



— BUREAU OF —  
RECLAMATION

# 2021 Year in Review

California–Great Basin Region

An aerial photograph of a large concrete dam with multiple spillways, situated in a valley. The reservoir behind the dam is a deep blue color, contrasting with the brown, exposed earth of the dry lake bed areas. The surrounding landscape is a mix of green forested hills and rocky, mountainous terrain in the distance. A winding road and some industrial or utility structures are visible at the base of the dam.

## Mission Statements

The Department of the Interior conserves and manages the Nation's natural resources and cultural heritage for the benefit and enjoyment of the American people, provides scientific and other information about natural resources and natural hazards to address societal challenges and create opportunities for the American people, and honors the Nation's trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated island communities to help them prosper.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

# 2021 Year in Review

## California-Great Basin Region



Cover Photo: Aerial view of Shasta Dam and Reservoir illustrating a noticeable low water level.  
Photo taken October 28, 2021; courtesy of California Department of Water Resources.

**U.S. Department of the Interior**

**March 2022**



# Contents

<b>Welcome from Regional Director Conant</b>	6
<b>Addressing Second Consecutive Year of Drought</b>	7
Central Valley Project	7
Central Valley Project 2021 Water Year Timeline	9
Long-Term Operation of the Central Valley Project	11
Klamath Project	12
Klamath Project 2021 Water Year Timeline	13
Long-Term Operation of the Klamath Project	15
Other Water Projects in the California-Great Basin Region	16
<b>Modernizing Infrastructure</b>	17
Fallon Paiute-Shoshone Tribe S7-3 Lateral Lining Grant	17
East Park Dam Modifications	17
Nimbus Hatchery Fish Passage	18
C.W. "Bill" Jones Pumping Plant Re-wind	19
Friant-Kern Canal Capacity Correction	20
Delta-Mendota Canal Capacity Correction	21
Joint Reach/San Luis Canal Capacity Correction	22
B.F. Sisk Dam Modifications	22
<b>Advancing Storage Projects</b>	23
Sites Reservoir	23
Folsom Dam Raise	24
Los Vaqueros Reservoir Expansion Phase 2	24
B.F. Sisk Raise and Reservoir Expansion	25
Del Puerto Canyon Reservoir	26
<b>Optimizing Renewable Hydropower</b>	27
Central Valley Project Power Initiative	28
Turbine Runner Replacements (Trinity and Spring Creek Powerplants)	28
Electric Imbalance Market	29
Frequency Response Reserves	29



<b>Enhancing Habitat Restoration and Conservation .....</b>	<b>30</b>
Central Valley Project Habitat Restoration .....	30
Central Valley Project Conservation Program.....	32
Central Valley Project Improvement Act Habitat Restoration Program.....	33
San Joaquin River Restoration Program .....	34
Trinity River Restoration Program .....	36
<b>Providing Additional Resources for Wildlife Refuges.....</b>	<b>37</b>
Pacific Flyway Drought Action .....	37
<b>Implementing Water Reuse Projects.....</b>	<b>40</b>
Pure Water Monterey .....	40
Pure Water Soquel .....	41
<b>Enriching Recreation Opportunities and Protecting Natural Resources.....</b>	<b>42</b>
Auburn State Recreation Area and Auburn Project Lands .....	42
Lake Berryessa .....	43
New Melones Reservoir.....	44
<b>Implementing WIIN Act Contract Conversions .....</b>	<b>45</b>
<b>Acquiring Services and Administering Government Contracts .....</b>	<b>45</b>

# Welcome from Regional Director Conant

Welcome to the 2021 Year in Review for Reclamation's California-Great Basin Region. This report provides a snapshot of some of the highlights—and challenges—our region experienced over the last year.

Without a doubt the 2021 water year, one of the driest on record, was challenging for all Western water managers. In collaboration with federal and state partners, as well as our water and power customers, we implemented unprecedented measures in an effort to continue water supply deliveries for our agriculture customers, communities, and the environment. We will continue to face challenges in the future and proceed to work with our partners to adapt to a changing climate. Our region remains committed to improving ongoing projects and programs while addressing complex issues brought on by both climate variability and competing demands.

Despite the challenges the critically dry year brought us, our team made significant advances on several key projects important to our agency, as well as to our stakeholders, including infrastructure improvements, advances in water storage projects, fish passage improvements, habitat restoration projects, among others. We have worked diligently to meet our federal obligations and fulfill the needs of our stakeholders.

The following pages provide an insight into the work we have accomplished throughout 2021 and actions taken to preserve and maintain our water supply. Thank you to the Reclamation team and to our partners for your dedication to our mission.

Sincerely,



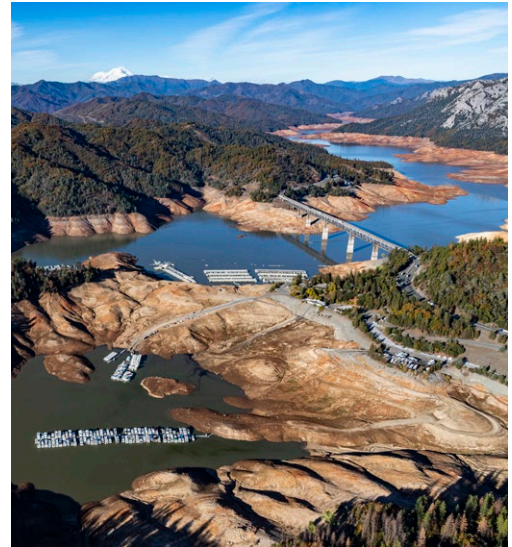
Ernest A. Conant  
Regional Director



Regional Director Ernest Conant.

# Addressing Second Consecutive Year of Drought

The 2021 water year was challenging for all Western water managers. A lack of precipitation during 2020 and 2021 greatly intensified after April 1 last year. A significant, and in some cases record breaking, decline in snow water equivalent was observed throughout April due to warm and dry conditions. Much of the Western snow melted one to four weeks early, including three to four weeks early in the Sierra. Low snowpack and poor runoff efficiency contributed to sudden water supply concerns. These conditions called for unprecedented actions for Reclamation's Central Valley Project (CVP) and Klamath Project, and other areas in the West.



Aerial view of Shasta Dam and Reservoir illustrating a noticeable low water level. Photo taken October 28, 2021; courtesy of California Department of Water Resources.

A water year is defined as the 12-month period beginning October 1 through September 30 of the following year. The water year is designated by the calendar year in which it ends. The year ending September 30, 2021, is called the "2021 water year."

## Central Valley Project

California experienced one of the driest years on record during the 2021 water year—second only in recent history behind drought year 1977. Combined with 2020, the two-year period is the second lowest on record for precipitation behind 1976-1977, leaving CVP reservoirs concerningly low at the end of the water year. Here's how Reclamation responded:

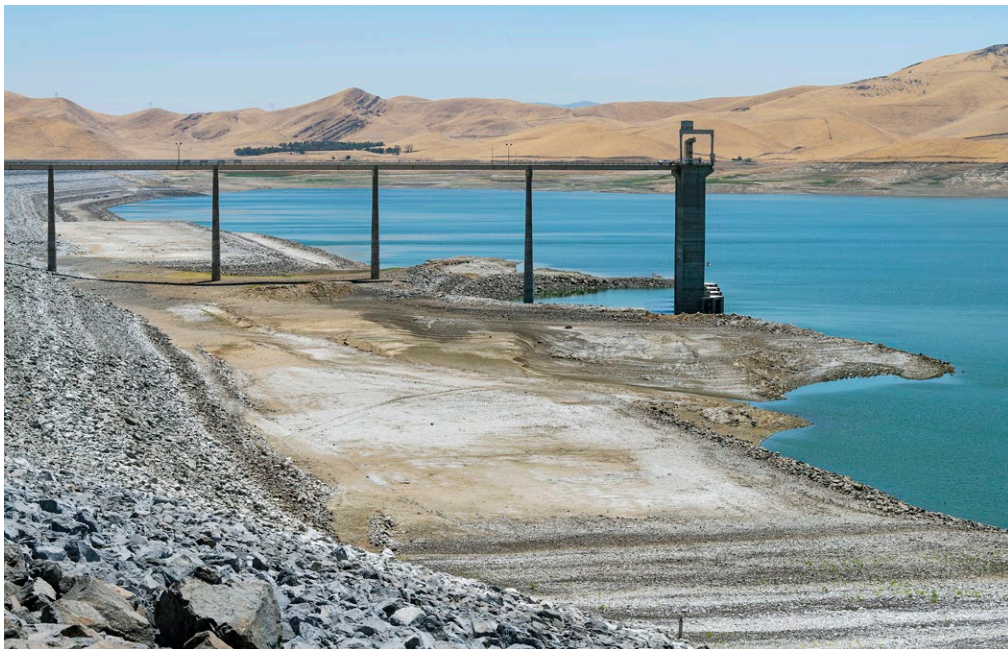
**Implemented an "all hands on deck" approach to balance a variety of needs, legal requirements, and objectives with limited resources including:**

- Rebalanced operations to increase the priority of conserving cold water pool in Shasta and Folsom reservoirs



Aerial view of Folsom Dam in Sacramento County showing exposed banks. Photo taken October 28, 2021; courtesy of California Department of Water Resources

- Implemented operational flexibilities in coordination with federal, state, and local agencies to gain the most benefit for fisheries under limited water supplies with actions such as pulse flows and targeted temperature management
- Managed stored water supplies for health and safety needs for California communities
- Facilitated voluntary actions by senior water right holders to preserve cold water
- Shored up our refugial and supplementation hatcheries
- Continued to fund habitat restoration projects and facility improvements to increase environmental resiliency
- Facilitated transfers from willing sellers needed for farms, refuges, and communities
- Closely coordinated drought operation decisions with federal and state agency partners



A section of San Luis Reservoir in Merced County is shown at a time of relatively low water levels. Photo taken August 10, 2021; courtesy of California Department of Water Resources.

Although the 2021 water year started with higher storage levels than previous critical years in recent history, forecasted inflow predictions were optimistic due to extreme conditions. Between the April 1 and May 1 Sacramento River Unimpaired Runoff Water Year Forecast, 685,000 acre-feet in projected inflow failed to materialize. Snowpack that normally drains into streams and reservoirs infiltrated into parched soils and evaporated into dry atmosphere. As a result, inflow to Shasta Reservoir was the lowest on record. Reclamation and the California Department of Water Resources (DWR) developed and simultaneously implemented a drought contingency plan that included the conservation actions by communities served by the CVP and State Water Project (SWP).



## Central Valley Project 2021 Water Year Timeline

### OCTOBER

- **October 1** — The CVP began the 2021 water year with 6.01 million acre-feet of storage.

### FEBRUARY

- **February 23** — **Reclamation announced initial allocations for CVP water users:**
  - » Agricultural water service contractors – 5%
  - » Municipal and Industrial (M&I) water service contractors – 55%
  - » Settlement and Exchange contractors – Critical Dry Year Determination
  - » Friant contractors – 20% (Class 1)
  - » Wildlife refuges – Critical Dry Year Determination

### MARCH

- **March 1** — Between the February and March 1 Sacramento River Unimpaired Runoff Water Year Forecast at the 90% exceedance, there was a 725,000 acre-feet reduction in projected inflow.
- **March 23** — **Reclamation suspended the 5% allocation for south-of-Delta agricultural water service contractors due to worsening drought conditions.**

### APRIL

- **April 16** — In coordination with federal and state fish agencies, **Reclamation began implementation of a warm water power bypass at Shasta Dam to help save cold water for later in the summer when most needed by winter-run Chinook salmon.** By sacrificing over 120 million kilowatt hours of carbon-neutral energy, Reclamation saved approximately 300,000 acre-feet of cold water. Reclamation released water from the upper layers of Shasta Reservoir directly through the dam's river outlets into the Sacramento River.
- **Mid-April** — The weekly water supply update from DWR indicated significant reduction in projected inflow to all reservoirs due to dry soils and evaporation.
- **Mid-April** — Reclamation significantly reduced Folsom releases to conserve storage to protect water needed to meet public health and safety out of Folsom Reservoir.

### MAY

- Sacramento River Settlement Contractors (SRSC) voluntarily participated in water transfers by making water available through groundwater substitution and cropland idling/crop shifting. SRSC pumped groundwater in-lieu of diverting surface water, thereby making surface water available for transfer.
- **May 1** — Between the April and May 1 "Sac Four River Index 90% forecast;" there was an unexpected 685,000 acre-feet reduction in projected inflow.



## MAY, Cont.

- **May 5 – Reclamation suspended the 5% allocation for north-of-Delta agricultural water service contractors due to worsening drought conditions.**
- **May 10 –** For the first time in CVP history, Reclamation released water from New Melones Reservoir to assist with meeting Delta salinity and outflow requirements; this action continues through late August.
- **May 17 – DWR and Reclamation filed a Temporary Urgency Change Petition (TUCP) to** the State Water Resources Control Board requesting temporary changes to water rights requirements regarding Delta water quality objectives designed to protect fish, wildlife, and agricultural water quality in order to maintain water storage in upstream reservoirs and meet other obligations such as M&I water supply.
- **May 26 – Reclamation updated allocations for CVP water users again due to worsening drought conditions:**
  - » Agricultural water service contractors north- and south-of-Delta confirmed at 0%
  - » M&I water service contractors reduced from 55% to 25% of historic use
- **May 28 – Reclamation submitted 2021 Sacramento River Temperature Management Plan to the State Water Resources Control Board.**

## JUNE

- **June 1 – State Water Resources Control Board approved TUCP to be effective between June 1 and August 15, 2021.**
- **June 10 – State Water Resources Control Board approved the 2021 Sacramento River Temperature Management Plan subject to conditions.**
- **June 15 –** In coordination with NOAA Fisheries, Reclamation implemented emergency pulse flow on Clear Creek to benefit spring-run Chinook salmon. This pulse flow required no additional stored water beyond normal operations. Reclamation and partner agencies coordinated this operational adjustment by reducing base flow in preparation for this pulse flow release when most needed by spring-run Chinook salmon.

## JULY

- **July 8 –** The State Water Resources Control Board approved water right change petition to deliver up to 50,000 acre-feet of SWP water supplies in San Luis Reservoir to meet San Joaquin River Exchange Contractors settlement contract needs. This This delivery was done in exchange for San Joaquin River water made available in the California Aqueduct through the cooperation of many agencies and avoided the need to release water from Millerton Reservoir for this purpose. This action conserved limited surface water and avoided harming spring-run salmon spawning just below Friant Dam. The approval was increased to 150,000 acre-feet on August 25.



## AUGUST

**August 20** – State Water Resources Control Board issued curtailment orders to approximately 4,500 right holders to protect drinking water supplies, prevent salinity intrusion and minimize impacts to fisheries and the environment.

## SEPTEMBER

**September 30** – The CVP ends the water year with 3.21 million acre-feet of stored water.

### Long-Term Operation of the Central Valley Project

The federal CVP and the SWP together provide water for over 30 million Californians, millions of acres of some of the most productive farmland in the world, and 19 federal, state, and local wildlife refuges along the Pacific Flyway. The Projects reduce the risks of catastrophic flooding; protect and restore habitat for many rare and unique species; supplement local water supplies for communities; produce zero carbon hydroelectric power; backstop water quality in the Sacramento and San Joaquin Delta; and support important commercial and recreational fisheries.

Reclamation issued a Record of Decision (ROD) on February 18, 2020, completing the Reinitiation of Consultation on the Coordinated Long-Term Operation of the Central Valley Project and SWP, which provided new operating rules for the Projects. The ROD also established and/or identified technical teams or groups to provide input on various technical and scientific issues concerning the operation of the Central Valley Project and SWP. In 2021, Reclamation, in coordination with NOAA Fisheries, U.S. Fish and Wildlife Service (USFWS), DWR, California Department of Fish and Wildlife (CDFW), and the State Water Resources Control Board, completed an adaptive management cycle on ROD implementation. Flow guidance documents, non-flow action charters, and seasonal reports that were initially developed in 2020 were revised in 2021 with updated information and lessons learned from the previous year.

On September 30, 2021, **Reclamation and DWR requested reinitiation of consultation** under Section 7 of the federal Endangered Species Act (ESA) with the federal fishery agencies; **USFWS** and **NOAA Fisheries** agreed to the reinitiation of consultation on October 1. The ESA reinitiation of consultation was requested due to anticipated modifications to a new Proposed Action that may cause effects to ESA-listed species or designated critical habitat not analyzed in the 2019 USFWS and NOAA Fisheries Biological Opinions. Public scoping meetings to seek public input will begin in March 2022.

## Klamath Project

The Klamath Project 2021 water year was the second lowest on record for precipitation (2014 being the lowest on record) in the Klamath Basin. Reclamation maintained efforts to balance the diverse water supply needs within the Klamath Basin and monitored drought conditions during difficult circumstances. Specific actions included:

- Conducted an emergency closure of the A Canal that included reinstalling the bulkheads at the headgates to protect public safety and water supply while securing the A Canal facility and urban infrastructure
- Managed stored water supplies in effort to meet federal ESA obligations under Biological Opinions issued by USFWS and NOAA Fisheries
- Continued to fund habitat restoration projects and facility improvements to protect critical habitat for threatened and endangered species
- Facilitated transfers in coordination with PacifiCorp, USFWS, and Tulelake Irrigation District to prevent a wildlife die-off in Tule Lake National Wildlife Refuge, resulting in adequate depth for suckers and preventing an avian botulism outbreak
- Provided \$20 million to the Klamath Project Drought Response Agency (KPDRA) to administer drought response programs within the Klamath Project
- Distributed \$3 million for Klamath Basin Tribal drought assistance through the Native American Affairs Program to provide economic relief and technical assistance for ecosystem activities in the Klamath Basin
- Assisted Oregon Water Resources Department in transporting water tanks to homes with domestic wells that ran dry
- Closely coordinated drought operation decisions with Tribes and water users and federal, state, and local governmental partners



Strong winds stir up dry soil, creating dust devils in the Upper Klamath Basin in the summer of 2021.



Dried out Tule Lake National Wildlife Refuge in July 2021 in Siskiyou County, California, a critical resource for 80% of migratory waterfowl in the Pacific Flyway.



## Klamath Project 2021 Water Year Timeline

### JANUARY – APRIL

- Reclamation held four meetings with Tribal representatives, Klamath Project water users, NOAA Fisheries, USFWS, and other entities to provide hydrologic updates and solicit feedback on 2021 operations.

### APRIL

- **April 1** — Natural Resources Conservation Service (NRCS) March 1 forecast of 430,000 acre-feet of inflow to Upper Klamath Lake from March-September is reduced to 305,000 acre-feet as of April 1.
- **April 14** — Reclamation distributed [news release](#) announcing:
  - » The release of the 2021 Temporary Operations Plan to address operational deviations from the 2020 Interim Operating Plan due to drought conditions. The plan was developed in coordination with NOAA Fisheries, USFWS, Tribes, and Klamath Project water users.
  - » An initial allocation of 33,000 acre-feet was announced (based on the NRCS April 1, 2021 forecast) and provisions in the Temporary Operations Plan, which provided operational guidance on Upper Klamath Lake elevation and Klamath River flow management.
  - » \$15 million in drought relief to the Klamath Project through the KPDRF plus an additional \$3 million in technical assistance to Tribes for technical assistance.

### MAY

- **May 1** - Drought conditions worsened; NRCS's May 1 forecast for Upper Klamath Lake inflow showed 85,000 acre-feet below what was reported on April 1.
- **May 12** — Reclamation distributed [news release](#) announcing:
  - » Unauthorized diversions expected to use most of the 33,000 acre-feet allocation.
  - » The A Canal will remain closed for the 2021 irrigation season due to lack of sufficient water supply to safely operate the canal.
  - » A surface flushing flow for salmon would not be implemented in 2021.

### JUNE

- **June 18** — Reclamation informed Klamath Project irrigators that none of the initial 33,000 acre-feet allocation will be available for the irrigation season.

### JULY

- **July 16** — \$15 million funding agreement between Reclamation and the KPDRF was executed.
- **July 17** — The Department of the Interior distributed [note to media](#) announcing Reclamation's \$15 million cooperative agreement with the KPDRF to distribute drought relief funds to Klamath Project irrigators in Oregon and California.



## AUGUST

- **August 5** — Reclamation in coordination with the USFWS, along with support from Tulelake Irrigation District, took action to protect from wildlife die-off in Tule Lake National Wildlife Refuge:
  - » Reclamation requested PacifiCorp utilize storage from Copco and Iron Gate reservoirs to meet Klamath River flow requirements, allowing for deliveries to Tule Lake Sump 1B.
  - » Reclamation, over the course of 4.5 weeks delivered around 9,300 acre-feet, resulting in 1.69 feet of additional depth in the sump which:
    - Provided adequate depth for sucker fish
    - Prevented an avian botulism outbreak

## JUNE – SEPTEMBER

- Consistent with the adjusted Temporary Operations Plan, Reclamation provided weekly updates to Tribes, USFWS, and NOAA Fisheries to discuss whether deviations from minimum Upper Klamath Lake elevations and Klamath River flows were necessary. No deviations occurred.

## JULY – AUGUST

- Reclamation assisted Oregon Water Resources Department in transporting water tanks to homes with wells that ran dry due to continued drought conditions reducing available ground water.

## SEPTEMBER

- **September 27** — Reclamation informed Klamath Project irrigators that water was still not available at the end of the season, allowing Upper Klamath Lake to better position itself to better meet the all the water needs of the Klamath Basin in 2022.
- 2021 end of season water delivery summary to Klamath Project:
  - » No diversions were authorized from Upper Klamath Lake
    - Over 31,000 acre-feet in out of priority and unauthorized diversions occurred from Upper Klamath lake Plan
  - » 23,000 acre-feet was delivered from Clear Lake reservoir and 32,000 acre-feet from Gerber Reservoir

## OCTOBER

- **October 1** — Reclamation transitioned Klamath Project operations from the adjusted Temporary Operations Plan back to the Interim Operations Plan.
- **October 1** — Upper Klamath Lake elevations projected to exceed ESA Upper Klamath Lake minimums by approximately 0.5 feet.
- **October 5** — Reclamation distributed [news release](#) announcing:
  - » Increase in drought funding to \$20 million available for Klamath Project irrigators impacted by the unavailability of water supply during the 2021 irrigation season.

## NOVEMBER

- **November 15** — Reclamation distributed [news release](#) announcing:
- » \$2.7 million in funding for activities and projects to enhance survival and recovery of coho salmon in the Klamath River Basin.
- 

### Long-Term Operation of the Klamath Project

Reclamation's Klamath Project is a system of dams, pumping plants, and canals that delivers up to 420,000 acre-feet of water to around 230,000 acres of irrigable lands in southern Oregon and northern California, and in the past has delivered up to 50,000 acre-feet of water to the Lower Klamath National Wildlife Refuge.

In operating the Klamath Project, Reclamation maintains Upper Klamath Lake water levels to protect critical habitat for endangered Lost River and short-nosed sucker fish, and Klamath River flow releases to protect critical habitat for threatened coho salmon, and Chinook salmon, a food source for endangered southern resident orcas. Every other year (even-numbered years), flows are requested for a Yurok Tribe Boat Dance ceremony.

An Interim Operating Plan for the Klamath Project was developed in 2020 and will be in place until Reclamation, NOAA Fisheries, and USFWS complete a reinitiation of consultation under Section 7 of the ESA. Adjustments were made to the Interim Operating Plan during the last two water years due to critically dry hydrologic conditions.



Part of the original dam structure completed in 1910 at Clear Lake Reservoir in Modoc County, California; its levels are reflective of last year's second driest year on record.

## Other Water Projects in the California-Great Basin Region



Aerial photo shows East Park Dam and Reservoir; Colusa County manages the reservoir and 1,600 acres of surrounding parklands, a popular recreation spot.

The critically dry year prompted actions within some of Reclamation's smaller water projects as well. Reclamation's East Park Dam and Reservoir, part of the Orland Project, took advantage of the extreme drought conditions and low reservoir levels to perform necessary dam maintenance and repairs.

On the Central Coast, Reclamation, at the request of Santa Barbara County, initiated a drought mitigation measure effort at the Santa Maria Project to evaluate the Project's use of adaptive flood control management to increase storage through the rain flood control season. Efforts also continued with partners, Santa Maria Valley Water Conservation District and Federal Emergency Management Agency, in removal of sedimentation, which has reduced the storage capacity of Twitchell Reservoir.

In the Cachuma Project, new operational procedures were adopted to minimize hazards to critical habitat caused by power loss and low-elevation levels to the reservoir by using a gravity-fed distribution configuration. This prevented loss of flow to the Hilton Creek habitat during 11 identified loss-of-power events. Rearing flows in the Santa Ynez River were also extended to protect observed spawning sites for ESA protected steelhead.

Reclamation's Solano Project, which includes Monticello Dam and Lake Berryessa, and Putah Diversion Dam and Lake Solano were able to remain within authorized downstream water deliveries for consumption purposes only in 2021. Minimum flows to Putah Creek were not affected by the drought.

Reclamation reservoirs in the Truckee and Carson basins were operated in accordance with the Truckee River Operating Agreement and Operating Criteria and Procedures.

# Modernizing Infrastructure

In the CGB Region, many of our facilities are 50 to over 100 years old. While our dams, canals, pumping plants, and other infrastructure are well cared for, the maintenance costs keep rising and updates to our facilities are called for. The investment in and modernization of our critical infrastructure is one of Reclamation's highest priorities and we made considerable progress advancing improvement projects over the past year. From north to south, the following is a summary of some of our major initiatives.

## Fallon Paiute-Shoshone Tribe S7-3 Lateral Lining Grant

Reclamation partnered with the Fallon Paiute-Shoshone Tribe to improve and expand a Reclamation water canal within the Reservation boundaries. The canal, called the S7-3 lateral, is part of the federal Newlands Project located in west-central Nevada. Reclamation completed the project design, and the Fallon Paiute-Shoshone Tribe executed the construction contracts. The project consists of three segments; Segment 3 includes a new concrete lining for approximately 3,700 feet and new control features to allow more efficient delivery of Newlands Project water to Fallon Paiute-Shoshone Tribe irrigators and increasing conservation of water.



A Fallon Paiute-Shoshone Tribal grant in west-Central Nevada improved and expanded a Reclamation canal within the Reservation. Photo shows a 4-foot stainless steel slide gate at Segment 1 in May 2021.

## East Park Dam Modifications

**Reclamation's 111-year-old East Park Dam received inspections and modernization of the outlet work gates during the latter part of 2021.**

The reservoir and surrounding parklands closed in August to allow for the dam inspections when the reservoir level was at its lowest since 1977 due to drought conditions.

Located in Colusa County, about 33 miles southwest of the town of Orland, East Park Dam is owned by Reclamation and operated and maintained by the Orland Unit Water Users Association. Colusa County manages the reservoir and 1,600 acres of adjacent parklands. Although repairs on the dam infrastructure have occurred since being built, the regulating gate on the dam failed in 2020 and required repair. The reservoir began a drawdown on August 24 while elevations were at their lowest in decades. **Orland Unit Water Users Association completed the installation of the**



When the reservoir was at its lowest since 1977 due to ongoing drought conditions last August, the area was closed to allow for inspections at East Park Dam in Colusa County.

**replacement regulating gate and rehabilitation of the lower and mid-level gates.** The repair to the stem for the dam's lower intake gate will be fully complete early 2022.

East Park Reservoir is currently refilling via the East Park Feed Canal and recent precipitation. **Reclamation is restocking the reservoir in 2022 with a focus on fish species that had known stable populations prior to 2021.** Within two years all stocked fish species are anticipated to be reproducing and growing well to support improved conditions for recreational fishing. The reservoir and surrounding parklands are anticipated to be reopened by the County of Colusa spring 2022.



Orland Unit Water Users Association completed the dam's replacement regulating gate installation and the lower and mid-level gates' rehabilitation last fall (its machinery is shown in this photo).

## Nimbus Hatchery Fish Passage

Nimbus Dam, located seven miles downstream of Folsom Dam on the Lower American River, serves as an afterbay for Folsom Dam and re-regulates American River flows. The construction of Nimbus Dam in 1955, blocked the migration for some fish species like Chinook salmon and Central Valley steelhead. To mitigate for the loss of habitat, Reclamation constructed the Nimbus Fish Hatchery, operated by the CDFW, along with a fish weir and ladder, which became operational the same year. Since then, much of the hatchery infrastructure has been modernized, but the weir and ladder system had largely gone unchanged.



Visitors view returning fish at the entrance of the new Nimbus Fish Hatchery ladder — a more reliable, safer system for collecting adult fall-run Chinook salmon and Central Valley steelhead trout.

Efforts to improve the fish passageway has been in development for over 10 years with a phased design approach. **Significant progress occurred in 2021 with the first phase of construction that included the completion of a new fishway consisting of a concrete flume, pool, fish ladder, and rock-lined natural-looking channel leading fish back to the hatchery to spawn.** The new fish ladder also provides an opportunity to educate the public with new viewing windows installed on the ladder.

Upon completion of the \$12.2-million fish passage project, salmon and steelhead will have access to the Nimbus Basin spawning and rearing habitat improvement area for holding and in-river spawning. This feature's operation will also provide improved genetic diversity by expanding the hatchery's spawning season that was historically limited by potential river-flood flows that required Reclamation to remove the pickets earlier than the end of the salmon run.

## C.W. “Bill” Jones Pumping Plant Rewind

The C. W. “Bill” Jones Pumping Plant lifts water from the Sacramento-San Joaquin Delta into the Delta-Mendota Canal. The plant, located about 12 miles northwest of Tracy, is essential for supplying agricultural, urban, and wildlife water to parts of the Delta and to the San Luis and San Felipe Units of the CVP. The San Luis & Delta-Mendota Water Authority (Authority) operate and maintain the pumping plant and Delta-Mendota Canal under a transfer agreement with Reclamation. The Jones Pumping Plant consists of six pumps, each powered by a 22,500 horsepower (13,600 volt) electric motor that lift Delta waters about 200 feet from the intake through three discharge pipes, which then conveys it a distance of about one mile to the Delta-Mendota Canal. In 2018, the Authority began a six-phased project to rewind all units at Jones Pumping Plan after Reclamation performed a condition assessment and found that all pumping units were at the end of their service life.

The rewinding of the Jones Pumping Plant units is being completed through an Authority-managed construction contract and the scope of work includes the manufacturing and installation of new stator coils, stator laminations, and vents. The rotor poles are removed and rewound offsite by the contractor. Authority staff are responsible for the full electrical/mechanical disassembly and reassembly of the units on a strict schedule to prevent delays in the construction contract. Performance testing is completed at the end of each unit to confirm the unit performance meets the contract performance requirements. The contractor, the Authority, and Reclamation all work closely together and have fostered an excellent working relationship to accomplish the mutual goal of successful unit rewinds. In 2021, the rewind of the third unit (Unit No. 5) was completed and immediately following the successful performance test, the rewind of the fourth unit (Unit No. 1) was initiated. By the end of the year, the contractor portion of the unit rewind was completed, and the electrical/mechanical assembly of the unit was underway with an anticipated completion date in early 2022. The Jones Pumping Plant Unit Rewind Project began in March 2018 and the final unit is planned to be completed in September 2023. The units at the Jones Pumping Plant are a vital component of the CVP and rewinding the units will ensure they remain reliable.



Contractor employee installing one of the 228 new multi-turn coils into the slots in the new stator as part of the Jones Pumping Plant Unit Rewind Project. The C.W. “Bill” Jones Pumping Plant operates in conjunction with the nearby Tracy Fish Collection Facility to protect and salvage fish from pump operations.



Refurbished unit rotor ready for installation; work included removal of the 40 field pole assemblies, asbestos abatement, windings’ re-insulation, amortisseur bar replacement, and refurbished pole assemblies’ re-installation.

## Friant-Kern Canal Capacity Correction

In the San Joaquin Valley, Reclamation is working with the Friant Water Authority to restore capacity in a 33-mile stretch of the Friant-Kern Canal. The gravity-fed, 152-mile Friant-Kern Canal plays a critical role in delivering water to one million acres of highly productive farmland and more than 250,000 people from Fresno south to Bakersfield.

Since the canal's construction in 1951, more than 50% of its original capacity has been lost due to land subsidence. The diminished capacity in the canal has resulted in up to 300,000 acre-feet of reduced water deliveries in certain years. When complete, this project will restore capacity from the current 1,600 cubic-feet-per-second (cfs) to the original 4,000 cfs for a 10-mile stretch of canal in the middle reach.



Department of the Interior's Assistant Secretary of Water and Science Tanya Trujillo was a keynote speaker at the January 2022 ceremony.

With the feasibility report and environmental compliance completed in 2020, this past year was focused on completing tasks to pave the way for construction initiation on the first phase of the project. Phase 1 consists of constructing approximately 10 miles of new concrete lined canal parallel to the existing canal including construction of 8 concrete box siphons along with 9 turnouts, and a check structure. The Phase 1 solicitation was issued on May 4, 2021, and the contract was awarded October 7, 2021, to the joint venture Brosamer & Wall/Tutor Perini.

**Construction for the first phase of the project was kicked off with a groundbreaking ceremony in January 2022** and anticipated to be completed and fully operational by January 2024. The project is funded by Reclamation, Friant Water Authority, and DWR.



Representatives from the Bureau of Reclamation, Friant Water Authority, California Department of Water Resources, and other partners shovel the project's first dirt at the \$500 million Friant-Kern Canal Middle Reach Capacity Correction project site in Tulare County on Jan. 25, 2022.

## Delta-Mendota Canal Capacity Correction



Photo of Delta-Mendota Canal showing subsidence. Located along the west side of the San Joaquin Valley, the Delta-Mendota Canal is essential for irrigation supply as part of the San Luis Unit and CVP's Delta Division. Courtesy of California Department of Water Resources.

Similar to the Friant-Kern Canal, the Delta-Mendota Canal is also in need of repair, as it is experiencing a 30% capacity loss due to subsidence. The 117-mile-long Delta-Mendota Canal begins at C.W. “Bill” Jones Pumping Plant near Tracy. The canal then follows the Coast Range south, providing irrigation water to the west side of the San Joaquin Valley along its route and terminating at Mendota Pool.

Completed in 1951, the canal has experienced capacity loss due to subsidence from groundwater pumping. The reduced capacity has led to reductions in storage in San Luis Reservoir. Reclamation in conjunction with the Authority began an appraisal study in February 2020 to restore the canal's capacity of over 70 miles of the Delta-Mendota Canal and upgrade many canal crossings. The appraisal study was completed in October 2020. Reclamation along with the Authority completed a Feasibility of Alternatives in September 2021 with the next to include a Feasibility level report covering the technical, economic, financial, and environmental aspects for the project.

## Joint Reach/San Luis Canal Capacity Correction

Similar to the other canals, the federally owned San Luis Canal has suffered subsidence. Reclamation is working with DWR to study and develop various alternatives to remediate the issue. During 2021, design efforts related to Check 17, Pool 17/18, and Pool 20/21 sub-projects achieved 30% design for both Joint Use Canal and federal turnouts along with design, engineering, and construction reviews for the Pool 20/21 Embankment Raise and Check 17 Replacement.



An aerial view of the California Aqueduct San Luis Canal in Merced County with Dos Amigos Pumping Plant in the foreground.

## B.F. Sisk Dam Modifications

B.F. Sisk Dam, completed in 1967, impounds San Luis Reservoir, the nation's largest offstream reservoir, and provides supplemental irrigation water storage and M&I water for the CVP and SWP. B.F. Sisk Dam is owned by Reclamation and operated by DWR. Storage in San Luis Reservoir is allotted 55% state and 45% federal.

In 2006, an issue evaluation was completed for B.F. Sisk Dam that identified the need for corrective actions. Corrective action alternatives were studied, investigated, and evaluated. In 2018, Reclamation selected a preferred alternative for dam safety modifications and moved into the final design process.

In December 2019, Reclamation and DWR announced a partnership to move forward on a \$1.1 billion seismic upgrade with the signing of a ROD and Notice of Determination. The dam safety project, Reclamation's largest project under the 1978 Safety of Dams Act, will add stability berms and other dam safety features to the existing 3.5-mile-long earthen dam. Increasing the dam height will reduce downstream public safety concerns by reducing the likelihood of overtopping if slumping were to occur during a seismic event. Exploratory blasting at B.F. Sisk occurred during 2020 in preparation for construction on the multi-year project to begin summer 2022.



Aerial view of Basalt Hill Rock Quarry next to B.F. Sisk Dam. The front loader places excavated materials in the portable rock screening plant, that material's fed to the rock crusher, and then it is stockpiled via conveyor belts.



A front loader in action at Basalt Hill Rock Quarry for this Safety of Dams' project near Los Banos; this dam impounds San Luis Reservoir to provide water to communities, farmland, and Pacific Flyway wetlands south-of-the-Delta.

# Advancing Storage Projects

Reclamation has been studying and pursuing new water storage opportunities for decades. Even as the state's population has nearly doubled, no major federal water storage infrastructure has been built since 1979. Reclamation, along with our partners, are making strides to change this. From Northern California to the San Joaquin Valley, Reclamation has provided the foundation to make new water storage plans become a reality. The following are some of the region's highlights from 2021.

## Sites Reservoir

As part of a continuing effort to increase storage capability throughout California, Reclamation and the Sites Project Authority worked together to evaluate new offstream surface water storage north of the Sacramento-San Joaquin Delta. Located 10 miles west of the town of Maxwell in rural Glenn and Colusa counties, Sites Reservoir would store water that is diverted from the Sacramento River for later release by beneficiaries throughout the state of California. The Sites Reservoir would store up to 1.5 million acre-feet of water and has the potential to increase Northern California's water storage by 15%.



Proposed location of Sites Reservoir, will store water diverted from the Sacramento River for later release by beneficiaries throughout California.

Reclamation and the Sites Project Authority jointly released a Revised Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement in November, to evaluate a project that can meet the water supply benefits required by the participating agencies. Two virtual public meetings were held in December to review the proposed alternatives and accept public comment. Sites Reservoir remains eligible for \$836 million in state funds to advance under the State of California's Proposition 1 Water Storage Investment Program, the largest award given to any project requesting funding. It has received significant federal investment including over \$100 million in Water Infrastructure Improvements for the Nation (WIIN) Act funding and is tentatively eligible for a \$449 million loan from the U.S. Department of Agriculture's Rural Development Program. Environmental compliance and water right processes are expected to continue through 2022. As the project advances, it will be optimized for current conditions and affordability of all participants, while maintaining flexibility to adapt to changing conditions.

## Folsom Dam Raise

Beginning in January 2020, Reclamation and partner, U.S. Army Corps of Engineers (Corps), broke ground on the Folsom Dam Raise Project. The project is part of a continuing effort to increase storage capability throughout California. The Folsom Dam Raise Project will increase flood-risk-management by using the reservoir's extra storage space to maximize both flood-storage capacity and flood protection to downstream American River communities.



Photo of Folsom Dam and new auxiliary spillway in 2021.

In June 2020, the Corps completed Phase 1 of the Folsom Dam Raise Project, which included raising Folsom Reservoir's Dike 8. The Corps is currently working on plans to award multiple contracts in fiscal years 2022 and 2023, which will include the Main Dam, Left and Right-Wing Dams and Dikes 1-6. With Reclamation's unique knowledge of Folsom Dam and operations, Reclamation has provided the Corps with continued support to the Folsom Dam Raise design development.

## Los Vaqueros Reservoir Expansion Phase 2

Los Vaqueros Reservoir is an existing offstream storage facility operated by Contra Costa Water District (CCWD), located in northeastern Contra Costa County. The Los Vaqueros Reservoir Expansion (LVE) is a joint investigation between Reclamation and CCWD, authorized by Congress in 2003.

The original Los Vaqueros Reservoir was completed in 1998 with a capacity of 100,000 acre-feet and later expanded to 160,000 acre-feet to improve CCWD's ability to deliver good water quality year-round and to provide emergency storage for their customers. Phase 2 is a collaborative effort that evaluated the feasibility of expanding Los Vaqueros Reservoir from the expanded size of 160,000 acre-feet to



Los Vaqueros Reservoir Expansion Project Phase 2, a joint Reclamation and Contra Costa Water District effort in northeastern Contra Costa County, would increase its capacity by 115,000 acre-feet, as well as CVP's water supply reliability and operational flexibility. Photo courtesy of Contra Costa Water District.

a total capacity of 275,000 acre-feet. This expansion would provide increased water supply reliability and operational flexibility to the CVP. In addition, the expansion would deliver water supplies to various Bay Area M&I water providers, as well as federally recognized wildlife refuge areas and irrigation districts in the San Joaquin Valley.

In 2020, the project received a feasibility determination from the Secretary of Interior pursuant to the WIIN Act. In 2021, the project received a feasibility determination from the California Water Commission pursuant to the Proposition 1 Water Storage Investment Program. Additionally in fiscal year 2022, the project received \$50 million in WIIN Act construction funding, and Reclamation and CCWD continue to work together to advance the project towards construction.



Map of Los Vaqueros Reservoir and surrounding area.

## B.F. Sisk Raise and Reservoir Expansion

B.F. Sisk Dam is a 382-foot high earthfill embankment located on the west side of the Central Valley, about 12 miles west of Los Banos. The dam is about 3.5-miles long and impounds San Luis Reservoir, the nation's largest offstream reservoir, which has a total capacity of over two million acre-feet of water. The reservoir provides supplemental irrigation water storage for the CVP and M&I water for the SWP. The dam and reservoir are owned by Reclamation and operated by DWR. San Luis Reservoir storage is allotted 55% state and 45% federal.



A drone view of San Luis Reservoir with storage at 363,587 acre feet, 18% capacity, or 38% of historical average. Photo taken Aug. 10, 2021, courtesy of California Department of Water Resources.

While implementing Safety of Dam Program modifications at B.F. Sisk Dam, Reclamation is partnering with the Authority to investigate raising the dam an additional ~10 feet to create an extra 130,000 acre-feet of storage in San Luis Reservoir. The additional space would be used to store water that could be delivered to south-of-Delta water contractors and wildlife refuges. This water would meet existing contractual obligations and not serve any new demands.

A Draft Supplemental Environmental Impact Statement (EIS) and Draft Environmental Impacts Report (EIR) were released in August 2020, followed by final environmental documents in December. A Final Feasibility Report was also transmitted to Congress in December with a finding of feasibility. During 2021, Reclamation and the Authority focused efforts on addressing the President's Office of Management and Budget's (OMB) request for additional information made during the review of the Feasibility Report. This involved significant coordination on the selection of an operational configuration. Reclamation collaborated with the Authority and their member agencies to select a combined CVP and investor-directed storage configuration. This selection was described in an addendum to the Feasibility Report, which is planned to be submitted in 2022 to OMB. In addition, consultations were initiated under ESA and the Natural Historic Preservation Act in preparation to sign the ROD. With \$60 million for construction received in fiscal year 2022 under the WIIN Act, 2022 will present more opportunities for advancement starting with the execution of the Record of Decision and cost share agreement with the non-federal partners in summer and initiation of final project design.

## Del Puerto Canyon Reservoir

Reclamation is working with Del Puerto Water District and the San Joaquin River Exchange Contractors Authority on a proposal to construct a new offstream reservoir to develop additional water storage south-of-the-Delta. The reservoir would be located on Del Puerto Creek in the Coastal Range, west of Patterson and Interstate 5. With a pipeline connection to the Delta-Mendota Canal, the reservoir would provide up to 82,000 acre-feet of water storage for nearby highly productive farmlands, in addition to benefits for refuge water supply, flood protection, and M&I supply for the city of Patterson. The project sponsors completed a Final Feasibility Report for the project, and the project received a feasibility determination from the Secretary of Interior on December 31, 2020.



An artist's rendering depicts the proposed Del Puerto Canyon Reservoir, a new offstream reservoir to develop more water storage south-of-the-Delta, received \$15 million in 2022 funding for permitting, engineering, and design.

Reclamation is preparing a Draft EIS for the project, and it is scheduled to be completed in 2022. Reclamation is currently coordinating with the project sponsors to review and revise the Administrative Draft EIS. The project received \$15 million in construction funding in fiscal year 2022, which will cover tasks including permitting, engineering, and design.

# Optimizing Renewable Hydropower



Shasta Powerplant is located just below Shasta Dam and includes five main generating units which have a capacity of approximately 710 megawatts.

Reclamation's California Great-Basin Power Program optimization of the CVP hydropower resource managed to provide value to its customers during unusually dry conditions last year. In fiscal year 2021, the CVP generated 2,933 gigawatt-hours with 1,815 gigawatt-hours delivered to the customer Base Resource. While FY2021 was the second lowest hydrology on record, with well below average total generation, Base Resource customers achieved generation valued at \$113.9M at a cost of \$90.2M. This was due to the Central Valley Operation's power peaking program, which prioritizes generation during high value hours and also to market power prices that were higher than historical pricing. If market power pricing remains high, this will mean even greater value to CVP and Base Resource customers in years with better hydrology.



Aerial view of Keswick Dam and Powerplant. CVP power generation is 'shaped' so that maximum production is predominantly available during peak demand hours from afternoon through early evening.

## Central Valley Project Power Initiative

Reclamation's California Great-Basin CVP Power Initiative was developed and implemented in 2019 to improve customer confidence through a reformed relationship with power customers. The initiative has four main focused areas: Cost Stability, Lost Production Opportunity, Value of the Resource, and Customer Service. Updates were provided to the customers throughout the year with six-month status reports as well as topic-specific papers posted on the regional hydropower website. In fiscal year 2021, Reclamation provided CVP power customers with updates and documents regarding miscellaneous revenues associated with aid-to-irrigation, construction cost recovery, non-permanent contract revenue treatment, and a summary of benefits derived from the Western Area Power Administration/Sierra Nevada power experiments. These documents were provided along with the bi-annual CVP Power Initiative on Reclamation's CVP Power Initiative Website in April 2021.

## Turbine Runner Replacements (Trinity and Spring Creek Powerplants)

Turbine runner replacement contracts have been underway at both Trinity and Spring Creek Powerplants. During fiscal year 2021, Trinity Unit 2 was unstacked by the crews at Reclamation's Northern California Area Office (NCAO) and parts are being furnished or repaired by the contractor, General Electric.

The scope of work includes furnishing a new stainless steel turbine runner and wicket gates along with significant repairs to the machinery including the head cover, wear rings, and associated parts, equipment, and systems. The work is expected to be completed with the unit returned to service by mid-2022. The new runners have improved efficiency over the originals, and they span the entire operational head range, eliminating the need for high head and low head runners. The first Trinity unit has already been completed, and Reclamation and the contractor performed further turbine testing with the low reservoir.

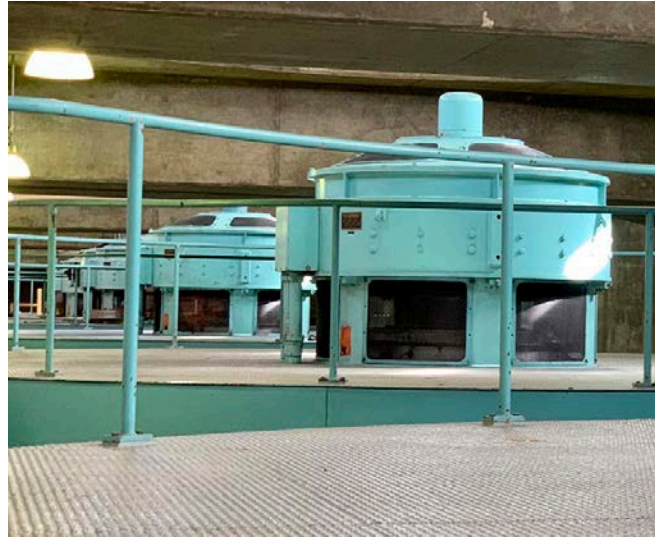


Trinity Powerplant at Trinity River has two generators with current total capacity of approximately 140 megawatts.

Likewise, another turbine contract is underway for two-unit Spring Creek Powerplant. During 2021, manufacturing of the first turbine runner was completed and inspected. Similar to the Trinity turbine work, NCAO crews perform all of the onsite work including disassembly, repairs, and reassembly. The contractor is similarly furnishing two new stainless steel turbine runners and wicket gates along with significant repairs to the machinery including the head cover, wear rings, and associated parts, equipment, and systems.

## Electric Imbalance Market

Reclamation's California Great-Basin modified its CVP control center operations to support the Western Area Power Administration – Sierra Nevada Region (WAPA/SNR) entry into the CAISO's Electric Imbalance Market (EIM). The EIM is an automated, voluntary, real-time, energy wholesale market that matches lowest-cost electricity supply with demand every 15 minutes and dispatches every 5 minutes. EIM is a centralized market that integrates renewable energy into the grid by expanding access to the participating balancing authority areas from other regions and states. EIM software automatically finds the lowest cost resources across a larger geographical area to meet immediate power needs, thereby reducing costs for participants.



Close up view of the pumps located at the C.W. "Bill" Jones Pumping Plant on the Sacramento-San Joaquin River Delta.

Reclamation's CVO Office modified its hourly dispatch of generating units to meet the new requirements for entering CAISO's EIM on March 25, 2021. CVO's migration involved redesigning and reprogramming its system operations and operational aggregation of the CVP powerplants as well as developing new operational procedures and training its own HydroSystem Controllers, all of which was coordinated with our federal partners WAPA/SNR, the Balancing Authority of Northern California (BANC) and other BANC participants.

## Frequency Response Reserves

Reclamation's California Great-Basin supported a major change in how power grid reserves are managed. In coordination with the Western Area Power Administration and Reclamation, the BANC began the Frequency Response Reserve (FRR) project in 2019 aiming to operationalize one of the first FRR methodologies in the West. FRR replaced the older 50% Spinning Reserve requirement with a methodology that capitalizes on the inherent strength of hydropower units to rapidly respond to frequency variations. CVO staff developed a new CVP SCADA process control program to manage FRR resources. FRR Field Test Operations began in November 2020 and the full system activation occurred in February 2021. FRR uses less water for reliability purposes thus increasing available water for overall hydropower production.

# Enhancing Habitat Restoration and Conservation

## Central Valley Project Habitat Restoration

Reclamation, in coordination with the USFWS and in partnership with other federal, state, and local parties, funds and constructs extensive Chinook salmon and Central Valley steelhead spawning and rearing habitat restoration projects on Central Valley rivers and streams below Reclamation-operated dams. The following are some highlights from 2021.

### Anderson River Park – Sacramento River

- As part of the project's Phase II and III, Reclamation and partners created .5 acres of Chinook salmon spawning habitat; 2.9 acres of rearing habitat; and 1 acre of floodplain habitat near Anderson, CA.
- Partners: CDFW, City of Anderson, Chico State University, DWR, Golden State Salmon Association, Pacific States Marine Fisheries Commission, River Partners, Sacramento River Forum, and USFWS.



Anderson River Park Phase II and III are shown on the Sacramento River looking downstream.

### Nur Pon (South Cypress) – Sacramento River

- Created 1 acre of Chinook salmon spawning habitat, 5.2 acres of rearing habitat, 2.9 acres of predator hot spot reduction, with more than 40 clusters of large wood for cover.
- Partners: CDFW, City of Redding, Chico State University, DWR, Sacramento River Settlement Contractors, Golden State Salmon Association, Pacific States Marine Fisheries Commission, River Partners, Sacramento River Forum, Trout Unlimited, and USFWS.



Nur Pon (South Cypress) Side Channel shown on the Sacramento River looking downstream.

### Ancil Hoffman – American River

- Created 2.5 acres of floodplain habitat for Chinook salmon and Central Valley steelhead and removed .25 acres of stranding habitat
- Maintained 2 acres of Chinook salmon and Central Valley steelhead spawning habitat and 1 acre of rearing habitat
- Partners: Sacramento Water Forum, City of Sacramento, CDFW, NOAA Fisheries, Sacramento Area Flood Control Agency, Sacramento County Parks, Effie Yeaw Nature Center, and USFWS.



Ancil Hoffman floodplain on the lower American River. This project recreated spawning and rearing habitat by constructing new gravel beds in the river and carving a new alcove to protect juvenile fish near Ancil Hoffman Park, halfway between Folsom Dam and downtown Sacramento.

### Goodwin Canyon – Stanislaus River

- Created .2 acres of Chinook salmon spawning habitat and .25 acres of rearing habitat.
- Maintained 1.26 acres of spawning habitat
- Partners: CDFW, Army Corps, DWR, Oakdale Irrigation District, Sean Smith Construction, and South San Joaquin Irrigation District



Goodwin Canyon gravel on the Stanislaus River, looking downstream. Goodwin Canyon is currently the most upstream area that Chinook salmon and steelhead can reach on the Stanislaus River.

## Central Valley Project Conservation Program

The CVP Conservation Program (CVPCP) was developed by Reclamation and the USFWS during the Reinitiation of Consultation on the Long-Term Operation of the CVP and SWP. The program goal is to ensure that the existing CVP operation and renewal of CVP water-service contracts do not jeopardize listed or proposed species or adversely affect designated or proposed critical habitat. Accordingly, the CVPCP implements actions that protect, restore, and enhance special-status species and their habitats affected by the CVP. The program provides funds through grants and agreements to nonprofit organizations, state and local agencies, universities, and others to acquire and conserve lands, restore habitats, and conduct research leading to the conservation and restoration of lands to help recover federally listed species whose populations have been impacted by the CVP. In 2021, CVPCP funds went toward the following efforts:

### LI Livestock Ranch Conservation Easement Acquisition Project

Funds were provided to the California Rangeland Trust (CRT) for the purchase of a conservation easement at the LI Livestock Ranch to permanently conserve 1,600 acres in San Benito County. Species with high priority for conservation occurring on or near the Ranch include: California condor, California tiger salamander, California red-legged frog, San Joaquin kit fox, California linderiella, mountain lion, vernal pool fairy shrimp, western pond turtle, and western spadefoot toad. The conservation easement will be managed by CRT.



Stock pond at the LI Livestock Ranch supports federally threatened California tiger salamanders. Livestock management and salamander populations both benefit from conservation of the ranch.

### Genetic Investigation of Listed Vernal Pool Plants and their Communities in Merced County

Additional funds were provided to the University of California, Merced, for research that will provide information to improve conservation and management of vernal pool plant species. The information will assist vernal pool land managers by providing improved genetic protocols for soil plant species identification from soil samples; enhanced vernal pool plant species richness estimates; genetic marker resource development for listed species; and a population genetic investigation of threatened vernal pool species. Federally listed species whose populations will benefit from the information include Colusa grass, succulent owl's clover, and San Joaquin orcutt grass.



Genetic information gathered through Reclamation-funded genetics research will provide important information for the conservation of these CVP-impacted vernal pool plants in Merced County.

### **Alkali Scrub Habitat Restoration at Kern NWR**

Funds were provided to continue work started in 2020 toward the first phase of an effort to restore 5,000 acres of alkali scrub habitat at Kern and Pixley NWRs to benefit the endangered San Joaquin kit fox, Tipton kangaroo rat, and blunt-nosed leopard lizard. The restoration will assist Reclamation in meeting its requirement with the State Water Resources Control Board for the CVP Consolidated Place of Use.



Alkali scrub habitat featured in this photo are being restored at Kern and Pixley National Wildlife Refuges in Kern and Tulare counties.

### **Central Valley Project Improvement Act Habitat Restoration Program**

The CVPIA Habitat Restoration Program (HRP), managed by Reclamation and USFWS, was established under Title XXXIV, Section 3406 (b)(1) “other” of the CVPIA under the Fish and Wildlife Restoration Activities’ section. Funds are provided from the CVP Restoration Fund. The HRP implements actions to protect, restore, and enhance special-status species and their habitats affected by the CVP. Its purposes, processes, species and habitat priorities, and implementation are identical to that of the CVPCP, and the programs are jointly managed. In 2021, HRP grant funds to Reclamation went toward the following efforts:

#### **Young Ranch Serpentine Habitat Acquisition on Coyote Ridge**

Funds were provided to the Santa Clara Valley Habitat Agency to help acquire the 2,150-acre Young Ranch to conserve endangered species in Santa Clara County. The property contains increasingly rare serpentine soil habitats in the rapidly developing Silicon Valley of the San Francisco Bay Area. The property contains populations of the federally listed California tiger salamander, California red-legged frog, bay checkerspot butterfly, Metcalf Canyon jewelflower, and Santa Clara Valley dudleya. The property will become part of the Coyote Ridge Open Space Preserve.



Serpentine soil plants shown in this photo will be conserved due to the Young Ranch Serpentine Habitat Acquisition on Coyote Ridge in Santa Clara County.

#### **Sacramento River Riparian Habitat Restoration – Boeger Tract**

Funds were provided to continue work started in 2020 toward restoration of 51 acres of riparian habitat at The Nature Conservancy’s Boeger Tract on the Sacramento River in Colusa County. Once fully restored, the property will provide habitat for the federally listed western yellow-billed cuckoo and least Bell’s vireo.



Central Valley riparian habitat area to be restored at the Boeger Tract on the Sacramento River in Colusa County.



## San Joaquin River Restoration Program

The San Joaquin River Restoration Program is the direct result of the San Joaquin River Restoration Settlement reached in September 2006 by the U.S. Departments of the Interior and Commerce, the Natural Resources Defense Council, and the Friant Water Contractors. The Settlement, which followed an 18-year lawsuit, received federal-court approval in October 2006. The San Joaquin River Restoration Settlement Act was passed in March 2009, authorizing federal agencies to implement the Settlement. The Settlement is based on two goals:

**Restoration:** To restore and maintain fish populations in “good condition” in the main stem of the San Joaquin River below Friant Dam to the confluence of the Merced River, including naturally reproducing and self-sustaining populations of salmon and other fish.

**Water Management:** To reduce or avoid adverse water-supply impacts to all of the Friant Division long-term contractors that may result from the settlement’s interim flows and restoration flows.

Key 2021 accomplishments for the program include:

### Despite Drought Conditions, Spring-run Chinook Salmon Return Again

Even a record low water year in 2021 could not stop spring-run Chinook salmon from spawning in the San Joaquin River. Nearly 300 spring-run Chinook salmon made their way to the upper river reach near Friant Dam for the spawning season, and this milestone marked the fourth year of naturally returning adult spring-run salmon from the ocean to the Restoration Area. The continued spawning success is directly due to the efforts of the San Joaquin River Restoration Program, including Reclamation and other partnering implementing agencies: CDFW, DWR, NOAA Fisheries, and USFWS. Having a self-sustaining, naturally reproducing population of Chinook salmon in the San Joaquin River is a key goal of the San Joaquin River Restoration Settlement and having fish continuing to return to the river to complete their lifecycle in increasing numbers is a major milestone in meeting this goal.



Fishery biologists record a spring-run Chinook salmon carcass.

## Managing Limited Flows to Maximize Salmon Benefits

The 2021 drought year in California had far reaching impacts, and the San Joaquin River Program was forced to disconnect the river for the first time since Restoration Flows began in 2016. However, drawing on Program and reservoir management experts, the decision to dry portions of the river allowed the Program to successfully conserve the cold-water pool in Millerton Reservoir to create river conditions conducive to holding and spawning of adult salmon and incubation of eggs in the gravel for the next generation of spring-run. When fall ambient air temperatures began to cool the reservoir and river temperatures, Restoration Flows once again resumed to connect the river by late-December, offering newly hatched spring-run a fully flowing river in which to journey to the ocean.



A field staff releases a Chinook salmon to the river.

## Completion of Mowry Bridge

The San Joaquin River Restoration Program and partner, the City of Mendota, completed construction of Mowry Bridge, which will serve as a construction and operations and maintenance access point for the Program's Reach 2B Project. The project removed an existing condemned bridge and constructed a new, concrete pre-formed bridge across the Fresno Slough near the Mendota Pool. The bridge also serves as the critical supporting structure for the economically-disadvantaged city's new water line—their primary source of drinking water.



SJRRP completed construction on the Mowry Bridge to improve construction access for the Reach 2B and Mendota Pool Bypass Improvement Project near Mendota in Fresno County.

## Removal of Upper Weir in Eastside Bypass

To improve fish passage, channel capacity, and safety concerns, the San Joaquin River Restoration Program removed the upper weir on the Merced National Wildlife Refuge in the Eastside Bypass. A similar lower weir was removed by the Program two years ago. Thanks to the quick contracting work of the Region's Construction Acquisition office, work was completed in three days and before potentially impacting waterfowl migration season on the refuge. With both weirs removed and completion of the Reach O levee improvements in November 2020, the Eastside Bypass channel capacity for Restoration Flows has increased to 2,500 cfs —meeting meeting the Funding Constrained Framework Stage 1 Channel Capacity goal.



SJRRP improved fish passage by removing a weir in the San Luis National Wildlife Refuge in Merced County.

## Trinity River Restoration Program

The Trinity River Restoration Program (TRRP) is a multi-agency program with eight government and tribal partners and numerous collaborators. The TRRP implements the 2000 Trinity Mainstem Fisheries Restoration ROD, which directs the Department of the Interior to restore the fisheries of the Trinity River from the impacts of the operation of the Trinity River Division of the CVP. In 2021, the TRRP constructed: the Chapman Ranch Phase B Channel Rehabilitation Project on the Trinity River, implemented the 2000 ROD restoration flows from Lewiston Dam for the Critically Dry 2020 Water Year, conducted gravel augmentation immediately below Lewiston Dam, analyzed a significant change to restoration flow management, and continued science monitoring to assess Trinity River natural-origin salmonid recovery goals.

### Chapman Ranch Phase B Channel Rehabilitation Project

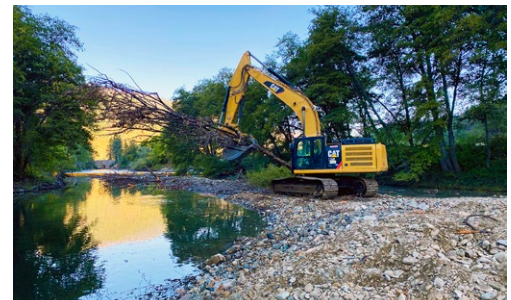
The collaborative Chapman Ranch Project, located about 27 miles downstream from Lewiston Dam, was constructed to recover dynamic river processes that will create and sustain salmon and steelhead habitat on the Trinity River. Design work for this project began in 2010; it is the second and final phase of the largest channel rehabilitation effort that the TRRP has undertaken to date. This is the second channel rehabilitation project that the TRRP constructed partially on USFS lands and is a testament to years of close cooperation with partners. Habitat benefits for fish and wildlife from this work will sustain over time as the river evolves with the constructed features and new terrain. These channel rehabilitation projects are monitored to assess the total change and optimal habitat across a range of flows before and after construction. Similar projects have shown significant improvements in the total available habitat, particularly for juvenile salmonids, which almost certainly contributes to the increased number of smolts that survive per spawning adult.

### Winter Flow Variability

Under the principles of adaptive management, the TRRP is directed to apply best available science to all of its' restoration tools, including flow management. In 2017, TRRP scientists embarked on an effort to understand how to optimize the use of flow to achieve restoration objectives. Analyses indicated that current flows were too late and too cold in the spring, and further, that the river was being held too static during the winter period when salmon evolved with a highly dynamic flow. This led to a proposal to shift a portion of the water earlier in the year to better emulate the flow pattern of a natural river.



*Looking upstream in a new meander constructed on the mainstem Trinity River at the Chapman Ranch Phase B Channel Rehabilitation Project restoration site. Trees with rootwads are buried in the bank to provide stability while riparian vegetation grows in.*



*An excavator places woody debris for fish habitat at the Chapman Ranch restoration site in Junction City.*

# Providing Additional Resources for Wildlife Refuges


## Pacific Flyway Drought Action



Gray Lodge Wildlife Area.

Drought conditions like California experienced in 2020 and 2021 has significant impacts on migratory birds that utilize the Pacific Flyway. Millions of ducks and geese typically migrate south in the fall from the northwest and Canada to spend the winter on the critical habitat of the Sacramento Valley's duck clubs, wildlife refuges, and post-harvest flooded rice fields. Unfortunately, in 2021 many refuges and managed wetland habitats experienced reduced amount of flooded habitat available to wildlife. The amount of post-harvest flooded rice fields was also reduced from about 270,000 post-harvest acres to only 65,000 acres.

Surface water diversions were reduced to benefit various beneficial purposes in the Sacramento Valley, including listed aquatic species, cities, farms, fish, and birds. Reclamation funded a pilot/demonstration project for use of existing groundwater wells from August 4, 2021, through October 31, 2021, to further offset surface water diversions from the Sacramento River in response to drought conditions. This project resulted in a reduction of in surface water diversions by SRSC from the Sacramento River. The voluntary reduction in surface water diversions by participating contractors assisted in Reclamation's efforts to manage water for various beneficial purposes in the Sacramento Valley.



This drought relief project allowed rice farmers to flood more of their rice acreage than was originally planned, assisting migratory birds in many ways. The overall footprint of flooded habitat available to ducks and geese expanded and was available to them for a longer period in fall 2021. The additional flooded rice acres allowed migratory birds to spread out, thus minimizing the threat and severity of avian disease outbreaks such as cholera. The additional habitat provided increased shelter from predators, and provided an additional, nutritious food source, supplemental to that available on refuges and duck clubs.

### Gray Lodge Wildlife Area

Gray Lodge Wildlife Area's (GLWA) location along the Pacific Flyway in Northern California's Butte County, make it a haven for wildlife. Surrounded by miles of agricultural lands, the 9,100-acre area is managed for more than 300 resident and migrant birds and mammals. The GLWA is managed by CDFW. The CVP Improvement Act (CVPIA) directs the Secretary of the Interior through Reclamation to deliver reliable water supplies of suitable quality and specified quantities to 19 refuges located in the Central Valley, including GLWA.

Currently, the GLWA receives an annual average of approximately 35,400 acre-feet Level 2 supplies through a combination of groundwater, CDFW water rights surface water, and CVPIA surface water supplies. However, the full refuge Level 4 allocation is 44,000 acre-feet of water supplies annually; this quantity includes Level 2 and is the amount identified for optimal habitat management.



*The 9,000-acre Gray Lodge Wildlife Area in Butte County receives about 35,400 acre-feet of water each year through groundwater, California Department of Fish and Wildlife surface water rights, and CVPIA surface water supplies.*

In 2003, Reclamation entered into a cooperative agreement with the Biggs-West Gridley Water District (BWGWD), a SWP settlement contractor, to convey CVPIA water supplies to GLWA's boundary, and to construct improvements to BWGWD's conveyance facilities to provide the capacity needed to deliver full Level 4 supplies and meet GLWA's scheduling and timing needs. Between 2013 and 2015 Reclamation completed Phase 1 of project construction. Remaining work to be completed under Phases 2, 3, 4, and 5 have been funded by State Proposition 1 funding in the amount of \$52.5 million. Activities completed in 2021 include:



**Lower Schwind Canal and Head Gate.**

- Major structures were completed on the Upper Traynor Lateral, including drain crossings at Stations 64 and 112, and new check structure at Station 102. Multiple farm turnouts were also replaced.

- Within the Lower Traynor Lateral, Check Structure 235 was completed. Other work included the installation of culverts, ditches, and rice checks outside of the canal.
- Within the Schwind Lateral, the reconstruction of the Schwind Flume and the construction of Check 88 were both completed. Farm turnouts were also replaced at multiple locations.
- Work on the Afton Road Bridge and vegetation management was performed.

### **Sutter National Wildlife Refuge**

Located in the Sacramento Valley, the Sutter National Wildlife Refuge (SNWR) is the southern-most refuge in the Sacramento National Wildlife Refuge Complex. The refuge consists of about 2,400 acres that supports wintering populations of more than 225,000 ducks and geese. The SNWR is owned and managed by USFWS. The CVP Improvement Act (CVPIA) directs the Secretary of the Interior through Reclamation to deliver reliable water supplies of suitable quality and specified quantities of water to 19 refuges located in the Central Valley, including SNWR.



Sutter National Wildlife Refuge is located in the Sacramento National Wildlife Refuge Complex and is owned and operated by U.S. Fish and Wildlife Service.

The SNWR currently receives its' primary water supply through riparian and appropriative water rights taken from the Lower Butte Creek's Sutter Flood Control Bypass facility (East Borrow Ditch). This water source is not a reliable water source to meet SNWR's scheduled needs. To improve water supply availability, Reclamation, and partners USFWS and Ducks Unlimited, are constructing the SNWR Lift Station. The lift station will allow delivery of the maximum Level 4 refuge water supplies (30,000 acre-feet/annually) and is versatile enough to efficiently handle a wide range of flow rates to satisfy diverse wildlife habitat management goals. Project funding includes State Proposition 1 funding. In 2021, Reclamation completed the design phase and environmental compliance for the project.

## Implementing Water Reuse Projects

Under the WaterSMART Program, Reclamation helps to implement a variety of water recycling and reuse projects. Title XVI of P.L. 102-575, as amended, provides authority for the program, called Reclamation's "Title XVI Program." Through the Title XVI Program, Reclamation identifies and investigates opportunities to reclaim and reuse wastewaters and impaired ground and surface water. Title XVI includes funding for the planning, design, and construction of water recycling and reuse projects in partnership with local government entities. In 2021, Reclamation continued our partnership with two projects in the coastal Monterey Bay area.



This advanced water purification facility serves 12 Monterey County communities, providing wastewater treatment services and recycling 4 billion gallons of crop water.

### Pure Water Monterey

A total of \$19,683,178 was appropriated by the federal government in 2021 for the Pure Water Monterey Project under WIIN Title XVI grant funding. Monterey One Water, the Title XVI project sponsor, is a Joint Powers Authority that serves the California communities of: Del Rey Oaks, Monterey, Pacific Grove, Salinas, Sand City, Seaside, Boronda, Castroville, Moss Landing, Fort Ord, Monterey County, and Marina. Monterey One Water provides wastewater treatment services to over 250,000 people; processes over 18.5 million gallons of wastewater each day; and recycles approximately 4 billion gallons of water for crops. Using a proven, multi-stage treatment process, Pure Water Monterey turns wastewater into a safe, reliable, and sustainable water supply. The project injects recycled water to replenish the

Seaside Groundwater Basin with 3,500 acre-feet/year and provides up to 4,500 acre-feet/year of additional recycled water for agricultural crop irrigation in northern Salinas Valley, including a drought reserve of 200 acre-feet/year.

## Pure Water Soquel

Pure Water Soquel has been appropriated a total of \$9,075,000 and is eligible for up to \$20,000,000. Reclamation intends to award a funding agreement in fiscal year 2022 pending completion of environmental documentation and a financial capability assessment. The Pure Water Soquel project is a joint effort by Soquel Creek Water District and the City of Santa Cruz to supplement natural recharge of the Santa Cruz mid-county groundwater basin with purified wastewater to increase sustainability of the Soquel Creek Water District's groundwater resources. The project includes capturing two million gallons of secondary treated effluent per day from the Santa Cruz Wastewater Treatment Facility, treating the water, and then distributing 1,500 acre-feet of purified water annually to recharge wells. The project is currently under construction and is anticipated to be completed in 2023.



Welders working on the infrastructure for the new wastewater purification facility



A groundbreaking ceremony was held on December 10, 2021, to celebrate this upcoming 2023 wastewater purification facility in Santa Cruz County.

# Enriching Recreation Opportunities and Protecting Natural Resources

Over the past decades, Reclamation has gravitated from development of single-purpose agricultural projects toward a multipurpose approach to water resource development that includes recreation. Today, Reclamation plays a major role in meeting the increasing public demands for water-based outdoor recreation facilities and opportunities. In the California-Great Basin Region, Reclamation manages, with partners, 41 recreation sites that have over 7 million visitors annually. Here's a snapshot of some of the region's recreation highlights from 2021:

## Auburn State Recreation Area and Auburn Project Lands



Goats graze within the wildland-urban interface in Auburn Project Lands in the winter as part of a five-year plan to reduce vegetation for wildfire prevention.

Working closely with the California Department of Parks and Recreation (State Parks), Reclamation met major milestones in 2020 on the Auburn State Recreation Area (SRA) General Plan/Resource Management Plan (GP/RMP). In August 2020, Reclamation signed a ROD that will guide the future development and management of Auburn SRA and Auburn Project Lands, ensuring the best possible stewardship for the benefit of all visitors.

The GP/RMP is a programmatic document that outlines broad goals and guidelines for management of Auburn SRA, including resource protection and land use strategies that will serve the communities and recreating public in the long term. These actions include

addressing fire prevention strategies and wildfire risk prior to new development; improving infrastructure, traffic circulation and parking issues; increasing natural and cultural resources management; and strengthening the mechanism for communicating river hazard risks to the public.

Situated in the Sierra Nevada foothills northeast of Sacramento, Auburn SRA/Auburn Project Lands include about 30,000 acres of public land set along the North and Middle forks of the American River and welcomes nearly one million visitors annually. Recreational opportunities include hiking, swimming, boating, fishing, camping, mountain biking, gold panning, and off-highway motorcycle riding. State Parks currently manages the Auburn SRA through a managing partner agreement with Reclamation.


Reclamation also developed a five-year plan for fuel reduction management projects on Auburn Project Lands, focusing on wildland-urban interfaces. Reclamation awarded a goat grazing contract in at the end of 2021 for activities scheduled for winter of 2022. Additionally, Reclamation worked with partner, California Conservation Corps to treat new shaded fuel brakes (SFB) and maintain existing SFB on Auburn project lands and within Folsom Dam Project lands. The goal was to thin lower-vegetation layers and lessen the chance for wildfire to spread into surrounding shrubs and trees.

## Lake Berryessa

Reclamation's Lake Berryessa is Napa County's largest reservoir and offers year-round recreation opportunities. In August 2020, the Lake Berryessa area was devastated by the LNU Lightning Complex Fire. Last spring, Lake Berryessa's Reclamation team partnered with California Human Development and La Cooperativa Campesina De California, which administers the Temporary Jobs Program for Wildfires Impacted Workers, to provide temporary employment to agricultural workers who were impacted by the 2020 wildfires, and to those workers who are long-term unemployed. Over the course of the last 10 months, the crews assisted the Lake Berryessa staff with multiple wildfire recovery projects, including removing fire debris from day use areas, replacing traffic control bollards, replacing fence posts, piling, and chipping debris from felling of fire damaged trees, and replacing traffic control posts and signs throughout the Lake Berryessa Recreation Area. The crew provided much needed additional labor, which was instrumental in recovering from the extensive fire damage. Following an onsite review of the crew's progress, La Cooperativa Campesina, noted the importance that Reclamation staff placed on training the crew members and suggested a longer-term partnership in the future.



A Tuleyome group hikes the North End Trail in September 2021; this important partner helps establish and maintain trails around Lake Berryessa.



In 2021, significant strides to secure additional funding resulted in several fire recovery or deferred maintenance projects receiving monies:

- \$804,000 was awarded by the Emergency Relief for Federally Owned Roads Program to replace the five Smittle Creek Trail Bridges destroyed in the 2020 fire;
- \$550,000 was awarded by the Federal Lands Transportation Program for rehabilitating pavement at Lake Solano;
- \$637,000 in additional capacity drought funds were used to complete the administrative buildings' Phase II Roof Replacement Project;
- \$939,000 in additional capacity recreation funds were used the final remediation of the Putah Canyon Underground Storage Tank; and
- \$1.8 million in drought funding, which will allow for the reconstruction of the retaining wall at Berryessa Point, construction of additional shade shelters, and widespread tree planting throughout the day use areas.

In 2021, Reclamation awarded \$200,000 to Napa County Sherriff Office's for a new Enhanced Law Enforcement contract. This has resulted in improved patrolling of the day use areas and roads serving the Lake Berryessa Recreation Area.

## New Melones Reservoir

Reclamation's New Melones Reservoir is located on the Stanislaus River in the central Sierra Nevada foothills. The multi-objective reservoir provides irrigation water, hydroelectric power, flood control, and wildlife habitat. Recreation includes fishing, camping, and boating within the Glory Hole Recreation Area and Tuttletown Recreation Area.

In 2021, the New Melones Field Office successfully completed the second prescribed fire in June to reduce fuel hazards and the impact of non-native plant species on the native ecosystem. The New Melones team added the Natural Bridges Day Use Area to the fee program and began charging day use fees. This was instrumental in managing a remote site more effectively reduced over-visitation, resource damage and increased public safety by partnering with the county to eliminate parking on the state highway. New Melones purchased three waterless boat decontamination stations to be used by visitors to prevent the spread of invasive species.



New Melones staff conducted a prescribed burn with CAL FIRE in Glory Hole Recreation Area last June. Firefighters applied fire to the land with drip torches to reduce noxious weeds and their seedbeds. This 100-acre burn also reduced vegetation that helps wildfires spread and enhanced existing oak savannah/oak woodland habitat. This firefighter monitored the flames to ensure it remained within its planned burn perimeters.

## Implementing WIIN Act Contract Conversions

Section 4011 of the WIIN Act directed the Secretary of the Interior to convert agricultural and municipal water service contracts to repayment contracts at the contractor's request. This provision allows for prepayment of allocable construction costs that otherwise would have been repaid to Reclamation over extended terms. The section authorizes prepayment of outstanding construction cost obligations either in a single lump sum or over three years in three equal payments.



Regional Director Conant shown signing a WIIN Act Del Puerto Water District contract conversion. This Act allowed current water service contract conversions and prepayments between the U.S. and federally developed water supply contractors.

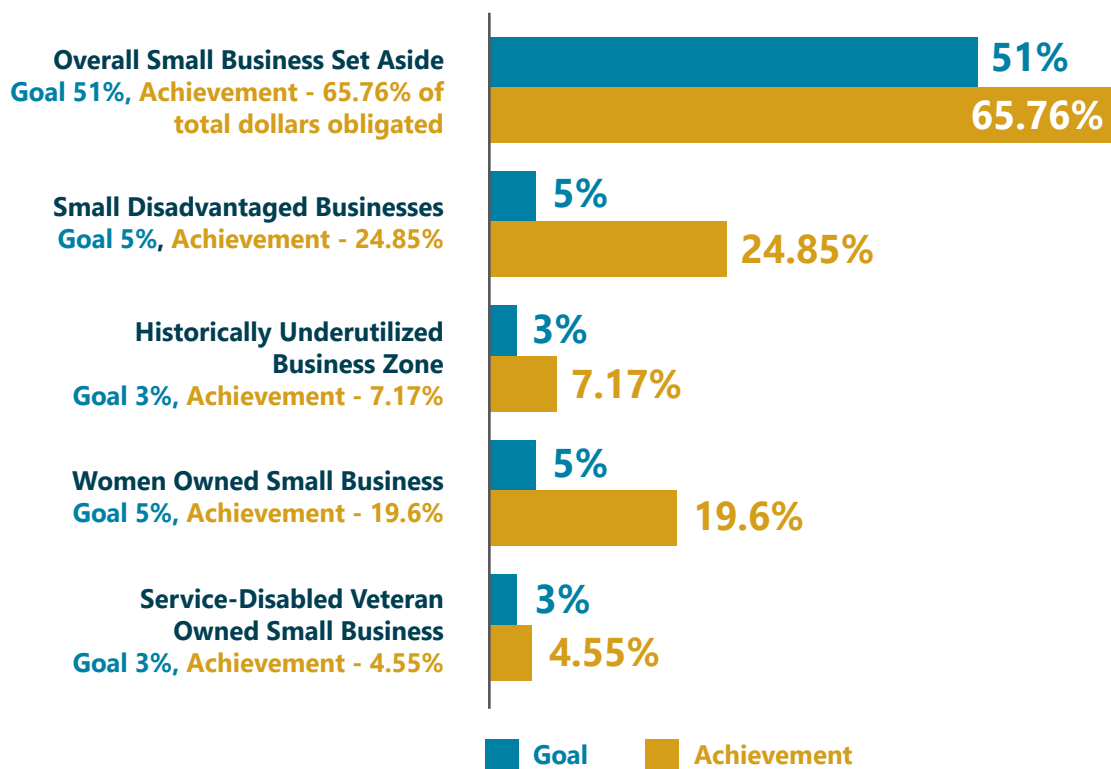
In 2019, the Region began CVP-wide contract negotiations to implement the WIIN Act, which allows for early CVP repayment and for a portion of the funds to go into a storage account. The deadline to convert contracts ended on December 16, 2021. A total of 76 CVP water contractors requested to convert contracts and 86 contracts were executed (some water contractors have multiple contracts). All contract negotiations were publicly noticed and negotiated.

## Acquiring Services and Administering Government Contracts

Reclamation's regional Division of Acquisition Services facilitates the timely delivery of goods and services through award and administration of contracts, financial assistance agreements, and other acquisition processes. This includes procurement of supplies, services, and construction to support programs and facilities; awards for financial assistance agreements (grants and cooperative agreements) to nonprofits, Tribes, water districts, and state entities; and awards for interagency agreements to obtain services from other federal agencies.

During fiscal year 2021, the region's Division of Acquisition Services completed 131 financial assistance awards and modifications for a total of \$101,993,845. Additionally, the team processed 667 contracting actions consisting of new contracts and contract modifications totaling \$113,143,273 including a \$177 million contract. Combined, a total of \$215,137,118 was obligated over the fiscal year.

The team also exceeded all “small business goals” established with the Department of the Interior. The goal for fiscal year 2021 was 51% and included several smaller goals for other subcategories. The Division of Acquisition Services successfully awarded 65.76% of the total dollars obligated to small businesses, exceeding the overall goal by 15.76%. In addition, the Department’s goals in every subcategory were exceeded:



Other highlights for the year include hosting the first annual Small Business Industry Day. Over 200 small businesses signed up to attend the free virtual event that featured presentations from Reclamation’s California-Great Basin Region. Reclamation team members discussed their programs and projects that were underway or planned for the future. The small businesses were able to ask questions and find out if there were any upcoming projects in their field of work.

On August 11, the Division of Acquisition Services hosted a meet and greet with the small business community. Over 150 small businesses signed up to attend the free virtual event which featured presentations from the management team in Acquisitions. Each Branch Chief discussed the current and future contracting opportunities for the region. The small businesses were able to ask questions and find out if there were any upcoming projects in their field of work.



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