SELF-ASSESSMENT AND RISK MANAGEMENT DECISION FRAMEWORK FOR DFO REGULATORY REQUIREMENTS

DESCRIPTION OF AQUATIC ENVIRONMENT:

Federally/provincially listed species present:	No
Fish that are part of commercial, recreational or Aboriginal (CRA) fisheries present:	No
Fish that support a CRA fishery, or have downstream connectivity to a CRA fisheries present:	Yes
Banks and approach slope characteristics:	Sloping banks, low grade.
Riparian characteristics:	Functional Riparian Width (m) at Crossing (<i>i.e.</i> , contribution to fish habitat): L: 20 to 30 m, R: 20 to 30 m

CONSTRUCTION DETAILS:

Construction Schedule:	January to March 2017				
Pipeline Methods:	Isolate if water present/open cut if dry or frozen to bottom				
Contingency Methods:	n/a	n/a			
Vehicle Crossing Methods:	Snowfill/ice bridge/clear span bridge/existing				
Estimated Maximum Footprint:	Right-of-Way Width: 45 m	Est. Instream Footprint: 45 m (ROW) x 12.3 m (wetted width) = 5,535 m ²			
	Bankfull Width: No defined channel, wetted width 12.3 m	Est. Functional Riparian Footprint: 45 m (ROW) x 60 m (riparian) = 2,700 m ²			
	Functional Riparian Width: L: 20 to 30 m, R: 20 to 30 m Max Instream + Riparian Footprint: $5,535 \text{ m}^2 + 2700 \text{ m}^2 = 8,235 \text{ m}^2$				
Zone-of-influence (ZOI):	100 m				
No. Days of Instream Work:	2 to 15 days				

RISK ASSESSMENT RANKING:

Scale of Negative Effects Evaluation Criteria Fish species present and fish habitat potential within zone of		Sensitivity of Fish and Fish Habitat				
influence Instream timing windows Pipeline and vehicle/equipment crossing method Occurrence and duration of instream work Footprint size Disturbance to riparian vegetation	Scale of Negative Effect	Extreme Project Unlikely to Proceed	High DFO Authorization	Moderate Additional Mitigation and/or NEB/DFO Request for Review May be Required	Low Meets DFO criteria; review not required	Not fish habitat
Channel and fish passage restrictions Changes to water quality and turbidity parameters Changes to timing, duration and frequency of flow Riparian and bank restoration measures Beaver activity and associated removals	Extreme Project Unlikely to Proceed					
ensitivity to Fish and Fish Habitat Evaluation Criteria	High DFO Authorization					
 Fish-bearing status Fish stream classification Federally or provincially listed fish species Fish species of management concern Habitat potential and/or availability for fish species and/or life stages Riparian habitat value Water quality parameters 	Moderate Additional Mitigation and/or NEB/DFO Request for Review May be Required				SK-WC77	
	Low Meets DFO criteria; review not required					
	None					

QUESTION	ANSWER
If YES is answered to Questions 1 and 2 below, NEB/DFO review is not required for the proposed activities at the proposed watercourse crossis answered for one or more of Questions 1 and 2, proceed to Questions 3 and 4.	ng. If NO is
1. Can all of the criteria outlined in DFO's Project Activities for the above pipeline/vehicle methods be met based on the qualified fish biologist's current knowledge?	YES
Provide rationale: <u>Dewatering/Pumping</u> : Temporary isolation dams and pumps with fish screen and a qualified fish biologist-lead fish salvage i if water is present at the time of the isolation. Recommended the site be restored to pre-construction conditions. <u>Bridges:</u> Recommend no earth fill below the high watermark and no obstruction of potential fish passage by vehicle crossing.	is recommended
Diages. Recommend to early the below the high watermark and to obstruction of potential tist passage by vehicle clossing.	
2. Can all applicable mitigation measures listed in DFO's <i>Measures to Avoid Causing Harm to Fish and Fish Habitat</i> be implemented to address the Pathways of Effects based on the qualified fish biologist's current knowledge?	YES
Provide rationale: Construction is to occur outside the restricted activity timing window. It is assumed the remaining mitigation measures for pr site selection, contaminant and spill management, erosion and sediment control, revegetation and stabilization, fish protection and operation of be met and are included in the Project's ESA and the EPP.	
If YES is answered to Questions 3 and 4 below, NEB/DFO review is not required for the proposed activities at the proposed watercourse crossic answered for one or more of Questions 3 and 4, proceed to Question 5.	ng. If NO is
3. Have fisheries management objectives, best management practices and/or plans been considered and applied where applicable?	NA
Provide rationale:	
4. Have additional mitigation measures to avoid causing harm to fish and fish habitat been recommended by a qualified fish biologist and will serious harm to fish be avoided and/or mitigated by the successful implementation of these additional measures?	NA
Provide rationale:	
5. Is further review by NEB/DFO recommended by the qualified fish biologist?	No
Provide rationale:	

- Notes:

Aquatic Technical Report November 2014/10427

Pending further direction from DFO regarding riparian habitat disturbance at pipeline-associated watercourse crossings, the mitigation measures and best management practices described in the Project's EPP and the guidance of existing provincial standards are assumed to be sufficient to avoid serious harm to fish, unless otherwise specified by a qualified fish biologist.

Watercourse (Site#): Montgomery Creek (SK-WC78) Legal Location: 14-4-13-3 W2M UTM (Zone 13U): 688727E, 5548559N SKP (as of June 2014): 890.8

CHANNEL AND FLOW CONDITIONS (No. of Transects: 5)			
Confinement	n/a		
Channel Pattern	Irregular, wandering		
Bankfull Width (m): Mean, Range	0.6, 0.5-0.8		
Wetted Width (m): Mean, Range	Dry		
Water Depth (m): Mean, Range	Dry		
Ordinary Highwater Mark (m): Mean, Range	0.20,0.15-0.20		
Discharge (m ³ /s)	Dry		
Stream Gradient (%)	1-2%		
Embeddedness	n/a		

SUBSTRATE	%
Organics	24
Fines (<2 mm)	49
Small Gravel (2-20 mm)	5
Large Gravel (21-65 mm)	20
Cobble (66-250 mm)	2
Boulder (>250 mm)	0

WATER QUALITY PARAMETERS			
Water Temperature (°C)	n/a		
pН	n/a		
Dissolved Oxygen (mg/L)	n/a		
Conductivity (µS/cm)	n/a		
Turbidity (visual) n/a			

Pool 1 (depth >1.00 m)	-	-	-	-	Bould
Pool 2 (depth 0.5-1.00 m)	-	-	-	-	Under
Pool 3 (depth <0.5 m)	-	-	-	-	Overh
Run 1 (>1.00 m)	-	-	-	-	Wood
Run 2 (0.5-1.00 m)	-	-	-		Depth
Run 3 (<0.5 m)	-	-	-	-	Instrea
Flat 1 (>1.00 m)	-	-	-	-	Other
Flat 2 (0.5-1.00 m)	-	-	-	-	Other
Flat 3 (<0.5 m)	-	-	-	-	Other
Riffle	-	-	-	-	Other
No defined channel	2	125	63	Dry	Other
Other (dry channel)	2	75	27	Dry	TOTA
Other	-	-	-	-	Stream

No. Length (m)

Survey Date: September 11, 2013
Habitat Survey Length (m): 200
Restricted Activity Timing Window: April 1 to May 31
Field Crew: E. Fulcher, L. Olsen

CHANNEL AND FLOW CONDITIONS CONTINUED				
Beaver Dams	None			
Native Channel Width (m)	n/a			
BANK CONDITIONS	LEFT BANK	RIGHT BANK		
Bank Shape	Sloping	Sloping		
Bank Texture	Fines/small gravel	Fines/small gravel		
Mean Bank Height (m)	0.2	0.3		
Grade of Approach Slopes (%)	<4	<4		
Riparian Area Width (m)	5-10	10-20		
Riparian Vegetation Type	Grasses	Grasses		

FISH SPECIES PREVIOUSLY DOCUMENTED

Fathead minnow, lowa darter and spottail shiner have been previously documented (AAR 2007a).

Velocit

%

/ (m/s)	COVER TYPES	%
	Boulders	-
	Undercut Banks	-
	Overhanging Vegetation	-
	Woody Debris	-
	Depth	-
	Instream Vegetation	-
	Other	-
/	Other	-
/	TOTAL COVER (m ²)	Dry
	Stream Shading	0 %

FISH HABITAT POTENTIAL RATINGS

FISH SPECIES PRESENT

No fish sampling conducted

(dry)

Species	Spawning	Rearing	Overwintering	Migration	
northern pike	Unsuitable	Unsuitable	Unsuitable	Unsuitable	
walleye	Unsuitable	Unsuitable	Unsuitable	Unsuitable	
white sucker	Unsuitable	Unsuitable	Unsuitable	Unsuitable	
brassy minnow	Unsuitable	Unsuitable	Unsuitable	Unsuitable	

No. Observed

-

No. Captured

-

HABITAT

Fork Length (mm): Mean, Range	FISH SAMPLING EFFORT	
-	Sampling Method	No fish sampling conducted (dry)
-	No. of seconds/hours	-
-	Distance (m)/No. of traps	-
-	No. Captured	-
-	CPUE	-
-		

ADDITIONAL HABITAT COMMENTS

Dry at time of assessment. Intermittent sections of defined and undefined channel. Cattle impacts evident including at right-of-way centerline. Previous information indicates fish presence and wetter conditions in the spring.

Notes: Catch per unit effort (CPUE) is the number of fish captured per hour of minnow trapping, per m² of seine netting and per 100 seconds of electrofishing. n/a: not applicable.



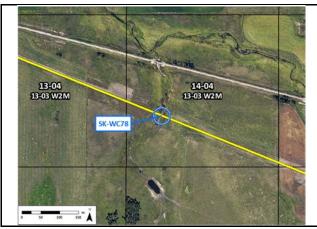
Plate 1 Photograph taken at right-of-way looking upstream.



Plate 3 Photograph taken at right-of-way looking at left bank.



Plate 5 Aerial photograph taken of crossing view north (June 26, 2013).



Map illustrating crossing and watercourse.

Application Submitted to the NEB Appendix 6

> Aquatic Technical Report November 2014/10427



Plate 2 Photograph taken at right-of-way looking downstream.



Plate 4 Photograph taken at right-of-way looking at right bank.



Plate 6 Photograph taken approximately 100 m downstream of the right-of-way looking upstream at dry channel section.





SELF-ASSESSMENT AND RISK MANAGEMENT DECISION FRAMEWORK FOR DFO REGULATORY REQUIREMENTS

DESCRIPTION OF AQUATIC ENVIRONMENT:

Federally/provincially listed species present:	No
Fish that are part of commercial, recreational or Aboriginal (CRA) fisheries present:	No
Fish that support a CRA fishery, or have downstream connectivity to a CRA fisheries present:	Yes
Banks and approach slope characteristics:	Sloping banks, low grade (<4%). Cattle impacts evident, including at right-of-way centerline.
Riparian characteristics:	Functional Riparian Width (m) at Crossing (<i>i.e.</i> , contribution to fish habitat): L: 5 to 10 m, R: 10 to 20 m

CONSTRUCTION DETAILS:

Construction Schedule:	January to March 2017	
Pipeline Methods:	Isolate if water present/open cut if dry or froze	n to bottom
Contingency Methods:	n/a	
Vehicle Crossing Methods:	Snowfill/ice bridge/clear span bridge/existing	
Estimated Maximum	Right-of-Way Width: 45 m	Est. Instream Footprint: 45 m (ROW) x 0.6 m (bankfull) = 27 m ²
Footprint:	Bankfull Width: 0.6 m	Est. Functional Riparian Footprint: 45 m (ROW) x 30 m (riparian) = 1,350 m ²
	Functional Riparian Width: L: 5 to 10 m, R: 10 to 20 m	Max Instream + Riparian Footprint: 27 m ² + 1,350 m ² = 1,377 m ²
Zone-of-influence (ZOI):	100 m	
No. Days of Instream Work:	2 to 15 days	

RISK ASSESSMENT RANKING:

Scale of Negative Effects Evaluation Criteria Fish species present and fish habitat potential within zone of			Sensitivity	of Fish and Fish	Habitat	
influence Instream timing windows Pipeline and vehicle/equipment crossing method Occurrence and duration of instream work Footprint size Disturbance to riparian vegetation	Scale of Negative Effect	Extreme Project Unlikely to Proceed	High DFO Authorization	Moderate Additional Mitigation and/or NEB/DFO Request for Review May be Required	Low Meets DFO criteria; review not required	Not fish habitat
Channel and fish passage restrictions Changes to water quality and turbidity parameters Changes to timing, duration and frequency of flow Riparian and bank restoration measures Beaver activity and associated removals	Extreme Project Unlikely to Proceed					
Sensitivity to Fish and Fish Habitat Evaluation Criteria	High DFO Authorization					
Fish-bearing status Fish stream classification Federally or provincially listed fish species Fish species of management concern Habitat potential and/or availability for fish species and/or life	Moderate Additional Mitigation and/or NEB/DFO Request for Review May be Required				SK-WC78	
stages Riparian habitat value Water quality parameters	Low Meets DFO criteria; review not required					
	None					

SELF-ASSESSMENT DECISION FRAMEWORK: QUESTION	ANSWER
If YES is answered to Questions 1 and 2 below, NEB/DFO review is not required for the proposed activities at the proposed watercourse crossin answered for one or more of Questions 1 and 2, proceed to Questions 3 and 4.	g. If NO is
1. Can all of the criteria outlined in DFO's Project Activities for the above pipeline/vehicle methods be met based on the qualified fish biologist's current knowledge?	YES
Provide rationale: <u>Dewatering/Pumping</u> : Temporary isolation dams and pumps with fish screen and a qualified fish biologist-lead fish salvage is if water is present at the time of the isolation. Recommended the site be restored to pre-construction conditions. <u>Bridges</u> : Recommend no earth fill below the high watermark and no obstruction of potential fish passage by vehicle crossing.	recommended
2. Can all applicable mitigation measures listed in DFO's Measures to Avoid Causing Harm to Fish and Fish Habitat be implemented to address the Pathways of Effects based on the qualified fish biologist's current knowledge?	YES
Provide rationale: Construction is to occur outside the restricted activity timing window. It is assumed the remaining mitigation measures for prosite selection, contaminant and spill management, erosion and sediment control, revegetation and stabilization, fish protection and operation of r be met and are included in the Project's ESA and the EPP.	
If YES is answered to Questions 3 and 4 below, NEB/DFO review is not required for the proposed activities at the proposed watercourse crossin answered for one or more of Questions 3 and 4, proceed to Question 5.	g. If NO is
3. Have fisheries management objectives, best management practices and/or plans been considered and applied where applicable?	NA
Provide rationale:	
4. Have additional mitigation measures to avoid causing harm to fish and fish habitat been recommended by a qualified fish biologist and will serious harm to fish be avoided and/or mitigated by the successful implementation of these additional measures?	NA
Provide rationale:	
5. Is further review by NEB/DFO recommended by the qualified fish biologist?	No
Provide rationale	

- Notes: 1

Aquatic Technical Report November 2014/10427

Pending further direction from DFO regarding riparian habitat disturbance at pipeline-associated watercourse crossings, the mitigation measures and best management practices described in the Project's EPP and the guidance of existing provincial standards are assumed to be sufficient to avoid serious harm to fish, unless otherwise specified by a qualified fish biologist.

Watercourse (Site#): Unnamed tributary to Montgomery Creek (SK-WC79) Legal Location: 5-3-13-3 W2M UTM (Zone 13U): 690215E, 5548024N SKP (as of June 2014): 892.3

CHANNEL AND FLOW CONDITIONS (No. o	f Transects: 5)
Confinement	Unconfined
Channel Pattern	Irregular, wandering
Bankfull Width (m): Mean, Range	2.5,1.5-3.4
Wetted Width (m): Mean, Range	Dry
Water Depth (m): Mean, Range	Dry
Ordinary Highwater Mark (m): Mean, Range	0.3, 0.2-0.5
Discharge (m ³ /s)	Dry
Stream Gradient (%)	1-2%
Embeddedness	n/a

%
8
54
10
4
22
2

WATER QUALITY PAR	AMETERS
Water Temperature (°C)	22.0
рН	9.2
Dissolved Oxygen (mg/L)	4.0 (see comments)
Conductivity (µS/cm)	1350.0
Turbidity (visual)	Moderate

HABITAT	No.	Length (m)	%	Velocity (m/s)	COVER TY
Pool 1 (depth >1.00 m)	-	-	-	-	Boulders
Pool 2 (depth 0.5-1.00 m)	-	-	-	-	Undercut Ba
Pool 3 (depth <0.5 m)	-	-	-	-	Overhangin
Run 1 (>1.00 m)	-	-	-	-	Woody Deb
Run 2 (0.5-1.00 m)	-	-	-		Depth
Run 3 (<0.5 m)	-	-	-	-	Instream Ve
Flat 1 (>1.00 m)	-	-	-	-	Other
Flat 2 (0.5-1.00 m)	-	-	-	-	Other
Flat 3 (<0.5 m)	-	-	-	-	Other
Riffle	-	-	-	-	Other
No defined channel	3	60	30	-	Other
Other (dry channel)	2	140	70	-	TOTAL CO
Other	-	-	-	-	Stream Sha

Survey Date: September 11, 2013
Habitat Survey Length (m): 200
Restricted Activity Timing Window: April 1 to May 31
Field Crew: E. Fulcher, L. Olsen

CHANNEL AND FLOW CONDIT	IONS CONTINUED	
Beaver Dams	None	9
Native Channel Width (m)	n/a	
BANK CONDITIONS	LEFT BANK	RIGHT BANK
Bank Shape	Sloping	Sloping
Bank Texture	Fines/cobble	Fines/cobble
Mean Bank Height (m)	1.2	0.8
Grade of Approach Slopes (%)	<4	<4
Riparian Area Width (m)	0-5	0-5
Riparian Vegetation Type	Grasses	Grasses

ocity (m/s)	COVER TYPES	%
-	Boulders	-
-	Undercut Banks	-
-	Overhanging Vegetation	-
-	Woody Debris	-
	Depth	-
-	Instream Vegetation	-
-	Other	-
-	TOTAL COVER (m ²)	-
-	Stream Shading	0 %

Dip netting 20 minutes 1 0.05

FISH HABITAT POTENTIAL RATINGS							
Species	Spawning	Rearing	Overwintering	Migration			
northern pike	Unsuitable	Unsuitable	Unsuitable	Unsuitable			
walleye	Unsuitable	Unsuitable	Unsuitable	Unsuitable			
white sucker	Unsuitable	Unsuitable	Unsuitable	Unsuitable			
brassy minnow	Unsuitable	Unsuitable	Unsuitable	Unsuitable			

FISH SPECIES PREVIOUSLY DOCUMENTED
Brook stickleback, fathead minnow and pearl dace have been previously documented (AAR 2007a).

FISH SPECIES PRESENT	No. Captured	No. Observed	Fork Length (mm): Mean, Range	FISH SAMPLING EFFORT
Pearl dace	1	5	20	Sampling Method
-	-	-	-	No. of minutes
-	-	-	-	No. Captured
-	-	-	-	CPUE
-	-	-	-	
-	-	-	-	

ADDITIONAL HABITAT COMMENTS

Isolated pond present within right-of-way where fish were captured and observed. No defined channel at centreline. Dry for remainder of study area at the time of assessment. Sections of dry defined channel and undefined channel. Cattle impacts evident. Dissolved oxygen reading taken with HACH test kit.

Notes: Catch per unit effort (CPUE) is the number of fish captured per hour of minnow trapping, per m² of seine netting, per 100 seconds of electrofishing and per minute of dipnetting. n/a: not applicable.



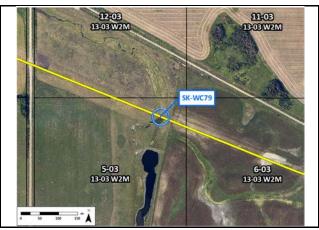
Plate 1 Photograph taken at right-of-way looking upstream.



Plate 3 Photograph taken at right-of-way looking at left bank.



Plate 5 Aerial photograph taken of crossing view north (June 26, 2013).



Map illustrating crossing and watercourse.

Application Submitted to the NEB Appendix 6

> Aquatic Technical Report November 2014/10427



Plate 2 Photograph taken at right-of-way looking downstream.



Plate 4 Photograph taken at right-of-way looking at right bank.



Plate 6 Photograph taken approximately 25 m upstream of the right-of-way looking downstream





SELF-ASSESSMENT AND RISK MANAGEMENT DECISION FRAMEWORK FOR DFO REGULATORY REQUIREMENTS

DESCRIPTION OF AQUATIC ENVIRONMENT:

Federally/provincially listed species present:	No
Fish that are part of commercial, recreational or Aboriginal (CRA) fisheries present:	No
Fish that support a CRA fishery, or have downstream connectivity to a CRA fisheries present:	Yes
Banks and approach slope characteristics:	Sloping banks, low grade (<4%). Cattle impacts evident.
Riparian characteristics:	Functional Riparian Width (m) at Crossing (<i>i.e.</i> , contribution to fish habitat): 0 to 5 m

CONSTRUCTION DETAILS:

Construction Schedule:	January to March 2017					
Pipeline Methods:	Isolate if water present/open cut if dry or froze	Isolate if water present/open cut if dry or frozen to bottom				
Contingency Methods:	n/a	n/a				
Vehicle Crossing Methods:	Snowfill/ice bridge/clear span bridge/existing					
Estimated Maximum	Right-of-Way Width: 45 m	Est. Instream Footprint: 45 m (ROW) x 2.5 m (bankfull) = 112.5 m ²				
Footprint:	Bankfull Width: 2.5 m	Est. Functional Riparian Footprint: 45 m (ROW) x 10 m (riparian) = 450 m ²				
	Functional Riparian Width: L: 0 to 5 m, R: 0 to 5 m	Max Instream + Riparian Footprint: $112.5 \text{ m}^2 + 450 \text{ m}^2 = 562.5 \text{ m}^2$				
Zone-of-influence (ZOI):	100 m					
No. Days of Instream Work:	2 to 15 days					

RISK ASSESSMENT RANKING:

Scale of Negative Effects Evaluation Criteria Fish species present and fish habitat potential within zone of		Sensitivity of Fish and Fish Habitat				
influence Instream timing windows Pipeline and vehicle/equipment crossing method Occurrence and duration of instream work Footprint size Disturbance to riparian vegetation	Scale of Negative Effect	Extreme Project Unlikely to Proceed	High DFO Authorization	Moderate Additional Mitigation and/or NEB/DFO Request for Review May be Required	Low Meets DFO criteria; review not required	Not fish habitat
Channel and fish passage restrictions Changes to water quality and turbidity parameters Changes to timing, duration and frequency of flow Riparian and bank restoration measures Beaver activity and associated removals	Extreme Project Unlikely to Proceed					
Sensitivity to Fish and Fish Habitat Evaluation Criteria	High DFO Authorization					
Fish-bearing status Fish stream classification Federally or provincially listed fish species Fish species of management concern Habitat potential and/or availability for fish species and/or life	Moderate Additional Mitigation and/or NEB/DFO Request for Review May be Required				SK-WC79	
stagesRiparian habitat valueWater quality parameters	Low Meets DFO criteria; review not required					
	None					

SELF-ASSESSMENT DECISION FRAMEWORK: QUESTION	ANSWER
If YES is answered to Questions 1 and 2 below, NEB/DFO review is not required for the proposed activities at the proposed watercourse crossin answered for one or more of Questions 1 and 2, proceed to Questions 3 and 4.	g. If NO is
1. Can all of the criteria outlined in DFO's Project Activities for the above pipeline/vehicle methods be met based on the qualified fish biologist's current knowledge?	YES
Provide rationale: <u>Dewatering/Pumping</u> : Temporary isolation dams and pumps with fish screen and a qualified fish biologist-lead fish salvage is if water is present at the time of the isolation. Recommended the site be restored to pre-construction conditions. <u>Bridges</u> : Recommend no earth fill below the high watermark and no obstruction of potential fish passage by vehicle crossing.	recommended
2. Can all applicable mitigation measures listed in DFO's <i>Measures to Avoid Causing Harm to Fish and Fish Habitat</i> be implemented to address the Pathways of Effects based on the qualified fish biologist's current knowledge?	YES
Provide rationale: Construction is to occur outside the restricted activity timing window. It is assumed the remaining mitigation measures for prosite selection, contaminant and spill management, erosion and sediment control, revegetation and stabilization, fish protection and operation of n be met and are included in the Project's ESA and the EPP.	
If YES is answered to Questions 3 and 4 below, NEB/DFO review is not required for the proposed activities at the proposed watercourse crossin answered for one or more of Questions 3 and 4, proceed to Question 5.	g. If NO is
3. Have fisheries management objectives, best management practices and/or plans been considered and applied where applicable?	NA
Provide rationale:	
4. Have additional mitigation measures to avoid causing harm to fish and fish habitat been recommended by a qualified fish biologist and will serious harm to fish be avoided and/or mitigated by the successful implementation of these additional measures?	NA
Provide rationale:	
5. Is further review by NEB/DFO recommended by the qualified fish biologist?	No
Provide rationale:	

- Notes:

Aquatic Technical Report November 2014/10427

Pending further direction from DFO regarding riparian habitat disturbance at pipeline-associated watercourse crossings, the mitigation measures and best management practices described in the Project's EPP and the guidance of existing provincial standards are assumed to be sufficient to avoid serious harm to fish, unless otherwise specified by a qualified fish biologist.

Watercourse (Site#): Unnamed Drainage Ditch (SK-WC80) Legal Location: 13-36-12-3 W2M UTM (Zone 13U): 693525E, 5547265N SKP (as of June 2014): 895.8

CHANNEL AND FLOW CONDITIONS (No. of Transects: 5)						
Confinement	Unconfined					
Channel Pattern	Straight					
Bankfull Width (m): Mean, Range	3.6, 2.0 - 6.0					
Wetted Width (m): Mean, Range	3.1, 2.0-4.8					
Water Depth (m): Mean, Range	0.34, 0.12 - 0.59					
Ordinary Highwater Mark (m): Mean, Range	0.05, 0 - 0.10					
Discharge (m ³ /s)	Negligible					
Stream Gradient (%)	0.5					
Embeddedness	n/a					

SUBS Organ Fines Small Large

	•
WATER QUALITY PARAM	IETERS
Water Temperature (°C)	20.9
pН	8.4
Dissolved Oxygen (mg/L)	7.0
Conductivity (µS/cm)	1015
Turbidity (visual)	Stained

Survey Date: July 7, 2013
Habitat Survey Length (m): 200
Restricted Activity Timing Window: April 1 to May 31
Field Crew: J. Evans, S. Courtney

CHANNEL AND FLOW CONDITIONS CONTINUED Beaver Dams None Native Channel Width (m) n/a BANK CONDITIONS LEFT BANK RIGHT BANK Sloping Bank Shape Sloping Bank Texture Fines Fines Mean Bank Height (m) 0.5, 0.3 - 0.6 0.6, 0.3 – 0.7 Grade of Approach Slopes (%) <4 <4 Riparian Area Width (m) 0-5 0 – 5 Riparian Vegetation Type Grasses/Wetland Grasses/Wetland

SUBSTRATE	%	HABITAT	No.	Length (m)	%	Velocity (m/s)	COVER TYPES	%
Organics	0	Pool 1 (depth >1.00 m)	-	-	-	-	Boulders	-
Fines (<2 mm)	100	Pool 2 (depth 0.5-1.00 m)	-	-	-	-	Undercut Banks	-
Small Gravel (2-20 mm)	0	Pool 3 (depth <0.5 m)	-	-	-	-	Overhanging Vegetation	-
Large Gravel (21-65 mm)	0	Run 1 (>1.00 m)	-	-	-	-	Woody Debris	-
Cobble (66-250 mm)	0	Run 2 (0.5-1.00 m)	-	-	-	-	Depth	-
Boulder (>250 mm)	0	Run 3 (<0.5 m)	-	-	-	-	Instream Vegetation	See comments
		Flat 1 (>1.00 m)	-	-	-	-	Other	-
WATER QUALITY PARAM	ETERS	Flat 2 (0.5-1.00 m)	-	-	-	-	Other	-
Water Temperature (°C)	20.9	Flat 3 (<0.5 m)	-	-	-	-	Other	-
pН	8.4	Riffle	-	-	-	-	Other	-
Dissolved Oxygen (mg/L)	7.0	No defined channel	-	-	-	-	Other	-
Conductivity (µS/cm)	1015	Anthropogenic channel	1	200	100	Negligible	TOTAL COVER	See comments
Turbidity (visual)	Stained	Other	-	-	-	-	Stream Shading	0 %

FISH HABITAT POTENTIAL RATINGS								
Species	Spawning	Rearing	Overwintering	Migration				
northern pike	Unsuitable	Unsuitable	Unsuitable	Marginal				
walleye	Unsuitable	Unsuitable	Unsuitable	Marginal				
white sucker	Unsuitable	Unsuitable	Unsuitable	Marginal				
brassy minnow	Marginal	Marginal	Marginal	Marginal				

FISH SPECIES PREVIOUSLY DOCUMENTED						
	No species of fish have been previously documented.					

FISH SPECIES PRESENT	No. Captured	No. Observed	Fork Length (mm): Mean, Range				
Fathead minnow	4	0	20	Sampling Method	Dip Netting	Minnow Trapping	
Iowa darter	1	0	45	Time	15 minutes	4 hours	
	-	-	-	Distance (m)/ No. of Traps	n/a	4	
-	-	-	-	No. Captured	4	1	
-	-	-	-	CPUE	0.27	0.25	
-	-	-	-				

ADDITIONAL HABITAT COMMENTS

Drainage ditch, likely anthropogenic. Bull rushes and instream vegetation throughout the study area. Originates in the community of Langbank, SK and continues to the south as an undefined drainage full of bull rushes with little water. Fish likely present in drainage ditch due to flooding from other sources.

Notes: Catch per unit effort (CPUE) is the number of fish captured per hour of minnow trapping, per m² of seine netting, per 100 seconds of electrofishing and per minute of dip netting.

n/a: not applicable.



Plate 1 Photograph taken at right-of-way looking upstream.



Plate 3 Photograph taken at right-of-way of left bank



Plate 5 Aerial photograph taken of crossing view north (June 26, 2013)



Map illustrating crossing and watercourse.

Application Submitted to the NEB Appendix 6

> Aquatic Technical Report November 2014/10427



Plate 2 Photograph taken at right-of-way looking downstream



Plate 6 Photograph taken of Iowa darter captured.





SELF-ASSESSMENT AND RISK MANAGEMENT DECISION FRAMEWORK FOR DFO REGULATORY REQUIREMENTS

DESCRIPTION OF AQUATIC ENVIRONMENT:

Federally/provincially listed species present:	No
Fish that are part of commercial, recreational or Aboriginal (CRA) fisheries present:	No
Fish that support a CRA fishery, or have downstream connectivity to a CRA fisheries present:	Yes
Banks and approach slope characteristics:	Sloping banks, low grade.
Riparian characteristics:	Functional Riparian Width (m) at Crossing (<i>i.e.</i> , contribution to fish habitat): 0 to 5 m

CONSTRUCTION DETAILS:

Construction Schedule:	January to March 2017						
Pipeline Methods:	Isolate if water present/open cut if dry or froze	Isolate if water present/open cut if dry or frozen to bottom					
Contingency Methods:	n/a						
Vehicle Crossing Methods:	Snowfill/ice bridge/clear span bridge/existing						
Estimated Maximum	Right-of-Way Width: 45 m	Est. Instream Footprint: 45 m (ROW) x 3.6 m (bankfull) = 162 m ²					
Footprint:	Bankfull Width: 3.6 m	Est. Functional Riparian Footprint: 45 m (ROW) x 10 m (riparian) = 450 m ²					
	Functional Riparian Width: L: 0 to 5 m, R: 0 to 5 m	Max Instream + Riparian Footprint: $162 \text{ m}^2 + 450 \text{ m}^2 = 612 \text{ m}^2$					
Zone-of-influence (ZOI):	100 m						
No. Days of Instream Work:	2 to 15 days						

RISK ASSESSMENT RANKING:

Scale of Negative Effects Evaluation Criteria Fish species present and fish habitat potential within zone of		Sensitivity of Fish and Fish Habitat				
influence Instream timing windows Pipeline and vehicle/equipment crossing method Occurrence and duration of instream work Footprint size Disturbance to riparian vegetation	Scale of Negative Effect	Extreme Project Unlikely to Proceed	High DFO Authorization	Moderate Additional Mitigation and/or NEB/DFO Request for Review May be Required	Low Meets DFO criteria; review not required	Not fish habitat
Channel and fish passage restrictions Changes to water quality and turbidity parameters Changes to timing, duration and frequency of flow Riparian and bank restoration measures Beaver activity and associated removals	Extreme Project Unlikely to Proceed					
Sensitivity to Fish and Fish Habitat Evaluation Criteria	High DFO Authorization					
 Fish-bearing status Fish stream classification Federally or provincially listed fish species Fish species of management concern Habitat potential and/or availability for fish species and/or life 	Moderate Additional Mitigation and/or NEB/DFO Request for Review May be Required				SK-WC80	
stages Riparian habitat value Water quality parameters	Low Meets DFO criteria; review not required					
	None					

QUESTION	ANSWER
If YES is answered to Questions 1 and 2 below, NEB/DFO review is not required for the proposed activities at the proposed watercourse cross answered for one or more of Questions 1 and 2, proceed to Questions 3 and 4.	sing. If NO is
1. Can all of the criteria outlined in DFO's Project Activities for the above pipeline/vehicle methods be met based on the qualified fish biologist's current knowledge?	YES
Provide rationale: <u>Dewatering/Pumping</u> : Temporary isolation dams and pumps with fish screen and a qualified fish biologist-lead fish salvage if water is present at the time of the isolation. Recommended the site be restored to pre-construction conditions. <u>Bridges:</u> Recommend no earth fill below the high watermark and no obstruction of potential fish passage by vehicle crossing.	is recommende
2. Can all applicable mitigation measures listed in DFO's Measures to Avoid Causing Harm to Fish and Fish Habitat be implemented to address the Pathways of Effects based on the qualified fish biologist's current knowledge?	YES
Provide rationale: Construction is to occur outside the restricted activity timing window. It is assumed the remaining mitigation measures for p site selection, contaminant and spill management, erosion and sediment control, revegetation and stabilization, fish protection and operation of be met and are included in the Project's ESA and the EPP.	roject planning, f machinery can
If YES is answered to Questions 3 and 4 below, NEB/DFO review is not required for the proposed activities at the proposed watercourse cross answered for one or more of Questions 3 and 4, proceed to Question 5.	sing. If NO is
2. Usus fisherics management objectives, best management practices and/or plans been considered and applied where applied by	NA
3. Have fisheries management objectives, best management practices and/or plans been considered and applied where applicable? Provide rationale:	NA
4. Have additional mitigation measures to avoid causing harm to fish and fish habitat been recommended by a qualified fish biologist and will serious harm to fish be avoided and/or mitigated by the successful implementation of these additional measures?	NA
Provide rationale:	
5. Is further review by NEB/DFO recommended by the qualified fish biologist?	No
J. IS TURRINE TEMEW BY TREDIDE O TECONNICIAL BY LIFE YUANNEW INTRODUCIAL	INU

- Notes: 1

Aquatic Technical Report November 2014/10427

Pending further direction from DFO regarding riparian habitat disturbance at pipeline-associated watercourse crossings, the mitigation measures and best management practices described in the Project's EPP and the guidance of existing provincial standards are assumed to be sufficient to avoid serious harm to fish, unless otherwise specified by a qualified fish biologist.

Watercourse (Site#): Little Pipestone Creek (SK-WC87) Legal Location: 4-26-11-33 WPM UTM (Zone 14U): 291856E, 5536830N SKP (as of June 2014): 927.2

CHANNEL AND FLOW CONDITIONS (No. of Transects: 5)						
Confinement	Unconfined					
Channel Pattern	Straight					
Bankfull Width (m): Mean, Range	n/a					
Wetted Width (m): Mean, Range	17.3,2.0-51.8					
Water Depth (m): Mean, Range	0.28,0.03-0.70					
Ordinary Highwater Mark (m): Mean, Range	0.2					
Discharge (m ³ /s)	Negligible					
Stream Gradient (%)	0-1%					
Embeddedness	n/a					

SUBS Organ Fines Small Large Cobbl Bould

WATER QUALITY PARAMETERS					
Water Temperature (°C)	20.8				
рН	8.2				
Dissolved Oxygen (mg/L)	7.0 (see comments)				
Conductivity (µS/cm)	1453.0				
Turbidity (visual)	Light				

Survey Date: September 10, 2013
Habitat Survey Length (m): 200
Restricted Activity Timing Window: April 1 to May 31
Field Crew: E. Fulcher, L. Olsen

CHANNEL AND FLOW CONDITIONS CONTINUED							
Beaver Dams	None						
Native Channel Width (m)	n/a						
BANK CONDITIONS	LEFT BANK RIGHT BANK						
Bank Shape	Sloping	Sloping					
Bank Texture	Fines/small gravel	Fines/small gravel					
Mean Bank Height (m)	n/a	n/a					
Grade of Approach Slopes (%)	<4	>14					
Riparian Area Width (m)	40-50	0-5					
Riparian Vegetation Type	Grasses	Grasses					

%	HABITAT	No.	Length (m)	%	Velocity (m/s)	COVER TYPES	%
30	Pool 1 (depth >1.00 m)	-	-	-	-	Boulders	-
70	Pool 2 (depth 0.5-1.00 m)	-	-	-	-	Undercut Banks	-
0	Pool 3 (depth <0.5 m)	-	-	-	-	Overhanging Vegetation	-
0	Run 1 (>1.00 m)	-	-	-	-	Woody Debris	-
0	Run 2 (0.5-1.00 m)	-	-	-		Depth	-
0	Run 3 (<0.5 m)	-	-	-	-	Instream Vegetation	See comments
	Flat 1 (>1.00 m)	-	-	-	-	Other	-
METERS	Flat 2 (0.5-1.00 m)	-	-	-	-	Other	-
20.8	Flat 3 (<0.5 m)	-	-	-	-	Other	-
8.2	Riffle	-	-	-	-	Other	-
7.0 (see comments)	No defined channel	2	200	100	Negligible	Other	-
1453.0	Other (dry channel)	-	-	-	-	TOTAL COVER (m ²)	See comments
Light	Other	-	-	-	-	Stream Shading	0 %
	30 70 0 0 0 0 0 NETERS 20.8 8.2 7.0 (see comments) 1453.0	30 Pool 1 (depth >1.00 m) 70 Pool 2 (depth 0.5-1.00 m) 0 Pool 3 (depth <0.5 m)	30 Pool 1 (depth >1.00 m) - 70 Pool 2 (depth 0.5-1.00 m) - 0 Pool 3 (depth <0.5 m)	30 Pool 1 (depth >1.00 m) - - 70 Pool 2 (depth 0.5-1.00 m) - - 0 Pool 3 (depth <0.5 m)	30 Pool 1 (depth >1.00 m) -	30 Pool 1 (depth > 1.00 m) - - - - 70 Pool 2 (depth 0.5-1.00 m) - <td< td=""><td>30 Pool 1 (depth > 1.00 m) - - - - - - - - - Boulders Undercut Banks Undercut Banks Undercut Banks Overhanging Vegetation Other <t< td=""></t<></td></td<>	30 Pool 1 (depth > 1.00 m) - - - - - - - - - Boulders Undercut Banks Undercut Banks Undercut Banks Overhanging Vegetation Other Other <t< td=""></t<>

FISH HABITAT POTENTIAL RATINGS								
Species Spawning Rearing Overwintering Migrat								
northern pike Marginal Marginal		Marginal	Unsuitable	Marginal				
walleye	walleye Unsuitable U		Unsuitable	Marginal				
white sucker	Unsuitable	Marginal	Unsuitable	Marginal				
brassy minnow	Marginal	Marginal	Marginal	Marginal				

No. Observed

No. Captured

95

3

3

1

-

FISH SPECIES PREVIOUSLY DOCUMENTED	

White sucker, fathead minnow and lake chub have been previously documented (AAR 2007a).

Sampling Method	Backpack electrofishing
No. of seconds/hours	565
Distance (m)/No. of traps	100
No. Captured	102
CPUE	18.05

ADDITIONAL HABITAT COMMENTS

FISH SPECIES PRESENT

Pearl dace

Brook stickleback

Fathead minnow

White sucker

Cattle impacts are evident. No defined channel with limited connectivity. Railway culvert crossing present 50 m downstream causes ponding effects. Instream vegetation present as cover. Dissolved oxygen reading taken with HACH test kit.

Fork Length (mm): Mean, Range

24,12-55

15, 10-18

56, 43-65

138

-_

Notes: per unit effort (CPUE) is the number of fish captured per hour of minnow trapping, per m² of seine netting and per 100 seconds of electrofishing n/a: not applicable.



Plate 1 Photograph taken at right-of-way looking upstream.



Plate 3 Photograph taken at right-of-way looking at left bank.



Plate 5 Aerial photograph taken of crossing view north (June 26, 2013).



Map illustrating crossing and watercourse.

Application Submitted to the NEB Appendix 6

> Aquatic Technical Report November 2014/10427



Plate 2 Photograph taken at right-of-way looking downstream.



Plate 4 Photograph taken at right-of-way looking at right bank



Photograph taken approximately 25 m downstream of the right-of-way looking downstream at culvert railroad crossing. Plate 6





SELF-ASSESSMENT AND RISK MANAGEMENT DECISION FRAMEWORK FOR DFO REGULATORY REQUIREMENTS

DESCRIPTION OF AQUATIC ENVIRONMENT:

Federally/provincially listed species present:	No
Fish that are part of commercial, recreational or Aboriginal (CRA) fisheries present:	No
Fish that support a CRA fishery, or have downstream connectivity to a CRA fisheries present:	Yes
Banks and approach slope characteristics:	Sloping banks, low grade on left bank (<4%), high grade on right bank (>14%). Cattle impacts are evident.
Riparian characteristics:	Functional Riparian Width (m) at Crossing (<i>i.e.</i> , contribution to fish habitat): L: 40 to 50 m, R: 0 to 5 m

CONSTRUCTION DETAILS:

Construction Schedule:	January to March, 2017			
Pipeline Methods:	Isolate if water present/open cut if dry or frozen to bottom			
Contingency Methods:	n/a			
Vehicle Crossing Methods:	Snowfill/ice bridge/clear span bridge/existing			
Estimated Maximum	Right-of-Way Width: 45 m	Est. Instream Footprint: 45 m (ROW) x 17.3 m (wetted width) = 778.5 m ²		
Footprint:	Bankfull Width: No defined channel, wetted width 17.3 m	Est. Functional Riparian Footprint: 45 m (ROW) x 55 m (riparian) = 2475 m ²		
	Functional Riparian Width: L: 40 to 50 m, R: 0 to 5 m	Max Instream + Riparian Footprint: 778.5 m ² + 2,475 m ² = 3,253.5 m ²		
Zone-of-influence (ZOI):	100 m			
No. Days of Instream Work:	2 to 15 days			

RISK ASSESSMENT RANKING:

Scale of Negative Effects Evaluation Criteria		Sensitivity of Fish and Fish Habitat				
Fish species present and fish habitat potential within zone of influence Instream timing windows Pipeline and vehicle/equipment crossing method Occurrence and duration of instream work Footprint size Disturbance to riparian vegetation	Scale of Negative Effect	Extreme Project Unlikely to Proceed	High DFO Authorization	Moderate Additional Mitigation and/or NEB/DFO Request for Review May be Required	Low Meets DFO criteria; review not required	Not fish habitat
Channel and fish passage restrictions Changes to water quality and turbidity parameters Changes to timing, duration and frequency of flow Riparian and bank restoration measures Beaver activity and associated removals	Extreme Project Unlikely to Proceed					
ensitivity to Fish and Fish Habitat Evaluation Criteria	High DFO Authorization					
Fish-bearing status Fish stream classification Federally or provincially listed fish species Fish species of management concern Habitat potential and/or availability for fish species and/or life	Moderate Additional Mitigation and/or NEB/DFO Request for Review May be Required				SK-WC87	
stages Riparian habitat value Water quality parameters	Low Meets DFO criteria; review not required					
	None					

SELF-ASSESSMENT DECISION FRAMEWORK:	
QUESTION	ANSWER
If YES is answered to Questions 1 and 2 below, NEB/DFO review is not required for the proposed activities at the proposed watercourse crossin answered for one or more of Questions 1 and 2, proceed to Questions 3 and 4.	ıg. If NO is
1. Can all of the criteria outlined in DFO's Project Activities for the above pipeline/vehicle methods be met based on the qualified fish biologist's current knowledge?	YES
Provide rationale: <u>Dewatering/Pumping</u> : Temporary isolation dams and pumps with fish screen and a qualified fish biologist-lead fish salvage is if water is present at the time of the isolation. Recommended the site be restored to pre-construction conditions.	recommended
Bridges: Recommend no earth fill below the high watermark and no obstruction of potential fish passage by vehicle crossing.	
2. Can all applicable mitigation measures listed in DFO's <i>Measures to Avoid Causing Harm to Fish and Fish Habitat</i> be implemented to address the Pathways of Effects based on the qualified fish biologist's current knowledge?	YES
Provide rationale: Construction is to occur outside the restricted activity timing window. It is assumed the remaining mitigation measures for pro- site selection, contaminant and spill management, erosion and sediment control, revegetation and stabilization, fish protection and operation of r be met and are included in the Project's ESA and the EPP.	iject planning, nachinery can
If YES is answered to Questions 3 and 4 below, NEB/DFO review is not required for the proposed activities at the proposed watercourse crossin answered for one or more of Questions 3 and 4, proceed to Question 5.	ıg. If NO is
3. Have fisheries management objectives, best management practices and/or plans been considered and applied where applicable?	NA
Provide rationale:	
T	
4. Have additional mitigation measures to avoid causing harm to fish and fish habitat been recommended by a qualified fish biologist and will serious harm to fish be avoided and/or mitigated by the successful implementation of these additional measures?	NA
Provide rationale:	
5. Is further review by NEB/DFO recommended by the qualified fish biologist?	No
Provide rationale:	

- Notes: 1

Aquatic Technical Report November 2014/10427

Pending further direction from DFO regarding riparian habitat disturbance at pipeline-associated watercourse crossings, the mitigation measures and best management practices described in the Project's EPP and the guidance of existing provincial standards are assumed to be sufficient to avoid serious harm to fish, unless otherwise specified by a qualified fish biologist.

Watercourse (Site#): Stony Creek (SK-WC89) Legal Location: 7-11-10-30 WPM UTM (Zone 14U): 323729E, 5521460N SKP (as of June 2014): 963.0

CHANNEL AND FLOW CONDITIONS (No. of Transects: 5)				
Confinement	Unconfined			
Channel Pattern	Straight			
Bankfull Width (m): Mean, Range	2.9, 2.0-3.3			
Wetted Width (m): Mean, Range	Dry			
Water Depth (m): Mean, Range	Dry			
Ordinary Highwater Mark (m): Mean, Range	0.3,0.2-0.3			
Discharge (m ³ /s)	Dry			
Stream Gradient (%)	1-2%			
Embeddedness	n/a			

SUBSTRATE	%
Organics	0
Fines (<2 mm)	80
Small Gravel (2-20 mm)	4
Large Gravel (21-65 mm)	4
Cobble (66-250 mm)	10
Boulder (>250 mm)	2

WATER QUALITY PARAMETERS				
Water Temperature (°C)	n/a			
рН	n/a			
Dissolved Oxygen (mg/L)	n/a			
Conductivity (µS/cm)	n/a			
Turbidity (visual)	n/a			

Pool 1 (depth >1.00 m)	-	-	-	-	Bould
Pool 2 (depth 0.5-1.00 m)	-	-	-	-	Unde
Pool 3 (depth <0.5 m)	-	-	-	-	Overl
Run 1 (>1.00 m)	-	-	-	-	Wood
Run 2 (0.5-1.00 m)	-	-	-		Depth
Run 3 (<0.5 m)	-	-	-	-	Instre
Flat 1 (>1.00 m)	-	-	-	-	Other
Flat 2 (0.5-1.00 m)	-	-	-	-	Other
Flat 3 (<0.5 m)	-	-	-	-	Other
Riffle	-	-	-	-	Other
No defined channel	-	-	-	-	Other
Other (dry channel)	2	140	100	Dry	TOTA
Other	-	-	-	-	Strea

Beaver Dams

Bank Shape

Bank Texture

Length (m)

No.

Native Channel Width (m)

BANK CONDITIONS

Mean Bank Height (m)

Riparian Area Width (m)

Riparian Vegetation Type

Grade of Approach Slopes (%)

%

Survey Date: September 9, 2013 Habitat Survey Length (m): 140

Field Crew: E. Fulcher, L. Olsen CHANNEL AND FLOW CONDITIONS CONTINUED

Restricted Activity Timing Window: April 1 to May 31

Velocity (m/s)

Gra	Grasses Grasses		S
	COVER TY	PES	%
	Boulders		-
	Undercut B	anks	-
	Overhangin	g Vegetation	-
	Woody Deb	oris	-
	Depth		-
	Instream Ve	egetation	-
	Other		-
	TOTAL CO	VER (m ²)	Dry
	Stream Sha	ading	0 %

RIGHT BANK

Sloping

Fines/small gravel

0.5

<4

10-20

None

n/a

LEFT BANK

Sloping

Fines/small gravel

0.6

<4

10-20

FISH HABITAT POTENTIAL RATINGS

Species	Spawning	Rearing	Overwintering	Migration
northern pike	Unsuitable	Unsuitable	Unsuitable	Unsuitable
walleye	Unsuitable	Unsuitable	Unsuitable	Unsuitable
white sucker	Unsuitable	Unsuitable	Unsuitable	Unsuitable
brassy minnow	Unsuitable	Unsuitable	Unsuitable	Unsuitable

HABITAT

FISH SPECIES PRESENT	No. Captured	No. Observed	Fork Length (mm): Mean, Range
No fish sampling conducted (dry)	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

	-
FISH SAMPLING EFFORT	

Brook stickleback and fathead minnow have been previously documented (Milani 2013).

FISH SPECIES PREVIOUSLY DOCUMENTED

Sampling Method	No fish sampling conducted (dry)
No. of seconds/hours	-
Distance (m)/No. of traps	-
No. Captured	-
CPUE	-

ADDITIONAL HABITAT COMMENTS

Dry channel present throughout study area at time of assessment. Cattle impacts evident and affect channel definition. Could not access further then 40 m upstream due to lack of land access. No documented fish presence, potential for small bodied fish when flowing.

Catch per unit effort (CPUE) is the number of fish captured per hour of minnow trapping, per m² of seine netting and per 100 seconds of electrofishing. Notes: n/a: not applicable.



Plate 1 Photograph taken at right-of-way looking upstream.



Plate 3 Photograph taken at right-of-way looking at left bank.



Aerial photograph taken of crossing view north (June 26, 2013). Plate 5



Map illustrating crossing and watercourse.

Application Submitted to the NEB Appendix 6

> Aquatic Technical Report November 2014/10427



Plate 2 Photograph taken at right-of-way looking downstream



Plate 4 Photograph taken at right-of-way looking at right bank



Plate 6

Photograph taken approximately 40 m upstream of the right-of-way looking at left bank showing cattle impacts.





SELF-ASSESSMENT AND RISK MANAGEMENT DECISION FRAMEWORK FOR DFO REGULATORY REQUIREMENTS

DESCRIPTION OF AQUATIC ENVIRONMENT:

Federally/provincially listed species present:	No
Fish that are part of commercial, recreational or Aboriginal (CRA) fisheries present:	No
Fish that support a CRA fishery, or have downstream connectivity to a CRA fisheries present:	Yes
Banks and approach slope characteristics:	Sloping banks, low grade. Cattle impacts evident and affect channel definition.
Riparian characteristics:	Functional Riparian Width (m) at Crossing (<i>i.e.</i> , contribution to fish habitat): L: 10 to 20 m, R: 10 to 20 m

CONSTRUCTION DETAILS:

Construction Schedule:	January to March 2017		
Pipeline Methods:	Isolate if water present/open cut if dry or frozen to bottom		
Contingency Methods:	n/a		
Vehicle Crossing Methods:	Snowfill/ice bridge/clear span bridge/existing		
Estimated Maximum	Right-of-Way Width: 45 m	Est. Instream Footprint: 45 m (ROW) x 2.9 m (bankfull) = 130.5 m ²	
Footprint:	Bankfull Width: 2.9 m	Est. Functional Riparian Footprint: 45 m (ROW) x 40 m (riparian) = 1,800 m ²	
	Functional Riparian Width: L: 10 to 20 m, R: 10 to 20 m	Max Instream + Riparian Footprint: 130.5 m ² + 1,800 m ² = 1,930.5 m ²	
Zone-of-influence (ZOI):	100 m		
No. Days of Instream Work:	2 to 15 days		

RISK ASSESSMENT RANKING:

Scale of Negative Effects Evaluation Criteria		Sensitivity of Fish and Fish Habitat				
 Fish species present and fish habitat potential within zone of influence Instream timing windows Pipeline and vehicle/equipment crossing method Occurrence and duration of instream work Footprint size Disturbance to riparian vegetation 	Scale of Negative Effect	Extreme Project Unlikely to Proceed	High DFO Authorization	Moderate Additional Mitigation and/or NEB/DFO Request for Review May be Required	Low Meets DFO criteria; review not required	Not fish habitat
Channel and fish passage restrictions Changes to water quality and turbidity parameters Changes to timing, duration and frequency of flow Riparian and bank restoration measures Beaver activity and associated removals	Extreme Project Unlikely to Proceed					
Sensitivity to Fish and Fish Habitat Evaluation Criteria	High DFO Authorization					
 Fish-bearing status Fish stream classification Federally or provincially listed fish species Fish species of management concern Habitat potential and/or availability for fish species and/or life stages Riparian habitat value Water quality parameters 	Moderate Additional Mitigation and/or NEB/DFO Request for Review May be Required				SK-WC89	
	Low Meets DFO criteria; review not required					
	None					

SELF-ASSESSMENT DECISION FRAMEWORK: QUESTION	ANSWER
If YES is answered to Questions 1 and 2 below, NEB/DFO review is not required for the proposed activities at the proposed watercourse crossin answered for one or more of Questions 1 and 2, proceed to Questions 3 and 4.	ng. If NO is
1. Can all of the criteria outlined in DFO's Project Activities for the above pipeline/vehicle methods be met based on the qualified fish biologist's current knowledge?	YES
Provide rationale: <u>Dewatering/Pumping</u> : Temporary isolation dams and pumps with fish screen and a qualified fish biologist-lead fish salvage is if water is present at the time of the isolation. Recommended the site be restored to pre-construction conditions. <u>Bridges</u> : Recommend no earth fill below the high watermark and no obstruction of potential fish passage by vehicle crossing.	s recommended
2. Can all applicable mitigation measures listed in DFO's <i>Measures to Avoid Causing Harm to Fish and Fish Habitat</i> be implemented to address the Pathways of Effects based on the qualified fish biologist's current knowledge?	YES
Provide rationale: Construction is to occur outside the restricted activity timing window. It is assumed the remaining mitigation measures for prosite selection, contaminant and spill management, erosion and sediment control, revegetation and stabilization, fish protection and operation of the met and are included in the Project's ESA and the EPP.	pject planning, machinery can
If YES is answered to Questions 3 and 4 below, NEB/DFO review is not required for the proposed activities at the proposed watercourse crossir answered for one or more of Questions 3 and 4, proceed to Question 5.	ng. If NO is
3. Have fisheries management objectives, best management practices and/or plans been considered and applied where applicable?	NA
Provide rationale:	
4. Have additional mitigation measures to avoid causing harm to fish and fish habitat been recommended by a qualified fish biologist and will serious harm to fish be avoided and/or mitigated by the successful implementation of these additional measures?	NA
Provide rationale:	
5. Is further review by NEB/DFO recommended by the qualified fish biologist?	No
Provide rationale:	

- Notes: 1

Aquatic Technical Report November 2014/10427

Pending further direction from DFO regarding riparian habitat disturbance at pipeline-associated watercourse crossings, the mitigation measures and best management practices described in the Project's EPP and the guidance of existing provincial standards are assumed to be sufficient to avoid serious harm to fish, unless otherwise specified by a qualified fish biologist.

Watercourse (Site#): Pipestone Creek (MB-WC1) Legal Location: 10-34-9-29 WPM UTM (Zone 14U):331981E, 5518167N SKP (as of June 2014):971.9

CHANNEL AND FLOW CONDITIONS (No. of Transects: 6)			
Confinement Frequently confined			
Channel Pattern	Sinuous		
Bankfull Width (m): Mean, Range	23.2, 14.0-36.0		
Wetted Width (m): Mean, Range	19.5, 10.0-31.0		
Water Depth (m): Mean, Range	0.75, 0.23-1.26		
Ordinary Highwater Mark (m): Mean, Range	0.2, consistent throughout		
Discharge (m ³ /s)	4.41		
Stream Gradient (%)	2%		
Embeddedness	Low embeddedness		

SUBSTRATE	%
Organics	0
Fines (<2 mm)	63
Small Gravel (2-20 mm)	12
Large Gravel (21-65 mm)	0
Cobble (66-250 mm)	1
Boulder (>250 mm)	24

WATER QUALITY PARAMETERS		
Water Temperature (°C)	17.8	
pН	n/r	
Dissolved Oxygen (mg/L)	8.0	
Conductivity (µS/cm)	936.0	
Turbidity (visual)	Moderately turbid	

Survey Date: June 18, 2014
Habitat Survey Length (m): 250
Restricted Activity Timing Window: April 1 to June 30
Field Crew: J. Mouland, S. Layher

CHANNEL AND FLOW CONDITIONS CONTINUED			
Beaver Dams	No		
Native Channel Width (m)	n/a		
BANK CONDITIONS	LEFT BANK RIGHT BANK		
Bank Shape	Sloping	Vertical	
Bank Texture	Fines/cobble	Fines/small gravel	
Mean Bank Height (m)	2.0	3.4	
Grade of Approach Slopes (%)	>14	>14	
Riparian Area Width (m)	150	1	
Riparian Vegetation Type	Grasses/shrubs	Grasses/shrubs	

RATE	%	HABITAT	No.	Length (m)	%	Velocity (m/s)	COVER TYPES	%
S	0	Pool 1 (depth >1.00 m)	-	-	-	-	Boulders	57.7
<2 mm)	63	Pool 2 (depth 0.5-1.00 m)	-	-	-	-	Undercut Banks	0.4
Gravel (2-20 mm)	12	Pool 3 (depth <0.5 m)	-	-	-	-	Overhanging Vegetation	0
Gravel (21-65 mm)	0	Run 1 (>1.00 m)	2	215	83	0.65	Woody Debris	0.2
(66-250 mm)	1	Run 2 (0.5-1.00 m)	-	-	-	-	Depth	41.2
r (>250 mm)	24	Run 3 (<0.5 m)	-	-	-	-	Instream Vegetation	0.5
		Flat 1 (>1.00 m)	-	-	-	-	Other	-
R QUALITY PARA	METERS	Flat 2 (0.5-1.00 m)	-	-	-	-	Other	-
[emperature	17.8	Flat 3 (<0.5 m)	-	-	-	-	Other	-
	n/r	Riffle	-	-	-	-	Other	-
ed Oxygen	8.0	No defined channel/lake	-	-	-	-	Other	-
tivity (µS/cm)	936.0	Rapid	1	45	17	1.5	TOTAL COVER (m ²)	971
y (visual)	Moderately turbid	Other	-	-	-	-	Stream Shading	1-20%

FISH HABITAT POTENTIAL RATINGS							
Species	Spawning	Rearing	Overwintering	Migration			
northern pike	Marginal	Marginal	Marginal	Important			
walleye	Marginal	Important	Marginal	Important			
white sucker	Important	Important	Marginal	Important			
brassy minnow	Marginal	Marginal	Important	Important			

FISH SPECIES PRESENT	No. Captured	No. Observed	Fork Length (mm): Mean, Range
Fathead minnow	4	0	45, 38-50

FISH SPECIES PREVIOUSLY DOCUMENTED

Northern pike, walleye, yellow perch, white sucker, creek chub, fathead minnow, pearl dace, longnose dace, lowa darter and brook stickleback have been previously documented (AAR 2007b, Milani 2013, Janusz pers. comm, McCutcheon pers. comm.)

Sampling Method	Backpack Electrofishing	Minnow Trap	Seine Netting
No. of seconds/hours/m ²	1254	120	4
Distance (m)/# of traps/# of nets	400	6	4
No. Captured	4	0	0
CPUE	0.32	0	0

ADDITIONAL HABITAT COMMENTS

White heelsplitter, cylindrical papershell, giant floater and fatmucket mussel species have been previously documented in Pipestone Creek (Watson et al. 1998). Damage to banks where cattle enter the watercourse is evident throughout the assessment length. Boulder substrate is artificial rip-rap from existing right-of-way. Approach slopes will need to be graded. 150 m downstream is only 20 m linear distance from proposed right-of-way as the site is located at a meander bend. Two fatmucket mussels captured downstream of proposed centerline and large mussel shells were noted throughout the study reach. Mussel shells are suspected of being from white heelsplitter, fatmucket, cylindrical papershell and giant floater. Field crew could only access to 300 m downstream due to landowner concerns. In addition, the outboard motor and generator for the float electrofishing gear were not used due to landowner concerns.

Catch per unit effort (CPUE) is the number of fish captured per hour of minnow trapping, per m² of seine netting and per 100 seconds of electrofishing. Notes: n/a: not applicable, n/r: not recorded.



Plate 1 Photograph taken at right-of-way looking upstream.



Plate 3 Photograph taken at right-of-way looking toward left bank.



Plate 5 Aerial photograph taken of crossing looking north (June 26, 2014).



Map illustrating crossing and watercourse.

Application Submitted to the NEB Appendix 6

> Aquatic Technical Report November 2014/10427



Plate 2 Photograph taken at right-of-way looking downstream.



Plate 4 Photograph taken at right-of-way looking toward right bank.



Plate 6 Photograph taken of fatmucket mussel captured.

Line 3 Replacement Program





A CH2M HILL Company

SELF-ASSESSMENT AND RISK MANAGEMENT DECISION FRAMEWORK FOR DFO REGULATORY REQUIREMENTS

DESCRIPTION OF AQUATIC ENVIRONMENT:

Federally/provincially listed species present:	No
Fish that are part of commercial, recreational or Aboriginal (CRA) fisheries present:	Yes
Fish that support a CRA fishery, or have downstream connectivity to a CRA fisheries present:	Yes
Banks and approach slope characteristics:	Left bank sloping with a low grade of approach slope (<4%). Right bank vertical with a moderate grade of approach slope (4-14%). Right bank was noted to be unstable.
Riparian characteristics:	Functional Riparian Width (m) at Crossing (<i>i.e.</i> , contribution to fish habitat): L: 150 m R: 1 m

CONSTRUCTION DETAILS:

Sonorico en de mies.							
Construction Schedule:	January to March 2017						
Pipeline Methods:	Isolate if water present/open cut if dry or frozen to bottom						
Contingency Methods:	n/a	n/a					
Vehicle Crossing Methods:	Snowfill/ice bridge/clear span bridge/existing	Snowfill/ice bridge/clear span bridge/existing					
Estimated Maximum Footprint:	Right-of-Way Width: 45 m	Est. Instream Footprint: 45 m (ROW) x 23.2 m (bankfull) = 1,044 m ²					
	Bankfull Width: 23.2 m	Bankfull Width: 23.2 m Est. Functional Riparian Footprint: 45 m (ROW) x 151 m (riparian) = 6,795 m ²					
	Functional Riparian Width: L: 150 m, R: 1 m Max Instream + Riparian Footprint: 1,044 m ² +6,795 m ² = 7,839 m ²						
Zone-of-influence (ZOI):	2,700 m						
No. Days of Instream Work:	2 to 15 days	2 to 15 days					

RISK ASSESSMENT RANKING:

Scale of Negative Effects Evaluation Criteria			Sensitivity	of Fish and Fish	Habitat		
 Fish species present and fish habitat potential within zone of influence Instream timing windows Pipeline and vehicle/equipment crossing method Occurrence and duration of instream work Footprint size Disturbance to riparian vegetation 	Scale of Negative Effect	Extreme Project Unlikely to Proceed	High DFO Authorization	Moderate Additional Mitigation and/or NEB/DFO Request for Review May be Required	Low Meets DFO criteria; review not required	Not fish habitat	
 Channel and fish passage restrictions Changes to water quality and turbidity parameters Changes to timing, duration and frequency of flow Riparian and bank restoration measures Beaver activity and associated removals 	Extreme Project Unlikely to Proceed						
Sensitivity to Fish and Fish Habitat Evaluation Criteria	High DFO Authorization						
 Fish-bearing status Fish stream classification Federally or provincially listed fish species Fish species of management concern Habitat potential and/or availability for fish species and/or life stages 	Moderate Additional Mitigation and/or NEB/DFO Request for Review May be Required			MB-WC1			
 Riparian habitat value Water quality parameters	Low Meets DFO criteria; review not required						
	None						

SELF-ASSESSMENT DECISION FRAMEWORK: QUESTION If YES is answered to Questions 1 and 2 below, NEB/DFO review is not red otherwise stated. If NO is answered for one or more of Questions 1 and 2, 1. Can all of the criteria outlined in DFO's Project Activities for the above pi biologist's current knowledge? Provide rationale: Dewatering/Pumping: Temporary isolation dams and pu if water is present at the time of the isolation. Recommended the site be res Bridges: Recommend no earth fill below the high watermark and no obstru 2. Can all applicable mitigation measures listed in DFO's Measures to Avoi address the Pathways of Effects based on the qualified fish biologist's curre Provide rationale: Construction is to occur outside the restricted activity ti Causing Harm to Fish and Fish Habitat may not be met due to potential inc bend. It is assumed the remaining mitigation measures for project planning revegetation and stabilization, fish protection and operation of machinery of If YES is answered to Questions 3 and 4 below, NEB/DFO review is not reotherwise stated. If NO is answered for one or more of Questions 3 and 4, 3. Have fisheries management objectives, best management practices and Provide rationale: Other standards and best management practices for we implemented where applicable (e.g., CAPP et al. 2005). 4. Have additional mitigation measures to avoid causing harm to fish and fi serious harm to fish be avoided and/or mitigated by the successful implement Provide rationale: Watercourse was rated as Important walleye rearing h documented in the watercourse. Maintaining a qualified fish biologist onsite is recommended to facilitate fish salvage during construction. Recommend bank stabilization measures to be implemented are a combin The right bank was noted to be unstable at the proposed crossing location. It is recommend to minimize any disturbance to the riparian vegetation alon proposed pipeline crossing location. 5. Is further review by NEB/DFO recommended by the gualified fish biologi not result due to habitat sensitivity and bank conditions. Notes: serious harm to fish, unless otherwise specified by a qualified fish biologist. result of the alignment paralleling a meander bend.

Moderate

Application Submitted to the NEB Appendix 6

> Aquatic Technical Report November 2014/10427

	ANSWER
quired for the proposed activities at the proposed watercourse crossi proceed to Questions 3 and 4.	ng unless
ipeline/vehicle methods be met based on the qualified fish	YES
umps with fish screen and a qualified fish biologist-lead fish salvage i stored to pre-construction conditions.	s recommended
ction of potential fish passage by vehicle crossing.	
id Causing Harm to Fish and Fish Habitat be implemented to ent knowledge?	NO
ming window. Alignment parallels a meander bend and all DFO's <i>Me</i> creased riparian disturbance. Proposed centerline is 20 m away from g, site selection, contaminant and spill management, erosion and sedi can be met and are included in the Project's ESA and the EPP.	the meander
quired for the proposed activities at the proposed watercourse crossi. proceed to Question 5.	ng unless
d/or plans been considered and applied where applicable?	YES
orking in and around water have been incorporated into the Project's	EPP and will be
ish habitat been recommended by a qualified fish biologist and will entation of these additional measures?	YES (see below)
abitat potential and northern pike, walleye and yellow perch are previo	ously
h passage, if warranted, and conduct water quality monitoring and a f	ish/mussel
ation of hard armouring ($e.g.$, riprap) and bio-engineering ($e.g.$, live sl	hrub staking).
ng the meander bend of the watercourse and limit construction activit	ies to the
ist?	YES

Provide rationale: With the successful implementation of additional recommendations made by a qualified fish biologist, moderate sensitivity of the study reach and construction timing, it is expected no serious harm to fish will result. However, review by the NEB/DFO is recommended to confirm serious harm will

> Pending further direction from DFO regarding riparian habitat disturbance at pipeline-associated watercourse crossings, the mitigation measures and best management practices described in the Project's EPP and the guidance of existing provincial standards are assumed to be sufficient to avoid

2 Functional riparian width is interpreted as the terrestrial area/zone adjacent to a watercourse where vegetation and microclimate are hydrologically influenced by the presence of perennial or intermittent water from the stream or river. The footprint calculation assumes no additional disturbance as a

Watercourse (Site#): Black Creek (MB-WC27) Legal Location: 5-25-7-18 WPM UTM (Zone 14U): 442348E, 5494205N SKP (as of June 2014): 1087.6

CHANNEL AND FLOW CONDITIONS (No. of Transects: 5)					
Confinement	n/a				
Channel Pattern	n/a				
Bankfull Width (m): Mean, Range	n/a				
Wetted Width (m): Mean, Range	2.5, 1.6-3.3				
Water Depth (m): Mean, Range	0.36, 0.23-0.52				
Ordinary Highwater Mark (m): Mean, Range	0.3				
Discharge (m ³ /s)	Negligible				
Stream Gradient (%)	3%				
Embeddedness	n/a				

Survey Date: September 7, 2013 Habitat Survey Length (m): 110 Restricted Activity Timing Window: April 1 to June 30 Field Crew: E. Fulcher, L. Olsen

CHANNEL AND FLOW CONDITIONS CONTINUED						
Beaver Dams	None	9				
Native Channel Width (m)	n/a					
BANK CONDITIONS	LEFT BANK	RIGHT BANK				
Bank Shape	Sloping	Sloping				
Bank Texture	Fines	Fines				
Mean Bank Height (m)	n/a	n/a				
Grade of Approach Slopes (%)	<4	>14				
Riparian Area Width (m)	0 - 5	0 - 5				
Riparian Vegetation Type	Grasses	Grasses				

SUBSTRATE	%	HABITAT	No.	Length (m)	%	Velocity (m/s)	COVER TYPES	%
Organics	100	Pool 1 (depth >1.00 m)	-	-	-	-	Boulders	-
Fines (<2 mm)	0	Pool 2 (depth 0.5-1.00 m)	-	-	-	-	Undercut Banks	-
Small Gravel (2-20 mm)	0	Pool 3 (depth <0.5 m)	-	-	-	-	Overhanging Vegetation	-
Large Gravel (21-65 mm)	0	Run 1 (>1.00 m)	-	-	-	-	Woody Debris	-
Cobble (66-250 mm)	0	Run 2 (0.5-1.00 m)	-	-	-		Depth	-
Boulder (>250 mm)	0	Run 3 (<0.5 m)	-	-	-	-	Instream Vegetation	See comme
	<u> </u>	Flat 1 (>1.00 m)	-	-	-	-	Other	-
WATER QUALITY PARAM	IETERS	Flat 2 (0.5-1.00 m)	-	-	-	-	Other	-
Water Temperature (°C)	16.6	Flat 3 (<0.5 m)	-	-	-	-	Other	-
pН	7.1	Riffle	-	-	-	-	Other	-
Dissolved Oxygen (mg/L)	4.5	No defined channel	2	110	100	Negligible	Other	-
Conductivity (µS/cm)	2058.0	Other (LWB)	-	-	-	-	TOTAL COVER (m ²)	See comme
Turbidity (visual)	Moderate	Other	-	-	-	-	Stream Shading	0 %

FISH HABITAT POTENTIAL RATINGS					
Species	Spawning	Rearing	Overwintering	Migration	
northern pike	Unsuitable	Unsuitable	Unsuitable	Unsuitable	
walleye	Unsuitable	Unsuitable	Unsuitable	Unsuitable	
white sucker	Unsuitable	Unsuitable	Unsuitable	Unsuitable	
brassy minnow	Marginal	Marginal	Marginal	Unsuitable	

FISH SPECIES PRESENT	No. Captured	No. Observed	Fork Length (mm): Mean, Range
Brook stickleback	6	-	45.5,40-50
Pearl dace	13	-	38.5,29-46
-	-	-	-
-	-	-	-
-	-	-	-

FISH SPECIES PREVIOUSLY DOCUMENTED White sucker, fathead minnow, creek chub, common shiner and brook stickleback have been previously documented (Milani 2013).

FISH SAMPLING EFFORT Sampling Method Backpack electrofishing 304 No. of seconds/hours Distance (m)/No. of traps 25 No. Captured 19 CPUE

6.25

ADDITIONAL HABITAT COMMENTS

No defined channel. Isolated pockets of water with fish present at time of assessment. Instream vegetation is the dominant form of cover.

Catch per unit effort (CPUE) is the number of fish captured per hour of minnow trapping, per m² of seine netting and per 100 seconds of electrofishing. Notes: n/a - not applicable.



Plate 1 Photograph taken at right-of-way looking upstream.



Plate 3 Photograph taken at right-of-way of left bank



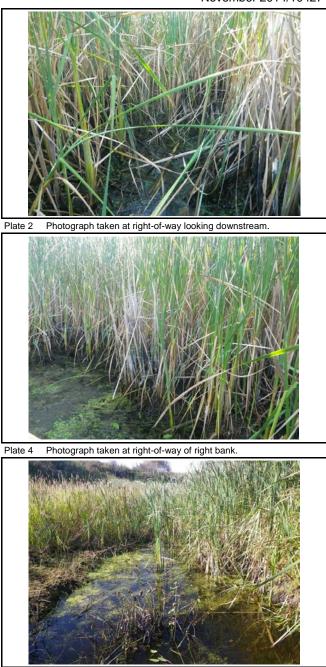
Plate 5 Aerial photograph taken of crossing view north (June 26, 2013).



Map illustrating crossing and watercourse.

Application Submitted to the NEB Appendix 6

> Aquatic Technical Report November 2014/10427



Photograph taken approximately 25 m upstream of the right-of-way looking upstream at ponding. Plate 6





Enbridge Pipelines Inc. Line 3 Replacement Program

SELF-ASSESSMENT AND RISK MANAGEMENT DECISION FRAMEWORK FOR DFO REGULATORY REQUIREMENTS

DESCRIPTION OF AQUATIC ENVIRONMENT:

Federally/provincially listed species present:	No
Fish that are part of commercial, recreational or Aboriginal (CRA) fisheries present:	No
Fish that support a CRA fishery, or have downstream connectivity to a CRA fisheries present:	Yes
Banks and approach slope characteristics:	Sloping banks. Approach slope of left bank is low (<2%), while right bank is high (>14%).
Riparian characteristics:	Functional Riparian Width (m) at Crossing (<i>i.e.</i> , contribution to fish habitat): 0 to 5 m

CONSTRUCTION DETAILS:

Construction Schedule:	August to December 2017				
Pipeline Methods:	Isolate if water present/open cut if dry or frozen to bottom				
Contingency Methods:	n/a	n/a			
Vehicle Crossing Methods:	Snowfill/ice bridge/clear span bridge/existing	Snowfill/ice bridge/clear span bridge/existing			
Estimated Maximum	Right-of-Way Width: 45 m	Est. Instream Footprint: 45 m (ROW) x 2.5 m (wetted width) = 112.5 m ²			
Footprint:	Bankfull Width: No defined channel, wetted width 2.5 m	Est. Functional Riparian Footprint: 45 m (ROW) x 10 m (riparian) = 450 m ²			
	Functional Riparian Width: L: 0 to 5 m, R: 0 to 5 m	Max Instream + Riparian Footprint: 112.5 m ² + 450 m ² = 562.5 m ²			
Zone-of-influence (ZOI):	100 m				
No. Days of Instream Work:	2 to 15 days				

RISK ASSESSMENT RANKING:

Scale of Negative Effects Evaluation Criteria		Sensitivity of Fish and Fish Habitat				
Fish species present and fish habitat potential within zone of influence Instream timing windows Pipeline and vehicle/equipment crossing method Occurrence and duration of instream work Footprint size Disturbance to riparian vegetation	Scale of Negative Effect	Extreme Project Unlikely to Proceed	High DFO Authorization	Moderate Additional Mitigation and/or NEB/DFO Request for Review May be Required	Low Meets DFO criteria; review not required	Not fish habitat
Channel and fish passage restrictions Changes to water quality and turbidity parameters Changes to timing, duration and frequency of flow Riparian and bank restoration measures Beaver activity and associated removals	Extreme Project Unlikely to Proceed					
ensitivity to Fish and Fish Habitat Evaluation Criteria	High DFO Authorization					
Fish-bearing status Fish stream classification Federally or provincially listed fish species Fish species of management concern Habitat potential and/or availability for fish species and/or life stages	Moderate Additional Mitigation and/or NEB/DFO Request for Review May be Required				MB- WC27	
Riparian habitat value Water quality parameters Freshwater mussel presence	Low Meets DFO criteria; review not required					
	None					

QUEST	ION		ANSWE
		ed to Questions 1 and 2 below, NEB/DFO review is not required for the proposed activities at the proposed watercourse crossing or more of Questions 1 and 2, proceed to Questions 3 and 4.	ing. If NO is
		criteria outlined in DFO's Project Activities for the above pipeline/vehicle methods be met based on the qualified fish t knowledge?	YES
Provide if water	rational	e: <u>Dewatering/Pumping</u> : Temporary isolation dams and pumps with fish screen and a qualified fish biologist-lead fish salvage i t at the time of the isolation. Recommended the site be restored to pre-construction conditions. nend no earth fill below the high watermark and no obstruction of potential fish passage by vehicle crossing.	is recommen
		ble mitigation measures listed in DFO's <i>Measures to Avoid Causing Harm to Fish and Fish Habitat</i> be implemented to ways of Effects based on the qualified fish biologist's current knowledge?	YES
site sele	ction, co	e: Construction is to occur outside the restricted activity timing window. It is assumed the remaining mitigation measures for pro- ntaminant and spill management, erosion and sediment control, revegetation and stabilization, fish protection and operation of ncluded in the Project's ESA and the EPP.	
		ed to Questions 3 and 4 below, NEB/DFO review is not required for the proposed activities at the proposed watercourse crossi e or more of Questions 3 and 4, proceed to Question 5.	ing. If NO is
		management objectives, best management practices and/or plans been considered and applied where applicable?	NA
Provide	rational	2:	
			1
serious	harm to f	I mitigation measures to avoid causing harm to fish and fish habitat been recommended by a qualified fish biologist and will ish be avoided and/or mitigated by the successful implementation of these additional measures?	NA
Provide	rational	e:	
	h or roulo	why NED/DEC recommended by the gualified fish historiet?	No
E lo furt		w by NEB/DFO recommended by the qualified fish biologist?	No
		Pending further direction from DFO regarding riparian habitat disturbance at pipeline-associated watercourse crossings, the mitigation measu best management practices described in the Project's EPP and the guidance of existing provincial standards are assumed to be sufficient to a	ires and avoid
5. Is furt Provide otes:		serious harm to fish, unless otherwise specified by a qualified fish biologist.	

Aquatic Technical Report November 2014/10427

Watercourse (Site#): Souris River (MB-WC32) Legal Location: 10-22-7-17WPM UTM (Zone 14U): 449807 E, 5492649 N SKP (as of June 2014): 1095.3

CHANNEL AND FLOW CONDITIONS (No. of Transects: 6)			
Confinement	Frequently confined		
Channel Pattern	Sinuous		
Bankfull Width (m): Mean, Range	53.5, 41.0-67.0		
Wetted Width (m): Mean, Range	52.0, 39.0-66.0		
Water Depth (m): Mean, Range	1.99, 1.20-3.00		
Ordinary Highwater Mark (m): Mean, Range	0		
Discharge (m ³ /s)	104.6		
Stream Gradient (%)	1-2		
Embeddedness	Unembedded		

SUBSTRATE	%
Organics	0
Fines (<2 mm)	16
Small Gravel (2-20 mm)	30
Large Gravel (21-65 mm)	40
Cobble (66-250 mm)	14
Boulder (>250 mm)	0

WATER QUALITY PARAMETERS		
Water Temperature (°C)	19.5	
рН	n/r	
Dissolved Oxygen (mg/L)	8.1	
Conductivity (µS/cm)	1022	
Turbidity (visual)	Turbid	

%	HABITAT	No.	Length (m)	%	Velocity (m/s)	COVER TYPES
0	Pool 1 (depth >1.00 m)	-	-	-	-	Boulders
16	Pool 2 (depth 0.5-1.00 m)	-	-	-	-	Undercut Banks
30	Pool 3 (depth <0.5 m)	-	-	-	-	Overhanging Vegetation
40	Run 1 (>1.00 m)	1	550	100	1.3	Woody Debris
14	Run 2 (0.5-1.00 m)	-	-	-	-	Depth
0	Run 3 (<0.5 m)	-	-	-	-	Instream Vegetation
	Flat 1 (>1.00 m)	-	-	-	-	Other
S	Flat 2 (0.5-1.00 m)	-	-	-	-	Other
	Flat 3 (<0.5 m)	-	-	-	-	Other
	Riffle	-	-	-	-	Other
	No defined channel/lake	-	-	-	-	Other
	Rapid	-	-	-	-	TOTAL COVER (m ²)
	Other	-	-	-	-	Stream Shading (%)

FISH HABITAT POTENTIAL RATINGS						
Species	Spawning	Rearing	Overwintering	Migration		
northern pike	Marginal	Marginal	Important	Important		
walleye	Essential	Important	Important	Essential		
white sucker	Marginal	Important	Important	Important		
Brassy minnow	Marginal	Marginal	Marginal	Marginal		

FISH SPECIES PRESENT No. Captured No. Observed Fork Length (mm): Mean, Range 343.5, 187-500 walleye 2 0 285.5, 176-395 white sucker 2 0 97 yellow perch 1 0 290 black bullhead 0 1

FISH SAMPLING EFFORT			
	[
Sampling Method	Float Electrofishing		
No. of seconds/hours	3669		
Distance (m)/No. of traps	1000		
No. Captured	6		
CPUE	0.16		

Goldeye, northern pike, walleye, yellow perch, burbot, rock bass, central mudminnow, common carp, common shiner, pearl dace, golden shiner, river shiner, bigmouth shiner, blacknose shiner, blackchin shiner, spottail shiner, sand shiner, northern redbelly dace, fathead minnow, flathead chub, western blacknose dace leagnage dace grace shib white

western blacknose dace, longnose dace, creek chub, white sucker, shorthead redhorse, black bullhead, brown bullhead, stonecat, tadpole madtom, trout-perch, brook stickleback, lowa darter, Johnny darter and blackside darter have been previously documented (McCulloch and Franzin 1996, AAR

FISH SPECIES PREVIOUSLY DOCUMENTED

2007b, 2008a, Milani 2013).

ADDITIONAL HABITAT COMMENTS

Field crew could not traverse to 875 m downstream due to shallow stream section. Electrofishing was restricted to the area near the boat launch due to high flows and the decreased performance of the boat in these conditions. Existing right-of-way looks like a trenched crossing although this likely resulted in substantial sediment mobilization and any attempt to do so would also result in sediment mobilization both during construction and after.

Notes: Catch per unit effort (CPUE) is the number of fish captured per hour of minnow trapping, per m² of seine netting and per 100 seconds of electrofishing. n/a: not applicable, n/r: not recorded.

Survey Date: June 20, 2014 Habitat Survey Length (m): 550 Restricted Activity Timing Window: April 1 to June 30 Field Crew: J. Mouland, S. Layher

CHANNEL AND FLOW CONDIT	IONS CONTINUED				
Beaver Dams No					
Native Channel Width (m)	ive Channel Width (m) n/a				
BANK CONDITIONS	LEFT BANK	RIGHT BANK			
Bank Shape	Vertical	Vertical			
Bank Texture	Fines/large gravel	Fines/large gravel			
Mean Bank Height (m)	5.9, 3.9-12.5	6.1, 3.5-9.0			
Grade of Approach Slopes (%)	<4	4-14			
Riparian Area Width (m)	30-50	5-40			
Riparian Vegetation Type	Deciduous/grasses	Deciduous/grasses			

,			
	Boulders	0.5	
	Undercut Banks	0	
	Overhanging Vegetation	0.1	
	Woody Debris	3.4	
	Depth	96	
	Instream Vegetation	0	
	Other	-	
	TOTAL COVER (m ²)	20,845	
	Stream Shading	1-2%	

%



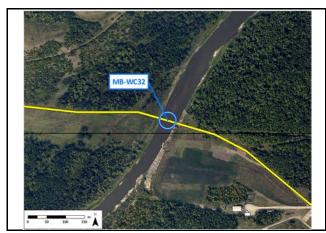
Plate 1 Photograph taken at right-of-way looking upstream.



Plate 3 Photograph taken at right-of-way looking toward left bank.



Plate 5 Photograph taken of adult walleye captured.



Map illustrating crossing and watercourse.

Application Submitted to the NEB Appendix 6

> Aquatic Technical Report November 2014/10427



Plate 2 Photograph taken at right-of-way looking downstream.



Plate 4 Photograph taken at right-of-way looking toward right bank.



Photograph taken approximately 50 m downstream of right-of-Plate 6 way looking upstream.





Enbridge Pipelines Inc. Line 3 Replacement Program

SELF-ASSESSMENT AND RISK MANAGEMENT DECISION FRAMEWORK FOR DFO REGULATORY REQUIREMENTS

DESCRIPTION OF AQUATIC ENVIRONMENT:

Federally/provincially listed species present:	No
Fish that are part of commercial, recreational or Aboriginal (CRA) fisheries present:	Yes
Fish that support a CRA fishery, or have downstream connectivity to a CRA fisheries present:	Yes
Banks and approach slope characteristics:	Both banks vertical. Grade of left approach slope low (<4%), grade of right approach slope moderate (4-14%).
Riparian characteristics:	Functional Riparian Width (m) at Crossing (<i>i.e.</i> , contribution to fish habitat): L: 30 m to 50 m, R: 5 m to 40 m

CONSTRUCTION DETAILS:

Construction Schedule:	August to December 2017				
Pipeline Methods:	Trenchless	Trenchless			
Contingency Methods:	Contingency trenchless location	Contingency trenchless location			
Vehicle Crossing Methods:	Existing				
Estimated Maximum	Right-of-Way Width: 45 m	Est. Instream Footprint: 0 m ² (trenchless)			
Footprint*:	Bankfull Width: 53.5 m Est. Functional Riparian Footprint: 0 m ² (trenchless)				
	Functional Riparian Width: L: 30m to 50m, R: 5m to 40m	Max Instream + Riparian Footprint: 0 m ² (trenchless)			
Zone-of-influence (ZOI):	10,000 m (high flows at time of assessment, I	ikely to be lower during construction)			
No. Days of Instream Work:	Nork: 0				

RISK ASSESSMENT RANKING:

Using the risk assessment evaluation criter	ia, what ranking did the proposed water	course crossing receive?
	,	g

Scale of Negative Effects Evaluation Criteria		Sensitivity of Fish and Fish Habitat					
 Fish species present and fish habitat potential within zone of influence Instream timing windows Pipeline and vehicle/equipment crossing method Occurrence and duration of instream work Footprint size Disturbance to riparian vegetation 	Scale of Negative Effect	Extreme Project Unlikely to Proceed	High DFO Authorization	Moderate Additional Mitigation and/or NEB/DFO Request for Review May be Required	Low Meets DFO criteria; review not required	Not fish habitat	
 Channel and fish passage restrictions Changes to water quality and turbidity parameters Changes to timing, duration and frequency of flow Riparian and bank restoration measures Beaver activity and associated removals 	Extreme Project Unlikely to Proceed						
Sensitivity to Fish and Fish Habitat Evaluation Criteria	High DFO Authorization						
 Fish-bearing status Fish stream classification Federally or provincially listed fish species Fish species of management concern Habitat potential and/or availability for fish species and/or life stages 	Moderate Additional Mitigation and/or NEB/DFO Request for Review May be Required						
Riparian habitat valueWater quality parameters	Low Meets DFO criteria; review not required		MB-WC32				
	None						

QUESTI	ON		ANSWE
		red to Questions 1 and 2 below, NEB/DFO review is not required for the proposed activities at the proposed watercourse crossin ne or more of Questions 1 and 2, proceed to Questions 3 and 4.	ng. If NO is
		criteria outlined in DFO's Project Activities for the above pipeline/vehicle methods be met based on the qualified fish nt knowledge?	YES
Provide	rationa	ale: <u>Trenchless methods</u> : No instream work anticipated. Imend no earth fill below the high watermark and no obstruction of potential fish passage by vehicle crossing.	
2. Can a address	ll applic the Pat	cable mitigation measures listed in DFO's <i>Measures to Avoid Causing Harm to Fish and Fish Habitat</i> be implemented to hways of Effects (POE) based on the qualified fish biologist's current knowledge?	YES
revegeta measure Water qu	tion an s outlin Jality m	ale: The mitigation measures for project planning, timing, site selection, contaminant and spill management, erosion and sediment d stabilization, fish protection and operation of machinery can be met and are included in the Project's ESA and the EPP. The met ed above and in the EPP for the Project address the POEs. onitoring during trenchless construction is recommended. Preparation for contingency crossing location is recommended in the sing methods are unsuccessful.	itigation
		red to Questions 3 and 4 below, NEB/DFO review is not required for the proposed activities at the proposed watercourse crossin the or more of Questions 3 and 4, proceed to Question 5.	ng. If NO is
2 11/0	fichorio	s management objectives, best management practices and/or plans been considered and applied where applicable?	NA
Provide			107
	narm to	nal mitigation measures to avoid causing harm to fish and fish habitat been recommended by a qualified fish biologist and will fish be avoided and/or mitigated by the successful implementation of these additional measures?	NA
	Tution		
		ew by NEB/DFO recommended by the qualified fish biologist?	NO
Provide			
otes:	1	Pending further direction from DFO regarding riparian habitat disturbance at pipeline-associated watercourse crossings, the mitigation measur best management practices described in the Project's EPP and the guidance of existing provincial standards are assumed to be sufficient to a serious harm to fish, unless otherwise specified by a qualified fish biologist.	es and void
	2	Functional riparian width is interpreted as the terrestrial area/zone adjacent to a watercourse where vegetation and microclimate are hydrologi influenced by the presence of perennial or intermittent water from the stream or river.	cally

Low

Aquatic Technical Report November 2014/10427

Watercourse (Site#): Spring Brook (MB-WC36) Legal Location: 12-18-7-16 WPM UTM (Zone 14U): 453931E, 5491228N SKP (as of June 2014): 1100.4

CHANNEL AND FLOW CONDITIONS (No. of Transects: 5)					
Confinement	Occasionally confined				
Channel Pattern	Irregular, wandering				
Bankfull Width (m): Mean, Range	3.0, 2.0-3.8				
Wetted Width (m): Mean, Range	1.9, 0.3-3.2				
Water Depth (m): Mean, Range	0.23, 0.01 – 0.80				
Ordinary Highwater Mark (m): Mean, Range	0.2, 0.1-0.3				
Discharge (m ³ /s)	Negligible				
Stream Gradient (%)	0-1%				
Embeddedness	Highly embedded				

HABITAT

Rearing

Important

Unsuitable

Important

Important

No. Captured

7

1 --

-

-

		_
SUBSTRATE	%	
Organics	0	
Fines (<2 mm)	50	
Small Gravel (2-20 mm)	33	
Large Gravel (21-65 mm)	16	
Cobble (66-250 mm)	1	
Boulder (>250 mm)	0	

WATER QUALITY PARAMETERS					
Water Temperature (°C)	21.0				
рН	7.7				
Dissolved Oxygen (mg/L)	5.2				
Conductivity (µS/cm)	1940.0				
Turbidity (visual)	Moderate				

FISH HABITAT POTENTIAL RATINGS

Spawning

Important

Unsuitable

Marginal

Important

Species

northern pike

walleye

white sucker

brassy minnow

Northern pike

Creek chub

FISH SPECIES PRESENT

Pool 1 (depth >1.00 m)	1	25	12.5	Negligible	Boulders
Pool 2 (depth 0.5-1.00 m)	-	-	-	-	Undercut E
Pool 3 (depth <0.5 m)	-	-	-	-	Overhangi
Run 1 (>1.00 m)	-	-	-	-	Woody De
Run 2 (0.5-1.00 m)	-	-	-		Depth
Run 3 (<0.5 m)	-	-	-	-	Instream V
Flat 1 (>1.00 m)	-	-	-	-	Other
Flat 2 (0.5-1.00 m)	4	135	67.5	Negligible	Other
Flat 3 (<0.5 m)	2	35	17.5	Negligible	Other
Riffle	-	-	-	-	Other
No defined channel					Other
Low water barrier	1	5	2.5	-	TOTAL CC
Other	-	-	-	-	Stream Sh

Survey Date: September 6, 2013 Habitat Survey Length (m): 200

Field Crew: E. Fulcher, L. Olsen CHANNEL AND FLOW CONDITIONS CONTINUED

Restricted Activity Timing Window: April 1 to June 30

Velocity (m/s)

LEFT BANK

Vertical

Fines

0.7

<4

0 - 5

Grasses		Grasses	\$	
_				
	COVER TY	PES	%	
	Boulders		-	
	Undercut B	anks	10	
	Overhangin	g Vegetation	5.5	
	Woody Deb	oris	1.5	
	Depth		45	
	Instream Ve	egetation	38	
	Other		-	
	TOTAL CO	VER (m ²)	448	
	Stream Sha	ading	0	

RIGHT BANK

Sloping

Fines

0.8

4 – 14

5 - 10

None

n/a

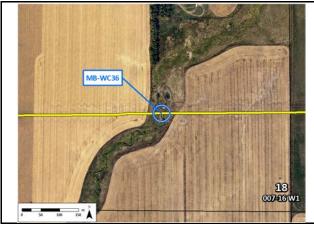
Plate 1 Photograph taken at right-of-way looking upstream.



Plate 3 Photograph taken at right-of-way of left bank



Aerial photograph taken of crossing view northeast (June 26, 2013). Plate 5



Map illustrating crossing and watercourse.

Boulder (>250 mm) 0

Run 1 (>1.00 m)	-	-	-	-	
Run 2 (0.5-1.00 m)	-	-	-		
Run 3 (<0.5 m)	-	-	-	-	
Flat 1 (>1.00 m)	-	-	-	-	
Flat 2 (0.5-1.00 m)	4	135	67.5	Negligible	
Flat 3 (<0.5 m)	2	35	17.5	Negligible	
Riffle	-	-	-	-	
No defined channel					
Low water barrier	1	5	2.5	-	
Other	-	-	-	-	

Migration

Marginal

Marginal

Marginal

Marginal

Fork Length (mm): Mean, Range

200,190 - 215

205

-

-

-

Beaver Dams

Bank Shape

Bank Texture

No. Length (m)

Native Channel Width (m)

BANK CONDITIONS

Mean Bank Height (m)

Riparian Area Width (m)

Riparian Vegetation Type

Grade of Approach Slopes (%)

%

Northern pike, lake chub, cree dace and brook stickleback ha (AAR 2007b, RL&L 1998c).	k chub, fathead minnow, pearl ve been previously documented			
FISH SAMPLING EFFORT				
Sampling Method	Backpack electrofishing			
No. of seconds/hours 1017				

	Sampling Method	Backpack electrofishing
	No. of seconds/hours	1017
	Distance (m)/No. of traps	200
	No. Captured	8
	CPUE	0.79

FISH SPECIES PREVIOUSLY DOCUMENTED

ADDITIONAL HABITAT COMMENTS

Low water barrier present at right-of-way centreline and 100 m downstream which disrupts connectivity. Deep pool present and starting at approximately 65 m downstream (greater than 1.3 m deep and 8 m by 25 m in size) where juvenile northern pike were captured. Abundant instream vegetation and habitat potential for northern pike spawning.

Catch per unit effort (CPUE) is the number of fish captured per hour of minnow trapping, per m² of seine netting and per 100 seconds of electrofishing. Notes: n/a: not applicable.

Overwintering

Important Unsuitable

Important

Important

No. Observed

20

-

-

-

Application Submitted to the NEB Appendix 6

> Aquatic Technical Report November 2014/10427





Plate 2 Photograph taken at right-of-way looking downstream.



Plate 4 Photograph taken at right-of-way of right bank.



Plate 6

Photograph taken approximately 100 m downstream of the right-of-way looking upstream (deep pool is visible through the vegetation).





SELF-ASSESSMENT AND RISK MANAGEMENT DECISION FRAMEWORK FOR DFO REGULATORY REQUIREMENTS

DESCRIPTION OF AQUATIC ENVIRONMENT:

Federally/provincially listed species present:	No
Fish that are part of commercial, recreational or Aboriginal (CRA) fisheries present:	Yes
Fish that support a CRA fishery, or have downstream connectivity to a CRA fisheries present:	Yes
Banks and approach slope characteristics:	Left bank vertical with low grade of approach slope (<4%). Right bank sloping with moderate grade of approach slope (4-14%).
Riparian characteristics:	Functional Riparian Width (m) at Crossing (<i>i.e.</i> , contribution to fish habitat): L: 0 to 5 m, R: 5 to 10 m

CONSTRUCTION DETAILS:

CONSTRUCTION DETRIES:					
Construction Schedule:	August to December 2017				
Pipeline Methods:	Isolate if water present/open cut if dry or froze	Isolate if water present/open cut if dry or frozen to bottom			
Contingency Methods:	n/a	n/a			
Vehicle Crossing Methods:	Snowfill/ice bridge/clear span bridge/existing				
Estimated Maximum	Right-of-Way Width: 45 m	Est. Instream Footprint: 45 m (ROW) x 3.0 m (bankfull) = 135 m ²			
Footprint:	Bankfull Width: 3.0 m	Est. Functional Riparian Footprint: 45 m (ROW) x 15 m (riparian) = 675 m ²			
	Functional Riparian Width: L: 0 to 5 m, R: 5 to 10 m	Max Instream + Riparian Footprint: 135 m ² + 675 m ² = 810 m ²			
Zone-of-influence (ZOI):	100 m				
No. Days of Instream Work:	2 to 15 days				

RISK ASSESSMENT RANKING:

Scale of Negative Effects Evaluation Criteria		Sensitivity of Fish and Fish Habitat				
 Fish species present and fish habitat potential within zone of influence Instream timing windows Pipeline and vehicle/equipment crossing method Occurrence and duration of instream work Footprint size Disturbance to riparian vegetation 	Scale of Negative Effect	Extreme Project Unlikely to Proceed	High DFO Authorization	Moderate Additional Mitigation and/or NEB/DFO Request for Review May be Required	Low Meets DFO criteria; review not required	Not fish habitat
Channel and fish passage restrictions Changes to water quality and turbidity parameters Changes to timing, duration and frequency of flow Riparian and bank restoration measures Beaver activity and associated removals	Extreme Project Unlikely to Proceed					
Sensitivity to Fish and Fish Habitat Evaluation Criteria	High DFO Authorization					
 Fish-bearing status Fish stream classification Federally or provincially listed fish species Fish species of management concern Habitat potential and/or availability for fish species and/or life 	Moderate Additional Mitigation and/or NEB/DFO Request for Review May be Required			MB-WC36		
stages Riparian habitat value Water quality parameters Freshwater mussel presence	Low Meets DFO criteria; review not required					
	None					

SELF-ASSESSMENT DECISION FRAMEWORK: QUESTION If YES is answered to Questions 1 and 2 below. NEB/DFO review is not re answered for one or more of Questions 1 and 2, proceed to Questions 3 a 1. Can all of the criteria outlined in DFO's Project Activities for the above p biologist's current knowledge? Provide rationale: Dewatering/Pumping: Temporary isolation dams and p if water is present at the time of the isolation. Recommended the site be re Bridges: Recommend no earth fill below the high watermark and no obstru 2. Can all applicable mitigation measures listed in DFO's Measures to Avoi address the Pathways of Effects based on the qualified fish biologist's curr Provide rationale: Construction is to occur outside the restricted activity to site selection, contaminant and spill management, erosion and sediment co be met and are included in the Project's ESA and the EPP. If YES is answered to Questions 3 and 4 below, NEB/DFO review is not reanswered for one or more of Questions 3 and 4, proceed to Question 5. 3. Have fisheries management objectives, best management practices and Provide rationale: Other standards and best management practices for w implemented where applicable (e.g., CAPP et al. 2005). 4. Have additional mitigation measures to avoid causing harm to fish and f serious harm to fish be avoided and/or mitigated by the successful implem Provide rationale: Watercourse was rated as Important northern pike rear captured within the study reach. An overwintering pool was also present do Maintaining a qualified fish biologist onsite is recommended to facilitate fish during construction. 5. Is further review by NEB/DFO recommended by the qualified fish biologist? Provide rationale: With the successful implementation of additional recom restricted activity timing window), it is expected no serious harm to fish will Notes: 1 serious harm to fish, unless otherwise specified by a qualified fish biologist. 2 Functional riparian width is interpreted as the terrestrial area/zone adjacent to a watercourse where vegetation and microclimate are hydrologically influenced by the presence of perennial or intermittent water from the stream or river.

Aquatic Technical Report November 2014/10427

	ANSWER			
equired for the proposed activities at the proposed watercourse crossinn d 4.	ng. If NO is			
ipeline/vehicle methods be met based on the qualified fish	YES			
oumps with fish screen and a qualified fish biologist-lead fish salvage is estored to pre-construction conditions. Iction of potential fish passage by vehicle crossing.	s recommended			
oid Causing Harm to Fish and Fish Habitat be implemented to rent knowledge?	YES (however, see below)			
iming window. It is assumed the remaining mitigation measures for pro- ontrol, revegetation and stabilization, fish protection and operation of				
equired for the proposed activities at the proposed watercourse crossi	ng. If NO is			
d/or plans been considered and applied where applicable?	YES			
orking in and around water have been incorporated into the Project's	EPP and will be			
ish habitat been recommended by a qualified fish biologist and will entation of these additional measures?	YES			
ring, spawning and overwintering habitat potential and juvenile northern pike were ownstream of the proposed crossing location. h passage, if required, and conduct water quality monitoring and a fish salvage				
ict?	NO			

	NO
nmendations made by a qualified fish biologist and construction timing	g (<i>i.e.</i> , outside
result.	

Pending further direction from DFO regarding riparian habitat disturbance at pipeline-associated watercourse crossings, the mitigation measures and best management practices described in the Project's EPP and the guidance of existing provincial standards are assumed to be sufficient to avoid

Watercourse (Site#): Oak Creek (MB-WC42) Legal Location: 2-13-7-16 WPM UTM (Zone 14U): 462988E, 5490342N SKP (as of June 2014): 1109.5

CHANNEL AND FLOW CONDITIONS (No. of Transects: 5)					
Confinement	Occasionally confined				
Channel Pattern	Irregular meandering				
Bankfull Width (m): Mean, Range	11.0, 6.0-15.0				
Wetted Width (m): Mean, Range	8.2, 6.0-11.0				
Water Depth (m): Mean, Range	0.56, 0.20-1.10				
Ordinary Highwater Mark (m): Mean, Range	0.1, 0.05-0.1				
Discharge (m ³ /s)	0.66				
Stream Gradient (%)	1-2				
Embeddedness	NA				

Habitat Survey Length (m): 200 Restricted Activity Timing Window: April 1 to June 30 Field Crew: J. Mouland, S. Layher CHANNEL AND FLOW CONDITIONS CONTINUED

Survey Date: June 17, 2014

CHANNEL AND FLOW CONDITIONS CONTINUED					
Beaver Dams Yes					
n/a					
LEFT BANK	RIGHT BANK				
Vertical	Vertical				
Fines	Fines				
2.1	2.8				
<4	<4				
50-160	50-60				
Grasses/shrubs	Grasses				
	Yes n/a LEFT BANK Vertical Fines 2.1 <4 50-160				

SUBSTRATE	%	HABITAT	No	Length (m)	%	Velocity (m/s)	COVER TYPES	%
Organics	0	Pool 1 (depth >1.00 m)	2	12	6	1.15	Boulders	0
Fines (<2 mm)	92	Pool 2 (depth 0.5-1.00 m)	-	-	-	-	Undercut Banks	2
Small Gravel (2-20 mm)	6	Pool 3 (depth <0.5 m)	-	-	-	-	Overhanging Vegetation	6
Large Gravel (21-65 mm)	0	Run 1 (>1.00 m)	-	-	-	-	Woody Debris	24
Cobble (66-250 mm)	0	Run 2 (0.5-1.00 m)	3	27	13.5	0.24	Depth	47
Boulder (>250 mm)	2	Run 3 (<0.5 m)	4	93	46.5	0.42	Instream Vegetation	21
		Flat 1 (>1.00 m)	3	68	34	0.20	Other	-
WATER QUALITY PARAM	ETERS	Flat 2 (0.5-1.00 m)	-	-	-	-	Other	-
Water Temperature (°C)	21.1	Flat 3 (<0.5 m)	-	-	-	-	Other	-
pН	n/r	Riffle	-	-	-	-	Other	-
Dissolved Oxygen (mg/L)	7.7	No defined channel/lake	-	-	-	-	Other	-
Conductivity (µS/cm)	796	Other (LWB)	-	-	-	-	TOTAL COVER (m ²)	109.5
Turbidity (visual)	Stained	Other	-	-	-	-	Stream Shading	1-20%

FISH HABITAT POTENTIAL RATINGS						
Species	Spawning	Rearing	Overwintering	Migration		
northern pike	Important	Important	Marginal	Important		
walleye	Marginal	Important	Marginal	Important		
white sucker	Important	Important	Important	Important		
brassy minnow	Important	Important	Important	Important		

FISH SPECIES PRESENT	No. Captured	No. Observed	Fork Length (mm): Mean, Range
Fathead minnow	453	>1000	39, 17-55
Longnose dace	3	0	55
Sand shiner	2	0	42.5, 40-45
Common shiner	1	0	73
White sucker	3	0	187, 178-201
Chestnut lamprey	1	0	140
Northern pike	1	0	75
Western blacknose dace	1	0	55
Rock bass	1	0	54

FISH SPECIES PREVIOUSLY DOCUMENTED

Northern pike, white sucker, Johnny darter, Iowa darter, blackside darter, pearl dace, western blacknose dace, emerald shiner, bigmouth shiner, common shiner, fathead minnow, longnose dace, creek chub, trout-perch and brook stickleback were previously documented (AAR 2007b, RL&L 1998c, Milani 2013). Chestnut lamprey were also documented approximately 12 km downstream (Milani 2013).

Sampling Method	Backpack Electrofishing	Minnow Trap	Dip-netting
No. of seconds/hou rs/minutes	1008	48	5
Distance (m)/# of traps	750	6	n/a
No. Captured	65	386	16
CPUE	6.05	8.04	3.20

ADDITIONAL HABITAT COMMENTS

Wabash pigtoe, white heelsplitter, cylindrical papershell, giant floater and fatmucket have all been previously documented (Watson *et al.* 1998). The current proposed rightof-way is on a meander bend. Right bank is relatively unstable at 50 m upstream of right-of-way. Very good habitat throughout reach, although overwintering potential is limited within assessment reach. Over 1000 minnows were observed, most likely fathead minnows. 10 small mussels were found after sampling 20 m² 100 m and 150 m downstream of proposed right-of-way, and it is expected that mussels would be found in sandy/muddy areas throughout entire study reach. It is recommended that a mussel salvage be done.

Notes: Catch per unit effort (CPUE) is the number of fish captured per hour of minnow trapping, per m² of seine netting and per 100 seconds of electrofishing. n/a: not applicable, n/r: not recorded.



Plate 1 Photograph taken at right-of-way looking upstream.



Plate 3 Photograph taken at right-of-way looking toward left bank.



Plate 5 Aerial photograph taken of crossing looking north (June 26,



Application Submitted to the NEB Appendix 6

> Aquatic Technical Report November 2014/10427



Plate 2

Photograph taken at right-of-way looking downstream and toward suggested alternate right-of-way.



Plate 4 Photograph taken at right-of-way looking toward right bank.



Plate 6 Photograph taken of juvenile rock bass captured.





SELF-ASSESSMENT AND RISK MANAGEMENT DECISION FRAMEWORK FOR DFO REGULATORY REQUIREMENTS

DESCRIPTION OF AQUATIC ENVIRONMENT:

Federally/provincially listed species present:	No
Fish that are part of commercial, recreational or Aboriginal (CRA) fisheries present:	Yes
Fish that support a CRA fishery, or have downstream connectivity to a CRA fisheries present:	Yes
Banks and approach slope characteristics:	Vertical banks. Low grade of approach slopes (<4%).
Riparian characteristics:	Functional Riparian Width (m) at Crossing (<i>i.e.</i> , contribution to fish habitat): L: 50m to 160m, R: 50m to 60m

CONSTRUCTION DETAILS:

Construction Schedule:	August to December 2017					
Pipeline Methods:	Isolate if water present/open cut if dry or froze	solate if water present/open cut if dry or frozen to bottom				
Contingency Methods:	n/a					
Vehicle Crossing Methods:	Snowfill/ice bridge/clear span bridge/existing					
Estimated Maximum Footprint:	Right-of-Way Width: 45 m	Est. Instream Footprint: 45 m (ROW) x 11 m (bankfull) = 495 m ²				
	Bankfull Width: 11 m	Est. Functional Riparian Footprint: 45 m (ROW) x 220 m (riparian) = 9,900 m ²				
	Functional Riparian Width: L: 50m-160m, R: 50m-60m	Max Instream + Riparian Footprint: 495 m ² + 9,900 m ² = 10,395 m ²				
Zone-of-influence (ZOI):	500 m					
No. Days of Instream Work:	2 to 15 days					

RISK ASSESSMENT RANKING:

Using the risk assessment evaluation criteria, what ranking did	the proposed wa	tercourse crossin	ig receive?			Moderate	<u>)</u>
Scale of Negative Effects Evaluation Criteria			Sensitivity	of Fish a	nd Fish	Habitat	
 Fish species present and fish habitat potential within zone of influence Instream timing windows Pipeline and vehicle/equipment crossing method Occurrence and duration of instream work Footprint size Disturbance to riparian vegetation Channel and fish passage restrictions 	Scale of Negative Effect	Extreme Project Unlikely to Proceed	High DFO Authorization	Mod Addii Mitigatio NEB, Requ Review Review	ional n and/or /DFO est for May be	Low Meets DFO criteria; review not required	Not fish habitat
 Changes to water quality and turbidity parameters Changes to timing, duration and frequency of flow Riparian and bank restoration measures 	Extreme Project Unlikely to Proceed						
Beaver activity and associated removals	High DFO Authorization						
 Fish-bearing status Fish stream classification Federally or provincially listed fish species Fish species of management concern Habitat potential and/or availability for fish species and/or life stages Riparian habitat value Water quality parameters 	Moderate Additional Mitigation and/or NEB/DFO Request for Review May be Required			MB-V	VC42		
	Low Meets DFO criteria; review not required						
	None						

	ANSWER
ered to Questions 1 and 2 below, NEB/DFO review is not required for the proposed activities at the proposed watercourse crossined. If NO is answered for one or more of Questions 1 and 2, proceed to Questions 3 and 4.	ng unless
	YES
ent at the time of the isolation. Recommended the site be restored to pre-construction conditions.	s recommende
	NO
to Fish and Fish Habitat may not be met due to potential increased riparian disturbance. It is assumed the remaining mitigation m g, site selection, contaminant and spill management, erosion and sediment control, revegetation and stabilization, fish protection	neasures for
ered to Questions 3 and 4 below, NEB/DFO review is not required for the proposed activities at the proposed watercourse crossined. If NO is answered for one or more of Questions 3 and 4, proceed to Question 5.	ng unless
	YES
	EPP and will I
	YES (See below)
ale:	
n. Watercourse also contains high species diversity (nine species captured). Jualified fish biologist onsite is recommended to facilitate fish passage, if required, and conduct water quality monitoring and a fish construction. ank stabilization measures that are implemented are a combination of hard armouring (<i>e.g.</i> , riprap) and bio-engineering (<i>e.g.</i> , live d to minimize any disturbance to the riparian vegetation along the meander bend of the watercourse and limit construction activiti	h/mussel e shrub staking
iew by NEB/DFO recommended by the qualified fish biologist?	
	YES
ale: With the successful implementation of additional recommendations made by a qualified fish biologist, moderate sensitivity of struction timing, it is expected no serious harm to fish will result. However, review by the NEB/DFO is recommended to confirm se o habitat sensitivity.	f the study
ale: With the successful implementation of additional recommendations made by a qualified fish biologist, moderate sensitivity of struction timing, it is expected no serious harm to fish will result. However, review by the NEB/DFO is recommended to confirm se	f the study erious harm wi res and
	ered to Questions 1 and 2 below, NEB/DF O review is not required for the proposed activities at the proposed watercourse crossis ed. If NO is answered for one or more of Questions 1 and 2, proceed to Questions 3 and 4. e criteria outlined in DFO's Project Activities for the above pipeline/vehicle methods be met based on the qualified fish ent knowledge? nate: <u>Dewatering/Pumping</u> : Temporary isolation dams and pumps with fish screen and a qualified fish biologist-lead fish salvage i ent at the time of the isolation. Recommended the site be restored to pre-construction conditions. mmend no earth fill below the high watermark and no obstruction of potential fish passage by vehicle crossing. Table: Construction is to occur outside the restricted activity timing window. Alignment parallels a meander bend and all DFO's <i>Me</i> to <i>Fish and Fish Habitat</i> may not be met due to potential increased riparian disturbance. It is assumed the remaining mitigation and selection, contaminant and spill management, erosion and sediment control, revegetation and stabilization, fish protection and be met and are included in the Project's ESA and the EPP. ered to Questions 3 and 4 below, NEB/DFO review is not required for the proposed activities at the proposed watercourse crossis ed. If NO is answered for one or more of Questions 3 and 4, proceed to Question 5. es management objectives, best management practices and/or plans been considered and applied where applicable? nate: Other standards and best management practices for working in and around water have been incorporated into the Project's where applicable (e.g., CAPP et al. 2005).

Application Submitted to the NEB Appendix 6

Aquatic Technical Report November 2014/10427

gist?	YES
mmendations made by a qualified fish biologist, moderate sensitivity o esult. However, review by the NEB/DFO is recommended to confirm se	

Watercourse (Site #): Oak Creek (MB-WC43) Legal Location: 6-31-6-13 WPM UTM (Zone 14U): 484685E, 5485686N SKP (as of June 2014): 1132.0

CHANNEL AND FLOW CONDITIONS (No. of Transects: 5)				
Confinement	Unconfined			
Channel Pattern	Sinuous			
Bankfull Width (m): Mean, Range	17.2, 13.0 – 22.0			
Wetted Width (m): Mean, Range	41.6, 28.0 - 49.0			
Water Depth (m): Mean, Range	1.35, 1.00 – 2.00			
Ordinary Highwater Mark (m): Mean, Range	See comments			
Discharge (m ³ /s)	Negligible			
Stream Gradient (%)	1.0			
Embeddedness	Highly embedded			

Survey Date: July 4, 2013 Habitat Survey Length (m): 300 Restricted Activity Timing Window: April 1 to June 30 Field Crew: J. Evans, S. Courtney

Velocity (m/s)

%

CHANNEL AND FLOW CONDIT	IONS CONTINUED			
Beaver Dams	Non	e		
Native Channel Width (m)				
BANK CONDITIONS				
Bank Shape	Vertical	Vertical		
Bank Texture	Fines	Fines		
Mean Bank Height (m)	1.5	1.5		
Grade of Approach Slopes (%)	of Approach Slopes (%) <4			
Riparian Area Width (m)	20 - 30	20 – 30		
Riparian Vegetation Type	Grasses and wetland	Grasses and wetland		

		_	
SUBSTRATE	%		HABITAT
Organics	50		Pool 1 (dep
Fines (<2 mm)	46		Pool 2 (dep
Small Gravel (2-20 mm)	0		Pool 3 (dep
Large Gravel (21-65 mm)	2		Run 1 (>1.0
Cobble (66-250 mm)	2		Run 2 (0.5-
Boulder (>250 mm)	0		Run 3 (<0.5
			Elot 1 (>1.0

WATER QUALITY PARAMETERS				
Water Temperature (°C)	24.0			
pH	8.6			
Dissolved Oxygen (mg/L)	5.6			
Conductivity (µS/cm)	960.0			
Turbidity (visual)	Stained			

Pool 1 (depth >1.00 m)					E	Boul
Pool 2 (depth 0.5-1.00 m)					ι	Und
Pool 3 (depth <0.5 m)					(Ove
Run 1 (>1.00 m)	1	200	100	Negligible	١	Woo
Run 2 (0.5-1.00 m)					ſ	Dept
Run 3 (<0.5 m)					1	Instr
Flat 1 (>1.00 m)					(Othe
Flat 2 (0.5-1.00 m)					(Othe
Flat 3 (<0.5 m)					(Othe
Riffle					(Othe
Other					(Othe
Other					-	тот
Other					ŝ	Strea

No. Length (m)

COVER TY	PES	%
Boulders		
Undercut Ba	anks	
Overhangin	g Vegetation	
Woody Deb	ris	
Depth		75
Instream Ve	getation	25
Other		
TOTAL CO	/ER	100
Stream Sha	ding	0

FISH HABITAT POTENTIAL RATINGS				
Species	Spawning	Rearing	Overwintering	Migration
northern pike	Important	Important	Marginal	Important
walleye	Unsuitable	Marginal	Marginal	Important
white sucker	Unsuitable	Important	Marginal	Important
brassy minnow	Important	Important	Marginal	Important

FISH SPECIES PREVIOUSLY DOCUMENTED
Northern pike, white sucker, Johnny darter, Iowa darter, blackside darter, pearl dace, western blacknose dace, emerald shiner, bigmouth shiner, common shiner, fathead minnow, longnose dace, creek chub, trout-perch and brook stickleback previously documented in Oak Creek (AAR 2007b, Milani 2013).

FISH SPECIES PRESENT	No. Captured	No. Observed	Fork Length (mm): Mean, Range
Johnny darter	3	0	23, 20 – 25
northern pike	3	0	140, 130 – 150
white sucker	11	0	30, 21 – 40
cyprinid spp.	2	0	21, 20 – 22
-			

ADDITIONAL HABITAT COMMENTS

Abundant instream vegetation (approximately ½ of channel). Wet flooded marsh along all stream margins in assessment area. Water level was above the ordinary highwater mark. Due to close proximity and habitat homogeneity, fish sampling was conducted at one location between the two proposed Oak Creek crossings. There is a small amount of large gravel and cobble at the proposed crossing, likely due to previous pipeline construction. Some depths and banks heights were estimated due to unsafe wading conditions.

CPUE is the number of fish captured per hour of minnow trapping and number of fish captured per m² of seining. Notes: n/a: not applicable.

FISH SAMPLING EFFORT			
Sampling Method	Seine Netting	Minnow Trapping	
No. Of hauls/ No. of traps	5	6	
Area (m²)/Time (hours)	50 m²	24 hours	
No. Captured	16	3	
CPUE	0.32	0.13	



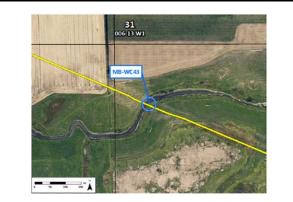
Plate 1 Photograph taken at right-of-way looking upstream.



Plate 3 Photograph taken at right-of-way of left bank.



Plate 5 Aerial photograph taken of crossing view north (June 26, 2013).



Map illustrating crossing and watercourse.

Application Submitted to the NEB Appendix 6

> Aquatic Technical Report November 2014/10427





Plate 6 Photograph taken of juvenile northern pike captured.





Enbridge Pipelines Inc. Line 3 Replacement Program

SELF-ASSESSMENT AND RISK MANAGEMENT DECISION FRAMEWORK FOR DFO REGULATORY REQUIREMENTS

DESCRIPTION OF AQUATIC ENVIRONMENT:

Federally/provincially listed species present:	No
Fish that are part of commercial, recreational or Aboriginal (CRA) fisheries present:	Yes
Fish that support a CRA fishery, or have downstream connectivity to a CRA fisheries present:	Yes
Banks and approach slope characteristics:	Vertical banks, low grade of approach slopes (<4%).
Riparian characteristics:	Functional Riparian Width (m) at Crossing (<i>i.e.</i> , contribution to fish habitat): L: 20 to 30 m, R: 20 to 30 m

CONSTRUCTION DETAILS:

Construction Schedule:	August to December 2017			
Pipeline Methods:	Isolate if water present/open cut if dry or frozen to bottom			
Contingency Methods:	n/a	n/a		
Vehicle Crossing Methods:	Snowfill/ice bridge/clear span bridge/existing			
Estimated Maximum	Right-of-Way Width: 45 m Est. Instream Footprint: 45 m (ROW) x 17.2 m (bankfull) = 2			
Footprint*:	Bankfull Width: 17.2 m	Est. Functional Riparian Footprint: 45 m (ROW) x 60 m (riparian) = 2,700 m ²		
	Functional Riparian Width: L: 20 to 30 m, R: 20 to 30 m	Max Instream + Riparian Footprint: 774 m ² + 2,700 m ² = 3,474 m ²		
Zone-of-influence (ZOI):	300 m			
No. Days of Instream Work:	2 to 15 days			

RISK ASSESSMENT RANKING:

Scale of Negative Effects Evaluation Criteria		Sensitivity of Fish and Fish Habitat				
 Fish species present and fish habitat potential within zone of influence Instream timing windows Pipeline and vehicle/equipment crossing method Occurrence and duration of instream work Footprint size Disturbance to riparian vegetation 	Scale of Negative Effect	Extreme Project Unlikely to Proceed	High DFO Authorization	Moderate Additional Mitigation and/or NEB/DFO Request for Review May be Required	Low Meets DFO criteria; review not required	Not fish habitat
Channel and fish passage restrictions Changes to water quality and turbidity parameters Changes to timing, duration and frequency of flow Riparian and bank restoration measures Beaver activity and associated removals	Extreme Project Unlikely to Proceed					
Sensitivity to Fish and Fish Habitat Evaluation Criteria	High DFO Authorization					
 Fish-bearing status Fish stream classification Federally or provincially listed fish species Fish species of management concern Habitat potential and/or availability for fish species and/or life 	Moderate Additional Mitigation and/or NEB/DFO Request for Review May be Required			MB-WC43		
stages Riparian habitat value Water quality parameters Freshwater mussel presence	Low Meets DFO criteria; review not required					
	None					

QUESTION	ANSWER
If YES is answered to Questions 1 and 2 below, NEB/DFO review is not required for the proposed activities at the proposed waterco answered for one or more of Questions 1 and 2, proceed to Questions 3 and 4.	ourse crossing. If NO is
 Can all of the criteria outlined in DFO's Project Activities for the above pipeline/vehicle methods be met based on the qualified fish biologist's current knowledge? 	
Provide rationale: <u>Dewatering/Pumping</u> : Temporary isolation dams and pumps with fish screen and a qualified fish biologist-lead fi if water is present at the time of the isolation. Recommended the site be restored to pre-construction conditions.	sh salvage is recommend
Bridges: Recommend no earth fill below the high watermark and no obstruction of potential fish passage by vehicle crossing.	
2. Can all applicable mitigation measures listed in DFO's Measures to Avoid Causing Harm to Fish and Fish Habitat be implemented	d to YES
address the Pathways of Effects based on the qualified fish biologist's current knowledge?	(however, s below)
Provide rationale: Construction is to occur outside the restricted activity timing window. It is assumed the remaining mitigation mea site selection, contaminant and spill management, erosion and sediment control, revegetation and stabilization, fish protection and c be met and are included in the Project's ESA and the EPP.	
If YES is answered to Questions 3 and 4 below, NEB/DFO review is not required for the proposed activities at the proposed waterco answered for one or more of Questions 3 and 4, proceed to Question 5.	ourse crossing. If NO is
2. How fishering management chinatives, best management practices and/or plans been considered and applied where applied by	? YES
3. Have fisheries management objectives, best management practices and/or plans been considered and applied where applicable? Provide rationale: Other standards and best management practices for working in and around water have been incorporated into the implemented where applicable (e.g., CAPP et al. 2005).	
4. Have additional mitigation measures to avoid causing harm to fish and fish habitat been recommended by a qualified fish biologis serious harm to fish be avoided and/or mitigated by the successful implementation of these additional measures?	t and will YES
Provide rationale: Watercourse was rated as Important northern pike rearing and spawning habitat potential and juvenile northern the study reach.	pike were captured within
Maintaining a qualified fish biologist onsite is recommended to facilitate fish passage, if required, and conduct water quality monitori salvage during construction.	ng and a fish/mussel
5. Is further review by NEB/DFO recommended by the qualified fish biologist?	NO
Provide rationale: With the successful implementation of additional recommendations made by a qualified fish biologist and constructed activity timing window), it is expected no serious harm to fish will result.	
 Pending further direction from DFO regarding riparian habitat disturbance at pipeline-associated watercourse crossings, the mitig best management practices described in the Project's EPP and the guidance of existing provincial standards are assumed to be serious harm to fish, unless otherwise specified by a qualified fish biologist. 	gation measures and sufficient to avoid
2 Functional riparian width is interpreted as the terrestrial area/zone adjacent to a watercourse where vegetation and microclimate influenced by the presence of perennial or intermittent water from the stream or river.	are hydrologically

Aquatic Technical Report November 2014/10427

Watercourse (Site #): Oak Creek (MB-WC44) Legal Location: 4-32-6-13 WPM UTM (Zone 14U): 485594E, 5485289N SKP (as of June 2014): 1133.0

CHANNEL AND FLOW CONDITIONS (No. of Transects: 5)			
Confinement	Unconfined		
Channel Pattern	Sinuous		
Bankfull Width (m): Mean, Range	21.7, 18.0 – 30.0		
Wetted Width (m): Mean, Range	23.5, 18.0 – 30.0		
Water Depth (m): Mean, Range	1.01, 0.49 – 1.50		
Ordinary Highwater Mark (m): Mean, Range	See comments		
Discharge (m ³ /s)	Negligible		
Stream Gradient (%)	1.0		
Embeddedness	n/a		

Survey Date: July 4, 2013 Habitat Survey Length (m): 200 Timing Window: April 1 to June 30 Field Crew: J. Evans, S. Courtney

%

2013).

Sampling

No. of traps Area (m²)/ Time

No. Captured

Method No. Of hauls/

(hours)

CPUE

FISH SAMPLING EFFORT

CHANNEL AND FLOW CONDITIONS CONTINUED			
Beaver Dams	None		
Native Channel Width (m)	n/a		
BANK CONDITIONS	LEFT BANK RIGHT BANK		
Bank Shape	Sloping	Sloping	
Bank Texture	Fines	Fines	
Mean Bank Height (m)	1.2	1.3	
Grade of Approach Slopes (%)	<4	<4	
Riparian Area Width (m)	10 – 20	10 – 20	
Riparian Vegetation Type	Grasses and wetland	Grasses and wetland	

FISH SPECIES PREVIOUSLY DOCUMENTED Northern pike, white sucker, Johnny darter, Iowa darter, blackside darter, pearl dace, western blacknose dace, emerald shiner, bigmouth shiner, common shiner, fathead minnow, longnose dace, creek chub, trout-perch and brook stickleback \ previously documented in Oak Creek (AAR 2007b, Milani

Seine Netting

5

50 m²

16

0.32

Velocity (m/s)

SUBSTRATE	%	HABITAT
Organics	50	Pool 1 (dep
Fines (<2 mm)	50	Pool 2 (dep
Small Gravel (2-20 mm)	0	Pool 3 (dep
Large Gravel (21-65 mm)	0	Run 1 (>1.0
Cobble (66-250 mm)	0	Run 2 (0.5-
Boulder (>250 mm)	0	Run 3 (<0.5

WATER QUALITY PARAMETERS			
Water Temperature (°C)	25.4		
pН	8.6		
Dissolved Oxygen (mg/L)	5.4		
Conductivity (µS/cm)	988.0		
Turbidity (visual)	Stained		

Pool 1 (depth >1.00 m)					Bould
Pool 2 (depth 0.5-1.00 m)					Unde
Pool 3 (depth <0.5 m)					Overh
Run 1 (>1.00 m)	1	200	100	Negligible	Wood
Run 2 (0.5-1.00 m)					Depth
Run 3 (<0.5 m)					Instre
Flat 1 (>1.00 m)					Other
Flat 2 (0.5-1.00 m)					Other
Flat 3 (<0.5 m)					Other
Riffle					Other
Other					Other
Other					TOTA
Other					Strea

No. Length (m)

Welland Orasses and Welland				
COVER TY	COVER TYPES			
Boulders				
Undercut B	anks			
Overhangin	g Vegetation			
Woody Deb	oris			
Depth		75		
Instream Vegetation		25		
Other				
TOTAL CO	VER	100		
Stream Sha	ading	0		

Minnow Trapping

6

24 hours

3

0.13



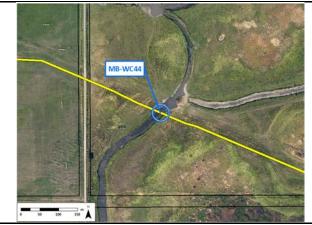
Plate 1 Photograph taken at right-of-way looking upstream.



Plate 3 Photograph taken at right-of-way of left bank



Plate 5 Aerial photograph of crossing view north (June 26, 2013). Side channel is visible to the left.



Map illustrating crossing and watercourse.

FISH HABITAT POTENTIAL RATINGS					
Species	Spawning	Rearing	Overwintering	Migration	
northern pike	Important	Important	Marginal	Important	
walleye	Unsuitable	Marginal	Marginal	Important	
white sucker	Unsuitable	Important	Marginal	Important	
brassy minnow	Important	Important	Marginal	Important	

FISH SPECIES PRESENT	No. Captured	No. Observed	Fork Length (mm): Mean, Range
Johnny darter	3	0	23, 20 – 25
northern pike	3	0	140, 130 – 150
white sucker	11	0	30, 21 – 40
cyprinid spp.	2	0	21, 20 – 22

ADDITIONAL HABITAT COMMENTS

Abundant instream vegetation (approximately ½ of channel). Wet flooded marsh along all stream margins in assessment area. Water level was above the ordinary highwater mark. Side channel, likely anthropogenic, branches off from main channel approximately 80 m downstream. Due to close proximity and habitat homogeneity, fish sampling was conducted at one location between the two Oak Creek crossings. Some depths and banks heights were estimated due to unsafe wading conditions.

Notes: CPUE is the number of fish captured per hour of minnow trapping and number of fish captured per m² of seining. n/a: not applicable.

Application Submitted to the NEB Appendix 6

> Aquatic Technical Report November 2014/10427



Plate 2 Photograph taken at right-of-way looking downstream.





Plate 6 Photograph taken approximately 100 m upstream of the right-of-way looking upstream.





SELF-ASSESSMENT AND RISK MANAGEMENT DECISION FRAMEWORK FOR DFO REGULATORY REQUIREMENTS

DESCRIPTION OF AQUATIC ENVIRONMENT:

Federally/provincially listed species present:	No
Fish that are part of commercial, recreational or Aboriginal (CRA) fisheries present:	Yes
Fish that support a CRA fishery, or have downstream connectivity to a CRA fisheries present:	Yes
Banks and approach slope characteristics:	Sloping banks, low grade (<4%).Wet flooded marsh along all stream margins in assessment area.
Riparian characteristics:	Functional Riparian Width (m) at Crossing (<i>i.e.</i> , contribution to fish habitat): L: 10 to 20 m, R: 10 to 20 m

CONSTRUCTION DETAILS:

Construction Schedule:	August to December 2017			
Pipeline Methods:	Isolate if water present/open cut if dry or frozen to bottom			
Contingency Methods:	n/a	n/a		
Vehicle Crossing Methods:	Snowfill/ice bridge/clear span bridge/existing			
Estimated Maximum	Right-of-Way Width: 45 m	Est. Instream Footprint: 45 m (ROW) x 21.7 m (bankfull) = 976.5 m ²		
Footprint:	Bankfull Width: 21.7 m	Est. Functional Riparian Footprint: 45 m (ROW) x 40 m (riparian) = 1,800 m ²		
	Functional Riparian Width: L: 10 to 20 m, R: 10 to 20 m	Max Instream + Riparian Footprint: 976.5 m ² + 1,800 m ² = 2,776.5 m ²		
Zone-of-influence (ZOI):	300 m			
No. Days of Instream Work:	2 to 15 days			

RISK ASSESSMENT RANKING:

Scale of Negative Effects Evaluation Criteria	Sensitivity of Fish and Fish F		Habitat	Habitat		
 Fish species present and fish habitat potential within zone of influence Instream timing windows Pipeline and vehicle/equipment crossing method Occurrence and duration of instream work Footprint size Disturbance to riparian vegetation 	Scale of Negative Effect	Extreme Project Unlikely to Proceed	High DFO Authorization	Moderate Additional Mitigation and/or NEB/DFO Request for Review May be Required	Low Meets DFO criteria; review not required	Not fish habitat
Channel and fish passage restrictions Changes to water quality and turbidity parameters Changes to timing, duration and frequency of flow Riparian and bank restoration measures Beaver activity and associated removals	Extreme Project Unlikely to Proceed					
Sensitivity to Fish and Fish Habitat Evaluation Criteria	High DFO Authorization					
Fish-bearing status Fish stream classification Federally or provincially listed fish species Fish species of management concern Habitat potential and/or availability for fish species and/or life	Moderate Additional Mitigation and/or NEB/DFO Request for Review May be Required			MB-WC44		
stages Riparian habitat value Water quality parameters Freshwater mussel presence	Low Meets DFO criteria; review not required					
	None					

SELF-ASSESSMENT DECISION FRAMEWORK: QUESTION If YES is answered to Questions 1 and 2 below. NEB/DFO review is not re answered for one or more of Questions 1 and 2, proceed to Questions 3 and 1. Can all of the criteria outlined in DFO's Project Activities for the above p biologist's current knowledge? Provide rationale: Dewatering/Pumping: Temporary isolation dams and p if water is present at the time of the isolation. Recommended the site be re Bridges: Recommend no earth fill below the high watermark and no obstru 2. Can all applicable mitigation measures listed in DFO's Measures to Avoi address the Pathways of Effects based on the qualified fish biologist's curr Provide rationale: Construction is to occur outside the restricted activity to site selection, contaminant and spill management, erosion and sediment co be met and are included in the Project's ESA and the EPP. If YES is answered to Questions 3 and 4 below, NEB/DFO review is not reanswered for one or more of Questions 3 and 4, proceed to Question 5. 3. Have fisheries management objectives, best management practices and Provide rationale: Other standards and best management practices for w implemented where applicable (e.g., CAPP et al. 2005). 4. Have additional mitigation measures to avoid causing harm to fish and f serious harm to fish be avoided and/or mitigated by the successful implem Provide rationale: Watercourse was rated as Important northern pike rea the study reach. Maintaining a qualified fish biologist onsite is recommended to facilitate fis salvage during construction. 5. Is further review by NEB/DFO recommended by the qualified fish biologist? Provide rationale: With the successful implementation of additional recon the restricted activity timing window), it is expected no serious harm to fish Notes: 1 serious harm to fish, unless otherwise specified by a qualified fish biologist. influenced by the presence of perennial or intermittent water from the stream or river.

Aquatic Technical Report November 2014/10427

NO

	ANSWER		
equired for the proposed activities at the proposed watercourse crossinn d4.	ng. If NO is		
ipeline/vehicle methods be met based on the qualified fish	YES		
oumps with fish screen and a qualified fish biologist-lead fish salvage i estored to pre-construction conditions. Iction of potential fish passage by vehicle crossing.	s recommended		
oid Causing Harm to Fish and Fish Habitat be implemented to rent knowledge?	YES (however, see below)		
iming window. It is assumed the remaining mitigation measures for pro- ontrol, revegetation and stabilization, fish protection and operation of			
equired for the proposed activities at the proposed watercourse crossi	ng. If NO is		
d/or plans been considered and applied where applicable?	YES		
orking in and around water have been incorporated into the Project's	EPP and will be		
ish habitat been recommended by a qualified fish biologist and will entation of these additional measures?	YES		
ring and spawning habitat potential and juvenile northern pike were ca	aptured within		
h passage, if required, and conduct water quality monitoring and a fish/mussel			

131:	NO
nmendations made by a qualified fish biologist and construction timing	g (<i>i.e.</i> , outside
will result.	

Pending further direction from DFO regarding riparian habitat disturbance at pipeline-associated watercourse crossings, the mitigation measures and best management practices described in the Project's EPP and the guidance of existing provincial standards are assumed to be sufficient to avoid

2 Functional riparian width is interpreted as the terrestrial area/zone adjacent to a watercourse where vegetation and microclimate are hydrologically

Watercourse (Site #): Cypress River (MB-WC48) Legal Location: 15-18-6-12 WPM UTM (Zone 14U): 494639E, 5481485N SKP (as of June 2014): 1143.5

CHANNEL AND FLOW CONDITIONS (No. of Transects: 5)				
Confinement	Frequently confined			
Channel Pattern	Straight			
Bankfull Width (m): Mean, Range	8.9, 5.9 – 13.1			
Wetted Width (m): Mean, Range	2.0, 1.4 – 2.5			
Water Depth (m): Mean, Range	0.12, 0.33 – 0.05			
Ordinary Highwater Mark (m): Mean, Range	0.15, 0 - 30			
Discharge (m ³ /s)	0.06			
Stream Gradient (%)	1.5			
Embeddedness	Moderately embedded			

Survey Date: September 4, 2013
Habitat Survey Length (m): 200
Timing Window: April 1 to June 30
Field Crew: E. Fulcher, L. Olsen

CHANNEL AND FLOW CONDIT	CHANNEL AND FLOW CONDITIONS CONTINUED				
Beaver Dams	Non	e			
Native Channel Width (m)	n/a	1			
BANK CONDITIONS	LEFT BANK RIGHT BANK				
Bank Shape	Vertical	Vertical			
Bank Texture	Fines and large gravel Fines and boulder				
Mean Bank Height (m)	1.6	3.0			
Grade of Approach Slopes (%)	4 - 14	<4			
Riparian Area Width (m)	5 - 10	5 - 10			
Riparian Vegetation Type	Grasses	Grasses			

SUBSTRATE	%
Organics	0
Fines (<2 mm)	32
Small Gravel (2-20 mm)	31
Large Gravel (21-65 mm)	26
Cobble (66-250 mm)	11
Boulder (>250 mm)	0

WATER QUALITY PARAMETERS			
Water Temperature (°C)	16.9		
рН	8.1		
Dissolved Oxygen (mg/L)	10.8		
Conductivity (µS/cm)	858.0		
Turbidity (visual) Clear			

HABITAT	No.	Length (m)	%	Velocity (m/s)
Pool 1 (depth >1.00 m)		-	-	-
Pool 2 (depth 0.5-1.00 m)	1	12	6	n/r
Pool 3 (depth <0.5 m)	1	2	1	n/r
Run 1 (>1.00 m)				
Run 2 (0.5-1.00 m)				
Run 3 (<0.5 m)	2	28	14	n/r
Flat 1 (>1.00 m)				
Flat 2 (0.5-1.00 m)				
Flat 3 (<0.5 m)	4	130	65	n/r
Riffle	2	28	14	n/r
Other				
Other				
Other				

es Glasses			
COVER TY	PES	%	
Boulders		1.1	
Undercut Ba	anks	1.5	
Overhangin	g Vegetation	0	
Woody Deb	ris	0.4	
Depth		0	
Instream Ve	egetation	3.4	
Other		0	
TOTAL CO	VER	6.4	
Stream Sha	iding	0	

FISH HABITAT PO	DTENTIAL RATINGS	S		
Species	Spawning	Rearing	Overwintering	Migration
northern pike	Unsuitable	Marginal	Unsuitable	Important
walleye	Unsuitable	Unsuitable	Unsuitable	Important
white sucker	Important	Important	Marginal	Important
brassy minnow	Important	Important	Important	Important

FISH SPECIES PREVIOUSLY DOCUMENTED Northern pike, rock bass, black bullhead, stonecat, white sucker, silver redhorse, common shiner, river shiner, bigmouth shiner, sand shiner, emerald shiner, fathead

FISH SPECIES PRESENT	No. Captured	No. Observed	Fork Length (mm): Mean, Range	FI
silver redhorse	1	0	55	Sa
white sucker	17	0	140, 80 - 165	No
creek chub	22	0	70, 20 - 208	Di
brassy minnow	18	0	40, 25 - 78	No
western blacknose dace	39	0	49, 30 - 64	CI
pearl dace	3	0	50, 25 - 75	
longnose dace	3	0	80	
emerald shiner	3	0	45, 40 - 50	
sand shiner	9	0	74, 70 - 78	
common shiner	7	0	50, 25 - 75	

minnow, western blacknose dace, longnose dace, finescale dace, creek chub, brook stickleback, Johnny darter, blackside darter, river darter and central mudminnow previously documented in the Cypress River (Milani 2013, McCulloch and Franzin 1996, RL&L 1998c).	
FISH SAMPLING EFFORT	
Sampling Method	Backpack electrofishing
No. of seconds	962

Sampling Method	Backpack electrofishing
No. of seconds	962
Distance (m)	200
No. Captured	122
CPUE	12.69

ADDITIONAL HABITAT COMMENTS

No land access in July 2013. Bank armouring present on right bank within right-of-way. Overhead pipeline crossing present at 50 m downstream. Flood signs are present, showing evidence of high flows. Banks are unstable at some locations within the study area. Limited overwintering habitat potential for large-bodied fish species due to depth. There were five fatmucket mussels captured and observed both upstream and downstream of the right-of-way.

CPUE is the number of fish captured per 100 seconds of electrofishing effort. Notes:

n/a: not applicable, n/r: not recorded



Plate 1 Photograph taken at right-of-way looking upstream.



Plate 3 Photograph taken at right-of-way of left bank.



Plate 5 Aerial photograph of crossing view north showing existing aerial pipeline crossing (June 26, 2013).



Map illustrating crossing and watercourse.

Application Submitted to the NEB Appendix 6

> Aquatic Technical Report November 2014/10427







Plate 4 Photograph taken at right-of-way of right bank.



Plate 6 Photograph taken of fatmucket mussel captured.





SELF-ASSESSMENT AND RISK MANAGEMENT DECISION FRAMEWORK FOR DFO REGULATORY REQUIREMENTS

DESCRIPTION OF AQUATIC ENVIRONMENT:

Federally/provincially listed species present:	No
Fish that are part of commercial, recreational or Aboriginal (CRA) fisheries present:	No
Fish that support a CRA fishery, or have downstream connectivity to a CRA fisheries present:	Yes
Banks and approach slope characteristics:	Left bank vertical with moderate grade of approach slopes (4-14%), right bank vertical with low grade of approach slopes (<4%).
Riparian characteristics:	Functional Riparian Width (m) at Crossing (<i>i.e.</i> , contribution to fish habitat): L: 5 to 10 m, R: 5 to 10 m

CONSTRUCTION DETAILS:

nstruction Schedule:	August to December 2017				
eline Methods:	Isolate if water present/open cut if dry or frozen to bottom				
ntingency Methods:	n/a	n/a			
hicle Crossing Methods:	Snowfill/ice bridge/clear span bridge/existing				
timated Maximum	Right-of-Way Width: 45 m	Est. Instream Footprint: 45 m (ROW) x 8.9 m (bankfull) = 400.5 m ²			
otprint*:	Bankfull Width: 8.9 m Est. Functional Riparian Footprint: 45 m (ROW) x 20 m (riparian) = 900 m ²				
	Max instream + Rinarian Footprint: 400.5 m2 + 900 m2 = 1.300.5 m2				
ne-of-influence (ZOI):	200 m				
. Days of Instream Work:	2 to 15 days				
ne-of-influence (ZOI):	Functional Riparian Width: L: 5 to 10 m, R: 5 to 10 m 200 m	900 m ²			

RISK ASSESSMENT RANKING:

Scale of Negative Effects Evaluation Criteria		Sensitivity of Fish and Fish Habitat				
 Fish species present and fish habitat potential within zone of influence Instream timing windows Pipeline and vehicle/equipment crossing method Occurrence and duration of instream work Footprint size Disturbance to riparian vegetation 	Scale of Negative Effect	Extreme Project Unlikely to Proceed	High DFO Authorization	Moderate Additional Mitigation and/or NEB/DFO Request for Review May be Required	Low Meets DFO criteria; review not required	Not fish habitat
Channel and fish passage restrictions Changes to water quality and turbidity parameters Changes to timing, duration and frequency of flow Riparian and bank restoration measures Beaver activity and associated removals	Extreme Project Unlikely to Proceed					
Sensitivity to Fish and Fish Habitat Evaluation Criteria	High DFO Authorization					
 Fish-bearing status Fish stream classification Federally or provincially listed fish species Fish species of management concern Habitat potential and/or availability for fish species and/or life 	Moderate Additional Mitigation and/or NEB/DFO Request for Review May be Required			MB-WC48		
stages Riparian habitat value Water quality parameters Freshwater mussel presence	Low Meets DFO criteria; review not required					
	None					

SELF-ASSESSMENT DECISION FRAMEWORK: QUESTION If YES is answered to Questions 1 and 2 below, NEB/DFO review is not reanswered for one or more of Questions 1 and 2, proceed to Questions 3 ar 1. Can all of the criteria outlined in DFO's Project Activities for the above pi biologist's current knowledge? Provide rationale: Dewatering/Pumping: Temporary isolation dams and pu if water is present at the time of the isolation. Recommended the site be re-Bridges: Recommend no earth fill below the high watermark and no obstrue 2. Can all applicable mitigation measures listed in DFO's Measures to Avoi address the Pathways of Effects based on the gualified fish biologist's curre Provide rationale: Construction is to occur outside the restricted activity site selection, contaminant and spill management, erosion and sediment co be met and are included in the Project's ESA and the EPP. If YES is answered to Questions 3 and 4 below, NEB/DFO review is not reanswered for one or more of Questions 3 and 4, proceed to Question 5. 3. Have fisheries management objectives, best management practices and Provide rationale: Other standards and best management practices for we implemented where applicable (e.g., CAPP et al. 2005). 4. Have additional mitigation measures to avoid causing harm to fish and fi serious harm to fish be avoided and/or mitigated by the successful implement Provide rationale: Watercourse contains high species diversity (10 specie Maintaining a qualified fish biologist onsite is recommended to facilitate fish salvage during construction. It is also recommended to revegetate using live staking, particularly on the issues were noted with earlier pipeline crossings. 5. Is further review by NEB/DFO recommended by the qualified fish biologi Provide rationale: With the successful implementation of additional recommendations made by a qualified fish biologist and construction timing (i.e., outside restricted activity timing window), it is expected no serious harm to fish will result. Notes: 1 Pending further direction from DFO regarding riparian habitat disturbance at pipeline-associated watercourse crossings, the mitigation measures and serious harm to fish, unless otherwise specified by a qualified fish biologist. influenced by the presence of perennial or intermittent water from the stream or river.

Aquatic Technical Report November 2014/10427

	ANSWER			
equired for the proposed activities at the proposed watercourse crossinn d 4.	ng. If NO is			
ipeline/vehicle methods be met based on the qualified fish	YES			
umps with fish screen and a qualified fish biologist-lead fish salvage is stored to pre-construction conditions. Iction of potential fish passage by vehicle crossing.	s recommended			
id Causing Harm to Fish and Fish Habitat be implemented to rent knowledge?	YES (however, see below)			
timing window. It is assumed the remaining mitigation measures for prontrol, revegetation and stabilization, fish protection and operation of				
equired for the proposed activities at the proposed watercourse crossing and the proposed watercourse crossing a second	ng. If NO is			
d/or plans been considered and applied where applicable?	YES			
orking in and around water have been incorporated into the Project's	EPP and will be			
ish habitat been recommended by a qualified fish biologist and will entation of these additional measures?	YES			
es captured) and is documented to contain northern pike and rock bass. h passage, if required, and conduct water quality monitoring and a fish/mussel				
depositional (left) bank, to facilitate re growth as previous flood-relate	ed revegetation			
ist?	NO			

best management practices described in the Project's EPP and the guidance of existing provincial standards are assumed to be sufficient to avoid

2 Functional riparian width is interpreted as the terrestrial area/zone adjacent to a watercourse where vegetation and microclimate are hydrologically

Watercourse (Site#): Thornhill Coulee (MBR-WC3) Legal Location: 6-29-3-5 WPM UTM (Zone 14U): 565023E, 5454946N SKP (as of June 2014): 1223.5

CHANNEL AND FLOW CONDITIONS (No. of Transects: 5)		
Confinement	Occasionally confined	
Channel Pattern	Regular meanders	
Bankfull Width (m): Mean, Range	1.8,1.2-2.6	
Wetted Width (m): Mean, Range	0.9,0.2-1.3	
Water Depth (m): Mean, Range	0.09,0.03-0.21	
Ordinary Highwater Mark (m): Mean, Range	0.6,0.5-0.8	
Discharge (m ³ /s)	Negligible	
Stream Gradient (%)	0.5%	
Embeddedness	Highly embedded	

SUBSTRATE	%
Organics	0
Fines (<2 mm)	100
Small Gravel (2-20 mm)	0
Large Gravel (21-65 mm)	0
Cobble (66-250 mm)	0
Boulder (>250 mm)	0

WATER QUALITY PARAMETERS		
Water Temperature (°C)	6.1	
рН	7.3	
Dissolved Oxygen (mg/L)	8.8	
Conductivity (µS/cm)	1921.0	
Turbidity (visual)	Moderately turbid	

HABITAT	No.	Length (m)	%	Velocity (m/s)
Pool 1 (depth >1.00 m)	-	-	-	-
Pool 2 (depth 0.5-1.00 m)	-	-	-	-
Pool 3 (depth <0.5 m)	-	-	-	-
Run 1 (>1.00 m)	-	-	-	-
Run 2 (0.5-1.00 m)	-	-	-	-
Run 3 (<0.5 m)	-	-	-	-
Flat 1 (>1.00 m)	-	-	-	-
Flat 2 (0.5-1.00 m)	-	-	-	-
Flat 3 (<0.5 m)	-	-	-	-
Riffle	-	-	-	-
No defined channel	-	-	-	-
Other (LWB)	-	-	-	-
Other	-	-	-	-

Survey Date: October 13, 2013 Habitat Survey Length (m): 200 Restricted Activity Timing Window: April 1 to June 30 Field Crew: B. Stitt, L. Snook

CHANNEL AND FLOW CONDITIONS CONTINUED			
Beaver Dams	None	None	
Native Channel Width (m)	n/a		
BANK CONDITIONS	LEFT BANK	RIGHT BANK	
Bank Shape	Vertical	Vertical	
Bank Texture	Organic/fines	Organic/fines	
Mean Bank Height (m)	2.3,1.3-3.2	2.0,2.2-1.7	
Grade of Approach Slopes (%)	<4	<4	
Riparian Area Width (m)	0 - 5	0 - 5	
Riparian Vegetation Type	Grass	Grass	

ty (m/s)	COVER TYPES	%
-	Boulders	-
-	Undercut Banks	-
-	Overhanging Vegetation	-
-	Woody Debris	-
-	Depth	-
-	Instream Vegetation	-
-	Other	-
-	TOTAL COVER (m ²)	See comments
-	Stream Shading	0 %

FISH HABITAT POT	FISH HABITAT POTENTIAL RATINGS			
Species	Spawning	Rearing	Overwintering	Migration
northern pike	Unsuitable	Unsuitable	Unsuitable	Unsuitable
walleye	Unsuitable	Unsuitable	Unsuitable	Unsuitable
white sucker	Unsuitable	Unsuitable	Unsuitable	Unsuitable
black bullhead	Unsuitable	Unsuitable	Unsuitable	Unsuitable

FISH SPECIES PRESENT	No. Captured	No. Observed	Fork Length (mm): Mean, Range
Fathead minnow	69	-	23,15-32
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

ADDITIONAL HABITAT COMMENTS

Defined channel with limited depth and no flow detected. Cattle sign is evident. Limited cover for fish, expect high flows in the spring.

Notes: Catch per unit effort (CPUE) is the number of fish captured per hour of minnow trapping, per m² of seine netting and per 100 seconds of electrofishing. n/a: not applicable.

FISH SPECIES PREVIOUSLY DOCUMENTED

Brook stickleback, fathead minnow and central mudminnow have been previously documented (AAR 2007b, Milani 2013).

FISH SAMPLING EFFORT	
Sampling Method	Backpack Electrofishing
No. of seconds/hours	210
Distance (m)/No. of traps	100 m
No. Captured	69
CPUE	32.86



Plate 1 Photograph taken at right-of-way looking upstream.



Plate 3 Photograph taken at right-of-way of left bank.



Plate 5 Aerial photograph taken of crossing view west (June 26, 2013).



Map illustrating crossing and watercourse.

Application Submitted to the NEB Appendix 6

> Aquatic Technical Report November 2014/10427





Plate 4 Photograph taken at right-of-way of right bank.



Plate 6 Photograph taken approximately 50 m downstream of the right-of-way looking downstream.





Enbridge Pipelines Inc. Line 3 Replacement Program

SELF-ASSESSMENT AND RISK MANAGEMENT DECISION FRAMEWORK FOR DFO REGULATORY REQUIREMENTS

DESCRIPTION OF AQUATIC ENVIRONMENT:

Federally/provincially listed species present:	No
Fish that are part of commercial, recreational or Aboriginal (CRA) fisheries present:	No
Fish that support a CRA fishery, or have downstream connectivity to a CRA fisheries present:	Yes
Banks and approach slope characteristics:	Vertical banks, low grade (<4%).
Riparian characteristics:	Functional Riparian Width (m) at Crossing (<i>i.e.</i> , contribution to fish habitat): 0 to 5 m

CONSTRUCTION DETAILS:

Construction Schedule:	August to December 2017			
Pipeline Methods:	Isolate if water present/open cut if dry or frozen to bottom			
Contingency Methods:	n/a	n/a		
Vehicle Crossing Methods:	Snowfill/ice bridge/clear span bridge/existing			
Estimated Maximum	Right-of-Way Width: 45 m	Est. Instream Footprint: 45 m (ROW) x 1.8 m (bankfull) = 81 m ²		
Footprint*:	Bankfull Width: 1.8 m	Est. Functional Riparian Footprint: 45 m (ROW) x 10 m (riparian) = 450 m^2		
	Functional Riparian Width: L: 0 to 5 m, R: 0 to 5 m	Max Instream + Riparian Footprint: 81 m ² + 450 m ² = 531 m ²		
Zone-of-influence (ZOI):	100 m			
No. Days of Instream Work:	2 to 15 days			

RISK ASSESSMENT RANKING:

Scale of Negative Effects Evaluation Criteria	Scale of Negative Effect	Sensitivity of Fish and Fish Habitat				
 Fish species present and fish habitat potential within zone of influence Instream timing windows Pipeline and vehicle/equipment crossing method Occurrence and duration of instream work Footprint size Disturbance to riparian vegetation 		Extreme Project Unlikely to Proceed	High DFO Authorization	Moderate Additional Mitigation and/or NEB/DFO Request for Review May be Required	Low Meets DFO criteria; review not required	Not fish habitat
Channel and fish passage restrictions Changes to water quality and turbidity parameters Changes to timing, duration and frequency of flow Riparian and bank restoration measures Beaver activity and associated removals	Extreme Project Unlikely to Proceed					
Sensitivity to Fish and Fish Habitat Evaluation Criteria	High DFO Authorization					
Fish-bearing status Fish stream classification Federally or provincially listed fish species Fish species of management concern Habitat potential and/or availability for fish species and/or life stages	Moderate Additional Mitigation and/or NEB/DFO Request for Review May be Required				MBR- WC3	
Ripgrian habitat value Water quality parameters Freshwater mussel presence	Low Meets DFO criteria; review not required					
	None					

		ANSWER
	uestions 1 and 2 below, NEB/DFO review is not required for the proposed activities at the proposed watercourse crossin re of Questions 1 and 2, proceed to Questions 3 and 4.	ng. If NO is
biologist's current know	5	YES
if water is present at the	ratering/Pumping: Temporary isolation dams and pumps with fish screen and a qualified fish biologist-lead fish salvage is time of the isolation. Recommended the site be restored to pre-construction conditions.	s recommende
Bridges: Recommend n	o earth fill below the high watermark and no obstruction of potential fish passage by vehicle crossing.	
	igation measures listed in DFO's <i>Measures to Avoid Causing Harm to Fish and Fish Habitat</i> be implemented to f Effects based on the qualified fish biologist's current knowledge?	YES
Provide rationale: Con site selection, contamin	struction is to occur outside the restricted activity timing window. It is assumed the remaining mitigation measures for pro ant and spill management, erosion and sediment control, revegetation and stabilization, fish protection and operation of i in the Project's ESA and the EPP.	
	uestions 3 and 4 below, NEB/DFO review is not required for the proposed activities at the proposed watercourse crossir re of Questions 3 and 4, proceed to Question 5.	ng. If NO is
2 House fishering manage	ament objectives, best menogement practices and/or plans been considered and applied where applicable?	NIA
Provide rationale:	ement objectives, best management practices and/or plans been considered and applied where applicable?	NA
		NA
4. Have additional mitigation measures to avoid causing harm to fish and fish habitat been recommended by a qualified fish biologist and will serious harm to fish be avoided and/or mitigated by the successful implementation of these additional measures?		
Provide rationale:		
Trovide rationale.		
	EB/DFO recommended by the qualified fish biologist?	No
	EB/DFO recommended by the qualified fish biologist?	No
5. Is further review by N Provide rationale: Notes: 1 Pendir best m	EB/DFO recommended by the qualified fish biologist? g further direction from DFO regarding riparian habitat disturbance at pipeline-associated watercourse crossings, the mitigation measur anagement practices described in the Project's EPP and the guidance of existing provincial standards are assumed to be sufficient to a barm to fish, unless otherwise specified by a qualified fish biologist.	res and

Aquatic Technical Report November 2014/10427