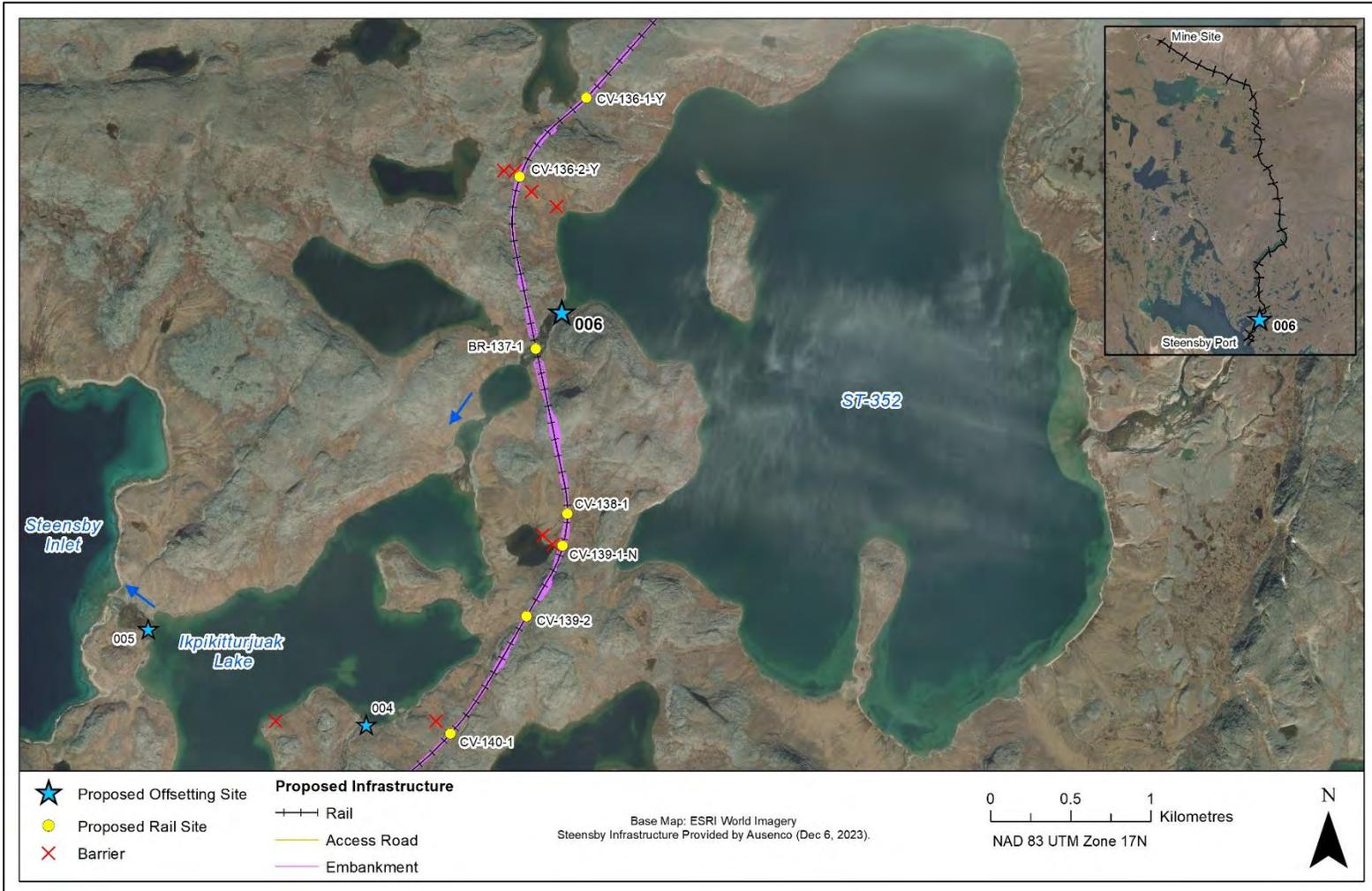
Photos 1. Photos taken at habitat transect 1 (top) and transect 3 (bottom) at Site 005: (A,D) facing north; (B,E) facing south; and (C,F) facing east.

# POTENTIAL OFFSETTING SITE 006

## LOCATION AND SITE DESCRIPTION

Site ID: 006      Site General UTM Coordinates: 17W 598818 E 7808224 N      Date Surveyed: 24-Aug-23      Waterbody Type: Lake

## SITE MAP



**BAFFINLAND IRON MINES  
MARY RIVER PROJECT**

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

**FISH HABITAT:**

**ARCTIC CHAR - YES**

**NINESPINE STICKLEBACK - POTENTIAL**

# POTENTIAL OFFSETTING SITE 006

## SITE SUMMARY

Potential Offsetting Site 006 is located in a large lake (Lake ST-352) at its outflow to Ikpikitturjuak Lake. The lake has an approximate surface area of 9,922,296 m<sup>2</sup> and shoreline length of 17,188 m. The outflow stream is crossed by the proposed Steensby railway at site BR-137-1. There are no barriers to fish movements between this lake and Ikpikitturjuak Lake, which is known to support an anadromous population of char. It is unknown if other lakes in the system also support anadromous populations, though limited strontium analyses of adult char captured in lakes ST-176 and ST-352 found no evidence of anadromy.

Aquatic habitat at Site 006 is comprised mainly of boulder and cobble. There was no aquatic vegetation in the surveyed area and riparian vegetation was mainly grass and willows. The area has a moderate slope with depths  $\leq 0.75$  m within approximately 5-10 m of the shoreline within the surveyed area. Specific conductance was very low (18.2-18.6  $\mu\text{S}/\text{cm}$ ).

Small numbers of juvenile Arctic Char were captured/observed in the surveyed area in August 2023. Habitat within the survey polygon is used by char for rearing/feeding in the open-water season. Depths ( $< 0.75$  m) are insufficient for overwintering or char spawning, both of which likely occur farther offshore in this lake, though bathymetry and substrate data for the lake are lacking. Given the proximity of this site to the large stream connecting Lake ST-352 to Ikpikitturjuak Lake, the area may also be used as a movement corridor between the lakes.

Stickleback were not captured in August 2023, though they have been found in other lakes and streams within this catchment and could potentially be present in Lake ST-352. If present, stickleback could use habitat in the area for rearing/feeding; spawning is unlikely given the lack of vegetation at this site for nest building, though there is sufficient cover in the form of boulders.

# POTENTIAL OFFSETTING SITE 006

## HYDROLOGY & HABITAT CHARACTERISTICS

Habitat Transect	General Habitat Characteristics				Substrate Composition (%)				
	Depth at Offshore Edge of Polygon (m)	Distance from Shore at Offshore Edge (m)	Water Temperature (°C)	Specific Conductance (µS/cm)	Fines	Gravel	Small Cobble	Large Cobble	Boulders
1	0.75	9.6	6.9	18.2	-	20	20	30	30
2	0.75	5.4	-	-	-	10	10	30	50
3	0.75	5.8	6.8	18.6	-	10	10	30	50

## FISH HABITAT POTENTIAL

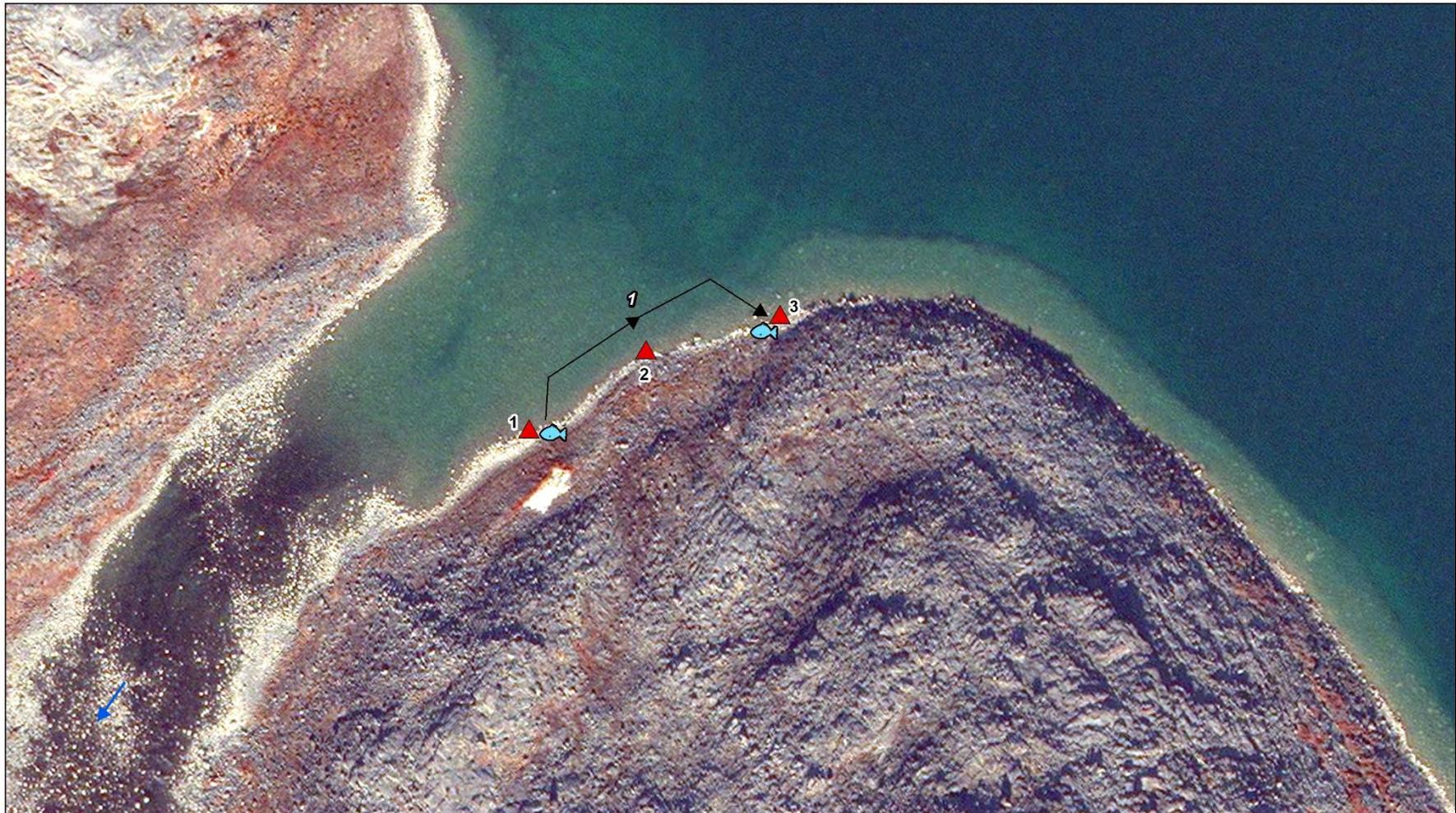
Nearest Potential Overwintering Habitat - ARCH: This lake

Distance to Nearest Potential Overwintering Habitat - ARCH (km): 0

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

# POTENTIAL OFFSETTING SITE 006

## FISHING AND HABITAT SURVEY SITES



-  Electrofishing
-  Nearshore Habitat Transect

0 50 100  
Metres

NAD 83 UTM Zone 17N  
Base Map: © 2021 Digital Globe, Inc.



# POTENTIAL OFFSETTING SITE 006

## ELECTROFISHING DATA

Date: 24-Aug-23 Temperature (°C): 6.9 Distance of Shoreline Fished (m): 95.71  
Duration Fished (seconds): 642 Area Fished (m<sup>2</sup>): 659

Species	Pass	Effort (Seconds)	Fish Captured	Fish Observed	CPUE (No. Fish/60 Seconds)	Mean Length (mm)	Length Range (mm)
ARCH	1	642	3	2	0.467	78.4	50 - 150
NNST	1	642	0	0	-	-	-

## COMMENTS

Small numbers of Arctic Char (50-150 mm) were captured/observed at this site in August 2023. Stickleback were not captured/observed but have been observed in other waterbodies in the catchment (e.g., Ikpikitturjuak Lake).

# POTENTIAL OFFSETTING SITE 006

24-AUG-23



**A**



**B**



**C**



**D**



**E**



**F**

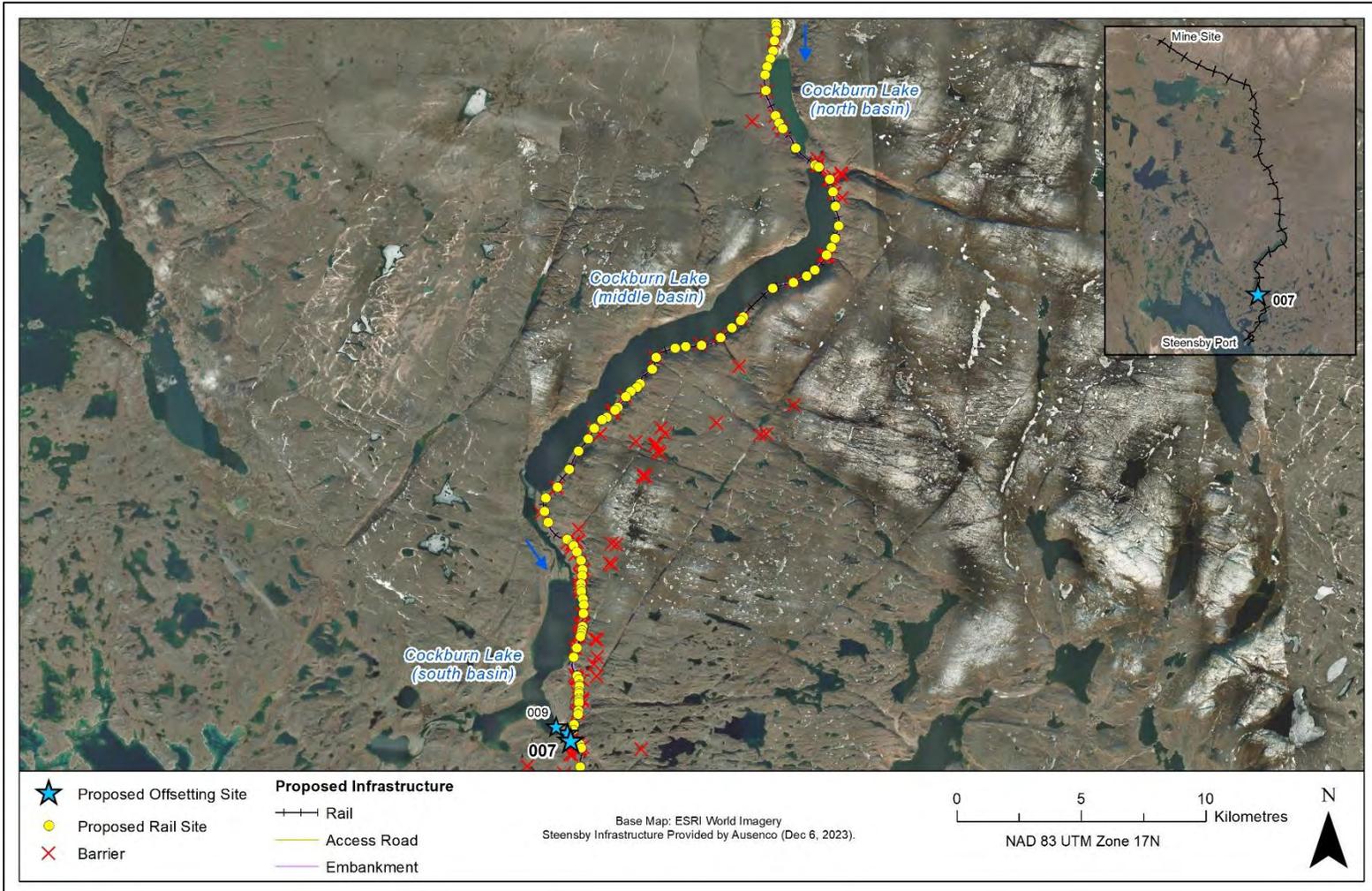
Photos 1. Photos taken at habitat transect 1 (top) and transect 3 (bottom) at Site 006: (A,D) facing southwest; (B,E) facing northeast; and (C,F) facing northwest.

# POTENTIAL OFFSETTING SITE 007

## LOCATION AND SITE DESCRIPTION

Site ID: 007      Site General UTM Coordinates: 17W 598119 E 7817703 N      Date Surveyed: 20-Aug-23      Waterbody Type: Lake

## SITE MAP



**BAFFINLAND IRON MINES  
MARY RIVER PROJECT**

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

**FISH HABITAT:**

**ARCTIC CHAR - YES**

**NINESPINE STICKLEBACK - YES**

# POTENTIAL OFFSETTING SITE 007

## SITE SUMMARY

Potential Offsetting Site 007 is located in the southeast bay at the southern end of Cockburn Lake. Cockburn Lake is a narrow lake, approximately 37 km long, confined within a steep-sided valley. It is comprised of three basins separated by two narrow and relatively shallow channels. The middle basin is by far the largest (approximately 19.5 km long and 22.5 km<sup>2</sup>), while the south basin (approximately 11 km long and 11.5 km<sup>2</sup>) and north basin (approximately 6 km long and 3.4 km<sup>2</sup>) are substantially smaller. There are several small inflow streams 100-300 m south of this site and a large inflow 300-500 m north, near two additional potential offsetting sites. Bathymetry, substrate, and gillnetting surveys were previously conducted in Cockburn Lake. Habitat assessments and fish presence surveys have also been conducted at a large number of tributaries to Cockburn Lake during the Steensby railway baseline field studies.

Aquatic habitat at Site 007 is comprised mainly of cobble, boulder, and gravel. There was no aquatic vegetation in the surveyed area and riparian vegetation was mainly grass and moss. The area has a moderate to steep slope with depths <0.75 m within approximately 4-12 m of the shoreline. Specific conductance was very low (13.9-15.2 µS/cm).

Six small juvenile Arctic Char were captured/observed in the surveyed area in August 2023. Habitat within the survey polygon is used by char for rearing/feeding in the open-water season. Depths (<0.75 m) are insufficient for overwintering or char spawning, both of which occur farther offshore in this lake. Bathymetry and substrate surveys indicate the lake has a maximum depth approaching 200 m and there are suitable char spawning substrates at depths >3.0 m.

Stickleback were not captured at this site in August 2023. However, they were captured at Site 009 in Cockburn Lake northwest of this site. Stickleback could use habitat in the survey area for feeding; spawning is unlikely given the lack of vegetation at this site for nest building, though there is sufficient cover in the form of boulders.

# POTENTIAL OFFSETTING SITE 007

## HYDROLOGY & HABITAT CHARACTERISTICS

Habitat Transect	General Habitat Characteristics				Substrate Composition (%)				
	Depth at Offshore Edge of Polygon (m)	Distance from Shore at Offshore Edge (m)	Water Temperature (°C)	Specific Conductance (µS/cm)	Fines	Gravel	Small Cobble	Large Cobble	Boulders
1	0.75	4.15	7.3	15.2	5	10	20	45	20
2	0.75	11.8	-	-	5	25	10	40	20
3	0.75	3.82	7.0	13.9	-	-	-	-	-

## FISH HABITAT POTENTIAL

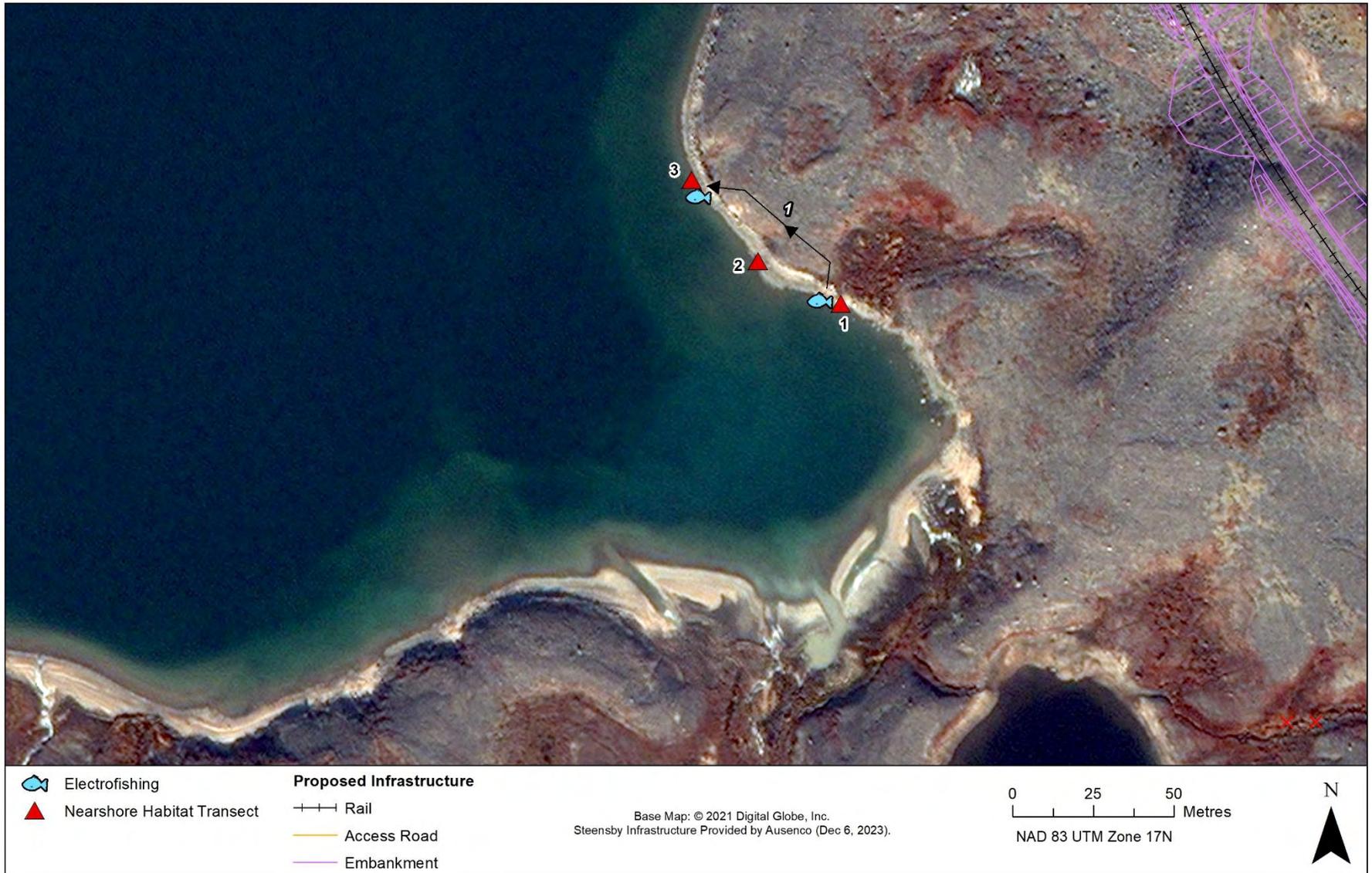
Nearest Potential Overwintering Habitat - ARCH: Cockburn Lake

Distance to Nearest Potential Overwintering Habitat - ARCH (km): 0

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

# POTENTIAL OFFSETTING SITE 007

## FISHING AND HABITAT SURVEY SITES



# POTENTIAL OFFSETTING SITE 007

## ELECTROFISHING DATA

Date: 20-Aug-23      Temperature (°C): 7.3      Distance of Shoreline Fished (m): 49.68  
Duration Fished (seconds): 505      Area Fished (m<sup>2</sup>): 330

Species	Pass	Effort (Seconds)	Fish Captured	Fish Observed	CPUE (No. Fish/60 Seconds)	Mean Length (mm)	Length Range (mm)
ARCH	1	505	4	2	0.713	59	49 - 80
NNST	1	505	0	0	-	-	-

## COMMENTS

Six small (49-80 mm) juvenile Arctic Char were captured/observed electrofishing at Site 007 in August 2023. No stickleback were captured at this location.

# POTENTIAL OFFSETTING SITE 007

20-AUG-23



**A**



**B**



**C**



**D**



**E**



**F**

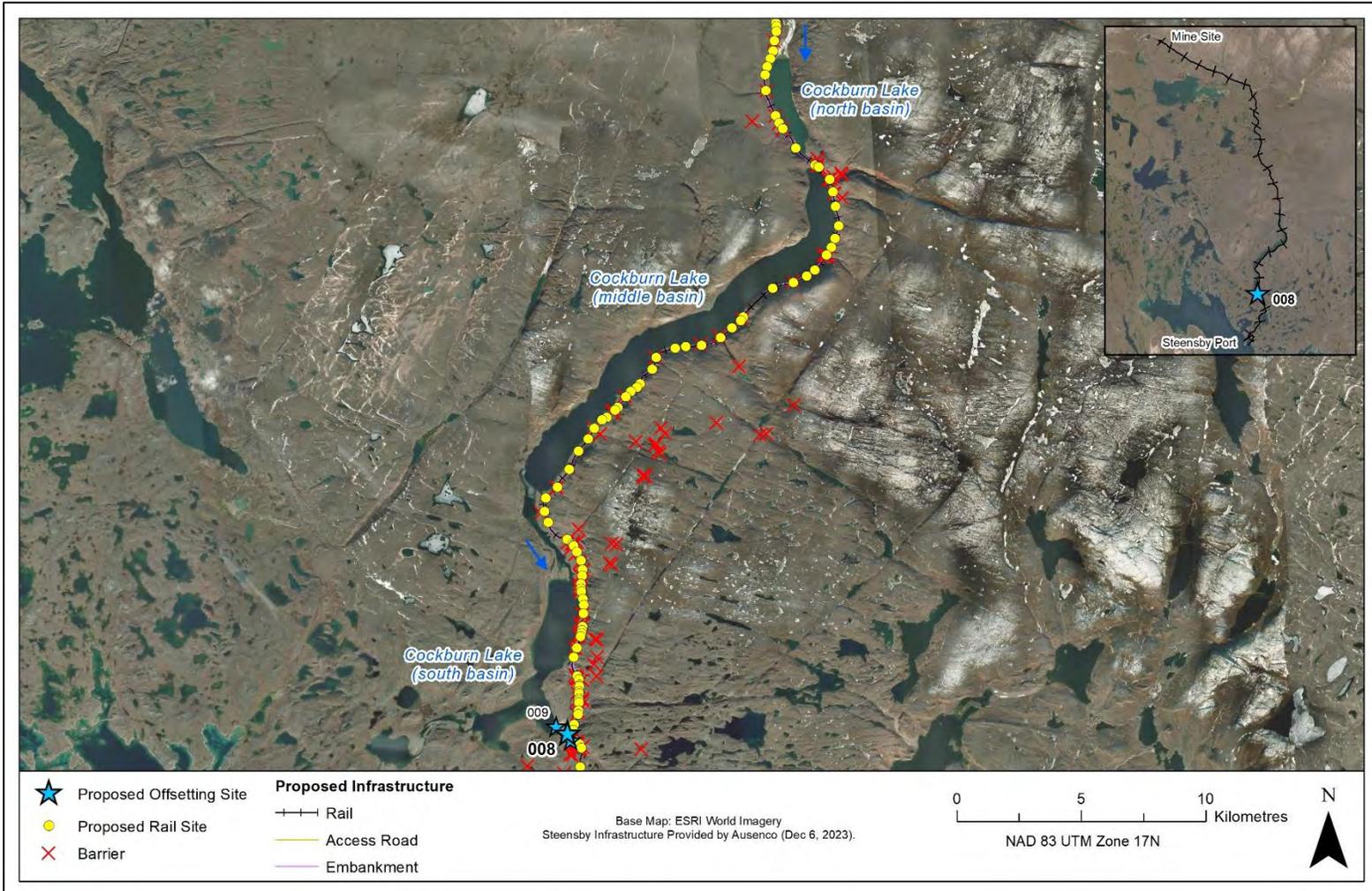
Photos 1. Photos taken at habitat transect 1 (top) and transect 3 (bottom) at Site 007: (A,D) facing east; (B,E) facing west; and (C,F) facing south.

# POTENTIAL OFFSETTING SITE 008

## LOCATION AND SITE DESCRIPTION

Site ID: 008      Site General UTM Coordinates: 17W 598001 E 7818001 N      Date Surveyed: 20-Aug-23      Waterbody Type: Lake

## SITE MAP



BAFFINLAND IRON MINES  
MARY RIVER PROJECT

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

FISH HABITAT:

ARCTIC CHAR - YES

NINESPINE STICKLEBACK - YES

# POTENTIAL OFFSETTING SITE 008

## SITE SUMMARY

Potential Offsetting Site 008 is located in the southeast bay at the southern end of Cockburn Lake. Cockburn Lake is a narrow lake, approximately 37 km long, confined within a steep-sided valley. It is comprised of three basins separated by two narrow and relatively shallow channels. The middle basin is by far the largest (approximately 19.5 km long and 22.5 km<sup>2</sup>), while the south basin (approximately 11 km long and 11.5 km<sup>2</sup>) and north basin (approximately 6 km long and 3.4 km<sup>2</sup>) are substantially smaller. This offsetting site is at the southeast end of the alluvial fan of a large inflow stream. Two additional offsetting sites (sites 007 and 009) are located farther to the south and northwest, respectively, in the south basin of Cockburn Lake. Bathymetry, substrate, and gillnetting surveys were previously conducted in Cockburn Lake. Habitat assessments and fish presence surveys have also been conducted at a large number of tributaries to Cockburn Lake during the Steensby railway baseline field studies.

Aquatic habitat at Site 008 is comprised mainly of fines (sand) and gravel. There was no aquatic vegetation in the surveyed area and riparian vegetation was mainly lichens and moss. The area has a very low slope as a result of sediment input and deposition from the large inflow stream, with depths <0.75 m within approximately 30-60 m of the shoreline. Specific conductance was very low (13.2 µS/cm).

No fish were captured/observed in the surveyed area in August 2023. However, both species were captured at Site 009 to the northwest. The predominantly sand/gravel habitat within the survey polygon is not preferred by either species due to a lack of cover. Catch rates in similar habitat in other studies have been similarly low. The area may provide marginal feeding/rearing habitat use by both species. Depths (<0.75 m) are insufficient for overwintering or char spawning, both of which occur farther offshore in this lake. Bathymetry and substrate surveys indicate the lake has a maximum depth approaching 200 m and there are suitable char spawning substrates at depths >3.0 m. This site would likely be primarily used by juvenile char and stickleback as a movement corridor between Cockburn Lake and the inflow river.

# POTENTIAL OFFSETTING SITE 008

## HYDROLOGY & HABITAT CHARACTERISTICS

Habitat Transect	General Habitat Characteristics				Substrate Composition (%)				
	Depth at Offshore Edge of Polygon (m)	Distance from Shore at Offshore Edge (m)	Water Temperature (°C)	Specific Conductance (µS/cm)	Fines	Gravel	Small Cobble	Large Cobble	Boulders
1	0.75	59.6	7.0	13.2	40	55	5	-	-
2	0.75	32.1	-	-	30	60	5	5	-
3	0.75	37.3	7.0	13.2	50	30	10	10	-

## FISH HABITAT POTENTIAL

Nearest Potential Overwintering Habitat - ARCH: Cockburn Lake

Distance to Nearest Potential Overwintering Habitat - ARCH (km): 0

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

# POTENTIAL OFFSETTING SITE 008

## FISHING AND HABITAT SURVEY SITES



-  Electrofishing
-  Nearshore Habitat Transect

0 25 50  
Metres

NAD 83 UTM Zone 17N  
Base Map: © 2021 Digital Globe, Inc.



# POTENTIAL OFFSETTING SITE 008

## ELECTROFISHING DATA

Date: 20-Aug-23 Temperature (°C): 7 Distance of Shoreline Fished (m): 30  
Duration Fished (seconds): 536 Area Fished (m<sup>2</sup>): 990

Species	Pass	Effort (Seconds)	Fish Captured	Fish Observed	CPUE (No. Fish/60 Seconds)	Mean Length (mm)	Length Range (mm)	Mean Weight (g)	Weight Range (g)
ARCH	1	536	0	0	0	-	-	-	-
NNST	1	536	0	0	0	-	-	-	-

## COMMENTS

No fish were captured or observed in the survey area in August 2023.

# POTENTIAL OFFSETTING SITE 008

20-AUG-23



**A**



**B**



**C**



**D**



**E**



**F**

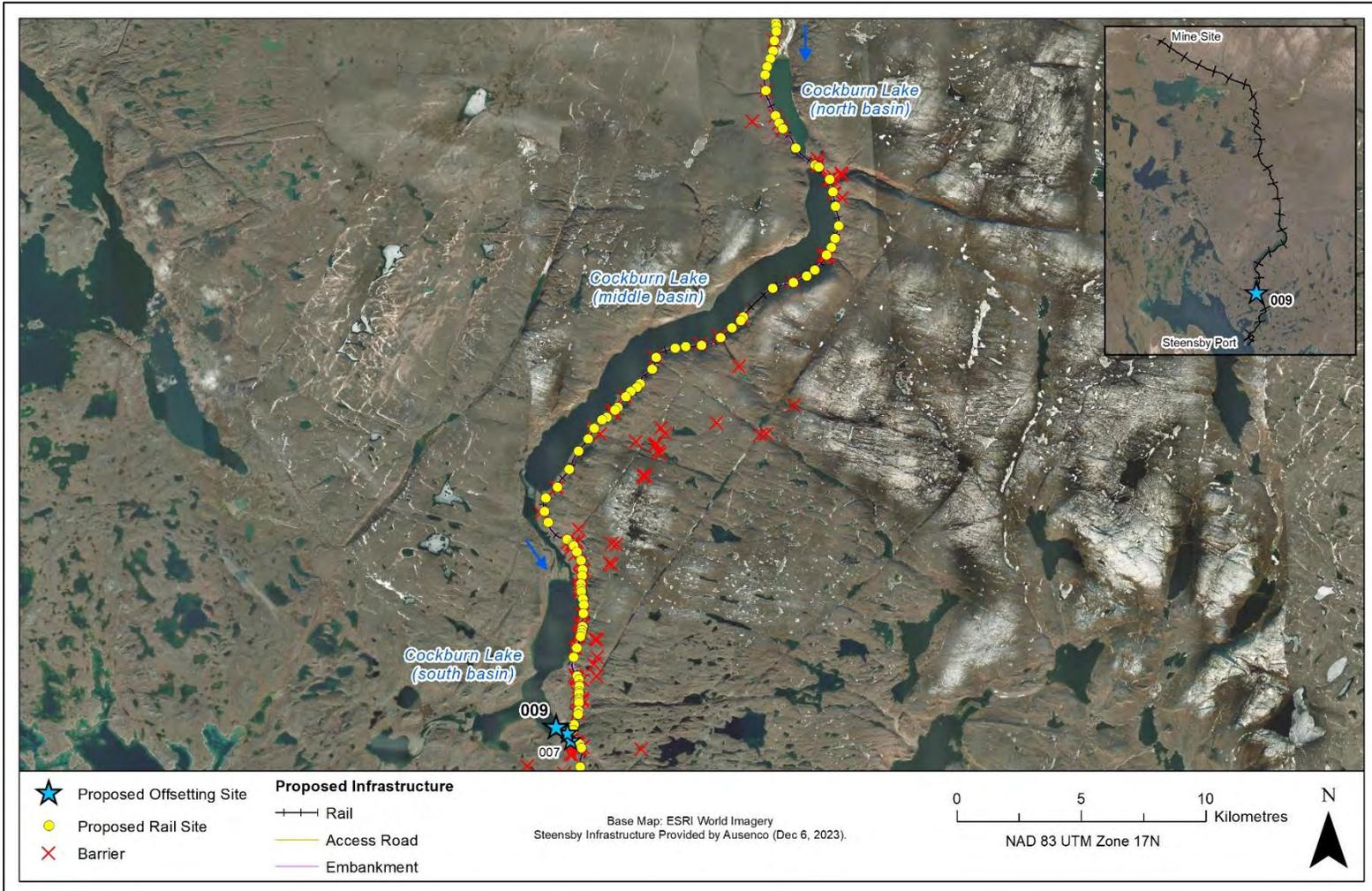
Photos 1. Photos taken at habitat transect 1 (top) and transect 3 (bottom) at Site 008: (A,D) facing east; (B,E) facing west; and (C,F) facing south.

# POTENTIAL OFFSETTING SITE 009

## LOCATION AND SITE DESCRIPTION

Site ID: 009      Site General UTM Coordinates: 17W 597531 E 7818253 N      Date Surveyed: 20-Aug-23      Waterbody Type: Lake

## SITE MAP



**BAFFINLAND IRON MINES  
MARY RIVER PROJECT**

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

**FISH HABITAT:**

**ARCTIC CHAR - YES**

**NINESPINE STICKLEBACK - YES**

# POTENTIAL OFFSETTING SITE 009

## SITE SUMMARY

Potential Offsetting Site 009 is located in the southeast bay at the southern end of Cockburn Lake. Cockburn Lake is a narrow lake, approximately 37 km long, confined within a steep-sided valley. It is comprised of three basins separated by two narrow and relatively shallow channels. The middle basin is by far the largest (approximately 19.5 km long and 22.5 km<sup>2</sup>), while the south basin (approximately 11 km long and 11.5 km<sup>2</sup>) and north basin (approximately 6 km long and 3.4 km<sup>2</sup>) are substantially smaller. This offsetting site is at the northwest edge of the alluvial fan of a large inflow stream. Two additional offsetting sites (sites 007 and 008) are located 500 m and 830 m farther to the southeast, respectively, along the Cockburn Lake shoreline. Bathymetry, substrate, and gillnetting surveys were previously conducted in Cockburn Lake. Habitat assessments and fish presence surveys have also been conducted at a large number of tributaries to Cockburn Lake during the Steensby railway baseline field studies.

Aquatic habitat at Site 009 is comprised mainly of fines (sand) and gravel. There was no aquatic or riparian vegetation in the survey area. The area has a low slope as a result of sediment input and deposition from the large inflow stream, with depths <0.75 m within approximately 11-17 m of the shoreline. Specific conductance was very low (12.3 µS/cm).

Nineteen small juvenile Arctic Char and one stickleback were captured/observed in the surveyed area in August 2023. CPUE (2.24 fish/60 s) for char was the second highest of all the surveyed sites. The predominantly sand/gravel habitat within the offsetting polygon is generally not preferred by either species due to a lack of cover but there may be some feeding/rearing use by both species and it may possibly be a staging area for fish moving into the nearby stream. Depths (<0.75 m) are insufficient for overwintering or char spawning, both of which occur farther offshore in this lake. Bathymetry and substrate surveys indicate the lake has a maximum depth approaching 200 m and there are suitable char spawning substrates at depths >3.0 m.

**BAFFINLAND IRON MINES  
MARY RIVER PROJECT**



**FISH HABITAT:**

**ARCTIC CHAR - YES**

**NINESPINE STICKLEBACK - YES**

# POTENTIAL OFFSETTING SITE 009

## HYDROLOGY & HABITAT CHARACTERISTICS

Habitat Transect	General Habitat Characteristics				Substrate Composition (%)				
	Depth at Offshore Edge of Polygon (m)	Distance from Shore at Offshore Edge (m)	Water Temperature (°C)	Specific Conductance (µS/cm)	Fines	Gravel	Small Cobble	Large Cobble	Boulders
1	0.75	11.21	6.8	12.3	35	50	15	-	-
2	0.75	11.34	-	-	20	80	-	-	-
3	0.75	17.31	6.9	12.3	30	70	-	-	-

## FISH HABITAT POTENTIAL

Nearest Potential Overwintering Habitat - ARCH: Cockburn Lake

Distance to Nearest Potential Overwintering Habitat - ARCH (km): 0

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

# POTENTIAL OFFSETTING SITE 009

## FISHING AND HABITAT SURVEY SITES



# POTENTIAL OFFSETTING SITE 009

## ELECTROFISHING DATA

Date: 20-Aug-23      Temperature (°C): 6.9      Distance of Shoreline Fished (m): 60  
Duration Fished (seconds): 508      Area Fished (m<sup>2</sup>): 797

Species	Pass	Effort (Seconds)	Fish Captured	Fish Observed	CPUE (No. Fish/60 Seconds)	Mean Length (mm)	Length Range (mm)
ARCH	1	508	7	12	2.244	90	51 - 122
NNST	1	508	1	0	0.118	48	48

## COMMENTS

Nineteen small (51-122 mm) juvenile Arctic Char and one stickleback were captured/observed at this site in August 2023.

# POTENTIAL OFFSETTING SITE 009

20-AUG-23



**A**



**B**



**C**



**D**



**E**



**F**

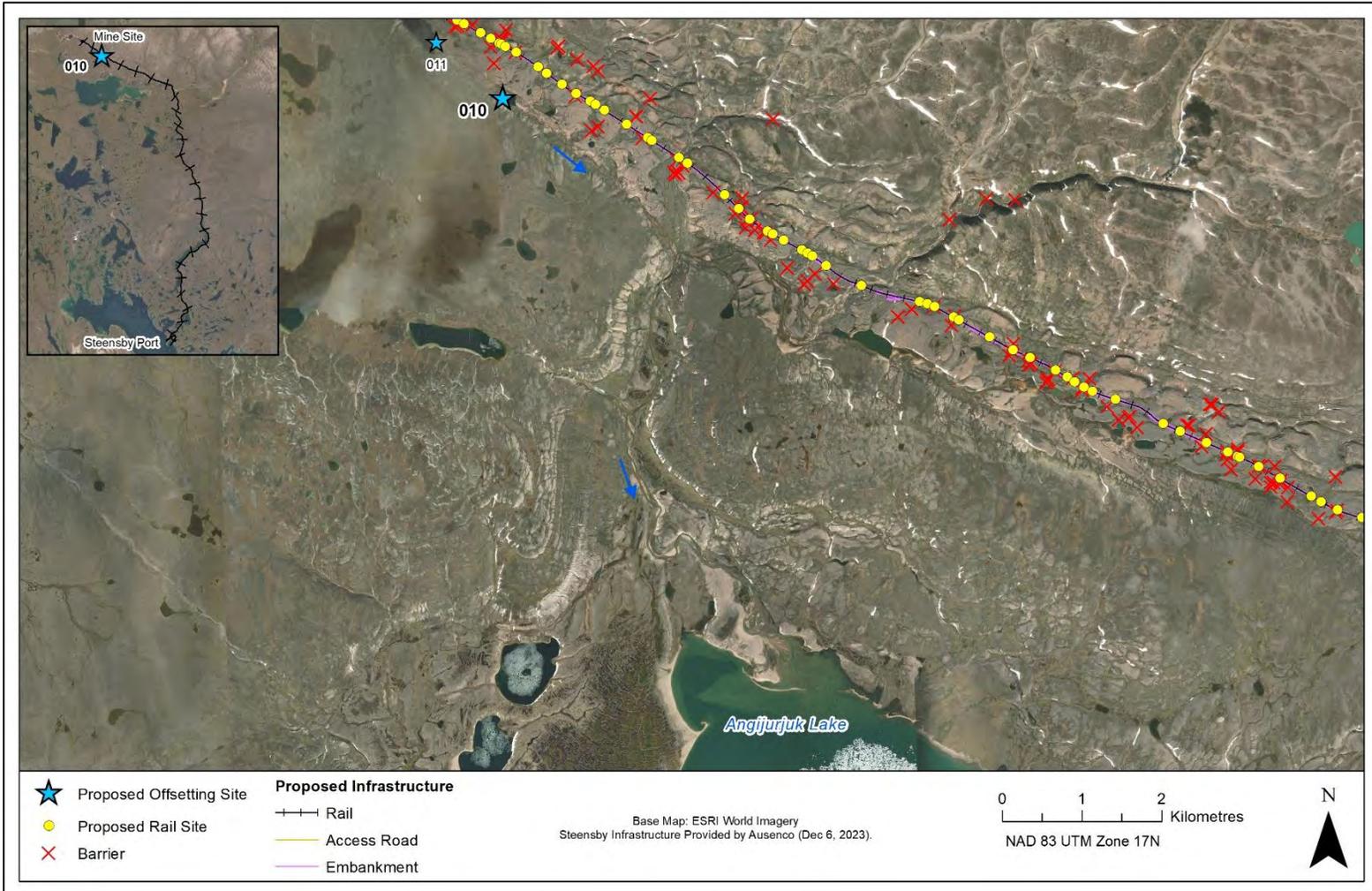
Photos 1. Photos taken at habitat transect 1 (top) and transect 3 (bottom) at Site 009: (A,D) facing southeast; (B,E) facing northwest; and (C,F) facing south/southwest.

# POTENTIAL OFFSETTING SITE 010

## LOCATION AND SITE DESCRIPTION

Site ID: 010      Site General UTM Coordinates: 17W 568581 E 7907289 N      Date Surveyed: 18-Aug-23      Waterbody Type: Lake

## SITE MAP



BAFFINLAND IRON MINES  
MARY RIVER PROJECT

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

FISH HABITAT:

ARCTIC CHAR – POTENTIAL

NINESPINE STICKLEBACK – POTENTIAL

# POTENTIAL OFFSETTING SITE 010

## SITE SUMMARY

Potential Offsetting Site 010 is located on the western shoreline of a small, unnamed lake near km 8 of the proposed Steensby railway, within a large river system that drains 10 km generally southeast towards the north end of Angijurjuk Lake. The lake has an approximate surface area of 17,561 m<sup>2</sup> and shoreline length of 614 m. Fish passage from this lake to other downstream lakes and the presence of barriers to fish movement in this drainage are unknown.

Aquatic habitat at the Site 010 is comprised mainly of gravel/fines/cobble at one end of the polygon, transitioning to almost exclusively fines at the other end. There was no aquatic vegetation in the survey area and riparian vegetation was mainly grass and moss. The area has a moderate slope, with depths <0.75 m within approximately 5-9 m of the shoreline. Specific conductance was low (83.8-85.4 µS/cm).

No fish were captured/observed in the surveyed area in August 2023. However, juvenile char have been captured in some of the nearby tributaries in this drainage where they are crossed by the proposed Steensby railway (e.g., CV-006-1, CV-006-3, and CV-007-1) as well as in the upstream lake at Site 011. The predominantly fine substrates and sparsity of aquatic vegetation within the polygon are not preferred habitat conditions for either species due to a lack of cover. However, the area may support limited feeding/rearing use by both species during the open-water period. Depths within the polygon (<0.75 m) are insufficient for overwintering or char spawning. Stickleback spawning is unlikely due to a lack of cover habitat in most of the area. Satellite imagery suggests the lake may have sufficient depths for overwintering of both species.

# POTENTIAL OFFSETTING SITE 010

## HYDROLOGY & HABITAT CHARACTERISTICS

Habitat Transect	General Habitat Characteristics				Substrate Composition (%)				
	Depth at Offshore Edge of Polygon (m)	Distance from Shore at Offshore Edge (m)	Water Temperature (°C)	Specific Conductance (µS/cm)	Fines	Gravel	Small Cobble	Large Cobble	Boulders
1	0.75	5.71	10.0	83.8	30	50	20	-	-
2	0.75	8.68	-	-	95	5	-	-	-
3	0.75	6.81	8.7	85.4	90	10	-	-	-

## FISH HABITAT POTENTIAL

Nearest Potential Overwintering Habitat - ARCH: This Lake

Distance to Nearest Potential Overwintering Habitat - ARCH (km): 0

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

# POTENTIAL OFFSETTING SITE 010

## FISHING AND HABITAT SURVEY SITES



# POTENTIAL OFFSETTING SITE 010

## ELECTROFISHING DATA

Date: 18-Aug-23 Temperature (°C): 8.7 Distance of Shoreline Fished (m): 35  
Duration Fished (seconds): 612 Area Fished (m<sup>2</sup>): 247

Species	Pass	Effort (Seconds)	Fish Captured	Fish Observed	CPUE (No. Fish/60 Seconds)	Mean Length (mm)	Length Range (mm)	Mean Weight (g)	Weight Range (g)
ARCH	1	612	0	0	0	-	-	-	-
NNST	1	612	0	0	0	-	-	-	-

## COMMENTS

No fish were captured or observed during this survey. Juvenile char have been captured in nearby small streams and the upstream lake at Site 011 but it is unknown if they use habitat in this lake.

# POTENTIAL OFFSETTING SITE 010

18-AUG-23



**A**



**B**



**C**



**D**



**E**



**F**

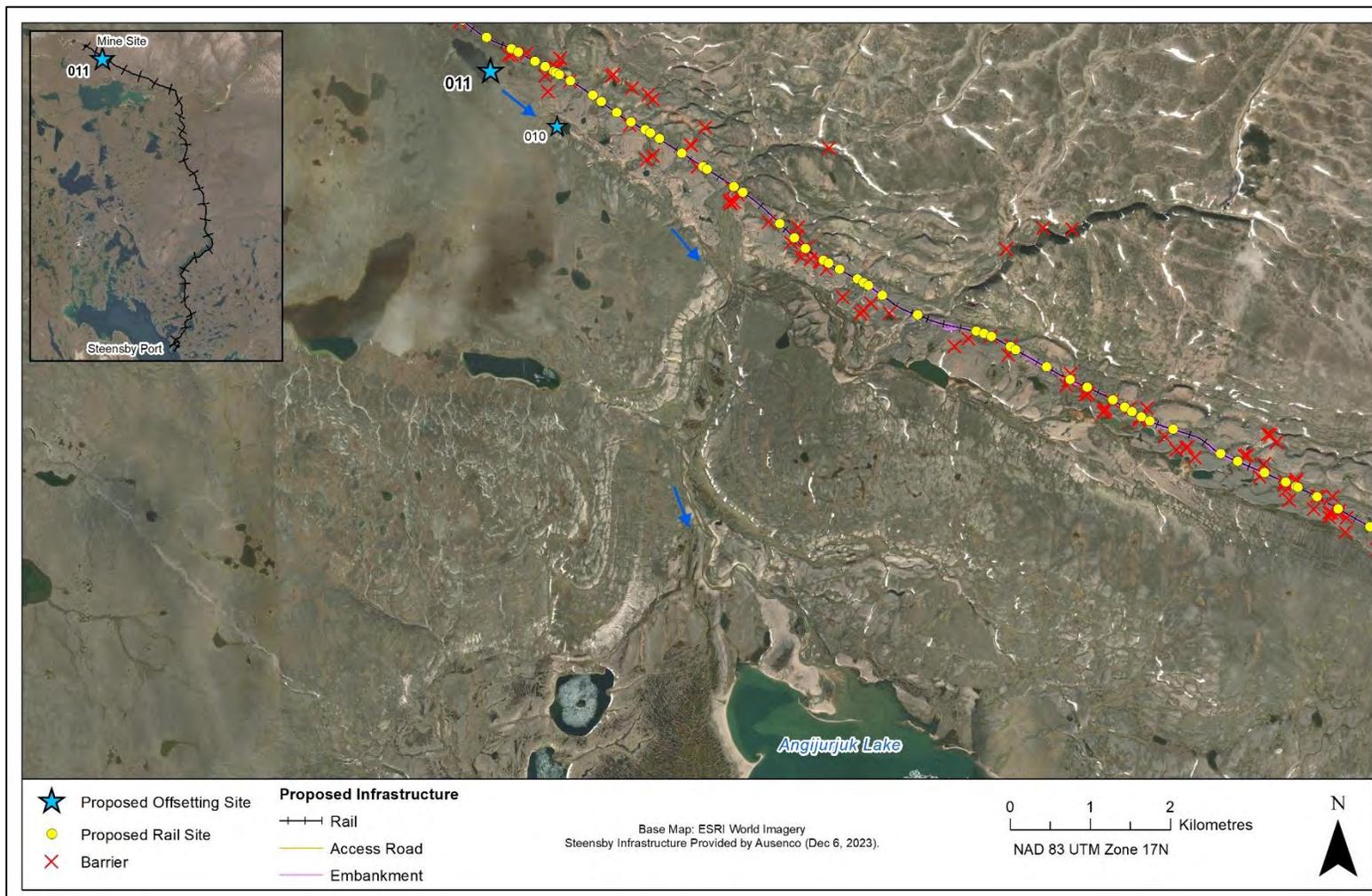
Photos 1. Photos taken at habitat transect 1 (top) and transect 3 (bottom) at Site 010: (A) facing north; (B, F) facing south; (C) facing east; and (E) facing southwest.

# POTENTIAL OFFSETTING SITE 011

## LOCATION AND SITE DESCRIPTION

Site ID: 011      Site General UTM Coordinates: 17W 567744 E 7907985 N      Date Surveyed: 18-Aug-23      Waterbody Type: Lake

## SITE MAP



BAFFINLAND IRON MINES  
MARY RIVER PROJECT

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

FISH HABITAT:

ARCTIC CHAR - YES

NINESPINE STICKLEBACK - POTENTIAL

# POTENTIAL OFFSETTING SITE 011

## SITE SUMMARY

Potential Offsetting Site 011 is located on the southeastern shoreline of an unnamed lake near km 7 of the proposed Steensby railway. The lake is at the headwaters of a large river system that drains 11 km generally southeast towards the north end of Angijurjuk Lake. This lake has an approximate surface area of 130,142 m<sup>2</sup> and shoreline length of 1671 m and has several small inflow streams and one outflowing river. Tributaries to the north and east of the lake were surveyed at the proposed Steensby railway crossings during baseline field programs. Arctic Char were captured at one of these tributaries (crossed by the rail at CV-006-1) indicating that char are present in the local drainage. However, fish passage from this lake to other downstream lakes and the presence of barriers to fish movement in this drainage are unknown.

Aquatic habitat at Site 011 is comprised mainly of sand with some gravel and cobble. There was no aquatic vegetation in the survey area and riparian vegetation was almost exclusively moss. The area has a moderate slope, with depths <0.75 m within approximately 7-10 m of the shoreline. Specific conductance was low (73.1-73.2 µS/cm).

Numerous (27) small juvenile char were captured/observed in the surveyed area in August 2023. CPUE (3.24 fish/60 s) for char was the highest of all the surveyed sites. Char use of the area is limited to feeding/rearing during the open-water period. Depths within the survey polygon (<0.75 m) are insufficient for overwintering or char spawning. Detailed bathymetry and substrate surveys have not been conducted for this lake, but imagery suggests it is likely deep enough to support overwintering farther offshore from the offsetting site.

Stickleback were not captured/observed at this site and were not captured in any of the inflow streams on the northeast side of the lake from 2021-2023. It is unknown if the species is present in the lake. If present, stickleback could use habitat in the offsetting area for feeding and potentially spawning.

# POTENTIAL OFFSETTING SITE 011

## HYDROLOGY & HABITAT CHARACTERISTICS

Habitat Transect	General Habitat Characteristics				Substrate Composition (%)				
	Depth at Offshore Edge of Polygon (m)	Distance from Shore at Offshore Edge (m)	Water Temperature (°C)	Specific Conductance (µS/cm)	Fines	Gravel	Small Cobble	Large Cobble	Boulders
1	0.75	9.31	8.7	73.2	50	10	30	10	-
2	0.75	8.89	-	-	50	20	30	-	-
3	0.75	7.12	8.7	73.1	65	10	10	10	5

## FISH HABITAT POTENTIAL

Nearest Potential Overwintering Habitat - ARCH: This lake

Distance to Nearest Potential Overwintering Habitat - ARCH (km): 0

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

# POTENTIAL OFFSETTING SITE 011

## FISHING AND HABITAT SURVEY SITES



Base Map: © 2020 Digital Globe, Inc.

-  Electrofishing
-  Nearshore Habitat Transect

0 25 50  
Metres  
NAD 83 UTM Zone 17N  
Base Map: © 2021 Digital Globe, Inc.



# POTENTIAL OFFSETTING SITE 011

## ELECTROFISHING DATA

Date: 18-Aug-23      Temperature (°C): 8.7      Distance of Shoreline Fished (m): 57.0  
Duration Fished (seconds): 500      Area Fished (m<sup>2</sup>): 481

Species	Pass	Effort (Seconds)	Fish Captured	Fish Observed	CPUE (No. Fish/60 Seconds)	Mean Length (mm)	Length Range (mm)	Mean Weight (g)	Weight Range (g)
ARCH	1	500	19	8	3.240	45	30 - 81	-	-
NNST	1	500	0	0	0.000	-	-	-	-

## COMMENTS

A total of 27 small (30-81) juvenile Arctic Char were captured during electrofishing at Site 011 in August 2023. The catch included some potential young-of-the-year, suggesting spawning may have occurred in this lake. No stickleback were captured during the survey and it is unknown if they are present in the lake.

# POTENTIAL OFFSETTING SITE 011

18-AUG-23



**A**



**B**



**C**



**D**



**E**



**F**

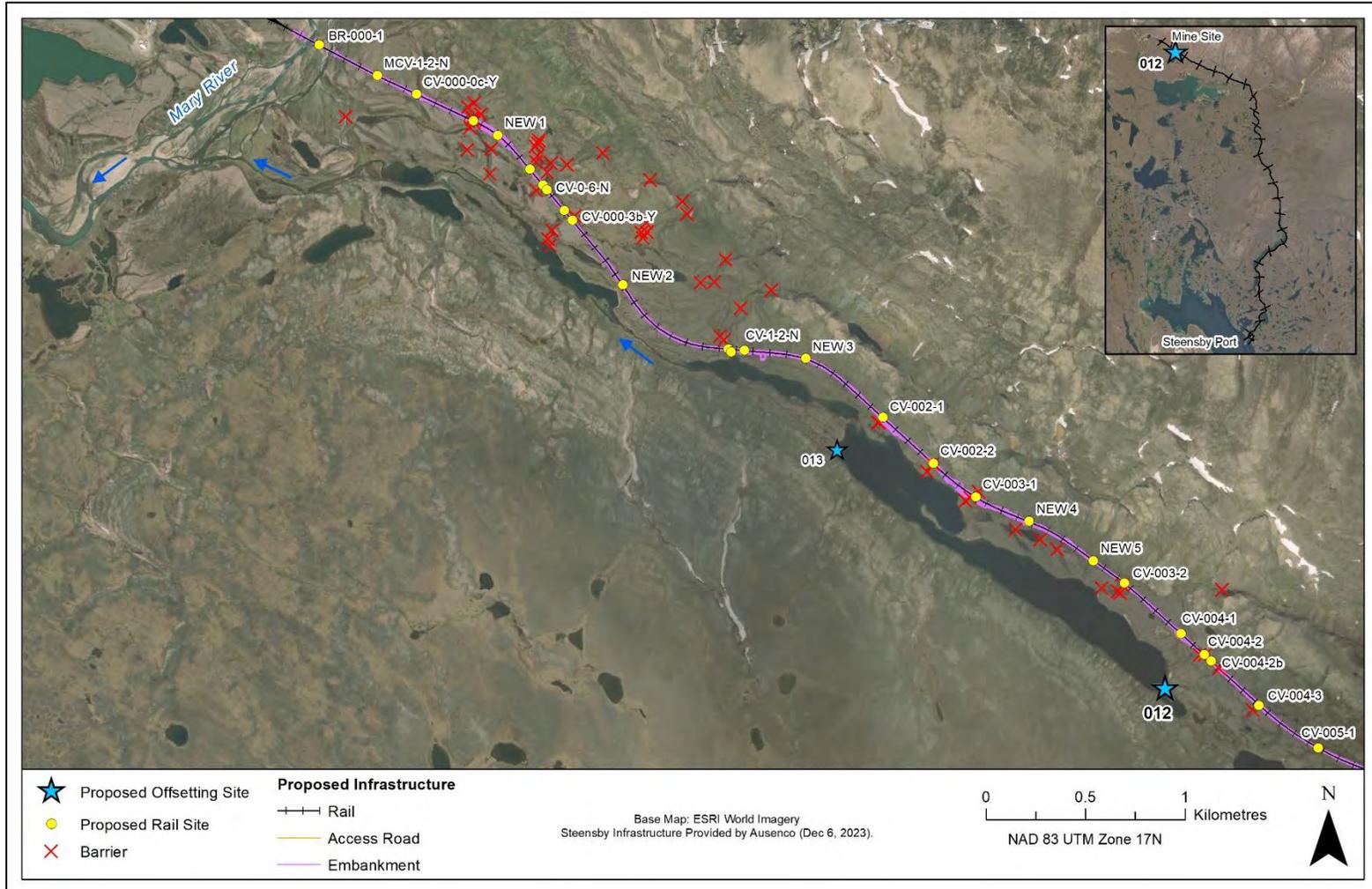
Photos 1. Photos taken at habitat transect 1 (top) and transect 3 (bottom) at Site 011: (A,D) facing west; (B,E) facing south; and (C,F) facing north.

# POTENTIAL OFFSETTING SITE 012

## LOCATION AND SITE DESCRIPTION

Site ID: 012      Site General UTM Coordinates: 17W 566922 E 7908699 N      Date Surveyed: 2-Sept-23      Waterbody Type: Lake

## SITE MAP



**BAFFINLAND IRON MINES  
MARY RIVER PROJECT**

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

**FISH HABITAT:**

**ARCTIC CHAR - YES**

**NINESPINE STICKLEBACK - POTENTIAL**

# POTENTIAL OFFSETTING SITE 012

## SITE SUMMARY

Potential Offsetting Site 012 is located on the southeastern shoreline of an unnamed lake at approximately km 3-6 of the proposed Steensby railway. The lake is at the headwaters of a river system that drains 4 km generally northwest towards the Mary River. This lake has an approximate surface area of 418,566 m<sup>2</sup> and shoreline length of 4927 m and has several small inflow streams and one larger outflow river. Tributaries along the northeast side of the lake have been surveyed in the vicinity of the proposed Steensby railway crossings. Several of these streams are known to support juvenile char during the open-water season. There are no permanent barriers to fish movements between this lake and the Mary River downstream.

Aquatic habitat at the Site 012 is comprised almost exclusively of fines/sand with small amounts of interspersed gravel and cobble. There was no aquatic vegetation in the survey area and riparian vegetation consisted of grass, willows, and moss. The area has a shallow slope, with depths <0.75 m within approximately 20-27 m of the shoreline. Though relatively low, specific conductance (95.0-96.7 µS/cm) was higher than at most other surveyed sites.

Ten small juvenile char were captured/observed in the surveyed area in August 2023, including some potential young-of-the-year (YOY). Char use of the offsetting area is limited to feeding/rearing during the open-water period. Depths within the offsetting polygon (<0.75 m) are insufficient for overwintering or char spawning. Although detailed bathymetry and substrate surveys have not been conducted in this lake, site imagery suggests it is likely deep enough to support overwintering farther offshore. The presence of YOY in the catch further suggests that spawning occurs in the lake.

Stickleback were not captured/observed at Site 012 and were not captured in any of the tributary streams originating from the northeast side of the lake during the Steensby rail baseline programs (2021-2023) or at the second survey site (Site 013) on the opposite side of the lake. It is unknown if the species is present in the lake. If present, stickleback could use habitat in the area for feeding and potentially spawning.

# POTENTIAL OFFSETTING SITE 012

## HYDROLOGY & HABITAT CHARACTERISTICS

Habitat Transect	General Habitat Characteristics				Substrate Composition (%)				
	Depth at Offshore Edge of Polygon (m)	Distance from Shore at Offshore Edge (m)	Water Temperature (°C)	Specific Conductance (µS/cm)	Fines	Gravel	Small Cobble	Large Cobble	Boulders
1	0.75	19.47	6.1	96.7	87	5	5	2	1
2	0.75	27.27	-	-	85	7	6	1	1
3	0.75	27.30	6.0	95.0	80	5	10	4	1

## FISH HABITAT POTENTIAL

Nearest Potential Overwintering Habitat - ARCH: This lake

Distance to Nearest Potential Overwintering Habitat - ARCH (km): 0

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

# POTENTIAL OFFSETTING SITE 012

## FISHING AND HABITAT SURVEY SITES



Base Map: © 2020 Digital Globe, Inc.

-  Electrofishing
-  Nearshore Habitat Transect

0 25 50  
Metres  
NAD 83 UTM Zone 17N  
Base Map: © 2021 Digital Globe, Inc.



# POTENTIAL OFFSETTING SITE 012

## ELECTROFISHING DATA

Date: 2-Sept-23      Temperature (°C): 6.1      Distance of Shoreline Fished (m): 30.0  
Duration Fished (seconds): 507      Area Fished (m<sup>2</sup>): 740

Species	Pass	Effort (Seconds)	Fish Captured	Fish Observed	CPUE (No. Fish/60 Seconds)	Mean Length (mm)	Length Range (mm)	Mean Weight (g)	Weight Range (g)
ARCH	1	507	10	0	1.183	52	32 - 64	-	-
NNST	1	507	0	0	0.000	-	-	-	-

## COMMENTS

Ten small (32-64) juvenile Arctic Char were captured during electrofishing at Site 012 in August 2023. The catch included some potential young-of-the-year char. Stickleback were not captured or observed during the survey and it is unknown if they are present in the lake.

# POTENTIAL OFFSETTING SITE 012

2-SEPT-23



**A**



**B**



**C**



**D**



**E**



**F**

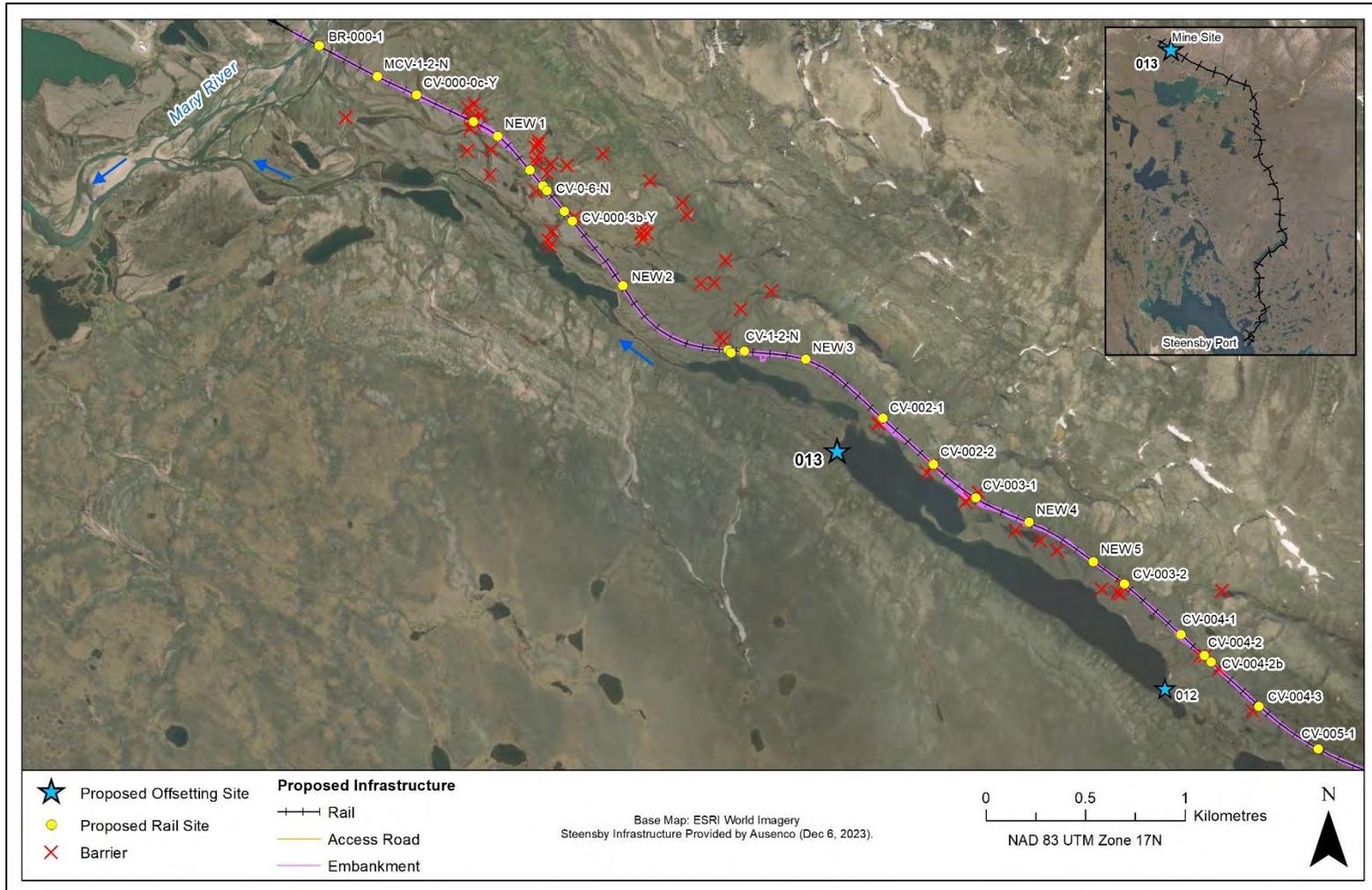
Photos 1. Photos taken at habitat transect 1 (top) and transect 3 (bottom) at Site 012: (A,D) facing west; (B,E) facing south; and (C,F) facing north.

# POTENTIAL OFFSETTING SITE 013

## LOCATION AND SITE DESCRIPTION

Site ID: 013      Site General UTM Coordinates: 17W 565272 E 7909895 N      Date Surveyed: 2-Sep-23      Waterbody Type: Lake

## SITE MAP



**BAFFINLAND IRON MINES  
MARY RIVER PROJECT**

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

**FISH HABITAT:**

**ARCTIC CHAR - YES**

**NINESPINE STICKLEBACK - POTENTIAL**

# POTENTIAL OFFSETTING SITE 013

## SITE SUMMARY

Potential Offsetting Site 013 is located on the northwestern shoreline of an unnamed lake at approximately km 3-6 of the proposed Steensby railway. The lake is at the headwaters of a river system that drains 4 km generally northwest towards the Mary River. This lake has an approximate surface area of 418,566 m<sup>2</sup> and shoreline length of 4927 m and has several small inflow streams and one larger outflow river. Tributary streams along the northeast side of the lake have been surveyed in the vicinity of the proposed Steensby railway crossings. Several of these streams are known to support juvenile char during the open-water period. There are no permanent barriers to fish movements between this lake and the Mary River downstream.

Aquatic habitat at Site 013 is comprised almost exclusively of fines/sand with small amounts of interspersed gravel and cobble. There was no aquatic vegetation in the survey area and riparian vegetation consisted of grass, willows, and moss. The area has a relatively shallow slope, with depths <0.75 m within approximately 10-13 m of the shoreline. Specific conductance (105.2.0-109.8 µS/cm) was marginally higher than at Site 012 on the opposite end of the lake as well as most other surveyed sites.

Three juvenile char were captured/observed in the surveyed area in August 2023. Char use of the area is limited to feeding/rearing during the open-water period. Depths within the survey polygon (<0.75 m) are insufficient for overwintering or char spawning. Although detailed bathymetry and substrate surveys have not been conducted for this lake, site imagery suggests it is likely deep enough to support overwintering farther offshore. The presence of YOY in the catch from Site 012 at the other end of the lake further suggests that spawning occurs in the lake.

Stickleback were not captured/observed at the Site 013 and were not captured in any of the tributary streams originating on the northeast side of this lake during the Steensby rail baseline programs (2021-2023) or at the second survey site (Site 012) on the opposite side of the lake. It is unknown if the species is present in the lake. If present, stickleback could use habitat in the area for feeding and potentially spawning.

**BAFFINLAND IRON MINES  
MARY RIVER PROJECT**



**FISH HABITAT:**

**ARCTIC CHAR - YES**

**NINESPINE STICKLEBACK – POTENTIAL**

# POTENTIAL OFFSETTING SITE 013

## HYDROLOGY & HABITAT CHARACTERISTICS

Habitat Transect	General Habitat Characteristics				Substrate Composition (%)				
	Depth at Offshore Edge of Polygon (m)	Distance from Shore at Offshore Edge (m)	Water Temperature (°C)	Specific Conductance (µS/cm)	Fines	Gravel	Small Cobble	Large Cobble	Boulders
1	0.75	10.98	5.8	109.8	90	-	5	5	-
2	0.75	13.10	-	-	99	1	-	-	-
3	0.75	11.88	6.1	105.2	90	-	5	5	-

## FISH HABITAT POTENTIAL

Nearest Potential Overwintering Habitat - ARCH: This lake

Distance to Nearest Potential Overwintering Habitat - ARCH (km): 0

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

# POTENTIAL OFFSETTING SITE 013

## FISHING AND HABITAT SURVEY SITES



Base Map: © 2020 Digital Globe, Inc.

-  Electrofishing
-  Nearshore Habitat Transect

0 25 50  
Metres  
NAD 83 UTM Zone 17N  
Base Map: © 2021 Digital Globe, Inc.



# POTENTIAL OFFSETTING SITE 013

## ELECTROFISHING DATA

Date: 2-Sep-23      Temperature (°C): 5.8      Distance of Shoreline Fished (m): 65  
Duration Fished (seconds): 500      Area Fished (m<sup>2</sup>): 779

Species	Pass	Effort (Seconds)	Fish Captured	Fish Observed	CPUE (No. Fish/60 Seconds)	Mean Length (mm)	Length Range (mm)	Mean Weight (g)	Weight Range (g)
ARCH	1	500	3	0	0.360	105	59 - 139	-	-
NNST	1	500	0	0	0.000	-	-	-	-

## COMMENTS

Three juvenile Arctic Char (59-139 mm) were captured at the offsetting site in August 2023. Stickleback were not captured/observed and it is unknown if they are present in this lake.

# POTENTIAL OFFSETTING SITE 013

2-SEP-23



**A**



**B**



**C**



**D**



**E**



**F**

Photos 1. Photos taken at habitat transect 1 (top) and transect 3 (bottom) at Site 013: (A) facing southeast; (B) facing northeast; (C) facing southwest; (D) facing east; (E) facing northeast; (F) facing southeast.