

Monitoring Steelhead Response Following Dam Removal in the White Salmon Subbasin



Photo Credit:
Andy Maser and
Steve Stampfli



Photo Credit:
Jeanette Burkhardt



Joe Zendt
Yakama Nation Fisheries Program
PSMFC Steelhead Meeting December 11, 2025

Funding by:

**National Marine Fisheries Service,
WA State Salmon Recovery Funding Board,
Clark Skamania Flyfishers,
Friends of the White Salmon,
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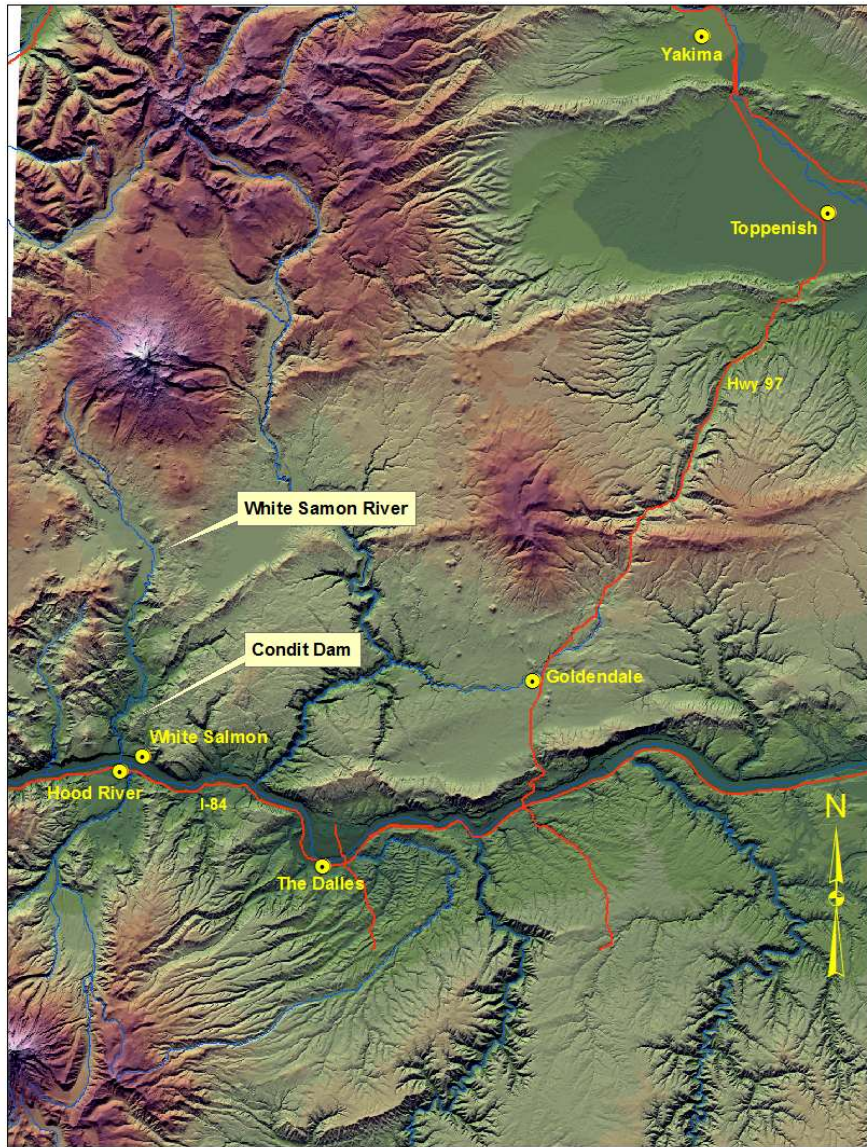


Clark-Skamania Flyfishers



White Salmon River monitoring collaborators:





Background

- Condit Dam
 - RM 3.3 (rkm 5.3)
 - 1912-2012
 - Blocked fish passage
 - Several early attempts at passage failed
 - Breached 2011, removed 2012
- Post- and some pre-removal monitoring
 - Spawner abundance and distribution
 - Juvenile monitoring
 - Genetic sampling and analysis, eDNA sampling
 - Limited funds – monitoring is not comprehensive or continuous
- Multi-agency workgroup
 - Natural recolonization strategy for steelhead

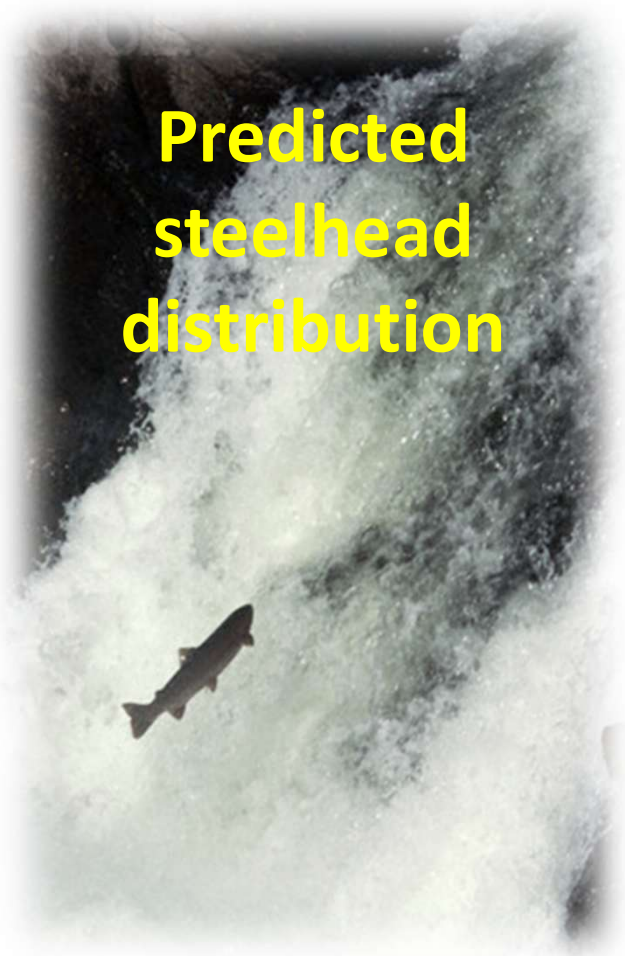


Fish Species

- Summer and Winter Steelhead* - Mid C
- Fall Chinook Salmon*
 - “White Salmon” tule
- Spring Chinook Salmon
- Coho Salmon*
- Chum Salmon*
- Bull Trout*
- Cutthroat Trout
- Pacific Lamprey

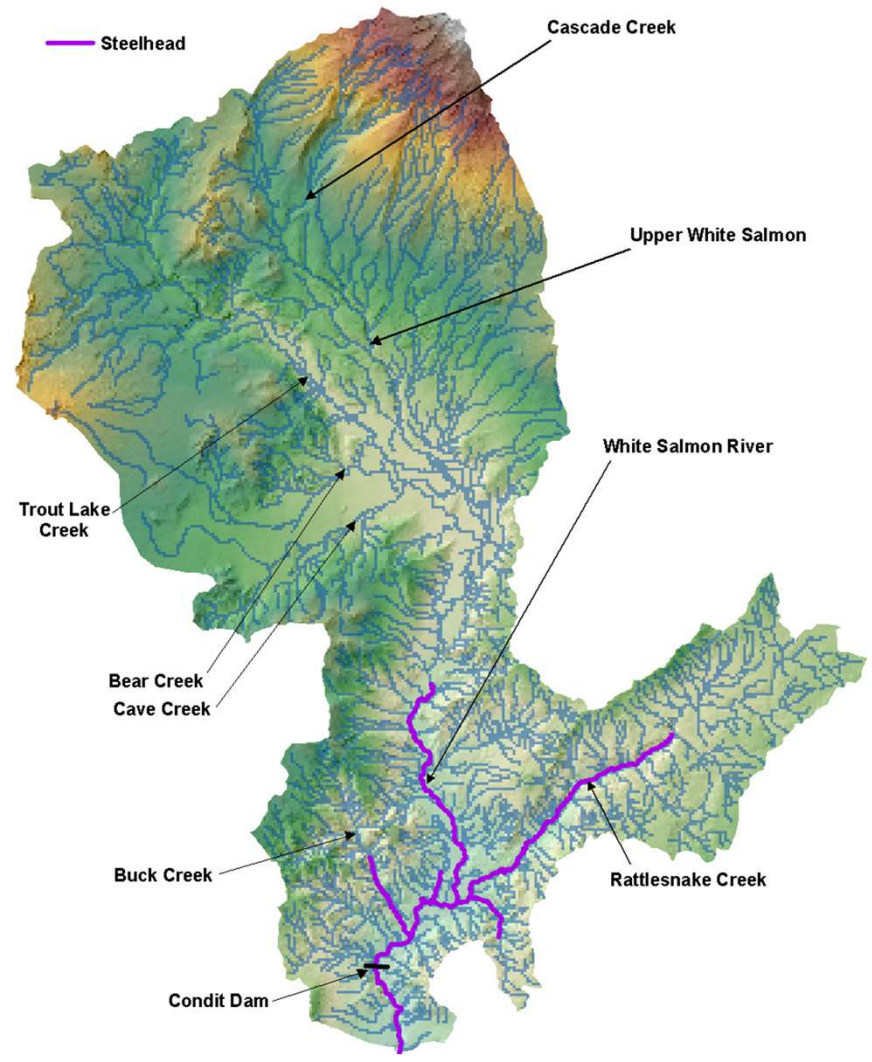


* Listed as “Threatened” under Endangered Species Act



Predicted
steelhead
distribution

White Salmon Subbasin



Steelhead Recovery Strategy

- Multi-Agency Fisheries Technical Workgroup – Yakama Nation Fisheries, NMFS, USFWS, WDFW, USGS, Pacificorp
 - Natural recolonization strategy with intensive monitoring and 5-year re-evaluation...
 - NMFS Recovery Plan 2013...
- USGS studies: *O. mykiss* from Rattlesnake and Buck Creeks PIT-tagged in 2004 and 2009 detected at Bonneville juvenile bypass, adult ladder, or East Sand Island tern colony
 - Anadromy not extinguished after 100 years? (Allen et al. 2016)





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October 2011

Removed May 2012



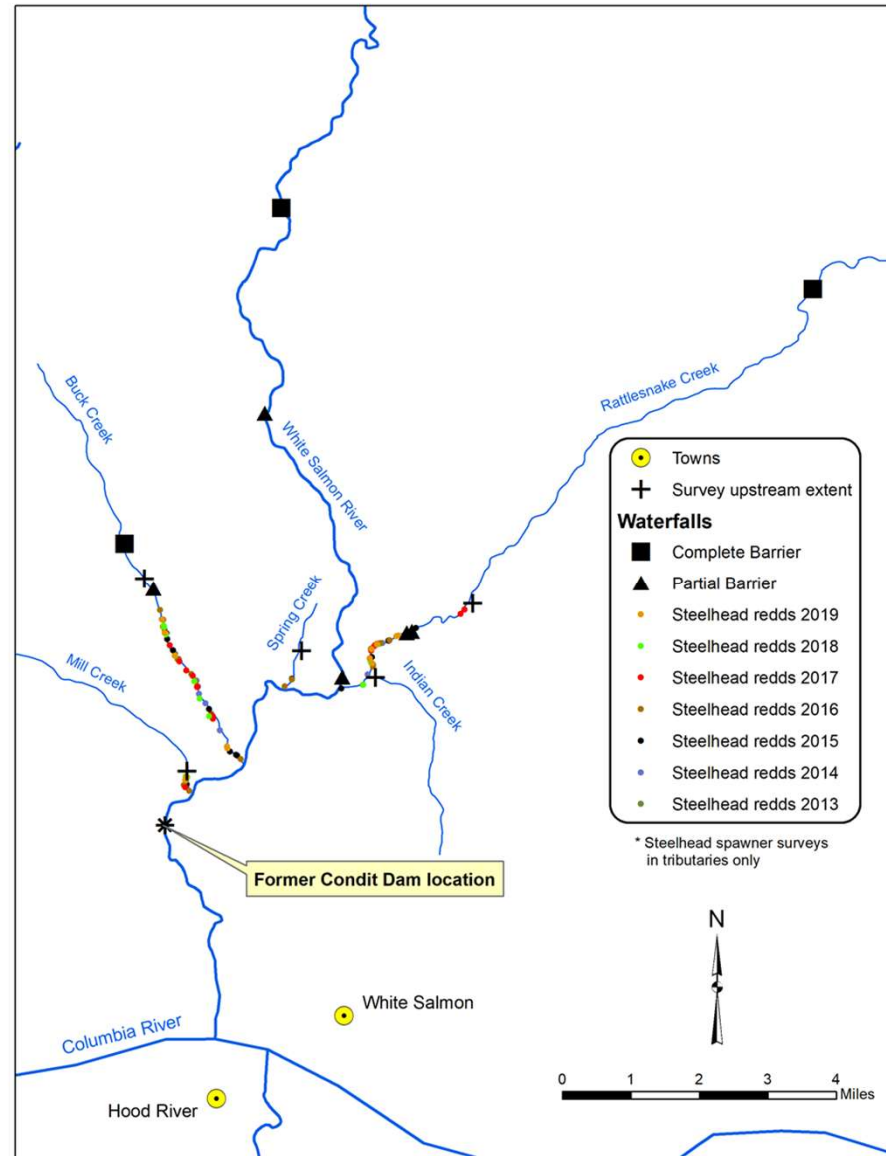
Steelhead Spawner Surveys

- Redd counts
- GPS locations recorded
- Usually undercounts
- Tributaries only (no mainstem surveys)



White Salmon tributaries Steelhead spawner/ Redd count results 2013-2019

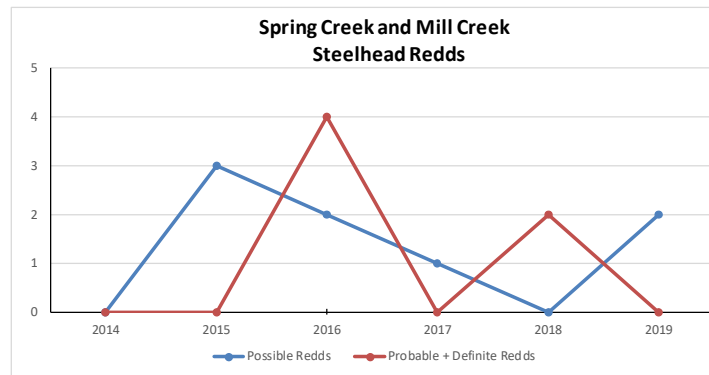
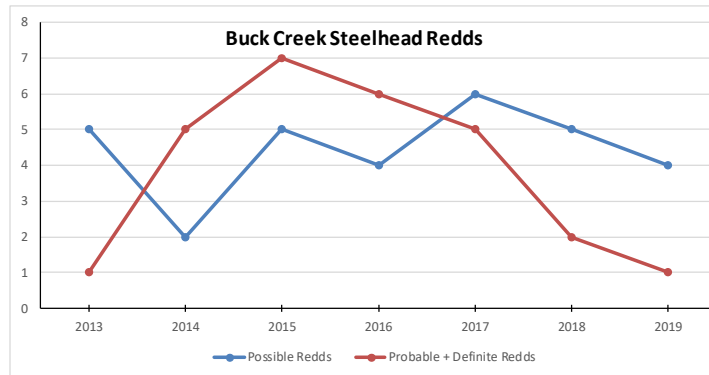
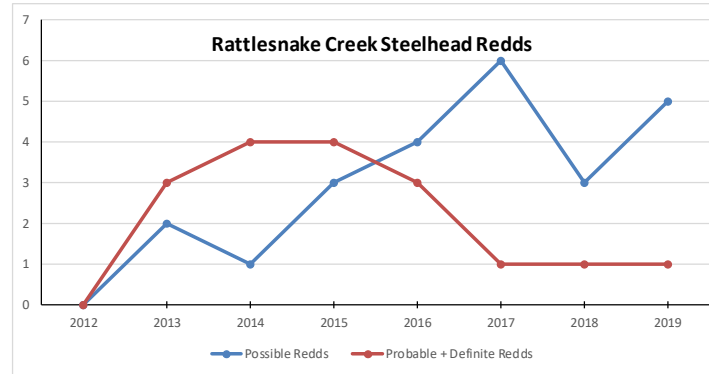
- Tributaries only (no mainstem surveys)





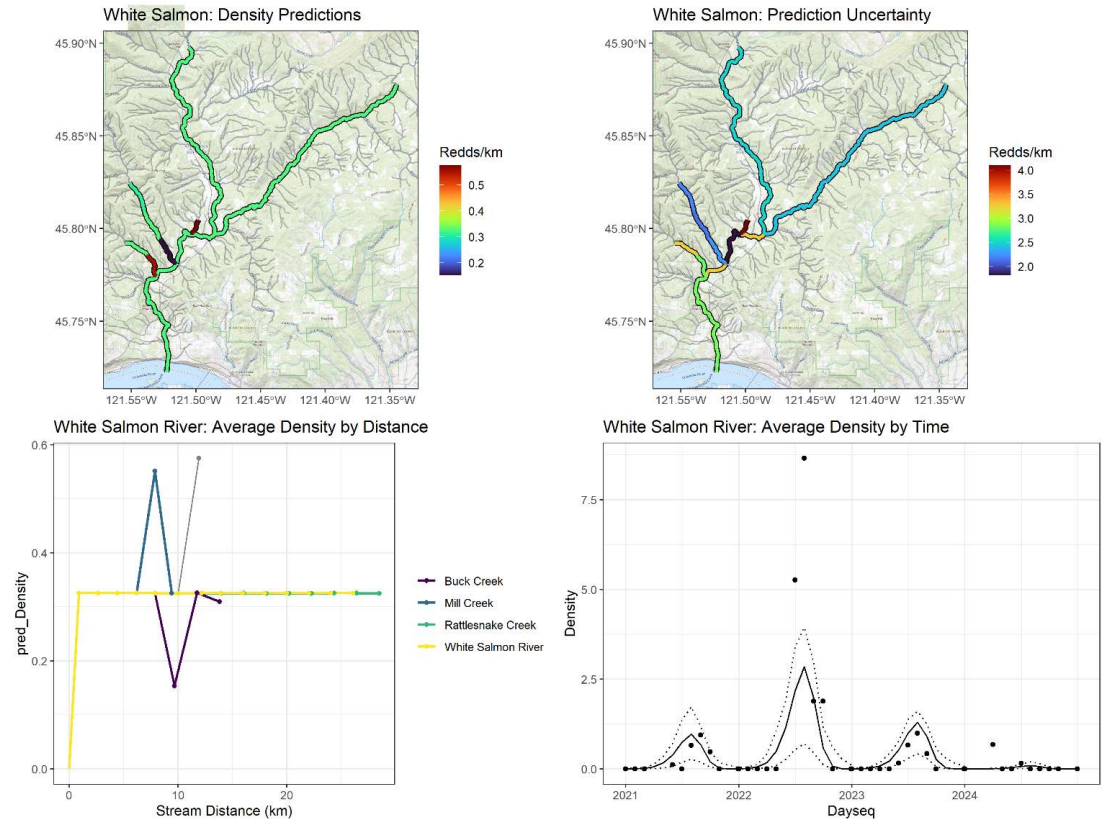
2012-2019 Steelhead spawner/ Redd count results

- Spawner numbers are relatively small; showed signs of increases after dam removal, decreased since along with region
- Overall steelhead spawner escapement to tributaries likely at least 50-100 fish per year (spawner surveys may underestimate)
- Coho spawning also observed in lower numbers in same streams (generally not as far upstream)



2021-2024 Steelhead Spawner Surveys

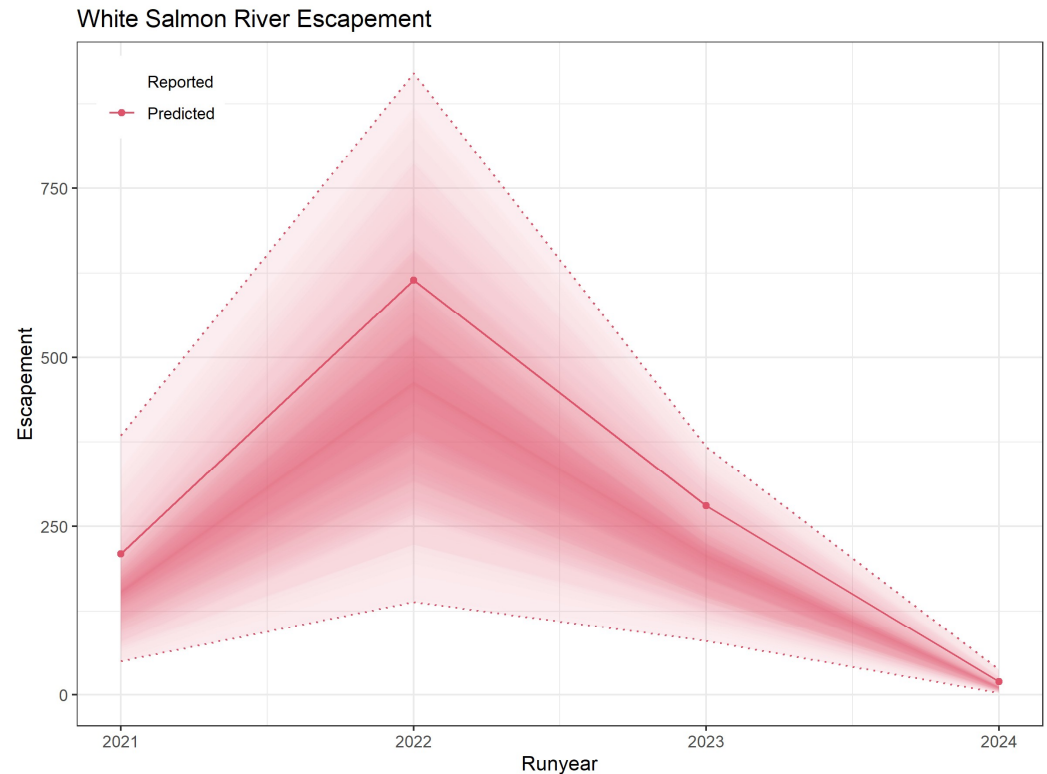
- Conducted by volunteers currently coordinated by Trout Unlimited
- Data collected in WDFW Spawner Survey Database field tablets
- Spatiotemporal model (VAST) takes redd count data and estimates density across distance and time, and allows for some unsurveyed areas and/or infrequent surveys
- High uncertainty due to large gaps in geographic coverage (mainstem, Rattlesnake Cr.), however...



Preliminary data courtesy of WDFW (Jeremy Harris and Thomas Buehrens)

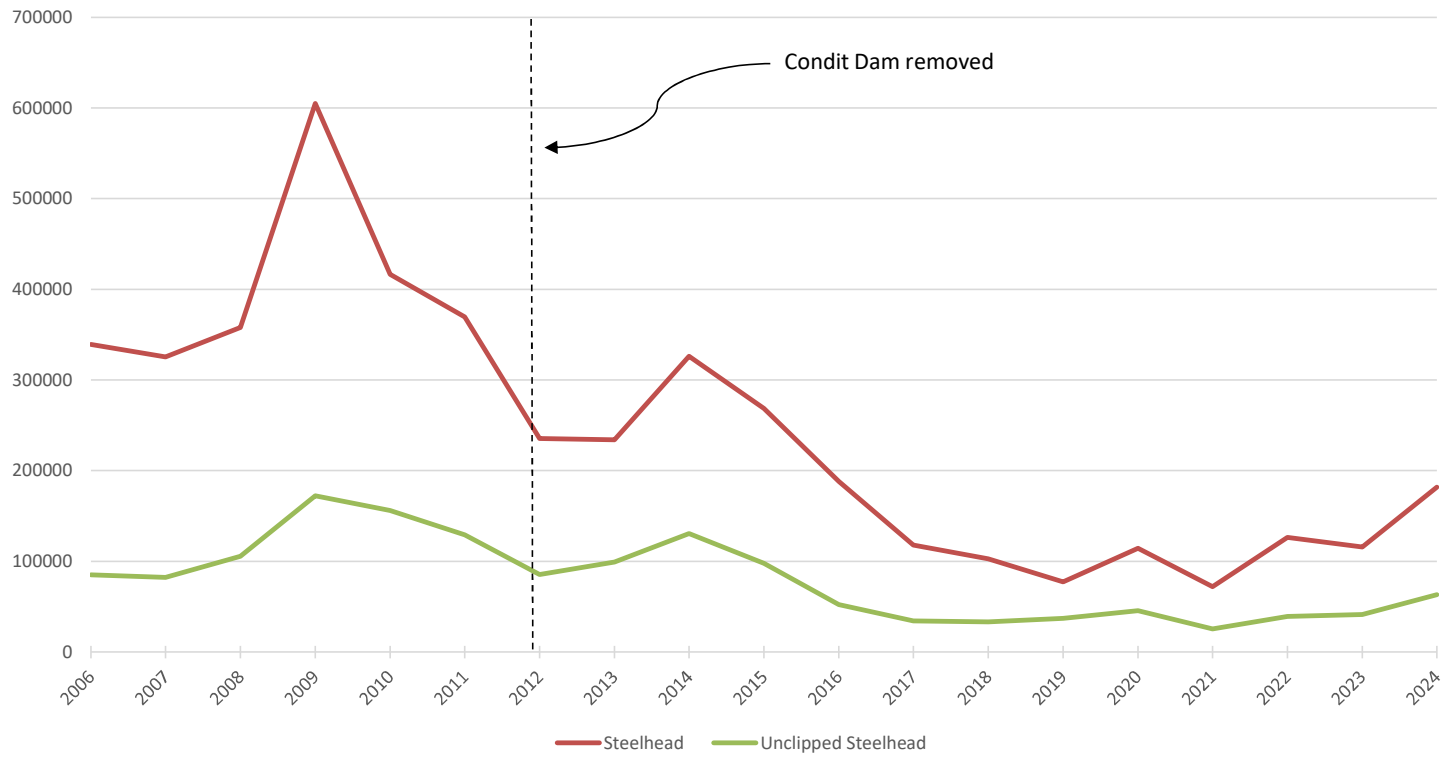
2021-2024 Steelhead Spawner Surveys (continued)

- This model allows for population (subbasin) scale estimates of steelhead spawner abundance
- Spawner abundance estimated from total unique redds estimate from VAST (using redd life estimates) and fish per redd estimates from previous studies
- Working on incorporating 2012-2019 data (less frequent surveys but more geographic coverage) for trend analysis of abundance since dam removal



Preliminary data courtesy of WDFW (Jeremy Harris and Thomas Buehrens)

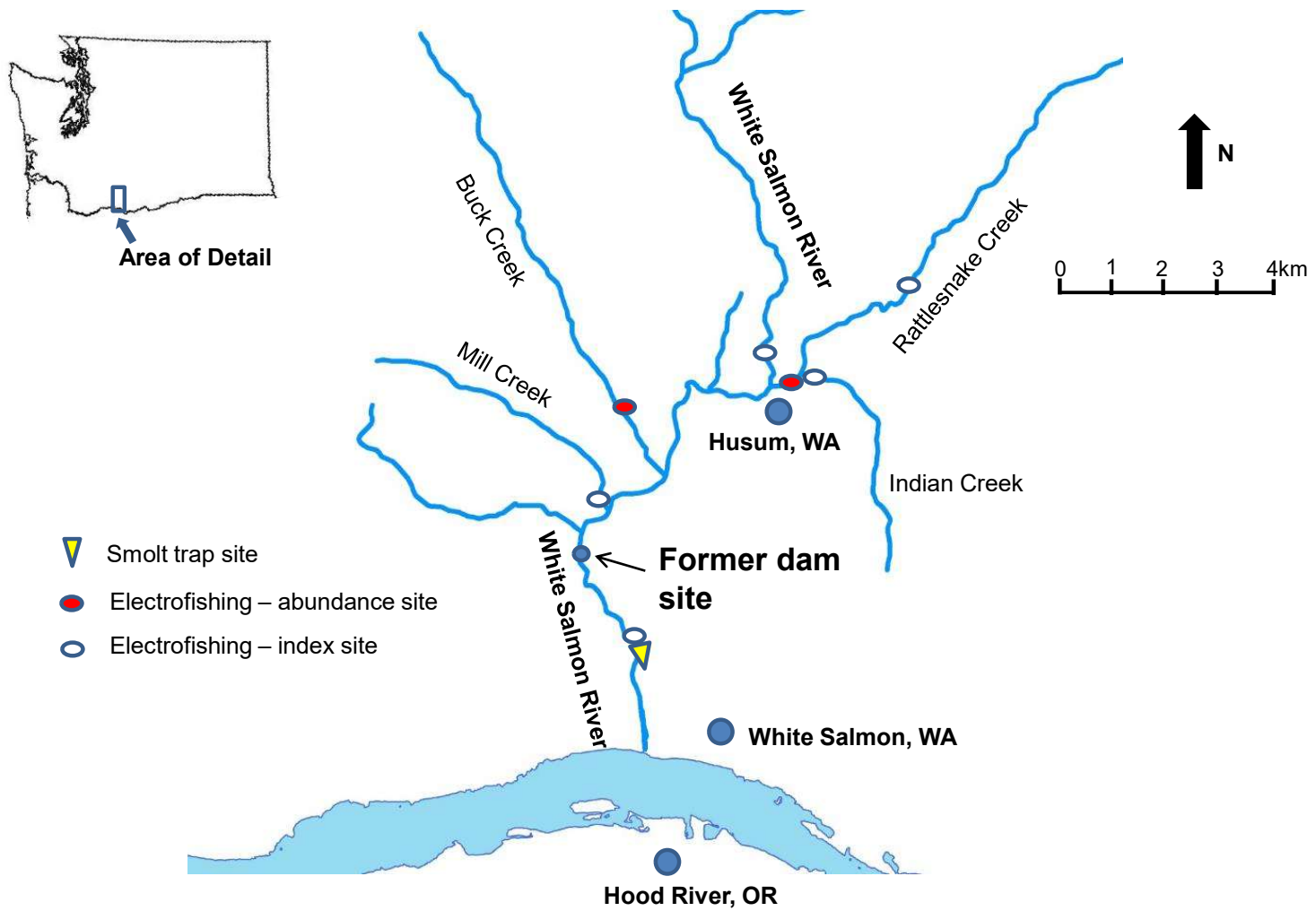
Bonneville Dam Steelhead Counts



Juvenile Salmonid Monitoring

- USGS Columbia R. Research Lab, Yakama Nation Fisheries, Mid-Columbia Fisheries Enhancement Group
- Assess Steelhead and Coho smolt abundance in the lower White Salmon R. – rotary screw trap at rkm 2.3
- Assess distribution, species composition, and abundance in tributaries.
- Document life history traits via Passive Integrated Transponder (PIT) tags.
- Genetic sample collection
- 2001 - 2005, 2009 - 2010 (pre-removal);
2016 - 2021 (post-removal)

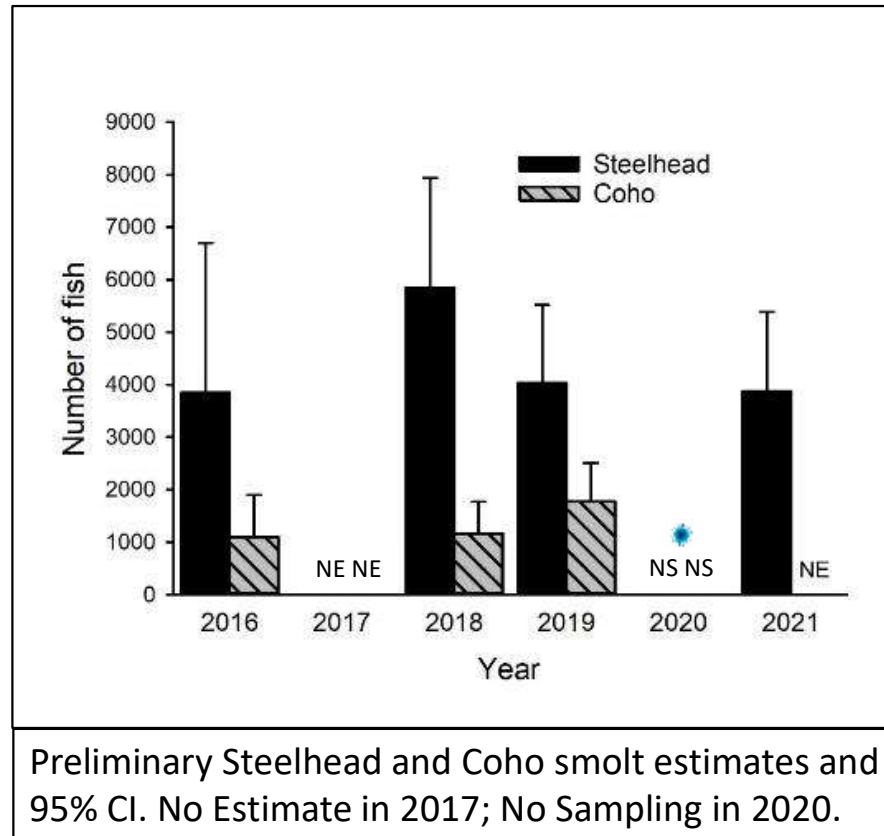




Map courtesy of USGS Columbia River Research Laboratory

Screw Trapping Results

- **Steelhead and Coho fry, parr, and smolts captured in all years.**
 - **Steelhead and Coho smolt estimates in 2016, 2018, 2019, and 2021.**
 - **Chinook Salmon fry captured in all years.**
- Data indicate:**
- Upstream spawning.
 - Life-history diversity.
 - Use of improved habitat downstream of dam site.



Data courtesy of USGS Columbia River Research Laboratory

Electrofishing Results

➤ Juvenile Salmonid Abundance

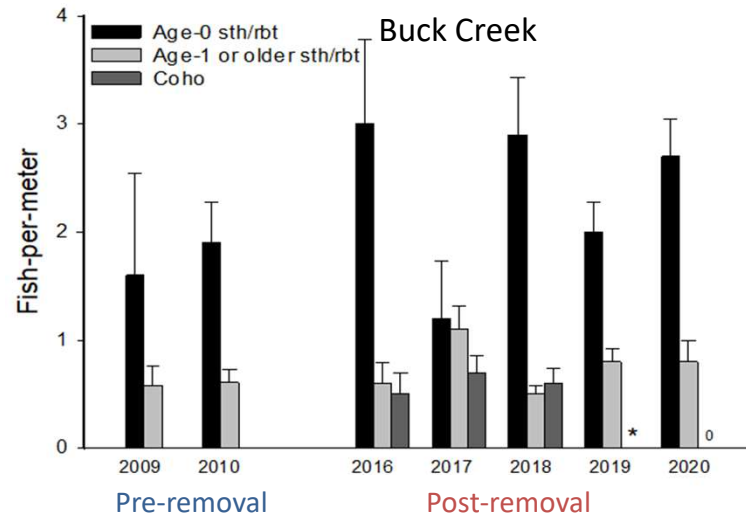
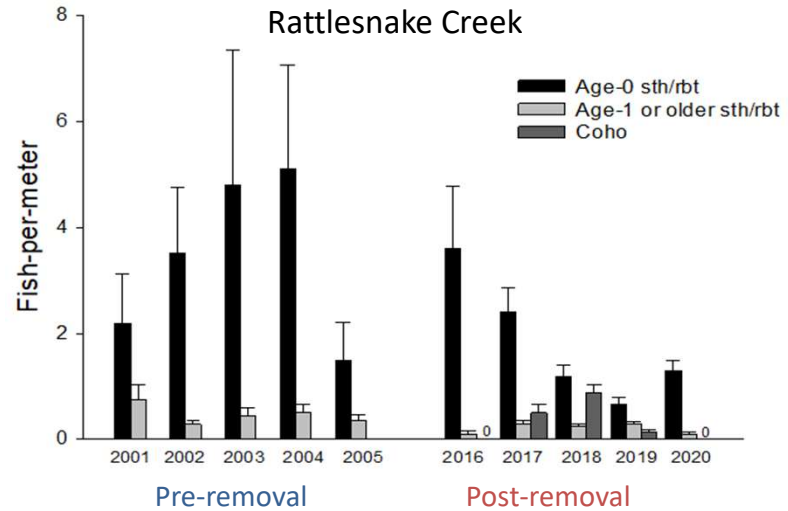
- Rattlesnake Cr. - Juvenile salmonid abundance is within the pre-dam removal range.
- Buck Cr. – Greater juvenile salmonid abundance post-dam removal than pre-dam removal.

➤ Steelhead and Coho smolts confirmed from Mill, Buck, and Rattlesnake Creeks.

➤ Coho Salmon, PIT-tagged in tributaries, have returned to Bonneville Dam as adults.

➤ Coastal Cutthroat in multiple tributaries.

2001 – 2005 Data from Allen et al. 2006
 2009 – 2010 Data from Allen et al. 2012



* Two Coho were captured in 2019.

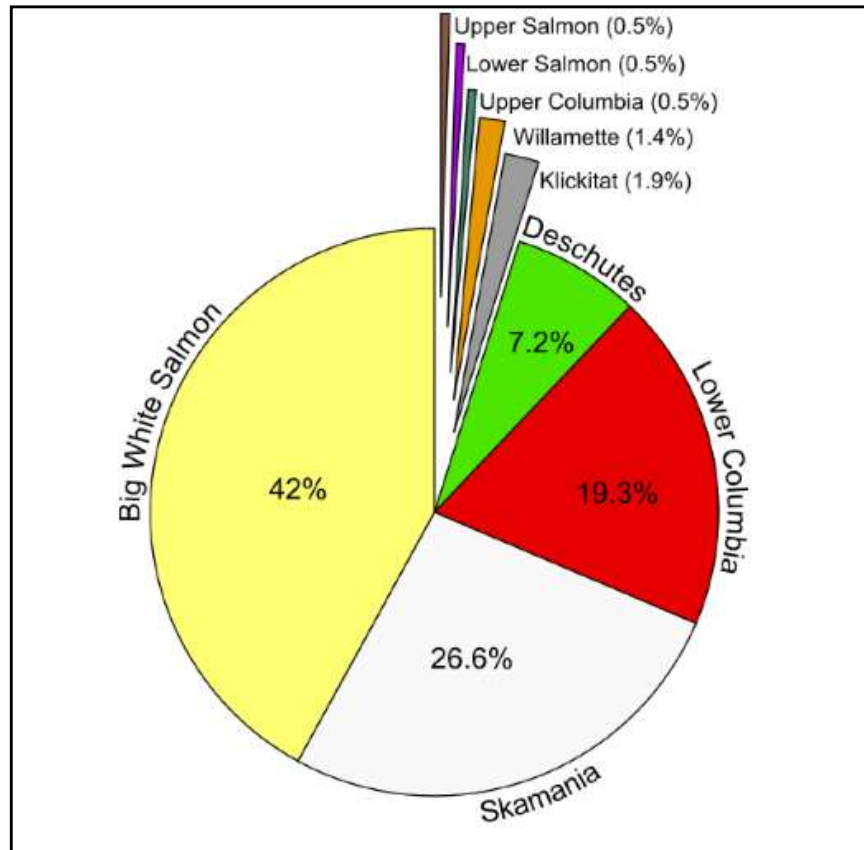
Data courtesy of USGS Columbia River Research Laboratory

- **Adult returns of Steelhead PIT tagged at White Salmon screw trap returning to Bonneville Dam**
- **SAR rates for run years 2017-2024**
 - 1.2 – 2.7% (low sample size, high uncertainty)
 - Similar values to other recent local runs
 - Steelhead return timing suggests winter and summer component
- **Pre-dam removal Steelhead/rainbow trout PIT tags (2004-2006):**
 - Fish tagged in Rattlesnake and Buck creeks detected returning at Bonneville Dam or at East Sand Island tern colony



Steelhead Genetics

- 207 samples of parr and smolt at screw trap and mainstem efish.
- White Salmon is largest single reporting group.
- Winter and summer run



Genetic Stock Identification of Steelhead smolts and parr sampled at the White Salmon screw trap and through electrofishing in the mainstem during 2016.

Credit: Steven Micheletti, CRITFC, 2018

What We Know

- Recolonization above former dam site by multiple anadromous species:
 - Steelhead spawners in all major tributaries including upstream of partial barriers
- Juvenile outmigrant production – have abundance in some but not all years
 - Preliminary Adult returns/SARs
- Source/origin of recolonizing spawners – still more to learn, but local White Salmon *O. mykiss* population appears to play a key role

What We Don't Know

- Steelhead
 - Precise abundance estimates
 - Full spatial distribution?

Future Monitoring?

- Limited funds
- Multi-agency coordination and cooperation

- Smolt trapping to resume 2027-2029 (Yakama Nation Fisheries)
- Steelhead spawner surveys continuing for 2025-2026 but uncertain status after that

Questions?

