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**THE DELTA POOL**

A REPORT OF THE  
ASSEMBLY INTERIM COMMITTEE ON WATER  
TO THE CALIFORNIA LEGISLATURE  
(House Resolution No. 13, 1960)

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January 2, 1961



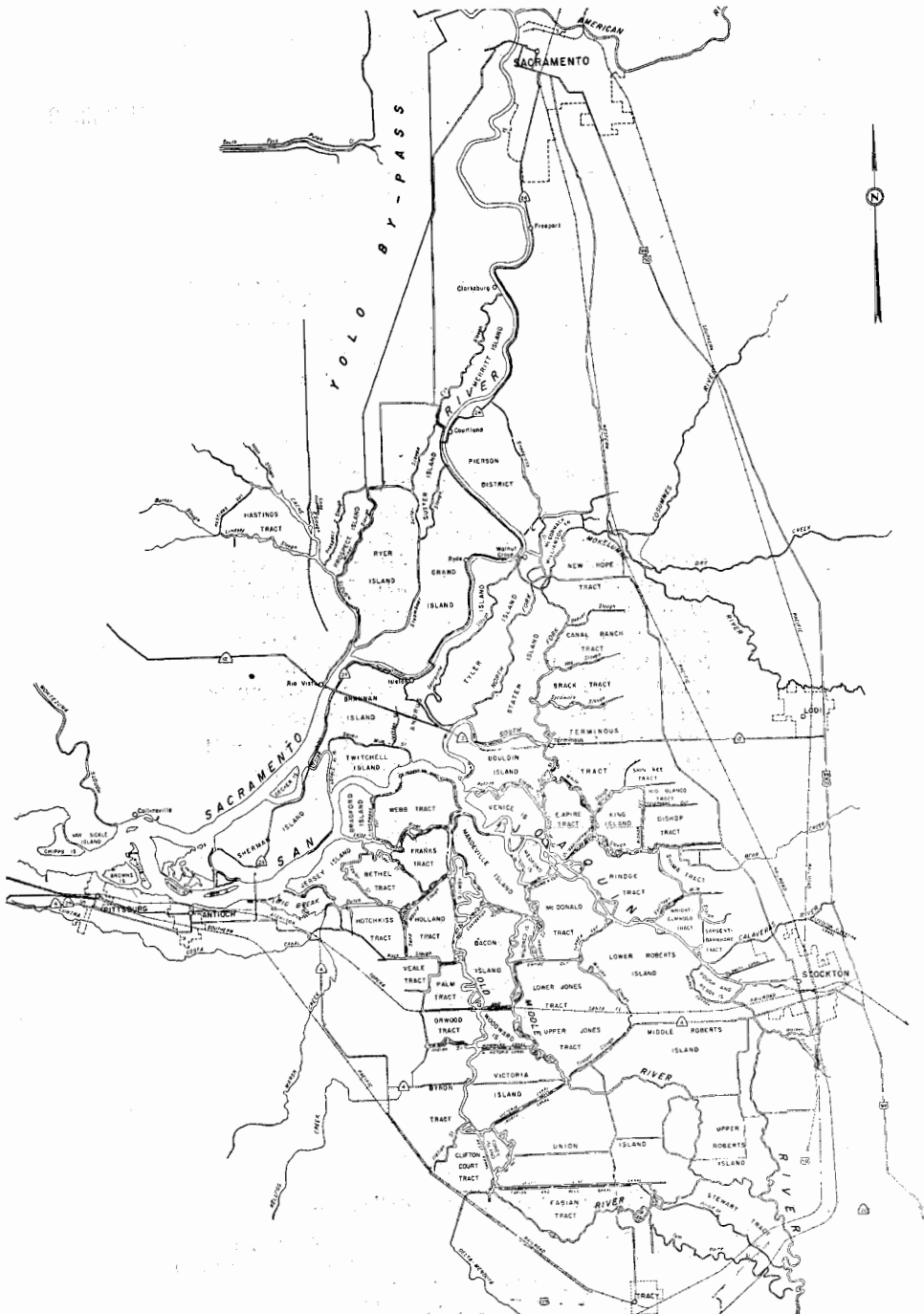
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**ASSEMBLY**  
**OF THE STATE OF CALIFORNIA**

RALPH M. BROWN  
*Speaker*

CARLOS BEE  
*Speaker pro Tempore*

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*Chief Clerk of the Assembly*



## LETTER OF TRANSMITTAL

ASSEMBLY INTERIM COMMITTEE ON WATER

January 2, 1961

HON. RALPH M. BROWN,  
*Speaker of the Assembly*  
 MEMBERS OF THE ASSEMBLY  
*State Capitol, Sacramento, California*

GENTLEMEN: The Assembly Interim Committee on Water submits herewith its report on the Delta Pool. This report and the hearings which preceded it were authorized by House Resolution No. 13, 1960.

Pursuant to House Resolution No. 13, which directed a comprehensive study of the Delta problems, your committee has considered all known factors. It has attempted to assess the problems it has found and to recommend the most appropriate action in each instance.

As more fully set forth in the body of the report, your committee has concluded that the Delta area should be added to the San Francisco Bay Model of the U.S. Corps of Engineers at Sausalito to permit certain joint studies of the Bay and the Delta by the Department of Water Resources and the U.S. Corps of Engineers. The committee also recommends that a Delta Study Commission, patterned somewhat after recent federal experience in the southeastern states and Texas, be established to develop a comprehensive solution to the problems of the Delta confronting the State in constructing the Delta Water Project as part of the state water facilities.

With respect to the Delta Pool Concept, which is an important part of the water sales contracts being negotiated between the State and its customers, your committee concluded that the Delta Pool Concept should be limited to pooling at the Delta to provide an export water supply and to replenish the Delta Pool. Further, the committee concluded that the method of computing the price of water at the Delta Pool should be restudied by the department, and the consideration given to making it more responsive to savings in the Delta Pool investment and to minimizing the burden of costs on both the project customers and the General Fund. In making these recommendations the committee does not intend to adversely affect the terms of the contract executed on November 4, 1960, by the Department of Water Resources and the Metropolitan Water District of Southern California.

Your committee wishes to express its appreciation to the numerous organizations, state agencies and private citizens who have contributed generously of their time and talents. The chairman and the committee

wish to thank the Legislative Counsel Bureau and the office of the Legislative Analyst who have provided staff services to the committee.

Respectfully submitted,

(signed)

CARLEY V. PORTER, Chairman  
PAUL J. LUNARDI, Vice Chairman  
Assembly Water Committee

JACK A. BEAVER  
CARLOS BEE  
FRANK P. BELOTTI  
(with reservations)  
\*JOHN L. E. COLLIER  
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BRUCE SUMNER  
JOHN L. WILLIAMSON  
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\* I do not support any part of this report that will alter in any way the Metropolitan Water District of Southern California-State of California contract that is presently agreed upon.

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# THE DELTA POOL

## INTRODUCTION

In its report of February 1, 1960, entitled "Economic and Financial Policies for State Water Projects," the Assembly Interim Committee on Water gave only brief consideration to the concept of a Delta Pool. Without having made any detailed study of the pooling concept or of the problems of the Delta itself, the committee felt it was unable to draw significant conclusions on the matter. Therefore, it recommended that the Delta Pool be the subject of a special study. During the 1960 Budget Session the committee sponsored Assembly House Resolution No. 13 which directed that the "subject matter of the Delta Pool and all problems related to it" should be studied and a report submitted to the Assembly.

The committee's work on the Delta has essentially encompassed two facets: (1) a study of the physical problems in the Delta; and (2) a study of the concept of operating the Delta as a physical and financial pool to secure the supply of water needed for export by the State Water Facilities.

The committee's study of the Delta involved the following hearings and activities:

<i>Date</i>	<i>Location</i>	<i>Subject</i>
May 3, 1960	Delta -----	Tour of the Delta area.
May 4, 1960	Oakland -----	Testimony from Department of Water Resources on Delta Water Project and the Delta Pool Concept.
June 27, 1960	Martinez -----	Testimony from Delta Counties on local problems in the Delta.
June 28, 1960	Berkeley -----	Testimony from U.S. Corps of Engineers and Department of Water Resources on various Delta problems.
July 18, 1960	Santa Monica -----	} Testimony on various aspects of contract problems which partially relate to the Delta Pool Concept as included in contract drafts.
July 19, 1960	Santa Monica -----	
Sept. 13, 1960	Portola -----	
Sept. 14, 1960	Sacramento -----	
Sept. 15, 1960	Sausalito -----	Tour of the U.S. Corps of Engineers Bay Model and work session.
Oct. 5, 1960	Riverside -----	Testimony on Weber Foundation Studies including proposals for solution of Delta problems.
Nov. 14, 1960	Monterey -----	Work session.
Nov. 15, 1960	Monterey -----	Work session.

The problems of the Delta involve many complex engineering and technical matters which are beyond the capacity of a legislative committee to analyze or to deal with technically. The hearings held by the committee were designed to give a comprehensive view of the Delta problems and to determine the State's success in solving its Delta problems as well as to recommend actions to resolve remaining problems. Therefore, the committee has not attempted to evaluate or make recommendations on various conflicting technical proposals for the development of the Delta and the San Francisco Bay area.

### THE DELTA AND ITS PROBLEMS

Geographically, the Delta is the confluence of the Sacramento and San Joaquin Rivers where they empty into the eastern part of San Francisco Bay.<sup>1</sup> Other smaller streams such as the Mokelumne, Cosumnes and Calaveras Rivers flow into the Delta from the East. The Delta itself is a criss-crossing pattern of rivers, sloughs, interconnecting channels and drains, which form more than 50 islands ranging in size from a few to several thousand acres.

The Delta islands are composed of gradations of fine silts and peat lands which lack the desired stability to provide a base for the construction of levees and other flood control structures. The organic soils in some portions of the Delta have subsided 18 feet below sea level. The historic rate of subsidence is an average of one foot every four years.

The islands of the Delta are exclusively devoted to intensive agricultural use. In spite of technical problems with seepage, drainage, subsidence, and intrusion of saline waters, the Delta islands constitute some of the richest farm lands in the State. Much of the land ownership is in large tracts. The original condition of the Delta was a marshland, but since its reclamation large sections of it still remain suitable only for dwellingless farms.

There are approximately 1,100 miles of channels and water ways in the Delta which make the area a unique and valuable site for recreation, consequently, the Delta is highly prized by boat owners, fisherman and water sports enthusiasts. The economic importance of recreation in the area is already large and promises to become even greater. There are thousands of small boats in the area and many thousands more have access from the Sacramento River and San Francisco Bay. In addition to its importance for recreational boating, the Delta is the salt water entrance to the deep-water channel for the Port of Stockton. The U.S. Corps of Engineers is currently constructing a similar deep-water channel which will terminate in a new port just west of Sacramento. The Delta is, therefore, also important as a commercial navigation facility.

At the western edge of the Delta in the Pittsburg-Antioch area, an important complex of large industries has located, partly because of the availability of large quantities of fresh water. These industries view with alarm the increasing tendency for saline waters to intrude farther into the Delta during the low flow summer periods and to raise the salinity of the waters in the western Delta beyond their tolerance standards.

In the southern part of the Delta is the Tracy pumping plant of the Central Valley Project which was constructed by the Bureau of Reclamation to pump Delta waters into the Delta-Mendota Canal for delivery in the San Joaquin Valley. The bureau's Shasta Dam on the Sacramento River stores water during the periods of high flow for release during low flow periods to serve the bureau's customers along the Sacramento River and to provide sufficient water in the Delta for the Tracy pumping plants. In order to pass this fresh water from the Sacramento River to the Tracy pumps, the water must move the length of the Delta and still retain its quality. To do this the bureau must provide sufficient

water from the Sacramento River both to supply the pumps and at the same time to push back the saline waters in the western part of the Delta which the Tracy pumps tend to draw into the Delta through their pumping action.

In past years the Bureau of Reclamation has provided an inflow into the Delta of approximately 3,300 second-feet during the summer which was generally considered sufficient to maintain a high quality water in the Delta for the bureau's pumps and the farmers and industries in the Delta. In the last few years the bureau has reduced this inflow to approximately 1,500 second-feet which is sufficient to maintain the quality of water at the Tracy pumping plant but which apparently will permit the intrusion of sufficient saline waters from San Francisco Bay to adversely affect the industries and irrigated agriculture in the western Delta.<sup>2</sup>

Since the Delta waters are already used by industries in the western Delta, by agriculture on the Delta islands, by the Central Valley Project in the San Joaquin Valley, and, in the future, will be delivered from the State's project into San Diego County, the quality of the water in the Delta is of utmost importance. Quality is no problem during the rainy season when flows are high; but as the flows diminish in the summer, increasingly larger proportions of the flows are diverted upstream from the Delta for prior use by industries, irrigators and municipalities. Along the Sacramento River this diverted water is returned to the River as sewage effluent or irrigation drainage of reduced quality. The Central Valley Project normally diverts all the flows of the San Joaquin River at Friant Dam. During the summer months only low quality waste waters from irrigation drainage or municipalities may reach the Delta from the San Joaquin River. The Delta is, therefore, largely dependent for a water supply during the summer upon storage releases of water from the Central Valley Project or State Water Facilities, which releases are primarily made for export purposes.

As both the San Joaquin Valley and the Sacramento Valley develop, the waste water problem will increase to the point that in the San Joaquin Valley first, and later in the Sacramento Valley, special master drains will some day be required to remove the poor quality water from the Valleys and bypass the Delta. A drainage system to serve the San Joaquin Valley has been included in the State Water Facilities. Releasing drainage water into the San Francisco Bay may add other new problems in the Bay.

The Delta is also the epicenter of a very special complex of problems related to water rights. The Delta is the point at which natural flows converge by following the stream channels of the Central Valley. At this point all waters which are not previously stored or consumed or not used at the Delta pass out to the ocean and are lost to further use. The construction of a storage or diversion project on any stream or tributary of the Delta will reduce the remaining quantities of natural flows still entering the Delta. California's water rights law requires

<sup>2</sup>There is disagreement between the Delta interests and the Bureau of Reclamation on the obligation of the bureau to protect the Delta from salinity intrusion. Because this is a matter of federal law, federal policy and perhaps contractual arrangements to pay for the benefits received, the committee has only noted the problem.

<sup>1</sup>A legal definition is contained in Section 12220 of the Water Code.

a permit to pump water from the Delta. Similarly, a permit is also required to store water on, or divert water from, a stream tributary to the Delta or from any other unappropriated source in California.

The watersheds of origin statute in the Water Code prohibits the State Water Facilities and the U.S. Central Valley Project from securing a permit for a firm water right because

“ . . . a watershed or area wherein water originates, or an area immediately adjacent thereto which can conveniently be supplied with water therefrom, shall not be deprived by the department directly or indirectly of the prior right to all of the water reasonably required to adequately supply the beneficial needs of the watershed, area, or any of the inhabitants or property owners therein.”<sup>3</sup>

This statute was enacted to ensure that an area where water originates would have a first right to the use of the water. Thus both the yield of a storage project to provide a Delta export supply and the quantities of surplus water naturally available in the Delta are subject to diminution by the construction of future upstream projects or increased diversions of water any place in the Central Valley. Under these legal limitations, water available for export from the Delta will someday be diminished to the extent that new projects to replenish or resupply the Delta will be required. These new projects might be constructed either on tributary streams of the Delta or on north coastal streams from which tunnels could divert the water into the Central Valley streams to flow into the Delta. The need to construct projects to replenish the Delta means that the future cost of an export water supply at the Delta will probably increase.

A final problem arising from replenishing the Delta is the need to pool or average out the costs of replenishing the Delta water supplies among the users. The Delta is also a likely place to pool or spread any surplus project benefits.

It is no overstatement to conclude that the complex of problems briefly outlined above is unprecedented in California water resources development. Consideration of the progress being made in resolving these problems is the object of the remainder of this report. It is necessary to consider first the physical problems of the Delta.

### THE DELTA WATER PROJECT

One of the first steps in resolving the physical problems of the Delta is the preparation of a plan to: (1) solve the local problems already existing in the Delta; (2) assure that the Delta will hydrologically function properly as a source of export water for the State Water Facilities; and (3) compensate for any difficulties arising from 1 and 2 above. To do this, the Department of Water Resources has evolved a tentative proposal for a Delta Water Project which was presented to the committee in Oakland on May 4, 1960.

The most recent description of the project is contained in the pamphlet entitled “The Delta and the Delta Water Project” published by

<sup>3</sup> Water Code Section 11460. There is some question whether the federal government will voluntarily observe this law. A further factor of importance is the operating agreement of May 16, 1960, between the Department of Water Resources and the Bureau of Reclamation providing for a sharing between the two agencies of the unappropriated waters reaching the Delta.

the Department of Water Resources dated January 1960.<sup>4</sup> The department plans to construct a series of gates or river control structures at points located along the rivers and main channels of the Delta. These structures would prevent the intrusion of salt water from the San Francisco Bay beyond the control structures and would reduce the quantity of water wasting into San Francisco Bay to repel salinity. However, the western part of the Delta beyond the control structures would be opened to increased salinity intrusion. Along with the control structures would be constructed 250 miles of master levees on which a system of roads could be built. The control structures and levees would convey the high quality waters of the Sacramento River through the east-central portion of the Delta to the pumping plants in the southern part of the Delta. The master levee system would restrict the winter flood flows of up to 600,000 second-feet to a few master channels and would protect many islands from floods by closing off most of the small drains, sloughs and channels surrounding them. Closing off the smaller channels would require that substitute drainage and water supply facilities be constructed to serve those lands closed off. Extensive small craft transfer facilities and fishways would be required to preserve recreation and fishery values. The department estimated the preliminary cost to be about \$83,000,000. First construction was scheduled to begin in 1962 and the last units would not be completed until 1982.

At the committee's hearing in Martinez, the department's proposal met substantial opposition from many local interests in the Delta.<sup>5</sup> Representatives from Contra Costa County expressed varying degrees of opposition or dissatisfaction with the department's proposal. One of the most pointed objections was that the control structures are located too far east and upstream in the Delta. Contra Costa proposed instead a Chipps Island barrier to the west of the Delta which would make the whole western portion of the Delta fresh water instead of saline as in the department's proposal.

San Joaquin County representatives expressed either reservations or lack of sufficient information to concur in the department's proposal. Sacramento County expressed reservations and specified certain objectives which the county felt should be achieved by the Delta Water Project.

In general, the recreation, fisheries and water sports interests were opposed to closing many of the smaller channels. The Port of Stockton and the Sacramento-Yolo Port Authority opposed the construction of any barriers which would impede ship movements into their ports through the Delta. Some Delta interests expressed a preference to be left alone. The Delta Counties and local governments expressed concern about approximately \$30,000,000 of the Delta Water Project costs for roads and local improvements which the Department of Water Resources had indicated might be allocated to them for payment. The

<sup>4</sup> A report on “Feasibility of Construction by the State of Barriers in the San Francisco Bay System” was published by the Water Project Authority in March, 1955. In March, 1957, the Department of Water Resources published Bulletin No. 60, “Interim Report on the Salinity Control Barrier Investigation,” which contained the forerunner of the Delta Water Project. The Delta Water Project is included in the list of authorized projects contained in Senate Bill No. 1106 (Burns-Porter Water Bond Act) and is, therefore, the Delta portion of the State Water Facilities.

<sup>5</sup> Details of the hearing may be found in the transcript of Martinez hearing, June 27, 1960, which was mimeographed by the committee.

department has subsequently stated that it is restudying the Chipps Island barrier, and promised that it would not construct any facilities chargeable to local government unless their construction is desired by local government.

Many of the Delta interests are confronted with a dilemma. Some strongly opposed the Delta Water Project, but others strongly stressed the need for action because of the seriousness of the problems they face. These local interests naturally have their own particular problems foremost in mind, but the general tone of their testimony seemed to indicate that it is not clear to them how their problems can be accommodated in an overall solution to the Delta problem, and this seems to be the essence of their dilemma.

The committee also felt from the testimony that the department's planning approach places too much emphasis upon presenting the department's solutions to problems rather than consulting with local interests to achieve mutual understanding and co-ordination of effort. The committee recommends that appropriate legislation be enacted to require local consultation and co-operation in the department's planning work.<sup>6</sup>

In general the committee concludes, without attempting to judge the technical adequacy of the department's planning work, that the department does not now have a solution to the problems of the Delta which is acceptable to the Delta interests.

#### THE DELTA IN ITS BROADEST CONTEXT

After studying the local problems of the Delta and local attitudes toward the Delta Water Project, the committee turned to the broader picture of the Delta as a part of the State Water Facilities, as a part of the greater complex of San Francisco Bay problems, and as a subject of important responsibilities of several federal agencies. In this context the problems of the Delta take on an entirely different perspective.

It has already been pointed out that the Delta is the focal point of the water transportation and pumping operations of the Central Valley Project by means of the Cross-Delta Channel and Tracy pumping plants. The bureau's customers along the Delta-Mendota Canal and those areas being served by the bureau's Contra Costa Canal are already intensely interested in the Delta. As the bureau adds new customers in the San Luis service area and the State signs up customers in the South Bay Aqueduct service area and along the San Joaquin Valley-Southern California Aqueduct, these customers too will be vitally interested in the Delta. They will have much in common with the interests of the large industries in the Pittsburg-Antioch area of Contra Costa County and the farmers in the Delta.

Judging from the above, the problems of the Delta are neither local nor isolated, but directly or indirectly concern most of the water interests of the State. This conclusion cannot be escaped irrespective of exactly which projects are built or which areas are served with water from the Delta.

<sup>6</sup> The committee formally voted to prepare a directive to the department that it follow a formula of local co-operation in its planning work. A concurrent resolution was first discussed by the committee but subsequently a statute was suggested. Transcript of June 27, 1960, page 221.

The Delta is a part of the greater body of water known as the San Francisco Bay. The Delta and any major physical changes affecting it have varying relationships to recreational and commercial navigation in San Francisco Bay. The flows from the Delta carry silt into San Francisco Bay and influence the formation of shoals and dredging problems. The interaction of tide stages and flood peaks determines the flood control problems of the Delta and the eastern part of the Bay. The flushing action of flood peaks as they sweep into San Francisco Bay and the quality of the Delta outflow condition aquatic life in the Bay area. Finally, and perhaps most important, the location of any barriers to saline intrusion can be determined only after full analysis of the possible locations of barriers throughout the San Francisco Bay itself. The above brief mention of the Delta in relationship to the San Francisco Bay shows that the Delta is directly related to the solution of some of San Francisco Bay's important problems.

The desirability of constructing a system of bay barriers and whether these control structures or barriers should be located in the Delta as proposed by the Department of Water Resources or elsewhere is not resolved. Many thoughtful persons propose a more costly and comprehensive set of barriers than is included in the department's Delta Water Project.<sup>7</sup> The location of bay barriers is included in more extensive studies being made by the San Francisco District of the U.S. Corps of Engineers at the San Francisco Bay Model located in Sausalito. This model of the Bay hydrologically duplicates problems of the Bay to permit intensive study in miniature form. The model does not, however, include the Delta. At various times in the past two years the Department of Water Resources, the Corps of Engineers, and other interested agencies have discussed the desirability of co-operation between the State and the Corps of Engineers to add the Delta to the Bay Model, but such action has not yet been taken. The model can be expanded, the space is available and the phasing out of certain studies by the Corps of Engineers creates an opportunity to join the efforts of the Department of Water Resources and the Corps of Engineers to make a fully comprehensive and complete analysis of the Delta problem.

The committee recognizes that extensive exchange of information takes place between the Department of Water Resources and the Corps of Engineers and that relations between the two agencies are good. However, the department is proceeding with analytical studies of the Delta problems while the corps is proceeding with model studies of the Bay. It does not serve the public interest to continue these activities without joining them fully to achieve the maximum returns from the expenditure of public funds and the best possible co-ordination of answers and recommendations. The committee knows of no opposition

<sup>7</sup> The plan of the late John Reber and the Weber Foundation studies both propose an elaborate multiple purpose system of barriers in the heart of the San Francisco Bay. Interest in the Reber plan is generally credited with having brought about the present Bay Model studies of the U. S. Corps of Engineers. The earlier report of the Water Project Authority (see note 4, above) rejected barriers in San Francisco Bay in favor of more limited control structures in the Delta. However, the U. S. Corps of Engineers is studying several locations for bay barriers by means of its Bay Model at Sausalito. The results of the corps' work will not be published until December 1961. In the meantime, the department's Delta Water Project control structures have incurred opposition, as already discussed in this report, and the department is restudying the Chipps Island barrier which the Corps of Engineers is also studying.

to this proposal and strongly recommends that such action be undertaken immediately.<sup>8</sup>

A review of the Water Code, appropriation bills and other legislative pronouncements might indicate that the Department of Water Resources has the responsibility for solving all the problems of the Delta. However, upon taking a broader view of the Delta's problems, the committee found that such responsibility cannot and does not exist. The department is the nucleus agency around which cluster various studies by other state agencies. For example, fisheries studies are being made by the Department of Fish and Game and the University of California and the Central Valley Regional Water Pollution Control Board are participating in water pollution studies of the San Francisco Bay and the Sacramento River. Some state agencies have independent statutory authorities and interests. Among these agencies are the Department of Public Health, the Department of Fish and Game, and the Division of Beaches and Parks.

In the San Francisco Bay Model studies there is a similar cluster of federal agencies contributing to the work of the Corps of Engineers.<sup>9</sup>

<sup>8</sup> The attitude of the Corps of Engineers on adding the Delta to the Bay Model is set forth below:

*"Honorable Carley V. Porter, Chairman  
Assembly Interim Committee on Water  
California State Legislature  
Room 2114, State Capitol  
Sacramento, California*

"DEAR MR. PORTER:

"With reference to your letter of 1 November 1960 and supplementing my letter of 24 October 1960, please be advised that within the limits of existing authorities the Corps of Engineers will be glad to co-operate with the State of California in any studies that it may require. If the State desires model studies of the Sacramento-San Joaquin Delta be accomplished at our Sausalito facility, is willing to bear all added costs attendant therewith, and can delay the testing program so as will not interfere with our own schedules, we will most certainly lend all possible assistance in that endeavor.

"Regulations covering work to be performed by this office for other agencies require specific approval by the Office of the Chief of Engineers. Such authority will be requested if and when it appears that the study is definitely desired. In addition, funds to cover the total estimated cost of the work or an initial increment of the estimated cost based on an approved schedule of payment must be deposited with the installation performing the work (San Francisco District) before any obligation or expense in connection with the work is incurred. When funds are being deposited on an approved schedule, no obligations or expense will be incurred in connection with the work in excess of funds on deposit.

"Our testing program at Sausalito is currently scheduled for continuation through fiscal year 1963. Thus, although model construction could be initiated prior to that time, results of studies of Delta salinity and water transfer problems could not be foreseen for about two years thereafter or 1965 at the earliest.

"Construction of the model extension would require about 12 months, and could begin as early as December 1961. Hydraulic and salinity verification would require an additional 12 months and, assuming our own testing program is sufficiently advanced and personnel are available, might be accomplished during the period December 1962 through December 1963. Delta tests could then be initiated in January 1964 and conceivably would require 16 months to complete.

"Although detailed estimates have not been prepared, it is possible that the cost of such a program would be of the same general order as operation and construction of a separate model at the Vicksburg Waterways Experiment Station, or roughly \$275,000. This, of course, does not include the cost of procuring basic physical data required for construction and verification.

"If the foregoing schedule is within State requirements and you should so desire, I will request the San Francisco District to prepare detailed time and cost schedules.

"Very truly yours,

"R. G. MACDONNELL  
"Brigadier General, USA  
"Division Engineer"

<sup>9</sup> Mr. Reuben Johnson of the San Francisco District testified on this point on pages 66 and 67, transcript of June 28, 1960:

"From the Department of Commerce we have asked for an economic projection of the Bay area as to its development up to the year 2020. That report

Some of these federal agencies have their own statutory responsibilities which clearly supersede state authority in such matters as navigation, national defense implication of bay barriers or funding of a federal contribution to flood control in the Delta.<sup>10</sup> In fact, the Bureau of Reclamation, by virtue of its operation of the Central Valley Project, already has an operational and proprietary interest in the Delta which the State cannot alter. The Corps of Engineers Sacramento District also has a prime interest in Delta flood control problems. Thus in both the Delta and the San Francisco Bay the federal agencies have interests, constitutional powers and operating responsibilities that the State cannot disregard.

At the local level the Delta counties, most notably Contra Costa and San Joaquin Counties, have spent substantial sums for engineering studies, gathering data and economic analyses of their Delta problems. Within the Delta counties there are many reclamation districts, water districts, associations, land owners, industries, boat operators, and recreationists who have interests in the Delta.

Viewed in this full perspective it is apparent that the solution to the Delta problems is not in the hands of one agency. Even with all the studies being made, the large sums being spent and the hard work of so many agencies and individuals, an important link is missing. There is no mechanism for the comprehensive solution of the Delta problems in the Delta's broadest context.

#### DELTA STUDY COMMISSION

Because of the wealth of federal, state and local agencies working on the Delta problems or having responsibilities in the Delta, establishing any type of a co-ordinating committee which would provide representation for each agency and interest seems unworkable. Perhaps as many as 30 or 40 representations would be required on the co-ordinating committee. Such a large group could not function effectively. In addition, any solution to the Delta problems which achieves agreement among all interests, but which is technically deficient, may be worse than no solution. Difficult as it may be to achieve agreement among all interests, the engineering, water quality, legal and fishery problems are equally as difficult and some are unique.

The committee feels that a Study Commission consisting of at least seven members could provide the machinery to solve the Delta prob-

is just coming out now in July and it has some very interesting information in regard to how this Bay area consisting of nine counties are going to develop from the standpoint of growth and population and economic development. We have also contracts with the Public Health Service in regard to pollution in the Bay as their use might affect the pollution, both within and without barriers, how the population is going to progress as time goes on in connection with the population growth. The Fish and Wildlife Service is also making a study of the fish and wildlife aspects of barriers. They are concerning themselves primarily with barriers and, of course, that does include the effect in the Delta area.

"We also have called in the Department of Agriculture for studies on the use of marsh and tidelands for agricultural purposes if they were reclaimed, the evaporation and transpiration of fresh water lakes, and several other features that they have supplied information on, and we have also utilized the expert services of the United States Geological Survey and also the Bureau of Reclamation."

<sup>10</sup> No dikes or other obstructions to the navigable capacity of the waters in the Delta or in the San Francisco Bay could be constructed by the State without the approval of the Chief of Engineers and the Secretary of the Army (see 33 U.S.C.A. 401 and 403). The powers of the United States with respect to controlling the navigability of waters are derived from the commerce clause (Cl. 3, Sec. 8,



lems.<sup>11</sup> Appointment to the commission should be based upon specific qualification requirements such as contained in the Water Code sections for selecting members of the State Water Rights Board. A reasonable breakdown of the qualifications of the seven members might be as fol-

Art. I) of the United States Constitution and are supreme over any powers of a state (Art. VI, U. S. Constitution).

<sup>11</sup> A study commission has been established by Congress to deal with complex, multi-agency problems in the southeastern states (see U. S. Study Commission for South Carolina, Georgia, Alabama and Florida, page 1224, hearings before the Subcommittee of the Committee on Appropriations, House of Representatives, Eighty-sixth Congress, Second Session, Part I, Civil Functions, Department of the Army) and in Texas (see U. S. Study Commission for Texas, same source, page 1232).

The two U. S. study commissions differ from the proposal for a Delta Study Commission in that (1) both have substantial budgets to pay for work which is not being done by existing federal or state agencies, (2) both are organized upon the basis of representation, because in the case of the Texas Study Commission, full representation can be achieved by appointing only 16 members, (3) the problems appear to be less difficult technically than in the Delta and more nearly like the usual work in comprehensive planning, and (4) the states involved do not have the initiative or the special interest that California has in its Delta, which Delta lies within the State's borders.

The following material is quoted from the budget justification of the U. S. Study Commission for Texas (page 1233 of above source):

"The U. S. Study Commission—Texas was established in August 1958 to make a comprehensive, integrated, and co-operative investigation, study, and survey in connection with—and in promotion of—the conservation, utilization, and development of the land and water resources of the Neches, Trinity, Brazos, Colorado, Guadalupe, San Antonio, Nueces, and San Jacinto River basins and intervening areas in Texas. The commission is further charged with formulating and submitting to the President for transmission to the Congress a basic, comprehensive, and integrated plan of land and water resources development for this area.

"The original legislation provided for a commission of 14 members, 13 of whom were appointed by the President on December 18, 1958. Amendatory legislation enacted in 1959 increased the membership of the commission to 16. Two members were appointed by the President on December 3, 1959, leaving only one commissioner, who will represent the Texas Board of Water Engineers, still to be appointed. The 15 commissioners who have been named are the chairman, who was appointed from the entire area, six from federal departments and agencies having jurisdiction in land and water resource planning, and one from each of the eight river basins.

"The legislation creating the U. S. Study Commission—Texas represents a new approach to land and water resource planning. Under the authority given the commission, there are, for the first time, no inhibitions or restrictions on full consideration of all possibilities in the formulation of a development plan for the area. The approach thus far has worked well, and the desire for a collaborative effort by all state and federal agencies concerned with land and water resource planning in the area has been realized. Many state and local agencies and interests are co-operating actively and wholeheartedly in the collection, submission, and analysis of data essential to sound planning.

"Appointment of six commissioners from federal departments and agencies has brought to the commission a vast store of knowledge, experience, and skill from the regular departments and bureaus of the federal government. The work of the commission is being expedited by the availability of the resources and facilities of these agencies and by the co-operation which has been given it in carrying out its assignment. The commissioners from federal agencies, by reason of their special status, are free to bring to bear on the overall problem all of the knowledge and experience which they have acquired through many years of service, without being subject to any limitations imposed upon their agencies by law or regulation. They are in a position to point out clearly any conflicts or inconsistencies among the laws and procedures regulating the agencies.

"Beyond this, the legislation and the procedures governing the study which this commission has been directed to make brings into the planning for the first time, as equal partners, representatives of the state and local agencies. This is proving of great assistance to the commission and should contribute immeasurably to the usefulness, soundness, and acceptability of the development plan which the commission expects to submit to the President and the Congress.

"The commission held eight meetings during 1959 in Houston, Texas, where it has established its headquarters. It is directing its efforts toward completion of its report within three years from the date of its organization meeting in Houston on January 5, 1959. When this assignment is completed, the commission automatically will pass out of existence. Its status thus is different from that of other federal agencies which have submitted plans of a similar nature in the past. It will have no responsibility for construction. It will have no incentive to seek authorization and adoption of the plan it will submit in order to stay in business and establish another construction bureau in the federal structure. Although it is expected that the commission's report will recommend the construction of certain control

works: two engineers, one water rights attorney, one water quality specialist, an economist specializing in navigation and recreation, a fisheries biologist and a lay person as chairman. A membership of seven commissioners seems to be the minimum necessary to include the technical fields of knowledge required. At the same time it is perhaps as large as any working group should be in order to function effectively.

The Delta Study Commissioners should expect to devote at least half time to this work and should be given a clear mandate to complete their work within a specified period of about two years after which the Study Commission would automatically be terminated.

It is apparent from the large sums of money already being expended by federal, state and local agencies, that there is no deficiency in funding or staffing for technical studies and gathering of data.<sup>12</sup> The primary duty of the Study Commission, therefore, must be to analyze, compare, and integrate prior studies and the work now being done so as to define an objective around which a comprehensive, compatible solution can be formulated. The commission need not have an independent staff, but should request federal agencies and direct state agencies to modify their studies, eliminate duplication and co-ordinate their approaches to provide a compatible end result. It may be that the com-

works, it will be the responsibility of others to work out the refinements of design, to construct them, and to operate them.

"The work plan of the commission may be divided into three stages. The first involves the review, collection, study, and analysis of data. The second will require the formulation of alternative development plans for the individual river basins and intervening areas. The third will involve the formulation of alternative, integrated, area-wide plans; the selection of the plan to be recommended; and the preparation of the commission's report.

"The commission has determined that its staff will be kept small but will be composed of highly qualified, objective professional people. It now consists of 20 highly qualified engineers and conservationists, and six administrative personnel. It is anticipated that the staff will not exceed 50 including consultants and part-time personnel.

"Although much of the work will be performed for the commission by other agencies, particularly in the first and second stages, it will be carried out in close collaboration with the commission's own staff which will be responsible for co-ordination, checking on progress of the work, and the monitoring of commission policy. In order that the commission's assignment may be completed as expeditiously as possible, first-stage planning work has been initiated and pressed as vigorously as staff recruitment and availability of funds permit.

"Generally, the duties of the staff are to take a fresh, objective look at all of the procedures currently being used by the planning agencies; and, where necessary, to determine alternative methods for accomplishing the same purposes; to review, analyze and study basic data and reports that are currently available; and to assist the commission in filling any gaps or deficiencies that exist in these data, in formulating alternative development plans, and in preparing its report.

"The commission's greatest organizational problem has been to devise means of utilizing not only the results of earlier studies and the data gathered and accumulated at various places around the State, but also the know-how that had been developed, particularly in some of the major federal agencies. This problem was solved by the establishment of two types of committees, a planning co-ordinating committee and a number of collaboration groups. Functionally, these committees provide channels for maximum co-operation and participation in the commission's work by all federal and state agencies concerned with land and water resource planning in the study area."

<sup>12</sup> For example, the Department of Water Resources has budgeted for fiscal year 1960-61 the following expenditures for work related to the Delta:

Salinity Control Barrier	\$275,611
Delta Levees Investigation	57,199
Western Delta Studies	83,613
Staging and Programming*	361,893
Central Valley Operation*	137,095
Sacramento Valley Seepage Investigation*	93,726
San Joaquin Valley Drainage Investigation*	426,872
Sacramento River Water Pollution Survey	283,571
Trial Distribution, Sacramento River*	147,079
Sacramento-San Joaquin Water Supervision*	200,805

\* Only a part of this money will be spent in the Delta.

mission should have a small amount of money to pay for any work that cannot be covered by existing agencies, but such a need should be minor.

The State should leave the way open for federal participation in the Delta Study Commission, possibly by sharing the costs or permitting the federal government to select several of the commissioners. However, securing authorization for federal participation from Congress will take time and cause delays. Since the concept of the Delta Study Commission is one of membership based upon knowledge and skills rather than representation, the need for federal participation actually may be more desirable for reasons of harmony than it is essential to the functioning of the commission.

The Delta Study Commission should hold public hearings to inform the public and Delta interests of the technical considerations the commission finds which limit or condition solutions to the Delta problems. Hearings should also be held to receive statements from all local and statewide interests on their problems and desires as they relate to the Delta. The purpose of the hearings should be to mutually acquaint the commissioners, the public, the local and statewide interests and all involved agencies of government with both the technical limiting conditions on Delta solutions and the desires of the Delta and other interests. This exchange of information should clarify the issue and encourage agreement through an understanding of each other's problems as well as the extent to which individual problems and local desires can be resolved within the overall framework of a comprehensive, technically competent solution of the Delta problems. At the completion of its work, the Study Commission should prepare a report with a recommended program which will, as nearly as possible, resolve all differences.

The Study Commission should devote its energies to constructive analysis and comprehensive solutions of the Delta problems. To do this, it should be assisted in gathering and interpreting information, or securing information not now available, by a group of liaison members. Each liaison member should be appointed by and should represent one of the principal agencies or groups interested in the Delta. There would probably be 30 or 40 liaison members who could be organized by the commission into subject matter groups to meet with the commissioners. The duties of a liaison member in most cases would not be full time and would require that only part of his time be devoted to Study Commission activities. The work of the liaison members and the commission's hearings should be the media by which the Delta interests and governmental agencies communicate with the commission. The liaison members and the hearing process compensate for the fact that a study commission based upon representation would be unwieldy and lacking in the necessary technical skills to be effective.

The State's water program, and indeed progress on many water problems in the Central Valley, depends heavily upon a solution to the Delta problems. The committee, therefore, recommends the addition of the Delta to the San Francisco Bay Model which, in itself, will be a major move in co-ordinating the Delta work of state and federal agencies, and the establishment of a Delta Study Commission as the only

presently ascertainable constructive steps which hold potential for the solution of the intricate, inter-related problems of the Delta. The report and the recommendations of the Delta Study Commission must result in a solution to the Delta's problems which will protect the interests of all parties, meet the technical requirements, be within the existing requirements of law, be financially feasible and merit the support of all federal, state, and local agencies of government.

#### THE DELTA POOL CONCEPT

The Department of Water Resources has developed the Delta Pool Concept as a means of handling many difficult financial problems involved in operating the Delta as a physical pool from which the State Water Facilities secure their water. Data on the Delta Pool Concept has not been set forth in detail by the department but certain principles are contained in the department's water service contract signed by the Metropolitan Water District of Southern California on November 4, 1960.

As a minimum the department's pooling concept involves combining: (1) certain allocated costs for water conservation features at the Oroville Dam and Reservoir which store water to supplement those natural flows which are already available at no cost in the Delta; with (2) costs of certain features of the Delta Water Project designed to protect the water in transportation across the Delta or salvage water now used for salinity repulsion. On top of this minimum pooling the department has also added: (3) certain allocated costs of the San Luis Dam and Reservoir amounting to about \$115,000,000; and (4) the costs of Grizzly Valley and Frenchman Projects on the Upper Feather River. Eventually the department will add costs of: (5) such other projects as may be constructed in the future to replenish water supplies in the Delta, including: (6) any local upstream projects constructed as part of future major storage projects.

These six pooled costs are to be met by revenues received from the sale of water and power at or above the Delta. A \$2 per acre-foot power credit is added, which is equivalent to the so-called surplus power revenues at Oroville. A separate surcharge equivalent to the power credit is added to lands in single ownership exceeding 160 acres as part of the charge for moving water from the Delta to the point of use. These costs are proposed to be repaid by a Delta Water Charge based on average costs which, during the repayment period, will return all costs minus the power credit. A single price is paid for water by all the State's customers receiving water from the Delta or from any state project upstream from the Delta. The Delta Water Charge is expressed in the contract by a complex mathematical formula.<sup>13</sup>

The Committee considered three basic principles involved in the Delta Pool Concept. The first was the department's distinction between transportation and conservation facilities. The department's concept of the Delta Pool is that it includes the facilities required to conserve water for export plus all other facilities not a part of the aqueduct delivery system. Facilities required to transport water are included

<sup>13</sup> The computation of the Delta Water Charge and the formula to be applied are contained in Article 22 of the contract the department signed with the Metropolitan Water District, dated November 4, 1960.

in a transportation charge which covers the principal, interest, operation, maintenance and replacement costs of aqueducts, pumps, tunnels, etc., used in the transportation of water from the Delta. The transportation charge paid by each water purchasing agency is based directly upon the costs of its individual service. The department's distinction between conservation and transportation appears to be too broad a classification for good contact administration and has led to difficulties when the resulting classification varied from the facts.

For example, at the committee's May 4 hearing in Oakland the department explained that because the Delta Water Project salvages certain flows now used for salinity repulsion and also transports water across the Delta, it is a conservation facility. The department further explained that the San Luis Dam and Reservoir with 2,100,000 acre-feet of storage is a transportation facility. The committee had considerable difficulty in understanding this approach. Subsequently in Berkeley on June 28, the department presented a revised analysis which showed that all the State's costs of approximately \$115,000,000 for San Luis Dam and Reservoir and related aqueduct and pumping plants were charged to the Delta Pool as conservation facilities. These San Luis costs were also added to the Delta Pool in the contract signed with the Metropolitan Water District by means of definition of the Delta Pool contained in Article 22(e).

As a result the department now classifies all State Water Facilities from San Luis Dam and Reservoir to Frenchman Dam inclusive as conservation facilities, except for the South and North Bay Aqueducts.<sup>14</sup> The South Bay Aqueduct water users, however, protested to the committee that if San Luis Dam and Reservoir is a conservation facility and is not to be paid for directly through the transportation charge but is to be charged into the Delta Pool, so should the Del Valle Dam and Reservoir on the South Bay Aqueduct, since it fulfills a similar role.

Other unusual results occur from the classification. The State's customers along the Feather River below Oroville and at the Upper Feather River projects will pay a price for water which includes the San Luis Dam and Reservoir, the Delta Water Project and also the cost of pumping water into the San Luis Reservoir. The price charged these customers has no relationship to the cost of the service they get. In fact, testimony presented to the committee at Portola by the department indicates that irrigation revenues from the Frenchman project will repay only about one-third of the Frenchman construction costs allocated to irrigation.<sup>15</sup> The remaining two-thirds will not be repaid by Frenchman water users but will represent a subsidy through the operation of the Delta Pool.

<sup>14</sup> Any reference to conservation facilities and their costs should be understood to exclude all facilities designated for, or costs not allocated to water supply purposes such as flood control, navigation, fisheries, etc.

<sup>15</sup> In testimony contained on page A-168 of the committee's report, "Economic and Financial Policies for State Water Projects," February 1, 1960, the department informed the committee that about 55 percent of the \$2,500,000 costs for the Frenchman Project would be allocated to irrigation, or \$1,375,000. In testimony contained on page 18, transcript of September 13, 1960, the department stated " \* \* \* the Frenchman Project service area with a yield now estimated at 9,400 acre feet \* \* \* would produce a gross annual revenue at \$3.50 per acre foot of \$33,000 \* \* \* Over a 50-year period \* \* \* this would amount to a repayment of \$430,000 of capital cost \* \* \* " This is a repayment of about one-third.

The committee has been unable to find a logical basis for classifying all project facilities as either conservation or transportation facilities. Certain facilities may be either transportation or conservation or a combination of both, irrespective of the department's overall classification. The department's arbitrary classification, when used as the basis of a pricing system, defeats the principle that beneficiaries should pay for the services they receive and creates a category of project customers who pay for water on a basis which has little relationship to their costs. While this may be financially advantageous to some customers it is equally disadvantageous to others and tends to obscure any subsidies which may occur. Later in this report, the committee suggests a more limited approach to pooling and the problem of classification of facilities.

The committee, as a second matter, made an effort to ascertain whether the facilities proposed to be included in the Delta Water Charge are equally required at this time or whether some of them might be delayed or reduced in scope in a manner beneficial to all. The water pumped from the Delta during the first years of project operation involves no cost at the Delta prior to diversion and the only expenditures for regulation will be below the Delta.<sup>16</sup> The committee attempted to determine why the department proposed to charge for unregulated water at the Delta in the early years of project operation and why any reduction of capital expenditures for the Delta Pool facilities in the early years of project operation does not reduce the department's Delta Water Charge.

The report of Charles T. Main, Inc., clearly states that the completion of Oroville Dam is not necessary for water supply purposes until 1982, and that constructing it before then will introduce financing problems.<sup>17</sup> Under these circumstances a delay in Oroville would certainly reduce the initial investment in the Delta Pool facilities and, therefore, might reduce the initial cost of the Delta water but this would be at the expense of flood control. The committee consequently attempted to find out from the U.S. Corps of Engineers and the Department of Water Resources what steps might be taken to provide alternate or interim flood control along the Feather River because it felt that a delay in constructing Oroville Dam for water supply should not result in a delay in providing flood control. However, work on planning an interim, low-level, flood control dam at Oroville which could be later built to full size had not progressed to the point that a decision on this and other possible alternatives could be made. The

<sup>16</sup> The Director of Water Resources informed the committee, page 395, transcript of November 6, 1959, "The problem I think \* \* \* involves these unregulated surplus waters (in the Delta). Were we not to attempt to conserve those waters, even though they may not be a completely firm supply in the accepted sense of the term, the water which would in those cases be sent to Southern California would be much more expensive than the figure that we have quoted because the water which we conserve from this unregulated surplus hasn't cost anybody anything up to the point of diversion from the Delta. It is free at that point. We firm that up with regulated releases from the upstream storage." If upstream storage is not needed for water conservation until 1982 as indicated by Charles T. Main, Inc., then the initial water supplies at the Delta should cost nothing. The necessary regulation is provided at San Luis for the San Joaquin Valley-Southern California Aqueduct and at Del Valle for the South Bay Aqueduct. Costs of these reservoirs are clearly related to the customers they serve.

<sup>17</sup> See Final Report of Charles T. Main, Inc., dated October, 1960, pages 9-1 and 3-2.

economic problem remaining for decision is whether the costs to the water users for conservation features at Oroville which are not needed until 1982 outweigh the abandonment costs involved in building an interim, low-level flood control dam at Oroville.

The committee's hearings on the Delta Water Project, as already discussed, indicated that the present scope and nature of the Delta Water Project is not acceptable to the Delta interests and the department has stated that the Delta Water Project is subject to some curtailment, the amount of which is presently unknown. This report has already pointed out that the department's proposal to include \$115,000,000 of the construction costs of the San Luis Dam and Reservoir and portions of the Delta to San Luis Aqueduct in the Delta Pool as conservation costs charged to all water users seems questionable. A reassignment of these costs seems logically desirable. The details of its effect on water users is not now known and needs analysis. The committee concludes, therefore, as a logical proposition, that some major but presently undefinable reassignment of costs, reduction in scope or delay in construction of the facilities to be included in the Delta Pool can be made by the department.

Costs incurred at the Delta include annual principal and interest payments for the bonds issued to construct whatever facilities are included in the Delta Pool and operation, maintenance and replacement charges for such facilities. To the extent that these costs are not covered by the revenues received from the Delta Water Charge, the deficiency must be made up by borrowing from the General Fund to cover principal and interest. The department has arbitrarily established an interim Delta Water Charge of \$3.50 to give a uniform price for water during the first years of project operation. After 1970 the Delta Water Charge is to be based upon actual costs computed by the department according to a complex formula which averages the actual costs for each year over the 80 year bond repayment period.<sup>18</sup>

Data presented by the department to the committee indicates that there will be a deficiency in the Delta Water Charge of approximately \$60,000,000 during the first eleven years of project operation. This deficiency will result in borrowing from the General Fund in varying amounts from approximately 50 cents up to \$106 per acre-foot of water delivered.

Because of indications that the scope of the department's proposed Delta Pool facilities could be reduced and that major General Fund borrowing is contemplated by the department, the committee made an attempt to evaluate the effect on the Delta Water Charge during the first years of project operation if minimum Delta Pool facilities were built and the price for water were based on the actual annual costs for principal, interest, operation, maintenance and replacement. The results as computed by the department showed a substantially reduced actual cost for water at the Delta. The cost was under \$1 in a number of early years and then rose to a peak of \$25.35 in 1969 after which it declined again. This method gave a Delta cost of \$20.59 per acre-foot of water

<sup>18</sup> Article 22(c) of the contract dated November 4, 1960.

delivered in 1968, or General Fund borrowing of \$17.09 per acre-foot assuming a price of \$3.50 per acre-foot, compared to the department's Delta Water Charge of \$3.50 plus a General Fund borrowing of \$85 or a total of \$88.50 in the same year.

The lower cost per acre-foot in the committee's actual cost approach is probably due to minimizing the facilities to be included in the Delta Water Charge. The method of computing the price for water really makes little difference so long as it returns annually in full the costs which the State incurs and in the long run these costs are controlled by the investment made. The department's pricing formula is really a ceiling until 1970; and because thereafter it is an average, it bears no relationship to the annual costs the State must somehow meet during the initial years of project operation. The committee's actual annual cost approach serves to clarify the true costs including General Fund borrowing. The department's approach facilitates including large capital investments in the Delta Water Charge on the basis that they will eventually be paid out by the project. It should be pointed out that the resulting interim borrowing from the General Fund is an added expense to the taxpayers. The committee concludes that the method of computing the Delta Water Charge should be restudied and consideration given to making it more responsive to savings in the Delta Pool investment and to minimizing the burden on both the project customers and the General Fund.

A third concern of the committee in the Delta Pool Concept arises from the spreading of the so-called Oroville surplus power revenues to reduce the price of water at the Delta.<sup>19</sup> It is clear from the testimony of the Department of Water Resources that the Delta Pool as envisioned by the department will require borrowing from the General Fund in an amount of \$60,000,000 during the first eleven years of project operation. Even under the favorable conditions which the committee evaluated some General Fund borrowing will exist but will be minimized. If the demand for water is less than the department estimates, the department's estimate of borrowing from the General Fund may increase. It should be understood that whenever the revenues from water sales do not cover the true Delta Pool costs, the use of so-called surplus power revenues to further reduce the price for water only diverts the power revenues to the benefit of the water users to reduce water prices instead of being used to repay project costs.

If the construction of Oroville is delayed as recommended in the Interim Report of Charles T. Main, Inc., or an interim flood control project is constructed at Oroville, there will be no power revenues during the first two decades of operation. Under these circumstances any reduction in the Delta Pool Charge based upon so-called surplus power

<sup>19</sup> The department proposes to spread the so-called surplus power revenues from Oroville evenly over each acre-foot of water sold at the Delta price. The State will have no customers who do not pay at least the Delta price. Therefore, the Delta Pool is not essential to spreading these power revenues, because all customers benefit equally for each acre-foot of water purchased. Power revenues are actually received in the proportion that annual water purchases bear to the so-called surplus power revenues available in any given year. Subparagraph 30(c) of the contract establishes the amount of the surplus power revenues at \$2 per acre foot until the beginning of power generation at Oroville at which time the rate is to be recomputed according to a formula provided.

revenues, will not be funded by power revenues, but will only increase the borrowing from the General Fund.<sup>20</sup>

In summary, the committee feels that the concept of a Delta Pool should be limited to spreading the costs and revenues involved in providing water at the Delta for export purposes. The justification for financial pooling lies in averaging out the costs of water at the Delta for all of the State's customers served from water physically pooled at the Delta. This is necessary because the physical pooling of water at the Delta makes it either impossible or unreasonable to isolate costs for each customer. In addition, the inability of the State to secure a firm water right because of the prior rights given to areas of origin by state law means that a project cannot in the long run be tied to a specific source of water but must operate with a replenishable pool.

The committee recommends that the Delta Pool Concept should include only pooling of water at the Delta for export and providing replenishment of the Delta Pool. If this is done, it is immaterial whether San Luis Dam and Reservoir is classified as a conservation or transportation facility. The important consideration is that it serves only those customers south of San Luis and its costs should, therefore, be borne entirely by them and not spread over customers north of the Delta who receive no service or benefit from San Luis. The Delta Pool should both physically and financially be limited to those who directly secure a water supply from the Delta and should include only the Delta Water Project and upstream storage facilities needed to supply water to the Delta. Customers upstream from the Delta should pay for only the costs of the facilities which serve them. Any surplus power benefits can be spread as desired based on the quantity of water purchased by each customer wherever located.

<sup>20</sup> It may be noted that other General Fund borrowing may also be required. Thus, there may be deficiencies in revenues from the transportation charge to cover the actual annual costs of the transportation facilities. Since the department proposes that contracts be secured covering only 75 percent of the costs of the transportation facilities before construction is begun, it is possible that up to 25 percent of the annual costs of the transportation facilities will have to be borrowed from the General Fund for an unknown period of time. This borrowing could reach as much as \$25,000,000 per year, that is, 25 percent of the aqueduct revenues shown on page 36 of the Final Report by Dillon, Reed and Company, Inc., the financial consultants working with Charles T. Main, Inc. The contract signed with the Metropolitan Water District includes the 75 percent advance sign-up requirement in Article 17(d).

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