

# APPENDIX F WATERCOURSE CROSSING ASSESSMENT DATA SHEETS

Assessment Sheets 30 pages

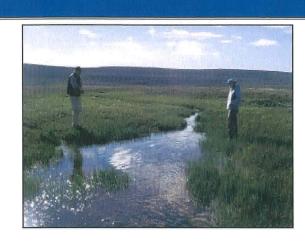


Figure 1: Downstream view from proposed crossing showing abundant pool habitat and vegetation.



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



Figure 3: View across CV-60.

	V-60 7W 0527621 / 7930342			Watercourse Name	e: Unknown River
OTM. 17	777 03270217 7 930342	Site Description		Pote	ntial Fish Utilization
			<u> 1996 (1997) (1</u>	Lips Participal participal pictures	Arctic Char
Watershed Size: Regulated: Channelized: Bankfull Width: Wetted Width: Riffle-Crest Depth: Pool Depth: Residual Pool Depth: Bankfull Depth: Bank Height: D <sub>95</sub> : D: Confinement:	5.257 km <sup>2</sup> No No No 12.0 m 3.6 m 0.12 m 0.62 m 0.50 m 0.62 m N/A N/A V/A V/COOO11 m Unconfined	Mesohabitat Composition: Substrate Composition: Stream Cover: Riparian Vegetation: Aquatic Vegetation: Unique Features: Summary:	Pool – 90%; Riffle – 10%  Sand – 90%; Gravel – 10%  Undercut – 5%; In- and Overstream Vegetation – 20%  Moss, grasses, willows  None  None  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.	Spawning: Migration: Rearing: Overwintering: Nin Spawning: Migration: Rearing: Overwintering:	Unlikely Unlikely Yes None  Pespine Stickleback  Possible Possible Possible None
Channel Morphology:	Riffle-Pool	F:	sh Habitat Quality		Comments
Channel Gradient: Turbidity: Side Slope Approach: Bank Stability: Erosion Potential: Undercut Banks:	0° 0.00 FTU R - 5%; L - 5% R - 95%; L - 95% Low-Moderate Low-Moderate Some		Important	char. Many small ch during fisheries stud adult char. Though	abundant pool habitat for juvenile nar were observed or captured dies. There is likely little to no use l not captured ninespine stickleback reek as both a feeding and refuge

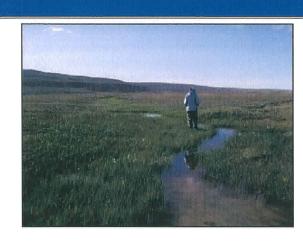


Figure 1: Downstream view from proposed crossing showing pool habitat with vegetation.

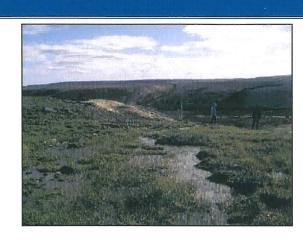


Figure 2: Upstream view from proposed crossing showing more pool habitat.



Figure 3: View across CV-57.

			Location		
Site: UTM:	CV-57 17W 0528378 / 7928656			Watercourse Name	: Unknown River
	S	ite Description		Poter	ntial Fish Utilization
Watershed Size: Regulated: Channelized: Bankfull Width: Wetted Width: Riffle-Crest Depth: Pool Depth: Residual Pool Depth Bankfull Depth:	0.563 km <sup>2</sup> No No 8.0 m 1.0 m N/A 0.60 m  1.0 m	Mesohabitat Composition: Substrate Composition: Stream Cover: Riparian Vegetation: Aquatic Vegetation: Unique Features: Summary:	Undercut – 5%; In- and Overstream Vegetation – 20%  Moss, grasses, Arctic cotton  None  None  This is a small-sized waterbody composed almost entirely of pool habitat with sand substrate. The banks have moderate erosion	Spawning:	Arctic Char  Unlikely Unlikely Yes None  espine Stickleback  Possible
Bank Height:  D <sub>95</sub> :  D:  Confinement:  Channel Morphology		F	potential and there is relatively abundant vegetative cover.  ish Habitat Quality	Migration: Rearing: Overwintering:	Possible Possible None  Comments
Channel Gradient: Turbidity: Side Slope Approach: Bank Stability: Erosion Potential: Undercut Banks:	0° 0.00 FTU R - 5%; L - 5% R - 95%; L - 95% Low-Moderate Low-Moderate Some		Important	char. Several small during fisheries stud adult char. Though r may also use this cr area.	abundant pool habitat for juvenile char were observed or captured lies. There is likely little to no use by not captured ninespine stickleback eek as both a feeding and refuge
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**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.

			Location		
	CV-55 17W 0528842 / 7927584			Watercourse Name	: Unknown River
		Site Description		Poten	tial Fish Utilization
Watershed Size: Regulated: Channelized: Bankfull Width: Wetted Width: Riffle-Crest Depth: Pool Depth: Residual Pool Depth: Bankfull Depth: Bank Height: D95: D: Confinement: Channel Morphology Channel Gradient: Turbidity: Side Slope	N/A N/A 0.32 m 0.01 m Unconfined	Mesohabitat Composition: Substrate Composition: Stream Cover: Riparian Vegetation: Aquatic Vegetation: Unique Features: Summary:	Riffle – 50%; Cascade – 50%  Sand – 60%; Cobble – 20%; Gravel – 10%; Boulders – 10%  Boulders – 10%; In- and Overstream Vegetation – 40%  Moss, grasses, willows  None  This is an extra small-sized waterbody consisting of riffles and cascades with sand and cobble substrate. The banks have moderate erosion potential and there is relatively abundant cover.	Spawning: Migration: Rearing: Overwintering: Nine Spawning: Migration: Rearing: Overwintering:  Although habitat at the marginally suitable for drop downstream. The spawning of the spawning	Arctic Char  None None None None Spine Stickleback None None None None None None The proposed crossing may be or juvenile char, there is a steep his site is, therefore, likely
Approach: Bank Stability: Erosion Potential: Undercut Banks:	R – 93%; L – 93%  Moderate  Moderate  None				ther downstream. In addition, there vintering locations upstream.
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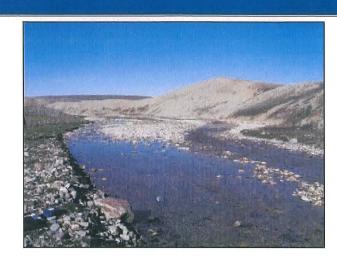


Figure 1: Downstream view from proposed crossing showing riffle habitat with cobble substrate.



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

Site: UTM:	CV-49 17W 0529676 / 7926541			Watercourse Name	: Unknown River
		Site Description		Poter	ntial Fish Utilization
Watershed Size: Regulated: Channelized: Bankfull Width: Wetted Width: Riffle-Crest Depth: Pool Depth: Residual Pool Depth Bankfull Depth: Bank Height: D <sub>95</sub> : D: Confinement:	0.70 m 0.60 m 1.24 m 0.004 m Partially Confined	Mesohabitat Composition: Substrate Composition: Stream Cover: Riparian Vegetation: Aquatic Vegetation: Unique Features: Summary:	Riffle – 100%  Cobble – 95%; Boulder – 3%; Gravel – 2%  Boulders – 3%  Moss, lichens, small plants  None  None  This is a large-sized waterbody consisting almost exclusively of riffles and cobble habitat. The banks have low-moderate erosion potential and there is relatively little available cover.	Spawning: Migration: Rearing: Overwintering:  Nine Spawning: Migration: Rearing: Overwintering:	Arctic Char  Possible Possible None  espine Stickleback  Unlikely Unlikely Unlikely None
Channel Morphology Channel Gradient:	/: Riffle	F	ish Habitat Quality		Comments
Turbidity: Side Slope Approach: Bank Stability: Erosion Potential: Undercut Banks:	0.00 FTU  R - 7%; L - 7%  R - 93%; L - 93%  Moderate  Low-Moderate  None		Important	be potentially suitabe char, none were cape investigations. Use I lack of low velocity a only use the site for some early spring festill potentially importalso restricted by ve	he proposed crossing appears to le for several life cycle stages of outred or observed during fisheries by juveniles may be limited due to a areas while adults may potentially spawning in the fall and maybe seding activity. However, this river is tant for char. Stickleback use is locity.  ORTH/SOUTH DNSULTANTS INC.

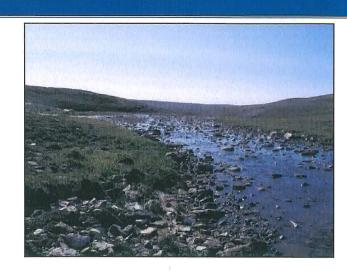


Figure 1: Downstream view from proposed crossing showing riffle habitat with cobble substrate.



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

				Location		
	Site: UTM:	CV-40 17W 0535175 / 7920305			Watercourse Name	e: Unknown River
			Site Description		Poter	ntial Fish Utilization
	Watershed Size:	12.021 km²	Mesohabitat Composition:	Riffle – 95%; Pool – 5%		Arctic Char
	Regulated: Channelized:	No No	Substrate Composition:		Spawning: Migration:	Unlikely Unlikely
	Bankfull Width:	19.0 m	Stream Cover:	Boulders – 10%	Rearing:	Possible
	Wetted Width:	12.0 m	Riparian Vegetation:	Moss, grasses	Overwintering:	None
•	Riffle-Crest Depth:	0.11 m	Aquatic Vegetation:	Algae		
	Pool Depth:	N/A	Unique Features:	None	Nine	espine Stickleback
	Residual Pool Depth	: N/A	Summary:	This is a large-sized waterbody consisting almost exclusively of riffles and cobble	Spawning:	Unlikely
	Bankfull Depth:	0.34 m		habitat. The banks have moderate erosion potential and boulders represent the only	Migration:	Unlikely
п	Bank Height:	0.23 m		available cover.	Rearing:	Unlikely
	D <sub>95</sub> :	1.16 m			Overwintering:	None
	D:	0.001 m				
	Confinement:	Partially Confined				
	Channel Morphology	r: Riffle-Pool				
	Channel Gradient:	2.5 <sup>0</sup>	Fi	sh Habitat Quality		Comments
	Turbidity:	0.00 FTU				er, water levels were relatively low lugust thus limiting use by larger
	Side Slope	R - 7%, $L - 7%$		Marginal	fish. As water levels	continue to decrease into the fall it fish would be migrating upstream
	Approach:	R – 93%; L – 93%			to spawn near the cr	rossing. No juveniles were captured stigations. This crossing may be
	Bank Stability:	Low-Moderate			too far removed from	n more suitable habitat (ie. s significantly reducing use by
	Erosion Potential:	Moderate			smaller fish.	s significantly reducing use by
	Undercut Banks:	None				
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**Figure 1:** Downstream view from proposed crossing showing riffle-pool habitat, cobble substrate, and Camp Lake.

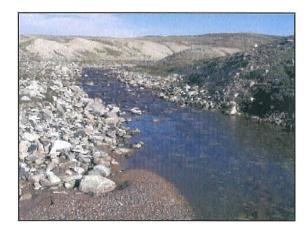


Figure 2: Upstream view from proposed crossing showing more riffle-pool habitat.

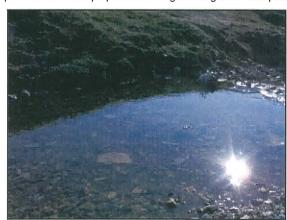


Figure 3: View across CV-225.

				Location		
	Site: UTM:	CV-225 17W 0557406 / 7915137			Watercourse Name	e: Unknown River
			Site Description		Poter	tential Fish Utilization  Arctic Char  Unlikely Unlikely Yes None  Ninespine Stickleback  Unlikely Unlikely Unlikely Unlikely None  Comments  of Camp Lake, this site provides or juvenile char to rear or take refuge in the lake. Spawning likely doesn't cosed crossing due to low water levels rther downstream closer to the lake. ar were captured during fisheries this creek. The habitat is less suitable  NORTH/SOUTH CONSULTANTS INC. AGUATIC ENVIRONMENT SPECIALISTS
Ť	Watershed Size: Regulated: Channelized: Bankfull Width: Wetted Width: Riffle-Crest Depth: Pool Depth: Residual Pool Depth Bankfull Depth: Bank Height:	12.180 km² No No 31.0 m 7.0 m 0.12 m 0.28 m 0.16 m 0.83 m 0.55 m	Mesohabitat Composition: Substrate Composition: Stream Cover: Riparian Vegetation: Aquatic Vegetation: Unique Features: Summary:	Riffle – 60%; Pool – 40%  Cobble – 75%; Gravel – 15%; Boulders – 10%  Boulders – 10%  Grasses and moss  None  None  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.	Spawning: Migration: Rearing: Overwintering: Nin Spawning: Migration:	Unlikely Yes None espine Stickleback Unlikely
	D <sub>95</sub> :  D:  Confinement:  Channel Morphology  Channel Gradient:	0.86 m 0.03 m Partially Confined	Fi	sh Habitat Quality	Rearing: Overwintering:	None
	Turbidity: Side Slope Approach: Bank Stability: Erosion Potential: Undercut Banks:	0.00 FTU  R – 1%; L – 1%  R – 99%; L – 99%  Low-Moderate  Moderate  None		Important	suitable habitat for ju from larger char in the occur at the proposed but may occur further Several small char v	uvenile char to rear or take refuge he lake. Spawning likely doesn't ed crossing due to low water levels er downstream closer to the lake. were captured during fisheries
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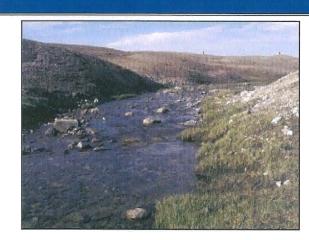


Figure 1: Downstream view from proposed crossing showing riffle-pool habitat and cobble substrate.



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



Figure 3: View across BG-01.

			Location		
Site: UTM:	BG-01 17W 0557991 / 7914918			Watercourse Nam	e: Unknown River
		Site Description		Pote	ntial Fish Utilization
Watershed Size:	5.612 km <sup>2</sup>	Mesohabitat Composition:	Riffle – 95%; Pool – 5%		Arctic Char
Regulated: Channelized:	No No	Substrate Composition:	Cobble – 70%; Boulders – 20%; Gravel – 5%; Sand – 5%	Spawning: Migration:	Unlikely Unlikely
Bankfull Width:	5.0 m	Stream Cover:	Boulders – 20%	Rearing:	Yes
Wetted Width:	5.0 m	Riparian Vegetation:	Arctic cotton, moss, willows, and grasses	Overwintering:	None
Riffle-Crest Depth:	0.18 m	Aquatic Vegetation:	None		
Pool Depth:	0.30 m	Unique Features:	None	Nii	nespine Stickleback
Residual Pool Depth	n: 0.12 m	Summary:	The banks have moderate-high erosion potential and boulders are the only significant available cover.	Spawning:	Unlikely
Bankfull Depth:	0.58 m			Migration:	Unlikely
Bank Height:	0.40 m			Rearing:	Unlikely
D <sub>95</sub> :	0.80 m			Overwintering:	None
D:	0.06 m				
Confinement:	Confined			r.	
Channel Morphology	y: Riffle-Pool	_			
Channel Gradient:	3.5 <sup>0</sup>	F1	ish Habitat Quality		Comments
Turbidity:	0.00 FTU				Camp Lake and has suitable habita rear or take refuge from larger char
Side Slope	R – 1%; L – 1%		Important	in the lake. It is unl	kely spawning occurs in this or levels are relatively low during the
Approach:	R – 99%; L – 99%			fall, however it can	not be ruled out completely. Severa ptured during fisheries investigation
Bank Stability:	Low-Moderate				abitat is less suitable for
Erosion Potential:	Moderate-High				
Undercut Banks:	None				
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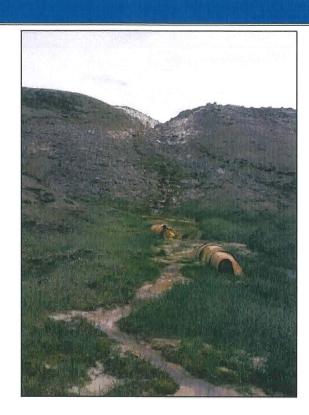
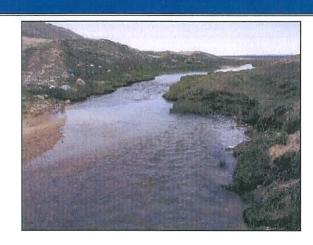


Figure 1: Upstream view from proposed crossing showing nearly dry habitat and empty fuel drums.

Site: UTM:	BG-16 17W 0550742 / 7917611			Watercourse Nam	e: Unknown River
		Site Description		Pote	ntial Fish Utilization
Watershed Size: Regulated: Channelized: Bankfull Width: Wetted Width: Riffle-Crest Depth: Pool Depth: Residual Pool Depth Bankfull Depth: Bank Height: D <sub>95</sub> : D: Confinement:	0.064 km² No No N/A	Mesohabitat Composition: Substrate Composition: Stream Cover: Riparian Vegetation: Aquatic Vegetation: Unique Features: Summary:	N/A N/A N/A N/A N/A N/A 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	Spawning: Migration: Rearing: Overwintering: Nir Spawning: Migration: Rearing: Overwintering:	Arctic Char  None None None None None  None  None  None None
Channel Morphology Channel Gradient: Furbidity: Side Slope	y: N/A N/A N/A N/A	Fi	sh Habitat Quality  None	contributes runoff to appears to be little	Comments  ory of BG-17 and likely only the much larger BG-17. There available fish habitat and, therefore for fish populations. There are
Approach: Bank Stability: Erosion Potential: Undercut Banks:	N/A N/A N/A			also empty fuel dru	IORTH/SOUTH CONSULTANTS INC.  QUATIC ENVIRONMENT SPECIALISTS



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

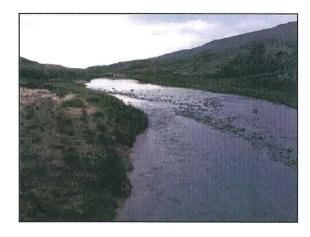


Figure 2: Upstream view from proposed crossing showing more riffle-pool habitat.



Figure 3: View across BG-17.

				Location		
	Site:	BG-17			Watercourse Name	e: Unknown River
	UTM:	17W 0550703 / 7917643				
			Site Description		Poter	ntial Fish Utilization
,	Watershed Size: Regulated: Channelized: Bankfull Width: Wetted Width: Riffle-Crest Depth:	13.767 km <sup>2</sup> No No 9.0 m 8.0 m 0.19 m	Mesohabitat Composition: Substrate Composition: Stream Cover: Riparian Vegetation: Aquatic Vegetation:	Instream Vegetation – 3%  Grasses, moss, thrift, small plants, and willows  Submerged grasses	Spawning: Migration: Rearing: Overwintering:	Arctic Char  None  Possible  Yes  None
	Pool Depth:	0.30 m	Unique Features:	None	Nin	espine Stickleback
	Residual Pool Depth Bankfull Depth: Bank Height: D <sub>95</sub> : D: Confinement: Channel Morphology	0.95 m 0.65 m 0.10 m 0.06 m Partially Confined	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.	Spawning: Migration: Rearing: Overwintering:	Possible Possible Possible None
	Channel Gradient: Turbidity: Side Slope Approach: Bank Stability: Erosion Potential: Undercut Banks:	1° 22.95 FTU R - 10%; L - 10% R - 90%; L - 90% Low High Some		Important	char. The extent of the area at the prop for spawning. Increa may provide suitabl small char were cap	bundant, suitable habitat for juvenile use by adults is unknown though posed crossing is unlikely to be used ased turbidity levels and pool habitat e habitat for stickleback though only obtured in fisheries investigations.
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Figure 1: Downstream view from proposed crossing showing riffle and cobble habitat habitat and downstream lake.



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



Figure 3: Aerial view of BG-24 showing braided channel.

Site: UTM:	BG-24 17W 0548766 / 7918877			Watercourse Name	: Unknown River
		Site Description		Poter	ntial Fish Utilization
Watershed Size: Regulated: Channelized: Bankfull Width: Wetted Width: Riffle-Crest Depth: Pool Depth: Residual Pool Depth Bankfull Depth:	5.506 km <sup>2</sup> No No No 62.0 m 5.5 m 0.12 m 0.30 m 0.18 m 0.63 m 0.45 m	Mesohabitat Composition: Substrate Composition: Stream Cover: Riparian Vegetation: Aquatic Vegetation: Unique Features: Summary:	Riffle – 95%; Pool – 5%  Cobble – 90%; Gravel – 5%; Boulders – 5%  Boulders – 5%; Undercut – 10%  Moss, willows and grasses  None  None  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: Migration: Rearing: Overwintering: Nin Spawning: Migration: Rearing:	Arctic Char  None None Yes None  espine Stickleback  Unlikely Unlikely Unlikely
D <sub>95</sub> : D: Confinement: Channel Morpholog Channel Gradient:	0.35 m  0.02 m  N/A (braided channel)  y: Riffle-Pool  4.5°	Fi	ish Habitat Quality	Overwintering:	None  Comments
Turbidity: Side Slope Approach: Bank Stability: Erosion Potential: Undercut Banks:	0.00 FTU  R - 2%; L - 2%  R - 98%; L - 98%  Moderate-High  Moderate  Moderate		Important	sufficient suitable ha likely an important re downstream. Severa captured during fish	areas are relatively small, there is abitat for juvenile char. This area is earing/refuge area from the lake al small char were observed or eries investigations. Water levels h enough even during spring for by adult char.

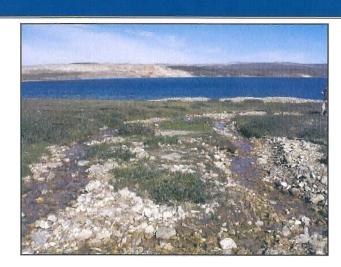


Figure 1: Downstream view from proposed crossing showing cascade, cobble habitat and downstream lake.



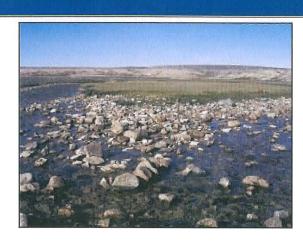
Figure 2: Upstream view from proposed crossing more cascade habitat.

Baffinland Iron Mines Mary River Project Watercourse Crossing Assessment

Site: UTM:	BG-27 17W 0547876 / 7919342			Watercourse Nam	e: Unknown River
		Site Description		Pote	ntial Fish Utilization
Watershed Size:	0.553 km <sup>2</sup>	Mesohabitat	Consider 000% Deal 400%		Arctic Char
Regulated:	No	Composition:	Cascade – 90%; Pool – 10%	Spawning:	None
Channelized:	No	Substrate Composition:	Cobble – 70%; Gravel – 10%; Sand – 10%; Boulders – 10%	Migration:	None
Bankfull Width:	7.0 m	Stream Cover:	Boulders – 10%; Undercut – 2%; Overstream	Rearing:	Possible
Wetted Width:	5.0 m		Vegetation – 2%	Overwintering:	None
Riffle-Crest Depth:	0.05 m	Riparian Vegetation:	Moss, small plants, willows and grasses		
Pool Depth:	N/A	Aquatic Vegetation:	None	Nin	nespine Stickleback
Residual Pool Depth	: N/A	Unique Features:	None		
Bankfull Depth:	0.50 m	Summary:	This is a small-sized waterbody consisting almost exclusively of cascade habitat with	Spawning:	Unlikely
Bank Height:	0.45 m		cobble substrate. The banks have moderate erosion potential and there is a variety of	Migration:	Unlikely
D <sub>95</sub> :	0.27 m		available cover.	Rearing:	Unlikely
D:	0.05 m			Overwintering:	None
Confinement:	Partially Confined				
Channel Morphology		Fi	ish Habitat Quality		Comments
Channel Gradient:	7 <sup>0</sup>		The state of the s		
Turbidity:	0.00 FTU		Baranto al	limit use of this hab	r levels and higher velocities likely itat by both stickleback and juvenile
Side Slope	R - 2%; $L - 2%$		Marginal	there is probably so	e from a nearby lake downstream some intermittent use. Adult char do
Approach:	R – 98%; L – 98%			not use this habitat	at any time.
Bank Stability:	Moderate				
Erosion Potential:	Moderate				ORTH/SOUTH
Undercut Banks:	Some				QUATIC ENVIRONMENT SPECIALISTS

Location

	Bulk Sample	e Road Waterco	ourse Crossing	Assessment		
				Location		
No Figure Available	Site: BG UTM: 17V	i-28 N 0547567 / 7919479			Watercourse Nam	e: Unknown River
			Site Description		Pote	ntial Fish Utilization
	Watershed Size: Regulated: Channelized: Bankfull Width: Wetted Width: Flat Depth: Pool Depth: Residual Pool Depth: Bankfull Depth: Bank Height: D95:	0.166 km² No No N/A	Mesohabitat Composition: Substrate Composition Stream Cover: Riparian Vegetation: Aquatic Vegetation: Unique Features: Summary:	N/A  N/A  N/A  N/A  N/A  N/A  This is an extra-small-sized waterbody that is almost completely dry with no existing connection to a lake downstream.	Spawning: Migration: Rearing:	Arctic Char  None None None None None None None Non
	D: Confinement: Channel Morphology: Channel Gradient: Turbidity: Side Slope	N/A N/A N/A N/A N/A	F	Fish Habitat Quality  None	Overwintering:  This waterbody is liprovides no suitable or species.	Comments  kely only a spring runoff stream and a fish habitat for any life cycle stage
Baffinland Iron Mines Mary River Project Watercourse Crossing Assessment	Approach:  Bank Stability:  Erosion Potential:  Undercut Banks:	N/A N/A N/A N/A			N C	ORTH/SOUTH ONSULTANTS INC. QUATIC ENVIRONMENT SPECIALISTS



**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.

Site: UTM:	BG-50 17W 0529334 / 7926845			Watercourse Nam	e: Unknown River
		Site Description		Pote	ntial Fish Utilization
Watershed Size: Regulated: Channelized: Bankfull Width: Wetted Width: Riffle-Crest Depth: Pool Depth: Residual Pool Depth Bankfull Depth: Bank Height: D <sub>95</sub> : D: Confinement:	0.70 m 0.50 m 1.56 m 0.02 m Unconfined	Mesohabitat Composition: Substrate Composition: Stream Cover: Riparian Vegetation: Aquatic Vegetation: Unique Features: Summary:	Riffle – 100%  Cobble – 80%; Boulders – 20%  Boulders – 20%; In- and Overstream Vegetation – 40%  Moss, grasses, willows  None  None  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: Migration: Rearing: Overwintering: Nit Spawning: Migration: Rearing: Overwintering:	Arctic Char  Possible Possible Yes None  nespine Stickleback  Possible but Unlikely Possible but Unlikely None
Channel Morphology Channel Gradient:	y: Riffle 1 <sup>0</sup>	Fi	ish Habitat Quality		Comments
Turbidity: Side Slope Approach: Bank Stability: Erosion Potential: Undercut Banks:	0.00 FTU  R - 5%; L - 5%  R - 95%; L - 95%  High  Low  None		Important	Although aquatic h crossing, water velfor significant use be char was captured since this crossing upstream of a lake foraging by adults unsuitable for stick	abitat is abundant at the proposed ocities may be too consistently high by juvenile char. Only a single young during fisheries studies. However, is a relatively short distance, fall spawning and possibly summer may also occur. This habitat is likely leback.

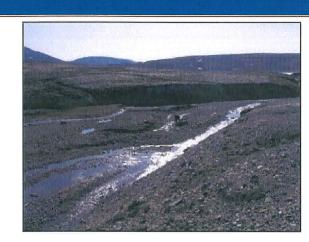


Figure 1: Downstream view from proposed crossing showing riffle-pool habitat and cobble substrate.



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

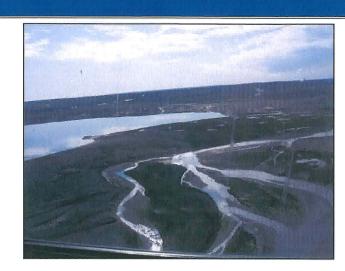


Figure 3: View across CV-224.

Baffinland Iron Mines Mary River Project Watercourse Crossing Assessment

Site:	CV-224			Watercourse Name	e: Unknown River	
UTM:	17W 0556238 / 7915043					
		Site Description		Poter	ntial Fish Utilization	
Watershed Size:	2.835 km <sup>2</sup>	Mesohabitat			Arctic Char	
Regulated:	No	Composition:	Riffle – 95%; Pool – 5%	Spawning:	None	
Channelized:	No	Substrate Composition:	Cobble – 60%; Gravel – 25%; Sand – 10%; Boulders – 5%	Migration:	None	
Bankfull Width:	33.0 m	Stream Cover:	Boulders – 5%, Instream Vegetation – 1%	Rearing:	Yes	
Wetted Width:	9.5 m	Riparian Vegetation:	Grasses and willows	Overwintering:	None	
Riffle-Crest Depth:	0.03 m	Aquatic Vegetation:	Submerged grasses			
Pool Depth:	0.22 m	Unique Features:	None	Nin	espine Stickleback	
Residual Pool Depth	0.19 m	Summary:	The hanks have high erosion notential	Spawning:	Unlikely	
Bankfull Depth:	1.22 m (left), 1.44 (right)			Migration:	Unlikely	
Bank Height:	1.00 m (left), 1.22 (right)		boulders are the only significant available cover.	Rearing:	Unlikely	
D <sub>95</sub> :	0.45 m		cover.	Overwintering:	None	
D:	0.01 m					
Confinement:	Partially Confined					
Channel Morphology	y: Riffle-Pool			100 St. 100 St		
Channel Gradient:	2 <sup>0</sup>	F	ish Habitat Quality		Comments	
Turbidity:	0.00 FTU				uitable habitat for juvenile char to from larger char in the lake	
Side Slope	R – 20%; L – 5%		Important	downstream. However, due to the relatively low was levels, adult use is unlikely. Higher velocities also		
Approach:	R – 80%; L – 95%			probably limit stickle		
Bank Stability:	Low					
Erosion Potential:	High					
Undercut Banks:	None					

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**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.

			Location		
Site: UTM:	CV-223 17W 0555817 / 7914691			Watercourse Nam	e: Unknown River
	s	Site Description		Pote	ntial Fish Utilization
Watershed Size:	59.240 km²	Mesohabitat Composition:	Riffle – 50%; Pool – 50%		Arctic Char
Regulated: Channelized:	No No	Substrate Composition:	Cobble – 60%; Gravel – 30%; Boulders – 10%	Spawning: Migration:	Possible Possible
Bankfull Width:	195.0 m	Stream Cover:	Boulders – 10%	Rearing:	Yes
Wetted Width:	117.0 m	Riparian Vegetation:	Grasses, moss, and willows	Overwintering:	None
Riffle-Crest Depth:	0.27 m	Aquatic Vegetation:	Algae		
Pool Depth:	0.30 m	Unique Features:	None	Nir	nespine Stickleback
Residual Pool Depti	<b>h:</b> 0.03 m	Summary:	This is an extra large-sized waterbody with abundant riffle and pool habitat with cobble	Spawning:	Unlikely
Bankfull Depth:	1.40 m		and gravel substrate. The banks have high erosion potential. Boulders are the only	Migration:	Unlikely
Bank Height:	1.1 m		significant available cover. The channel is braided with three wetted channels measuring 18 m, 35 m, and 64 m wide.	Rearing:	Unlikely
D <sub>95</sub> :	0.49 m			Overwintering:	None
D:	0.03 m				
Confinement:	N/A (braided channel)				
Channel Morpholog	y: Riffle-Pool				
Channel Gradient:	1 <sup>0</sup>	Fi	ish Habitat Quality		Comments
Turbidity:	8.67 FTU			This river is a major	r tributary of Mary Lake. This site
Side Slope	R – 15%; L – 15%		Important	adult char. The site	abitat for juvenile and occasionally provides suitable rearing and refuge
Approach:	R – 85%; L – 85%		·		so be used for spawning or feeding Lake. The habitat is probably
Bank Stability:	Low			unsuitable for signif	ficant stickleback use.
Erosion Potential:	High				IORTH/SOUTH
Undercut Banks:	None				CONSULTANTS INC.  QUATIC ENVIRONMENT SPECIALISTS

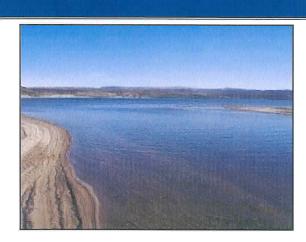


Figure 1: Downstream view from proposed crossing showing flat, sandy habitat habitat with large, unnamed lake visible.



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

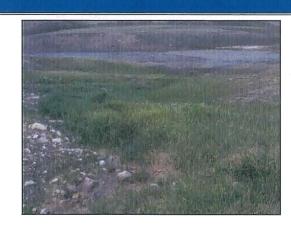


Figure 3: View across CV-217.

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

Site: UTM:	CV-217 17W 0542218 / 7922157			Watercourse Nam	ne: Unknown River
		Site Description		Pote	ntial Fish Utilization
Watershed Size: Regulated: Channelized: Bankfull Width: Wetted Width: Flat Depth: Pool Depth: Residual Pool Depth Bankfull Depth: Bank Height:	153.045 km <sup>2</sup> No No 162.0 m 124.0 m 0.42 m N/A : N/A 7.37 m 6.95 m	Mesohabitat Composition: Substrate Composition: Stream Cover: Riparian Vegetation: Aquatic Vegetation: Unique Features: Summary:	Flat – 100%  Sand – 60%; Gravel – 40%  None  Small intermittent patches of small plants, willows and grasses  None  None  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.	Spawning: Migration: Rearing: Overwintering: Nii Spawning: Migration: Rearing:	Arctic Char  Unlikely Yes Possible Possible  nespine Stickleback  Possible Possible Yes
D <sub>95</sub> : D: Confinement: Channel Morphology	<0.001 m  Partially Confined			Overwintering:	Possible
Channel Gradient:	0°	Fi	sh Habitat Quality		Comments
Turbidity: Side Slope Approach: Bank Stability: Erosion Potential: Undercut Banks:	0.00 FTU  R - 15%; L - 15%  R - 85%; L - 85%  Low  High  None		Important	lake, is unlike most road. It is deep and freeze entirely durit overwintering. How substrates are not river that is access use is likely limited Spawning may occupstream so this all addition, this habital	nich is the major outlet of a large at crossings along the bulk transport of relatively slow-moving and may not not winter, thus allowing for potential vever, a lack of cover and fine ideal conditions for juveniles in a lible to adult char. Therefore juvenile and possibly migratory only. For the crossing or further rea could be important during fall. In at is more suitable for stickleback use red during fisheries investigations.

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**Figure 1:** Downstream view from proposed crossing with Philliips 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.

			Location		
Site:	CV-156			Watercourse Nam	e: Unknown River
UTM:	17W 0507580 / 7970389				
		Site Description		Pote	ntial Fish Utilization
Watershed Size:	0.066 km <sup>2</sup>	Mesohabitat Composition:	Riffle – 100%		Arctic Char
Regulated: Channelized: Bankfull Width: Wetted Width: Riffle Crest Depth: Residual Pool Depth Bankfull Depth: Bank Height:	No No No 0.60 m 0.26 m 0.03 m n: N/A 0.10 m 0.07 m	Substrate Composition: Stream Cover: Riparian Vegetation: Aquatic Vegetation: Unique Features: Summary:	Sand – 75%; Gravel – 20%; Cobble – 5%  In- and Overstream vegetation – 2%;  Grasses  Submerged grasses  None  This is an extra small, nearly waterless stream with predominantly sand substrate and low-moderate erosion potential. There is relatively little significant cover.	Spawning: Migration: Rearing: Overwintering: Nir Spawning:	No No No No No No nespine Stickleback
D <sub>95</sub> :  D:  Confinement:  Channel Morphology  Channel Gradient:	0.16 m 0.001 m Unconfined			Migration: Rearing: Overwintering:	No No No
Turbidity:	0.00 FTU	Fi	ish Habitat Quality		Comments
Side Slope Approach: Bank Stability: Erosion Potential: Undercut Banks:	0.00 FT0  R – 5%; L – 5%  R – 95%; L – 95%  Moderate-High  Low-Moderate  None		None	runoff stream. Ever too steep and wate	kely significant only as a spring  at peak flows, the gradient is likely  r levels too low to offer useful habitat  c or young-of-the-year char from  ek.
				( 🧸 ) c	IORTH/SOUTH ONSULTANTS INC. QUATIC ENVIRONMENT SPECIALISTS

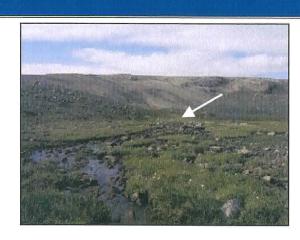


Figure 1: Downstream view from proposed crossing. Riffle-pool habitat type with predominantly cobble/sand substrate. Falls begin at the arrow.



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 Site: CV-146 UTM: 17W 0508786 / 7968870 **Site Description** Watershed Size: 1.021 km<sup>2</sup> Mesohabitat Composition: Regulated: No Channelized: No Bankfull Width: 2.40 m Stream Cover: Wetted Width: 2.40 m Pool Depth: 0.18 m Residual Pool Depth: 0.08 m **Unique Features:** Bankfull Depth: 0.18 m Summary: Bank Height: 0.00 m D<sub>95</sub>: 0.57 m D: 0.001 m Confinement: Unconfined Channel Morphology: Riffle-pool **Channel Gradient: Turbidity:** 0.00 FTU Side Slope R - 0%; L - 0%

R - 100%; L - 100%

Moderate-High

Low

None

Approach:

Bank Stability:

**Erosion Potential:** 

**Undercut Banks:** 

Watercourse Name: Unknown River Potential Fish Utilization **Arctic Char** Riffle - 60%; Pool - 40% No Spawning: Substrate Composition: Cobble - 65%; Sand - 25%; Boulders - 5%; Migration: No Silt/Organic - 5% Rearing: No Boulders - 5%; In- and Overstream Vegetation - 5% Overwintering: No Riparian Vegetation: Grasses Aquatic Vegetation: Submerged grasses Ninespine Stickleback None Spawning: No This is a small, meandering stream with relatively little water, characterized by a Migration: No series of riffles and pools. Substrate is predominantly cobble-sand and the banks Rearing: No have moderate-high erosion potential. There is relatively little significant cover. Overwintering: **Fish Habitat Quality** Comments This waterbody is likely significant only as a spring runoff stream. Though the gradient at the proposed None 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

Location



where overwintering is possible.

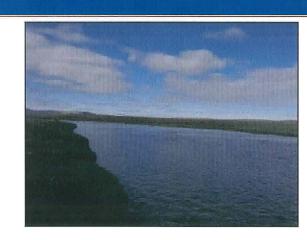


Figure 1: Downstream view from proposed crossing showing predominantly run habitat.

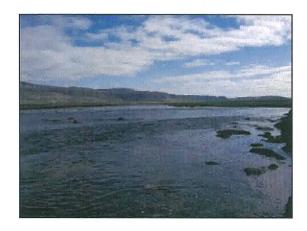


Figure 2: Upstream view from proposed crossing showing riffle-pool habitat and cobble substrate.



Figure 3: View across CV-128.

			Location		
Site: UTM:	CV-128 17W 0513544 / 7965894			Watercourse Name	: Unknown River
		Site Description		Poter	ntial Fish Utilization
Watershed Size:	251.57 km <sup>2</sup>	Mesohabitat Composition:	Riffle – 25%; Pool – 25%; Run – 50%	Spawning:	Arctic Char  Possible (land-locked char)
Regulated: Channelized:	No No	Substrate Composition: Stream Cover:	Cobble – 85%; Boulders – 10%; Gravel – 5%; Boulders – 10%; Undercut – 2%; In- and	Migration:	Possible
Bankfull Width: Wetted Width:	44.0 m 44.0 m	Riparian Vegetation:	Overstream Vegetation - 2% Grasses	Rearing: Overwintering:	Yes Unlikely
Pool Depth:	0.20 m	Aquatic Vegetation:	None		
Residual Pool Depth	: 0.05 m	Unique Features:	None	Nin	espine Stickleback
Bankfull Depth:	0.55 m	Summary:	This is an extra large stream characterized by riffles, pools, and runs. Substrate is	Spawning:	Possible but unlikely
Bank Height:	0.35 m		variety of notential cover with houlders the	Migration:	Possible but unlikely
D <sub>95</sub> :	0.51 m			Rearing:	Possible but unlikely
D:	0.07 m			Overwintering:	Unlikely
Confinement:	Unconfined				
Channel Morphology	•				
Channel Gradient:	1 <sup>0</sup>		ish Habitat Quality		Comments
Turbidity:	0.00 FTU		isii nabitat Quanty		
Side Slope	R – 0%; L – 0%		1	stages of char and s	as suitable habitat for all life-cycle stickleback though only juvenile cl
Approach:	R – 100%; L – 100%		Important	water may be too fa	ng fisheries investigations. The st and too clear for stickleback. Ir
Bank Stability:	Low-Moderate				y to larger char may decrease the as refuge habitat for juveniles.
Erosion Potential:	Low-Moderate				•
Undercut Banks:	Some				
				( 🦠 ) C	ORTH/SOUTH ONSULTANTS INC.

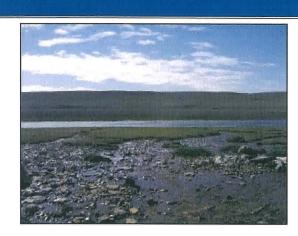


Figure 1: Downstream view from proposed crossing showing predominantly cascade habitat.



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



Figure 3: View across CV-114.

			Location		
Site: UTM:	CV-104 17W 0521732 / 7952787			Watercourse Nam	e: Unknown River
		Site Description		Pote	ntial Fish Utilization
Watershed Size: Regulated: Channelized: Bankfull Width: Wetted Width: Riffle-Crest Depth: Residual Pool Depth Bankfull Depth: Bank Height: D <sub>95</sub> : D:	5.198 km <sup>2</sup> No No 6.0 m 6.0 m 0.06 m N/A 0.31 m 0.25 m 0.26 m 0.02 m	Mesohabitat Composition: Substrate Composition: Stream Cover: Riparian Vegetation: Aquatic Vegetation: Unique Features: Summary:	Cascade – 50%; Riffle – 50%  Cobble – 80%; Gravel – 15%; Boulders – 5%; Boulders – 5%; In- and Overstream Vegetation - 5%  Grasses, willows, fireweed  Algae  None  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: Migration: Rearing: Overwintering: Nin Spawning: Migration: Rearing: Overwintering:	Arctic Char  Unlikely Unlikely Yes Unlikely  nespine Stickleback  Unlikely Unlikely Unlikely Unlikely Unlikely Unlikely
Confinement: Channel Morphology Channel Gradient: Turbidity: Side Slope Approach: Bank Stability:	Unconfined  y: Cascade-Riffle  8°  0.00 FTU  R – 1%; L – 1%  R – 99%; L – 99%  Moderate-High	Fi	sh Habitat Quality  Marginal	young-of-the-year of during fisheries inver- flowing water may partickleback. The pro-	Comments  a suitable habitat for juvenile and thar. A few YOY char were observed estigations. The lack of calm, slow-prevent extensive use by char or eximity of Phillips Creek suggests at least occasional use by young
Erosion Potential: Undercut Banks:	Low-Moderate None			char for feeding and	IORTH/SOUTH ONSULTANTS INC. QUATIC ENVIRONMENT SPECIALISTS

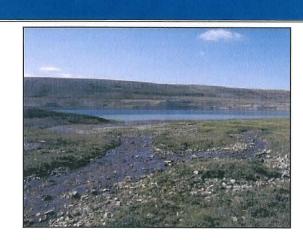


Figure 1: Downstream view from proposed crossing showing cascade-riffle habitat.



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

Site:	CV-104			Watercourse Nam	e: Unknown River
UTM:	17W 0521732 / 7952787			watercourse war	e. CHAIOWIT KIVE
		Site Description		Pote	ntial Fish Utilization
Watershed Size: Regulated: Channelized: Bankfull Width: Wetted Width: Riffle-Crest Depth: Residual Pool Depth: Bankfull Depth: Bank Height: D <sub>95</sub> : D: Confinement:	5.198 km <sup>2</sup> No No 6.0 m 6.0 m 0.06 m N/A 0.31 m 0.25 m 0.26 m Unconfined	Mesohabitat Composition: Substrate Composition: Stream Cover: Riparian Vegetation: Aquatic Vegetation: Unique Features: Summary:	Cascade – 50%; Riffle – 50%  Cobble – 80%; Gravel – 15%; Boulders – 5%; Boulders – 5%; In- and Overstream Vegetation - 5%  Grasses, willows, fireweed  Algae  None  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: Migration: Rearing: Overwintering:  Nii Spawning: Migration: Rearing: Overwintering:	Arctic Char  Unlikely Unlikely Yes Unlikely  nespine Stickleback  Unlikely Unlikely Unlikely Unlikely Unlikely
Channel Morphology: Channel Gradient:					
Turbidity:	0.00 FTU	Fi	sh Habitat Quality		Comments
Side Slope Approach: Bank Stability: Erosion Potential: Undercut Banks:	R – 1%; L – 1% R – 99%; L – 99% Moderate-High Low-Moderate None		Marginal		s suitable habitat for juvenile and char. A few YOY char were observed estigations. The lack of calm, slow-prevent extensive use by char or le char from Phillips Creek likely useing and refuge during the open water

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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.

	CV-99 17W 0521811 / 7948819			Watercourse Nam	e: Unknown River
	Astronomic Mass Commo	Site Description		Pote	ntial Fish Utilization
Watershed Size: Regulated: Channelized: Bankfull Width: Wetted Width: Riffle-Crest Depth: Pool Depth: Residual Pool Depth: Bankfull Depth: Bank Height: D <sub>95</sub> :	28.559 km <sup>2</sup> No No No 24.0 m 8.0 m 0.15 m 0.51 m 0.36 m 0.44 m 0.12 m 0.88 m 0.04 m	Mesohabitat Composition: Substrate Composition: Stream Cover: Riparian Vegetation: Aquatic Vegetation: Unique Features: Summary:	Riffle – 60%; Pool – 40%  Cobble – 80%; Boulder – 10%; Gravel – 5%; Sand; 5% Boulders – 10%  Moss, willows, fireweed  None  None  This is a large-sized stream characterized by riffles and pools. Substrate is predominantly cobble and the banks have low erosion potential. Cover is relatively limited.	Spawning: Migration: Rearing: Overwintering: Nir Spawning: Migration: Rearing: Overwintering:	Arctic Char  Possible Possible Yes Unlikely  nespine Stickleback  Possible Possible Possible Unlikely
Confinement: Channel Morphology Channel Gradient:	1°	Fi	ish Habitat Quality	This waterbody has	Comments suitable habitat for several life cyc
Turbidity: Side Slope Approach: Bank Stability: Erosion Potential: Undercut Banks:	0.00 FTU  R - 5%; L - 5%  R - 95%; L - 95%  High  Low  None		Important		gh it is likely used primarily for h. Many YOY and juvenile char wer ured during fisheries investigations. nay prevent extensive use by
					IORTH/SOUTH

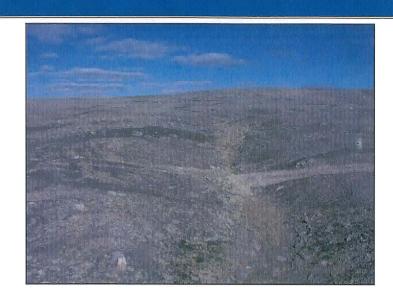


Figure 1: Aerial view of proposed crossing showing a dry cobble/gravel creek bed.

Site: UTM:	CV-95 17W 0522618 / 7945799			Watercourse Name	e: Unknown River
	(	Site Description		Poter	ntial Fish Utilization
Watershed Size:	0.119 km²	Mesohabitat			Arctic Char
Regulated: Channelized: Bankfull Width: Wetted Width:	No No N/A N/A	Composition: Substrate Composition: Stream Cover: Riparian Vegetation: Aquatic Vegetation:	N/A N/A	Spawning: Migration: Rearing: Overwintering:	None None None
Riffle-Crest Depth: Pool Depth: Residual Pool Depth Bankfull Depth: Bank Height: D <sub>95</sub> : D: Confinement:	N/A	Unique Features: Summary:	N/A  N/A  This is an extra small waterbody that was dry at the time of sampling in August. It is exclusively a spring run-off stream	Nin Spawning: Migration: Rearing: Overwintering:	None None None None None
Channel Morpholog Channel Gradient:	y: N/A N/A	F	ish Habitat Quality		Comments
Turbidity: Side Slope Approach:	N/A N/A N/A		None	This waterbody is e fish habitat. Even du not likely any fish us	phemeral and provides no suitable uring high water in spring there is se.
Bank Stability: Erosion Potential: Undercut Banks:	N/A N/A N/A			( 🕵 ) C	ORTH/SOUTH ONSULTANTS INC. QUATIC ENVIRONMENT SPECIALISTS

Location



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

	CV-93			Watercourse Name	: Unknown River
UTM:	17W 0523116 / 7944890				
	S	ite Description		Poten	tial Fish Utilization
Watershed Size:	0.880 km²	Mesohabitat			Arctic Char
Regulated:	No	Composition:	N/A	Spawning:	None
Channelized:	No	Substrate Composition:	N/A	Migration:	None
Bankfull Width:	N/A	Stream Cover:	N/A	Rearing:	None
Wetted Width:	N/A	Riparian Vegetation:	N/A	Overwintering:	None
Riffle-Crest Depth:	N/A	Aquatic Vegetation:	N/A		
Pool Depth:	N/A	Unique Features:	N/A	N.E.	solos Offslidskasli
Residual Pool Depth:		Summary:	This is a small waterbody that was almost completely dry at the time of sampling in	Nine	espine Stickleback
	N/A		lugust. It is exclusively a spring run-off Spawning:	Spawning:	None
Bankfull Depth:			stream	Migration:	None
Bank Height:	N/A			Rearing:	None
D <sub>95</sub> :	N/A			Overwintering:	None
D:	N/A				
Confinement:	N/A				
Channel Morphology	r: N/A				
Channel Gradient:	N/A	FI	sh Habitat Quality		Comments
Turbidity:	N/A				hemeral and provides no suitable ring high water in spring there is
Side Slope	N/A		None	not likely any fish use	e. There is a cliff downstream of uld represent a significant barrier to
Approach:	N/A			fish passage even if	water levels were sufficient.
Bank Stability:	N/A				
Erosion Potential:	N/A			NC NC	DRTH/SOUTH
Undercut Banks:	N/A			( 🤾 ) co	INSULTANTS INC. JATIC ENVIRONMENT SPECIALISTS

Location



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

Site: CV-92 UTM: 17W 0523106 / 7944186 3.453 km<sup>2</sup> Watershed Size: 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 D<sub>95</sub>: N/A D: N/A Confinement: N/A **Channel Morphology:** N/A **Channel Gradient:** N/A **Turbidity:** N/A Side Slope N/A

N/A

N/A

N/A

N/A

Approach:

**Bank Stability:** 

**Erosion Potential:** 

**Undercut Banks:** 

**Site Description Potential Fish Utilization Arctic Char** Mesohabitat Composition: N/A Spawning: None Substrate Composition: N/A Migration: None Stream Cover: N/A Rearing: None Riparian Vegetation: N/A Overwintering: None **Aquatic Vegetation:** N/A **Unique Features:** N/A Ninespine Stickleback Summary: This is a medium waterbody that was completely dry at the time of sampling in Spawning: None August. It is probably only a spring run-off Migration: None Rearing: None Overwintering: None **Fish Habitat Quality** Comments This waterbody is ephemeral and provides no suitable fish habitat. Even during high water in spring there is None not likely any fish use. NORTH/SOUTH CONSULTANTS INC. AQUATIC ENVIRONMENT SPECIALISTS

Watercourse Name:

Unknown River

Location

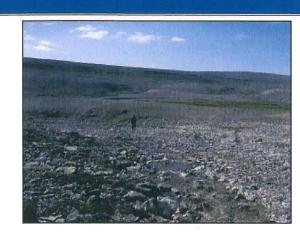


Figure 1: Downstream view from proposed crossing showing cascade habitat with cobble and boulders.



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



Figure 3: View across CV-87.

				Location		
	Site: UTM:	CV-87 17W 0523704 / 7941040			Watercourse Name	e: Unknown River
	Si		ite Description		Poter	ntial Fish Utilization
ו	Watershed Size: Regulated: Channelized: Bankfull Width: Wetted Width: Riffle-Crest Depth: Pool Depth: Residual Pool Depth Bankfull Depth: Bank Height: D <sub>95</sub> : D:	9.873 km <sup>2</sup> No No No 55.0 m 10.0 m 0.20 m N/A N/A 0.52 m 0.32 m 0.72 m 0.04 m	Mesohabitat Composition: Substrate Composition: Stream Cover: Riparian Vegetation: Aquatic Vegetation: Unique Features: Summary:	Cascade – 100%  Cobble – 75%; Boulder – 20%; Gravel – 5% Boulders – 20%  Moss, small plants, grasses, willows  None  None  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.	Spawning: Migration: Rearing: Overwintering: Nin Spawning: Migration: Rearing: Overwintering:	Arctic Char  None  None  Possible but Unlikely  None  espine Stickleback  None  None  None  None  None
	Confinement: Channel Morphology Channel Gradient:	N/A (braided stream)  Cascade  110	Fi	ish Habitat Quality		Comments
	Turbidity: Side Slope Approach: Bank Stability: Erosion Potential: Undercut Banks:	0.00 FTU  R - 10%; L - 10%  R - 90%; L - 90%  High  Low-Moderate  None		Marginal	Though a large watershed, habitat in this waterbody likely unsuitable for fish. It lacks areas of slow flow th char seem to prefer and has relatively little wetted wi at the time of sampling. It is marginal fish habitat at b but more likely provides no fish habitat.	
	C. NO. OUT DUTING.				( 🤾 )c	ORTH/SOUTH ONSULTANTS INC. QUATIC ENVIRONMENT SPECIALISTS



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

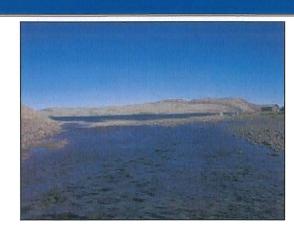


Figure 2: Upstream view from proposed crossing showing more cascade habitat and cobble substrate.



Figure 3: View across CV-78.

			Location			
Site: UTM:	CV-78 17W 0525852 / 7936787			Watercourse Nam	e: Unknown River	
		Site Description		Pote	ntial Fish Utilization	
Watershed Size: 19.440 km <sup>2</sup>		Mesohabitat		Arctic Char		
Regulated:	No	Composition:	Riffle – 50%; Pool – 50%	Spawning:	Possible but Unlikely	
Channelized:	No	Substrate Composition:	Cobble – 80%; Gravel – 15%; Boulder – 5%	Migration:	Possible	
Bankfull Width:	31.0 m	Stream Cover:	Boulders – 5%	Rearing:	Yes	
Wetted Width:	21.0 m	Riparian Vegetation:	Moss, small plants, grasses	Overwintering:	None	
Riffle-Crest Depth:	0.06 m	Aquatic Vegetation:	None			
Pool Depth:	0.38 m	Unique Features:	None	Nii	nespine Stickleback	
Residual Pool Depth	0.44 m	Summary:	This is a large-sized waterbody with typical riffle-pool habitat. Substrate is predominantly	Spawning:	Possible	
Bankfull Depth:	0.55 m		cobble and the banks have low erosion potential.	Migration:	Possible	
Bank Height:	0.49 m		potential.	Rearing:	Possible	
D <sub>95</sub> :	0.30 m			Overwintering:	None	
D;	0.02 m					
Confinement:	Partially Confined					
Channel Morphology	y: Riffle-Pool		Lab Habitat Couling			
Channel Gradient:	2 <sup>0</sup>	F	ish Habitat Quality		Comments	
Turbidity:	0.00 FTU			This large waterbody has sufficient slow-moving habitat for juvenile char. Many small char were captured during		
Side Slope	R – 5%; L – 5%		Important		fisheries studies. The habitat, however, is less suitable for ninespine stickleback.	
Approach:	R – 95%; L – 95%					
Bank Stability:	High					
Erosion Potential:	Low-Moderate					
Undercut Banks:	None					
					NORTH/SOUTH CONSULTANTS INC. QUATIC ENVIRONMENT SPECIALISTS	



**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

CV-183					
17W 0504695 / 7976416	V 0504695 / 7976416				
Site Description					
59.897 km²	Mesohabitat Composition:				
No	Substrate Compo				
No	Substrate Compo				
30 m	Stream Cover:				
12 m	Riparian Vegetation				
0.31 m	Aquatic Vegetatio				
n: N/A	Unique Features:				
1.11 m	Summary:				
0.80 m					
0.32 m					
0.014 m					
Partial confinement					
y: Riffle-Run					
1 <sup>0</sup>					
0.00 FTU					
R – 10%; L – 10%					
R – 90%; L – 90%					
	17W 0504695 / 7976416  Sin  59.897 km²  No  No  30 m  12 m  0.31 m  N/A  1.11 m  0.80 m  0.32 m  0.014 m  Partial confinement  Y: Riffle-Run  10  0.00 FTU  R – 10%; L – 10%				

Moderate

High

None

Bank Stability:

**Erosion Potential:** 

**Undercut Banks:** 

		Watercourse Nam	ne: Unknown River	
ite Description		Potential Fish Utilization		
Mesohabitat		Arctic Char		
Composition:	Riffle – 75%; Run – 25%	Spawning:	Yes [Anadromous char]	
Substrate Composition:	Cobble – 80%; Gravel – 10%; Boulders – 10%	Migration:	Yes	
Stream Cover:	Boulders – 10%	Rearing:	Yes	
Riparian Vegetation:	None	Overwintering:	Unlikely	
Aquatic Vegetation:	None	1		
Unique Features:	None	Ninespine Stickleback		
Summary:	This is an extra large, fast-moving, meandering stream with predominantly	Spawning:	Possible but unlikely	
	cobble substrate and high erosion potential. There is relatively little significant cover. This stream flows directly into Milne Inlet and is somewhat estuarine about 50 m	Migration:	Possible but unlikely	
		Rearing:	Possible but unlikely	
	downstream of the proposed crossing location.	Overwintering:	Unlikely	
Aqu	atic Habitat Quality		Comments	
	Important	watershed. The promarine and estuaring upstream as far as example, a sculpin during electrofishin overall importance	small lakes upstream in this eximity to marine habitat means that ne fish may sometimes move the crossing for feeding. For (Myoxocephalus sp.) was observed g downstream of the crossing. The of this stream to these other species ster season is difficult to determine.	
			NORTH/ SOUTH CONSULTANTS INC. AQUATIC BYVIRONMBNT SPECIALISTS	

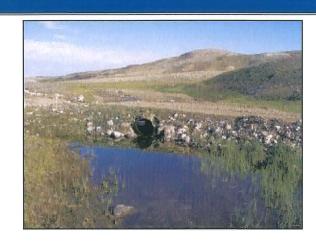


Figure 1: Downstream view from proposed crossing showing pool habitat and existing culvert.



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



Figure 3: View across CV-187.

Site: C	V-187			Watercourse Nam	e: Unknown River	
UTM: 1	7W 0560957 / 7913414			vvater course Halli	e. Oligiowii Rivei	
		Site Description		Pote	ntial Fish Utilization	
Watershed Size:	Watershed Size: 0.907 km <sup>2</sup>		Mesohabitat		Arctic Char	
Regulated:	No	Composition:	Pool – 80%; Riffle – 20%	Spawning:	None	
Channelized:	No	Substrate Composition:	Cobble – 70%; Gravel – 10%; Boulders – 10%; Silt/organic – 10%	Migration:	None	
Bankfull Width:	5.7 m	Stream Cover:	Boulders – 10%; Instream Vegetation – 15%	Rearing:	Yes	
Wetted Width:	4.0 m	Riparian Vegetation:	Small plants, willows, and grasses	Overwintering:	None	
Riffle-Crest Depth:	0.02 m	Aquatic Vegetation:	Algae, submerged grasses			
Pool Depth:	0.38 m	Unique Features:	Fuel drum culvert at crossing	Nir	nespine Stickleback	
Residual Pool Depth:	0.36 m	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	
Bankfull Depth:	0.62 m			Migration:	Unlikely	
Bank Height:	0.60 m			Rearing:	Unlikely	
D <sub>95</sub> :	0.95 m			Overwintering:	None	
D:	<0.001 m					
Confinement:	Partially Confined					
Channel Morphology:	Riffle-Pool					
Channel Gradient:	0.50	F	ish Habitat Quality		Comments	
Turbidity:	0.00 FTU			Abundant pools with some larger substrates represent ideal habitat for juvenile char. Several young char wer captured during fisheries investigations There is probably little use by adult char or by sticklebacks.		
Side Slope	R – 5%; L – 5%		Important			
Approach:	R – 95%; L – 95%			probably mile dee by additional of by sticklebacker.		
Bank Stability:	Low-Moderate					
Erosion Potential:	Moderate					
Undercut Banks:	None					
				( <b>%</b> ) C	ORTH/SOUTH ONSULTANTS INC. QUATIC BYVIRONMENT SPECIALISTS	

Watercourse Name:

Spawning:

Migration:

Rearing:

Spawning:

Migration:

Rearing:

Overwintering:

Overwintering:

Unknown River

**Potential Fish Utilization** 

**Arctic Char** 

None

Unlikely

Unlikely

None

Unlikely

Unlikely

Unlikely

Comments

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

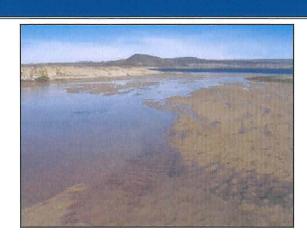
too low. It is highly unlikely that adult fish use this tributary, particularly for fall spawning migrations. Due to a lack of preferred habitat (larger substrate sizes and deeper pools) juvenile use is likely also limited. There is

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also likely little use by sticklebacks.

None

Ninespine Stickleback



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



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

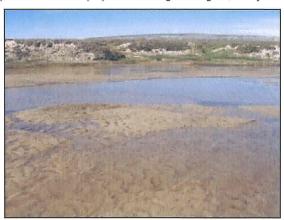


Figure 3: View across CV-216.

			Location	
Site:	CV-216			
UTM:	17W 0542773 / 7921699			
		Site Description		
Watershed Size:	13.318 km²	Mesohabitat Composition:	Flat – 98%; Riffle – 2%	
Regulated:	No	Substrate Composition:		
Channelized:	No			
Bankfull Width:	38.0 m	Stream Cover:	None	
Wetted Width:	28.0 m	Riparian Vegetation:	Small plants and grasses	
Flat Depth:	0.09 m	Aquatic Vegetation:	None	
Pool Depth:	N/A	Unique Features:	None	
Residual Pool Depth		Summary:	This is a large-sized waterbody consisting almost exclusively of flat habitat with fine	
Bankfull Depth:	0.63 m		substrates. The banks have high erosion potential and there is no significant cover	
Bank Height:	0.54 m			
D <sub>95</sub> :	0.04 m			
D:	<0.001 m			
Confinement:	Partially Confined			
Channel Morphology	: Riffle-Flat			
Channel Gradient:	00	Fi	sh Habitat Quality	
Turbidity:	0.00 FTU			
Side Slope	R – 10%; L – 10%		Marginal	
Approach:	R – 90%; L – 90%			
Bank Stability:	Low			
Erosion Potential:	High			
Undercut Banks:	None			