Operational and Structural Changes at Two Hydroelectric Dams to Aid in Downstream Juvenile Salmonid Passage Survival on the Mid-Columbia River

Curt Dotson, Grant County Public Utility District

145th Annual Meeting of the American Fisheries Society, Portland, Oregon
Wanapum and Priest Rapids Dams
Performance Standards Required of Grant County PUD by FERC

93% survival thru the reservoir and past the dam

Bi.Op. & SSSA: 95% survival past the concrete
Acoustic Tags for Tracking
Juvenile Fish Bypasses:

- Wanapum Fish Bypass
Downstream View
Agencies & Tribes (PRCC) in Iowa
Construction on the Wanapum Fish Bypass
Acoustic Tags for Tracking

By determining the sound's time of arrival at each hydrophone...
Fish Passage Efficiency

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steelhead:</td>
<td>77%</td>
</tr>
<tr>
<td>Sockeye:</td>
<td>78%</td>
</tr>
</tbody>
</table>

Fish Survival

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>99%</td>
</tr>
<tr>
<td></td>
<td>98%</td>
</tr>
</tbody>
</table>
Priest Rapids Fish Bypass (PRFB)
Acoustic Tags for Tracking

By determining the sound's time of arrival at each hydrophone...
## Results - Downstream Detection

<table>
<thead>
<tr>
<th>Year</th>
<th>Prototype Top-Spill/Fish Bypass</th>
<th>Powerhouse</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>99.6%</td>
<td>93.8%</td>
</tr>
<tr>
<td>2010</td>
<td>97.5%</td>
<td>94.9%</td>
</tr>
<tr>
<td>2009</td>
<td>98.9%</td>
<td>91.0%</td>
</tr>
<tr>
<td>2008</td>
<td>98.0%</td>
<td>91.3%</td>
</tr>
</tbody>
</table>
Benefits from the Wanapum & Priest Rapids Fish Bypasses

• Increased survival rates for juvenile salmon past Wanapum & PR Dam
• Fulfils requirements of the FERC License and its associated mandates & obligations
• Lower TDG levels when fish spill is taking place
• More water available for power generation during the salmonid smolt out-migration
Test the Turbines
Existing (Unit 9)  -  AHTS (Unit 8)
Fish Survival vs. Turbine Efficiency – i.e. “Fish Mode”

WANAPUM DAM TURBINE - FISH SURVIVAL
75 FT HEAD

Percent Survival

102.0%
100.0%
98.0%
96.0%
94.0%
92.0%
90.0%
88.0%
86.0%
84.0%
82.0%

9,000 11,000 15,000 17,000

Turbine Flow, cfs

10 ft Depth Release Survival
30 ft Depth Release Survival

Fish Mode
Nadir Locations

Original Turbine

MGR Turbine
Performance Standards Required of Grant County PUD by FERC

93% survival thru the reservoir and past the dam

Bi.Op. & SSSA:
95% survival past the concrete
Priest Rapids Hydroelectric Project (FERC No. 2114), 2009 Wanapum Dam Avian Zones
Wanapum Dam Tailrace, Columbia River, WA
Northern Pike Minnow Removal Program

- Set-lines
- Traps
- Angling
- Beach seine
- Electrofishing
- Ladder traps
This is a quick overview of the juvenile passage program at Grant PUD.

Thank You.