

APPENDIX F
WATERCOURSE CROSSING ASSESSMENT DATA SHEETS

- Assessment Sheets 30 pages

Bulk Sample Road Watercourse Crossing Assessment



Figure 1: Downstream view from proposed crossing showing abundant pool habitat and vegetation.




Figure 2: Upstream view from proposed crossing showing more pool habitat.



Figure 3: View across CV-60.

Baffinland Iron Mines
Mary River Project
Watercourse Crossing Assessment

Location				
Site:	CV-60	Watercourse Name:	Unknown River	
UTM:	17W 0527621 / 7930342			
Site Description		Potential Fish Utilization		
Watershed Size: 5.257 km ² Regulated: No Channelized: No Bankfull Width: 12.0 m Wetted Width: 3.6 m Riffle-Crest Depth: 0.12 m Pool Depth: 0.62 m Residual Pool Depth: 0.50 m Bankfull Depth: 0.62 m Bank Height: N/A D₉₅: N/A D: <0.001 m Confinement: Unconfined Channel Morphology: Riffle-Pool Channel Gradient: 0° Turbidity: 0.00 FTU Side Slope R – 5%; L – 5% Approach: R – 95%; L – 95% Bank Stability: Low-Moderate Erosion Potential: Low-Moderate Undercut Banks: Some	Mesohabitat Composition: Pool – 90%; Riffle – 10% Substrate Composition: Sand – 90%; Gravel – 10% Stream Cover: Undercut – 5%; In- and Overstream Vegetation – 20% Riparian Vegetation: Moss, grasses, willows Aquatic Vegetation: None Unique Features: None Summary: This is a medium-sized, low-velocity waterbody with predominantly sand substrate. The banks have moderate erosion potential and there is relatively abundant vegetative cover.	Arctic Char		
		Spawning:	Unlikely	
		Migration:	Unlikely	
		Rearing:	Yes	
		Overwintering:	None	
		Ninespine Stickleback		
		Spawning:	Possible	
		Migration:	Possible	
		Rearing:	Possible	
		Overwintering:	None	
	Fish Habitat Quality		Comments	
	Important		This waterbody has abundant pool habitat for juvenile char. Many small char were observed or captured during fisheries studies. There is likely little to no use by adult char. Though not captured ninespine stickleback may also use this creek as both a feeding and refuge area.	
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Bulk Sample Road Watercourse Crossing Assessment



Figure 1: Downstream view from proposed crossing showing pool habitat with vegetation.

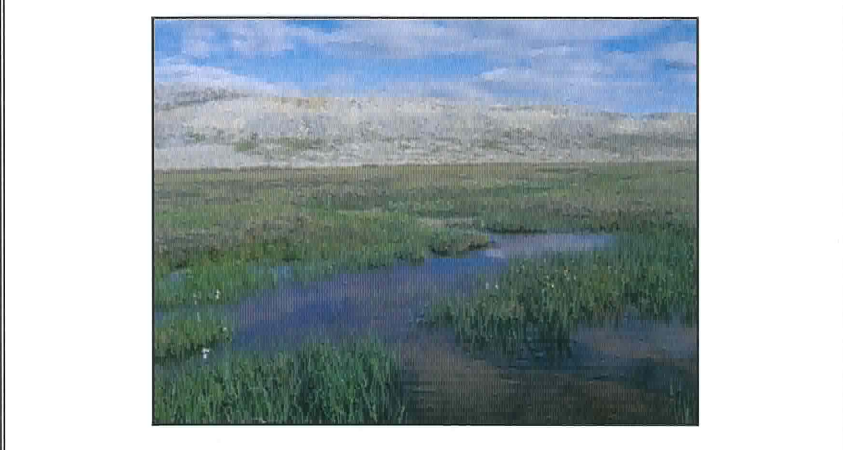


Figure 2: Upstream view from proposed crossing showing more pool habitat.

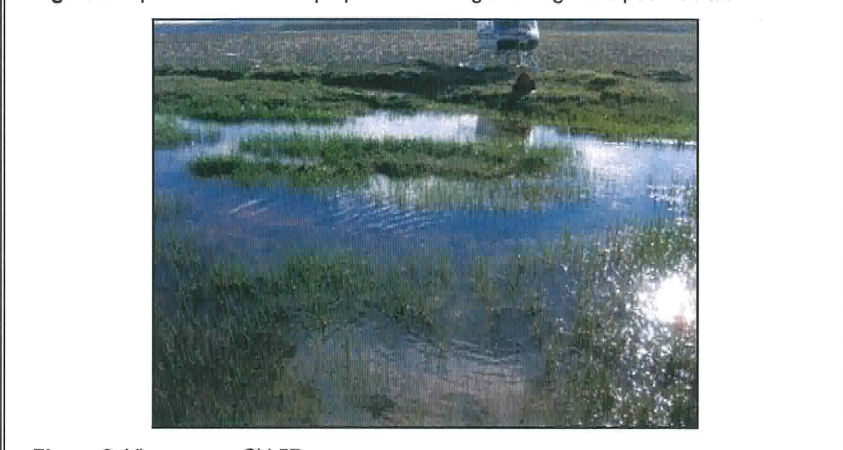


Figure 3: View across CV-57.

<p>Baffinland Iron Mines Mary River Project Watercourse Crossing Assessment</p>			 <p>NORTH/SOUTH CONSULTANTS INC. AQUATIC ENVIRONMENT SPECIALISTS</p>
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Bulk Sample Road Watercourse Crossing Assessment



Figure 1: Downstream view from proposed crossing showing riffle habitat with steep drop where the field crew is standing.



Figure 2: Upstream view from proposed crossing showing more cascade-riffle habitat.

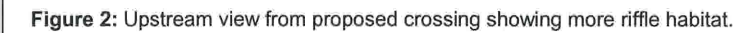
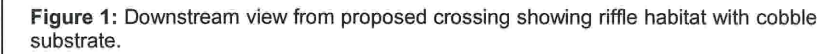


Figure 3: View across CV-55.

Baffinland Iron Mines
Mary River Project
Watercourse Crossing Assessment

Location			
Site:	CV-55	Watercourse Name:	Unknown River
UTM:	17W 0528842 / 7927584		
Site Description		Potential Fish Utilization	
Watershed Size:	0.036 km ²	Arctic Char	
Regulated:	No	Spawning:	None
Channelized:	No	Migration:	None
Bankfull Width:	3.2 m	Rearing:	None
Wetted Width:	1.1 m	Overwintering:	None
Riffle-Crest Depth:	0.01 m	Ninespine Stickleback	
Pool Depth:	N/A	Spawning:	None
Residual Pool Depth:	N/A	Migration:	None
Bankfull Depth:	N/A	Rearing:	None
Bank Height:	N/A	Overwintering:	None
D ₉₅ :	0.32 m	Comments	
D:	0.01 m		
Confinement:	Unconfined	Although habitat at the proposed crossing may be marginally suitable for juvenile char, there is a steep drop downstream. This site is, therefore, likely inaccessible from further downstream. In addition, there are no suitable overwintering locations upstream.	
Channel Morphology:	Cascade-Riffle		
Channel Gradient:	7 ⁰		
Turbidity:	0.00 FTU		
Side Slope	R – 7%; L – 7%		
Approach:	R – 93%; L – 93%		
Bank Stability:	Moderate		
Erosion Potential:	Moderate		
Undercut Banks:	None		
Fish Habitat Quality		Comments	
None			

Bulk Sample Road Watercourse Crossing Assessment



<p align="center">Baffinland Iron Mines Mary River Project Watercourse Crossing Assessment</p>

Bulk Sample Road Watercourse Crossing Assessment



Figure 1: Downstream view from proposed crossing showing riffle habitat with cobble substrate.



Figure 2: Upstream view from proposed crossing showing more riffle habitat.

Baffinland Iron Mines
Mary River Project
Watercourse Crossing Assessment

Location					
Site:		CV-40		Watercourse Name:	
UTM:		17W 0535175 / 7920305		Unknown River	
Site Description				Potential Fish Utilization	
Watershed Size: 12.021 km ² Regulated: No Channelized: No Bankfull Width: 19.0 m Wetted Width: 12.0 m Riffle-Crest Depth: 0.11 m Pool Depth: N/A Residual Pool Depth: N/A Bankfull Depth: 0.34 m Bank Height: 0.23 m D₉₅: 1.16 m D: 0.001 m Confinement: Partially Confined Channel Morphology: Riffle-Pool Channel Gradient: 2.5 ⁰ Turbidity: 0.00 FTU Side Slope R – 7%; L – 7% Approach: R – 93%; L – 93% Bank Stability: Low-Moderate Erosion Potential: Moderate Undercut Banks: None		Mesohabitat Composition: Riffle – 95%; Pool – 5%		Arctic Char	
		Substrate Composition: Cobble – 80%; Boulder – 10%; Sand – 3%; Gravel – 3%		Spawning: Unlikely	
		Stream Cover: Boulders – 10%		Migration: Unlikely	
		Riparian Vegetation: Moss, grasses		Rearing: Possible	
		Aquatic Vegetation: Algae		Overwintering: None	
		Unique Features: None			
		Summary: This is a large-sized waterbody consisting almost exclusively of riffles and cobble habitat. The banks have moderate erosion potential and boulders represent the only available cover.			

Bulk Sample Road Watercourse Crossing Assessment



Figure 1: Downstream view from proposed crossing showing riffle-pool habitat, cobble substrate, and Camp Lake.



Figure 2: Upstream view from proposed crossing showing more riffle-pool habitat.



Figure 3: View across CV-225.

Baffinland Iron Mines
Mary River Project
Watercourse Crossing Assessment

Location					
Site:		CV-225		Watercourse Name:	
UTM:		17W 0557406 / 7915137		Unknown River	
Site Description				Potential Fish Utilization	
Watershed Size: 12.180 km ² Regulated: No Channelized: No Bankfull Width: 31.0 m Wetted Width: 7.0 m Riffle-Crest Depth: 0.12 m Pool Depth: 0.28 m Residual Pool Depth: 0.16 m Bankfull Depth: 0.83 m Bank Height: 0.55 m D₉₅: 0.86 m D: 0.03 m Confinement: Partially Confined Channel Morphology: Riffle-Pool Channel Gradient: 3 ⁰ Turbidity: 0.00 FTU Side Slope R – 1%; L – 1% Approach: R – 99%; L – 99% Bank Stability: Low-Moderate Erosion Potential: Moderate Undercut Banks: None		Mesohabitat Composition: Riffle – 60%; Pool – 40%		Arctic Char	
		Substrate Composition: Cobble – 75%; Gravel – 15%; Boulders – 10%		Spawning: Unlikely	
		Stream Cover: Boulders – 10%		Migration: Unlikely	
		Riparian Vegetation: Grasses and moss		Rearing: Yes	
		Aquatic Vegetation: None		Overwintering: None	
		Unique Features: None			
		Summary: This is a large-sized waterbody consisting of riffle-pool habitat with mostly cobble substrate. The banks have moderate erosion potential and boulders are the only significant available cover.			



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Bulk Sample Road Watercourse Crossing Assessment



Figure 1: Downstream view from proposed crossing showing riffle-pool habitat and cobble substrate.



Figure 2: Upstream view from proposed crossing showing more riffle-pool habitat.



Figure 3: View across BG-01.

Baffinland Iron Mines
Mary River Project
Watercourse Crossing Assessment


Location					
Site:		BG-01		Watercourse Name:	
UTM:		17W 0557991 / 7914918		Unknown River	
Site Description				Potential Fish Utilization	
Watershed Size: 5.612 km ² Regulated: No Channelized: No Bankfull Width: 5.0 m Wetted Width: 5.0 m Riffle-Crest Depth: 0.18 m Pool Depth: 0.30 m Residual Pool Depth: 0.12 m Bankfull Depth: 0.58 m Bank Height: 0.40 m D₉₅: 0.80 m D: 0.06 m Confinement: Confined Channel Morphology: Riffle-Pool Channel Gradient: 3.5 ⁰ Turbidity: 0.00 FTU Side Slope R – 1%; L – 1% Approach: R – 99%; L – 99% Bank Stability: Low-Moderate Erosion Potential: Moderate-High Undercut Banks: None		Mesohabitat Composition: Riffle – 95%; Pool – 5%		Arctic Char	
		Substrate Composition: Cobble – 70%; Boulders – 20%; Gravel – 5%; Sand – 5%		Spawning: Unlikely	
		Stream Cover: Boulders – 20%		Migration: Unlikely	
		Riparian Vegetation: Arctic cotton, moss, willows, and grasses		Rearing: Yes	
		Aquatic Vegetation: None		Overwintering: None	
		Unique Features: None			
		Summary: This is a medium-sized waterbody consisting largely of riffle habitat with cobble substrate. The banks have moderate-high erosion potential and boulders are the only significant available cover.			
Fish Habitat Quality				Ninespine Stickleback	
		Spawning: Unlikely		Spawning: Unlikely	
		Migration: Unlikely		Migration: Unlikely	
		Rearing: Unlikely		Rearing: Unlikely	
		Overwintering: None		Overwintering: None	
				Comments	
				Site is upstream of Camp Lake and has suitable habitat for juvenile char to rear or take refuge from larger char in the lake. It is unlikely spawning occurs in this tributary since water levels are relatively low during the fall, however it cannot be ruled out completely. Several small char were captured during fisheries investigations of this creek. The habitat is less suitable for sticklebacks.	

Bulk Sample Road Watercourse Crossing Assessment



Figure 1: Upstream view from proposed crossing showing nearly dry habitat and empty fuel drums.

Baffinland Iron Mines
Mary River Project
Watercourse Crossing Assessment

Location					
Site:		BG-16		Watercourse Name:	
UTM:		17W 0550742 / 7917611		Unknown River	
Site Description				Potential Fish Utilization	
Watershed Size: 0.064 km ² Regulated: No Channelized: No Bankfull Width: N/A Wetted Width: N/A Riffle-Crest Depth: N/A Pool Depth: N/A Residual Pool Depth: N/A Bankfull Depth: N/A Bank Height: N/A D₉₅: N/A D: N/A Confinement: N/A Channel Morphology: N/A Channel Gradient: N/A Turbidity: N/A Side Slope: N/A Approach: N/A Bank Stability: N/A Erosion Potential: N/A Undercut Banks: N/A		Mesohabitat Composition: N/A		Arctic Char	
		Substrate Composition: N/A		Spawning: None	
		Stream Cover: N/A		Migration: None	
		Riparian Vegetation: N/A		Rearing: None	
		Aquatic Vegetation: N/A		Overwintering: None	
		Unique Features: N/A			
		Summary: This is an extra small-sized waterbody that is steep and nearly dry at the time of sampling. It is likely only a spring run-off stream.		Ninespine Stickleback	
				Spawning: None	
				Migration: None	
				Rearing: None	
		Overwintering: None			
Fish Habitat Quality				Comments	
None				This site is a tributary of BG-17 and likely only contributes runoff to the much larger BG-17. There appears to be little available fish habitat and, therefore little to no importance for fish populations. There are also empty fuel drums rusting in the stream.	
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Bulk Sample Road Watercourse Crossing Assessment



Figure 1: Downstream view from proposed crossing showing riffle-pool habitat, cobble/gravel/sand substrate.



Figure 2: Upstream view from proposed crossing showing more riffle-pool habitat.

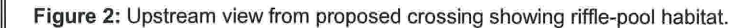
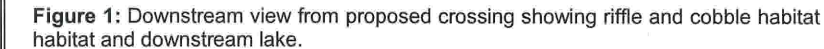


Figure 3: View across BG-17.


Baffinland Iron Mines
Mary River Project
Watercourse Crossing Assessment

Location					
Site:		BG-17		Watercourse Name:	
UTM:		17W 0550703 / 7917643		Unknown River	
Site Description				Potential Fish Utilization	
Watershed Size: 13.767 km ² Regulated: No Channelized: No Bankfull Width: 9.0 m Wetted Width: 8.0 m Riffle-Crest Depth: 0.19 m Pool Depth: 0.30 m Residual Pool Depth: 0.11 m Bankfull Depth: 0.95 m Bank Height: 0.65 m D₉₅: 0.10 m D: 0.06 m Confinement: Partially Confined Channel Morphology: Riffle-Pool Channel Gradient: 1 ⁰ Turbidity: 22.95 FTU Side Slope R – 10%; L – 10% Approach: R – 90%; L – 90% Bank Stability: Low Erosion Potential: High Undercut Banks: Some		Mesohabitat Composition: Riffle – 50%; Pool – 50%		Arctic Char	
		Substrate Composition: Cobble – 40%; Gravel – 30%; Sand – 30%		Spawning: None	
		Stream Cover: Instream Vegetation – 3%		Migration: Possible	
		Riparian Vegetation: Grasses, moss, thrift, small plants, and willows		Rearing: Yes	
		Aquatic Vegetation: Submerged grasses		Overwintering: None	
		Unique Features: None			
		Summary: This is a large-sized waterbody with abundant riffle and pool habitat and a mixture of cobble, gravel, and sand substrate. The banks have high erosion potential. There is some flooded vegetation provding potential cover.			

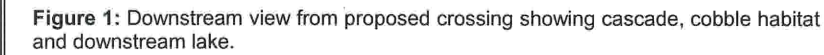
Bulk Sample Road Watercourse Crossing Assessment



Baffinland Iron Mines Mary River Project Watercourse Crossing Assessment

Location				
Site:	BG-24		Watercourse Name:	
UTM:	17W 0548766 / 7918877		Unknown River	
Site Description			Potential Fish Utilization	
Watershed Size: 5.506 km ² Regulated: No Channelized: No Bankfull Width: 62.0 m Wetted Width: 5.5 m Riffle-Crest Depth: 0.12 m Pool Depth: 0.30 m Residual Pool Depth: 0.18 m Bankfull Depth: 0.63 m Bank Height: 0.45 m D ₉₅ : 0.35 m D: 0.02 m Confinement: N/A (braided channel) Channel Morphology: Riffle-Pool Channel Gradient: 4.5 ⁰ Turbidity: 0.00 FTU Side Slope R – 2%; L – 2% Approach: R – 98%; L – 98% Bank Stability: Moderate-High Erosion Potential: Moderate Undercut Banks: Moderate	Mesohabitat Composition: Riffle – 95%; Pool – 5%	Arctic Char		
	Substrate Composition: Cobble – 90%; Gravel – 5%; Boulders – 5%	Spawning:	None	
	Stream Cover: Boulders – 5%; Undercut – 10%	Migration:	None	
	Riparian Vegetation: Moss, willows and grasses	Rearing:	Yes	
	Aquatic Vegetation: None	Overwintering:	None	
	Unique Features: None	Ninespine Stickleback		
	Summary: This is a medium-sized waterbody consisting almost exclusively of riffle habitat with cobble substrate. The banks have moderate-high erosion potential and there is a variety of available cover. The stream is split into three separate wetted channels (3.5, 1, and 1 m wetted widths) at the proposed crossing.	Spawning:	Unlikely	
	Fish Habitat Quality		Migration:	Unlikely
	Important	Rearing:	Unlikely	
		Overwintering:	None	
Comments				
			Though the wetted areas are relatively small, there is sufficient suitable habitat for juvenile char. This area is likely an important rearing/refuge area from the lake downstream. Several small char were observed or captured during fisheries investigations. Water levels are probably not high enough even during spring for any significant use by adult char.	
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Bulk Sample Road Watercourse Crossing Assessment



Location	
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Site:	BG-27	Watercourse Name:	Unknown River
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UTM:	17W 0547876 / 7919342
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Site Description	
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Potential Fish Utilization	
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Arctic Char

Spawning:	None
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Migration:	None
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Rearing:	Possible
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Overwintering:	None
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Ninespine Stickleback

Spawning:	Unlikely
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Migration:	Unlikely
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Rearing:	Unlikely
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Overwintering:	None
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Fish Habitat Quality	
1	2
3	4
5	6
7	8
9	10
11	12
13	14
15	16
17	18
19	20
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65	66
67	68
69	70
71	72
73	74
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77	78
79	80
81	82
83	84
85	86
87	88
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95	96
97	98
99	100

Comments

Relatively low water levels and higher velocities likely limit use of this habitat by both stickleback and juvenile char. It is accessible from a nearby lake downstream so there is probably some intermittent use. Adult char do not use this habitat at any time.

**Baffinland Iron Mines
Mary River Project
Watercourse Crossing Assessment**

Bank Stability:	Moderate
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Erosion Potential:	Moderate
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Undercut Banks:	Some
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Marginal




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Bulk Sample Road Watercourse Crossing Assessment									
No Figure Available	Location								
	Site:		BG-28		Watercourse Name:		Unknown River		
	UTM:		17W 0547567 / 7919479						
	Site Description					Potential Fish Utilization			
	Watershed Size:		0.166 km ²		Arctic Char				
	Regulated:		No		Spawning:			None	
	Channelized:		No		Migration:			None	
	Bankfull Width:		N/A		Rearing:			None	
	Wetted Width:		N/A		Overwintering:			None	
	Flat Depth:		N/A						
	Pool Depth:		N/A		Ninespine Stickleback				
	Residual Pool Depth:		N/A		Spawning:			None	
	Bankfull Depth:		N/A		Migration:			None	
	Bank Height:		N/A		Rearing:			None	
D ₉₅ :		N/A		Overwintering:			None		
D:		N/A							
Confinement:		N/A							
Channel Morphology:		N/A							
Channel Gradient:		N/A		Fish Habitat Quality					
Turbidity:		N/A		None					
Side Slope		N/A							
Approach:		N/A							
Bank Stability:		N/A							
Erosion Potential:		N/A		Comments					
Undercut Banks:		N/A							
Baffinland Iron Mines Mary River Project Watercourse Crossing Assessment		<div><div></div><div><div>NORTH/SOUTH CONSULTANTS INC.</div><div>AQUATIC ENVIRONMENT SPECIALISTS</div></div></div>							

Bulk Sample Road Watercourse Crossing Assessment




Figure 1: Downstream view from proposed crossing showing riffle habitat with cobble substrate. The river forks around an island at this point.

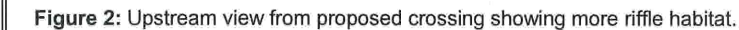
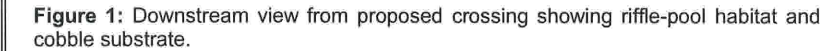


Figure 2: Upstream view from proposed crossing showing more riffle habitat.


Baffinland Iron Mines
Mary River Project
Watercourse Crossing Assessment

Location					
Site:		BG-50		Watercourse Name:	
UTM:		17W 0529334 / 7926845		Unknown River	
Site Description				Potential Fish Utilization	
Watershed Size: 180.263 km ² Regulated: No Channelized: No Bankfull Width: 77.0 m Wetted Width: 61.0 m Riffle-Crest Depth: 0.20 m Pool Depth: N/A Residual Pool Depth: N/A Bankfull Depth: 0.70 m Bank Height: 0.50 m D₉₅: 1.56 m D: 0.02 m Confinement: Unconfined Channel Morphology: Riffle Channel Gradient: 1 ⁰ Turbidity: 0.00 FTU Side Slope R – 5%; L – 5% Approach: R – 95%; L – 95% Bank Stability: High Erosion Potential: Low Undercut Banks: None		Mesohabitat Composition: Riffle – 100%		Arctic Char	
		Substrate Composition: Cobble – 80%; Boulders – 20%		Spawning: Possible	
		Stream Cover: Boulders – 20%; In- and Overstream Vegetation – 40%		Migration: Possible	
		Riparian Vegetation: Moss, grasses, willows		Rearing: Yes	
		Aquatic Vegetation: None		Overwintering: None	
		Unique Features: None		Ninespine Stickleback	
		Summary: This is an extra large-sized waterbody consisting of riffles and primarily cobble substrate. The banks have low erosion potential and there is relatively abundant rocky cover.		Spawning: Possible but Unlikely	
				Migration: Possible but Unlikely	
				Rearing: Possible but Unlikely	
				Overwintering: None	
		Comments			
		Fish Habitat Quality		The river forks around an island at the crossing. Although aquatic habitat is abundant at the proposed crossing, water velocities may be too consistently high for significant use by juvenile char. Only a single young char was captured during fisheries studies. However, since this crossing is a relatively short distance upstream of a lake, fall spawning and possibly summer foraging by adults may also occur. This habitat is likely unsuitable for stickleback.	
		Important			
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Bulk Sample Road Watercourse Crossing Assessment



**Baffinland Iron Mines
Mary River Project
Watercourse Crossing Assessment**

Location				
Site:	CV-224	Watercourse Name:	Unknown River	
UTM:	17W 0556238 / 7915043			
Site Description		Potential Fish Utilization		
<div>Watershed Size: 2.835 km²</div> <div>Regulated: No</div> <div>Channelized: No</div> <div>Bankfull Width: 33.0 m</div> <div>Wetted Width: 9.5 m</div> <div>Riffle-Crest Depth: 0.03 m</div> <div>Pool Depth: 0.22 m</div> <div>Residual Pool Depth: 0.19 m</div> <div>Bankfull Depth: 1.22 m (left), 1.44 (right)</div> <div>Bank Height: 1.00 m (left), 1.22 (right)</div> <div>D₉₅: 0.45 m</div> <div>D: 0.01 m</div> <div>Confinement: Partially Confined</div> <div>Channel Morphology: Riffle-Pool</div> <div>Channel Gradient: 2⁰</div> <div>Turbidity: 0.00 FTU</div> <div>Side Slope: R – 20%; L – 5%</div> <div>Approach: R – 80%; L – 95%</div> <div>Bank Stability: Low</div> <div>Erosion Potential: High</div> <div>Undercut Banks: None</div>	Mesohabitat Composition: Riffle – 95%; Pool – 5%	Arctic Char		
	Substrate Composition: Cobble – 60%; Gravel – 25%; Sand – 10%; Boulders – 5%	Spawning:	None	
	Stream Cover: Boulders – 5%, Instream Vegetation – 1%	Migration:	None	
	Riparian Vegetation: Grasses and willows	Rearing:	Yes	
	Aquatic Vegetation: Submerged grasses	Overwintering:	None	
	Unique Features: None	Ninespine Stickleback		
	Summary: This is a medium-sized waterbody with dominant riffle and mostly cobble habitat. The banks have high erosion potential, particularly on the right bank. Vegetation and boulders are the only significant available cover.	Spawning:	Unlikely	
		Migration:	Unlikely	
		Rearing:	Unlikely	
		Overwintering:	None	
	Fish Habitat Quality		Comments	
	Important	This site provides suitable habitat for juvenile char to rear or take refuge from larger char in the lake downstream. However, due to the relatively low water levels, adult use is unlikely. Higher velocities also probably limit stickleback presence.		
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Bulk Sample Road Watercourse Crossing Assessment



Figure 1: Downstream aerial view from proposed crossing showing riffle-pool habitat and multiple wetted channels.



Figure 2: Upstream aerial view from proposed crossing showing the braided channel.

Baffinland Iron Mines
Mary River Project
Watercourse Crossing Assessment

Location					
Site:		CV-223		Watercourse Name:	
UTM:		17W 0555817 / 7914691		Unknown River	
Site Description				Potential Fish Utilization	
Watershed Size: 59.240 km ² Regulated: No Channelized: No Bankfull Width: 195.0 m Wetted Width: 117.0 m Riffle-Crest Depth: 0.27 m Pool Depth: 0.30 m Residual Pool Depth: 0.03 m Bankfull Depth: 1.40 m Bank Height: 1.1 m D₉₅: 0.49 m D: 0.03 m Confinement: N/A (braided channel) Channel Morphology: Riffle-Pool Channel Gradient: 1 ⁰ Turbidity: 8.67 FTU Side Slope R – 15%; L – 15% Approach: R – 85%; L – 85% Bank Stability: Low Erosion Potential: High Undercut Banks: None		Mesohabitat Composition: Riffle – 50%; Pool – 50%		Arctic Char	
		Substrate Composition: Cobble – 60%; Gravel – 30%; Boulders – 10%		Spawning: Possible	
		Stream Cover: Boulders – 10%		Migration: Possible	
		Riparian Vegetation: Grasses, moss, and willows		Rearing: Yes	
		Aquatic Vegetation: Algae		Overwintering: None	
		Unique Features: None			
		Summary: This is an extra large-sized waterbody with abundant riffle and pool habitat with cobble and gravel substrate. The banks have high erosion potential. Boulders are the only significant available cover. The channel is braided with three wetted channels measuring 18 m, 35 m, and 64 m wide.			

Bulk Sample Road Watercourse Crossing Assessment



Figure 1: Downstream view from proposed crossing showing flat, sandy habitat with large, unnamed lake visible.




Figure 2: Upstream view from proposed crossing showing flat, sandy habitat.



Figure 3: View across CV-217.

Baffinland Iron Mines
Mary River Project
Watercourse Crossing Assessment

Location			
Site:	CV-217		Watercourse Name: Unknown River
UTM:	17W 0542218 / 7922157		
Site Description		Potential Fish Utilization	
Watershed Size: 153.045 km ² Regulated: No Channelized: No Bankfull Width: 162.0 m Wetted Width: 124.0 m Flat Depth: 0.42 m Pool Depth: N/A Residual Pool Depth: N/A Bankfull Depth: 7.37 m Bank Height: 6.95 m D₉₅: 0.05 m D: <0.001 m Confinement: Partially Confined Channel Morphology: Flat Channel Gradient: 0° Turbidity: 0.00 FTU Side Slope R – 15%; L – 15% Approach: R – 85%; L – 85% Bank Stability: Low Erosion Potential: High Undercut Banks: None	Mesohabitat Composition: Flat – 100% Substrate Composition: Sand – 60%; Gravel – 40% Stream Cover: None Riparian Vegetation: Small intermittent patches of small plants, willows and grasses Aquatic Vegetation: None Unique Features: None Summary: This is an extra large-sized waterbody consisting almost exclusively of flat habitat with fine substrates. The banks have high erosion potential and there is no significant cover.		Arctic Char
			Spawning: Unlikely
			Migration: Yes
			Rearing: Possible
			Overwintering: Possible
			Ninespine Stickleback
			Spawning: Possible
			Migration: Possible
			Rearing: Yes
			Overwintering: Possible
		Fish Habitat Quality	Comments
		Important	This waterbody, which is the major outlet of a large lake, is unlike most crossings along the bulk transport road. It is deep and relatively slow-moving and may not freeze entirely during winter, thus allowing for potential overwintering. However, a lack of cover and fine substrates are not ideal conditions for juveniles in a river that is accessible to adult char. Therefore juvenile use is likely limited and possibly migratory only. Spawning may occur near the crossing or further upstream so this area could be important during fall. In addition, this habitat is more suitable for stickleback use and one was captured during fisheries investigations.
		 NORTH/SOUTH CONSULTANTS INC. AQUATIC ENVIRONMENT SPECIALISTS	

Bulk Sample Road Watercourse Crossing Assessment



Figure 1: Downstream view from proposed crossing with Phillips Creek visible. Riffle habitat type with predominantly sand/gravel substrate.




Figure 2: Upstream view from proposed crossing showing relatively steep gradient.



Figure 3: View across CV-156.

Baffinland Iron Mines
Mary River Project
Watercourse Crossing Assessment

Location						
Site: CV-156		Watercourse Name: Unknown River				
UTM: 17W 0507580 / 7970389						
Site Description			Potential Fish Utilization			
<div>Watershed Size: 0.066 km²</div> <div>Regulated: No</div> <div>Channelized: No</div> <div>Bankfull Width: 0.60 m</div> <div>Wetted Width: 0.26 m</div> <div>Riffle Crest Depth: 0.03 m</div> <div>Residual Pool Depth: N/A</div> <div>Bankfull Depth: 0.10 m</div> <div>Bank Height: 0.07 m</div> <div>D₉₅: 0.16 m</div> <div>D: 0.001 m</div> <div>Confinement: Unconfined</div> <div>Channel Morphology: Riffle</div> <div>Channel Gradient: 15⁰</div> <div>Turbidity: 0.00 FTU</div> <div>Side Slope: R – 5%; L – 5%</div> <div>Approach: R – 95%; L – 95%</div> <div>Bank Stability: Moderate-High</div> <div>Erosion Potential: Low-Moderate</div> <div>Undercut Banks: None</div>	<div>Mesohabitat Composition: Riffle – 100%</div> <div>Substrate Composition: Sand – 75%; Gravel – 20%; Cobble – 5%</div> <div>Stream Cover: In- and Overstream vegetation – 2%;</div> <div>Riparian Vegetation: Grasses</div> <div>Aquatic Vegetation: Submerged grasses</div> <div>Unique Features: None</div> <div>Summary: This is an extra small, nearly waterless stream with predominantly sand substrate and low-moderate erosion potential. There is relatively little significant cover.</div>		<div>Arctic Char</div> <div>Spawning: No</div> <div>Migration: No</div> <div>Rearing: No</div> <div>Overwintering: No</div>			
				<div>Ninespine Stickleback</div> <div>Spawning: No</div> <div>Migration: No</div> <div>Rearing: No</div> <div>Overwintering: No</div>		
				<div>Comments</div> <div>This waterbody is likely significant only as a spring runoff stream. Even at peak flows, the gradient is likely too steep and water levels too low to offer useful habitat even for stickleback or young-of-the-year char from nearby Phillips Creek.</div>		
				<div> NORTH/SOUTH CONSULTANTS INC. AQUATIC ENVIRONMENT SPECIALISTS</div>		

Bulk Sample Road Watercourse Crossing Assessment



Figure 1: Downstream view from proposed crossing. Riffle-pool habitat type with predominantly cobble/sand substrate. Falls begin at the arrow.



Figure 2: Upstream view from proposed crossing showing pool habitat.

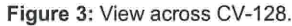
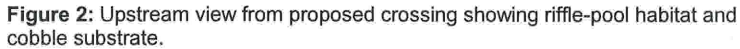
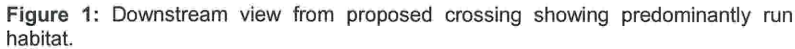


Figure 3: View across CV-146.


Baffinland Iron Mines
Mary River Project
Watercourse Crossing Assessment

Location			
Site:	CV-146	Watercourse Name:	Unknown River
UTM:	17W 0508786 / 7968870		
Site Description		Potential Fish Utilization	
Watershed Size:	1.021 km ²	Arctic Char	
Regulated:	No	Spawning:	No
Channelized:	No	Migration:	No
Bankfull Width:	2.40 m	Rearing:	No
Wetted Width:	2.40 m	Overwintering:	No
Pool Depth:	0.18 m	Ninespine Stickleback	
Residual Pool Depth:	0.08 m	Spawning:	No
Bankfull Depth:	0.18 m	Migration:	No
Bank Height:	0.00 m	Rearing:	No
D ₉₅ :	0.57 m	Overwintering:	No
D:	0.001 m	Comments	
Confinement:	Unconfined	This waterbody is likely significant only as a spring runoff stream. Though the gradient at the proposed crossing is low, there is a set of falls downstream before this creek enters Phillips Creek. In addition, this creek dries up approximately 200 m further upstream from the crossing. Although the habitat may be suitable for small fish, there appears to be no access from areas where overwintering is possible.	
Channel Morphology:	Riffle-pool		
Channel Gradient:	2 ⁰		
Turbidity:	0.00 FTU		
Side Slope	R – 0%; L – 0%		
Approach:	R – 100%; L – 100%	Fish Habitat Quality	
Bank Stability:	Low	None	
Erosion Potential:	Moderate-High		
Undercut Banks:	None		
Mesohabitat Composition:			
Substrate Composition:			
Stream Cover:			
Riparian Vegetation:			
Aquatic Vegetation:			
Unique Features:			
Summary:			

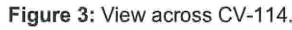
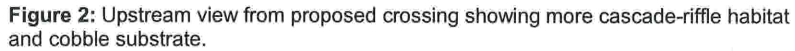
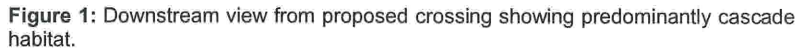
Bulk Sample Road Watercourse Crossing Assessment




Baffinland Iron Mines Mary River Project Watercourse Crossing Assessment

Location					
Site:		CV-128		Watercourse Name:	
UTM:		17W 0513544 / 7965894		Unknown River	
Site Description				Potential Fish Utilization	
Watershed Size: 251.57 km ² Regulated: No Channelized: No Bankfull Width: 44.0 m Wetted Width: 44.0 m Pool Depth: 0.20 m Residual Pool Depth: 0.05 m Bankfull Depth: 0.55 m Bank Height: 0.35 m D₉₅: 0.51 m D: 0.07 m Confinement: Unconfined Channel Morphology: Riffle-pool Channel Gradient: 1 ⁰ Turbidity: 0.00 FTU Side Slope R – 0%; L – 0% Approach: R – 100%; L – 100% Bank Stability: Low-Moderate Erosion Potential: Low-Moderate Undercut Banks: Some		Mesohabitat Composition: Riffle – 25%; Pool – 25%; Run – 50% Substrate Composition: Cobble – 85%; Boulders – 10%; Gravel – 5%; Stream Cover: Boulders – 10%; Undercut – 2%; In- and Overstream Vegetation - 2% Riparian Vegetation: Grasses Aquatic Vegetation: None Unique Features: None Summary: This is an extra large stream characterized by riffles, pools, and runs. Substrate is predominantly cobble and the banks have low-moderate erosion potential. There is a variety of potential cover with boulders the main type.		Arctic Char Spawning: Possible (land-locked char) Migration: Possible Rearing: Yes Overwintering: Unlikely	
		Ninespine Stickleback Spawning: Possible but unlikely Migration: Possible but unlikely Rearing: Possible but unlikely Overwintering: Unlikely			
		Fish Habitat Quality		Comments	
		Important		This large stream has suitable habitat for all life-cycle stages of char and stickleback though only juvenile char were observed during fisheries investigations. The water may be too fast and too clear for stickleback. In addition, accessibility to larger char may decrease the value of the stream as refuge habitat for juveniles.	
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Bulk Sample Road Watercourse Crossing Assessment



**Baffinland Iron Mines
Mary River Project
Watercourse Crossing Assessment**

Location			
Site:	CV-104	Watercourse Name:	Unknown River
UTM:	17W 0521732 / 7952787		
Site Description		Potential Fish Utilization	
Watershed Size: 5.198 km ² Regulated: No Channelized: No Bankfull Width: 6.0 m Wetted Width: 6.0 m Riffle-Crest Depth: 0.06 m Residual Pool Depth: N/A Bankfull Depth: 0.31 m Bank Height: 0.25 m D ₉₅ : 0.26 m D: 0.02 m Confinement: Unconfined Channel Morphology: Cascade-Riffle Channel Gradient: 8 ⁰ Turbidity: 0.00 FTU Side Slope: R – 1%; L – 1% Approach: R – 99%; L – 99% Bank Stability: Moderate-High Erosion Potential: Low-Moderate Undercut Banks: None	Mesohabitat Composition: Cascade – 50%; Riffle – 50%	Arctic Char	
	Substrate Composition: Cobble – 80%; Gravel – 15%; Boulders – 5%;	Spawning:	Unlikely
	Stream Cover: Boulders – 5%; In- and Overstream Vegetation - 5%	Migration:	Unlikely
	Riparian Vegetation: Grasses, willows, fireweed	Rearing:	Yes
	Aquatic Vegetation: Algae	Overwintering:	Unlikely
	Unique Features: None	Ninespine Stickleback	
	Summary: This is a medium-sized stream characterized by cascades. Substrate is predominantly cobble and the banks have low-moderate erosion potential. Cover is relatively limited.	Spawning:	Unlikely
		Migration:	Unlikely
		Rearing:	Unlikely
		Overwintering:	Unlikely
Fish Habitat Quality		Comments	
Marginal		This waterbody has suitable habitat for juvenile and young-of-the-year char. A few YOY char were observed during fisheries investigations. The lack of calm, slow-flowing water may prevent extensive use by char or stickleback. The proximity of Phillips Creek suggests that there should be at least occasional use by young char for feeding and refuge.	
		 NORTH/SOUTH CONSULTANTS INC. AQUATIC ENVIRONMENT SPECIALISTS	

Bulk Sample Road Watercourse Crossing Assessment



Figure 1: Downstream view from proposed crossing showing cascade-riffle habitat.




Figure 2: Upstream view from proposed crossing showing more cascade-riffle habitat and cobble substrate.



Figure 3: View across CV-104.

Baffinland Iron Mines
Mary River Project
Watercourse Crossing Assessment

Location			
Site:	CV-104		Watercourse Name: Unknown River
UTM:	17W 0521732 / 7952787		
Site Description		Potential Fish Utilization	
Watershed Size: 5.198 km ² Regulated: No Channelized: No Bankfull Width: 6.0 m Wetted Width: 6.0 m Riffle-Crest Depth: 0.06 m Residual Pool Depth: N/A Bankfull Depth: 0.31 m Bank Height: 0.25 m D₉₅: 0.26 m D: 0.02 m Confinement: Unconfined Channel Morphology: Cascade-Riffle Channel Gradient: 8° Turbidity: 0.00 FTU Side Slope: R – 1%; L – 1% Approach: R – 99%; L – 99% Bank Stability: Moderate-High Erosion Potential: Low-Moderate Undercut Banks: None	Mesohabitat Composition: Cascade – 50%; Riffle – 50% Substrate Composition: Cobble – 80%; Gravel – 15%; Boulders – 5%; Stream Cover: Boulders – 5%; In- and Overstream Vegetation - 5% Riparian Vegetation: Grasses, willows, fireweed Aquatic Vegetation: Algae Unique Features: None Summary: This is a medium-sized stream characterized by cascades. Substrate is predominantly cobble and the banks have low-moderate erosion potential. Cover is relatively limited.	Arctic Char	
			Spawning: Unlikely
			Migration: Unlikely
			Rearing: Yes
			Overwintering: Unlikely
			Ninespine Stickleback
			Spawning: Unlikely
			Migration: Unlikely
			Rearing: Unlikely
			Overwintering: Unlikely
		Fish Habitat Quality	
		Marginal	
		Comments	
		This waterbody has suitable habitat for juvenile and young-of-the-year char. A few YOY char were observed during fisheries investigations. The lack of calm, slow-flowing water may prevent extensive use by char or stickleback. Juvenile char from Phillips Creek likely use this creek for feeding and refuge during the open water season.	
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Bulk Sample Road Watercourse Crossing Assessment



Figure 1: Downstream view from proposed crossing showing pool habitat.



Figure 2: Upstream view from proposed crossing showing more cascade-riffle habitat and cobble substrate.



Figure 3: View across CV-99.

Baffinland Iron Mines
Mary River Project
Watercourse Crossing Assessment

Location			
Site:	CV-99	Watercourse Name:	Unknown River
UTM:	17W 0521811 / 7948819		
Site Description		Potential Fish Utilization	
Watershed Size:	28.559 km ²	Arctic Char	
Regulated:	No	Spawning:	Possible
Channelized:	No	Migration:	Possible
Bankfull Width:	24.0 m	Rearing:	Yes
Wetted Width:	8.0 m	Overwintering:	Unlikely
Riffle-Crest Depth:	0.15 m	Ninespine Stickleback	
Pool Depth:	0.51 m	Spawning:	Possible
Residual Pool Depth:	0.36 m	Migration:	Possible
Bankfull Depth:	0.44 m	Rearing:	Possible
Bank Height:	0.12 m	Overwintering:	Unlikely
D ₉₅ :	0.88 m	Comments	
D:	0.04 m	This waterbody has suitable habitat for several life cycle stages of char though it is likely used primarily for rearing of young fish. Many YOY and juvenile char were observed and captured during fisheries investigations. Reduced turbidity may prevent extensive use by stickleback.	
Confinement:	Moderately Confined		
Channel Morphology:	Riffle-Pool		
Channel Gradient:	1 ⁰		
Turbidity:	0.00 FTU	Important	
Side Slope	R – 5%; L – 5%		
Approach:	R – 95%; L – 95%		
Bank Stability:	High		
Erosion Potential:	Low	Fish Habitat Quality	
Undercut Banks:	None		



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Bulk Sample Road Watercourse Crossing Assessment



Figure 1: Aerial view of proposed crossing showing a dry cobble/gravel creek bed.




Figure 1: Aerial view of proposed crossing showing a dry cobble/gravel creek bed.



Location					
Site:		CV-95		Watercourse Name:	
UTM:		17W 0522618 / 7945799		Unknown River	
Site Description				Potential Fish Utilization	
Watershed Size:		0.119 km ²		Arctic Char	
Regulated:		No		Spawning:	
Channelized:		No		Migration:	
Bankfull Width:		N/A		Rearing:	
Wetted Width:		N/A		Overwintering:	
Riffle-Crest Depth:		N/A			
Pool Depth:		N/A		Ninespine Stickleback	
Residual Pool Depth:		N/A		Spawning:	
Bankfull Depth:		N/A		Migration:	
Bank Height:		N/A		Rearing:	
D ₉₅ :		N/A		Overwintering:	
D:		N/A			
Confinement:		N/A			
Channel Morphology:		N/A			
Channel Gradient:		N/A			
Turbidity:		N/A			
Side Slope		N/A			
Approach:		N/A			
Bank Stability:		N/A			
Erosion Potential:		N/A			
Undercut Banks:		N/A			

Baffinland Iron Mines
Mary River Project
Watercourse Crossing Assessment

Bulk Sample Road Watercourse Crossing Assessment





Figure 1: Aerial view of proposed crossing showing an almost completely dry cobble/gravel creek bed.

	Location				
	Site: CV-93		Watercourse Name: Unknown River		
	UTM: 17W 0523116 / 7944890				
	Site Description			Potential Fish Utilization	
	<div><div>Watershed Size: 0.880 km²</div><div>Regulated: No</div><div>Channelized: No</div><div>Bankfull Width: N/A</div><div>Wetted Width: N/A</div><div>Riffle-Crest Depth: N/A</div><div>Pool Depth: N/A</div><div>Residual Pool Depth: N/A</div><div>Bankfull Depth: N/A</div><div>Bank Height: N/A</div><div>D₉₅: N/A</div><div>D: N/A</div><div>Confinement: N/A</div><div>Channel Morphology: N/A</div><div>Channel Gradient: N/A</div><div>Turbidity: N/A</div><div>Side Slope: N/A</div><div>Approach: N/A</div><div>Bank Stability: N/A</div><div>Erosion Potential: N/A</div><div>Undercut Banks: N/A</div></div>		Arctic Char		
			Spawning: None		
			Migration: None		
			Rearing: None		
			Overwintering: None		
			Ninespine Stickleback		
Spawning: None					
Migration: None					
Rearing: None					
Overwintering: None					
Fish Habitat Quality			Comments		
None			This waterbody is ephemeral and provides no suitable fish habitat. Even during high water in spring there is not likely any fish use. There is a cliff downstream of the crossing that would represent a significant barrier to fish passage even if water levels were sufficient.		
Baffinland Iron Mines Mary River Project Watercourse Crossing Assessment			 NORTH/SOUTH CONSULTANTS INC. AQUATIC ENVIRONMENT SPECIALISTS		

Bulk Sample Road Watercourse Crossing Assessment



Figure 1: Aerial view of proposed crossing showing a completely dry cobble/gravel creek bed.

	Location				
	Site: CV-92		Watercourse Name: Unknown River		
	UTM: 17W 0523106 / 7944186				
	Site Description			Potential Fish Utilization	
	<div><div><div>Watershed Size: 3.453 km²</div><div>Regulated: No</div><div>Channelized: No</div><div>Bankfull Width: N/A</div><div>Wetted Width: N/A</div><div>Riffle-Crest Depth: N/A</div><div>Pool Depth: N/A</div><div>Residual Pool Depth: N/A</div><div>Bankfull Depth: N/A</div><div>Bank Height: N/A</div><div>D₉₅: N/A</div><div>D: N/A</div><div>Confinement: N/A</div><div>Channel Morphology: N/A</div><div>Channel Gradient: N/A</div><div>Turbidity: N/A</div><div>Side Slope: N/A</div><div>Approach: N/A</div><div>Bank Stability: N/A</div><div>Erosion Potential: N/A</div><div>Undercut Banks: N/A</div></div><div><div>Mesohabitat Composition: N/A</div><div>Substrate Composition: N/A</div><div>Stream Cover: N/A</div><div>Riparian Vegetation: N/A</div><div>Aquatic Vegetation: N/A</div><div>Unique Features: N/A</div><div>Summary: This is a medium waterbody that was completely dry at the time of sampling in August. It is probably only a spring run-off stream</div></div></div>			Arctic Char	
				Spawning: None	
				Migration: None	
				Rearing: None	
				Overwintering: None	
				Ninespine Stickleback	
Spawning: None					
Migration: None					
Rearing: None					
Overwintering: None					
			Comments		
			This waterbody is ephemeral and provides no suitable fish habitat. Even during high water in spring there is not likely any fish use.		
			<div> NORTH/SOUTH CONSULTANTS INC. AQUATIC ENVIRONMENT SPECIALISTS</div>		
Baffinland Iron Mines Mary River Project Watercourse Crossing Assessment					

Bulk Sample Road Watercourse Crossing Assessment



Figure 1: Downstream view from proposed crossing showing cascade habitat with cobble and boulders.



Figure 2: Upstream view from proposed crossing showing more cascade habitat and cobble substrate.



Figure 3: View across CV-87.

Baffinland Iron Mines
Mary River Project
Watercourse Crossing Assessment

Location

Site: CV-87
UTM: 17W 0523704 / 7941040

Watercourse Name: Unknown River

Site Description

Watershed Size: 9.873 km²
Regulated: No
Channelized: No
Bankfull Width: 55.0 m
Wetted Width: 10.0 m
Riffle-Crest Depth: 0.20 m
Pool Depth: N/A
Residual Pool Depth: N/A
Bankfull Depth: 0.52 m
Bank Height: 0.32 m
D₉₅: 0.72 m
D: 0.04 m
Confinement: N/A (braided stream)
Channel Morphology: Cascade
Channel Gradient: 11°
Turbidity: 0.00 FTU
Side Slope: R – 10%; L – 10%
Approach: R – 90%; L – 90%
Bank Stability: High
Erosion Potential: Low-Moderate
Undercut Banks: None

Mesohabitat Composition: Cascade – 100%
Substrate Composition: Cobble – 75%; Boulder – 20%; Gravel – 5%
Stream Cover: Boulders – 20%
Riparian Vegetation: Moss, small plants, grasses, willows
Aquatic Vegetation: None
Unique Features: None
Summary: This is a large-sized waterbody but it has relatively shallow depths and higher velocities characterized by cascades. Substrate is predominantly cobble and the banks have low erosion potential.

Potential Fish Utilization

Arctic Char

Spawning: None
Migration: None
Rearing: Possible but Unlikely
Overwintering: None

Ninespine Stickleback

Spawning: None
Migration: None
Rearing: None
Overwintering: None

Fish Habitat Quality

Marginal

Comments

Though a large watershed, habitat in this waterbody is likely unsuitable for fish. It lacks areas of slow flow that char seem to prefer and has relatively little wetted width at the time of sampling. It is marginal fish habitat at best but more likely provides no fish habitat.



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Bulk Sample Road Watercourse Crossing Assessment



Figure 1: Downstream view from proposed crossing showing riffle-pool habitat with cobble and boulders.



Figure 2: Upstream view from proposed crossing showing more cascade habitat and cobble substrate.



Figure 3: View across CV-78.

Baffinland Iron Mines
Mary River Project
Watercourse Crossing Assessment

Location

Site: CV-78
UTM: 17W 0525852 / 7936787

Watercourse Name: Unknown River

Site Description

Watershed Size: 19.440 km²
Regulated: No
Channelized: No
Bankfull Width: 31.0 m
Wetted Width: 21.0 m
Riffle-Crest Depth: 0.06 m
Pool Depth: 0.38 m
Residual Pool Depth: 0.44 m
Bankfull Depth: 0.55 m
Bank Height: 0.49 m
D₉₅: 0.30 m
D: 0.02 m
Confinement: Partially Confined
Channel Morphology: Riffle-Pool
Channel Gradient: 2°
Turbidity: 0.00 FTU
Side Slope: R – 5%; L – 5%
Approach: R – 95%; L – 95%
Bank Stability: High
Erosion Potential: Low-Moderate
Undercut Banks: None

Mesohabitat Composition: Riffle – 50%; Pool – 50%
Substrate Composition: Cobble – 80%; Gravel – 15%; Boulder – 5%
Stream Cover: Boulders – 5%
Riparian Vegetation: Moss, small plants, grasses
Aquatic Vegetation: None
Unique Features: None
Summary: This is a large-sized waterbody with typical riffle-pool habitat. Substrate is predominantly cobble and the banks have low erosion potential.

Potential Fish Utilization

Arctic Char

Spawning: Possible but Unlikely
Migration: Possible
Rearing: Yes
Overwintering: None

Ninespine Stickleback

Spawning: Possible
Migration: Possible
Rearing: Possible
Overwintering: None

Fish Habitat Quality

Important

Comments

This large waterbody has sufficient slow-moving habitat for juvenile char. Many small char were captured during fisheries studies. The habitat, however, is less suitable for ninespine stickleback.



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Bulk Sample Road Watercourse Crossing Assessment

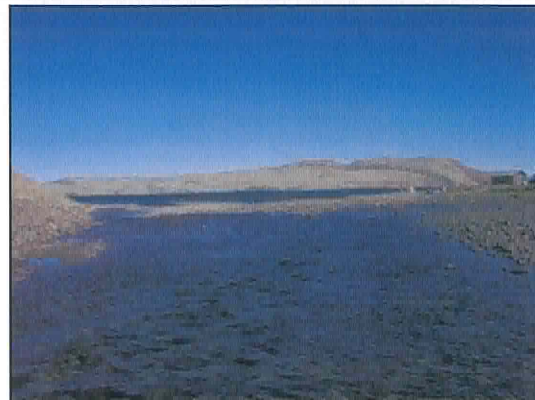


Figure 1: Downstream view from proposed crossing with Milne Inlet visible in the distance. Riffle-run habitat type with cobble/boulder substrate.




Figure 2: Upstream view from proposed crossing. Riffle-run habitat type with cobble/boulder substrate.



Figure 3: View across CV-183. Riffle-run habitat type with cobble/boulder substrate.

Baffinland Iron Mines
Mary River Project
Watercourse Crossing Assessment

Location			
Site:	CV-183		Watercourse Name: Unknown River
UTM:	17W 0504695 / 7976416		
Site Description		Potential Fish Utilization	
Watershed Size:	59.897 km ²	Arctic Char	
Regulated:	No	Spawning:	Yes [Anadromous char]
Channelized:	No	Migration:	Yes
Bankfull Width:	30 m	Rearing:	Yes
Wetted Width:	12 m	Overwintering:	Unlikely
Riffle Crest Depth:	0.31 m	Ninespine Stickleback	
Residual Pool Depth:	N/A	Spawning:	Possible but unlikely
Bankfull Depth:	1.11 m	Migration:	Possible but unlikely
Bank Height:	0.80 m	Rearing:	Possible but unlikely
D ₉₅ :	0.32 m	Overwintering:	Unlikely
D:	0.014 m	Aquatic Habitat Quality	
Confinement:	Partial confinement	Important	
Channel Morphology:	Riffle-Run		
Channel Gradient:	1 ⁰		
Turbidity:	0.00 FTU		
Side Slope	R – 10%; L – 10%		
Approach:	R – 90%; L – 90%		
Bank Stability:	Moderate	Comments	
Erosion Potential:	High		
Undercut Banks:	None		
		There are several small lakes upstream in this watershed. The proximity to marine habitat means that marine and estuarine fish may sometimes move upstream as far as the crossing for feeding. For example, a sculpin (<i>Myoxocephalus</i> sp.) was observed during electrofishing downstream of the crossing. The overall importance of this stream to these other species during the open water season is difficult to determine.	
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Bulk Sample Road Watercourse Crossing Assessment



Figure 1: Downstream view from proposed crossing showing pool habitat and existing culvert.



Figure 2: Upstream view from proposed crossing showing riffle-pool habitat.



Figure 3: View across CV-187.

Baffinland Iron Mines
Mary River Project
Watercourse Crossing Assessment

Location				
Site:	CV-187	Watercourse Name:	Unknown River	
UTM:	17W 0560957 / 7913414			
Site Description		Potential Fish Utilization		
Watershed Size: 0.907 km ² Regulated: No Channelized: No Bankfull Width: 5.7 m Wetted Width: 4.0 m Riffle-Crest Depth: 0.02 m Pool Depth: 0.38 m Residual Pool Depth: 0.36 m Bankfull Depth: 0.62 m Bank Height: 0.60 m D ₉₅ : 0.95 m D: <0.001 m Confinement: Partially Confined Channel Morphology: Riffle-Pool Channel Gradient: 0.5 ⁰ Turbidity: 0.00 FTU Side Slope R – 5%; L – 5% Approach: R – 95%; L – 95% Bank Stability: Low-Moderate Erosion Potential: Moderate Undercut Banks: None	Mesohabitat Composition: Pool – 80%; Riffle – 20%	Arctic Char		
	Substrate Composition: Cobble – 70%; Gravel – 10%; Boulders – 10%; Silt/organic – 10%		Spawning: None	
	Stream Cover: Boulders – 10%; Instream Vegetation – 15%		Migration: None	
	Riparian Vegetation: Small plants, willows, and grasses	Rearing: Yes	Overwintering: None	
	Aquatic Vegetation: Algae, submerged grasses			
	Unique Features: Fuel drum culvert at crossing	Ninespine Stickleback		
	Summary: This is a small-sized waterbody consisting largely of pool habitat with cobble substrate. The banks have moderate erosion potential and there is a variety of available cover.	Spawning: Unlikely		
		Migration: Unlikely		
		Rearing: Unlikely		
		Overwintering: None		
	Fish Habitat Quality		Comments	
	Important		Abundant pools with some larger substrates represent ideal habitat for juvenile char. Several young char were captured during fisheries investigations. There is probably little use by adult char or by sticklebacks.	

Bulk Sample Road Watercourse Crossing Assessment

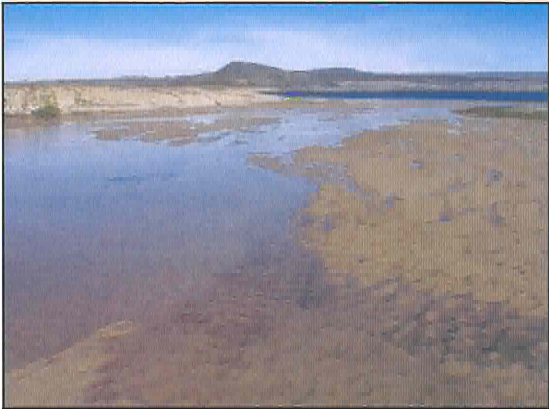


Figure 1: Downstream view from proposed crossing showing flat, shallow, sandy habitat and exposed sand bar preventing access to large lake.




Figure 2: Upstream view from proposed crossing showing flat, sandy habitat.



Figure 3: View across CV-216.

Baffinland Iron Mines
Mary River Project
Watercourse Crossing Assessment

Location				
Site:	CV-216	Watercourse Name:	Unknown River	
UTM:	17W 0542773 / 7921699			
Site Description		Potential Fish Utilization		
Watershed Size: 13.318 km ² Regulated: No Channelized: No Bankfull Width: 38.0 m Wetted Width: 28.0 m Flat Depth: 0.09 m Pool Depth: N/A Residual Pool Depth: N/A Bankfull Depth: 0.63 m Bank Height: 0.54 m D ₉₅ : 0.04 m D: <0.001 m Confinement: Partially Confined Channel Morphology: Riffle-Flat Channel Gradient: 0° Turbidity: 0.00 FTU Side Slope: R – 10%; L – 10% Approach: R – 90%; L – 90% Bank Stability: Low Erosion Potential: High Undercut Banks: None	Mesohabitat Composition: Flat – 98%; Riffle – 2%	Arctic Char		
	Substrate Composition: Sand – 95%; Gravel – 5%	Spawning:	None	
	Stream Cover: None	Migration:	Unlikely	
	Riparian Vegetation: Small plants and grasses	Rearing:	Unlikely	
	Aquatic Vegetation: None	Overwintering:	None	
	Unique Features: None	Ninespine Stickleback		
	Summary: This is a large-sized waterbody consisting almost exclusively of flat habitat with fine substrates. The banks have high erosion potential and there is no significant cover.	Spawning:	Unlikely	
		Migration:	Unlikely	
		Rearing:	Unlikely	
		Overwintering:	None	
	Fish Habitat Quality		Comments	
	Marginal		This waterbody is a smaller outlet of the same lake CV-217 drains. However, at the time of sampling there was no actual connection with the lake as water levels were too low. It is highly unlikely that adult fish use this tributary, particularly for fall spawning migrations. Due to a lack of preferred habitat (larger substrate sizes and deeper pools) juvenile use is likely also limited. There is also likely little use by sticklebacks.	
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