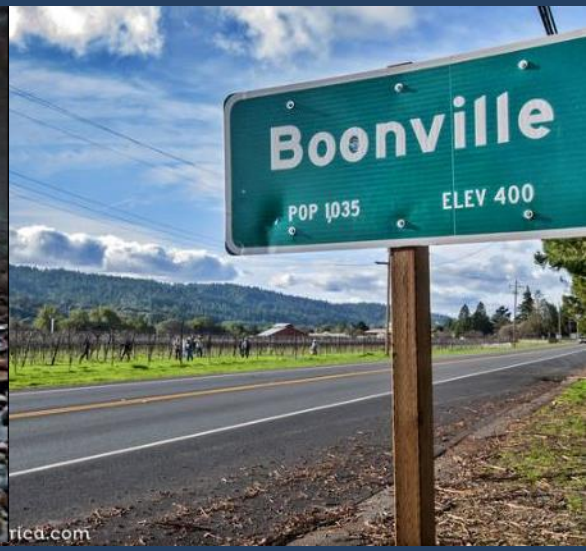
Navarro Streamflow Enhancement

Community-based Streamflow & Water Management Strategies
For Farms, People and Fish

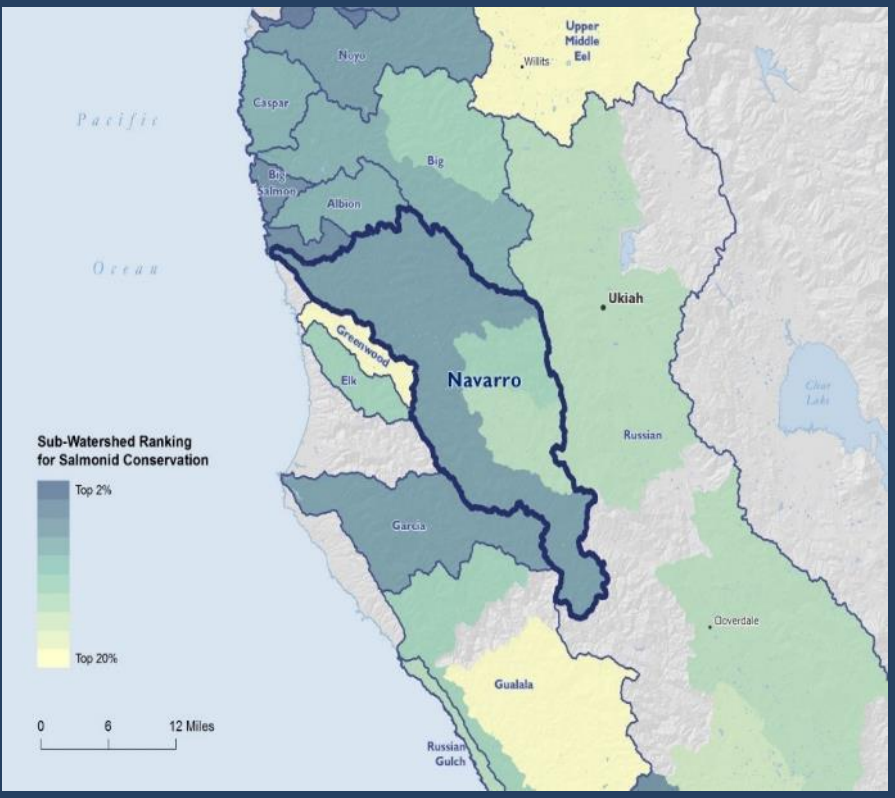
Presentation to the Salmonid Restoration Federation
Coho Confab
August 20, 2021

Linda MacElwee
Mendocino County RCD

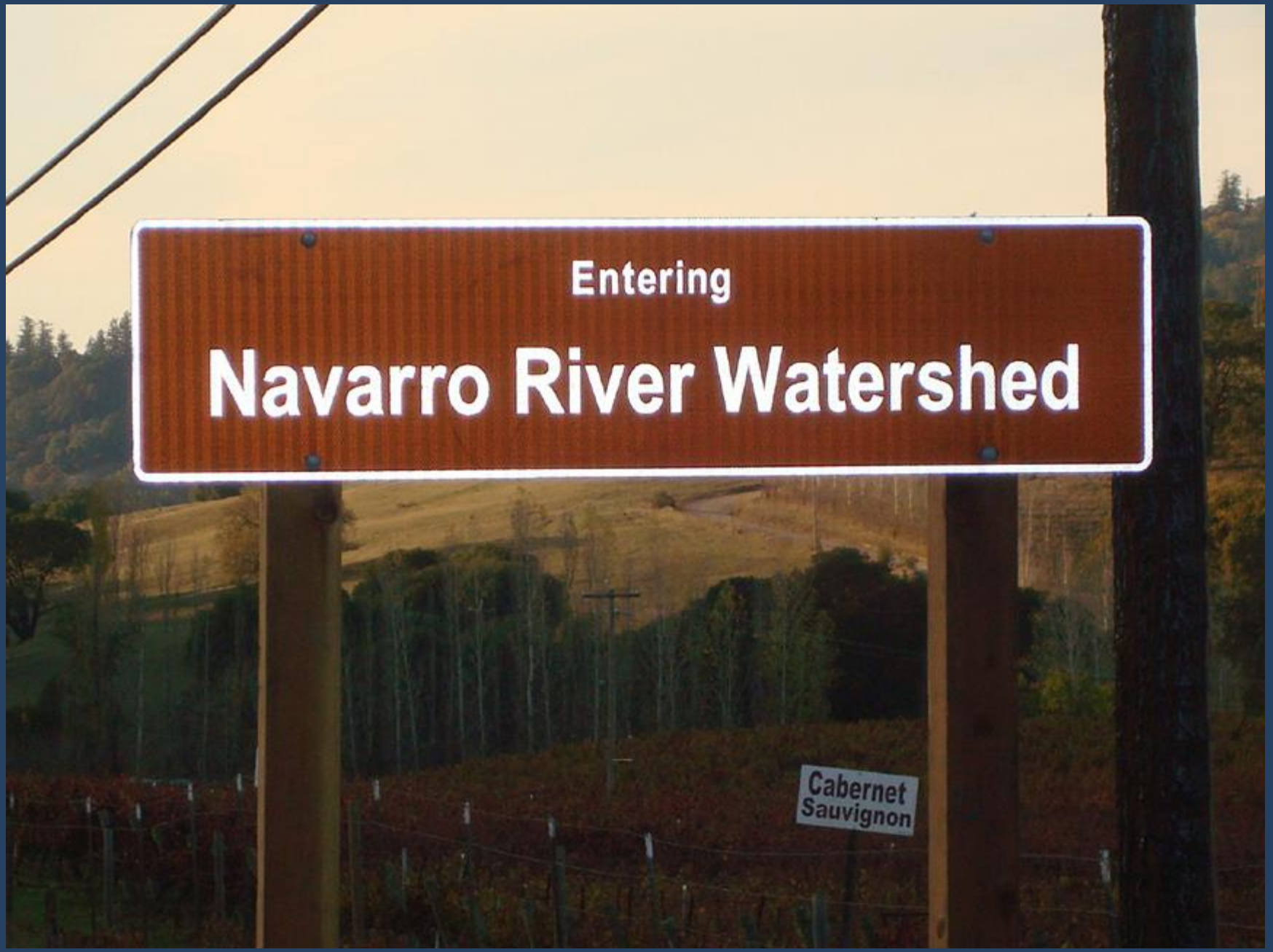
Monty Schmitt
The Nature Conservancy

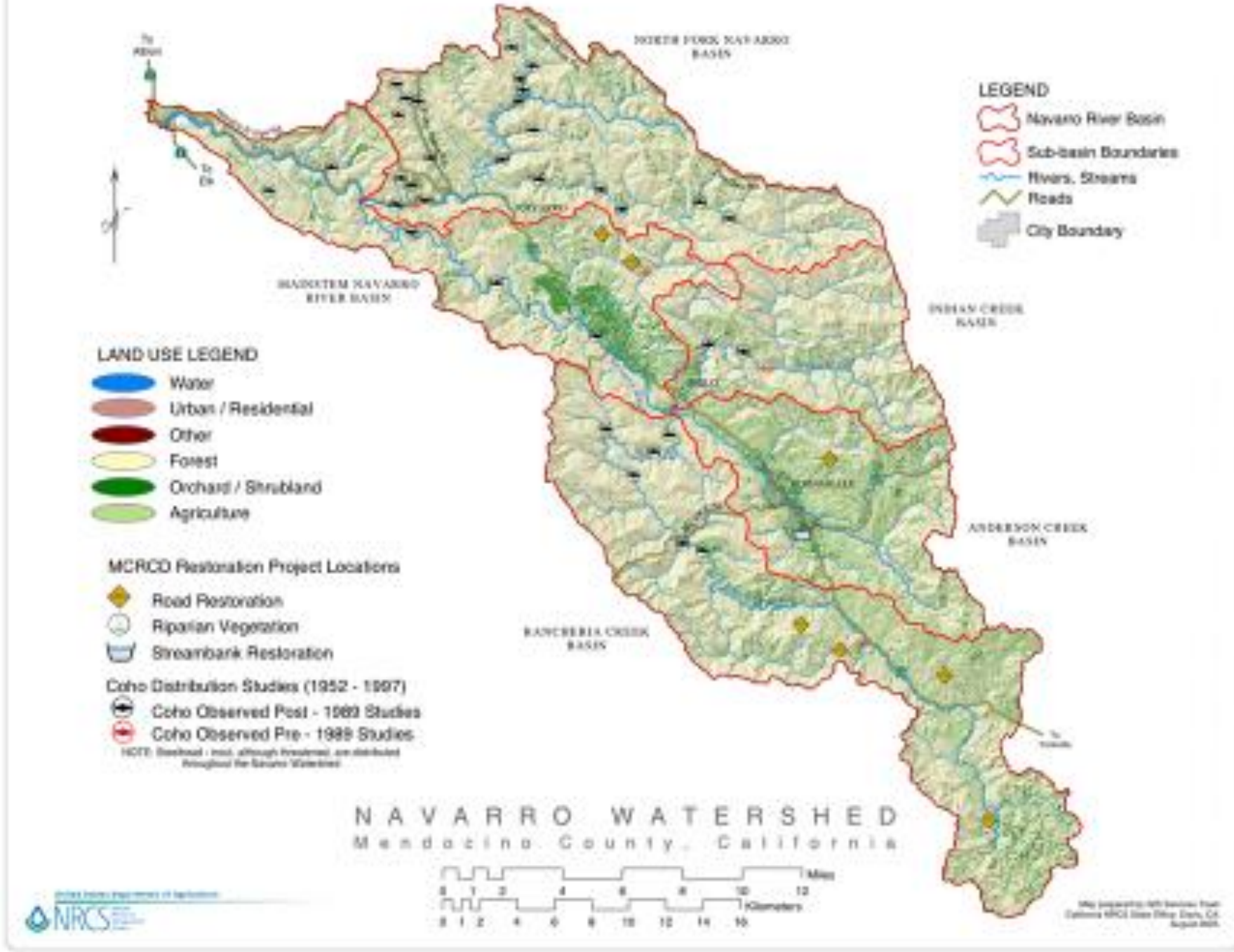


Navarro River Watershed

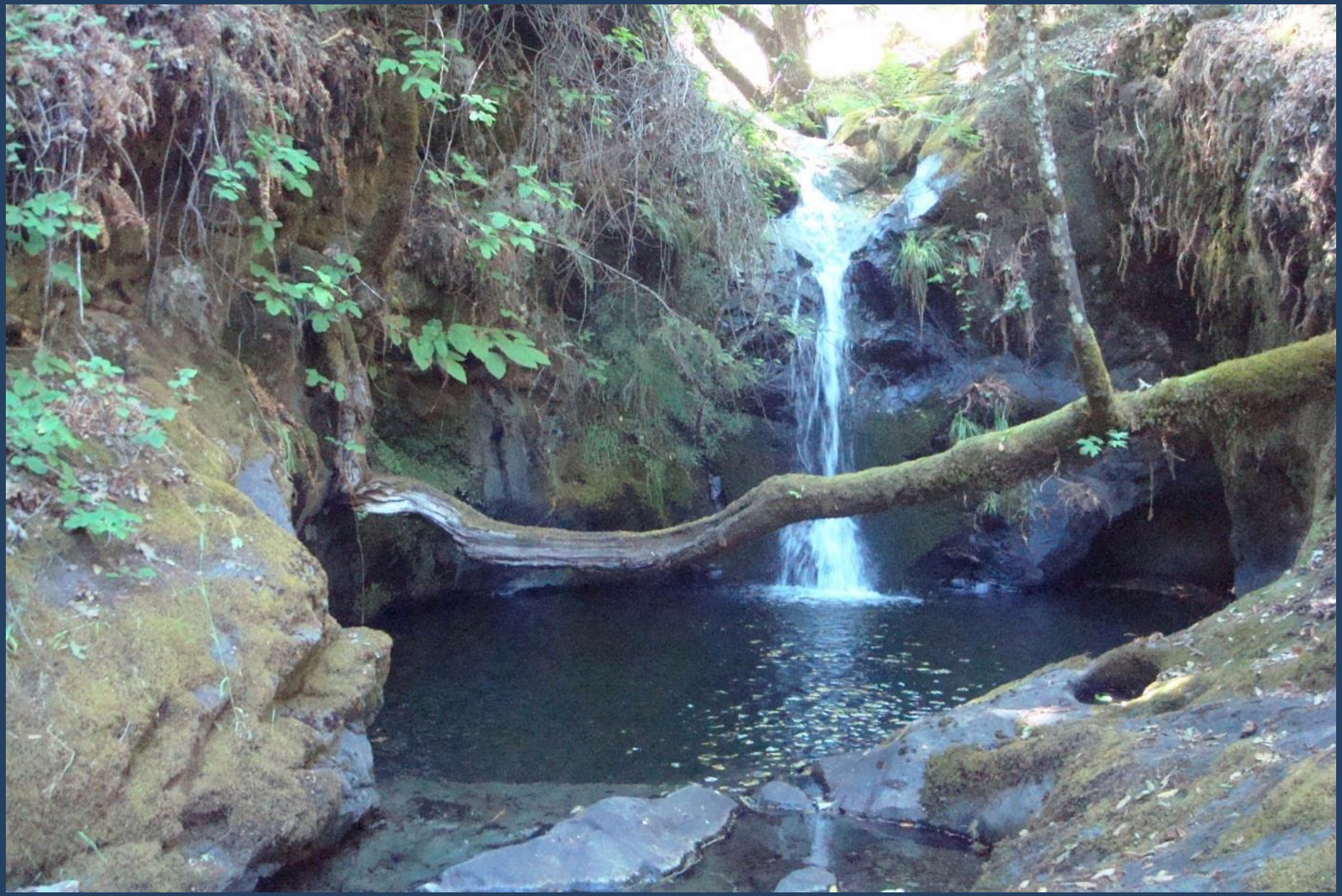


- Priority for the recovery of listed coho salmon and steelhead populations
- Local landowners want improved water security, healthy rivers and thriving fisheries
- Opportunity to use and improve existing water management policies and tools
- Provide a regional model for collaborative watershed approaches

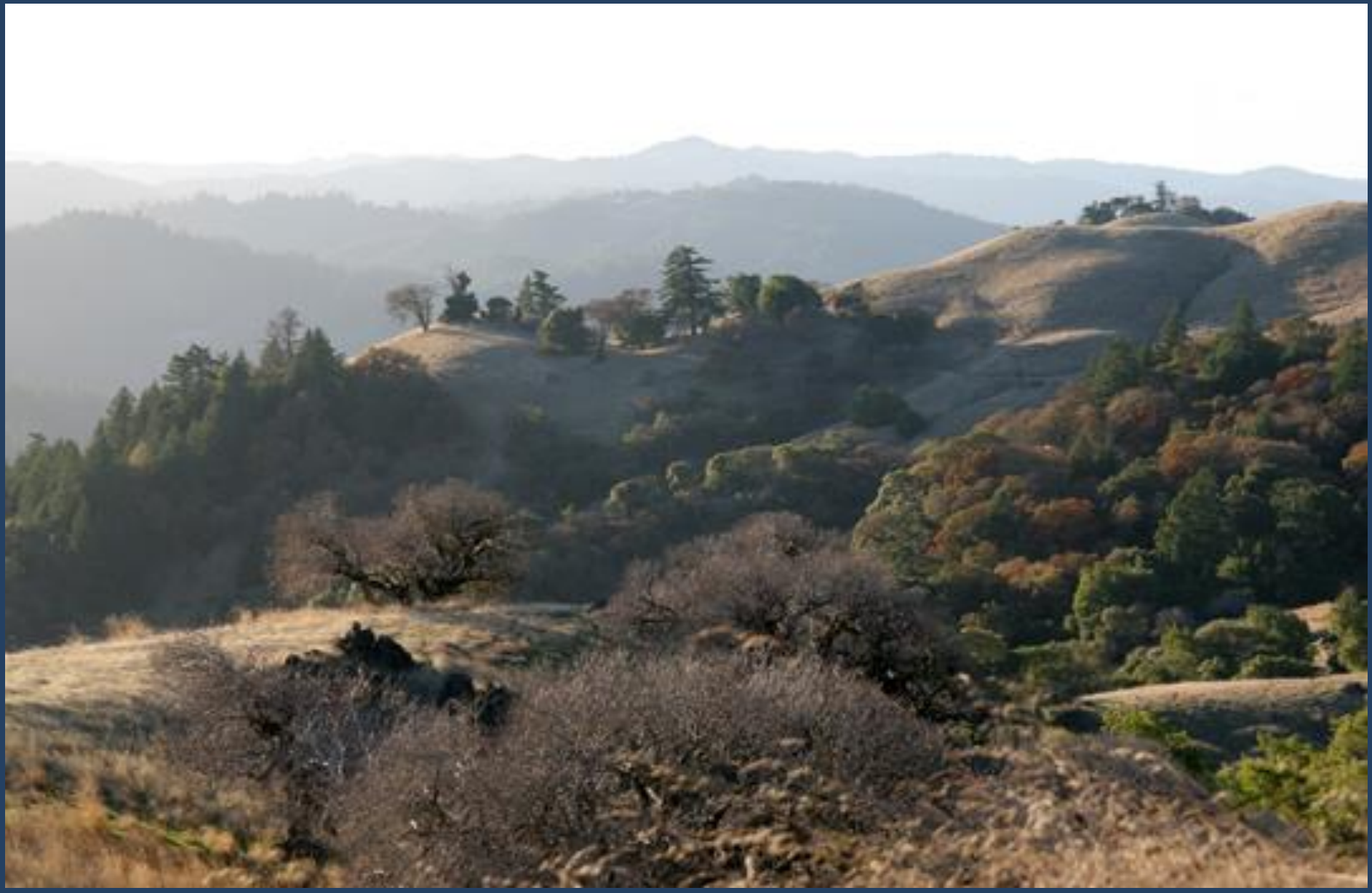

Entering
Navarro River Watershed
Cabernet
Sauvignon


LEGEND
Navarro River Basin
Sub-basin Boundaries
Rivers, Streams
Roads
City Boundary
LAND USE LEGEND
Water
Urban / Residential
Other
Forest
Orchard / Shrubland
Agriculture
MCRCD Restoration Project Locations
Road Restoration
Riparian Vegetation
Streambank Restoration
Coho Distribution Studies (1952 - 1997)
Coho Observed Post - 1989 Studies
Coho Observed Pre - 1989 Studies
NORTH FORK NAVARRO BASIN
INDIAN CREEK BASIN
ANDERSON CREEK BASIN
RANCHERIA CREEK BASIN
NAVARRO WATERSHED
Mendocino County, California
Miles
Kilometers
NRCS

From the top of the watershed



Through the Yorkville Highlands



to the Anderson Valley from Boonville to Philo

Down into the deep end of the watershed

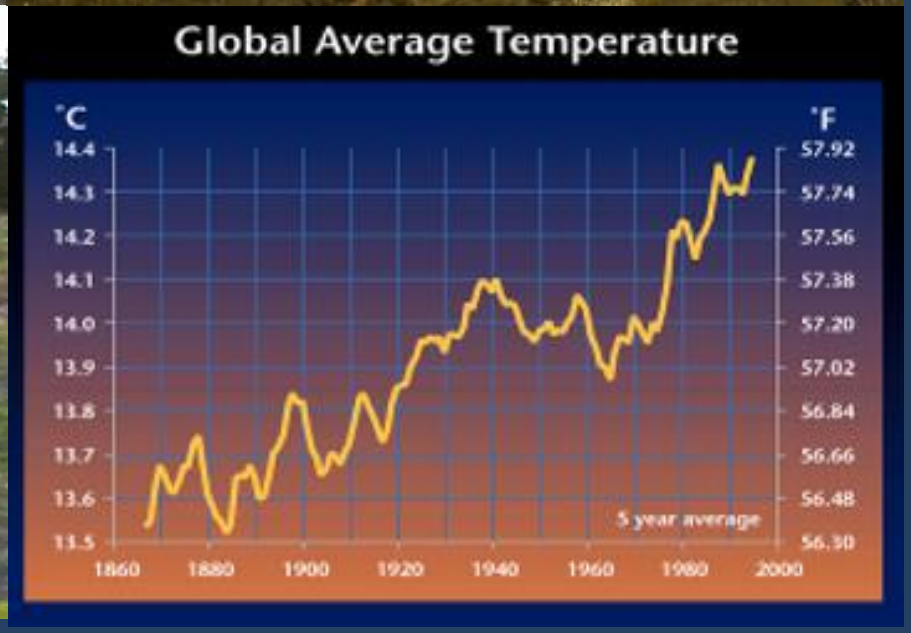
To the mouth of the river…

During high flows the Navarro can get up to nearly 60,000 cfs
Photo: January 2006

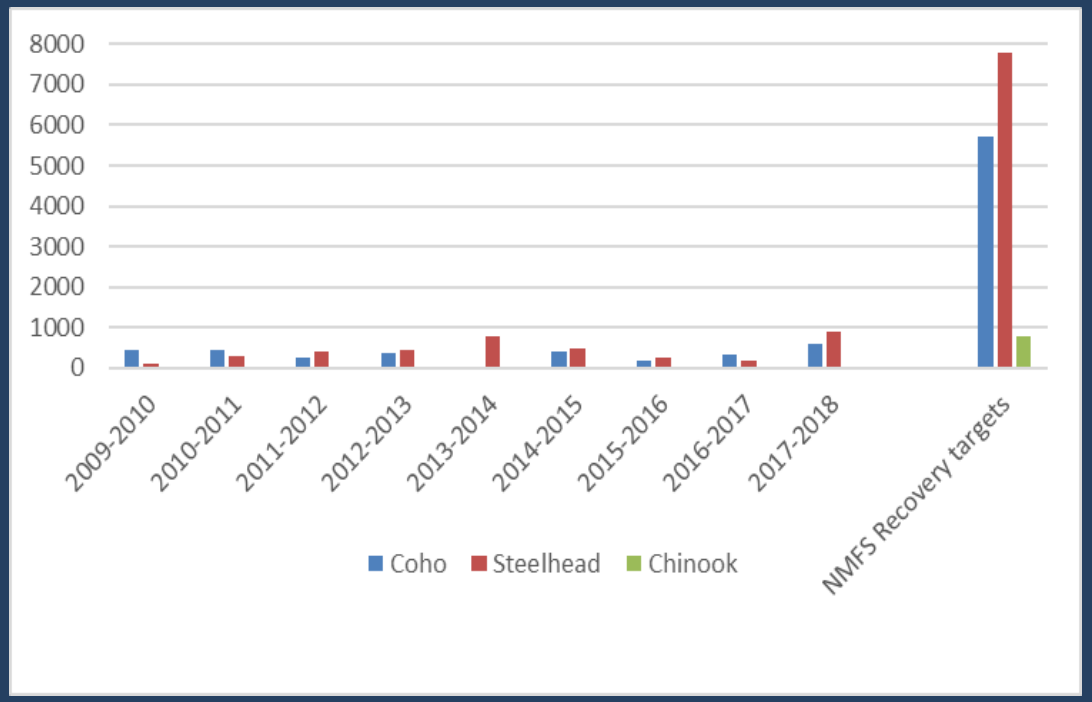
The Navarro is a very “flashy” river system….
with low flows at the Navarro USGS gauge
getting down to <.01 CFS (July 25, 2021)

MCRCD has been working in the Navarro since 2001

North Coast Water Management Challenges



Coho Recovery & Dry Season Baseflows

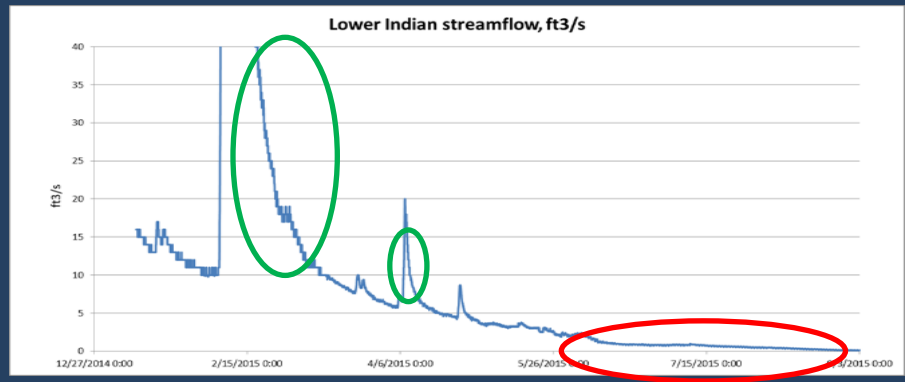


Fish Habitat Needs:

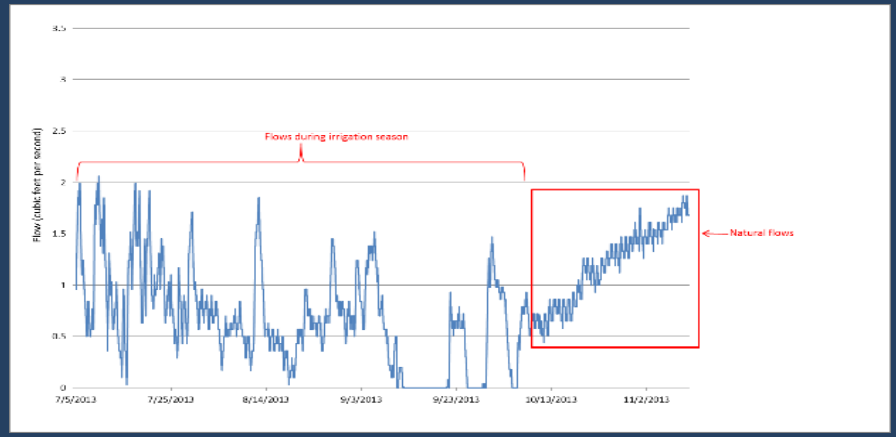
- Passage
- Spawning
- Juvenile Rearing –summer & fall

Navarro River Hydrology

- High flows in winter/ spring
- Low flows in summer/ fall

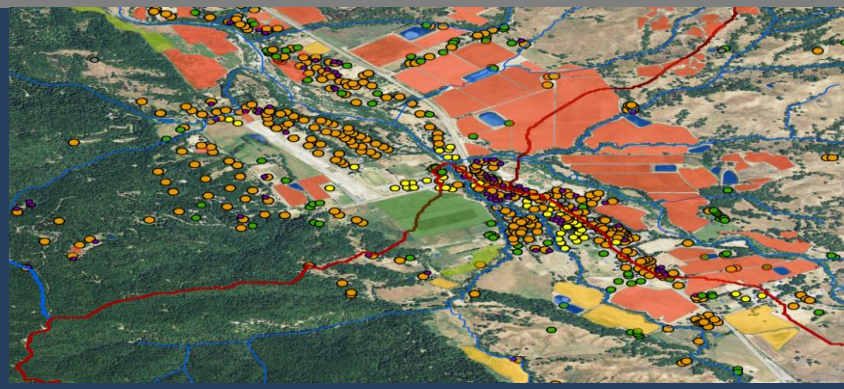


- Summer diversions further reduce stream flows
- Diversions can dewater stream reaches, particularly in dry years



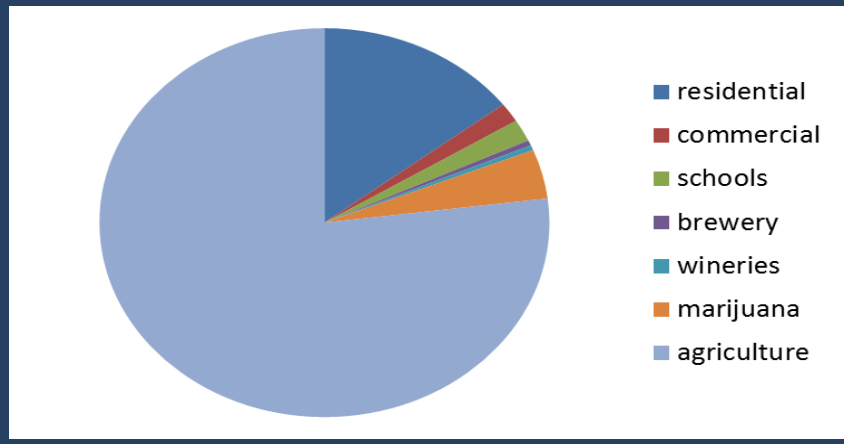
Existing Water Use and Needs

Navarro River Watershed



Water Use

- Annual water use = 1,700 Acre-Feet
  - Summer water use = 1,400 Acre-Feet
  - *82% of all water is use in summer*

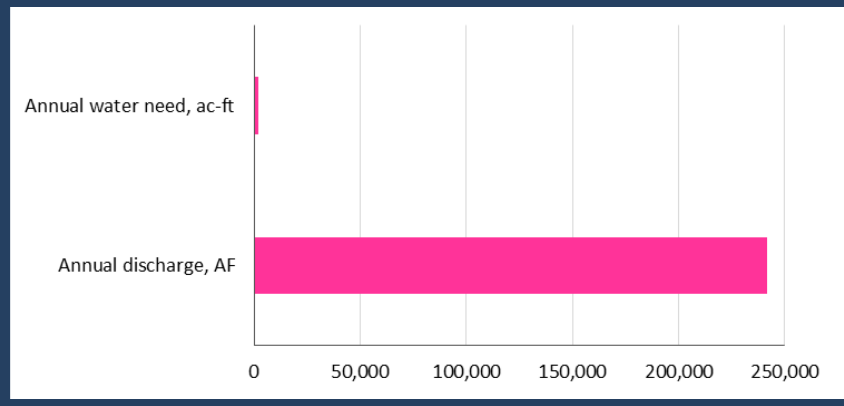


Water Supply

Average annual runoff = 240,000 Acre-Feet

Supply vs Need

- *Human water need = ~ 1% of runoff*



The Solution

Reduce reliance on dry season diversions by storing water in the wet season to meet human needs

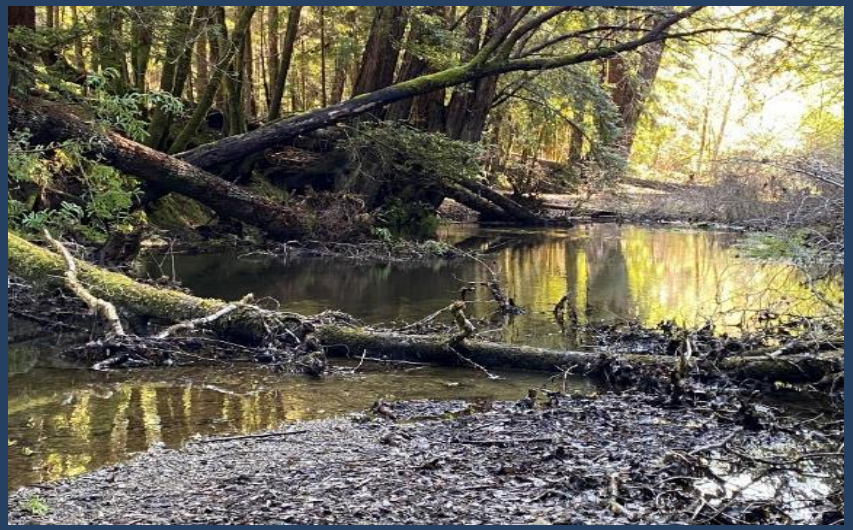
Water Management Projects, Actions & Policies

Blue Meadow Farm

Water Management Projects:

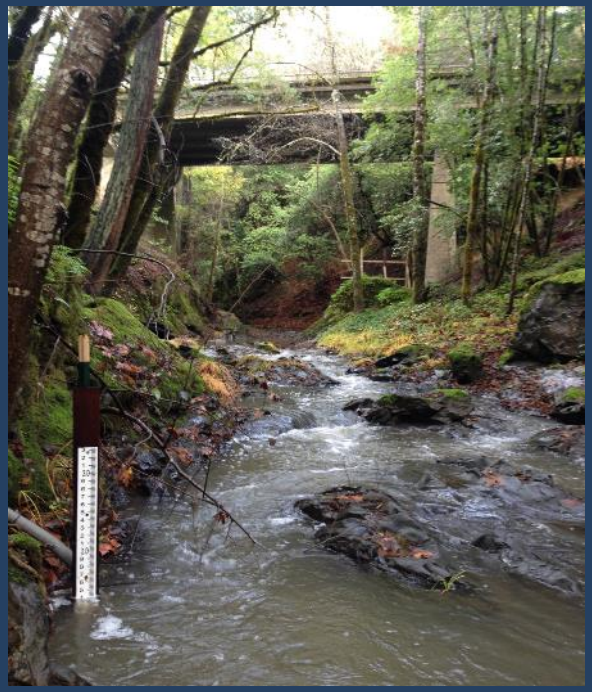
- Storage ponds and tanks
- Rainwater harvesting
- Large wood restoration
- Infiltration and groundwater recharge
- Release of stored water

Husch Vineyard Pond



North Fork Navarro LWD

Water Management Projects, Actions & Policies



Water Management Actions

- Conservation and efficiency
- Coordinate timing of diversions
  - Mill Creek and Mainstem Navarro
- Reducing diversion rates

Example: McKee Creek - Coordinated Diversion Management:

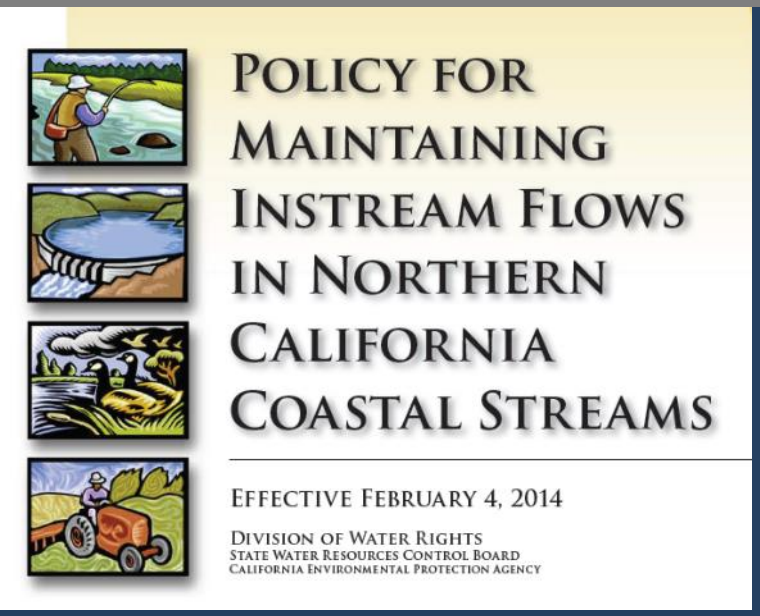
Pumping Season

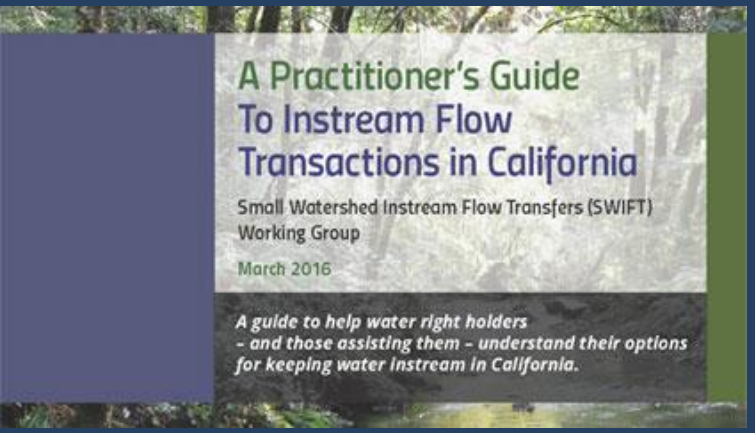
No coordination: May 7 –Dec 15

With coordination: June 7- Dec 15

(Extended season of diversion by 1 month)

Water Management Projects, Actions & Policies



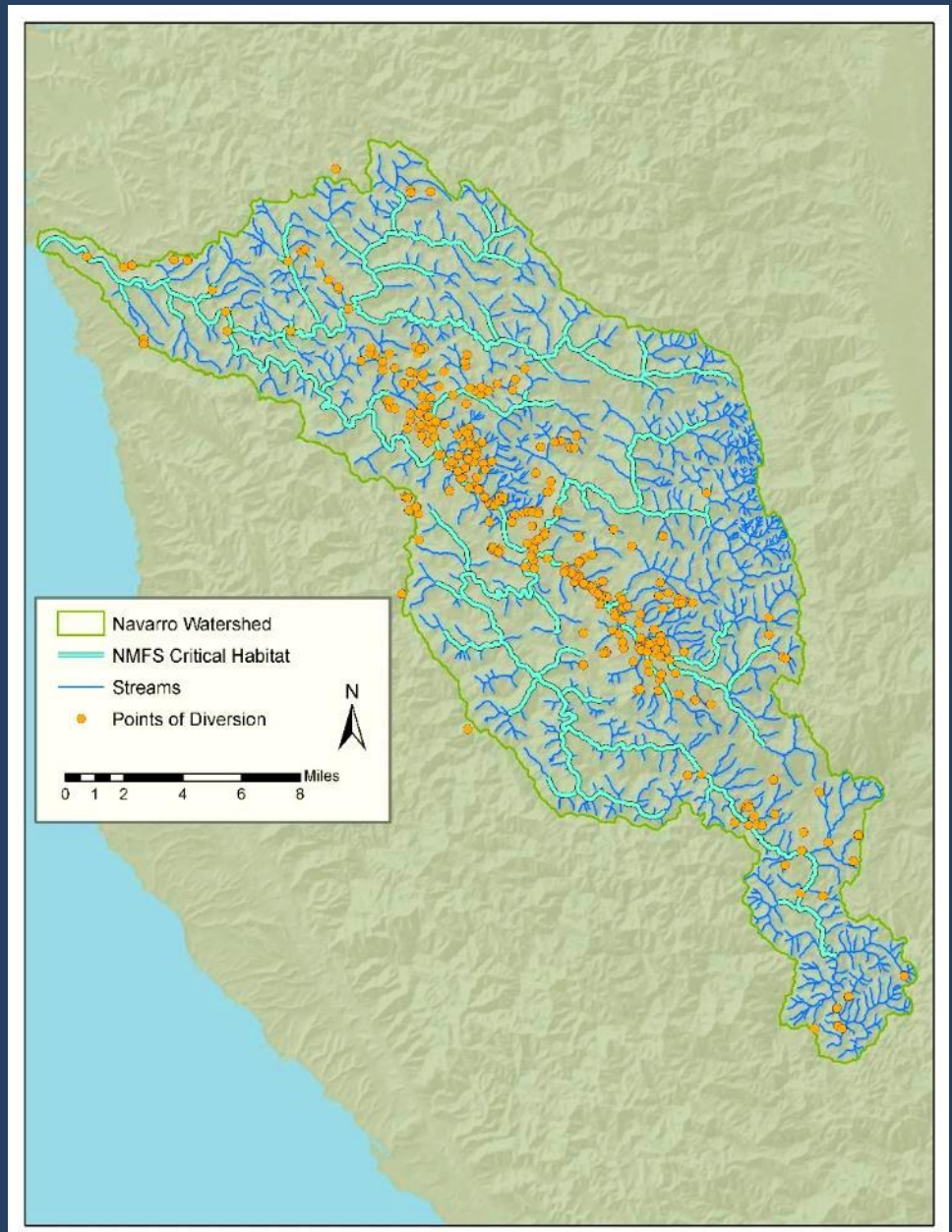


Policies and Water Right Tools:

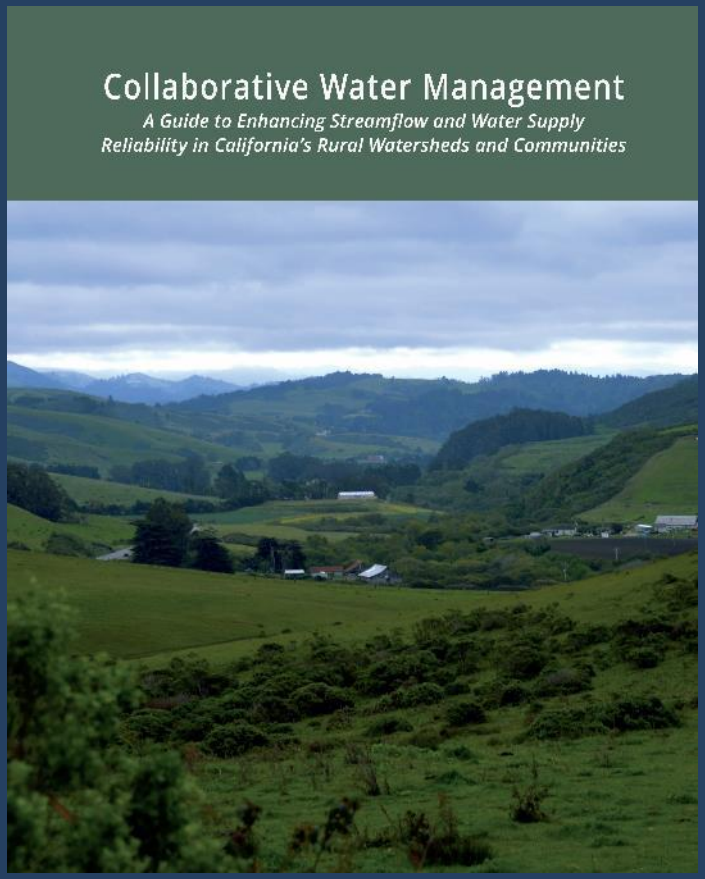
- New water rights – winter storage
  - Small Domestic Use
  - Small Irrigation Use
- Forbearance agreements
  - All projects
- Safe Harbor Agreements
- Instream flow dedications (1707)
- CWM Handbook and other resources
  - See our website

Watershed Community-Based Flow Restoration

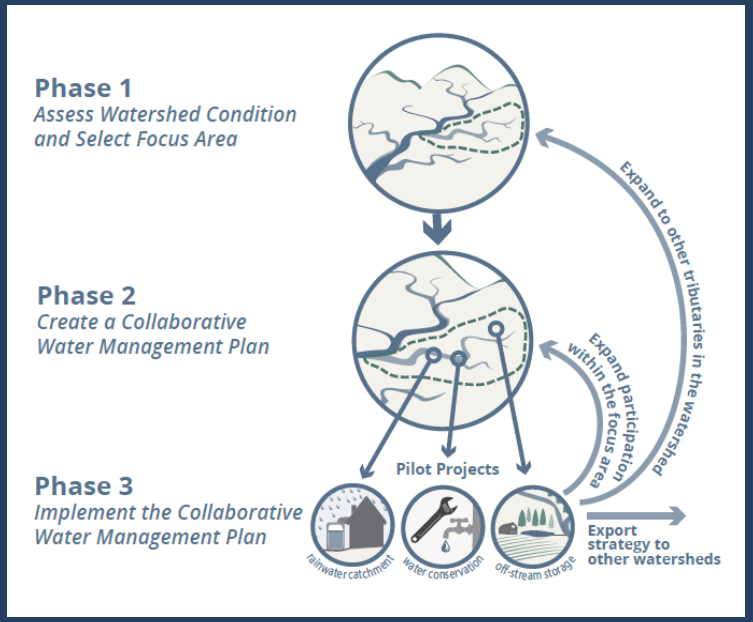
- Decentralized Water Supply
  - Many points of diversion
- Streamflow Projects
  - Incremental benefit
  - Slow to implement
- Accelerate Pace and Scale



Collaborative Water Management Guidebook

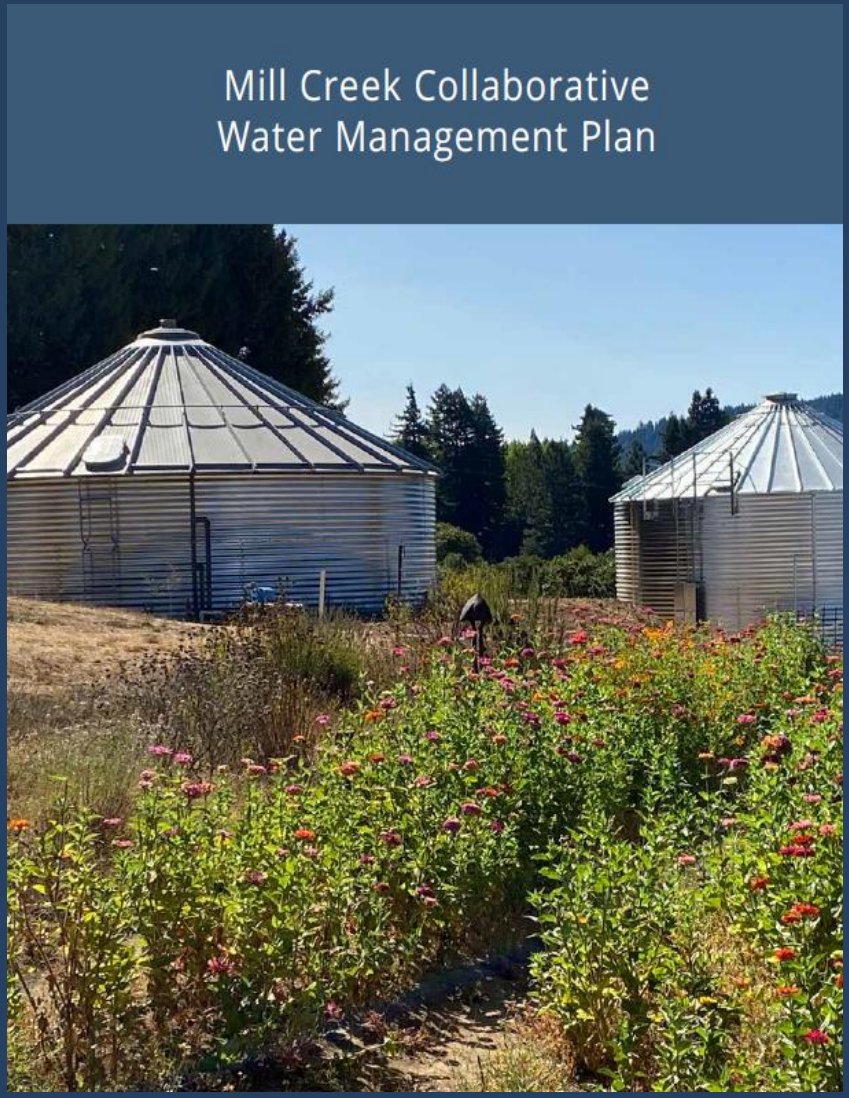


A collaborative *watershed* approach *incentivizing* individual water users to *collectively* reduce summer diversions to improve streamflow for fish, and improve their water supply reliability.

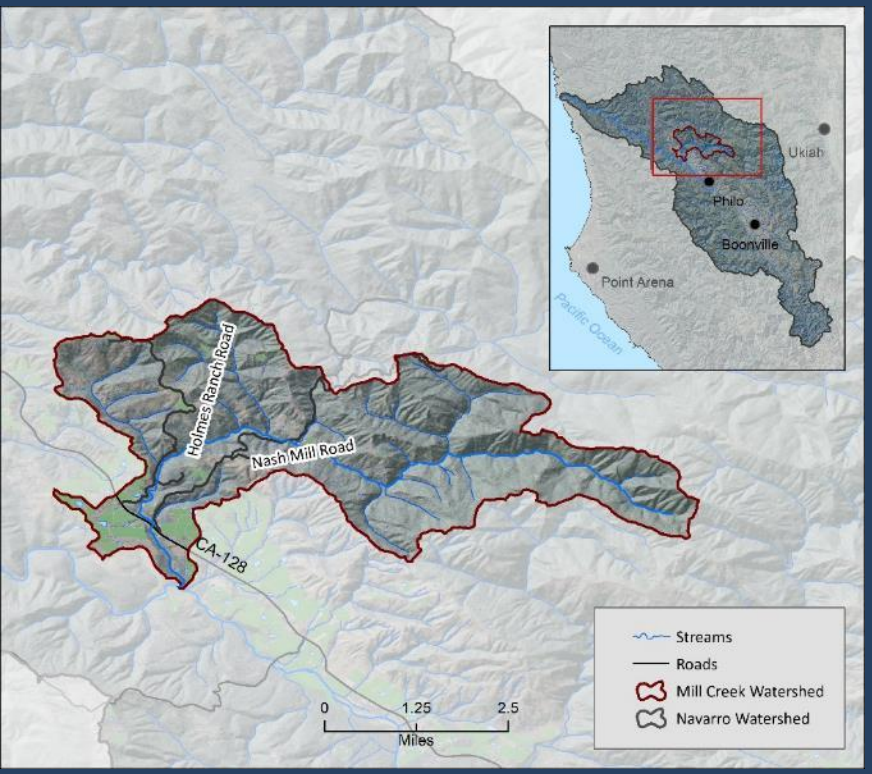


Alford, C., D. Stolzman, and M. Schmitt. 2021. Collaborative Water Management: A Guide to Enhancing Streamflow and Water Supply Reliability In California's Rural Watersheds and Communities. Prepared for The Nature Conservancy. San Francisco, CA.

Mill Creek Collaborative Water Management Project



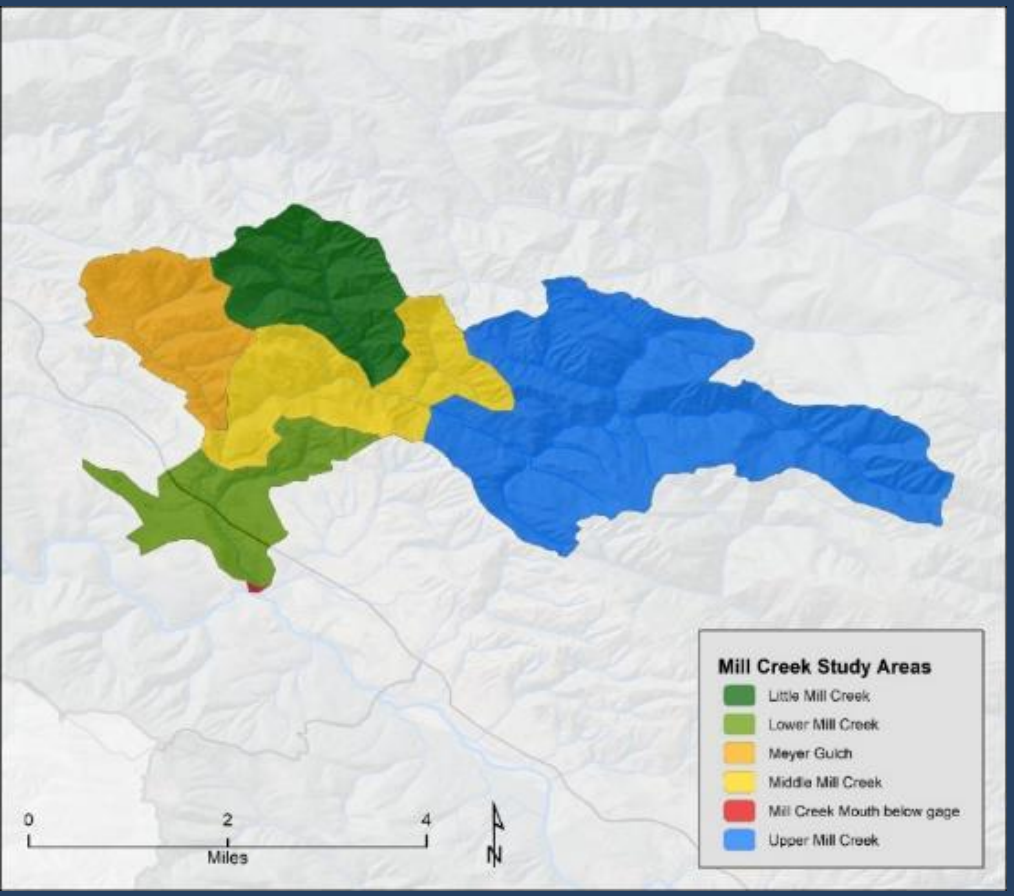
Mill Creek Collaborative Water Management Plan



Why Mill Creek:

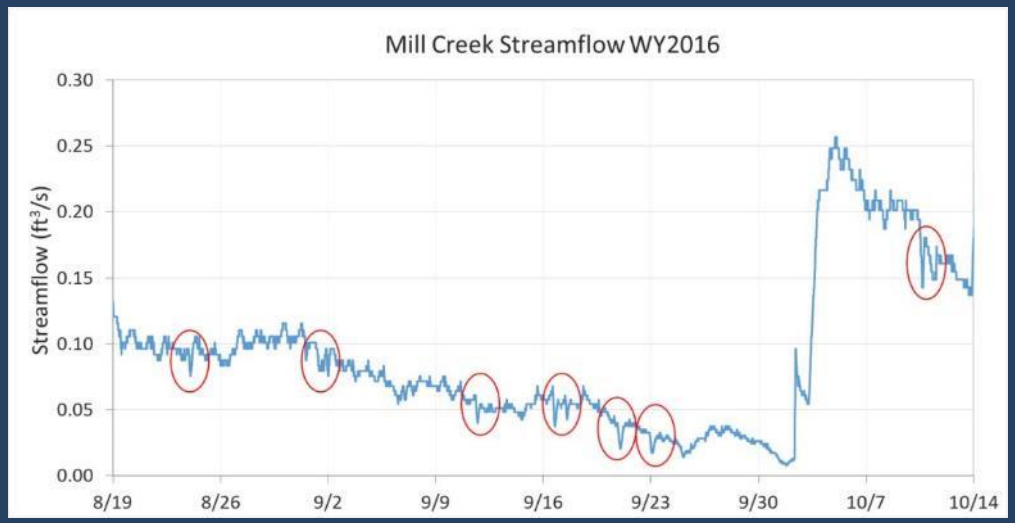
- Historic salmon and steelhead runs
- Priority for recovery efforts
- Existing streamflow data
- Mill Creek Watershed
  - ~130 properties
  - Mix of residential and agriculture
  - 47+ water rights
- Existing communication networks
  - Road associations
- Local demonstration projects
  - Blue Meadow Farm
  - Husch Vineyards

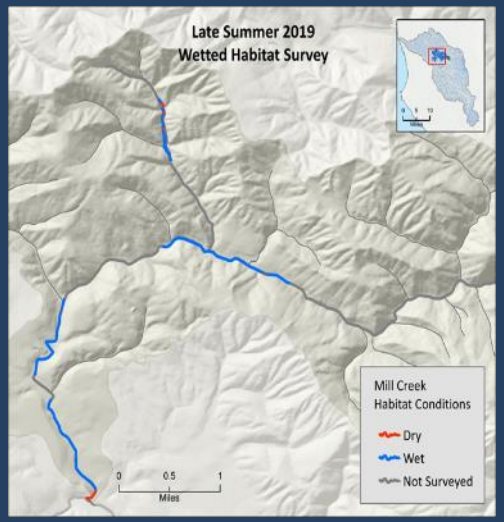
Mill Creek Collaborative Water Management Plan

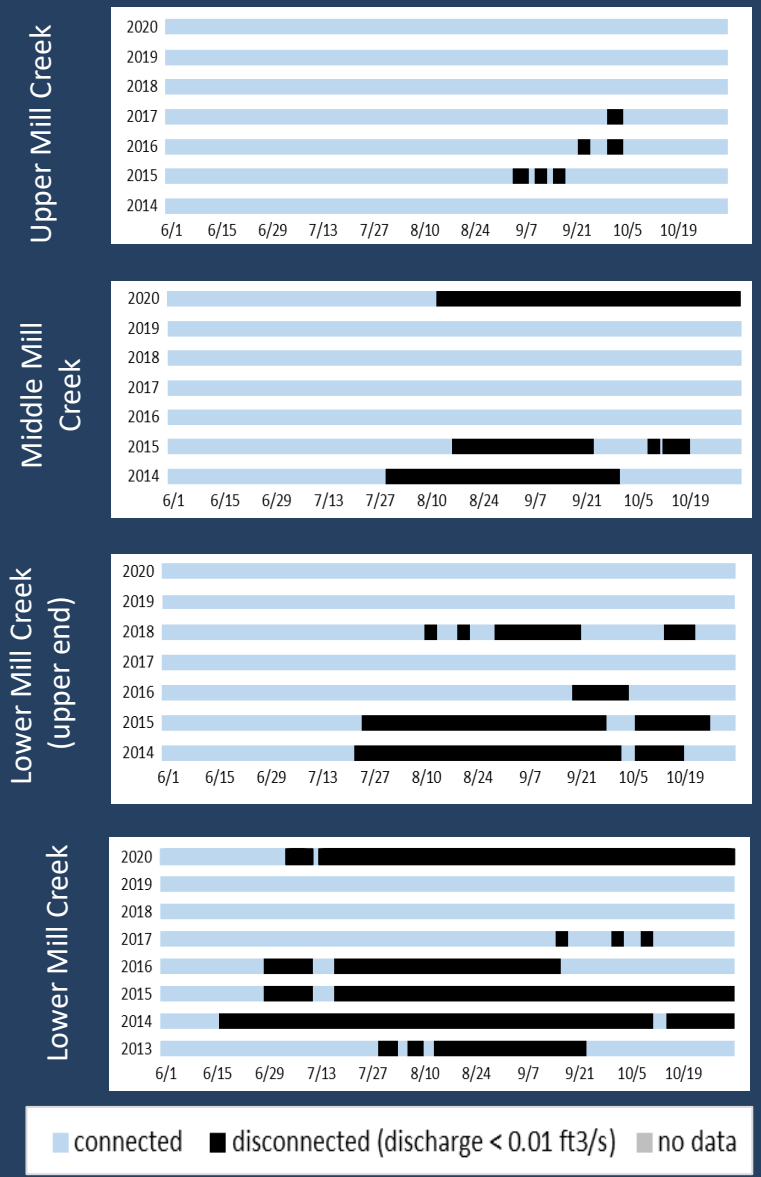


1. **Identified Sub-Watersheds**
2. **Data Collection and Analyses**
3. **Assessed Effectiveness of Management Strategies**

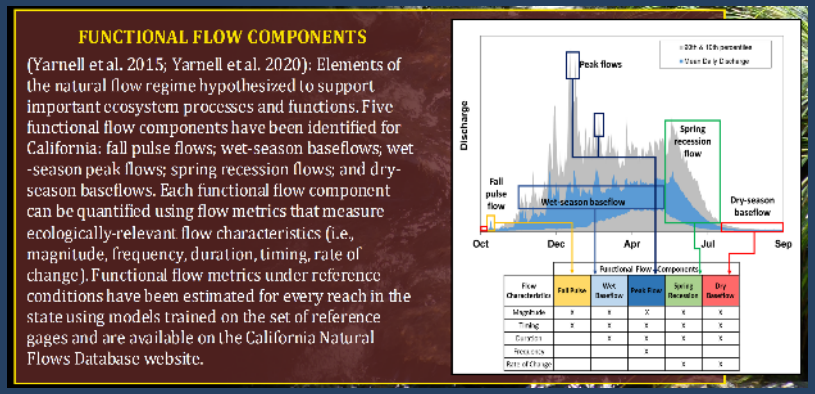
Streamflow Gauging and Wet/Dry Mapping







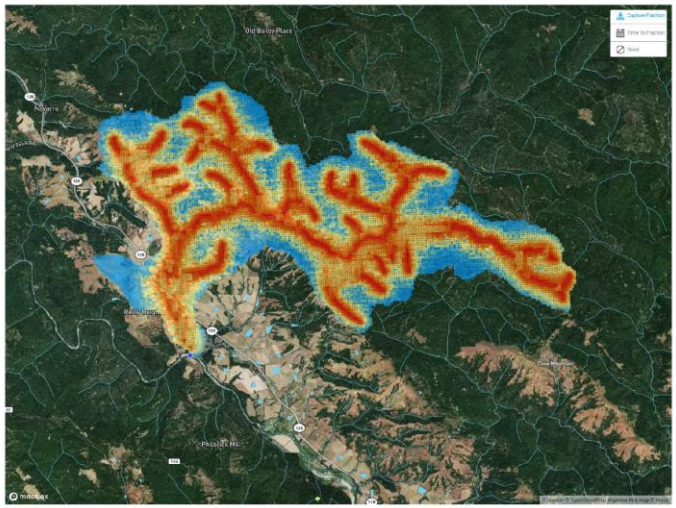
Assessed Streamflow Alteration and Developed Functional Flow Objectives for Sub Watersheds



Dry season base and 5-yr peak are altered = low

Flow Component	Flow Metric	Predicted Range at Lower Mill - Na02 and Na13 (COMID 2664783); median (10th–90th percentile	Predicted Range at Middle Mill - Na12 (COMID 2664737); median (10th–90th percentile)	Predicted Range at Upper Mill - Na11 (COMID 2664723); median (10th–90th percentile)	Predicted Range at Little Mill (COMID 2664675); median (10th–90th percentile)	Predicted Range at Meyer Gulch (COMID 2664715); median (10th–90th percentile)
Fall pulse flow	Fall pulse magnitude	likely unaltered	likely unaltered	likely unaltered	likely unaltered	likely unaltered
	Fall pulse timing	likely unaltered	likely unaltered	likely unaltered	likely unaltered	likely unaltered
	Fall pulse duration	likely unaltered	likely unaltered	likely unaltered	no data	no data
Wet season baseflow	Wet season baseflow (median magnitude)	unclear if altered*	unclear if altered*	likely altered (low)*	unclear if altered*	likely unaltered*
	Wet season start date	unclear if altered	likely unaltered	unclear if altered	likely unaltered	likely unaltered
	Wet season duration	likely unaltered	likely unaltered	likely unaltered	likely unaltered	likely unaltered
Peak flows	5-year flood magnitude	likely altered (low)*	likely altered (low)*	likely altered (low)*	likely altered (low)*	likely altered (low)*
	5-year flood duration	likely unaltered	likely unaltered	likely unaltered	no data	no data
	5-year flood frequency (number of 5-year floods/ year)	likely unaltered	likely unaltered	likely unaltered	no data	no data
Spring recession flows	Spring recession magnitude	likely unaltered	likely unaltered	likely unaltered	likely unaltered	likely unaltered
	Spring recession timing	unclear if altered	unclear if altered	unclear if altered	likely altered (early)	likely altered (early)
	Spring recession duration	likely unaltered	likely unaltered	likely unaltered	unclear if altered	likely unaltered
	Spring recession rate of change	likely unaltered	likely unaltered	likely unaltered	no data	no data
Dry season baseflow	Dry season (median) baseflow	likely altered (low)	likely altered (low)	likely unaltered	likely altered (low)	likely altered (low)
	Dry season start date	likely unaltered	likely unaltered	unclear if altered	likely unaltered	likely unaltered
	Dry season duration	likely unaltered	likely unaltered	likely unaltered	likely unaltered	likely unaltered

Assessed the Effect of Streamflow Depletion Due to Groundwater Pumping



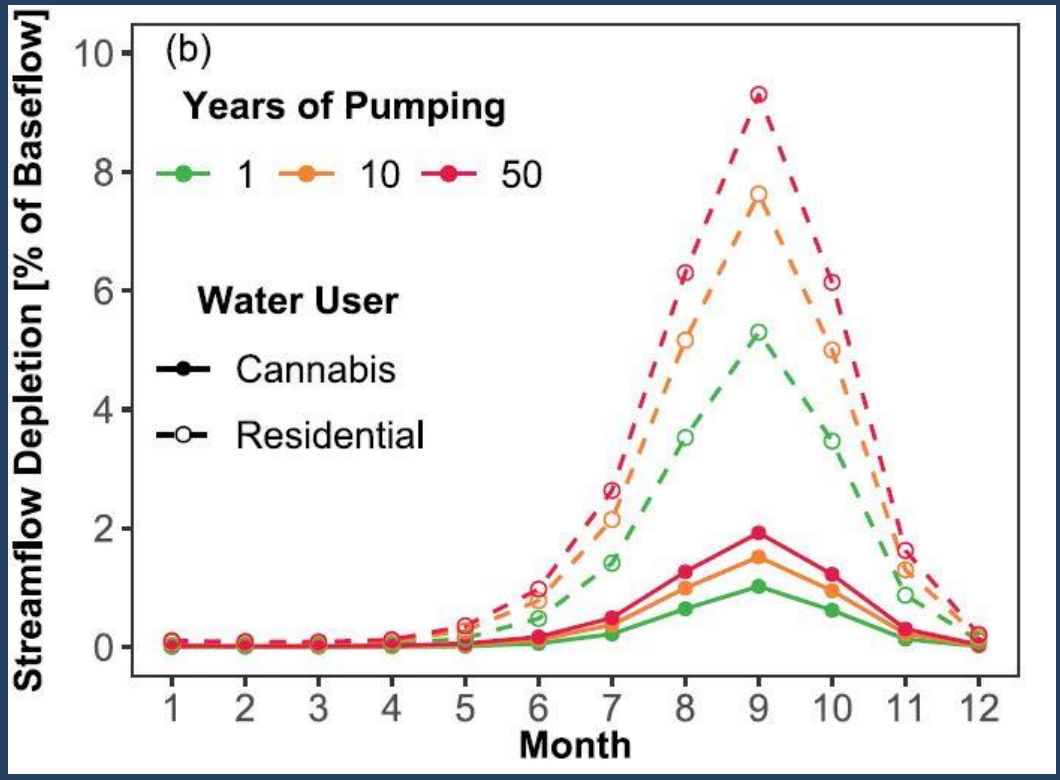
Mill Creek Streamflow Depletion

Scenarios for modified groundwater pumping - Report

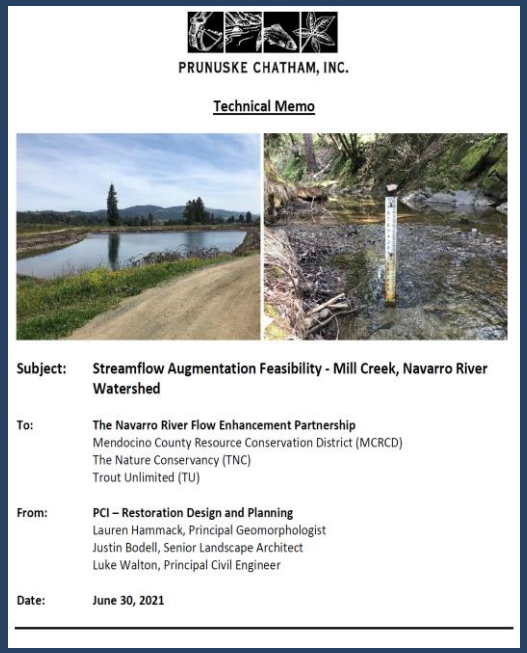
2020.05.25

Foundry Spatial Ltd.
3947-A Quadra St.
Victoria, BC
V8X 1J5

FOUNDRY SPATIAL



Streamflow Augmentation From Offstream Storage



PRUNUSKE CHATHAM, INC.

Technical Memo

Subject: **Streamflow Augmentation Feasibility - Mill Creek, Navarro River Watershed**

To: **The Navarro River Flow Enhancement Partnership**
Mendocino County Resource Conservation District (MCRCD)
The Nature Conservancy (TNC)
Trout Unlimited (TU)

From: **PCI – Restoration Design and Planning**
Lauren Hammack, Principal Geomorphologist
Justin Bodell, Senior Landscape Architect
Luke Walton, Principal Civil Engineer

Date: **June 30, 2021**

Table 2. Potential streamflow and release scenarios based on regional augmentation project examples and Mill Creek specific estimated dry season flow rates. Measured mean monthly flows are listed as comparison to release scenarios, as is the volume of water storage needed to provide the releases.

	Actual flows 2013/14-2019	Triage flows		Survival flows		Thriving flows		Unimpaired 10%*		Unimpaired dry**	
	Mean monthly (cfs)	Mean monthly (cfs)	acre-feet	Mean monthly (cfs)	acre-feet	Mean monthly (cfs)	acre-feet	Mean monthly (cfs)	acre-feet	Mean monthly (cfs)	acre-feet
July	0.29			0.2	12	0.5	30	0.5	30	1.0	61
August	0.1	0.1	6	0.2	12	0.5	30	0.2	12	0.6	37
September	0.06	0.2	12	0.2	12	0.5	30	0.1	6	0.4	24
October	0.24	0.1	6	0.2	12	0.5	30	0.5	30	1.1	68
TOTAL			**24**		**48**		**120**		**78**		**190**

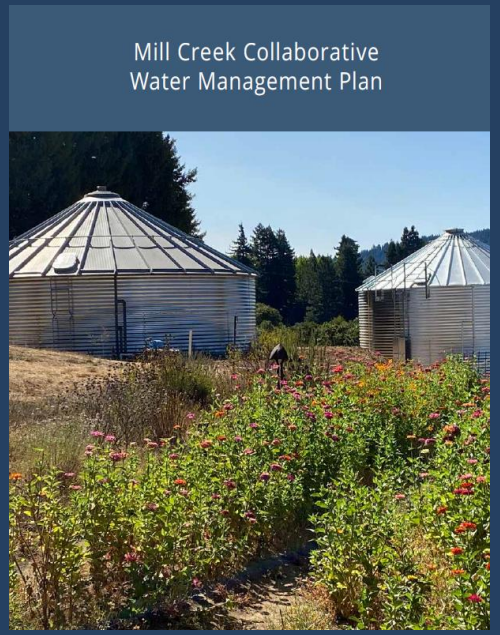
*Natural Flows Database unimpaired mean monthly flow (1950-2015) using 10th percentile (low end) prediction.

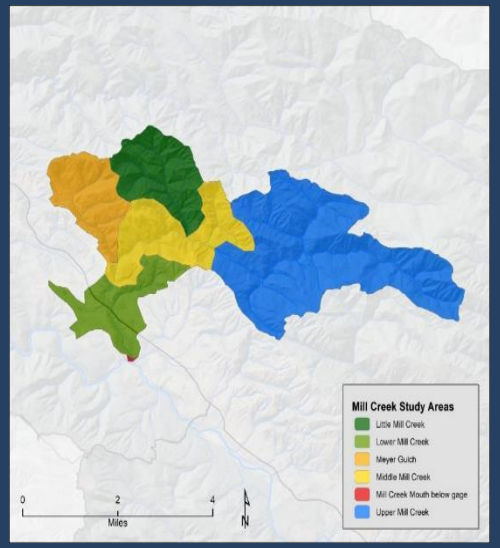
**Natural Flows Database unimpaired mean monthly flow (1950-2015) using driest 33% of years.

- Focused on lower reaches for rearing
- Maintaining connectivity in dry years 24-48 AF
- Over 200 AF of existing storage in lower watershed

Mill Creek Collaborative Water Management Plan

- Watershed Conditions
- Human Water Use
- Salmon Habitat
- Streamflow Study Results and Flow Objectives
- Permitting, Agreements, and other considerations
- Reach specific recommended flow improvement strategies
- Plan implementation

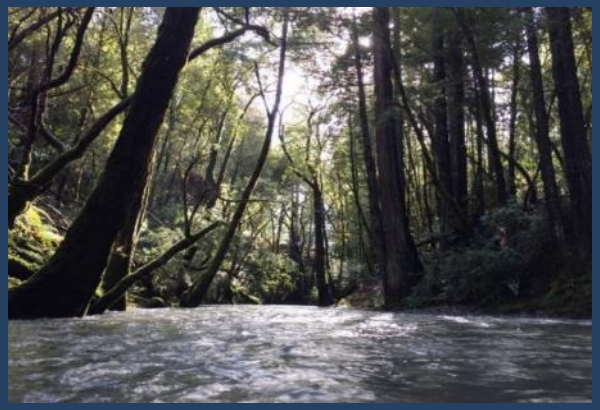




Navarro Flow Enhancement Partnership

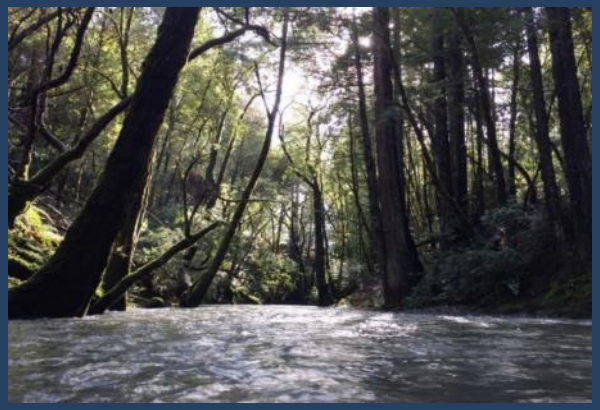
Next Steps

1. Mill Creek CWM Plan Project Implementation (on-going)
2. North Fork Navarro CWM Plan Development (2021-2023)
3. Outlet Creek Direct Release Study
4. Coordinated Water Diversion Project - Mainstem Navarro
5. Flynn Creek Groundwater Infiltration Project
6. Camp Navarro Rainwater Capture Project
7. Mendocino SHaRP / North Coast Salmon Project Implementation
8. Streamflow Data Collection
9. Community Outreach



Thanks to our Partners, Supporters and Funders

- Trout Unlimited
- Navarro and Mill Creek Communities
- Salmonid Restoration Federation
- Sanctuary Forest, Inc.
- Salmon and Steelhead Coalition
- California Department of Fish and Wildlife
- North Coast Regional Water Quality Control Board
- Wildlife Conservation Board
- Christopher Woltemade Shippensburg Univ.


For more information:

http://mcrcd.org/resources/flow-enhancement:

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