FACTUAL DATA ON THE CENTRAL VALLEY PROJECT

California's vast Central Valley Project, one of the nation's major water conservation developments, extends from the Cascade Range in the north to the semiarid but fertile plains along the Kern River in the south.

The initial features of the project, authorized by President Roosevelt in 1935 for construction by the Bureau of Reclamation, included:

Shasta Dam on the Sacramento River and Friant Dam on the San Joaquin River to catch and store the floodwaters; Tracy Pumping Plant and Delta-Mendota Canal to transfer Sacramento River water to the San Joaquin Valley; powerplants at Shasta and at Keswick Dam below Shasta, with powerlines to bring the power generated to the Tracy pumps and to integrate that power into other electric systems; the Contra Costa Canal, the Friant-Kern Canal, and the Madera Canal to deliver the water throughout the Central Valley; and the Delta Cross Channel to shorten the path of the Sacramento River water across the Delta to the Tracy and Contra Costa Pumping Plants. Shasta Dam began storing water in January 1944; by 1951 the project had become fully operational. To help meet the expanding needs in the Central Valley, in 1949 Congress authorized the American River Division, including Folsom Dam and Powerplant, Nimbus Dam and Powerplant, and the Sly Park Unit; the Sacramento Canals Unit in 1950; the Trinity River Division in 1955; the San Luis Unit in 1960; the New Melones Unit in 1962; the Auburn-Folsom South Unit in 1965; and the San Felipe Division in 1967.

Initial features of the project were primarily built to protect the Central Valley from crippling water shortages and menacing floods. New project units are now being built to provide water and power to match the continued growth of the State, with additional units planned for the future.

Project facilities now in operation, under construction, or authorized, will bring irrigation water to 3,757,000 acres (1520 x 10^4 ha) of land, much of which is already under cultivation. In 1976, project powerplants with a total capacity of 1,368,094 kW had been completed and were producing electricity to help meet rapidly growing demands from farm, industrial, and domestic users.

Although developed primarily for irrigation, the multiple-purpose Central Valley Project also provides flood control, improves Sacramento River navigation, supplies domestic and industrial water, generates electric power, conserves and enhances fish and wildlife, creates opportunities for recreation, repels saline ocean waters, and enhances instream water quality in normally low flow months.

WATER SUPPLY

THE CENTRAL VALLEY BASIN includes two major watersheds--that of the Sacramento River on the north, and the San Joaquin River on the south--plus the Tulare Lake Basin. The combined watersheds extend nearly 500 mi (800 km) in a northwest-southeast direction and average about 120 mi (190 km) in width. The basin is surrounded by mountains except for a gap in its western edge, at the Carquinez Straits. The valley floor occupies about one-third of the basin, the other two-thirds are mountainous. The Cascade Range and Sierra Nevada on the north and the east rise in elevation to about 14,000 ft (4250 m) and the Coast Ranges on the west to as high as 8,000 ft (2400 m). The Sacramento River and its tributaries flow southward, draining the northern part of the basin. The San Joaquin River and its tributaries flow northward, draining the central southern portion. The two river systems join at the Sacramento-San Joaquin Delta, flow through Suisun Bay and Carquinez Straits into San Francisco Bay, and thence out the Golden Gate to the Pacific Ocean.

The average annual natural runoff of the Central Valley Basin for the 50-year period beginning in water year 1921 was about 27 million acre-ft (33 300 x 10^6 m^3), and for the critical 7-year dry period 1928-34, inclusive, it was 15 million acre-ft (18 500 x 10^6 m^3).

PROJECT FACILITIES

TRINITY RIVER DIVISION

THE TRINITY RIVER DIVISION was completed in 1964. Above Lewiston Dam, the Trinity River drains 728 mi^2 (188 500 ha) of mountainous country producing a high yield of water. Water from the Trinity River Basin is stored, regulated, and diverted through a system of dams, reservoirs, tunnels, and powerplants into the Sacramento River for use in water deficient areas of the Central Valley Basin. Additional power generating capacity is also provided for northern and central California. Trinity River Division improves recreational opportunities and provides minimum flows in the Trinity River.

Trinity River water is stored in Clair Engle Lake behind Trinity Dam. Releases from this reservoir are utilized to generate power at Trinity, Lewiston, Spring Creek, Judge Francis Carr, and Keswick Powerplants. Releases from Clair Engle Lake are reregulated at Lewiston Lake 7 mi (11 km) downstream. Lewiston Dam regulates flows to meet the downstream requirements of the Trinity River Basin and provides diversion through the Clear Creek Tunnel to the Judge Francis Carr Powerhouse and then into Whiskeytown Lake behind Clair A. Hill Whiskeytown Dam on Clear Creek, a tributary of the Sacramento River. From Whiskeytown Lake the water from Trinity River, and surplus flows from Clear Creek, flow through Spring Creek Power Conduit to the Spring Creek Powerplant and discharge into existing Keswick Reservoir on the Sacramento River. Water from the Trinity River waters combined with that of the Sacramento River, provides irrigation service to lands in the Sacramento Valley and other areas of the Central Valley Project.

TRINITY DAM AND CLAIR ENGLE LAKE on the Trinity River regulates a drainage area of over 728 mi^2 (188 500 ha). Clair Engle Lake stores a maximum of 2,448,000 acre-ft (3020 x 10^6 m^3) of water. The dam, completed in 1962, is a zoned earthfill structure 538 ft (164 m) high with a crest length of 2,450 ft (747 m).

TRINITY POWERPLANT at Trinity Dam has two generators with a total installed capacity of 105,556 kW.

LEWISTON DAM AND LAKE, about 7 mi (11 km) downstream from Trinity Dam, creates an afterbay to Trinity Powerplant and diverts water by means of Clear Creek Tunnel to Whiskeytown Lake. Lewiston Dam is a zoned earthfill structure 91 ft (27.7 m) high with a crest length of 745 ft (227 m) and forms a reservoir capacity of 14,660 acre-ft (18 x 10^6 m^3).

LEWISTON POWERPLANT, using releases for the support of fish life and other downstream purposes in the Trinity River, has one unit, with a capacity of 350 kW, and is operated as a station service unit for Trinity Powerplant.

THE TRINITY RIVER FISH HATCHERY was constructed to mitigate for the loss of salmon and steelhead spawning areas rendered inaccessible to anadromous fish because of Lewiston and Trinity Dams. The facility is operated for the Bureau by the Department of Fish and Game and produces approximately 200,000 lbs (90 720 kg) of fish per year. Current production goals are 500,000 coho salmon yearlings, 800,000 steelhead trout yearlings, and 1.7 million chinook salmon yearlings plus an additional 3 million salmon smolts. To maintain the salmon and steelhead fisheries below Lewiston Dam, the Bureau currently releases a minimum of 300 ft^3/s (8.5 m^3/s) to the Trinity River during normal and dry years and 150 ft^3/s (4.3 m^3/s) in critically dry years. In addition, short-term releases up to 800 - 1,000 ft^3/s (22.6 - 28.3 m^3/s) may be requested for special fishery management purposes including the attraction of fish to the hatchery.

CLEAR CREEK TUNNEL, 17½ ft (5.3 m) in diameter and 10.8 mi (17.4 km) long, enables transfer of water from Lewiston Lake through the Judge Francis Carr Powerhouse and into Whiskeytown Lake. A bypass is provided into Crystal Creek.

JUDGE FRANCIS CARR POWERHOUSE, located on Clear Creek, has two generators with a capacity of 154,400 kW.

CLAIR A. HILL WHISKEYTOWN DAM AND WHISKEYTOWN LAKE are located on Clear Creek. The dam provides regulation for Trinity River flows discharged from the Clear Creek Tunnel and regulates the runoff from the Clear Creek drainage area. The dam is a zoned earthfill structure 282 ft (86 m) high, with a main crest length of 2,250 ft (686 m), and creates a reservoir with a capacity of 241,000 acre-ft (297 x 10^6 m^3).

SPRING CREEK POWER CONDUIT AND POWERPLANT The conduit diverts water from Whiskeytown Lake on Clear Creek through the Spring Creek Powerplant to the Sacramento River above Keswick Dam. The conduit is 1.. ft (5.6 m) in diameter and about 3 mi (5 km) in length, including the 17 ft (5.2 m) diameter Rock Creek Siphon, six-tenths of a mile (1 km) in l.. It has two generators with a capacity of 200,000 kW.

SPRIN.. CREEK DEBRIS DAM AND RESERVOIR. The dam is a zo.. earthfill structure 196 ft (59.7 m) high with a crest length of 1,140 ft (347.5 m), located on Spring Creek above the powerplant tailrace. The reservoir, with a capacity of 5,800 acre-ft (7 x 10^6 m^3), controls flows that are polluted by old copper mines in the watershed which would otherwise enter the Sacramento River; this water is then released at a controlled rate to ensure proper dilution by Sacramento and Trinity River water providing an important fishery benefit by controlling the polluted runoff.

CLEAR CREEK SOUTH UNIT, located in Shasta County, was authorized as a part of the Trinity River Division. The major feature is the 11.7 mi (18.8 km) long Whiskeytown Conduit with capacity to transport 15,000 acre-ft (19 x 10^6 m^3) of water from Whiskeytown Lake for agricultural and municipal and industrial use in the Clear Creek Community Service District of Anderson.

COW CREEK UNIT, located in Shasta County, was authorized as a part of the Trinity River Division in 1955. The unit's features consist of the Wintu Pumping Plant with a maximum capacity of 100 ft^3/s (2.8 m^3/s) through the main conveyance, and a 92 ft^3/s (2.6 m^3/s) pressure system with branching pressure distribution lines. About 23,000 acre-ft (28 x 10^6 m^3) of water can be lifted 295 ft (90 m) from the Sacramento River by the Wintu Pumping Plant into the 8 mi (13 km) long Bella Vista Conduit for agricultural and municipal and industrial use on land east of Redding.

SHASTA DIVISION

THE SHASTA DIVISION, completed in 1962, consists of Shasta Dam and Shasta Lake, Shasta Powerplant, Keswick Dam and Keswick Reservoir, and Keswick Powerplant.

SHASTA DAM AND LAKE on the Sacramento River near Redding, serves to control floodwater and store surplus winter runoff for irrigation use in the Sacramento and San Joaquin Valleys, and to provide maintenance of navigation flows and conservation of fish in the Sacramento River, protection of the Sacramento-San Joaquin Delta from intrusion of saline ocean water, water for municipal and industrial use, and generation of hydroelectric energy. Completed in 1945, the dam is a concrete gravity structure 602 ft (183 m) high with a crest length of 3,460 ft (1055 m). Shasta Lake, with a capacity of 4,552,000 acre-ft (5615 x 10^6 m^3), provides abundant recreation.

SHASTA POWERPLANT is located just below Shasta Dam. Water from the dam is released through five 15 ft (4.6 m) diameter penstocks leading to the five main generating units and two station service units. The total capacity of these units is 578,000 kW.

KESWICK DAM AND RESERVOIR are located on the Sacramento River 9 mi (14 km) downstream from Shasta Dam. The dam creates a 23,000 acre-ft (28 x 10^6 m^3) afterbay for Shasta Lake and the Trinity River Divisions, and stabilizes the uneven water releases from the powerplants. The dam is a concrete gravity structure 159 ft (48 m) high with a crest length of 1,046 ft (319 m).

Migratory fish trapping facilities at the dam are operating in conjunction with the Coleman Fish Hatchery on Battle Creek, 25 mi (40 km) downstream.

KESWICK POWERPLANT, located at Keswick Dam, has three generating units with a total capacity of 75,000 kW.

SACRAMENTO RIVER DIVISION

SACRAMENTO CANALS UNIT was added to the Central Valley Project in 1950. The unit consists of the Red Bluff Diversion Dam, Corning Pumping Plant, and Corning and Tehama-Colusa Canals. The unit was authorized to supply irrigation water to over 200,000 acres (80 900 ha) of land in the Sacramento Valley, principally in Tehama, Glenn, Colusa and Yolo Counties.

RED BLUFF DIVERSION DAM diverts water from the Sacramento River to the Corning Canal and the Tehama-Colusa service areas. The structure is concrete, 78 ft (24 m) high, and 752 ft (229 m) long. Fish ladders at each abutment permit king salmon and steelhead to pass around the dam in their migration to upstream spawning areas.

CORNING CANAL diverts water from the Tehama-Colusa Canal about ½ mi (0.8 km) downstream of the Red Bluff Diversion Dam. The water is lifted 56 ft (17 m) by the Corning Pumping Plant into the Corning Canal and is delivered to lands in Tehama County with an elevation too high to be served from Tehama-Colusa Canal. The Corning Canal is 21 mi (34 km) long and terminates about 4 mi (6 km) southwest of Corning. The initial diversion capacity is 500 ft^3/s (14 m^3/s) which is gradually decreased to 88 ft^3/s (2.5 m^3/s) at the terminus.

TEHAMA-COLUSA CANAL extends southerly from Red Bluff Diversion Dam. The first reach of the canal has a multipurpose function. Included in the upper end of the canal are the Tehama-Colusa Fish Facilities, which provide 1.6 million ft^2 (150 000 m^2) of spawning area for salmon in special gravel-bottom portions of the canal. These facilities, the largest of their kind in the world, were designed to accommodate 30,000 adult salmon. The canal serves irrigation needs in Tehama, Glenn, Colusa, and northern Yolo Counties. The initial diversion capacity is 2,530 ft^3/s (75 m^3/s) diminishing to 1,700 ft^3/s (48 m^3/s) at the terminus.

BLACK BUTTE DAM AND LAKE, constructed, operated, and maintained by the Corps of Engineers, includes facilities for delivery of water to South Canal of Orland Project and a water supply for the Sacramento Canals Unit. The structure provides about 59,000 acre-ft (73 x 10^6 m^3) of new water annually for irrigation and related purposes in addition to flood protection.

AMERICAN RIVER DIVISION

The American River Division provides water for irrigation and municipal and industrial use, hydrologic power, recreation, and flood control. The division includes Folsom and Sly Park units, both authorized in 1949 and now in operation, and the Auburn-Folsom South Unit, authorized in 1965.

FOLSOM UNIT consists of Folsom Dam, Lake, and Powerplant, Nimbus Dam, Lake Natoma, and Nimbus Powerplant on the American River.

FOLSOM DAM AND LAKE. Folsom Dam, which has a drainage area of 1,875 mi^2 (485 600 ha), was constructed by the Corps of Engineers and upon completion was turned over to the Bureau of Reclamation for coordinated operation with other Central Valley Project structures. The dam has a concrete main river section having a height of 340 ft (104 m) and a crest length of 1,400 ft (427 m), flanked by long earthfill wing dams extending from the ends of the concrete section on both abutments for a total length of 10,200 ft (3109 m). The dam plus an earthfill auxiliary dam at Mormon Island Saddle and eight other earthfill dikes create Folsom Lake with a storage capacity of 1,010,000 acre-ft (1245 x 10^6 m^3). The dam regulates flow of the American River for irrigation, power, flood control, municipal and industrial use, fish and wildlife, recreation, and other purposes.

FOLSOM POWERPLANT, constructed and operated by the Bureau of Reclamation, is located just below Folsom Dam. Water from the dam is released through three 15 ft (4.6 m) diameter penstocks to three generating units. The total capacity is 238,050 kW.

NIMBUS DAM AND POWERPLANT AND LAKE NATOMA. Nimbus Dam, 7 mi (11 km) below Folsom, creates Lake Natoma to reregulate the releases for power made through Folsom Powerplant. The dam is a concrete gravity structure 76 ft (23 m) in height, with a crest length of 1,093 ft (333 m). It serves as a diversion dam for the Folsom South Canal. The 13,500 kW, two-unit powerplant is located at the toe of Nimbus Dam. Also located at Nimbus Dam is the 30 million egg Nimbus Fish Hatchery built to compensate for the spawning area of salmon and steelhead that was destroyed by construction of Nimbus Dam.

SLY PARK UNIT includes Jenkinson Lake formed by Sly Park Dam on Sly Park Creek, a low concrete diversion dam on Camp Creek, and the Sly Park-Camino Conduit. Sly Park Dam is an earthfill structure 190 ft (58 m) high with a crest length of 760 ft (232 m), and with an auxiliary earthfill dam 130 ft (40 m) high with a crest length of 600 ft (183 m). Jenkinson Lake has a storage capacity of 41,000 acre-ft (51 x 10^6 m^3). The concrete diversion dam on Camp Creek and connecting tunnel from Camp Creek to Sly Park Creek augment the inflow into Jenkinson Lake. Sly Park-Camino Conduit, with a capacity of 125 ft^3/s (3.5 m^3/s), extends 7 mi (11 km) west from Sly Park Dam to Camino to deliver supplemental water to El Dorado Irrigation District for irrigation and municipal purposes in the vicinity of Placerville.

AUBURN-FOLSOM SOUTH UNIT, authorized in 1965, will consist of Auburn Dam, Powerplant, and Reservoir; County Line Dam, Pumping Plant, and Reservoir; Sugar Pine Dam and Reservoir; Linden and Mormon Island Pumping Plants, Folsom South Canal, and necessary diversion works, conduits, and appurtenant works for the delivery of water supplies in Placer, El Dorado, Sacramento, and San Joaquin Counties, and for future needs of the project. The unit will also provide hydroelectric power, flood control, fish protection, and new recreational facilities.

SUGAR PINE DAM AND RESERVOIR, completed in 1981, are located on North Shirttail Canyon approximately 7 mi (11 km) north of Foresthill. The dam is an earth and rockfill structure 197 ft (60 m) high with a crest length of 680 ft (207 m). Water from Sugar Pine will be piped approximately 9 mi (15 km) to the Forest Hill Divide Service Area for irrigation and municipal and industrial use.

FOLSOM SOUTH CANAL originates at Lake Natoma, which is an afterbay of Folsom Dam. When completed, the canal will be approximately 61.7 mi (99.3 km) long and serve municipal and industrial and irrigation users in Sacramento and San Joaquin Counties. The initial diversion capacity is 3,500 ft^3/s (99 m^3/s). The first two reaches, 26.7 mi (43 km), of the canal were complete.. The remaining 35 mi (56.3 km) will be constructed p.. authorization.

DELTA DIVISION

The Delta Division provide.. fo.. .. of water through the central portion of the great C.. Valley, including the Sacramento-San Joaquin Delta. The main features of the division are Delta Cross Channel, Contra Costa Canal, Tracy Pumping Plant, and Delta-Mendota Canal.

DELTA .. OSS CHANNEL is a controlled diversion channel between .. Sacramento River and Snodgrass Slough. Water is diverted from the river through a short, excavated channel near Walnut Grove into the slough. It then flows through natural channels into the Central Sacramento-San Joaquin Delta. The diversion provides an adequate supply of water to the intakes of the Contra Costa and the Delta-Mendota Canals, improves the irrigation supplies in the Sacramento-San Joaquin Delta, and helps repel ocean salinity. The channel is designed to divert approximately 3,500 ft^3/s (99 m^3/s).

CONTRA COSTA CANAL originates at Rock Slough about 4 mi (6 km) southeast of Oakley. Water for municipal, industrial, and irrigation use is lifted from Rock Slough 127 ft (38.7 m) by a series of four pumping plants. The canal is 47.8 mi (77 km) long and terminates in the Martinez Reservoir. The initial diversion capacity is 350 ft^3/s (10 m^3/s), diminishing to 22 ft^3/s (0.6 m^3/s) at the terminus.

TRACY PUMPING PLANT consists of an inlet channel, pumping plant, and discharge pipes. Water in the Delta is lifted 197 ft (60 m) into the Delta-Mendota Canal. Each of the six pumps at Tracy is powered by a 16,778 hp (12,511 kW) electric motor and is capable of pumping at the rate of 767 ft^3/s (22 m^3/s). Power to run the huge pumps is supplied by Central Valley Project powerplants. The water is pumped through three 15 ft (4.6 m) diameter discharge pipes which carry it about 1 mi (1.6 km) up an inclined grade to the Delta-Mendota Canal. The intake canal includes the Tracy Fish Screen which was built to intercept downstream migrant fish so they may be returned to the main channel to resume their journey to the ocean.

DELTA-MENDOTA CANAL carries water southeasterly from the Tracy Pumping Plant along the west of the San Joaquin Valley for irrigation supply, use in the San Luis Unit, and to replace San Joaquin River water stored by Friant Dam and used in the Friant-Kern and Madera systems. The canal is 113 mi (182 km) long and terminates at the Mendota Pool about 30 mi (48 km) west of Fresno. The initial diversion capacity is 4,600 ft^3/s (130 m^3/s) which is gradually decreased to 3,211 ft^3/s (91 m^3/s) at the terminus.

WEST SAN JOAQUIN DIVISION

THE SAN LUIS UNIT, latest link in the Central Valley Project and also the State of California Water Plan, was authorized to be built and operated jointly with the State of California. The San Luis Unit consists of one major dam and reservoir, a forebay dam and forebay, two detention dams and reservoirs, two pumping plants, two pumping-generating plants, two major canals, and switchyard facilities.

B.F. SISK SAN LUIS DAM AND SAN LUIS RESERVOIR (JOINT FEDERAL-STATE FACILITIES) are located on San Luis Creek near Los Banos. The reservoir, with a capacity of 2,041,000 acre-ft (2518 x 10^6 m^3), is used to store surplus water of the Sacramento-San Joaquin Delta. Releases are made through the William R. Gianelli Pumping-Generating Plant, utilizing its generating capability to generate power. The dam is a zoned earthfill structure 382 ft (116 m) high, with a crest length of 18,000 ft (5670 m).

O'NEILL DAM AND FOREBAY (JOINT FEDERAL-STATE FACILITIES) are located on San Luis Creek 2½ mi (4 km) downstream from B.F.Sisk San Luis Dam. O'Neill Dam is a zoned earthfill structure with a height of 87 ft (26.5 m) and a crest length of 14,300 ft (4360 m); the Forebay has a capacity of 56,000 acre-ft (70 x 10^6 m^3). The Forebay is utilized as a hydraulic junction point for Federal and State waters, the top 20,000 acre-ft (25 x 10^6 m^3) acting as reregulator storage necessary to permit offpeak pumping and onpeak generation by the main William R. Gianelli Pumping-Generating Plant. Recreation facilities are provided on the Forebay.

O'NEILL PUMPING-GENERATING PLANT (FEDERAL FACILITY) consists of an intake channel leading off the Delta-Mendota Canal, 70 mi (113 km) from the Tracy Pumping Plant, and six pumping-generating units. Normally these units operate as pumps to lift water from 45 to 53 ft (14 to 16 m) into the O'Neill Forebay. When water is occasionally released from the Forebay to the Delta-Mendota Canal, these units operate as generators. When operating as pumps and motors each unit can discharge 700 ft^3/s (20 m^3/s) and has a rating of 6,000 hp (4500 kW). When operating as turbines and generators each unit will have a generating capacity of about 4200 kW.

WILLIAM R. GIANELLI PUMPING-GENERATING PLANT (JOINT FEDERAL-STATE FACILITY), located at B.F. Sisk San Luis Dam, lifts water by pump-turbines from the O'Neill Forebay into San Luis Reservoir. During the irrigation season, water is released from San Luis Reservoir back through the pump-turbines to the Forebay and energy is reclaimed. Each of the eight pumping-generating units has a capacity of 63,000 hp (47 000 kW) as a motor and 53,000 kW as a generator. As a pumping station to fill San Luis Reservoir, each unit lifts 1,375 ft^3/s (39 m^3/s) at 290 ft (88 m) total head. As a generating plant, each unit passes 1,640 ft^3/s (46 m^3/s) at the same head.

SAN LUIS CANAL (JOINT FEDERAL-STATE FACILITY) carries water southeasterly from O'Neill Forebay along the west side of the San Joaquin Valley. The canal is 102 mi (164 km) long. The joint facility terminates at Kettleman City where it becomes the Governor Edmund G. Brown California Aqueduct (a State facility). The canal capacity ranges from 13,100 ft^3/s (371 m^3/s) at the intake to 8,350 ft^3/s (236 m^3) at its terminus.

DOS AMIGOS PUMPING PLANT (JOINT FEDERAL-STATE FACILITY), 17 mi (27 km) south of the Forebay, is a relift plant in the San Luis Canal. The plant contains six pumping units, each capable of delivering 2,200 ft^3/s (62 m^3s) at 125 ft (38 m) of head.

COALINGA CANAL (FEDERAL FACILITY), which carries water from the turnout structure on the San Luis Canal to the Coalinga area, is a concrete-lined canal 11.6 mi (18.6 km) in length with a capacity of 1,110 ft^3/s (31 m^3/s).

PLEASANT VALLEY PUMPING PLANT (FEDERAL FACILITY) lifts water 180 ft (55 m) from an intake channel leading from San Luis Canal at mile 74. Three 7,000 hp (5200 kW), three 3,500 hp (2600 kW), and three 1,250 hp (900 kW) units are used to deliver 1,140 ft^3/s (32 m^3/s) into Coalinga Canal.

LOS BANOS AND LITTLE PANOCHE DETENTION DAMS AND LOS BANOS AND LITTLE PANOCHE RESERVOIRS (JOINT FEDERAL-STATE FACILITIES) are features required to protect the San Luis Canal by controlling flows of streams crossing the canal.

FRIANT DIVISION

The Friant Division provides for the transport of northern California water through the southern part of the semiarid Central Valley.

FRIANT DAM AND MILLERTON LAKE, completed in 1942, are located on the San Joaquin River below a drainage area of 1,630 mi^2 (422 170 ha). Friant Dam is a straight concrete gravity-type structure 319 ft (97 m) high with a crest length of 3,488 ft (1063 m). The reservoir has a capacity of 520,500 acre-ft (642 x 10^6 m^3). It controls San Joaquin River flows, provides downstream releases to meet requirements above Mendota Pool, and provides conservation storage and diversion into Madera and Friant-Kern Canals.

MADERA CANAL, completed in 1945, carries water northerly from Millerton Lake to furnish new and supplemental supplies to lands in Madera County. The canal is 36 mi (58 km) long and terminates at the Chowchilla River about 8 mi (13 km) northeast of Chowchilla.

FRIANT-KERN CANAL, completed in 1951, carries water from Millerton Lake southerly for new and supplemental irrigation supplies in Fresno, Tulare, and Kern Counties. The canal is 152 mi (245 km) long and terminates at the Kern River about 4 mi (6 km) west of Bakersfield. The initial diversion capacity is 5,300 ft^3/s (150 m^3/s), which gradually decreases to 2,500 ft^3/s (71 m^3/s) at the canal's terminus.

EAST SIDE DIVISION

The NEW MELONES UNIT consists of the New Melones Dam, Lake, and Powerplant, which are located on the Stanislaus River about 60 mi (97 km) upstream from its confluence with the San Joaquin River. The dam was originally authorized by the Flood Control Act of December 22, 1944, for construction by the U.S. Army Corps of Engineers to help alleviate serious flooding problems along the Stanislaus and lower San Joaquin Rivers. In 1962, Congress expanded and reauthorized the project (P.L. 87-874) for operation by the Secretary of the Interior as an integral part of the Central Valley Project. Multi-purpose functions of the New Melones Unit include flood control, irrigation, and municipal and industrial water supply, power generation, fishery enhancement, water quality improvement, and recreation. The dam, completed in 1979, is an earth and rockfill structure 625 ft (191 m) high, with a crest length of 1,560 ft (476 m) and forms a reservoir with a capacity of 2,400,000 acre-ft (2960 x 10^6 m^3).

SAN FELIPE DIVISION

The SAN FELIPE DIVISION, completed in 1987, includes Pacheco Tunnel, about 7 mi (11 km) long, and Santa Clara Tunnel, 1 mi (1.6 km) long, with about 48 mi (78 km) of conveyance facilities, pumping plants, power transmission facilities, a regulating reservoir, and distribution facilities in Santa Clara and San Benito Counties. An average of 216,000 acre-ft (266 x 10^6 m^3) of water will be delivered annually from Central Valley Project sources through San Luis Reservoir and diversion facilities.

ELECTRICAL TRANSMISSION SYSTEM

The CVP TRANSMISSION SYSTEM, operated and maintained by Western Area Power Administration, consists of switchyards, high-voltage lines, and substations for delivery of power to project pumps and for wholesale disposal of excess power with approximately 1,144 circuit-mi (1841 km) of 230-kV line. The backbone of the system consists of two 230-kV circuits from the Shasta-Trinity Powerplant complex to Tracy Switchyard, three 230-kV circuits from the Shasta-Trinity Powerplant complex to Elverta Substation, two 230-kV circuits from Elverta Substation to Tracy Switchyard, plus a 230-kV connection between Folsom Powerplant and Elverta Substation. The system is connected to the Northwest by the Malin-Round Mountain 500-kV line and Round Mountain-Cottonwood 230-kV line, both units of the Pacific Northwest-Pacific Southwest Intertie.

CORPS OF ENGINEERS PROJECT

Buchanan and Hidden Dams (H.V. Eastman and Hensley Lakes), completed in 1976, are operated by the Corps of Engineers. Marysville Dam, Powerplant, and Reservoir, are authorized for construction and operation by the Corps. The projects are, and will be, financially integrated with the Central Valley Project with the Bureau of Reclamation authorized to sell the water and the power.

IRRIGATION PLAN

Reservoirs of the Central Valley Project are coordinated in their operation in order to obtain maximum yields and to deliver water into the main river channels and into the canals of the project in the most efficient and economical manner. Both irrigation and municipal water are delivered from the main canals of the Sacramento and American Rivers, and the Sacramento-San Joaquin Delta with long-term contracts negotiated with water districts and other local organizations. The distribution of water from the main CVP conveyance facilities to the individual users is the responsibility of the local districts.

IRRIGATION DISTRIBUTION SYSTEMS consist of lateral canals and pipe systems to take water from the main canals of the Sacramento and American Rivers and the Sacramento-San Joaquin Delta and deliver it to individual farms. The Bureau of Reclamation has built several distribution systems and is constructing others for the water users.

IRRIGABLE ACRES IN THE PROJECT

The irrigable acreage of the service area of the authorized Central Valley Project is approximately 3,757,000 acres (1520 x 10^4 ha). A full irrigation water supply is furnished to new lands and to a supplemental supply for presently irrigated areas.

CHARACTER OF SOIL IN IRRIGABLE AREAS

Approximately two-thirds of the soils in the project service area are recent alluvial deposits suitable for a wide variety of crops. The remainder of the alluvial soils have moderately compacted subsoils, which somewhat limit crop adaptability and types of farming. Residual soils of variable depths are found in the small areas of the foothill lands.

ALTITUDE OF IRRIGABLE AREA

The irrigable lands are below elevations of 500 ft (152 m), except for the Sly Park Unit with an elevation of around 2,500 ft (760 m) in the foothills.

FARM WATER REQUIREMENT

The farm irrigation water requirement varies to some extent climatologically, but principally by crop and soil types. Under good irrigation practices, the water requirement varies from as little as 1 acre-ft/acre (3048 m^3/ha) for grain to as much as 7 acre-ft/acre (21 500 m^3/ha) for rice. The farm water use for the Central Valley Project averages around 3 acre-ft/acre (9000 m^3/ha).

LENGTH OF IRRIGATION

The irrigation season extends over a period of time of from 6 to 10 months. The total growing season averages over 240 days.

ANNUAL RAINFALL

Precipitation throughout the Central Valley varies geographically, seasonally, and annually. On the main valley floor, rainfall is comparatively light, decreasing from an annual normal of 22 in (559 mm) at Red Bluff to 6 in (152 mm) in Bakersfield. On the east side of the valley in the Cascade Range and Sierra Nevada, the precipitation varies from a normal annual of 80 in (2032 mm) in the north to 35 in (889 mm) in the south, most of which falls as snow above the 3,100 to 6,400-ft (945 to 1950-m) elevation. In the Coast Range precipitation is less than in the Cascade Range and Sierra Nevada and falls almost entirely as rain. Precipitation varies in the amount from year to year, the maximum some 3½ times the minimum, with extremes at more than seven times the minimum.

RANGE OF TEMPERATURE

The main valley floor has warm dry summers with occasional temperatures exceeding 100 °F (38 °C). In the summer, surrounding mountains are generally warm and dry, but in the winter, particularly in the Cascade Range and Sierra Nevada, temperatures drop below freezing. The average annual temperature for Sacramento is about 60 °F (15 °C) and for Fresno about 63 °F (17 °C). The average frost-free period in the valley is about 9 months; the winter months are mild with an average of less than 15 days when minimum temperatures are below 32 °F (0 °C).

PRINCIPAL PRODUCTS

Of the 220 different crops grown on the Central Valley farms, the principal ones are field crops - including alfalfa, irrigated pastures, sugar beets, beans, barley, cotton, and rice; truck crops - including asparagus, potatoes, tomatoes, melons and a variety of other vegetables; fruits and nuts - including grapes, peaches, plums, prunes, apricots, pears, olives, oranges, almonds, and walnuts. Seed crops - truck and pasture - are raised extensively. Practically all these crops, except for some barley, almonds, and beans, are grown under irrigation, with 90 percent of the gross farm income of the Central Valley Basin from irrigated crops. The production of livestock for beef and for dairy products is also very important in the Central Valley.

PRINCIPAL MARKETS

The Central Valley crops enjoy a wide distribution and are shipped to all major national and many international markets. Livestock, dairy products, and basic field crops are primarily marketed locally, as these markets are increasing as a result of substantial population growth.

RECREATION

Recreation is an important benefit of the Central Valley Project facilities. There are 32 developed recreation areas which draw over 11 million visitor days of use. Activities include fishing, boating, waterskiing, swimming, picnicking, camping, hiking, sightseeing, and hunting. Management of these areas is normally by other Federal, State, and local public agencies.

CENTRAL VALLEY PROJECT MAPS

Central Valley Project, North Half
Map No. 214-208-4174
Central Valley Project, South Half
Map No. 214-208-4175
Shasta and Trinity River Divisions
Map No. 214-208-4469
Delta Division
Map No. 214-208-4177
San Luis Unit
Map No. 214-208-5165
American River Division
Map No. 353-208-138

OTHER BUREAU OF RECLAMATION PROJECTS IN THE CENTRAL VALLEY BASIN

ORLAND PROJECT with its related storage and diversions facilities was authorized for construction in 1907 and is now a part of the Central Valley Project. Details concerning it will be found on a seperate Orland Project Map. The project has been operated and maintained by the Orland Unit Water Users' Association since October 1954.

SOLANO PROJECT, with Monticello Dam, Putah Diversion Dam, and Putah South Canal as its major features, is not a part of the Central Valley Project. Details will be found on a separate Solano Project Map.

Address all inquiries regarding additional information concerning this project to:

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