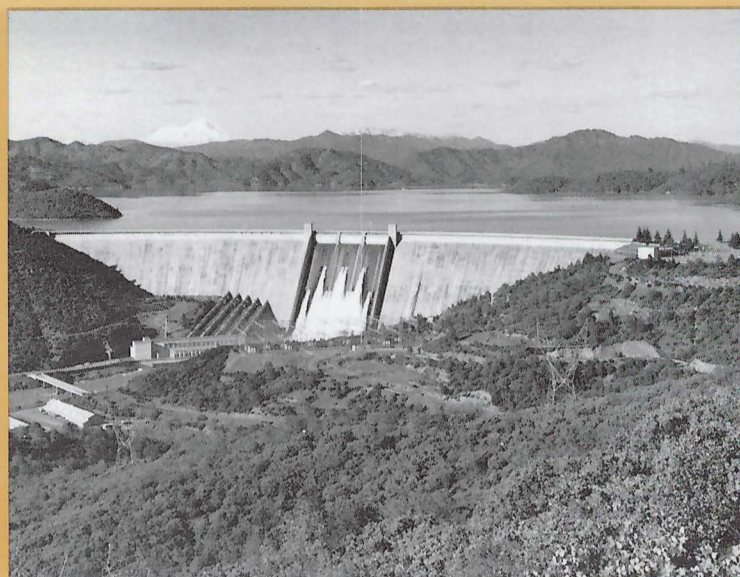


# Shasta

Water Resource Project  
California

U.S. Department of the Interior  
Water and Power Resources Service

Boating on Shasta Lake



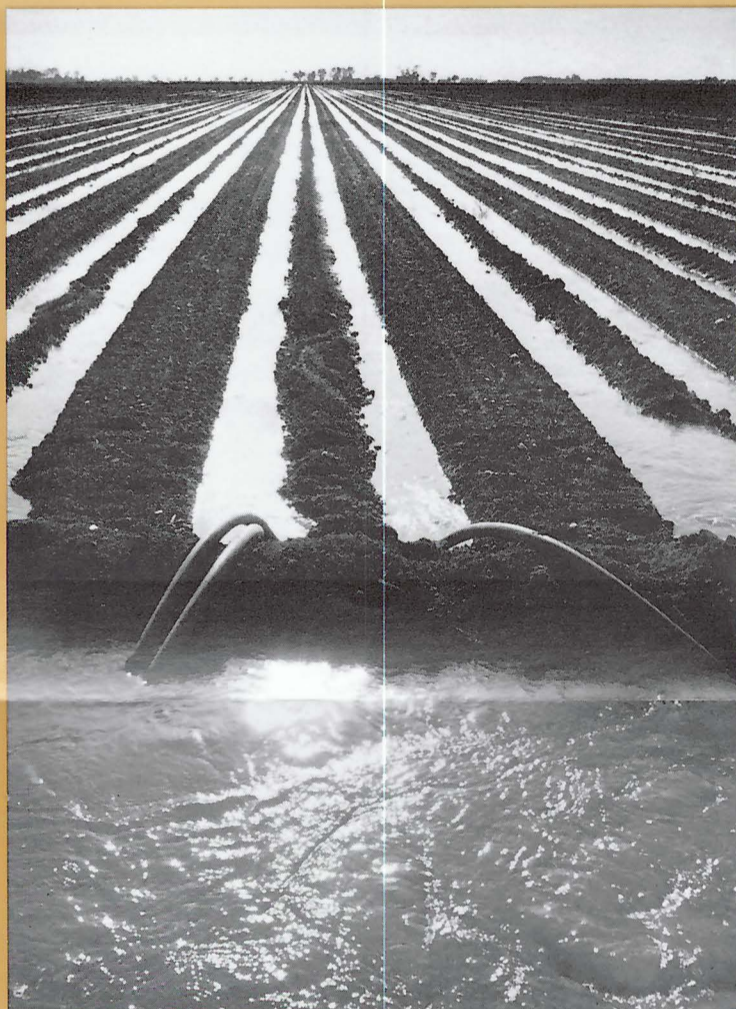
Shasta Dam and Mt. Shasta

Shasta Dam sits like a benevolent guardian on the upper Sacramento River. The dam and its reservoir, Shasta Lake, store Sacramento River waters for use in the Central Valley Project (CVP), one of the largest water resource developments in the world. Shasta Dam, Lake, and Powerplant, plus downstream Keswick Dam, Reservoir, and Powerplant, constitute the Shasta Division of the CVP.

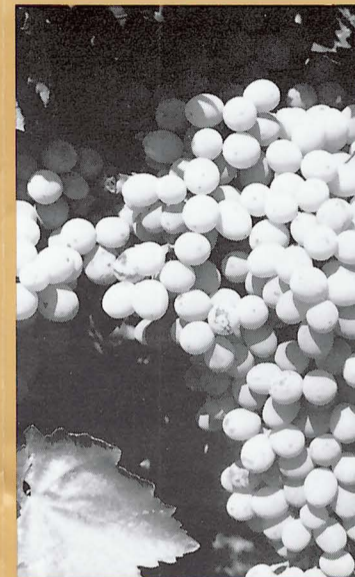
## The Central Valley

The Central Valley covers nearly one-third of California. It extends 500 miles from the Cascade Range in the north to the semiarid plains along the Kern River in the south. The valley is bounded on the west by the Coast Range and on the east by the Sierra Nevada. The Sacramento Valley, which contains two-thirds of the Central Valley's water and one-third of its land, is drained by the southward-flowing Sacramento River. The Sacramento meets the northward-flowing San Joaquin River, which drains most of the San Joaquin Valley, in a delta east of San Francisco that feeds Suisun Bay.

The average precipitation in the Central Valley ranges from 5 inches in the southern end to more than 30 inches in the north. More than three-fourths of the precipitation falls from December through April—the water is needed primarily from May through



Irrigating tomatoes south of Los Banos



Grapes on the vine near Biola



Pittsburg, Calif.



San Joaquin Delta

October. Prior to construction of the CVP, these conditions produced spring flooding from the heavy runoff and irrigation water shortages during the growing season.

## The Central Valley Project

The CVP is a vast labyrinth of dams, canals, and power and pumping plants designed and constructed by the Bureau of Reclamation. This massive project annually delivers irrigation water to more than 2 million acres, generates more than 5 billion kilowatt-hours of electricity, provides 1 million acre-feet of water for municipal and industrial use, and prevents millions of dollars in flood damages.

Interest in controlling the flood-drought cycle and developing irrigation supplies in the Central Valley dates back to 1873, when the Army Corps of Engineers studied the water conditions in the valley. The CVP took form during the 1920's through a series of State-sponsored studies. Funds for the CVP's initial features, which included Shasta and Keswick Dams, were approved by President Franklin Roosevelt in 1935. Although the first features of the project were built to protect the valley from crippling water shortages and floods, later units were constructed to provide water and power for California's growing population. To date, the project includes 19 storage reservoirs, 9 powerplants, and several

thousand miles of canals and farm distribution systems. The CVP is separated into divisions for efficient administration and operation.

During the irrigation season and low-flow periods, surplus Sacramento River water from Shasta Lake is released and diverted across the Sacramento-San Joaquin Delta through the Delta Cross Channel. Some of this water is transported through the Contra Costa Canal to provide adequate supplies for area farms, industries, and municipalities. The rest of the surplus Sacramento River water is lifted by pumps at Tracy into the Delta-Mendota Canal and transported nearly 180 miles through irrigated lands to the Mendota Pool on the San Joaquin River. This water replaces water which has been diverted by Friant Dam to the southernmost part of the CVP.

Benefits from the CVP's two original purposes, irrigation and flood control, are mammoth. About \$340 million in damages has been prevented by operation of the CVP since 1950, when flood control records were first kept. The first irrigation water deliveries were made in 1943 and more than \$14 billion worth of crops have been produced on project lands since then. About \$1.5 billion worth of crops are grown annually.

## Shasta Dam and Lake

Shasta Dam, started in 1938 and completed in 1945, is the principal facility in the operation of the Central Valley Project. Shasta Lake is the largest of the CVP reservoirs, with a maximum capacity of 4,552,000 acre-feet. The lake controls runoff from a 6,665 square mile drainage area. The Shasta facility is operated to make navigation possible on the Sacramento River, provide flood protection for the upper valley, and furnish irrigation and municipal and industrial water for the Sacramento Valley as well as for export to the San Joaquin Valley.

Fresh water from Shasta Lake is also used to repel ocean water to protect the land from salt damage. Some of California's most productive acreage is in the delta where the Sacramento and San Joaquin Rivers meet before flowing into San Francisco Bay. Before completion of Shasta, intrusion of salt water from San Francisco Bay often damaged these delta lands. However, fresh water releases from Shasta are now channeled to the area to protect the quality of project water being pumped at Tracy and defend the delta area from salt water encroachment.

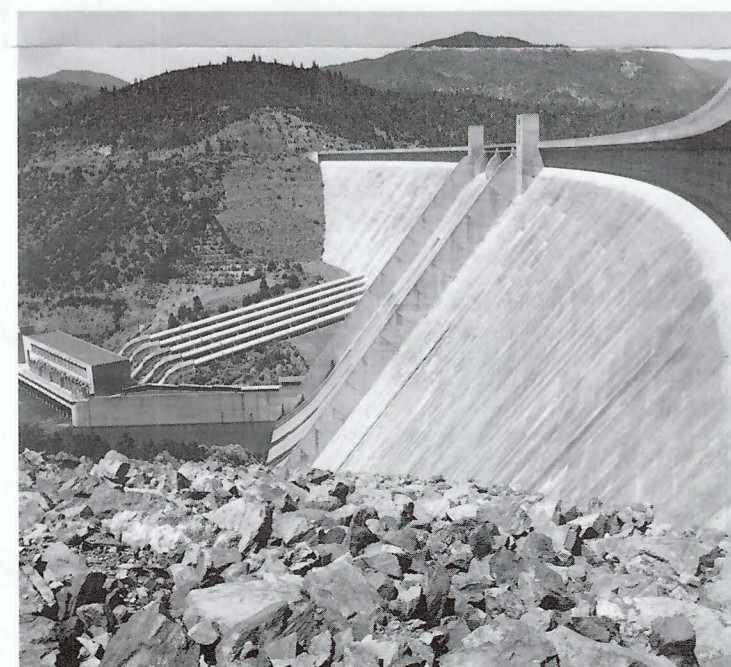
Construction of the reservoir necessitated the relocation of facilities of all types. The main line of the Southern Pacific Railroad, which followed the Sacramento River through the reservoir area and damsite, had to be relocated to the east. Twelve

miles of Interstate 5 — the main north-south highway — also had to be relocated. The railroad and the highway now cross the Pit River branch of Shasta Lake on the Pit River Bridge, the world's highest double-deck bridge. The old mining town of Kennett, 3 miles above the damsite, was inundated, requiring relocation of the town's cemetery. After the reservoir was filled, ferry service had to be provided across the McCloud arm of the lake for access to a mine producing iron ore for use as ship ballast.

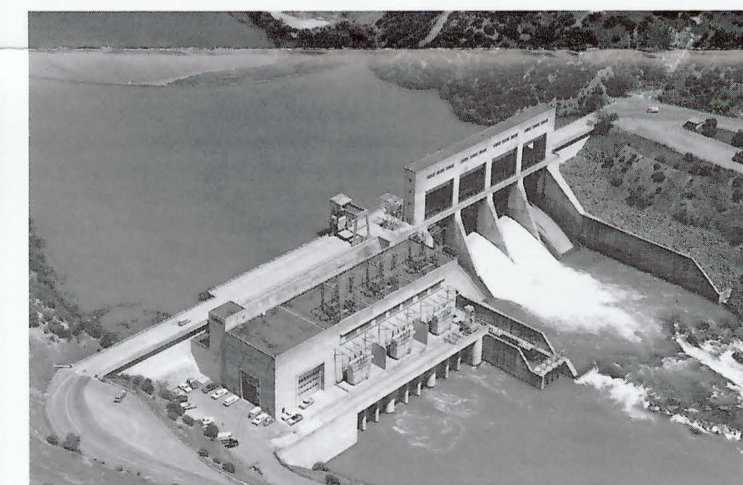
Shasta Dam is 602 feet high, 3,460 feet long, and contains about 6 million cubic yards of concrete. More than 5 miles of galleries in the dam allow operating personnel access to valve chambers, grouting and cooling outlets, cable galleries, and instrument terminal boards. The galleries also permit visual inspection of the interior of the dam at all times.

## Keswick Dam and Reservoir

Nine miles downstream from Shasta Dam on the Sacramento sits Keswick Dam. Keswick creates an afterbay for Shasta Lake and smooths out uneven water releases from Shasta Powerplant. Keswick Reservoir has a maximum capacity of 23,800 acre-feet. The dam is 157 feet high and has a crest length of 1,046 feet. Fish trapping facilities at the dam are operated in conjunction with the downstream Coleman Fish Hatchery.



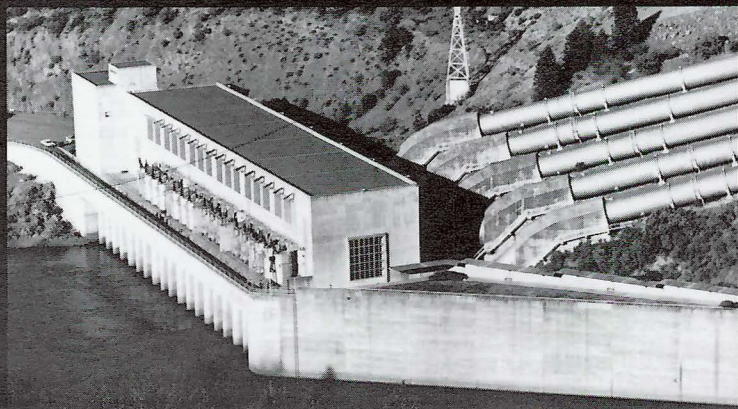
Shasta Dam and Powerplant



Keswick Dam and Powerplant



# Shasta

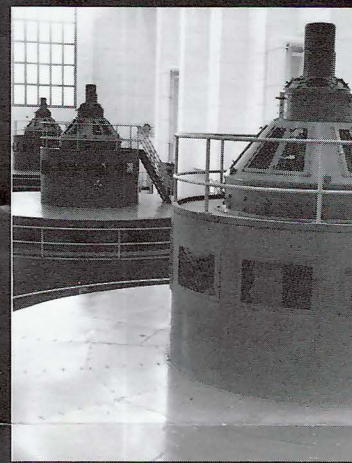


Shasta Powerplant

**State's Largest Hydroplant**  
Shasta Powerplant is the largest hydroelectric generating plant in California, with an installed capacity of 539,000 kilowatts. This plant annually generates more than 2 billion kilowatt-hours of electricity. Water from the reservoir flows through five 15-foot diameter penstocks to the generators.

Shasta is perhaps the only powerplant whose generators were placed in service before there was water behind the dam. In the early days of World War II, when the West faced a critical power short-

age, parts for two generators and turbines lay idle at Shasta Powerplant. No water had yet been stored in the reservoir, nor would there be for a long time to come. There was ample water at Grand Coulee Dam and space to install the turbines and generators. Hydraulic characteristics were such that the turbines and generators could be used at Grand Coulee. The parts were shipped to Grand Coulee and installed. They generated power during the war years, and were then returned to Shasta.



Keswick Powerplant



Keswick Switchyard

Keswick Dam also has a powerplant. Its three units have a total capacity of 75,000 kilowatts. This plant generates more than 500 million kilowatt-hours of electricity each year.

Some of the power generated by the Shasta and Keswick Powerplants is used to pump water to irrigation systems in the southern part of the project. The remaining power is sold to cities and irrigation districts. Power revenues help pay for the cost of building the CVP.

## A California Playground

California and recreation are synonymous. The Shasta Division of the CVP certainly helps maintain that reputation. Shasta Lake, part of a national recreation area, is one of the major outdoor attractions in the western United States, recording more than 2 million visitors annually. When full, the lake boasts 365 miles of shoreline and nearly 30,000 surface acres.

Shasta offers visitors a variety of recreation opportunities. Camping, boating, picnicking, swimming, waterskiing, and fishing are favorite pursuits. And there are plenty of spectacular sights. Mount Shasta, at 14,457 feet, provides a towering backdrop to the lake, which is a little more than 1,000 feet above sea level. Shasta Caverns on the McCloud arm of the lake display nature's dramatic handiwork.

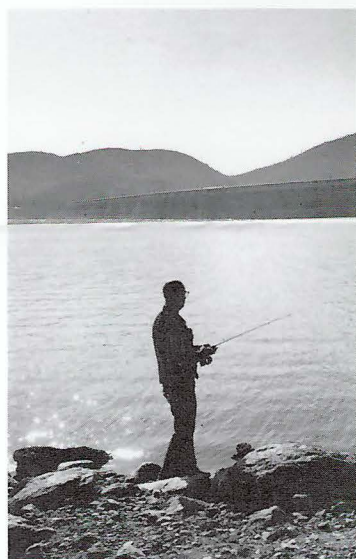
If fishing is your pleasure, Shasta is almost a dream. With several main species of fish in the lake, angling is exciting the year around. Warm water fish include bluegill, crappie, small- and largemouth bass, bullhead, channel and white catfish, and white sturgeon. Trout fishermen test their skill on rainbow, brown, and kamloops.

Keswick Reservoir, with 640 surface acres and about 25 miles of shoreline, also attracts recreationists, though in limited numbers because it sits in rough, rocky terrain. Keswick's cool waters offer good rainbow trout fishing.

Shasta National Recreation Area is operated by the U.S. Forest Service. Shasta County administers recreation at Keswick Reservoir.

## Aiding Fish and Wildlife

Shasta and Keswick Reservoirs provide excellent habitat for large fish populations. The shoreline areas support a variety of wildlife. The facilities are also operated to stabilize water releases, which helps improve downstream fish runs, and to provide water for wildlife refuges in the valley. Water is released into the river from the depths of Shasta Lake during the annual salmon runs at a temperature that is ideal for spawning.



Fishing behind Shasta Dam



Municipal water

## Costs and Repayment

Shasta Division facilities cost about \$182 million to construct. For purposes of repayment, the division is included in the overall CVP, which is treated as one unit. Of the nearly \$2 billion already spent on the CVP, about 20 percent has been repaid by water and power users.

The total estimated cost of the entire CVP is \$3.7 billion. About 90 percent of this — \$3.3 billion — will eventually be repaid to the U.S. Treasury. Some of the "common good" benefits such as recreation, fish and wildlife, river navigation, flood control and water quality are not reimbursable.

Considering only the agricultural benefits of the CVP, the cumulative value of crops produced on project lands is already more than 3.5 times greater than the total estimated cost of the entire project.

## Visitors' Center, Tours, Information

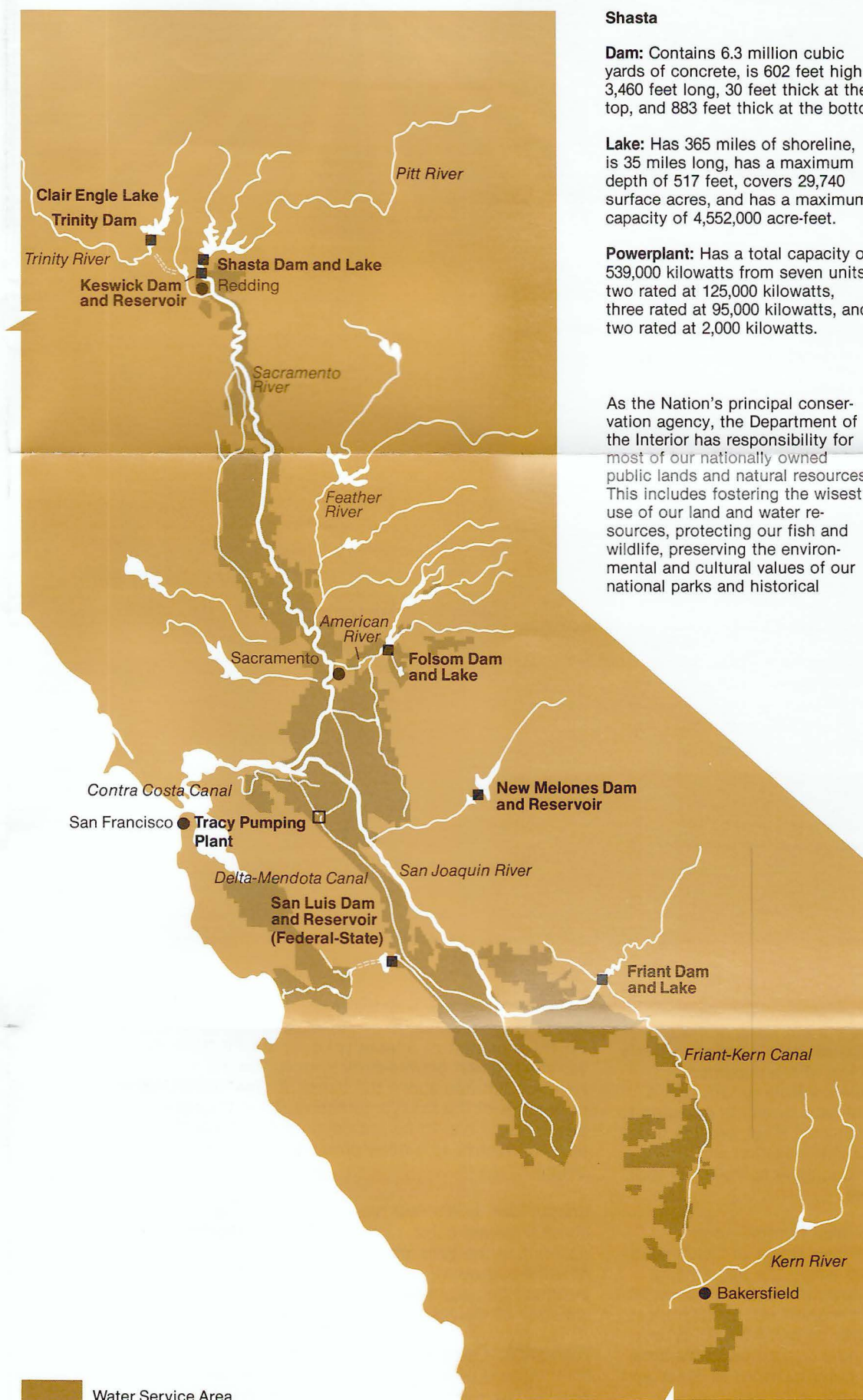
A visitor center at Shasta Dam is open all year. Free guided tours of the dam and powerplant are also available daily throughout the year. Additional information concerning the Shasta or Keswick facilities is available from:  
Water and Power Resources Service  
Shasta Office (CVP)  
Shasta Dam  
Redding, California 96001



Friant-Kern Canal



Sacramento supermarket



## Shasta

**Dam:** Contains 6.3 million cubic yards of concrete, is 602 feet high, 3,460 feet long, 30 feet thick at the top, and 883 feet thick at the bottom.

**Lake:** Has 365 miles of shoreline, is 35 miles long, has a maximum depth of 517 feet, covers 29,740 surface acres, and has a maximum capacity of 4,552,000 acre-feet.

**Powerplant:** Has a total capacity of 539,000 kilowatts from seven units, two rated at 125,000 kilowatts, three rated at 95,000 kilowatts, and two rated at 2,000 kilowatts.

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical

## Keswick

**Dam:** Contains 197,000 cubic yards of concrete, is 157 feet high, 1,046 feet long, 20 feet thick at the top, and 110 feet thick at the bottom.

**Reservoir:** Has 25 miles of shoreline, is 9 miles long, has a maximum depth of 118 feet, covers 640 surface acres, and has a maximum capacity of 23,800 acre-feet.

**Powerplant:** Has a total capacity of 75,000 kilowatts from three units, each rated at 25,000 kilowatts.

places, and providing for the enjoyment of life through outdoor recreation.

The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people.

The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.