PLANNING STATUS REPORT

WATER RESOURCES APPRAISALS FOR HYDROELECTRIC LICENSING

This is one of a series of revised Planning Status Reports for major river basins in the United States. The original reports, which were prepared several years ago, are being revised as part of a program of Water Resources Appraisals for Hydroelectric Licensing. The revised reports provide updated information on water resources for use by the Federal Energy Regulatory Commission and its staff when considering hydroelectric licensing and other work. The reports present data on water resource developments, existing and potential, and on water use by existing and projected steam-electric generating facilities. The reports also summarize past and current planning studies. The information presented in these reports was abstracted from available sources and involved no new analyses. Information is current as of December 1980 unless otherwise indicated. The report is a staff effort which was not prepared for adoption or approval by the Commission, and does not commit or prejudice later Commission action.

FEDERAL ENERGY REGULATORY COMMISSION
OFFICE OF ELECTRIC POWER REGULATION

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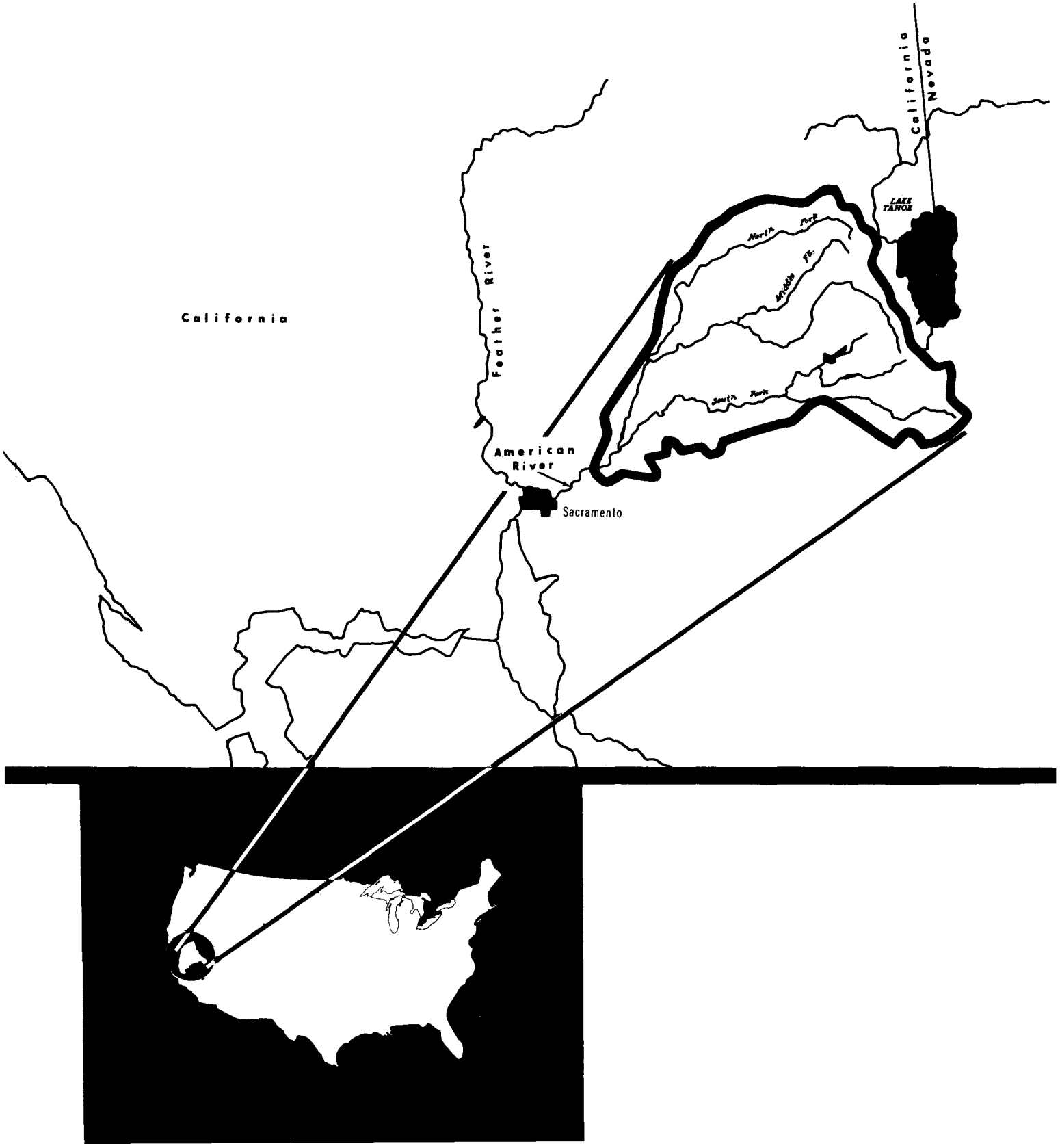
THE AMERICAN RIVER BASIN AREA



DESCRIPTION OF THE BASIN

Physiography

The American River rises high in the Sierra Nevada of California. Flowing generally southwesterly, it joins the Sacramento River at Sacramento, California. The river is divided into three forks, the North, Middle, and South, and drains an area of about 2,160 square miles. The Middle Fork joins the North Fork American River just above the city of Auburn. The South Fork American River joins the North Fork in Folsom reservoir about 15 miles below Auburn to form the American River. The Middle Fork has one important tributary, the Rubicon River; the South Fork has two, Silver Creek and Silver Fork. A stream profile, figure 1, and a detailed basin map, figure 2, are included at the end of this report.

Elevations in the basin range from about 25 feet above mean sea level at the mouth of the American River to about 10,000 feet at the highest peak near its eastern boundary. The upper portion, above the 5,000-foot elevation, includes high peaks with bare granite domes, glacial basins, and numerous natural lakes. The gradient of the upper reaches of the North Fork averages about 80 feet per mile as compared with the Middle Fork which averages about 170 feet per mile. The South Fork gradient is about 120 feet per mile. In the lower reaches of these tributaries the gradient is more moderate, averaging about 30 feet per mile.

The central region of the basin encompasses a 25-mile wide area between the 5,000 foot elevation and the 1,500 foot elevation. Here, vegetation consists primarily of coniferous forest, changing at the lower elevations to oak and brush-covered slopes. Between the central area and the Sacramento Valley floor lies an area of foothills about 15 miles wide with elevations ranging from 200 to 1,500 feet. Some vines and deciduous fruits are grown in the foothill area, but agriculture is primarily limited to grazing.

Climate

The American River basin has warm summers and mild winters in the lower regions, but cool summers and cold winters accompanied by heavy snows in the high mountains. Average annual precipitation varies from about 25 inches in the foothill area to more than 70 inches in the high mountains. Approximately 80 percent of annual precipitation occurs during the five months of November through March. Most of the precipitation at the higher elevation occurs as snowfall and is retained until the spring and summer runoff period.

Runoff

The runoff from the American River basin varies considerably from year to year. This is indicated by the streamflow measured at the U.S. Geological Survey gaging station at Fair Oaks (drainage area 1,888 square miles). The average annual runoff for 74 years of record (1904-1978) at Fair Oaks, adjusted for change in storage, diversions, and evaporation from Folsom reservoir, was 3,739 cubic feet per second. This runoff, which is equivalent to 2,709,000 acre-feet per year, compares with the maximum yearly average of 5,400,000 acre-feet in 1911 and a minimum yearly average of 605,000 acre-feet in 1924. On the average, about 78 percent of the annual runoff occurs during February through June. The months of August, September, and October have comparatively little runoff. About 33 percent of the runoff is contributed by the South Fork, and about 40

DESCRIPTION OF THE BASIN

percent by the Middle Fork. The remainder originates from the North Fork and minor foothill drainage areas. The minimum discharge recorded at the Fair Oaks gaging station was 3.4 cubic feet per second in August 1924. The largest flood of record occurred February 1, 1963, when the inflow to Folsom reservoir, upstream from the Fair Oaks station, was 240,000 cubic feet per second.

Population

In 1848, John Marshall's discovery of gold near the present site of Coloma triggered a great influx of people into the basin. As the easily-worked sources of gold were exhausted, many people left, but others turned to farming, lumbering, and the service trades. The population of the basin, which may have reached upward of 40,000 at the height of the "gold rush" days declined to about 14,000 in 1870. By 1920, the population was further reduced to about 8,000. However, the downward trend ceased in the early twenties, and since then, the population has been increasing steadily, reaching about 50,000 in 1970, excluding the city of Sacramento. The city of Sacramento borders the American River near the confluence of the American and Sacramento Rivers. It is the largest city in the Central Valley with a metropolitan population in 1978 of about 950,000.

Economy

Lumbering ranks as the principal economic activity in the basin, followed by recreation, agriculture, and service trades. Farming activities are largely confined to the foothill area, which is considered to be one of the principal pear-producing areas in the State. The principal actitivies of the mountainous eastern half of the basin are lumbering and recreation. The region's scenic grandeur and numerous streams and lakes, including the Folsom reservoir, are prime recreational resources.

EXISTING WATER RESOURCE DEVELOPMENTS

Table 1 summarizes data on the 15 hydroelectric plants either existing or under construction in the American River basin. Most of the hydroelectric development has occurred since 1955. Prior to 1955, the total installed capacity in the basin was about 26 megawatts. Presently, the total installed capacity is 1,078 megawatts. Auburn Dam, with a proposed capacity of 300 megawatts, is under construction.

In the mid-1950's, the Corps of Engineers constructed the Folsom Dam, and the Bureau of Reclamation constructed Lake Natoma Dam and the Folsom and Nimbus powerplants on the main stem of the American River. It was also in the middle 1950's that plans were initiated by the Sacramento Municipal Utility District and by the Placer County Water Agency for comprehensive development of the remaining water resources of the basin. Sacramento Municipal Utility District's primary interest was hydroelectric power; Placer County Water Agency's was irrigation, with power providing a firm revenue source.

Nimbus and Folsom Dams and powerplants have been in operation since 1955. Nimbus Dam creates an afterbay for Folsom Dam. The Folsom project is operated by the Water and Power Resources Service (previously the U.S. Bureau of

Reclamation) as an integral part of the Central Valley project. A portion of the yield from Folsom reservoir is diverted to the Folsom-South Canal to be used for irrigation, powerplant cooling, and municipal and industrial applications by the East Bay Municipal District. At the present, the Folsom South Canal is completed only as far as Rancho Seco nuclear plant. The remainder of the yield from Folsom reservoir satisfies riparian rights, American River fish flows, Sacramento-San Joaquin Delta water quality requirements, and municipal and industrial demands. During the high runoff season, up to 400,000 acre-feet is reserved for flood control. When possible, the reservoir is operated to maintain a minimum recreation pool with a storage capacity of 610,000 acre-feet until September.

Table 1

Hydroelectric Powerplants
Existing and Under Construction
American River Basin

Project	Powerhouse Location: Stream	Powerhouse Location: Approximate Mile	Owner: Name 1/	Owner: Class 2/	Drainage Area (sq mi)	Usable Storage (1,000 ac-ft)	Maximum Pool Elevation (ft)	Gross Head (ft)	Installed Capacity (kW)	Average Annual Energy (MWh)	Year Installed
Nimbus	American R.	24	WPRS	F	1887	5	125	43	13,500	91,100	1955
Folsom	American R.	32	WPRS	F	1861	920	466	333	198,720	702,700	1955
Auburn 3/	American R.	44	WPRS	F	982	[1,966]	1,131	675	[300,000]	[860,000]	-
Chili Bar	S. Fork American R.	21	PG&E	P	597	2	998	60	7,020	37,000	1965
White Rock	S. Fork American R.	22	SMUD	M	497	16	1,850	854	190,000	618,600	1968
Camino	S. Fork American R.	34	SMUD	M	165	4/	2,915	1,065	142,500	441,600	1968
El Dorado No. 1	S. Fork American R.	35	PG&E	P	217	4/	3,788	1,909	20,000	97,900	1924
Jaybird	Silver Creek	6	SMUD	M	168.4	3	4,450	1,535	133,000	575,000	1961
Union Valley	Silver Creek	16	SMUD	M	83.6	264	4,870	420	33,250	115,000	1963
Robbs Peak	Silver Creek	21	SMUD	M	30.9	4/	5,226	356	23,750	55,000	1965
Oxbow	M. Fork American R.	17	PCWA	M	429	3	1,178	89	6,570	36,500	1966
Ralston	Rubicon R.	0	PCWA	M	210	4/	2,529	1,344	79,200	476,300	1966
Lowell J. Stephenson	M. Fork American R.	32	PCWA	M	113	203	4,630	2,101	109,800	650,000	1966
French Meadows	Rubicon R.	32	PCWA	M	47.2	125	5,263	639	15,300	75,300	1966
Loon Lake	Gerle Creek	2	SMUD	M	8.1	73.1	6,410	1,133	74,105	117,000	1969
		Totals				1614.1			1,046,715	4,089,000	

[ ] - *Non-added item.*

1/ *WPRS - U.S. Water and Power Resources Service; SMUD - Sacramento Municipal Utility District; PG&E - Pacific Gas and Electric Company; PCWA - Placer County Water Agency.*
2/ *F - Federal; M - Municipal; P - private.*
3/ *Construction of Auburn Dam was initiated in 1967 and suspended in 1975 due to seismic considerations. Construction has not been resumed, but the project is still under active consideration.*
4/ *Less than 1,000 acre-feet.*

Construction began on the Auburn Dam in 1967 but was halted in 1975 due to seismic considerations. An earthquake having a magnitude of 5.7 on the Richter scale occurred on August 1, 1975 near Oroville, California, about 50 miles northwest of Auburn. Previously, potential for active faulting was regarded as low. However, the earthquake suggested that part of the foothills fault system might be active, and a number of safety related concerns were expressed. Notably, since the dimensions of the planned concrete structure were based on extrapolations from previously constructed, similar dams, doubts as to the structure's ability to withstand an earthquake were raised.

The main consumptive use of Auburn reservoir's yield would be for irrigation in the Folsom South Canal Service Area under the provisions of the Auburn-Folsom South Unit Authorization Act. If Auburn Dam is built, Auburn would have a maximum flood control storage allocation of 450,000 acre-feet, and flood control storage capacity at Folsom Dam would be reduced to 200,000 acre-feet. Folsom reservoir would be maintained at a pool equivalent to 810,000 acre-feet of storage until September 1 each year for recreation purposes. Although the decision on whether to complete the Auburn project is still pending, the initial power installation will probably be a 2-unit, 300-megawatt powerplant.

EXISTING WATER RESOURCE DEVELOPMENTS

The Placer County Water Agency Middle Fork Project is a multiple purpose project designed to conserve and control waters of the Middle Fork of the American River, the Rubicon River, and certain tributaries for irrigation, domestic and commercial purposes, and for the generation of electric energy. Principal project features are two storage reservoirs, five diversion dams, four powerplants, diversion and water transmission facilities, five tunnels, and appurtenances. The powerplants (French Meadows, Lowell J. Stephenson, Ralston, and Oxbow) have a combined generating capacity of 210,870 kilowatts. The two storage reservoirs (French Meadows and Hell Hole) have a combined usable capacity of approximately 327,600 acre feet.

The present irrigated area within the American River basin is only about 8,000 acres, which is devoted to pasture and to the growing of grapes, citrus fruits, nuts, rice, and truck crops. The Placer County Water Agency Middle Fork Development is expected to meet water requirements of Placer County for irrigation and domestic uses.

Information on major storage projects is shown on table 2. The total usable storage capacity of the 19 storage reservoirs listed is 3,702,000 acre-feet. The largest existing reservoir in the basin is the 920,000 acre-foot Folsom reservoir. The SMUD and PCWA projects account for 422,000 and 331,000 acre-feet, respectively.

Table 2

Storage Reservoirs
Existing and Under Construction
American River Basin

Reservoir	Stream	Normal Water Surface Elev. (ft)	Usable Storage Capacity (1,000 ac-ft)	Purpose[1/]	Owner[2/]
Main Stem					
Lake Natoma	American River	125	5	I,P	WPRS
Folsom	American River	466	920	P,I,P	WPRS
South Fork American					
Slab Creek	S. Fk. American R.	1,850	16	P	SMUD
Camino	Silver Creek	2,915	1	P	SMUD
Junction	Silver Creek	4,450	3	P	SMUD
Ice House	S. Fk. Silver Creek	5,450	46	P	SMUD
Union Valley	N. Fk. Silver Creek	4,870	277	P	SMUD
Brush Creek	Brush Creek	2,915	2	P	SMUD
Silver Lake	Silver Fork	7,261	9	P	PG&E
Twin Lakes	Caples Creek	7,801	22	P	PG&E
Medley Lakes (Lake Aloha)	Pyramid Creek	8,114	5	P	PG&E
Middle Fork American					
Ralston Afterbay	M. Fk. American R.	1,178	3	P	PCWA
Loon Lake	Gerle Creek	6,410	77	P	SMUD
Hell Hole	Rubicon R.	4,630	203	P,I	PCWA
French Meadows	M. Fk. American R.	5,263	125	P,I	PCWA
North Fork American					
Auburn[3/]	N. Fk. American R.	1,131	[1,966]	P,I,F	WPRS
North Fork[4/]	N. Fk. American R.	715	8	FC,Db	Corps
Sugar Pine[5/]	Shirttail Creek	3,618	6	M	WPRS
Lake Valley	N. Fk. of N. Fk. American R.	5,770	8	P,I,M,D	PG&E
Total			1,736		

[ ] - Non-added item.

1/ P - Power Generation; I - Irrigation; M - Municipal and Industrial Water Supply; D - Domestic; F - Flood Control; Db - Debris Control.

2/ PG&E - Pacific Gas & Electric Company; Corps - Army Corps of Engineers; SMUD - Sacramento Municipal Utility District; PCWA - Placer County Water Agency; WPRS - Water and Power Resources Service.

3/ Construction of Auburn Dam was initiated in 1967 and suspended in 1975 due to seismic considerations. Construction has not been resumed, but the project is still under active consideration.

4/ Would be inundated by Auburn reservoir.

5/ Under construction.

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EXISTING WATER RESOURCE DEVELOPMENTS

The only steam-electric plant in the basin is the Rancho Seco nuclear plant owned by Sacramento Municipal Utility District. The generating capacity is 963 megawatts, and average annual energy generation is about 2,470 gigawatt-hours. The cooling water source is the American River via the Folsom South Canal, and the plant uses a wet tower cooling system. The 1975 average withdrawal was 8 million gallons per day, and 5 million gallons per day was consumed. The estimated water use is an average value, dependent on power demand, temperature of the cooling water, and other factors. The operating data is from the Second National Water Assessment, dated December 1978.

STATUS OF HYDROELECTRIC LICENSING

Table 3 shows the name and license status of existing and proposed non-federal hydroelectric plants in the American River basin. There are 12 plants operating under Federal Energy Regulatory Commission (FERC) licenses. These projects account for 85 percent of the hydroelectric generating capacity developed in the basin.

Table 3

Status of Hydroelectric Licensing
American River Basin

Project Name	FERC FERC Project Number	Type of License or Permit and Status 1/	Expiration Date	Status of Project
El Dorado No. 1	184	MON	2/	Existing
Oxbow	2079	MOP	2-28-13	Existing
Ralston	2079	MOP	2-28-13	Existing
French Meadows	2079	MOP	2-28-13	Existing
L.J. Stephenson	2079	MOP	2-28-13	Existing
Loon Lake	2101	MOP	7-31-07	Existing
Robbs Peak	2101	MOP	7-31-07	Existing
Union Valley	2101	MOP	7-31-07	Existing
Jaybird	2101	MOP	7-31-07	Existing
Camino	2101	MOP	7-31-07	Existing
White Rock	2101	MOP	7-31-07	Existing
Chili Bar	2155	MON	7-31-07	Existing
El Dorado No. 2	2761	MAP	-	Potential
Park Creek	2761	MAP	-	Potential
Plum Creek	2761	MAP	-	Potential

1/ *Type of License:*
MON - Major outstanding license non-public;
MOP - Major outstanding license public;
MAP - Major license - application pending public.

2/ *The original license expired 2-22-72 and has since been licensed on an annual basis.*

STATUS OF HYDROELECTRIC LICENSING

In 1967, the Sacramento Municipal Utility District White Rock project was completed and deprived the now abandoned PG&E American River plant (FERC Project No. 78) of its water supply. According to the prearranged agreement between the two companies, PG&E took title to District's Chili Bar project and its electrical output as a substitution. This agreement was sanctioned by the Commission in a joint license for Chili Bar Project No. 2155 issued to both companies.

Project No. 184 was originally issued for the El Dorado project to the El Dorado Power Company, and subsequently transferred to PG&E. This plant receives its water supply from the headwaters of the South Fork American River by utilizing the storage of four small headwater reservoirs and the diversions from two streams, Alder and Plum Creeks via El Dorado Ditch. Energy generated by the El Dorado plant is transmitted into the licensee's interconnected transmission lines. The project license expired February 22, 1972, and the Commission has taken no action on the relicense application filed February 27, 1970. However, the project is operating on an annual license, which is renewed each year.

Placer County Water Agency has scheduled the construction of a 500-kilowatt powerplant at Hell Hole Dam as an addition to their Middle Fork American River Development. They have recently submitted an application for an amendment to the existing license (FERC Project No. 2079).

The El Dorado Irrigation District has submitted a major license application (FERC Project No. 2761) for the South Fork American River Upper Mountain Development. The project includes three powerplants with a total installed capacity of 110.4 megawatts. Energy will be sold to the Sacramento Municipal Utility District, Pacific Gas and Electric, or the Sierra Pacific Power Company, all of which are tied to the Northern California Power Grid.

WATER RESOURCES PLANNING

Prior Studies and Reports

Studies and reports on the water and power potential of the American River basin have been made over a period of many years by both private and public agencies. The following paragraphs describe important water resource planning reports which led to the present development of the basin.

State of California Reports. Early reports of the State (Bulletin No. 12 in 1927, No. 24 in 1929, and No. 25 in 1930) were concerned mainly with projects which might be developed at Folsom, Auburn, and Coloma. A long period elapsed before publication of a comprehensive plan. In 1955, the California Department of Water Resources published three reports dealing with water resource development in the American River basin: Bulletin No. 10, "Placer County Investigation;" Bulletin No. 21, "American River Investigation;" and Bulletin No. 56, "Survey of Mountainous Areas." These reports were preliminary to the State master plan for the basin presented in Bulletin No. 3, "The California Water Plan," published in 1957. Bulletin No. 3 included detailed information on a state proposal in relation to a Sacramento Municipal Utility District proposal for comprehensive development of the American River basin.

WATER RESOURCES PLANNING

In these reports, the California Department of Water Resources considered two basin wide development plans, a basic plan and a modified plan. The present developments by Sacramento Municipal Utility District and Pacific Gas and Electric Company are generally part of the modified plan to develop the South Fork of the American River from Silver Creek to Chili Bar. The modified plan would develop the reach between Chili Bar and Folsom reservoir with either a very large Salmon Falls reservoir and powerplant or alternatively a smaller Salmon Falls reservoir and powerplant and a large Coloma reservoir and powerplant. Both large developments would inundate portions of Gold Discovery State Park at Coloma. Since the State legislature has announced that flooding of the park is not permissible unless specifically authorized by law, the development of either large reservoir would require special State legislative action.

The modified plan also provided for a diversion scheme where water from the Silver Fork American River would be diverted at a point downstream from the confluence of Caples Creek by canal to a storage reservoir on Alder Creek. Water from Alder Creek reservoir would be released through a powerplant and would flow down Alder Creek for diversion by canal into an enlarged Jenkinson reservoir. Discharges from Jenkinson reservoir would be released through a powerplant, conveyed through a power drop to the Weber reservoir, and from the Weber reservoir through a powerdrop to a small distributing reservoir on Hangtown Creek south of Placerville.

Corps of Engineers Reports. An interim report by the Corps of Engineers entitled "Sacramento River and Tributaries, California, from Collinsville to Shasta Dam," was printed in House Document No. 649, 78th Congress, 2nd Session, 1944. The Corps' proposed Folsom project, with a reservoir capacity of 355,000 acre-feet and provisions for future power facilities, was one of seven multiple-purpose projects proposed for the development in the basin. The Federal Power Commission commented to the Chief of Engineers by letter dated April 12, 1944. The Commission agreed with the Corps of Engineers that there was a need for additional flood control, power, and other conservation regulation; and concurred with the Corps that the report constituted an adequate framework upon which final plans for the comprehensive development of the water resources of the basin can be made. Folsom Dam was authorized for construction by the Flood Control Act of 1944.

A "Comprehensive Flood Control Survey Report on Sacramento-San Joaquin Basin Streams, California," dated February 1, 1945, presented a plan of development for the Sacramento-San Joaquin basin consisting of 25 major storage reservoirs and other works. The authorized Folsom project was to be constructed initially for flood control with provisions for a future powerplant, and was included in the plan with a view to its later enlargement to a capacity of one million acre-feet.

The Federal Power Commission commented on the report by letter dated April 24, 1946, to the Chief of Engineers. The Commission concurred with the Corps that the basin plan for flood control and related uses should be adopted and it should include the development of power at the authorized Folsom project on the American River.

The American River Basin Development Act of October 14, 1949 provided authorization for the Folsom Dam and Reservoir to be constructed by the Corps of

Engineers and the powerplant with an installation of about 120,000 kilowatts to be constructed by the Bureau of Reclamation, after which the project would be operated by the Bureau.

Bureau of Reclamation Reports. In 1940, the Bureau of Reclamation began general studies of the development and use of American River water. The Regional Director's report, dated 1945, was transmitted to the Commissioner of Reclamation and was published as a part of the Bureau of Reclamation's report entitled, "Central Valley Basin," dated August 1949, which was printed in Senate Document No. 113, 81st Congress, 1st Session. The ultimate plan proposed in the report encompassed 38 major reservoirs, canals, 28 hydroelectric powerplants and other related facilities. Folsom and Coloma reservoirs in the American River basin with a combined storage capacity of 1,800,000 acre-feet, associated with five hydroelectric powerplants with a combined generating capacity of about 146,000 kilowatts, were included. The Federal Power Commission's comments on the Bureau's report given in its letter dated April 24, 1946, were also published in Senate Document No. 113. The Commission did not comment on the generating capacities for individual projects, but rather concurred in general that the proposed plan, when integrated with that of the War Department, would provide for coordinated development of the water resources of the Central Valley basin. On the basis of this report and other presentations to Congress by local and Federal agencies, the Folsom project was authorized by the American River Basin Development Act of October 14, 1949 (63 Stat. 852, 1949), and was constructed cooperatively by the Corps of Engineers and the Bureau of Reclamation. The powerplant, with a present installation of 198,720 kilowatts, was placed on line in 1955.

In 1950, the Bureau completed a feasibility investigation of potential irrigation in the area south of the American River. In January 1960, the Bureau issued a report on the Folsom South Unit, Central Valley Project, California, presenting additional studies as to the feasibility of supplying American River water to Sacramento and San Joaquin Counties.

In 1962, the Bureau published a report titled "Auburn-Folsom South Unit, Central Valley Project, California" (H.D. 305, 87th Congress, 2nd Session, 1962). The works recommended would supplement those already constructed under the provisions of the American River Basin Development Act of 1949 mentioned above. Specifically, the project would provide water for irrigation and municipal use in the Folsom South Service Area (shown on figure 2); and would also serve multiple-purpose interests including power, flood control, fishery, and recreational uses. The major features of the Auburn Unit included Auburn Dam with 1,000,000 acre-feet of storage and a 155,000 kilowatt powerplant. By letter dated March 23, 1961, to the Secretry of the Interior, the Federal Power Commission agreed that the Auburn unit was economically justified, but expressed the view that studies of the advisability of including a future hydroelectric power unit should be included in future investigations. The Commission also suggested that a pumped-storage operation be considered.

In 1963, the Bureau published a report titled, "Supplemental Evaluation of the Auburn-Folsom South Unit, Central Valley Project, California," (H.D. 171, 88th Congress, 1st Session, 1964). This report presented a revision of the Auburn-Folsom South Unit, described in House Document 305 mentioned above; the revision being principally in increasing the Auburn reservoir storage from 1 to 2-1/2 million acre-feet, and the proposed initial installed capacity from 155 mega-

watts to 240 megawatts, with provisions for an ultimate installation of 400 megawatts. This report, as well as testimony by the Bureau, indicated an intent to integrate the operation of Auburn and Folsom reservoirs and Lake Natoma, for the purpose of developing water supply for the Folsom South Service Area. The Federal Power Commission commented by letter dated May 31, 1963, to the Secretary of the Interior, that the development of power as recommended would be desirable and economically justified as an increment to the multiple-purpose development of the Auburn site. Subsequently the Auburn Dam and the Folsom South Unit was authorized on September 2, 1965 by P.L. 89-161 89th Congress, H.D. 45, and construction of the dam was initiated in 1967.

In June 1964 the Bureau released a reconnaissance appraisal report entitled "Lake-Tahoe Basin, California-Nevada." This report explores ways to develop a supplemental water supply for Lake Tahoe basin. It discusses several alternate plans for importing water by trans-mountain diversion from the headwaters of the American River basin to the Lake Tahoe basin. The possible annual diversions from the plans selected for study range from 1,100 to 35,000 acre-feet.

The Bureau prepared a report entitled "Pleasant Oak Unit, American River Division, Central Valley Project, California." This report, prepared in May 1965, outlined plans to provide water to 30,000 acres in an area southeast of Placerville in the South Fork American River basin and North Fork Cosumnes River basin. The unit would obtain its water supply from Jenkinson Lake. The plan includes a diversion from Alder Creek to Jenkinson Lake. Jenkinson Lake currently discharges into the existing Camino Conduit and ultimately into the South Fork American River.

California State Water Resources Board. The Board issued Decisions 1356 (February 5, 1970) and 1400 (April 11, 1972) regarding the flows to be maintained below the Auburn Dam to the mouth of the American River.

Decision 1356 approved Bureau of Reclamation applications for consumptive use for irrigation, municipal, industrial, recreational, domestic, and water quality control purposes for use between November 1 and the succeeding July 1. Other applications were also approved in Decision 1356 for total of 6,900 cubic feet per second to be used throughout the year for power purposes at Auburn, Folsom, and Nimbus powerplants.

The Folsom South Service Area is the primary recipient of the water from the Auburn-Folsom South Unit of the Central Valley Project. It is served by the Folsom South Canal from Lake Natoma. A much larger area is also authorized to be served by water stored in Auburn reservoir, commingled with much greater quantities of water from other Central Valley Project sources, including the Trinity River, Clear Creek and the Sacramento River.

Decision 1400 was issued to establish minimum flows in the American below Auburn Dam. Permits issued pursuant to decision 1356 were amended to include the following:

1. The minimum flow shall not be less than 75 cubic feet per second between Auburn Dam and Folsom reservoir.

2. For the maintenance of fish and wildlife, the minimum flow shall be 1,250 cubic feet per second between October 15 and July 14 and 800 cubic feet per second between July 15 and October 14, in the river reach between Nimbus Dam and the mouth of the American River.

3. For recreational purposes, the minimum flow from May 15 through October 14 shall be 1500 cubic feet per second between Nimbus Dam and the mouth of the river.

4. Additional conditions are included in decision 1400 outlining flow reductions in the event of shortage.

Sacramento Municipal Utility District Reports. In 1955, a survey report on utilization of the water resources of the American River basin was prepared by Consulting Engineer, Frank E. Bonner. This report was the beginning of development of a comprehensive plan by Sacramento Municipal Utility District engineers, which was followed in its development of the South Fork of the American River.

Placer County Water Agency. Placer County Water Agency was organized by a special act of the California State Legislature in 1957 for the purpose of developing and operating major water facilities in Placer County. The engineering firm of Porter, Urquhart, McCreary, and O'Brien prepared a "General Plan for Proposed Development of the Water Resource of Placer County," in May 1959. In June 1961, the firm of McCreary and Koretsky prepared a feasibility report on the Middle Fork American River. This report was the basis for the Placer County Water Agency Middle Fork American River Development.

National Water Assessment. The Water Resources Planning Act of 1965 (P.L. 89-80) authorizes the Water Resources Council to maintain a continuing study of the Nation's water and related land resources and to prepare periodic assessments to determine the adequacy of these resources to meet present and future water requirements. The Council reported its first national assessment in 1968, which put into nationwide perspective estimates of present and future regional water and related land requirements and supplies. The Second National Water Assessment, dated December 1978, presents nationally consistent current and projected water use and supply information by regions and subregions for the United States. The second assessment found that significant achievements have been made in the past decade in preserving water and harnessing its power with a growing interest in water conservation and environmental protection; and that greater efforts are needed to insure careful management of our water resources and to solve the complex water and related land problems which still exist. A supplemental report to the second assessment, Water for Energy, provides information on energy and related water requirements at the region and subregion level for the years 1975, 1985, and 2000, including cooling water requirements for steam-electric generation.

El Dorado County Water Agency and El Dorado Irrigation District. Ebasco Services, Incorporated, prepared a report entitled, "Water Supply and Hydroelectric Development in the South Fork American River Basin," dated March 1967, for the El Dorado County Water Agency. The report presents a comprehensive plan for the development of the water resources in the South Fork primarily for the purpose of hydroelectric power. The project would also assure adequate water supply, provide flood control, enhance fish and wildlife, and improve water

quality. The plan included the Upper Mountain Development, the El Dorado Ditch and Powerplant Addition, and the Lower Mountain Development. Subsequent modifications of the Upper Mountain and El Dorado Ditch and Powerplant Addition were made by Ebasco to reduce the size of the developments. The modified plans are presented in a revised report issued June 1969. The Lower Mountain Development was not included in the plans of the modified project.

The Upper Mountain Development and El Dorado Ditch and Powerplant Addition were superseded by the development outlined in El Dorado Irrigation District's license application (FERC Project No. 2761) for the South Fork American River development. There is about 430 feet of drop between Folsom and Chili Bar reservoirs which is undeveloped.

The 1967 South Fork development plan envisioned four powerplants and reservoirs to develop the reach. Coloma reservoir and powerplant would be directly below Chili Bar. Discharges from Coloma would be regulated by an afterbay and a powerplant which would generate power from afterbay releases. The Salmon Falls reservoir and powerplant and the Salmon Falls afterbay and powerplant would be located in the reach of river downstream of Gold Discovery State Park.

In March 1969, Sierra Hydrotech prepared a report, entitled "El Dorado Irrigation District, Water Supply with Regard to Texas Hill Site Acquisition", for El Dorado County Water Agency. The report contains general information on the county's water needs and appraises the potential of Texas Hill reservoir or other possible alternative developments to satisfy these needs.

Wild and Scenic Rivers. In the interest of preserving rivers having exceptional scenic, historical or recreational qualities, Congress enacted the Wild and Scenic Rivers Act (P.L. 92-542) in 1968. Rivers authorized for inclusion into this system shall be preserved in a free flowing condition, and their immediate environments be protected for the enjoyment of present and future generations. A section of the North Fork of the American River, from the Cedars to the Auburn reservoir was authorized for study under section 5(a) of the Act as amended (P.L. 93-621) January 1975. Subsequently, the North Fork of the American River, from a point 0.3 miles above Heath Springs, downstream to a point approximately 1,000 feet upstream of the Colfax-Iowa Hill Bridge, was authorized for inclusion into the system under section 3(a) of the Act as amended (P.L. 95-625) November 10, 1968.

The Lower American River is also being considered for inclusion within the National Wild and Scenic Rivers System. Details of this proposal are set forth in the Draft Environmental Impact Statement on the subject by the U.S. Department of Interior Heritage and Recreation Service dated September 1980. The Governor of California in a letter dated July 18, 1980, to Secretary of the Interior requested that the Lower American River be included in the National Wild and Scenic Rivers System.

Under the authority of section 5(d) of the National Wild and Scenic Rivers Act, the Heritage Conservation and Recreation Service has conducted an inventory to identify rivers and river segments that are in relatively natural and undeveloped condition. The results of the Pacific Southwest Region's initial inventory are presented in "Nationwide Rivers Inventory, Phase I," March 1980. The only stream segment in the American River basin identified in this report was a 29-mile portion of the Rubicon River.

WATER RESOURCES PLANNING

Under California Wild and Scenic Rivers Act (chapter 1.4) the State has designated certain rivers which possess extraordinary scenic or wildlife values. Under the Act, construction of impoundment or diversion facilities are prohibited (except FERC licensing) unless the facility is needed for domestic water supply for residents of the county through which the river flows. Section 5093.54 of the act designates the North Fork of the American River from its source to the Iowa Hill Bridge, and the Lower American River from Nimbus Dam to its junction with the Sacramento River as part of the system.

Federal Power Commission Appraisal Studies. In 1970, the staff of the Federal Power Commission prepared a Water Resources Appraisal Report for the South Fork American River basin as part of the program of Water Resources Appraisals for Hydroelectric Licensing. The report contained a brief description of hydroelectric projects in the basin and an appraisal of potential developments. The information presented in the report is based on reconnaissance type information from earlier reports of Federal, State and local agencies.

On-Going Studies

The Water and Power Resources Service (WPRS) studied alternative designs for the Auburn site in light of the earthquake at Oroville. The WPRS announced that a conventional gravity dam could be built to withstand seismic shocks, but a full congressional reauthorization of the project is necessary. In addition, the Department of the Interior will not recommend reauthorization until a number of California State issues are resolved.

The WPRS is scheduled to study the minimum flow requirements in the American River below Nimbus Dam. If funding is approved for the project, a draft report will be prepared in 1981 and a final report published in 1982.

The El Dorado Irrigation District has recently submitted an application for an FERC license for its proposed project, the South Fork American River Upper Mountain Development. An Environmental Impact Report for this project is now being completed by the District.

Sacramento Municipal Utility District is presently conducting studies for the development of the Jones Fork hydroelectric plant. The present scheme incorporates Ice House reservoir as the forebay and Union Valley reservoir as the afterbay. The installed capacity would be 10 megawatts. The District is also studying a 400-kilowatt development with a fish ladder at the Slab Creek reservoir.

The Corps of Engineers is currently conducting a detailed assessment of the Nation's hydroelectric resources as part of the National Hydroelectric Power Study authorized by section 167 of the Water Resources Development Act of 1976 (Public Law 94-587). The study is designed to provide a current and comprehensive estimate of the potential for incremental or new generation at existing dams and other water resources projects, as well as for undeveloped sites in the United States.

POTENTIAL WATER RESOURCE DEVELOPMENTS

Table 4 presents data on potential hydroelectric developments in the American River basin. No further development on the North Fork American River appears to be practical. The steepness of the canyon walls of this stream and the stream's status under section 3(a) of the National Wild and Scenic Rivers Act precludes storage development. In the 1950's, the State of California investigated the North Fork in the course of preparation of Bulletin No. 21, "American River Basin Investigation," and found that costly tunnel construction would be necessary to develop the power head. The combination of lack of economic upstream storage sites, high cost of head development, and low runoff makes hydroelectric generation uneconomical.

Table 4

Potential Water Resources Developments
American River Basin

Project Name	Stream	Gross Head (ft)	Drainage Area (sq mi)	Potential Installed Capacity (kW)	Power Storage Capacity (1,000 ac-ft)	Maximum Normal Pool Elev. (ft)	Potential Average Annual Energy (MWh)
Salmon Falls Afterbay[1/]	South Fork American R.	60	809	10,000	1	NA	27,000
Salmon Falls[1/]	South Fork American R.	212	808	85,000	88	702	190,000
Coloma Afterbay[1/]	South Fork American R.	40	623	7,000	1	792	23,000
Coloma[1/]	South Fork American R.	150	606	48,000	15.6	942	111,000
Slab Creek	South Fork American R.	NA	NA	400	NA	NA	NA
El Dorado No. 2[2/]	South Fork American R.	1,830	NA	60,800	168	3,786	261,000
Park Creek[2/]	Park Creek	197	NA	6,900	168	5,468	29,600
Plum Creek[2/]	Plum Creek	1,285	NA	42,700	168	5,468	183,285
Jones Fork	Silver Creek	580	NA	18,000	46	5,450	NA
Alder Creek[3/]	Alder Creek	1,445	17	[20,000]	[79]	NA	[104,000]
Kyburz[3/]	South Fork American R.	1,055	108	[20,000]	[63]	NA	[120,000]
Silver Fork	Silver Fork	NA	NA	63,000	NA	NA	273,000
Hell Hole	Rubicon R.	NA	NA	500	NA	NA	3,000
	Totals			342,300	655.6		1,100,885

NA - Not available.
[ ] - Non-added item.

1/ Projects envisioned in the Lower Mountain Project.
2/ Projects included in El Dorado Irrigation District's SOFAR Upper Mountain Project.
3/ Alder Creek and Kyburz would most likely be superseded by development of the SOFAR project.

The El Dorado Irrigation District and the El Dorado County Water Agency have submitted an application for license for the South Fork American River Upper Mountain Project. The Upper Mountain Project incorporates elements of Ebasco's modified plan for the development of the South Fork American River. Water would be diverted from the South Fork American River at Forni Diversion Dam and at Sherman Diversion Dam on the Silver Fork American River, to the Alder reservoir on Alder Creek. Water would be conveyed from Alder reservoir to Plum Creek powerhouse and then diverted to a powerhouse on Park Creek above Jenkinson Lake. From Park Creek powerhouse, water would be conveyed via a series of three pipelines and three tunnels to the existing El Dorado Forebay. Where the diversion system crosses the North Fork of Weber Creek, a turnout structure would be provided to deliver 30,000 acre-feet per year to Weber Creek system, consisting of the existing Weber and proposed Texas Hill reservoirs.

The water in the El Dorado Forebay would be discharged to Pacific Gas & Electric's El Dorado plant in accordance with historic operation of the plant, to El Dorado's main ditch in accordance with an existing contract, and to the

POTENTIAL WATER RESOURCE DEVELOPMENTS

Project's new El Dorado Powerhouse No. 2. Water would be released directly into the South Fork where it would be utilized at White Rock and Chili Bar plants.

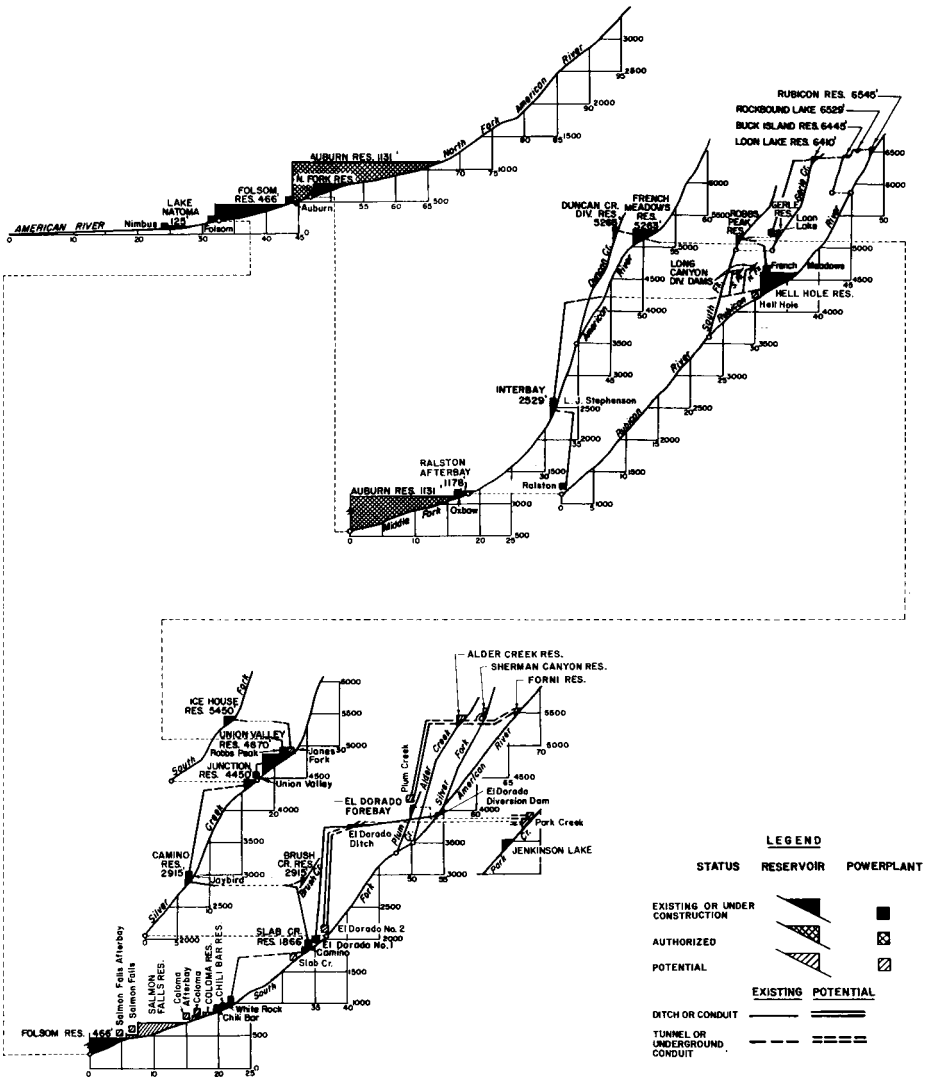
There are two retired hydroelectric projects in the basin, Prison Power owned by Folsom State Prison and Pacific Gas and Electric's American River plant. Prison Power was a 400-kilowatt plant on the American River and has no reasonable likelihood for redevelopment. The American River plant was a 5,500-kilowatt plant deprived of its water supply and abandoned in 1967.

The projected steam-electric generating capacity and cooling water needs in the basin are listed in table 5. These data are based on projections from the Second National Water Assessment of the Water Resources Council for steam-electric generating plants with installed capacities of 25,000 kilowatts or more. As previously mentioned the only existing steam-electric project in the basin is the Rancho Seco nuclear plant. Data for the years 1985 and 2000 reflect planned capacity additions to that plant.

Table 5

Projected Cooling Water Requirements
American River Basin

Year	Capacity (MW)	Generation (GWh)	Cooling Water Withdrawal (mgd)	Cooling Water Consumption (mgd)
1985	1942	12,759	41	27
2000	2913	19,586	59	39

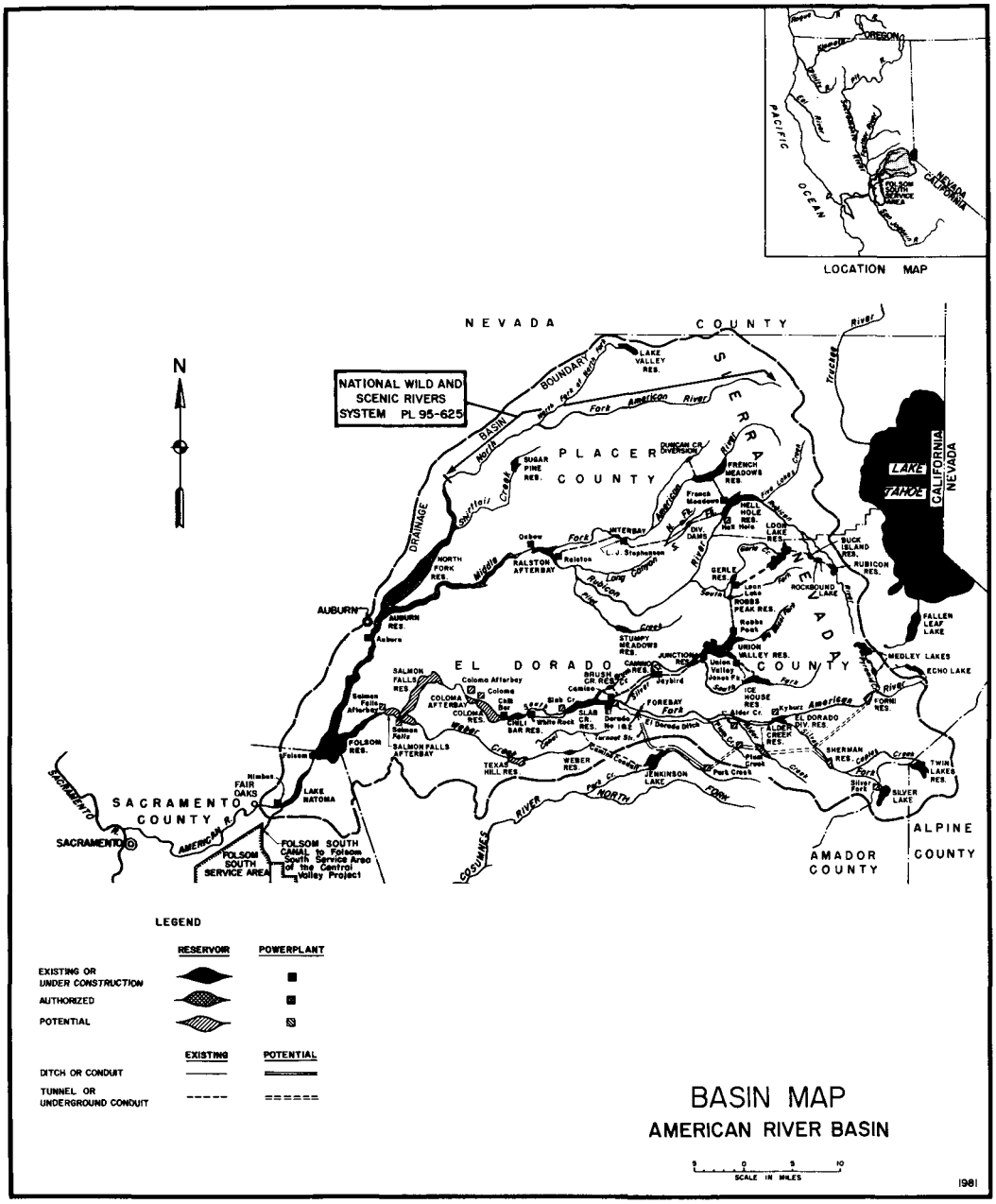


PROFILES
AMERICAN RIVER BASIN

1981

FERC-WATER RESOURES APPRAISALS FOR HYDROELECTRIC LICENSING

Figure 1



FERC—WATER RESOURCES APPRAISALS FOR HYDROELECTRIC LICENSING

Figure 2

* United States Government Printing Office:1981--343-722/8228