



WORKING TOWARDS HEALTHY WATERSHEDS AND HEALTHY COMMUNITIES

CINDY BUXTON WATERSHED STEWARDSHIP PROGRAM ASSOCIATE



LAND ACKNOWLEDGEMENT

Nor Rel Muk Wintu Chimariko Tsnungwe Hoopa Yurok



HELICOPTER WOOD RESTORATION PROJECTS





YUROK TRIBAL FISHERIES PROGRAM



Photo: McMahon

SOUTH FORK TRINITY RIVER

- California's <u>largest remaining undammed river</u> Nearly 1,000² miles and >90 miles long
- Land protections:
 - 75% USFS
 - 18% Roadless areas
 - 2% Wilderness areas
 - Wild and Scenic River
 - and limited river access.

Approximately 2-3 thousand people in the entire watershed

One of the last remaining wild spring-run Chinook Salmon (Oncorhynchus tshawytscha) populations in California.



SPRING CHINOOK – "KING" SALMON

- Move up in the spring and over-summer before spawning.
- Life history strategy: feed heavily in ocean and load up on fatty oils so they can survive the summer.
- Most prized of the salmon species for size, taste, and oil content.
- Very vulnerable due to life history strategy fish in a barrel.

Currently being reviewed as a ESA candidate



PHASE 1 RESTORATION

- **2017-2019**
- Focus on Hyampom's St John's reach







COMPLEXITY

Assessment and Monitoring

- Drone flights
 Photogrammetry DEMs
- RTK surveys (long-pro and xs)
- Hydraulic modeling
- Large wood risk assessment
- Habitat mapping
- Adult snorkel surveys, Juvenile/CHAMP
- Benthic macroinvertebrate sampling
- LWD counts/mapping/tracking
- Thermograph/pool stratification

Grant management - Humboldt County and DWR o Labor compliance plan

Labor com
 Reporting

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- Invoicing
- Matching funds
- Communications
- Subcontracts
- Deliverables
- Final report

Partnerships - Yurok Tribe

- Sub-award
 Budget coordination
- Budget co
 Match
- Contracting
- Harvest: LTO, RPF, Operators, Safety and fire,

Collaboration - Landowners

- Private residences
- Landowner agreements
- Public outreach
 Public sofety
- Public safety
- Continual communications
 Noxious weeds

Tree harvest

- New Island Capital timber landowner
- CALFIRE collaboration
- BBWA RPF forester
- WRTC LTO
 Units 1 and 2 compliant
- Onits 1 and 2 compliant
 Slash plan
- Sustainable tree mark
- Detailed tree inventory and map
- Wood properties research
- Harvest

Post project inspection

Contractors - Columbia Helicopters

- Skycrane scale
- Contract
 Budget vetting
- Budget vetting
 Safety plan
- Grapple
- Choker logistics
- Safe zones
- Communications
- Permitting
 - USFS NEPA: Biologic Opinion, Decision Memo, Wild and Scenic Section 7
 - NCRWQCB Warmerdam, NOE, HRE 401
 - Army Corps NP 27 for 404
 NOAA Biologic Opinion
 - NUAA Biologic Upinion
 CDFW HREA for 1653
 - CDFW HREA for 1653
 CALFIRE EN for THP
 - Other: frogs, owls, turtles, etc.



Implementation is challenging

- Plan, plan, plan... go!
- Heli limitations (wind, topography, weather...)
- 7-1 minute turnarounds
- Rock/snag fall dangers
- Needs flexibility, comms. and teamwork



3 YEARS PLANNING → 22 HOURS ON-THE-GROUND



2019 = 54,000 cfs

Biggest storm in the last 22 years of USGS records.

Largest storm in ~40 years in Hayfork Creek







12,000 cfs

8,100 cfs

Post 54,000 cfs

Gone...

Panic?!

Some fascinating results of wild wood













Some lessons learned:

- Tagging trees was useful...
 - Found 195 of 300 trees (65%)
 - We did not search downstream of Hyampom
- Wood travelled
 - many up to 15 miles and still is beneficial
- **Biggest lesson: tree diversity**

Phase 2 Restoration





YUROK TRIBAL FISHERIES PROGRAM

2020-2022
Silver Creek to Forest Glen reach

Similar levels of planning but "only" 2 years instead of 3

Phase 2 Objectives

- Take lessons learned from Phase 1
 - Use hardwoods and bigger trees
- Protect and enhance thermal refugia in this key reach
- Work in a section of the river that has smaller dimensions for better longevity
- Utilize a yarder for larger tree placement, better natural anchoring, and final ballast to hold down jams





Wood Placement

 Columbia Helicopters placed ~200 trees

- 120 hardwoods
- 80 conifers
- Yarder placed ~20 trees
 - 3 cut
 - 7 downed → moved
 - 10 yarded





Blue Ridge 4 Fish Specialized restoration yarder









Catalyst for Geomorphic Processes



Catalyst for Geomorphic Processes









This huge jam at Charlton Creek contained >55 logs, many suspected to be project wood.







14 logs moved 10+ miles and racked in this jam, creating fish habitat and refugia



Juvenile fish video





Tree Species Diversity

- Fir floated
- Madrone splintered
- Oaks stayed in the water
- Chinquapin is dense and its
 branches are Velcro

Fine sediment retention: riparian vegetation nursery



Anecdotal conclusions:

- Good work happened before wood floated/moved.
- Geomorphic changes are happening
- Tree species and size matter
- Unexpected benefits of racked wood
- We are still learning (check-in again in10 years...)

Wood is good, rivers know what to do with it.

TEAMWORK

<u>Great partnerships</u>: WRTC, Yurok, USFS, Landowners, Water Board, CDFW, Humboldt County, DWR, North Coast Resource Partnership, TRRP, Blue Ridge, Columbia etc.

Photo: Strazzante

STORAGE AND FORBEARANCE







M. Manka









2014-2016 FRGP Supplemental Watershed

Assessment

Focused on human impacts to stream flow

• Death by a thousand "straws"

Solutions

- Unique problems in sub-watersheds
- Suite of tools needed
 - Water Conservation
 - Watershed Restoration
 - Change in methods

TRINITY RIVER WATER RESILIENCY PARTNERSHIP

5 Counties Salmonid Conservation Program Trinity County Resource Conservation District The Watershed Research and Training Center









BROWNS CREEK (BROC1)

June 30, 2020 **3.6 cfs**



BROWNS CREEK (BROC1)

July 1, 2021 <0.1 cfs



BROWNS CREEK (BROC1)

July 6, 2021 **0 cfs**





HYDROGRAPH AND MEDITERRANEAN CLIMATE

- Cool Wet Winters
- Hot Dry Summers

STORAGE AND FORBEARANCE



FORBEARANCE

USGS 11528700 SF TRINITY R BL HYAMPOM CA



10 S&F PROJECTS COULD PROVIDE 0.18 CFS

0 cfs

<0.1 cfs



Outreach

In rural communities, this may entail door-to-door solicitation, cold calling, postcards, and social media posts.

Site Visit & Planning



Site visits to participating properties and understanding their water source, plumbing, and water use. This is the time to discuss the details of the project and forbearance agreement.

> THIS AGREEMENT is made and entered into as of this <u>day of</u>, by and between the Watershed Research & Training Center (hereinafter "**Center**") – collectively hereinafter referred to as Trustees, and OWNER, (hereinafter "**Participant**"), for the Project consisting of: 1) the seasonal forbearance of direct diversion of water from NAME Creek in the Trinity River Watershed, Trinity County, and/or tributary groundwater; and 2) the construction, installation and use of a Water Management System on the Property.

RECITALS

- A. WHEREAS Trustees are tax-exempt non-profit organizations qualified under Section 501(c)(3) of the Internal Revenue Code of 1986, as amended;
- B. WHEREAS Trustees are seeking to protect instream flow within the watershed to benefit the migration, spawning and rearing needs of the native Coho salmon and steelhead trout, as well as other aquatic species;
- C. WHEREAS, Participant is owner of certain property in Trinity County in NAME Creek Watershed, which is more particularly described in **Exhibit A** (**"Property"**);
- D. WHEREAS, the Property is near NAME Creek, and Participant diverts water under a riparian claim via easement from NAME Creek and/or groundwater adjacent to the creek for domestic and incidental irrigation uses on the Property;
- E. WHEREAS, Trustees have performed analysis of the instream flow regime and fisheries in NAME Creek watershed, and have identified target flow objectives to protect and enhance fisheries habitat in the watershed;

PROCESS

Design & Agreement

Notarize the forbearance agreement and record at the County Recorder's Office. Finalize designs based on tank placement and location, location of water source, existing and additional plumbing, number of tanks, etc.

Implementation

Ordering tanks, plumbing supplies, and sand base, ensuring contractors are available, staking tank pad, and then the fun...



PROCESS



Implementation





PROCESS

Implementation



PROCESS

Monitoring

PROCESS

Taking weekly water meter readings, calculating water use, observing tank levels



	Week	Date	Creek Meter	House Meter	Water used	Average gal/day
			Reading	Reading	between dates	
	1	8/1/2023		96030.00		
•	2	8/8/2023		105305.00	9275.00	1325.00
	3	8/15/2023		108330.00	3025.00	432.14
	4	8/22/2023		109950.00	1620.00	231.43
	5	8/29/2023		111750.00	1800.00	257.14
	6	9/5/2023		113965.00	2215.00	316.43
	7	9/12/2023		116090.00	2125.00	303.57
	8	9/19/2023		118000.00	1910.00	272.86
	9	9/26/2023		119450.00	1450.00	207.14
	10	10/3/2023		120710.00	1260.00	180.00
	11	10/10/2023		122110.00	1400.00	200.00
	12	10/15/2023		122810.00	700.00	140.00
					Total Water Used	Available Storage
					26780.00	8220.00

Accidentally left the garden hose on and still had 1.5 tanks leftover at the end of the forbearance season!

STORAGE AND FORBEARANCE TO DATE



500.000 450.000 0.7 400,000 0.6 350,000 0.5 300,000 allons 0.4 250,000 200.000 0.3 150.000 0.2 100,000 0.1 50,000 0 2021 2022 2023 2024 2025 2026 Year

Total Gallons Stored Per Year

Eight Storage and Forbearance projects, with systems ranging from 7 to 10 tanks

 Utilize matching funds: we have the ability to install five more systems, totaling to 470,000 gallons stored in a summer!





THANK YOU!







QUESTIONS?















