

**DAVE MARSHALL SALMON RESERVE  
RESTORATION, MAINTENANCE, AND UPGRADES**

**COA-F17-F-1343  
YEAR END REPORT**



Prepared for:  
Fish and Wildlife Compensation Program

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Prepared with the financial support of the Fish and Wildlife Compensation Program on behalf of its program partners: BC Hydro, the Province of BC, Fisheries and Oceans Canada, First Nations, and Public Stakeholders

May 11, 2017

## **Executive Summary**

The Dave Marshall Salmon Reserve Restoration project focused on restoring, upgrading, and maintaining several ground water and river intake channels of the Cheakamus River. The project is located at the Cheakamus Centre (School District #44) in Squamish, British Columbia. The project targeted habitat improvements for coho, chum, pink, Chinook, and steelhead salmon. As well, benefits extend to other salmonid, amphibian, bird and wildlife species.

The project fits within the directives identified in the Cheakamus Watershed Salmonid Action Plan as noted in Table 2 under Habitat Based Actions: a) Maintain existing constructed habitat enhancements for all salmonids; and b) Improve existing side channels and off-channel areas for all salmonids.

This project builds upon the work undertaken in the 3 phases of Evans Creek Re-watering projects funded by FWCP and links to and benefit the Evans Creek Re-watering project but is a standalone project in that it concentrates on upgrades and improvements to the Dave Marshall Salmon Reserve.

There were slight modifications to the works schedule in the 2016/2017 season. The intake at Far Point was upgraded to a 3' diameter pipe along with a new intake structure and the Far Point head pond was cleaned out early in 2016. The field season concentrated on upgrades to weir structures and flow split upgrades at Coho Connector and Birth of a Stream North and South, removal of obstructions and woody debris in Wountie Channel and Mykiss Channel, and bridge upgrades at various locations including Birth of a Stream North and South. Cleanup of Gorbuscha Channel and Duck Pond head ponds were also completed. The valve replacement of Eagle Point Intake was also completed replacing the butterfly valve with a more robust flow control structure. The extension of Kiwi Channel now ties directly into the downstream Evans Creek Re-watering project.

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## 1.0 Introduction

The “Dave Marshall Salmon Reserve Restoration and Upgrades” project included improvements to flow structures, in-stream diversions, and upgrades to weirs and bridge structures along with extension of channels to connect downstream into the Evans Creek Re-watering project. This project resulted in direct benefits to salmonids, in particular focusing on rearing and overwintering habitat as well as spawning habitat for coho, chum, pink, and steelhead salmon. This project is a partnership of the Cheakamus Centre (School District #44), Fisheries and Oceans Canada, Squamish Nation, and the Squamish River Watershed Society, along with BC Hydro and is the direct result of collaboration from all these parties with a commitment towards healthy salmon stocks.

## 2.0 Goals and Objectives

Upgrading the intakes, wooden flow structures, culverts and bridge crossings; cleaning out debris clogging the intakes; extending and restoring river fed and ground water channels; and overall maintaining the overall function of the channels

### Tasks:

- Far Point intake upgraded to 3' diameter pipe and new intake structure.
- Far Point head pond cleanout.
- Coho Connector primary flow split restructured.
- Birth of a Stream North flow split restructured and new bridges installed.
- Birth of a Stream South flow split restructured and new bridges installed.
- Upper end of Wountie Channel restructured and re-watered.
- Upper end of Mykiss Channel restructured and re-watered.
- Gorbuscha intake head pond cleanout.
- Duck Pond intake head pond cleanout.
- Eagle Point intake valve replacement.
- Kiwi Channel Extension

The results from the project have helped to provide improved and year-round base flows from the Far Point intake into the off-channel habitat on the west side of Paradise Valley Road resulting in over 5,500 m<sup>2</sup> in spawning habitat and 25,000 m<sup>2</sup> in rearing and over-wintering habitat. The addition of over native riparian plants will, in time, provide shade and streamside protection for juvenile salmonids. The new structures and weirs will provide better passage for adult fish and improved flows into the side-channels creating over 2,000 m<sup>2</sup> of improvements to pool riffles, by-pass channels, habitat complexing, and removal of nuisance vegetation.

This project benefits primarily coho, chum, pink, steelhead salmonid in all their life stages and, to a lesser degree, juvenile Chinook salmon. Rainbow trout, char, and other salmonids also benefit from these upgrades, improvements, and channel extensions.

### 3.0 Study Area

The salmon habitat restoration sites are located on the west bank of the Cheakamus River downstream of the Paradise Valley Road Bailey Bridge. The project is within the lands managed by the Cheakamus Centre, School District 44 (North Vancouver) designated as District Lots 1245 and 1244 within the New Westminster Land District. The project is within the Squamish Nation territorial lands. Maps covering the site are Natural Resources Canada National Topographic System 92G/14 and GeoData British Columbia Terrain Resource Information Management 92G.085 (see map/drawing at end of report).

This portion of the Cheakamus River floodplain is within the “Dave Marshall Salmon Reserve” and contains an extensive network of restored fish habitats that have been constructed over the past thirty years. The area is separated from the main river by dikes, which provide a degree of protection to the restored habitats during significant floods.

### 4.0 Methods

Most of the work was undertaken using 200 series excavators to access the site, remove the old weirs and install the new structures. Gravel and aggregate were trucked into the sites to improve trails, roads, and provide spawning gravels within the streams. State of the art new bridge decking was used to replace the old wooden structures. Most of the larger bridge upgrades and replacements were undertaken with manual labour and on-site construction.

### 5.0 Results and Outcomes

The results include:

- Improved water flows to over 5,500 m<sup>2</sup> of spawning habitat;
- Benefits and improvements for over 25,000 m<sup>2</sup> rearing and over-wintering habitat;
- Riparian planting of over 500 native riparian trees and shrubs (see detailed planting summary below);
- Engagement of 25 volunteers from Squamish Nation, Cheakamus Centre and the larger Streamkeeper community;
- Over 2,000 m<sup>2</sup> of improved habitat from weir upgrades, improvements to pool riffles, by-pass channels, and removal of nuisance vegetation.

Physical results include:

- Far Point intake upgraded to 3' diameter pipe and new intake structure.
- Far Point head pond cleanout.
- Coho Connector primary flow split restructured.
- Birth of a Stream North flow split restructured and new bridges installed.
- Birth of a Stream South flow split restructured and new bridges installed.
- Upper end of Wountie Channel restructured and re-watered.
- Upper end of Mykiss Channel restructured and re-watered.
- Gorbusha intake head pond cleanout.
- Duck Pond intake head pond cleanout.
- Eagle Point intake valve replacement.
- Kiwi Channel extension extending 300 m south into Moody's Channel.
- Riparian grass seeding.

## **6.0 Discussion**

This project was the result of natural changes within streams and watercourses which alter base flows, overwintering and spawning habitat as well as natural weathering of structures, such as bridges, weirs, and intakes. The project began with improved flows entering into the Far Point intake and structural changes to that intake and intake channels, including removal of silt and debris from the intake and intake channel. Replacement of older bridges and weirs and improvements to trails have resulted in overall improvements to the function of the off-channel habitat. Bridge upgrades were undertaken at Birth of a Steam South and North channel, Coho Intake Channel, and Far Point Channel intake. The head ponds at Gorbuscha Channel intake and Duck Pond Intake were cleaned out of silt and debris. Woody debris build up at Wountie Channel and Mykiss Channel was cleared up and removed, thereby opening up the channel flows and improving access for salmonids. Works on Kiwi Channel South extension channel have increased over 300 linear metres of new channel habitat for rearing, spawning, and overwintering salmonids.

This project has involved partnerships with Squamish Nation and Cheakamus Centre (School District #44) along with Fisheries and Oceans staff to continue long-term benefits for the Dave Marshall Salmon Reserve and downstream Evans Creek and Moody's Channel restoration project.

Some of the challenges faced this year was the overly long winter period that extended from early December until late March which prevented access to the site due to unprecedented accumulation of snow. With the extension into May the final bridge upgrades, channel extensions, and culvert replacements were completed.

## **7.0 Recommendations**

The Cheakamus Centre is an important educational facility that provides hands-on learning opportunities for thousands of students annually to learn about salmon, our streams, and the importance of a clean environment. Due to the limited access by salmonids downstream of the Daisy Reservoir, projects such as this one which provide valuable off-channel habitat for spawning and rearing salmonids allows for healthy salmon populations and stocks to return to the Cheakamus River. Long-term monitoring and on-going upgrades to the existing structures, channels, rearing ponds, and flow are all important to ensuring healthy salmon stocks in the watershed for years to come. The project was impacted by the early winter conditions that began in early October and extended until late March resulting in delays in completing the works as per the intended scheduling. An extension by FWCP allowed the project to be completed as originally intended.

## **8.0 Acknowledgement**

We would like to thank Fisheries and Oceans Canada and the financial support of the Fish and Wildlife Compensation Program for this project.

We would also like to take this time to thank:

- Cheakamus Centre
- Squamish Nation

- Dave Nanson, Al Johnson and other Fisheries and Oceans Canada for all of their assistance; and
- Whistler Excavating Ltd, Atwell Contracting, & John Hunter Company

## 9.0 References

BC Hydro Fish and Wildlife Compensation Program Cheakamus Watershed Salmonid Action Plan. Final Draft. October 2011.

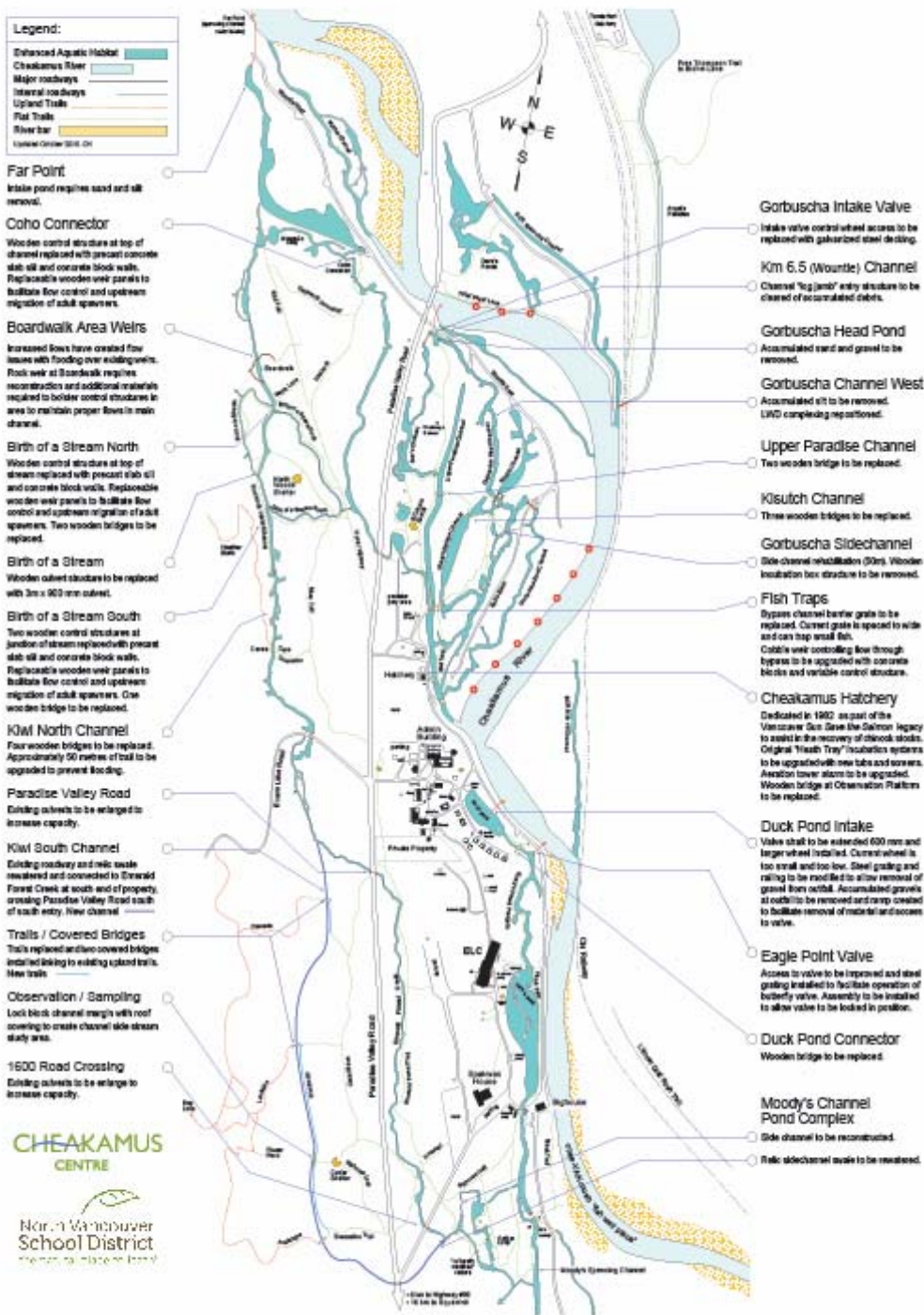
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Melville, M. and D. McCubbing. 2000. *Assessment of the 2000 Juvenile Salmon Migration from the Cheakamus River, using Rotary Screw Traps (draft)*. Prepared for BC Hydro, Burnaby. 36 p. + appendices

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# CHEAKAMUS CENTRE

## Dave Marshall Salmon Reserve



Site Map of Cheakamus Centre Off-Channel Habitat

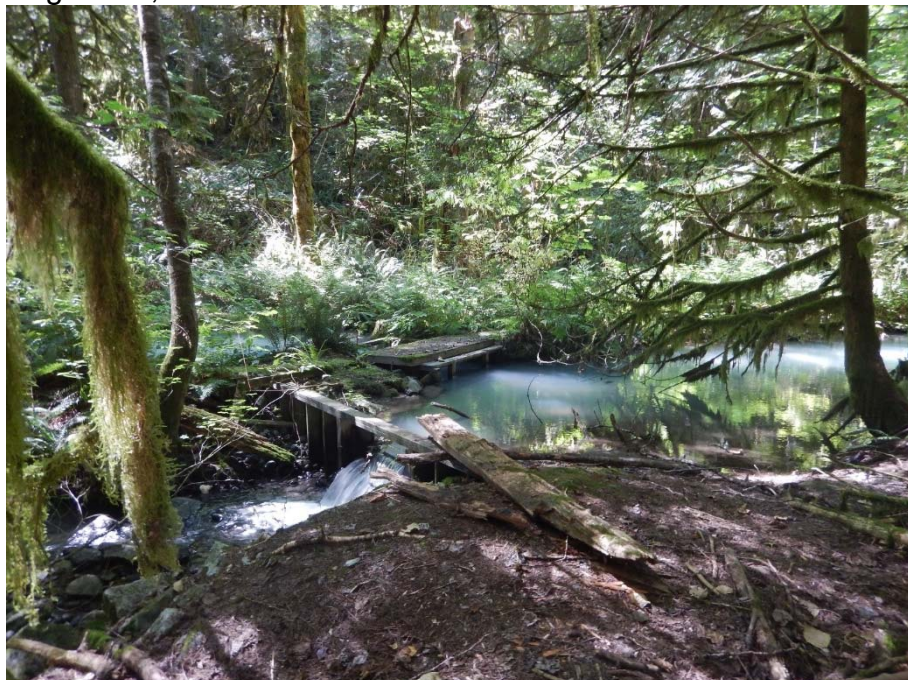


**8.0 Photos**  
June 7, 2016



Representatives from Fisheries and Oceans Canada visit the site

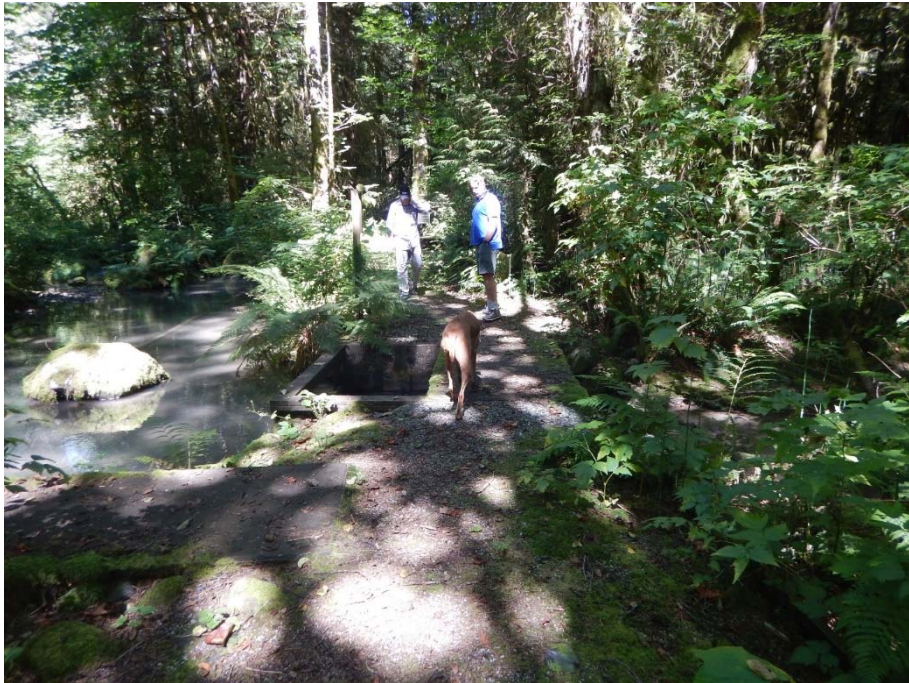
August 11, 2016



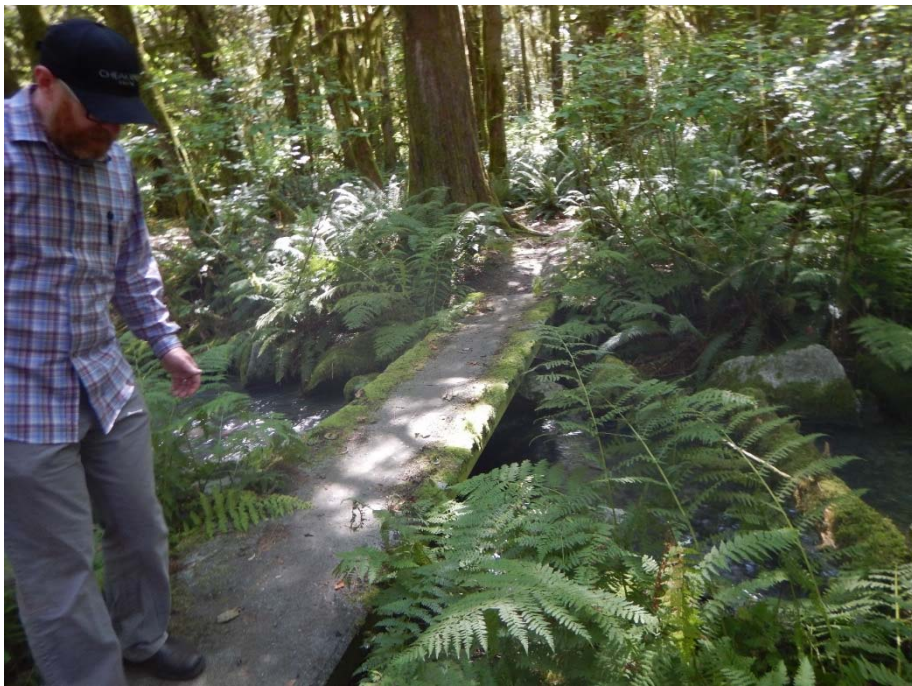
Facing west towards Birth of a Stream South (note weir in foreground and bridge in background)



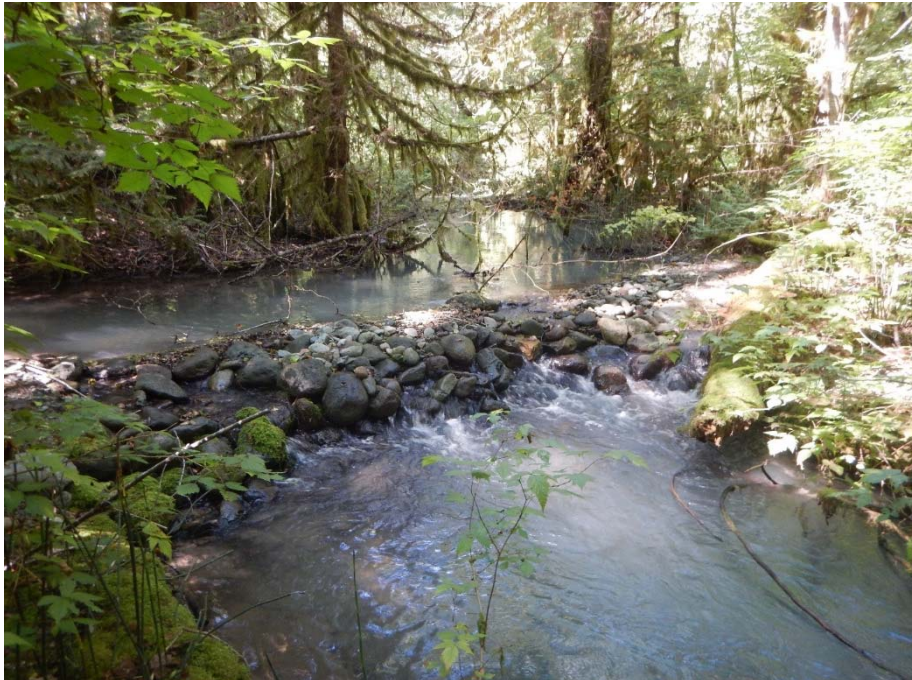
Facing north towards Birth of a Stream North foot bridge



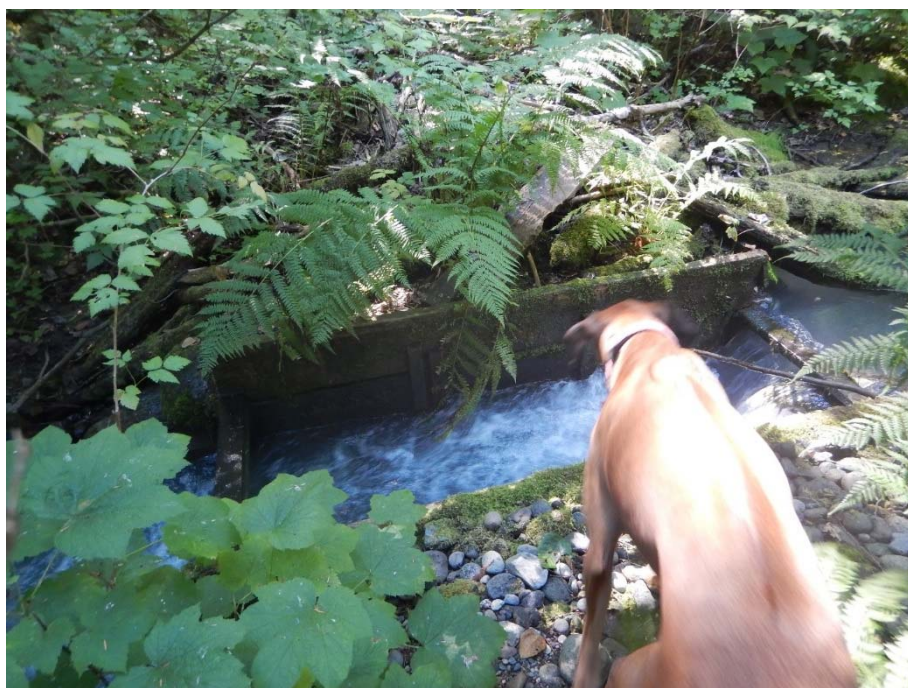
Facing north towards Birth of a Stream North weir



Facing west towards foot bridge to be replaced/upgraded (south of Coho Connector)



Rock weir hand built due west of foot bridge (just south of Coho Connector)



Facing west towards Coho Connector Weir

August 23, 2016 – Eagle Point Valve



Looking down into Eagle Point Valve (prior to upgrade)

February 28, 2017 – Completed Works



Birth of a Stream South – replaced foot bridges and weir and improvements to flow structures



Birth of a Stream South – replaced foot bridges, replaced weir, in-stream flow diversion structures



Coho Connector – replaced weir with lock blocks and new in-stream flow structure



Mykiss Channel (east side of Bailey bridge – facing downstream on Cheakamus River) – removal of log jam and woody debris build-up



Close up of Mykiss Channel woody debris has been removed