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4/16

STATE WATER PROJECT

CALIFORNIA'S STATE WATER PROJECT

WATER, THE FIRST NEED

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

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, canals 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 San Francisco and Los Angeles. Irrigated agriculture, a major water user in California, is also sustained in large part by supplies conveyed from other areas.

The SWP, built and operated by the Department of Water Resources (DWR), is an important link in the long chain of water projects that began with the Spanish missions.

accessible floating camps, a 42-mile loop mountain bike trail 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, picnic, swim, water ski, camp, boat and hunt.

In Southern California, Castaic and Pyramid Lakes offer boating, fishing, picnic sites and water skiing. Camping facilities are available in nearby 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 also allowed at designated sites along the California Aqueduct.

Visitors Centers

At DWR's three visitors centers, exhibits, films and photos tell the story of the SWP and display water's important role in our lives. In Northern California, Oroville Visitors Center is located near Lake Oroville and the Romero Overlook Visitors Center, located 15 miles west of Los Banos, overlooks San Luis Reservoir. In Southern California, the Vista del Lago Visitors Center offers a spectacular view of Pyramid Lake, just 50 miles north of Los Angeles.

OTHER PROJECT BENEFITS

Flood Control

The SWP 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 Intertie, a Project feature not originally planned, helps prevent flooding of San Joaquin Valley farmlands during years of high runoff. 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 reduces flooding, but also saves energy by reducing the need to pump water from the Delta.

Recreation

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

In Northern California, Lake Davis, Frenchman Lake, and Antelope Lake were constructed principally for recreation and fish and wildlife enhancement. Lake Oroville and Thermalito Forebay and Afterbay have facilities for water sports, camping, an equestrian camp and trail network, boat-

STARTUP OF THE SWP

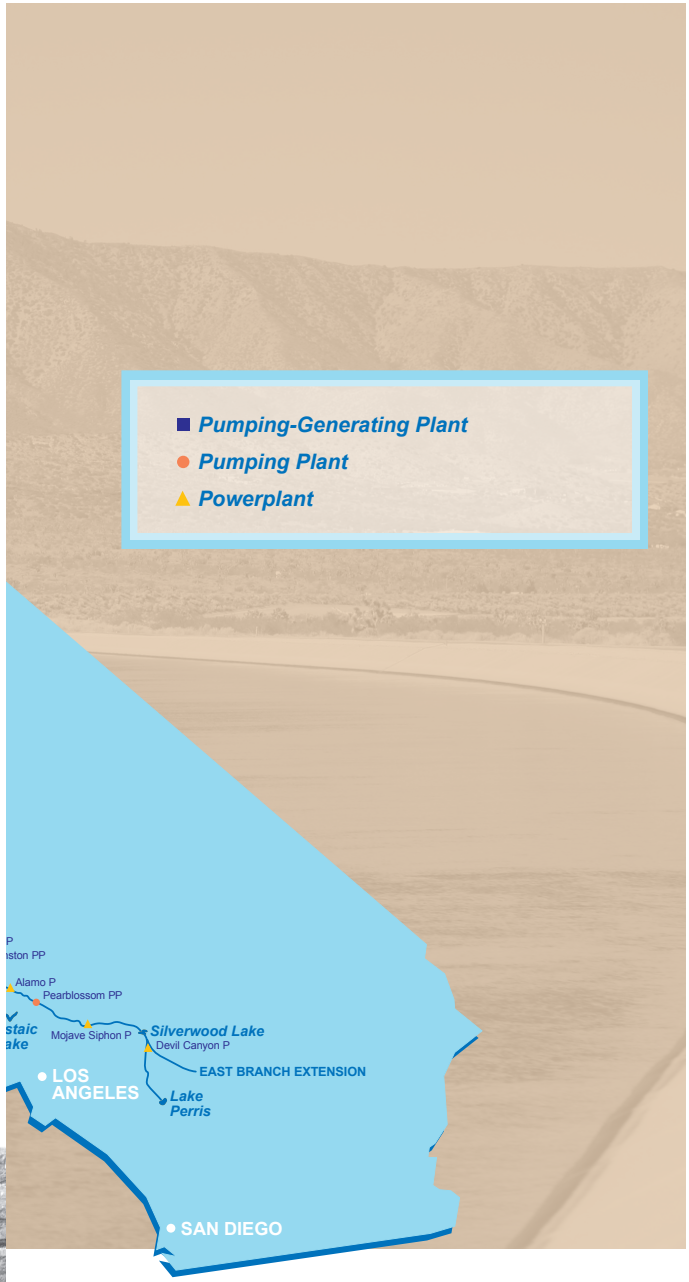
In 1951, the State Legislature authorized what is now the SWP and appropriated funds for detailed studies. The Legislature passed the Burns-Porter Act in 1959, authorizing $1.75 billion in bonds to build the Project's initial facilities. The funds were contingent on voter approval which was given in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

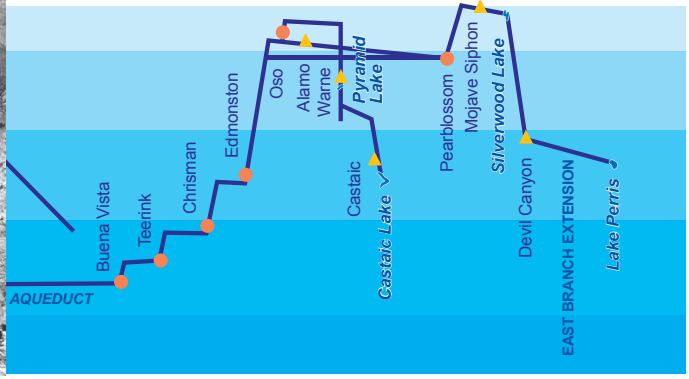
THE STATE WATER PROJECT

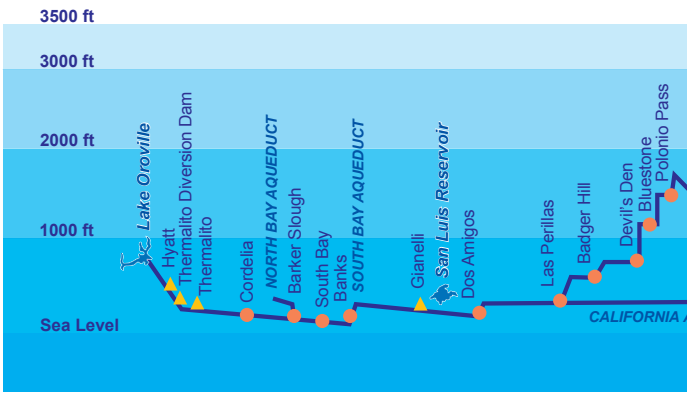
Planned, designed, constructed and operated by DWR, the SWP is the largest state-built, multi-purpose water project in the United States.

The SWP, spanning more than 600 miles from Northern California to Southern California, includes 34 storage facilities, 20 pumping plants, four pumping-generating plants, five hydroelectric power plants and approximately 700 miles of canals, tunnels and pipelines.

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.







THE SWP AND THE ENVIRONMENT

Even before the SWP began its 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, such as the Feather River Fish Hatchery and Skinner Fish Facility.

The ***Feather River Fish 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 salmon.

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 California 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 SWP 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 and evaluating the estuary's water quality and aquatic resources through the Interagency Ecological Program to understand changes in the Bay-Delta ecosystem, developing programs to maintain brackish water and tidal wetland habitats in Suisun Marsh, enhancement of river corridors including spawning gravel placement and riparian plantings, and purchasing land for mitigation. Today, the SWP is operated to benefit fish and wildlife, recreation and water quality.

THE SWP, FROM NORTHERN TO SOUTHERN CALIFORNIA

The Upper Feather River Lakes to the Delta

The SWP 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 3,537,580 acre-feet of water. (An acre-foot is about 325,851 gallons.) At Oroville, water flows through three hydroelectric power plants, 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. 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.

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 – annually generate a total of about 3.4 billion kWh as water that is pumped over the mountains flows back down to lower elevations.

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 urban and agricultural water agencies have long-term contracts for the delivery of SWP water. Approximately 70 percent of SWP water goes to urban users and 30 percent to agricultural users. These SWP contracting agencies are repaying the cost, including interest, of financing, building, operating and maintaining the SWP water storage and delivery system.

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 San Luis Joint-Use Complex, which serves both the SWP and the CVP, was built by the USBR and is operated and maintained by DWR. Costs and use of these joint facilities are shared approximately 55 percent by the State and 45 percent by the federal government.

STATE WATER PROJECT FACILITIES

Pumping and Powerplants

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

From the Delta through the San Joaquin Valley, the Project must pump water repeatedly until it reaches elevations of more than 3,400 feet before flowing by gravity into Southern California reservoirs.

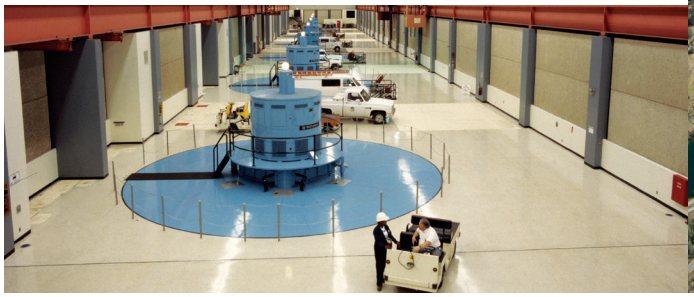
The energy needed to operate the Project comes from a variety of sources, including hydroelectric power plants and energy exchanged and purchased from other utilities.

Hydroelectric

The Project's nine hydroelectric power plants produce much of the power needed to move SWP water to areas of need in California. The power produced – which although highly variable due to the water year, averages around six billion kilowatt-hours (kWh) a year - is enough to serve the entire needs of the City of San Francisco, or 780,000 average households, for one year.

Hyatt Powerplant, housed in solid rock beneath Oroville Dam, is the Project's largest power plant, generating nearly 2.2 billion kWh each year. A few miles to the west, Thermalito Pumping-Generating Plant produces 320 million kWh and Thermalito Diversion Dam Powerplant generates 17 million kWh annually.

Both the Hyatt and Thermalito power plants are pumping-generating plants, capable of pumping water back upstream for storage to improve operational flexibility and provide generation capacity during times of high power demand.



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.

Water then flows from O'Neill Forebay and is pumped through Gianelli Pumping-Generating Plant for storage in San Luis Reservoir. San Luis Reservoir, which is part of the San Luis Joint-Use Complex, is the largest off-stream reservoir in the United States. Shared by DWR and the U.S. Bureau of Reclamation (USBR), San Luis Reservoir holds water for delivery to the federal Central Valley Project (CVP) and the State Water Project customers on the west side of the San Joaquin Valley, State Water Project customers in Southern California, and the federal San Felipe Project in San Benito and Santa Clara counties.

State Water Project water released from San Luis Reservoir 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.

East Branch

The East Branch carries water through Antelope Valley via 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 1,406 feet into Devil Canyon Powerplant, then flows to Lake Perris, the southernmost reservoir in the Project. At Devil Canyon, the Project also extends east into Riverside County via the East Branch Extension's Foothill Pipeline. Water is pumped at Greenspot Pump Station, then into Crafton Hills Reservoir and into Crafton Hills Pump Station. From Crafton Hills the water flows to Cherry Valley Pump Station, where water is delivered to customers or into spreading basins for groundwater recharge.

In the southern San Joaquin Valley, the Coastal Branch extends 115.5 miles from Las Perillas Pumping Plant in Kern County to Vandenberg Air Force Base in Santa Barbara County, and serves San Luis Obispo and Santa Barbara counties.

The Big Lift

At the Tehachapis, fourteen 80,000 horsepower pumps at 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, where the aqueduct divides into two branches-West and East.

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 and then into Pyramid Lake in Los Angeles County. From there it flows through the Angeles Tunnel and Castaic Powerplant into Castaic Lake, the terminus of the West Branch.