

BC Fish Passage Program Annual Report 2020–2021

A partnership between

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

and

Inter-Agency Fish Passage Technical Working Group



Ministry of
Forests, Lands, Natural
Resource Operations
and Rural Development



Ministry of
Transportation
and Infrastructure



Ministry of
Environment and
Climate Change Strategy

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1 BACKGROUND

Fish and other aquatic organisms inhabiting streams need to move freely (upstream and downstream) throughout their natural aquatic ecosystems. Different fish species and life stages require a variety of habitats at different times of the year. Human-made barriers such as road-stream crossings that block or delay fish movement can reduce the carrying capacity of the stream and therefore cause declines in fish population productivity. These barriers can also cause changes in fish community composition. Healthy, resilient fish populations are required to support recreational, commercial, and Indigenous food fisheries. Additionally, 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.

In 2007, the Assistant Deputy Ministers of the then named BC Ministry of Forests and Range and Ministry of Environment—in cooperation with Fisheries and Oceans Canada (DFO) and the Council of Forest Industries—formed the Fish Passage Program. Out of the Fish Passage Program came the establishment of an inter-agency Fish Passage Technical Working Group (FPTWG), which developed a four-phase Fish Passage Strategic Approach to guide delivery of the program:

1. Complete assessments of all road crossings in watersheds that are identified as of high value to fish;
2. Conduct habitat confirmation assessments at crossings assessed to be the best candidates for remediation to determine actual habitat value to be gained as a result of the remediation;
3. Prepare site plans and designs to determine the most effective structure to remediate priority crossings identified in step two; and
4. Remediate the crossings to restore fish passage, typically by purchasing and installing new fish-friendly structures (e.g., culverts and bridges) or deactivating the road crossings (e.g., for non-status roads).

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

The undertaking of projects on-the-ground is primarily accomplished through agreement between the FPTWG and BC Timber Sales (BCTS); however, district and regional staff may also lead the delivery of some projects. For instance, FPTWG has been working with the Ministry of Forests, Lands, Natural Resource Operations and Rural Development (MFLNRORD) Natural Resource District staff to prioritize and remediate problem road-stream crossings. Between 2008 and 2020 the Fish Passage Program has remediated 182 road stream crossings, restoring fish access to 815.6 km of habitat (Table 1). BC's Land Based Investment Strategy (LBIS) funded the Fish Passage Program in 2018, 2019, and 2020. The 2020 Fish Passage Program budget totaled \$1.0 million from LBIS. The purpose of this annual report is to summarize the remediation projects undertaken by the Fish Passage Program in 2020–2021 in BCTS Business Areas and MFLNRORD Districts (Table 2).

Table 1. Summary of remediation projects completed from 2008 to 2020.

Fiscal Year	Expenditure (millions)	Crossing Assessments	Installed Culverts	Installed Bridges	Deactivations	Crossings remediated	km fish habitat 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
2017/18	\$1.2**	156	3	2	1	7#	26.4
2018/19	\$1.0	62	1	2	0	3	12.0
2019/20	\$1.0	156	0	4	2	6	8.9
2020/21	\$1.1	-	1	4	-	5	11.1
Total	\$23.3	>26,315 ##	65	51	39	182	815.6

Notes: * denotes FIA funding; ** includes RFCPP funding; # includes removal of one small dam; ## includes some assessments completed on non-fish bearing streams. From 2002/03 to 2007/08, an additional \$18.5 million was spent from the Forest Investment Account (FIA)

Table 2. Summary of remediation projects completed in 2020.

Project	Location	2020 Costs	Remediation	Habitat Gain	Fish
Burman River	Vancouver Island	\$485,700.50	Created three groundwater channels and a wetland; Two bridge installations	632 m (stream) 690 m ² (wetland)	Coho Salmon, Cutthroat Trout
Loveland Bay	Vancouver Island	\$189,603.09	Replacement of an existing collapsed wood box culvert with an embedded culvert and stream rehabilitation	521 m	Rainbow Trout, Cutthroat Trout
Freeman Creek	Kootenays	\$123,230.00	Replacement of a culvert with a bridge and environmental monitoring	4,100 m (moderate value rearing habitat)	Westslope Cutthroat Trout, possibly also Bull Trout and Rainbow Trout.
Gollen Creek	Thompson Rivers District	\$308,773.44	Replacement of a culvert with a concrete slab 24 m long bridge	6,000 m (~370 m is high value spawning and rearing habitat)	Sockeye Salmon, Chinook Salmon, Coho Salmon, Pink Salmon, Steelhead, Bull Trout, Rainbow Trout
Total		\$1,107,307	4 remediation projects	11,253 m of stream 690 m² of wetland	

2 BCTS BUSINESS AREAS

2.1 Strait of Georgia

2.1.1 Burman River

Project Manager

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LBIS Project Number

71332032

Objectives

- To create groundwater channels at the location of several abandoned channels that became disconnected from the Burman River mainstem as the result of naturally occurring landslides.
- To install two clear-span bridges to allow for fish access into the channels upstream of the Burman mainline.
- To increase the amount of accessible off-channel salmonid spawning and rearing habitat in the Burman River watershed.

Location

The Burman River is located on the west coast of Vancouver Island and flows into Matchlee Bay south-east of the Gold River. The restoration site is located roughly 7 km up the Burman Mainline on the north side of the river.

Implementing Partners

BC Timber Sales - Strait of Georgia Business Area, LBIS, Canadian Wildlife Federation (CWF), M.C. Wright and Associates Ltd., Far North Contracting Ltd.

Introduction

Many areas of the Burman River have lost connectivity to off-channel habitat. In some locations there has been a significant loss or reduction in available spawning and rearing habitat as the result of channel aggrading.

During a fish habitat assessment completed in 2005 several areas were identified as high priority for restoration, including a site located at approximately 7.0 km on the Burman Mainline. The site consisted of several vegetated linear depressions that were once channels connected to the Burman River. The former channels were cut off from the Burman River

by a landslide that occurred in June of 1946. The depressions at this site presented a good opportunity for the creation of groundwater channels as the minimal excavation would be required to access the groundwater table.

Assessment and Prescription

In 2019, a prescription was developed for the creation of a network of interconnected groundwater channels and a small wetland at the 7.0 km site. In addition, two clear span bridges were designed to allow for unimpeded fish passed to the groundwater channels upstream of the Burman Mainline.

Work Completed

Restoration works took place between August 17 and October 7, 2020. Overburden and alluvial material was excavated from the abandoned channels, which resulted in the creation of three groundwater channels and a small wetland. Excavated material was end-hauled and spoiled along a deactivated spur off the Burman Mainline. Stumps and riprap were placed in the completed channels to increase habitat complexity and stabilize the banks. Banks were planted with spruce saplings and sward fern salvaged from the adjacent forest. In addition, two steel deck portable bridges on lock-block footings were installed where the channels cross the Burman Mainline.

Results

Three groundwater channels and a small wetland totaling 10,031 m² (bankfull area) or 943 m (linear length) of aquatic habitat were created. The total volume of material excavated during the works was 10,822 m³. The total habitat gained index upstream of the Burman mainline resulting from the installation of the two bridges was 632 m.

Follow up monitoring was completed starting in October of 2020. Juvenile Coho Salmon and Cutthroat Trout were observed throughout all three of the channels and in the wetland, and evidence of adult salmonid spawning activity was observed in numerous locations. Woody debris and rock structures were stable and no bank erosion was observed. Time lapse cameras and a water level/temperature logger were installed to continuously monitor site conditions into the spring of 2021.

Costs

Year	Component	Cost
2019	Assessment and Prescription Development - LBIS	\$8,877.20
	Bridge Design - LBIS	\$6,847.39
	40' bridge purchase - LBIS	\$70,050.00
2020	Construction Guidance and Monitoring - CWF	\$114,285.71
	Stonecroft install and raise - LBIS	\$13,315.01
	Construction Guidance and Monitoring - LBIS	\$6,966.32
	Equipment, labour, and 60' bridge purchase - CWF	\$293,483.60
	Equipment - LBIS	\$57,649.89
	Total	\$571,475.12

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Plate 1. Looking downstream toward one of two bridge sites before restoration.



Plate 2. Looking downstream toward one of two bridge sites after restoration.



Plate 3. Looking upstream in one of the vegetated depressions before restoration.

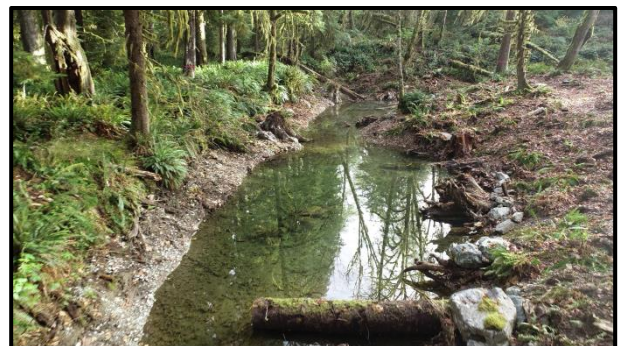


Plate 4. Looking upstream in one of the vegetated depressions after restoration.

2.1.2 Loveland Bay

Project Manager

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LBIS Project Number

71LC148F1

Objectives

- To remove an existing collapsed wood box culvert (WBC) that was a barrier to fish access to 520 m of spawning and rearing habitat upstream of the crossing at 4.8 km on the Loveland Bay Road.
- To install a 2700 mm diameter 36 m long CMP with a simulated streambed.
- To rehabilitate the streambed 50 m upstream and downstream of the crossing.

Location

The crossing structure is located at 4.8 km on the Loveland Bay Forest Service Road (FSR; 50°03'07.8"N, 125°23'16.9"W) on Vancouver Island. The unnamed S3 stream drains directly into John Hart Lake, which is northwest of Campbell River, BC.

Implementing Partners

BC Timber Sales - Strait of Georgia Business Area; Land Based Investment; Ministry of Transportation and Infrastructure; MFLNRORD; Night Train Contracting Inc.; BRAT XP; M.C. Wright and Associates Ltd; A-tlegay Fisheries Society; StoneCroft Engineering

Introduction

In January 2018, M.C. Wright and Associates Ltd. was tasked by BC Timber Sales to conduct fish passage culvert assessments in the Sayward Forest. The WBC at 4.8 km of Loveland Bay FSR was found to be a barrier. A confirmation assessment completed in February 2018 determined that there was high value habitat upstream of the culvert.

Assessments and Prescriptions

The crossing was surveyed November 2018 by StoneCroft Engineering. The Engineering team determined that a 2700 mm x 36 m embedded culvert was the best option for restoring fish access to fish habitat upstream of the crossing. During site reviews it was also determined that some channel rehabilitation (approx. 50 m) would be required upstream and downstream of the crossing. Final designs were completed in May 2020.

Work Completed

Installation of the embedded culvert and rehabilitation of the stream were completed between June 23 and July 15, 2020.

Results

The works restored Rainbow Trout and Cutthroat Trout access to spawning and rearing habitat upstream of the crossing. The total habitat gained index was 521 m. Also, a total of 40 m upstream and 36 m downstream of spawning and rearing habitat was rehabilitated, improving fish access to the culvert outlet and access to fish habitat upstream of the crossing.

Costs

Component	Cost
Construction	\$114,125.00
Materials	\$23,544.00
Professional Services	\$51,931.18
Total Cost	\$189,603.09

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Plate 1. Looking upstream at the downstream side of the road prism. The collapsed WBC outlet is covered with road material that has slumped into the channel.



Plate 2. Looking downstream at the embedded culvert and rehabilitated stream channel.



Plate 5. The completed road.



Plate 3. Looking upstream toward the embedded culvert outlet at the end of the project.



Plate 4. Looking upstream at the completed stream rehabilitation and the embedded culvert inlet.

2.2 Kootenays

2.2.1 Freeman Creek

Project Manager

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Objectives

To replace a culvert that was impeding fish passage with a bridge on Freeman Creek, which drains into West Yahk River near Yahk, BC.

Location

The culvert was in a pond off Yahk-Meadow Creek Rd, approximately 18 km south of Yahk, BC (49°01'47.4"N, 115°52'29.6"W).

Implementing Partners

BC Timber Sales – Kootenay Business Area, LBIS
Fish Passage Technical Working Group, CWF,
MFLNRORD Range

Work Completed

In Sept 2020, a sediment fence was installed at the downstream end of the work zone, at the entrance to the pond, to both contain sediment generated upstream as well as to facilitate fish, amphibian, and reptile salvage. The old culvert was removed, and a 12 m concrete girder bridge was installed. The streambed was recontoured and widened and large woody debris root wads were installed in the stream to provide complex habitat. Vegetation salvaged prior to beginning construction was replanted around the stream and additional riparian planting was completed. Cattle exclusion fencing was installed around the plunge pool.

Results

The project restored access to 4.1 km of moderate value rearing habitat for Westslope Cutthroat Trout (blue-listed) and possibly also Bull Trout and Rainbow Trout.

Costs

Year	Component	Cost
2018	Habitat confirmation assessment	\$3,000
	Environmental Management Plan	\$1,800
	Engineering site survey and control	\$3,000
	Engineering design and drawings	\$4,500
	Fabricate 12 m girder bridge	\$80,400
2020	Bridge installation contract	\$82,000
	Engineer supervision, sign-off	\$8,400
	Project foreman supervision	\$2,400
	Environmental monitoring	\$10,800
	BCTS 10% admin overhead	\$19,630
Total		\$215,930



2.3 Kamloops

No projects were completed in this area in 2020–2021.

2.4 Okanagan Columbia

No projects were completed in this area in 2020–2021.

2.5 Haida Gwaii

No projects were completed in this area in 2020–2021.

3 MFLNRORD DISTRICTS

3.1 Thompson Rivers Natural Resource District

3.1.1 Gollen Creek

Project Manager

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Objectives

To remove a 30 m x 3 m diameter culvert that was a barrier to fish passage and replace it with a concrete slab 24 m long bridge, which would restore access to approximately 6 km of habitat for Sockeye, Coho and Chinook Salmon and resident species such as Bull Trout, Rainbow Trout and Kokanee.

Location

Gollen Creek Forest Service Road at 5.5 km (51°27'58.01"N, 119°31'22.98"W). Gollen Creek drains into the Upper Adams River.

Implementing Partners

Canadian Wildlife Federation (CWF), BC Government, LBIS

Introduction

Gollen Creek has historically supported all species found in the Adams River but the lower reach is prone to dewatering in the late summer to early fall, limiting fish access.

Work Completed

A habitat assessment, site plan, and initial site preparations were completed in 2018/19. The bridge structure was purchased in 2019/20. The bridge was installed in 2021/20.

Results

The bridge was installed, restoring access to 6 km of habitat for the above-mentioned fish species, ~370 m of which is high value spawning and rearing habitat.

Costs

Year	Partner	Cost
2019	LBIS	\$220,371.00
	CWF	\$75,000.00
2020	MFLNRORD	\$47,373.60
	LBIS	\$261,399.84
Total		\$599,239.44

