



Fish Passage Barriers in Johnson Creek, Portland, Oregon

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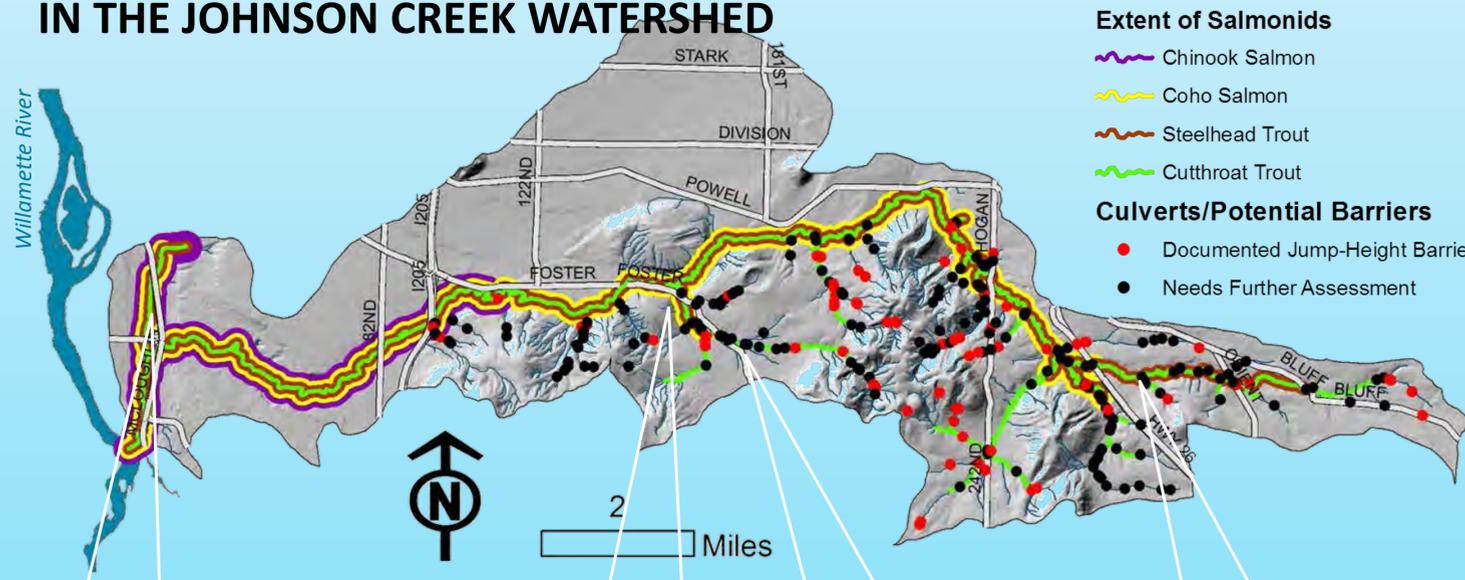
Wild Lower Columbia Coho, Chinook, Steelhead, and resident Cutthroat live in Johnson Creek. Fish surveys in 2011¹ found that most tributaries to Johnson Creek are inhabited by salmonids and other native fishes. However, no fish were detected in a number of stream reaches with good habitat, indicating that downstream barriers (in particular, culverts) are likely limiting fish access to quality habitat in numerous areas of the watershed.

The Johnson Creek Watershed Council (JCWC), working with the six jurisdictions that manage stream culverts in the Johnson Creek Watershed (Portland, Gresham, Damascus, Milwaukie, Clackamas and Multnomah Counties) and the Oregon Department of Fish & Wildlife (ODFW), is in the process of assessing 340 publicly- and privately-owned man-made, potential obstructions to fish passage using the well-vetted Washington Department of Fish & Wildlife (WDFW) protocol.



In 2013, volunteers from Portland State University (PSU) and the Saturday Academy ASE Program received training from ODFW and JCWC. Permission to visit privately-owned stream crossings was requested via a mailed brochure designed by PSU students. Then, these citizen scientists ground-truthed the locations of 180 culverts and stream crossings, taking photographs and measuring stream and culvert dimensions at each one. Volunteers flagged crossings that were not obvious barriers (culvert outlet drop heights over 0.15m) or obviously passable (bridges) for follow-up assessments by professionals. Professional assessments are now underway, and will be completed by March, 2014.

SALMON, TROUT & POTENTIAL FISH PASSAGE BARRIERS IN THE JOHNSON CREEK WATERSHED



EXAMPLES OF FISH PASSAGE RESTORATION PROJECTS IN JOHNSON CREEK

CRYSTAL SPRINGS CREEK

There are nine culverts between SE 28th and Crystal Spring Creek's confluence with Johnson Creek that inhibited fish from reaching spawning and rearing habitat. Ongoing culvert replacement projects managed by the City of Portland are now opening 2.5 miles of habitat for threatened native fish species.

SE FOSTER RD & 162ND AVE

In 2003, a box culvert near the mouth of Kelley Creek was replaced with an open-bottom arch culvert to improve fish passage to Kelley Creek. Fish presence surveys by ODFW in 2009 verified that Coho Salmon have now moved up the system due to this barrier removal project.

BRADSHAW OFF-LINE POND

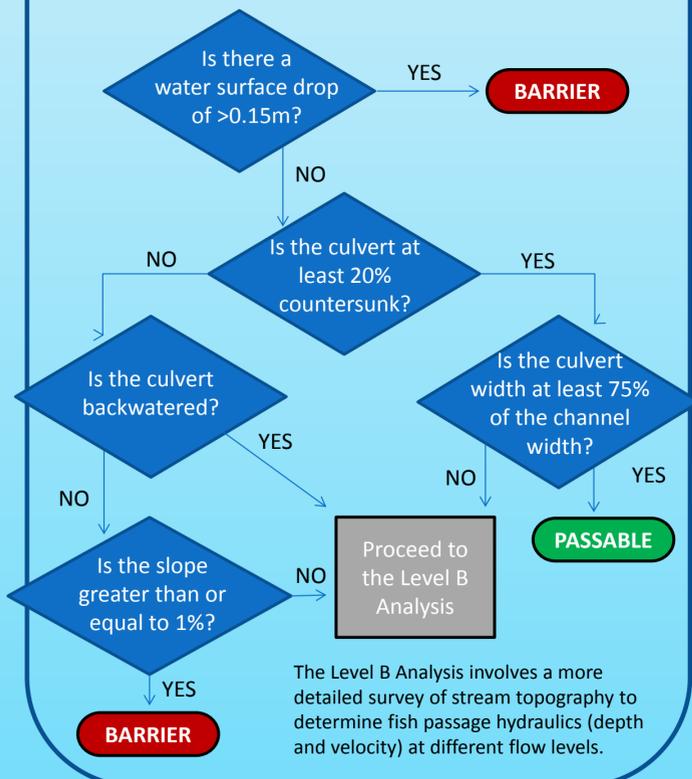
In 2007, JCWC worked with private landowners to remove a 6 ft. dam in Kelley Creek. The dam formed a 200-by-80-square foot pond that acted as a heat and bacteria source to the creek. Restoring this reach resulted in open fish passage, enhanced in-stream habitat, improved water quality, and a reforested riparian buffer.

SE 28TH & STONE RD

This 40' culvert was a 5x7 ft flat-bottomed box, through which Johnson Creek flowed. It blocked fish passage and severely constricted the creek. Multnomah County replaced it in 2006 with a 70' open-bottomed culvert with a natural streambed substrate, planted a riparian wetland, and enhanced habitat with in-stream wood.

WDFW Fish Passage Barrier Assessment Protocol

This flow chart shows the factors considered in the determination of whether a culvert restricts or blocks passage for salmon and trout.



The Level B Analysis involves a more detailed survey of stream topography to determine fish passage hydraulics (depth and velocity) at different flow levels.

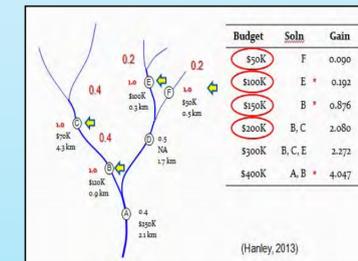
¹Iwai, Roy. 2012. *Fish Species Composition, Distribution, and Biotic Integrity in Johnson Creek*. Multnomah County, Oregon.

NEXT STEPS

- Spring 2014: Prioritize Barriers for Removal using APASS Model**
- Using the APASS model, we will prioritize known barriers for removal using model filters including ownership, feasibility, cost, and access to quality habitat. Results will be shared with all stakeholders.

APASS (Anadromous Fish Passage Optimization Tool)

is a budget-constrained model for deciding which barriers to repair or remove to maximize habitat availability for anadromous fish. It considers the habitat gains from improved fish passage, partial passability, project alternatives, the relationship between multiple barriers, the networked nature of a watershed, and the economics of barrier restoration. The model returns a list of barrier removal projects that would result in the greatest gains of upstream habitat.



APASS has a simple user interface with options for consideration of multiple species, prioritizing individual subwatersheds, running the model at prescribed, stepwise budget levels, and for forcing in or forcing out specific barrier removal projects.

²Hanley, J.R., J. Wright, M. Diebel, M.A. Fedora, and C.L. Soucy. 2013. Restoring stream habitat connectivity: A proposed method for prioritizing the removal of resident fish passage barriers. *Journal of Environmental Management*, Volume 25, August 2013, pages 19-27.

Summer-Fall 2014: Design Culvert Removals for Top-ranked Barriers

- JCWC will visit the top 20 privately-owned barriers (where we have permission) with a river restoration consultant and develop conceptual designs and cost estimates for removal. Grant proposals will be submitted to fund barrier replacements.

Summer 2015: Replace Two Privately-Owned Priority Barriers

- Working closely with East Multnomah and Clackamas SWCD, as well as ODFW, we plan to fundraise for, permit, and manage the removal of two high-priority, privately-owned fish passage barriers in 2015.

SPECIAL THANKS

- East Multnomah Soil & Water Conservation District
- Oregon Department of Fish and Wildlife
- Cities of Gresham and Portland
- PSU Spring 2013 Capstone class
- PCC GIS Certificate Program Students
- Saturday Academy ASE Interns
- PGE Salmon Habitat Fund
- Dr. Jesse O'Hanley, APASS Model

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