FISH PASSAGE – CULVERT INSPECTIONS

FIA Investment Schedule: NOTSA032309
FIA Activity Number: 2309002 (FIRS)

UPPER FULTON RIVER and HAROLD PRICE CREEK WATERSHEDS

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Acknowledgements

The Fish Passage – Culvert Inspection project within Pacific Inland Resources (PIR's) operating area was funded by the Forest Investment Account (FIA) through Pacific Inland Resources, a division of West Fraser Mills Ltd. Field work was conducted by Ralph Kossman and Dan Brookes. Kent Coish (PIR) provided assistance and direction during the pre-field office planning stage.

Executive Summary

Silvicon Services Inc. was retained by Pacific Inland Resources Ltd. (a Division of West Fraser Mills, Ltd.) to carry out a Fish Passage-Culvert Inspection (FPCI) project within the Fulton River and Harold Price Creek Watersheds. In the ***Land Base Investment Rationale*** prepared by West Fraser Mills Ltd. for the Bulkley Management Unit and dated March 31, 2003, fish passage-culvert inspections address several strategic resource management objectives that currently exist for the Bulkley TSA (more specifically, items 4 and 5 on page 3, items 4 and 5 Section 2 on page 4 and Strategy (4b) on page 7). Funding for this project was provided by the Forest Investment Account.

Historical inventory information obtained from the "Fishwizard" software program, the Fisheries Information Summary System (FISS) and 1:20 000 RIC Reconnaissance Inventory maps have determined that sport-fish populations of rainbow trout (*Oncorhynchus mykiss*), steelhead (*Oncorhynchus mykiss*), bull trout (*Salvelinus confluentus*), cutthroat trout (*Oncorhynchus clarki*), sockeye salmon (*Oncorhynchus nerka*), coho salmon (*Oncorhynchus kisutch*), and Dolly Varden (*Salvelinus malma*) are supported by the watercourses and their tributaries. Coastal Cutthroat trout, Bull Trout and Dolly Varden are on the Provincial Blue List for endangered species and upper-Skeena coho stocks are of special management concern. The sites visited in the 2004 season are sites which were outstanding from 2003. They include sites not visited in 2003 and sites which required a stream survey and/or sampling for fish presence/absence. If sites were found to be fish bearing, a full FPCI was completed. The majority of the sites were found to occur on S6 streams or non-classified drainages and therefore no fish passage assessments were done on these culverts. For the remaining sites that were classified as fish bearing, one was a partial barrier to fish passage and the other a full barrier to fish passage.

1.0 INTRODUCTION

Field work for this project commenced June, 2004. All culverts assessed were within the Fulton River and Harold Price Creek watersheds. Starting at the beginning of the 3000 road at the southern end of Chapman Lake, fish passage-culvert inspections were completed at all 2003 deferred sites on spur roads off of the Upper Fulton FSR and on culvert crossing sites on the Upper Fulton FSR mainline up to 53 Km. Field work for the project continued throughout June and July with preparation of the report commencing in December of 2004.

This Fish Passage-Culvert Inspection (FPCI) project was implemented to assess fish passage at culvert bearing road crossings within the Fulton River and Harold Price Creek watersheds. The assessments were carried out at culvert crossings installed on fish bearing streams on roads primarily constructed prior to the implementation of the Forest Practices Code in 1996. It should be noted that culverts on spur roads that were too overgrown or spur roads that were deactivated were not visited and therefore the culvert sites on possible fish-bearing streams on these roads were not visited or assessed.

Historical inventory information obtained from the "FishWizard" software program, the Fisheries Information Summary System (FISS) and 1:20 000 RIC Reconnaissance Inventory maps have documented the following fish species: Dolly Varden(*Salvelinus malma*), rainbow trout(*Oncorhynchus mykiss*), steelhead(*Oncorhynchus mykiss*), cutthroat trout(*Oncorhynchus clarki*), chinook salmon(*Oncorhynchus tshawytscha*), coho salmon(*Oncorhynchus kisutch*), pink salmon(*Oncorhynchus gorbuscha*), lake whitefish(*Coregonus clupeaformis*), mountain whitefish(*Prosopium williamsoni*), lake trout(*Salvelinus namayacush*), burbot(*Lota lota*), lake chub(*Couesius plumbeus*), lamprey(*Lampetra spp.*), longnose dace(*Rhinicthys cataractae*), peamouth chub(*Mylocheilus caurinus*) and longnose sucker(*Catostomus catostomus*).

Insert map

While bull trout(*Salvelinus confluentus*) was not documented in Chapman Lake, the Fulton River or Harold Price Creek by the 'FishWizard" software, it is a species which is present in the Bulkley and Babine River watersheds. Bull trout and Dolly Varden are both provincially blue-listed species and are therefore of management concern. Coastal cutthroat trout have also been added to the provincial blue-list as have Westslope cutthroat trout. Upper-Skeena coho stocks are also of special management concern due to dwindling returns in recent years (pers comm. Jeff Lough, 2001). Historically, many of the tributaries of the Babine and the Bulkley River watersheds were likely important spawning and rearing habitat for coho.

Forest Renewal B.C. implemented its Watershed Restoration Program in 1994. The program, more recently referred to as the Enhancing Environmental Values (EEV) Program, was established to provide an important opportunity to improve water quality and reverse fish habitat impairment as a result of past forest harvesting practices. Although Forest Renewal B.C. ceased to exist at the end of March 2002, the Land Based Investment Program of the Forest Investment Account provides an avenue for these works to continue. The upper Fulton River and Harold Price Creek watersheds are within Pacific Inland Resources' (PIR) traditional operating area and therefore PIR played the lead role in this project as the proponent.

The completed report includes two electronic copies on CD-ROM (one word document version and another in PDF format) that will be submitted to Pacific Inland Resources Ltd. (a Division of West Fraser Mills, Ltd.). Three hard copies of the report and maps will also be produced and one each will be submitted to the project proponent (**PIR**), another to the **Ministry of Forests Skeena Stikine District** and the final copy will remain with Silvicon Services Inc. Maps of each watershed accompany the reports and identify the location, degree of barrier and the priority ranking of each fully assessed culvert crossing and also identify sites that were visited but not assessed for fish passage. Sites that were visited but not assessed either were found not to have a defined stream channel associated with the crossing or were classified as non-fish bearing streams

following stream surveys and sampling. Both hard copies and a digital format of the maps accompany the deliverables.

2.0 METHODOLOGY

The methods outlined in WRTC No. 11 were followed to carry out all pre-field and field work for the project with the following exception. Initially, prioritisation of the assessed sites began using the original FPCI scoring matrix (Parker, 2000), however many sites scored the same, making it difficult to rank the sites. Modifications were made to some of the categories within the scoring matrix so that there was increased differentiation between total scores (Saimoto, 2000). The points system for the "% Stream Barred" and "Limiting to Upstream Barrier" categories remained the same. For the remaining categories; Fish Species, Habitat Values, Barriers, Length of New Habitat, criteria and scoring changes were made are as follows:

2.1 FISH SPECIES

Single Species: 6 points for any FPC listed species.

Significant Species: 10 points each for Coastal Cutthroat Trout (*Oncorhynchus clarki clarki*), Dolly Varden (*Salvelinus malma)* and/or Bull Trout (*Salvelinus confluentus*), all provincial blue-listed species.
10 points for Upper-Skeena coho, a race of special management concern (pers. comm. Jeff Lough, 2001).
.

Multiple Species: 8-10 points based upon significance of species encountered.

2.2 HABITAT VALUES

Scores for habitat values were determined after taking many different habitat variables into account and comparing variables between sites. Variables that figured in the scoring process included amount of spawning habitat, amount of over-wintering habitat, stream bed material, channel width, previous or current fish use, fish presence/absence, and the

particular fish species present. The points system separated habitat values into high, moderate, or low categories:

0-3 points: Low habitat value designation
4-7 points: Moderate habitat value designation
8-10 points: High habitat value designation

2.3 BARRIERS

For the barrier category, points were assigned based on field observations and data recorded in the appropriate section of the FPCI Form A. Undetermined barriers were scored 1-3 points.

Partial barriers were scored 4-7 points depending upon the degree of obstruction to fish passage. Some of the parameters taken into account included culvert outflow drop and/or minimum pool depth required vs. jumping abilities of target fish species of various life stages, culvert slope and culvert water velocities vs. swimming capabilities of target fish species of various life stages, seasonal high/low flows (i.e. culvert outflow drop at periods of low flow or water velocity barrier at periods of high flow).

Full barriers were scored 8-10 points depending upon the degree of certainty that a particular culvert would act as a barrier to fish passage during periods of either high or low flow.

2.4 LENGTH OF NEW HABITAT

The points scoring system for the Length of New Habitat category was refined and an increase of 1 point per 500 meters of habitat gained was implemented:

>4 km or lake:	10 points	1.5 – 2.0 km:	5 points
3.5 – 4.0 km:	9 points	1.0 – 1.5 km:	4 points
3.0 – 3.5 km:	8 points	0.5 – 1.0 km:	3 points
2.5 – 3.0 km:	7 points	<500 meters:	2 points
2.0 – 2.5 km:	6 points		

2.5 MAPPING SYMBOLS

Mapping symbols were modified so they would show both the type of barrier (full, partial, none and undetermined) and the priority ranking. The site number was moved outside the coloured culvert symbol and the priority ranking was inserted in its place. Also, the colour for the partial barrier symbol was changed from black to yellow. This was done primarily so it would be more conspicuous on the maps and the priority ranking would be visible.

2.6 WATER VELOCITY MEASUREMENTS

To measure water velocity in the streams and in the culverts a water velocity meter was used. The velocity meter had a 2.5 cm diameter impeller which was quite sensitive to low flows and would record velocities down to 0.1 m/s even if not completely submerged. There were still situations however, where there was not enough water for the meter to record a velocity. Where the water velocity was too low for the metre to read or where the water level was too low for the impeller, a measurement of <.1 m/s was given.

3.0 FINDINGS

Findings of the Fish Passage-Culvert Inspections have been summarised by watershed and the priority ranking within each watershed. Forms A, B, C, and D are contained in an appendix for each watershed.

3.1 FULTON RIVER WATERSHED

Located in the mid-region of the Bulkley TSA and within PIR's operating area, the Fulton River watershed has its headwaters along the eastern portion of the Babine mountain range, which makes up the northwest boundary of the watershed. The Fulton River has a stream length of 69.2km from it's headwaters to its confluence with Babine Lake at Topley Landing. The main access for the portion of this watershed within PIRs operating area is provided by the Upper Fulton FSR (3000 Rd) which branches from the Babine Lake road approximately 39km from Smithers. The Fulton River watershed contains generally flat to rolling terrain, growing steeper and mountainous to the northwest as the watershed approaches the Babine mountain range. The Fulton River watershed is a fifth order watershed.

For ease of reference, the information from the data collected at the assessed sites have been summarised based on their priority rank (Table 1). This table acts as a prioritisation summary for FPCI full culvert assessments for the Fulton River watershed. Scores are based on a modified version of the FPCI scoring matrix as discussed in the previous section. All culverts are sorted by their priority ranking.

Fulton River Watershed, Summary Table 1.
Prioritisation summary for FPCI's in the Fulton River watershed. Scores based on modified version of FPCI scoring matrix. All culverts sorted by rank.

Rank	Road	Site	Stream Width (m)	Fish Species	Habitat Value	Barrier	Barrier Descript[a]	Length of New Habitat	% Stream Barred	Limiting to upstream barrier	Total Score	Priority/ Ranking 39-55: High 26-38: Moderate 15-25: Low
				No FPCI's were conducted in the Fulton River Watershed in 2004.								

3000 Road and Spur Roads.

No FPCI assessments were conducted within the Fulton River watershed in the year 2004. Sites visited but not assessed on the 3000 Road or spur roads in the Fulton River watershed have been summarised in "Form D – Sites not Assessed Summary Table" in Appendix 1.

3.2 HAROLD PRICE CREEK WATERSHED

Located in the mid-region of the Bulkley TSA and within PIR's operating area, the Harold Price Creek watershed has its headwaters along the eastern portion of the Babine mountain range, which makes up the southwest boundary of the watershed. Harold Price Creek has a stream length of 77.4km from it's headwaters to its confluence with the Suskwa River. The main access for the portion of this watershed within PIRs operating area is provided by the Upper Fulton FSR (3000 Rd) which branches from the Babine Lake road approximately 39km from Smithers. Harold Price Creek watershed contains generally rolling and broken terrain, growing steeper and mountainous to the southwest as the watershed headwaters approach the Babine mountain range and also to the northwest as Harold Price Creek nears its confluence with the Suskwa River. Harold Price Creek watershed is a fifth order watershed.

For ease of reference, the information from the data collected at the assessed sites have been summarised based on their priority rank (Table 1). This table acts as a prioritisation

summary for FPCI full culvert assessments for the Harold Price Creek watershed. Scores are based on a modified version of the FPCI scoring matrix as discussed in the previous section. All culverts are sorted by their priority ranking.

Harold Price Creek Watershed, Summary Table 1.
Prioritisation summary for FPCI's in the Harold Price Creek watershed. Scores based on modified version of FPCI scoring matrix. All culverts sorted by rank.

Rank	Road	Site	Stream Width (m)	Fish Species	Habitat Value	Barrier	Barrier Descript[a]	Length of New Habitat	% Stream Barred	Limiting to upstream barrier	Total Score	Priority/ Ranking 39-55: High 26-38: Moderate 15-25: Low
1	3000	25/ 1718	2.20	CT	High	Partial	Blocked Culvert	440	13.7	No	32	M
2	3052	S1	1.55	Suspect CT/ DV	Mod	Full	Hanging culvert and high culvert gradient.	1550	88	No	35	M

3000 Road and the 352 Spur Road

Only two FPCI's were conducted within the Harold Price Creek watershed. Additional sites visited but not assessed in the Harold Price Creek watershed have been summarised in "Form D – Sites not Assessed Summary Table" in Appendix 1. Site 25/1718 is considered a partial barrier to fish passage due to a beaver dam blocking the culvert inlet. Stream flow has diverted along the road surface and around the culvert to the stream channel below the road.

Site 3052-S1 on the 352 Spur Road contains a full barrier to fish travel upstream through the crossing. The culvert is hanging at the outlet and contains a high gradient which would not allow for passage of fish. This site is ranked moderate due to its proximity to a known fish bearing stream and length of habitat upstream of the crossing.

4.0 SUMMATION

Only two FPCI's were conducted along the 3000 road and its spurs within the Upper Fulton River and Harold Price Creek watersheds. Both sites ranked moderate for remediation of the crossing structure. Site 3052-S1 was deemed a full barrier due to the high gradient of the culvert. Site 25/1718 on the 3000 road is a partial barrier due to possible fish navigation through the beaver dam located on the upstream side of the crossing.

Typically, in-stream fish passage rehabilitation work based on the findings of the FPCI report is targeted primarily at those sites ranking high in priority, although fish passage issues at the moderate priority sites should be addressed if there is a budget for the work.

5.0 LITERATURE CITED

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Kossman, R. March 2004. Fish Passage – Culvert Inspections. Nilkitkwa and Babine River Watersheds. Silvicon Services Inc. Smithers, B.C. 16p.

Lough, Jeff. 2001. Personal communication. MWLAP. Skeena Region. Smithers, B.C.

6.0 APPENDICES

TAB 1 APPENDIX 1 – FULTON RIVER WATERSHED

Table 2. Summary of Sampling Effort and Results
Form A (No FPCI's performed in this watershed.)
Form B
Form C
Form D

Table 2. Summary of Sampling Effort and Results in the Fulton River Watershed

Site Number	Method/ No.	1:20,000 K Mapping?	Previous Stream Classification	Stream Classification	Fish Presence/ Species	Comments
304B Rd.						
1	None	Yes	Inferred S3	S6	None	Stream was dry at time of survey and channel spreads out and dissipates completely into the soil downstream of the crossing.
311 Rd.						
1	EF	Yes	Inferred S3	S6	None	Barriers d/s of culvert
2	EF	Yes	Inferred S3	S6	None	Barriers d/s of culvert
3	EF	Yes	Inferred S3	S6	None	Barriers d/s of culvert

Form B – FPCI Summary Table

Fish Passage – Culvert Inspection Summary Table

Priority Rank	Score	Site Number	Barrier	Stream Length Gained (m)	% Stream Barred	X-Reference Site Number(s)	FIA Eligible
		No FPCI's performed in this watershed.					

Form C – Other Priority Culvert Crossings Summary

Other Priority Culvert Crossings Summary Table

Priority Rating	Site Number	Maintenance Issues	Sediment Source	Notes
No Other Priority Crossings				

Form D – Sites not Assessed Summary Table

Site Number	Assessment	Notes
304B-1	Non-Fish Bearing	Dry channel at time of survey.
3011-1	Non-Fish Bearing	EF/NFC, d/s barrier
3011-2	Non-Fish Bearing	EF/NFC, d/s barrier
3011-3	Non-Fish Bearing	EF/NFC, d/s barrier
320J1	Non-Classified Drainage	

TAB 2 APPENDIX 2 – HAROLD PRICE CREEK WATERSHED

Table 2. Summary of Sampling Effort and Results
Form A with Photo page
Form B
Form C
Form D

Table 2. Summary of Sampling Effort and Results in the Harold Price Creek Watershed

Site Number	Method/ No.	1:20,000 K Mapping?	Previous Stream Classification	Stream Classification	Fish Presence/ Species	Comments
326A Rd						
3026A-2	EF	No	Not Classified	S6	None	Barriers d/s of culvert
352C Rd						
3052C-1	EF	Yes	S4	S6	None	Barriers d/s of culvert
3000 Rd						
3000-25/1718	VO	Yes	S3	S3	CT	Observed fish jumping and rising in beaver pond upstream of crossing.

Site 3052-S1
Form A – Fish Passage Culvert Inspection – Side 1

Date (mm/dd/yy)	09/23/03	**Stream Name**	Unnamed
Road name/ID #	352 Road	**Road Location (MoF District)**	Skeena/Stikine
UTM/GPS Location	E 628586 / N 6120549	**Watershed Code**	460-081700-43900-23800-3200
1:20 000 Map Sheet	093M.026	**Recorder's Name**	EW/PB
Site Number	3052-S1		

Culvert Characteristics:

Culvert Diameter (mm)	900	**Culvert Elev. (m)**	**U/s**	-	**D/s**	-	**Slope (%)**	10.9			
Culvert Length (m)	18.8	**High Water Mark (cm)**	20								
Culvert Material	Steel	**Culvert Water Depth (cm)**	0								
Culvert Water Velocity (m/sec)	- - - -	**Culvert Outfall Drop (cm)**	65								
Culvert Shape	Round	**Culvert Inflow Drop (cm)**	25								
Culvert Embedded (yes/no)	No	**Depth Embedded**	**Inlet (cm)**	0	**Outlet (cm)**						
Culvert Wetted Width (cm)	0	**Culvert Maintenance (Hi/Mod/L/No)**	Low								
Coefficient of Roughness	0.018	**Fill Slope Depth (m)**	**U/S**	2.5	**D/S**	4.0					

Stream Characteristics:

Some water in stream, but not enough to measure. Tributary to Camp Creek, which is approximately 200 metres downstream and is a known fish bearing stream. No barriers exist between the culvert and Camp Creek.

Stream Reach		**Stream Classification**	S3
Pool Depth at Outfall (cm)		**S1 S2 S3 S4 S5 S6 P**	
Sediment Source/Degree	18	**Blue Listed / Significant Spp.**	

Measure	**Measurement(s) below culvert**			**Measurement(s) above culvert**			**Average Measurement**
Wetted Width (m)	0	0	0	0	0	0	0.0 m
Bankfull Width (m)	1.9	1.4	1.5	1.8	1.5	1.2	1.55 m
Water Depth (cm) .25 of width	0	0	0	0	0	0	0
Water Depth (cm) .5 of width	0	0	0	0	0	0	0
Water Depth (cm) .75 of width	0	0	0	0	0	0	0
Bankfull Depth (cm)	20	20	20	15	15	20	20
Stream Water Velocity (m/sec)	-	-	-	-	-	-	-
Average Stream Gradient (%)	18			12			15
Maximum Stream Gradient (%)	25			20			25
Length of Maximum Grade (m)	10			10			**N/A**
Coefficient of Roughness	0.040			0.040			**N/A**
Fish Presence - yes, no, no survey	Inferred						**N/A**
Fish Sampling Method							**N/A**
Sampling Effort (time)							**N/A**
Species Present							**N/A**
Beaver Activity/Type							**N/A**

Barrier Evaluation:

Barrier – Full/Partial/None/Undetermined:	Full
Barrier Type:	Culvert outfall drop (0.65 m with 0.18 m deep outfall pool) is a barrier to all fish. No staging possible for jumping. Culvert slope (10.9%) creates a barrier to all fish.

Site Photos:

Roll #:	E2		
Inlet upstream photo:	13	**Inlet downstream photo:**	12
Outlet upstream photo:	14	**Outlet downstream photo:**	15

Site 3052-S1
Form A – Fish Passage – Culvert Inspection – Side 2

Comments:

Office Calculations: (*to be completed for full and partial barriers only)

Q100 Diameter Estimate (mm)	800	**Stream Length Above Barrier (m)**	1550
Road Responsibility		**% Stream Barred**	88

Prioritization Calculations – FPCI Scoring Matrix:

Fish Species		**Habitat Value**		**Barrier**		**Length of New Habitat**		**Stream Barred (%)**		**Limiting to Upstream Barrier**	
Multiple or Significant		**H**		**Full**	10	**≥ 1 km**	5	**> 70%**	10	**Yes**	
Single	6	**M**	4	**Partial**		**< 1 km ≥ 500 m**		**≥50-70%**		**No**	0
Other		**L**		**Undeter**		**< 500 m**		**< 50%**			

Total Score: 35


ROAD 352
FEATURE —
SITE 3052-1
OUTLET UPSTREAM


ROAD 352
FEATURE —
SITE 3052-1
OUTLET DOWNSTREAM


ROAD 352
FEATURE —
SITE 3052-1
INLET DOWNSTREAM

Site 3000-25/1718
Form A – Fish Passage Culvert Inspection – Side 1

Date (mm/dd/yy)	06/17/04	**Stream Name**	Camp Creek
Road name/ID #	3000 Road	**Road Location (MoF District)**	Skeena /Stikine
UTM/GPS Location	E 627303 / N 6121743	**Watershed Code**	460-081700-43900-13700
1:20 000 Map Sheet	093M.025/ 026	**Recorder's Name**	REK
Site Number	Site 25/1718		

Culvert Characteristics:

Beaver dam on upstream side of road is built up above running surface of road. Culvert is approximately 5 cm above bed at outflow pool, but no outfall drop due to water depth in culvert. No flow through culvert. Flow is through upstream side of road, then across road surface and down new channel into outflow pool.

Culvert Diameter (mm)	1200	**Culvert Elev. (m)**	**U/s**	-	**D/s**	-	**Slope (%)**	-			
Culvert Length (m)	Est. 10 m	**High Water Mark (cm)**	49								
Culvert Material	Steel	**Culvert Water Depth (cm)**	40								
Culvert Water Velocity (m/sec)	0	0	0	0	**Culvert Outfall Drop (cm)**	0					
Culvert Shape	Round	**Culvert Inflow Drop (cm)**	Unknown								
Culvert Embedded (yes/no)	No	**Depth Embedded**	**Inlet (cm)**	-	**Outlet (cm)**	-					
Culvert Wetted Width (cm)	120	**Culvert Maintenance (Hi/Mod/L/No)**	High – beavers								
Coefficient of Roughness	.02	**Fill Slope Depth (m)**	**U/S**	blocked	**D/S**						

Stream Characteristics:

16° C , PH=7.8, Cond=50 mS. The pond on the upstream side of the road is approximately 30 m wide and 100 m long. No sign of beaver dams or flooding after approximately 30 m downstream of outlet. Many trout observed in beaver pond immediately u/s of culvert.

Stream Reach	1	**Stream Classification**	S3
Pool Depth at Outfall (cm)	45	**S1 S2 S3 S4 S5 S6 P**	
Sediment Source/Degree	Road runoff/Mod-Hi	**Blue Listed / Significant Spp.**	Unknown

Measure	**Measurement(s) below culvert**			**Measurement(s) above culvert**			**Average Measurement**
Wetted Width (m)	1.55	2.80	2.25	No measurements because of beaver pond			2.20
Bankfull Width (m)	1.55	2.80	2.25				2.20
Water Depth (cm) .25 of width	18	32	32				27
Water Depth (cm) .5 of width	28	33	30				30
Water Depth (cm) .75 of width	18	34	25				26
Bankfull Depth (cm)	34	40	38				37
Stream Water Velocity (m/sec)	0.8	0.4	0.3				0.5
Average Stream Gradient (%)	2						2
Maximum Stream Gradient (%)	2						2
Length of Maximum Grade (m)	~ 50+ m						**N/A**
Coefficient of Roughness	0.040						**N/A**
Fish Presence - yes, no, no survey	Yes			Yes			**N/A**
Fish Sampling Method	120 k fish inv.			Fish Observation			**N/A**
Sampling Effort (time)	-			-			**N/A**
Species Present	CT based on inv.			-			**N/A**
Beaver Activity/Type	Dam			Dam			**N/A**

Barrier Evaluation:

Barrier – Full/Partial/None/Undetermined:	Partial
Barrier Type:	Beaver Dam/ plugged culvert.

Site Photos:

Roll #: REK 4

#3 Outlet u/s with channel on right.
#5 View of flow on road from loaded side
#6 Fish rising in pond.

Inlet upstream photo:	4	**Inlet downstream photo:**	No photo (can't see cmp).
Outlet upstream photo:	2	**Outlet downstream photo:**	1

Site 3000-25/1718
Form A – Fish Passage – Culvert Inspection – Side 2

Comments:
Moderate priority due to beaver dam which is causing a partial barrier and blockage of culvert. Culvert is also undersized based on Q100 estimate.

Office Calculations: (*to be completed for full and partial barriers only)

Q100 Diameter Estimate (mm)	1810	**Stream Length Above Barrier (m)**	4200 m (the lake and inlet stream were included in this value).
Road Responsibility	-	**% Stream Barred**	57.5%

Prioritization Calculations – FPCI Scoring Matrix:

Fish Species		Habitat Value		Barrier		Length of New Habitat		Stream Barred (%)		Limiting to Upstream Barrier	
Multiple or Significant		**H**	10	**Full**		**≥ 1 km**	Lake 10	**> 70%**		**Yes**	
Single	6	**M**		**Partial**		**< 1 km ≥ 500 m**		**≥50-70%**	6	**No**	0
Other		**L**		**Undeter**	3	**< 500 m**		**< 50%**			

Total Score: 35

Site 25/1718 : Outlet.

Site 25/1718 : Outlet downstream view.

Site 25/1718 : Outlet with channel entering outlet pool on right.

Site 25/1718 : Beaver dam atop the inlet.

Site 25/1718 : Flow along road surface. Crew person standing above culvert outlet.

Site 25/1718 : Fish rising in beaver pond.

Form B – FPCI Summary Table

Fish Passage – Culvert Inspection Summary Table

Priority Rank	Score	Site Number	Barrier	Stream Length Gained (m)	% Stream Barred	X-Reference Site Number(s)	FIA Eligible
1	35	3052-S1	Full	1550	88	None	Yes
2	32	3000 – 25/1718	Partial	4200	57.5	None	Yes

Form C – Other Priority Culvert Crossings Summary

Other Priority Culvert Crossings Summary Table

Priority Rating	Site Number	Maintenance Issues	Sediment Source	Notes
No Other Priority Crossings				

Form D – Sites not Assessed Summary Table

Site Number	Assessment	Notes
3026A-2	Non-Fish Bearing	EF/NFC, d/s barrier
3052C-S1	Non-Fish Bearing	EF/NFC, d/s barrier
3000 Rd. KM 52- 53.5		
1719	x-drain	
1720	x-drain	

TAB 3 APPENDIX 3

HAROLD PRICE CREEK WATERSHED MAP