

RESTORING FLOODPLAIN HABITAT

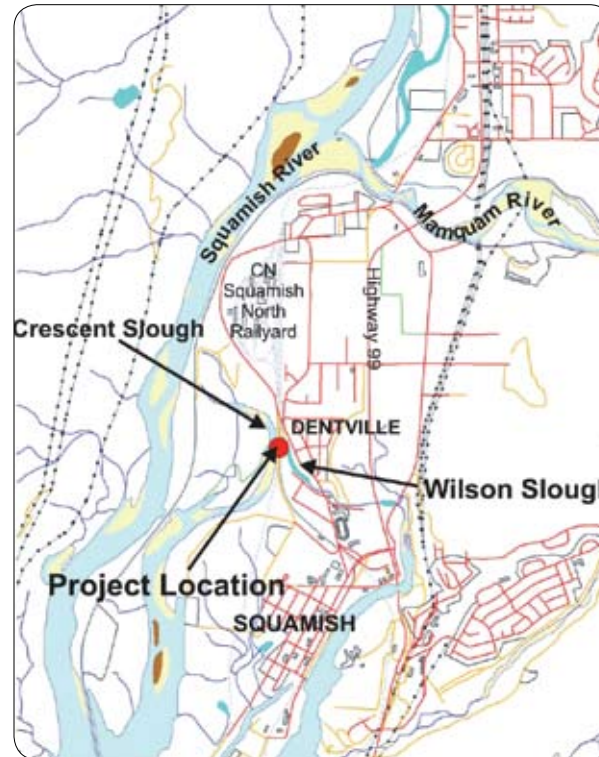
This project was designed to re-connect Wilson Slough to Crescent Slough of the Squamish River Estuary in order to improve water quality and fish passage. The project is part of the Mamquam Reunion Project which has been underway in Squamish for several years and was initiated by local environmental stewardship groups.

Project design was completed through an active partnership with the District of Squamish who maintains and operates the automated control valve.

RESULTS

Project planning and consultation took place between July 2006 and July 2007. Construction commenced in October 2007 and was completed in May 2008. The project involved installation of a 75 metre long culvert under two roads and three sets of railroad tracks with an automated gate valve to control water flow.

The Wilson Slough re-connection project provides an important link between the western and eastern portion of the estuary. The project has resulted in increased tidal flushing and improved water quality to enhance rearing conditions for juvenile fish such as chinook and pink salmon as well as other fishes.



CN remains committed to the recovery of the Cheakamus River and continues to work together with environmental consultants and experts on fish recovery and habitat enhancement.

CN Environment is a member of the Cheakamus Ecosystem Restoration Technical Committee (CERTC), which includes additional representation from District of Squamish, Fisheries and Oceans Canada, BC Ministry of Environment and Squamish Nation.

For more information on the recovery of the Cheakamus River, visit www.certc.ca.



Wilson Slough Re-connection

CHEAKAMUS RIVER RECOVERY



PROJECT PHASES

In cooperation with Fisheries and Oceans Canada and the District of Squamish, CN developed a conceptual plan for the re-connection project. Much of the project was based on information from Hay and Company's 2005 Mamquam Blind Channel Integrated Watershed Management Plan, which conducted a review of tidal flushing capacities in the Mamquam Blind channel and recommended various methods of improving water quality.

Multiple methods of construction were used for culvert installation to minimize environmental impacts and reduce local access inconvenience. In total there were five phases to the project.



PHASE 1: SITE PREPARATION

- Removed vegetation to create access and laydown areas for equipment operation
- Installed modular fencing to deter public access
- Notified local residents and Emergency Services of impending road closures required for construction

PHASE 2: PIPE BORING & AUGERING

- Installed a well-point dewatering system to lower ground-water levels in worksite vicinity
- Excavated a pit (bell hole) for augering equipment to install the new culvert
- Bored and augered a 73.5 m long by 1 m diameter steel pipe below three roads and three sets of railway tracks
- Filled in bell hole, removed dewatering system and re-contoured surrounding area
- Implemented erosion control measures to reduce run-off from disturbed areas

PHASE 3: HEADWALL CONSTRUCTION

- Worked at low tides to enable sensitive works to be done in the dry
- Installed a temporary berm to isolate the worksite within Wilson Slough
- Pumped water out of site into vegetated areas where it could slowly infiltrate back into the soil
- Used concrete lock-blocks to create headwalls with sloping faces around each end of the pipe

- Poured concrete around each end of the pipe, and implemented best management practices to contain uncured concrete and prevent entry into local waterways
- Armoured banks around the headwall with riprap to ensure bank stability
- Installed a monitoring well and staff gauges to assess local water levels

PHASE 4: AUTOMATED GATE INSTALLATION

- Installed an automated screw valve on the Squamish estuary side of the project, controlled by water level sensors located in a monitoring well in Wilson Slough
- Installed a flap gate on the Wilson Slough side to ensure one way flow of fresh water through the culvert and into Wilson Slough
- Installed debris screens on the sloped faces of each headwall

PHASE 5: CHANNEL RE-CONNECTION

- Set sensors in the monitoring well to levels suggested by Fisheries and Oceans Canada
- Connected power to the system and began operation in late May 2008
- Visual inspections of operation confirm the gates open and close with tidal fluctuations
- After project completion, operation of automated gate was turned over to the District of Squamish to ensure water levels could be controlled locally