

WILDLIFE CONSERVATION BOARD

STREAM FLOW ENHANCEMENT PROGRAM

5-YEAR REPORT



Credit: The Wildlands Conservancy (top left), CalTrout (top right), Gold Ridge RCD (bottom left), California Sea Grant (bottom right)



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STREAM FLOW ENHANCEMENT PROGRAM 5-YEAR REPORT

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Appendices

- Appendix A. Maps of Projects Awarded Funds Through the SFEP (2016 – 2021) for Each CDFW Region
- Appendix B. Projects Awarded Funds Through the SFEP (2016 – 2021)

Executive Summary

Over the past six years, the Stream Flow Enhancement Program funded by Proposition 1 has funded 128 grants for projects that will enhance the quality or quantity of stream flows throughout California. Projects have included acquisitions of land and water rights; planning and implementation of projects focused on water conservation (use efficiency, storage, and instream dedication) and habitat restoration (mountain meadow and floodplain hydrology, geomorphology, and groundwater recharge; invasive species eradication; and improved forest health); and scientific studies in support of future projects. These projects are especially important for enhancing instream habitat and water availability for anadromous fish.

Projects funded through the Stream Flow Enhancement Program are multi-year projects and some are requiring additional time to fully implement due to the scale, scope, constraints imposed by wildfires, the COVID pandemic, and other factors. As such, 33 projects have been completed to date, and of those nine are implementation projects. Results are continuing to be reported as active projects wrap up, and ongoing monitoring will help to determine the actual increases to stream flow and other benefits from implementation projects. Some challenges faced by the program include a low number of water right acquisition projects, the length of time water rights transactions have taken, and limited information regarding existing hydrologic conditions in many of the State's streams. However, the program has funded many studies and planning projects that are filling these knowledge gaps and are expected to lead to important implementation projects over the next few years. Additionally, many projects are providing valuable local benefits as highlighted in this report.

Background

Proposition 1

The Water Quality, Supply, and Infrastructure Improvement Act of 2014 (Proposition 1) provides funding to implement the three objectives of the [California Water Action Plan](#) (CWAP): 1) more reliable water supplies, 2) the restoration of important species and habitat, and 3) a more resilient, sustainably managed water resources system (e.g., water supply, water quality, flood protection, environment) that can better withstand inevitable and unforeseen pressures in the coming decades.

Proposition 1 authorized the Legislature to appropriate \$200 million to the Wildlife Conservation Board (WCB) to fund projects that result in enhanced stream flow. WCB administers these funds through the Stream Flow Enhancement Program (SFEP), a statewide grant program with a competitive solicitation process.

Program Outreach

Prior to the release of each Proposal Solicitation Notice (PSN), SFEP staff have implemented several outreach activities, including:

- Debriefing applicants on the strengths and weaknesses of previously submitted applications and discussing opportunities to improve future submittals.
- Project consultations with potential applicants, which provided an opportunity to discuss project ideas, eligibility, approaches for developing competitive proposals, questions pertaining to the PSN and applications, and other topics.

- Making presentations and distributing program fliers at relevant conferences, workshops, and other venues.
- Advertising release of each PSN through WCB’s ListServ, WCB’s home page, and the SFEP webpage, as well as other venues, including the Salmonid Restoration Federation’s electronic Newsletter, Maven’s Notebook, and announcements to the Sierra Meadow Partnership and California Environmental Water Network.

In addition, State Water Quality Control Board (Water Board) staff were available to consult with potential applicants regarding water rights related questions.

Summary of Awards to Date

From 2016 to 2021, the SFEP has granted approximately \$134 million in funding to 128 projects. This funding has supported projects designed to lead to or result in enhanced stream flow and contribute to achieving the objectives and actions outlined in the California Water Action Plan.

SFEP accepts proposals in four broad categories: Acquisition, Implementation, Planning and Scientific Study.

- *Planning grants* provide funding for necessary activities that will lead to a specific future on-the-ground implementation project(s) that is likely to qualify for future implementation funding.
- *Scientific Study grants* fund studies to assess the effectiveness of previously implemented stream flow enhancement projects or inform design and implementation of future stream flow enhancement projects.
- *Implementation grants* fund construction of restoration and enhancement projects and new or enhanced facilities that will provide a direct and measurable enhancement to stream flow.
- *Acquisition grants* fund purchases of land, water rights, or interests in land or water that lead to a direct and measurable stream flow enhancement.

Within these categories, there are many eligible activity types that can result in stream flow enhancement. Some common examples are water conservation, instream dedications, acquisitions, and habitat restoration. These are described in more detail in the following section.

A summary of the grants by project category is given in Table 1 below, and by fiscal year in Figure 1 below. The geographic distribution of previously awarded projects is depicted in Figure 2; regional maps are included in Appendix A. A complete list of projects funded through the first six years of the SFEP is provided in Appendix B.

Table 1. Summary of Awards by Project Category, 2016 to 2021

Project Category	Number Awarded*	Funding Awarded
Acquisition	8	\$18,280,250
Implementation	50	\$82,447,952
Planning	50	\$23,748,409
Scientific Study	20	\$9,538,909

*This table is limited to projects that ultimately resulted in a grant. Projects which were awarded funding but subsequently withdrawn or cancelled are not shown. Some projects have both an acquisition and implementation component, and so have been included in both totals.

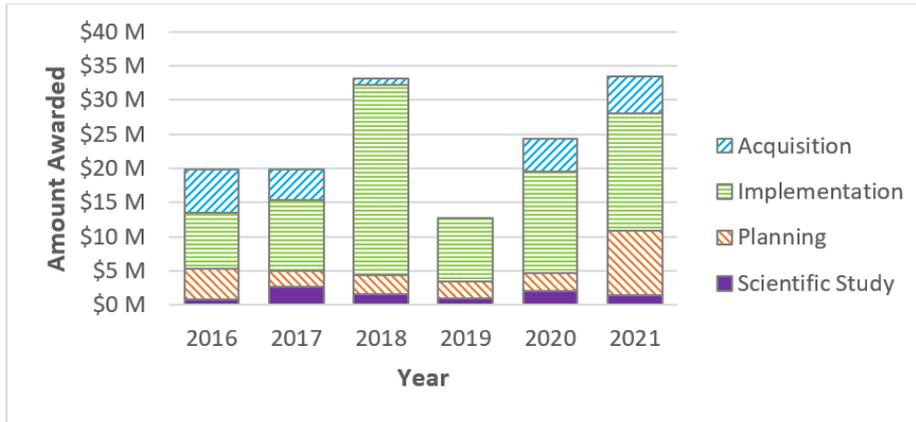


Figure 1. Total Funds Awarded by Fiscal Year and Project Category

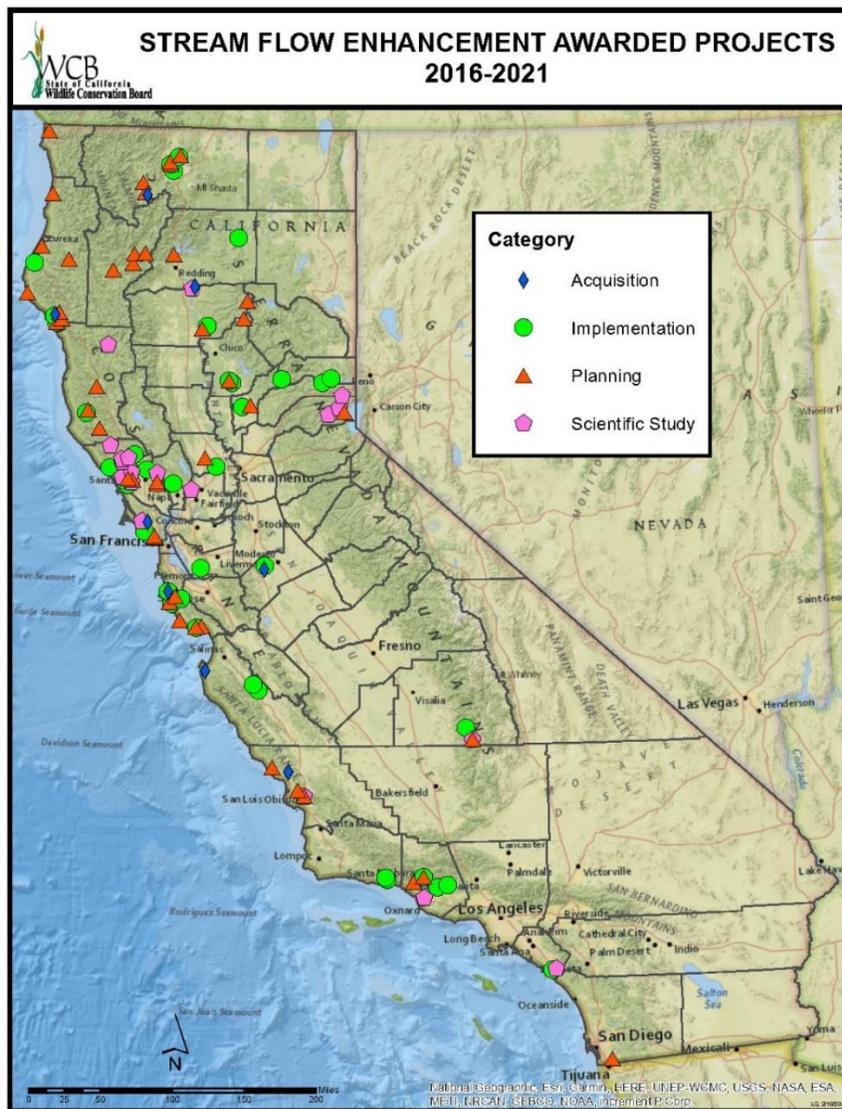


Figure 2. Distribution of Projects Awarded Funds through the Stream Flow Enhancement Program (2016–2021)

Results and Projections

Estimation of Benefits

This section discusses SFEP-funded projects and their estimated benefits to stream flow and habitat. Projects are grouped into sections by general activity type, though they can fall into more than one category. The metrics presented below include both completed and ongoing projects. Therefore, the estimated total benefits are projections, and reflect those claimed in the project application. Only Implementation and Acquisition projects are included, as Planning and Scientific Study grants generally do not have direct measurable benefits but lay the groundwork for future benefits. For Acquisition and Implementation projects, it is estimated that a total 439 miles of stream will benefit from stream flow enhancements.

Acquisition and/or Instream Dedication

Acquisition and instream dedication projects focus on increasing the amount of water in a waterway via the purchase and/or modification of a water right for the benefit of fish, wildlife, riparian communities, and other ecological processes. The possible mechanisms for these acquisitions and dedications are generally:

- 1) California Water Code (CWC) section 1707 dedications through which a water right may be changed to designate instream use as the only purpose of use, thereby effectively requiring that the water be left in stream. Alternatively, instream uses can simply be added to the list of allowable uses under the water right (aka 'permissive change') allowing the water right holder to leave some or all the water instream and specify the timeframe and duration of the instream dedication;
- 2) water transfers that allow a water rights holder to retain a water right in the long term but to lease the water right, or a portion thereof, for a specified amount of time (20 years, for example) to allow for a different entity to use the water in a different location, and for a different purpose than specified under the original water right;
- 3) forbearance agreements, which are contractual arrangements through which a water rights holder agrees to not divert some or all of their water right, for a specific period of time (20 years, for example), to allow water to be left instream; and
- 4) conservation easements that require some or all of the water to be left instream in perpetuity.

It is important to note that forbearance agreements and conservation easements do not protect instream flows from diversion by other water right holders and do not protect appropriative water rights from forfeiture. In most cases, they must be coupled with a CWC section 1707 instream dedication to account for this.

Table 2 provides a general summary of how these mechanisms are being implemented with support from SFEP funding and shows the range of estimated stream flow benefit for these projects. These additional flows are crucial to the recovery and sometimes survival of native anadromous fishes and help to improve ecosystem resiliency to climate change which has become even more important in recent years of drought.

Table 2. Acquisition and/or Instream Dedication Projects

Project Name	Current Status	Activity	Flow Enhancement Estimate ¹
Dos Rios Section 1707 Project	In Progress	1707 Instream Dedication	0.1 to 8.4 cfs, varies by month
Rancho Cañada Carmel River Flow Enhancement	In Progress	Land (fee title - completed) and Water Right Acquisition, 1707 Instream Dedication	282.63 AFY
USFS Hot Springs-Montecito Creek Section 1707 Project	In Progress	1707 Instream Dedication and Forbearance Agreement	51.2 AFY
San Geronimo Conservation Easement and Flow Enhancement	In Progress	Land Acquisition (conservation easement), 1707 Instream Dedication	20 AFY
San Joaquin River - Grayson Property Acquisition Project	Completed	Land Acquisition (fee title)	940 AFY
Salmonid Habitat Acquisition on East Fork Scott River	In Progress	Land (fee title) and Water Right Acquisition, 1707 Instream Dedication	3 to 10.88 cfs
Santa Rita Ranch Flow Enhancement, Acquisition	In Progress	Land (fee title) and Water Right Acquisition, 1707 Instream Dedication and Forbearance Agreement	234 AFY
Battle Creek, Tompkins Water Right Acquisition	In Progress	Water Right Acquisition, 1707 Instream Dedication	12 cfs / 707 AFY
San Gregorio Creek, Marchi and Son Farm Forbearance Agreement	In Progress	1707 Instream Dedication and Forbearance Agreement, Irrigation Efficiency	83 AFY

Water Conservation and Storage

Water conservation and storage projects encompass a variety of actions that provide more efficient use of water diverted, reduce the amount diverted, or change the timing or location of diversion, resulting in enhanced stream flow. These actions are coupled with long-term (≥ 20 years) protections for the conserved water, for example instream dedications and/or forbearance agreements, to ensure the stream flow benefits are durable. These outcomes are achieved through a diverse array of activities including rainwater catchment, off-channel storage, irrigation ditch lining or piping, stockwater systems, changes in timing or rate of diversion, and changes in point of diversion. In regions where rural landowners often rely on diversion of surface water through riparian claims, storage and forbearance projects are becoming an increasingly popular tool to address the dry conditions in summer and fall which put salmon and steelhead at risk. Construction of storage (along with any necessary water rights changes to allow for water storage) allows water users to divert in the winter, when stream flow is plentiful, and use only their stored water during the dry season, when surface flow can become dangerously low and is critically needed by fish. Table 3 shows a variety of ways these activities can be combined in order to achieve stream flow benefits, as well as the storage capacity and/or estimated stream flow benefits for completed and ongoing projects. These benefits in amount and timing are critical for the local fish populations and health of these stream ecosystems, where even a small amount of increased streamflow can make a difference.

¹ cfs is cubic feet per second; AFY is acre-feet per year.

Table 3. Water Conservation and Storage Projects

Project Name	Current Status	Activities	Storage Capacity	Flow Enhancement (estimated) ^{2,3}
Porter Creek Streamflow Enhancement	Completed	Flow Augmentation		390 gpm
Little Butano Creek Flow Enhancement, Butano State Park	In Progress	Storage and Forbearance, 1707 Instream Dedication	100,000 gallons	0.04 cfs
Navarro River Watershed Streamflow Enhancement	In Progress	Collaborative Water Management, Storage and Forbearance, Coordinated Diversion Timing		3 cfs
Peters Creek Flow Enhancement	In Progress	Storage and Forbearance, 1707 Instream Dedication	630,000 gallons	0.028 cfs
Pine Gulch Water Rights and Instream Flow Enhancement	Completed	Storage and Forbearance, 1707 Instream Dedication	62.2 AF	61.5 AFY
San Gregorio Creek Enhancement at Blue House Farm	In Progress	Storage and Forbearance, 1707 Instream Dedication	30 AF	0.13 - 0.29 cfs
San Gregorio Creek Stream Flow Enhancement, Klingman-Moty Farm	In Progress	Storage and Forbearance, 1707 Instream Dedication	25 AF	0.4 - 0.55 cfs
Mark West Creek Flow Enhancement	In Progress	Rainwater Catchment, Storage and Forbearance	100,000 gallons	0.4 cfs
Mill Creek Water Storage for Flow Enhancement	In Progress	Rainwater Catchment, Storage and Forbearance	300,000 gallons	0.2 cfs
Green Valley Creek Rural Water Conservation	Completed	Rainwater Catchment and Forbearance	255,000 gallons	Forbear pumping 255,000 gallons
Green Valley Creek Rural Water Conservation, Phase II	In Progress	Rainwater Catchment and Forbearance	220,000 gallons	0.2 cfs
Salmon Creek School Water Conservation	In Progress	Rainwater Catchment and Forbearance, Irrigation Efficiency	517,000 gallons	0.05 cfs
San Ysidro Flow Enhancement and Water Conservation	In Progress	Rainwater Catchment, Forbearance 1707 Instream Dedication	150,000 gallons	Forbear pumping 150,000 gallons
The Thacher School Instream Flow Resiliency and Dormitory Conservation	In Progress	Rainwater Catchment, Forbearance, 1707 Instream Dedication	920,000 gallons	0.004 cfs
Sonoma County Coastal Rainwater Catchment and Forbearance	Completed	Rainwater Catchment and Forbearance	240,000 gallons	Forbear pumping 240,000 gallons
Rancheria Creek Stream Flow Enhancement and Restoration	In Progress	Flow Augmentation, Floodplain/Riparian Restoration, Stormwater Detention, Arundo Removal		180 AFY
Alliance Redwoods Water Conservation	In Progress	Irrigation Efficiency, Changing Point of Diversion		2.5 million gallons per year
Deer Creek Irrigation District Diversion Automation	In Progress	Irrigation Efficiency		3 cfs
Hart Ranch Instream Flow Enhancement	In Progress	Irrigation Efficiency, Stockwater System, Fish Passage Improvements, Riparian Plantings, 1707 Instream Dedication		Permissive - 19.533 cfs Permanent - 1.5 cfs
Parks Creek Flow Enhancement and Fish Passage	In Progress	Irrigation Efficiency, Changed Point of Diversion, Stockwater System, Fish Barrier Removal, 1707 Instream Dedication		2.98 cfs

²Flow enhancement estimates are those that were included in project grant applications.

³gpm is gallons per minute; cfs is cubic feet per second; AF is acre-feet; AFY is acre-feet per year.

Spotlight On...Parks Creek Flow Enhancement and Fish Passage Project

In 2020, WCB awarded a grant to California Trout for a large-scale multi-benefit restoration project at the Cardoza Ranch in Siskiyou County. The project changed the point of diversion in order to remove a 25-acre impoundment on Parks Creek. A pump and fish screen were installed at the new point of diversion on the Shasta River, downstream from the confluence with Parks Creek. The site of the impoundment, which had been a barrier to fish passage and led to warmer water temperatures downstream, was replaced with a restored channel and culvert (Figure 3). Parks Creek below Kettle Springs was identified as a priority reach for summer rearing of juvenile salmonids due to the cold-water contributions from multiple spring complexes. Additionally, lower Parks Creek was identified as a critical migration corridor for adult salmon migrating to upstream spawning grounds. Relocating the point of diversion and removing the impoundment resulted in a minimum stream flow enhancement of 2.98 cfs, as well as enhanced water quality and cooler temperatures downstream for at least 2.8 miles - the distance between the old and new points of diversion. This enhanced flow greatly benefits coho and Chinook salmon and steelhead trout, and provides access to approximately 14 miles of upstream habitat that was previously blocked. The project also includes on-farm efficiency upgrades to lower the average amount of water that will need to be diverted for irrigation each year.



Figure 3. The Parks Creek culvert before (left) and after (right) restoration work, viewed from downstream (credit: AquaTerra Consulting LLC)

A CWC section 1707 petition for instream dedication was filed to allow the landowner to deliver the consumed portion of the adjudicated right (2.98 cfs) to a downstream place of use, protecting the enhanced flow instream. Construction of the capital improvements was recently completed, and in early 2022 native riparian vegetation will be planted along the banks of the restored channel. Post-project monitoring will be ongoing to measure project effectiveness. Preliminary data is already showing that higher flows and cooler temperatures are being maintained through the late summer and fall (Figure 4). UC Davis will continue PIT tag monitoring for salmon and steelhead at the project site.

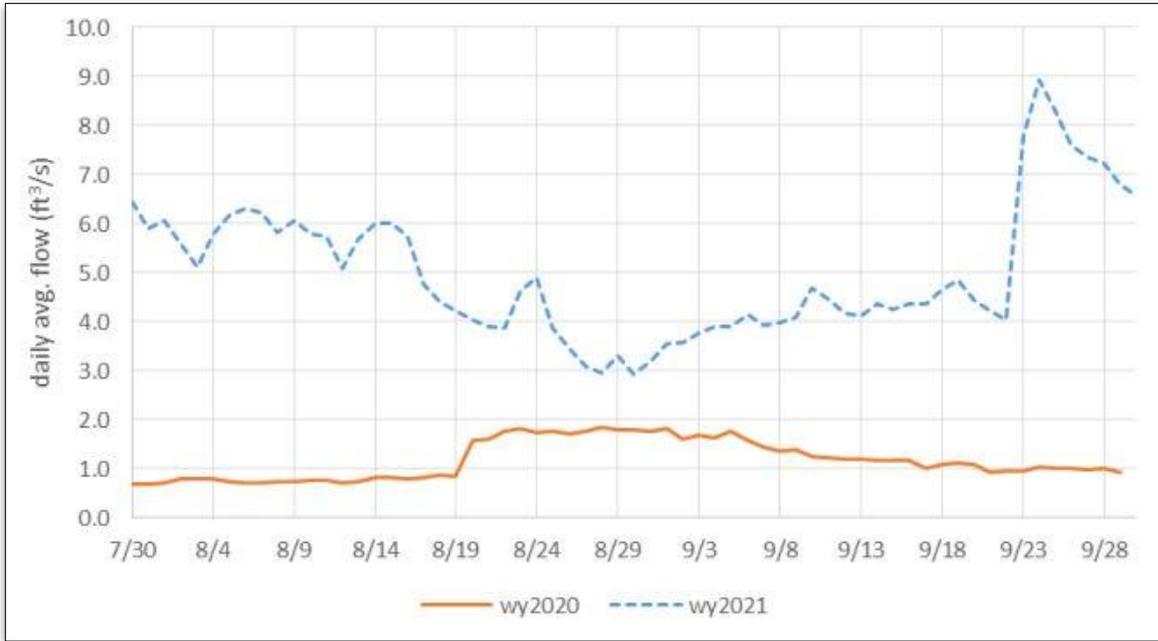


Figure 4. Stream Flow comparison before and after project construction (credit: AquaTerra Consulting LLC)

Habitat Restoration and Enhancement

Habitat restoration and enhancement projects supported by the SFEP include activities that increase the habitat quality of an area and have a particular benefit to stream flow. Such multi-benefit projects have included, but are not limited to, mountain meadow restoration, forest health restoration, invasive species eradication, and floodplain reconnection and restoration. These activities are explained in more detail in the sections below.

Mountain Meadow Restoration—Although meadows cover a relatively small fraction of the greater Sierra Nevada and Cascade ranges, the hydrological and ecological functions they provide are vital to maintaining watershed health. Meadows and the streams that flow through them provide important habitat for native aquatic and terrestrial species, including a number of special-status species, and are recognized as hotspots of biodiversity. Efforts to restore hydrological and ecological functions of meadows return numerous critical services, including increased groundwater storage, attenuation of peak flows, enhancement of summer base flows in streams flowing through the meadows, improved water quality, carbon sequestration, and improved habitat for native species. Recognizing their importance, the California Water Action Plan identified the restoration of 10,000 acres of mountain meadows as a targeted action. In addition to funding projects designed to restore mountain meadow ecosystems, the SFEP has also funded projects designed to improve our understanding of meadow restoration outcomes relative to stream flow and other important metrics. To date, four SFEP grant funded projects have restored, or are in the process of restoring, approximately 294 acres of mountain meadows.



Figure 5. Hat Creek Enhancement Project, wet meadow floodplain activated following project construction, April 2019 (credit: Fall River RCD)

Reconnecting Flood Flows with Restored Floodplains – Flood flows, and the floodplains they move across, provide vital habitat for a wide range of native species, allow for sediment redistribution and soil nutrient enrichment, and aid in water quality enhancement and groundwater recharge. With a focus on process-based restoration techniques, SFEP has funded eight implementation projects with the aim of restoring floodplains and reconnecting them with flood flows. These projects are projected to restore 577 acres of floodplain.

Eradication of Invasive Plant Species – *Arundo donax* (Arundo) is a bamboo-like perennial grass that grows up to 25 feet tall in riparian settings, often forming large, dense stands capable of producing a wide range of impacts to natural ecosystems, including high water use relative to native species, increased fire risk, increased sediment buildup, displacement of native riparian vegetation, and degraded habitat for native fish and wildlife species. Removing Arundo from riparian corridors brings multiple benefits to water quality and habitat availability. However, the effects of Arundo removal on stream flow are difficult to quantify, and to isolate from other factors affecting flow in a given watershed. Estimates of water savings from removal of Arundo are generally based on estimated evapotranspiration rates (“ET,” sum of evaporation and transpiration). However, ET estimates vary based on the method used as well as environmental factors like temporal variability, biomass, hydrology, and climatic conditions. A 2011 report by the California Invasive Plant Council (Cal IPC) estimated the average ET rate of Arundo is 24 acre-feet per acre per year (ac-ft/ac/yr), compared to 4 ac-ft/ac/yr attributed to native riparian vegetation. Therefore, the net water savings from removing one

acre of *Arundo* and replacing it with native vegetation was estimated at 20 ac-ft/ac/yr⁴. A literature review by the Nature Conservancy in 2019 found that annual ET rates for *Arundo* ranged from 1 to 48 ac-ft/ac/yr⁵. Another Cal IPC study (funded by SFEP) conducted a literature search and estimated the net potential water savings of *Arundo* removal ranging from 3.2 to 33.7 ac-ft/ac/yr, depending on the method of measurement; in the Central Valley it was estimated at 15.4 ac-ft/ac/yr⁶.

To date, SFEP grant-funded projects are projected to eradicate 1,152 acres of *Arundo*. One of these projects has been completed and has provided a localized estimate of water savings from *Arundo* removal. The Resource Conservation District (RCD) of Monterey County removed 350 acres of *Arundo* as a part of its ongoing Salinas River *Arundo* Eradication Program. The RCD contracted with a researcher from CSU Monterey Bay to conduct a remote sensing analysis of *Arundo* ET rates in the Salinas Valley. *Arundo* was compared with both perennial vegetation and sparse herbaceous vegetation. Results showed annual variability, but the ET of *Arundo* stands was consistently higher than the other two vegetation types. The average difference between *Arundo* and perennial vegetation was 0.6 ac-ft/ac/yr, and the average difference between *Arundo* and herbaceous vegetation was 1.5 acre- ac-ft/ac/yr.



Figure 6. A large stand of *Arundo* near the Salinas River (credit: RCD of Monterey County)

Forest Health— A legacy of fire suppression and past forest management practices has led to overstocked forest conditions which, coupled with climate change, has led to increased susceptibility of those forests to high-severity wildfire, drought-induced mortality, and pest mortality. Overgrown forests can also significantly reduce water yield. Recent research has demonstrated that ecologically-sound forest management practices, such as thinning, can increase stream flow by reducing the forests’

⁴ California Invasive Plant Council 2011. *Arundo donax: Distribution and Impacts*. <https://www.cal-ipc.org/solutions/research/arundo-report/>

⁵ The Nature Conservancy 2019. *Enhancing Water Supply through Invasive Plant Removal: A Literature Review of Evapotranspiration Studies on Arundo Donax*. https://groundwaterresourcehub.org/public/uploads/pdfs/TNC_Arundo_ET_Literature_Review_Feb2019.pdf

⁶ California Invasive Plant Council [Cal-IPC]. 2020. Central Valley *Arundo*: Distribution, Impacts, and Management. Final Report to the State of California Wildlife Conservation Board, Agreement No. WC-1561MM. Available: www.cal-ipc.org

demand for water and influencing snow accumulation and melt volumes. In addition, these actions have potential to yield several other important benefits, including improved forest health and resilience, reduced risk of high intensity wildfires, enhanced habitat for native species, and increased tree species diversity. To date, SFEP has funded two projects that are projected to treat 1,331 acres of forest.

Scientific Studies

Scientific studies funded through the SFEP are designed to assess effectiveness of previously implemented projects and/or inform design and implementation of future stream flow enhancement projects. For example, SFEP has contributed funding to three scientific studies designed to improve understanding and better predict how different forest management approaches and environmental factors affect stream flow and other important metrics. Other studies have examined instream flow, or developed tools and processes that help further stream flow enhancement efforts by reducing key barriers. Most of these studies have been, or will be, publishing findings in scientific journals so that the information can be shared with the restoration and scientific communities and inform future management actions, stream flow enhancement projects, and SFEP program administration. Scientific Study grants are listed in Table 4 below.

Table 4. Scientific Study Projects

Project Name	Current Status	Subject of Study
Ecological Flow Assessment of Middle and North Fork Eel River Tributaries	In Progress	Ecological Flow Criteria
Environmental Flow Recommendations to Support Flow Enhancement Implementation in Two California Watersheds	In Progress	Ecological Flow Criteria
Lagunitas Creek Floodplain Activation Flow Assessment	Completed	Floodplain Restoration
Advancing Flow Enhancement Measurement Capabilities from Forest Restoration in Northern California	In Progress	Forest Health
Forest Management Strategies to Increase Stream Flow	In Progress	Forest Health
French Meadow Watershed Restoration	In Progress	Forest Health
Sierra Meadow Hydrology Monitoring Project	In Progress	Mountain Meadow Restoration
Squaw Creek Monitoring	In Progress	Mountain Meadow Restoration
Suisun Creek Watershed Instream Flow Enhancement Project	Completed	Reservoir Operations
Baseflow Monitoring for Stream Flow Enhancement Project Planning and Evaluation in San Luis Obispo County	Completed	Stream Flow
Flow Availability Analysis for Mark West Creek	Completed	Stream Flow
Mill Creek Watershed Flow Enhancement Study	Completed	Stream Flow
Peña Creek Flow Enhancement Prioritization	In Progress	Stream Flow
Russian River Watershed Stream Gauging	In Progress	Stream Flow
Porter Creek Stream Flow Enhancement Project, Phase II	In Progress	Stream Flow, Salmonid Health
Studies to Support Coho in the Russian River Basin	Completed	Stream Flow, Salmonid Health
Decision Support Tool for Flow Enhancement in Green Valley, Atascadero, and Dutch Bill Creeks	In Progress	Tool or Framework Development

Project Name	Current Status	Subject of Study
Integrated Water Strategies for Flow Enhancement in the Ventura River Watershed	In Progress	Tool or Framework Development
Online Water Availability Tool	In Progress	Tool or Framework Development

Spotlight On...Online Water Availability Tool

In 2021, WCB awarded a Scientific Study grant to The Nature Conservancy for development of a free online tool for use by practitioners to complete Water Availability Analyses. A common example of implementable actions to improve stream flow is to increase water storage capacity and shift the timing of diversion from the summer to the winter. A diverse array of entities are racing to get more of these projects on the ground in their local area as drought continues to impact the state. However, these projects often require a new water right or modifications to an existing right, which involves going through a lengthy formal process with the Water Board. The Water Board’s 2014 Policy for Maintaining Instream Flows in Northern California Coastal Streams requires new appropriative water right applications within the geographic scope of the policy to provide a Water Availability Analysis that meets the policy’s requirements. Significant time and effort are associated with preparing these analyses and have been a stand-alone activity for each proposed project, with no widely available tool or common set of data to help streamline this process. The Nature Conservancy, in partnership with Trout Unlimited and software developer Foundry Spatial, will develop an easily accessible tool that will allow practitioners, landowners, and government agencies to more efficiently answer questions related to water availability using a common set of information. The geographic scope covers the North Coast Policy Area, which includes coastal streams from Humboldt County to Marin County. The goal of developing this online tool is to increase the pace and scale at which flow enhancement projects can be permitted and implemented within the Policy Area.

Partnerships and Contributions to Other Initiatives

Partnerships

Although SFEP has a statewide focus, there are a few examples of successful concentrated efforts in specific watersheds (e.g. the Russian River). Identifying and developing projects, obtaining grant funding, staying up to date on the latest science, and conducting public outreach and education all require a lot of time and resources. When local agencies, practitioners and stakeholders work together around a focused location, they can be far more effective and WCB support has helped propel the work of these groups. This can be especially helpful when dealing with small coastal watersheds, or watersheds with a wide range of land use types and property ownership. In these watersheds there is rarely one solution to low stream flow; the change often comes from many small, cumulative flow enhancement projects.

Spotlight On...Russian River Coho Water Resources Partnership

Collaborative, regional efforts, such as Russian River Coho Water Resources Partnership, have developed enhanced capacity to identify, prioritize, develop, and implement projects. The Coho Partnership was started in 2009, supported by funding from the National Fish and Wildlife Foundation, with the goal of supporting the local community of agricultural producers and private landowners while working towards the recovery of coho salmon within the Russian River watershed. The Partnership members are Sonoma

Resource Conservation District (RCD), Gold Ridge RCD, Occidental Arts and Ecology Center’s WATER Institute, California Sea Grant and Trout Unlimited. Regional staff from the California Department of Fish and Wildlife (CDFW), National Marine Fisheries Service (NMFS) and the North Coast Regional Water Quality Control Board also participate in a technical advisory capacity.

The close collaboration of many partners with varying expertise allows them to efficiently share new information and ensures they are using the best available science to develop practical solutions to human water needs and instream flow impairment. The Partnership has focused on five priority watersheds - Dutch Bill, Green Valley, Mark West, Mill and Grape creeks, which have been identified by NMFS as critical coho recovery streams (see Figure 7). Over the twelve years since the Partnership formed, they have gathered a dataset from more than 30 gauging sites on 9 streams, published 5 scientific papers, contributed to hydrologic modeling efforts, and have been successful in receiving funding for a total of 37 stream flow enhancement projects. WCB has funded nearly half of these projects (See Table 5. These projects have consisted of gauge installation, alternative water source and storage, rainwater harvesting, flow augmentation and the associated scientific studies, and project effectiveness monitoring. Through several research projects, Partners also learned the importance of retaining pool connection into the late summer and fall, and that even seemingly small amounts of flow (as little as 0.05 cfs) can improve conditions for salmonids by keeping pools connected⁷. More information can be found at cohopartnership.org and in a joint research article published in the journal *Global Change Biology*⁸.

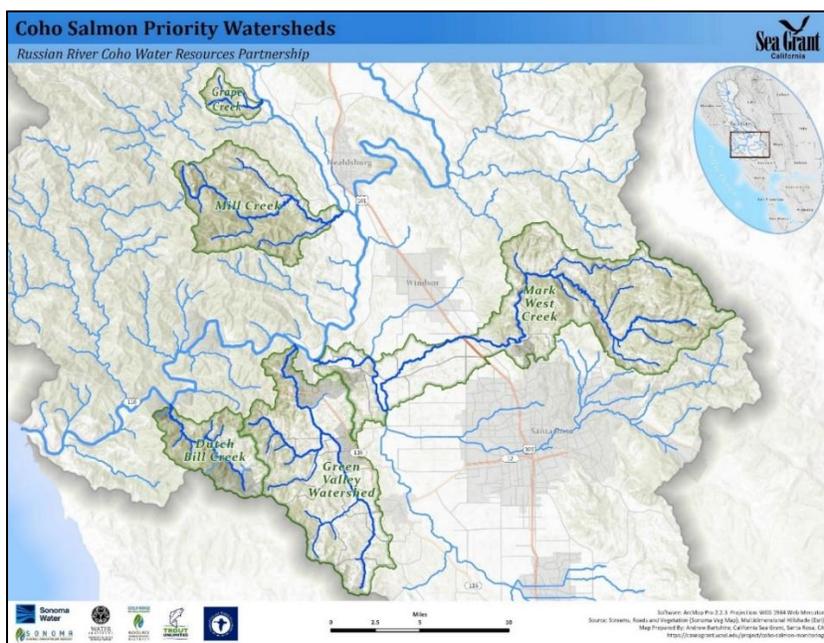


Figure 7. Coho Salmon Priority Watersheds (credit: California Sea Grant)

⁷ California Sea Grant. 2020. *Flow and survival studies to support endangered coho recovery in flow-impaired tributaries to the Russian River: Final Report for Wildlife Conservation Board Grant WC-1663CR*. Windsor, CA

⁸ Vander Vorste et al. 2020. *Refuges and ecological traps: Extreme drought threatens persistence of an endangered fish in intermittent streams*. *Global Change Biology*; 26: 3834– 3845. <https://doi.org/10.1111/gcb.15116>

Table 5. Projects in the Russian River Watershed

Project Name	Current Status	Grantee	Result of Project (actual or proposed)
Flow Availability Analysis for Mark West Creek	Completed	Sonoma RCD	Hydrologic analysis of stream flow conditions and the effectiveness of enhancement actions.
Green Valley Creek Rural Water Conservation Project	Completed	Gold Ridge RCD	250,000 gallons of water storage via rainwater catchment on 4 properties, and designs for more.
Mill Creek Watershed Flow Enhancement Study	Completed	Sonoma RCD	Hydrologic model to describe existing conditions relative to salmonid needs and determine watershed priorities.
Porter Creek Streamflow Enhancement Project	Completed	Sonoma RCD	Flow releases from an existing agricultural pond (up to 390 gpm) into Porter Creek at critical times of year.
Sonoma County Coastal Rainwater Catchment and Forbearance	Completed	Sonoma RCD	240,000 gallons of water storage via rainwater catchment on 21 residential properties in 3 sub-watersheds.
Studies to Support Coho in the Russian River Basin	Completed	UC San Diego	Flow and coho survival studies informing future stream flow enhancement projects, predictive models and published research.
Alliance Redwoods Water Conservation	In Progress	North Coast RC and DC	Change in point of diversion combined with an average 2.5 million gallon reduction in yearly water demand at a retreat center, eliminating the facility's surface diversion.
Decision Support Tool for Flow Enhancement in Green Valley, Atascadero, and Dutch Bill Creeks	In Progress	Coast Range Watershed Institute	Decision Support Tool for addressing insufficient summer flows and understanding ground-surface water interactions.
Green Valley Creek Rural Water Conservation Project, Phase II	In Progress	North Coast RC and DC	220,000 gallons of water storage via diversion to storage or rainwater catchment on 4 properties.
Lower Atascadero and Green Valley Creek Flow and Habitat Enhancement Master Plan	In Progress	Coast Range Watershed Institute	CEQA compliance, engineered designs and baseline monitoring for 5 project sites.
Mark West Creek Flow Enhancement	In Progress	Trout Unlimited	100,000 gallons of water storage via diversion to storage or rainwater catchment on 10 properties.
Mill Creek Water Storage for Flow Enhancement	In Progress	Trout Unlimited	300,000 gallons of water storage via diversion to storage or rainwater catchment on 18 properties.
Mt. Gilead Water Conservation and Flow Improvement Design	In Progress	North Coast RC and DC	Engineered designs for a 3 million gallon rainwater catchment system and irrigation efficiency upgrades at a summer camp.
Peña Creek Flow Enhancement Prioritization	In Progress	Trout Unlimited	Baseline data collection and reach prioritization in the Peña Creek sub-basin.

Project Name	Current Status	Grantee	Result of Project (actual or proposed)
Porter Creek Stream Flow Enhancement Project, Phase II	In Progress	UC Berkeley	Studies on the effectiveness of flow augmentation, refinement of an operations plan for the Porter Creek flow augmentation system.
Russian River Watershed Stream Gauging	In Progress	Trout Unlimited	Improvements to the stream gauging network throughout the watershed.
Salmon Creek School Water Conservation	In Progress	North Coast RC and DC	517,000 gallons of water storage via rainwater catchment at a public school.

Leveraging Other Funds

Through 2021, approximately \$134 million of SFEP grant expenditures were matched by nearly \$90 million in partner contributions, from state, federal and other sources as shown in Table 6 below. These partnerships are critical to maximizing the conservation efforts on the ground.

Table 6. Project Partner Funding (2016-2021)

Project Partner	Funding Amount
State (non-WCB)	\$22.2 million
Federal	\$5.8 million
Local	\$25.5 million
Non-Profit	\$3.9 million
Private	\$30.9 million
Total	\$88.3 million

Conclusion

Implementation of this program has been enlightening and rewarding. A few key challenges and lessons learned are summarized below, along with how the Program intends to move forward.

Challenges and Lessons Learned

Acquisition

Applications have been limited for projects that would acquire water rights or land with associated water rights, despite being listed as a funding priority for many years. This is due, in part, to the complex nature of acquisitions, particularly those involving water rights. Acquisitions which only protect existing conditions (e.g., a conservation easement that removes development rights but does not directly enhance stream flow) are not eligible for funding. Applicants must demonstrate how the acquisition will enhance stream flow, and to do so often leads to acquisitions being combined with other actions (e.g., CWC Section 1707 instream dedication). Staff have worked with project proponents and partners in relevant agencies in an effort to overcome several impediments related to acquisitions involving water rights, including:

- Ensuring the CEQA analysis adequately addresses all elements of the proposed project;

- Additional cost and time requirements associated with completing due diligence (e.g., establishing clear chain of title, verification of historic use) and securing water right changes; and
- Appraisal issues such as additional independent review, Department of General Services (DGS) review and approval, and disagreements about appraised values of a water right.

CWC Section 1707 Instream Dedications

As illustrated by the sections above, there are a variety of ways that water rights can come into play when planning and implementing stream flow enhancement activities. In California and much of the West, water rights issues can often be extremely complex and variable. Working on these projects with the Water Board staff through an interagency agreement has been a learning experience for all involved; the biggest takeaway being that these projects take a significant amount of time and effort to complete. The average timeline from submittal of a water right application or petition to the final permit or order is 2 to 3 years or more, depending on the complexity of the geographic area and the water rights in question. For a very simple and non-controversial project, the approximate minimum time is 9 months, whereas in a place like the Sacramento-San Joaquin Delta, it is possible that it could take several years. Most applications and petitions associated with SFEP-funded projects are still in progress; to date, one SFEP-funded project (Hart Ranch) has received an approved order under CWC section 1707.

Some lessons we have gleaned from these experiences that will inform future applications include:

- Consult early and often with Water Board staff. If you have the benefit of a water rights expert on the project team, any water rights due diligence you can conduct before applying for implementation funding would be helpful. If applicable, consult with any other agencies that may be responsible for permitting the project (e.g., CDFW, NMFS).
- Consider whether there may be opposition to your project, whether from local water users, environmental groups, or the general public. If you anticipate that there may be opposition, contact those parties early to begin to discuss your project with them and determine whether modifications may be warranted based on their concerns.
- If seeking planning funds for a project that will need water rights changes in order to be implemented, preparation of water right applications and/or change petitions can and should be included in the planning grant proposal. This way, when you reach the implementation stage, you will be well-positioned to continue the process smoothly.
- The Water Board has requirements that must be met for an application or petition to be accepted. Become familiar with the guidance provided by Water Board staff regarding applications for permits and petitions for instream flow dedication. In many cases you may also submit a draft petition for their review to ensure you have included everything they will need to accept it in a timely manner.

Quantifying and Monitoring Stream Flow Benefits

Through the application process, project proponents are asked to quantify, to the best of their ability, the stream flow benefits anticipated from successful completion of the proposed project. Proponents have relied on both qualitative and quantitative means of predicting stream flow benefits. It is

important to remember that SFEP has defined enhanced stream flow as changes in the amount, timing, or quality of water flowing down a stream or portion of the stream to benefit fish and wildlife. As such, not all projects will necessarily increase the amount of flow in the affected stream. Furthermore, implementation and acquisition projects are required to include monitoring activities to evaluate project outcomes. These efforts (estimated anticipated benefits and monitoring outcomes) are complicated by several factors, including:

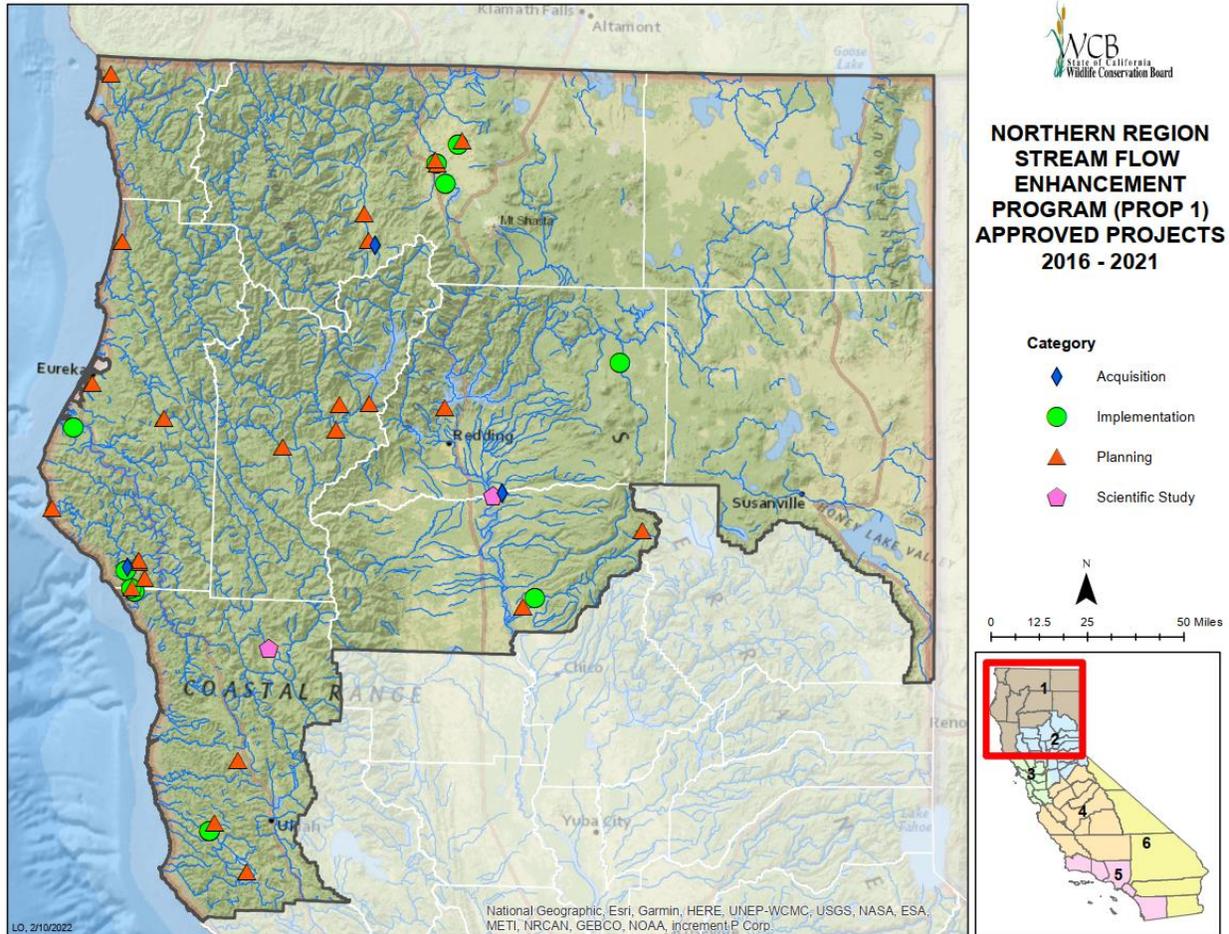
- Difficulties, time, and costs associated with establishing baseline conditions;
- A significant number of watersheds throughout the State lack gauging networks, and many of the watersheds that do contain gauging networks lack a sufficient period of record to adequately understand hydrology patterns;
- Level of understanding and ability to quantify benefits associated with different project types;
- Ability to contextualize significance of anticipated benefits absent flow objectives, flow recommendations, or other applicable information developed with scientifically defensible methods;
- Conflicting timelines with respect to the standard term of a grant agreement and time needed to evaluate the restoration trajectory of a site, accounting for variability in factors (e.g., hydrologic, geologic, anthropogenic) influencing stream systems. A grant typically closes 1 to 2 years after completion of restoration construction activities, providing a very limited period over which grant funds can be used to assess effectiveness; and
- Availability of necessary resources (e.g., staff, equipment, funding) to maintain monitoring activities beyond the grant term.

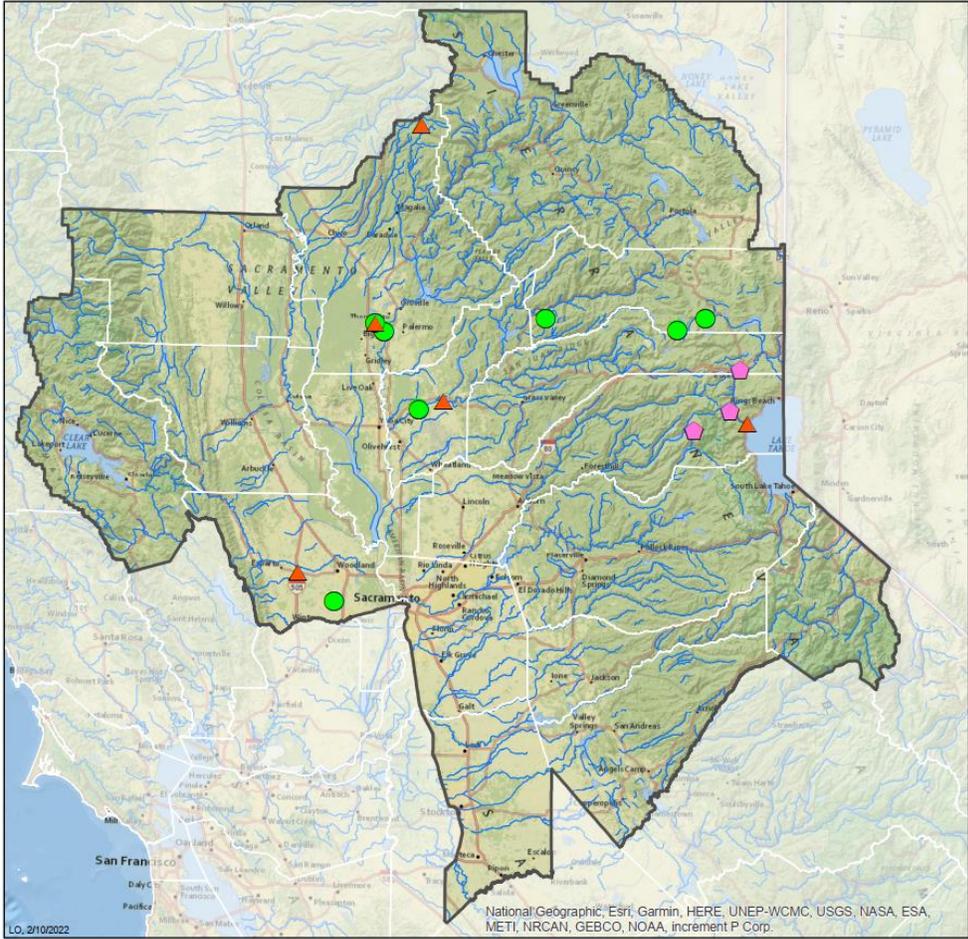
SFEP has funded several grants designed to address various elements of these on-going challenges, including scientific studies to better quantify anticipated benefits associated with specific project types (e.g., forest management actions and mountain meadow restoration), work to support development of ecological flow recommendations (e.g., application of California Environmental Flows Framework), and maintenance and expansion of gauging networks (e.g., Russian River Watershed Stream Gauging). Approaches to monitoring and evaluating project effectiveness, both within and beyond the term of individual grants, need continuing development and resources.

Looking Ahead

As the Stream Flow Enhancement Program moves forward in the coming years, we will use the knowledge gained from the first six years in continuing to fund high-quality projects to enhance stream flows throughout California and support healthy waterways for fish and wildlife. We will prioritize the implementation of projects for which the planning was funded by SFEP, and we will use information and tools funded by scientific studies and monitoring of implementation projects to help make more informed project decisions and recommendations. The SFEP also will continue existing partnerships and develop new partnerships to identify the most important actions to take in light of continued stressors such as fire and drought. These efforts will continue to be funded by the remainder of the Proposition 1 funds, as well as other General Fund or future bonds funds received by WCB.

**Appendix A. Maps of Projects Awarded Funds Through the SFEP (2016 – 2021)
for Each CDFW Region**

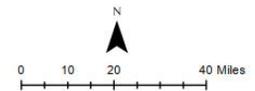




**NORTH CENTRAL REGION
STREAM FLOW
ENHANCEMENT
PROGRAM (PROP 1)
APPROVED PROJECTS
2016 - 2021**

Category

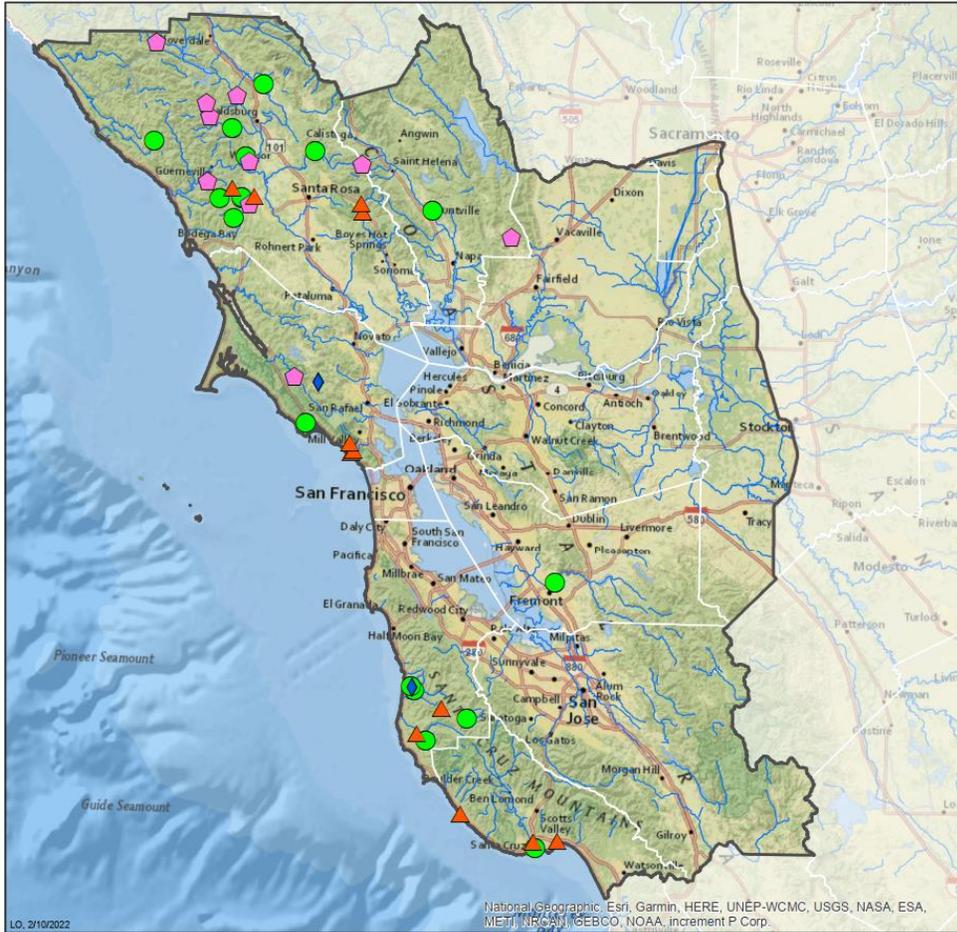
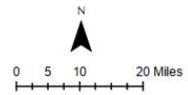
- ◆ Acquisition
- Implementation
- ▲ Planning
- ⬠ Scientific Study



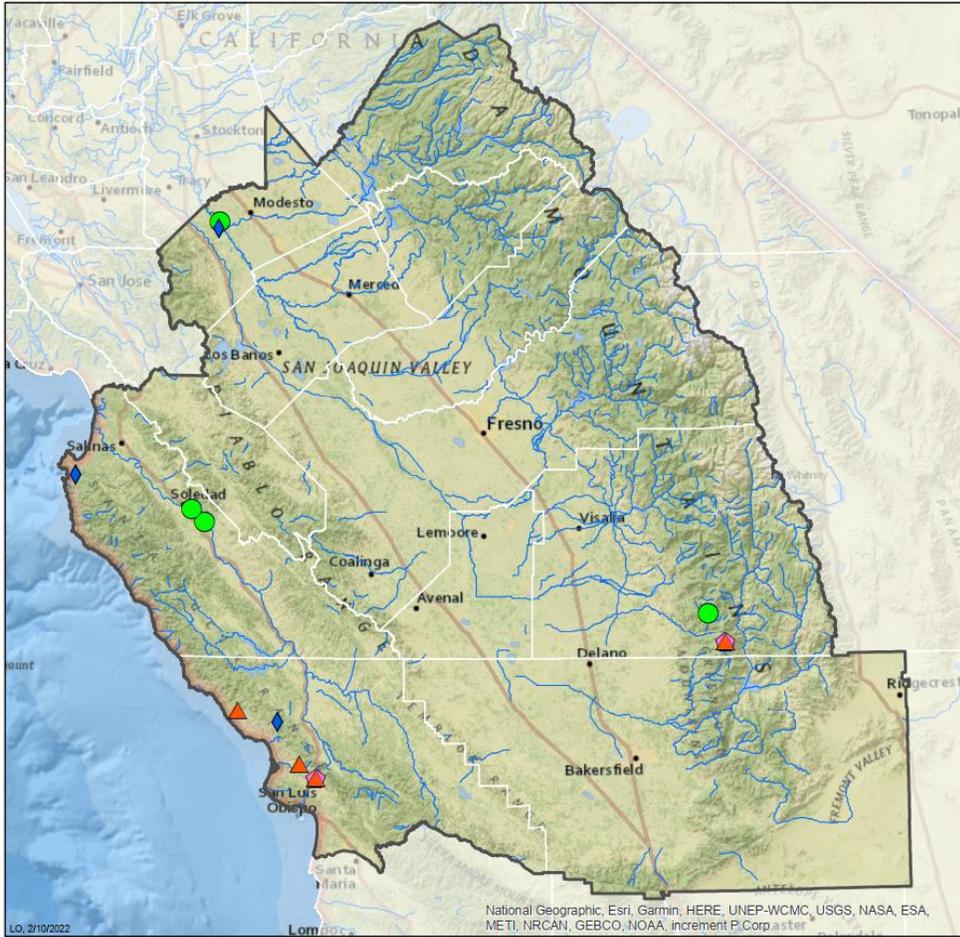


**BAY DELTA REGION
STREAM FLOW
ENHANCEMENT
PROGRAM (PROP 1)
APPROVED PROJECTS
2016 - 2021**

- Category**
- ◆ Acquisition
 - Implementation
 - ▲ Planning
 - ◆ Scientific Study

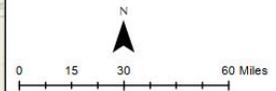


National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.



**CENTRAL REGION
STREAM FLOW
ENHANCEMENT
PROGRAM (PROP 1)
APPROVED PROJECTS
2016 - 2021**

- Category**
- ◆ Acquisition
 - Implementation
 - ▲ Planning
 - ⬠ Scientific Study

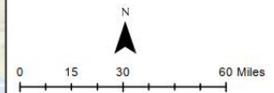




**SOUTH COAST REGION
STREAM FLOW
ENHANCEMENT
PROGRAM (PROP 1)
APPROVED PROJECTS
2016 - 2021**

Category

- ◆ Acquisition
- Implementation
- ▲ Planning
- ◆ Scientific Study



LO, 2/10/2022

National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, incrementIP Corp.

Appendix B. Projects Awarded Funds Through the SFEP (2016 – 2021)

(This table is also available on WCB's website via this [link](#))

Date Approved	Project Name	Grantee	Project Category	WCB Award	County	Project Status
2/1/2016	Baseflow Monitoring for Stream Flow Enhancement Project Planning and Evaluation in San Luis Obispo County	CreekLands Conservation	Scientific Study	\$180,701	San Luis Obispo	Completed
2/1/2016	Central Valley Arundo Mapping and Impact Assessment Project	California Invasive Plant Council	Planning	\$438,889	Multiple	Completed
2/1/2016	Domestic and Agricultural Water Efficiency Design Program	San Mateo RCD	Planning	\$828,357	San Mateo	Completed
2/1/2016	Dominie Creek and Rowdy Creek Fish Passage Improvement Project	Tolowa Dee-ni' Nation	Planning	\$399,589	Del Norte	Completed
2/1/2016	Dos Rios Section 1707 Project	Tuolumne River Trust	Implementation	\$75,000	Stanislaus	In Progress
2/1/2016	Dry Meadow Restoration Project	Trout Unlimited	Planning	\$94,635	Tulare	Completed
2/1/2016	Green Valley Creek Rural Water Conservation Project	Gold Ridge RCD	Implementation	\$508,376	Sonoma	Completed
2/1/2016	Mattole Headwaters Streamflow Enhancement Implementation Project	Sanctuary Forest Inc.	Implementation	\$356,744	Humboldt	Completed
2/1/2016	Mattole Headwaters Streamflow Enhancement Planning Project	Sanctuary Forest Inc.	Planning	\$565,048	Humboldt	Completed
2/1/2016	Navarro River Watershed – Plan for Streamflow Optimization and Enhancement	Mendocino County RCD	Planning	\$375,284	Mendocino	Completed
2/1/2016	Oroville Wildlife Area Floodplain Reconnection and Habitat	American Rivers	Planning	\$825,897	Butte	Completed
2/1/2016	Porter Creek Streamflow Enhancement Project	Sonoma RCD	Implementation	\$450,804	Sonoma	Completed
2/1/2016	Reconnecting Stream Flows in the Lower Eel River Delta	Humboldt County RCD	Implementation	\$2,629,826	Humboldt	In Progress
2/1/2016	San Joaquin River - Grayson Property Acquisition Project	River Partners	Acquisition	\$2,760,000	Stanislaus	Completed
2/1/2016	San Joaquin River - Grayson Property Project	River Partners	Planning	\$122,448	Stanislaus	Completed
2/1/2016	Scott and Shasta Flow Enhancement Planning Project	National Fish and Wildlife Foundation	Planning	\$395,577	Siskiyou	Completed
2/1/2016	Sonoma Creek Streamflow Stewardship Program, Phase 1	Sonoma Ecology Center	Planning	\$118,801	Sonoma	Completed

Date Approved	Project Name	Grantee	Project Category	WCB Award	County	Project Status
2/1/2016	Soquel Creek Stream Flow Stewardship Project	RCD of Santa Cruz County	Planning	\$211,372	Santa Cruz	Completed
2/1/2016	Suisun Creek Watershed Instream Flow Enhancement Project	California Land Stewardship Institute	Scientific Study	\$584,100	Napa	Completed
2/1/2016	The Salinas River Arundo Eradication Project Phase III	RCD of Monterey County	Implementation	\$3,389,560	Monterey	Completed
2/1/2016	The Thacher School Instream Flow Resiliency and Dormitory Conservation Project	The Thacher School	Implementation	\$836,221	Ventura	In Progress
3/1/2017	Developing Efficiencies for Instream Dedication	The Nature Conservancy	Planning	\$131,744	Siskiyou	In Progress
3/1/2017	Flow Availability Analysis for Mark West Creek	Sonoma RCD	Scientific Study	\$363,418	Sonoma	Completed
3/1/2017	Green Gulch Creek Water Conservation	San Francisco Zen Center	Planning	\$214,000	Marin	Completed
3/1/2017	Hart Ranch Instream Flow Enhancement	California Trout	Implementation	\$2,181,282	Siskiyou	In Progress
3/1/2017	Hat Creek Enhancement Project	Fall River RCD	Implementation	\$196,564	Shasta	Completed
3/1/2017	Integrated Water Strategies to Enhance Flows in Santa Barbara and Ventura Counties	CreekLands Conservation	Planning	\$581,141	Santa Barbara	Completed
3/1/2017	Lagunitas Creek Floodplain Activation Flow Assessment	Salmon Protection and Watershed Network	Scientific Study	\$157,742	Marin	Completed
3/1/2017	McKee Creek Bedrock and Inset Floodplain Stream Flow Enhancement	Sanctuary Forest Inc.	Implementation	\$135,720	Humboldt	Completed
3/1/2017	Mill Creek Watershed Flow Enhancement Study	Sonoma RCD	Scientific Study	\$364,603	Sonoma	Completed
3/1/2017	Outlet Creek Streamflow Enhancement Project	Trout Unlimited	Planning	\$354,729	Mendocino	Completed
3/1/2017	Pine Gulch Water Rights and Instream Flow Enhancement	Marin RCD	Implementation	\$406,917	Marin	Completed
3/1/2017	Rancheria Creek Stream Flow Enhancement and Restoration	Dry Creek Rancheria	Implementation	\$3,467,000	Sonoma	In Progress
3/1/2017	Rancho Cañada Carmel River Flow Enhancement	Monterey Peninsula Regional Park District	Acquisition	\$4,520,000	Monterey	Completed
3/1/2017	San Lorenzo Watershed Conjunctive Use Plan	County of Santa Cruz	Planning	\$330,451	Santa Cruz	Completed
3/1/2017	San Ysidro Flow Enhancement and Water Conservation	Immaculate Heart Community	Implementation	\$940,601	Santa Barbara	In Progress

Date Approved	Project Name	Grantee	Project Category	WCB Award	County	Project Status
3/1/2017	Scotts Creek Lagoon and Marsh Restoration Project	RCD of Santa Cruz County	Planning	\$435,000	Santa Cruz	Completed
3/1/2017	Sierra Meadow Hydrology Monitoring Project	Plumas Corporation	Scientific Study	\$763,771	Tulare	In Progress
3/1/2017	Southern California Coastal Watersheds Arundo Eradication	Mission RCD	Implementation	\$2,307,585	Orange	In Progress
3/1/2017	Studies to Support Coho in the Russian River Basin	Regents of the University of California, San Diego	Scientific Study	\$958,512	Sonoma	Completed
3/1/2017	Truckee River Flow Enhancement	Truckee River Watershed Council	Planning	\$173,585	Nevada	Completed
3/1/2017	Weaver Creek Watershed Flow Enhancement Project	Trinity County RCD	Planning	\$171,355	Trinity	In Progress
3/1/2018	Alameda Creek Fish Passage	Alameda County Water District	Implementation	\$5,358,075	Alameda	In Progress
3/1/2018	Arundo Removal at the Sespe Cienega	Regents of the University of California, Santa Barbara	Implementation	\$2,793,858	Ventura	In Progress
3/1/2018	Forest Management Strategies to Increase Stream Flow	Regents of the University of California, Santa Barbara	Scientific Study	\$609,970	Nevada	In Progress
3/1/2018	French Meadow Watershed Restoration	Regents of the University of California, Merced	Scientific Study	\$788,202	Placer	In Progress
3/1/2018	Lower Battle Creek Scoping Study	River Partners	Scientific Study	\$113,654	Shasta	In Progress
3/1/2018	Lower Bear Creek Slough Enhancement	Mattole Salmon Group	Planning	\$249,588	Humboldt	In Progress
3/1/2018	Mad River Enhancement	Humboldt Bay Municipal Water District	Planning	\$693,408	Humboldt	In Progress
3/1/2018	Marshall Ranch Flow Enhancement Design	Salmonid Restoration Federation	Planning	\$257,467	Humboldt	Completed
3/1/2018	McKee Creek Conservation and Stream Flow Enhancement (Acquisition)	Sanctuary Forest Inc.	Acquisition	\$1,020,000	Humboldt	Completed
3/1/2018	McKee Creek Conservation and Stream Flow Enhancement (Restoration)	Sanctuary Forest Inc.	Implementation	\$139,377	Humboldt	In Progress
3/1/2018	Napa River and Bear Creek Tributary Restoration	County of Napa	Implementation	\$3,000,000	Napa	In Progress
3/1/2018	Navarro River Large Wood Augmentation	Mendocino County RCD	Implementation	\$221,540	Mendocino	In Progress

Date Approved	Project Name	Grantee	Project Category	WCB Award	County	Project Status
3/1/2018	Navarro River Watershed Streamflow Enhancement	Mendocino County RCD	Implementation	\$726,374	Mendocino	In Progress
3/1/2018	Oroville Wildlife Area Restoration Project	Sutter Butte Flood Control Agency	Implementation	\$5,070,900	Butte	Completed
3/1/2018	Putah-Cache Watershed Arundo Eradication	Yolo County RCD	Planning	\$373,616	Yolo	In Progress
3/1/2018	Redwood Creek Enhancement Planning	Salmonid Restoration Federation	Planning	\$198,282	Humboldt	In Progress
3/1/2018	San Gregorio Creek Enhancement at Blue House Farm	San Mateo RCD	Implementation	\$886,590	San Mateo	In Progress
3/1/2018	San Luis Obispo Creek Flow Enhancement	CreekLands Conservation	Planning	\$250,062	San Luis Obispo	In Progress
3/1/2018	Santa Clara River Riparian Improvement	The Nature Conservancy	Implementation	\$3,919,146	Ventura	In Progress
3/1/2018	Santa Rosa Creek Flow Enhancement Pilot Project	CreekLands Conservation	Planning	\$627,226	San Luis Obispo	In Progress
3/1/2018	Sonoma County Coastal Rainwater Catchment and Forbearance	Sonoma RCD	Implementation	\$851,806	Sonoma	Completed
3/1/2018	Squaw Creek Monitoring	Trout Unlimited	Scientific Study	\$150,862	Placer	Completed
4/1/2019	Butano Creek Stream Flow Improvement Planning	San Mateo RCD	Planning	\$466,696	San Mateo	In Progress
4/1/2019	Environmental Flow Recommendations to Support Flow Enhancement Implementation in Two California Watersheds	Regents of the University of California, Davis	Scientific Study	\$499,955	Siskiyou	In Progress
4/1/2019	Lower Perazzo Meadow Restoration	Truckee River Watershed Council	Implementation	\$1,980,504	Sierra	In Progress
4/1/2019	Oroville Wildlife Area Restoration Project, Phase II	Sutter Butte Flood Control Agency	Implementation	\$1,542,100	Butte	Completed
4/1/2019	Porter Creek Stream Flow Enhancement Project, Phase II	Regents of the University of California, Berkeley	Scientific Study	\$530,366	Sonoma	In Progress
4/1/2019	Reducing Limiting Factors in the San Lorenzo River Lagoon	City of Santa Cruz	Implementation	\$2,215,000	Santa Cruz	In Progress
4/1/2019	Salinas River Arundo Eradication Project, Phase IV	RCD of Monterey County	Implementation	\$2,868,781	Monterey	In Progress
4/1/2019	San Gregorio Creek Stream Flow Enhancement, Klingman-Moty Farm	San Mateo RCD	Implementation	\$621,754	San Mateo	In Progress

Date Approved	Project Name	Grantee	Project Category	WCB Award	County	Project Status
4/1/2019	Sproul Creek, South Fork Eel River, Flow Enhancement Planning	Salmonid Restoration Federation	Planning	\$249,959	Humboldt	In Progress
4/1/2019	USFS Hot Springs-Montecito Creek Section 1707 Project	Los Padres ForestWatch	Implementation	\$45,750	Santa Barbara	In Progress
4/1/2019	Ventura Watershed Flow Enhancement and Water Resiliency Regional Framework	Ventura County RCD	Planning	\$1,783,345	Ventura	In Progress
4/1/2020	Advancing Flow Enhancement Measurement Capabilities from Forest Restoration in Northern California	Pepperwood Foundation	Scientific Study	\$1,244,879	Placer	In Progress
4/1/2020	Alliance Redwoods Water Conservation	North Coast Resource Conservation and Development Council	Implementation	\$1,526,416	Sonoma	In Progress
4/1/2020	Battle Creek Section 1707 Dedication	Trout Unlimited	Planning	\$159,368	Tehama	In Progress
4/1/2020	Battle Creek, Tompkins Water Right Acquisition	Trout Unlimited	Acquisition	\$550,250	Tehama	In Progress
4/1/2020	Integrated Water Strategies for Flow Enhancement in the Ventura River Watershed	CreekLands Conservation	Scientific Study	\$299,185	Ventura	In Progress
4/1/2020	Lower Prairie Creek Floodplain Restoration Design	Save the Redwoods League	Planning	\$332,000	Humboldt	In Progress
4/1/2020	Mark West Creek Flow Enhancement	Trout Unlimited	Implementation	\$1,082,455	Sonoma	In Progress
4/1/2020	Martin Slough Flow Enhancement Planning	Redwood Community Action Agency	Planning	\$589,413	Humboldt	In Progress
4/1/2020	Mt. Gilead Water Conservation and Flow Improvement Design	North Coast Resource Conservation and Development Council	Planning	\$331,694	Sonoma	In Progress
4/1/2020	Parks Creek Flow Enhancement and Fish Passage	California Trout	Implementation	\$3,807,868	Siskiyou	In Progress
4/1/2020	Peña Creek Flow Enhancement Prioritization	Trout Unlimited	Scientific Study	\$523,460	Sonoma	In Progress
4/1/2020	Peters Creek Flow Enhancement	Trout Unlimited	Implementation	\$1,875,977	San Mateo	In Progress
4/1/2020	Putah-Cache Watershed Arundo Eradication Program, Phase I	Yolo County RCD	Implementation	\$2,221,858	Yolo	In Progress
4/1/2020	Redwood Creek Floodplain Restoration Design	Golden Gate National Parks Conservancy	Planning	\$497,779	Marin	In Progress

Date Approved	Project Name	Grantee	Project Category	WCB Award	County	Project Status
4/1/2020	Salt Creek Floodplain Restoration Planning	The Watershed Research and Training Center	Planning	\$236,287	Trinity	In Progress
4/1/2020	San Gregorio Creek Flow Enhancement, Marchi and Son Farm	Trout Unlimited	Implementation	\$95,392	San Mateo	In Progress
4/1/2020	San Gregorio Creek, Marchi and Son Farm Forbearance Agreement	Trout Unlimited	Acquisition	\$400,000	San Mateo	In Progress
4/1/2020	Santa Rita Ranch Flow Enhancement, Acquisition	Land Conservancy of San Luis Obispo County	Acquisition	\$3,920,000	San Luis Obispo	Completed
4/1/2020	Santa Rita Ranch Flow Enhancement, Section 1707 Dedication	Land Conservancy of San Luis Obispo County	Implementation	\$38,100	San Luis Obispo	In Progress
4/1/2020	Sequoia National Forest Prioritized Meadow Restoration	Trout Unlimited	Implementation	\$816,401	Tulare	In Progress
4/1/2020	Shasta River Fish Passage and Instream Habitat Enhancement	Shasta Valley RCD	Implementation	\$3,302,443	Siskiyou	In Progress
4/1/2020	Sonoma Creek Flow Enhancement Design	Sonoma Ecology Center	Planning	\$520,039	Sonoma	In Progress
4/22/2021	Butte Creek House Meadow Restoration Planning	Butte County RCD	Planning	\$196,071	Butte	In Progress
4/22/2021	Community Water Management Planning in Browns and Tule Creeks	The Watershed Research and Training Center	Planning	\$278,596	Trinity	In Progress
4/22/2021	Decision Support Tool for Flow Enhancement in Green Valley, Atascadero, and Dutch Bill Creeks	Coast Range Watershed Institute	Scientific Study	\$151,685	Sonoma	In Progress
4/22/2021	Deer Creek Instream Flow Planning and Design	Trout Unlimited	Planning	\$1,642,594	Tehama	In Progress
4/22/2021	Deer Creek Irrigation District Diversion Automation	Trout Unlimited	Implementation	\$328,659	Tehama	In Progress
4/22/2021	Deer Creek Meadow and Gurnsey Creek Restoration Planning	RCD of Tehama County	Planning	\$724,836	Tehama	In Progress
4/22/2021	Ecological Flow Assessment of Middle and North Fork Eel River Tributaries	Round Valley Indian Tribes	Scientific Study	\$441,273	Mendocino	In Progress
4/22/2021	Escuela Ranch Water Resilience and Flow Enhancement Planning	CreekLands Conservation	Planning	\$150,154	San Luis Obispo	In Progress
4/22/2021	Farmers Ditch Water Use Efficiency and Flow Enhancement Planning	California Trout	Planning	\$319,295	Siskiyou	In Progress
4/22/2021	Green Gulch Farm Water Storage and Flow Enhancement Planning	San Francisco Zen Center	Planning	\$887,320	Marin	In Progress

Date Approved	Project Name	Grantee	Project Category	WCB Award	County	Project Status
4/22/2021	Green Valley Creek Rural Water Conservation Project, Phase II	North Coast Resource Conservation and Development Council	Implementation	\$870,121	Sonoma	In Progress
4/22/2021	Hallwood Side Channel and Floodplain Restoration, Phases III and IV	Yuba Water Agency	Implementation	\$1,985,000	Yuba	In Progress
4/22/2021	Little Butano Creek Flow Enhancement, Butano State Park	San Mateo RCD	Implementation	\$2,636,208	San Mateo	In Progress
4/22/2021	Little Shasta River Flow Enhancement Planning	California Trout	Planning	\$589,586	Siskiyou	In Progress
4/22/2021	Lower Atascadero and Green Valley Creek Flow and Habitat Enhancement Master Plan	Coast Range Watershed Institute	Planning	\$496,519	Sonoma	In Progress
4/22/2021	Mill Creek Water Storage for Flow Enhancement	Trout Unlimited	Implementation	\$1,941,481	Sonoma	In Progress
4/22/2021	Navarro River and Outlet Creek Flow Enhancement Planning	Mendocino County RCD	Planning	\$1,312,640	Mendocino	In Progress
4/22/2021	North Fork Lost River Flow and Habitat Enhancement	Sanctuary Forest Inc.	Implementation	\$2,065,410	Mendocino	In Progress
4/22/2021	Online Water Availability Tool	The Nature Conservancy	Scientific Study	\$551,255	Marin	In Progress
4/22/2021	Otay Valley Regional Park Hydrology Study and Restoration Planning	City of San Diego	Planning	\$892,051	San Diego	In Progress
4/22/2021	Russian River Watershed Stream Gauging	Trout Unlimited	Scientific Study	\$261,316	Sonoma	In Progress
4/22/2021	Salmon Creek School Water Conservation	North Coast Resource Conservation and Development Council	Implementation	\$2,067,390	Sonoma	In Progress
4/22/2021	Salmonid Habitat 1707 Petition on East Fork Scott River	The Wildlands Conservancy	Implementation	\$200,000	Siskiyou	In Progress
4/22/2021	Salmonid Habitat Acquisition on East Fork Scott River	The Wildlands Conservancy	Acquisition	\$3,000,000	Siskiyou	In Progress
4/22/2021	San Geronimo Conservation Easement and Flow Enhancement	Marin Open Space Trust	Acquisition	\$2,110,000	Marin	In Progress
4/22/2021	San Geronimo Creek Flow Enhancement	Marin Open Space Trust	Implementation	\$93,000	Marin	In Progress
4/22/2021	Scott River Flow Enhancement and Fish Passage Planning	Siskiyou Land Trust	Planning	\$234,180	Siskiyou	In Progress
4/22/2021	Trapper Forest Health Restoration	National Forest Foundation	Implementation	\$3,626,560	Yuba	In Progress

Date Approved	Project Name	Grantee	Project Category	WCB Award	County	Project Status
4/22/2021	Upper Lacey Meadows Restoration	Truckee River Watershed Council	Implementation	\$1,743,458	Sierra	In Progress
4/22/2021	Upper Long Bar Restoration Planning	South Yuba River Citizens League	Planning	\$865,456	Yuba	In Progress
4/22/2021	Water Management Plan for Utilization of Humboldt County Contract Water	Humboldt County	Planning	\$574,980	Trinity	In Progress