

'Water, Water, Everywhere'

Multiple-Purpose Central Valley Project in California Involves Huge Dams, Five Canals

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FROM sky-scraping Shasta Dam on the north to Bakersfield on the south, beneficiary of water to be carried by canals stretching like tentacles up and down California's great Central Valley a total distance of 393 miles, it's a case of "Water, water, everywhere."

The United States Bureau of Reclamation looks upon the Central Valley Project as holding greater potential benefit, both locally and nationally, than any conservation project attempted in its 38-year history. This undertaking is a multiple-purpose project, involving construction of two huge dams, Shasta and Friant, and five canals, which jointly will:

Improve navigation on inland waterways, reduce floods in the Sacramento and San Joaquin River valleys, furnish water to irrigate 2,000,000 acres of highly productive agricultural lands, control saltwater encroachment in the delta region of the two rivers mentioned, improve domestic and industrial water supplies in central California, and hydro-electric power for municipal, agricultural, industrial, and project uses.

What the system of canals, and the water they will carry, mean to agriculture and industry may be noted in these facts and figures:

During the last season, ten times more rain fell at Kennet, in the northern end of the project, than at Bakersfield, near the southern tip. Kennet, in the future area of Shasta reservoir, which will back up 35 miles and impound 4,500,000 acre feet of water, received a total of 112.76 inches, while 11.61 inches (twice normal) fell at Bakersfield. Some of Kennet's surplus will flow into the north and central parts of the valley, and make available San Joaquin River water for diversion

to the arid southern end of the valley.

Already, water is being delivered via the Contra Costa canal to Pittsburg, an industrial city located in the upper bay region 40 miles east of San Francisco. Necessity for this supply arises from an increase in hardness of the local well water from 155 to 800 parts per million in 19 years, and difficulties of pumping against a head of 225 feet. Canal water is now being substituted for this and other pumped water.

Shasta Dam serves a far more important function than any other individual unit of the Central Valley project. "Shasta reservoir," explains Walker R. Young, assistant chief engineer for the Bureau of Reclamation, "will be operated to diminish the seasonal flood flows of the Sacramento River and thereby check annual waste

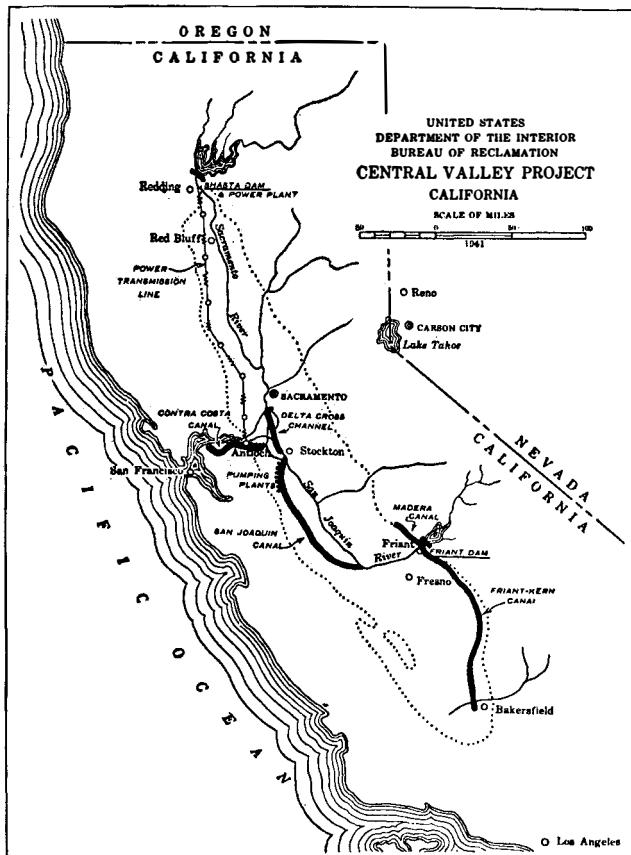
to the sea of precious water, and correspondingly to increase the natural output of the river during dry months for purposes of navigation, irrigation, and salinity control. Reservoir releases will generate electric power to be carried by project transmission lines down the Sacramento valley to load centers. Finally, after the conserved waters of the Sacramento River have served all these functions and we have wrung the last squeal from the last drop, they will afford a surplus for export to the upper San Francisco bay region and San Joaquin valley through other features.

"These include the Delta Cross Channel to divert Sacramento River water across the delta, Contra Costa Canal leading from the delta westward to a bayshore industrial and agricultural area, San Joaquin pumping system from the delta into the northern San Joaquin valley, and Friant-Kern and Madera canals to serve the southern San Joaquin valley. All these depend, directly or indirectly, upon Shasta Dam. In fact, no one feature can be fully utilized unless some or all the others are in operation."

Shasta—higher than Grand Coulee, second largest masonry dam ever built, with half again the mass of Boulder—staggered the imagination when you consider its proportions. Located 12 miles above Redding, on the Sacramento River, it will be 560 feet high and 3500 feet long. Six million yards of concrete will be placed before water climbs toward its crest.

Shasta will consist of a mass of pre-shrunk individual blocks, cooled by circulating river water through pipes imbedded in the mass. Upon completion of the blocks, they will be joined by pumping grout through another system of pipes, permanently imbedded for this purpose. Finally, a power plant, housed in a seven-story building, will involve operation of five 75,000-kilowatt generators turned by turbines developing 103,000 horsepower. The generators weigh 4250 tons, and 174 railroad cars will carry them from the manufacturing plant to the dam site. Of the 1,500,000,000 kilowatt hours of electrical energy developed each year, one-fifth will be utilized for project pumping, and the remainder made available for civil use.

Perhaps the most unusual feature connected with Shasta is the long ag-



Area covered by Central Valley Project