Yakima Basin Science & Management Conference 2018

~ Information ~ Communication ~ Coordination ~

PURPOSE **~ To provide a comprehensive overview and exchange of ideas about the most current biological science and resource management activities in the Yakima Basin.**

June 13th 8:00am – 5:00pm
June 14th 8:30am – 5:00pm

Central Washington University
400 E University Way
* Science II RM. 103
Ellensburg, WA 98926

For more information visit:
Yakima/Klickitat Fisheries project website
(www.ykfp.org)
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YAKIMA BASIN FISH AND WILDLIFE RECOVERY BOARD

CONFEDERATED TRIBES AND BANDS YAKAMA NATION TREATY OF 1855

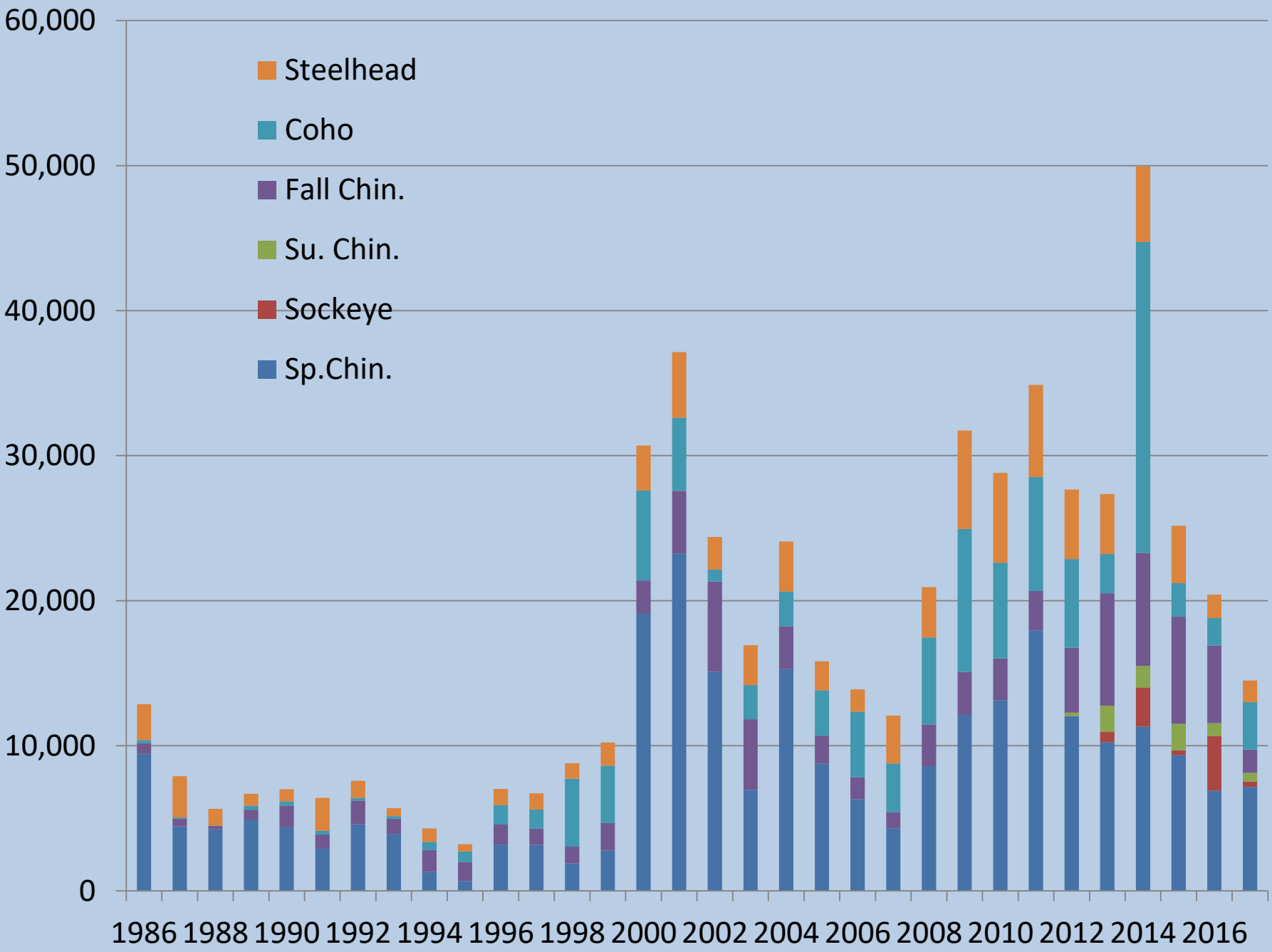
Washington Department of FISH and WILDLIFE

CENTRAL WASHINGTON UNIVERSITY WILDCATS

BONNEVILLE POWER ADMINISTRATION

U.S. DEPARTMENT OF THE INTERIOR BUREAU OF RECLAMATION

Salmon and Steelhead Returns to the Yakima Basin



Impacts to Salmon in the Yakima Basin During the 2015 Drought

- Increased Temperature
- Reduced Flow
- Increased Predation
- Reduced Survival of Outmigrating Smolts
- Reduced Survival of Returning Adults

Resulting Impacts Occuring in 2017 From the Drought of 2015

- Reduced Adults Returning from Fewer Smolts That Outmigrated in 2015
- Reduced Smolts from Fewer Spawners in 2015

Yakima Basin Integrated Plan

Kachess Drought Relief Pumping Project

Cle Elum Dam Fish Passage

KRD streams
Cle Elum Pool Rise

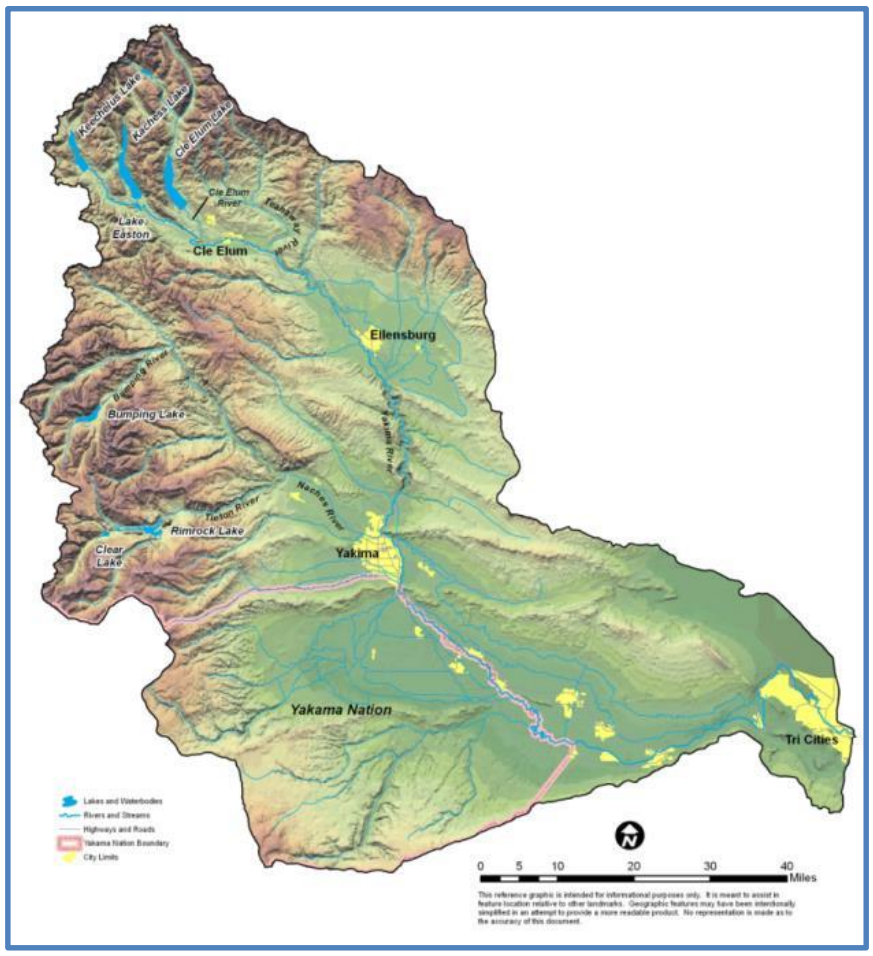
Teanaway Community Forest

Conservation Projects: Roza & Kennewick Irrigation

Gap to Gap Floodplain Restoration

Smolt Survival Study

Thermal Barriers



Yakima River Delta Enhancement Project

Wednesday Integrated Plan

Scott Nicolai – YN **Ryan DeKnikker – YN** **William Meyer - WDFW**	**Management of the Teanaway Community Forest**

Wendy Christensen - BoR **Danielle Squeochs - DoE**	**Yakima Basin Integrated Plan – Status of the Early Implementation Activities**
Joel Freudenthal – Yakima Co	**Wapato Reach Project Overview**
Tom Elliot – YN	**Wapato Reach Project – Right Bank**

Thursday Integrated Plan

Tobias Kock – USGS Russell Perry – USGS	Migration Survival of Chinook Salmon, Steelhead & Lamprey in the lower Yakima River 2018

Migration Survival of Juvenile Chinook Salmon, Steelhead, and Lamprey from Wapato Dam to the Mouth of the Yakima River, Washington

Michael Porter[1], Tobias Kock[2], Russell Perry[2], Patrick Monk[3] and Ian Courter[4].
[1]Yakama Nation – Yakima/Klickitat Fisheries Project, Toppenish, WA. [2]U.S. Geological Survey, Cook, WA. [3]U.S. Bureau of Reclamation, Yakima, WA, [4]Mt. Hood Environmental, Boring, OR.

The 2018 study employs acoustic telemetry to monitor yearling and sub-yearling Chinook Salmon, juvenile Steelhead and Lamprey in the lower 111 miles of the Yakima River,[1] where previous studies have shown that juvenile salmon survival can be poor.[2,3,4] The study is part of a multi-year evaluation of factors affecting migration survival of juvenile Chinook Salmon, Steelhead, and Lamprey at a scale that will enable us to model and more effectively manage these factors to improve smolt survival.

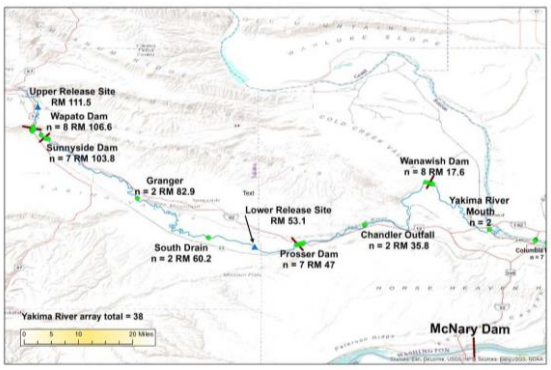


Figure 1. Study Area and Monitoring Sites. [1]

Season: 15 week smolt out-migration period
Measured Parameters:
- River Flow and Turbidity
- Water Temperature
- Predatory Bird and Fish Abundance
- Irrigation Diversions

Release groups (actively migrating juvenile fish):
- 350 yearling Chinook Salmon
- 350 sub-yearling Chinook Salmon
- 400 summer Steelhead
- 100 Pacific Lamprey[6] (experimental tags via PNNL)

Study area:
- 7 reaches of the Yakima River from Yakima to the Columbia River (Fig. 1)
- Columbia River mainstem from the Yakima River to Bonneville Dam

Duration: March to July 2018 (pilot study), 2019 and 2020

Telemetry data is gathered via acoustic monitoring arrays (Fig. 1 & Fig. 2) established and maintained in the Yakima River and Columbia River by the Yakama Nation (YN) and U.S. Geological Survey (USGS). [1]

Figure 2. Columbia River acoustic arrays. [1]

Two Columbia River arrays established by the YN and USGS will test the detection probability of the receivers and potentially eliminate the HWY 395 array in year 2 and 3 of the study, making those receivers available for use elsewhere in the Yakima River providing more resolution for survival analysis.

Acoustic receivers deployed in the Columbia River by Pacific Northwest National Laboratory for a concurrent U.S. Army Corps of Engineers smolt survival study will also monitor tagged fish and lamprey, extending the geographic scope without the cost of additional equipment.

Figure 3 . Monitoring Survival at Diversion Dams. [1]

Wapato Dam, Sunnyside Dam, Prosser Dam, and Wanawish Dam are each monitored by 7 to 8 receivers to gather route specific passage by tagged fish. Receiver deployment locations are selected to[1].
- Detect fish as they arrive at the dam
- Provide multiple detection sites within each passage route
- Detect fish as they move downstream after passing the dam
- Determine fish screen integrity

Week	Yearling Chinook		Subyearling Chinook		Steelhead	
	Wapato	Prosser	Wapato	Prosser	Wapato	Prosser
Mar 26-30	30	20				
Apr 2-6	30	20				
Apr 9-13	30	20			30	20
Apr 16-20	30	20			30	20
Apr 23-27	30	20			30	20
Apr 30-May 4	30	20			30	20
May 7-11	30	20			30	20
May 14-18			30	20	30	20
May 21-25			30	20	30	20
May 28-Jun 1			30	20		
Jun 4-8			30	20		
Jun 11-15			30	20		
Jun 18-22			30	20		
Jun 25-29			30	20		
Jul 2-6			30	20		
Totals	210	140	240	160	210	140

Table 1. Fish Tagging and Release. [1]

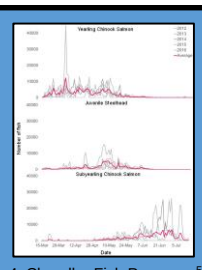


Figure 4. Chandler Fish Passage. [5]

To ensure that tagged fish are moving through all reaches of the study area continuously from late March to early July [1] a fish release strategy was developed by apportioning the 2018 release of 1,100 fish shown in Table 3, based on outmigration timing shown in Figure 4.

Fish releases occur several times each week at State Route 24 (mile 111.1) 4.5 miles upstream of Wapato Dam and Sunnyside Drain Bridge (mile 53.1) 6 miles upstream of Prosser Dam (Fig 1). [1]

Predators can have significant impacts on survival of juvenile salmonids[7] and lamprey. Survival may vary by river reach and predator numbers. A weekly predator index will be developed in the lower Yakima River during the study period. Predator survey data will be used in the survival analysis. [1]

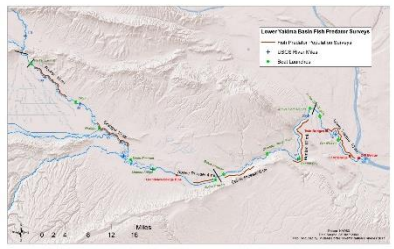


Figure 5. Fish Predator Survey Reaches.

A fish predator index is developed by conducting weekly fish predator electrofishing surveys in six river reaches (~50 miles) within the study area.

An avian predator index will be developed via a weekly count in 5 river reaches (~68 miles) within the study area. Avian hotspots at two dam locations will also have weekly avian predator counts.

Mt. Hood Environmental will conduct monthly fish predator abundance estimates in three river reaches of the study area using a mark/recapture effort. During this effort predator stomachs will be collected to develop a salmonid consumption estimate. [6]

The Yakama Nation is continuing work with the Bureau of Reclamation and the U.S. Geological Survey on water resource management actions to improve salmon and lamprey survival. New partnerships have been developed through this study to maximize its scope and benefits. The McNary Mitigation Fund is funding experimental acoustic tags for lamprey. Pacific Northwest National Laboratory is making the tags and providing expert assistance. The Yakima Basin Joint Board is providing funding for the fish predator abundance and salmonid consumption estimates. Kennewick Irrigation District is funding an additional 8 acoustic receivers to evaluate salmon and lamprey survival near the delta of the Yakima River.

Acknowledgments:
The Juvenile Salmon Study (JSS) is a joint effort by the U.S. Geological Survey and the Yakama Nation, with funding in 2018 provided primarily by Yakama Nation and the Bureau of Reclamation, also the Roza-Sunnyside Board of Joint Control, Kennewick Irrigation District and Kittitas Reclamation District. Special thanks to David Lind and Paul Huffman of the YN and Susie Dunham of Oregon State University for providing input in creating this poster.
Bibliography available at http://ykfp.org/par.html

Thursday Integrated Plan

Merritt Mitchell Wajeeh – MCFEG	**Yakima River Delta Project: An update on Bateman Island**
John Palmer - EPA	**Columbia River Cold Water Refuges Plan**
Marcella Appel – BCD Rebecca Wassell - MCFEG	**Thermal refuge on the lower Yakima: developing cool projects on a hot river**
Urban Eberhart – KRD	**Setting Up for Survival - A River Basin Endures**
Cole Provence – WDFW	**Beyond Manastash – How supplementation impacts upper Kittitas valley streams**

Bateman Island and the Yakima Delta

Yakima River Steelhead Kelt Reconditioning

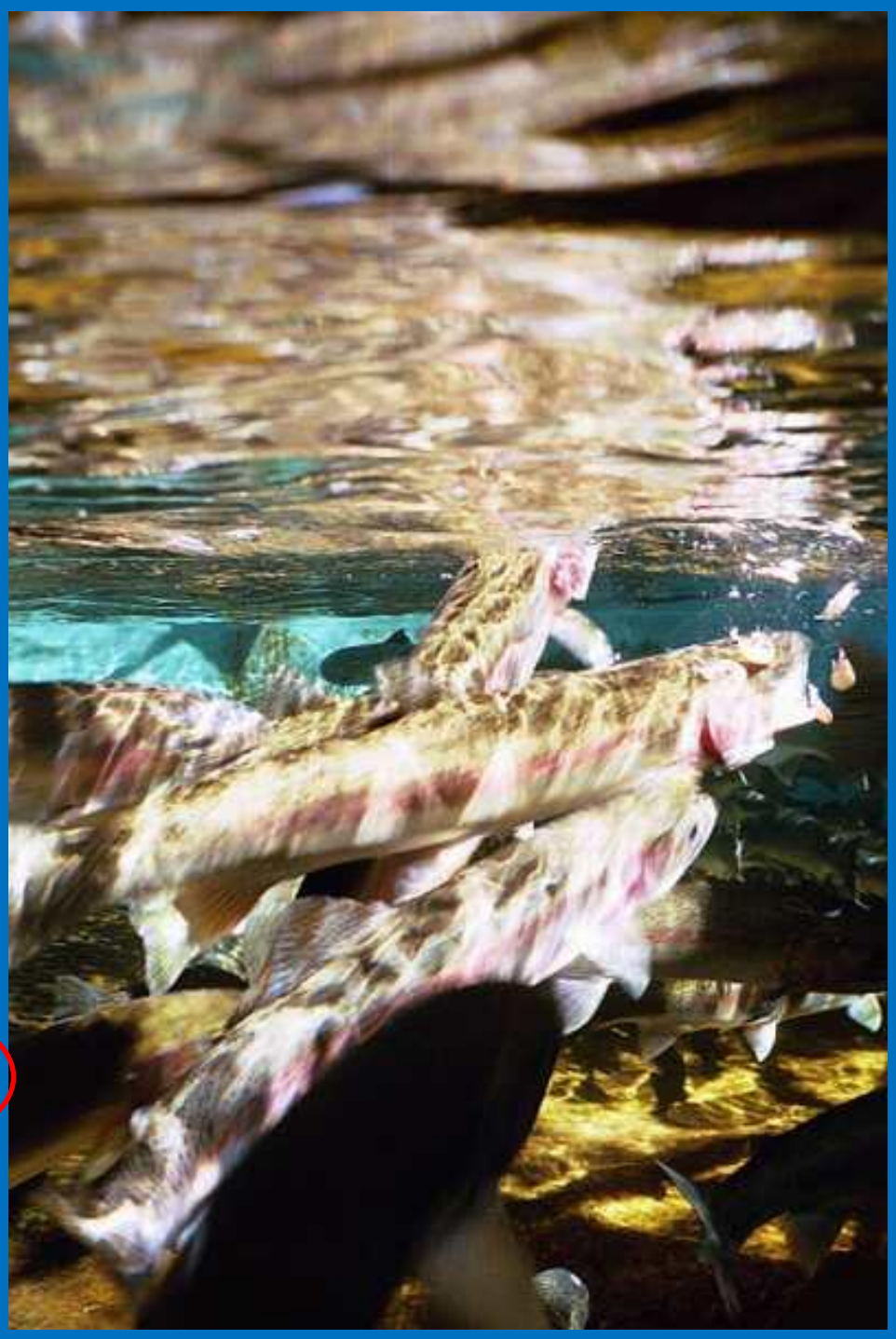
- Capture steelhead returning to ocean after completing first spawning cycle

- Most (>90%) are females

- Held and fed for 6-8 months

- Released in mid-late October (beginning of upstream migration peak)

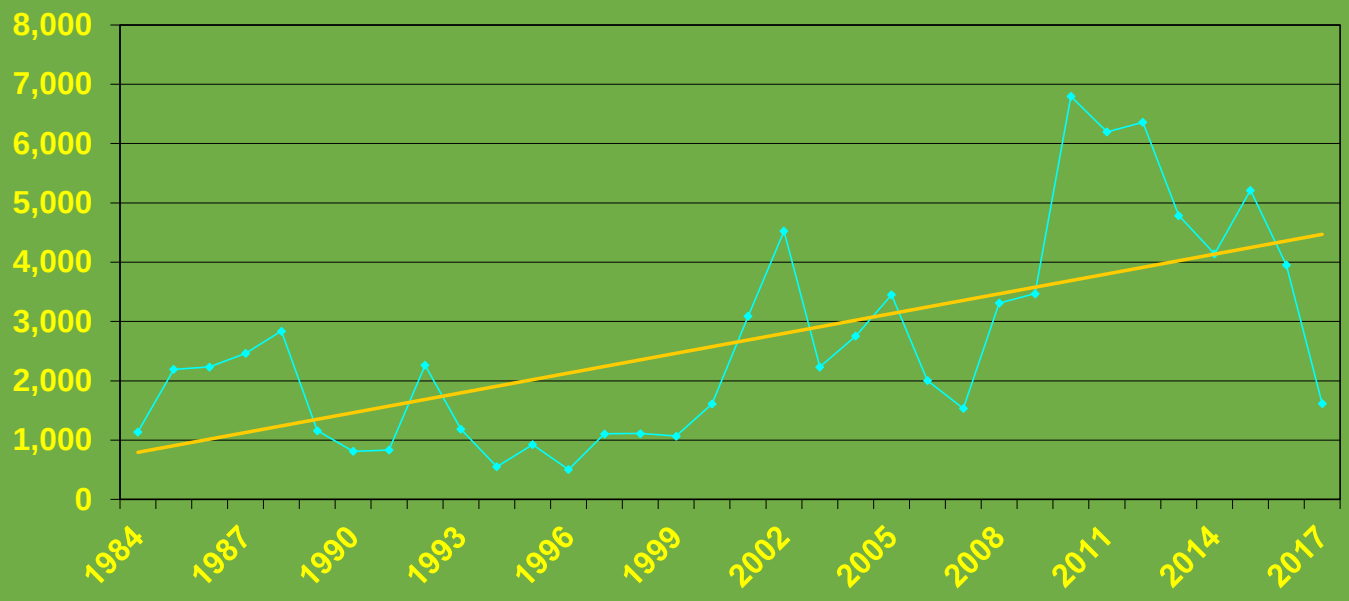
- Select own mates, where to spawn, when to spawn



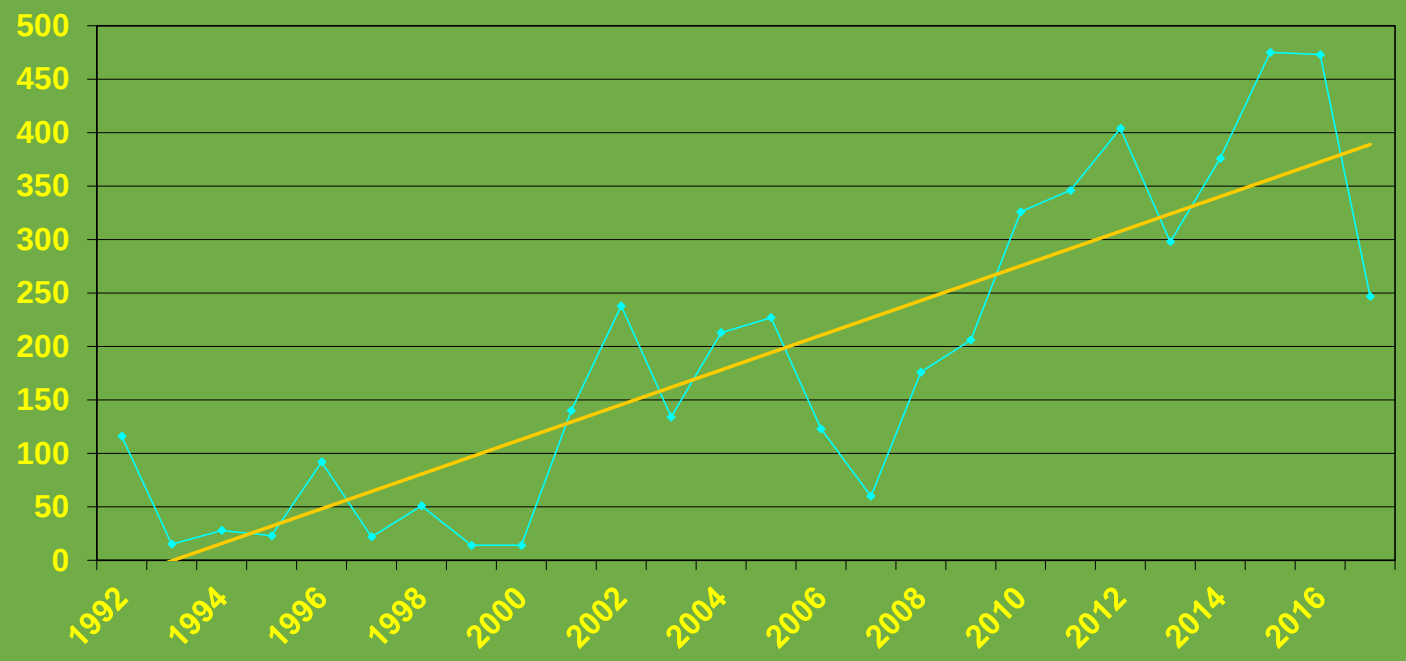
Laura Jenkins – U of Idaho	**Recovery, rematuration, and reproductive performance in repeat spawning reconditioned female steelhead**

Steelhead Population Response: Abundance Trends

Prosser Adult Abundance



Roza Adult Abundance



Neala Kendall – WDFW	**Life-cycle models for Yakima River O. mykiss: A tool for evaluating environmental influence on life history strategy and abundance**
Chris Frederiksen – YN	**Yakima River Steelhead VSP project: monitoring infrastructure and status and trends update**
Gabe Temple – WDFW	**Abundance, productivity, spatial structure, and diversity of a mixed O. mykiss population in the upper Yakima Basin**

Lake Cle Elum Sockeye Reintroduction

Year	Adults Transported	% Survival to Adult
2009	1,000	
2010	2,500	
2011	4,500	
2012	10,000	
2013	3,996 + 710	70%
2014	10,000 + 2740	107%
2015	10,000 + 340	8%
2016	10,000 + 3742	37%
2017	1,000 + 300	8%

Some of the first sockeye to spawn in upper Cle Elum R. watershed in over 100 years

Brian Saluskin – YN	**Cle Elum Sockeye Reintroduction/passage**
Andrew Matala - CRITFC	**Genetic monitoring of sockeye salmon reintroduction in the Cle Elum Reservoir**
Dan Schneider - WHOOSHH	**Engineering an Upstream Fish Passage installation at Cle Elum District**
Tobias Kock - USGS	**Evaluation of Whooshh Passage Study at Cle Elum**

Whooshh Fish Transport System Research at Cle Elum Dam

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State of Washington

Cle Elum Fish Passage
Whooshh Fish Transport System

Approximately 1700’ long, 150’ high,
Less than 60 seconds transport time for fish

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State of Washington

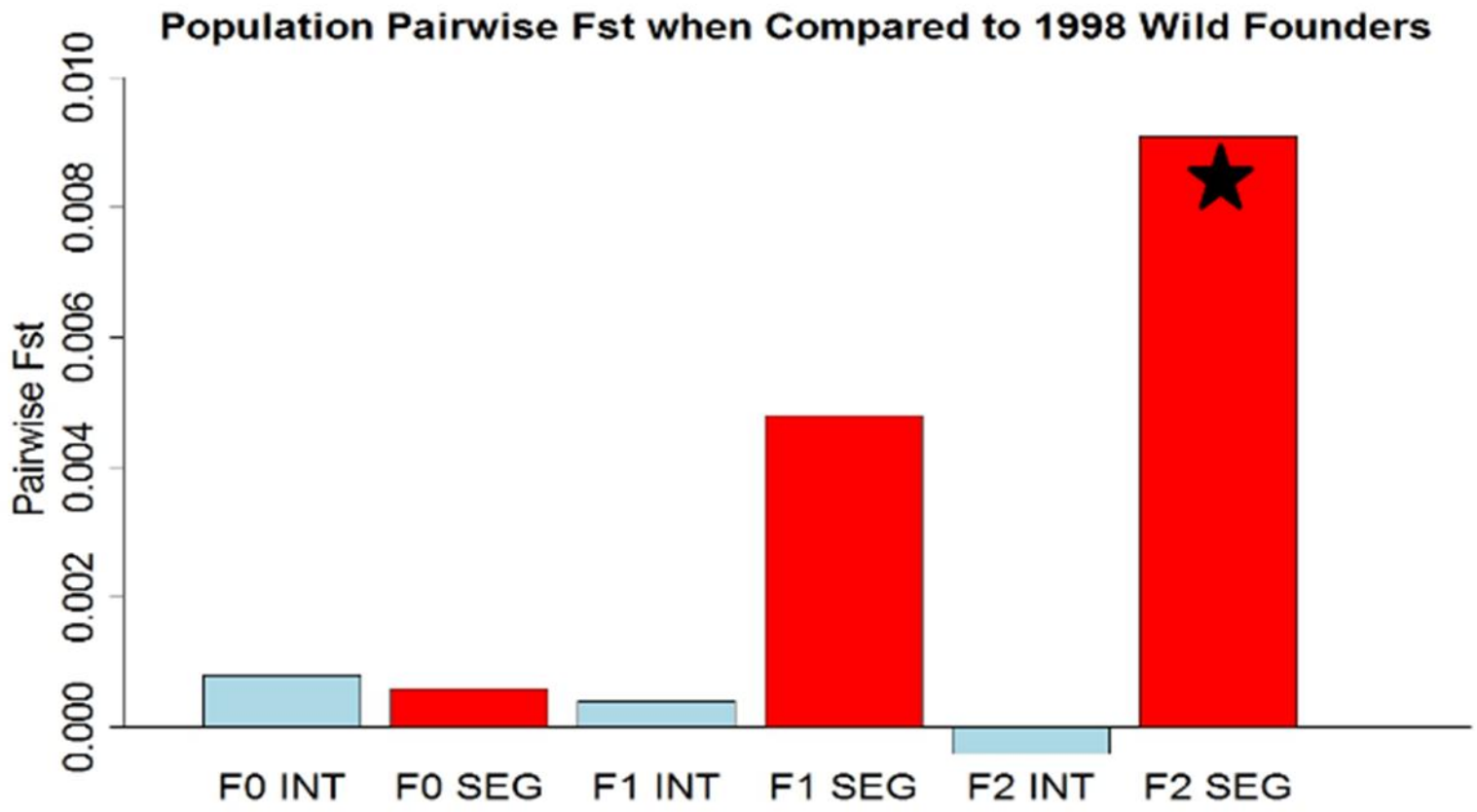
Charlie Waters passes his PhD Exam based on his genetic research at Cle Elum Supplementation and Research Facility

- Dissertation Title: Effectiveness of managed gene flow to reduce genetic and phenotypic change associated with captive breeding of Chinook salmon

Genetic Differentiation

Fst is a common measure of genetic differentiation

- Higher Fst means more differentiation
- Fst of 0.05-0.1 common among salmon populations



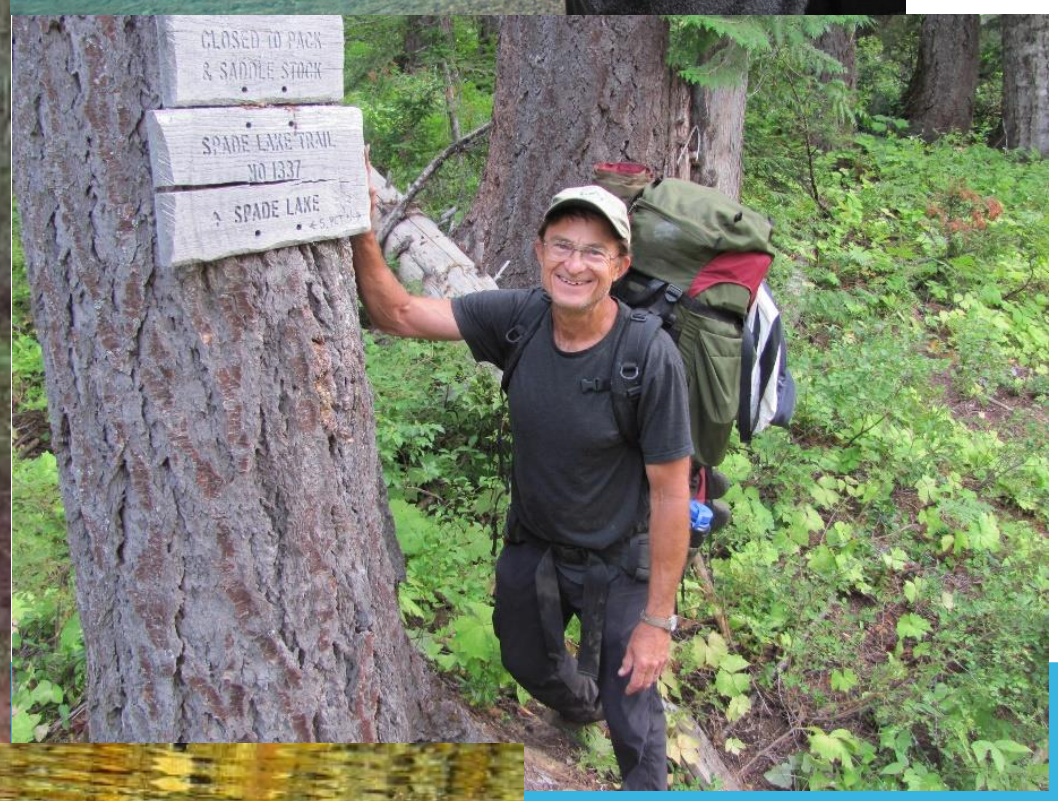
Two long time fisheries greybeards retire from the Yakima Basin
John Easterbrooks (WDFW) & Jeff Thomas (USFWS)

Jeff is good at catching big, exotic fish and explaining fish stuff. ***"So the fish opens it's mouth like so…"***

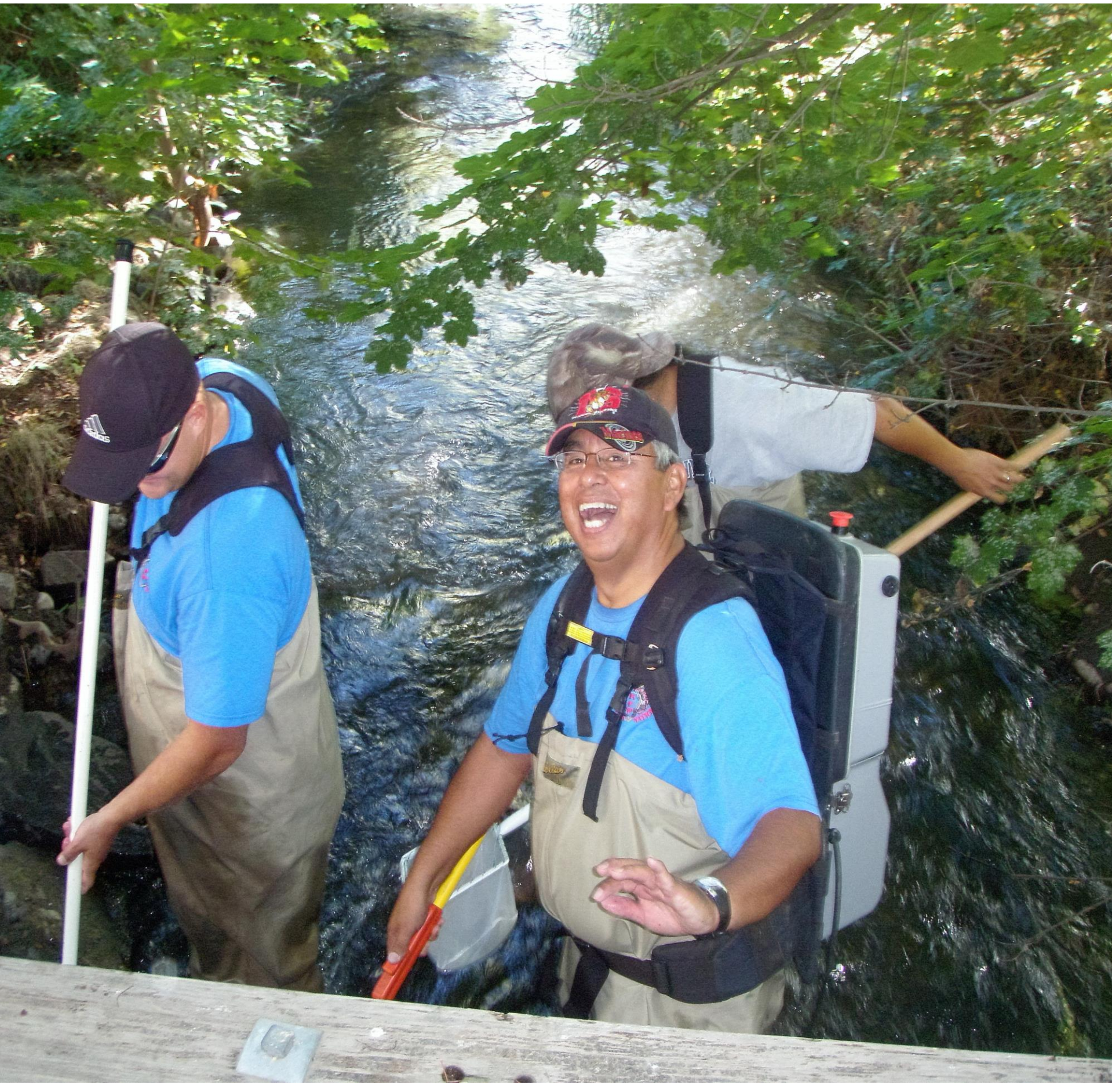
John catches exotic fish too……

- **John worked for forty years with WDFW, much in the Yakima Basin**

Eric Anderson retired after 32 years!



Joe Jay Pinkham – Yakama Nation Technician - Since Time Immemorial



Bruce Watson, scientist on YKFP, passed away this year. His contributions to the Yakima Basin Fisheries Program were monumental!

Paul Jewel, Kittitas County Commissioner and supporter of Integrated Plan, moves to a new position in County government.