The Story Behind Your Drinking Water Sources

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LAS VIRGENES MUNICIPAL WATER DISTRICT EST. 1958

The Bay Delta – Why It's Important

Hardly a week goes by without a news story about the "Bay Delta," the complex system formed by the intersection of the Sacramento and San Joaquin Rivers and San Francisco Bay. At the core of concern is its fragile system of levees. Although the Delta is hundreds of miles to our north, what happens there is very important to your water supply.

Photo by California DWR, courtesy of the Water Education Foundation

Decades ago, the State Water Project was built in response to the realities that two-thirds of California's population lives in semi-arid southern California, while two-thirds of the state's water supply lies in the north. This is the source of our local water. Water served to our region begins as rain or snow in the Sierras. Much of that water runs down the Feather River, through Lake Oroville and into the Sacramento River. Just south of the state capitol, it begins to wind through the Sacramento River Delta, where it is joined by water from the San Joaquin River. At the southern end of the Delta are the large State Water Project pumps that lift your water into the California Aqueduct where it continues its journey south.

There are multiple threats to a continuous supply of water flowing through the Delta. Many of its islands, which support farms and housing, are protected by fragile levees made of dirt and peat. Over time, the islands have sunk due to depletion of their soils from farming and wind erosion. Most now lie below the water's level, with only the levees to keep them dry, any of which can easily break due to a flood or earthquake. When this happens, the islands flood, organic material can mix with the Delta waters and salt water can inflow from San Francisco Bay. Any of these could shut down pumping operations for weeks or months. In 2004, emergency planners were surprised when a levee at Jones Tract failed for no apparent reason, causing a massive flood, interruptions in transportation systems and a shutdown of water pumping activities.

Water flow through the Delta is also impacted by strong concerns for the Delta's ecosystems. Salmon runs, the delta smelt and other species are stressed. At times, pumping from the Delta must be stopped as a protective measure for spawning fish.

Federal and state studies estimate it will take billions spent on new projects to ensure a reliable system of levees to protect this fragile "plumbing" network. So as you hear news reports about the Delta, remember the water you used today flowed through that area. The Delta is important not only to our area, but to interests throughout the state.

The Journey Your Water Takes

Introduction

As you turn on the tap in your home or business, all the water you see started as snowmelt in the Sierra Mountains. Water is brought to our area through the California Aqueduct and travels more than 440 miles to reach your tap. It is purchased from Metropolitan Water District of Southern California (MWD), the Southland's regional water wholesaler. LVMWD must import 100% of our drinking water because there are no native supplies to draw from within our 122-square mile service area.

Each year, LVMWD sets aside a portion of the water purchased from MWD as a reserve and stores it in our own Las Virgenes Reservoir. Holding enough water to serve all district customers for about six months, the reservoir provides water "insurance" for times of emergency. In addition, it provides flexibility to store water in the off-season when demand is lower.

Before water arrives at your tap it has been treated, filtered, disinfected, routinely sampled, and tested. Even before the journey to your tap begins, much effort goes into protecting water supplies at their source in Northern California and protecting it along the way. This has many benefits, including fewer contaminants in the water supply, better water quality, greater safety, and lower treatment costs. Thus, although far away, the fate of levees in the Bay Delta area is of great importance for our local water supply. This sensitive "crossroads" for water significantly impacts the quality and reliability of our drinking water supply.

The Journey Begins. . .

Step 1:

Snowmelt in the High Sierra Mountains provides water for Southern California. Rain and snow that fall in the northern half of California equals 2/3 of the state's annual precipitation and is used to supply 2/3 of the state's population that lives in Southern half of California.

Step 2:

Snowmelt flows through the mountains into the **Upper Feather River Lakes** (Antelope Lake, Frenchman Lake, and Lake Davis) created in the 1960s primarily for recreational use. Water releases from these lakes enhance fish and wildlife in the area and supplement water supplies.

Step 3:

Water next enters the Oroville – Thermalito Complex. **Lake Oroville**, the State Water Project's principal reservoir, has a capacity of 3.5 million acre-feet. This is enough to supply about 40% of California's urban water needs for 1 year. **Oroville Dam**, built in 1968, is the tallest dam in the U.S. at 770 feet. It was built with 72 million cubic yards of tailings left by gold miners and also provides flood control. The **Thermalito Facilities and Hyatt Pump Power Plant** produce an average of 2.2 billion kilowatt hours of electricity each year.

Step 4:

On its way downstream, some water enters the **Feather River Fish Hatchery**. Built in 1967 to replace spawning areas that were lost when the river was blocked by the construction of Oroville Dam, this is where salmon and steelhead eggs are artificially spawned. After hatching, the young fish are raised in rearing raceways until they are large enough to be released in the Sacramento River or Bay Delta.

Step 5:

Next our water flows into the **Sacramento Bay – San Joaquin Delta**. Originally a native marshland, much of this area was developed into farmland in the 1900s. This complex region contains 700 miles of rivers and sloughs, and almost 550,000 acres of farmland, divided into more than 70 islands with 1,100 miles of levees and roads. Salinity influx is a problem with tidal influences; upstream reservoirs that store water and then release during the summer help stabilize and improve water quality.

Step 6:

As the water continues south, it passes through the **Skinner Fish Facility**, built in 1966 - 1970. Here, a giant screen helps protect fish by keeping them away from the pumps that lift water into the California Aqueduct. An average of 15 million fish a year are diverted and returned to the Delta (via oxygenated tank trucks).

Step 7:

Now the water begins to really travel. At the **Harvey O. Banks Pumping Plant**, built 1963 - 1969, water is lifted 244 feet at the first of 6 pumping lifts. It enters the Bethany Reservoir.

Step 8:

Most of the water flows to the San Joaquin Valley via the **California Aqueduct**, a major SWP structure built from 1960 - 1971. From Banks Pumping Plant to Lake Perris, the Aqueduct travels 444 miles, ranging in depth from 7 to 33 feet.

Step 9:

The journey through most of the San Joaquin Valley is a direct, gravity-driven flow. However, at the Tehachapi Mountains, the water faces a major obstacle. At the A.D**. Edmonston Pumping Plant**, built 1965-1971, giant pumps lift the water 1,926 feet (the highest single lift pumping plant in the world) to enter 8.5 miles of tunnels and siphons that cross the mountain range. Capable of pumping 1 acre-foot of water in about 2 minutes, the water flows into the Antelope Valley where the Aqueduct divides.

Step 10:

The East Branch of the Aqueduct carries water through the valley into the San Bernardino Mountains and into Lake Perris. Water destined for LVMWD travels in the **West Branch**. After 32 miles, the water reaches **Oso Pumping Plant** for its final lift of 231 feet (the rest of the journey uses gravity).

Step 11:

The water crosses the San Andreas Fault, and eventually flows into **Pyramid Lake** in Los Angeles County. Under construction from 1969 to 1973, Pyramid Lake's surface area is 1,300 acres, with 172,000 acre-feet capacity. Pyramid Dam provides flood protection along Piru Creek.

Step 12:

Leaving the lake, water flows through the Angeles Tunnel (7 miles) to **Castaic Power Plant, Castaic Lake**, and **Castaic Dam** constructed between 1965 and 1974. This is the terminus of the West Branch of the California Aqueduct. The lake holds 324,000 acre-feet of water and was built to provide emergency storage during a shutdown of the California Aqueduct, to satisfy regulatory storage requirements and for recreational activities.

Step 13:

LVMWD's water then flows to **MWD's Jensen Water Treatment Plant** in Granada Hills. This facility provides safe, highly treated drinking water to portions of Ventura, Los Angeles, and Orange Counties. Normally, Jensen Water Treatment Plant receives 100% SWP water, but it can also receive water from the Los Angeles Aqueduct. During the treatment process water undergoes comprehensive treatments including rapid mix, flocculation, sedimentation, filtration and disinfection (via ozonation).

Step 14:

Getting closer to home now, our water leaves Jensen Water Treatment Plant and enters an enclosed system of connections and pumping stations in the west San Fernando Valley. These pipelines end at **LVMWD's Pumping Station #2** at a modest structure in Calabasas near the Leonis Adobe where LVMWD Facilities begin. Overall, LVMWD's pipeline system of tanks and pumping stations include 350 miles of 4" and larger pipeline (up to 48") and 25 tanks, ranging from 0.3 to 8 million gallons in capacity.

Step 15:

Depending on water demands and the time of year, the water now flows either **directly to your homes** or to **LVMWD's Las Virgenes Reservoir** in Westlake Village. Built between 1970 and 1972, the reservoir is able to hold 9,800 acre feet (nearly 3 billion gallons) of treated water from MWD's Jensen Plant. Two earthen dams contain the water. This reserve could provide 6 months of emergency water supply, if needed.

Step 16:

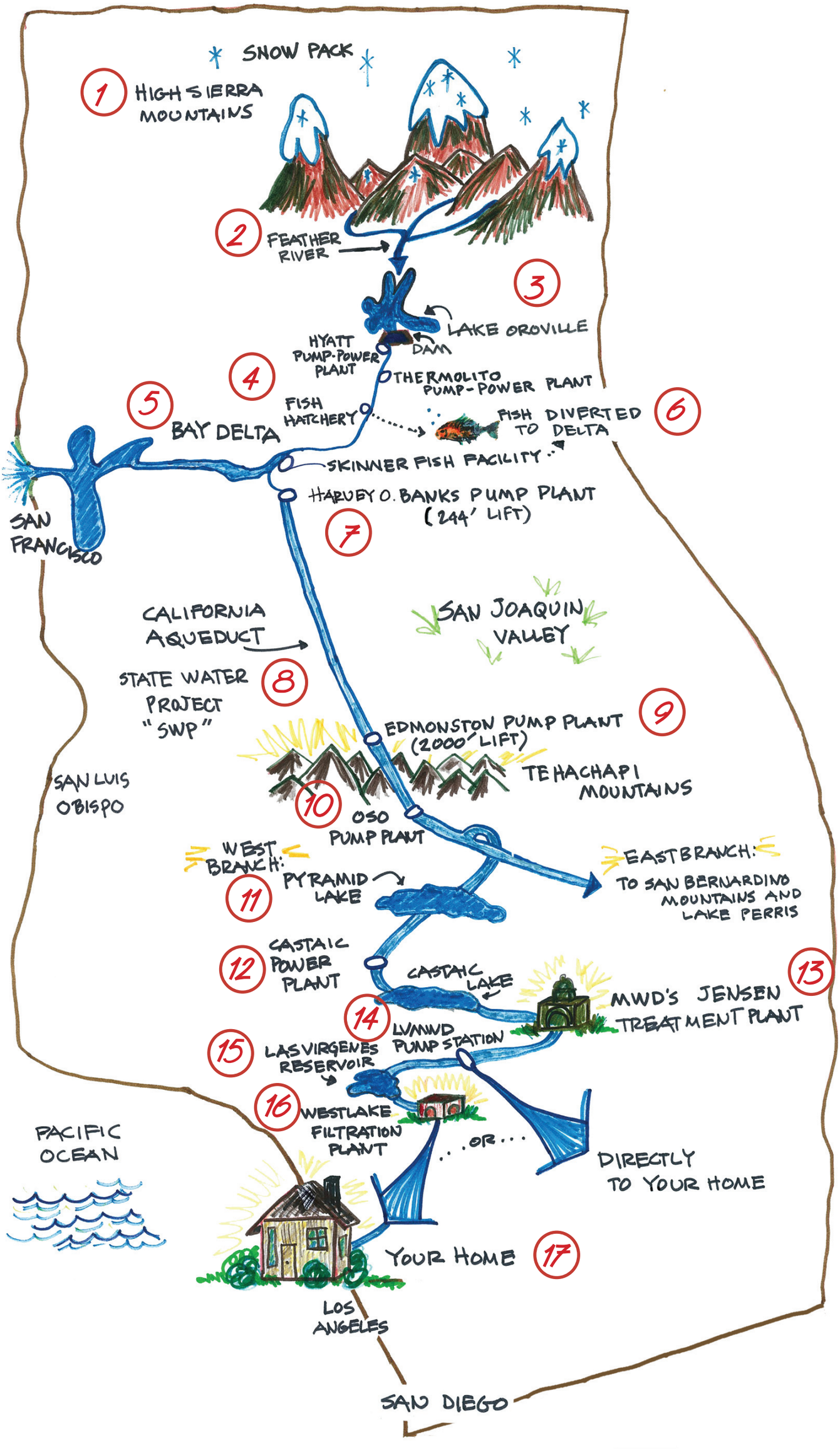
Water drawn from Las Virgenes Reservoir is filtered and disinfected again at **LVMWD's Westlake Filtration Plant**, built in 1989. In operation mainly during the summer, it is capable of processing 15 million gallons per day (MGD). Water is pumped from the base of the dam to a clear well tank and then enters the plant for filtration. Using 10 diatomaceous earth (DE) filtration units, each basin can filter 1.5 MGD. Once filtered, the water is disinfected using chloramines (chlorine + ammonia), a combination preferred as it does not produce potentially harmful by-products. Disinfection kills bacteria and prevents bacterial growth in the distribution system.

Step 17:

Finally, your water is pumped into transmission and distribution water mains where it flows through service lines to individual homes and businesses.

California's State Water Project

The State Water Project (SWP) is an important link in the long chain of water projects that began with the Spanish missions. Authorized by the State Legislature in 1951, the SWP was planned, designed, constructed and is operated by the California Department of Water Resources (DWR). It is the largest state-built, multipurpose water project in the United States and, because of the amount of energy needed to pump water, the SWP is the largest single user of electricity in California. Spanning over 600 miles from Northern California to Southern California, its main purpose is to divert and store water during wet periods and distribute it statewide. It also provides flood control, power generation, recreation, fish and wildlife enhancement, and water quality improvement in the Sacramento-San Joaquin Delta.


SNOW PACK
1
HIGH SIERRA MOUNTAINS
2
FEATHER RIVER
3
LAKE OROVILLE
DAM
HYATT PUMP-POWER PLANT
4
THERMOLITO PUMP-POWER PLANT
5
BAY DELTA
FISH HATCHERY
FISH DIVERTED TO DELTA
6
SKINNER FISH FACILITY
HARVEY O. BANKS PUMP PLANT (244' LIFT)
7
SAN FRANCISCO
CALIFORNIA AQUEDUCT
SAN JOAQUIN VALLEY
STATE WATER PROJECT "SWP"
8
EDMONSTON PUMP PLANT (2000' LIFT)
9
TEHACHAPI MOUNTAINS
SAN LUIS OBISPO
10
OSO PUMP PLANT
WEST BRANCH:
PYRAMID LAKE
11
EAST BRANCH:
TO SAN BERNARDINO MOUNTAINS AND LAKE PERRIS
12
CASTAIC POWER PLANT
CASTAIC LAKE
13
MWD's JENSEN TREATMENT PLANT
14
LVMWD PUMP STATION
15
LAS VIRGENES RESERVOIR
16
WESTLAKE FILTRATION PLANT
...OR...
DIRECTLY TO YOUR HOME
PACIFIC OCEAN
YOUR HOME
17
LOS ANGELES
SAN DIEGO