

Water Supply and Demand Assessment Program Navarro River Watershed

State Water Board Staff



Meeting Agenda

- Purpose of Today's Meeting
- Background on Board and Water Rights
- Water Supply & Demand Assessment Program Overview
- Navarro River Watershed
- Model Specifics & Work Plan

Purpose of Today's Meeting

- Introduce the Supply & Demand Assessment Program
- Provide an update on the status of work in the Navarro River Watershed, focusing on the Model Work Plan
 - Prepared by Paradigm Environmental, Inc.
 - Available on the Navarro River webpage: bit.ly/sda-navarro

State Water Board's Mission

To preserve, enhance, and restore the quality of California's **water** resources and **drinking water** for the **protection of the environment, public health, and all beneficial uses**, and to ensure **proper** water resource **allocation and efficient use**, for the benefit of present and future generations.



Board Members from left to right: Nichole Morgan, Laurel Firestone, Board Chair Joaquin Esquivel, Vice Chair Dorene D'Adamo, and Sean Maguire

Division of Water Rights

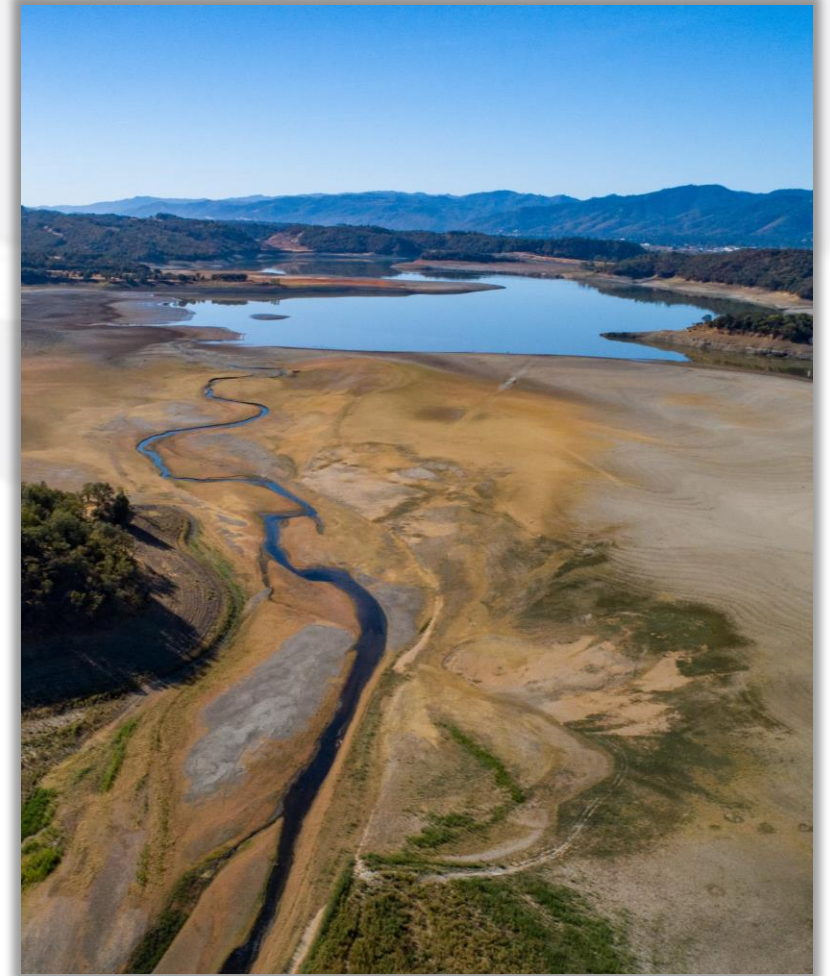
- Permits diversions and storage of water from streams and rivers
- Responsible for overseeing water use reporting
- May set instream flows
- Helps manage water during times of shortage



Lake Oroville, April 2024. CA DWR.

Supply & Demand Assessment Program

- Authorized in 2022, includes 9 positions building on Russian River drought response
- \$15M modeling contract with Paradigm Environmental, Inc.
- **Goal:** Provide data and tools to inform better planning and decision-making during times of water shortage



Lake Mendocino, October 2021. CA DWR

Supply & Demand Assessment Program

- Objective: Develop hydrologic models and tools to assess supply and demand in select watersheds throughout California to support local and Board efforts
- All tools (supply models, demand datasets, and water allocation tools) will be open source and accessible to public



Power BI Data Visualization Tool for the Russian River Watershed
Available on the SDA Webpage: www.waterboards.ca.gov/sda

What are Water Rights?

Water Rights

- Legal permission to use a reasonable amount of water for a beneficial purpose such as domestic use, irrigation, recreation, fish and wildlife protection, etc.

Most Common Types of Water Rights

- Riparian
 - Only applies to natural flow, water must be used on the riparian land, no seasonal storage
 - Priority System: “Correlative Sharing”
- Appropriative (pre-1914 or post-1914)
 - Applies to natural & foreign flow, water can be exported, allows for seasonal storage
 - Priority System: “First in Time, First in Right”

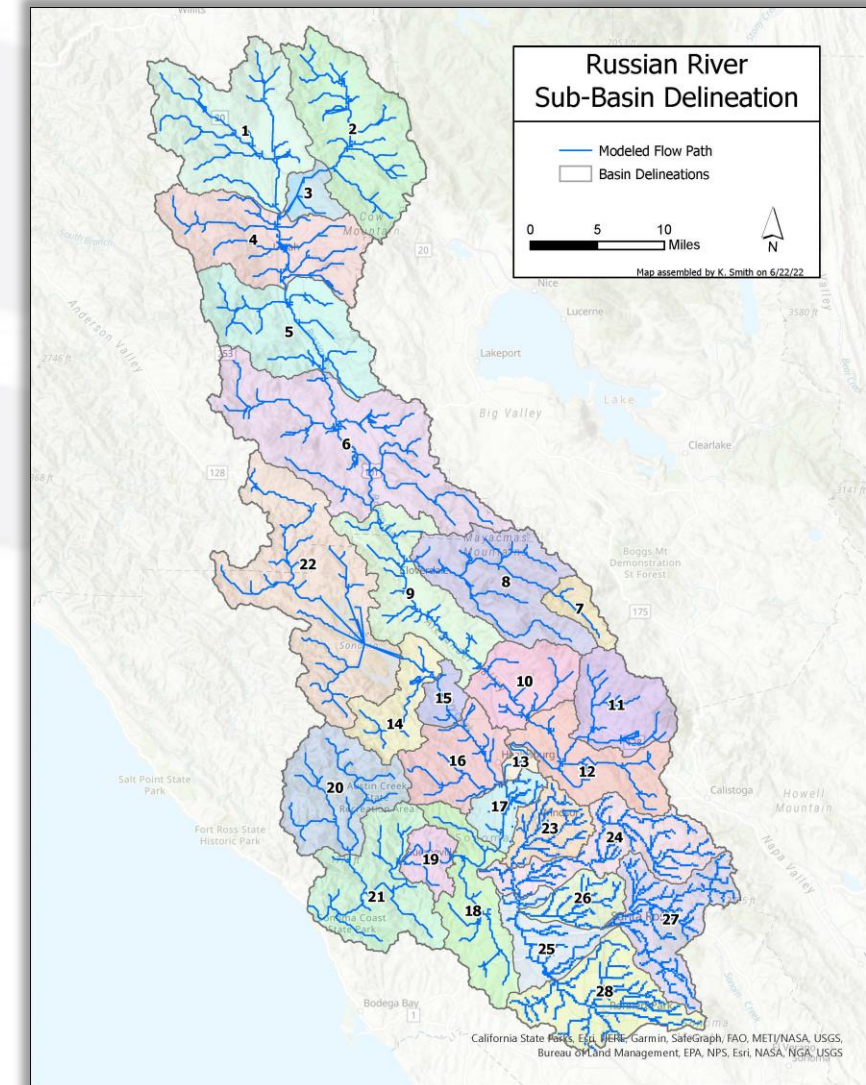
Background: Russian River Drought Response

- Emergency Regulations (2021-2022)
 - Board adopted emergency regulations to prevent the unreasonable use of water and to require curtailments to protect senior water rights
 - Set specific exceptions to curtailment (Human Health & Safety Needs, Non-Consumptive Uses, etc.)
 - Established a methodology for determining water availability for diverters in the Russian River watershed, at their priority of right
- Curtailment
 - Month-by-month curtailment based on forecast models and water right priority
 - Voluntary Water Sharing Program was developed with local interested parties as an alternative to curtailment

Russian River Drought Response

Water management using water allocation tool

- Observed and forecasted climate data are used to run hydrologic models that represent the “water supply” in watershed
- Division staff clean and process the diversion data (from annual water use reports) to develop a dataset that represents “water demand”
- Tool allocates available supply to water right holders based on the water right priority date, demand, and forecasted flow data on a monthly basis



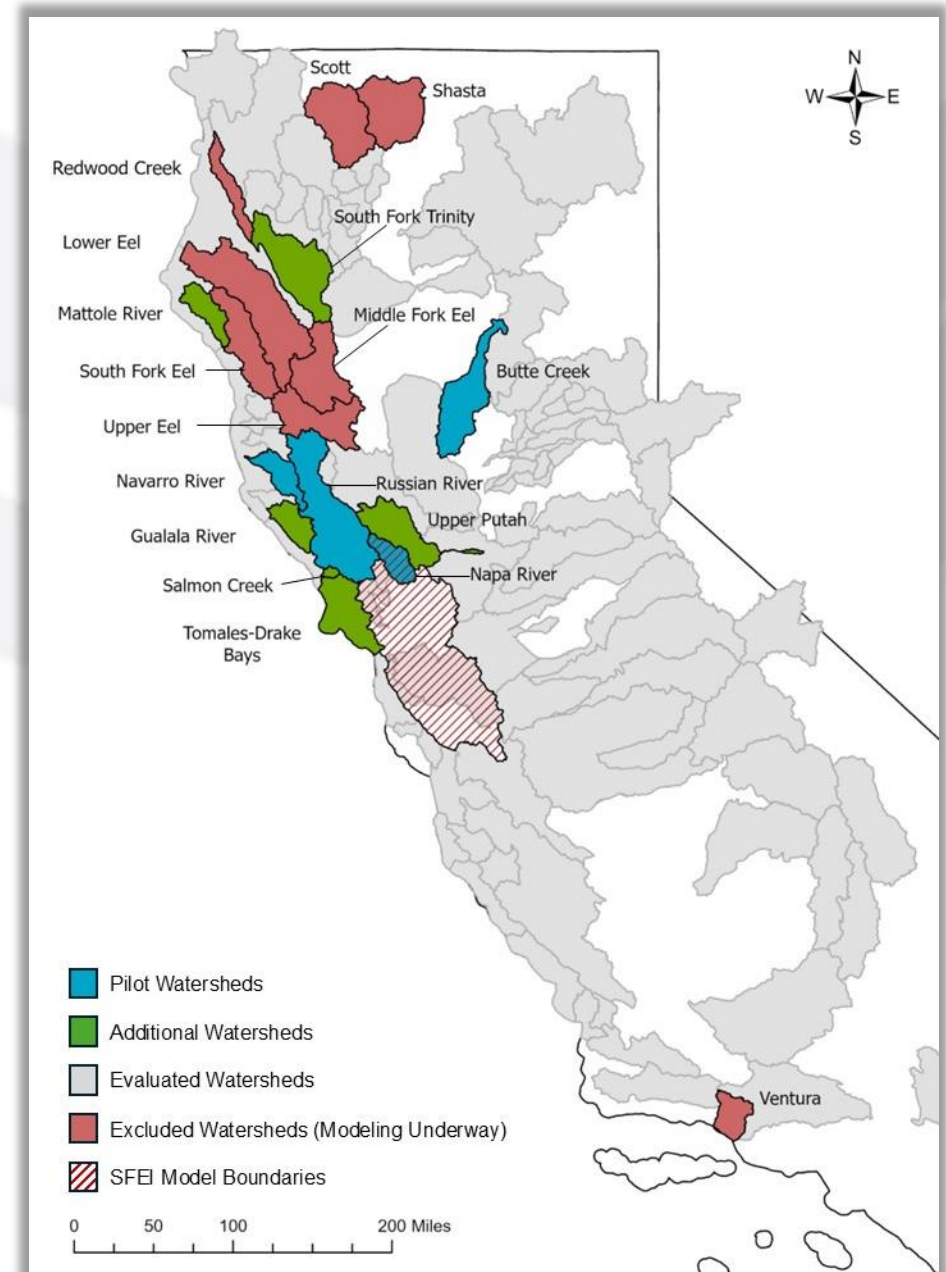
Selected Watersheds

- Pilot Watersheds

- Butte Creek
- Napa River
- Navarro River

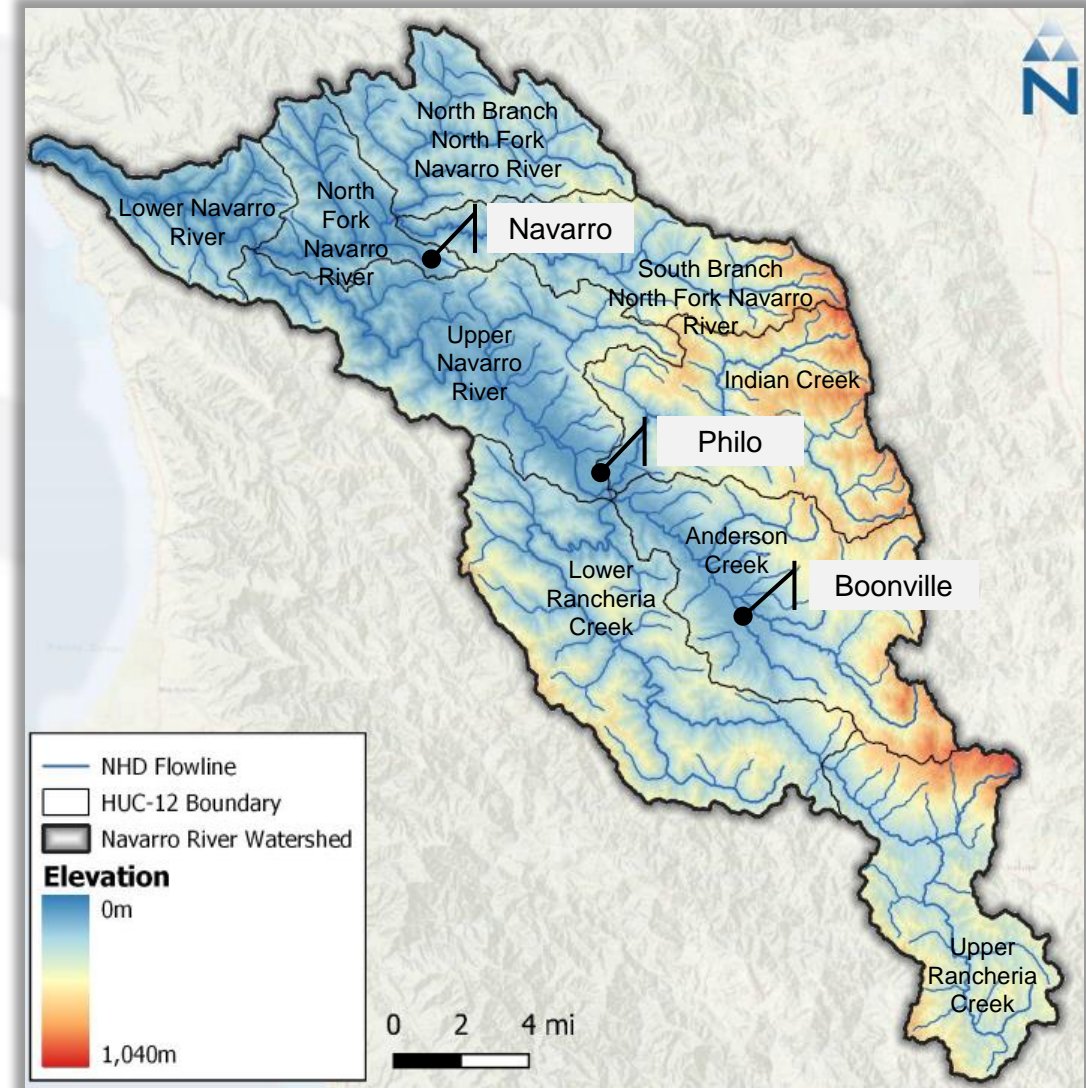
- Additional Watersheds

- Gualala River
- Mattole River
- Salmon Creek
- South Fork Trinity
- Tomales-Drake Bays
- Putah Creek



Navarro River Watershed

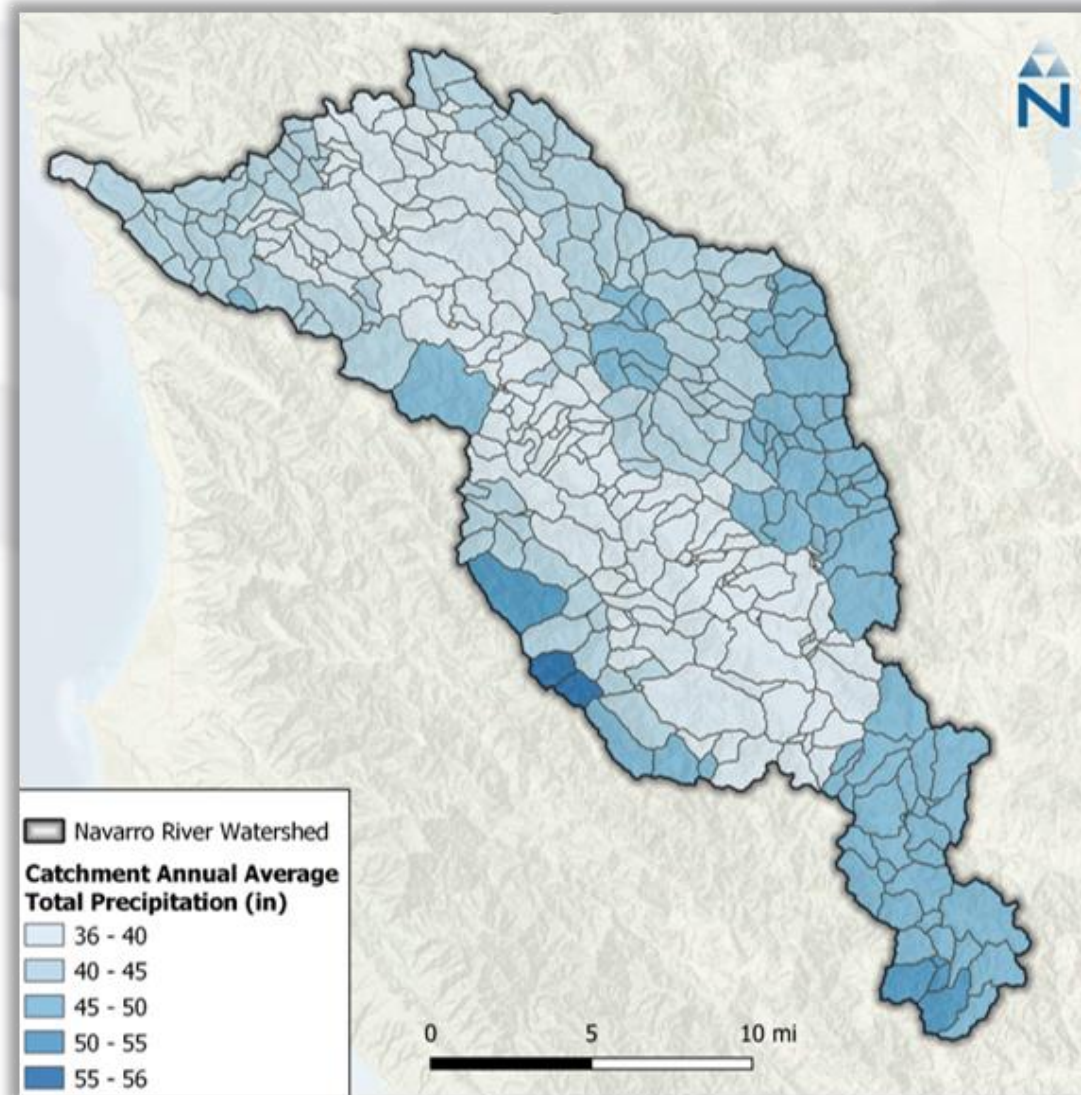
- Coastal watershed with drainage area of 315 square miles
- Elevation ranges from less than 300 feet to over 3,000 feet
- Originates at confluence of Rancheria and Anderson Creeks just south of Philo and outflows to Pacific Ocean



Navarro River Watershed. Map created by Paradigm.

Navarro River Watershed

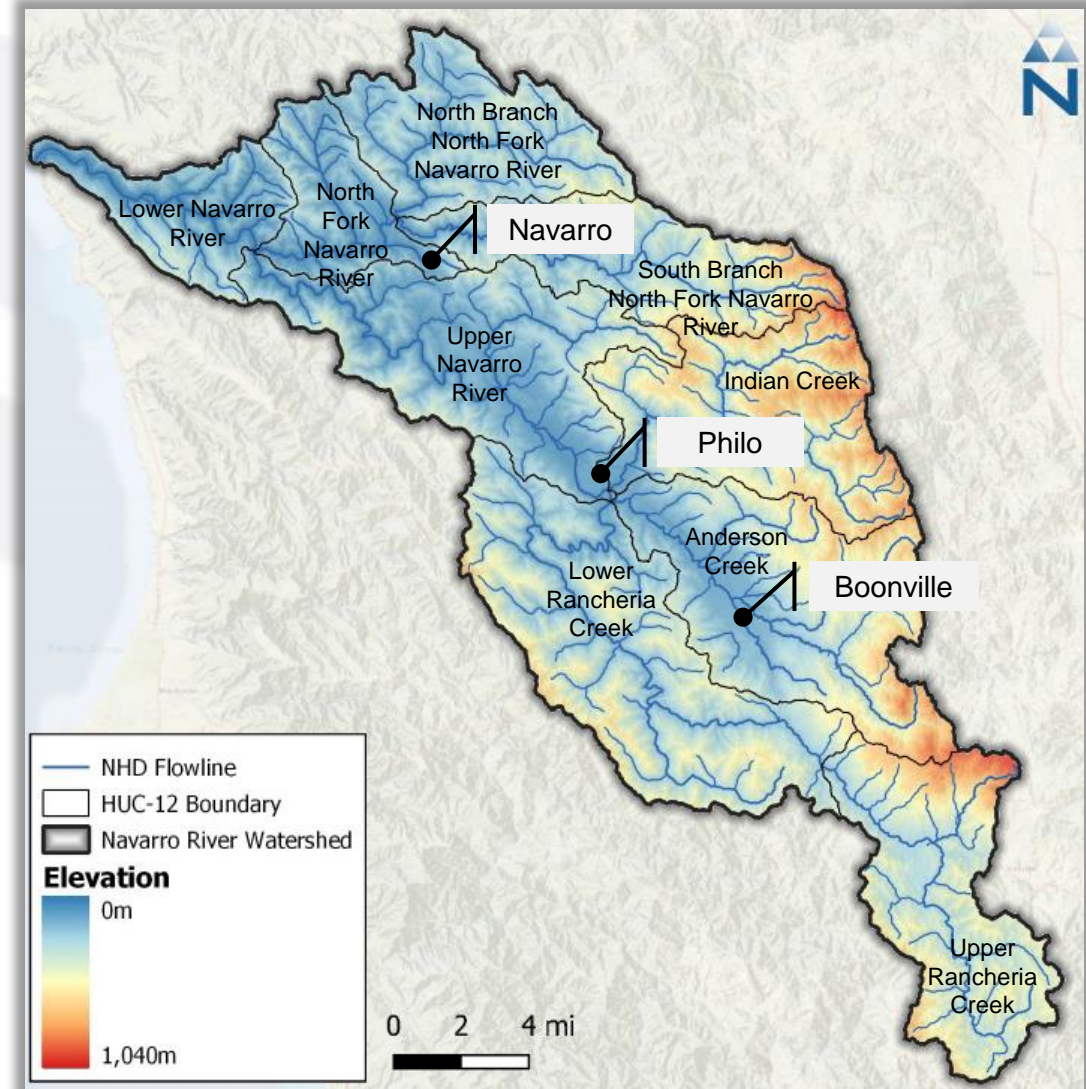
- Mediterranean climate with mean annual precipitation of 47 inches
- Water use is characterized by many small diversions for agricultural, commercial, and residential uses
- 97% of watershed still has native vegetation



Navarro River Watershed Precipitation. Map created by Paradigm

Navarro River Watershed

- Critical habitat for coho salmon and steelhead trout
- Increases in sedimentation and water temperatures resulted in salmonid population reduction
- Total Maximum Daily Load (TMDL) for temperature and sediment



Navarro River Watershed. Map created by Paradigm.

Existing Efforts

- Ongoing efforts by local agencies and organizations to monitor flow, temperature, and sediment in Navarro River
 - **Navarro Watershed Restoration Plan** (*Mendocino County Water Agency, Coastal Conservancy, Anderson Valley Land Trust*)
 - **Navarro Flow Enhancement Program** (*Mendocino County Resource Conservation District - MCRCD, The Nature Conservancy, Trout Unlimited*)
 - **Navarro Headwaters TMDL Implementation Project** (*MCRCD, Sonoma State*)
 - **Mendocino Coast TMDL Implementation Program** (*MCRCD*)
 - **Navarro River Basin Instream Flow Needs Study Plan** (*North Coast Regional Water Board*)
- Impact of groundwater pumping has been evaluated by previous models

Model for Navarro River Watershed

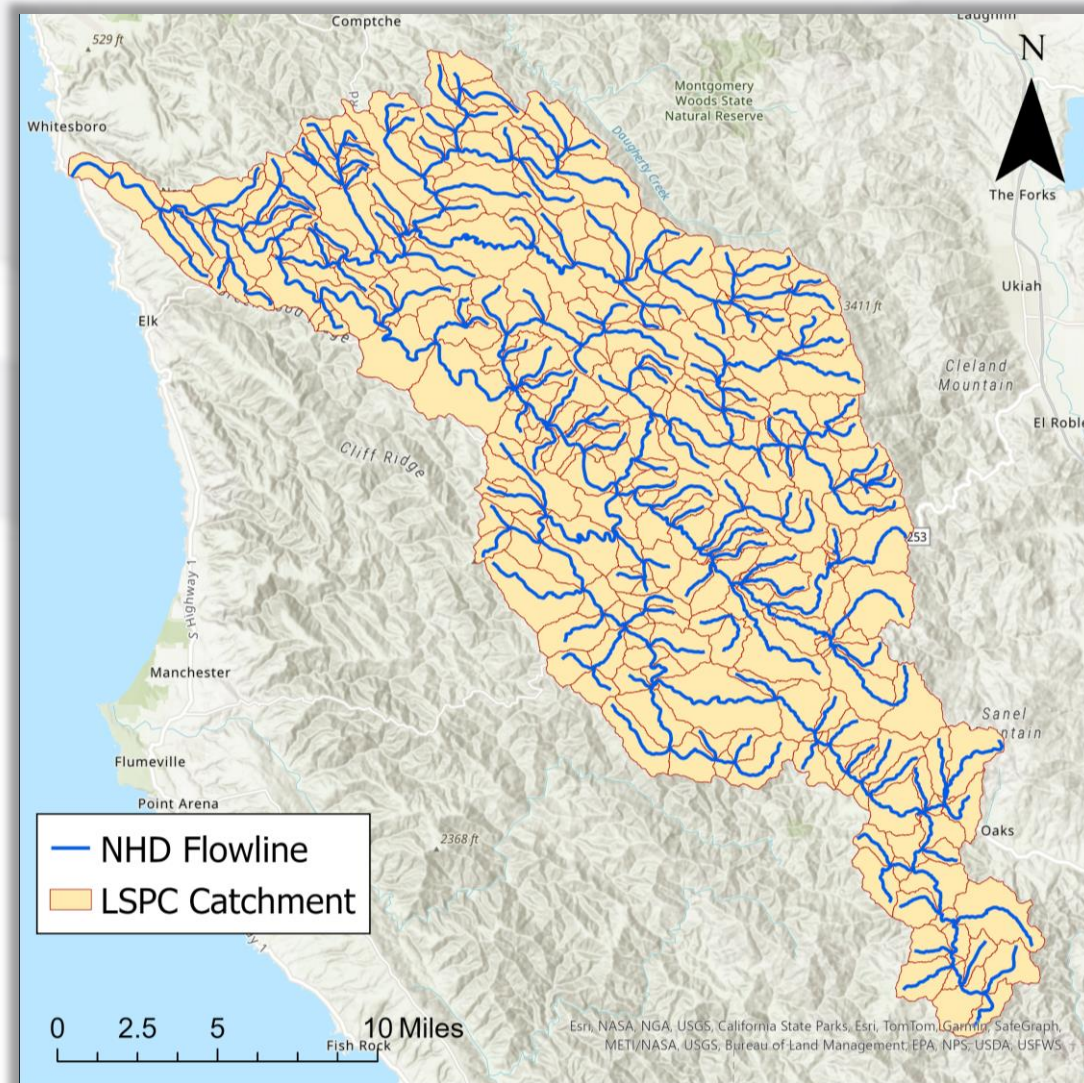
- Loading Simulation Program in C++ (LSPC) model is used to simulate available surface water
- Data used in modeling framework includes:
 - Meteorological – historical weather data (precipitation, evapotranspiration, air temperature, vapor pressure, wind speed)
 - Hydrological – current and historical streamflow data
 - Water Use and Diversion – diversion amounts serve as proxy for demand
 - Geospatial – watershed boundaries and channels, and physical properties (soil type, land cover type, and topography)

Model Data Sources

- Watershed subbasins and connectivity
 - USGS National Hydrology Dataset (catchments and primary flowlines)
- Precipitation
 - Observed gage data from USGS
 - Gridded data from Parameter-elevation Regressions on Independent Slopes Model (PRISM) and North American Land Data Assimilation System-2 (NLDAS)
- Evapotranspiration
 - California Irrigation Management Information System (CIMIS) and NLDAS
- Surface water withdrawals and irrigation demand
 - Electronic Water Rights Information Management System (eWRIMS)
- Digital Elevation Model (DEM)
 - USGS 3D Elevation Program (3DEP)
- Land Cover and Imperviousness
 - Multi-Resolution Land Characteristics (MRLC) Consortium's National Land Cover Database (NLCD)
- Soil Characteristics
 - USDA Soil Survey Geographic Database (SSURGO)

Model Specifics

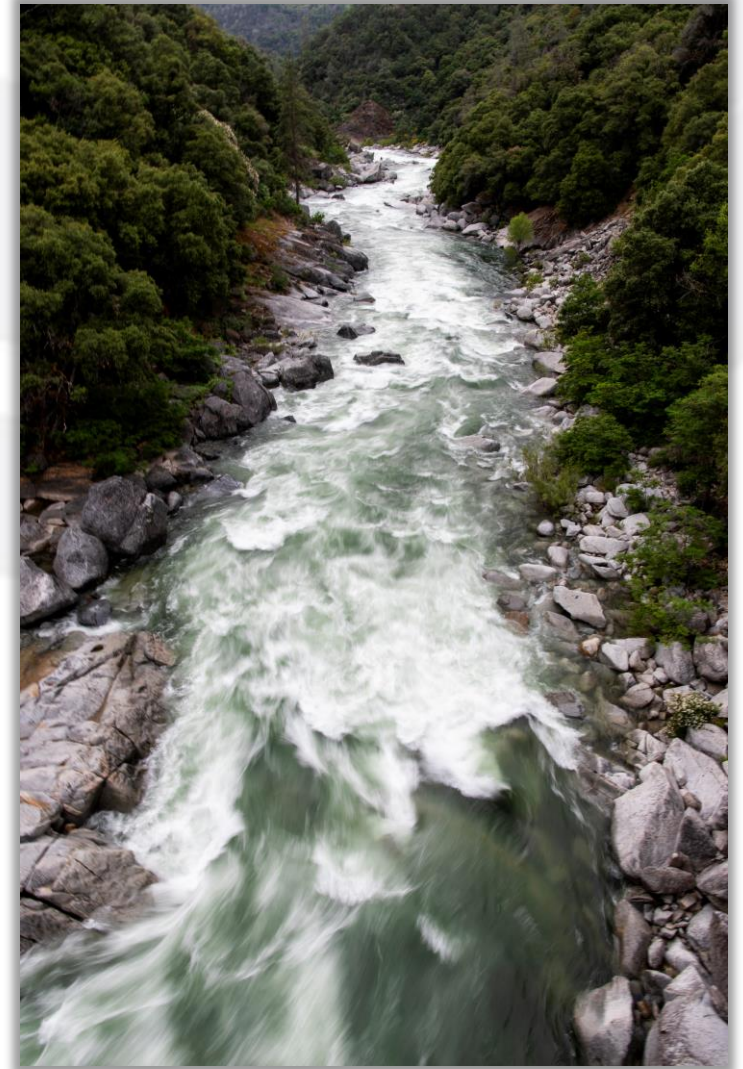
- Watershed subdivided into 364 catchments
- Simulates hydrological processes at scale of these catchments
- Using small catchments allows water allocation analyses to be done at the scale of small tributaries



Navarro River Sub-Watershed Catchments. Map created by SWRCB.

Assessing Water Demand: Water Right Reporting

- Annually, water rights holders (or agents) required to report amount of water diverted, stored, and used during each month
- Self-reported data often contains errors related to missing or duplicate reporting, unit conversions, or multiple owners
- Cleaned up data can be used to represent water demand for a watershed



South Yuba River, June 2023. CA DWR.

Assessing Water Demand: The QA/QC Process

- Self-reported water use data underwent Quality Assurance and Quality Control (QA/QC) before application in model
- QA/QC process included:
 - Assessing geolocational accuracy: ensuring points of diversion were plotted correctly and flowed into the watershed instead of neighboring watersheds
 - Correcting units (e.g., reporting in gallons instead of acre-feet)
 - Detecting duplicate reporting (e.g., when multiple water rights exist at a single point of diversion, it can lead to double or triple counting diversion amounts)

Assessing Water Demand

- Modeling framework incorporates QA/QC'd water diversion data provided by diverters via annual water use reports
- 254 water rights in Navarro River watershed
- Water use (demand) data applied in:
 - Water supply model:
 - To consider impact of diversions on streamflow
 - To better estimate evapotranspiration
 - Water allocation tool:
 - As a proxy for demand data to account for water demand of each catchment

Next Steps

- Model has shown good performance during both wet and dry years
- Model will be validated with data not already included in the calibration process
- Staff intend to use the final model to evaluate scenarios involving:
 - Current hydrologic conditions
 - Water allocations
 - Changes in demand
 - Impact of extreme events such as drought on water allocation
- Collaboration with local agencies and organizations

Pilot Telemetry Project 2025-2028 in Russian River Watershed

Water Board research project to test automated measurement and reporting. Keep monitoring equipment & help simplify future reporting.

**Looking for volunteers in the Russian River
to participate in this Pilot Project**

Read about the Project: <https://cawaterdata.org/projects/telemetered-data-project/>

Contact Water Board Staff by Email: Laurel.Dodgen@waterboards.ca.gov

Subscribe/Contact the Water Data Consortium: <https://cawaterdata.org/contact-us/>

For further information and to subscribe to
Supply and Demand Assessment Email List visit:

www.waterboards.ca.gov/sda

Contact Water Board Project Staff by Email:

DWR-SDA@waterboards.ca.gov

Navarro River Watershed Webpage: bit.ly/sda-navarro

Fact Sheet: bit.ly/navarro-fs

Model Work Plan: bit.ly/navarro-wp