

MILESTONE RIVER FISH BYPASS CHANNEL

A bypass channel was constructed to help migrating Coho salmon navigate around several barriers in the Millstone River. The bypass channel concept was chosen over a series of traditional fish ladders because it had less impact on the river (function and aesthetics), was less expensive, could provide spawning and rearing opportunities, and could serve as a community education platform.


Why do we need the Millstone Side Channel?

The Millstone River drains from Westwood, Diver and Brannen Lakes. Many of the small streams feeding into these lakes contain good spawning gravel for coho and steelhead. In addition, the upper reaches of the Millstream have deep, slow moving water with lush overhanging vegetation that provide an ideal nursery for salmon fry.

In the past, the lower section of the Millstone River flowed rapidly as it traveled through Bowen Park with the water cascading over rocks and waterfalls until it reached the last quarter mile where it opens into the harbour. These cascading rapids made it virtually impossible for salmon to reach the spawning grounds above.

The Estuary located here has been impacted by development; however, it still contains eel grass beds, and the protective waters of the Nanaimo harbour provide shelter and feed for salmon smolts.

In order to replenish the salmon population in this area, upgrades needed to be made.



Today there are numerous signs like this one along the trail that follows the channel. This has made an already popular park in Nanaimo more popular and a vibrant part of the city.

About the Millstone Side Channel

Fisheries and Oceans Canada, The City of Nanaimo, The Pacific Salmon Foundation, The Nanaimo Fish and Game Protective Association, The Island Waters Fly Fishers and the Georgia Basin Living Rivers Program and many other sponsors and volunteers partnered together to create the Millstone Nature Side Channel.

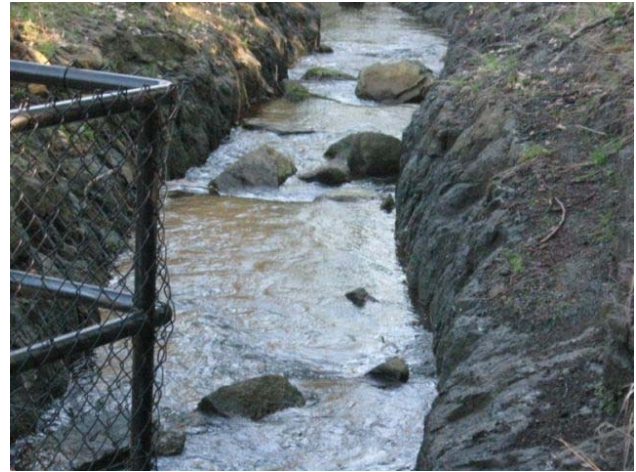
The 800 metre long side channel creates new habitat for coho salmon that bypasses a series of waterfalls in Bowen Park. Those waterfalls presented a barrier to fish preventing them from reaching productive spawning and rearing habitat above the falls. The project now enables fish to migrate and spawn in the upper watershed and tributaries in the Brannen Lake area.

The idea and design of the channel came from Fisheries and Oceans Canada, and the project is part of a plan to re-build coho populations in the area. With this improved access, it is hoped that a self-sustained salmon run will be established in the middle of the City. The side-channel will also benefit cutthroat and steelhead trout.

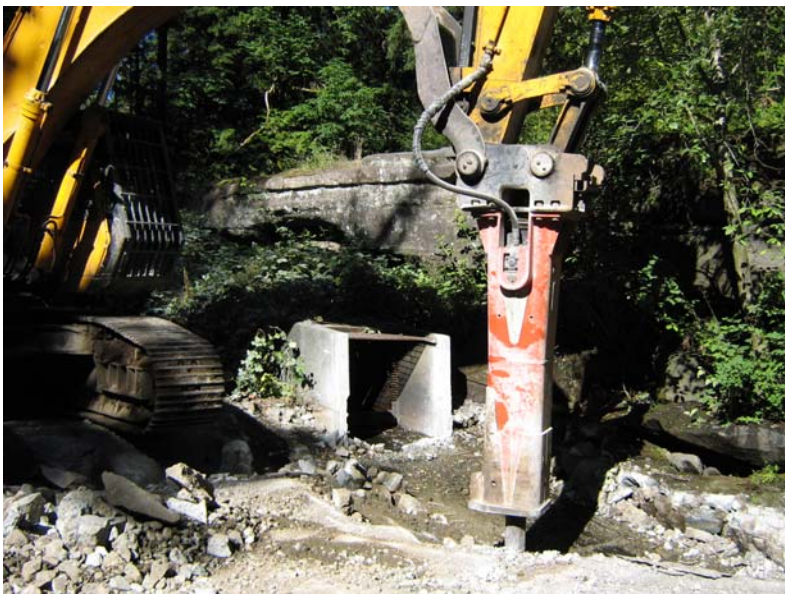
The channel was constructed on the left bank of the Millstone River in Bowen Park. At the upstream end the channel flow is diverted from the Millstone River through the concrete intake structure. The purpose of the structure is to restrict flood flows into the bypass channel so that erosion and sedimentation is limited. Also, adult migrating salmon must swim upstream through the intake at various river stages. For low summer flow conditions the intake is designed to divert no more than 10% of the Millstone River; the intake is fully adjustable through orifice plate and weir modifications.



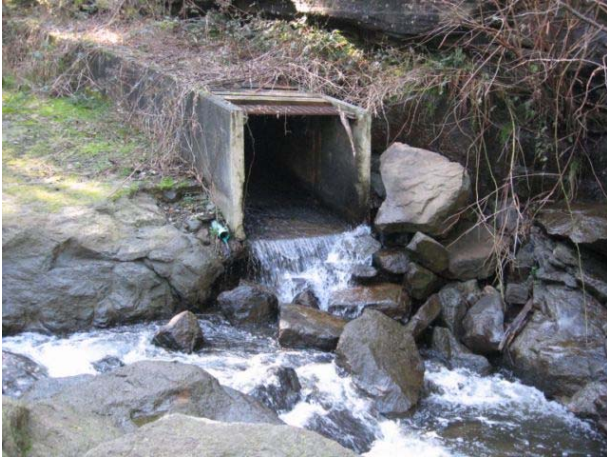
Intake structure



Channel below intake



Near the outlet the channel connects with the old fishway structure. The old fishway structure was modified to prevent upstream fish migration, but the additional flow helps attract fish to the bypass channel outlet at the base of the falls.



Large Woody Debris (LWD) was placed in the channel and ponds to provide approximately 20% coverage. Small spawning gravel platforms were constructed throughout the project. The Bowen Park trail system was modified to incorporate viewing and walking areas near the channel. Three new footbridges were constructed over the channel.



During the construction phase of the project the Millstone Parkway was closed to vehicle traffic and volunteer teams answered questions from the public about the project, directed foot and bicycle traffic around the construction zone, and provided site security during daylight hours. A professional security firm was contracted for site security during nighttime hours.

The volunteer teams consisted of members from the **Nanaimo Fish and Game Associations** and the **Island Waters Flyfishers**.



In general, the channel was constructed with a three stage approach. The first stage saw the removal of the vegetation and overburden (soil) down to the bedrock. For the second stage a channel was chipped into the bedrock, and the third stage required careful placement of wood, riprap, and gravel in the channel to create fish habitat features.

Project funding was provided by the Pacific Salmon Commission, Pacific Salmon Foundation, TimberWest, Cliff Jackman, Christopher Van Twest, BC Conservation Foundation, Nanaimo Fish & Game Association, BC Hydro, City of Nanaimo, and the Ministry of Transportation for a total of \$288,000. Donations in kind were provided by Nanaimo Fish & Game Association, Island Waters Flyfishers, Department of Fisheries & Oceans, City of Nanaimo, Roc Tech Contracting Ltd., Island Aggregates Ltd., Copcan Contracting Ltd., Mayco Mix Ltd., Hub City Paving Ltd., Northwest Hydraulic Consultants Ltd., W. R. Addison Loading & Hauling Company Ltd., and KML Forestry. The total project costs were \$323,200.

The channel alignment was cleared and a trench was excavated to drain moisture out of the site.



Topsoil was removed down to bedrock along the channel alignment.



Trucks were used intermittently to haul materials.



An excavator with a jackhammer attachment formed the channel into the bedrock.

A rock drill blasted the channel through rock.





The old fishway was modified and the new channel was connected to the Millstone River at the base of Deadman Falls.



The diversion structure footing was poured first, followed by the walls.



As The diversion structures looks today.