California Department of Water Resources' Mission...

To manage the water of California, in cooperation with other agencies, to benefit the state's people and protect, restore and enhance the natural and human environments.

California's State Water Project

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12/99

Water - The First Need

California's existence and continued prosperity depend on water. More than two-thirds of the people of California receive at least part of their water from the State Water Project. Project water also fuels thousands of industries and irrigates hundreds of thousands of acres of California farmland.

Water—one of California's most precious resources.

California's Water Development

Importing water from areas of surplus to areas of need has long been the cornerstone to water development in California. California is a land of contrast, with climate and geography ranging from desert to alpine to subtropical. Some areas may receive two inches of rain a year, while others are deluged with 100 inches or more. Population centers have grown up in many locations where there is not a sufficient local water supply. Thus, Californians have always been faced with the problem of how best to conserve, control, and move water to areas of need.

Recent research indicates that some California Indians used irrigation systems for agriculture. When the Spanish came to California, they too diverted and controlled water for their purposes. Remains of aqueducts, canal and dams still can be found near some of California's historic missions.

The discovery of gold in the 19th century brought a new demand for water. Hydraulic mining especially used large amounts of water to wash the precious metal from the soil.

In the early 20th century, aqueducts were built to bring water from the Sierra Nevada and the Colorado River to help meet the needs of growing cities, such as Los Angeles and San Francisco. Irrigated agriculture, a major water user in California, is also sustained in large part by supplies conveyed from other areas.

The State Water Project, built and operated by the Department of Water Resources, is an important link in the long chain of water projects that began with the Spanish missions. The largest state-built water development project in the United States, the SWP's principal purpose is to store water and distribute it statewide. Other purposes are flood control, power generation, water quality improvement, recreation, and the enhancement of fish and wildlife.

Gold mining placed a heavy demand on early water supplies.

Startup of the SWP

In 1951, the State Legislature authorized what is now the State Water Project and appropriated funds for detailed studies. The Legislature passed the Burns-Porter Act in 1959, authorizing $1.75 billion in bonds to build the Project's initial facilities. The funds were contingent on voter approval which was given in 1960.

The State Water Project

Planned, designed, constructed and operated by the California Department of Water Resources (DWR), the State Water Project (SWP) is the largest state-built, multipurpose water project in the United States.

The SWP, spanning over 600 miles from Northern California to Southern California, includes 32 storage facilities, 17 pumping plants, 3 pumping-generating plants, 5 hydroelectric power plants, and approximately 660 miles of canals and pipelines (This doesn't include the East Branch extension, located in Southern California, which is under construction).

The SWP's main purpose is to provide a water supply — that is, to divert and store water during wet periods and distribute it to areas of need in Northern California, the San Francisco Bay area, the San Joaquin Valley, the Central Coast, and Southern California. Other SWP purposes include flood control, power generation, recreation, fish and wildlife enhancement, and water quality improvement in the Sacramento-San Joaquin Delta.

Twenty-nine urban and agricultural water agencies have long-term contracts for a maximum delivery of just over four million acre-feet of water per year. Of this amount, approximately 70 percent will go to urban users and 30 percent to agricultural users.

The Suisun gates help maintain habitat in the Delta.

DWR employees monitor the health of the San Francisco Bay/Delta through water quality testing.

These SWP contracting agencies are repaying the cost, plus interest, of financing, building, operating and maintaining the SWP water storage and delivery system.

The SWP and the Environment

Even before the SWP began its first deliveries in the 1960s, environmental concerns began to rise, with some later taking shape in legislation such as the Clean Water Act and the federal and state Endangered Species Acts. These laws have changed how DWR manages and operates the project.

Fresh water releases are made from upstream reservoirs to meet state and federal water quality standards in the Delta. Pumping operations are scheduled to minimize impacts to fish.

The Department also established several programs and built facilities to protect fish and wildlife habitat, such as the Feather River Fish Hatchery and the Skinner Fish Facility. The hatchery, funded by DWR and operated by the California Department of Fish and Game, was built because the construction of Oroville Dam made many miles of Feather River spawning grounds inaccessible to steelhead and king salmon. Today, millions of young salmon from artificially spawned adults are raised at the hatchery, then released in streams and in the Sacramento-San Joaquin Estuary. Some of the hatchery-reared salmon are released into Lake Oroville, and other reservoirs to support recreational fisheries.

Oroville Dam is the tallest dam in the United States.

The Skinner Fish Facility, operated by DWR since 1968, serves as a giant fish screen to keep fish away from the pumps that lift water into the aqueduct at Banks Pumping Plant. At the facility, as many as 10 million juvenile fish a month are saved and returned to the Delta.

Other major environmental programs involving the State Water Project include preserving riparian vegetation along the Delta levees or replanting berms (low areas that extend 4 to 20 feet from a levee on the waterside); monitoring the estuary's water quality via DWR's vessels; participating in interagency projects such as conducting surveys of fish populations and other organisms to understand changes in the Bay-Delta ecosystem; developing programs to maintain brackish water habitat in Suisun Marsh; and purchasing land for mitigation.

The SWP - From the Beginning to End

The Upper Feather River Lakes to the Delta

The State Water Project begins with Lake Davis, Frenchman Lake, and Antelope Lake on Feather River tributaries in Plumas County. In addition to providing fishing and recreation, releases from these lakes enhance the downstream environment as they flow to the Feather River.

Branches and forks of the Feather River flow into Lake Oroville, the Project's principal reservoir with a capacity of 3 million acre-feet in an average year. (An acre-foot is about 326,000 gallons, the average amount of water up to two families use in a year.) At Oroville, water flows through three hydroelectric powerplants, then down the Feather and Sacramento rivers before reaching the Delta.

The North Bay Aqueduct, completed in 1988, supplies water out of the northern Delta to Napa and Solano counties. The Banks Pumping Plant lifts water near Byron in the southern Delta into Bethany Reservoir. From this small reservoir, some of the water is lifted by the South Bay Pumping Plant into the South Bay Aqueduct, which serves Alameda and Santa Clara counties.

The California Aqueduct

Most of the water from Bethany Reservoir flows into the California Aqueduct, which winds along the west side of the San Joaquin Valley to O'Neill Forebay, located near the town of Los Banos. From there, part of the water is pumped through the Gianelli Pumping-Generating Plant for storage in San Luis Reservoir until it is needed for later use. The Sisk Dam, which impounds the reservoir's 2.04 million acre-feet of water, is jointly owned with the Bureau of Reclamation. It was built by the Bureau and is operated by DWR.

The rest of the SWP water continues south down the valley and is raised another 1,069 feet by four

more pumping plants—Dos Amigos, Buena Vista, Teerink, and Chrisman—before reaching the foot of the Tehachapi Mountains.

In the southern San Joaquin Valley, the Coastal Branch will extend 102 miles from Devils Den in Kern County to Vandenberg Air Force Base in Santa Barbara County. The extension will serve San Luis Obispo and Santa Barbara counties.

The Big Lift

At the Tehachapis, the giant pumps of the Edmonston Pumping Plant raise the water 1,926 feet in a single lift to enter 8.5 miles of tunnels and siphons that cross the mountain range. Edmonston is the highest single lift pumping plant in the world. From the Tehachapi crossing, the water flows into the Antelope Valley.

East Branch

In the Antelope Valley, the aqueduct divides. The East Branch carries water through the valley including Pearblossom Pumping Plant and Alamo and Mojave Siphon Powerplants into Silverwood Lake in the San Bernardino Mountains.

From Silverwood, the water enters the San Bernardino Tunnel and drops 1,418 feet into Devil Canyon Powerplant, then flows to Lake Perris, the southernmost reservoir in the Project.

West Branch

Water in the West Branch flows through Oso Pumping Plant into Quail Lake. From Quail Lake, water flows through the Peace Valley Pipeline to Warne Powerplant. From the powerplant, it goes into Pyramid Lake in Los Angeles County. From there it flows through the Angeles Tunnel and Castaic Powerplant into Castaic Lake, terminus of the West Branch.

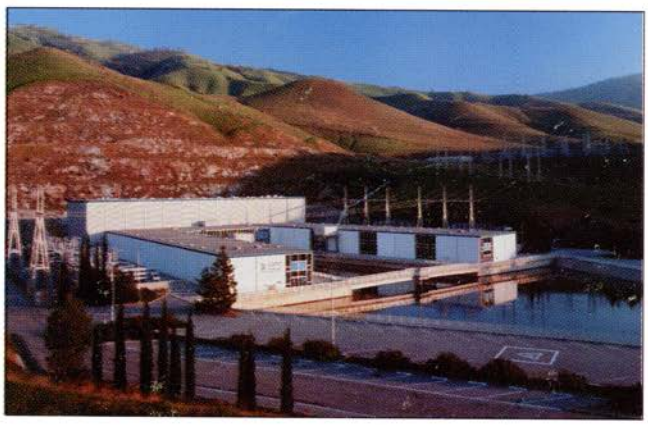
State Water Project Facilities

Pumping and Powerplants

Because of the amount of energy needed to pump water, the State Water Project is the largest single user of electricity in California.

From the Delta through the San Joaquin Valley, the Project must pump water repeatedly until it reaches elevations of more than 3,000 feet before flowing by gravity into Southern California reservoirs.

When the project is completed, 18 pumping plants will use 13.7 billion kilowatt-hours(kwh) of electricity a year to pump deliveries of 4.2 million acre-feet. At its peak capacity, the Edmonston Pumping Plant alone will require 5.8 billion kwh hours of electricity per year.



Edmonston Pumping Plant, located at the foot of the Tehachapi Mountains, is the largest pumping facility of the State Water Project.

The energy needed to operate the Project comes from a variety of sources, including coal-fired and hydroelectric powerplants, and energy exchanged and purchased from other utilities.

Hyatt Powerplant's six generators are capable of producing enough electricity to light the cities of Sacramento and Oakland.

Hydroelectric

The Project's nine hydroelectric powerplants produce about three-fourths of the power needed to move SWP water to areas of need in California. The power produced—some six billion kilowatt-hours a year—is enough to serve the entire needs of the city of San Francisco, or 780,000 average households, for one year.

The Hyatt Powerplant, housed in solid rock beneath Oroville Dam, is the Project's largest power plant, generating nearly 2.2 billion kilowatt hours a year. A few miles to the west, the Thermalito Powerplant produces 320 million kWh and the Thermalito Diversion Dam Powerplant generates 17 million kWh. Both the Hyatt and Thermalito power plants are pumping-generating plants, capable of pumping water back upstream for storage, as well

as to improve operational flexibility and provide generation capacity during times of high power demand.

Further south, SWP water is pumped from O'Neill Forebay and stored in San Luis Reservoir by the Gianelli Pumping-Generating Plant. As water is released from storage to meet Project needs, it produces an average of 180 million kWh a year. Other power plants - Devil Canyon, Castaic (operated under an exchange agreement by the Los Angeles Department of Water and Power), Warne, Alamo, and Mojave Siphon - recover a total of about 3.4 billion kWh as water that is pumped over the mountains flows back down to lower levels.

The Oroville Spillway helps maintain adequate flood control space.

Other Project Benefits

Flood Control

The State Water Project has played an essential role in flood control. For example, in 1964 the partially built Oroville Dam prevented flooding by the Feather River. Since its completion, the dam has continued to provide flood control in the Feather and Sacramento rivers.

The Kern River Intertie, a project feature not originally planned, helps prevent flooding of the San Joaquin Valley farmlands during years of high runoff.

Boating is popular at many SWP reservoirs.

This interconnection was built in 1977 to allow excess flows of the Kern River to be diverted into the California Aqueduct. The water can flow south for Southern California use, or can be pumped some distance north for agriculture. Diverting the river flows not only lessens flooding, but also saves energy by reducing the need to pump water from the Delta.

Recreation

From the Sierra to Southern California, Project reservoirs, lakes and aqueducts offer facilities for anglers, boaters, picnickers, campers, cyclists, and visitors of varied interests.

In Northern California, Lake Davis, Frenchman Lake, and Antelope Lake were constructed princi-

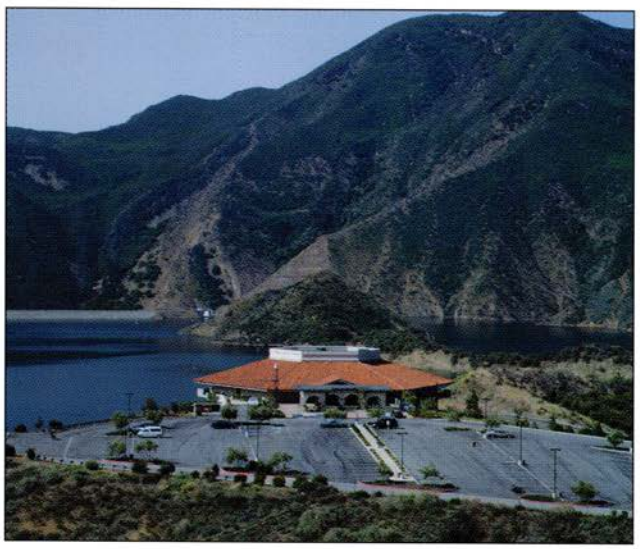
Horseback riding is among many activities available at Lake Del Valle.

pally for recreation and fish and wildlife enhancement. All three lakes are stocked with trout. Lake Oroville and Thermalito Forebay and Afterbay have facilities for water sports, camping, and picnicking. Limited hunting is allowed at the afterbay. In Alameda County, near Livermore, Lake Del Valle offers boating, swimming, fishing, camping, and picnicking.

In Central California, visitors to San Luis Reservoir and O'Neill Forebay can fish, swim, water ski, boat, camp, and hunt.

In Southern California, Castaic and Pyramid lakes offer boating, fishing, picnic sites, and water skiing. Camping facilities are available nearby in the Angeles National Forest. At Lake Perris, in addition to water sports, visitors can hike, rock climb, and scuba dive. Silverwood Lake in the San Bernardino Mountains, also offers a variety of recreational opportunities.

Fishing is allowed along many miles of the California Aqueduct.



Vista del Lago Visitors Center, which is the biggest SWP visitors center, provides a spectacular view of Pyramid Lake.

Visitors Centers

At the Department's three visitors centers, exhibits, films and photos tell the story of the State Water Project and display water's important role in our lives. In Northern California, Oroville Visitors Center is located near Lake Oroville, and Romero Overlook Visitors Center overlooks San Luis Reservoir near Los Banos. In Southern California, Vista del Lago Visitors Center offers a spectacular view of Pyramid Lake, just 50 miles north of Los Angeles.

Project Financing

The $1.75 billion bond issue of 1960 provided initial funding for the Project, and payments received from 29 contracting agencies are paying off the bonds. These 29 water agencies signed long term contracts with the Department to pay for Project facilities and to help ensure the water supply is available for delivery when they need it.

The federal government paid $77 million of Oroville Dam and Del Valle Dam construction costs allocated to flood control. Another $188 million for recreation and for fish and wildlife enhancement, which benefit all Californians, has been paid from the state general fund.

The Department of Water Resources has also issued revenue bonds to finance certain features of the Project such as hydroelectric plants. By the end of 1993, $4.3 billion had been spent to build the State Water Project.

Information

Visit DWR's Website at http://wwwdwr.water.ca.gov/

If you need this publication in an alternate form, contact the Office of Water Education at 1-800-272-8869.
For TTY phone service, call (916) 653-6226

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