Reintroduction of Salmon into their Historic Habitats (Two-Part Session)

A Concurrent Session at the 35th Annual Salmonid Restoration Conference held in Davis, CA from March 29 – April 1, 2017.

Session Overview

- Session Coordinators:
  - Curtis Knight, CalTrout
  - Rob Lusardi, Ph.D., CalTrout/UC Davis

Climate change, aging water infrastructure, successive years of drought, and increasing demand for water resources has precipitated strong declines in salmonids throughout California. Compounding this, longitudinal and lateral disconnections from historical spawning and rearing habitat has triggered a loss of salmonid life history diversity, making species less resilient to change. As a result, reintroductions of salmonids to historical habitat has occurred or is proposed as a recovery strategy. Dam removal, trap and haul above high head dams, reintroduction of captive bred animals, and improving lateral connectivity to historical floodplain habitat are proposed methods to improve salmonid life history diversity, abundance, population redundancy and, ultimately, resilience to change. We seek abstracts that examine the methods, science, and policy implications of salmonid reintroductions to historical habitat.

Presentations

Part 2 of Afternoon session

(Slide 4) *Salmonid Fish Rescue and Reintroduction Strategies*
Michael Dege, California Department of Fish and Wildlife

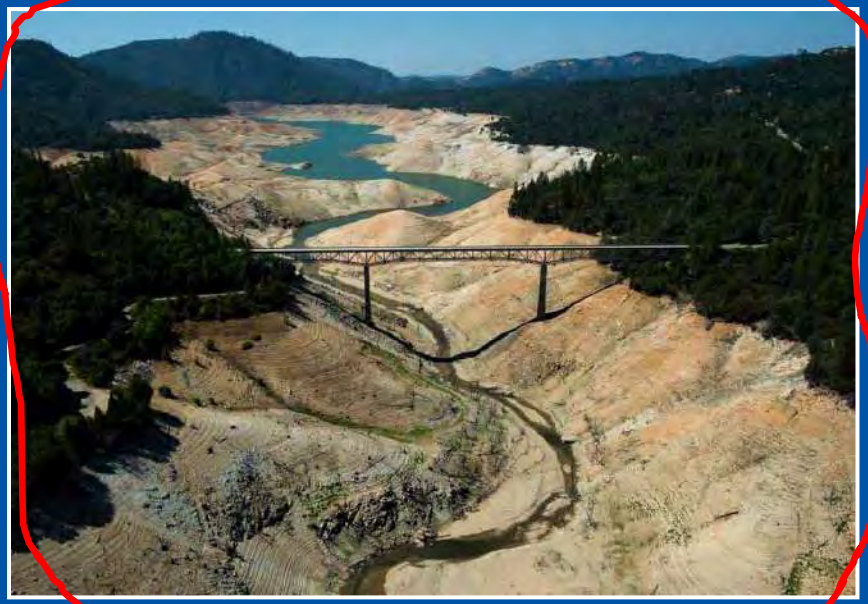
(Slide 18) *Beyond Boundaries – Restoring Habitat and Building Tribal Capacity in the Headwaters of the Klamath Basin - A Yurok Tribe Story from Limekiln Gulch*
David (DJ) Bandrowski, Yurok Tribe

Salmonid Fish Rescue and Reintroduction Strategies

Michael Dege
California Department of Fish and Wildlife

California's Ongoing Problems – A New Era

Drought and fire and floods…oh my!



CDWR, LA Times, Getty Images

Rescue Examples

SONCC Coho Salmon – Scott River, Siskiyou Co.

McCloud Redband – upper McCloud River basin, Siskiyou Co.

So. Cal. Coastal Rainbow Trout – Coldwater Canyon Creek, Riverside Co.

Coho Salmon – Scott River

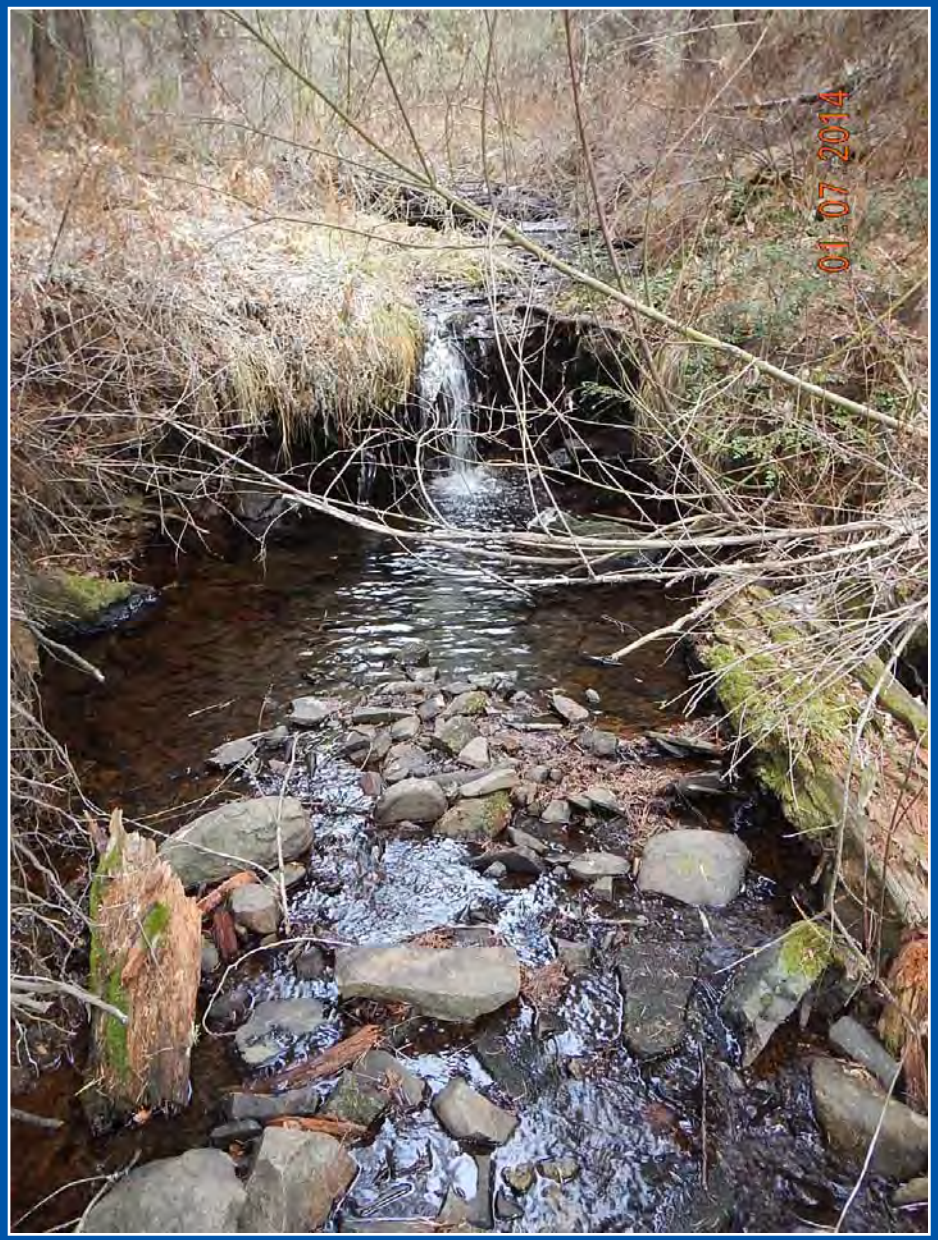
SoCal Coastal Rainbow Trout – Cold Canyon Creek

Small isolated headwater

Remnant native population

Limited rescue options

McCloud Redband – headwater streams



Assessing/implementing Fish Rescues

Implementing Rescues

- Species risk level – high risk species, genetically unique
- Observed and predicted habitat conditions (repeated)
- Historical information
- Risk to rescue
- Conditions compromise fish health and biological function = rescue

Assessing/implementing Fish Rescues (cont.)

CDFW Fish Rescue Matrix

- General guidance
- Three levels of evaluation (monitoring, translocation, rescue)
- Flexibility and professional judgement

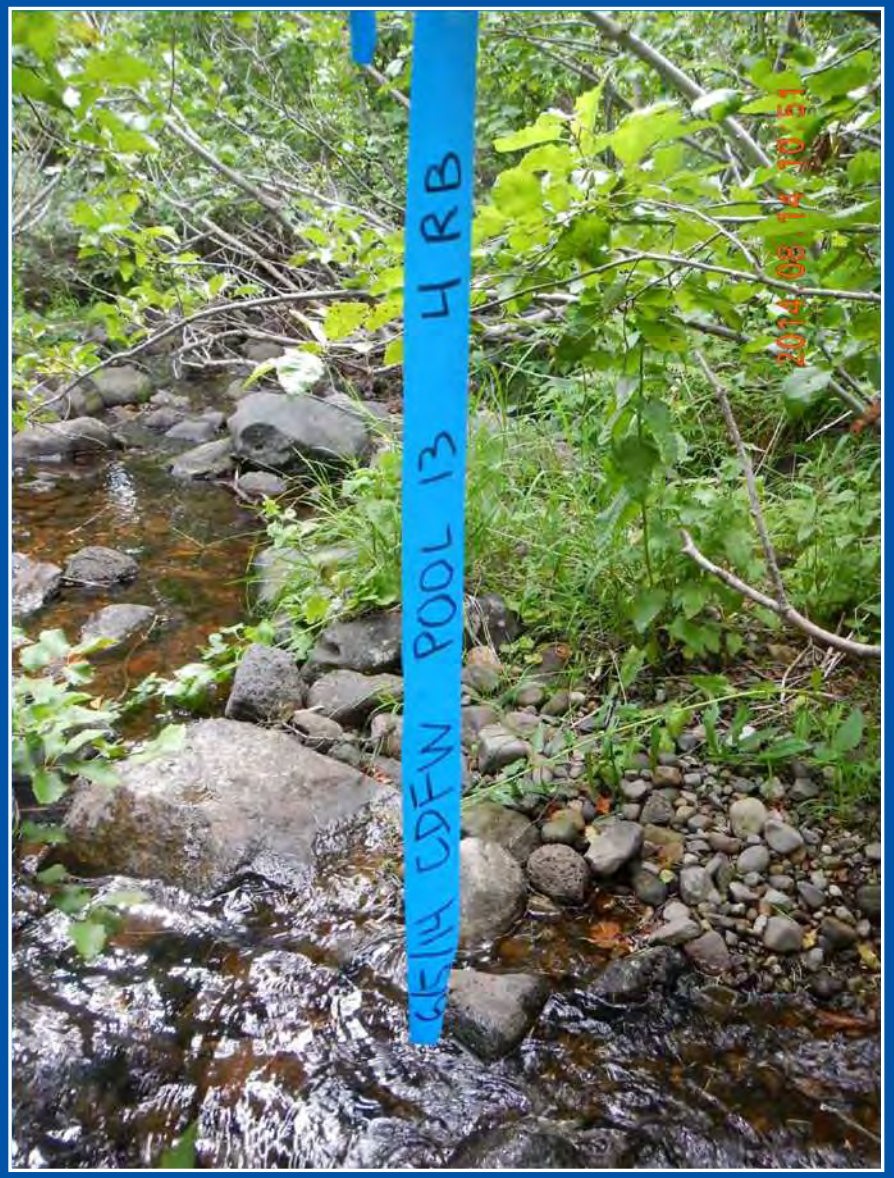
Level 1 (Monitoring at risk populations)

Action →	Trigger →	Response →	Peripherals
If a water is considered 'at risk' and is occupied by state or federally listed species, native species, or species of special concern, conduct onsite evaluations to assess existing instream habitat condition and flows at various locations and across seasons	Surveys find flow conditions **that will likely allow populations to persist** across seasons and not lead to adverse effects and/or loss of the population	Continue monitoring at intermittent intervals, based on season and localized flow/discharge (resources permitting)	Special considerations should be made to assess impacts to fish distribution/persistence in relation to barriers (natural/manmade) and overwinter survival
	Surveys find low or intermittent flow, potential stranding, and/or disconnection of wetted habitats **that will likely lead to adverse effects to, and potential loss of, the population**	Evaluate potential areas for translocation, assess disease threats, estimate logistical needs/procedures, and evaluate contribution/value of the extant population to the persistence of the species or strain	Significant effort should be placed into estimating timelines associated with desiccation and urgency of threat
Evaluate potential areas for translocation, assess disease threats, estimate logistical needs/procedures, and evaluate contribution/value of the extant population to the persistence of the species or strain	**Population is essential** to maintain species, strain, or "meta" population recovery and conservation	Initiate Level 2 translocation evaluation	Consideration of individual population's role in a disconnected "meta" population should be considered. Loss of unique alleles/genetic diversity and or numbers of adults collectively could be significant
	Population is not essential to species or meta population recovery and conservation	Continue monitoring at intermittent intervals, based on season and localized flow/discharge if resources are available (Level 1 monitoring)	

Assessing/implementing Fish Rescues (cont.)

Three rescue options:

- Instream relocation
- In-basin relocation
- Hatchery relocation



Fish Rescues

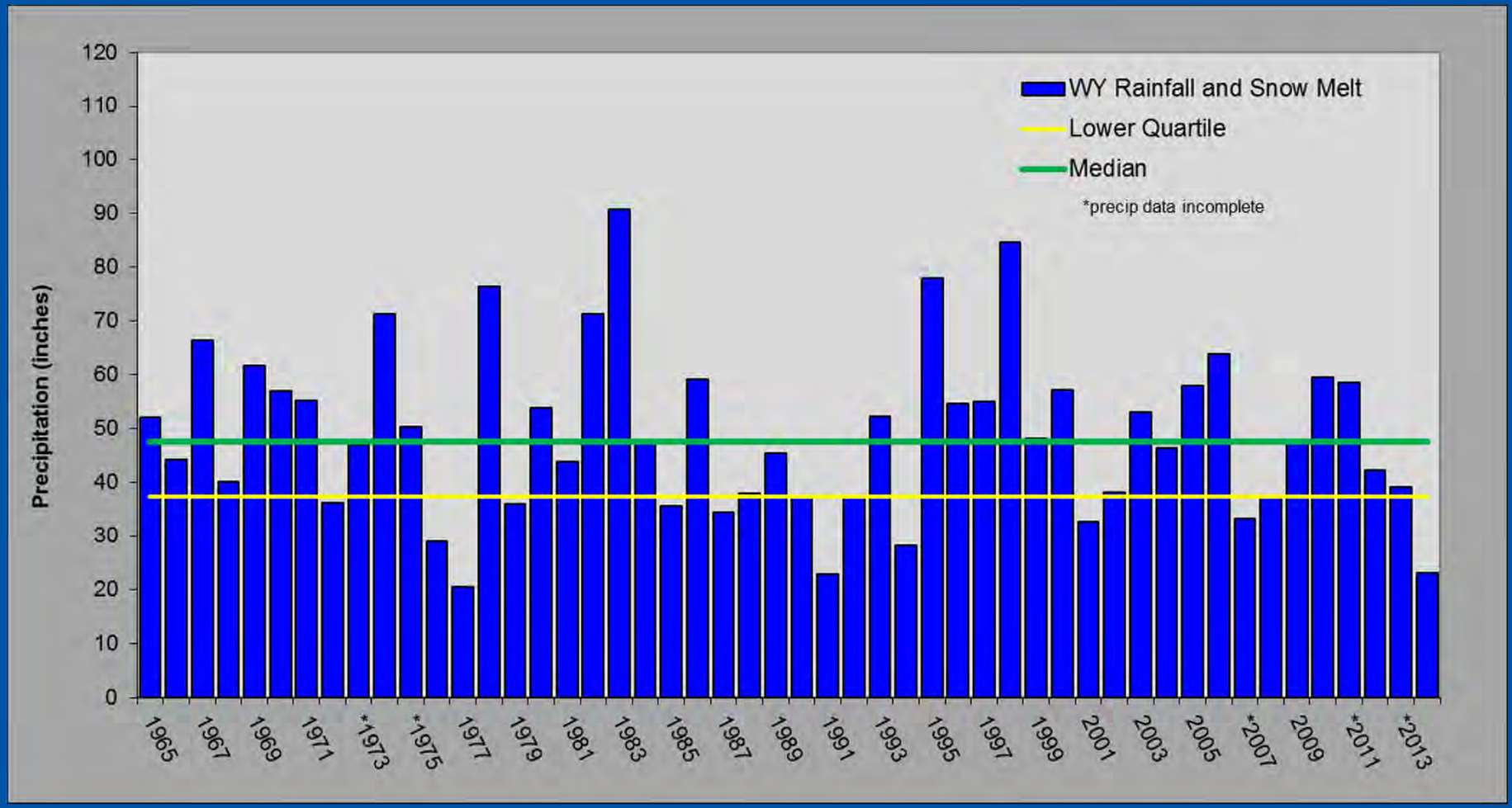
	2014 Scott	2014-15 Upper McCloud	2015-16 Cold Canyon
Instream		554	10
In-basin	111,552	77	
Hatchery	4,447	1,043	168
	115,999	1,674	178

Reintroduction

- Reintroduction strategy/criteria (environmental/biological data)
- Predictive/forecast approach with ground truthing
- One year/seasonal is as much as you can buy

McCloud Redband Reintroduction Plan/criteria

Water year (1965-2014) precipitation trends from McCloud, CA (data from NOAA National Climatic Data Center).



1. Trigger

   Green line = 47.6 inches

2. Trigger

   Temporal distribution
   23.8 inches (Oct-Jan)
   23.8 inches (Feb-May)

3. Snow Pack vs. Rainfall

   Early rain - late snowpack?

Future Planning – A New Era

Short and long-term solutions

- Rescue/reintroduction plans
- Stream refugia

- Reclaiming historic habitat
- Refuge populations
- Increasing genetic diversity
- Buffer capacity


Michael Dege
California Dept. of Fish & Wildlife
michael.dege@wildlife.ca.gov

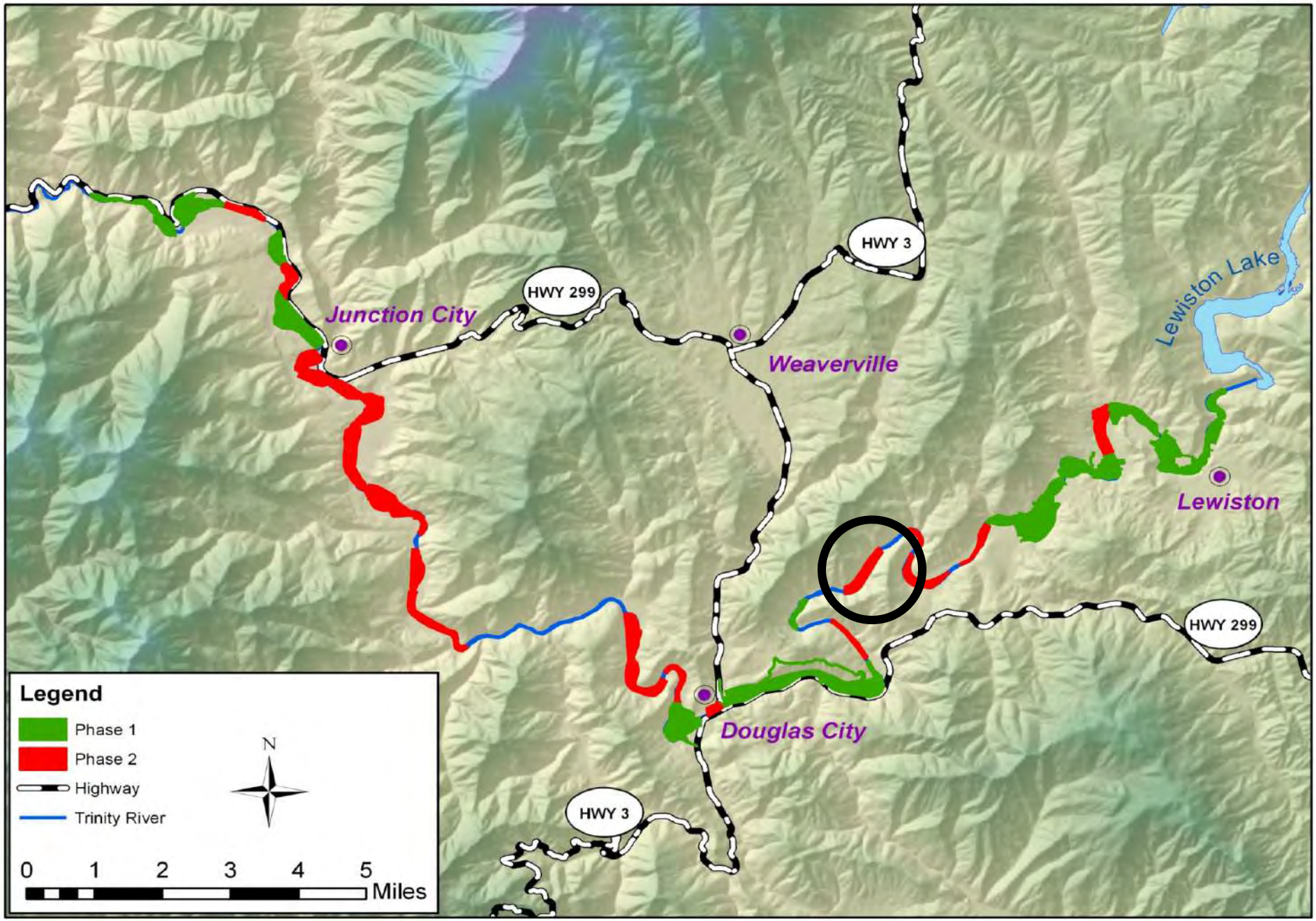
Beyond Boundaries – Restoring Habitat and Building Tribal Capacity in the Headwaters of the Klamath Basin
- A Yurok Tribe Story from Limekiln Gulch -

Salmon Restoration Federation (SRF) Conference
April 1st, 2017

David (DJ) Bandrowski P.E. - Yurok Tribe

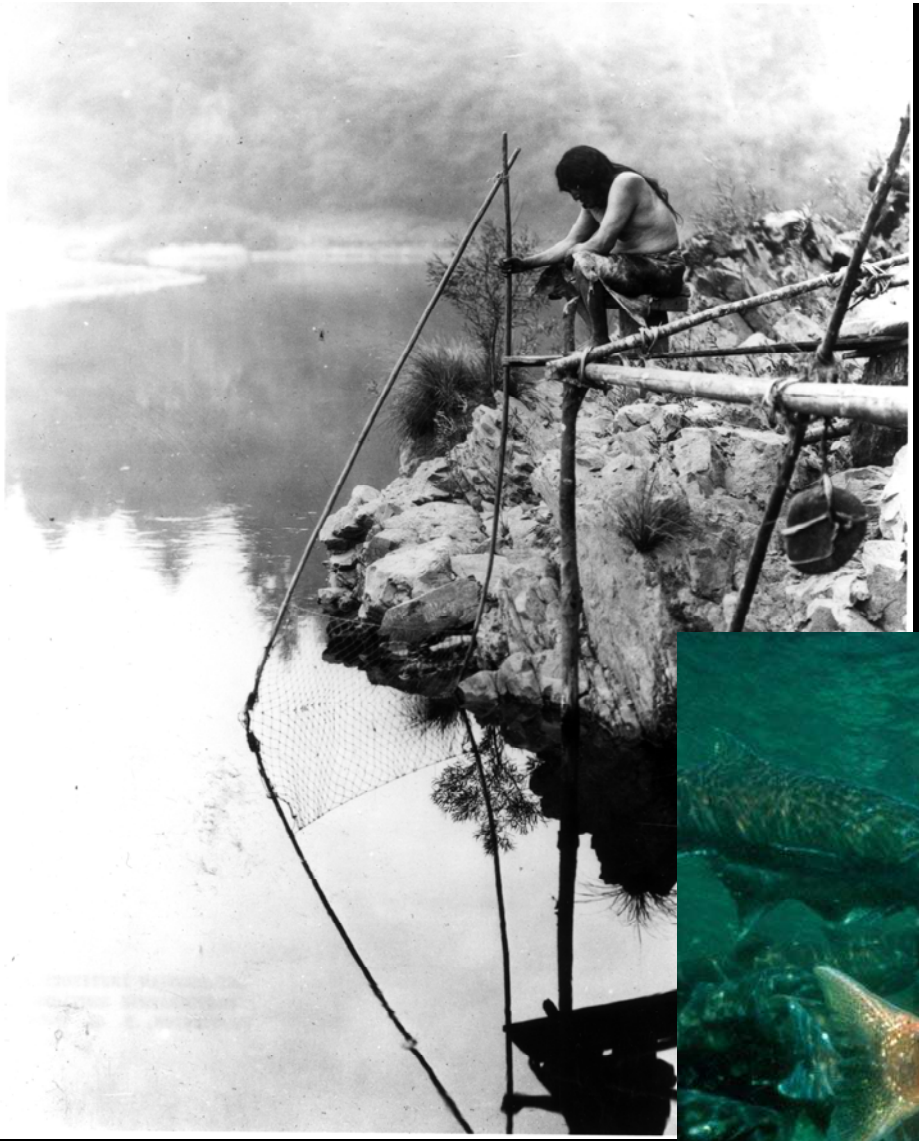
KLAMATH RIVER WATERSHED – UPPER TRINITY RIVER

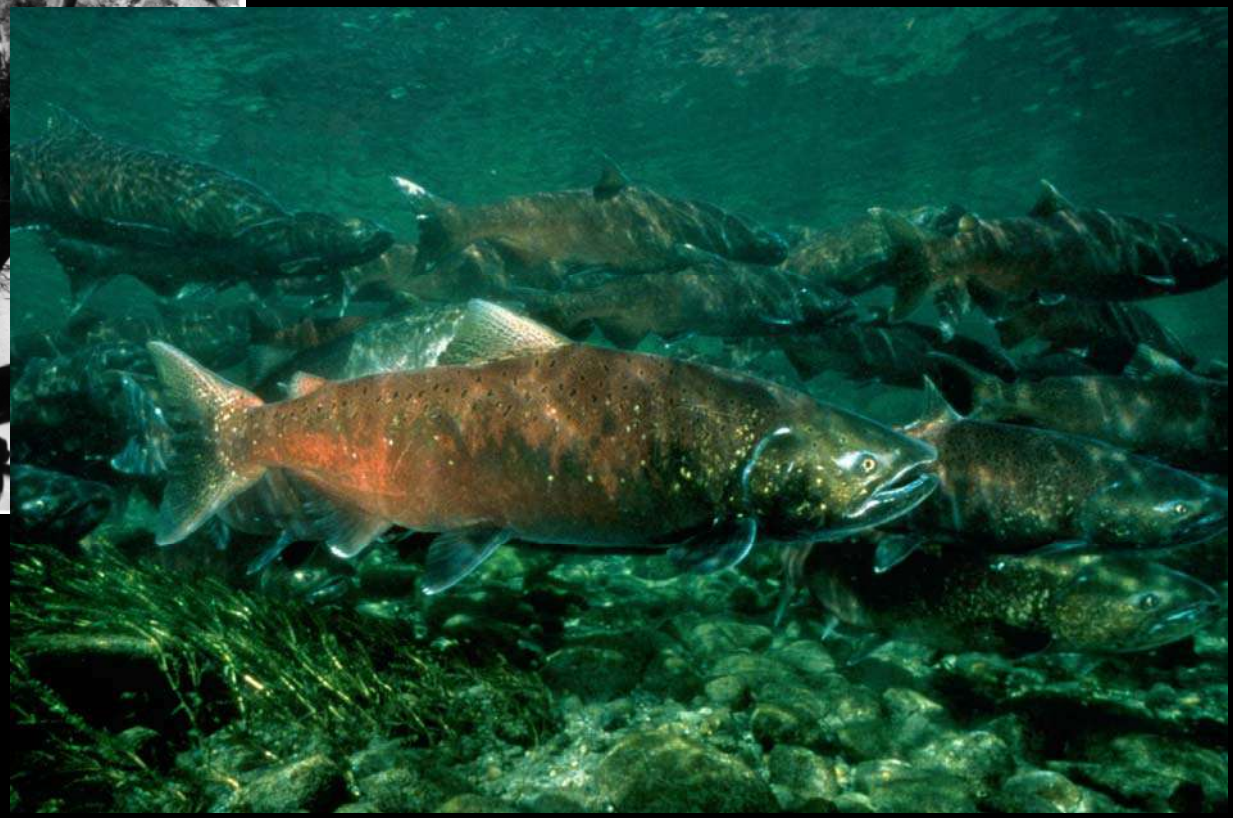
40 Mile Reach-Scale Approach - Limekiln Gulch



Limekiln Gulch Construction Team – Yurok Tribe Watershed Department - A Tribute to a Great Team!

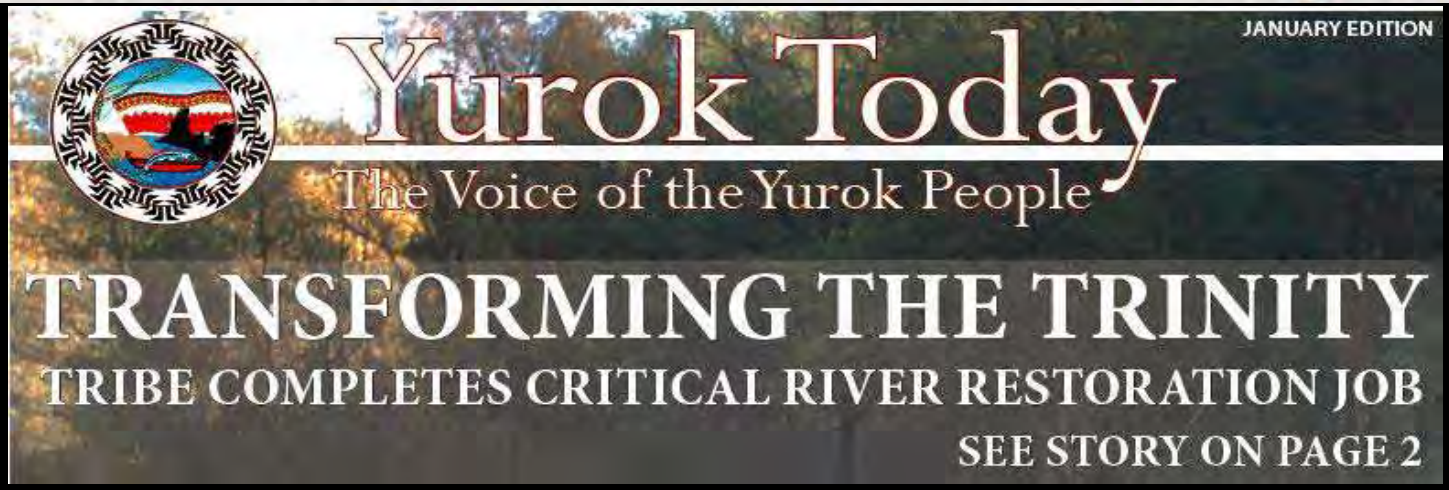
Yurok People are Part of the Fish and Fish Area Part of Them





Tribe finishes major Trinity River project

Tribal team creates salmon habitat on Klamath's largest trib



The Yurok Tribe's Watershed Restoration Program recently finished putting the final touches on an extensive project that is designed to increase the amount of favorable juvenile salmon habitat along the Trinity River.

The Limekiln Gulch Channel Rehabilitation Project was the first large-scale restoration project completed in its entirety by Yurok Tribe. The Bureau of Reclamation-funded project was a joint effort between the Yurok Tribe's Watershed and Fisheries Departments. It was conducted in accordance with the Trinity River Restoration Program's long-term plan to improve fish populations and wildlife habitat on the Klamath's largest tributary.

The project was completed on schedule and within the budget, despite many challenges faced during its implementation. The Yurok Tribe's Watershed Department has completed similar projects on the Trinity River in the recent past, although these projects were partnerships with private construction companies – where the Limekiln Gulch project was accomplished by Tribal biologists, restorationists and technicians.

"We are really excited about this for two reasons," said Richard Nelson, the superintendent for the project and Yurok Tribal member. "We showed the agency that our river restoration projects meet or exceed the highest of professional standards. More importantly, this work will strengthen salmon and steelhead stocks and improve habitat for native wildlife, which will benefit many future generations."

"The scope of work that the crew accomplished, in the amount of time that they did it, was astonishing," added Yurok Tribal Council Representative Jack Mattz, who toured the site. "They did an excellent job."

The Yurok Tribe is a partner in the Trinity River Restoration Program, and is working to rehabilitate and restore habitat for fish populations that support the Yurok Tribe's federally recognized fishery in the Lower Klamath River. The Limekiln Gulch Project, located six miles east of Weaverville on a property managed by the Bureau of Land Management (BLM), consisted of constructing several sophisticated juvenile salmon habitat features. The site is the size of the Klamath town site or several city blocks. On what was previously a straight stretch of river, the Watershed Restoration Program used heavy machinery to establish side channels that were later lined with native trees, shrubs and herbaceous plants. The crew also installed large wood structures that resemble beaver dams and serve as hiding spaces, especially in high water, for small salmonids. Big boulders were placed where they would propagate protected pockets of aerated water. The restoration crew also made marshy, slow water habitat. In addition to providing shelter for small salmon, the complex features that the Watershed team built into the river will yield myriad benefits for juvenile salmon and steelhead. Waterfowl and other wildlife will use the new fish-friendly features, too.

Constructing a holistic environment, conducive to the success of everything from bacteria to black bears, requires a tremendous amount of skill. Using heavy machinery, highly talented, Tribal Watershed restorationists, like Roger Boulby, Tony Alameda and Randy "Goose" Mattz molded each of the elaborate elements. These three Tribal members, along with Dewey Myers, Dan McQuillen and project superintendent Nelson performed the majority of the mechanical restoration work over the summer, which saw record high temperatures and constant clouds of smoke from out-of-control forest fires. Despite the poor air quality and 100-plus degree days, the team worked diligently on a daily basis to get the job done.

"The crew had to endure a considerable amount of adversity, but it didn't slow them down," said Nelson. "These Yurok Tribal members did a fantastic job."


DEERE


CAT

The First In-River Restoration Project Completed Entirely by the Yurok Tribe Personnel and Equipment

ALTHOUGH…, WHAT DID WE GET OURSELVES INTO?

THE MOST DIFFICULT CONSTRUCTION ACCESS OF ANY PROJECT

River Crossings and Fueling – Construction Logistics

Large Wood Harvesting for Salmon Habitat

New Wetland Development along the Riparian Corridor

LARGE WOOD PLACEMENT ON THE MAINSTEM TRINITY RIVER

LIMEKILN GULCH – LINKING MODELING TO IMPLEMENTATION

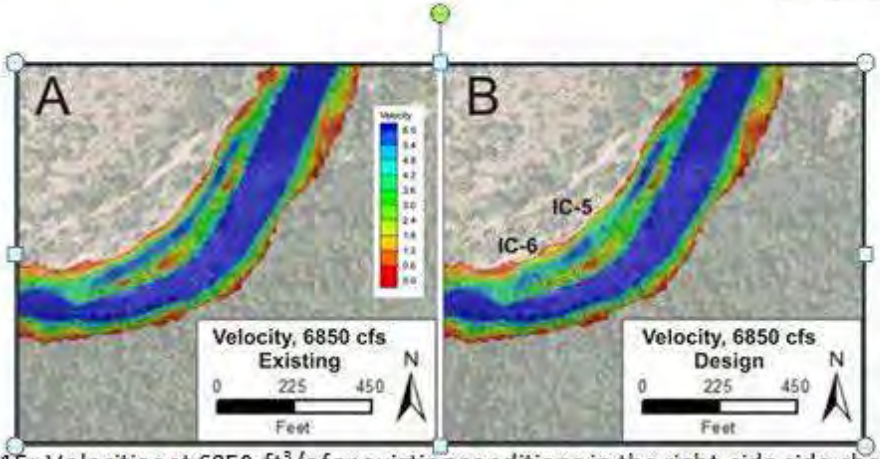


Figure 15: Velocities at 6850 ft^3/s for existing conditions in the right-side side channel containing IC-5 and IC-6 for A) existing and B) design conditions. Velocities are in units of ft/s with the highest velocities shown in blue.

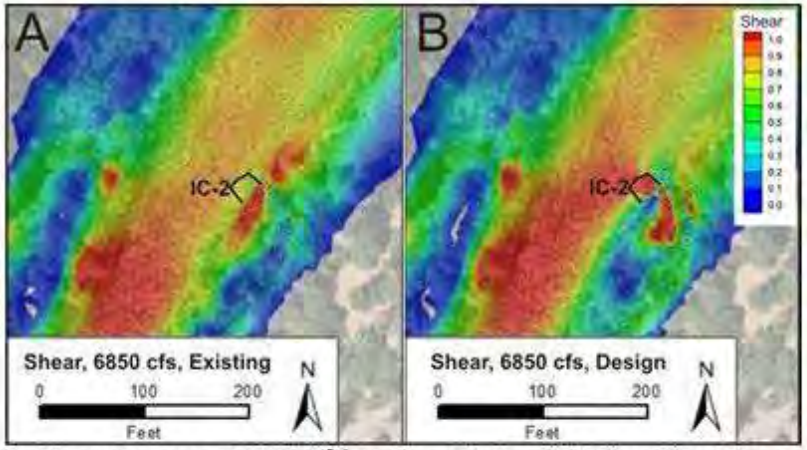
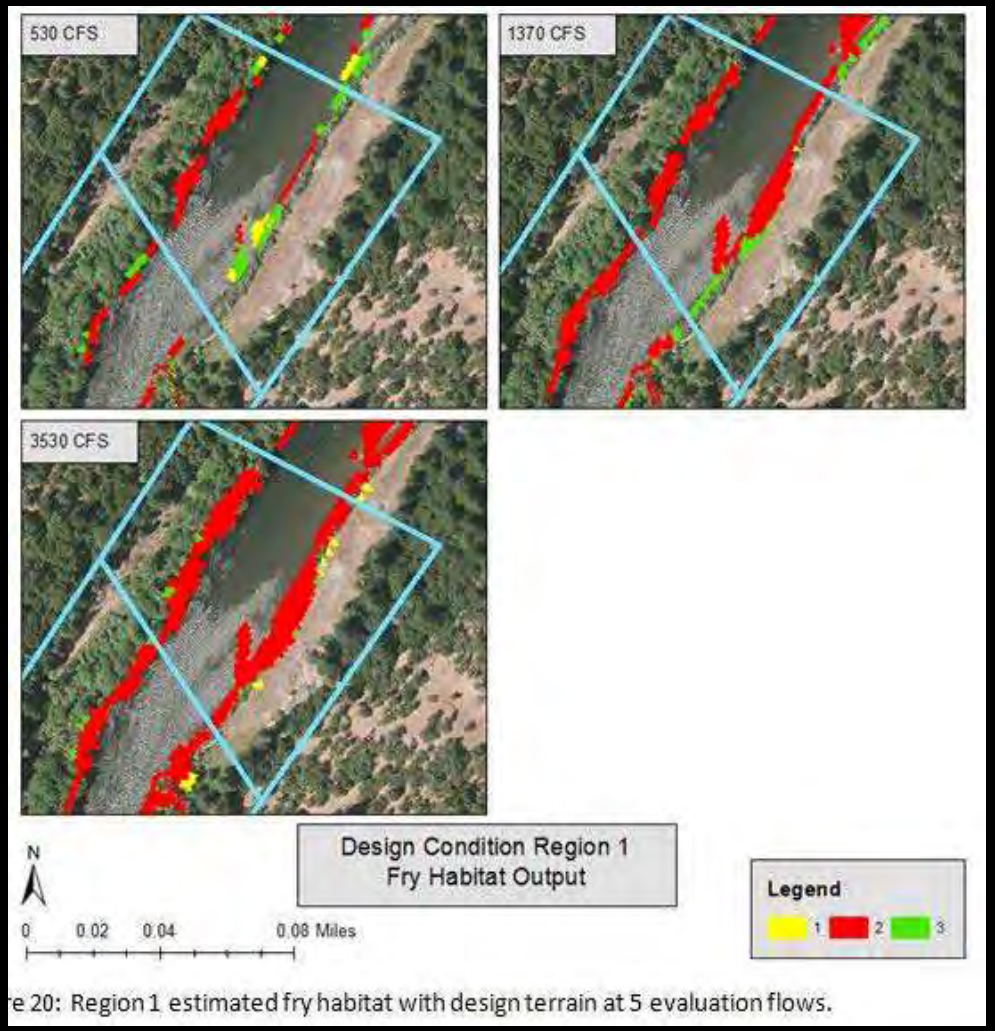


Figure 16: Shear stresses at 6850 ft^3/s in the vicinity of IC-2 for A) existing and B) design conditions. Shear stresses are in units of lbs/ft^2 with the highest shear stresses shown in red.

- Gaeuman et al. 2014

Analyzing Site Specific Design Alternatives at A Site Specific Sites Related to Hydraulics and Habitat



e 20: Region 1 estimated fry habitat with design terrain at 5 evaluation flows.

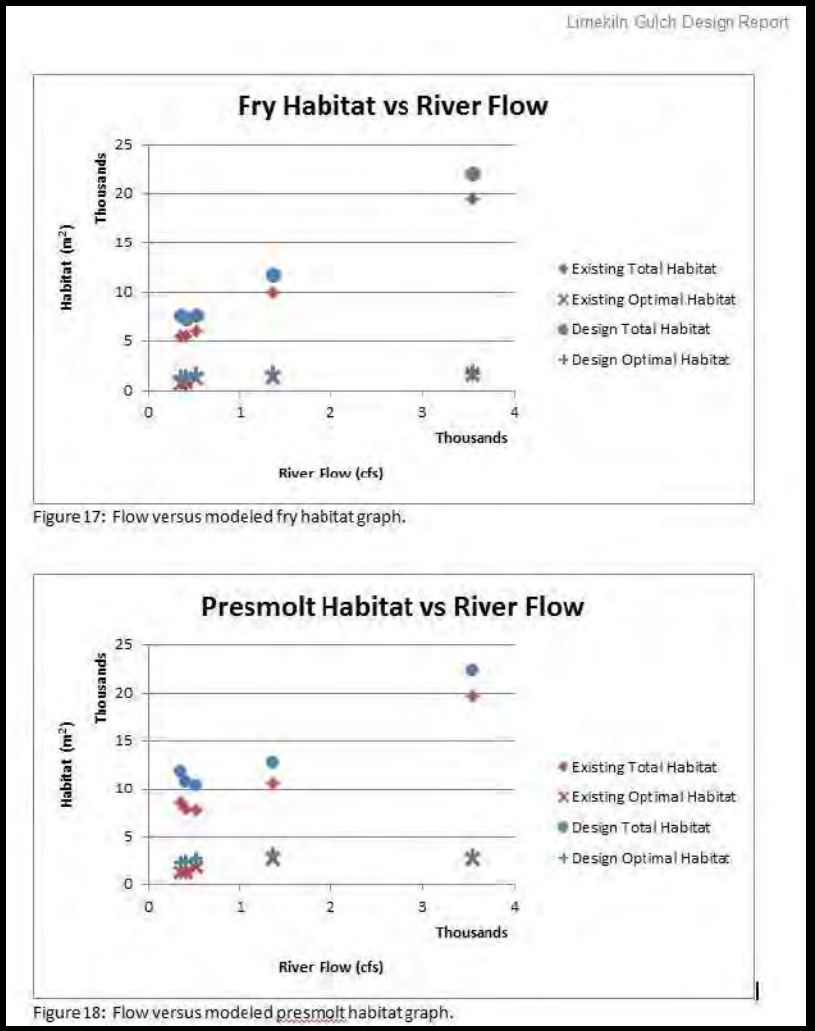


Figure 17: Flow versus modeled fry habitat graph.

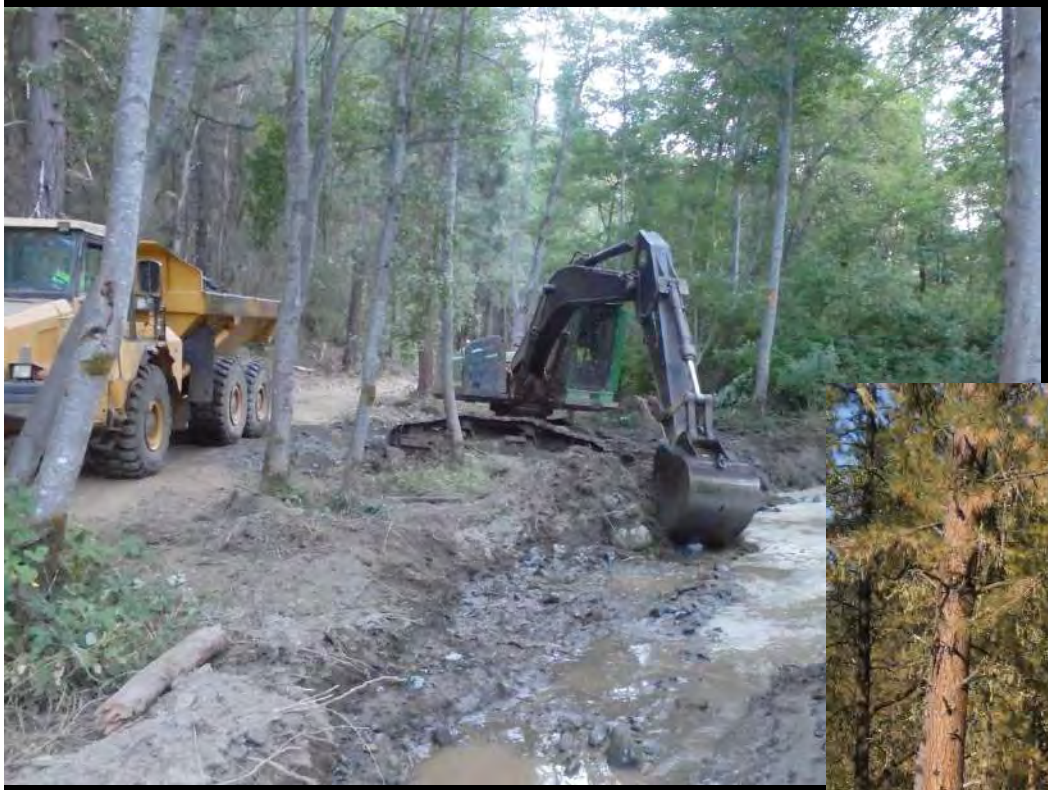
Figure 18: Flow versus modeled presmolt habitat graph.

- Gaeuman et al. 2014

Extreme Fire Danger Throughout the Project – Fire Suppression Was Paramount

Equipment Breakdowns - The Ingenuity of Keeping Things Moving Forward

Confined Space – The Challenge of Keeping a Small Restoration Footprint




CAT

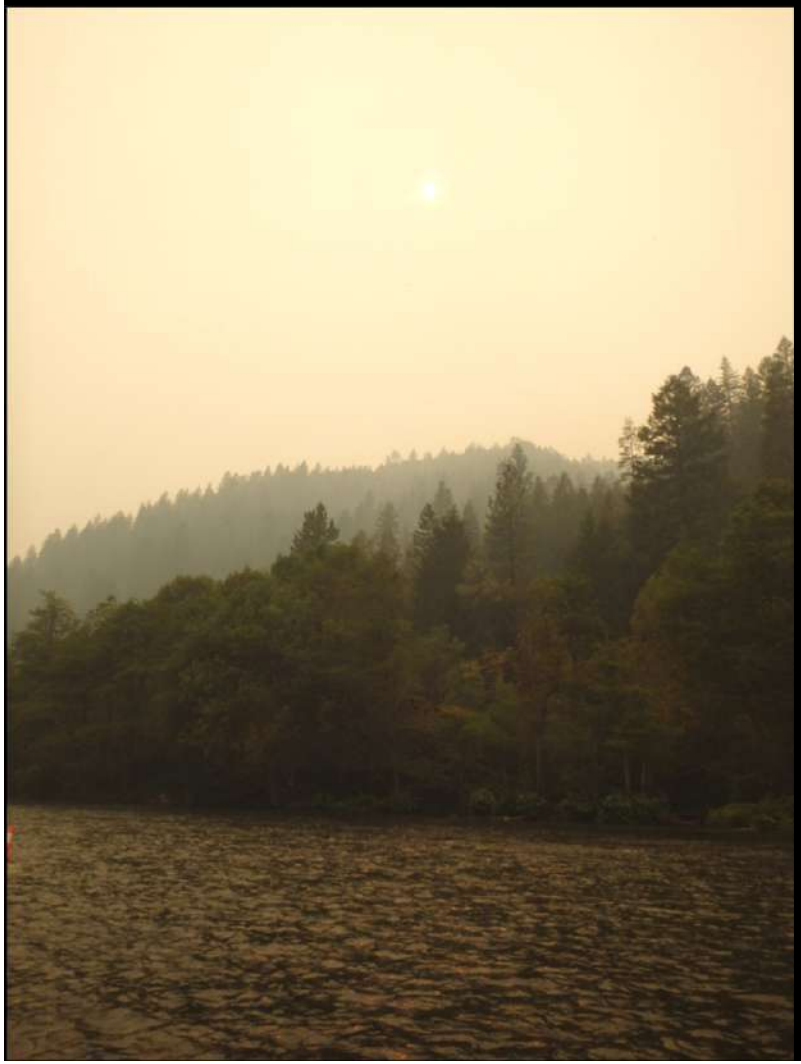
The Challenges of Working in the Mainstem River

Safety First! Always Training and Practicing Proper Protocols for Emergency Situations

Isolating the Work Zone - Keeping Turbidity from Construction Entering the Mainstem Trinity River

Fires Started on July 31st – The Difficulty Working in Smoke

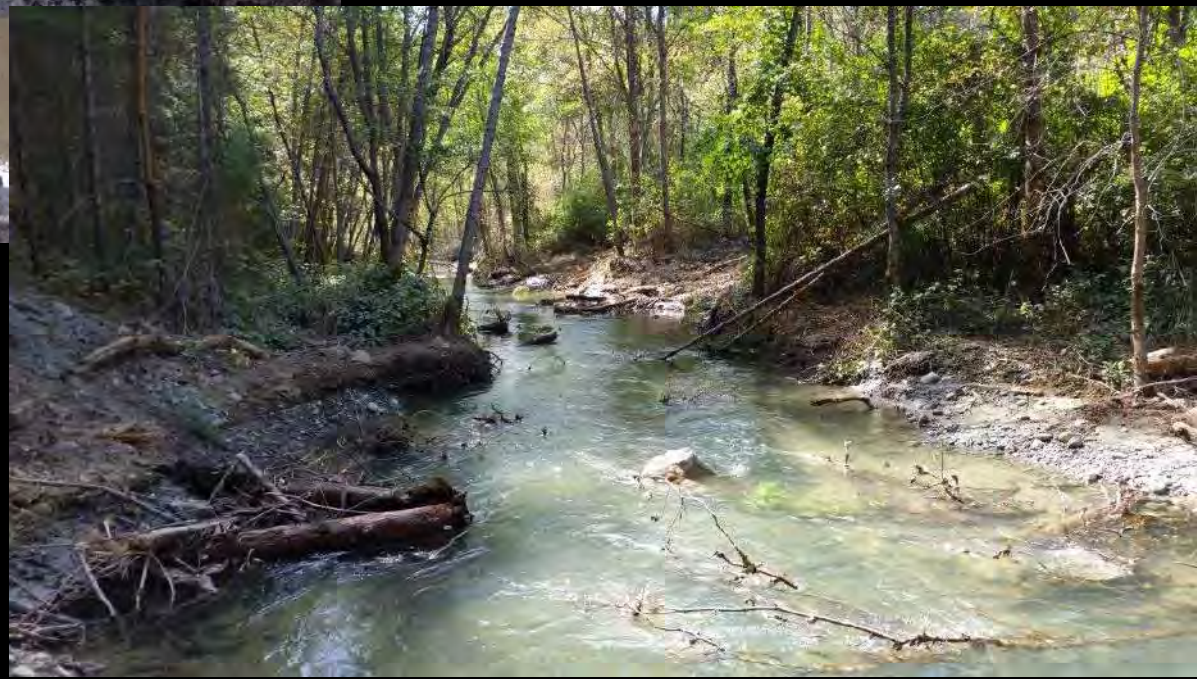
MIDDLE OF THE DAY SMOKE EFFECT….



OVERCOMING THE UNEXPECTED HIGH BEDROCK ISSUE

TEAMWORK – THE ESSENCE OF SUCCESS

Side Channel Construction to Juvenile Rearing
- Before and After -



Although its Not for the Faint Hearted – Challenges & Obstacles

A Job Well Done – Completed Side Channel Network Through Blood, Sweat, and Tears

One Year Later – Post Construction

Nature takes Hold…

Post Construction Monitoring and Data Collection

Implementation is for the Fish – but its about the People Too

LIMEKILN WAS A COLLABORATION ACROSS A GREAT TEAM
TRINITY RIVER RESTORATION PROGRAM - PARTNERSHIP

Building Capacity Beyond the Boundary of the Reservation
Klamath Dam Removal – the Next Chapter…
A Tribute to Troy Fletcher

Tell me and I'll forget. Show me, and I may not remember. Involve me, and I'll understand.

- Native American Saying -

DJ Bandrowski P.E., Project Engineer
djbandrowski@yuroktribe.nsn.us
906-225-9137