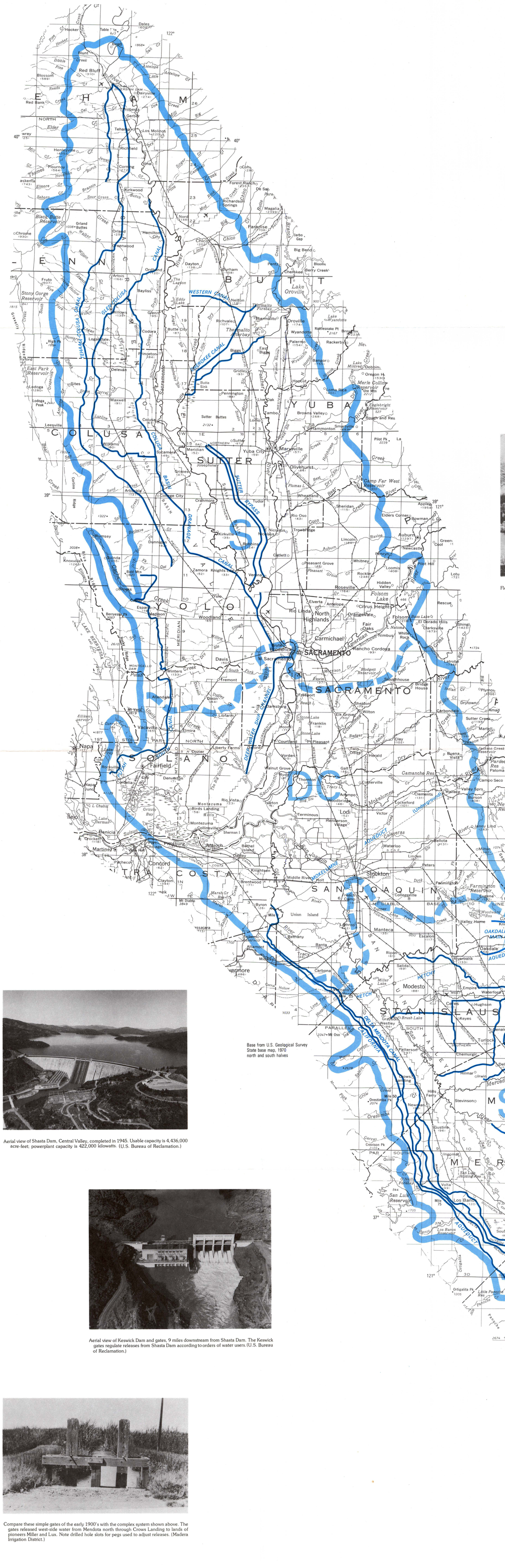
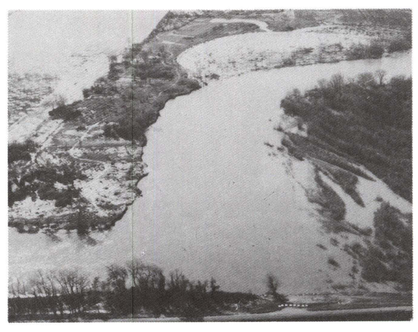




Flooding of the Sacramento Valley requires monitoring and adjustment of releases. A sudden rain might make unnecessary a delivery of water that is already on its way. (California State Library.)

Rolling type sprinkler system. (California State Library.)

Aerial view of Shasta Dam, Central Valley, completed in 1945. Usable capacity is 4,436,000 acre-feet; powerplant capacity is 422,000 kilowatts. (U.S. Bureau of Reclamation.)

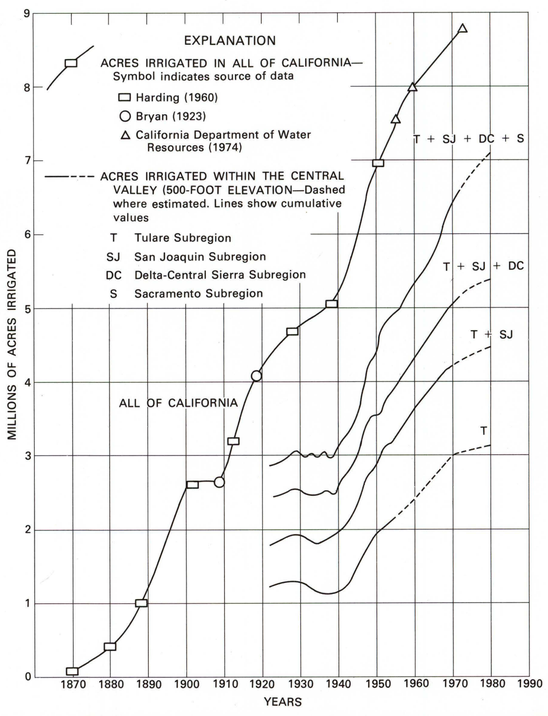
Orchards in Sacramento Valley. (California State Library.)

Irrigated lands that produce field crops, fruits, and livestock (California State Library.)

Aerial view of Keswick Dam and gates, 9 miles downstream from Shasta Dam. The Keswick gates regulate releases from Shasta Dam according to orders of water users. (U.S. Bureau of Reclamation.)

Compare these simple gates of the early 1900's with the complex system shown above. The gates released west-side water from Mendota north through Crows Landing to lands of pioneers Miller and Lux. Note drilled hole slots for pegs used to adjust releases. (Madera Irrigation District.)

Electronic control board and computers in Sacramento used by the Central Valley Project of the U.S. Bureau of Reclamation to distribute water for irrigation, power, flood control and salinity control. The release of water from reservoirs according to user demand is simple in theory, but in practice it requires technical coordination and effort. Water-operations personnel monitor river and reservoir data that read out on the status board seen in the background. The control center is linked to the five field offices of the U.S. Bureau of Reclamation, the California Department of Water Resources, the U.S. Army Corps of Engineers, and the Federal-State River Forecast Center. (U.S. Bureau of Reclamation.)



INCREASE OF IRRIGATED ACREAGE IN FOUR HYDROLOGIC SUBREGIONS SINCE 1922 AND IN ALL OF CALIFORNIA SINCE 1870

Continued from sheet 1

Major distribution canals in the extensive and complex irrigation system as it is today are shown on sheet 2. The increase of irrigated acreage in all of California since 1870 and in the valley parts of the four hydrologic subregions since 1922 (California Region Framework Study Committee, 1968) are shown graphically on sheet 2. Accurate data for the four subregions prior to 1922 are not available. The maps and graph, together with vintage and recent photographs in this atlas, show irrigation development from manually built irrigation ditches (sheet 1) dug adjacent to main streams, to the storage and distribution systems of today (sheet 2).

Prior to 1898 the use of ground water for irrigation was almost negligible (Wood and Dale, 1964). As of 1913, only 3 percent of all irrigation in California was by ground water obtained from 1,664 wells (Bloyd, 1978); by 1929, 30 percent of all irrigation was from ground water (Harding, 1960); and by 1972, ground water furnished about 40 percent of all the water used for irrigation in California (California Department of Water Resources, 1974).

The present irrigation system involves many different agencies that store water (as much as 4.5 million acre-feet in Shasta Lake, for example) and move it daily according to supply and the demand of local water contractors who have, in turn, based their daily estimates on orders from growers and other water users. From these orders, schedules are made, gates are opened and closed, and water is delivered according to the schedules. This process is simple in theory, but in practice it requires coordination and effort by many technicians. Computers keep track of the millions of gallons of water delivered to users. The supply-and-demand principle becomes complicated when large flows of water must be held for power production or for flushing out increasing salinity in the Sacramento-San Joaquin Delta, or if a sudden rain should obviate a delivery after the delivery is already on its way.

These examples and others demonstrate the complexity of the irrigation system of the Central Valley of California. In addition, they show how it has become necessary to reach ever farther beyond the immediate sources of surface water to satisfy the increasing needs of agriculture in the southern part of the valley. How does this impact ground-water use? In some areas, such as Westlands Water District on the west side of the San Joaquin Valley, pumping of ground water has decreased as surface-water supplies from the Sacramento Valley have increased; therefore, ground-water reservoirs are being recharged and water levels are rising.

The Westlands example demonstrates only one aspect of the complex interaction of ground-water and surface-water supplies. The trend that has developed of moving surface water from an area of heavy precipitation to a dry area may cause anomalous changes in water levels. This atlas is intended as an aid in understanding the distribution of surface water, so that the ground-water system can be modeled for intelligent and coordinated use of both supplies to benefit all.

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