

Golden State Goliath California Starts Huge System to Send Water To Arid Southern Area

It'll Cost More Than T.V.A. Or St. Lawrence Seaway: A Boost for "Pat" Brown?

Dry '59 Aggravates Problem

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SACRAMENTO, Calif.—In the rugged canyon of the Feather River about 80 miles north of here, construction crews armed with heavy machinery are busily re-routing railroad tracks, highways and utility lines to make room for what eventually will become the 15,000-acre reservoir of Oroville Dam—the first major segment of one of the largest construction projects ever undertaken.

Further south, along the arid west side of the San Joaquin Valley, state agents are beginning to negotiate for the purchase of the land necessary for a huge aqueduct system, dam and storage basin.

And at the Tehachapi Mountains, a formidable range that cuts across the lower half of the state from the high Sierras on the east to the Pacific Ocean on the west, planners envision the boring of a seven-mile tunnel at a height of some 3,500 feet to extend one large aqueduct through to populous and highly-industrialized southern California.

Behind these grandiose designs looms a shortage, real now in some areas and feared for the future in others, of a vital commodity—water. To meet the problem, the Feather River Project, a \$2 billion-plus behemoth, was approved last week by California's legislature after a five-year fight. (See map on Page 13.)

Feather River promises to dwarf even such lavish spending programs as the Tennessee Valley Authority, which cost U.S. taxpayers \$1.5 billion, and the St. Lawrence Seaway, on which \$1.1 billion has been spent to date.

A Dry Year

Water shortages, of course, are not an exclusive California problem. Nearly every year shortages of one degree or another plague cities, states and even larger areas around the nation. This national water problem has been growing increasingly serious and has been affecting more areas as water consumption grows along with population and industrial growth. In California, the problem—worsened by one of the driest years on record, is fast coming to a head—and bringing with it a host of far-reaching political and economic implications.

In some areas of the state, water shortages already are so acute that farmers are taking thousands of acres out of production. This has set many state officials to worrying—and with good cause. California is the leading U.S. producer of a wide variety of crops, including sugar beets, barley, figs, lemons, lettuce, strawberries, tomatoes and grapes, and ranks second behind Texas in cotton output. The vast majority of these crops is grown on irrigated land, which accounts for roughly 85% of the states' total farm production. Much of this irrigated land is reclaimed from what once was barren desert and waterless wasteland. And most of it is likely to return to that condition if it's deprived of adequate water supplies in the years ahead.

Passage of the Feather River Project—with its long-range promise to provide sufficient water supplies—is considered to be enhancing the prestige of California's new governor, Edmund G. Brown. The previous administration of Gov. Goodwin J. Knight was unable to win the acceptance of the legislature.

The Golden State's immediate problem is aggravated by scant rainfall this year. State-wide precipitation so far, including the mountain snowpack, is near the record low set in the drought year of 1933. The State Department of Water Resources reports present stream runoff is barely 50% of normal for the state as a whole and in some areas is as low as 30% of normal, and likely to dwindle further in the usually dry summer months ahead.

Moreover, Californians are depleting at an alarming rate their ground water resources—sub-surface water fed mostly from such sources as rain and subterranean streams. During 1958 the overdraft of ground water (water pumped out of the ground faster than nature replenishes it) in California amounted to about 5 million acre feet—up from 3 million acre feet in as recent a year as 1954. (An acre foot of water amounts to one acre covered by water one foot deep—or roughly 326,000 gallons). One state engineer figures the 1959 overdraft "could well exceed 5.5 million acre feet if the present drought continues."

Most of Water Is Unused

Ironically, California actually has plenty of water, but most of it flows unused into the sea.

Says Harvey Banks, director of the Department of Water Resources: "California has more water than we can hope to intelligently use in the foreseeable future. But the trouble is, Mother Nature gave us a kick in the pants and put nearly all of it in the wrong places."

The Feather River Project is designed to correct this imbalance by taking water from northern California, where it is plentiful, and transporting it to southern California, where it is scarce, and, along the way, making it available to the villages and farms—on the dry, west side of the San Joaquin valley.

Southern California—or that third of the state below the Tehachapi Mountains—has about 8.5 million people, or roughly 60% of the state's total population, and the state's heaviest concentration of industry. Because of this, the area requires about 77% of the state's usable water—but it has only about 2% of the state's water resources, according to the Department of Water Resources.

The northern two-thirds of California contains both the Sacramento and San Joaquin valleys, both named after the rivers that flow through them. The Sacramento Valley, to the north, has an estimated 70% of the state's total stream flow and thus has ample water. In fact, in some years there is too much, as evidenced by the disastrous 1955-56 flood that claimed at least 50 lives and did millions of

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dollars worth of damage to homes and farmlands. The San Joaquin Valley to the south, however, has a continual water problem, especially on its western side, which is in the lee of the coastal mountains and contains few streams, none of great size.

To provide water for the San Joaquin Valley, as well as other areas, Uncle Sam has, during the last 10 years, pumped more than \$1.2 billion into construction of the huge Central Valley Project. Basically, the Central Valley Project takes water from Shasta Dam at the headwaters of the Sacramento River near the Oregon border, and feeds it, on a semi-controlled basis, into the delta—a maze of swampland and water passages formed by the commingling of the Sacramento and San Joaquin rivers just south of the city of Sacramento. At the southern end of the delta, a pumping plant pushes the water into the Delta Mendota Canal, which extends about halfway down the San Joaquin valley and provides irrigation water for farmers, mostly along the valley's east side. The remaining water in the delta, estimated currently at some 18 million acre feet annually, flows unused into the Pacific through San Francisco Bay.

Problem of Salt Water

One function of Shasta Dam is to keep the water in the delta at a fairly constant level. This is necessary because otherwise the water often would be too high and the runoff thus too heavy in the spring rainy season, and the water too low during the usually dry summers. A constant level is needed so that as water is pumped into the Delta-Mendota Canal, farmers around the delta won't be deprived, and also to prevent salt water from backing up the Sacramento River from San Francisco Bay too close to the delta.

On top of the Central Valley outlays, state authorities figure local water control districts have spent an additional \$1.5 billion on smaller water projects during the same period. But despite such massive spending, California's water worries have continued to worsen.

To get an idea of just how serious the water situation is, consider the plight of farmer Tommy Jamieson near Bakersfield, along the southwestern side of the San Joaquin valley:

"We had to sell our land—all 700 acres—for the sole reason that we were running out of water," Mr. Jamieson regretfully reports. "Our ground water table was dropping at a terrific rate. We had some wells sunk to a depth of over 1,200 feet. To get water to the surface from that depth cost us over \$25 an acre foot—a cost above the level at which we could expect to break even when we sold the crops." Most of the land was planted in cotton, melons and grapes, Mr. Jamieson adds.

Water Affects Land Value

"That land sold for an average price of about \$300 an acre. If there had been plenty of water on it, however, it would have been worth \$1,200 to \$1,500 an acre and I wouldn't have sold out even at that price."

Mr. Jamieson is a comparatively small operator. But talks with many larger ranchers in the valley indicate that even they are having a tough time.

"We've had to take 1,500 acres out of production over the past three years or so," declares William Moore, executive vice president of the giant Tejon Ranch Co., a 26,000-acre farm near Bakersfield. "And this year we're really concerned because the heavy irrigation season is just getting started. We had to start our ground water pumps in February this year. Normally, we don't start them until late spring. There are no two ways about it, the water situation around here is critical."

Mr. Moore adds that due to water shortages, he's also had to do extensive re-planning of crops. This involves the re-arrangement of several crops requiring large amounts of irrigation water to put them closest to available supplies, and outright elimination of others.

Most farmers along this critical west side of the valley agree that the water situation is perilous, but many don't like to talk about it much.

"You must remember that I, as well as most other farmers around here, have to arrange a bank loan each year come planting time," says one. "And it scares the pants off them bankers when you talk of water shortages and land going back to the desert."

Other Areas Have Shortages

Besides the San Joaquin Valley, other areas of the state currently are being plagued with water shortages.

Take Orange County along the coast just south of Los Angeles. About 30% of the state's citrus fruits are grown there. Last winter, rainfall throughout the county averaged only seven inches, or less than 50% of normal. Because of this and because of declining ground water tables in recent years, Orange County now buys roughly 60% of its water requirements—double the amount of water purchases 10 years ago—from the Metropolitan Water District of Southern California. The district imports the water from such distant spots as the High Sierras and the Colorado River on the California-Arizona border.

G. E. Skiles, manager of the big Orange County Fruit Exchange which market the produce of some 1,700 citrus growers, figures that water supplies aren't yet so critical that growers are taking citrus groves out of production. "But," he adds, "it won't be long until we'll be in that position. We're definitely going to need supplementary water in the years ahead to maintain the present rate of operation."

Water for agricultural use isn't the only worry, however. Several large cities are also getting concerned about future supplies.

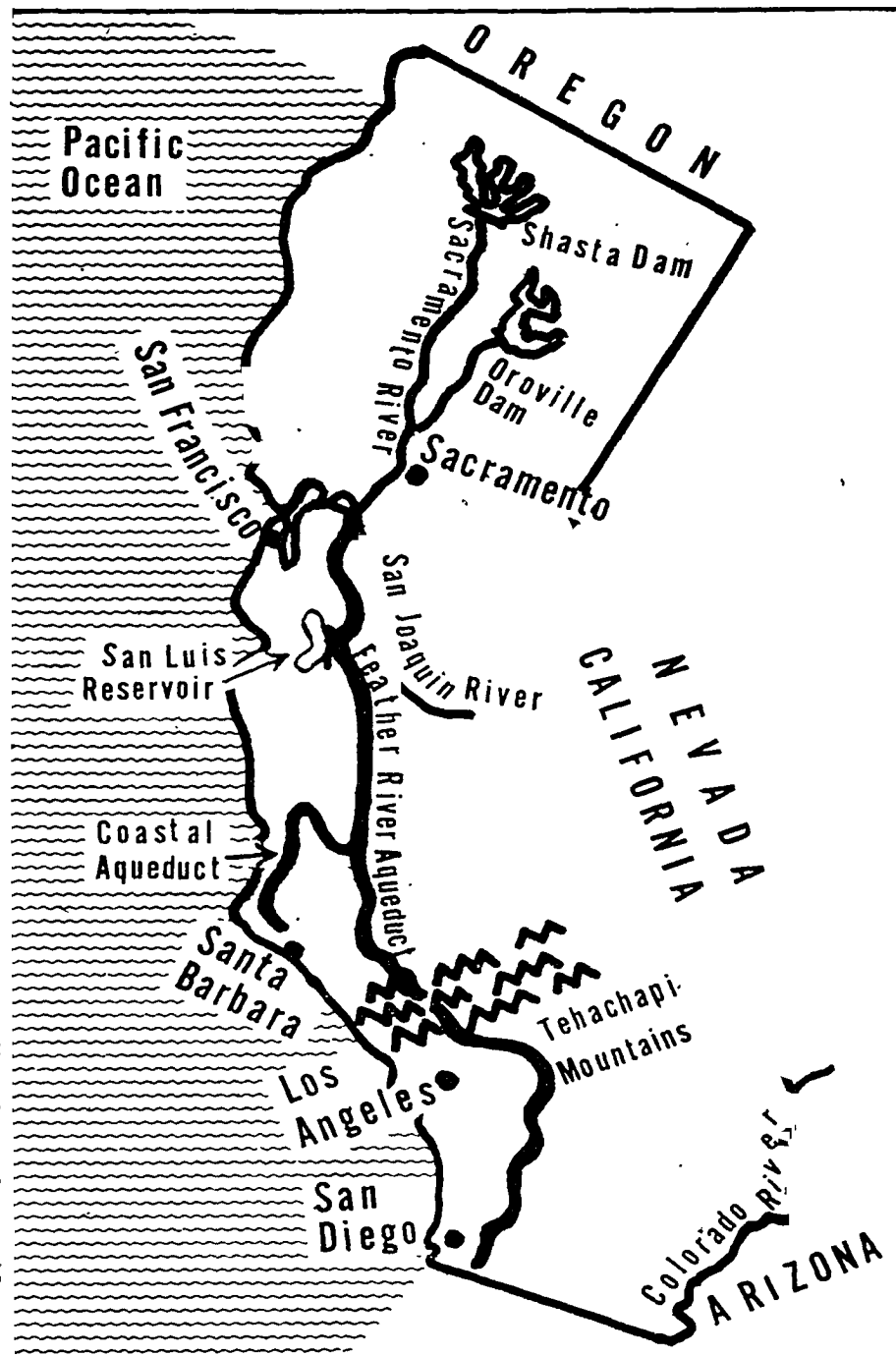
"The coming summer months are going to put an awful strain on our water reserves," says Richard Holmgren, chief engineer for the San Diego County Water Authority in San Diego. Mr. Holmgren reports existing water storage in San Diego reservoirs amounts to about 120,000 acre feet, down from 200,000 acre feet a year ago. "Because of present drought conditions here, I fully expect this reserve to drop to something less than 70,000 acre feet during the summer," he adds.

The City of Los Angeles, a sprawling giant of some 2.4 million residents, uses no less than 150 billion gallons of water annually.

Safe Until 1975

"Actually," reports a spokesman for the Los Angeles Department of Water and Power, "we're better fixed than most areas in southern California for water. We probably won't have to really worry until somewhere around 1975 or 1980. By that time, projections indicate our population will have very nearly doubled and we'll have to scout additional water sources."

Currently, Los Angeles gets about 72% of its total water requirements from a city-owned



aqueduct system that stretches eastward through the Owens Valley into the Sierras, where it taps the source of the Owens River. Another 8% is obtained from the conduits of the Metropolitan Water District of Southern California. The remaining 22% is pumped from local wells. Because of the city's mushrooming population and increased water consumption, one department spokesman figures local well pumping operations may be stepped up to 25% of the total requirements in 1959.

Oroville Dam, first unit of the Feather River Project, will be built astride the Feather River about five miles northeast of the town of Oroville. The dam will consume better than 80 million cubic yards of gravel and earth fill—enough to stretch 21 times around the world in a three-inch thick, three-foot wide strip. At a height of some 740 feet, it will be the tallest dam in the Western Hemisphere and will cost about \$150 million. It will store enough water—some 3.5 million acre feet—to take care of the normal annual needs of from 18 million to 20 million Californians.

The dam is just a first step, however. A second and no less important stage of the Feather River Project will be the building of more than 1,000 miles of aqueducts and canals. The system will start at the southern end of the delta near the town of Tracy and eventually will carry water as far south as San Diego, near the Mexican border. To help insure an adequate water supply on a year-around basis, a big storage reservoir—to be called San Luis—will be built approximately midway down the San Joaquin Valley on its western side. The U.S. Government will help finance construction of the reservoir, and will take a portion of the water each year to service a Federal reclamation project in the west-central part of the valley.

Lifting the Water

At the Tehachapi Mountains, several giant pumping stations will lift the water—which already will be well above sea level—some 2,100 feet to a level of about 3,500 feet, where it will be sent through the seven miles of tunneling. The system at this point will have a capacity flow of around 1.8 million acre feet of water annually.

Plans call for harnessing the power of the falling waters emerging on the southern side of the mountains and feeding the energy back to operate the pumping stations on the north

side. Complicated as it sounds, engineers say it is the best and least costly method of getting the water through the Tehachapi range. Once past the mountains, the water will flow on to supply such cities as Los Angeles and San Diego.

In addition to the main aqueduct, there will be several branches, the principal one going westward about 80 miles north of the Tehachapis and crossing over smaller hills and mountains to the Pacific, then angling southward to terminate near Santa Barbara.

Financing of the Feather River Project will take a variety of forms, principally \$1.75 billion worth of general obligation bonds to be issued over a period of 20 years. This bond issue will need the approval of California voters, however, and an election has been scheduled for November, 1960. State officials note that 60% of the voters live in southern California, the area to be benefitted, so they do not expect the issue to be in any danger of defeat. Meanwhile, construction and relocation work on the project is proceeding, financed by a \$25 million fund appropriated by the legislature a couple of years ago for general water development. In addition, next year's state budget calls for about \$63 million to be spent on water project development and Gov. Brown already has signed legislation transferring approximately \$170 million in tideland oil royalties into a fund dedicated to the water program.

Federal Help Expected

The state also expects to get some Federal help. So far, \$65 million to \$70 million already has been authorized by Congress to provide flood control facilities at Oroville Dam. Pending now in Congress is a bill that would provide \$170 million in Federal funds to pay for Uncle Sam's portion of the San Luis reservoir. "And we're hoping to get a few more millions from the Federal Government for flood control and stream navigation facilities at various other points," reports Mr. Banks of the Department of Water Resources.

Getting the state's water plan under way has been no easy task. The controversy over the project was mostly sectional, with legislators from northern California fearing the southern part of the state would appropriate most of the available water. A compromise that finally was worked out makes the bond issue more palatable to the northern interests by including funds especially set aside for water projects in that part of the state. Since the final legislation by and large was acceptable to the northern legislators, it is reasoned that it will be found acceptable, too, by most northern California voters.