# Water Supply and Demand Assessment Program

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## 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"

## Supply & Demand Assessment Program

❑ Authorized in 2022, includes 9 positions building upon the Division's 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
❑ Objective: Develop hydrologic models and tools to assess supply and demand in select watersheds throughout California
❑ Intend to develop accessible, open-source tools (including supply models, demand datasets, and water allocation tools) for additional watersheds to support local and Board efforts
❑ Continued work on the models and tools developed to monitor conditions in the Russian River watershed

## Russian River Drought Response

- ❑ 2021 & 2022 Emergency Regulations
  - ▪ Board adopted emergency regulations to prevent the unreasonable use of water and to require curtailments to protect senior water rights
  - ▪ Regulations set specific exceptions to curtailment (Human Health & Safety Needs, Non-Consumptive Uses, etc.)
  - ▪ Established a water availability methodology for the Russian River watershed
- ❑ Curtailment using a Russian River specific water allocation tool
  - ▪ Observed and forecasted climate data were used to run hydrologic models that represent the "water supply"
  - ▪ Division staff cleaned and processed the diversion data to develop a dataset that represent the "water demand"
  - ▪ Water was allocated on a month-by-month basis, based on the forecasted monthly water supply, water demand, and individual water right priority date
  - ▪ Voluntary Water Sharing Program was also developed with local stakeholders as an alternative to curtailment


Figure 1. Staff developed a PowerBI Data Visualization Tool to continue monitoring flows in the Russian River watershed.

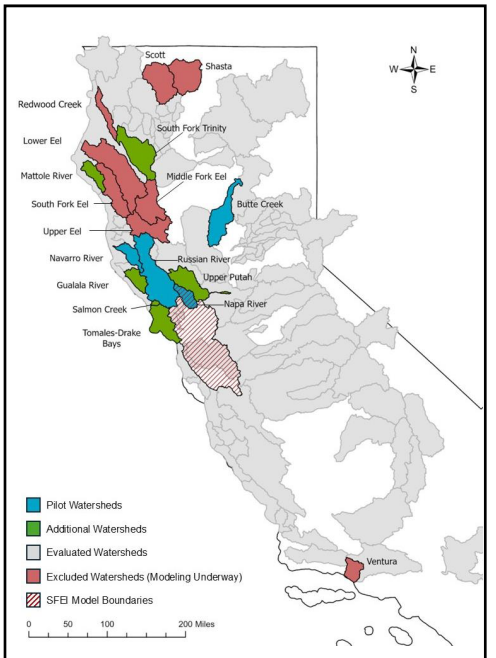


Figure 2. The light grey areas show the evaluated watersheds. The blue areas indicate the three pilot and Russian River watersheds that serve as a precursor to this effort. The green areas show the additional watershed selections that were selected with consideration of public input. The red areas show watersheds with existing modeling efforts either by other Board programs (solid red) or external organizations (hashed red).

## Watershed Selection

Staff considered the following factors when selecting potential additional watersheds for this program:

❑ Surface water demand: Emphasized watersheds driven by surface water demand where a water rights analysis would likely be successful. The amount of surface water diverted from a waterbody highly influences the streamflow in the system. Developing tools similar to those used in the Russian River watershed (water supply modeling and demand analyses) will help inform management of limited water supplies and/or protection of species and habitats.

❑ Ecological significance: Watersheds that contained areas of salmonid habitat or other important fisheries, especially areas where water quantity concerns impact those fisheries.

❑ Location: The North Coast, San Francisco Bay and Central Coast are geographic regions of specific interest due to lack of previous investments and engagement and the presence of critical salmonid habitat and refugia. Watersheds were not required to be located in these regions and staff considered other geographic locations on a case-by-case basis.

❑ Existing efforts: Prioritized regions where staff were not already engaged in other drought or flow assessment work with modeling efforts underway, unless modeling work at a sub-watershed level would accelerate or compliment efforts in the watershed of interest.

## Pilot Watersheds

### Navarro River Watershed

❑ A coastal watershed in southern Mendocino County
❑ Drainage area of approximately 315 square miles
❑ Mediterranean climate with distinct wet and dry seasons with a mean annual precipitation total of 46.7 in.
❑ Total of 237 points of diversion (PODs) were identified
❑ Loading Simulation Program in C++ (LSPC) is used to simulate watershed hydrology and water budget

### Napa River Watershed

❑ One of the major tributaries to the San Pablo and San Francisco Bays
❑ Drainage area of approximately 283 square miles
❑ Mediterranean climate with distinct wet and dry seasons with a mean annual precipitation total of 36.4 in.
❑ Total of 559 points of diversion (PODs) were identified
❑ A subset of the San Francisco Estuary Institute (SFEI) model is used with modifications to improve the hydrology simulation

### Butte Creek Watershed

❑ One of the major tributaries of the Sacramento River
❑ Drainage area of approximately 820 square miles
❑ Distinct wet and dry season with a mean annual precipitation ranging between 20 in (valley) and 50 in (higher elevation headwaters)
❑ Total of 242 points of diversion (PODs) were identified
❑ Combination of grid cells (simulate snow process), and NHDPlus catchments (simulate hydrology) are used for LSPC model development

## Future Work

❑ Developing hydrologic water supply and demand models for an additional six watersheds, including Gualala River, Mattole River, Putah Creek, Salmon Creek, South Fork Trinity River, and Tomales-Drake Bays
❑ Publishing a Quality Assurance and Quality Control (QAQC) report to assess water demand data at the watershed scale
❑ Continuing work on the models and tools developed to monitor conditions in the Russian River watershed
❑ Planning local and tribal engagement opportunities in the selected watersheds