BULKLEY/FULTON WATERSHED
FISH PASSAGE CULVERT ASSESSMENT PROGRAM

January 12, 2010

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1.0 Introduction

Barriers to fish passage at stream crossings are believed to be one of the major causes of loss of fish habitat in B.C. This is because fish barriers, created by road crossings, can block access to several kilometers of streams featuring good fish habitat. For this reason, FIA (Forest Investment Account) funding is made available to restore fish passage at crossings in high priority watersheds.

FIA offers funding to various forestry practitioners, researchers, government agencies and others specifically for the purpose of facilitating sustainable forestry practices in BC. The Land Base Investment Program is one of five programs under FIA and states "restoring terrestrial, aquatic and riparian environments" as one of its main goals. Watershed restoration projects fall under this program and entail the assessment and potential upgrade or replacement of watercourse crossings that present barriers to fish passage.

In order to determine where funding is applied, the province has been divided into watershed polygons and subdivided into watershed groups as per the 1:50,000 BC watershed Atlas. Priority rankings are then assigned to each polygon by MoE (Ministry of Environment) and based on fisheries and socioeconomic values such as endangered species, species richness, recreational value, commercial value and others. Only watershed groups ranking first or second within their respective watershed polygon are eligible for funding. The Bulkey and Fulton watersheds were selected for restoration because they were ranked as a high priority group in the Bulkley River watershed polygon.

The main objective of this type of program is to re-establish fish passage in as much of the selected watershed as possible; however, not all roads are eligible to be upgraded with FIA funding. The FIA Activity Standards Document (Version 3 – 2008/2009), Fish Passage Activity (design, construction and post-construction inspections), outlines roads to which funding can be applied. They are: Forest Service Roads (FSRs), Road Permit roads (pre-1995), and non-status roads. Once the selection of a watershed group and eligible roads has been made, field assessment and reporting are completed and based on two MoE documents titled "Field Assessment for Fish Passage Determination of Closed Bottomed Structures" and "Fish Passage Protocol for Culverted Sites".

Ecofor Consulting Ltd. (Ecofor) was retained by Tweedsmuir Forest Ltd. (Tweedsmuir) to conduct fish passage determination assessments at crossings on eligible roads within the Bulkley/Fulton watersheds in order to facilitate the restoration of fish passage in this watershed. The focus of this study is strictly on

crossings where closed bottom culverts are in place. Bridge crossings and open bottom culvert crossings were not assessed.

2.0 Project Setting

2.1 Study area

Two study areas are included in this report: the Bulkley watershed and the Fulton watershed. The study areas are found within the boundaries of the Bulkley River and Fulton River watersheds. The Bulkley watershed can be accessed via the North road approximately 6km from Houston, B.C. A complex network of roads is found in the study area that includes: Barren Spur, Hidden Lake, Perow and Byman FSR. This is a relatively large watershed encompassing an area of 40,438.1 ha.

The Fulton watershed, encompasses an area of 56,271.8 ha, is the largest study area investigated in 2009. The watershed can be accessed via the North Road from Houston or from Topley on Highway 118 located approximately 40km northeast of Houston. The North, Chapman FSR and Deception roads are the major roads in the area.

2.2 Watershed overview

The Bulkley watershed forms the headwaters of the Bulkley River east of Houston B.C. while the watercourses in the Fulton watershed flow into Fulton Lake, forming the Fulton River which flows east from Fulton Lake into Babine Lake at Topley Landing.

2.3 Canadian Terrestrial Ecozones and Ecoregions

The project is located within the Fraser Plateau Ecoregion of the Montane Cordillera Canadian Terrestrial Ecozone. It is characterized by moderate summers and cold winters with a mean annual temperature of approximately 3.0°C fluctuating between 12.5°C in the summer to -7.5°C in the winter with annual rainfall from 250-300mm per year. It is characterized by mixed stands of trembling aspen, paper birch, lodgepole pine with the climax species of white and black spruce. A variety of topographic features from steep slopes to mildly undulating valleys are present. In addition, several species of wildlife including moose, deer, woodland caribou, black bear, grizzly bear, beaver, mink, wolf and others inhabit this ecoregion (Environment Canada 2005).

3.0 Methods

3.1 Selection of Road Networks

The Bulkley/Fulton Watershed area was originally examined using TRIM (Terrain Resource Inventory Mapping) Maps. The map was generated showing site locations, access points GPS coordinates loaded in handheld units for field work. The handheld GPS units were used in conjunction with maps to locate sites.

3.2 Selection of Sites for Full Assessment

The location of every potential crossing was determined using a TRIM water features data layer plotted on a 1:50,000 scale map. A site was established for every place where a selected road crossed a drainage within the Bulkley/Fulton watershed. GPS units with Garmin MapSource™ were used to locate the crossing for additional spatial assistance. In instances where the culvert was not at the mapped location, the nearest culvert/drainage system to the plotted coordinates was used.

A visual examination was done on 180 sites. During the visual examination, it was decided whether a full assessment would be necessary. For a site to undergo a full assessment two conditions must be met: 1) a closed bottom culvert must be in place and 2) the crossing must have fish potential.

3.3 Field Assessment Methodology

For each site, appropriate data was collected and recorded on the closed bottomed structure field measurement form (Figure 1).

3.4 Fish Presence Analysis

In order to be considered for upgrades, streams must pass a fish presence test based on known information. To pass the test, all of the following conditions must be met:

1. Documented fish presence upstream or within one stream order downstream of the stream crossing (1:50,000 scale).
2. No downstream barriers (as either revealed from Provincial FISS dataset or local knowledge) that would preclude fish access.
3. Stream gradients upstream and downstream (to point of known fish presence) less than 20% (30% for bull trout systems).
4. No downstream crossings that are determined to be barriers to fish passage.
   (MOE 2008 – Fish Passage Protocol for Culverted Sites)

This information was collected using maps and FISS data.

Location and survey data							**Site Information**					
Date							Outlet res. pool depth (C-B) (cm)	C	B	OPD		
Crossing ID												
Crew							Stream slope %					
UTM							Habitat value	Low	Med	High		
Stream name							Depth of fill (m)					
Road name and km							Valley fill	DF	SF	BR		
MOF district							Beaver activity	Yes		No		
Crossing type	RC	PA	EC	EA	Other		Inlet drop	Yes		No		
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	0	25	50	75	100
Embedded	None	Part	Full				Fish sighted	Yes		No		
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM	OBS	SS	EM	BW
(cm)							Photos	D/S	Out	Bar	In	U/S
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**	Comments					
(m)												
Culvert slope %												
Culvert length (m)												
FBS	Emb.	OD	Slope	SWR	lng	**Sum**						

Figure 1. Closed bottomed structure field measurement form

3.5 Determination of a fish barrier

The determination of a fish barrier was done by using a scoring matrix (Figure 2) developed by MoE, as described in Field Assessment for Fish Passage Determination of Closed Bottom Structures, 2nd Edition (May 2008). The matrix is based on five culvert characteristics that include: depth and degree of embedment, outlet drop, slope, stream width to culvert ratio and length.

Risk	Embedded	Value	Outlet Drop	Value	Slope	Value	SWR	Value	Length	value
Low	>30cm or >20% of diameter and continuous	0	<15	0	<1	0	<1.0	0	<15	0
Mod	<30cmor 20% of diameter but continuous	5	15-30	5	1-3	5	1.0-1.3	3	15-30	3
High	No Embedment or Continuous	10	>30	10	>3	10	>1.3	6	>30	6

Scoring for determination of a fish barrier is as follows:

Cumulative Score	Result
0-14	Passable
15-19	Potential Barrier
20-42	Barrier

For each of these characteristics, the score is assigned based on the measurement of the characteristic in the field (e.g. if the outlet drop at a culvert outlet is less than 15 cm, it is assigned a score of 0, if it is between 15 and 30 cm, it is assigned a score of 5 and if it is above 30, it is assigned a score of 15.). A similar system is used for each of the five characteristics.

Figure 2. Fish passage scoring matrix

3.6 Site Prescriptions

Site prescriptions to address fish passage barriers were prepared using guidelines contained within B.C. Ministry of Forests' Fish Stream Crossing Guidebook. These guidelines were developed with consideration for fisheries values of the watercourses, as observed in the field. Closed bottom culverts have a maximum size of 3000 mm; therefore, they have not been considered for streams with channel widths of more than 3 m. Also, open bottom structures (OBS) must be used on streams exhibiting gradients greater that 6%.

Materials to be used (concrete, steel, wood) are not discussed in this report because the type of material used is not relevant to fish passage. Decisions regarding materials should be made with consideration for cost and engineering restrictions.

3.7 Cost Benefit Analysis

In addition to the fish passage assessment, a cost benefit analysis is done to facilitate the prioritization of sites for replacement or upgrades. In order to perform a cost benefit analysis, two pieces of information are necessary: the cost of the potential prescription and the habitat gained index (HGI).

HGI takes into account both the amount of available habitat upstream of the subject crossing and the quality of habitat. HGI is calculated by multiplying the length of the upstream habitat (in meters) by a number used to rank the quality of the habitat. Low quality habitat is ranked as 1, moderate quality habitat as 2 and high quality habitat as 3.

Habitat length was calculated using a TRIM water features data layer. Habitat was measured in meters that would be gained if fish passage was re-established at a given crossing location. HGI was only measured for stream crossings ranked as potential barrier or barrier with moderate and high habitat value. Habitat values were based on potential for spawning, rearing, migration and overwintering.

The cost benefit analysis produces a number representing units of benefit for every $1,000 spent. Cost benefit can be used to facilitate prioritization of sites because it offers a common denominator allowing different options at different sites to be compared relative to one another.

4.0 Results and Recommendations

4.1 Fish Passage Evaluation

Field assessments were completed by Dave Stanley, Mark Pokorski and Jason Casselman in November 2009 (Maps of all the sites are located in Appendix I). Within the Bulkley/Fulton watershed 196 sites were identified from the TRIM maps to be assessed. Twenty-one of these could not be visited due to weather conditions in areas of higher elevation. Of the 175 original crossing sites visited, only 84 qualified for a full assessment. Five sites that met the criteria and not identified on the TRIM maps were encountered in the field and assessed, bringing the total to 89 full assessments. The remaining sites did not meet the potential fish habitat criterion, being classified as NVC/NCD. Eleven sites were given a moderate habitat rating and five sites rated as high habitat values in the Bulkley watershed, while eight sites were rated at moderate habitat values in the Fulton watershed. A summary of these 24 closed bottom culvert crossings is located in Table 2. Site cards and respective photo documentation are included in Appendix II.

Table 1. Sites visited in the Bulkley-Fulton watershed that were rated as high and moderate habitat in streams where fish passage was restricted due to the crossing structure. Information including final score, type of barrier, habitat value and channel gradient % is included. Note: PB= partial barrier and B= barrier.

Site #	Road	Zone	UTM		Score	Barrier	Habitat	Channel
			Easting	Northing		PB/B	value	Gradient %
Bu-100	Barren Spur	9	655260	6043622	31	B	Mod	3
Bu-101	Barren Spur	9	654451	6042827	24	B	High	2
Bu-109	North Road	9	651400	6032337	26	B	Mod	4
Bu-129	Robert Hatch FSR	9	669680	6056904	16	PB	High	1
Bu-135	Byman FSR	9	658893	6053833	16	PB	Mod	5
Bu-138	Byman FSR	9	662291	6052289	34	B	Mod	4
Bu-139	North Road	9	664881	6052688	34	B	Mod	0
Bu-153	North Road	9	651246	6032226	39	B	Mod	8
Bu-164	North Road	9	668504	6056340	33	B	Mod	1
Bu-168	North Road	9	662522	6052094	34	B	High	3
Bu-171	North Road	9	660446	6048640	34	B	Mod	1
Bu-191	North Road	9	660871	6040440	39	B	Mod	6
Bu-24	Byman Spur	9	659056	6053815	23	B	Mod	7
Bu-36	Hidden Lake	9	650538	6044797	21	B	High	1
Bu-47	Hidden Lake	9	651657	6042495	24	B	Mod	3
Bu-93	North Road	9	656855	6048636	42	B	High	5
Fult-10	Chapman FSR	9	664368	6060785	26	B	Mod	4
Fult-124	Chapman FSR	9	664174	6060897	21	B	Mod	4
Fult-125	Chapman FSR	9	666100	6058190	39	B	Mod	9

Site #	Road	Zone	UTM		Score	Barrier	Habitat	Channel
			Easting	Northing		PB/B	value	Gradient %
Fult-156	North Road	9	678554	6073798	37	B	Mod	4
Fult-161	Chapman FSR	9	662862	6061768	26	B	Mod	5
Fult-73	Deception FSR	9	655363	6063775	18	PB	Mod	4
Fult-9	North Road	9	672142	6062683	24	B	Mod	3
Fult-X4	Chapman FSR	9	657774	6066886	16	PB	Mod	8

4.2 Site Prescriptions

Site prescriptions are only provided for sites identified as having a barrier or partial barrier and fish bearing. Since the culverts of interest are on the mainline forestry hauling roads or still active forestry secondary roads, road deactivation is not an option. As a result, prescriptions will only include a bridge, installation of an open bottom culvert and replacement of an embedded closed bottom culvert. Table 2 outlines the potential cost to complete each proposed option for a respective site. N/A is marked in fields where that option would not be feasible.

Wayne Patterson and Jeffrey Katuski of Allnorth Consultants Ltd were able to provide cost estimates for bridge, open bottom and embedded closed bottom culverts. These are general estimates and could vary with the price of construction materials (i.e. concrete vs. steel culverts). Also, if work is completed on more than one site, located in a similar area, equipment mobilization and demobilization costs could be shared between sites.

Table 2. Approximate cost for each respective replacement option

Site #	Bridge	Open Bottom Culvert	Embedded Closed Bottom Culvert
Bu-100	$100,000.00	$67,500.00	$45,000.00
Bu-101	$100,000.00	N/A	N/A
Bu-109	$100,000.00	$75,000.00	$45,000.00
Bu-129	$100,000.00	$67,500.00	$45,000.00
Bu-135	$100,000.00	$67,500.00	$45,000.00
Bu-138	$100,000.00	$67,500.00	$45,000.00
Bu-139	$100,000.00	N/A	N/A
Bu-153	$100,000.00	$82,500.00	$45,000.00
Bu-164	$100,000.00	$75,000.00	$45,000.00
Bu-168	$100,000.00	N/A	N/A
Bu-171	$100,000.00	N/A	N/A
Bu-191	$100,000.00	$75,000.00	$45,000.00
Bu-24	$100,000.00	$67,500.00	$45,000.00
Bu-36	$100,000.00	$67,500.00	N/A

Bu-47	$100,000.00	$67,500.00	$45,000.00
Bu-93	$100,000.00	N/A	N/A
Fult-10	$100,000.00	$67,500.00	$60,000.00
Fult-125	$100,000.00	$75,000.00	N/A
Fult-156	$100,000.00	$67,500.00	$45,000.00
Fult-161	$100,000.00	$67,500.00	$45,000.00
Fult-73	$100,000.00	$75,000.00	$45,000.00
Fult-9	$100,000.00	$67,500.00	$45,000.00
Fult-X4	$100,000.00	$75,000.00	N/A

4.3 Habitat Gained Index

The highest habitat gain in the Bulkley-Fulton watershed would be obtained from installing structures that provide safe fish passage at Bu-168 followed by Bu-93, Bu-139, Fult-73 and Bu-36 (Table 3). The lowest habitat gained would be obtained at Fult-9, Bu-100 and Fult-10 (Table 3).

Table 3. Habitat gained index and stream characteristics including stream channel width (m), channel gradient (%), habitat value and the amount of habitat found upstream of the crossing structure at each respective site.

Site #	Channel Width (m)	Habitat Gained (m)	Habitat Value	Habitat Score	Habitat Gained Index
Bu-100	1.5	600	Mod	2	1200
Bu-101	3.0	4600	High	3	13800
Bu-109	1.5	5600	Mod	2	11200
Bu-129	1.3	1000	High	3	3000
Bu-135	1.5	1200	Mod	2	2400
Bu-138	1.4	6300	Mod	2	12600
Bu-139	3.3	22300	Mod	2	44600
Bu-153	1.4	8800	Mod	2	17600
Bu-164	1.0	4000	Mod	2	8000
Bu-168	8.1	161700	High	3	485100
Bu-171	3.0	4200	Mod	2	8400
Bu-191	1.5	5300	Mod	2	10600
Bu-24	1.2	2600	Mod	2	5200
Bu-36	1.9	6900	High	3	20700
Bu-47	1.4	2500	Mod	2	5000
Bu-93	3.6	22700	High	3	68100
Fult-10	1.7	700	Mod	2	1400
Fult-124	1.6	2300	Mod	2	4600
Fult-125	2.3	8000	Mod	2	16000

Fult-156	1.2	9100	Mod	2	18200
Fult-161	1.1	1800	Mod	2	3600
Fult-73	1.1	12900	Mod	2	25800
Fult-9	1.5	300	Mod	2	600
Fult-X4*	2.1	N/A	Mod	2	N/A

* Site Fult-X4 is an unmapped watercourse and thus habitat gained could not be measured

4.4 Cost Benefit Analysis

The cost benefit analysis represents the amount of fish habitat upstream that could be gained if the site is corrected for every 1000$ spent (Table 4). For each potential solution, the HGI is divided by the cost of the project and the number indicated refers to the total amount of habitat gained for every $1000 spent.

Table 4. Summary of cost benefit analysis for crossings of high and moderate habitat value and considered a partial or complete barrier to fish passage (habitat gain for every $1000 spent)

Site #	HGI	Bridge	Open Bottom Culvert	Embedded Closed Bottom Culvert
Bu-100	1200	0.01	0.02	0.03
Bu-101	13800	0.14	N/A	N/A
Bu-109	11200	0.11	0.15	0.25
Bu-129	3000	0.03	0.04	0.07
Bu-135	2400	0.02	0.04	0.05
Bu-138	12600	0.13	0.19	0.28
Bu-139	44600	0.45	N/A	N/A
Bu-153	17600	0.18	0.21	0.39
Bu-164	8000	0.08	0.11	0.18
Bu-168	485100	0.49	N/A	N/A
Bu-171	8400	0.08	N/A	N/A
Bu-191	10600	0.11	0.14	0.24
Bu-24	5200	0.05	0.08	0.12
Bu-36	20700	0.21	0.31	N/A
Bu-47	5000	0.05	0.07	0.11
Bu-93	68100	0.68	N/A	N/A
Fult-10	1400	0.01	0.02	0.02
Fult-124	4600	0.05	0.06	0.08
Fult-125	16000	0.16	0.21	N/A
Fult-156	18200	0.18	0.27	0.40
Fult-161	3600	0.04	0.05	0.08
Fult-73	25800	0.26	0.34	0.57
Fult-9	600	0.01	0.01	0.01
Fult-X4	N/A	N/A	N/A	N/A

In the Bulkley watershed, the highest cost benefit ratio for habitat gained per 1000$ is achieved by replacing Bu-93, Bu168 and Bu-139 with a bridge (0.68, 0.49 and 0.45 respectively), an embedded closed bottom culvert at Bu-153 and Bu-138 (0.39 and 0.28 respectively) and an open bottom culvert at Bu-36 (0.31) (Table 4).

In the Fulton watershed, the highest cost benefit ratio for habitat gained per 1000$ is achieved by replacing Fult-73 and Fult-156 (0.57 and 0.40 respectively) with an embedded closed bottom culvert, and an open bottom culvert at Fult-125 (0.21).

5.0 Closure

The fish passage assessment program for the Bulkley/Fulton watershed has revealed several sites where structure upgrade will benefit fish resources in the watershed. Timely implementation of these works is recommended so that fish can move into these reaches as soon as possible.

6.0 Reference Material

B.C Ministry of Environment. 2008. Fish Passage Protocol for Culverted Sites, 1st Edition.

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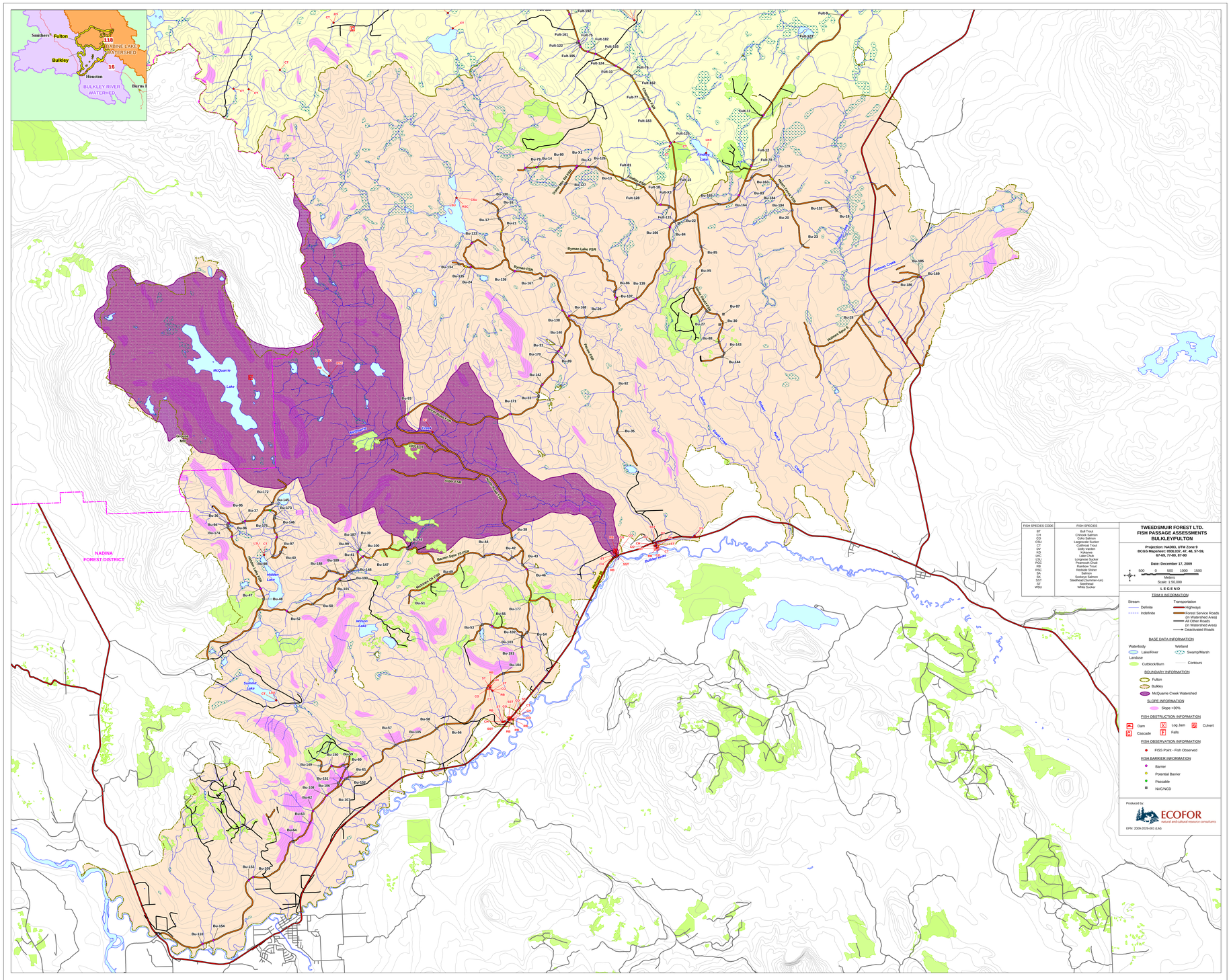
Appendix I

Site maps



FISH SPECIES CODE	FISH SPECIES
BT	Bull Trout
CH	Chinook Salmon
CO	Coho Salmon
CSU	Largescale Sucker
DV	Dolly Varden
DV	Dolly Varden
KO	Kokanee
LSU	Largescale Sucker
LSU	Longnose Sucker
PCC	Pearlmouth Chub
RB	Rainbow Trout
RSC	Redside Shiner
SK	Sockeye Salmon
SK	Sockeye Salmon
SST	Steelhead (Summer-run)
ST	Steelhead
WSU	White Sucker

TWEEDSMUIR FOREST LTD.
FISH PASSAGE ASSESSMENTS
BULKLEY/FULTON

Projection: NAD83, UTM Zone 9
BCGS Mapsheet: 093L037, 47, 48, 57-59, 67-69, 77-80, 87-90

Date: December 17, 2009

500 0 500 1000 1500
Meters
Scale: 1:50,000

L E G E N D

TRIM II INFORMATION

Stream
- Definite
- Indefinite

Transportation
- Highways
- Forest Service Roads (In Watershed Area)
- All Other Roads (In Watershed Area)
- Deactivated Roads

BASE DATA INFORMATION

Waterbody
- Lake/River
- Wetland
- Swamp/Marsh

Landuse
- Cutblock/Burn
- Contours

BOUNDARY INFORMATION
- Fulton
- Bulkley
- McQuarrie Creek Watershed

SLOPE INFORMATION
- Slope >30%

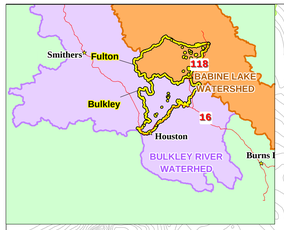
FISH OBSTRUCTION INFORMATION
- Dam
- Log Jam
- Culvert
- Cascade
- Falls

FISH OBSERVATION INFORMATION
- FISS Point - Fish Observed

FISH BARRIER INFORMATION
- Barrier
- Potential Barrier
- Passable
- NVC/NCD

Produced by:
ECOFOR
natural and cultural resource consultants

EPN: 2009-2029-001 (LM)



NADINA FOREST DISTRICT

Fulton Lake

Babine Lake

Nicholson Creek

Dorsey Creek

Federal Creek

Dennison Fork

Chapman Fork

Findlay FSR

Lennac Lake

Findlay Lake

Duncan Mtn Rd FSR

Byman Lake FSR

Jarvis Creek FSR

Jarvis Creek

Fult-1, Fult-68, Fult-67, Fult-66, Fult-156, Fult-74, Fult-121, Fult-9, Fult-123, Fult-11, Fult-12, Fult-78, Fult-129, Fult-163, Fult-83, Fult-184, Fult-194, Fult-20, Fult-132, Fult-19, Fult-23, Fult-185

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Bu-79, Bu-14, Bu-80, Bu-X1, Bu-X2, Bu-126, Bu-13, Bu-127, Bu-130, Bu-16, Bu-17, Bu-21, Bu-133, Bu-165, Bu-164, Bu-166

FISH SPECIES CODE	FISH SPECIES
BT	Bull Trout
CH	Chinook Salmon
CO	Coho Salmon
CSU	Largescale Sucker
CT	Cutthroat Trout
DV	Dolly Varden
KO	Kokanee
LKC	Lake Chub
LSU	Longnose Sucker
PCC	Peamouth Chub
RB	Rainbow Trout
RSC	Redside Shiner
SA	Salmon
SK	Sockeye Salmon
SST	Steelhead (Summer-run)
ST	Steelhead
WSU	White Sucker

TWEEDSMUIR FOREST LTD.
FISH PASSAGE ASSESSMENTS
FULTON/BULKLEY

Projection: NAD83, UTM Zone 9
BCGS Mapsheet: 093L037, 47, 48, 57-59, 67-69, 77-80, 87-90

Date: December 18, 2009

500 0 500 1000 1500
Meters
Scale: 1:50,000

LEGEND

TRIM II INFORMATION

Stream: Definite; Indefinite

Transportation: Highways; Forest Service Roads (In Watershed Area); All Other Roads (In Watershed Area); Deactivated Roads

BASE DATA INFORMATION

Waterbody: Lake/River

Wetland: Swamp/Marsh

Landuse: Cutblock/Burn

Contours

BOUNDARY INFORMATION

Fulton

Bulkley

McQuarrie Creek Watershed

SLOPE INFORMATION

Slope >30%

FISH OBSTRUCTION INFORMATION

Dam; Log Jam; Culvert; Cascade; Falls

FISH OBSERVATION INFORMATION

FISS Point - Fish Observed

FISH BARRIER INFORMATION

Barrier

Potential Barrier

Passable

NVC/NCD

Produced by:

ECOFOR
natural and cultural resource consultants

EPN: 2009-2029-001 (LM)

Appendix II

Site Card and Photodocumentation

Location and survey data							**Site Information**						
Date	06-Nov-09						Outlet res. pool	C	B	OPD			
Crossing ID	Bu-13						depth (C-B) (cm)			0			
Crew	MP/JS						Stream slope %						
UTM	9u	663433E		6057338N			Habitat value	Low	Med	High			
Stream name	unnamed						Depth of fill (m)						
Road name and km	Findley 2km						Valley fill	DF	SF	BR			
MOF district	Nadina						Beaver activity	Yes		No			
Crossing type	RC	PA	EC	EA	Other		Inlet drop	Yes		No			
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	0	25	50	75	100	
Embedded	None	Part	Full				Fish sighted	Yes		No			
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM	OBS	SS	EM	BW	
(cm)			0				Photos	**D/S**	**Out**	**Bar**	**In**	**U/S**	
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**	Comments	no culvert at the site, small flowing watercourse running out of woods and into ditch, follows ditch for 100m before joining wet area					
(m)													
Culvert slope %													
Culvert length (m)													
FBS	Emb.	OD	Slope	SWR	lng	**Sum**							
						0							

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Date: 06/11/2009

Comments:

View of habitat downstream from culvert outlet.

Date: 06/11/2009

Comments:

View of the culvert outlet.

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Date: 06/11/2009

Comments:

View of the habitat downstream of the culvert outlet.

Date: 06/11/2009

Comments:

View of the culvert outlet.

Date: 06/11/2009

Comments:

View of the culvert inlet.

Date: 06/11/2009

Comments:

View of the habitat upstream of the culvert inlet.

Location and survey data							**Site Information**						
Date	06-Nov-09						Outlet res. pool	C	B	OPD			
Crossing ID	Bu-14						depth (C-B) (cm)	30	5	25			
Crew	MP/JS						Stream slope %			5			
UTM	9u	661378E		6057330N			Habitat value	**Low**	Med	High			
Stream name	unnamed						Depth of fill (m)		0.7				
Road name and km	Findley 4.5km						Valley fill	DF	**SF**	BR			
MOF district	Nadina						Beaver activity		Yes		**No**		
Crossing type	**RC**	PA	EC	EA	Other		Inlet drop		Yes		**No**		
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	**0**	25	50	75	100	
Embedded	**None**	Part	Full				Fish sighted		Yes		**No**		
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM	OBS	SS	EM	BW	
(cm)	10	5	15				Photos	**D/S**	**Out**	**Bar**	**In**	**U/S**	
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**	Comments	u/s ditch collects water from several seepages and small streams combining it into one, originates from wet woods, little to no habitat u/s					
(m)	0.5	0.5	1	0.67	0.5	1.33							
Culvert slope %			3.2										
Culvert length (m)			9										
FBS	Emb.	OD	Slope	SWR	lng	**Sum**							
	10	5	10	6	0	31							

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Date: 06/11/2009

Comments:

View of the habitat downstream of the culvert outlet.

Date: 06/11/2009

Comments:

View of the culvert outlet.

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Date: 06/11/2009

Comments:

View of barrel.

Date: 06/11/2009

Comments:

View of the habitat above the culvert inlet.

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Date: 06/11/2009

Comments:

View of the habitat above the culvert inlet.

Location and survey data							**Site Information**						
Date	6-Nov-09						Outlet res. pool	C		B		OPD	
Crossing ID	Bu-15						depth (C-B) (cm)					0	
Crew	MP/JS						Stream slope %						
UTM	9u	666222E		6056587N			Habitat value	Low		Med		High	
Stream name	unnamed						Depth of fill (m)						
Road name and km	Chapman						Valley fill	DF		SF		BR	
MOF district	Nadina						Beaver activity		Yes			No	
Crossing type	**RC**	PA	EC	EA	Other		Inlet drop		Yes			No	
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	0		25		50	75	100
Embedded	None	Part	Full				Fish sighted		Yes			No	
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM		OBS		SS	EM	BW
(cm)							Photos	**D/S**		**Out**		**Bar**	**In**	**U/S**
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**	Comments	NVC, no stream channel, standing pools of water in wet draw but no scour, same crossing as Fult-82					
(m)				#DIV/0!		#DIV/0!							
Culvert slope %													
Culvert length (m)													
FBS	Emb.	OD	Slope	SWR	lng	**Sum**							
						0							

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Date: 06/11/2009

Comments:

View of the habitat downstream of the culvert outlet.

Date: 06/11/2009

Comments:

View of the culvert outlet.

ECOFOR
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Date: 06/11/2009

Comments:

View of the culvert inlet.

Date: 06/11/2009

Comments:

View of the habitat upstream of the culvert inlet.

Location and survey data							**Site Information**						
Date	05-Nov-09						Outlet res. pool	C	B	OPD			
Crossing ID	Bu-16						depth (C-B) (cm)	0	0	0			
Crew	DS/RP						Stream slope %			0%			
UTM	9u	660021		6055797			Habitat value	Low	Med	High			
Stream name	Unnamed Watercourse						Depth of fill (m)		0				
Road name and km	Byman FSR 5.6 km						Valley fill	DF	SF	BR			
MOF district	Nadina						Beaver activity		Yes		No		
Crossing type	RC	PA	EC	EA	**Other**		Inlet drop		Yes		No		
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	0	25	50	75	100	
Embedded	None	Part	Full				Fish sighted		Yes		No		
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM	OBS	SS	EM	BW	
(cm)	0	0	0				Photos	**D/S**	Out	Bar	In	**U/S**	
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**	Comments	The culvert has been removed and the road deactivated; slight scour at crossing from ditch flows but no stream exists at this crossing. This road is in a 15-20 yr old cut-block.					
(m)													
Culvert slope %	0.00%												
Culvert length (m)	0												
FBS	Emb.	OD	Slope	SWR	lng	**Sum**							
	0	0	0	0	0	0							

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Date: 05/11/2009

Comments:

The culvert has been removed from this location; there is some slight scour due to the concentration of ditch flows.

Date: 05/11/2009

Comments:

The crossing would have transported some ditch flow and run-off from the surrounding cut-block. Other than the ditch flows there is no other evidence of any scoured stream channel.

Date: 05/11/2009

Comments:

Downhill of the road there is no indication of any stream or watercourse in the 15-20 year old cut-block.

Location and survey data							**Site Information**						
Date	05-Nov-09						Outlet res. pool	C	B	OPD			
Crossing ID	Bu-17						depth (C-B) (cm)	0	0	0			
Crew	DS/RP						Stream slope %			0%			
UTM	9u	660067		6055524			Habitat value	Low	Med	High			
Stream name	Unnamed Watercourse						Depth of fill (m)		0				
Road name and km	Byman FSR 5.3 km						Valley fill	DF	SF	BR			
MOF district	Nadina						Beaver activity		Yes		No		
Crossing type	RC	PA	EC	EA	**Other**		Inlet drop		Yes		No		
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	0	25	50	75	100	
Embedded	None	Part	Full				Fish sighted		Yes		No		
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM	OBS	SS	EM	BW	
(cm)	0	0	0				Photos	**D/S**	Out	Bar	In	**U/S**	
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**	Comments	The culvert has been removed and the road deactivated; slight scour at crossing from ditch flows but no stream exists at this crossing. This road is in a 15-20 yr old cut-block.					
(m)													
Culvert slope %	0.00%												
Culvert length (m)	0												
FBS	Emb.	OD	Slope	SWR	lng	**Sum**							
	0	0	0	0	0	0							

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Date: 05/11/2009

Comments:

The culvert has been removed from this location; there is no stream or any signs of flowing water or a scoured stream channel downhill of the road crossing.

Date: 05/11/2009

Comments:

The crossing would have transported some ditch flow and run-off from the surrounding cut-block.

Date: 05/11/2009

Comments:

Uphill of the road there is no indication of any stream or a gully or even a break in the topography.

Location and survey data							**Site Information**						
Date	6-Nov-09						Outlet res. pool	C		B		OPD	
Crossing ID	Bu-18						depth (C-B) (cm)	18		6		12	
Crew	MP/JS						Stream slope %					3	
UTM	9u	665637E		6056017N			Habitat value	**Low**		Med		High	
Stream name	unnamed						Depth of fill (m)		0.6				
Road name and km	Findley 0.8km						Valley fill	DF		**SF**		BR	
MOF district	Nadina						Beaver activity		Yes			**No**	
Crossing type	**RC**	PA	EC	EA	Other		Inlet drop		Yes			**No**	
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	0		**25**		50	75	100
Embedded	**None**	Part	Full				Fish sighted		Yes			**No**	
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM		OBS		SS	EM	BW
(cm)	0	0	0				Photos	**D/S**		**Out**		**Bar**	**In**	**U/S**
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**	Comments	stream follows ditch on u/s side for 50m, very little gravel and cobble u/s, 2nd culvert (665597E, 6056072N) joins with stream 20m d/s						
(m)	0.9	0.9	0.9	0.90	0.5	1.80							
Culvert slope %				5									
Culvert length (m)				9									
FBS	Emb.	OD	Slope	SWR	lng	**Sum**							
	10	0	0	6	0	16							

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Date: 06/11/2009

Comments:

View of the habitat downstream of the culvert outlet.

Date: 06/11/2009

Comments:

View of the culvert outlet.

Date: 06/11/2009

Comments:

View of the culvert inlet.

Date: 06/11/2009

Comments:

View of the barrel.

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Date: 06/11/2009

Comments:

View of the habitat upstream of the culvert inlet.

Location and survey data							**Site Information**						
Date	06-Nov-09						Outlet res. pool	C	B	OPD			
Crossing ID	Bu-19						depth (C-B) (cm)	0	0	0			
Crew	DS/RP						Stream slope %			0%			
UTM	9u	671931		6055818			Habitat value	Low	Med	High			
Stream name	Unnamed Watercourse						Depth of fill (m)		0				
Road name and km	Robert Hatch FSR (left fork @ 2.9) then 2.2 km						Valley fill	DF	SF	BR			
MOF district	Nadina						Beaver activity		Yes		No		
Crossing type	RC	PA	EC	EA	Other		Inlet drop		Yes		No		
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	0	25	50	75	100	
Embedded	None	Part	Full				Fish sighted		Yes		No		
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM	OBS	SS	EM	BW	
(cm)	0	0	0				Photos	**D/S**	Out	Bar	In	**U/S**	
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**							
(m)													
Culvert slope %			0.00%										
Culvert length (m)			0										
FBS	Emb.	OD	Slope	SWR	lng	**Sum**							
	0	0	0	0	0	0							

There is no stream at this crossing location or a culvert. They ended a road at this point; wet draw (willows, labrador tea, swamp grass, spruce regen.) in a pine forest. There pools of standing water in this opening, but there is no signs of any flowing water or a scoured stream channel.

Date: 06/11/2009

Comments:

Looking southeast at the end of the built road; this is a wet spruce swampy area with pools of standing water present, but there is no other sign of flowing water or a scoured stream channel. There is no culvert installed at this location, but it will need one if the road is extended for further access or harvesting activities.

Date: 06/11/2009

Comments:

To the west of the road there are some old machinery tracks which have filled with water.

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Date: 06/11/2009

Comments:

Collection of adjoining pools of standing water along the east side of the road grade. Water accumulations are seepage flows out of the swampy ground; there is no stream at this location.

Date: 06/11/2009

Comments:

Opening to the east of the road grade is low lying and wet with a cover of swamp grass, bog birch and willow. There is no stream crossing at this location.

Location and survey data							**Site Information**						
Date	06-Nov-09						Outlet res. pool	C		B		OPD	
Crossing ID	Bu-20						depth (C-B) (cm)	0		0		0	
Crew	DS/RP						Stream slope %					0%	
UTM	9u		670372		6055822		Habitat value	Low		Med		High	
Stream name	Unnamed Watercourse						Depth of fill (m)			0			
Road name and km	Robert Hatch FSR 3.1 km (right fork @2.9)						Valley fill	DF		SF		BR	
MOF district	Nadina						Beaver activity			Yes			No
Crossing type	**RC**	PA	EC	EA	Other		Inlet drop			Yes			No
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	0		25		50	75	100
Embedded	None	Part	Full				Fish sighted			Yes			No	
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM		OBS		SS	EM	BW
(cm)	0	0	0				Photos	**D/S**		**Out**		Bar	**In**	**U/S**
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**								
(m)														
Culvert slope %			0.00%											
Culvert length (m)			0											
FBS	Emb.	OD	Slope	SWR	lng	**Sum**								
	0	0	0	0	0	0								

There is no stream at this crossing location; culvert only handles ditch-line run-off and seepage flows, but no scoured stream channel is present.

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Date: 06/11/2009

Comments:

Downstream view of the culvert inlet; culvert only handles ditch run-off. There are no signs of any flowing water or a scoured stream channel.

Date: 06/11/2009

Comments:

Upstream view of culvert outlet; there is some weak scour in ditch running for 20-30m before flows disappear in wet forested area.

Date: 06/11/2009

Comments:

Upstream of the culvert the only water flows are from ditch run-off.

Date: 06/11/2009

Comments:

There is a man-made ditch which conveys ditch run-off away from the road. There is no stream at this culvert location.

Date: 06/11/2009

Comments:

At the end of the ditch the overland run-off flows dissipate in the mossy ground.

Location and survey data							**Site Information**					
Date	05-Nov-09						Outlet res. pool	C	B	OPD		
Crossing ID	Bu-21						depth (C-B) (cm)	0	0	0		
Crew	DS/RP						Stream slope %			5%		
UTM	9u	660134		6055060			Habitat value	**Low**	Med	High		
Stream name	Unnamed Watercourse						Depth of fill (m)		0.65			
Road name and km	North Road 48 km						Valley fill	DF	**SF**	BR		
MOF district	Nadina						Beaver activity		Yes		**No**	
Crossing type	**RC**	PA	EC	EA	Other		Inlet drop		Yes		**No**	
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	**0**	25	50	75	100
Embedded	**None**	Part	Full				Fish sighted		Yes		**No**	
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM	OBS	SS	EM	BW
(cm)	0	0	0				Photos	**D/S**	**Out**	Bar	**In**	**U/S**

Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**
(m)	0.9	1.1	0.8	0.93	0.6	1.56

Culvert slope %	0.50%
Culvert length (m)	9

FBS	Emb.	OD	Slope	SWR	lng	**Sum**
	10	0	0	6	0	16

This culvert just passes as a potential barrier to fish passage due mainly to lack of embeddedness and channel width/CV width ratio. The upstream fish habitat values would be rated as low as there would only be limited rearing potential; no spawning or over-wintering. Recommend culvert is left as is, no repairs or renovations required as fish passage may still be possible.

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Date: 05/11/2009

Comments:

Culvert inlet is overgrown with a heavy cover of alder and willow. There is a small well scoured stream channel present.

Date: 05/11/2009

Comments:

Upstream view of the culvert outlet shows no outfall drop combined with low gradient and length of the culvert give this crossing a potential barrier status

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Date: 05/11/2009

Comments:

This is a small watercourse; while a scoured channel exists offering limited rearing potential there is no deep pools for overwintering or gravels with sufficient water flows to support spawning. The overall fish habitat value would be low.

Date: 05/11/2009

Comments:

Downstream of the culvert crossing the stream channel is scoured in a slight gully with a heavy cover of willow/alder.

Location and survey data							**Site Information**						
Date	06-Nov-09						Outlet res. pool	C	B	OPD			
Crossing ID	Bu-22						depth (C-B) (cm)	0	0	0			
Crew	DS/RP						Stream slope %			0%			
UTM	9u	666381		6055359			Habitat value	Low	Med	High			
Stream name	Unnamed Watercourse						Depth of fill (m)		0				
Road name and km	North Main FSR 46 km						Valley fill	DF	SF	BR			
MOF district	Nadina						Beaver activity		Yes		No		
Crossing type	**RC**	PA	EC	EA	Other		Inlet drop		Yes		No		
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	0	25	50	75	100	
Embedded	None	Part	Full				Fish sighted		Yes		No		
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM	OBS	SS	EM	BW	
(cm)	0	0	0				Photos	**D/S**	**Out**	Bar	**In**	**U/S**	
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**	There is no stream at this culvert location. There is a 50-80m wide draw (wet area covered in willow, swamp grass) that collects run-off in pools of standing water or in flooded areas, but no scoured stream channel exists. All water from the crossing dissipates on the bottom of the draw 70m downstream of the road, beyond that there is no evidence of any water. Large shallow pool of standing water DS of CV measures 50*70m (ground estimate).						
(m)													
Culvert slope %	0.00%												
Culvert length (m)	0												
FBS	Emb.	OD	Slope	SWR	lng	**Sum**							
	0	0	0	0	0	0							

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Date: 06/11/2009

Comments:

There is no stream at this culvert crossing; culvert inlet is overgrown and obviously only flows when water levels rise sufficiently to enter into the pipe.

Date: 06/11/2009

Comments:

Upstream view of the culvert outlet; culvert only conveys run-off which collects in the draw uphill of the road. There is a large pool of standing water (30*70m ground estimate (GE)) that extends down the draw away from the road.

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Date: 06/11/2009

Comments:

Upstream of the culvert there is a 50-80m wide draw (GE) which collects run-off from the surrounding ridges. There is no evidence of any flowing water or a scoured stream channel.

Date: 06/11/2009

Comments:

Downstream of the culvert there is a pool of standing water which collects from run-off flows. Beyond that there is no sign of any flowing water or a watercourse.

Date: 06/11/2009

Comments:

Below the large pool of water there is a long finger that extends away from the road, beyond that last pool of water there is no evidence of any water flows or pooling. It is a wet low-lying draw that absorbs run-off; there is no stream present.

Location and survey data							**Site Information**						
Date	06-Nov-09						Outlet res. pool	C	B	OPD			
Crossing ID	Bu-23						depth (C-B) (cm)	0	0	0			
Crew	DS/RP						Stream slope %			0%			
UTM	9u	670744		6054580			Habitat value	Low	Med	High			
Stream name	Unnamed Watercourse						Depth of fill (m)		0				
Road name and km	Robert Hatch FSR 4.5 km (right fork @2.9)						Valley fill	DF	SF	BR			
MOF district	Nadina						Beaver activity		Yes		No		
Crossing type	**RC**	PA	EC	EA	Other		Inlet drop		Yes		No		
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	0	25	50	75	100	
Embedded	None	Part	Full				Fish sighted		Yes		No		
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM	OBS	SS	EM	BW	
(cm)	0	0	0				Photos	**D/S**	**Out**	Bar	**In**	**U/S**	
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**							
(m)													
Culvert slope %			0.00%										
Culvert length (m)			0										
FBS	Emb.	OD	Slope	SWR	lng	**Sum**							
	0	0	0	0	0	0							

There is no stream at this crossing location; seepage and ditch line flows run in man-made ditch to low lying swampy area in a pine forest where the flows dissipate. There are no other signs of flowing water or a scoured stream channel.

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Date: 06/11/2009

Comments:

Downstream view of the culvert inlet; there is no scoured stream channel or even flowing water at this location.

Date: 06/11/2009

Comments:

To the north of the road there is a man-made ditch that transports ditch run-off to a wet opening 30-40m from the road.

Date: 06/11/2009

Comments:

There is no scoured stream channel or signs of any flowing water upstream of the culvert inlet. This culvert conveys ditch flows.

Date: 06/11/2009

Comments:

Small accumulation of run-off at the end of the man-made ditch; ditch runs north of the road out into wet swampy opening.

Location and survey data							**Site Information**						
Date	11-Nov-09						Outlet res. pool	C	B	OPD			
Crossing ID	Bu-24						depth (C-B) (cm)	10	5	5			
Crew	MP/RP						Stream slope %			7			
UTM	9u	659056E		6053815N			Habitat value	Low	**Med**	High			
Stream name	unnamed						Depth of fill (m)		0.6				
Road name and km	Byman Spur						Valley fill	DF	**SF**	BR			
MOF district	Nadina						Beaver activity		Yes		**No**		
Crossing type	**RC**	PA	EC	EA	Other		Inlet drop		Yes		**No**		
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	0	25	50	**75**	100	
Embedded	**None**	Part	Full				Fish sighted		Yes		**No**		
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM	OBS	SS	EM	BW	
(cm)	0	0	0				Photos	**D/S**	**Out**	**Bar**	**In**	**U/S**	
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**	Comments	small pond located u/s from the site, potential fish bearing pond, some gravel, UC, pools, fish might migrate d/s from pond					
(m)	1.2	1.1	1.3	1.20	1	1.20							
Culvert slope %			5.9										
Culvert length (m)			9										
FBS	Emb.	OD	Slope	SWR	lng	**Sum**							
	10	0	10	3	0	23							

ECOFOR
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Date: 11/11/2009

Comments:

Representative habitat found upstream of the culvert.

Date: 11/11/2009

Comments:

View of the culvert inlet.

ECOFOR
natural and cultural resource consultants

Date: 11/11/2009

Comments:

Representative habitat found downstream of the culvert.

Date: 11/11/2009

Comments:

View of the culvert barrel and culvert outlet.

Location and survey data							**Site Information**						
Date	05-Nov-09						Outlet res. pool	C	B	OPD			
Crossing ID	Bu-26						depth (C-B) (cm)	0	0	0			
Crew	DS/RP						Stream slope %			0%			
UTM	9u	663119		6052045			Habitat value	Low	Med	High			
Stream name	Unnamed Watercourse						Depth of fill (m)		0				
Road name and km	North Road 40.7 km						Valley fill	DF	SF	BR			
MOF district	Nadina						Beaver activity		Yes		No		
Crossing type	**RC**	PA	EC	EA	Other		Inlet drop		Yes		No		
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	0	25	50	75	100	
Embedded	None	Part	Full				Fish sighted		Yes		No		
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM	OBS	SS	EM	BW	
(cm)	0	0	0				Photos	**D/S**	**Out**	Bar	**In**	**U/S**	
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**	Comments	There is no stream at this crossing location, it is a slight depression in a pine cut-block. The gully may collect some run-off and produce weak overland water flows or discontinuous pools of standing water, but no continuous scoured stream channel exists.					
(m)													
Culvert slope %	0.00%												
Culvert length (m)	0												
FBS	Emb.	OD	Slope	SWR	lng	**Sum**							
	0	0	0	0	0	0							

ECOFOR
natural and cultural resource consultants

Date: 05/11/2009

Comments:

Culvert inlet is overgrown with no sign of any stream at this crossing. Culvert only conveys some ditch flows and runoff from the surrounding cut-block.

Date: 05/11/2009

Comments:

Culvert outlet has a small accumulation of runoff in front of pipe, but there is no stream at this crossing location.

ECOFOR
natural and cultural resource consultants

Date: 05/11/2009

Comments:

Uphill of the road there is a defined gully in a regenerating pine cut-block. The gully collects some runoff and concentrates some overland flow, but there is no sustained scoured stream channel present.

Date: 05/11/2009

Comments:

Downhill of the road there is a slight gully in the regenerating cut-block, but no signs of any flowing water or a scoured stream channel.

Location and survey data							**Site Information**						
Date	06-Nov-09						Outlet res. pool	C	B	OPD			
Crossing ID	Bu-27						depth (C-B) (cm)	0	0	0			
Crew	DS/RP						Stream slope %			0%			
UTM	9u	667370		6052265			Habitat value	Low	Med	High			
Stream name	Unnamed Watercourse						Depth of fill (m)		0				
Road name and km	Johnny David FSR 3.1 km						Valley fill	DF	SF	BR			
MOF district	Nadina						Beaver activity		Yes		No		
Crossing type	**RC**	PA	EC	EA	Other		Inlet drop		Yes		No		
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	0	25	50	75	100	
Embedded	None	Part	Full				Fish sighted		Yes		No		
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM	OBS	SS	EM	BW	
(cm)	0	0	0				Photos	**D/S**	**Out**	Bar	**In**	**U/S**	
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**							
(m)													
Culvert slope %			0.00%										
Culvert length (m)			0										
FBS	Emb.	OD	Slope	SWR	lng	**Sum**							
	0	0	0	0	0	0							

There is no stream at this culvert location. There is a slight draw with a cover of spruce/balsam (adjacent to cut-block). There is some seepage/overland flow that dissipate into the forest floor 30m DS of the culvert. No other evidence of a scoured stream channel is present.

ECOFOR
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Date: 06/11/2009

Comments:

There is no stream at this culvert crossing; culvert inlet is almost totally overgrown (just visible behind willow). Low lying area collects run-off and seepage before moving through culvert.

Date: 06/11/2009

Comments:

Upstream view of the culvert outlet; culvert only conveys ditch run-off which collects in ditch below outlet. Overland flows dissipate downstream of the road.

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Date: 06/11/2009

Comments:

Upstream of the culvert there is no evidence of any flowing water or a scoured stream channel.

Date: 06/11/2009

Comments:

Downstream of the culvert the ditch run-off flows overland for 30-40m before it dissipates on the ground.

Date: 06/11/2009

Comments:

Below the road right of way the ground is low-lying with a cover of spruce, willow and swamp grass. There is no stream channel present all water flows disappear in the wet mossy ground.

Location and survey data							**Site Information**						
Date	06-Nov-09						Outlet res. pool	C	B	OPD			
Crossing ID	Bu-28						depth (C-B) (cm)			0			
Crew	JC/TP						Stream slope %						
UTM	9u	672903E		6052151N			Habitat value	Low	Med	High			
Stream name	Red Top Crk						Depth of fill (m)						
Road name and km	Holmes Spur						Valley fill	DF	SF	BR			
MOF district	Nadina						Beaver activity	Yes		No			
Crossing type	**RC**	PA	EC	EA	Other		Inlet drop	Yes		No			
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	0	25	50	75	100	
Embedded	None	Part	Full				Fish sighted	Yes		No			
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM	OBS	SS	EM	BW	
(cm)			0				Photos	**D/S**	**Out**	**Bar**	**In**	**U/S**	
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**	Comments	bridge crossing					
(m)													
Culvert slope %													
Culvert length (m)													
FBS	Emb.	OD	Slope	SWR	lng	**Sum**							
						0							

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Date: 06/11/2009

Comments:

Downstream view of the stream from the bridge.

Date: 06/11/2009

Comments:

Upstream view of the stream from the bridge.

Location and survey data							**Site Information**						
Date	06-Nov-09						Outlet res. pool	C	B	OPD			
Crossing ID	Bu-30						depth (C-B) (cm)	0	0	0			
Crew	DS/RP						Stream slope %			0%			
UTM	9u	667823		6051793			Habitat value	Low	Med	High			
Stream name	Unnamed Watercourse						Depth of fill (m)		0				
Road name and km	Johnny David FSR 4.1 km						Valley fill	DF	SF	BR			
MOF district	Nadina						Beaver activity		Yes		No		
Crossing type	**RC**	PA	EC	EA	Other		Inlet drop		Yes		No		
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	0	25	50	75	100	
Embedded	None	Part	Full				Fish sighted		Yes		No		
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM	OBS	SS	EM	BW	
(cm)	0	0	0				Photos	**D/S**	**Out**	Bar	**In**	**U/S**	
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**							
(m)													
Culvert slope %			0.00%										
Culvert length (m)			0										
FBS	Emb.	OD	Slope	SWR	lng	**Sum**							
	0	0	0	0	0	0							

There is no stream at this culvert location; culvert handles some ditch water, nothing else. There are no seeps, low areas of standing water or any other signs of any watercourse.

ECOFOR
natural and cultural resource consultants

Date: 06/11/2009

Comments:

There is no stream entering into this culvert inlet; culvert handles ditch-line run-off.

Date: 06/11/2009

Comments:

There is a small pool of standing water at the culvert outlet; no other sign of flowing water or a scoured channel exist.

ECOFOR
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Date: 06/11/2009

Comments:

There is no sign of flowing water or scoured stream channel at this culvert crossing location. Any stream would be apparent in this 10-20 year old cut-block.

Date: 06/11/2009

Comments:

There is no evidence of any watercourse at this crossing.

Location and survey data							**Site Information**						
Date	05-Nov-09						Outlet res. pool	C	B	OPD			
Crossing ID	Bu-31						depth (C-B) (cm)	0	0	0			
Crew	DS/RP						Stream slope %			4%			
UTM	9u	662145		6050849			Habitat value	**Low**	Med	High			
Stream name	Unnamed Watercourse						Depth of fill (m)	0.83					
Road name and km	North Road 38.7 km						Valley fill	DF	**SF**	BR			
MOF district	Nadina						Beaver activity	Yes		**No**			
Crossing type	**RC**	PA	EC	EA	Other		Inlet drop	Yes		**No**			
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	**0**	25	50	75	100	
Embedded	**None**	Part	Full				Fish sighted	Yes		**No**			
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM	OBS	SS	EM	BW	
(cm)	0	0	0				Photos	**D/S**	**Out**	Bar	**In**	**U/S**	
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**	This culvert just passes as a barrier to fish passage due mainly to lack of embeddedness, CV slope and channel width/CV width ratio. The upstream fish habitat values would be rated as low as there would only be limited rearing potential; no spawning or over-wintering. Also there is only≈ 1 km of stream US of the crossing and a portion of that will not have a scoured channel or offer any fish habitat opportunities. Recommend culvert is left as is, no repairs or renovations required.						
(m)	0.75	0.7	0.6	0.68	0.6	1.14							
Culvert slope %	4.90%												
Culvert length (m)	12.5												
FBS	Emb.	OD	Slope	SWR	lng	**Sum**							
	10	0	10	3	0	23							

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Date: 05/11/2009

Comments:

Downstream view of culvert inlet, small watercourse does not generate large water flows. Majority of the flows are during freshet and early summer, minimal water flows at this time.

Date: 05/11/2009

Comments:

Upstream view of culvert outlet, no outfall drop and no outfall pool below outlet, it is a smooth transition from the culvert into the watercourse. This watercourse does not receive substantial water flows.

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Date: 05/11/2009

Comments:

Upstream of the crossing the channel is confined in a small gully. It is a small stream and only offers rearing potential for fish stocks, there is no deep pool habitat for overwintering or gravels for spawning.

Date: 05/11/2009

Comments:

There is a scoured stream channel downstream of the culvert outlet. There is low fish habitat potential in such a small watercourse.

Date: 05/11/2009

Comments:

Downstream of the culvert crossing the stream moves through a draw in a wet spruce/sub-alpine fir forest.

Location and survey data							**Site Information**						
Date	05-Nov-09						Outlet res. pool	C	B	OPD			
Crossing ID	Bu-33						depth (C-B) (cm)	0	0	0			
Crew	DS/RP						Stream slope %			0%			
UTM	9u	661449		6049262			Habitat value	Low	Med	High			
Stream name	Unnamed Watercourse						Depth of fill (m)		0				
Road name and km	North Road 36.9km						Valley fill	DF	SF	BR			
MOF district	Nadina						Beaver activity		Yes		No		
Crossing type	**RC**	PA	EC	EA	Other		Inlet drop		Yes		No		
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	0	25	50	75	100	
Embedded	None	Part	Full				Fish sighted		Yes		No		
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM	OBS	SS	EM	BW	
(cm)	0	0	0				Photos	**D/S**	**Out**	Bar	**In**	**U/S**	
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**	There are 2 steep sided gullies US of the culvert; both gullies are non-classified drainages (limited scoured channel runs 50-60m before scour disappears). The gullies cover a large area and contribute run-off through the culvert as overland water flows. Flows dissipate in the gully DS of the culvert before a scoured channel is established.						
(m)													
Culvert slope %			0.00%										
Culvert length (m)			0										
FBS	Emb.	OD	Slope	SWR	lng	**Sum**							
	0	0	0	0	0	0							

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Date: 05/11/2009

Comments:

Downstream view of culvert showing flowing water from ditch-line. These flows are from the gully which is further south of the crossing; the second gully that runs directly into the culvert has no run-off flows at this time.

Date: 05/11/2009

Comments:

At the culvert outlet flows are not well channelized and they dissipate on the forest floor 40-50m downstream of the culvert.

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Date: 05/11/2009

Comments:

Upstream of the crossing there are two gullies that contribute run-off. The scoured channel from flowing water extends between 50 and 70m uphill in both gullies before there is no sign of flowing water.

Date: 05/11/2009

Comments:

Upstream of the culvert crossing 60-70m, the scoured channel disappears in the gully. There is no more evidence of any scoured channel or of any flowing water.

Date: 05/11/2009

Comments:

Downstream of the culvert the water flows dissipate on the forest floor within 40-50m.

Location and survey data							**Site Information**						
Date	05-Nov-09						Outlet res. pool	C	B	OPD			
Crossing ID	Bu-35						depth (C-B) (cm)	0	0	0			
Crew	MP/JS						Stream slope %						
UTM	9u	664213E		6048000N			Habitat value	Low	Med	High			
Stream name	unnamed						Depth of fill (m)						
Road name and km	Perow						Valley fill	DF	SF	BR			
MOF district	Nadina						Beaver activity	Yes		No			
Crossing type	RC	PA	EC	EA	Other		Inlet drop	Yes		No			
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	0	25	50	75	100	
Embedded	None	Part	Full				Fish sighted	Yes		No			
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM	OBS	SS	EM	BW	
(cm)			0				Photos	**D/S**	Out	Bar	In	**U/S**	
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**	Comments	No culvert found at this location, wet alder thickets on both sides of the road					
(m)													
Culvert slope %													
Culvert length (m)													
FBS	Emb.	OD	Slope	SWR	lng	**Sum**							
						0							

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Date: 05/11/2009

Comments:

View downstream. No culvert found at this location.

Date: 05/11/2009

Comments:

Upstream view of the NVC. No culvert at this location.

Location and survey data							**Site Information**						
Date	04-Nov-09						Outlet res. pool	C	B	OPD			
Crossing ID	Bu-36						depth (C-B) (cm)	0	0	0			
Crew	DS/RP						Stream slope %			1%			
UTM	9u	650538		6044797			Habitat value	Low	Med	**High**			
Stream name	Unnamed Watercourse						Depth of fill (m)		0.77				
Road name and km	Hidden Lk FSR 6.6 km						Valley fill	DF	**SF**	BR			
MOF district	Nadina						Beaver activity		Yes		**No**		
Crossing type	**RC**	PA	EC	EA	Other		Inlet drop		Yes		**No**		
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	**0**	25	50	75	100	
Embedded	**None**	Part	Full				Fish sighted		Yes		**No**		
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM	OBS	SS	EM	BW	
(cm)	0	0	0				Photos	**D/S**	**Out**	**Bar**	**In**	**U/S**	
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**	Comments	Very nice stream with all the fish habitat features: excellent rearing, good spawning and fair over-wintering potential. This culvert ranks as a barrier: There is a second CV of similar size that only flows seasonally; if we set this pipe at the same or a more favorable gradient and filled both pipes with a substrate (embedd) we could make the structures passable.					
(m)	1.8	2	2	1.93	1	1.93							
Culvert slope %			1.75%										
Culvert length (m)			12										
FBS	Emb.	OD	Slope	SWR	lng	**Sum**							
	10	0	5	6	0	21							

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Date: 04/11/2009

Comments:

Downstream view of culvert inlets; culvert on right transport majority of stream flows except during freshet or high run-off events. The culvert on the left is set at a higher elevation and is presently dry.

Date: 04/11/2009

Comments:

Upstream view of culvert outlets, the left culvert handles the majority of the water flows with the culvert on the right flowing only during high water flows.

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Date: 04/11/2009

Comments:

Upstream of the culvert there is excellent fish habitat values, abundant cover for rearing, consistent water flows and clean gravels for spawning as well as possible over-wintering habitat.

Date: 04/11/2009

Comments:

Looking downstream from the road crossing, the stream immediately enters a wetland traveling downstream to a wetland waterbody (≈500m).

Date: 04/11/2009

Comments:

Looking upstream through the barrel of the primary culvert, there are no obstructions in the culvert that would hamper fish passage upstream in this structure. Culvert gradient is minimal creating no apparent velocity barrier.

Location and survey data							**Site Information**						
Date	04-Nov-09						Outlet res. pool	C	B	OPD			
Crossing ID	Bu-37						depth (C-B) (cm)	0	0	0			
Crew	DS/RP						Stream slope %			2%			
UTM	9u	651110		6044871			Habitat value	**Low**	Med	High			
Stream name	Unnamed Watercourse						Depth of fill (m)	0.88					
Road name and km	Hidden Lk FSR 7 km						Valley fill	DF	**SF**	BR			
MOF district	Nadina						Beaver activity	Yes		**No**			
Crossing type	**RC**	PA	EC	EA	Other		Inlet drop		**Yes**		No		
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	**0**	25	50	75	100	
Embedded	**None**	Part	Full				Fish sighted	Yes		**No**			
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM	OBS	SS	EM	BW	
(cm)	0	0	0				Photos	**D/S**	**Out**	Bar	**In**	**U/S**	
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**	Comments	There is very low fish habitat values through-out this watercourse; stream may even be non-fish bearing (no perennial instream habitat and no connection fish bearing waters). Culvert rates as a barrier but low habitat values and < 500m stream channel above the road don't really make this site a prime candidate for renovation or repair.					
(m)	0.7	1.4	1.2	1.10	0.6	1.83							
Culvert slope %	2.20%												
Culvert length (m)	9												
FBS	Emb.	OD	Slope	SWR	lng	**Sum**							
	10	0	5	6	0	21							

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Date: 04/11/2009

Comments:

View of heavily overgrown culvert inlet, there is a stream present with clean washed cobbles in front of the inlet.

Date: 04/11/2009

Comments:

Upstream view of culvert outlet with a small outfall pool. Whole site overgrown with willow and regenerating forest.

ECOFOR
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Date: 04/11/2009

Comments:

Upstream of the culvert there is a scoured channel present. It is a small watercourse but it provides consistent run-off and has established a continuous scoured stream channel, but its' overall fish habitat value is low.

Date: 04/11/2009

Comments:

Downstream of the culvert the scoured stream channel continues through a wet willow area before entering into the spruce forest.

Location and survey data							**Site Information**						
Date	03-Nov-09						Outlet res. pool	C	B	OPD			
Crossing ID	Bu-38						depth (C-B) (cm)	0	0	0			
Crew	DS/RP/MP						Stream slope %			0%			
UTM	9u	660505		6044267			Habitat value	Low	Med	High			
Stream name	Unnamed Watercourse						Depth of fill (m)		0				
Road name and km	North road 24.5 km						Valley fill	DF	SF	BR			
MOF district	Nadina						Beaver activity		Yes		No		
Crossing type	**RC**	PA	EC	EA	Other		Inlet drop		Yes		No		
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	0	25	50	75	100	
Embedded	None	Part	Full				Fish sighted		Yes		No		
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM	OBS	SS	EM	BW	
(cm)	0	0	0				Photos	**D/S**	**Out**	Bar	**In**	**U/S**	
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**	Comments	There is no stream at this culvert crossing. CV handles ditch flows that have caused slight scour below the outlet, but flows quickly dissipate on the forest floor 15-20m DS.					
(m)													
Culvert slope %				0									
Culvert length (m)				0									
FBS	Emb.	OD	Slope	SWR	lng	**Sum**							
	0	0	0	0	0	0							

ECOFOR
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Date: 03/11/2009

Comments:

Downstream view of culvert inlet, pipe receives limited run-off during spring melt and from seasonal run-off from ditch-lines. There is no stream at this culvert crossing location.

Date: 03/11/2009

Comments:

Upstream view of culvert outlet : small outfall drop and no evident scoured channel as water flows are limited and seasonal.

ECOFOR
natural and cultural resource consultants

Date: 03/11/2009

Comments:

Downstream of the culvert the weak overland water flows dissipate amongst the swamp grass, willow and spruce.

Date: 03/11/2009

Comments:

Upstream of the culvert there is a slight draw in a previously logged cut-block that collects some run-off during spring melt. There is no evidence of a stream at this culvert location.

Location and survey data							**Site Information**					
Date	04-Nov-09						Outlet res. pool	C	B	OPD		
Crossing ID	Bu-39						depth (C-B) (cm)	0	0	0		
Crew	DS/RP						Stream slope %			0%		
UTM	9u	655146		6043856			Habitat value	Low	Med	High		
Stream name	Unnamed Watercourse						Depth of fill (m)		0			
Road name and km	Barren spur off Mcinnis						Valley fill	DF	SF	BR		
MOF district	Nadina						Beaver activity		Yes		No	
Crossing type	RC	PA	EC	EA	**Other**		Inlet drop		Yes		No	
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	0	25	50	75	100
Embedded	None	Part	Full				Fish sighted		Yes		No	
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM	OBS	SS	EM	BW
(cm)	0	0	0				Photos	**D/S**	Out	Bar	In	**U/S**
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**	Comments	The culvert has been removed on this deactivated road; there was no stream at this crossing location. The culvert would have conveyed ditch-run-off.				
(m)												
Culvert slope %			0									
Culvert length (m)			0									
FBS	Emb.	OD	Slope	SWR	lng	**Sum**						
	0	0	0	0	0	0						

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Date: 04/11/2009

Comments:

This location had a culvert at this crossing which was removed when the road was deactivated. The culvert only handled ditch run-off, as there was no stream at this location.

Date: 04/11/2009

Comments:

View downhill through cut-block shows no stream channel or signs of flowing water.

ECOFOR
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Date: 04/11/2009

Comments:

This is a mixed forest with some wet areas with a cover of willow/spruce that contribute limited amounts of run-off.

Date: 04/11/2009

Comments:

The ditch-lines contribute minimal amounts of run-off; note there isn't even a well scoured channel from water flows.

Location and survey data							**Site Information**						
Date	11-Nov-09						Outlet res. pool	C	B	OPD			
Crossing ID	Bu-40						depth (C-B) (cm)			0			
Crew	MP/RP						Stream slope %						
UTM	9u	652367E		6043778N			Habitat value	Low	Med	High			
Stream name	unnamed						Depth of fill (m)						
Road name and km	Hidden East						Valley fill	DF	SF	BR			
MOF district	Nadina						Beaver activity	Yes		No			
Crossing type	RC	PA	EC	EA	Other		Inlet drop	Yes		No			
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	0	25	50	75	100	
Embedded	None	Part	Full				Fish sighted	Yes		No			
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM	OBS	SS	EM	BW	
(cm)			0				Photos	**D/S**	**Out**	**Bar**	**In**	**U/S**	
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**	Comments	Deactivated crossing, no culvert, lots of snow, doesn't appear to be any evidence of a stream					
(m)													
Culvert slope %													
Culvert length (m)													
FBS	Emb.	OD	Slope	SWR	lng	**Sum**							
						0							

Date: 11/11/2009

Comments:

View upstream from the deactivated crossing.

Date: 11/11/2009

Comments:

View downstream from the deactivated crossing.

Location and survey data							**Site Information**						
Date	04-Nov-09						Outlet res. pool	C	B	OPD			
Crossing ID	Bu-41						depth (C-B) (cm)	0	0	0			
Crew	DS/RP						Stream slope %			0%			
UTM	9u	655019		6043293			Habitat value	Low	Med	High			
Stream name	Unnamed Watercourse						Depth of fill (m)		0				
Road name and km	Barren spur off Mcinnis						Valley fill	DF	SF	BR			
MOF district	Nadina						Beaver activity		Yes		No		
Crossing type	**RC**	PA	EC	EA	Other		Inlet drop		Yes		No		
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	0	25	50	75	100	
Embedded	None	Part	Full				Fish sighted		Yes		No		
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM	OBS	SS	EM	BW	
(cm)	0	0	0				Photos	**D/S**	**Out**	Bar	**In**	**U/S**	
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**	Comments	There is no stream at this culvert crossing location. CV handles seepage flows and ditch run-off running out of a wet balsam/spruce forest. Water flows overland for 25m DS of CV before flows dissipate on the forest floor.					
(m)													
Culvert slope %			0										
Culvert length (m)			0										
FBS	Emb.	OD	Slope	SWR	lng	**Sum**							
	0	0	0	0	0	0							

ECOFOR
natural and cultural resource consultants

Date: 04/11/2009

Comments:

Downstream view of culvert inlet: overland water flows gather in depression before entering culvert inlet. There is no stream at this culvert crossing location.

Date: 04/11/2009

Comments:

Upstream view of the culvert outlet; shallow ditch collects minimal run-off before flows dissipate on forest floor downstream of the crossing.

ECOFOR
natural and cultural resource consultants

Date: 04/11/2009

Comments:

Upstream of the culvert there is a shallow gully that transports some over-land water flows to the culvert, but there is no scoured channel present.

Date: 04/11/2009

Comments:

Downstream of the culvert crossing water flows dissipate on the forest floor, there is no evidence of any continuous scoured stream channel.

Location and survey data							**Site Information**						
Date	05-Nov-09						Outlet res. pool	C	B	OPD			
Crossing ID	Bu-42						depth (C-B) (cm)			0			
Crew	MP/JS						Stream slope %						
UTM	9u	660511E		6043578N			Habitat value	Low	Med	High			
Stream name	unnamed						Depth of fill (m)						
Road name and km	Barren Spur						Valley fill	DF	SF	BR			
MOF district	Nadina						Beaver activity	Yes		No			
Crossing type	**RC**	PA	EC	EA	Other		Inlet drop	Yes		No			
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	0	25	50	75	100	
Embedded	None	Part	Full				Fish sighted	Yes		No			
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM	OBS	SS	EM	BW	
(cm)			0				Photos	**D/S**	**Out**	Bar	**In**	**U/S**	
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**	Comments	NVC, no scoured channel present, drains into alder depression					
(m)													
Culvert slope %													
Culvert length (m)													
FBS	Emb.	OD	Slope	SWR	lng	**Sum**							
						0							

ECOFOR
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Date: 05/11/2009

Comments:

View downstream. Culvert found but no stream NVC.

Date: 05/11/2009

Comments:

Upstream view of the NVC. Culvert handles ditchflows.

Location and survey data							**Site Information**						
Date	03-Nov-09						Outlet res. pool	C	B	OPD			
Crossing ID	Bu-43						depth (C-B) (cm)	0	0	0			
Crew	DS/RP/MP						Stream slope %			0%			
UTM	9u	660886		6043330			Habitat value	Low	Med	High			
Stream name	Unnamed Watercourse						Depth of fill (m)		0				
Road name and km	North road 23.4km						Valley fill	DF	SF	BR			
MOF district	Nadina						Beaver activity		Yes		No		
Crossing type	**RC**	PA	EC	EA	Other		Inlet drop		Yes		No		
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	0	25	50	75	100	
Embedded	None	Part	Full				Fish sighted		Yes		No		
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM	OBS	SS	EM	BW	
(cm)	0	0	0				Photos	**D/S**	**Out**	Bar	**In**	**U/S**	
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**	Comments	There is no stream at this culvert crossing. It is a wet alder swale in a cut-block that has some seepage flows, but no scoured stream channel exists. CV handles ditch flows that have caused slight scour below the outlet, but flows quickly dissipate on the forest floor.					
(m)													
Culvert slope %													
Culvert length (m)													
FBS	Emb.	OD	Slope	SWR	lng	**Sum**							
	0	0	0	0	0	0							

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Date: 03/11/2009

Comments:

Downstream view of culvert inlet; culvert only handles ditch-line run-off and seepage out of wet willow covered draw adjacent to road.

Date: 03/11/2009

Comments:

Upstream view of culvert outlet, culvert only flows during spring melt handling seepage and some ditch-line run-off. Both the inlet and outlet are partially buried under slumping road shoulders.

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Date: 03/11/2009

Comments:

Upstream view from the culvert crossing of wet willow covered draw adjacent to road. This wet area provides seepage and slight run-off during the freshet.

Date: 03/11/2009

Comments:

Looking up ditch-line towards the culvert outlet: water flows have scoured a channel in this ditch-line for approximately 50-60m before entering forest and disappearing on the forest floor.

ECOFOR
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Date: 03/11/2009

Comments:

Once water flows diverge from man-made ditch they dissipate on the forest floor.

Location and survey data							**Site Information**						
Date	05-Nov-09						Outlet res. pool	C	B	OPD			
Crossing ID	Bu-44						depth (C-B) (cm)			0			
Crew	MP/JS						Stream slope %						
UTM	9u	659527E		6043614N			Habitat value	Low	Med	High			
Stream name	unnamed						Depth of fill (m)						
Road name and km	Barren Spur						Valley fill	DF	SF	BR			
MOF district	Nadina						Beaver activity	Yes		No			
Crossing type	RC	PA	EC	EA	Other		Inlet drop	Yes		No			
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	0	25	50	75	100	
Embedded	None	Part	Full				Fish sighted	Yes		No			
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM	OBS	SS	EM	BW	
(cm)			0				Photos	**D/S**	**Out**	Bar	**In**	**U/S**	
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**	Comments	no stream or culvert at this location, snow could be hiding culvert					
(m)													
Culvert slope %													
Culvert length (m)													
FBS	Emb.	OD	Slope	SWR	lng	**Sum**							
						0							

ECOFOR
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Date: 05/11/2009

Comments:

View downstream. No culvert found at this location.

Date: 05/11/2009

Comments:

Upstream view of the NVC. No culvert at this location.

Location and survey data							**Site Information**						
Date	04-Nov-09						Outlet res. pool	C	B	OPD			
Crossing ID	Bu-45						depth (C-B) (cm)	0	0	0			
Crew	DS/RP						Stream slope %			0%			
UTM	9u	656825		6043910			Habitat value	Low	Med	High			
Stream name	Unnamed Watercourse						Depth of fill (m)		0				
Road name and km	Barren spur off Mcinnis 5.8 km						Valley fill	DF	SF	BR			
MOF district	Nadina						Beaver activity		Yes		No		
Crossing type	**RC**	PA	EC	EA	Other		Inlet drop		Yes		No		
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	0	25	50	75	100	
Embedded	None	Part	Full				Fish sighted		Yes		No		
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM	OBS	SS	EM	BW	
(cm)	0	0	0				Photos	**D/S**	**Out**	Bar	**In**	**U/S**	
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**	Comments	There is no stream at this culvert crossing. CV handles some seepage and ditch flows that drain DS in a wet willow meadow. There are pools of standing water, but no scoured stream channel is present. All flows from the culvert dissipate 20m DS in the meadow.					
(m)													
Culvert slope %			0										
Culvert length (m)			0										
FBS	Emb.	OD	Slope	SWR	lng	**Sum**							
	0	0	0	0	0	0							

ECOFOR
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Date: 04/11/2009

Comments:

Downstream view of culvert inlet; slight scouring above inlet from ditch-line run-off, but no stream is present at this culvert crossing.

Date: 04/11/2009

Comments:

Upstream view of culvert outlet, there is limited overland water flows present from ditch-line flow and seepage upstream.

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Date: 04/11/2009

Comments:

Upstream of the culvert there is a mixed spruce/sub-alpine fir forest that contribute some seepage, but there is no continuous scoured stream channel at this location.

Date: 04/11/2009

Comments:

Downstream of the culvert the forest opens up into a wet swampy area with a cover of swamp grass, willow and spruce. There is no stream channel present, the whole area is wet with discontinuous pools of standing water.

ECOFOR
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Date: 04/11/2009

Comments:

Downstream of the culvert the overland water flows dissipate in the swamp grass at the edge of the spruce/willow swamp.

Location and survey data							**Site Information**						
Date	03-Nov-09						Outlet res. pool	C	B	OPD			
Crossing ID	Bu-46						depth (C-B) (cm)	0	0	0			
Crew	DS/RP/MP						Stream slope %			14%			
UTM	9u	661031		6043178			Habitat value	**Low**	Med	High			
Stream name	Unnamed Watercourse						Depth of fill (m)	7.19					
Road name and km	North road 23.3km						Valley fill	DF	**SF**	BR			
MOF district	Nadina						Beaver activity	Yes		**No**			
Crossing type	**RC**	PA	EC	EA	Other		Inlet drop	Yes		**No**			
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	**0**	25	50	75	100	
Embedded	**None**	Part	Full				Fish sighted	Yes		**No**			
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM	OBS	SS	EM	BW	
(cm)	140	0	140				Photos	**D/S**	**Out**	Bar	**In**	**U/S**	
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**	Comments	This stream has very low habitat values and only flows during the freshet; therefore recommend that the culvert is left as is. In addition there is not significant channel gain above the road (≈ 1km).					
(m)	1.4	0.9	1	1.10	0.9	1.22							
Culvert slope %	5% US 6% DS												
Culvert length (m)	31												
FBS	Emb.	OD	Slope	SWR	lng	**Sum**							
	10	10	10	3	6	39							

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Date: 03/11/2009

Comments:

Downstream view of culvert inlet, there is a dry stream channel that is well-scoured that only flows during the freshet. Large diameter pipe has a high water mark 1/3 to 1/2 the way up the pipe.

Date: 03/11/2009

Comments:

Upstream view of culvert outlet : large outfall drop of 1.4m would not allow fish passage upstream in this culvert.

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Date: 03/11/2009

Comments:

Downstream of the culvert outlet there is a well-scoured channel >1.0m wide and approaching a meter in depth.

Date: 03/11/2009

Comments:

Upstream of the culvert the gully is confined and well-vegetated contributing significant run-off. There is a well-defined stream channel that is not evident in this photo.

Location and survey data							**Site Information**						
Date	04-Nov-09						Outlet res. pool	C		B		OPD	
Crossing ID	Bu-47						depth (C-B) (cm)	58		5		53	
Crew	DS/RP						Stream slope %					3%	
UTM	9u	651657		6042495			Habitat value	Low		**Med**		High	
Stream name	Unnamed Watercourse						Depth of fill (m)		2.13				
Road name and km	Hidden Lk FSR 3.9 km						Valley fill	DF		**SF**		BR	
MOF district	Nadina						Beaver activity		Yes			**No**	
Crossing type	**RC**	PA	EC	EA	Other		Inlet drop		Yes			**No**	
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	0		25	**50**	75	100
Embedded	**None**	Part	Full				Fish sighted		Yes			**No**	
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM		**OBS**	SS	EM	BW
(cm)	0	0	0				Photos	**D/S**		**Out**	Bar	**In**	**U/S**
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**	Comments	This culvert would be classed as a barrier to fish passage with a rating of 24 due mainly due to culvert slope, lack of embedded substrate and channel/CV ratio. This stream has moderate habitat values as it offers rearing, possible spawning and is an important migration corridor between two lakes (> 1km apart).					
(m)	1.4	1.5	1.4	1.43	0.5	2.87							
Culvert slope %	2.50%												
Culvert length (m)	15												
FBS	Emb.	OD	Slope	SWR	lng	**Sum**							
	10	0	5	6	3	24							

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Date: 04/11/2009

Comments:

Downstream view of culvert inlet, upstream water flows gather in pool before entering into culvert. No inlet drop noted.

Date: 04/11/2009

Comments:

Upstream view of culvert outlet; no outfall drop as the outfall pool extends up into culvert (difficult to tell how far water extends through pipe, it was too dark to see inside of culvert at time of sampling). Large outfall pool approximately 2m by 5m (ground estimate).

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Date: 04/11/2009

Comments:

Upstream of the culvert there is a well scoured stream channel which receives year-round water flows.

Date: 04/11/2009

Comments:

Downstream of the culvert the stream flows through a 15-20 year old cut-block before it enters Hidden Lake.

Location and survey data							**Site Information**						
Date	04-Nov-09						Outlet res. pool	C	B	OPD			
Crossing ID	Bu-48						depth (C-B) (cm)	0	0	0			
Crew	DS/RP						Stream slope %			0%			
UTM	9u	651768		6042124			Habitat value	Low	Med	High			
Stream name	Unnamed Watercourse						Depth of fill (m)		0				
Road name and km	Hidden Lk FSR						Valley fill	DF	SF	BR			
MOF district	Nadina						Beaver activity		Yes		No		
Crossing type	**RC**	PA	EC	EA	Other		Inlet drop		Yes		No		
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	0	25	50	75	100	
Embedded	None	Part	Full				Fish sighted		Yes		No		
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM	OBS	SS	EM	BW	
(cm)	0	0	0				Photos	**D/S**	**Out**	Bar	**In**	**U/S**	
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**	Comments	There is no stream at this culvert crossing location. Culvert conveys some weak ditch run-off, but no continuous scoured stream channel exists. **Culvert crossing is 110m off mapped location; there is no watercourse present at either location or up or down the road.					
(m)													
Culvert slope %				0									
Culvert length (m)				0									
FBS	Emb.	OD	Slope	SWR	lng	**Sum**							
	0	0	0	0	0	0							

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Date: 04/11/2009

Comments:

Downstream view of culvert inlet: the pipe is overgrown with vegetation and there is no noticeable scoured channel. This culverts handles ditch run-off in the spring, otherwise it is dry.

Date: 04/11/2009

Comments:

Upstream view of the culvert outlet showing few signs of any significant water flows. There is no scoured channel or outfall pool, as well there is no noticeable high water mark inside the pipe which results from sustained water flows.

ECOFOR
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Date: 04/11/2009

Comments:

Opposite of the culvert inlet there is a wet alder/willow swale that contributes run-off, but there is no stream at this location.

Date: 04/11/2009

Comments:

Downstream of the culvert outlet within the forest, there is no sign of any flowing water or a scoured stream channel.

Location and survey data							**Site Information**						
Date	05-Nov-09						Outlet res. pool	C	B	OPD			
Crossing ID	Bu-49						depth (C-B) (cm)	14	3	11			
Crew	MP/JS						Stream slope %			5			
UTM	9u	657895E		6042784N			Habitat value	**Low**	Med	High			
Stream name	unnamed						Depth of fill (m)	0.5					
Road name and km	McInnes cr						Valley fill	DF	**SF**	BR			
MOF district	Nadina						Beaver activity	Yes		**No**			
Crossing type	**RC**	PA	EC	EA	Other		Inlet drop	Yes		**No**			
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	**0**	25	50	75	100	
Embedded	**None**	Part	Full				Fish sighted	Yes		**No**			
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM	OBS	SS	EM	BW	
(cm)	7	3	10				Photos	**D/S**	**Out**	**Bar**	**In**	**U/S**	
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**	Comments						
(m)	0.6	0.8	0.7	0.70	1	0.70							
Culvert slope %			4										
Culvert length (m)			9										
FBS	Emb.	OD	Slope	SWR	lng	**Sum**							
	10	0	10	0	0	20							

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Date: 05/11/2009

Comments:

View of the downstream habitat from the road crossing.

Date: 05/11/2009

Comments:

View of the culvert outlet.

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Date: 05/11/2009

Comments:

Representative habitat found upstream of the road crossing.

Date: 05/11/2009

Comments:

View of the culvert inlet.

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Date: 05/11/2009

Comments:

View of the culvert barrel from the upstream side of the culvert.

Location and survey data							**Site Information**						
Date	04-Nov-09						Outlet res. pool	C	B	OPD			
Crossing ID	Bu-50						depth (C-B) (cm)	0	0	0			
Crew	DS/RP						Stream slope %			0%			
UTM	9u	653501		6041953			Habitat value	Low	Med	High			
Stream name	Unnamed Watercourse						Depth of fill (m)		0				
Road name and km	2 km Barren FSR						Valley fill	DF	SF	BR			
MOF district	Nadina						Beaver activity		Yes		No		
Crossing type	**RC**	PA	EC	EA	Other		Inlet drop		Yes		No		
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	0	25	50	75	100	
Embedded	None	Part	Full				Fish sighted		Yes		No		
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM	OBS	SS	EM	BW	
(cm)	0	0	0				Photos	**D/S**	**Out**	Bar	**In**	**U/S**	
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**	Comments	There is no stream at this culvert crossing location. A basin US of the road produces run-off which collects in pools of standing water US of the culvert 20-30m before flows cross through culvert. DS of the road there are discontinuous pools of standing water. There is no continuous scoured stream channel present.					
(m)													
Culvert slope %				0									
Culvert length (m)				0									
FBS	Emb.	OD	Slope	SWR	lng	**Sum**							
	0	0	0	0	0	0							

ECOFOR
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Date: 04/11/2009

Comments:

Downstream view of culvert inlet: the pipe handles ditch run-off, there is no well developed scoured channel present.

Date: 04/11/2009

Comments:

Upstream view of the culvert outlet showing few signs of any significant water flows. There is no scoured channel or outfall pool.

ECOFOR
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Date: 04/11/2009

Comments:

Downstream of the culvert outlet run-off disperses in wet draw. There is no evidence of a scoured stream channel.

Date: 04/11/2009

Comments:

Upstream of the culvert inlet water collects in a small gully at the bottom of an enclosed basin. There is no stream contributing to this run-off (bottom edge of basin walked looking for stream) just overland flows from melt and run-off . Pools disappear 35-40m away from road.

Location and survey data							**Site Information**						
Date	05-Nov-09						Outlet res. pool	C	B	OPD			
Crossing ID	Bu-51						depth (C-B) (cm)			0			
Crew	MP/JS						Stream slope %						
UTM	9u	656899E		6042272N			Habitat value	Low	Med	High			
Stream name	unnamed						Depth of fill (m)						
Road name and km							Valley fill	DF	SF	BR			
MOF district	Nadina						Beaver activity	Yes		No			
Crossing type	RC	PA	EC	EA	**Other**		Inlet drop	Yes		No			
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	0	25	50	75	100	
Embedded	None	Part	Full				Fish sighted	Yes		No			
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM	OBS	SS	EM	BW	
(cm)			0				Photos	**D/S**	**Out**	**Bar**	**In**	**U/S**	
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**	Comments	culvert was removed on this deactivated road					
(m)													
Culvert slope %													
Culvert length (m)													
FBS	Emb.	OD	Slope	SWR	lng	**Sum**							
						0							

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Date: 05/11/2009

Comments:

View downstream. Old deactivated crossing in a cutblock.

Date: 05/11/2009

Comments:

Upstream view of the deactivated road crossing in the cutblock.

Location and survey data							**Site Information**						
Date	04-Nov-09						Outlet res. pool	C		B		OPD	
Crossing ID	Bu-52						depth (C-B) (cm)	0		0		0	
Crew	DS/RP						Stream slope %					2%	
UTM	9u	652585		6041707			Habitat value	**Low**		Med		High	
Stream name	Unnamed Watercourse						Depth of fill (m)		1.27				
Road name and km	Barren FSR1 km						Valley fill	DF		**SF**		BR	
MOF district	Nadina						Beaver activity		Yes			**No**	
Crossing type	**RC**	PA	EC	EA	Other		Inlet drop		**Yes**			No	
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	**0**		25		50	75	100
Embedded	**None**	Part	Full				Fish sighted		Yes			**No**	
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM		OBS		SS	EM	BW
(cm)	0	0	0				Photos	**D/S**		**Out**		Bar	**In**	**U/S**
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**	Comments	This culvert would be classed as a barrier to fish passage due mainly due to culvert slope, lack of embedded substrate and channel/CV ratio. This stream has low habitat values as well there is only approximately 500m of channel to be gained above the road, there fore I would recommend it is left as is. The stream is very weakly scoured above the road and likely has subsurface sections or discontinuous flows above the crossing.						
(m)	1.2	1	0.9	1.03	0.6	1.72							
Culvert slope %			1.90%										
Culvert length (m)			9										
FBS	Emb.	OD	Slope	SWR	lng	**Sum**							
	10	0	5	6	0	21							

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Date: 04/11/2009

Comments:

Downstream view of culvert inlet; there are minimal water flows entering into this overgrown culvert inlet.

Date: 04/11/2009

Comments:

Upstream view of culvert outlet, there some run-off that has collected in a small outfall pool. There is no outfall drop associated with this culvert.

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Date: 04/11/2009

Comments:

Upstream of the culvert there is weakly scoured channel giving it a stream classification, but the overall fisheries values are low.

Date: 04/11/2009

Comments:

Downstream of the culvert there is small scoured stream channel. There is abundant overhanging vegetation providing cover for fish, but little deep pool habitat.

Date: 04/11/2009

Comments:

Downstream of the culvert approximately 60m the stream enters into a mature spruce forest.

Location and survey data							**Site Information**						
Date	05-Nov-09						Outlet res. pool	C	B	OPD			
Crossing ID	Bu-53						depth (C-B) (cm)			0			
Crew	MP/JS						Stream slope %						
UTM	9u	659472E		6041230N			Habitat value	Low	Med	High			
Stream name	unnamed						Depth of fill (m)						
Road name and km	North road						Valley fill	DF	SF	BR			
MOF district	Nadina						Beaver activity	Yes		No			
Crossing type	**RC**	PA	EC	EA	Other		Inlet drop	Yes		No			
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	0	25	50	75	100	
Embedded	None	Part	Full				Fish sighted	Yes		No			
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM	OBS	SS	EM	BW	
(cm)			0				Photos	**D/S**	Out	Bar	In	**U/S**	
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**	Comments	NVC, low gradient, very little scour, snow makes it difficult to distinguish					
(m)													
Culvert slope %													
Culvert length (m)													
FBS	Emb.	OD	Slope	SWR	lng	**Sum**							
						0							

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Date: 05/11/2009

Comments:

Downstream view from the culvert.

Date: 05/11/2009

Comments:

Upstream view from the culvert.

Location and survey data							**Site Information**						
Date	05-Nov-09						Outlet res. pool	C	B	OPD			
Crossing ID	Bu-54						depth (C-B) (cm)			0			
Crew	MP/JS						Stream slope %						
UTM	9u	661036E		6040946N			Habitat value	Low	Med	High			
Stream name	unnamed						Depth of fill (m)						
Road name and km	North Road 21km						Valley fill	DF	SF	BR			
MOF district	Nadina						Beaver activity	Yes		No			
Crossing type	**RC**	PA	EC	EA	Other		Inlet drop	Yes		No			
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	0	25	50	75	100	
Embedded	None	Part	Full				Fish sighted	Yes		No			
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM	OBS	SS	EM	BW	
(cm)			0				Photos	**D/S**	**Out**	Bar	**In**	**U/S**	
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**	Comments	scoured channel dissipates onto forest floor, no continuous channel					
(m)													
Culvert slope %													
Culvert length (m)													
FBS	Emb.	OD	Slope	SWR	lng	**Sum**							
						0							

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Date: 05/11/2009

Comments:

Downstream view from the culvert.

Date: 05/11/2009

Comments:

Upstream view from the culvert.

Location and survey data							**Site Information**						
Date	05-Nov-09						Outlet res. pool	C	B	OPD			
Crossing ID	Bu-55						depth (C-B) (cm)	22	3	19			
Crew	MP/JS						Stream slope %			5			
UTM	9u	659820E		6041170N			Habitat value	**Low**	Med	High			
Stream name	unnamed						Depth of fill (m)		0.4				
Road name and km	7543-04						Valley fill	DF	**SF**	BR			
MOF district	Nadina						Beaver activity		Yes		**No**		
Crossing type	**RC**	PA	EC	EA	Other		Inlet drop		Yes		**No**		
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	**0**	25	50	75	100	
Embedded	**None**	Part	Full				Fish sighted		Yes		**No**		
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM	OBS	SS	EM	BW	
(cm)	8	3	11				Photos	**D/S**	**Out**	**Bar**	**In**	**U/S**	
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**	Comments						
(m)	0.9	1	0.6	0.83	0.5	1.67							
Culvert slope %			5										
Culvert length (m)			9										
FBS	Emb.	OD	Slope	SWR	lng	**Sum**							
	10	0	10	6	0	26							

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Date: 05/11/2009

Comments:

View of the downstream habitat from the road crossing.

Date: 05/11/2009

Comments:

View of the culvert outlet.

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Date: 05/11/2009

Comments:

Representative habitat found upstream of the road crossing.

Date: 05/11/2009

Comments:

View of the culvert inlet.

ECOFOR
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Date: 05/11/2009

Comments:

View of the culvert barrel from the upstream side of the culvert.

Location and survey data							**Site Information**						
Date	05-Nov-09						Outlet res. pool	C	B	OPD			
Crossing ID	Bu-56						depth (C-B) (cm)	0	0	0			
Crew	MP/JS						Stream slope %			2			
UTM	9u	658173E		6037720N			Habitat value	**Low**	Med	High			
Stream name	unnamed						Depth of fill (m)		2.4				
Road name and km	North road						Valley fill	DF	**SF**	BR			
MOF district	Nadina						Beaver activity		Yes		**No**		
Crossing type	**RC**	PA	EC	EA	Other		Inlet drop		Yes		**No**		
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	0	25	50	75	**100**	
Embedded	None	Part	**Full**				Fish sighted		Yes		**No**		
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM	OBS	SS	EM	BW	
(cm)			0				Photos	**D/S**	**Out**	**Bar**	**In**	**U/S**	
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**	Comments	culvert almost completely filled with sediment, likely floods in the spring, culvert can't handle all flows when filled with sediment, stream appears to dissipate 100m u/s of road					
(m)	1.1	0.9	1.2	1.07	0.5	2.13							
Culvert slope %			4.6										
Culvert length (m)			16										
FBS	Emb.	OD	Slope	SWR	lng	**Sum**							
	0	0	10	6	3	19							

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Date: 05/11/2009

Comments:

View of the downstream habitat from the road crossing.

Date: 05/11/2009

Comments:

View of the culvert outlet.

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Date: 05/11/2009

Comments:

Representative habitat found upstream of the road crossing. Stream may dissipate 100m u/s.

Date: 05/11/2009

Comments:

View of the culvert inlet.

Location and survey data							**Site Information**						
Date	05-Nov-09						Outlet res. pool	C	B	OPD			
Crossing ID	Bu-57						depth (C-B) (cm)			0			
Crew	MP/JS						Stream slope %						
UTM	9u	656419E		6036985N			Habitat value	Low	Med	High			
Stream name	unnamed						Depth of fill (m)						
Road name and km	North 14km						Valley fill	DF	SF	BR			
MOF district	Nadina						Beaver activity	Yes		No			
Crossing type	**RC**	PA	EC	EA	Other		Inlet drop	Yes		No			
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	0	25	50	75	100	
Embedded	None	Part	Full				Fish sighted	Yes		No			
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM	OBS	SS	EM	BW	
(cm)			0				Photos	**D/S**	**Out**	**Bar**	**In**	**U/S**	
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**	Comments	NVC, no scoured channel					
(m)													
Culvert slope %													
Culvert length (m)													
FBS	Emb.	OD	Slope	SWR	lng	**Sum**							
						0							

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Date: 05/11/2009

Comments:

View downstream. Culvert found but no stream NVC.

Date: 05/11/2009

Comments:

Upstream view of the NVC. Culvert handles ditchflows.

Location and survey data							**Site Information**						
Date	05-Nov-09						Outlet res. pool	C	B	OPD			
Crossing ID	Bu-58						depth (C-B) (cm)			0			
Crew	MP/JS						Stream slope %						
UTM	9u	657869E		6037569N			Habitat value	Low	Med	High			
Stream name	unnamed						Depth of fill (m)						
Road name and km	North 16km						Valley fill	DF	SF	BR			
MOF district	Nadina						Beaver activity	Yes		No			
Crossing type	**RC**	PA	EC	EA	Other		Inlet drop	Yes		No			
Fish passage criteria (for fish barrier scoring; FBS)							Backwatered %	0	25	50	75	100	
Embedded	None	Part	Full				Fish sighted	Yes		No			
Outlet drop (A+B)	A	B	OD				Culvert Fix	RM	OBS	SS	EM	BW	
(cm)			0				Photos	**D/S**	**Out**	**Bar**	**In**	**U/S**	
Stream width ratio	Channel Widths			Avg. Ch.W.	Culv W.	**SWR**	Comments	NVC, no scoured channel u/s, slight scour d/s but dissipates into wet meadow and wet draw					
(m)													
Culvert slope %													
Culvert length (m)													
FBS	Emb.	OD	Slope	SWR	lng	**Sum**							
						0							

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Date: 05/11/2009

Comments:

View downstream. Culvert found but no stream NVC.

Date: 05/11/2009

Comments:

Upstream view of the NVC. Culvert handles ditchflows.