



Providing for Fish Passage

February 2012



A barrier culvert was replaced in 2011 on SR 20 Red Cabin Creek with a 66-foot bridge.

WSDOT's Fish Passage Barrier Removal Program

Salmon and other fish need access to freshwater habitat for spawning and juvenile rearing. Washington State Department of Transportation (WSDOT) recognizes that removing fish barriers is important to the restoration of fish habitats and salmon recovery efforts.



WSDOT works with the Department of Fish and Wildlife to identify and prioritize fish-bearing streams and fish passage problems.

WSDOT's Fish Passage Barrier Removal Program began in 1991 to identify and remove barriers to fish passage caused by culverts under state highways. This is a cooperative effort with the Washington Department of Fish and Wildlife (WDFW).

How do we determine the number of blocking culverts?

WSDOT works with WDFW to evaluate culverts for fish passability in all fish bearing stream crossings. Physical habitat surveys are conducted upstream from fish barriers to help us prioritize corrections that have the most benefit to fish.

Our *June 2011 Fish Passage Inventory* reported:

- 6,514 crossings have been inventoried statewide
- 3,200 crossings in the state system are in fish-bearing streams
- 1,978 of the crossings in fish-bearing streams were identified as barriers
- 1,521 WSDOT-owned fish passage barriers that are in need of modification or replacement were identified as having significant habitat gain.*

* Significant habitat gain can be described as adding more than 200 meters (or 218 yards – approximately two football fields) of upstream habitat by removing a barrier from a fish-bearing stream.

How we address the problem – our three-pronged approach:

- Fish barriers are corrected through highway projects, whenever a hydraulic permit is required
- Stand-alone projects fix high priority barriers on highways that will not be addressed by a highway construction project anytime soon
- Some barriers are corrected with our Maintenance program that repairs or replaces a failing culvert with a fish passable structure

How are culvert projects prioritized?

Stand-alone fish barrier corrections are prioritized to provide the largest habitat gains, for the greatest number of “at-risk” fish species, and for the best value.

Prioritizing factors include:

- Amount of habitat gained for spawning and rearing
- Quality of the habitat gained
- The number of species that benefit from the habitat
- Cost of the project – Costs for barrier corrections cover a wide range – from solutions that modify existing culverts in place to those that entirely replace a culvert with a bridge.

How are culverts designed to provide fish passage?

When a fish passage barrier is identified and scheduled for correction, WSDOT works with WDFW to pick the best alternative for correcting the fish passage problems. Culvert designs are based on the latest edition of WDFW's *Design of Road Culverts for Fish Passage Manual*. This design manual provides a variety of culvert correction options. WSDOT's and WDFW's goal is to select a design that maximizes fish passage for the species found in a particular stream, and can be successfully constructed at that location.

Where feasible, WSDOT and WDFW prefer to use a type of design called "stream simulation" to correct culvert barriers because it best mimics the conditions found in the natural streambed at the culvert site. Culverts designed to simulate natural streambeds are constructed wider than the existing stream channel width, and sloped at a similar gradient as the existing natural stream. One approach to a stream simulation culvert is a bottomless culvert placed over a natural streambed. Use of stream simulation culverts is based on the principle that, if fish can migrate through the natural channel, they can also migrate through a man-made culvert that simulates the stream channel.

What's been done so far?

- Since 1991, WSDOT has completed 258 fish barrier removal projects opening up well over 852 miles of potential upstream habitat for fish.
- For 2011, there were 11 fish passage projects constructed.
- The budget for stand-alone fish passage projects and inventory work for 2011-13 is \$23.75 million and included is an interagency agreement with WDFW for \$1.7 million to provide inventory, assessment and scoping of fish passage barriers and inspection of fishways.



Before:

An undersized 5-foot culvert at the South Branch of Big Creek north of Aberdeen was replaced in 2011.



After:

This 21-foot wide culvert improves access to almost 5 miles of upstream habitat for chinook, chum and coho salmon, steelhead, sea-run cutthroat and resident trout.

Fish passage construction for 2011

Project Location	Description
I-5 near Ground Mound	Replaced a 3-foot culvert with a 12-foot box culvert at a tributary to Dry Creek
SR 105 west of Raymond	Replaced a 5-foot culvert with a 87-foot bridge at Norris Slough
US 101 north of Raymond	Replaced two smaller culverts (2.5-foot & 6-foot) with a 18-foot culvert at Lower Salmon Creek
US 101 north of Hoquiam	Replaced a 2-foot culvert with a 10-foot culvert at MP 100.90 at the South Branch of Big Creek
US 101 north of Hoquiam	Replaced a 5-foot culvert with a 21-foot culvert at MP 102.14 at the South Branch of Big Creek
SR 548 near Ferndale	Replaced a 6-foot culvert with a 23-foot culvert at Terrell Creek which flows into Birch Bay
US 2 north of Sultan	Removed dam structure under bridge and replace with new stream channel at Wagley's Creek
SR 20 just west of Hamilton	Replaced 7-foot twin box culverts with a 66-foot bridge at Red Cabin Creek
SR 520 east side of bridge	Replaced a 5-foot culvert with a 12-foot wide arch at Fairweather Creek
SR 520 east side of bridge	Replaced a 4-foot culvert with a 11-foot wide arch at Cozy Cove Creek
SR 520 east side of bridge	Replaced a 4-foot culvert with a 12.5-foot wide box at the West Tributary to Yarrow Creek

Where are we heading?

WSDOT is committed to doing its part for the environment by removing barriers to fish habitat. Our strategy is to continue correcting barriers as part of highway construction projects where we have in-stream work; and to spend money provided by the legislature for stand-alone projects on the highest priority corrections. WSDOT anticipates 16 fish passage barrier corrections will be completed in 2012.

For More Information:

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