BIOLOGICAL CONSIDERATIONS

MODULE 7 - DAMON ROMERO
Fish Passage Coordinator
HQ Environmental Services Office
WSDOT

Current duties: Fish Passage project support and Federal Culvert Injunction coordination.

Background & Experience: Damon’s background is in fish passage and environmental permitting. He worked at WDFW for 10 years evaluating culverts for fish passage, conducting habitat surveys on streams impacted by fish passage barriers and reviewing Hydraulic Project Applications for projects throughout Washington. Damon has worked for WSDOT for 5 years. He started at WSDOT as a fish passage biologist, conducting post-project monitoring and supporting the fish passage program. Damon now works as the Fish Passage Coordinator at WSDOT HQ supporting fish passage projects, providing guidance to regional environmental staff on fish passage issues, and coordinating WSDOT’s compliance with the Federal Culvert Injunction.

Education: The Evergreen State College, 1995, BS in Environmental Studies

Personal interests: Damon lives in Olympia, plays guitar and enjoys surfing on Washington’s coast.

Biological Considerations

This module will inform designers and practitioners on the impact of fish passage barriers to salmon and steelhead and the benefits of stream simulation structures to wild fish. We will discuss resources for writing the PHD Report and how specific project elements benefit salmon and steelhead recovery in degraded watersheds.
Fish Passage and Stream Restoration Training

Biological Considerations

Damon Romero
WSDOT Fish Passage Coordinator

- Culverts are on WSDOT’s barrier list because they create conditions that exceed the swimming or leaping abilities of an adult (6") trout.

- Barrier corrections must be passable for all species of salmon at all life stages at all flows where the fish would naturally seek passage.

Level A Barrier Example: SR 112 Joe Cr.

- Almost all fish passage barriers are undersized
- Site 990214, pre-correction, was considered 67% passable (partial barrier) due to “WS Drop” or hydraulic drop of 0.85 feet
- If an adult fish made the jump into the culvert they would face 116 feet of very difficult conditions
- Outfall developed over time due to being undersized and creating excessive velocity
**Level B Barrier Velocity Example: SR 112 UNT to Whiskey Creek**

- Site 991693, located 17 miles east of Joe Creek
- Twin 3' Concrete Pipes
- <0.4% slope
- Basin Area= 1.25 sq mi
- Precipitation= 75 inches
- Velocity= 5 feet/second
- 67% passable

**Level B Depth Barrier Example: SR 531 UNT to Edgecomb Creek**

- Tiny Basin Area, 0.14 sq. mi.
- Annual Precipitation= 38.2" 
- Level B results:
  - Velocity= 2.2 feet/second
  - Depth= 2 inches at low-flow period
  - 33% Passable

**Tidal Velocity Barrier Example: SR 509 Wapato Creek**

- Unknown barrier by Level A
- Level B not applicable due to tidal influence
- Requires WDFW Engineer Review
- Inadequate Depth observed
- Allowable velocity= 3 feet/second
- Tidal hydrology only= passable
- Tidal + Olfp= 5.4 feet/second
- Predicted to be worse if downstream crossing were not limiting and attenuating tidal processes
WDFW Barrier Assessment Manual 2019

https://wdfw.wa.gov/publications/G2081

Entrainment = Velocity

- Depth insufficient for adult salmon
- Pre-spawn mortality of female Pink salmon
- Will not trigger a Level B barrier status due to presence of bed material and adequate span

“Other” Barrier Example: SR 532 Church Creek
Barrier Effects on Habitat

SR 112 MP 33.21 Joe Creek - 990214 Photos taken on different dates and flow conditions but still...

Upper photo is upstream of SR 112
- Natural recruitment of LWM
- Habitat is complex with pools and riffles
- Well graded substrate

Lower photo is downstream of SR 112
- Lacking LWM
- Uniform riffle
- Coarser substrate

WDFW Fish Passage Website
https://geodataservices.wdfw.wa.gov/hp/fishpassage/index

Site Description
- WR/A#
- Species

Culvert Assessment
- Measurements
- Avg. Stream Width
- Barrier Assessment Method
- Barrier Reason

Habitat Survey Summary
- File Names
- Comments
- Potential Habitat Gain
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- Stream Name
- Tributary to
- WRIA #

- Stream Name
- Tributary to
- WRIA #
  - Water Resource Inventory Area

- Species
  - (Salmonid only)
Basic information of existing barrier:
- Shape
- Material
- Span
- Rise
- Length
- Water Depth in Culvert
- WS Drop
- Countersunk (streambed material throughout)
- Backwater (throughout)
- Slope
- Channel width (use with care)
- Road fill depth

- Barrier Reason
- % Passable
- Assessment Method
- Comments

- Habitat Survey Type
- Length (Linear Gain)
- Spawning area
- Rearing area
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Table 1: Native fish species potentially present within the project area.

<table>
<thead>
<tr>
<th>Species</th>
<th>Presence (Presumed, Modeled, or Documented)</th>
<th>Data Source</th>
<th>ESA Listing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chinook (Oncorhynchus tshawytscha)</td>
<td>Presumed</td>
<td>WDFW Biological Scoping Report</td>
<td>Federally Threatened</td>
</tr>
<tr>
<td>Coho (Oncorhynchus kisutch)</td>
<td>Presumed</td>
<td>WDFW Biological Scoping Report</td>
<td>Not Warranted</td>
</tr>
<tr>
<td>Steelhead (Oncorhynchus mykiss)</td>
<td>Presumed</td>
<td>WDFW Biological Scoping Report</td>
<td>Federally Threatened</td>
</tr>
<tr>
<td>Coastal Cutthroat (Oncorhynchus clarki clarki)</td>
<td>Presumed</td>
<td>WDFW Biological Scoping Report</td>
<td>Not Warranted</td>
</tr>
</tbody>
</table>
Limiting Factors to Salmon Productivity Include:

- Fish Passage Barriers
- Floodplain Impacts
- Poor Riparian Conditions
- Flashy Flows
- Low Flows
- Excessive sedimentation
- Warm water temperatures
- Lacking LWM

Riparian Conditions and Fish Habitat