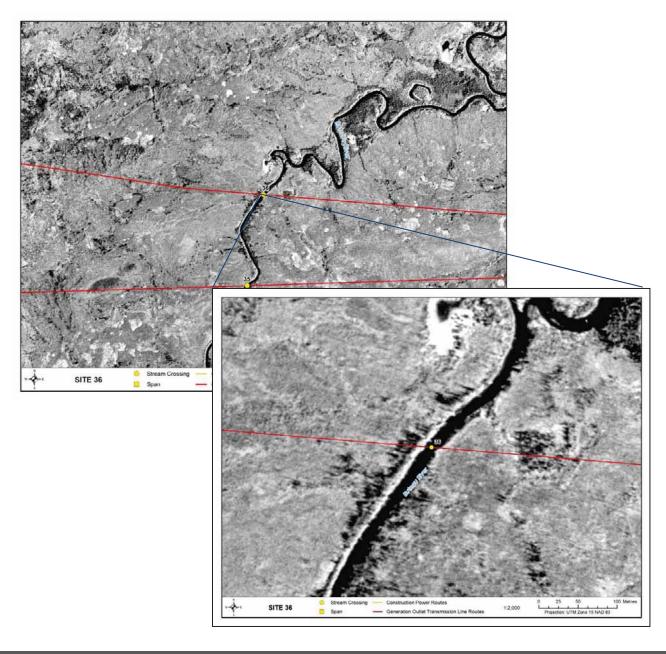
Butnau River

Location

Datum:	NAD 83	
UTM:	Zone: Easting: Northing:	15V 383584 6241813
Location Depic	ted Below:	

General Morphology

Gen. Description:Small riverPattern:Irregular wanderingConfinement:ConfinedStage:HighFlow Regime:PerennialU/S Drainage:682 km²Receiving Water/Dist.:Kettle River/10.5 km





F I I	ysical Data		Surve	y Date:	25 Ju	ly 2009)	
Chani	nel Profile							
Chann	el and Flow			Water 1	Depths (m)		
	Channel Width (m)	10-15			Max.	-		
	Wetted Width (m)	-			Avg.	-		
Banks	$\mathbf{D}^{\prime} 1 \mathbf{I} \mathbf{D} 1 \mathbf{I} \mathbf{I} \mathbf{I} \mathbf{I} \mathbf{I} \mathbf{I} \mathbf{I} I$	2		01	200		0, 1, 11,	. 11
	Right Bank Height (m):	~3 ~3		Shape: Shape:			Stability:	stable stable
	Left Bank Height (m):	~3		Snape:	$\sim 30^{\circ}$		Stability :	stable
Subst	rate			Habita	at Type)		
	ate Type (%)					sition (%	<i>(</i> 0)	
	Fines	100			Pool	10		
	Small Gravel	-			Flat	60		
	Large Gravel	-			Run	30		
	Cobble	-			Riffle	-		
	Boulder	-						
Cover	<u>· Types</u>						Riparian	
	1,000			US	DS			
Fotal C	Cover Available (%)			10	10		Riparian Vegetation	Гуре (Y/N)
	Cover Composition (9/	of Total)					Moss	
	Cover Composition (%			5	5			- V
	Large Woody D Overhanging Ve			5 65	5		Grasses/Sedges Shrubs	Y Y
				65 25	65 25		Conifers	Y Y
	Instream Vegeta	uion		25 5				r
	Pool				5		Deciduous	-
	Boulder			-	-		Mixed Forest	-
	Undercut Bank			-	-			
	Surface Turbule	nce		-	-		Canopy Cover (%)	-
	ater Quality Dat	а						
	2							
				-			DO (mg/L):	-
	Surface Temp (°C):							
	Specific Conductance (uS/cm):		-			pH:	-
		uS/cm):		-				-

Fish Habitat Classification and Sensitivity

+ Fish Habitat Potential Spawning

Large-Bodied Fish: Small-Bodied Fish: Low Moderate Rearing/Feeding Moderate Moderate **Overwintering** Low Low

Impediments to Migration: None observed

Fish Presence: lake whitefish, longnose sucker, northern pike, walleye, and white sucker (Johnson and Barth 2007)

+ Fish and Fish Habitat Sensitivity

Sensitivity Rating:

Moderate







Photo 1. Site 36 crossing area.

Photo 2. Downstream view of crossing Site 36.



Photo 3. Downstream of Site 36; looking downstream.





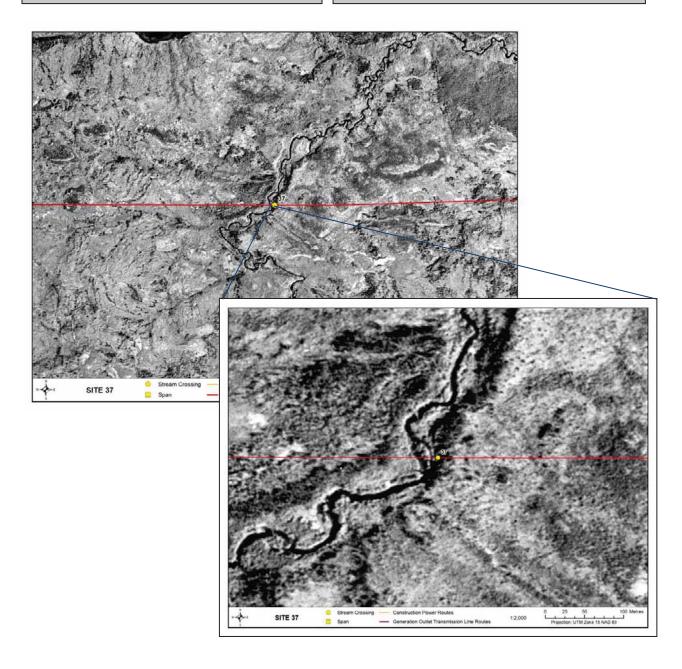
Unnamed Tributary of Butnau River

Location

Datum:	NAD 83	
UTM:	Zone: Easting: Northing:	
Location Depic	ted Below:	

General Morphology

Gen. Description:	low gradient boreal stream
Pattern:	Irregular meander
Confinement:	Frequently confined
Stage:	High
Flow Regime:	Perennial
U/S Drainage:	128 km^2
Receiving Water/Dist.:	Butnau River/6 km





Ph	ysical Data	S	urvey Date:	24 July 200)9	
hanr	nel Profile					
	el and Flow		Water	Depths (m)		
	Channel Width (m)	8-10		Max		
	Wetted Width (m)	-		Avg		
anks		_				
	Right Bank Height (m):	~3		rounded	Stability:	Stable
	Left Bank Height (m):	~2	Shape:	rounded	Stability :	Stable
ubsti	rate		Habit	at Type		
	te Type (%)			t Composition	(%)	
	Fines	-		Pool -		
	Small Gravel	-		Flat 20		
	Large Gravel	-		Run 75		
	Cobble	-		Riffle 5		
	Boulder	-				
OVON	Types				<u>Riparian</u>	
over	<u>I ypes</u>		US	DS	<u>Mparian</u>	
otal C	over Available (%)		25	20	Riparian Vegetation	Type (V/N)
otai C	over Available (70)		25	20	Riparian vegetation	1 ypc (1/1()
	Cover Composition (%	of Total)			Moss	-
	Large Woody D		15	5	Grasses/Sedges	Y
	Overhanging Ve		80	85	Shrubs	Y
	Instream Vegeta	ation	5	10	Conifers	Y
	Pool		-	-	Deciduous	-
	Boulder		-	-	Mixed Forest	-
	Undercut Bank		-	-		
	Surface Turbule	nce	-	-	Canopy Cover (%)	20
	ater Quality Dat	2				
VVC	3	a				
	Surface Temp (°C):		-		DO (mg/L):	-
	Specific Conductance (µ	uS/cm):	-		pH:	-

Fish Habitat Classification and Sensitivity

+ Fish Habitat Potential

TDS (g/L):

Salinity (ppt):

Large-Bodied Fish: Small-Bodied Fish: **Spawning** Low

Low

Rearing/Feeding Moderate-High Moderate-High

Turbidity (NTU):

Overwintering

Low Moderate

Impediments to Migration: None observed Fish Presence: Unknown

+ Fish and Fish Habitat Sensitivity

Sensitivity Rating: Low-Moderate





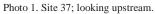




Photo 2. Upstream view of Site 37.



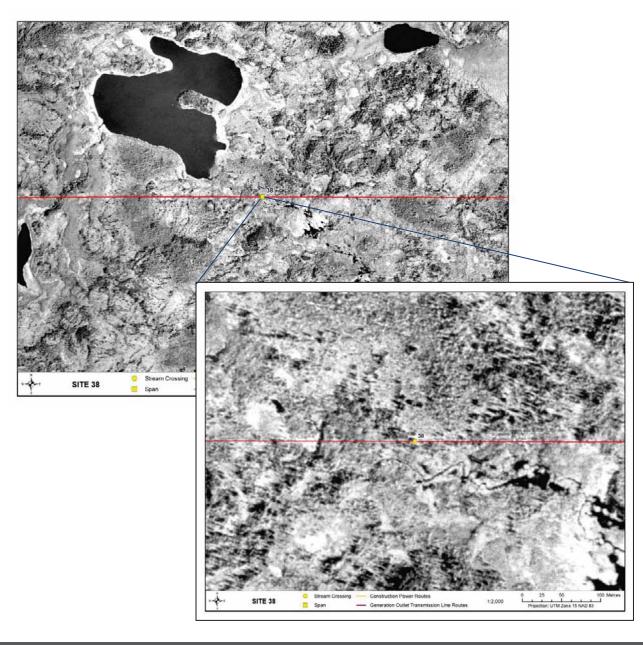
Unnamed Watercourse

Location

Datum:	NAD 83	
UTM:	Zone: Easting: Northing:	15V 372615 6241144
Location Depic	ted Below:	

General Morphology

Gen. Description:	Wetland/bog drainage
Pattern:	-
Confinement:	Unconfined
Stage:	Moderate
Flow Regime:	Perennial
U/S Drainage:	3 km^2
Receiving Water/Dist.:	Butnau River/19 km





Site Conditions

+ Ph	ysical Data	S	urvey Date	: 23 Ju	ly 2009		
Chann	nel Profile el and Flow Channel Width (m) Wetted Width (m)	-	Water	Depths (Max. Avg.	~ 1.5		
Banks	Right Bank Height (m): Left Bank Height (m):	-	Shape: Shape:			Stability: Stability :	Stable Stable
Subst Substra	rate ate Type (%) Fines Small Gravel Large Gravel Cobble Boulder	100 - - -		at Type t Compo Pool Flat Run Riffle	<u>e</u> sition (% 100 - - -	6)	
	<u>• Types</u> Cover Available (%)		US 40	DS 40		<u>Riparian</u> Riparian Vegetation 7	Гуре (Y/N)
	Cover Composition (% Large Woody D Overhanging Ve Instream Vegeta Pool Boulder Undercut Bank Surface Turbule	ebris egetation ation	15 30 55 - - -	15 30 55 - -		Moss Grasses/Sedges Shrubs Conifers Deciduous Mixed Forest Canopy Cover (%)	- Y Y Y - -
+ Wa	ater Quality Dat Surface Temp (°C): Specific Conductance (p TDS (g/L): Salinity (ppt):		- - -			DO (mg/L): pH: Turbidity (NTU):	- -

Fish Habitat Classification and Sensitivity

+ Fish Habitat Potential Spawning **Rearing/Feeding Large-Bodied Fish:**

Small-Bodied Fish:

Low-Moderate Moderate

Low Moderate Overwintering

Low Low

Impediments to Migration: Beaver dam ~ 300 m downstream Fish Presence: Unidentified minnows observed during survey

+ Fish and Fish Habitat Sensitivity





Photo 1. Downstream view of Site 38.





Photo 3. Beaver dam 300 m downstream of ROW.



Datu

UTN

Unnamed Tributary of Butnau River

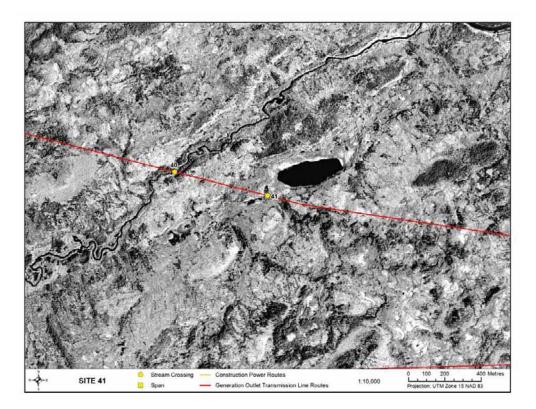
Location

A: Zone: 15V Easting: 380391	ım:	NAD 83
	/1:	Zone: 15V Easting: 380391 Northing: 6242338

Location Depicted Below:

General Morphology

Gen. Description:	Low gradient boreal stream
Pattern:	Irregular meander
Confinement:	Frequently confined
Stage:	Flood
Flow Regime:	Perennial
U/S Drainage:	139 km^2
Receiving Water/Dist.:	Butnau River/1.8 km





Ph	ysical Data		Surve	y Date:	25 Ju	ly 2009		
Chanr	<u>iel Profile</u>							
	el and Flow			Water 1	Depths (m)		
	Channel Width (m)	7			Max.	< 1.5		
	Wetted Width (m)	20			Avg.	< 1.0		
Banks								
	Right Bank Height (m):	1.0			vertical		Stability:	Stable
	Left Bank Height (m):	1.0		Shape:	vertical		Stability :	Stable
Substr	ate			Habite	at Type	`		
	ite Type (%)					<u>-</u> sition (%	()	
s an sti a	Fines	_		Indita	Pool	10	•)	
	Small Gravel	_			Flat	70		
	Large Gravel	_			Run	20		
	Cobble	_			Riffle	-		
	Boulder	_			Turrie			
	<u>Types</u> over Available (%)			US 25	DS 25		<u>Riparian</u> Riparian Vegetation T	Type (Y/N)
							Moss	_
	Cover Composition (%	of Total)						
	Cover Composition (% Large Woody D			30	30		Grasses/Sedges	Y
	Large Woody D	ebris		30 40	30 40		Grasses/Sedges Shrubs	Y Y
	Large Woody D Overhanging Ve	ebris getation					0	-
	Large Woody D	ebris getation		40	40		Shrubs	-
	Large Woody D Overhanging Ve Instream Vegeta	ebris getation		40	40		Shrubs Conifers Deciduous	Y -
	Large Woody D Overhanging Ve Instream Vegeta Pool	ebris getation		40	40		Shrubs Conifers	Y -
	Large Woody D Overhanging Ve Instream Vegeta Pool Boulder	ebris egetation tion		40	40		Shrubs Conifers Deciduous Mixed Forest	Y -
	Large Woody D Overhanging Ve Instream Vegeta Pool Boulder Undercut Bank	ebris egetation tion		40	40		Shrubs Conifers Deciduous	Y -
	Large Woody D Overhanging Ve Instream Vegeta Pool Boulder Undercut Bank	ebris egetation ttion		40	40		Shrubs Conifers Deciduous Mixed Forest	Y -
	Large Woody D Overhanging Ve Instream Vegeta Pool Boulder Undercut Bank Surface Turbule	ebris egetation ttion		40	40		Shrubs Conifers Deciduous Mixed Forest	Y -
	Large Woody D Overhanging Ve Instream Vegeta Pool Boulder Undercut Bank Surface Turbule	ebris egetation ttion nce a		40	40		Shrubs Conifers Deciduous Mixed Forest Canopy Cover (%)	Y -
	Large Woody D Overhanging Ve Instream Vegeta Pool Boulder Undercut Bank Surface Turbule Ater Quality Dat Surface Temp (°C):	ebris egetation ttion nce a		40	40		Shrubs Conifers Deciduous Mixed Forest Canopy Cover (%) DO (mg/L):	Y -

Fish Habitat Classification and Sensitivity

+ Fish Habitat Potential

Large-Bodied Fish: Small-Bodied Fish:

N

Spawning Low Moderate Rearing/Feeding Moderate Moderate Overwintering

Low Low

Impediments to Migration: None observed Fish Presence: Unknown

+ Fish and Fish Habitat Sensitivity





Photo 1. View of crossing at Site 40.



Photo 2. Upstream view of Site 40.



Photo 3. Downstream view of Site 40.



Photo 4. Aerial view of Site 40.



Unnamed Watercourse

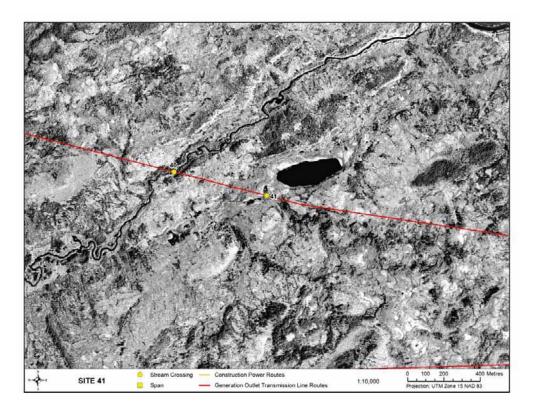
Datum:	NAD 83
UTM:	Zone: Easting: Northing

Cone: 15V Easting: 380903 Northing: 6242207

Location Depicted Below:

General Morphology

Gen. Description:	Wetland/bog drainage
Pattern:	-
Confinement:	Unconfined
Stage:	Moderate
Flow Regime:	Perennial
U/S Drainage:	0.15 km^2
Receiving Water/Dist.:	Butnau River/1.9 km





Site Conditions

+ Ph	ysical Data	S	urvey Da	i te: 25 Ju	ly 2009		
Chann	nel Profile el and Flow Channel Width (m) Wetted Width (m)	15	Wa	ter Depths Max. Avg.	(m) < 1.0 -		
Banks	Right Bank Height (m): Left Bank Height (m):	-		pe: - pe: -		Stability: Stability :	Stable Stable
Substra	rate ate Type (%) Fines Small Gravel Large Gravel Cobble Boulder	100 - - -		bitat Typ pitat Compo Pool Flat Run Riffle		%)	
	<u>• Types</u> Cover Available (%)		US 75	DS 75		<u>Riparian</u> Riparian Vegetation	Type (Y/N)
	Cover Composition (% Large Woody D Overhanging Ve Instream Vegeta Pool Boulder Undercut Bank Surface Turbule	ebris egetation tion	30 - 70 - -	30 - 70 - - -		Moss Grasses/Sedges Shrubs Conifers Deciduous Mixed Forest Canopy Cover (%)	- Y Y - V 0
+ Wa	ater Quality Dat	а					
	Surface Temp (°C): Specific Conductance (µ TDS (g/L): Salinity (ppt):	ıS/cm):	- -			DO (mg/L): pH: Turbidity (NTU):	-

Fish Habitat Classification and Sensitivity

+ Fish Habitat Potential	Spawning	Rearing/Feeding	Overwintering
Large-Bodied Fish: Small-Bodied Fish:	Low Low	Low Low	Low Low
Impediments to Migration: None observed			

Impediments to Migration: None observed **Fish Presence:** Unknown

+ Fish and Fish Habitat Sensitivity







Photo 1. View of crossing at Site 41.

Photo 2. Large pool downstream from Site 41.



Photo 3. Small water body upstream of Site 41.



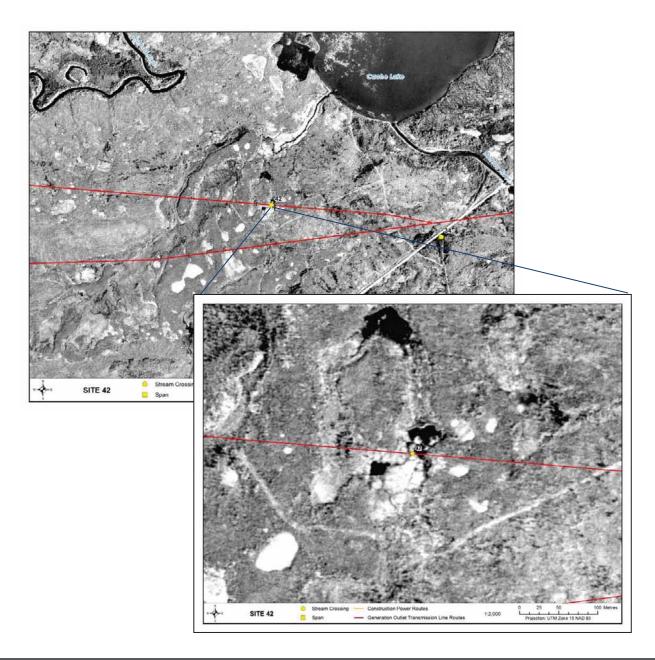
Unnamed Tributary of Cache Lake

Location

Datum:	NAD 83					
UTM:	Zone: Easting: Northing:	15V 385525 6241654				
Location Depicted Below:						

General Morphology

Gen. Description:	Wetland/bog drainage
Pattern:	-
Confinement:	Unconfined
Stage:	Moderate
Flow Regime:	Perennial
U/S Drainage:	3.57 km^2
Receiving Water/Dist.:	Kettle River/6 km





+ Physical Data	S	urvey Date:	25 Ju	ly 2009)	
Channel Profile						
Channel and Flow		Water	Depths	(m)		
Channel Width (m)	1-20		Max.	< 1.0		
Wetted Width (m)	-		Avg.	-		
Banks						
Right Bank Height (m):	-	Shape:			Stability:	Stable
Left Bank Height (m):	-	Shape:	-		Stability :	Stable
Substrate		Habit	at Typ	e		
Substrate Type (%)				osition (%	%)	
Fines	100		Pool	100	,	
Small Gravel	-		Flat	-		
Large Gravel	-		Run	-		
Cobble	-		Riffle	-		
Boulder	-					
Cover Types					<u>Riparian</u>	
		US	DS			
Fotal Cover Available (%)		50	50		Riparian Vegetation	Type (Y/N)
Cover Composition (%	of Total)				Moss	_
Large Woody D		30	30		Grasses/Sedges	Y
Overhanging V		-	-		Shrubs	Ŷ
Instream Vegeta		70	70		Conifers	-
Pool		-	-		Deciduous	-
Boulder		_	_		Mixed Forest	-
Undercut Bank		_	_			
Surface Turbule	ence	-	-		Canopy Cover (%)	0
+ Water Quality Dat	ta					
Surface Temp (°C):		_			DO (mg/L):	-
Specific Conductance (uS/cm):	_			pH:	_
TDS (g/L):					Turbidity (NTU):	_

Fish Habitat Classification and Sensitivity

+ Fish Habitat Potential	Spawning	Rearing/Feeding	Overwintering
Large-Bodied Fish: Small-Bodied Fish:	Low Low	Low Low	Low Low
Impediments to Migration: None observed			

Fish Presence: Unknown

N

+ Fish and Fish Habitat Sensitivity







Photo 1. Downstream view of crossing at Site 42.

Photo 2. Downstream channel connection from Site 42 to Cache Lake.

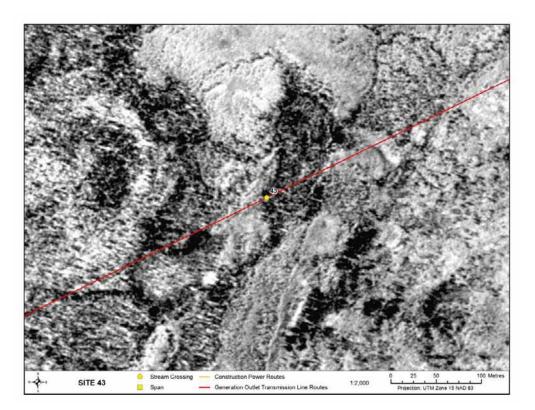


Unnamed Tributary of Kettle River

Location

Seneral	Morphology
---------	------------

Datum:	NAD 83		Gen. Description:	Wetland/bog drainage
			Pattern:	-
UTM:	Zone:	15V	Confinement:	Unconfined
	Easting:	392789	Stage:	Moderate
	Northing:	6242942	Flow Regime:	Intermittent
			U/S Drainage:	0.07 km^2
Location Dep	icted Below:		Receiving Water/Dist.:	Kettle River/1.7 km





Site Conditions

+ Phy	ysical Data	S	Survey D	ate: 24 Ju	ly 2009		
	el Profile l and Flow Channel Width (m) Wetted Width (m)	-	W	ater Depths (Max. Avg.	m) - -		
	Right Bank Height (m): Left Bank Height (m):	-		ape: - ape: -		Stability: Stability :	-
	ate te Type (%) Fines Small Gravel Large Gravel Cobble Boulder	100 - - -		abitat Type abitat Compo Pool Flat Run Riffle			
<u>Cover</u> Total Co	<u>Types</u> over Available (%)		US -	5 DS -		iparian parian Vegetation T	Гуре (Y/N)
	Cover Composition (% Large Woody D Overhanging Ve Instream Vegeta Pool Boulder Undercut Bank Surface Turbule	ebris egetation tion		- - - - -	Gr Sh Cc De	oss rasses/Sedges urubs onifers eciduous ixed Forest anopy Cover (%)	- Y Y - -
+ Wa	ter Quality Dat	а					
	Surface Temp (°C): Specific Conductance (µ TDS (g/L): Salinity (ppt):	ıS/cm):	- - -		pF	O (mg/L): I: ırbidity (NTU):	-

Fish Habitat Classification and Sensitivity

+ Fish Habitat Potential	Spawning	Rearing/Feeding	Overwintering
Large-Bodied Fish: Small-Bodied Fish:	Low Low	Low Low	Low Low
Impediments to Migration: None observed			

Fish Presence: Unknown

+ Fish and Fish Habitat Sensitivity





Photo 1. View of crossing at Site 43.

Photo 2. Large ponds located 800 m downstream of Site 43.



Photo 3. Discontinuous channel downstream from Site 43.



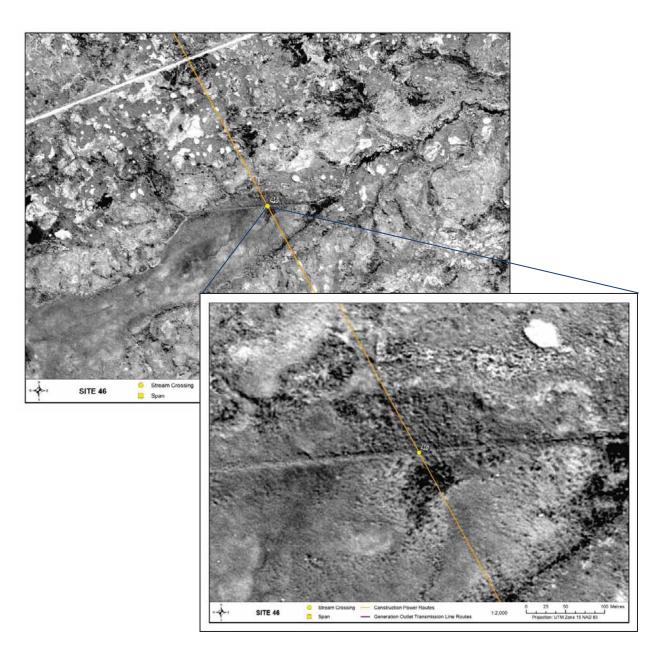
Unnamed Tributary of Kettle River

Location

Datum:	NAD 83	
UTM:	Zone: Easting: Northing:	15V 373115 6231432
Location Depicted Below:		

General Morphology

Gen. Description:	Wetland/bog drainage
Pattern:	-
Confinement:	Confined
Stage:	High
Flow Regime:	Ephemeral
U/S Drainage:	0.8 km^2
Receiving Water/Dist.:	Kettle River/9 km





Site Conditions

+ Physical Data	Su	rvey Date	: 22 July 200)9	
Channel Profile Channel and Flow Channel Width (m) Wetted Width (m)	-	Water	Depths (m) Max. ~1.0 Avg		
Banks Right Bank Height (m): Left Bank Height (m):	-	Shape: Shape:		Stability: Stability :	Stable Stable
Substrate Substrate Type (%) Fines Small Gravel Large Gravel Cobble Boulder	100 - - -		tat Type at Composition Pool 100 Flat - Run - Riffle -	(%)	
<u>Cover Types</u> Total Cover Available (%)		US 30	DS 30	<u>Riparian</u> Riparian Vegetation	Type (Y/N)
Cover Composition (% Large Woody I Overhanging V Instream Veget Pool Boulder Undercut Bank Surface Turbul	Debris fegetation ation	10 50 40 - -	10 50 40 - -	Moss Grasses/Sedges Shrubs Conifers Deciduous Mixed Forest Canopy Cover (%)	- Y Y Y - -
+ Water Quality Da Surface Temp (°C): Specific Conductance (TDS (g/L): Salinity (ppt):		- - -		DO (mg/L): pH: Turbidity (NTU):	- - -

Fish Habitat Classification and Sensitivity

+ Fish Habitat Potential

Large-Bodied Fish: Small-Bodied Fish: SpawningRearLow-ModerateLowModerateModerate

Rearing/Feeding Low Moderate Overwintering

Low Low

Impediments to Migration: None observed Fish Presence: Unknown

+ Fish and Fish Habitat Sensitivity





Photo 1. View of crossing at Site 46.



Photo 2. Wetland pools at Site 46.



Photo 3. Man-made channel upstream from crossing at Site 46.



Photo 4. Downstream view of crossing at Site 46.



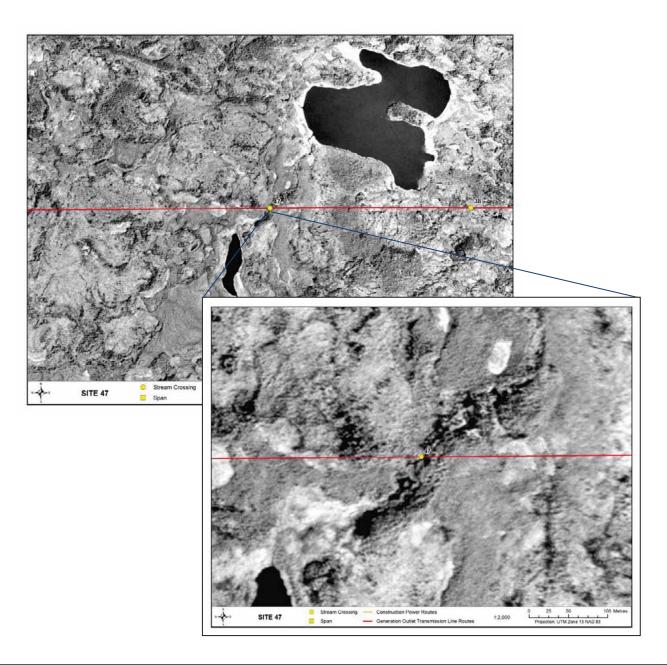
Unnamed Watercourse

Location

Datum:	NAD 83			
UTM:	Zone: Easting: Northing:	15V 371509 6241142		
Location Depicted Below:				

General Morphology

Gen. Description:	Wetland/bog drainage
Pattern:	-
Confinement:	Unconfined
Stage:	High
Flow Regime:	Perennial
U/S Drainage:	0.74 km^2
Receiving Water/Dist.:	Butnau River/21 km





Site Conditions

+ Ph	ysical Data	(Survey	Date:	24 Ju	ly 2009		
	nel Profile					J		
	el and Flow Channel Width (m) Wetted Width (m)	-		Water]	Depths (Max. Avg.	~ 1.5		
Danks	Right Bank Height (m): Left Bank Height (m):	-		Shape: Shape:			Stability: Stability :	Stable Stable
<u>Substr</u> Substra	rate ate Type (%) Fines Small Gravel Large Gravel Cobble Boulder	100 - - -			at Type Compo Pool Flat Run Riffle	<u>e</u> ssition (% 100 - - -	ó)	
	<u>• Types</u> Cover Available (%)			US 40	DS 40		<u>Riparian</u> Riparian Vegetation ⁷	Гуре (Y/N)
	Cover Composition (% Large Woody D Overhanging Ve Instream Vegeta Pool Boulder Undercut Bank Surface Turbule	ebris egetation tion		5 20 75 - - -	5 20 75 - - -		Moss Grasses/Sedges Shrubs Conifers Deciduous Mixed Forest Canopy Cover (%)	- Y Y - - -
+ Wa	ater Quality Dat	а						
	Surface Temp (°C): Specific Conductance (µ TDS (g/L): Salinity (ppt):	ıS/cm):		-			DO (mg/L): pH: Turbidity (NTU):	-

Fish Habitat Classification and Sensitivity

+ Fish Habitat Potential

Large-Bodied Fish: Small-Bodied Fish: SpawningRearing/FeedingLow-ModerateLowModerateModerate

Overwintering

Low Low

Impediments to Migration: Shallow water Fish Presence: Unknown

+ Fish and Fish Habitat Sensitivity





Photo 1. View of crossing Site 47.



Photo 2. Downstream view of Site 47.



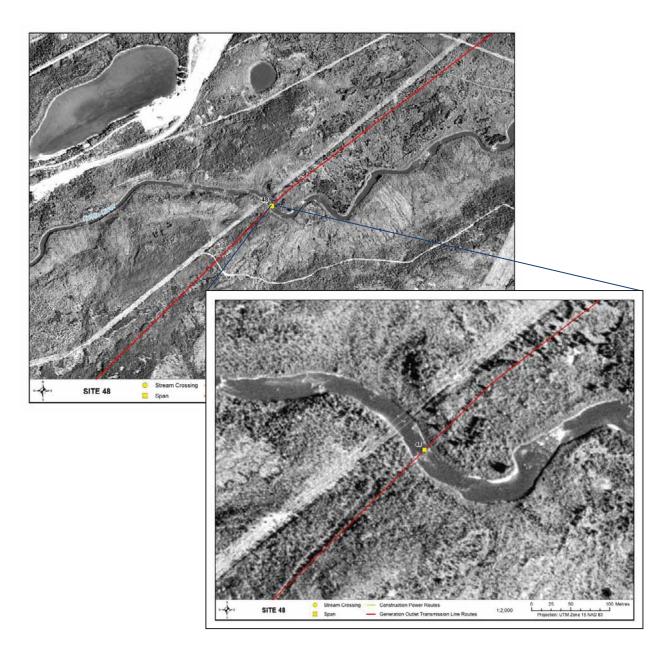
Kettle River

Location

Datum:	NAD 83			
UTM:	Zone: Easting: Northing:	15V 398190 6246076		
Location Depicted Below:				

🕥 General Morphology

Gen. Description:	Medium sized river
Pattern:	Sinuous
Confinement:	Confined
Stage:	Moderate
Flow Regime:	Perennial
U/S Drainage:	1957 km ²
Receiving Water/Dist.:	Nelson River/8 km





Ph	ysical Data		Surve	y Date:	23 July 200)9	
Chann	el Profile						
	l and Flow			Water 1	Depths (m)		
	Channel Width (m)	20			Max		
	Wetted Width (m)	20			Avg		
Banks							
	Right Bank Height (m):	3-5			rounded	Stability:	Stable
	Left Bank Height (m):	3-5		Shape:	rounded	Stability :	Stable
Substr	ate			Habit	at Type		
	te Type (%)				t Composition ((%)	
	Fines	-			Pool -		
	Small Gravel	-			Flat -		
	Large Gravel	-			Run 50		
	Cobble	-			Riffle 50		
	Boulder	-					
	<u>Types</u> over Available (%)			US -	DS -	<u>Riparian</u> Riparian Vegetation 7	Гуре (Y/N)
	Cover Composition (%	of Total)				Moss	_
	Large Woody D			_	_	Grasses/Sedges	Y
	Overhanging Ve			_	_	Shrubs	Y
	Instream Vegeta			_	_	Conifers	-
	0			_	_	Deciduous	_
	Pool				_	Mixed Forest	Y
	Pool Boulder					mineu i olost	1
	Boulder			-	_		
	Boulder Undercut Bank	nce		-	-	Canopy Cover (%)	0
	Boulder	nce		-	-	Canopy Cover (%)	0
+ Wa	Boulder Undercut Bank			-	-	Canopy Cover (%)	0
+ Wa	Boulder Undercut Bank Surface Turbule			-	-	Canopy Cover (%) DO (mg/L):	0
+ Wa	Boulder Undercut Bank Surface Turbule	а		-	-		0
+ Wa	Boulder Undercut Bank Surface Turbule ter Quality Dat Surface Temp (°C):	а		-	-	DO (mg/L):	0 - -

Fish Habitat Classification and Sensitivity

+ Fish Habitat Potential	Spawning	Rearing/Feeding	Overwintering
Large-Bodied Fish:	Moderate	Low	Low
Small-Bodied Fish:	Low	Low	Low

Impediments to Migration: None observed

Fish Presence: brook trout, longnose sucker, northern pike, walleye, white sucker (Johnson and Barth 2007)

+ Fish and Fish Habitat Sensitivity

Sensitivity Rating: Moderate-High

N

Manitoba Hydro: Keeyask Transmission Project Watercourse Crossing Assessment: Site 48 – Kettle River Page 2 of 3







Photo 1. View of crossing at Site 48.

Photo 2. Upstream view of Site 48.



Photo 3. Downstream view of Site 48.





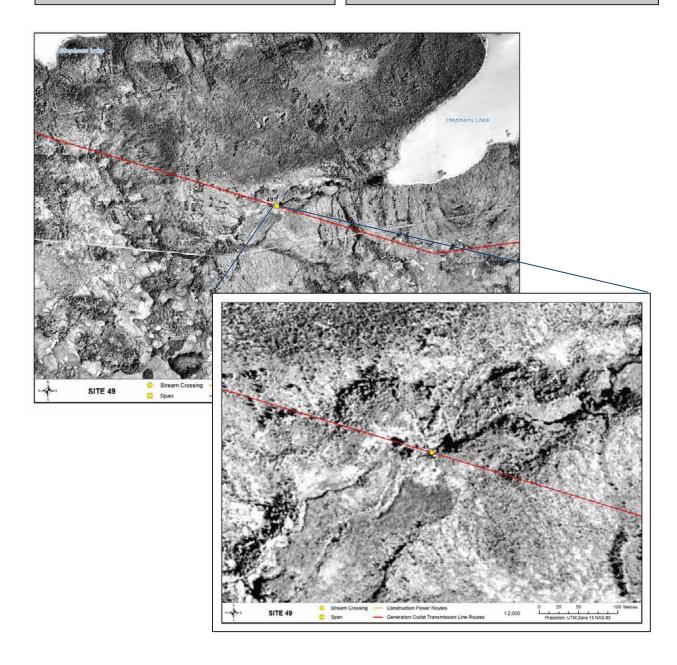
Unnamed Tributary of Stephens Lake

Location

Datum:	NAD 83		
UTM:	Zone: Easting: Northing:	15V 374041 6243487	
Location Depicted Below:			

General Morphology

Gen. Description:	Wetland/bog drainage
Pattern:	-
Confinement:	Unconfined
Stage:	Moderate
Flow Regime:	Perennial
U/S Drainage:	0.11 km^2
Receiving Water/Dist.:	Stephens Lake/0.6 km





Physical Data		Survey	/ Date:	25 Ju	ly 2009		
Channel Profile							
Channel and Flow			Water 1	Depths ((m)		
Channel Width (m)	1			Max.	~ 1		
Wetted Width (m)	-			Avg.	< 1		
Banks							
Right Bank Height (m):	-		Shape:			Stability:	Stable
Left Bank Height (m):	-		Shape:	-		Stability :	Stable
Substrate			Habita	at Typ	e		
Substrate Type (%)					 osition (%	(0)	
Fines	100			Pool	-		
Small Gravel	-			Flat	100		
Large Gravel	-			Run	-		
Cobble	-			Riffle	-		
Boulder	-						
Cover Types						<u>Riparian</u>	
<u>cover rypes</u>			US	DS			
Total Cover Available (%)			30	30		Riparian Vegetation	Гуре (Y/N)
Cover Composition (%	of Total)					Moss	_
Large Woody D			-	-		Grasses/Sedges	Y
Overhanging V			35	35		Shrubs	Y
Instream Vegeta			35	35		Conifers	Y
Pool			-	-		Deciduous	-
Boulder			-	-		Mixed Forest	_
Undercut Bank			30	30			
Surface Turbule	ence		-	-		Canopy Cover (%)	0
+ Water Quality Dat	ta						
Surface Temp (°C):			-			DO (mg/L):	-
Specific Conductance (uS/cm):		_			pH:	_
	moreniy.					Turbidity (NTU):	
TDS (g/L):			-				-

Fish Habitat Classification and Sensitivity

+ Fish Habitat PotentialSpawningRearing/FeedingOverwinteringLarge-Bodied Fish:LowLowLowLowSmall-Bodied Fish:ModerateLowLow

Impediments to Migration: Beaver dams downstream of crossing Fish Presence: Unknown

+ Fish and Fish Habitat Sensitivity

Sensitivity Rating: Low

N





Photo 1. View upstream towards crossing Site 49.



Photo 2. Downstream view towards Stephens Lake.



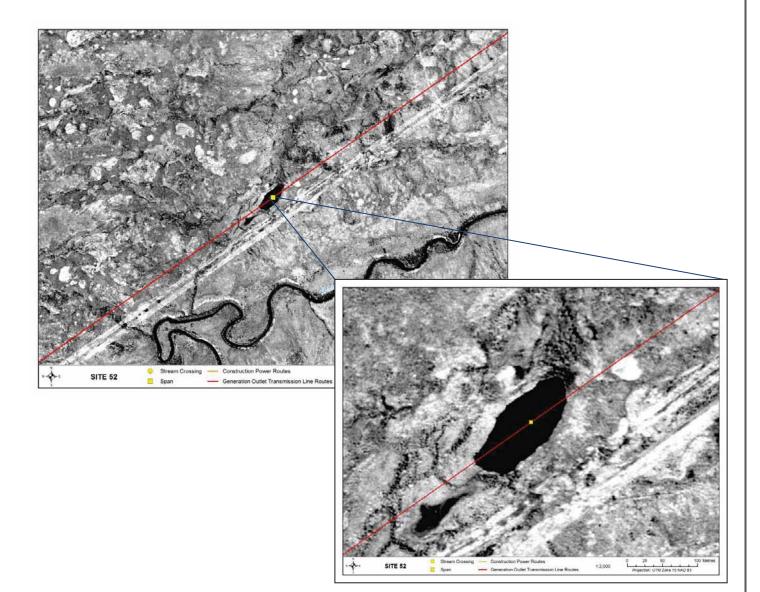
Unnamed Pond

Ы)	Location
All and a second s	

Datum:	NAD 83	
UTM:	Zone: Easting: Northing:	
Location Depi	cted Below:	

General Morphology

Gen. Description:	Isolated Pond
Pattern:	-
Confinement:	Confined
Stage:	-
Flow Regime:	Perennial
U/S Drainage:	n/a
Receiving Water/Dist.:	Butnau River/4 km





- Ph	ysical Data	:	Surve	y Date:	1 Sep	tember	2012		
Chann	el Profile								
	el and Flow			Water 1	Depths	(m)			
	Channel Width (m)	155			Max.	-			
	Wetted Width (m)	155			Avg.	-			
anks	Right Bank Height (m):			Shape:			Stability:	Stable	
	Left Bank Height (m):	-		Shape:			Stability :	Stable	
	Leit Buik Height (III).			onape.			Stubility.	Stuble	
ubstr	ate			Habita	at Typ	e			
	te Type (%)					osition (%	%)		
	Fines	-			Pool	100			
	Small Gravel	-			Flat	-			
	Large Gravel	-			Run	-			
	Cobble	-			Riffle	-			
	Boulder	-							
over	Types						Riparian		
	<u>I ypcs</u>			US	DS		<u>Mparran</u>		
'otal C	over Available (%)			-	-		Riparian Vegetation Type (Y/N)		
							1 0		
	Cover Composition (%						Moss	-	
	Large Woody D			-	-		Grasses/Sedges	Y	
	Overhanging Ve			-	-		Shrubs	Y	
	Instream Vegeta	ation		-	-		Conifers	Y	
	Pool			-	-		Deciduous	-	
	Boulder			-	-		Mixed Forest	-	
	Undercut Bank			-	-				
	Surface Turbule	nce		-	-		Canopy Cover (%)	0	
Wa	iter Quality Dat	а							
	3								
	Surface Temp (°C):			-			DO (mg/L):	-	
	Specific Conductance (µ	IS/cm)		-			pH:	-	

Fish Habitat Classification and Sensitivity

+ Fish Habitat Potential

Large-Bodied Fish: Small-Bodied Fish:

N

Low Moderate

Spawning

Rearing/Feeding Low Moderate

Overwintering

Low Moderate

Impediments to Migration: Undefined connection to downstream waters. Fish Presence: Unknown

+ Fish and Fish Habitat Sensitivity



Unnamed Tributary of Kettle River

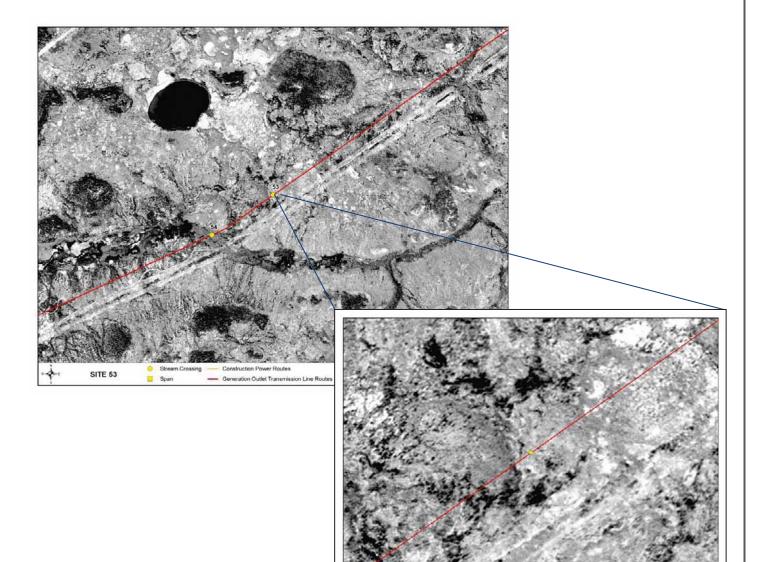
Location

Location Depicted Below:

Datum:	NAD 83	
UTM:	Zone: Easting: Northing:	15V 377704 6232996

General Morphology

Gen. Description:	Wetland/bog drainage
Pattern:	-
Confinement:	Unconfined
Stage:	-
Flow Regime:	Ephemeral
U/S Drainage:	0.4 km^2
Receiving Water/Dist.:	Kettle River/4 km



SITE 53



Site Conditions

+ Physical Data	Sun	VOV Data	: 1 Septembe	or 2012	
	Surv	ley Date	: I Septembe	ei 2012	
Channel Profile Channel and Flow Channel Width (m) Wetted Width (m) Banks	-	Water	Depths (m) Max Avg		
Right Bank Height (m): Left Bank Height (m):	-	Shape: Shape:		Stability: Stability :	Stable Stable
Substrate Substrate Type (%) Fines Small Gravel Large Gravel Cobble Boulder	- - -		tat Type at Composition Pool 100 Flat - Run - Riffle -	ı (%)	
<u>Cover Types</u> Total Cover Available (%)		US -	DS -	<u>Riparian</u> Riparian Vegetation ⁷	Гуре (Y/N)
Cover Composition (% Large Woody I Overhanging V Instream Veget Pool Boulder Undercut Bank Surface Turbuk	Debris egetation ation	- - - - -		Moss Grasses/Sedges Shrubs Conifers Deciduous Mixed Forest Canopy Cover (%)	- Y Y Y - - 0
+ Water Quality Da	ta				
Surface Temp (°C): Specific Conductance (TDS (g/L): Salinity (ppt):	μS/cm):			DO (mg/L): pH: Turbidity (NTU):	-

Fish Habitat Classification and Sensitivity

+ Fish Habitat Potential	Spawning	Rearing/Feeding	Overwintering
Large-Bodied Fish:	Low	Low	None
Small-Bodied Fish:	Low	Low	Low

Impediments to Migration: Beaver dams downstream and upstream Fish Presence: Unknown

+ Fish and Fish Habitat Sensitivity



Unnamed Tributary of Kettle River

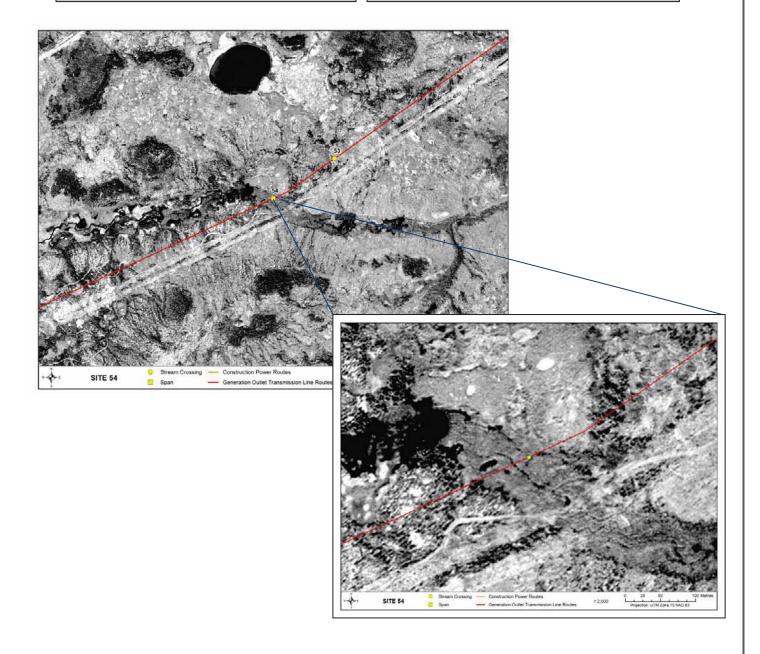
Location

Location Depicted Below:

Datum:	NAD 83	
UTM:	Zone: Easting: Northing:	15V 377357 6232769

General Morphology

Gen. Description:	Wetland/bog drainage
Pattern:	-
Confinement:	Confined
Stage:	-
Flow Regime:	Perennial
U/S Drainage:	7.2 km^2
Receiving Water/Dist.:	Kettle River/4 km





Site Conditions

Dhu	ucical Data	0	D 1	1.0		0.04.0	
+ PHy	vsical Data	Sur	vey Date:	T Sep	tember	2012	
Channel	el Profile and Flow Channel Width (m) Wetted Width (m)	~ 5 -	Water	Depths (Max. Avg.	(m) - -		
1	Right Bank Height (m): Left Bank Height (m):	-	Shape: Shape:			Stability: Stability :	Stable Stable
	ate e Type (%) Fines Small Gravel Large Gravel Cobble Boulder	- - -		at Type t Compe Pool Flat Run Riffle	<u>e</u> ssition (% 100 - - -	%)	
<u>Cover</u> Total Co	<u>Types</u> wer Available (%)		US -	DS -		<u>Riparian</u> Riparian Vegetation	Гуре (Y/N)
	Cover Composition (% Cover Composition (% Coverhanging Ve Overhanging Ve Instream Vegeta Pool Boulder Undercut Bank Surface Turbuler	ebris getation tion	- - - - -			Moss Grasses/Sedges Shrubs Conifers Deciduous Mixed Forest Canopy Cover (%)	- Y Y Y - -
+ Wat	ter Quality Dat	а					
	Surface Temp (°C): Specific Conductance (µ TDS (g/L): Salinity (ppt):	S/cm):	- - -			DO (mg/L): pH: Turbidity (NTU):	-

Fish Habitat Classification and Sensitivity

+ Fish Habitat Potential

Large-Bodied Fish: Small-Bodied Fish: Low-Moderate Low Moderate Mode

Spawning

Rearing/Feeding Low Moderate Overwintering

Low Low

Impediments to Migration: Beaver dams downstream and upstream Fish Presence: Unknown

+ Fish and Fish Habitat Sensitivity





Photo 1. View of crossing at Site 46, 4 km upstream of Site 54.



Photo 2. Downstream view of crossing at Site 46, 4 km upstream of Site 54.

