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BC Fish Passage Program Annual Report 2016-2017

Partnership between

BC Ministry of Forests, Lands and Natural Resource Operations' Land Based Investment Strategy (LBIS)

Inter-Agency Fish Passage Technical Working Group









Fisheries and Oceans Canada's Recreation Fisheries Conservation Partnership Program (RFCPP)



Recreational Fisheries Conservation Partnership Program Programme de partenariats relatifs à la conservation des pêches récréatives

and the

Pacific Salmon Foundation



Acknowledgements

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Pacific Salmon Foundation:

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Remediation Project Delivery with RFCPP and PSF:

O'Cock River Tributary

- Daniel Braun, BC Timber Sales Stuart-Nechako, FLNR
- Ken Yorston, BC Timber Sales Stuart-Nechako, FLNR

Cypre River, and Tranquil Creek

• Dave Hamilton, BC Timber Sales – Strait of Georgia, FLNR

Lemon Creek, and Rock Creek – Purcell Creek

• Phil MacDonald, BC Timber Sales – Kootenays, FLNR

Dead Horse Lake Tributary/Kuldo FSR Site 23 and Date 1200

- Alan Harrison, BC Timber Sales Skeena, FLNR
- Gail Campbell, BC Timber Sales Skeena, FLNR

Other Remediation Projects:

Shuttleworth Creek/Kilmer FSR

• Megan Sheshurak, BC Timber Sales – Okanagan-Columbia, FLNR

Coast South 700 Main

• Mike McCulley, BC Timber Sales – Seaward/tlasta, FLNR

Jamieson Creek

• Drew Alway, Southern Engineering Group, Engineering Branch, FLNR

Maxan Creek

• Rob Phillips, Nadina Forest District, FLNR

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Background

Why restore fish passage?

The ability for fish and other aquatic organisms inhabiting streams to move freely (upstream and downstream) throughout their natural environment is an important component of healthy resilient natural aquatic ecosystems. Different fish species and life stages require a variety of habitats at different times of the year. Human-caused barriers such as road-stream crossings that block or delay fish movement can result in changes to fish communities and lost productive capacity. Healthy, resilient fish populations are necessary to maintain BC's fish species diversity and productivity that in turn supports our recreational, commercial, and indigenous food fisheries. In addition to the importance to our fisheries, maintaining access to a full range of habitats is necessary to ensure fish populations and other aquatic species have the best chance to adapt to changing aquatic conditions resulting from climate change.

Fish passage program

In 2007, the Assistant Deputy Ministers of the then BC Ministry of Forests and Range, and Ministry of Environment (MOE) – in cooperation with federal Department of Fisheries and Oceans (DFO) and the Forest Industry (Council of Forest Industries or COFI and Coast Forest Products Association or CFPA) – formed the Fish Passage Program. The inter-agency Fish Passage Technical Working Group (FPTWG) was established and then developed the four-phase 'Fish Passage Strategic Approach' that guides delivery of the program by prioritizing problem road-stream crossings for remediation. The four phases are:

- 1. *Assessments* undertaken for all road crossings in watersheds that are strategically identified as a high priority for fish;
- 2. *Habitat confirmations* undertaken at crossings assessed to be the best candidates for remediation to determine actual habitat values to be gained;
- 3. *Site plans and designs* to determine the most effective structure to remediate priority crossings identified through the habitat confirmation phase;
- 4. *Remediation* projects that most often involve either (i) the purchasing and installation of new fish-friendly structures (e.g. culverts and bridges) or (ii) road crossing deactivations (e.g. for non-status roads) that restore fish passage.

Data and reports from each of the four-phases are to be uploaded in the Provincial Stream Crossing Information System (PSCIS).

BC's FPTWG has been working with BC Timber Sales (BCTS), Ministry of Transportation and Infrastructure, Pacific Salmon Foundation (PSF) and DFO (through its Recreational Fisheries Conservation Partnership Program – RFCPP) to prioritize and remediate problem road-stream crossings. Between 2008 and 2015 the Fish Passage Program has remediated over 150 road stream crossings resulting in fully restored access to over 750 kilometers of fish habitat. BCTS is critical to the success of the program.

The actual delivery of projects on-the-ground is primarily accomplished through agreement with BCTS; however district and regional staff may also lead delivery for some projects. For more information about the LBIS Fish Passage and the FPTWG: <u>http://www2.gov.bc.ca/gov/content/environment/natural-resource-stewardship/land-based-investment/investment-categories/fish-passage</u>

2016-2017 Budget

The Fish Passage Program budget totaled \$1,097,723 including:

- \$880,639 from LBIS, and
- \$217,084 from federal partnership funding DFO's Recreation Fisheries Conservation Partnership Program (RFCPP) received by working with the Pacific Salmon Foundation (PSF) – all for remediation projects.

2016-2017 Accomplishments

Assessments

276 fish passage assessments in total: 189 assessments in Salmo River watershed and surrounding area, 75 assessments in St. Mary's River watershed, and 12 assessments in the Boundary in the Kootenays. In addition, habitat restoration assessments were completed for the Artlish and San Juan watersheds on Vancouver Island.

Prioritizing habitat confirmations

2 areas with assessments were reviewed to prioritize crossings for habitat confirmations: McGregor and Horsefly watersheds.

Habitat confirmations

25 crossings in total including 10 in Salmo River Watershed and 1 for Rock Creek in the Kootenays; 4 in Cascades District (Tyaughton Creek watershed in Lillooet Timber Supply Area); 5 in the Babine; 2 on Haida Gwaii (Honna River); 1 in Okanagan-Columbia (Shuttleworth Creek); 1 on Northern Vancouver Island (Coast Main S700); and 1 in Skeena (Kuldo FSR 2.6 km).

Site plans and designs

7 crossings: Tranquil Creek and Coast Main S700 on Vancouver Island; Lemon Creek and Rock Creek in the Kootenays; Kuldo FSR Sites 17 and 23 in Skeena; and Shuttleworth Creek in the Okanagan-Columbia.

Structure Purchase

6 replacement structures were purchased including Coast Main S700 for installation in 2016/17; and Tranquil Creek, Lemon Creek, Rock Creek, Dead Horse Lake Tributary and Shuttleworth Creek for installation in 2017/18. Material was purchased for Site 540 in Cascades District in anticipation of future remediation work.

Remediations

6 crossings were remediated including O'Cock Creek (bridge) in Stuart Nechako; 3 crossing structures were removed and deactivated in Cypre River on Vancouver Island; Coast Main S700 (bridge) in Northern Vancouver Island; and a derelict bridge that impeded fish passage was removed on Maxan Creek a tributary to the Bulkley River.

In addition, an instream weir was installed on Date 1200 in the Skeena area to restore fish passage, and initial work towards removing a dam in 2017/18 that impedes fish passage was completed in 2016/17 for Jamieson Creek in the Kamloops area.

Tables 1 and 2 provide an overall summary of the remediation projects including Year One progress on 2-year projects where the remediation work will be completed in 2017/18.

Communications

- Provided funding and project support to FPInnovations to prepare and completed a information pamphlet entitled: "Stream Simulation: Planning and Design for Closed-Bottom Structures for Fish Streams"
- Prepared a summary of the Plumbob Creek 'good news' story for the BC's Species at Risk website which was also included in FLNR's DIRT magazine
- Submitted pictures/summary of the Bench FSR project for APEGBC's Project Highlights issue
- Prepared a third article for ABCFP's Forest Professional magazine entitled "Reconnection Fish Habitat Starts with Good Data Management" that profiles the Provincial Stream Crossing Inventory System (PSCIS) – this is expected to be published in the July/August 2017 edition
- In June 2016, Richard Thompson from the FPTWG delivered a two day Fish Passage Assessment Training course to First Nations and government staff in the Smithers area. Representatives from the Lake Babine, Wet'suwet'en, and Gitanyow First Nations attended the training.

Other

- Funded and supported the first year of a 2-year Benefit-Cost Analysis of Fish Passage Program investments with three reports completed in Year 1:
 - Benefit-Cost Analysis Fish Passage Project Costs Part 1
 - $\circ \quad \text{Benefit-Cost Analysis}-\text{Scenarios}-\text{Part 2}$
 - o Benefit-Cast Analysis Incremental Benefits Part 2
- Maintained/updated PSCIS data base
- In partnership with PSF, applied for Federal DFO RFCPP Round 6 funding for 2 projects to be initiated in 2017-2018.

Fiscal Year	Expenditure (millions)	Crossing Assessments	Installed Culverts	Installed Bridges	Deactivations	Total crossings	Km fish habitat
				_		remediated	recovered
2008/09	\$6.1*	4 683	28	17	-	44	158
2009/10	\$3.6*	4 594	23	11	-	34	184
2010/11	\$2.4	8 171	-	-	-	17	305
2011/12	\$0.8	1 987	-	-	-	2	25
2012/13	\$2.0	3 000	-	-	11	18	27
2013/14	\$0.5	1 954	2	2	2	6	18
2014/15	\$1.0**	1 416	1	4	20	25	11.6
2015/16	\$1.4**	16	6	4	0	11#	22.3
2016/17	\$1.2**	276	0	1	3	4	6.3
Total	\$17.8	26 097	60	39	36	161	757.2

2008-2016 Accomplishments

* denotes FIA funding **includes RFCPP funding # includes removal of one small dam Note: From 2002/03 to 2007/08, further \$18.5 MM was expended from Forest Investment Account (FIA)

2016-2017 Remediation Projects

Project	Location	2016/17 Costs	Restoration	Habitat Gain	Fish
1. O'Cock River	Stuart -	\$106,645	Bridge installed	5000 m	Rainbow Trout; likely also Coho Salmon,
Tributary	Nechako				Cutthroat Trout, and Dolly Varden
2. Cypre River/	Vancouver	\$59,600	3 Deactivations	550 m	Chinook Salmon, Coho Salmon, Chum
Clayquot	Island			4675 m2	Salmon, Pink Salmon, Cutthroat Trout,
					Rainbow Trout
3. Tranquil Creek/	Vancouver	\$82,139	Site Plan and Structure Purchase	225 m in 17/18	Coho Salmon and Cutthroat Trout; likely also
Clayquot – Year One	Island		2016/17.		Chinook, Chum, Pink and Sockeye Salmon,
			Bridge to be installed in		Rainbow Trout and Steelhead, and Dolly
			2017/18.		Varden
4. Lemon Creek –	Kootenays	\$115,687	Site Plan and Structure Purchase	5000 m in 17/18	Rainbow Trout and Bull Trout
Year One			2016/17.		
			Bridge to be installed in		
			2017/18.		
5. Rock Creek –	Kootenays	\$115,000	Habitat Confirmation, Site Plan	2500 m in 17/18	Rainbow Trout
Year One			and Structure Purchase 2016/17.		
			Bridge to be installed in		
			2017/18.		
6. Dead Horse Lake	Skeena	\$20,138	Site Plan and Structure Purchase	1500 m in 17/18	Rainbow Trout
Tributary/Kuldo FSR			in 2016/17.		
Site 23 – Year One			Embedded structure installation		
			in 2017/18.		

Table 1: Summary of Remediation Projects 2016/17 in partnership with LBIS, BCTS, RFCPP and PSF

Projects #1 to 6 in above table and ensuing one-pagers per project provide a summary of accomplishments 2016/17 from the partnership between FLNR's LBIS Fish Passage program, DFO's RFCPP program, and the Pacific Salmon Foundation with project delivery by FLNR district and BCTS staff. A Final Report or Year One Progress Report for each project is available that provides more details.

Project	Location	2016/17 Costs	Restoration	Habitat Gain	Fish
7. Shuttleworth	Okanagan -	\$11,613	Habitat Confirmation and Site	6600 m in 17/18	Rainbow Trout
Creek/Kilmer FSR -	Columbia		plan in 2016/17.		
Year One			Purchase and install		
			replacement structure in		
			2017/18.		
8. Coast South 700	Vancouver	\$150,000	Habitat Confirmation, Site Plan,	750 m	Coho, Chum, Pink and Chinook Salmon;
Main	Island		Structure Purchase and	1875 m2	Cutthroat Trout and Steelhead; and Dolly
			Installation		Varden
9. Jamieson Creek	Kamloops	\$85,000	Groundwater well drilled with	9,250 m in 17/18	Rainbow Trout and Bull Trout
Weir Removal			pump & power installed 16/17.	2,900 m in 17/18	Coho Salmon
			The dam (weir) removal will		
			occur in 2017/18.		
10. Maxan Creek	Nadina	\$28,800	Derelict Stimbold Bridge was	Fish barrier at	Chinook, Coho, and Sockeye Salmon;
Derelict Bridge			removed	some flows	Steelhead, Rainbow Trout, Dolly Varden, and
Removal				removed	Mountain Whitefish
11. Date 1200	Skeena	\$6,200	Backwater weirs installed and 4	275 m	Cutthroat Trout
			upstream abandoned beaver		
			dams were breached		

Table 2: Summary of Other LBIS Fish Passage Remediation Projects 2016/17

Further information on Projects #7 to 10 in above table are provided in one-page descriptions that follow. The projects were funded by LBIS and with BCTS delivery except Jamieson Creek which was delivered by Southern Engineering Group, Engineering Branch, and Maxan Creek which was delivered by Nadina District.



Map 1: Location of Remediation Projects 2016/17

<u>Note</u>: Mooluck Creek project cancelled due to higher than anticipated remediation costs; Date 1200 was small project not shown above; it is located near Mooluck Creek

1. O'Cock River Tributary Fish Passage Remediation Project



Left photo: Before – Closed bottom structure that impeded fish passage that was removed Right photo: After – Open bottom bridge that provides for fish passage that was installed

Project Objective

The project objective was to Remove the existing closed bottom crossing structure that was impeding fish passage, located at km 3.5 on the O'Cock Forest Service Road (also referred to as Crossing OCOC001), and replace it with an open bottom structure that restores fish passage to high quality fish habitat.

Project Costs

LBIS 2015/16: \$86,034 LBIS 2016/17: \$50,645 PSF 2016/17: \$ 2,500 RFCPP 2016/17: \$53,500 *Total:* \$192,679

Total 2016/17: \$106,645

Project Results

The project objective was achieved with the removal of the closed bottom structure, and installation of an open bottom bridge. With the crossing structure replacement, the O'Cock River Tributary Fish Passage Restoration Project now provides fish access to at least 5000 linear metres of high quality upstream rearing and over-wintering habitat for *Oncorhynchus mykiss* (Rainbow trout), and likely also for *O. kisutch* (Coho salmon), *O. clarkii* (Cutthroat trout), and Salvelinus malma (Dolly Varden trout).

Project delivery thanks to Daniel Braun and Ken Yortson, BC Timber Sales – Stuart-Nechako.

2. Cypre River/Clayquot Fish Passage Remediation Project



Left photo: Before – Looking upstream toward the collapsed wood box culvert outlet prior Right photo: After – Looking upstream after removal of the collapsed wood box culvert

Project Objectives

The project objectives were to:

- Remove a collapsed wood box culvert (WBC) and a corrugated metal pipe (CMP), located at two CYP-3001 crossings, that was a barrier to fish passage access to upstream habitat including an off-channel habitat restoration site (Channel 23) on the Cypre River;
- Restore the streambed and stream bank at the CYP-3001 crossing sites following removal of the WBC and CMP; and
- Remove a collapsed WBC that was discovered at the restoration site during the deactivation work; this was included as an additional objective.

Project Costs

LBIS 2014-	2015: \$40,808		
LBIS 2016/	17: \$23,516		
PSF 2016/1	7: \$ 2,500		
RFCPP 201	6/17: <u>\$33,584</u>		
Total:	\$100,408	Total 2016/17:	\$59,600

Project Results

The project objectives were achieved with the removal of the two WBC and the CMP, and the restoration of the streambed and stream bank. With the deactivation of the CYP-3001 road crossing, the Cypre River Fish Passage Restoration Project now provides fish access to 550 linear metres, and 4,675 square metres, of upstream habitat for utilization by *Oncorhynchus tshawytscha* (Chinook salmon), *O. kisutch* (Coho salmon), *O. keta* (Chum salmon), *O. gorbuscha* (Pink salmon) as well as *O. clarkii* (Cutthroat Trout) and *O. mykiss* (Rainbow trout). This includes access to a 1999 fish habitat rehabilitation project where a groundwater-fed channel (Channel 23) was constructed along the right bank of the Cypre River.

Project delivery thanks to Dave Hamilton - BC Timber Sales - Strait of Georgia.

3. Tranquil Creek/Clayquot Fish Passage Remediation Project – Year One



Project Objectives

To restore 225 linear metres of high value habitat for Coho Salmon and Cuthroat Trout on Tranquil Creek by replacing a road crossing (TNQ-0005) culvert that is a barrier to fish passage with a fish-friendly crossing structure that provides for safe fish passage. The restoration of high value fish habitat should result in increased opportunities for recreational and aboriginal fisheries. The Clayquot Sound area where the Cypre River is located is important to several First Nations.

Project Costs

LBIS 2014-2015: \$30,068 LBIS 2016/17: \$39,639 PSF 2016/17: \$ 2,500 RFCPP 2016/17: <u>\$40,000</u> *Total 2016/17:* **\$112,207**

Total 2016/17: \$82,139

Project Results – Year One

In 2016/17 (Year One), a site plan was prepared, and the replacement bridge structure was purchased and delivered – with installation planned for 2017/18. In 2014-2015, fish passage assessments and habitat confirmations were undertaken.

Project delivery thanks to Dave Hamilton – BC Timber Sales – Strait of Georgia.

4. Lemon Creek Fish Passage Remediation Project – Year One



Project Objectives

To restore access to 5000 metres of fish habitat for rainbow and bull trout by replacing a culvert that impedes fish passage with an open bottom structure (arch culvert or bridge) on a tributary to Lemon Creek located in the Slocan Valley of BC. Bull Trout are classified as blue-listed by the British Columbia Conservation Data Centre as populations are declining throughout its global range due to habitat degradation, disruption of migration patterns and over fishing. This project will address 2 of 3 limiting factors. Rainbow Trout are a prized recreational sport fish and angling for them contributes to the local economy.

Project Costs

LBIS 2016/17: \$73,187 PSF 2016/17: \$ 2,500 RFCPP 2016/17: <u>\$40,000</u> *Total 2016/17:* **\$115,687**

Project Results

In 2016/17 (Year One), a site plan was prepared, and the replacement bridge structure was purchased and delivered – with installation planned for 2017/18.

Project delivery thanks to Phil MacDonald, BC Timber Sales – Kootenays.

5. Rock Creek Fish Passage Remediation Project – Year One



Project Objectives

To restore access to 2500 metres of high quality fish habitat for rainbow trout (spawning, rearing and over-wintering) upstream of crossing #58924 on Rock Creek (or a better crossing pending the outcomes of habitat confirmation work in 2016/17) by replacing a culvert that impedes fish passage with a fish friendly structure that provides for safe fish passage. Rainbow Trout are a prized recreational sport fish and angling for them contributes to the local economy.

Project Costs

 LBIS 2016/17:
 \$72,500

 PSF 2016/17:
 \$ 2,500

 RFCPP 2016/17:
 \$40,000

 Total 2016/17:
 \$115,000

Project Results

In 2016/17 (Year One), habitat confirmation work verified that the crossing was a priority for remediation, a site plan was prepared, and the replacement bridge structure was purchased and delivered – with installation planned for 2017/18.

Project delivery thanks to Phil MacDonald, BC Timber Sales - Kootenays.

6. Dead Horse Lake/Kuldo FSR Site 23 Fish Passage - Year One



Project Objectives

To restore access to 1500 metres of moderate value spawning habitat for rainbow trout by replacing a culvert that impedes fish passage with a fish friendly structure (likely an arch culvert) on a tributary of Dead Horse Lake located in the Skeena region of BC. Rainbow Trout are a prized recreational sport fish and angling for them contributes to the local economy.

Project Costs

LBIS 2016/17: \$8,838 PSF 2016/17: \$1,500 RFCPP 2016/17: <u>\$10,000</u> *Total 2016/17:* **\$20,138**

Project Results

In 2016/17 (Year One), a site plan was prepared, and the replacement embedded culvert structure was purchased and delivered – with installation planned for 2017/18.

Project delivery thanks to Alan Harrison and Gail Campbell, BC Timber Sales – Skeena.

7. Shuttleworth Creek/Kilmer FSR Fish Passage Remediation Project - Year One



Project Objectives

To restore at least 6.6 km of spawning and rearing habitat for Rainbow Trout, Longnose Dace, Redside Shiner, and Slimy Sculpin on Shuttleworth Creek which is a tributary of the Okanagan River located in the Southern Interior of BC near Penticton, BC.

Project Costs

LBIS 2016/17: **\$11,613**

Project Results

In 2016/17 (Year One), habitat confirmation work and a site plan was prepared, with purchase of replacement structure and installation planned for 2017/18.

Project delivery thanks to Megan Sheshurak, BC Timber Sales - Okanagan-Columbia

8. Coast South 700 Main Fish Passage Remediation Project



Left photo: Before – Significant constriction of channel with large rip rap Right photo: After remediation with installation of new clear span bridge

Project Objectives

To replace the existing road crossing with rip rap that restricts upstream fish access to high value fish habitat to times of high and moderate flow with a clear span bridge that enables a diversity of salmon and other species to have access to 1875 m2 of fish habitat.

Project Costs

LBIS 2016/17: \$90,000 BCTS 2016/17<u>: \$60,000</u> Total: **\$150,000**

Project Results

The habitat confirmation work, site plan, structure purchase and installation were all completed in 2016/17. BCTS provided additional funding to augment and partner with LBIS Fish Passage investments to help complete the project.

Project delivery thanks to Mike McCulley, BC Timber Sales - Seaward/tlasta

9. Jamieson Creek Fish Passage Remediation Project - Year One



Left Photo: Cross view of weir Right Photo: Upstream view from weir

Project Objectives

To remove a dam (weir) that is a barrier to fish passage and restore 9,250 m of habitat for Rainbow and Bull Trout, and 2,900 m of habitat for Coho Salmon. Before removing the dam, alternative sources of water need to be provided to water license holders; this will be accomplished by drilling to provide access to groundwater, and the installation of a pump and power.

Project Costs

LBIS 2016/17: \$85,000

Project Results – Year One

Groundwater well was drilled with pump and power installed. The dam (weir) removal will occur next fiscal year.

Project delivery thanks to Drew Alway, Southern Engineering Group, Engineering Branch, FLNR

10. Maxan Creek Fish Passage Remediation Project



Left Photo: Before with derelict bridge Right Photo: After removal of derelict bridge

Project Objectives

To remove the derelict Strimbold Bridge that is impacting fish habitat and likely a barrier to fish passage at some flows, and may pose a environmental risk if washed downstream due to flood event. Fish species present include Chinook, Coho, and Sockeye Salmon; Steelhead, Rainbow Trout, Dolly Varden, and Mountain Whitefish.

Project Costs

LBIS 2016/17: \$28,800

Project Results

An Environmental Mitigation Plan was prepared in fall 2015 and commented on by MOE, DFO and FLNR to determine work windows, acceptable procedures and disposal. The derelict bridge was removed in 2016/17 at a lower than expected cost (\$40,000 was original cost estimate). An Environmental Monitoring Report was prepared in July 2016.

Project delivery thanks to Rob Phillips, Nadina Forest District, FLNR

11. Date 1200 Fish Passage Remediation Project



Left Photo: Before installation of backwater weir Right Photo: After installation of backwater weir

Project Objectives

To restore fish passage to 275 m of upstream habitat for Cutthroat Trout by installing a backwater weir and breaching 4 abandoned beaver dams

Project Costs

LBIS 2016/17: \$6,200

Project Results

Project objectives were achieved by installing the backwater weir to allow fish passage through a culvert that was a barrier to fish passage, and by breaching 4 abandoned beaver dams. The Gitanyow Fisheries Authority (GFA) undertook the habitat confirmation field work in 2015 that confirmed that the fish-stream crossing at Date 1200 was a barrier to fish passage, and GFA was commissioned to carry out the remediation project in 2016 and prepare a report on the weir installation and beaver dam breaching work.

Project delivery thanks to Alan Harrison and Gail Campbell, BC Timber Sales – Skeena.