Yakama Nation Fisheries

1890s Side Channel Restoration and Monitoring Project

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Funders:
Bonneville Power Administration
Pacific Coastal Salmon Fund

Monitoring Assistance:
WDFW Fish Program Science Division
YN Mid-Columbia Coho Project
Cascade Columbia Fisheries Enhancement Group
Presentation Overview

- 2014 Restoration Project
- Post Project Monitoring
  - Restored Hydrology
  - Fish Use
What is the 1890s Side Channel Project?

First salmon habitat project in the Upper Columbia Region to restore side channel habitat using a groundwater infiltration gallery system.
What is an infiltration gallery?

A porous pipe system installed horizontally below ground that intercepts and collects shallow groundwater through infiltration.

The porous pipe attaches to solid wall conveyance pipe which uses gravity to transport the collected flow towards a desired surface discharge location.
Why do this?

A Groundwater Infiltration Gallery Helps:

- Increase surface flows
- Optimizes water temperatures
- Sustain perennial surface flows
- Increases sediment mobilization
2014 Restoration Actions

- Created a 600 foot infiltration gallery near the Methow River
- Created a 2,300 foot long conveyance pipe to bring water to the channel restoration area
- Created a 4,060 foot long perennial spring creek channel in the old 1890s river channel
- Created habitat complexity elements throughout the spring creek channel and restored riparian/wetland conditions
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Why did we do this?
Project Site and Habitat Problem
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2014 Construction Activity

- 3 Months of Active Construction
- Installed 3,800 linear feet of pipe
- Excavated 42,000 cubic yards of alluvial fill
- Imported and placed 230 habitat logs
- Extensive revegetation effort with complex wetland transport and intensive creation elements
## Restored Habitat Metrics

<table>
<thead>
<tr>
<th>Habitat Element</th>
<th>Metrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring fed channel Length</td>
<td>4,060 feet</td>
</tr>
<tr>
<td>Spring fed channel Width</td>
<td>10 to 14 feet</td>
</tr>
<tr>
<td>Sinuosity</td>
<td>1.01 to 1.34</td>
</tr>
<tr>
<td>Slope</td>
<td>0.2% to 0.33%</td>
</tr>
<tr>
<td>Substrate</td>
<td>sand, gravel, and cobble</td>
</tr>
<tr>
<td>Pools (2 to 4 feet deep)</td>
<td>51</td>
</tr>
<tr>
<td>Riffles (0.2 to 1 feet deep, 2 to 4 times channel width)</td>
<td>50</td>
</tr>
<tr>
<td>Big Pool Depth</td>
<td>4 feet</td>
</tr>
<tr>
<td>Backwater Length</td>
<td>200 feet</td>
</tr>
</tbody>
</table>

![Image of restored habitat metrics](image.png)
Monitoring

Restored Hydrology

Fish Use
Discharge Monitoring Stations
Channel Discharge and Temperature
Upper Station: November 2014 – August 2017

[Graph showing discharge and temperature data from November 2014 to August 2017]
Channel Discharge and Temperature
Mid Station: May 2016– Sept 2017

1890s Channel Mid Gauge
Mid WY16 - WY17

- Measured Discharge
- Discharge
- Temperature

Discharge, cfs

5/6/2016 11:00
5/21/2016 13:00
6/5/2016 15:00
6/20/2016 17:00
7/7/2016 19:00
7/20/2016 21:00
8/14/2016 23:00
8/20/2016 1:00
9/4/2016 3:00
9/19/2016 5:00
10/4/2016 7:00
10/9/2016 9:00
11/3/2016 1:00
11/18/2016 3:00
12/3/2016 15:00
12/18/2016 3:00
1/17/2017 2:00
2/17/2017 1:00
3/4/2017 3:00
3/9/2017 5:00
3/15/2017 7:00
4/3/2017 7:00
4/18/2017 9:00
5/2/2017 1:00
5/17/2017 15:00
6/17/2017 19:00
7/2/2017 23:00
8/17/2017 1:00
8/22/2017 3:00
9/16/2017 5:00
Channel Discharge and Temperature
Lower Station: November 2014 – August 2017
Surface Water Temperatures – November 2014 – September 2015
Surface Water Temperatures – November 2014 – September 2015
Surface Water Temperatures – November 2014 – September 2015
Fish Use and Productivity Monitoring
Monitoring Plan

**Objective 1**: Describe how and when fish use the side channel.

**Objective 2**: Measure size and growth of salmonids overwintering in the 1890s side channel. Compare spring pre-migratory size to salmonids residing in the Silver Side Channel, flow-through channels, and main channel rearing salmonids.

**Objective 3**: Determine if overwinter survival rates are higher for juvenile salmonids overwintering in the 1890s channel compared to other habitat types including the Silver Side Channel (also groundwater), M2 flow through side channels, and main-channel habitats.
Objective 1: Fish Use

- What species are found in the 1890s the side channel?

- What life-stage of fish (by species) are found in the 1890s side channel?

- What time of year do fish (by species) use the side channel?

  - Snorkel Surveys
    - Life stage, species, abundance
    - Summer, fall, late-winter/early-spring

  - Spawning Ground Surveys
Objective 2: Size and growth

- Measure size and growth of salmonids overwintering in channel.
- Compare pre-migratory size to other sites

- Snorkel herding/E-fishing
  - Fall
    - Collect FL and W data
    - Mark w/ PIT tags
  - Late-winter
    - Scan for recaptures
    - Data collected from all fish

- Measure and compare overwinter growth
  - Direct measure for recaps
  - Mean FL change by species
Objective 3: Overwinter Survival

- What are the survival rates of fish overwintering in channel?
  - Tagging to emigration
    - Number fish tagged
    - Detections at PIT array
    - Measure of efficiency

- What is the relative survival compared to other sites?
  - Tagging to Rock Reach Dam
  - Cormack-Jolly Seber estimates
Preliminary Results
Observations of Fish Use
Density of Juvenile Salmonids in the 1890s Side Channel Estimated from Snorkel Survey Enumeration

Survey Period

Fish/FT2

Coho fish/ft²
Chinook fish/ft²
Steelhead fish/ft²
## Spawning Activity

<table>
<thead>
<tr>
<th>Species</th>
<th>Year</th>
<th>Redds</th>
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<tbody>
<tr>
<td>Coho</td>
<td>2015</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>2016</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>2017</td>
<td>73</td>
</tr>
<tr>
<td>Steelhead</td>
<td>2015</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>2016</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>2017</td>
<td>1</td>
</tr>
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</table>
Immigration into 1890’s

- Steelhead
- Chinook
- Bull Trout

- CHEWUCH
- LOWER TWISP
- MIDDLE METHOW
- UPPER MIDDLE METHOW
- UPPER TWISP

HONOR. PROTECT. RESTORE.
Conclusions

Preliminary results are promising

Full implementation of monitoring

Final analysis of results will be forthcoming
Acknowledgements

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Washington Dept. of Fish and Wildlife

Bonneville Power Administration

Cascade Columbia Fisheries Enhancement Group

Pacific Coastal Salmon Recovery Fund

Work Cited