
Introduction to the
Eel River Watershed Conservation and
Restoration Plan and → Program
Eel River Forum – April 4, 2023
Covelo Round Valley Library Commons 11:00-3:00
CALIFORNIA TROUT
FISH · WATER · PEOPLE
CONCOW · POMO · YUKI · WAILACKI · NOMLACKI · LITTLE LAKE · PIT RIVER
CALIFORNIA
DEPARTMENT OF
FISH & WILDLIFE
McBain Associates
APPLIED RIVER SCIENCES
Stillwater Sciences
M.Wier

MEETING AGENDA – April 4, 2023

11:00 am start

- Greetings
- Overview of the Eel Conservation and Restoration Plan
- Questions/Answers – CalTrout and RVIT
- Hopes for Eel River Watershed – Map activity for All

--Lunch 12:00-12:45 + *optional walk to restoration site*

- GROUP ACTIVITY Feedback on Restoration Program goals
- AFTERNOON SPEAKERS
  - Darren Mierau - Potter Valley updates and Pikeminnow overview
  - Wyatt Smith – Ongoing conservation and fish monitoring in the Eel Watershed, RVIT
  - Marisa McGrew – Pacific Lamprey, Wiyot monitoring
  - Samantha Kannry – Summer steelhead
- Closing and next steps for the Eel Restoration and Conservation Plan

3:00 pm end

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Roadmap

Morning session 11:00 – 12:00

1. **Who** is involved in this Conservation and Restoration Program?
2. **Where** is the Program focused?
3. **Why** do we need a Program?
4. **What** is the Eel River Conservation and Restoration Program?
5. **How** is this Program different than other restoration planning in the Eel Watershed?
6. **When** will this Planning happen?

- Group work: Audience questions, feedback on Program Goals, and survey results from the Eel River Forum mailing list.

At the end of the meeting, we hope to have done the following:

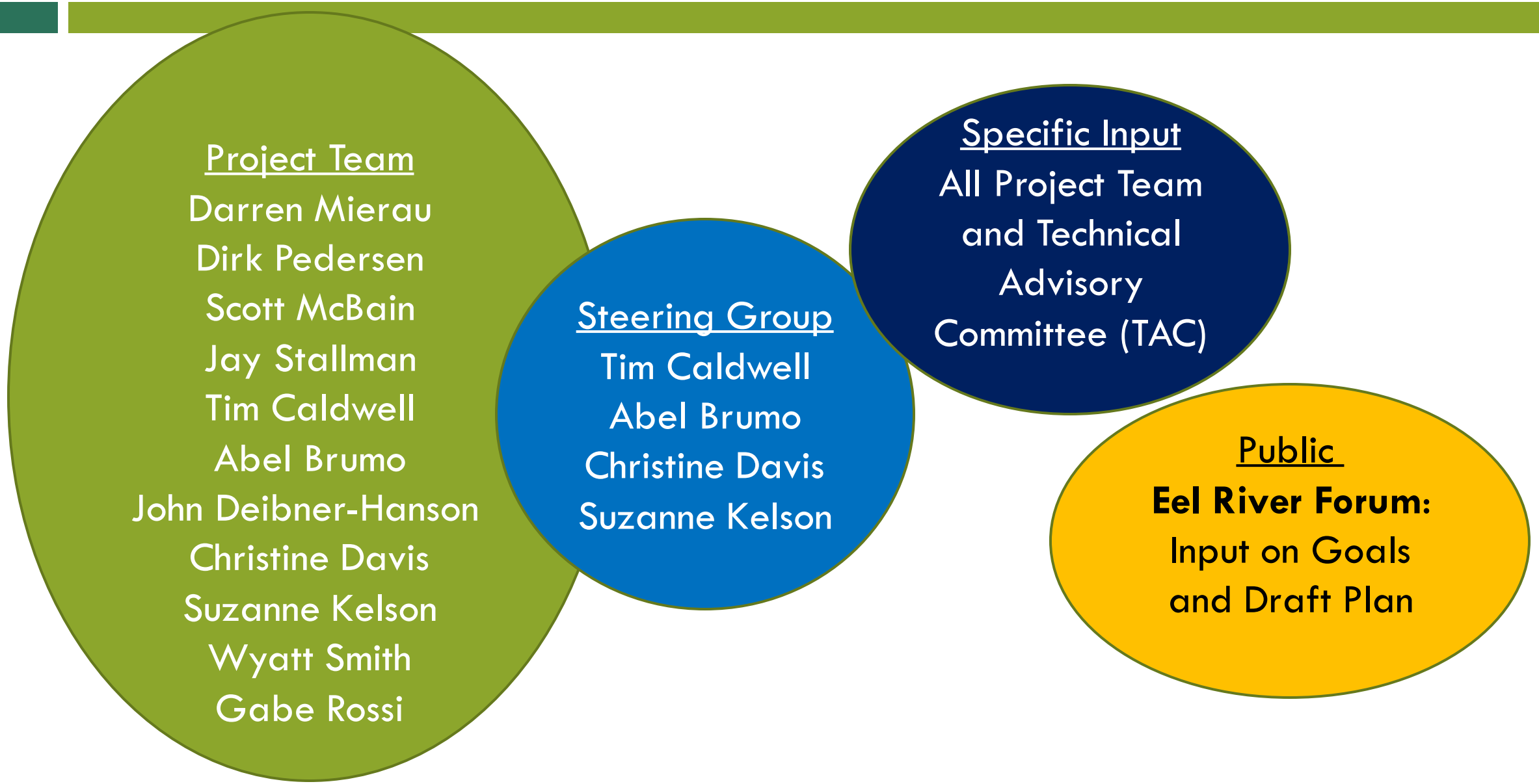
1. Provide an understanding of:

Eel River Watershed Conservation and Restoration Plan and Program

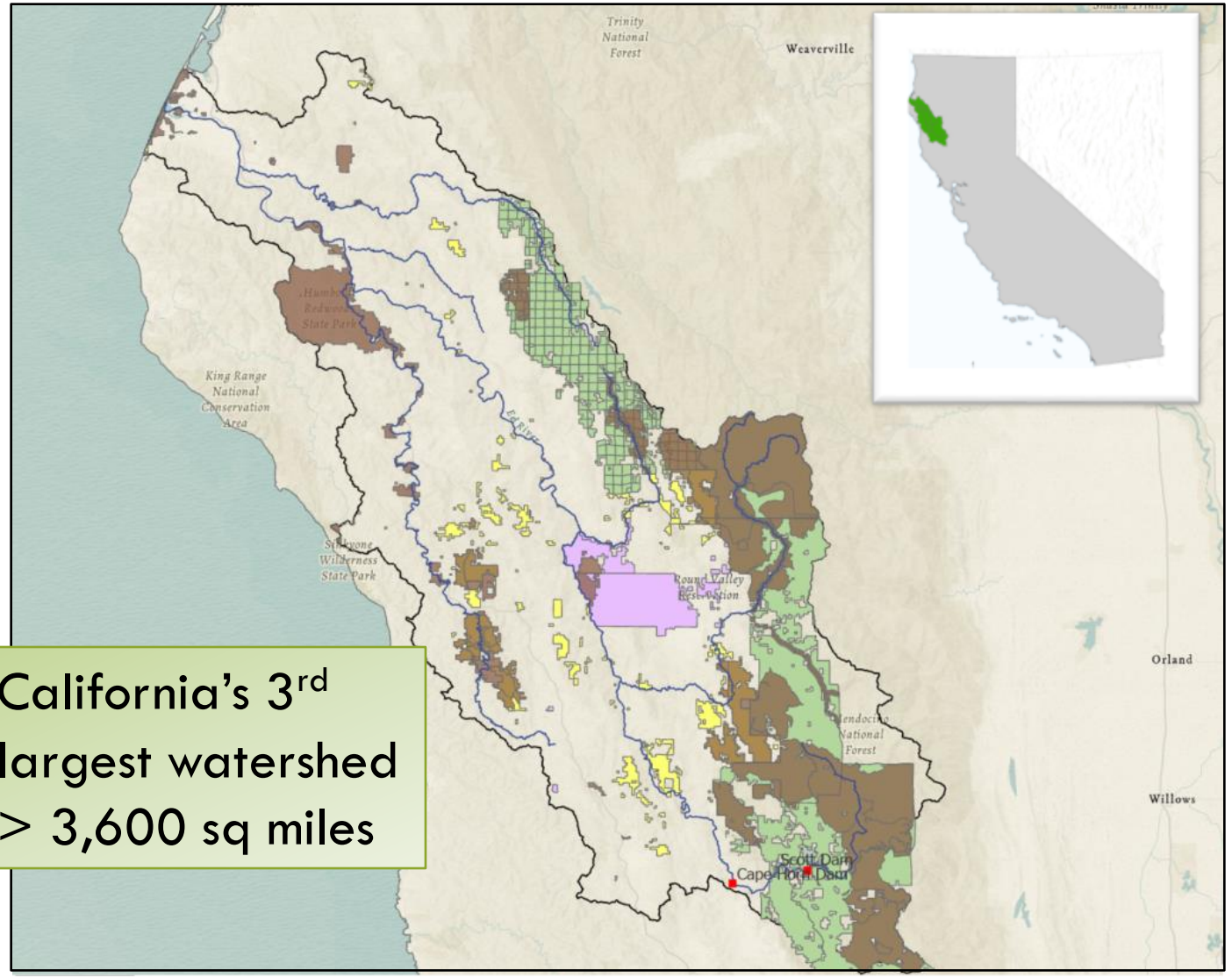
2. Understand attendees' feedback on the draft Program Goals

3. Hear about current conservation work in the Middle Fork sub region of the Eel Watershed

Who are we? Project Team Organization



Where? The Eel River Watershed, a basin-wide Program



- California's 3rd largest watershed
- > 3,600 sq miles

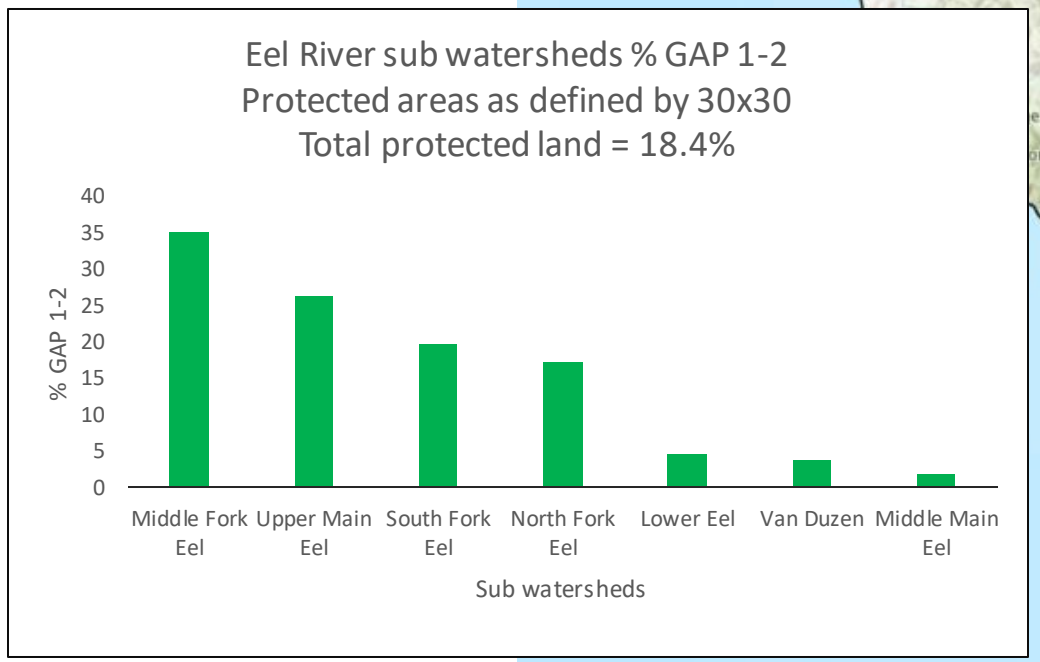
<u>Major public lands</u>:

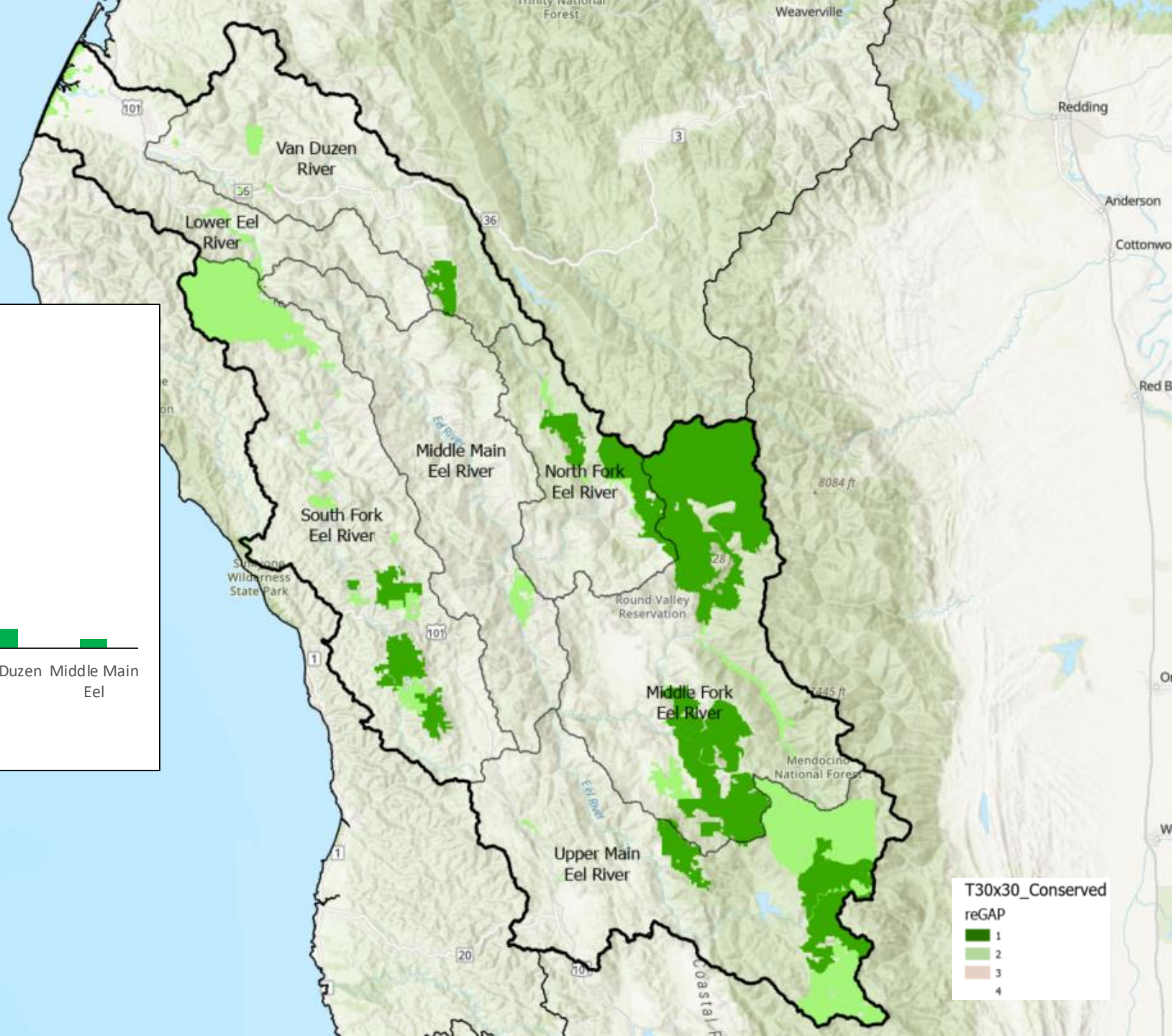
Tribal lands

Forest Service

Bureau of Land Management

Protected areas, public and private easements, State Parks – some overlap with public lands.


Eel River sub watersheds % GAP 1-2
Protected areas as defined by 30x30
Total protected land = 18.4%
% GAP 1-2
40
35
30
25
20
15
10
5
0
Middle Fork Eel
Upper Main Eel
South Fork Eel
North Fork Eel
Lower Eel
Van Duzen
Middle Main Eel
Sub watersheds

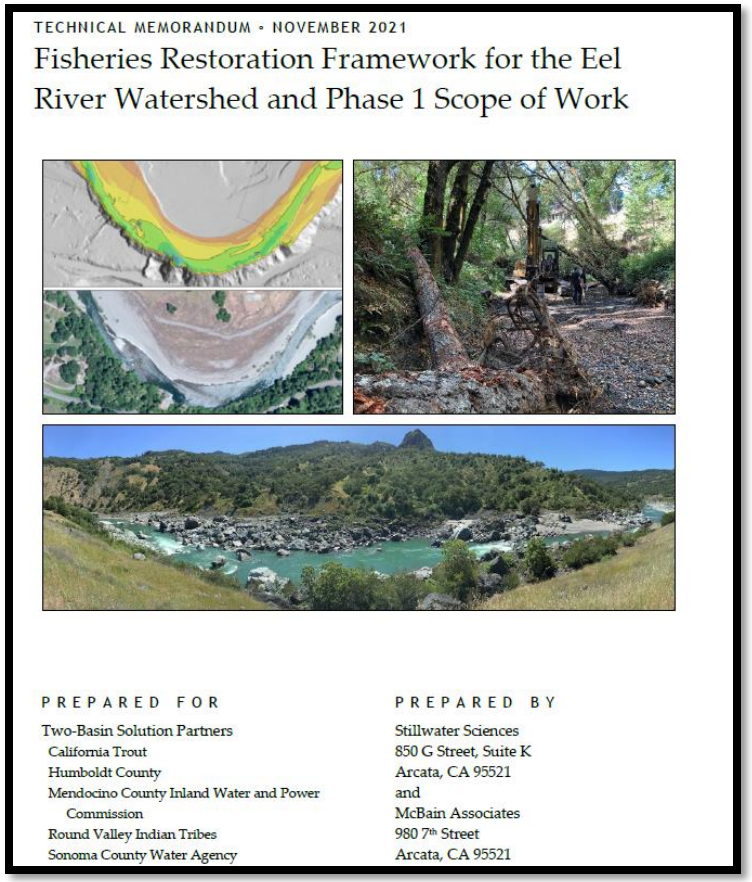

Van Duzen River
Lower Eel River
Middle Main Eel River
North Fork Eel River
South Fork Eel River
Middle Fork Eel River
Upper Main Eel River
Weaverville
Redding
Anderson
Round Valley Reservation
T30x30_Conserved
reGAP
1
2
3
4

Why? The Need for the Eel River Conservation & Restoration Program

Background

Potter Valley Project Feasibility Studies

- Fisheries Restoration in the Eel Basin was a shared objective of the Two-Basin Solution Partnership



TECHNICAL MEMORANDUM • NOVEMBER 2021

Fisheries Restoration Framework for the Eel River Watershed and Phase 1 Scope of Work

PREPARED FOR

Two-Basin Solution Partners
California Trout
Humboldt County
Mendocino County Inland Water and Power Commission
Round Valley Indian Tribes
Sonoma County Water Agency

PREPARED BY

Stillwater Sciences
850 G Street, Suite K
Arcata, CA 95521
and
McBain Associates
980 7th Street
Arcata, CA 95521

Stillwater & McBain 2021

CALIFORNIA DEPARTMENT OF FISH & WILDLIFE

CALIFORNIA TROUT

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CDFW & CalTrout 2022

What is the Program? *Eel River Conservation & Restoration Program* Phases 1-4

PHASE 1 — 2022-2024

- Develop overall program goals, objectives & timeline
- Select focal species
- Develop spatial analysis framework
- Develop conceptual life-cycle models to identify limiting factors & data gaps
- Describe & categorize actions that address limiting factors
- Develop prioritization process
- Develop monitoring & adaptive

Outcome: Conservation and Restoration Plan

PHASE 2

- Develop & apply prioritization tools
  - -Fish production models
  - -Ecosystem evaluation tools
- Large-scale prioritization: evaluate restoration planning areas & habitats
- Prioritize & evaluate actions within planning areas & habitats for restoration & conservation
- Develop Decision Support System

2 **Outcome: Restoration and Conservation Priorities Action Plan**

PHASE 3

- Direct resources towards priority restoration & conservations actions
- Project implementation
  - -Site assessment
  - -Design, engineering, & evaluation
  - -Permitting
  - -Construction

3 **Outcome: Restored Habitats & Recovered Populations**

PHASE 4

- Implement restoration monitoring
- Program-level
  - -Fish population
  - -Environmental
- Site-specific
  - -Biological & physical response to restoration
- Adaptive management: feedback to Phases 1-3 based on lessons learned from implementation & monitoring.

4 **Outcome: Refinement of Restoration Process & Actions**

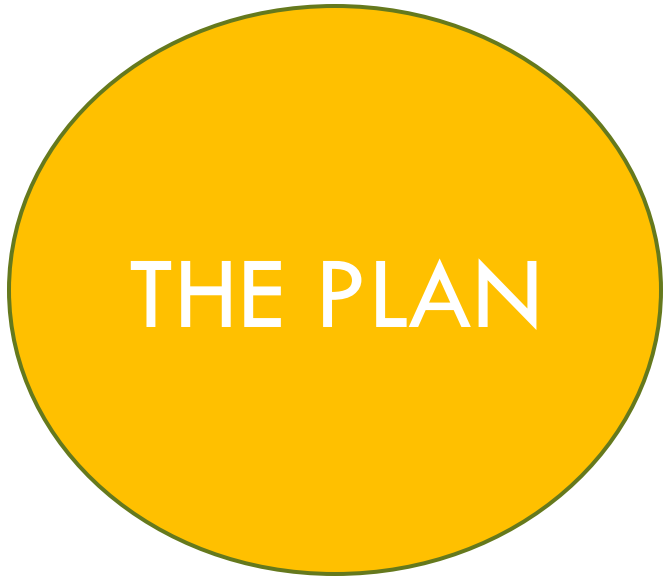
Re-evaluate goals and objectives
Reassess limiting factors

Reassess large- and small-scale priorities

Refine designs

Eel River Conservation & Restoration Program Phase 1 = THE PLAN

PHASE 1 **2022-2024**



Outcome:
Conservation and Restoration Plan

- Develop Program Goals
- Select focal species
- Develop conceptual life cycle models to identify limiting factors and data gaps
- Describe and categorize actions that address limiting factors
- Develop prioritization process
- Develop monitoring and adaptive management framework

= Plan Document

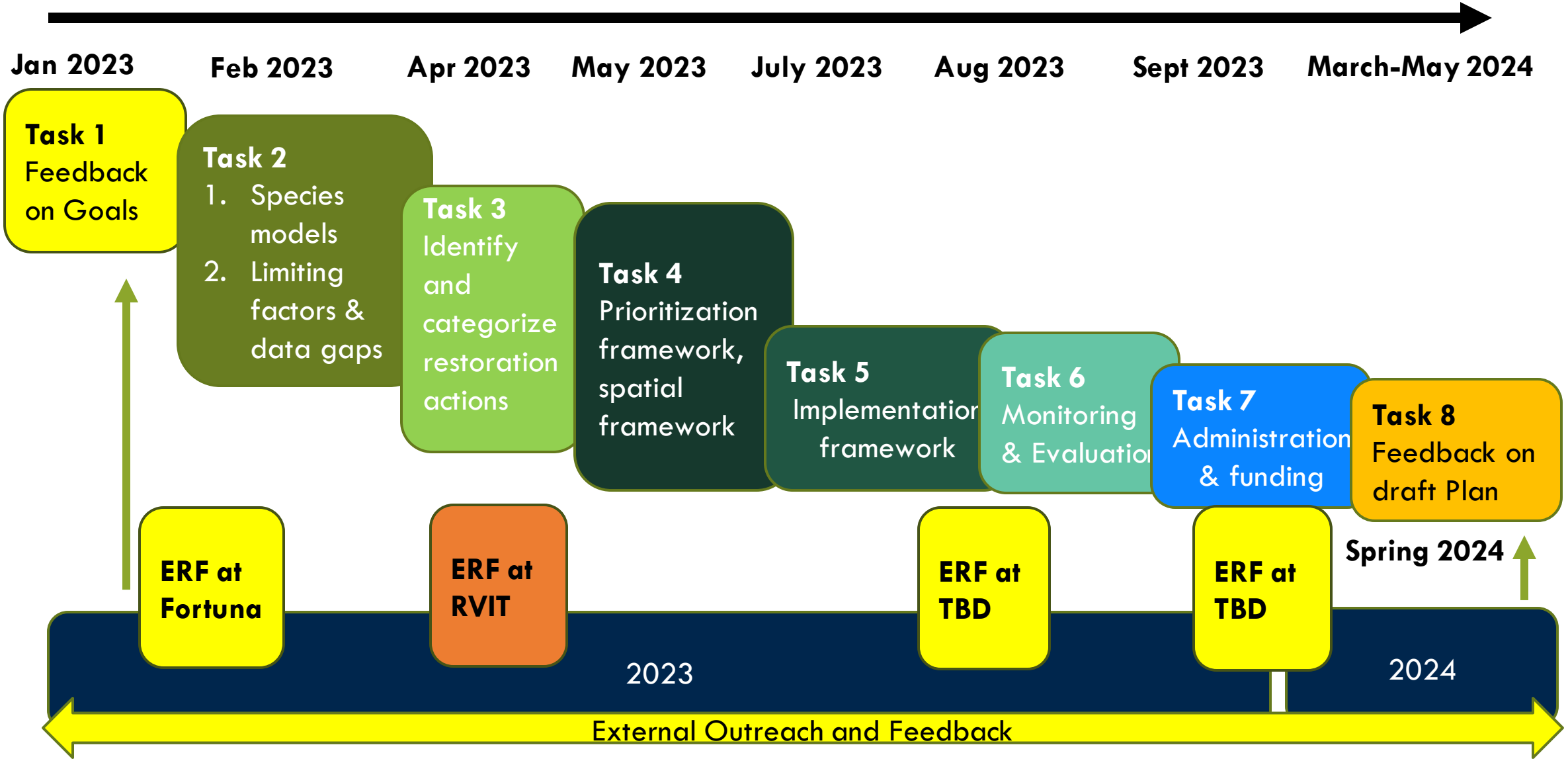
Eel River Conservation & Restoration Program

How is it different?

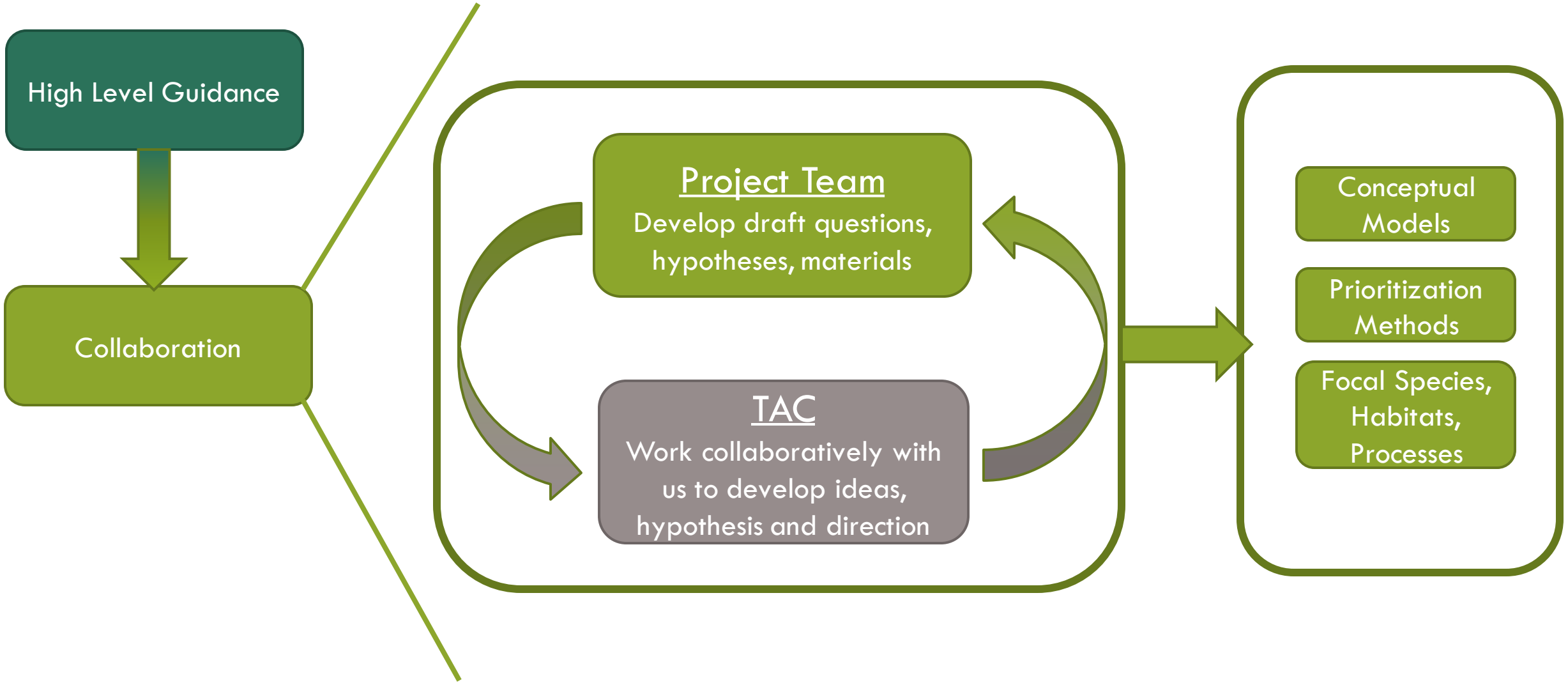
- Basin-wide Plan and Program
- Pulls together information from different planning and species recovery plans
- Integrates the needs of *multiple* species
- Incorporates spatial planning and prioritization
- Recommends conservation / restoration action areas
- Builds a framework to prioritize watershed needs
- Emphasizes fish life history diversity
- Implements a monitoring framework to assess success

= The difference

Conservation and Restoration Plan – 1 Year Overview Calendar



Technical Advisory Committee (TAC) advises Phase 1 (Plan)



WHAT'S NEXT FOR THE EEL RIVER FORUM?

CalTrout is leading the Eel River Forum with quarterly meetings about the Conservation and Restoration Program:

1. Input on the Plan goals in Fortuna (January 30, 2023)

2. Program overview and freshwater species in Covelo (April 4, 2023)

3. Draft products review (Summer 2023)

4. The Draft Plan (Spring 2024)

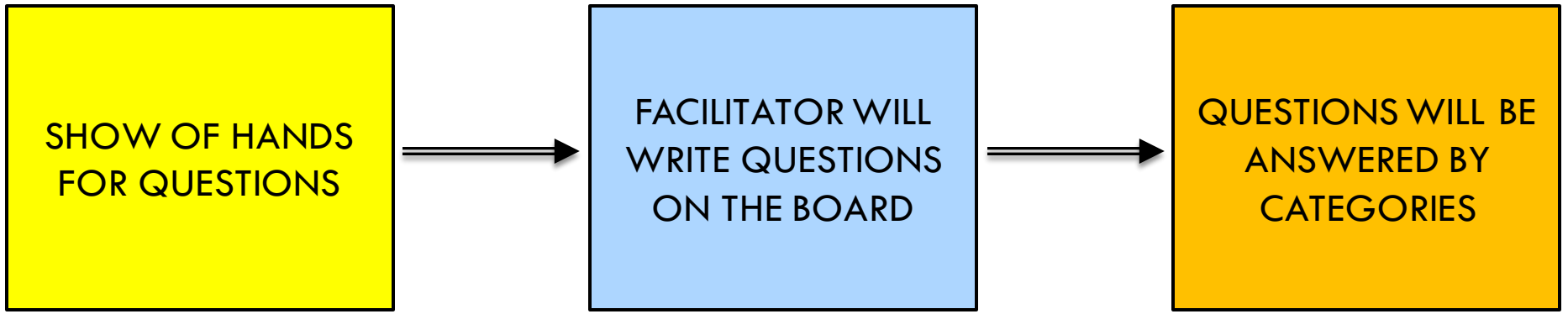
THE WILDLANDS CONSERVANCY

GREAT REDWOOD TRAIL AGENCY

Friends of the Eel River
Working for the recovery of our Wild & Scenic Eel River, its fisheries and communities

SOUTH FORK Eel RESTORATION PLAN

Questions on Program or Phase 1?



Break for lunch 12:00-12:45

Optional walk to restoration site in Covelo

RETURN AT 12:45 for group session and afternoon speakers

Darren Mierau – California Trout: Potter Valley Project and Pikeminnow research

Wyatt Smith – Round Valley Indian Tribes: Fisheries Department research and monitoring

Marisa McGrew – Wiyot Tribe: Pacific Lamprey

Samantha Kannry – TRIB: Summer Steelhead

Program Goals

Outcome Goals + Process Goals

To be successful, the Restoration Program should be broadly supported, implementable, and underpinned by physical and biological processes. The following goals will guide development of the Restoration Program.

Program Goals

Outcome Goals

1. RESTORE - Restore and conserve intrinsic, self-sustaining ecological processes and habitats supporting recovery and life history diversity of native anadromous fish populations in the Eel River watershed.

2. ECOLOGICAL / GEOMORPHOLOGICAL - Embrace the variability in dynamic ecological and geomorphic processes at the sub-watershed scale and integrate across these sub-watersheds to create an interconnected mosaic of habitats that support the various life history stages and strategies of focal species.

3. CULTURAL - Acknowledge and support community and Tribal resource needs, economics, and recreational values of the watershed.

4. ACTIONS - Recommend actions that are implementable on a timescale, magnitude, and trajectory that will achieve efficient and meaningful improvements.

Program Goals

Outcome Goals

5. PRIORITIZATION - Implement a prioritization process to develop a restoration strategy that integrates river corridor attributes with the needs of native fish and the aquatic ecosystem.

6. MONITORING - Include a robust monitoring, assessment, and active management process that allows evaluation of measurable goals and restoration targets and refinement of the Restoration Program.

7. MEASURE SUCCESS - Identify projects and areas where adaptive management can be implemented to revisit processes, prioritization, and goals of the Restoration Program.

Program Goals

Process Goals

1. **COORDINATE -** with and build support from Tribes, agencies, local communities, and others for restoration goals and strategies.

2. **INCORPORATE -** the best available information in the Eel River by synthesizing existing data, input from experts, and species management plans within the watershed.

3. **INCORPORATE -** lessons learned from ongoing and past restoration/recovery efforts in the Eel River watershed and from other basin-wide restoration programs.

4. **INCORPORATE -** Traditional Ecological Knowledges (TEKS) from the Indigenous people of the watershed to understand historical ecology, develop restoration and conservation strategies, and inform the prioritization process.

Program Goals

Goals – group work

Please discuss with groups for 15 minutes

Choose the top 1-2 comments from your group about the Program goals.

Write the 2 top comments on the board

How can these goals be improved?

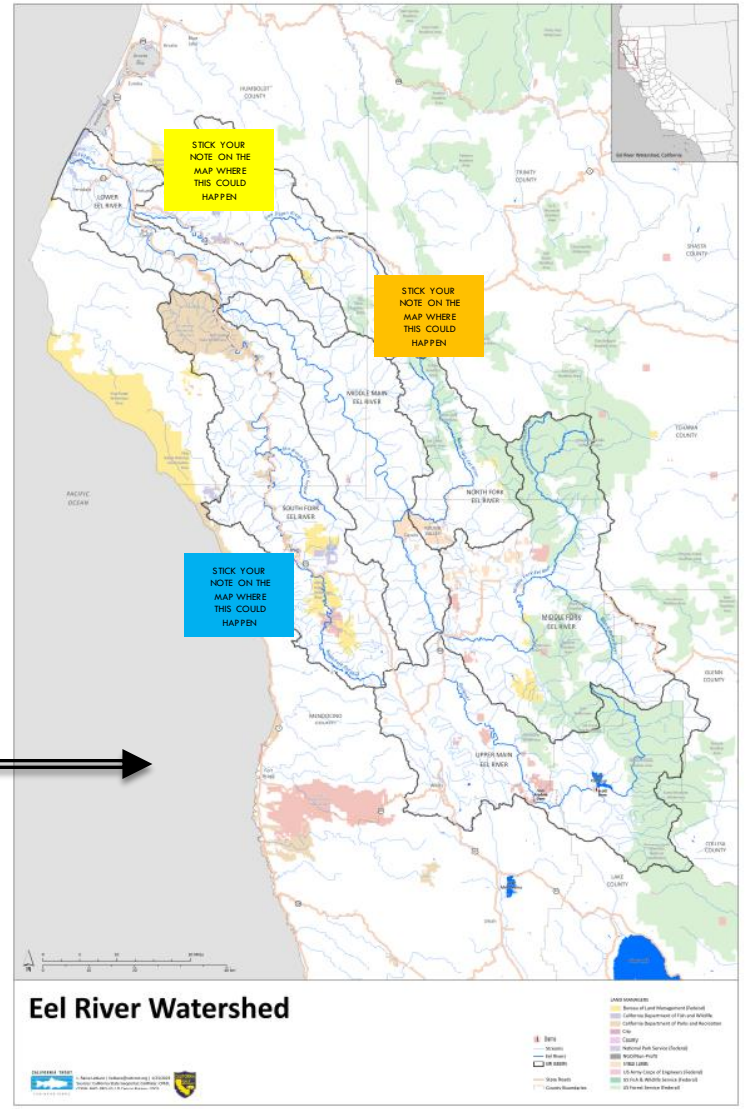
- Is the scope of the goals appropriate?
- Are there other key goals that were not included but should be?
- Will the goals help inform and build support for the Program?

WRITE A NOTE:
Hopes for future Eel Watershed conservation and restoration

WRITE ON POST IT NOTE

STICK YOUR NOTE ON THE MAP WHERE THIS COULD HAPPEN (YOUR IDEAS)

WHAT RESTORATION AND CONSERVATION IS NEEDED



Sacramento Pikeminnow Past and Present

- Historical Returns of more than 1 million pacific salmon in the Eel Basin (Yoshiyama and Moyle 2010)
- Severe declines in abundance over 20th Century led to federal ESA listings (Chinook, Coho, Steelhead)
- Pikeminnow were introduced into the Eel River in 1979; have spread throughout the river basin
- Interact with salmonids in at least three important ways:
  - Direct predation
  - Competition and occupancy of juvenile habitat
  - Alteration of juvenile behavior (avoidance)
- May be a dominant factor undermining current salmonid recovery efforts
- Summarizing the work of many others (UC Berkeley, Wiyot Tribe, ERRP, CDFW, Stillwater, etc.)

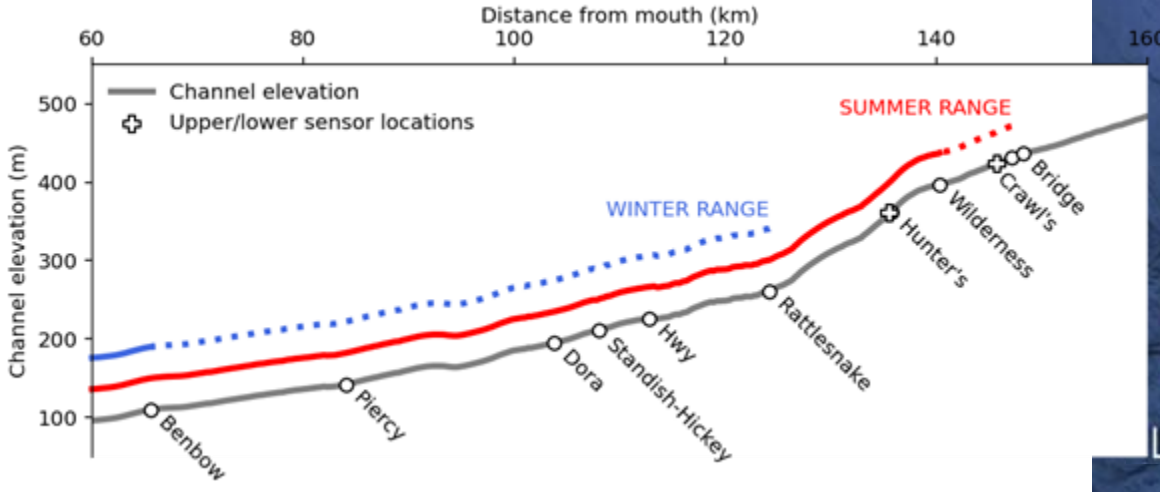
Overall goal is to better understand pikeminnow, suppress their abundance, eventually eradicate them basin-wide.

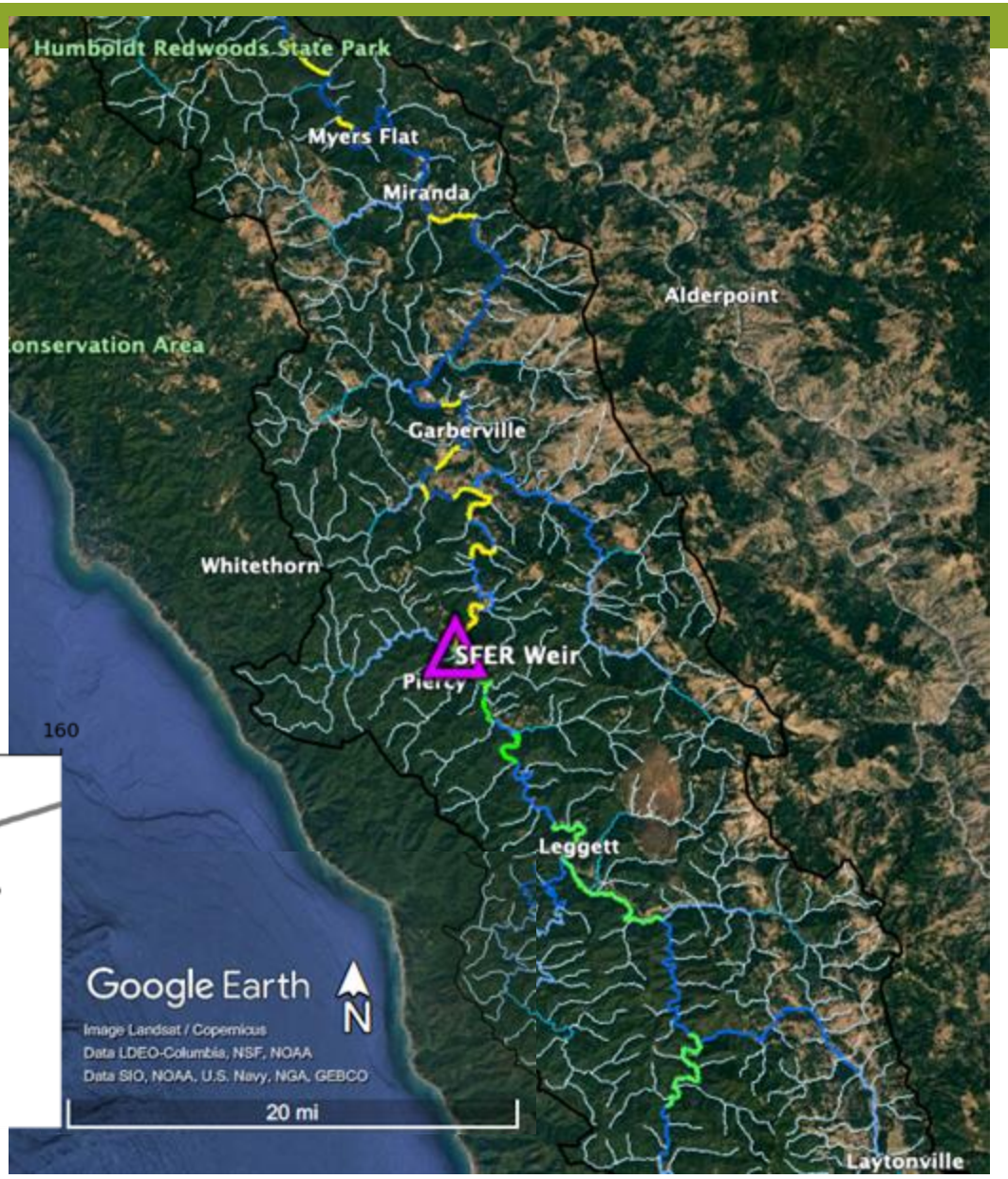
Cannery at Port K

Sacramento Pikeminnow Surveys

- Phil Georgakakos at UC Berkeley
  - 2014 – present (8 years)
  - Angelo to Ten Mile Creek
- Eel River Recovery Project
  - 2017 – present
  - Rattlesnake to Standish Hickey
- Wiyot Tribe and Stillwater Sciences
  - 2021-present
  - GRTS lower mainstem SF Eel

- = 58 km of SF Eel 2x per year Before-After





Sacramento Pikeminnow Suppression Efforts

- Wiyot Tribe
  - electro-fishing, gill-netting, spearfishing, seining
- BLM
  - survey and removal in the NF and SF
- PG&E
- Telemetry
  - radio-tag fish to observe migration patterns
- Isotope and Diet Sampling
- South Fork Weir
  - Built by Cramer Fish Sciences
  - Delivered to Piercy, CA
  - Ready to install ASAP

SF Eel River Seasonal Weir

Objectives

- Segregate migratory pikeminnow from prime salmonid rearing habitat
- Remove large numbers of adult pikeminnow
- Document the seasonal interaction of salmonids and pikeminnow in the South Fork Eel River mainstem
- Develop a weir operating plan (through a collaborative inter-agency process) that can be a model for similar projects in the Eel River and elsewhere.

Operation

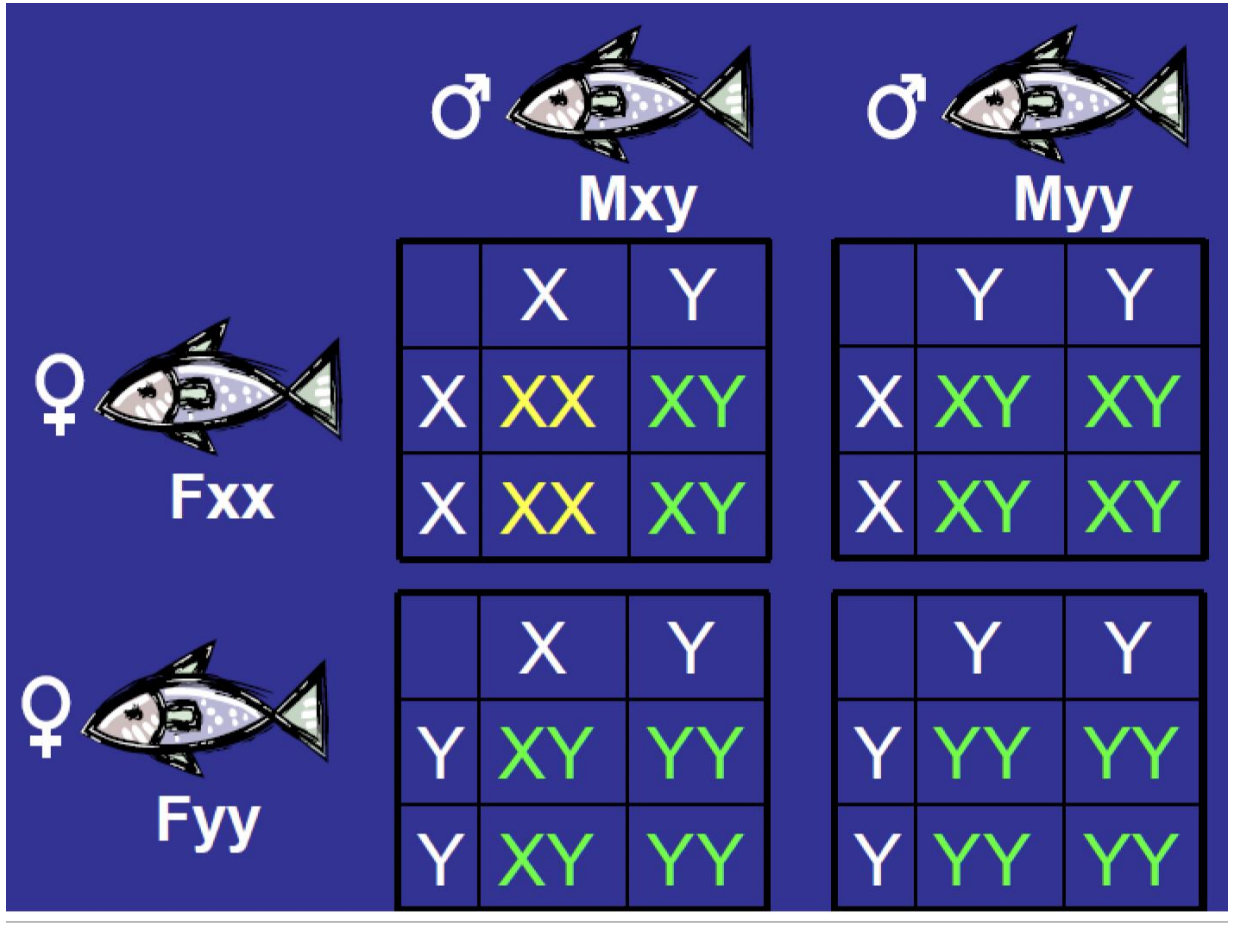
- April through September 2023 (pilot year)
- Daily maintenance with UCB, CalTrout, Wiyot field techs
- Suppress 8-12 inch size class; eliminate 12+ size class (from habitat above weir)
- Telemetry Study and Surveys for BACI Response

Cal Poly Humboldt TYC Research

CPH Fisheries Department
Trojan Y Chromosome Strategy

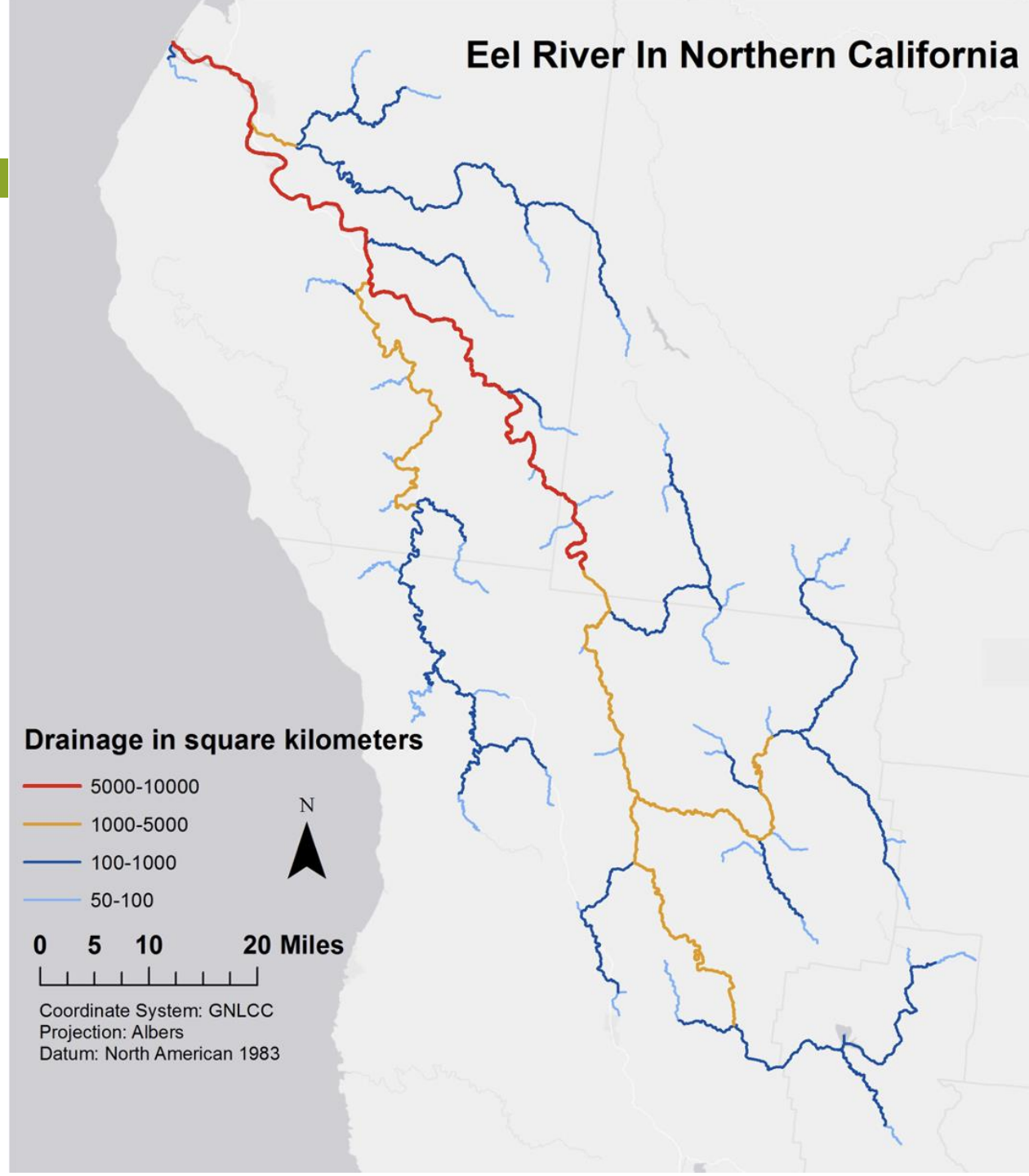
- A novel genetic bio-control method which aims to extirpate an invasive population by eliminating female fish
- Produce Myy and/or Fyy fish through *androgenesis* (in a controlled lab setting)
- Introduce yy fish into the river, which breed and produce all-male pikeminnow offspring
- Over successive generations, leads to extirpation

- Two Cal Poly Graduate Students:
  - Alex Juan – Population Modeling to determine how many yy fish needed.
  - Raven McAdams – Aquaculture study to determine androgenesis methods
- Dr Andre Buchheister and Dr Rafael Cuevas-Uribe
- CalTrout sponsored research



Next Steps

- Lots of work ahead in next few years
- Summarize effective methods and results into PM Management Plan
- Seek long-term funding support to expand Program throughout Eel River basin
- Incorporate into PG&E PVP Decommissioning Plan

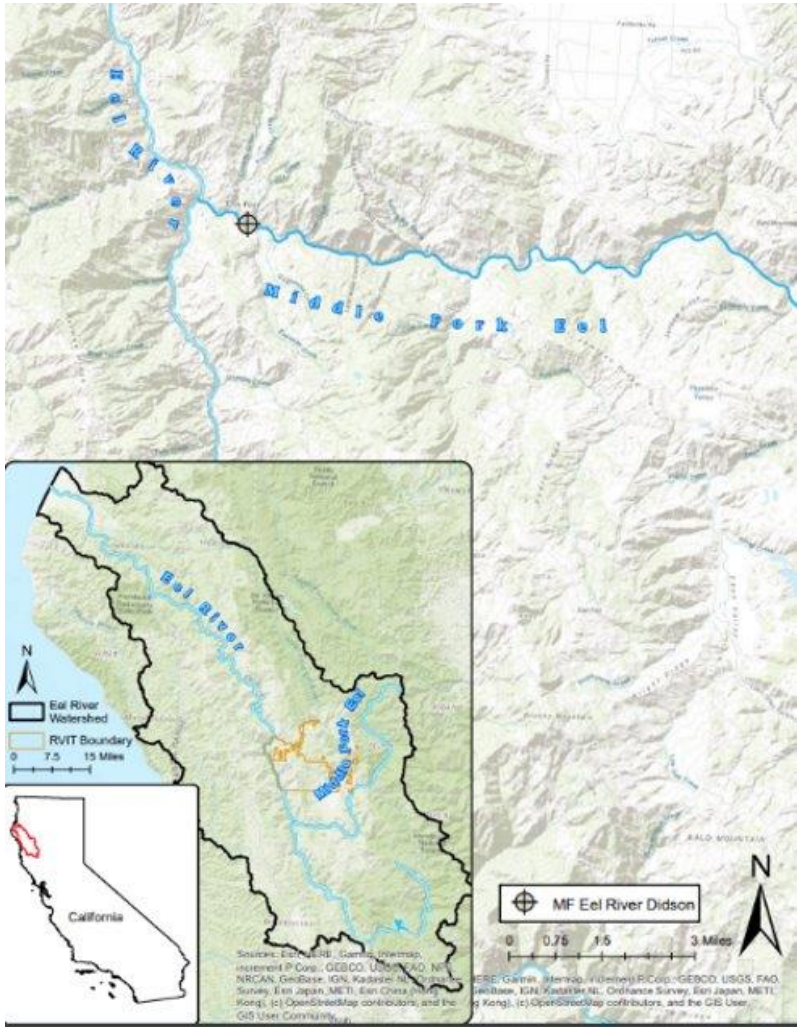


Eel River Conservation and Restoration- Round Valley Indian Tribes- Wyatt Smith, Fisheries Biologist

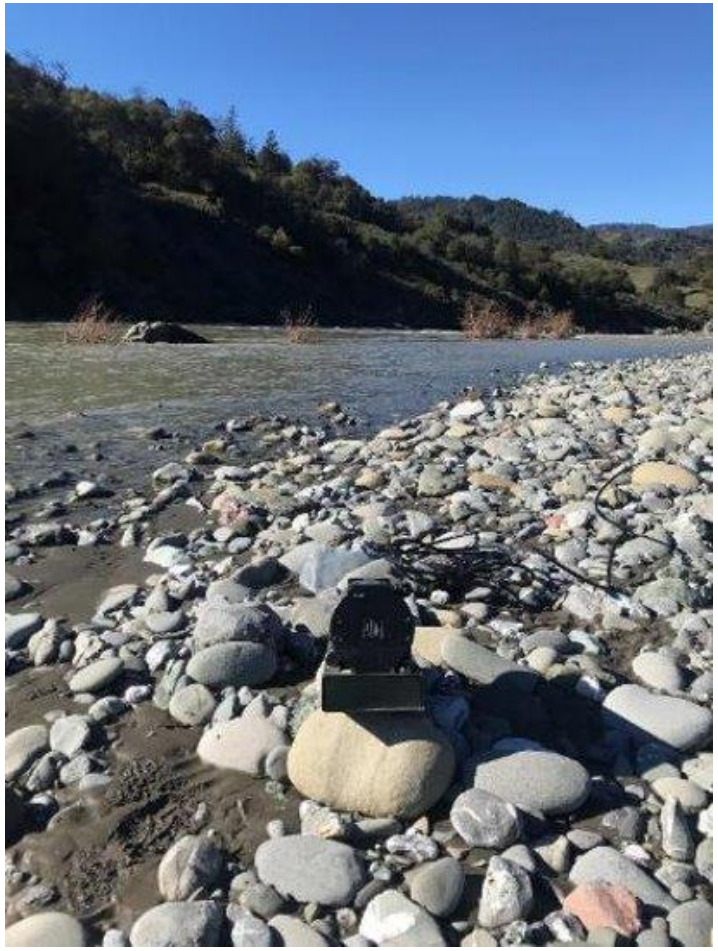
Round Valley Indian Tribes' Fisheries Department Projects

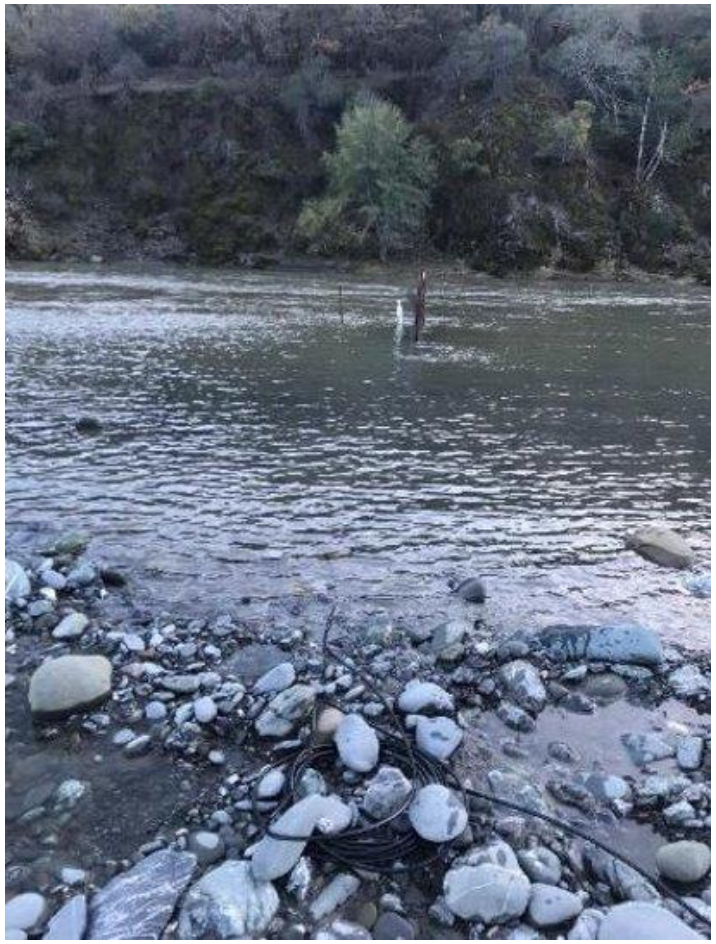
- DIDSON adult salmonid monitoring at Middle Fork Eel River at Dos Rios
- Fish Productivity Study (individual-based fish production model) below Cape Horn Dam
- Operation of Eel River gaging stations
- Instream flow assessment on tribal tributaries
- Climate change assessment on tribal tributaries
- Participation in Eel River Restoration Framework
- Participation in Drought Working Group, Agency Group, and Block Water

Overview of DIDSON monitoring on the Middle Fork Eel River

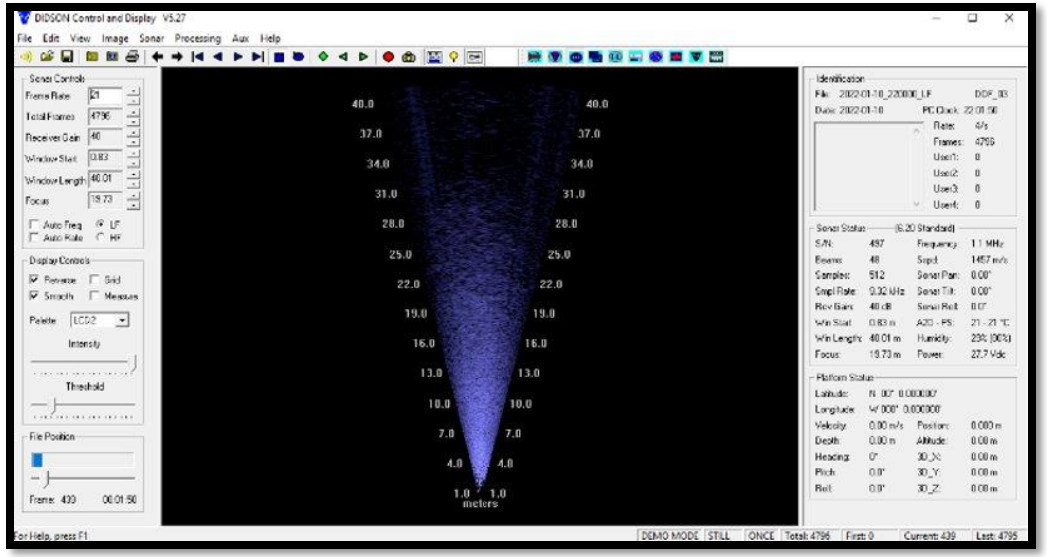


Overview of DIDSON monitoring on the Middle Fork Eel River

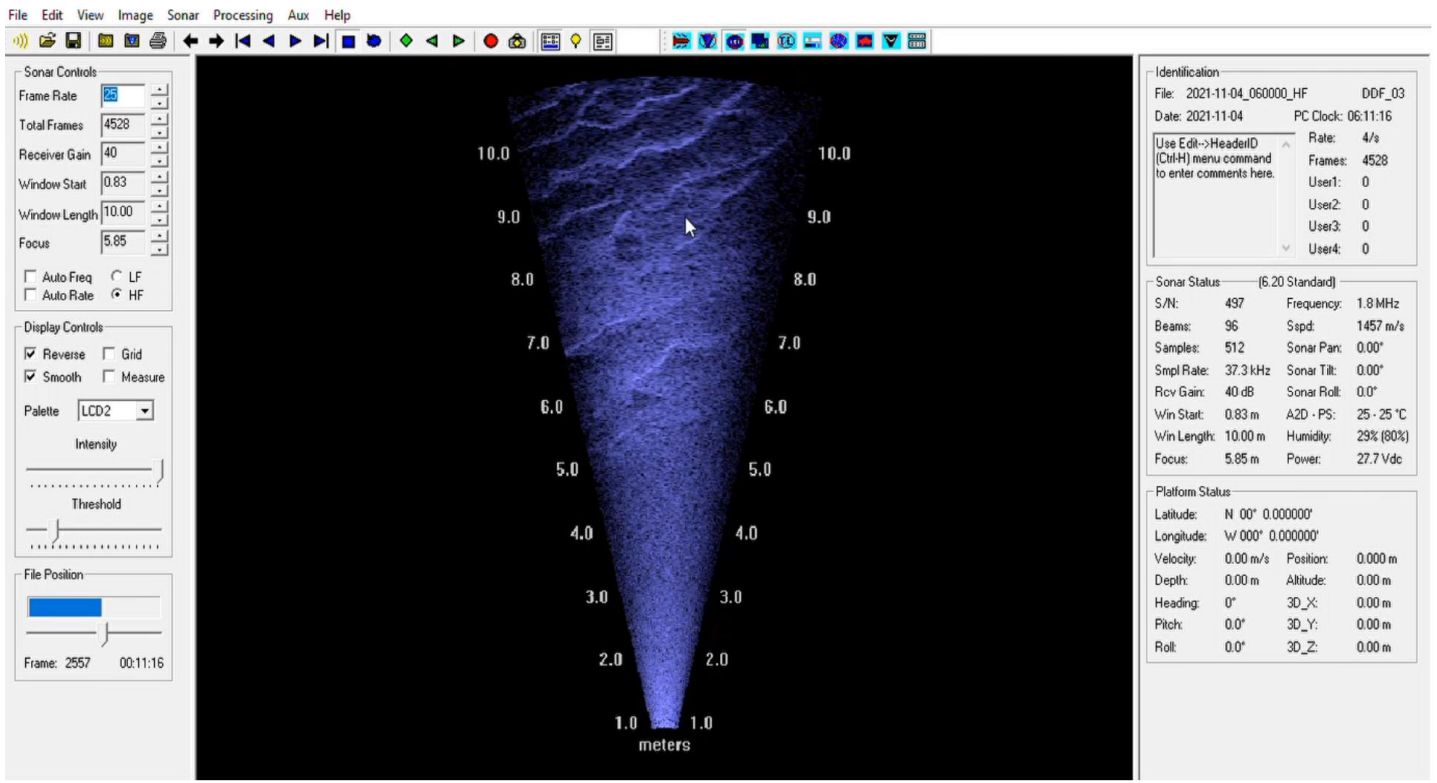




MF Eel DIDSON

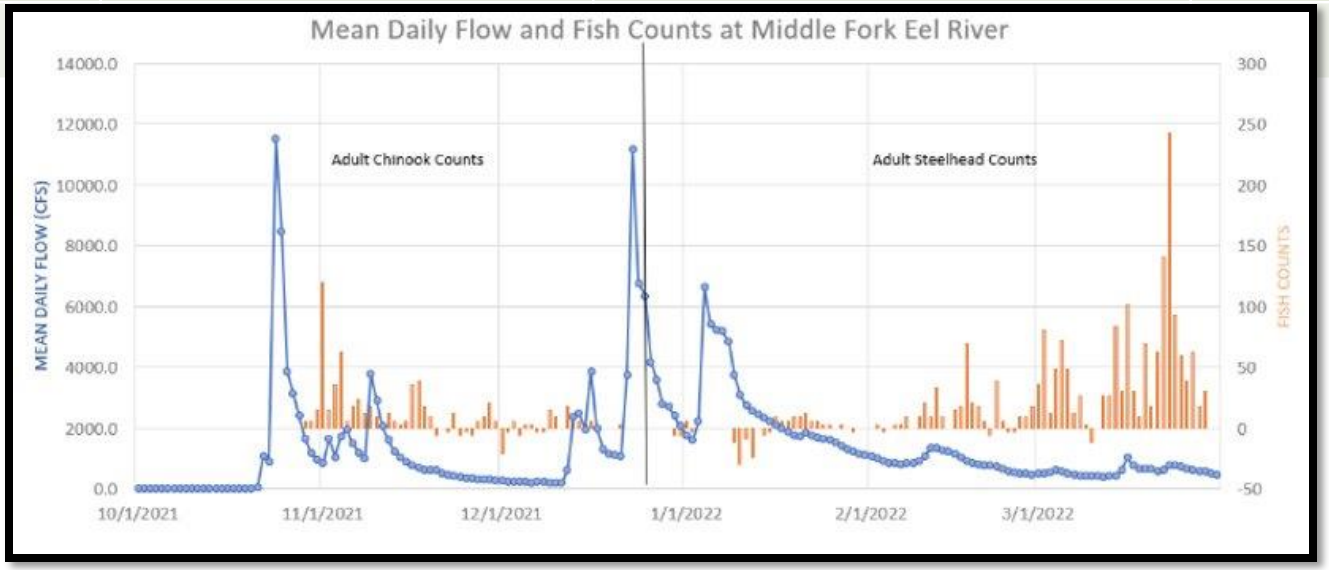


Sonar Example



MF Eel Adult Salmonid Escapement 2022-2023

2021 Adult Chinook Salmon Return: October-December	2022 Adult steelhead Return: December- March	2022 Adult Chinook Salmon Return: October-December	2023 Adult steelhead Return: December- March
Adults (<65cm) **360 Fish**	Pilot Project- Did not separate size classes	Adults (<65cm) 348 Fish	Adults (<65cm) 189 Fish
Sub Adults- Jacks (35cm-64cm) **192 Fish**	Pilot Project- Did not separate size classes	Sub Adults- Jacks (35cm-64cm) **99 Fish**	Sub Adults- Jacks (35cm-64cm) **108 Fish**
Total= **552 Fish**	Total= **1,167 Fish**	Total= **447 Fish**	Total= **297 Fish**



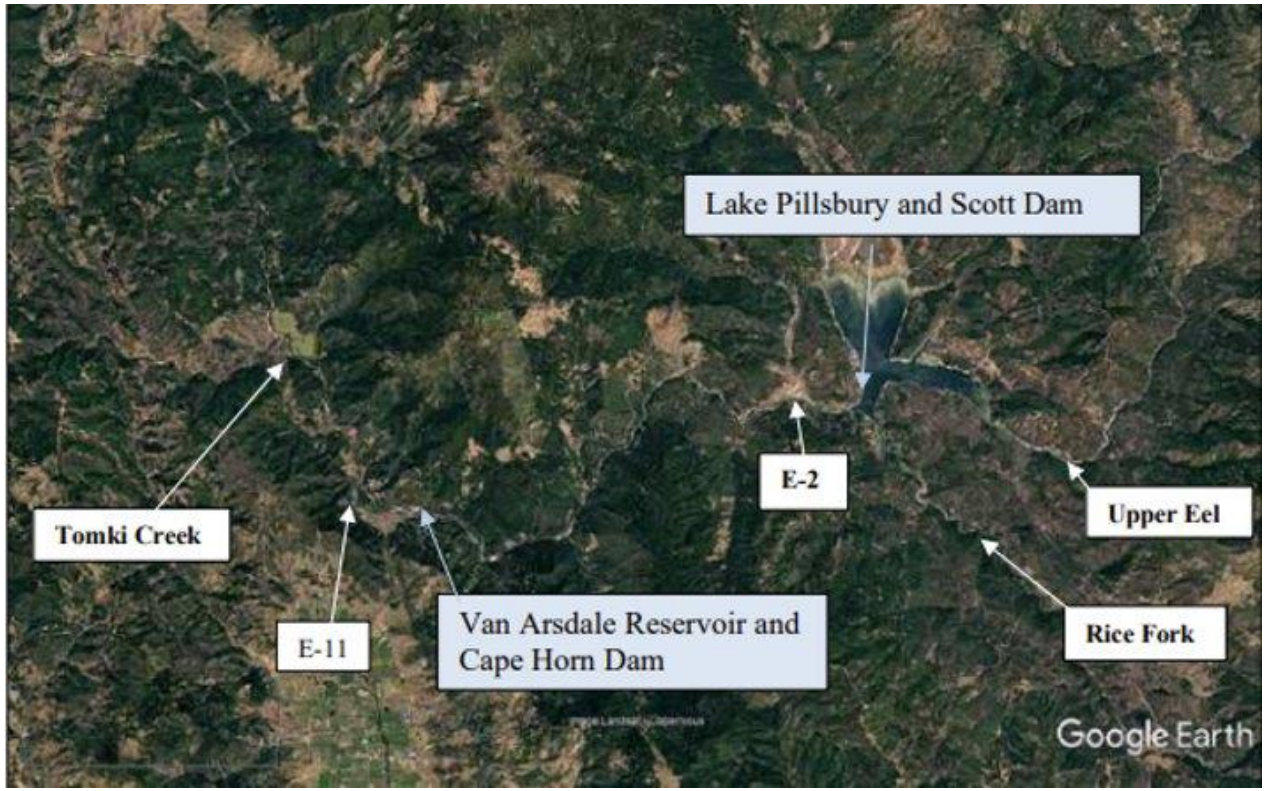
Flow Needs Below PVP Diversion

- RVIT and Sonoma Water Collaboration

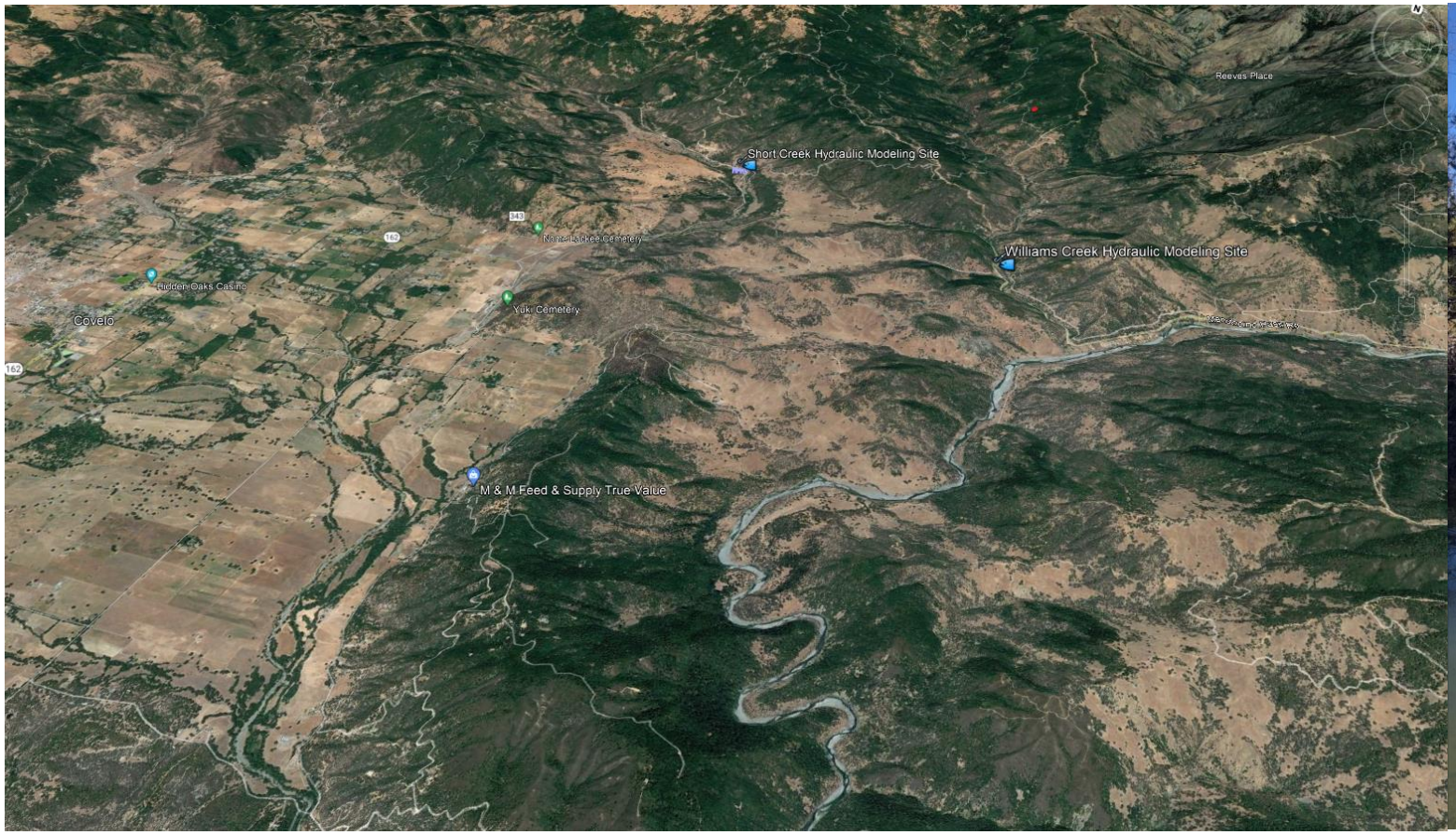
- If diversion to Russian River remains, what stream flow is needed below diversion to support salmonids.
  - Using fish production model to determine flows that will improve growth and reduce predation from invasive pikeminnow.
- Additional tools will be developed later
  - Fish Passage – NMFS Grant

Operation of Upper Eel River Gaging Stations

- Two stations upstream of Lake Pillsbury (flow, temperature, turbidity)
- One station immediately below Scott Dam (turbidity)
- One station on Tomki Creek (flow, temperature)
- One station on Short Creek and one station on Williams Creek (flow, temperature)



Williams Creek and Short Creek Sites

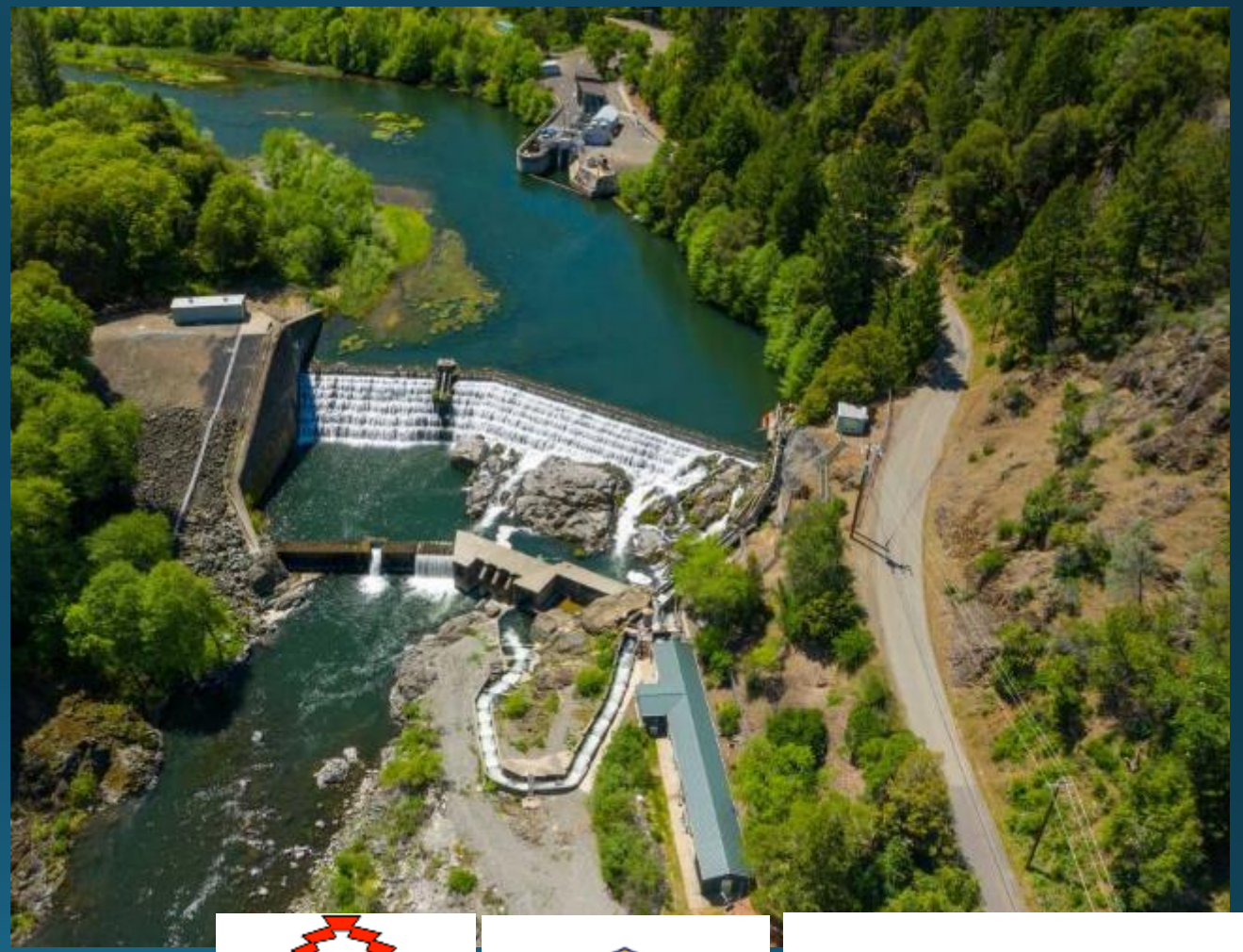


Overview of studies on Middle Fork Tributaries

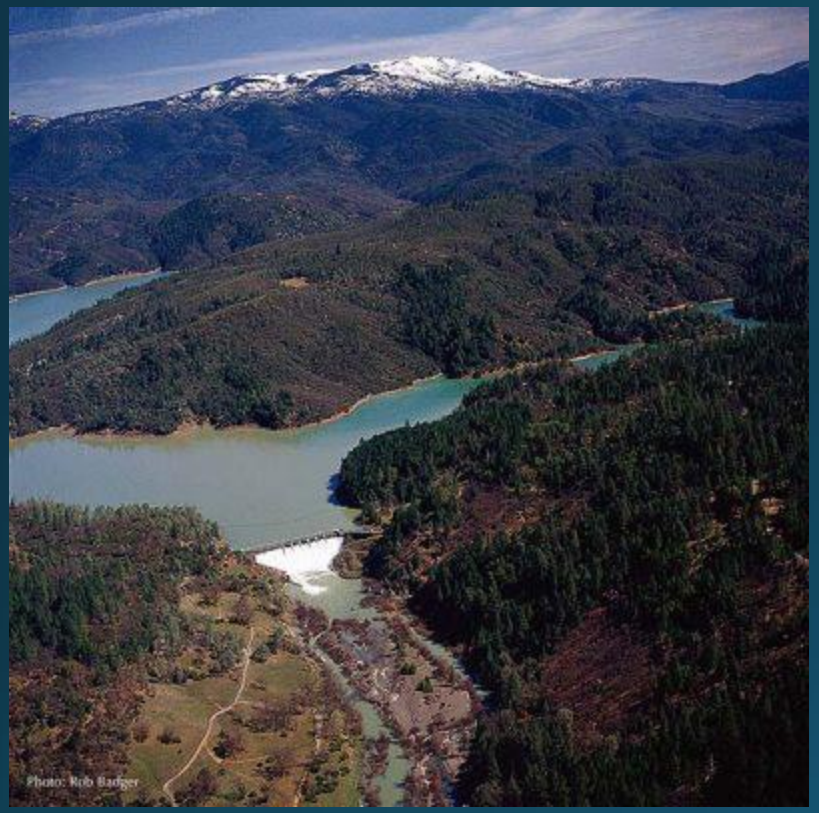
- CA Wildlife Conservation Board's Streamflow Enhancement Program
  - Diversions may be reducing streamflow and impacting salmonid production.
  - The resulting information would give the Tribe the information needed to enforce streamflow requirements on diverters.
- BIA Climate Resiliency Grant
  - The watershed is changing with climate – fire, precipitation and air temperature are altering riparian vegetation and water temperature.

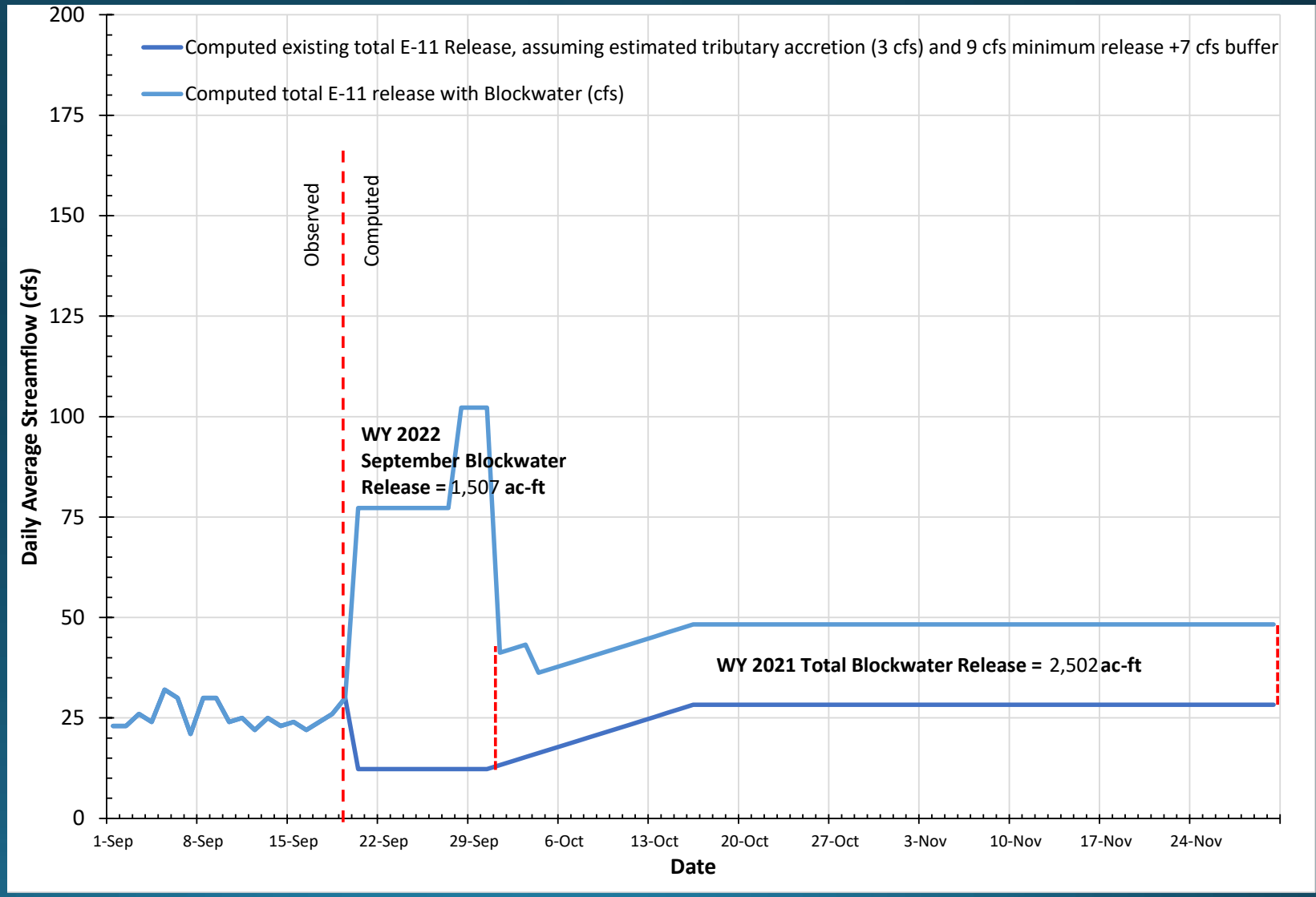
Participation in PVP Drought Working Group

- 2002 NMFS flows and more recent PG&E operations are "broken", system isn't working as intended
- 7 of last 9 years required a FERC flow variance
- Very stressful, solutions difficult to achieve
- Agencies ultimately have to make decisions (NMFS, RVIT, CDFW)



Participation in Annual Scott Dam Block Water Releases





Summary of RVIT's Upcoming Work on Eel River

- Fish passage assessment below Cape Horn Dam
- Additional DIDSON monitoring on mainstem Eel River, Middle Fork Eel River, North Fork Eel River
- Summer steelhead surveys and water temperature monitoring- NF/MF Eel
- Additional gaging on the upper Eel River
- Pikeminnow monitoring and suppression MF Eel
- Continued technical and legal support in PVP operations and decommissioning process
- Continued technical support on Eel River Restoration Framework
- Continuation of instream flow assessments

Questions?

Wsmith@rvit.org

Lamprey - Marisa McGrew, Wiyot Natural Resources

Gou'daw (Pacific lamprey) in the Eel River

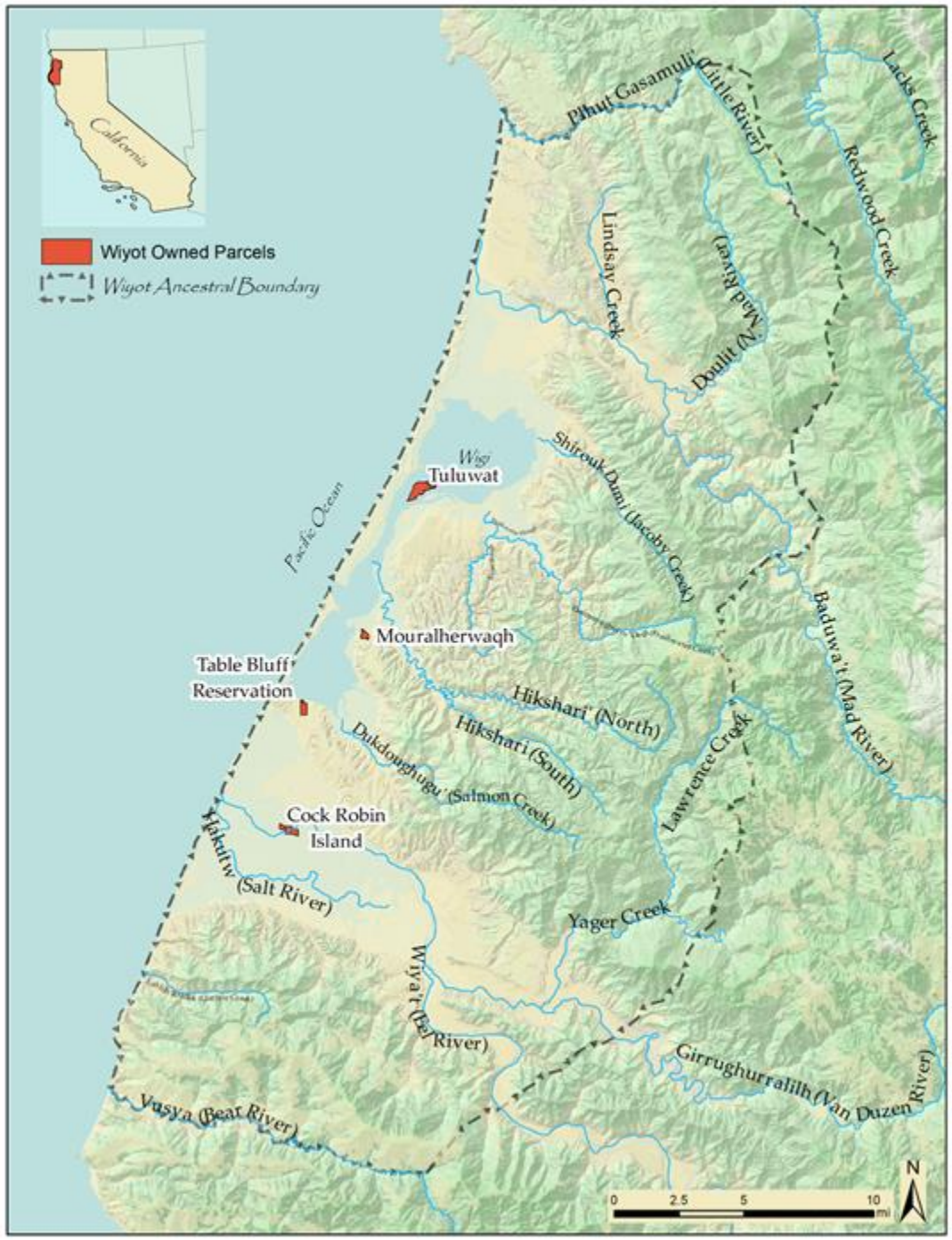
Eel River Forum, Covelo

April 4, 2023

Marisa McGrew
Wiyot Tribe, Natural Resources Department

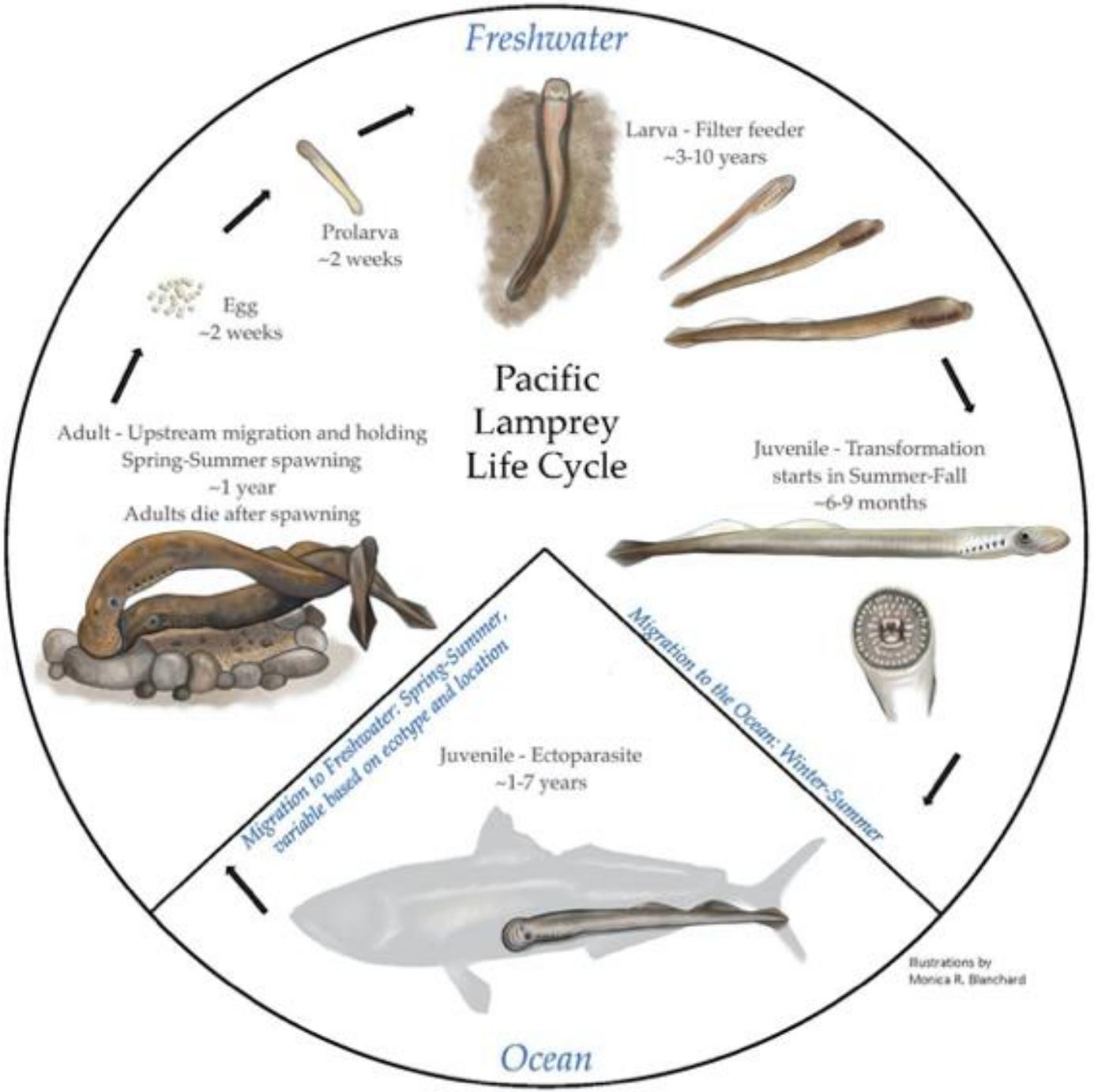
Wiyot Tribe

- Have lived and continue to live in lower Eel River and Humboldt Bay region since time immemorial
- *Wiya't* is the shared name with the tribe and the river - translates to abundance



Background on eels

- Appear in fossil record ~400 million years ago
- Jawless fish
- Highly fecund: 30,000 - 240,000 eggs
- Ocean maturing ecotype *tewol*
- River maturing ecotype *ke'ween*



Tribal connection

- Pacific lamprey (eel) are important part of Wiyot diet and culture
- Teething babies
- High caloric content - 3-5x higher than chinook salmon

Threats

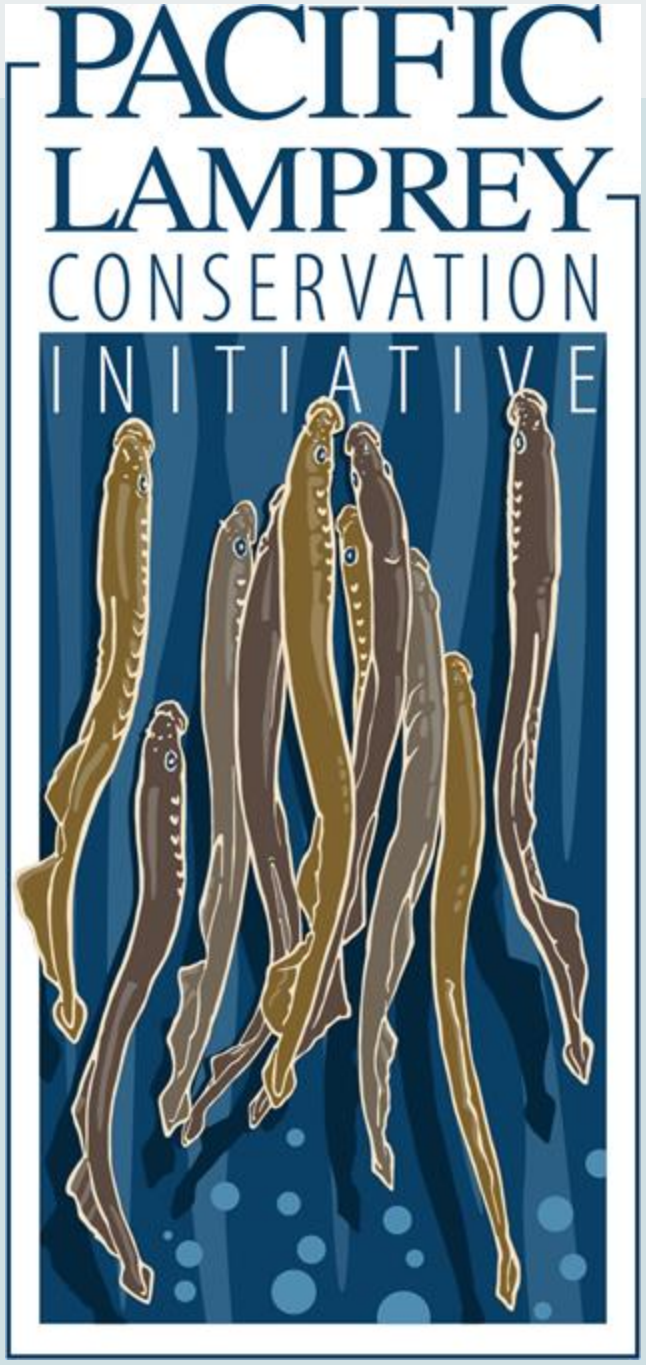
- Passage barriers
- Lack of knowledge, understanding, and awareness
    - Lack of funding

Butte Creek

Credit Zane Ruddy

Past work

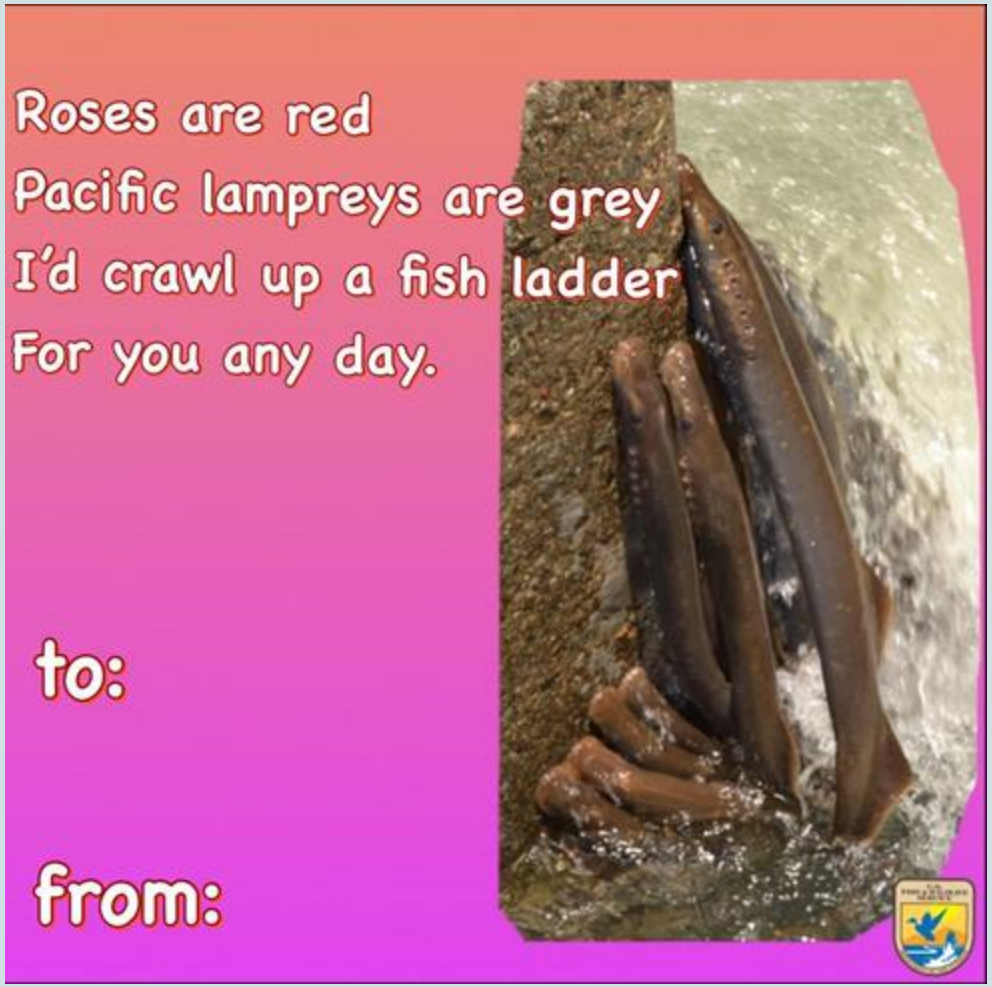
- Numerous USFWS Tribal Wildlife Grant funded projects…
- Life History, Distribution, Status and Research needs for Pacific lamprey in the Eel River Basin (2010 with Stillwater Sciences)
- Evaluation of barriers to Pacific lamprey migration in the Eel River basin (2014a with Stillwater Sciences)
- A conceptual framework for understanding factors limiting Pacific lamprey production in the Eel River basin (2014b with Stillwater Sciences)



Moving forward

- Tribal nations
- Pacific Lamprey Conservation Initiative
  - Assessment
  - Conservation agreement
  - Regional Implementation Plans
- **SRF Conference 2023**

Questions?



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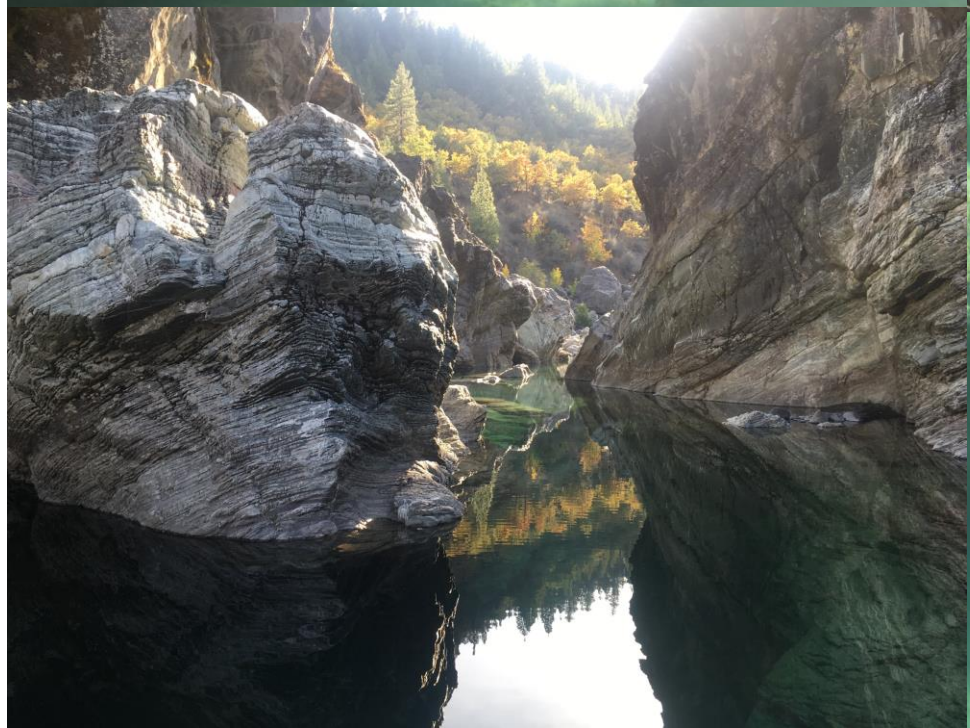
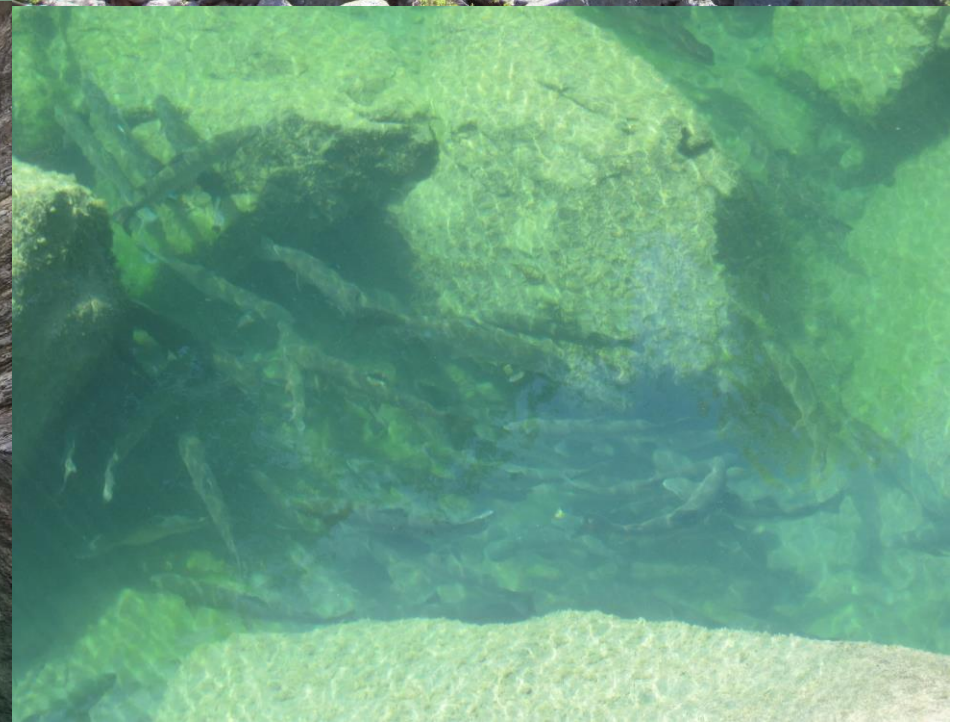
Summer Steelhead - Samantha Kannry, TRIB





Thank you!

ERF@Caltrout.org for more information

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