

Chapter 5

EAST BAY MUNICIPAL UTILITY DISTRICT:

WATER RIGHTS, SUPPLY, AND THE FOLSOM SOUTH CANAL

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Drought succeeds like nothing else in reminding Californians of their total dependence upon water. During the 1976-77 drought year, water shortages forced the State Water Project to impose fifty percent deficiencies on agricultural deliveries. Furthermore, the U.S. Bureau of Reclamation (USBR) was forced to reduce deliveries by seventy-five percent to agriculture and fifty percent for municipal and industrial use. The 1976-77 drought clearly demonstrated to municipalities that additional supplies beyond those needed to meet demand during normal rainfall years are a necessity to safeguard against droughts in the near future.

Berkeley receives its water from the East Bay Municipal Utility District (EBMUD). The District today has the rights to divert far more water than the present service area could consume during normal years. However, the District anticipates a growing future demand for municipal water. During dry years, shortages are anticipated. Beyond the year 2000, many factors that may affect future supply can not be predicted.

This paper will not discuss all sources of supply potentially available to the District. Rather, it will concentrate on the water right that the District has secured on the American River, but, as of this time cannot deliver directly to its service area. My paper will discuss the legal basis for the District's water rights, as well as predicted supplies. Finally, I will discuss the Folsom South Canal, what it is and how it affects the District's future water supply and, therefore, the city of Berkeley.

Water is the most precious resource to man. However, in an environment like California, its utility to both man and nature increases. There are conflicting needs competing for a scarce resource. When these conflicts are between human beings, just water rights can ameliorate the problems. Fortunately, early California legislators realized this and established the roots of today's State Water Law.

Water Rights literature distinguishes two major trends in the development of water rights law. Most states follow either the "Colorado Doctrine" or the "California Doctrine" (Archibald, 1977). The Colorado Doctrine is based on that state's determination that priority of appropriation (taking), not ownership of riparian land, governs the right to use surface water. This doctrine is normally adopted by arid western states, where riparian rights doctrine is considered to be "fundamentally incompatible with the physical conditions of the state" (Archibald, 1977, p. 3).

California Doctrine recognizes both appropriative and riparian rights. The historical background of this development goes far beyond the scope of the present discussion. The interested reader should refer to the Governor's Commission to Review California Water Rights Law (1978) for a more complete discussion.

Riparian rights pertain only to those parcels of land abutting the water course. The riparian user does not have a right to any specific amount of water, but has a correlative share in the natural flow of the stream in common with the other riparian users on the stream (WRCB, 1976). Furthermore, the riparian right is neither created by use, nor lost by nonuse.

In California the appropriative right is dominant. Persons attempting to secure an appropriative right must demonstrate that the amount of water applied for will be put to beneficial use, and that the conveyance systems will be constructed with due diligence from the time the right is granted. Article 10, Section 2, of the California Constitution restricts all water use to the amount reasonably necessary for beneficial purposes. One cannot appropriate water which one cannot use. However, the California Water Code permits municipal appropriators such as EBMUD to acquire appropriative rights for existing and future resources (Section 106.5). Therefore, municipalities are granted a preferred position to protect water rights presently acquired, but not yet fully utilized (Lee, 1977).

EBMUD Water Supply

EBMUD has three sources of water supply: local resources, the Mokelumne River, and U.S. Bureau of Reclamation (USBR) water.

Local resources - The local resources are supplies captured by the District's five reservoirs in the East Bay. Rainfall in normal years supplies 10 million gallons per day (MGD) to the District. In dry years evaporation is about the same as run-off, and there is no net yield (Meyer, 1983).

Mokelumne River - The Mokelumne River on the western slope of the Sierra Nevada in central California is the main source of water supply to the District. Presently, the District has the right to divert up to 325 MGD from the Mokelumne River. In 1923, the District applied for the right to divert up to 200 MGD; in 1949 it applied for an additional 125 MGD. The District has obligations to release approximately 237 MGD downstream for riparian users, senior appropriators, fish flows and channel losses (Table 1). These downstream obligations reduce the amount of water available to the District.

Not all of the 325 MGD can be counted on at all times. Therefore, it is useful to calculate the safe yield of the supply. The safe yield is that supply available to the District under the most severe drought conditions. The 1976-77 drought data are used as the barometer for the safe yield estimate. In 1978, the District determined that 198 MGD will be the safe yield in the year 2000 (EBMUD, 1982). Of course, this figure incorporates many assumptions, the three most important

being that (1) channel losses in the lower Mokelumne will still average approximately 45 MGD; (2) the Folsom South Canal will be completed to the Mokelumne River by 1990; and (3) the State Water Resource Control Board (SWRCB) releases mandated in the "public interest" will not affect their yield. The effect on the District, if it is required to make such releases, is unknown. If the Folsom South Canal is not extended, certain water districts will not receive needed water. During dry years, the District, by agreement, must supply these other water districts with water. Supplying these districts would reduce the safe yield from 198 to 173 MGD.

U.S. Bureau of Reclamation - On December 12, 1970, the District secured another high quality source of supply by contracting with the U.S. Bureau of Reclamation (USBR) for 134 MGD of American River water. This water was to be diverted from the Folsom South Canal at Grant Line Road near the town of Clay. At present the District has no way to bring its American River supply to its service area. Not all of the USBR water will be available in case of drought. By contract, under severe drought conditions, service to municipal and industrial water users will not be reduced until agricultural users are reduced 25%. Then both municipal, industrial and agricultural users will be reduced at the same rate. Therefore, after the agricultural users' cut-off, municipal and industrial users will have only 25% of their allotment. Based on these criteria, and disregarding the fact that USBR supply is subject to SWRCB decisions, one can estimate the safe yield of the District's USBR supply at 25% of 134 MGD, or 33 MGD. Furthermore, the District assumes that even if the Folsom South Canal is not built, the USBR water will be available through alternate means. Thus, the total water supply available to the District in the year 2000 is estimated to be 231 MGD under severe drought conditions and 468 MGD in average years (Table 2).

	AFA
1. Riparian Senior Appropriators	21,000
2. Agreements	
a) Dept. of Fish & Game	13,019 wet/yr 5,375 dry/yr
b) Woodbridge Irrigation District	
c) N. San Joaquin Water Conservation District	150,000
d) Others	155,000
3. Channel Losses	50,000-80,000
TOTAL RANGE	205,000-419,019

Table 1. Approximate magnitude of District's downstream obligations for Mokelumne River Supply.
1 MGD = 1,119.4 acre feet/year (AFA).

Source: EBMUD, unpublished data, 1983.

	Severe Drought Years 1976-77 (MGD)	Dry Periods 1928-35 (MGD)	Average Years (MGD)
Local Supply	0	0	10
Mokelumne Supply w/FSC	198	292	314
Mokelumne Supply w/o FSC	173	249	310
USBR Supply	33	33 to 101	134

Table 2. Summary of total projected water supply available to the District in the year 2000.
FSC = Folsom South Canal.

Source: EBMUD, 1982

Demand

Present demand is approximately 200 MGD. Demand is expected to rise to 246 MGD by the year 2000 (Figure 1). The District's demand figures reflect only that growth expected within its present service boundaries. However, the District is looking at a possible EBMUD-Contra Costa Water District merger. If the District were to supply 60-70 MGD from its present supplies to Contra Costa County, the District would then become more vulnerable to even slight droughts. Although such a merger is conceivable, at the present studies are just beginning.

A comparison of supply with demand clearly demonstrates that under normal or wet years the District should have plenty of water to meet its obligations. However, under severe drought conditions and without the USBR supply, the District would only be able to fulfill 80% of its obligations by the year 2000. Moreover, during extended dry periods, the District could run out of water in the 1980's or 1990's (Meyer, 1983).

Predictions of future demand have caused the District's planners to look very seriously at a means to convey the USBR supply to the East Bay. The District may or may not need to extend the Folsom South Canal to get its contract water. But it does need a canal to supply the Northern San Joaquin Valley irrigation districts and municipalities with water. Providing water to these districts would help to recharge the ground water supplies that are presently being overdrafted at a rate of 1340 MGD. This in turn would decrease the District's channel losses and increase the water available to it. Moreover, the Folsom South Canal would also provide water to all who depend on District releases in dry years. If the canal could serve these areas as planned, then 25 to 43 MGD would be freed for diversion to the East Bay.

Although EBMUD does not depend upon the completion of the Folsom South Canal for delivery of its USBR water, the District's yield is indirectly affected by the canal. Therefore, the Folsom

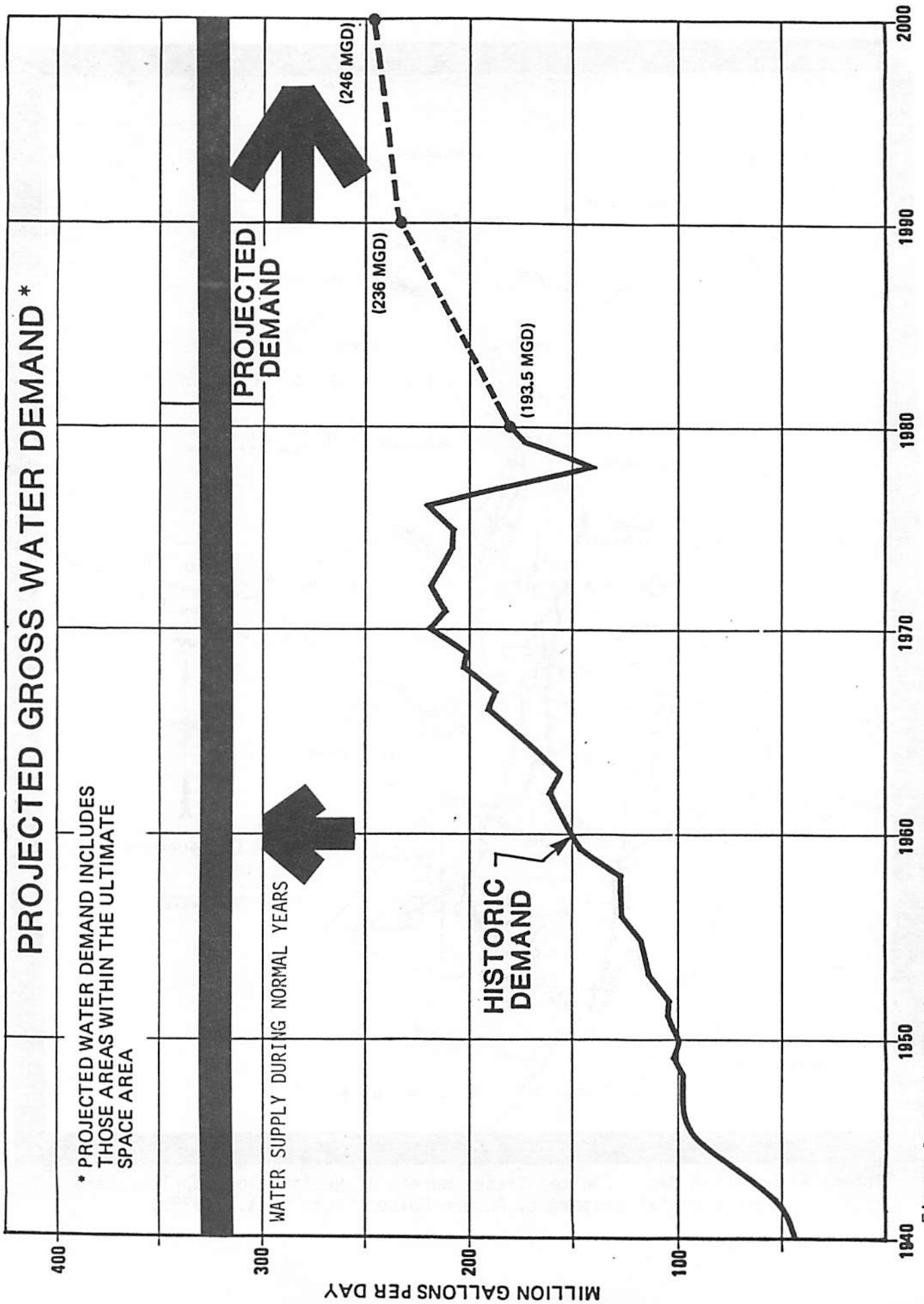
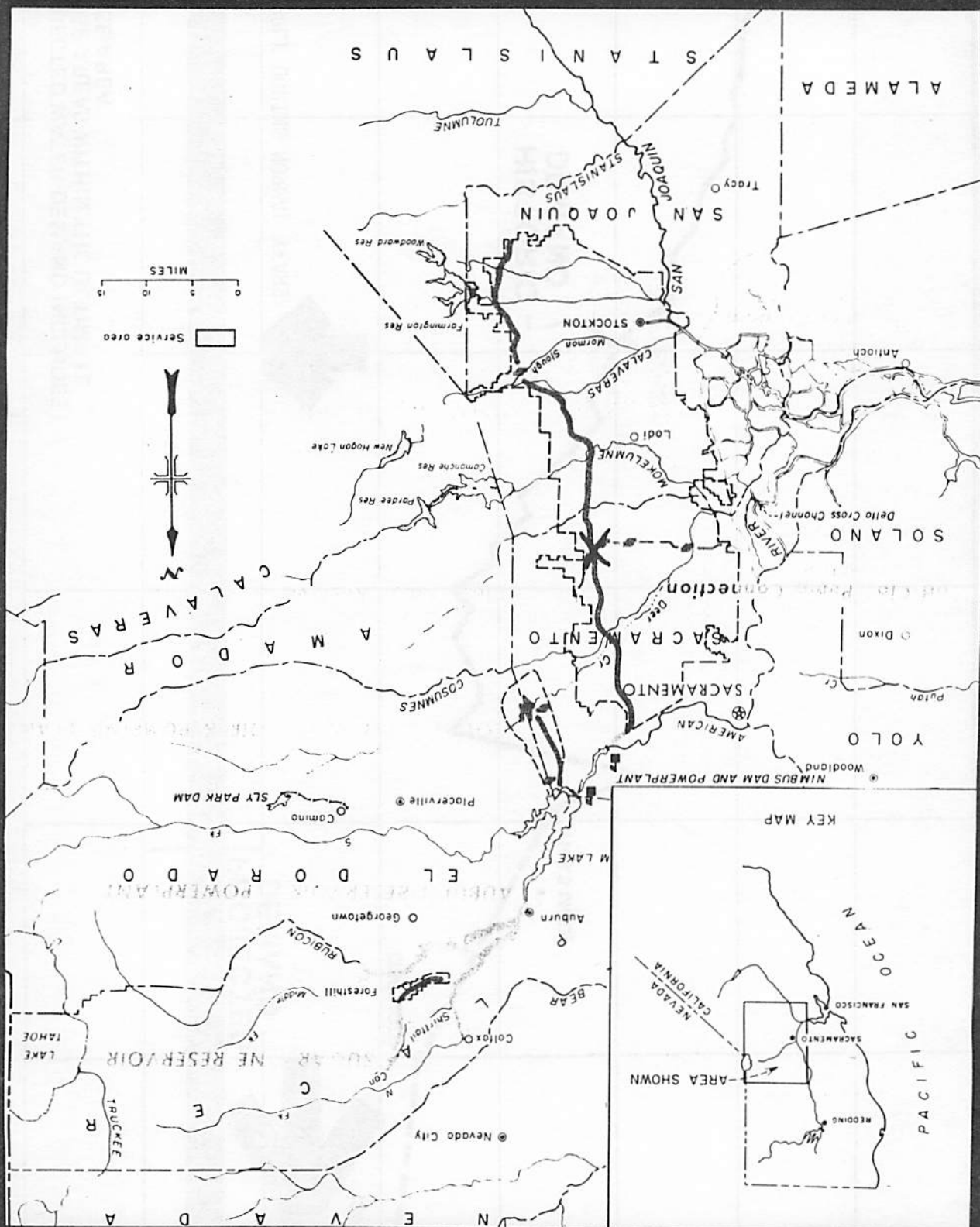


Figure 1 Projected Gross Water Demand for the East Bay Municipal Utility District.
(Tak Mizuno, Planning Department, EDMUD, 1983)

Figure 2 Location Map. (United States Bureau of Reclamation Supplementary Environmental Statement, Auburn-Folsom South Unit. 1975.)



South Canal for delivery of its USBR water, the District's yield is indirectly affected by the canal. Therefore, the Folsom South Canal is of great interest to the District.

Folsom South Canal

On September 2, 1965, Congress authorized the Auburn Folsom South Unit, which included Auburn Dam, Reservoir, and Power Plant on the North Fork of the American River. It also authorized the construction of the Folsom South Canal, which would convey American River water 62 miles south (Figure 2) to serve an area of approximately 500,000 acres (Hanson, 1983). The Federal Government was to pay for construction of the canal with repayment from the appropriators of water in the canal. In 1970 construction of the Folsom South Canal began, and by 1974 the first two of five reaches of the canal had been built (27 miles). By this time USBR had executed contracts totaling 201 MGD, 134 MGD to EBMUD and 67 MGD with the Sacramento Municipal Utility District (SMUD).

The passage of the National Environmental Policy Act of 1969 forced USBR to submit an Environmental Impact Report on the Auburn Folsom South Unit project. By 1971 the first draft was made public. The public was not primarily concerned with the physical disruption of the environment, but rather, with decreased flows in the Lower American River causing lower wildlife quality and reducing recreational potential. Litigation was brought against the Bureau concerning the adequacy of the Environmental Impact Report. The Federal Court ruled to defer construction of the canal pending completion of alternatives studies.

The kind of water year, and the quantity of mandatory releases determine the amount of water available for diversion to municipal, industrial and agricultural users. USBR must release water downstream to satisfy minimum flow agreements made with government agencies. These agreements determine the amount of water available to be diverted. The 1965 authorization for the Folsom South Canal used the flow agreements in effect at that time to determine the amount of water available to the project. At the time construction was stopped the USBR had agreements with the Department of Fish and Game. But in April of 1972, the SWRCB issued Decision 1400 (D-1400), requiring releases four times those previously mandated. D-1400 is now in litigation in Federal District Court primarily on the "jurisdictional position that project purposes authorized by Congress cannot be altered by the State without specific directions from Congress" (USBR, 1975, p. 3). However, USBR would like to reach an agreement out of court whereby alternative plans would allow D-1400 flows to be met voluntarily by the Bureau, while still satisfying demand for the service area (Denny, 1983). USBR has estimated that the demand in the Folsom South Service area is approximately 800 MGD. Therefore, it has determined that, if it meets D-1400 requirements, it can release only 357 MGD from Nimbus Dam down the canal. This would leave a shortage of 443 MGD. There are many proposed alternatives to solve this problem, all of which, while differing slightly in small aspects, rely on changing the

point of diversion for approximately 443 MGD. Instead of taking all of the needed water at Nimbus Dam, the Bureau would release the amount necessary to meet D-1400 requirements. This water would then be recovered downstream from the Sacramento River and pumped back into the canal.

Alternative Plans

There are a wide variety of Lower American River alternative plans being considered by the USBR. The Bureau will either meet decision D-1400 objectives or maintain flows of 1000 cubic feet per second (cfs) all year round. Plans to meet D-1400 objectives are classified as Plan 2 (Figure 3) and those of 1000 cfs are classified as Plan 3. The only major differences in terms of design are the size or capacities of proposed alternative facilities. For the purpose of this paper, I will assume that D-1400 objectives will be met, not 1000 cfs. Additional facilities proposed include a Hood-Clay connection, a Clay Station reservoir, and Laguna Canal. The Hood-Clay connection would be an earth-filled canal with a capacity of 1,100 cfs, extending from the Sacramento River near the town of Hood (21.1 miles) to the Folsom South Canal. This facility would pump approximately 446.6 MGD of Sacramento River water into the Folsom South Canal. It would also be necessary to provide additional offstream regulatory storage of about 130 MGD. This would be accomplished by constructing a Clay Station Reservoir located on Laguna Creek north of the town of Clay. A proposed Laguna Canal would be used to divert regulatory storage from the reservoir to the Folsom South Canal. The new facilities will have impact in four Folsom South areas: the Lower American River, Hood-Clay Connection, Laguna Canal and Pumping Plant, and Clay Station Dam and Reservoir.

By increasing downstream releases, under D-1400 flow objectives, there would be increased recreation and fishery potentials. The U.S. Fish and Wildlife Service, in cooperation with California Department of Fish and Game, estimated that the D-1400 flows would provide better riverine conditions in terms of maintaining estimated salmon and steelhead runs. The Right-of-Way of the Hood-Clay pump connection would eliminate potential agricultural land. The Laguna Canal would convert native grassland and irrigated pasture to canal right-of-way. The Clay Station reservoir would change native grassland to a fluctuating body of water. Unquestionably, extending the Folsom South Canal will have substantial environmental effects. However, environmental groups are far more concerned with the resultant decreased flows inevitable under Plan 1. Therefore, although many organizations still may not favor the Folsom South Canal, the opposition to the Folsom South Canal surely is weakened by the Hood-Clay Connection proposal.

No decision has been made on the exact proposal to be presented to Congress for re-authorization. The price of extending the Folsom South Canal, and proposed new facilities, is estimated at approximately \$146 million (1975 dollars). However, no one can predict the cost of the canal when it is finally built. It is estimated that once authorized, it would take 2 to 2½ years to complete designs

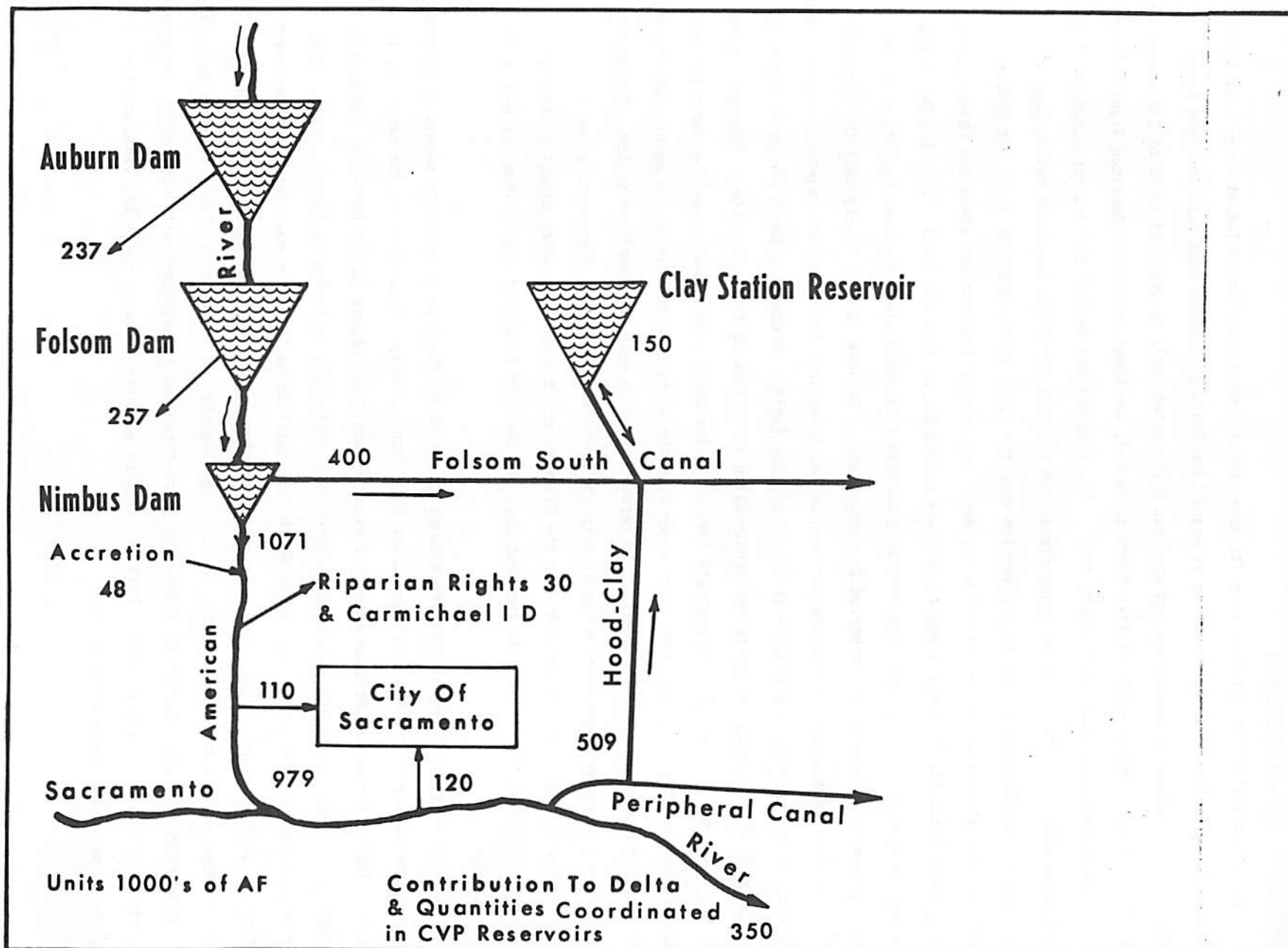


Figure 3 Alternative Plan 2. (United States Department of the Interior
Bureau of Reclamation Central Valley Project, American River Division.)

and another 8 to 10 years for construction (Macias, 1983).

EBMUD and the Folsom South Canal

By contract the District must take its water right from a diversion point at Grant Line Road (Figure 2). The District, by diverting at Grant Line Road, guarantees that pure American River water--not a mixture of Sacramento and American River water--will be received south of its diversion point. Sacramento River water is five times as turbid, two times as hard as American River water, and contains many more nutrients (USBR, 1975). The District has several options for acquiring its additional water. If the District renegotiates its contract for a new diversion point, then it may obtain its additional water from diversion near the mouth of the American River (at Nimbus Dam), or from the Sacramento River below the American, or near the location where the Folsom South Canal would cross the District's Mokelumne River Aqueducts, or from the Delta. Both the Delta and Sacramento diversion points are less desirable because they would yield a poorer quality of water than the American River supply diverted at Nimbus Dam. I believe it most likely that the District will construct an aqueduct across the northern Delta, tying into its Mokelumne aqueducts near Pittsburg. The cost of an aqueduct is estimated at \$113.7 million (1974). Presently, the District is studying the costs of diverting at the Delta and constructing facilities to treat the water. However, it is doubtful that the studies will demonstrate that using low quality Delta water would be more economical than bringing high quality American River water from the Grant Line Road diversion point. Of course, the District can renegotiate its contract to permit diversion near the Mokelumne system. The District could divert American River water directly into the Mokelumne River and, therefore, allow for increased diversion at Pardee Reservoir. Or the District could direct the water directly into its Mokelumne Aqueducts for delivery to the East Bay. No decision on any of the options has been made at this time.

The USBR is still doing alternative studies to decide on the best proposal to submit to Congress for reauthorization of the Auburn Folsom South Unit (Denny, 1983). Opposition to the canal still exists. The Environmental Defense Fund, for example, would not object to the Hood-Clay Connection Proposal, but feels there are many other alternatives that could be looked at (Graff, 1983). Many groups just don't believe that the Folsom South Canal will be built in the near future, or at least not by the USBR (Perkins, 1983). The most recent development on the canal has come from Congressman Norm Shumway, who has proposed amending the original legislation authorizing Plan 1 to grant authority to the Secretary of the Interior to enter into joint-financing arrangements with non-Federal entities for the construction of the project. This legislation was introduced on March 21, 1983, and the outcome is not predictable at this time.

Summary

California Water Rights Law is extremely complex. California Water Law recognizes both riparian and appropriative rights with the appropriative right occupying the lead position. Municipal appropriators may obtain rights for more water than they can use at the time the right is granted.

EBMUD has a local supply of 10 MGD in normal years. The yield of the District's Mokelumne system is 310 MGD in average run-off years, 249 in dry years, and 173 MGD in severe drought, assuming that the Folsom South Canal is not extended. In 1970 the District contracted with the USBR for 134 MGD of American River water, to be diverted at Reach 2 of the Folsom South Canal. The safe yield of this water is estimated at 33 MGD.

During normal and average years the District should have plenty of water well past the year 2000. However, during dry or drought conditions the District could have problems meeting its obligation in the 1980's or 1990's. Compounding this problem is a proposal to form a joint water district with Contra Costa County.

The Folsom South Canal is part of the Auburn-Folsom South Unit authorized by Congress in 1965. The Folsom South Canal is to convey American River water from Nimbus Dam 62 miles south to serve a service area of approximately 500,000 acres. Because of litigation brought against the project, construction was stopped in 1974. In 1972 the SWRCB issued D-1400 requiring four times the flow in the Lower American River than was required under 1957 agreements. D-1400 objectives would force the USBR to divert only 400 AFA at Nimbus Dam, leaving it approximately 400 AFA short of satisfying the predicted Folsom South Service area demand.

Alternatives studies were undertaken to solve this problem, and many alternatives have been looked into. Most require that a Hood-Clay Connection be built to pump Sacramento River water back into the canal. Cost of completion of additional facilities and the extension of the original canal is approximately \$146 million (1975 dollars).

The District can get its American River supply by building an aqueduct from Reach 2, or renegotiating its contract for diversion at another source. Opponents of the extension of the canal feel that conservation or the use of a combination of other water resources in the area can meet the service areas' demand (Graff, 1983). Experts believe that the canal will not be built if the Auburn Dam is not re-authorized and constructed. Even so, it is still 40 to 50 years away (Dubois, 1983).

Conclusion

The Folsom South Canal will not be completed by 1990 as once envisioned. Thus EBMUD must assume that its yield from the Mokelumne system will be reduced due to increased channel losses. Therefore, the District can either develop its American River right or obtain water from other possible sources not discussed here. Before the District can decide on the quantity of water it can deliver, it must

define accurately its predicated demand inside its service area. Since discussions on servicing the Contra Costa Water District are just beginning, no permanent decision on the USBR supply can responsibly be made now.

To make a commitment to bring American River water to its service area, the District must decide which delivery system would be the most cost-effective in the long term: whether to construct a direct aqueduct securing high quality water or using a lower quality source with increased treatment costs. EBMUD must develop a master plan which defines clearly its future objectives. By comparing its future objectives with the results of its cost studies, intelligent decisions regarding future delivery systems can be made.

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