amended by attached sheet dated 12-23-65

STATE OF CALIFORNIA

STATE WATER RIGHTS BOARD

In the Matter of Applications 5625, 5626, 9363, 9364, 9365, 9366, 9367, 9368 and 10588,	Decision D 990
UNITED STATES OF AMERICA, BUREAU OF RECLAMATION, Applicant	Sources: Sacramento River, Rock Slough, Old River, and Channels of the Sacramento-San Joaquin Delta
SACRAMENTO RIVER AND DELTA WATER ASSOCIATION, ET AL., Protestants	

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Adopted February 9, 1961

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INTRODUCTION

This decision concerns nine applications by the United States through its Bureau of Reclamation, Region 2, Sacramento, (hereinafter sometimes referred to as the Bureau) for permits to appropriate water from the Sacramento River and Sacramento-San Joaquin Delta (hereinafter referred to as the Delta) in furtherance of the Central Valley Project (hereinafter referred to as the Project). A map of the Central Valley (Sacramento-San Joaquin Valley) Basin depicting the drainage system and the various features referred to in the decision is appended as Plate 1. A map of the Delta with its maze of channels and waterways and the numerous intensely farmed islands is appended as Plate 2.

California is traversed lengthwise by two approximately parallel ranges of mountains - the Sierra Nevada on the east and the coast range on the west - which converge at Mount Shasta on the north and are joined by the Tehachapi Mountains on the south to enclose the Central Valley Basin. The valley floor, comprising nearly one-third of the basin area is a gently sloping practically unbroken alluvial plain 400 miles long and averaging 45 miles in width. Sacramento River drains the northern portion of the basin and San Joaquin River the southern portion. These two streams flow toward each other, join in the Delta and find a common outlet to the Pacific Ocean through San Francisco Bay.

Most engineering studies consider the western limit of the Delta as corresponding with the boundary of the agricultural lands, or western-most part of Sherman Island now under irrigation. This generally accepted concept does not agree with the definition of the Delta as adopted by the Legislature in 1959 and contained in Water Code Section 12220 which

describes the Delta as extending to a point approximately two miles west of the City of Pittsburg. However, for convenience, the discussion portion of this decision will refer to the Delta as defined in the engineering studies.

The San Joaquin Valley, that portion of the Central Valley which lies south of the Delta, contains rich lands and enjoys a climate which permits the production of a great variety of irrigated crops. Development in some areas is limited, however, because of the lack of an adequate water supply for irrigation.

The Sacramento Valley, that portion of the Central Valley which lies north of the Delta, also contains fertile lands which produce a variety of irrigated crops, including many thousands of acres of rice. Unlike the San Joaquin Valley, the Sacramento Valley enjoys an abundant water supply, although during the late summer months in most years there is insufficient water to meet irrigation requirements without the benefit of seasonal storage.

For many years it had been the ambition of those people concerned with water development in the State to construct a project capable of exporting surplus water from the Sacramento Valley into the San Joaquin Valley and, at the same time, provide a supplemental supply for those water users in the Sacramento Valley dependent upon the natural stream flow. A plan to accomplish this was formulated by State engineers and later adopted by the Legislature in 1933 as the Central Valley Project Act. In 1927 and 1938 pursuant to Chapter 286, Statutes of 1927 (now codified as Division 6, Part 2 of the Water Code), the State made applications to appropriate water for the Project.

When it became apparent that the State was unable to finance the necessary construction works, the United States, with the urging of the

State, directed the Bureau to undertake construction and operation of the Project. Later, eight of the nine applications involved in this decision (Application 10588 was filed by the United States) were assigned to and completed by the United States. After notice of these applications was published, 73 protests based on 20 separate grounds were received.

Hearing before the State Water Rights Board (hereinafter referred to as the Board) for the purpose of receiving evidence commenced on September 15, 1959. The hearing was conducted by Board Members Ralph J. McGill (Acting Chairman) and W. P. Rowe, assisted by Bert Buzzini of the legal staff and Donald E. Kienlen of the engineering staff.

After 20 days of hearing, on November 4, 1959, the United States requested a recess for the purpose of allowing time to negotiate with the State Department of Water Resources (hereinafter referred to as Department) and those parties claiming rights to the use of water from the Sacramento River and Delta. None of the parties objected to the continuance and many joined in the request made by the United States. The hearing was scheduled to resume on January 5, 1960, at which time the parties requested a further continuance for negotiations. Pursuant to this request the Board granted a continuance until April 19, 1960, and directed the parties to report their progress to the Board every 30 days. Except for an agreement between the United States and the Department providing for an apportionment of water between the Federal Central Valley Project and the State Feather River and Delta Diversion Project (DWR 77*), the negotiations failed and the hearing resumed upon the expiration of that continuance.

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*Exhibit 77 of Department of Water Resources

The hearing concluded on August 24, 1960, after requiring a total of 75 days. It was reopened on November 1, 1960, and February 2, 1961, to allow presentation of certain motions by the parties. Those appearing at this hearing and their representatives are as follows:

Party	Representative
Anderson-Cottonwood Irrigation District Glenn-Colusa Irrigation District Jacinto Irrigation District Provident Irrigation District	P. J. Minasian, Attorney
California Water Service Company	Carl F. Mau, Vice President
Central California Irrigation District	Senator James A. Cobey, Attorney
Central Valley Regional Pollution Control Board Modesto Irrigation District	Clifford E. Plummer, Engineer
Chowchilla Water District	Denslow Green, Attorney
Columbia Canal Company Firebaugh Canal Company San Luis Canal Company	J. E. Woolley, Attorney
Contra Costa County Water Agency Contra Costa County Water District, et al Solano, County of	Frederick Bold, Jr., Attorney
Delano-Earlimart Irrigation District Rag Gulch Water District	Erling Kloster, Attorney
Delta Water Users Association	John A. Wilson, Attorney
Feather Water District	Arthur W. Coats, Jr., Attorney
Friant Water Users Association	James F. Sorenson, Engineer
Jongeneel, Albert	Malcolm O'Connell, Attorney
Kaweah Delta Water Conservation District Lower Tule Irrigation District Pixley Irrigation District Tulare Irrigation District	Kenneth Kuney, Attorney

Party	Representative
Kern, County of	William A. Carver, Deputy County Counsel
Kings River Conservation District	Henry Karrer, Engineer
Landowners Association of Reclamation District 108, Inc.	Robert H. Fouke, Attorney
Madera Irrigation District	Adolph Moskovitz, Attorney
Metropolitan Water District of Southern California	Charles C. Cooper, Jr., General Counsel
Merced, County of	Arthur Ferrari, Supervisor District 1
Merced Irrigation District	Kenneth R. McSwain, Chief Engineer and Manager
Newhall Land and Farming Company Tisdale Irrigation and Drainage Company	Donald H. Ford, Attorney
Reclamation Districts 756 and 802 Ritchie, Grace S. Western California Canners, Inc.	Tom H. Louttit, Attorney
Sacramento River and Delta Water Association, et al	Martin McDonough, Attorney George Basye, Attorney
San Joaquin County Flood Control and Water Conservation District	William F. Haywood, Assistant County Counsel
Shasta, County of Northern California County Supervisors' Association	Arnold S. Rummelsburg, Director Shasta County Department of Water Resources
Sproule, Marie	Albert Monaco, Attorney
Stanislaus, County of	Oliver Deatsch, County Surveyor and Engineer
State of California Department of Fish and Game	James M. Sanderson, Deputy Attorney General
State of California Department of Water Resources	Russell Kletzing, Attorney
Sutton, Louis	Louis N. Desmond, Attorney
Tehama, County of	Joseph E. Patten, Engineer

Party	Representative
Tulare, County of	Robert E. Moock, Attorney
Union Properties, Inc.	Walter Gleason, Attorney
United States of America Bureau of Reclamation	Thomas J. Clark, Assistant Regional Solicitor
Westlands Water District	Kenneth G. Avery, Attorney

None of the parties appearing at the hearing objected to permits being granted to the United States for water to be appropriated for the Project. However, many urged that the Board impose certain permit terms and conditions for the protection of the water supply of those parties who might be adversely affected by the operation of the Project and those parties receiving a water supply therefrom.

SUBSTANCE OF THE APPLICATIONS

For convenience the material contained in the amended applications has been summarized and is presented in Table 1 (page 11).

Application 5625, filed on July 30, 1927, by the Department of Finance, State of California, and assigned to the United States on September 3, 1938, as amended, is for a permit to appropriate 11,000 cubic feet per second (cfs) by direct diversion year-round, and 3,190,000 acre-feet per annum (afa) by storage to be collected between October 1 of each year and ~~July 1~~ 4/ of the succeeding year from the Sacramento River for power purposes. Point of diversion is at Shasta Dam located within the NE¼ of SE¼ of Section 15, T33N, R5W*. Place of use is at Shasta Power Plant located within the NE¼ of SW¼ of Section 15, T33N, R5W.

Application 5626, filed on July 30, 1927, by the Department of Finance, State of California, and assigned to the United States on September 3, 1938, as amended, is for a permit to appropriate 8,000 cfs by direct diversion, year-round, and 3,190,000 afa by storage to be collected between October 1 of each year and July 1 of the succeeding year from the Sacramento River for irrigation, incidental domestic, stockwatering, navigation and recreational purposes. The application also indicates that it may be necessary to provide up to 6,000 cfs of direct diversion and/or storage releases to flow into Suisun Bay in order to provide water of suitable quality for the Delta-Mendota and Contra Costa Canals (hereinafter referred to as "carriage water"). The point of direct diversion and diversion to storage is at Shasta Dam. Points of rediversion are shown at top of page 12.

*All references to township and range are from Mount Diablo Base and Meridian (MDB&M).

TABLE 1

SUMMARY OF DATA IN APPLICATIONS 5625, 5626, 9363, 9364, 9365, 9366, 9367, 9368 and 10588

Applications(1)	Purpose	Direct Diversion Rate cfs	Storage Quantity afa	Points of Diversion	Places of Use
5625	Power	11,000	3,190,000	Shasta Dam	Shasta Power Plant
5626	Irrigation, navigation, incidental domestic, stockwatering and recreational (2)	8,000	3,190,000	Shasta Dam	Gross area of 3,455,000 acres in Delta and Sacramento-San Joaquin Valley; net area of 1,200,000 acres to be irrigated in any one year
9363	Municipal and industrial	1,000	310,000	Along Sacramento River from Shasta Dam to Delta and channels of Delta(3)	Within gross area of 3,455,000 acres described under Application 5626
9364	Irrigation, flood control, navigation, incidental domestic, stockwatering and recreational (2)	9,000	3,000,000	Same as Application 9363 with the exclusion of the Vallejo Pumping Plant	Same as Application 5626
9365	Power	7,000	3,310,000	Shasta Dam	Shasta Power Plant
9366	Irrigation and domestic	200(4)	none	Rock Slough at intake of Contra Costa Canal	Gross area of 102,000 acres within Contra Costa County. Net area of 20,000 acres to be irrigated in any one year
9367	Municipal and industrial	250(4)	none	Same as Application 9366	Within gross area of 102,000 acres described under Application 9366
9368	Irrigation and domestic	4,000	none	Old River at intake canal to Tracy Pumping Plant	Gross area of 988,000 acres within San Joaquin Valley. A net area of 320,000 acres to be irrigated in any one year
10588	Power and incidental domestic	13,800	none	Keswick Dam	Keswick Power Plant

1. Applications 5625 and 5626 filed July 30, 1927, 9363 through 9368 filed August 2, 1938 and 10588 filed January 5, 1943.

2. The application also indicates that it may be necessary to provide up to 6000 cfs of direct diversion and/or storage releases to flow into Suisun Bay in order to provide water of suitable quality for the Delta-Mendota and Contra Costa Canals.

3. Points of diversion and/or rediversion included but not limited to the following: Keswick Dam; Tehama (Corning) Canal and Tehama-Colusa Canal (Corning Pumping Plant); Chico Canal Intake; Delta Cross Channel Intake; Delta-Mendota Canal (Tracy Pumping Plant); Contra Costa Canal Intake; and Vallejo Pumping Plant on Maine Prairie Slough.

4. The total combined diversions under Applications 9366 and 9367 are not to exceed 350 cubic feet per second.

Keswick Dam	Within NW¼ of SW¼ of Section 21, T32N, R5W
Tehama (Corning) Canal Tehama-Colusa Canal (Corning Pumping Plant)	Within NE¼ of NE¼ of Section 33, T27N, R3W
Chico Canal	Within SE¼ of NW¼ of Section 1, T23N, R2W
Delta Cross Channel	Within Swamp Land Survey 763, T5N, R4E
Delta-Mendota Canal (Old River Intake)	Within NE¼ of SW¼ of Section 29, T1S, R4E
Contra Costa Canal (Rock Slough Intake)	Within SE¼ of NE¼ of Section 33, T2N, R3E

The place of use consists of a gross area of 3,455,000 acres lying along the floor of the Sacramento-San Joaquin Valley and Delta within which a maximum area of 1,200,000 acres may be irrigated in any one year.

Application 9363, filed on August 2, 1938, by the Department of Finance, State of California, and assigned to the United States on March 26, 1952, as amended, is for a permit to appropriate 1,000 cfs by direct diversion, year-round, and 310,000 afa by storage to be collected between October 1 of each year and July 1 of the succeeding year from the Sacramento River for municipal and industrial purposes. Points of direct diversion are at Shasta Dam and locations (not specified) along the Sacramento River from Shasta Dam to the Delta and on channels of the Delta including but not limited to the points of rediversion described in Application 5626. An additional point of direct diversion and/or rediversion is the Vallejo Pumping Plant located on Maine Prairie Slough within NW¼ of NW¼ of Section 10, T5N, R2E. Other points of rediversion of stored water released from Shasta Reservoir are described as being located along the Sacramento River from Shasta Dam to the Delta and on channels of the Delta including but not

limited to those named in Application 5626. The place of use is within the gross service area described in Application 5626.

Application 9364, filed on August 2, 1938, by the Department of Finance, State of California, and assigned to the United States on September 3, 1938, as amended, is for a permit to appropriate 9,000 cfs by direct diversion, year-round, and 3,000,000 afa by storage to be collected between October 1 of each year and July 1 of the succeeding year from the Sacramento River for irrigation, flood control, navigation, incidental domestic, stockwatering and recreational purposes. The application also indicates that it may be necessary to provide up to 6,000 cfs of direct diversion and/or storage releases to flow into Suisun Bay in order to provide "carriage water". Points of direct diversion and/or rediversion are the same as those referred to under Application 9363 with the exclusion of the Vallejo Pumping Plant. The place of use is the same as that described in Application 5626.

Application 9365, filed on August 2, 1938, by the Department of Finance, State of California, and assigned to the United States on September 3, 1938, as amended, is for a permit to appropriate 7,000 cfs by direct diversion, year-round, and 3,310,000 afa by storage to be collected between October 1 of each year and July 1 of the succeeding year from the Sacramento River for power purposes. The point of diversion is at Shasta Dam. The place of use is at Shasta Power Plant.

Application 9366, filed on August 2, 1938, by the Department of Finance, State of California, and assigned to the United States on March 26, 1952, as amended, is for a permit to appropriate 200 cfs, year-round, by direct diversion from Rock Slough for irrigation and domestic purposes. The total combined diversions under this application and

Application 9367 are not to exceed 350 cfs. The point of diversion is on Rock Slough at the intake of the Contra Costa Canal. The place of use consists of a gross area of 102,000 acres lying principally within the Contra Costa County Water District and wholly within the County of Contra Costa. Of this, a maximum of 20,000 acres may be irrigated in any one year.

Application 9367, filed on August 2, 1938, by the Department of Finance, State of California, and assigned to the United States on March 26, 1952, as amended, is for a permit to appropriate 250 cfs year-round, by direct diversion from Rock Slough for municipal and industrial purposes. The total combined diversions under this application and Applications 9366 are not to exceed 350 cfs. The point of diversion is on Rock Slough at the intake leading to the Contra Costa Canal. The place of use is the same as that described in Application 9366.

Application 9368, filed on August 2, 1938, by the Department of Finance, State of California, and assigned to the United States on March 26, 1952, as amended, is for a permit to appropriate 4,000 cfs, year-round, by direct diversion from Old River for irrigation and domestic purposes. The point of diversion is on Old River at the intake canal leading to Tracy Pumping Plant. The place of use consists of a gross area of 988,000 acres lying along the central and western portion of the San Joaquin Valley. Of this, a maximum of 320,000 acres may be irrigated in any one year.

Application 10588, filed on January 5, 1943, by the United States, is for a permit to appropriate 13,800 cfs, year-round, from Sacramento River for power and incidental domestic purposes. The point of diversion is at Keswick Dam. The place of use is at Keswick Power Plant within the NW$\frac{1}{4}$ of SW$\frac{1}{4}$ of Section 21, T32N, R5W.

PLAN OF THE UNITED STATES
FOR USE OF SACRAMENTO RIVER AND DELTA WATER

The water sought to be appropriated under the subject applications is only for part of an overall project. The Bureau envisions the Central Valley Project as an expanding project to meet the demands for water supplies. As water requirements increase, new units will be added to provide a dependable supply (RT 11389*). To operate the Project the Bureau has either constructed or intends to construct certain physical works. These facilities and the proposed plan of operation described by Gleason Renoud and James J. O'Brien, engineers of the Bureau, are outlined in the following paragraphs.

Shasta Dam, the key unit of the project, is located on the Sacramento River about 14 miles upstream from the City of Redding and creates a reservoir capable of impounding 4,493,000 acre-feet of water. At the lowest reservoir level from which power may be developed there will be 502,000 acre-feet of water in storage although the river outlets will allow all but a small portion of the reservoir to be drained. The power plant at Shasta Dam is capable of using a maximum of 13,275 cfs. Keswick Dam is located about nine miles downstream from Shasta Dam and creates an afterbay reservoir of 23,800 acre-feet. The power plant at Keswick Dam is capable of using a maximum of 15,500 cfs (USBR 45**).

Between Keswick Dam and the Delta, the Bureau intends to divert water from the Sacramento River at various points as hereinafter described. Immediately east of Redding is the location of the proposed intake of the Bella Vista conduit, which will convey 93 cfs into the Cow Creek area (USBR 194). About

*Page 11389 of reporter's transcript of hearing
** United States Bureau of Reclamation Exhibit 45

two miles below the City of Red Bluff is the site of the Corning Pumping Plant, a common diversion point for the Corning and Tehama-Colusa Canals (RT 395). The pumping plant will have a capacity of about 2200 cfs. Water delivered through the Corning and Tehama-Colusa Canals will supply lands along the west side of the Sacramento Valley for approximately its entire length. At a point about 31 miles downstream from the City of Red Bluff is the site of the diversion plant for the Chico Canal which is to have a diversion capacity of 310 cfs. Water diverted through this canal is to be used on the east side of the Sacramento Valley in the vicinity of the City of Chico. Although not authorized at the present time, the Bureau has planned a canal to serve the Yolo-Zamora area located west of the Community of Knights Landing. The intake of the Yolo-Zamora Canal is to be located approximately 12 miles upstream from Knights Landing and is to have a capacity of 165 cfs (USBR 194).

Approximately 20 miles downstream from the City of Sacramento and immediately north of the City of Walnut Grove on the Sacramento River is the intake of the Delta Cross Channel which has a capacity of 7600 cfs. This channel facilitates the transfer of water from the northern or Sacramento portion of the Delta to the southern or San Joaquin portion of the Delta.

In the southern portion of the Delta are located the headworks of two export canals; namely, the Contra Costa and Delta-Mendota. Water diverted into the Contra Costa Canal is pumped from an extension of Rock Slough near the City of Oakley. This 48-mile canal has a capacity of 350 cfs and supplies water to agricultural lands and industrial areas of northern Contra Costa County (USBR 37 and 45). Tracy Pumping Plant, which diverts water into the 113-mile Delta-Mendota Canal, is located on a cut channel extending to Old River about 10 miles northwest of the City of Tracy.

The Delta-Mendota Canal has a capacity at its head of 4600 cfs and delivers water to lands along the western side of the San Joaquin Valley and to the San Joaquin River at Mendota Pool west of the City of Fresno (USBR 45 and Staff 8*).

In addition to the features described above, other divisions and units which were planned by the State have been authorized for construction by the Bureau as parts of the Project, including the American River Division and the Trinity River Division. The American River Division consists of Folsom Dam and Reservoir on the American River about 20 miles east of the City of Sacramento and the Natomas Afterbay Reservoir created by Nimbus Dam located on the river seven miles downstream from Folsom Dam. Water from this division, in addition to supplying demands in the American River Service Area, supplements releases from Shasta Reservoir to provide the required inflow to the Delta (RT 367-371). The Trinity River Division which is under construction consists of Trinity Reservoir on the Trinity River approximately 19 miles generally west of Shasta Dam and an afterbay reservoir formed by Lewiston Dam six miles downstream. Trinity River water is to be imported into the Sacramento Valley to supplement the water supplies developed by the other Divisions of the Project. To accomplish this, Trinity River water will be diverted at Lewiston Dam through a tunnel into a reservoir to be formed by constructing Whiskeytown Dam located on Clear Creek, a tributary of the Sacramento River, at a point approximately five miles west of Keswick Dam. At this point Trinity River water will be commingled with Clear Creek water and rediverted through a tunnel into Keswick Reservoir (RT 396-400).

*State Water Rights Board Staff Exhibit 8

The largest demands for Project water are from the southern end of the Central Valley, while the largest water supply is in the north. The Delta is the hub of the Project. Diversions of water at Friant Dam on the San Joaquin River, another unit of the Project located about 18 miles north of the City of Fresno, into the Madera and Friant-Kern Canals for use along the east side of the San Joaquin Valley are possible by providing a substitute supply at Mendota Pool. This exchange is described in "Amended Contract for Exchange Of Waters" (USBR 82), which provides for 855,000 afa to be diverted to Mendota Pool through the Delta-Mendota Canal. This quantity may be reduced in critical dry years in accordance with provisions set forth in the Contract. An exchange of an additional quantity of water, estimated by the Bureau to be about 50,000 afa, is provided for in Schedule 2 of the "Contract for Purchase of Miller and Lux Water Rights" (USBR 164A and Staff 10, p. 567). To be able to export sufficient quantities of water to Mendota Pool, it is necessary to supplement the uncontrolled inflow to the Delta with stored water (RT 1717-20). Similarly, the requirements of the Sacramento Valley must be met. The conservation of water to satisfy these demands requires that the multi-purpose reservoirs of the Project -- Shasta on the Sacramento River, Folsom on the American River, Trinity on the Trinity River and Whiskeytown on Clear Creek -- be integrated in their operation and coordinated with the unregulated downstream inflow (RT Vol. 18, p. 2373). It is on this basis that the United States intends to provide adequate water supplies.

In addition to providing water for irrigation, domestic, municipal and industrial uses, the Project will provide many other benefits. Shasta Reservoir has greatly reduced the flood hazard along the Sacramento River. It has also provided a great recreational benefit. Most of the water

released at Shasta Dam passes through both Shasta and Keswick Power Plants to provide an economical source of electricity. Control of the Sacramento River at Shasta Dam provides for the conservation of fish life and enhancement of salmon and other fisheries. It provides adequate river regulation for navigation. Last, but not least, it provides control against encroachment of saline water into the Delta.

PENDING PETITIONS

The place of use of the water to be appropriated by the United States as described in these applications (other than for power) covers only a portion of the total service area of the Project. Applications filed for other units of the Project cover the remainder of the service area, although there is duplication in part. Because much of the water from the Trinity, Sacramento and American Rivers will be commingled prior to its actual use and, in order to allow greater flexibility in Project operations, the Bureau desires to amend the description of the place of use in the various applications so that water from each of the sources may be used anywhere within the Project service area to the extent it is physically possible and feasible. The desired consolidation and enlargement of places of use would also extend the service area to new lands surrounding the various reservoirs and to additional acreage in the Central Valley and in Alameda, Contra Costa and Solano Counties.

Before such amendments may be made the law requires that permission first be secured from the Board (Water Code Sections 1701 through 1705). When State filings are involved, the amendments must be approved by the California Water Commission before their submission to the Board (Water Code Section 10504.5).

The California Water Commission approved the proposed amendments including additional points of diversion and rediversion. Thereafter, petitions for the desired changes were filed with the Board. However, the Board has taken no action on these petitions because a proceeding to set aside the Commission's approval has been filed in the Superior Court of Sacramento County (No. 126921) and has not yet been determined.

On November 1, 1960, Tulare Irrigation District and others orally moved the Board to set for hearing the aforesaid petitions for permission to change place of use and points of diversion (RT 12461). This motion was taken under submission and it is hereby denied. The intent, if not the letter, of the law would be subverted were the Board to attempt to assume jurisdiction of the petitions before validity of the Commission's approval is determined by the Court.

The Board by its order of December 20, 1960, did, after public hearing, allow changes in points of rediversion and in place of use by the United States pursuant to Permits 11968, 11969, 11971 and 11973 (Applications 15374, 15375, 16767 and 17374) on the Trinity River and Permit 12364 (Application 17376) on Clear Creek so that wherever it is physically possible, water from the Trinity River Division of the Project may be placed on any lands within the service area of the Project. Since these permits were not subject to the jurisdiction of the California Water Commission, the changes did not require approval of the Commission before their submission to the Board.

POWER TO CONDITION PERMITS

Counsel for the Bureau relies heavily upon the Ivanhoe case (Ivanhoe Irrigation District v. McCracken, 357 U. S. 275) in contending that this Board is without power to impose any condition in permits to be issued to the United States upon approval of its applications. While paying lip service to the mandate of Section 8 of the Reclamation Act of 1902 (43 U. S. C. A. 383*) that the Secretary of the Interior shall proceed in conformity with state water laws in carrying out the provisions of federal reclamation law, it is nevertheless urged that the Board has no discretion to do other than to issue unconditional permits exactly as applied for because, so it is said, it has been shown that unappropriated water is available, and the water is necessary to the Project. Only the Secretary has the authority to determine how the water will be used and which citizens of the State within the total Project service area will receive Project benefits, it is argued.

The Ivanhoe decision declared that acquisition of water rights must not be confused with operation of federal projects and that the latter is within the exclusive jurisdiction of the United States. In evaluating the impact of this statement upon the power of the Board to condition permits in these proceedings, it must be borne in mind that the Court was

*"§ 383. Vested rights and State laws unaffected by chapter. Nothing in this chapter shall be construed as affecting or intended to affect or to in any way interfere with the laws of any State or Territory relating to the control, appropriation, use, or distribution of water used in irrigation, or any vested right acquired thereunder, and the Secretary of the Interior, in carrying out the provisions of this chapter, shall proceed in conformity with such laws, and nothing herein shall in any way affect any right of any State or of the Federal Government or of any landowner, appropriator, or user of water in, to, or from any interstate stream or the waters thereof. June 17, 1902, c. 1093, § 8, 32 Stat. 390."

addressing itself to one issue -- the relation between Section 8 and Section 5 (the excess lands provision) of the 1902 Act. It found there was no conflict because Section 8 deals with water rights and Section 5 concerns project operation. The decisions states:

> "Without passing generally on the coverage of § 8 in the delicate area of federal-state relations in the irrigation field, we do not believe that the Congress intended § 8 to override the repeatedly reaffirmed national policy of § 5."

The Court's opinion had previously declared that "the question of title to or vested rights in unappropriated water" was not necessary to its decision. Provisions of California law regarding the procedures for initiating new rights to unappropriated water were not properly before the Court under its view of the case and were not considered by it. Here, acquisition of water rights is not only involved, it is the focal point of these proceedings. It follows that Section 8 is the governing statute so far as federal law is concerned and that the Court's reasoning in the Ivanhoe case is readily distinguishable. To predict what the Court's appraisal of the Board's authority to condition permits issued to the United States Bureau of Reclamation would be if the issue were squarely before the Court, upon the basis of judicial pronouncements which related to an entirely different issue, would be most unfair and unwise.

The Ivanhoe decision declared that federal control of project operations is supreme and exclusive because the subject matter is federal property. The Court assumed that the United States either had title to the water involved or would secure title. Actually, the United States has not yet fully complied with state procedures for acquiring title to Project water; otherwise it would not be before the Board in this proceeding. The Ivanhoe decision expressly reaffirmed that because of Section 8 the United States must comply with state law in acquiring water rights required for

reclamation projects. Acting under this direction, the United States has perfected its applications to appropriate water and is now asking this Board to approve them and to issue permits in accordance with the procedures prescribed by the California Water Code. This the Board will do.

Some of the statements in the Ivanhoe decision are difficult to reconcile. The Court said that state law must be followed in acquiring water rights but also said that the United States must acquire the necessary water rights which it does not already own by "paying just compensation therefor, either through condemnation or, if already taken, through action of the owners in the courts." These statements appear to be contradictory because rights to unappropriated water cannot be acquired by purchase or condemnation if state law is to be followed. Section 102 of the California Water Code declares:

> "102. All water within the State is the property of the people of the State, but the right to the use of water may be acquired by appropriation in the manner provided by law."

Section 1225 of the Water Code provides:

> "1225. No right to appropriate or use water subject to appropriation shall be initiated or acquired except upon compliance with the provisions of this division."

Section 1225 is found in Division 2 of the Water Code which contains the application, permit and license procedure for acquiring rights to appropriate water. This procedure, then, is by virtue of Section 1225, the only means for acquiring rights to the use of unappropriated water under California law.

A possible clue to the true intent and meaning of the Court's declaration concerning the condemnation of water rights is disclosed by its citation in connection with said declaration of the Gerlach case (U. S. v. Gerlach Livestock Co., 339 U. S. 725), which case held that Congress by

authorizing the Central Valley Project as a reclamation project did not intend to take privately vested water rights needed for the Project, without payment of compensation to the owners thereof, citing Section 8 of the 1902 Act. Apparently, the Court in the Ivanhoe case had such rights in mind.

The demand of the Bureau for unconditional permits is irreconcilable with the provisions of Section 8 of the Reclamation Act of 1902 that federal reclamation law is not intended to interfere with state laws "relating to the control, appropriation, use, or distribution of water used in irrigation...and the Secretary of the Interior, in carrying out the provisions of this act shall proceed in conformity with such laws... ." There is no such thing as an unconditional water right under the law of California, or of any other western state for that matter. For example, Sections 1253, 1257, 1381, 1382, 1390 and 1391 of the Water Code provide:

> "1253. The board shall allow the appropriation for beneficial purposes of unappropriated water under such terms and conditions as in its judgment will best develop, conserve, and utilize in the public interest the water sought to be appropriated."
>
> "1257. In acting upon applications to appropriate water, the State Water Rights Board shall consider the relative benefit to be derived from all beneficial uses of the water concerned including, but not limited to, use for domestic, irrigation, municipal, industrial, preservation of fish and wildlife, recreational, mining and power purposes, and may subject such appropriations to such terms and conditions as in its judgment will best develop, conserve, and utilize in the public interest, the water sought to be appropriated."
>
> "1381. The issuance of a permit gives the right to take and use water only to the extent and for the purpose allowed in the permit."
>
> "1382. All permits shall be under the terms and conditions of this division."
>
> "1390. A permit shall be effective for such time as the water actually appropriated under it is used for a useful and beneficial purpose in conformity with this division, but no longer."

"1391. Every permit shall include the enumeration of conditions therein which in substance shall include all of the provisions of this article and the statement that any appropriator of water to whom a permit is issued takes it subject to the conditions therein expressed."

Sections 1395 through 1397 of the Water Code require permits to specify the time within which actual construction work upon any project shall begin, the time for completion of such construction work, and the time within which water shall be completely applied to beneficial use.

Other sections could be cited, but these are sufficient to demonstrate that all permits and all rights acquired thereunder are subject to conditions. In addition, permits issued pursuant to applications filed by the State, such as these, are required by state law to contain terms conditioning them upon compliance with Water Code Section 10504.5(a) which requires the assignee of a state-filed application to secure the approval of the California Water Commission before making any substantial change in the project in furtherance of which the assignment was made.

The decision of the California Supreme Court in the Ivanhoe case on remand from the United States Supreme Court (Ivanhoe Irrigation District v. All Parties and Persons, 53 Cal. 2d 692) declared the higher court's decision to mean that the title of the United States to project water was or could be made "unlimited". However, there is no judicial fiat that the United States is entitled to unlimited permits from the State. The resulting enigma is one which can only be explained by further court decision. In the meantime, this Board will endeavor to discharge those duties and responsibilities which have been delegated to it by the Legislature. To that end, it will carefully consider all applications for permits to appropriate the State's fast dwindling unused water resources, whether by individuals, corporate entities or by federal or local agencies, and will

issue permits only under such terms and conditions as in its judgment will best develop, conserve, and utilize in the public interest the water sought to be appropriated.

In view of the foregoing, the demand by the Bureau that unconditional permits be issued is contrary to law and must be rejected. Permits upon the conditions which are either required or authorized by state law are the most that the United States is entitled to receive in these proceedings. For additional water rights, if more are needed, it must look to other means, such as condemnation of privately vested rights. The evidence before the Board, however, indicates there is no need for additional water rights and that the Project can be operated as authorized by Congress and as presently planned by the Bureau within the framework of the permits to be issued and subject to the conditions therein imposed.

SEASONS OF DIVERSION AND WATER TO BE ALLOWED

Water Supply

It is accepted engineering practice when forecasting the availability of water to base the forecast on historic stream flows on the assumption that past conditions will be repeated in the future. Water supply records are available for this purpose at various points in the Sacramento River stream system. Table 2 (page 29) showing the flow of the Sacramento River at Shasta Dam and Table 3 (page 30) showing the inflow from the Sacramento River to the Delta have been prepared from these water supply records. The latter table does not reflect the total flow into the Delta since many streams, sloughs and drains contribute water to the area, but it does afford information of the magnitude of the available supply particularly during the summer months when it is the major source of inflow. The values in both tables have been adjusted to eliminate the effect of Shasta Reservoir operation which commenced in December 1943.

All of the studies considering water rights presented at the hearing assume a repetition of the hydrologic conditions experienced in the 31-year period, 1924 through 1954. The driest period of record, April 1928 through March 1935, occurred during the 31-year period (RT Vol. 18, p. 2374). The evidence from which Tables 2 and 3 were prepared indicates that hydrologic conditions vary considerably from year to year.

Seasons of Diversion to be allowed

In an effort to reach an agreement on existing water rights along the Sacramento River and in the Delta, the Bureau, the Department and the Sacramento River and Delta Water Association (hereinafter referred to as the Association) entered into a cooperative study program. For the purposes of

TABLE 2

FLOWS OF SACRAMENTO RIVER
AT SHASTA DAM FOR PERIOD
OCTOBER 1921 THROUGH SEPTEMBER 1954
In thousands

Month	Maximum		Minimum		Average	
	ac-ft	cfs	ac-ft	cfs	ac-ft	cfs
January	1677	27.27	179	2.91	565	9.19
February	1675	29.12	220	3.96	715	12.76
March	1886	30.67	228	3.71	720	11.71
April	1301	21.86	208	3.50	691	11.61
May	984	16.00	182	2.96	473	7.69
June	538	9.04	167	2.81	307	5.16
July	319	5.19	161	2.62	224	3.64
August	264	4.29	153	2.49	199	3.24
September	241	4.05	149	2.50	190	3.19
October	529	8.60	161	2.62	222	3.61
November	720	12.10	165	2.77	297	4.99
December	1323	21.52	177	2.88	472	7.68

NOTE: All quantities in acre-feet were taken from Table 3, USBR 100.

The maximum and minimum water-year (October 1 - September 30) runoffs were 9,548,000 and 2,479,000 acre-feet which occurred in 1937-38 and 1923-24, respectively. On a continuous flow basis these quantities equal 13,190 and 3,410 cubic feet per second.

The average water year runoff was 5,075,000 acre-feet which is equal to a continuous flow of 7,000 cubic feet per second.

TABLE 3

FLOWS OF SACRAMENTO RIVER
BELOW MOUTH OF AMERICAN RIVER
INTO SACRAMENTO-SAN JOAQUIN DELTA FOR PERIOD
OCTOBER 1921 THROUGH SEPTEMBER 1954
In thousands

Month	Maximum		Minimum		Average	
	ac-ft	cfs	ac-ft	cfs	ac-ft	cfs
January	6612	107.53	547	8.90	2252	36.62
February	7724	139.08	724	13.04	3049	54.43
March	8864	144.16	509	8.28	2948	47.94
April	6042	101.54	490	8.23	2832	47.59
May	4936	80.28	224	3.64	1955	31.79
June	2613	43.91	79	1.33	940	15.80
July	840	13.66	10	0.16	251	4.08
August	330	5.37	30	0.49	152	2.47
September	467	7.85	161	2.71	299	5.02
October	824	13.40	234	3.81	423	6.88
November	3560	59.83	264	4.44	780	13.11
December	5799	94.31	413	6.72	1619	26.33

NOTE: All quantities in acre-feet were taken from Table 12, USBR 100.

The maximum and minimum water-year (October 1 - September 30) runoffs were 39,796,000 and 4,909,000 acre-feet which occured in 1937-38 and 1923-24, respectively. On a continuous flow basis these quantities equal 54,970 and 6,760 cubic feet per second.

The average water-year runoff was 17,500,000 acre-feet which is equal to a continuous flow of 24,160 cubic feet per second.

these studies the engineers for each agency agreed upon certain assumptions with respect to hydrologic conditions and water rights. The final report acknowledged these assumptions, particularly with respect to water rights, may differ considerably from the rights as may be determined by a court of law. The results of these studies are presented in "Report on 1956 Cooperative Study Program" (USBR 107).

Using the results of these cooperative studies as a basis, the Bureau and the Association presented separate studies as an equitable basis for determining the yields of existing rights along the Sacramento River and in the Delta. Study C-2BR was presented by the Bureau and Study C-650D was submitted by the Association (USBR 110 through 144 ; SRDWA 22* through 57). Both studies indicate that there is no water available at Shasta Dam for direct diversion for consumptive uses under the subject applications in August and only small amounts available for less than a quarter of the period of the study for July (USBR 130 and SRDWA 32). Therefore, the months of July and August should not be included within the direct diversion season at Shasta Dam. Likewise, both studies indicate that water is available for diversion into storage at Shasta Dam from November through May and small amounts of water are available in some years during the months of June and October. Water is not available for diversion into storage during the month of September if direct diversion requirements are to be satisfied first. The studies were made upon that assumption (USBR 131 and SRDWA 33).

With respect to the availability of water along the Sacramento River from Shasta Dam to the Delta and in the channels of the Delta,

*Sacramento River and Delta Water Association Exhibit 22

Study C-2BR indicates that no water is available during August and only infrequently available during July. Study C-650D indicates that September is also a month of questionable supply (USBR 139 and SRDWA 39). However, the Bureau presented evidence that because of return flows from applied Project water, there will be unappropriated water available in various reaches of the River below Keswick Dam and in the Delta year-round (USBR 164 and 164A and RT 11388). This evidence is corroborated by testimony submitted by the Department (RT 10928-30). There is no doubt that Project water applied to lands which drain into channels tributary to the Delta will provide additional return flows, but the quantities cannot be predicted with any degree of accuracy (RT 10972-75). Return flows from applied Project water will enter the Sacramento River at various points below Keswick Dam (USBR 164A). It appears proper, therefore, to allow a year-round direct diversion season at points below Shasta Dam as requested by the Bureau. Any necessary reduction in the season can be made at the time of licensing when the project is fully developed and the extent of return flow can be more accurately determined.

Project Requirements

The Bureau has requested that permits be granted for the full amounts of the applications. These amounts as previously stated are set forth in tabular form together with other pertinent data in Table 1 (page 11).

The power requirements are described in Applications 5625, 9365 and 10588. These applications request a total of 18,000 cfs to be appropriated by direct diversion at Shasta Dam and 13,800 cfs to be appropriated by direct diversion at Keswick Dam. The Board finds that the maximum amount to be granted for direct diversion at Shasta Dam for use in

generation of power should be 13,275 cfs, the greatest discharge obtainable through the Shasta Power Plant at maximum reservoir elevation. Although the greatest discharge obtainable through the Keswick Power Plant is 15,500 cfs, the maximum rate which may be granted in the permit must be limited to 13,800 cfs, the amount requested in Application 10588 which is the only application for power at Keswick (USBR 45 and Staff 2).

For beneficial uses other than power development the Bureau seeks to appropriate water by direct diversion at the maximum total rate of 22,350 cfs and a total quantity of 6,500,000 acre-feet per annum by storage.

Water requirements of the Project and availability of water covering a hydrologic study period extending from October 1921 through September 1954 are included in USBR Exhibit 164 entitled, "Central Valley Project Study - Shasta Reservoir Operation", dated August 3, 1959. This study also summarizes the same information for the 7-year critical dry period from April 1928 through March 1935 (RT Vol. 18, p. 2374).

USBR 164 is based upon the Project meeting seven principal requirements as summarized in Table 4 (page 34). These include (1) providing a supplemental supply to meet the requirements of areas diverting directly from the Sacramento River, and from the bypasses and drainage channels paralleling the River (Colusa Trough, Back Borrow Pit, Knights Landing Ridge Cut, Yolo By-pass, Lower Butte Creek and Butte Slough, Sutter By-pass and Sacramento Slough) under local rights; (2) requirements for Sacramento Canals Unit (Corning, Tehama-Colusa and Chico Canals), Cow Creek Unit and Yolo-Zamora Unit; (3) providing a supplemental supply to meet the requirements of the Delta lowlands and Delta uplands; (4) "carriage water", estimated at 1500 cfs for the purpose of the study, to repel salinity incursion in channels of the Delta in order to provide water of the quality

TABLE 4

ULTIMATE ANNUAL PROJECT REQUIREMENTS

Requirement (1)	Quantity	Maximum Diversion Rate
	ac-ft	cfs
Irrigation		
Sacramento River, Delta and Bypasses (Firming local rights)	2,500,000 (2)	11,200 (3)
Sacramento Valley Canals	665,000	2,370
Cow Creek Unit	35,000	118
Yolo-Zamora Unit	40,000	146
Contra Costa Canal		(4)
Delta-Mendota Canal		4,600
Exchange Contract	1,070,000	
Other Contracts	647,000	
Portion of San Luis Service Area (Westlands)	512,000 (5)	
Additional Irrigation	735,000	2,390
Sub-total	6,204,000	20,824
Carriage Water	1,083,000	1,500
Municipal and Industrial		
Contra Costa Canal	195,000 (4)	350 (4)
Additional M & I	540,000	1,000
Sub-total	735,000	1,350
GRAND TOTAL	8,022,000	23,674

(1) Data from USBR 164B unless otherwise specified.
(2) RT 3371.
(3) Calculated by Board from USBR 122A, 123 and 124.
(4) Pending ultimate development of 195,000 acre-feet for municipal and industrial purposes through the Contra Costa Canal, water will be delivered through this Canal at a maximum rate of 200 cfs for irrigation purposes. However, at no time will the use of water for irrigation, municipal and industrial demands exceed 195,000 acre-feet diverted at the maximum rate of 350 cfs.
(5) RT 11241.

specified in the contracts for water deliveries to the Delta-Mendota and Contra Costa Canals; (5) requirements to be served through the Delta-Mendota Canal including the Amended Exchange Contract, estimate of requirements for rights described in Schedule 2 of the Purchase Contract, canal and operating losses, present contractual obligations and contemplated future deliveries limited to 4600 cfs, the capacity of the canal; (6) Contra Costa Canal diversion requirements limited by its capacity of 350 cfs; and (7) additional irrigation, municipal and industrial requirements from the Delta to be served through facilities not yet authorized or through non-project facilities. To these requirements may be added the potential direct diversion requirements of that portion of the San Luis Service Area (Westlands) which lies within the service area of these applications, limited to the presently unused capacity of the Delta-Mendota Canal. The maximum quantity which could thus be diverted to the Westlands area in any one year is 512,000 acre-feet (RT 11241).

In critical dry years a deficiency of 50 per cent was assumed on the irrigation requirements during the period April through October, except for the Delta lowlands and the requirements for the Amended Exchange Contract under the Delta-Mendota Canal. Deficiencies for this latter use were taken in accordance with the criteria contained in the Contract.

Water Required to Supplement Existing Rights

Regarding requirements (1) and (3) above, the Bureau proposed that Project water will be made available for diversion by and through the private facilities of water users to the extent necessary to assure the users a dependable supply over and above that which would have been available under local rights in dry years in the absence of the Project. These local

rights include riparian, appropriative and other rights to use water in the Sacramento Valley and Delta. The quantity of water required for this purpose is generally referred to as that quantity required to supplement local rights along the Sacramento River and in the Delta and may be determined from USBR Exhibits 122A, 123 and 124.

According to these exhibits, a maximum yield of water to local rights in a year of hydrologic conditions similar to 1924 would be 1,962,000 acre-feet. The assumed local rights along the Sacramento River between Shasta Dam and the Delta would have been, according to those exhibits, 4,325,000 acre-feet. This indicates a deficiency of 2,363,000 acre-feet which might be provided from the Project to supplement local rights. To this may be added the water required to supplement local rights along the bypass and drainage channels which were not included in the study summarized by USBR Exhibits 122A, 123 and 124. Study C-650D also considers yields to assumed local rights along the Sacramento River and in the Delta. However, the demand pattern utilized in Study C-650D does not allow its use in considering the maximum annual quantity required to supplement local rights. The quantity required to supplement local rights may also be derived from DWR 80 which analyzes USBR 164. According to DWR 80 the yield of local rights along the Sacramento River and bypasses and in the Delta for a hydrologic year similar to 1923-1924 is 2,159,000 acre-feet. USBR 164 indicates that the total requirement for these rights is 4,508,000 acre-feet or a deficiency of 2,349,000 acre-feet during a similar year. This approximates the 2,500,000 acre-feet testified to by the Bureau as necessary to supplement these rights (RT 3355).

Direct Diversion and/or
Rediversion Requirements

Ultimate annual irrigation requirements for lands to be served from the Project are: (1) 2,969,000 afa to be diverted at the maximum rate of 7,234 cfs for Project canals; (2) 2,500,000 afa to be diverted at the maximum rate of about 11,200 cfs for supplementing local rights; and (3) 735,000 afa to be diverted at the maximum rate of 2,390 cfs for additional irrigation requirements within the proposed service area, to be diverted either through additional Project facilities or privately-owned facilities for new developments. These requirements total 6,204,000 afa to be diverted at the maximum rate of 20,824 cfs. This rate includes not only direct diversion but also rediversion of stored water. The relative portion of each cannot be determined from the record. In July, when the maximum rate of diversion would occur, the greatest portion would be the rediversion of stored water.

The ultimate municipal and industrial requirements for the Project include 195,000 afa for the Contra Costa Canal to be diverted at a rate not to exceed a maximum of 350 cfs under ultimate conditions. Other municipal and industrial uses within the Project service area will require 540,000 afa to be diverted at rates not to exceed a maximum of 1000 cfs. This quantity of water will be used to meet the expanding municipal and industrial requirements such as those within Contra Costa County, as indicated by Exhibits 59 and 63 of the Contra Costa County Water Agency. Like irrigation requirements, the municipal and industrial requirements will be met by direct diversions and rediversions of stored water, but the exact amount of each cannot be determined at this time. The record indicates that the total quantity required for consumptive uses is 6,939,000 afa at a maximum diversion rate of 22,174 cfs.

The Contra Costa Canal requires special consideration due to the probable change in the character of use of water delivered by this canal. Applications 9366 and 9367, respectively, propose the appropriation of 200 cfs for irrigation purposes and 250 cfs for municipal and industrial purposes. However, the maximum rate at which water can be diverted under both applications is 350 cfs, the capacity of the canal. The evidence indicates that with the future expansion of municipal and industrial development in this service area the canal will deliver more water to these needs. This will be met by a reduction in agricultural use. However, the Board may not permit diversion rates greater than those named in the applications. When it becomes necessary to divert water for municipal and industrial purposes at a rate in excess of 250 cfs the United States may petition the Board to effect a change in character of use under Application 9366.

Storage Requirements

The maximum annual quantity of water which could be placed in storage in any one season would occur with a repetition of the hydrologic conditions similar to the years of 1923-1924 and 1924-1925. USBR 164 indicates that at the end of September for a year similar to 1923-1924 the reservoir would have contained only 500,000 acre-feet which is about the minimum power pool. Although the reservoir would have 3,993,000 acre-feet of storage space available, runoff which would occur during a year similar to 1924-1925 would have been sufficient to collect only 3,066,000 acre-feet of water into storage. This latter figure is confirmed by DWR Exhibit 76 and USBR Exhibit 130F.

A hydrologic year similar to 1924-1925 would produce the greatest combined appropriation of water by direct diversion and storage of 6,155,000

acre-feet although it does not include the greatest quantity which could be diverted without storage (USBR 164 and DWR 80). However, because of a possible change in hydrologic conditions in the future, it is not impossible for the greatest quantity appropriated by direct diversion (3,451,000 acre-feet - DWR 80) and the greatest quantity appropriated by storage (3,066,000 acre-feet - USBR 164), which would total 6,517,000 acre-feet, to occur during the same year.

Amounts to be Granted

The maximum quantity which could be diverted to storage during any one year, as previously stated, is 3,066,000 acre-feet. However, it is proper to grant a quantity equal to the gross capacity of the reservoir (4,493,000 acre-feet) to provide for the possibility that at some future time it may be necessary to completely drain the reservoir and refill it. This storage quantity together with water to be appropriated by direct diversion from the Sacramento River and Delta under permits issued pursuant to these applications and water from the Trinity River and the American River divisions will be adequate to meet all the Project requirements described in Table 4, including a maximum of 546,000 acre-feet of water to be released during periods of low stream flow to maintain water quality required by the contracts for water deliveries to the Delta-Mendota and Contra Costa Canals (based on a 1500 cfs outflow, USBR 253A). Based upon USBR 164 the Board finds that each application should be approved for the quantities requested with the total quantity to be used in any one year limited to 6,500,000 acre-feet of which not more than 3,450,000 acre-feet shall be by direct diversion and further limited to the extent that the combined rate of direct diversion and rediversion of stored water shall not exceed 22,200 cubic feet per

second. The quantity of water which may be diverted to storage shall not exceed 4,493,000 acre-feet per annum.

In fixing the rates of direct diversion to be allowed, the Board is inclined to greater liberality than usual because of the magnitude of the Project and the complexities involved in determining at this time the direct diversion as distinguished from rediversions of stored water. However, notwithstanding these considerations, we would require greater particularity in proof of direct diversion requirements were we not assured that no prejudice to others will result from failure of applicant to produce such proof. This assurance is provided by conditions which will be imposed in the permits subjecting exports of water from the Delta to use within the Sacramento River Basin and Delta so that there can be no interference with future development of these areas. Furthermore, the agreement of May 16, 1960 (DWR 77) between the United States and the California Department of Water Resources apportioning to each a share of the water in the Delta in the event the total available supply is not sufficient to satisfy the annual diversion requirements of both agencies, removes any possibility that appropriations by the United States would deprive the State of an equitable share in times of shortage.

However, in view of the Bureau's challenge of the Board's authority to impose conditions in the permits, the Board will reserve the right to re-examine and reduce the quantities which it authorizes the United States to appropriate by these permits in the event conditions protecting future uses in the Sacramento River Basin and Delta should be modified or set aside upon judicial review.

NAVIGATION AND FLOOD CONTROL

Included among the purposes for which water is sought to be appropriated pursuant to Application 9364 are navigation and flood control. With respect to Application 5626, navigation is included as a purpose of use. In this decision it is important, therefore, to distinguish on the one hand between the power of the United States pursuant to the commerce clause of the Federal Constitution to protect the navigability of the Sacramento River and to provide flood control and, on the other hand, acquisition by the United States of water rights in the stream flow pursuant to State procedures as required by the Reclamation Act of 1902.

Storage of water or regulation of flow for navigation and flood control purposes is a continuing paramount power of the United States conferred on it by the commerce clause of the United States Constitution. For this Board to grant a permit to use water for such purposes pursuant to these applications would be improper. Under applicable case law such a permit term would add nothing to the constitutional power of Federal authority and, to the extent such permit term were to purport to limit such power, it would be clearly invalid as an invasion of Federal power. We have previously so held in Decision D 935 (San Joaquin River applications of the United States and others) with respect to flood control and the same is now held with respect to navigation. Accordingly, Applications 5626 and 9364, insofar as they relate to the appropriation of water for navigation and flood control purposes, will be denied for lack of jurisdiction.

FLOW REQUIREMENTS FOR FISH CONSERVATION

The California Department of Fish and Game has presented evidence that certain minimum flows are required below Keswick Reservoir in order to maintain the fisheries which exist in the Sacramento River (F&G 2*). These minimum requirements have been adopted and formalized in a "Memorandum of Agreement for the Protection and Preservation of Fish and Wildlife Resources of the Sacramento River as Affected by the Operation of Shasta and Keswick Dams and Their Related Works and Various Diversions Proposed Under Applications 5625, 5626, 9363, 9364, 9365, 9366, 9367, 9368 and 10588 of the United States" executed on April 5, 1960, by both the United States and the California Department of Fish and Game (F&G 7). The minimum flows set forth in the agreement to be bypassed or released into the natural channel of the Sacramento River at Keswick Dam are as follows:

January 1 through February 28	-	2600 cfs
March 1 through August 31	-	2300 cfs
September 1 through November 30	-	3900 cfs
December 1 through December 31	-	2600 cfs

The agreement provides that these flows may be reduced in critical dry years in accordance with the schedule set forth in the agreement. The use of water for the preservation and enhancement of fish and wilflife resources is a beneficial use of water (Water Code Section 1243). The Board finds that the use of water as provided by the terms of the agreement is beneficial and in the public interest. Therefore, permits issued pursuant to these applications will be subject to said agreement.

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*Department of Fish and Game Exhibit 2

SALINITY INCURSION INTO THE DELTA

The Nature of the Problem

The Delta covers about 700 square miles of rich fertile lands between the City of Sacramento on the north, the City of Tracy on the south, the City of Stockton on the east and the City of Pittsburg on the west. It contains over 50 reclaimed islands (DWR 70A) interlaced by about 550 miles of open channels (DWR 5, p. 18). Water levels in these channels, all at or near sea level, are hydraulically connected and aggregate an open water area of about 38,000 acres (60 square miles). Moving from east to west, Suisun Bay, Carquinez Straits, San Pablo Bay and San Francisco Bay form connecting links between the Delta channels and the Pacific Ocean. Most of the Delta islands are below sea level and individual levee systems prevent their inundation.

Early settlers and residents in the area were familiar with the natural phenomenon of saline water invading the upper bay and the channels of the lower Delta during most years (DWR 5, p. 15). Because these channels furnished the only readily accessible water supply, salinity incursion was then a vexing problem and is now one of the most important issues before the Board.

The waters of the lower portion of the Delta are a combination of salt water from the ocean which enters through the Golden Gate and fresh water from the Central Valley and local runoff. The salinity of the water resulting from this combination is extremely variable, both geographically and during different periods of the year, as well as from year to year.

The variation in salinity is the result of the relative magnitude of the opposing forces of tidal action and stream flow. Seasonal

variations of salinity are characterized by the advance of saline water in the Delta channels starting in the late spring and continuing through the summer and fall months, which are the periods of low stream flow, and the retreat of saline water as it is replaced by fresh water from flood flows during the winter and spring months.

For the purposes of this discussion salinity is measured by the chloride ion concentration which is expressed as parts of chloride ions per million parts of water (hereinafter referred to as ppm). The exact limit of chloride ion concentration that may be allowed in irrigation water varies with crop, soil and drainage conditions and the frequency of use. In the Delta, water containing less than 1000 ppm is safe for irrigation use under average conditions. Water containing between 1000 and 2000 ppm may be used with caution, while that containing in excess of 2000 ppm is considered unsafe (RT Vol. 18, p. 2340).

The maximum chloride ion concentration acceptable for domestic use by the California Water Service Company is 100 ppm (RT 9649). The allowable limits of chloride ion concentration for industrial purposes vary in relation to the particular use of the water. For surface condensers in a steam power plant ocean water (about 18,500 ppm) may be acceptable (RT 9472), while water used for cooling canned food products must not have a concentration exceeding 200 ppm and preferably not more than 150 ppm (RT 9995).

The extent of salinity incursion into the Delta before and after the operation of Shasta Reservoir is shown on plates contained in reports of Sacramento-San Joaquin Water Supervision for the years 1924 through 1957 (Staff 6 and 6A). These plates show the limit of maximum seasonal encroachment of water containing 1000 ppm for the years 1920 through 1957.

Prior to the commencement of operation of Shasta Reservoir, salinity conditions in the Delta varied greatly from year to year. In dry years such as 1924, 1931 and 1934, water containing in excess of 1000 ppm intruded into practically all channels of the Delta. Only in 1938, the year of the largest runoff, did water in excess of 1000 ppm remain below Antioch for the entire year. For the period 1920 through 1943 the median of maximum incursion of water of this quality approximated a line through the northern part of Decker Island, the mouth of False River and a point on Dutch Slough about two miles west of the community of Bethel Island.

As previously stated, incursion of saline water into the upper part of Suisun Bay and the lower Delta has occurred during all known history of the area. A contributing cause for the deterioration of water quality around Sherman, Twitchell and Brannan Islands was the enlargement and straightening of the Sacramento River channel from Collinsville to above Rio Vista by the Army Corps of Engineers during the years 1917 to 1920 (SRDWA 65, p. 11).

Efforts and Planning to Solve the Salinity Problem

Efforts to meet the problems occasioned by the intrusion of saline water into the Delta varied greatly. California and Hawaiian Sugar Refining Corporation from 1908 to 1929 sent water barges upstream from Crockett in search of usable quality water (DWR 5, p. 48), while the City of Antioch brought an unsuccessful suit in 1920 to enjoin upstream diversions which contributed to lessening of the hydraulic barrier. Similarly, in 1923, the Holland Land Company and other landowners, who claimed riparian rights, sought injunctive court action (SRDWA 77B). However, the latter suit was not brought to trial and was voluntarily dismissed in 1944

after Shasta Reservoir went into operation (SRDWA 77D).

In a report published in 1920 the former State Water Commission favored the development of storage on the main streams and their tributaries above the Delta and the releases of this stored water at the proper time as a suitable method of controlling salinity incursion (CCCWA 2A*).

In response to a request by the 1925 State Legislature for a comprehensive plan for development of water resources, the State Engineer prepared a "Summary Report on the Water Resources of California and A Coordinated Plan for Their Development" 1927 (Bulletin No. 12, Department of Public Works, USBR 12). This report recommended construction of flood storage dams operated for power generation in order to provide revenue. Although observing that the water from the tailraces of power plants would be ample for navigation, irrigation and salt water control for a long time, the State Engineer concluded that a salt water barrier undoubtedly would ultimately be required. The recommended site for a large dam on the Sacramento River was at Kennett (USBR 12, p. 30, and Staff 9, p. 175).

Further studies of the plan were undertaken by a Joint Legislative Committee on Water Problems resulting in a report submitted on January 18, 1929, to the Legislature. The final conclusions reached in that report were that Shasta (then called Kennett) Dam be constructed with a view to conservation and most beneficial use of the surplus water of the Sacramento River along lines favorably affecting flood control, salinity control, navigation and irrigation. At the same time, construction of a salt water barrier at or near Army Point near the City of Benicia was described as necessary to completely carry out the coordinated plan for the development of the water resources of California (CCCWA 9). A supplemental

*Contra Costa County Water Agency Exhibit 2A.

report on April 9, 1929, by the same Joint Legislative Committee on Water Problems reaffirmed the conclusions that Shasta Dam be constructed for the principal purposes of relieving the salinity problem in the Delta and the furnishing of water to the San Joaquin Valley by means of dams, pumping plants, aqueducts and levees. The report said that Shasta Dam should be operated in the interest of navigation, flood control, furnishing water to the San Joaquin Valley, fresh water to the Delta and "as near as possible to industrial plants located along Carquinez Strait." It was said that such construction and operation of the dam would tend to solve the critical water problems in the big basin of northern California and the bay section as far as Antioch. Export to the San Joaquin Valley was considered after providing and guaranteeing an outflow at Antioch of not less than 5000 cfs (Staff 9, p. 233 and CCCWA 10).

In 1931, Bulletin No. 25 of the Department of Public Works was published as an operating study of the State Water Plan under assumed water conditions in the period 1918 to 1929. Prepared by the State Engineer, it included a summary of major features of the Central Valley Project and recommended an outflow from the Delta into Suisun Bay of not less than 3300 cfs at Antioch (DWR 3). This coordinated plan was later approved and adopted by the Legislature in 1941 (Stats. 1941, p. 2943; Water Code Section 10000).

The Army Corps of Engineers in 1931 reported to the 71st Congress concerning its studies of the Sacramento River recommending construction of Shasta Reservoir for the combined purposes of navigation, flood control, power development, irrigation and salinity control. A final report of the Corps of Engineers to Congress in 1933 affirmed salinity control as one of

the benefits to be derived from increased flows from Shasta Reservoir by providing a minimum discharge of 3300 cfs at Antioch (Staff 9, p. 514).

Salinity Control a Purpose of the Central Valley Project

The 1933 State Legislature authorized the Central Valley Project, making salinity control in the Sacramento-San Joaquin Delta one of the primary purposes of Shasta Dam (Stats. 1933, Ch. 1042). This provision is now found in Water Code Section 11207(c).

At the request of the House Committee on Rivers and Harbors of the 73rd Congress, the Chief of Army Engineers prepared a review report in which he approved the plan previously outlined in the report of the Corps of Army Engineers and concluded that providing for a minimum discharge of 3300 cfs at Antioch for salinity control in the Delta would eliminate the necessity of constructing locks in a physical barrier at the mouth of the river. This plan was accepted as the Rivers and Harbors Committee House Document No. 35, 73rd Congress (Staff 9, p. 544), and was later adopted and authorized by Congress in Section 1 of the River and Harbor Act of August 30, 1935 (49 Stats. 1028, 1038). This same plan was later incorporated in the River and Harbor Act of August 26, 1937 (50 Stats. 844, 850) when Congress adopted and reauthorized the Central Valley Project for construction by the Secretary of the Interior.

It follows from the foregoing that salinity control in the Delta is one of the purposes of the federally authorized Central Valley Project. This has been recognized by the United States Supreme Court in both U. S. v. Gerlach Livestock Co., 339 U. S. 725, and Ivanhoe Irrigation District v. McCracken, 357 U. S. 275.

Salinity Control a Purpose of the State Applications and of Their Assignment

As a step in obtaining the necessary water rights for the Project, the Secretary of the Interior on behalf of the United States requested the State of California to assign to it the applications to appropriate water of the Sacramento River and the Delta which had been filed by the State in 1927 and 1938. The assignment of Applications 5625, 5626, 9364 and 9365 followed on September 3, 1938. Of these, 5626 and 9364 covered diversion and storage at Shasta Reservoir and included "saline control" as one of the purposes for which the water was to be used. Under its terms, the assignment was made in consideration of the general benefits to accrue to the State of California from construction of the Project by the United States pursuant to Congressional authorization of August 26, 1937. On March 26, 1952, the State of California assigned to the United States Applications 9363, 9366, 9367 and 9368 "for the purposes of Central Valley Project as contemplated and provided by the State of California" (DWR 56). The State plan specifies salinity control as one of the purposes of Shasta Dam (Water Code Section 11207).

Thus it is clear that protection of the Delta from salinity incursion constituted a material part of the consideration for which the State of California assigned to the United States the applications which it had filed to provide adequate water for the Project. This protection was intended to accomplish two purposes: first, to provide the agricultural lands in the Delta with water of a quality suitable for irrigation; and second, to provide a reasonably accessible source of supply to meet the industrial and agricultural requirements along the south shore of Suisun Bay in Contra Costa County (DWR 3, p. 117, and 5, p. 221).

Present Plan of the Bureau to Control Salinity

In contrast to the federal plan contained in Document No. 35 as well as to the State plans dating from the early 1930's, the Bureau, as operator of the Project, now contends that its only obligation is to provide to its contract customers water of suitable quality at the intakes of the Delta-Mendota and Contra Costa Canals (RT 843). To accomplish this, the Bureau must prevent water containing in excess of 1000 ppm from encroaching beyond the limits of maximum incursion experienced in 1954 which approximated a line extending through the northern part of Decker Island, the mouth of False River and a point on Dutch Slough approximately two miles west of the community of Bethel Island (RT 1885). By coincidence, this approximates the pre-Shasta median of salinity incursion for the period 1920-1943, previously described.

Since the beginning of operation of Shasta Reservoir, water in excess of 1000 ppm has encroached beyond the pre-Shasta median line in only 1944, 1947 and 1959. Because 1944 was the first year of reservoir operations, it probably was not representative of actual operating conditions. The incursion in 1947 was described by a Bureau engineer as unintentional (CCCWA 37A) and the incursion in 1959 was caused by the adverse effect of an operational experiment (RT 2354).

Prevention of such encroachment requires a minimum inflow of fresh water to the Delta of approximately 1500 cfs in addition to the inflow required to meet consumptive uses in the Delta and that quantity required for export from the Delta (RT 2047). When the natural stream flow is insufficient to provide this minimum inflow, releases of Project water from storage are needed. According to evidence presented by the Bureau this would require on the average of 359,900 acre-feet of stored water

annually, and a maximum of 546,000 acre-feet in a very dry year (USBR 253A). According to evidence presented by Sacramento River and Delta Water Association, these quantities would be 192,260 and 403,430 acre-feet, respectively (SRDWA 45B).

Project operations as proposed by the Bureau would result in approximately 95% of the Delta obtaining water of adequate quality for irrigation (RT 1794) and would provide the Delta with greater protection than it enjoyed in dry years prior to the operation of the Project; but in wet years, salinity conditions in the western portion of the Delta - the remaining 5% below the aforementioned median line - would be inferior. This is because the spring runoff, which, in the absence of the Project, served to repel salinity incursion, would be modified to the extent of storage in Project reservoirs. The result would be that salinity would begin to encroach into the Delta at an earlier date each year than would have occurred in the absence of the Project (CWSC 10* and RT 9714-16). However, this situation generally has not occurred (RT 9822) and an analysis of the evidence indicates it will not occur for several years until use of Project water has been more fully developed. Furthermore, with the completion of the Trinity River Division of the Project, there will be substantial surpluses of water available for several years which could be used for salinity control purposes until additional diversion facilities are built and additional conduits are constructed to convey the water to the San Joaquin Valley (RT 11542). An average of 992,000 acre-feet per annum will be imported into the Sacramento Valley from the Trinity River (USBR 164).

California Water Service Company Exhibit 10

Proposals by Local Interests for Salinity Control

The western portion of the Delta comprises two distinct areas: one, the islands which are agricultural, and the other, those lands along the northern shore of Contra Costa County which support both an agricultural and industrial economy. With respect to the latter area, the Contra Costa County Water Agency in its Exhibit 59 sets forth the present and potential water requirements. The present needs are being met by water supplies delivered through the Contra Costa Canal, by diversions directly from Delta channels, by conservation of local runoff and by pumping from underground sources (CCCWA 58A). In order to meet future requirements, however, the Agency contends that the Project would have to be operated in such a manner as to provide quality standards at the City of Antioch and Mallard Slough intake of the California Water Service Company which the Agency describes as "necessary and practical". The quality standards sought by the Agency would provide that during the 150 consecutive days following the annual winter runoff season, water containing in excess of 250 ppm should not be allowed to advance upstream from the Mallard Slough intake of the California Water Service Company two miles west of the City of Pittsburg and that the average chloride ion concentration above Mallard Slough should not be allowed to exceed 150 ppm during this 150-day period; that water in excess of 350 ppm should never be permitted above Antioch. The Agency further contends that the operating conditions of the Project proposed by it should be maintained until such time as an alternate water supply is provided (CCCWA 85). This degree of water quality would require on the average 1,024,000 more acre-feet of stored water annually than would be required to prevent encroachment of salinity in the upper 95% of the Delta as contemplated by the Bureau (CCCWA 95 and USBR 253A).

The California Water Service Company holds Permit 3167 issued on Application 5941, filed in 1928. This permit authorizes a diversion of 50 cfs at the Mallard Slough intake and diversion to off-channel storage of 22,000 acre-feet per annum at a maximum rate of 120 cfs for domestic and industrial use (CWSC 2A). The Company takes the position that in the operation of the Project as proposed by the Bureau to provide quality water at the intake of the Contra Costa Canal, it must guarantee that the public's requirements for domestic water will be supplied on the basis of present maximum demands and estimated future demands. The Company estimates that Contra Costa Canal will reach its ability to meet maximum peak demands in about 1965, which will then make it necessary to enlarge facilities or supplement those now existing (CWSC 2). The Company would prefer, however, that the Board require the Bureau to maintain a satisfactory quality of water at the Company's intake on Mallard Slough so that the Company could continue to perfect its diversion right under Permit 3167. The Board is also urged to condition the permits of the United States so that the Company's 1928 priority is made superior to those presently under consideration (RT 9649).

The permits herein will be issued subject to vested rights and to that extent the Company's rights will be protected, however, no valid justification exists for upsetting the priority of the applications filed by the State in 1927 and now held by the United States pursuant to assignment. For reasons hereinafter discussed, enlarging the existing Contra Costa Canal or supplementing it with additional facilities may prove to be a more desirable and economical method of meeting future demands for domestic water than that proposed by the California Water Service Company.

The Association, the San Joaquin County Flood Control and Water Conservation District and others urge that the Board impose a condition in any permits granted to the United States to require that adequate outflows from the Delta into Suisun Bay be maintained at all times to prevent water in excess of 1000 ppm from encroaching beyond a point 0.6 mile west of Antioch. According to the Bureau's study, this would require on the average approximately 476,000 more acre-feet of stored water annually than would be required to maintain suitable quality for all but the western 5% of the Delta (USBR 253A and 253C). A comparable average annual figure according to the Association's study is 301,000 acre-feet (SRDWA 45B and 45D). In addition, the Association asks that the United States conduct studies in cooperation with the State of California to determine if it is possible to provide a substitute water supply to water users in and around the Delta in lieu of the water supply which would be available as a result of the above expressed condition.

The evidence shows that to protect the agricultural lands of the western Delta islands, it would be sufficient if water containing in excess of 1000 ppm were prevented from encroaching beyond the western end of Sherman Island. This would require an outflow of about 2650 cfs (RT 6629). Irrigation on Sherman Island could be continued with outflows of either 1800 cfs or 1500 cfs, but if these outflows were to continue for a long period of time it would be necessary to revise the Island's water distribution system. With an outflow of 1800 cfs a capital investment of $150,000 would be required. The capital expenditure with a 1500 cfs outflow would be at least $450,000. In addition to the capital expenditure,

the annual operation and maintenance costs would increase $15,000 and $45,000 respectively (SRDWA 86). No evidence was presented of the cost, if any, to maintain irrigation on Jersey Island with these outflows.

The State's Plan for Solution of the Salinity Problem

The complexity of the water supply problem in the western Delta, together with the need for a supply of adequate quality without the necessity for committing large quantities of water to flow into Suisun Bay to serve as a hydraulic barrier, has been the subject of study by the State of California (DWR 10). The salinity control barrier investigations conducted by the Department and its predecessors have resulted in plans for the Delta Water Project (DWR 70 and 70-1).

The purposes of this State plan are to conserve water by reducing the quantity required for salinity control; to distribute quality water throughout the Delta and to diverters adjacent thereto; and to provide a higher degree of flood protection to the Delta (RT 5141). Wayne MacRostie, a witness for the Department, estimated that with the physical facilities of the Delta Water Project, it will be necessary to maintain an outflow in the order of only 1,000 cfs to allow quality water to be transported across the Delta (RT 5143-44).

The State plan includes facilities to serve irrigation water to the western islands and to deliver adequate municipal and industrial water to the north shore of Contra Costa County and a portion of Solano County north of the Sacramento River. The physical features of the latter facility are as yet undetermined but are being studied by the Department pursuant to Chapter 1765, Statutes of 1959 (RT 5148). With respect to replacement of irrigation water for the western Delta through facilities

planned by the State, water would be provided to all lands downstream with a maximum intrusion of water containing 500 ppm. The mean concentration of chlorides at such locations would be about 250 ppm (RT 5170).

The costs of the features of the Delta Water Project, including the irrigation water replacement facilities and limited industrial and municipal water replacement facilities, would be about $83 million based on 1958 prices (RT 5177).

Disposition of the Salinity Problem

The evidence has clearly established that salinity incursion is a subject of continuing economic concern to a small but nevetheless important and highly developed area comprising the western portion of the Delta and the northern portion of Contra Costa County. One possible solution to incursion would be to provide a hydraulic barrier of fresh water to be maintained in the vicinity of the City of Antioch. Various parties in this proceeding have proposed conditions which they urge be imposed upon the United States to provide this barrier. However, it has been conclusively determined on the basis of functional and economic feasibility studies by the Department that the best means of conserving water otherwise needed for salinity repulsion is the Delta Water Project (RT 5126). Provided the western portion of the Delta will be supplied by an alternate method and thereby conserve water to be beneficially used in the future through the State water facilities or the Central Valley Project, the Board concludes that it would be unreasonable to dedicate for salinity repulsion purposes the large quantities of water that would be required to flow out to the sea.

The Board is particularly persuaded to this view in the light of Article XIV, Section 3, of the State Constitution:

"It is hereby declared that because of the conditions prevailing in this State the general welfare requires that the water resources of the State be put to beneficial use to the fullest extent of which they are capable, and that the waste or unreasonable use or unreasonable method of use of water be prevented, and that the conservation of such waters is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and for the public welfare ..."

In resolving the issue of salinity repulsion, the Board does not intend that the United States is to be relieved of its share of responsibility in this matter. The obligation of the United States is spelled out by the circumstances under which the Project was authorized and in the terms of the assignments of these applications which were originally filed by the State for this purpose.

Likewise, the Board is mindful of the State's obligation as set forth in Chapter 1 of Part 4.5 of the Water Code, with particular reference to Section 12202 which provides:

"Among the functions to be provided by the State Water Resources Development System, in coordination with the activities of the United States in providing salinity control for the Delta through operation of the Federal Central Valley Project, shall be the provision of salinity control and an adequate water supply for the users of water in the Sacramento-San Joaquin Delta ..."

The Board is also cognizant of the responsibility of the water users, present and future, in the Delta and in the northern portion of Contra Costa County to assume their share of the costs of the Federal and/or State project, commensurate with the benefits received, over and above those they would have enjoyed in the absence of a project.

Until the Delta Water Project as contemplated by the State becomes effective, continued maintenance of a hydraulic barrier is imperative. Until use of water from the Federal project develops more fully, surplus water will be available (particularly with the import of Trinity River

water) for the maintenance of such a barrier. Therefore, there is no impending emergency requiring imposition of specific permit terms relative to salinity control at this time. Rather, the Board will reserve jurisdiction for a reasonable period, not to exceed about three years subject to further extension, for the purpose of allowing the United States, the State of California, and the water users in the Delta, an opportunity to work out their problems by mutual agreement. During this period the Board will require the United States to report semi-annually the status of such negotiations, if any, and will welcome similar reports from any interested agency or individual. The permits can then be conformed to reflect the terms of any such agreement; or, failing to reach agreement, the Board will, after due notice and opportunity for interested parties to be heard, make such further order as may be necessary and proper relating to salinity control in the Delta.

In taking the action outlined in the preceding paragraph the Board recognizes that in this proceeding it has no jurisdiction over the Department or the water users to require their participation in such negotiations. An additional problem exists in the case of the latter group due to a lack of representation of all of the parties now being benefited or to be benefited. The Board also recognizes that reservation of jurisdiction does not solve the problem and without participation in good faith by all parties such action by the Board is of little consequence. The Board does not believe that reservation of jurisdiction and postponement of the day of final decision will cause the problem to disappear or diminish. Neither does it believe that the problem can be legislated out of existence nor solved by the mere weight of further investigations and studies, of which there have been many in the past, some of which have been recited in

this decision. The time has arrived for the parties to meet at the conference table, recognizing that all have a responsibility and an urgent interest in an early solution. As ably expressed by Harvey O. Banks, former Director of the Department of Water Resources and recognized as an eminent authority on the Delta problems: "I believe that the final solution to the allocation of costs and the responsibility for payment should be a three-way responsibility between the local water users there, the United States and the State" (RT 11558). "...it is imperative that these negotiations be started promptly and prosecuted vigorously" (RT 11600). William O'Connell, consulting engineer for Contra Costa County Water Agency stated in response to a question by engineer Kienlen of the Board's staff regarding the willingness of the people, industry and municipalities in Contra Costa County to pay for benefits derived through operation of the project: "I cannot answer in toto for the industry and people in Contra Costa County. The Contra Costa County Water Agency is willing and has made such a recommendation and received acceptance of their recommendation in principle by representative members of the community and the industrial complex" (RT 10282-83).

As stated above, jurisdiction of the Board over some of the parties to this proceeding is limited. Within a short time, however, the Department will be before this Board as an applicant for permits covering its proposed Feather River and Delta Diversion Project. The Department will then be faced with the salinity problem as the United States is at this time. The precedent of the May 16, 1960, agreement between the Department and the United States previously referred to, is believed adequate to warrant the participation of the Department at this time in similar negotiations regarding the extent of the State's responsibility for

releases of water for salinity control purposes, if and when the State is granted permits for its Feather River and Delta Diversion Project. Until this problem is solved a cloud will remain over the State project as to its ability to meet commitments under water service contracts.

We recognize that not all the Delta and the Contra Costa County water users were represented at the hearing and any agreement should properly include all beneficiaries. Although many interested parties in this area were very ably represented at the hearing through the Association, Contra Costa County Water Agency, and others, to effect overall representation, particularly for taxing purposes, some type of comprehensive water district or other legal entity might be required. If so, no impediment to its organization is indicated in the record.

As the Board views the record, the parties concerned apparently believe that no directive has yet been given or real incentive provided for them to aggressively approach the problem. Counsel for Contra Costa County Water Agency stated at the hearing: "...I know of no letter, no telephone call, (or) oral conversation in which any demand whatsoever has been made upon us to pay except at this hearing before this board.... There has been no negotiation or serious discussion ...of this subject with any responsible people" (RT 10286-87). We believe a real incentive for a negotiated settlement already exists. Mr. Banks cited the alternative as "...many years of litigation and many millions of dollars spent to make that determination." Mr. Banks was referring to a court determination of the water rights in the western portion of the Delta which may otherwise be required (RT 11566). Counsel for the Agency stated: "But apart from some massive litigation, we are convinced that the only protection that we can get is from the permit conditions imposed upon permits of the Bureau by

this Board" (RT 10288). Imposition of such permit conditions, however, is no absolute assurance against "massive litigation".

In summary, under Project operation large areas of the San Joaquin Valley are served directly from the Delta through the Delta-Mendota Canal. Absence of a Delta water supply for this Canal would largely preclude the irrigation of lands now being served from the Madera and Friant-Kern Canals. In a very real sense the economy of much of the San Joaquin Valley is contingent upon an adequate water supply in the Delta. Further, large exports from the Delta are to be made under the State Water Resources Development System authorized by the 1959 Legislature and endorsed by the people of the State in the bond election of November 1960. These exports will serve water-deficient areas from the Delta to the Mexican border. The people of the entire State have a transcending interest in the ultimate success of this plan as well as that of the Central Valley Project. The success of both will turn upon the acquisition of clearly defined rights to divert the necessary water from the Delta. Indefinite postponement of the determination of mutual responsibility and the clarification of the relationship between local interests and the two great Federal and State projects which are, or will be, dependent upon a Delta water supply, is adverse to the interests of the entire State.

The Board finds that in view of changing circumstances anticipated for the future, sufficient information is not yet available to determine with finality suitable terms and conditions which will protect the Delta from salinity incursion without unreasonable waste of water and thereby best develop, conserve and utilize in the public interest the water sought to be appropriated. The Board finds that in the absence of an agreement between the United States, the State of California and the Delta water

users a further period of actual operation of the Project will be necessary, coordinated with the State's Delta Water Project when constructed, in order to obtain the required information.

The Board will reserve jurisdiction to conform the permits to such agreement as may be reached, or to further order of the Board. If an agreement is not reached by March 1, 1964, or within such additional time as may be determined appropriate, the Board will, after due notice and opportunity for interested parties to be heard, make such further order as may be necessary and proper. Any final action which the Board may take in the absence of a negotiated settlement of the salinity control problem will be determined upon the premise that responsibility lies not with the United States alone but with the State of California and the Delta users as well.

COORDINATION OF FEDERAL-STATE PROJECTS

As previously pointed out, early studies by the State Engineer established the need for coordinated development of the water resources of the State. One of the devices to assure coordination, as provided by law, was the filing by the State of applications to appropriate water from the Sacramento River and streams tributary thereto as well as from the Delta, some of which are the applications under consideration in this proceeding. Many others are still retained by the State and are awaiting assignment (DWR 56). Still other applications have been filed by the Bureau for other units of the Project and are not yet acted upon.

The State plan for coordinated development includes the control of water in the Delta and its diversion for use to the south through an aqueduct conveyance system. In furtherance of this plan the Department has requested assignment of some applications for use in connection with the Feather River and Delta diversion units of the State Water Resources Development System. This system includes the Central Valley Project, the California Water Plan and the State Water Facilities as defined in Section 12934(d) of the Water Code (Water Code Section 12931). The physical relationship arising by reason of the joint use of the Delta requires coordinated operation of both federal and state projects.

Upon the urging of the Board the United States and the Department entered into an agreement on May 16, 1960, for the coordinated operation of the Central Valley Project and the State Feather River and Delta Diversion Projects (DWR77). This document, a significant milestone in federal-state relations with respect to water in California (RT 11539), provides, in part, for future "exchange of any and all plans, criteria,

and other operational information relative to the operation of their (federal and state) projects". The parties further covenant to "establish by agreement mutually acceptable operational criteria and plans including water service that will produce the maximum accomplishment of the Federal Central Valley and the State Feather River and Delta Diversion Projects" (DWR 77, p. 9).

The Board finds that the several units of the Central Valley Project, as well as other units of the State Water Resources Development System, are a coordinated project which require coordinated terms and conditions in permits for appropriations of project water (DWR 77). The Board further finds that the terms and conditions necessary to effect coordination cannot reasonably be determined until decision is reached on other State and Federal applications yet to be considered for permit. Therefore, reservation of jurisdiction to finally determine such terms and conditions is necessary. The period of time required to obtain the needed information is impossible to ascertain at this time. Jurisdiction will be reserved for the purposes stated for as long as may be necessary but not to exceed time of issuance of licenses.

WATERSHED PROTECTION

One of the principal functions of the Central Valley Project is the exportation of surplus water out of the catchment area of the Sacramento Valley into the San Joaquin Valley. This essential feature of the Project adopted by the early State planners has been followed by Federal project builders. As desirable as exportation may be, lands within the Sacramento Valley should not incur deficiencies in supply while water is transported past them to distant lands. Protection of users within the watershed against the possibility of suffering such deficiencies is a policy expression of law applied to the Central Valley Project in Water Code Sections 11460 through 11463.

It is contended by a number of parties in these proceedings that the provisions of the Watershed Protection Law are vague and uncertain and therefore unenforceable. Furthermore, counsel for the Bureau contends that this law does not apply to the United States. Similar contentions were advanced by the parties in the matter of applications by the United States to appropriate water of the San Joaquin River. In Decision D 935, the Board declared as follows:

> ". . . we are not here compelled to struggle with these problems of constitutional law and statutory construction. Such matters can only be finally determined by a court of competent jurisdiction. The limitations imposed by the watershed protection law are not dependent upon administrative action but exist by force of the statute itself. Action by the Board can have no effect upon them.
>
> "Without regard to the extent the statute may give rise to valid and enforceable obligations on the part of the United States, the Board is bound to look to all relevant legislative expressions of policy and to consider them as guides in exercising its discretion to condition permits in the public interest in the light of all the facts presently before the Board."

The foregoing statement applies equally to the present situation and is adopted as a part of this decision.

A number of parties in these proceedings argue that the Sacramento-San Joaquin Valley is in fact one watershed and that the Watershed Protection Law is, therefore, inapplicable. The evidence does not support such a conclusion. A brief review of the history of the Central Valley Project will serve to resolve any doubt on this issue.

Events Preceding the Adoption of the Watershed Protection Law

The earliest official state recognition of a plan for exportation of water from the Sacramento drainage basin to the San Joaquin Valley appeared in Department of Public Works Bulletin No. 4, "Water Resources of California - A Report to the Legislature of 1923". The report recommended a dam across Carquinez Straits for diversion of "excess waters" to the San Joaquin Valley. The investigation by the State Engineer which resulted in Bulletin No. 4 had been authorized by the 1921 State Legislature which directed formulation of a comprehensive plan for accomplishment of the maximum conservation, control, storage, distribution and application of all waters of the State (Staff 9, p. 150).

In 1925, another report, Department of Public Works Bulletin No. 9, "Supplemental Report on Water Resources of California - A Report to the Legislature of 1925" recommended importation of Sacramento River water to the San Joaquin Valley with an added feature of a major storage reservoir on the Sacramento River. This was followed by a further report on the comprehensive plan published in 1927 as Bulletin No. 12, "Summary Report on the Water Resources of California and a Coordinated Plan for their Development" by the State Engineer (DWR 1). Primary attention was

directed to the needs of the San Joaquin Valley with the Sacramento and upper Trinity drainage basins described as "the most accessible region of surplus". It was stated in the report that, "Here is ample water, taken with the San Joaquin Valley streams, for the full development of both valleys." The report continued, "The new supply for the San Joaquin Valley would be derived from the water used to maintain navigation in the channel of the Sacramento River. After serving its useful purpose in the Sacramento Valley, this water would be diverted at the mouth of the river into the San Joaquin." (Staff 9, p. 178)

The economic and legal problems implicit in carrying out the transfer of water from one drainage basin to another while at the same time protecting the watershed of origin from deficiencies prompted the State Legislature of 1927 to call for appointment of a Joint Legislative Committee to study the problems and recommend some method of procedure.

In 1929 the Joint Legislative Committee made its report suggesting that the State adopt a policy with respect to coordination of all uses for water and "The coordination of water supplies between the time and place of origin and time and place of use, and by means of transportation of water in excess of the needs of watersheds of origin from such watersheds to areas of deficient water supply to correct unequal geographic distribution." Continuing, the Committee urged a policy expression of law which would give "Definite and valid assurance that such areas of surplus from which water is or may be taken shall have a right to ample water for their ultimate needs, superior and prior to that of the area of deficiency to make use of such surplus. In the event of impounding water by storage, such areas or watersheds from which water is taken shall be entitled to use their prior water rights accorded hereunder, upon payment or agreement to

pay such consideration for waters used therefrom as may be reasonable and proper under all the circumstances and conditions relating thereto, making due allowance for the initial prior right of such areas to such surplus water." (Staff 9, pp. 230-231)

The "State Water Plan", Bulletin No. 25 (DWR 3), submitted in 1931 pursuant to legislative request of 1929, presented a comprehensive plan which included the diversion of water only from the Delta for exportation to the San Joaquin Valley. This was recommended because it would interfere least with "present rights and interests", and because it allowed utilizing the waters derived from the entire catchment area after they had flowed past all upstream users and after all upstream requirements had been met.

Applicable Statutes

The first successful legislative action to provide a protective policy with respect to a catchment area was in 1931 when the Department of Finance was prohibited from releasing from priority or assigning applications filed by the State pursuant to Statutes of 1927, Ch. 286, p. 508, § 1 (now Water Code Section 10500), for the appropriation of water when, in the judgment of the Department of Finance, such assignment or release would deprive the county in which such water originates of any water necessary for the development of the county (Stats. 1931, Ch. 720, p. 1514, § 1, now Water Code Section 10505).

In 1933, the Legislature authorized construction of a system of works designated as the Central Valley Project and creation of the Water Project Authority (Stats. 1933, Ch. 1042). The latter State agency was empowered to construct and operate any of the several units of the Project

as provided in the statute. The units authorized included a storage dam at or near Kennett, a Contra Costa County conduit, a Delta cross-channel, and Delta diversion, together with a conveyance system southward to the mouth of Fresno Slough which enters the San Joaquin River at Mendota Pool. By way of limiting the power of the Water Project Authority the statute provided that in the construction and operation by the Authority of any project authorized under provisions of the Central Valley Project Act, "no watershed or area wherein water originates, or any area immediately adjacent thereto which can conveniently be supplied with water therefrom, shall be deprived by the authority directly or indirectly of the prior right to all of said water reasonably required to adequately supply the beneficial needs of said watershed, area or any of the inhabitants or property owners therein."

The act further provided that the impairment or curtailment of watershed rights by the Authority could be accomplished in no other way than by purchase and that the act was not to be construed as creating any new property rights other than as against the Water Project Authority nor to require the furnishing of project water to any person unless the water was purchased. With respect to exchanging water of one watershed for that of another, the act provided that the requirements of the watershed wherein the exchange is made must be satisfied first and at all times to the extent such requirements would have been met were the exchange not made.

In 1943, the Legislature included the Central Valley Project Act in the Water Code as Division 6, Part 3, and incorporated the language of the watershed protection statute into Sections 11460 through 11463.

Bureau Policy Statements

On February 17, 1945, Acting Regional Director R. S. Calland of the Bureau of Reclamation stated in a letter to the Joint Committee on Rivers and Flood Control of the California State Legislature that it was the view of the Bureau that the intent of Water Code Section 11460 is "that no water shall be diverted from any watershed which is or will be needed for beneficial uses within that watershed." The letter continued: "The Bureau of Reclamation, in its studies for water resources development in the Central Valley, consistently has given full recognition to the policy expressed in this statute by the Legislature and the people. The Bureau has attempted to estimate in these studies, and will continue to do so in future studies, what the present and future needs of each watershed will be. The Bureau will not divert from any watershed any water which is needed to satisfy the existing or potential needs within that watershed...." (Staff 9, p. 798, SRDWA 19).

On May 17, 1948, Assistant Secretary of the Interior William E. Warne wrote a letter to Congressman Clarence Lea on the subject of Federal policy with respect to export of surplus water from the Sacramento Valley drainage basin to the San Joaquin Valley, stating: "As you know, the Sacramento Valley water rights are protected by (1) Reclamation law which recognizes State water law and rights thereunder; (2) the State's counties of origin act, which is recognized by the Bureau in principle; and (3) the fact that Bureau filings on water are subject to State approval." (Staff 9, p. 799 and SRDWA 19).

On October 12, 1948, Secretary of the Interior Krug, in a public speech at Oroville, stated: "Let me state, clearly and finally, the

Interior Department is fully and completely committed to the policy that no water which is needed in the Sacramento Valley will be sent out of it." He added: "There is no intent on the part of the Bureau of Reclamation ever to divert from the Sacramento Valley a single acre-foot of water which might be used in the valley now or later." (Staff 9, p. 799 & SRDWA 19).

On November 15, 1949, Regional Director Richard L. Boke reaffirmed these main policy statements and summarized them in a letter to Congressman Clair Engle, stating, "We believe the foregoing is a summary of the main policy statements by Government officials on the subject of importation of Sacramento Valley water to the San Joaquin Valley." (Staff 9, p. 799 & SRDWA 19).

Watershed Protection Law
Applicable to United States

In spite of these repeated clear-cut and unequivocal statements by persons occupying governmental positions of the highest authority respecting such matters at the time they were made, the Bureau has since qualified these long-held principles and now frankly proclaims its present intent: "To the extent that it can do so compatibly with project functions, the United States will satisfy watershed and area of origin needs and uses." (RT 1716).

In 1951, the Legislature added Section 11128 to the Water Code making the limitations prescribed in Sections 11460 to 11463 expressly applicable to "any agency of the State or Federal Government which shall undertake the construction or operation of the project, or any unit thereof".

In 1955, the State Attorney General published Opinion 53-298 in which he concluded that Water Code Sections 10505, 11460 and 11463 are

constitutional and that the latter two sections are applicable to the United States as the operator of the Central Valley Project in view of Water Code Section 11128 and Section 8 of the 1902 Federal Reclamation Act. Section 8 is interpreted as an affirmative election by Congress to comply with certain aspects of State law. It directs the Secretary of the Interior to proceed in conformity with state laws relating to the appropriation of water used in irrigation.

The Attorney General's opinion directs attention to the policy statements made in 1948 and 1949 by responsible Federal officials as consistent with the purpose of the legislative enactment of Water Code Sections 11460 and 11463. Referring to the enactment of Section 11128, the Attorney General said, "it removes any doubt but that, so far as State law is concerned, these sections do declare the law of the State for purposes of federal compliance therewith pursuant to Section 8 of the Reclamation Act".

Permit Conditions to Provide Watershed Protection

The Board concludes, therefore, that in the historical approach adopted by the project planners the Sacramento watershed was regarded as separate from that of the San Joaquin and that only water surplus to the needs of users in the Sacramento watershed would be considered as available for export to the San Joaquin. The Board views the legislative expression of protective policy as applicable in accordance with this historical concept of the distinction between the respective watersheds.

It is concluded that the public interest requires that water originating in the Sacramento Valley Basin be made available for use within

the Basin and the Sacramento-San Joaquin Delta before it is exported to more distant areas, and the permits granted herein will so provide.

However, the Board will limit the period of time in which such preference may be exercised. This limitation is necessary in order to best conserve in the public interest the water to be appropriated. The Board considers that, in view of the length of time the Project has been in operation, a period of approximately three years is a reasonable time in which the users within the watershed who are currently using water from Sacramento River or the Delta may have a preferred right to Project water. Accordingly, the permits will provide that until March 1, 1964, requests for water service contracts from such users within the Sacramento Valley and Delta shall be preferred over requests from users outside the watershed.

The Board concurs with Counsel for the Association that a period of approximately ten years is a reasonable length of time in which users within the watershed who are not presently diverting water from the Sacramento River or Delta may consummate contracts for Project water (SRDWA 79). Accordingly, the permits will provide that until March 1, 1971, requests for water service contracts from such users shall be preferred over requests from users outside the watershed.

Users within the watershed who do not presently hold appropriative rights but who wish to initiate such rights by application to this Board should also be afforded preference. Accordingly, the permits granted for use outside the watershed shall be subject to rights initiated by applications for use within the watershed.

All applications considered here, except Application 10588, were originally filed by the Department of Finance pursuant to Water Code Section

10500. The assignment of Applications 5625, 5626, 9364 and 9365, dated September 3, 1938, contains the following condition (DWR 56):

> "...subject to depletion of the stream flow above Shasta (formerly Kennett) Dam by the exercise of lawful rights to the use of water for the purpose of development of the counties in which such water originates, whether such rights have been heretofore or may be hereafter initiated or acquired, such depletion not to exceed in the aggregate four million five hundred thousand (4,500,000) acre-feet of water in any consecutive ten-year period, and not to exceed a maximum depletion in any one year in excess of seven hundred thousand (700,000) acre-feet."

On March 26, 1952, the Director of Finance executed two assignments, one concerning Applications 9363 and 9368 and the other concerning Applications 9366 and 9367. Both of these assignments contain the following condition (DWR 56):

> "...subject, however, in conformity with Section 10505 of the Water Code of the State of California, to any and all rights of any county in which the water sought to be appropriated originates to the extent that any such water may be necessary for the development of such county."

According to the Attorney General's Opinion No. 53-298, Section 10505 governs an exclusive function of the Department of Finance (now administered by the California Water Commission), but the State Engineer (whose functions in this regard are now performed by the State Water Rights Board) may incorporate all pertinent terms and reservations which were made as conditions of assignment into permits granted on the applications being considered. Therefore, permits issued pursuant to these applications will contain the terms set forth in the assignments of such applications.

PROTECTION OF EXISTING RIGHTS

Throughout these proceedings, the Bureau's representatives have consistently affirmed their policy to recognize and protect all water rights on the Sacramento River and in the Delta existing under State law at the time these applications were filed, including riparian, appropriative and others. Unfortunately, these rights have never been comprehensively defined. It is imperative, therefore, that the holders of existing rights and the United States reach agreement concerning these rights and the supplemental water required to provide the holders with a firm and adequate water supply, if a lengthy and extremely costly adjudication of the waters of the Sacramento River and its tributaries is to be avoided. Although not an issue at this hearing, reference to the two types of contracts for supplemental water that have been suggested is in order because the type of contract entered into between the holders of existing rights and the United States will have a direct bearing on the requirements necessary to protect existing rights.

One type of contract for supplemental water would provide for the water users to pay for the exact quantity of stored water diverted each year. This would require the maintenance of a large number of measuring devices and compilation of extensive records to determine the yield to each water user under his own right and the quantity of stored water diverted. Many of the measuring devices and records could be eliminated if the parties entered into the other type of contract for supplemental water similar to those proposed by the Bureau and the Sacramento River and Delta Water Users Association (USBR 96 and 97). This type of contract would require the water user to pay for the average annual quantity of stored

water that he would require during a repetition of hydrologic conditions similar to those during the period 1924 through 1954.

To assure that vested rights are protected under actual operating conditions of the Project and at the same time to assure that the water sought to be appropriated will be developed, conserved and utilized in the public interest, it will be necessary from time to time to establish measuring devices and reporting procedures. The Board finds that sufficient information is not now available with respect to these requirements to finally determine the terms and conditions which will reasonably protect such vested rights and at the same time best serve the public interest. Therefore, permits will provide that upon the request of the Board, permittee shall make such measurements and maintain and furnish to the Board such records and information as may be necessary to determine compliance with the terms and conditions of this order, including the recognition of vested rights and for the further purpose of determining the quantities of water placed to beneficial use under the permits both by direct diversion and storage.

RIGHTS SHALL BE APPURTENANT TO THE LAND

This Board has taken cognizance in previous decisions of resolutions adopted by the Legislature in 1952 expressing the desirability of including terms and conditions in permits issued to the United States for irrigation water to be used in federal reclamation projects (Stats. 1953, Vol. 1, pp. 272, 405).

Among such conditions recommended by the Legislature were those providing in substance that rights under the permits are to be held by the United States in trust for the water users and that rights acquired thereunder shall be permanent and appurtenant to the lands irrigated.

In Decision D 935, the Board discussed these conditions at some length, concluding that by force of applicable state and federal law, the United States holds all water rights acquired for project purposes in trust for the project beneficiaries who by use of the water on the land will become the true owners of the perpetual right to continue such use subject only to continued beneficial use and to observance of any and all contractual commitments to the United States. Upon the premise of this "trust theory" the permits issued to the United States were conditioned so as to express the "permanent and appurtenant" concept.

In further support of its view, this Board invited attention to the Congressional Act of July 2, 1956, Chapter 492, Section 4, 70 Stats. 484, now codified as Section 485h - 4, U. S. C. A., Title 43, which reaffirmed Section 8 of the Reclamation Act of 1902 containing the proviso reading as follows:

> "That the right to the use of water acquired under the provisions of this act shall be appurtenant to the land irrigated and beneficial use shall be the basis, the measure, and the limit of the right."

The views thus expressed in Decision D 935 are reaffirmed, and the permits to be issued pursuant to those applications which include irrigation as a purpose of use will provide in substance that rights to be acquired thereunder will be appurtenant to the land on which the water shall be applied and that such rights shall continue in perpetuity.

CONCLUSION

The evidence indicates and the Board finds that unappropriated water exists in the Sacramento River and in the Delta at times and in sufficient amounts to justify the approval of Applications 5625, 9366, 9367, 9368 and 10588 and also to warrant the approval in part of Applications 5626, 9363, 9364 and 9365; that the uses proposed are beneficial; that such waters in general, but with certain exceptions and subject to certain conditions, may be taken and used as proposed without interference with the exercise of prior rights; and that the applications should be approved and permits issued pursuant thereto, subject to the usual terms and conditions and subject to those additional terms and conditions indicated in the preceding portion of this decision for the protection of prior rights and in the public interest. The Board finds that as so conditioned the developments proposed in these applications will best develop, conserve and utilize in the public interest the water sought to be appropriated.

ORDER

Applications 5625, 5626, 9363, 9364, 9365, 9366, 9367, 9368 and 10588 of the United States for permits to appropriate unappropriated water having been filed with the predecessors of the State Water Rights Board, protests against the approval thereof having been submitted, jurisdiction of the administration of water rights, including the subject applications, having been subsequently transferred to the Board, a public hearing having been held by the Board and said Board having considered all of the evidence received at the hearing and now being fully informed in the premises:

IT IS HEREBY ORDERED that Applications 5625, 5626, 9363, 9364, 9365, 9366, 9367, 9368 and 10588 be, and the same are, approved and that permits be issued to the applicant subject to vested rights and to the following additional terms and conditions:

1. The quantity of water to be appropriated from Sacramento River for power purposes at Shasta Power Plant under permit issued pursuant to Application 5625 shall not exceed 11,000 cubic feet per second by direct diversion and 3,190,000 acre-feet per annum by storage.

2. The quantity of water to be appropriated from Sacramento River for power purposes at Shasta Power Plant under permit issued pursuant to Application 9365 shall not exceed 2,275 cubic feet per second by direct diversion and 1,303,000 acre-feet per annum by storage.

3. The quantity of water to be appropriated from Sacramento River for power purposes at Keswick Power Plant and for incidental domestic purposes under permit issued pursuant to Application 10588 shall not exceed 13,800 cubic feet per second.

4. The quantity of water to be appropriated from Sacramento River for irrigation, incidental domestic, stockwatering and recreational purposes under permit issued pursuant to Application 5626 shall not exceed 8,000 cubic feet per second by direct diversion and 3,190,000 acre-feet per annum by storage; provided, however, that the amount of water appropriated by direct diversion shall be limited to such quantity as would be available for appropriation at Shasta Dam.

5. The quantity of water to be appropriated from Sacramento River and channels of Sacramento-San Joaquin Delta for municipal and industrial purposes under permit issued pursuant to Application 9363 shall not exceed 1,000 cubic feet per second by direct diversion and 310,000 acre-feet per annum by storage.

6. The quantity of water to be appropriated from Sacramento River and channels of Sacramento-San Joaquin Delta for irrigation, incidental domestic, stockwatering and recreational purposes under permit issued pursuant to Application 9364 shall not exceed 9,000 cubic feet per second by direct diversion and 1,303,000 acre-feet per annum by storage.

7. The quantity of water to be appropriated from Rock Slough for irrigation and domestic purposes under permit issued pursuant to Application 9366 shall not exceed 200 cubic feet per second; provided, however, that the total quantity of water to be appropriated under permits issued pursuant to Applications 9366 and 9367 shall not exceed 350 cubic feet per second.

8. The quantity of water to be appropriated from Rock Slough for municipal and industrial purposes under permit issued pursuant to Application 9367 shall not exceed 250 cubic feet per second; provided,

however, that the total quantity of water to be appropriated under permits issued pursuant to Applications 9366 and 9367 shall not exceed 350 cubic feet per second.

9. The quantity of water to be appropriated from Old River for irrigation and domestic purposes under permit issued pursuant to Application 9368 shall not exceed 4,000 cubic feet per second.

10. The total quantity of water to be appropriated by direct diversion and by storage under permits issued pursuant to Applications 5626, 9363, 9364, 9366, 9367 and 9368 shall not exceed 6,500,000 acre-feet per annum of which not in excess of 3,450,000 acre-feet per annum shall be by direct diversion. The maximum combined rates of direct diversion and rediversion of stored water shall not exceed 22,200 cubic feet per second.

11. The total quantity of water to be appropriated by storage for power and other beneficial uses under permits issued pursuant to Applications 5625, 5626, 9363, 9364 and 9365 shall not exceed 4,493,000 acre-feet per annum.

12. The collection of water to storage under permits issued pursuant to Applications 5625 and 9365 shall be limited to the period extending from about October 1 of each year to about June 30 of the succeeding year. Direct diversion under permits issued pursuant to Applications 5625, 9365 and 10588 shall be allowed year-round.

13. The season of diversion under permits issued pursuant to Applications 5626, 9363, 9364, 9366, 9367 and 9368 where applicable shall be as follows:

(a) About October 1 of each year to about June 30 of the succeeding year for collection of water to storage.

(b) About September 1 of each year to about June 30 of the succeeding year for direct diversion from Sacramento River at Shasta Dam.

(c) Year-round for direct diversion from Sacramento River downstream from Shasta Dam and at points within the Sacramento-San Joaquin Delta.

14. No direct diversion or rediversion of stored water for beneficial use under permits issued pursuant to Applications 5626, 9363, 9364, 9366, 9367 and 9368, other than through the conduits or canals hereinafter named in this paragraph, shall be made until a description of the location of each point of diversion and statement of the quantity of water to be diverted is filed with the State Water Rights Board:

(a) Bella Vista Conduit

(b) Corning Canal

(c) Tehama-Colusa Canal

(d) Chico Canal

(e) Yolo-Zamora Conduit

(f) Contra Costa Canal

(g) Delta Mendota Canal

15. The quantities of water which may be appropriated as set forth in Paragraphs 1 through 11 of this Order may in license be reduced if investigation warrants, or those quantities set forth in Paragraphs 4 through 11 may be reduced at any time prior to license if the reservations contained in Paragraphs 22 and 23 of this Order are modified or set aside upon judicial review; and all rights and privileges under the permits, including method of diversion, method of use and quantity of water

diverted are subject to the continuing authority of the State Water Rights Board in accordance with law and in the interest of the public welfare to prevent waste, unreasonable use, unreasonable method of use and unreasonable method of diversion of said water.

16. Construction work shall be completed on or before December 1, 1985.

17. Complete application of the water to the proposed use shall be made on or before December 1, 1990.

18. Progress reports shall be filed promptly by permittee on forms to be provided annually by the State Water Rights Board until license is issued.

19. Permits issued pursuant to Applications 5625, 5626, 9363, 9364, 9365, 9366, 9367 and 9368 are subject to compliance with Water Code Section 10504.5(a).

20. The quantity of water which may be diverted under permits issued pursuant to Applications 5625, 5626, 9364 and 9365 shall remain subject to depletion of stream flow above Shasta Dam by the exercise of lawful rights to the use of water for the purpose of development of the counties in which such water originates, whether such rights have been heretofore or may be hereafter initiated or acquired; such depletion shall not exceed in the aggregate 4,500,000 acre-feet of water in any consecutive 10-year period and not to exceed a maximum depletion in any one year in excess of 700,000 acre-feet.

21. In conformity with Water Code Section 10505, permits issued pursuant to Applications 9363, 9366, 9367 and 9368 shall be subject to any and all rights of any county in which the water sought to be appropriated

originates to the extent that any such water may be necessary for the development of such county.

22. Direct diversion and storage of water under permits issued pursuant to Applications 5626, 9363, 9364, 9366, 9367 and 9368 for use beyond the Sacramento-San Joaquin Delta* or outside the watershed of Sacramento River Basin** shall be subject to rights initiated by applications for use within said watershed and Delta regardless of the date of filing said applications.

23. The export of stored water under permits issued pursuant to Applications 5626, 9363 and 9364 outside the watershed of Sacramento River Basin or beyond the Sacramento-San Joaquin Delta shall be subject to the reasonable beneficial use of said stored water within said watershed and Delta, both present and prospective, provided, however, that agreements for the use of said stored water are entered into with the United States prior to March 1, 1964, by parties currently diverting water from Sacramento River and/or Sacramento-San Joaquin Delta and prior to March 1, 1971, by

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*For the purpose of this Order the Sacramento-San Joaquin Delta shall be that area defined in Water Code Section 12220.

**For the purpose of this Order the Sacramento River Basin shall be that portion of the State encompassed by a line beginning at the Sacramento-San Joaquin Delta at Collinsville thence northeasterly to the crest of the Montezuma Hills; thence northwesterly through the crest of the Vaca Mountains; thence northerly along the crest of Putah, Cache, Stony, Thomes, and Cottonwood Creek Basins and along the crest of the Trinity Mountains to Mt. Eddy; thence easterly through Mt. Shasta and along the northern boundary of the Pit River Basin to the crest of the Warner Mountains; thence southerly and westerly along the boundary of the Pit River Basin to Red Cinder Cone Peak; thence easterly along the northern boundary of the Feather River Basin to the crest of the Sierra-Nevada; thence southerly along the crest of the Sierra-Nevada to the southern boundary of the American River Basin; thence westerly along the southern boundary of the American River Basin to the eastern boundary of said Delta; thence northerly, westerly and southerly along the boundary of the Delta to the point of beginning.

parties not currently using water from Sacramento River and/or Sacramento-San Joaquin Delta.

24. Permittee shall bypass or release into the natural channel of the Sacramento River at Keswick Dam for the purpose of maintaining fish life such flows as are provided for in "Memorandum of Agreement for the Protection and Preservation of Fish and Wildlife Resources of the Sacramento River as Affected by the Operation of Shasta and Keswick Dams and their Related Works and Various Diversions Proposed Under Applications 5625, 5626, 9363, 9364, 9365, 9366, 9367, 9368 and 10588 of the United States" between the United States and the California Department of Fish and Game, dated April 5, 1960, filed of record as Fish and Game Exhibit 7 at the hearing of said applications.

25. The State Water Rights Board reserves continuing jurisdiction over permits issued pursuant to Applications 5625, 5626, 9363, 9364, 9365, 9366, 9367, 9368 and 10588 until March 1, 1964, or such additional time as may be prescribed by the Board, for the purpose of formulating terms and conditions relative to salinity control in the Sacramento-San Joaquin Delta. Permittee shall on or before January 1, 1962, and each six months thereafter submit to the Board a written report as to the progress of negotiations relative to agreement between permittee and the State of California and/or the permittee and water users in the Delta and in Northern Contra Costa County.

26. The Board reserves continuing jurisdiction over permits issued pursuant to Applications 5625, 5626, 9363, 9364, 9365, 9366, 9367, 9368 and 10588 for an indefinite period not to extend beyond the date of issuance of licenses for the purpose of coordinating terms and conditions

of the permits with terms and conditions which have been or which may be included in permits issued pursuant to other applications of the United States in furtherance of the Central Valley Project and applications of the State of California in furtherance of the State Water Resources Development System.

27. Upon the request of the Board permittee shall make such measurements and maintain and furnish to the Board such records and information as may be necessary to determine compliance with the terms and conditions of this order, including the recognition of vested rights and for the further purpose of determining the quantities of water placed to beneficial use under the permits, both by direct diversion and storage.

28. Permits issued pursuant to Applications 5626, 9363, 9364, 9366, 9367 and 9368 shall be subject to "Agreement Between the United States of America and the Department of Water Resources of the State of California for the Coordinated Operation of the Federal Central Valley Project and the State Feather River and Delta Diversion Projects" dated May 16, 1960, filed of record as Department of Water Resources Exhibit 77 at the hearing of said applications.

29. Subject to the existence of long-term water delivery contracts between the United States and public agencies and subject to compliance with the provisions of said contracts by said public agencies, the permits issued on Applications 5626, 9364, 9366 and 9368 shall be further conditioned as follows:

(a) The right to the beneficial use of water for irrigation purposes, except where water is distributed to the general public by a private agency in charge of a public use, shall be appurtenant

to the land on which said water shall be applied, subject to continued beneficial use and the right to change the point of diversion, place of use and purpose of use as provided in Chapter 10 of Part 2 of Division 2 of the Water Code of the State of California and further subject to the right to dispose of a temporary surplus.

(b) The right to the beneficial use of water for irrigation purposes shall, consistent with other terms of the permit, continue in perpetuity.

IT IS FURTHER ORDERED that

(a) Insofar as the amount of water to be appropriated by storage under Application 9364 exceeds 1,303,000 acre-feet per annum the same is hereby denied.

(b) Insofar as the amount of water to be appropriated by storage under Application 9365 exceeds 1,303,000 acre-feet per annum the same is hereby denied.

(c) Insofar as the amount of water to be appropriated by direct diversion under Application 9365 exceeds 2,275 cubic feet per second the same is hereby denied.

(d) Insofar as Applications 5626 and 9364 are for use of water for navigation and flood control purposes the same are hereby denied.

Adopted as the decision and order of the State Water Rights Board at a meeting duly called and held at Sacramento, California on the 9th day of February, 1961.

/s/ Kent Silverthorne
Kent Silverthorne, Chairman

/s/ Ralph J. McGill
Ralph J. McGill, Member

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Board Member W. P. Rowe is filing a separate opinion concurring in part with, and dissenting in part from, the foregoing decision.

PLATE 2

STATE OF CALIFORNIA
STATE WATER RIGHTS BOARD

MAP TO ACCOMPANY
DECISION D 990

SACRAMENTO - SAN JOAQUIN DELTA

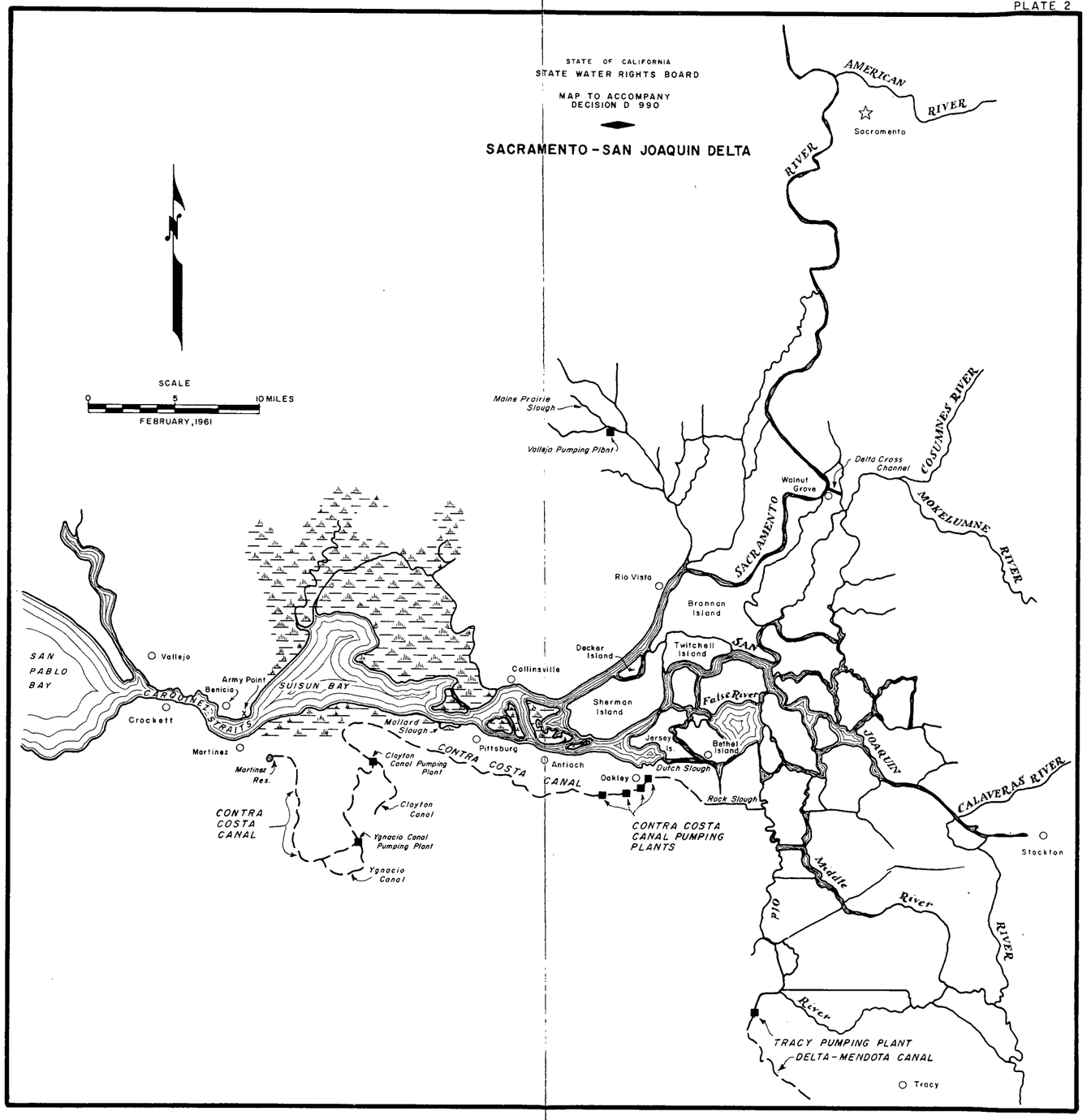
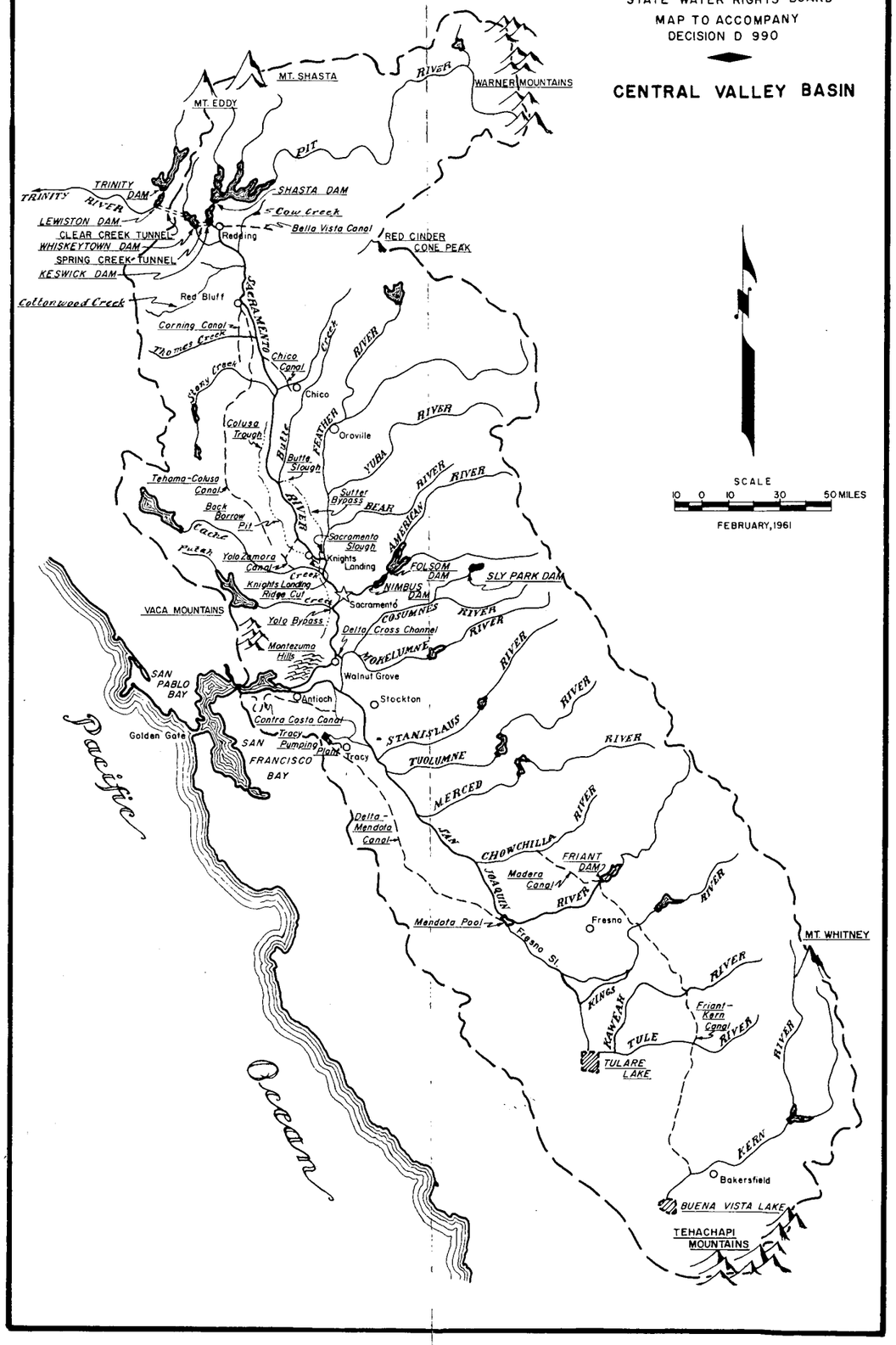


PLATE 1

STATE OF CALIFORNIA
STATE WATER RIGHTS BOARD
MAP TO ACCOMPANY
DECISION D 990

CENTRAL VALLEY BASIN



SCALE
10 0 10 30 50 MILES

FEBRUARY, 1961

STATE OF CALIFORNIA

STATE WATER RIGHTS BOARD

In the Matter of Applications 5625, 5626, 9363, 9364, 9365, 9366, 9367, 9368 and 10588,

UNITED STATES OF AMERICA, BUREAU OF RECLAMATION,

Applicant

SACRAMENTO RIVER AND DELTA WATER ASSOCIATION, et al.,

Protestants

OPINION BY

Board Member W. P. Rowe concurring in part with, and dissenting in part from, Decision D 990

February 9, 1961

STATE OF CALIFORNIA
STATE WATER RIGHTS BOARD

In the Matter of Applications 5625, 5626, 9363, 9364, 9365, 9366, 9367, 9368 and 10588, UNITED STATES OF AMERICA, BUREAU OF RECLAMATION, Applicant SACRAMENTO RIVER AND DELTA WATER ASSOCIATION, et al., Protestants	OPINION BY BOARD MEMBER W. P. ROWE CONCURRING IN PART WITH, AND DISSENTING IN PART FROM, DECISION D 990

February 9, 1961

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OPINION BY BOARD MEMBER W. P. ROWE
CONCURRING IN PART WITH, AND DISSENTING
IN PART FROM, DECISION D 990

I concur in Decision D 990 of the State Water Rights Board except with respect to the issue of Salinity Control and on this I dissent and submit herewith the supporting data for my dissent. I concur in the balance of the Decision but submit herewith explanatory material in support of "Watershed Protection" and "Coordination of Federal-State Projects" which I believe will be helpful to some of the parties.

When the first proposed decision prepared by the staff was submitted to the Board, I filed my comments which were directed principally toward the salinity control issue. There was also submitted my supporting data for these comments which were made available to the other two Board members. When my comments were filed, I stated that if my colleague and acting chairman during the hearing could not accept my views on salinity control it would be understood that we were in disagreement, which would automatically qualify our third Board member and chairman so that a decision could be agreed upon by a majority of at least two members as required by law.

The staff then prepared the final Decision which included much of the material in my supporting data. At the time I filed my comments and supporting data it was with the understanding that if the other two members agreed on the final Decision, I would dissent as regards salinity control

and include the supporting data as part of my dissenting opinion. We have now reached that stage of the proceedings.

I wish to make clear at the outset that no one on our Board is more appreciative of the great work the Bureau has done in helping to solve the State's water problems. I also feel it will be called upon for assistance in solving the State's new water problems created when the voters endorsed the present State Water Plan on November 8, 1960. I do believe, however, that the Bureau has some unfulfilled obligations, one of which is a clear-cut commitment on salinity control as it was originally conceived and understood by all parties until July 10, 1957 (USBR 154).

There are few, if any, present employees of either the State or the Bureau who were in the employ of these parties when the State Water Plan (which was turned over to the Bureau for construction during the depression years) was being formulated. It is mainly for this reason that my supporting data is so lengthy. I hope to recreate the atmosphere that prevailed during those early times. I do not believe it would be amiss in stating that my association with those early problems began in the mid-twenties. It may be that my lack of success with my fellow Board members in this effort is due, in part, to what I consider to be in the public interest rather than cold legal argument and also in the belief that promises, whether written or oral, are meant to be kept.

My supporting data begins with a chronology of events regarding salinity control as follows:

Chronology of Events Regarding Salinity Control

1850 "Arkansas Act" (Swamp and Overflow Act), giving such lands to States passed by Congress in 1850 (DWR 5, p. 157).

1861 State Legislature established Board of Swamp-lands Commissioners in 1861 (DWR 5, p. 157).

1917 California and United States started dredging channel 3000 feet wide on north side Sherman Island in 1917 (H. Doc. 791, 71st Cong., 1931).

1918 Stream flow of Sacramento River and main tributaries (Feather and American Rivers) during July plus August, 1918 was tenth lowest of 1905-1958 record (USGS Water Supply Papers). Inflow to Delta in July plus August, 1918 was also tenth lowest of record from 1892 through 1957 (DWR 5, pp. 88 & 428; USBR 155).

1918 Chlorides at Antioch in 1918 reached a maximum of 1800 ppm (DWR 5, p. 380).

1919 Inflow to Delta in July plus August, 1919 was ninth lowest of record (392,000 acre-feet) while maximum chlorides at Antioch were only 1050 ppm (DWR 5, pp. 428 & 380).

1920 Reclamation of Delta lands practically completed by 1920 (DWR 5, p. 160).

1920 Inflow to Delta in July plus August, 1920 was fourth lowest of record (199,000 acre-feet) while maximum chlorides at Antioch were 7,660 ppm (DWR 5, pp. 428 & 380).

1920 California and Hawaiian Sugar Refining Corporation abandoned use of barges for water supply in summer months beginning in 1920 because travel distance on Sacramento and San Joaquin Rivers was too long to reach good water.

1920 Walker Young, Construction Engineer for U. S. Bureau of Reclamation, in his report paid for jointly by State and Bureau, stated, "Generally speaking, any increase in the carrying capacity of the lower rivers through deepening, widening, or straightening of the channel, will, in the writer's opinion, permit of easier access of salt water into the Delta" (CCCWA 22, p. 190, 1929).

1920 The authors of State Bulletin 27 stated, "The increase in tidal flow from this work (dredging of 1917-20) did not become effective to much extent until after 1920 and gradually approached the full amount estimated during the succeeding ten years" (DWR 5, p. 162, 1931).

1923 State proposed salt water barrier at Carquinez Straits (USBR 9, pp. 47 & 48, 1923).

1927 State bulletins for State Water Plan began to concentrate on Kennett Reservoir (Shasta) as key to solution of water problems (USBR 12, DWR 2, CCCWA 2).

1930 Bulletin 25 outlined State Water Plan and showedneed for large storage reservoirs (USBR 14, pp. 36 & 37, 1930).

1931 Comprehensive study of salinity problems of Delta published by State. Flow of 3300 second-feet adopted as

minimum flow past Antioch. "This would put the control point for a maximum degree of mean tidal cycle surface zone salinity of 100 parts of chlorine per 100,000 parts of water about 0.6 mile below Antioch" (DWR 5, p. 224, 1931).

1933 Contribution of $7,000,000 toward construction of Kennett Dam recommended by U. S. Board of Engineers for Rivers and Harbors (CCCWA 19A, p. 1).

1933 Mr. W. A. Bashore, later the Commissioner of Reclamation, advocated construction of Folsom Dam as a means of resisting salinity advances (Staff 9, pp. 528-529, 1933).

1934 Chief of Engineers, U. S. Army, recommended direct participation of the Federal government of $12,000,000 in the construction of Kennett Dam because it remedies "the intrusion of salt water into the Delta" (Staff 9, p. 549).

1940 Contra Costa Canal started delivering water to users (USBR 162).

1943 Shasta Dam began regulating flow of Sacramento River December 30, 1943.

1945 Interdepartmental controversy between Secretary of Interior and Secretary of the Army over construction of and repayment for flood control dams was in full swing (Staff 9, p. 1050).

1946 Bureau allocated $18,083,000 to navigation and we can assume this included the $12,000,000 recommendation and authorization for "remedying the intrusion of salt water into the Delta" (Staff 9, p. 576).

1946 Water to be delivered within the Project area under the so-called 9(e) contracts which provide for canal-side or river-bank delivery (Staff 9, p. 578).

1947 Estimates for prevention of salinity intrusion into the Delta ranged from 3300 to 5000 cubic feet per second (Staff 9, p. 586).

1951 Bureau amended Applications 5626 and 9364 to provide up to 6000 cfs to dispose of chemical elements that would otherwise accumulate in the irrigation waters flowing in the Delta channels of the Sacramento and San Joaquin Rivers (USBR 87A).

1951 Bureau and State agreed on an estimate of 4500 cfs for consumptive uses in the Delta and an additional 4500 cfs for salinity repulsion (Staff 9, p. 745).

1951 State Engineer, in his Feasibility Report on the Feather River Project, allotted 4500 cfs for salinity control.

1952 The Bureau decided to release from Shasta about 12,000 second-feet to take care of the multiple uses of the Project (CCCWA 37A, p. 4 & Table 4 of this opinion).

1957 On July 10, 1957 the Bureau first promulgated the theory that its only obligation as regards salinity control was to provide a satisfactory quality of water at the intakes to the Contra Costa and Tracy pumping plants (USBR 154, p. 3).

1957 More than 3,000,000 acre-feet of fresh water must flow to Suisun Bay in period June 15 to September 1 (77 days) in order to provide fresh water at most westerly Delta lands (USBR 154, p. 4).

1957 If a water user is at the lower end of Sherman Island, which is within the Sacramento-Delta Service Area as agreed to in 1954 (Trial Water Distribution - 1954) by the State and the Bureau, he could demand delivery of water by the Bureau of good quality river-bank at his pump or syphon at the prevailing Bureau charge for similar water, even though it resulted in a flow of 3,000,000 acre-feet of fresh water past his land during the period June 15 through August 31, unless the Bureau furnished a substitute means of delivery (Staff 9, p. 578 & USBR 154).

1958 The Supreme Court of the United States in the so-called Ivanhoe case held that the expense of salinity prevention was nonreimbursable (78 Supreme Court Reporter 357).

1959 With the diversion of Trinity River water into the Sacramento River watershed and the release of water into the American River from Folsom Dam that will be diverted only if and when the Folsom North and Folsom South Canals are constructed, there will be an abundance of water available for salinity control for several years.

1960 The Bureau and water users in the Sacramento Valley have been negotiating for over 15 years without a contract. The fixing of the responsibility for salinity control should speed up the time for solving this problem as well as that presented when the State seeks a permit for its State Water Plan facilities.

It is my opinion that the Bureau should so operate its facilities as to maintain a flow of water at a point

0.6 mile west of Antioch that will not exceed 1000 ppm of chlorides until it can negotiate a settlement with the water users of Sherman and Jersey Islands and the shoreline of Contra Costa County east of Antioch by which their points of diversion can be moved upstream in order to conserve water. It is also my opinion that whenever the State constructs any dams within the drainage area of the Sacramento River or diverts water from the Delta during the irrigation season April 1 through October 31, it should reach an agreement with the Bureau as to the amount of money it should reimburse the Bureau for that portion of the expenditure properly chargeable to the State as the result of future Bureau constructions for salinity control.

The following sections contain my opinion on salinity control and comments for clarification of other subject matters listed in the "Table of Contents".

POWER TO CONDITION PERMITS

The Chief Counsel for the Board has prepared a valuable and helpful treatise on the subject of the power of the Board to condition permits issued to the Bureau. The problem of the Board in this regard is confined to two main categories. These are: (1) the inclusion of the Watershed Protection Law so that potential users of water in the Sacramento Valley will receive a priority when contracting for new or supplemental water; and (2) a provision for salinity control. If the Board can condition permits for watershed protection, it can, in my opinion, condition them for salinity control.

Under the section "Salinity Incursion into Delta" attention is called to the problem which would arise when a water user, at the lower end of the Delta using a river-bank pump or syphon, who would be content if the chlorides in his irrigation supply did not exceed 1000 ppm, should demand delivery of water from the Bureau under a contract similar to those with irrigators on the Contra Costa and Delta-Mendota Canals. Such a contracting party's land would be in the watershed of the Sacramento River, his land would be within the Sacramento Valley-Delta Service Area and he would have the river-bank facilities to divert the water. It is my opinion that he would be entitled to water of a quality similar to that furnished by the Bureau through the Contra Costa and

Delta-Mendota Canals, and that it would be up to the Bureau to devise the means whereby he would get what he paid for.

The Chief Counsel of the Board refers to the Ivanhoe and the Gerlach Livestock Company cases in his statement. It will be shown that the United States Supreme Court in the Ivanhoe case has held that salinity control was a non-reimbursible item in the Bureau's Central Valley Project. The Bureau, in its Exhibit 81, showed that it had paid out over $4,000,000 in acquiring water rights and settling claims along the San Joaquin River. This would be another method which the Bureau might use in the case of the landowner at the lower end of the Delta should he demand the water to which he is entitled under the Watershed Protection Law.

SALINITY INCURSION INTO THE DELTA

When the early history of the Sacramento-San Joaquin Delta is considered, it should be understood that the period of minimum inflow of river water to the Delta usually occurs in August (DWR 5, pp. 428, 429). This coincides with the maximum evapo-transpiration loss or consumptive use by native vegetation and irrigated crops in this area (DWR 5, Pl. X, Opp. p. 74).

The first recorded visit to the Delta area was made by Commander Don Juan Manuel de Ayola in the packet "San Carlos". He reached a position about midway between the lower end of Suisun Bay and the confluence of the Sacramento and San Joaquin Rivers in August, 1775. He found sweet water similar to a lake at this point (DWR 5, p. 46). The next visit of record to the Delta by boat was made by Commander Ringgold in August, 1841. He went up the San Joaquin River to the approximate location of Antioch where he camped and found brackish water in the river (DWR 5, p. 47). His log states that the winter of 1840 had been very dry (DWR 5, p. 47). The profile of the Sacramento River shown in Bulletin 27 for 1841 was prepared from data Ringgold compiled on this same voyage (DWR 5, Pl. XXXV). The historians do not say if he found brackish water in the Sacramento River on this trip.

A witness in the Antioch case testified to the invasion of saline tidal water up the San Joaquin River on one or two occasions some time between 1870 and 1876 (DWR 8,p.192).

As the three-year period 1868-1871 was a dry one with an average annual precipitation of 70 percent of normal, it was concluded by an engineer in that trial that this occurred in 1871 (CCCWA 8, p. 192). The historical information presented as to salinity conditions in 1775, 1841 and in the 1860's and 1870's "shows that the invasion of saline tidal water into the delta, under natural conditions before reclamation, extended only a short distance above the confluence of the Sacramento and San Joaquin Rivers, even in dry years" (DWR 5, p. 161). Prior to 1920, the invasion of saline tidal flows above Antioch happened at such rare intervals that their occurrence was news.

"The reclamation of the lands in the Delta has eliminated a large area of aquatic vegetation such as cat-tails and tules which consume three to four times as much water as the crops which are grown on these reclaimed lands. As a result, it appears probable that the consumption of water within the Delta has been decreased by reclamation development, and that a greater proportion of the stream flow entering the Delta now reaches the lower end of the Delta to repel saline invasion than before reclamation" (DWR 5, p. 161). The estimates of the amounts of water diverted from the Sacramento River during the early stages of development make no allowances for consumptive uses by native vegetation in the flood plain of the Sacramento River that were conserved when these lands were cleared for farming (DWR 5, Pl. XXXIII).

Reclamation in the Delta began at a rapid rate about ten years after the passage of the Federal "Swamp and Overflow Act" in 1850 granting these lands to the State. The value of the Delta lands was recognized about that time and the State Legislature established the Board of Swampland Commissioners in 1861. As the purchasers of these lands were required to reclaim them and the lands had to be be protected by levees before they could be reclaimed, it was natural that all the purchasers of an island in the Delta would unite in sharing the cost (DWR 5, p. 157).

Reclamation of the Delta lands in large areas began at an earlier date than in the Sacramento and San Joaquin Valleys. Table 1 (page 15) presents a comparison of the acreages reclaimed in the Delta and the acreages irrigated by direct diversion from the Sacramento and San Joaquin River Systems by decades or for the nearest year of the decade. The bulk of the reclamation development in the Delta was completed prior to 1920 (DWR 5, p. 160).

Farms in the Sacramento Valley irrigated in 1912, except for areas around Woodland on Cache Creek and around Yuba City on the Feather River were spotted throughout the area with not over one-fourth of any township being irrigated. The Central Canal of what became the Glenn-Colusa Irrigation District was serving water to scattered farms at this time (Staff 12). The acreage listed for the Sacramento Valley in 1920 includes land irrigated along the Feather River and the Sierra foothills.

TABLE 1

COMPARISON OF RECLAMATION IN DELTA WITH
AREAS IRRIGATED FROM SACRAMENTO AND
SAN JOAQUIN RIVER SYSTEMS
(Thousands of Acres)

Year	Delta (1)		Sacramento System (2)		San Joaquin System (2)	
	Increase	Total	Increase	Total	Increase	Total
1860		0				
	15.0					
1870		15.0				
	92.0					
1880 (3)		107.0		80.0		70.0
	70.0					
1890		177.0				
	58.0					
1900 (4)		235.0		160.0		170.0
	88.6		60.0		230.0	
1910		323.6		220.0		400.0
	94.0		282.0		257.0	
1920		417.6		502.0		657.0
	24.0		35.0		123.0	
1930 (5)		441.6		537.0		780.0

NOTES: (1) From DWR 5, p. 158, Table 22.

(2) From DWR 5, p. 126, Table 12.

(3) Acreages for Sacramento and San Joaquin Systems are for 1879..

(4) Acreages for Sacramento and San Joaquin Systems are for 1900.

(5) Acreages for Sacramento and San Joaquin Systems are for 1929.

The area of irrigated crops in the Delta in 1929 was 318,500 acres (DWR 5, p. 73).

The reclamation of the Delta lands required the leaching out of salts from the soil. The drainage of leach water from the Delta islands is accomplished by gathering the water in drains and pumping over the levees to discharge into the river. Most of the lands farmed in the Delta are near or below sea level depending on the consolidation of the peat soils (CCCWA 48, Pl. 7). Some of the lands lie as much as fifteen feet below sea level. Irrigation water is withdrawn from the river by syphoning or pumping over the levees in most cases (SRDWA 65).

In some instances these lands, because of their depth below sea level, are sub-irrigated by percolation of river water (DWR 16). In any event, the drainage water must be disposed of in order to maintain a balance between the salts in the water applied from irrigation and those in the drain water. The leach water used during the original reclamation was returned to the river channels and added to the salinity of its water. If it were not carried away by the tidal changes, it would remain around the vegetation along the outside of the levees and create a brackish condition.

A witness for the Sacramento River and Delta Water Association, Mr. Gerald Jones, testified it was his opinion that one of the main contributions to the invasion of saline water to the lower end of the Delta was the dredging done by the United States along the north side of Sherman Island from 1917 to 1920, inclusive (RT 6620). This testimony was uncontradicted during the hearing, even after its relative importance was called to the attention of the parties.

The State of California Department of Public Works, United States Bureau of Reclamation, and the Sacramento Valley Development Association entered into a contract under which Mr. Walker Young, Construction Engineer for the Bureau of Reclamation, was placed in charge of the studies, field work and writing of the report which was approved by Mr. Elwood Mead, Commissioner of Reclamation, on July 22, 1928. This study is Bulletin 22 (CCCWA 8).

In Mr. Young's Report (CCCWA 8) he commented on the new channel work that had been underway since 1917. This work made certain channel changes during the 10 to 15 years previous to 1928 in connection with reclamation and flood control works within the Delta which had the effect of increasing the tidal flow into the Delta. The principal dredging operation, which began in 1917 (House Doc. 791, 71st Congress, 1931), consisted of enlarging and straightening the Sacramento River channel from Collinsville to above Rio Vista. The work called for a channel 3,000 feet wide and 26 feet deep below mean lower low water. A portion of the channel consisted of a cut-off across a river bend on which Emmaton is located. The excavation amounted to about 141,000,000 cubic yards of material up to 1929 and the work was still in progress at that time (DWR 5, p. 162).

Prior to the deepening and widening of the Sacramento River below the junction of Cache Slough, Steamboat Slough and the Sacramento River at River Mile 65 (Rio Vista is at River Mile 63.5) to River Mile 52.5 (Collinsville is at River Mile 51.0), the average width of the Sacramento River was about

1000 feet. Mile zero is at the Golden Gate (DWR 5). The dredged channel had an average width of 3000 feet and a depth of 26 feet below mean lower low water (DWR 5, p. 162). The San Joaquin River channel had an average width of 3500 feet from the San Joaquin River at Mile 52.0 at the junction of San Joaquin and Sacramento Rivers, to Mile 61.5 at Jersey Point. The San Joaquin River narrowed to about 1250 feet at Kimball Island at San Joaquin River Mile 54 about a mile below Antioch. There have been no changes in the width of the San Joaquin River in this reach, except for the inundation of the lower end of Sherman Island.

"The increase in tidal flow from this work did not become effective to much extent until after 1920 and gradually approached the full amount estimated during the succeeding ten years" (DWR 5, p. 162). The effect of this dredging increased the volume of the tidal prism above Collinsville by about 9000 acre-feet which would have the effect of increasing the tidal flow passing Collinsville by 36,000 acre-feet per lunar day (DWR 5, p. 162). A similar increase was caused along the San Joaquin River by the flooding of the lower portion of Sherman Island and the reclamation south of Dutch Island (DWR 5, p. 162).

In a discussion of the effects of this dredging and the effect it had on the Delta tidal flows, Mr. Young stated, "Deep channels permit the heavier salt water to flow upstream along the bottom underneath the fresh water which it tends to displace. It follows that any dredging done to deepen the

channels through the bays and up the rivers would result in increased salinity in the Delta region. Generally speaking, any increase in the carrying capacity of the lower rivers through deepening, widening, or straightening of the channel, will, in the writer's opinion, permit of easier access of salt water into the Delta" (CCCWA 8, p. 190). "The flood-control works constructed by the Federal and State Governments have also been partly responsible for the invasion of salt water" (Staff 9, p. 496).

The statement regarding the "heavier salt water to flow upstream along the bottom beneath the fresh water which it tends to displace" was not borne out during the investigations presented by Bulletin No. 27, at least for the Bay areas as far upstream as Collinsville. However, data presented by Surveys No. 9 and No. 17 at Antioch and by Survey No. 1 at Curtis Landing in Bulletin No. 27 show that where the channels are narrow this action does take place (DWR 5, pp. 190-193 & Plate LXIV).

Chloride records at Antioch, based on analysis and by interpolation from analyses at Pittsburg, did not exceed 1000 parts per million (ppm) for the period of record 1910 through 1919 except for one analysis in 1913 (112) and two in 1918 (158 and 180). These analyses were made in the critical months of August or September but the tidal phase is not given. Beginning in 1920, there was a decided increase in chlorides out of proportion to the relationship between inflow to the Delta during July and August and chlorides at Antioch than

had existed previously. The total inflow to the Delta in July and August, 1919, was 391,800 acre-feet and in 1929 the total inflow to the Delta for these same months was 407,800 acre-feet. The maximum chlorides at Antioch for these same years (1919 and 1929) were 1050 ppm and 5800 ppm, respectively (DWR 5, pp. 428, 332 & 380). This fivefold increase in chlorides at Antioch can be attributed to the dredged channel. The chlorides at Antioch have never been below 1000 ppm since 1919 except when the inflow to the Delta during July plus August has exceeded 1,000,000 acre-feet. Table 2 (page 21) presents the inflow to the Delta for July and August and maximum chlorides at Antioch for the 11 driest years for the period of record.

The effects of the dredged channel were probably first apparent in 1920. Chlorides at Antioch in that year exceeded anything that had occurred previously, reaching 7660 ppm in September. Inflows to the Delta during July and August, 1920, were 129,700 and 69,700 acre-feet, respectively, the lowest of record up to this time. In only 3 years (1931, 1934 and 1924) was there less inflow to the Delta during similar periods of July and August. Total annual diversions from the Sacramento River and its two tributaries, Feather and Yuba Rivers, during 1931 were the largest up to that time and were not exceeded until 12 years later. Diversions from these streams during July and August, 1931 were not exceeded for six years. Table 2 (page 21) presents a comparison between inflow to the Delta in July plus August and the maximum

TABLE 2

INFLOW TO DELTA FOR JULY AND AUGUST
AND MAXIMUM CHLORIDE IONS AT ANTIOCH (1)

Year	Inflow (1000's Ac. Ft.)			Chloride Ions	
	July	August	Total	ppm	Date
1931 (2)	0	38	38	12,400	September 6
1934 (2)	86	92	178	9,600	September 10
1924 (3)	77	106	183	10,850	August 20
1920 (3)	130	70	200	7,660	September 17
1939 (2)	99	110	209	9,200	August 18
1926 (3)	144	141	285	9,200	August 26
1933 (2)	235	130	365	5,800	August 26
1929 (2)	200	187	387	5,800	August 30
1919 (3)	221	171	392	1,050	September 14
1918 (3)	249	186	435	1,800	August 13
1930 (2)	240	207	447	4,700	September 14

NOTES: (1) For the 11 driest years for period of record arranged in order of lowest total inflow for July and August.

(2) Inflow less 89% of diversions from Old River, Tom Paine Slough, and San Joaquin River from Stockton to Vernalis. Chlorides from Water Supervision Reports (Staff 6).

(3) Inflow and chloride figures from Bulletin 27 (DWR 5).

chlorides at Antioch in parts per million of water. The low amount of chlorides in 1918 and 1919 as compared with those after 1925 is indicative of the changes caused by the dredging of the channel. It appears that the year 1920 was the first in which the increase in chlorides at Antioch occurred.

When the invasion of saline tidal waters became acute to the point where property rights were being destroyed, and the entire blame was placed on increasing upstream users together with the occurrence of the dry period of the runoff cycle, the first solution appeared to be by litigation. The "Antioch" suit was brought by the City of Antioch on July 2, 1920, as a claimed riparian owner seeking to enjoin upstream diverters. The final decision declared the City was an appropriator and not a riparian owner (DWR 5, p. 23). It is interesting to note that the plaintiffs asked that the upstream users "be enjoined from taking more water from that river than would permit a flow of 3500 second-feet past Sacramento (CCCWA 8, p. 50), while the operation of Kennett (Shasta) Dam, as proposed by the Board of Engineers for Rivers and Harbors some 15 years later, would provide a flow of 6000 cubic feet per second between Chico Landing and Sacramento (Staff 9, p. 519). The State Engineer in a report on the Feather River Project (May, 1951) stated that the operation of proposed Oroville Dam of the Feather River in conjunction with the Central Valley Project facilities would provide 5000 cubic feet per second at Knight's Landing for navigation.

After the decision in the Antioch case was announced, a group of 143 riparian owners brought suit against 443 named upstream users. This is known as the "Holland Land" case which was finally dismissed in 1943 by the plaintiffs. Its principal function was to keep the threat of litigation against upstream users until Shasta Reservoir was in operation. Until an adequate water supply was furnished the lands above Sacramento, there was always the possibility of their being enjoined by the water users below Sacramento. It was realized that "Adequate storage in the Sacramento River would terminate this legal action because the additional water supplies would solve the salinity problem in the delta" (CCCWA 21, Staff 9, p. 497).

During this period of threatened litigation, the State proceeded in an effort to solve the water problems of the entire State. One of the first plans was by means of a barrier across the Carquinez Straits below the confluence of the Sacramento and San Joaquin Rivers at River Mile 50. (USBR 9, pp. 47, 48, 1923). The planning of the State in 1927 began to concentrate on a large dam on the upper Sacramento River as the key to the solution of the water problems of the Delta and San Joaquin Valley. The importation of Trinity River water was also included (USBR 12, p.29, 1927). The "Coordinated Plan" of 1928 elaborated on the need for large upstream storage (DWR 2, pp. 13 & 14, 1928). In 1929, the possibilities of fitting the American River into the State's "Comprehensive Plan" were studied, as it is one of the

principal tributaries of the Sacramento River, joining it at Sacramento (CCCWA 2).

Bulletin No. 25 (1930) was the first outline of the State's plan for coordination of the State's plans. It was realized that if the intakes were at the lower end of the Delta, the water to be diverted would have passed the lands of owners of rights in the Sacramento River and its tributaries, thereby causing no legal difficulties from upstream users (USBR 14, pp. 36 & 37, 1930). The State also made extensive studies in the Sacramento and San Joaquin Valleys at this time (1931) which showed there was sufficient water to supply the needs of the Sacramento Valley and leave a surplus for the San Joaquin Valley. "The greatest water problem in the Sacramento River Basin at the present time is that of invasion of saline water into the delta region" (DWR 4, p. 52, 1931). It was also realized that the importation of Trinity River water would be needed in the future (DWR 4, p. 62, 1931).

While the studies leading to the coordinated plan of development for the State's Central Valley Project were being made, the problems of the Delta were also being considered in detail by the State. It was emphasized that the dam across the Carquinez Straits would bring unlimited quantities of fresh water to the manufacturing centers along the bay shore from Benecia and Port Costa on the west to the City of Antioch on the east (USBR 9, p. 157, 1923). In the meantime the Corps of Engineers, U. S. Army, was interested in the interference with navigation as the result of diversions

from the river for the growing of increasing acreages of rice and other crops in the Sacramento Valley. This posed the question as to whether navigation of the Sacramento River was of more importance than the increased planting of rice and other crops in the Sacramento Valley which had reduced the flow of that river to a minimum of 500 to 700 second feet at Sacramento when a flow between 3500 and 4500 second-feet at Sacramento was considered a reasonable requirement for navigation (Staff 9, p. 165, 1925).

During all of the plans and discussions relative to conserving the flood waters of the Sacramento River, "Salinity Control" was a prime objective. According to Bulletin 27, (1929) at page 221, "The point and degree of control of salinity by stream flow must be based primarily upon a consideration of the needs of the agricultural interest in the Delta and the industrial, municipal and agricultural interests in the upper bay region. It was assumed that water having a salinity of over 100 parts or more of chlorine per 100,000 parts of water would not be suitable for irrigation" (DWR 5, p. 221). After considerable discussion of industrial needs along Suisun Bay and the domestic needs of Antioch, it was concluded that a conduit from a point farther upstream was the answer to this problem (DWR 5, p. 224).

The problem of providing suitable water for agricultural uses throughout the Delta was then considered and a quantity of 3300 second-feet was adopted as the "recommended amount of net control flow to be provided as a minimum flow

in the combined river channels past Antioch into Suisun Bay. This would put the control point for a maximum degree of mean tidal cycle surface zone salinity of 100 parts of chlorine per 100,000 parts of water about 0.6 miles below Antioch" (DWR 5, p. 224, 1931).

"The maximum salinity during a tidal cycle occurs at the time of slack water following high high tide and the minimum at the time of slack water following low low tide. The salinity at any time during a tidal cycle is directly related to the height of the tide above lower low water, increasing in direct proportion to the height of the tide above its lower low stage" (CCCWA 14, p. 28, 1931).

Consideration must be given the two channels which carry water from the Sacramento River to the San Joaquin River above Antioch in solving the salinity invasion problem. "Georgiana Slough branches off from the main river on its left or easterly bank immediately downstream from Walnut Grove, or about 32 miles below Sacramento. This is the first branch channel which connects with the San Joaquin Delta. It joins the Mokelumne River about three miles upstream from the confluence of the Mokelumne and San Joaquin rivers. Three Mile Slough forms the second and farthest downstream connecting channel between the Sacramento and San Joaquin rivers. It leaves the left or easterly bank of the Sacramento River about three miles downstream from Rio Vista, or about 50 miles below Sacramento. It is located about ten miles above the confluence of the Sacramento and San Joaquin Rivers" (DWR 5,p.109).

"The flow through Georgiana Slough is of particular importance, because this slough is the chief connecting channel through which the San Joaquin Delta obtains water from the Sacramento River. Based upon the 1929 measurements, with a flow in the Sacramento River past Sacramento of 3000 second-feet, about 1300 second-feet or 43½ per cent of the total flow is discharged through Georgiana Slough into San Joaquin Delta; with 5,000 second-feet, about 1800 second-feet or 36 per cent of the total flow; with 10,000 second-feet, about 2400 second-feet or 24 per cent; with 20,000 second-feet, about 3500 second-feet or 17½ per cent; with 40,000 second-feet, about 6000 second-feet or 15 per cent; and with 60,000 second-feet, about 9000 second-feet or 15 per cent.

"The flow through Three Mile Slough is a tidal flow, the magnitude of which depends upon the character of the tide" (DWR 5, p. 119). The flow at low stages of 2500 second-feet has varied from zero to almost 100 per cent, depending on the tidal phase.

It is interesting to note that the California-Hawaiian Sugar Refining Corporation had been obtaining, by barges, water having chlorides of not to exceed 50 ppm from the San Joaquin River at points ranging from near Collinsville to five miles above Antioch in the months of maximum salinity until 1918. In 1918, the Corporation went to the latitude of Stockton during the month of greatest salinity (September) for water having a chloride content of 140 ppm. During September, 1918, the total flow of the San Joaquin River and

tributaries was only 39,900 acre-feet. In 1919, the Corporation started to run its barges in the Sacramento River and during the month of maximum chlorides, August, the barges obtained water having 100 ppm from points between one and five miles above Rio Vista. After 1919, the Corporation ceased obtaining water from the rivers from about July 1 to about December 31 (DWR 5, Pl. IV opp. p. 48 & p. 428).

While the State was making its studies on the comprehensive State Water Plan, it announced in 1925 that the barrier at Carquinez Strait, although not a physical necessity at that time, would be an essential feature of the ultimate plan (CCCWA 5, p. 20, 1925). In 1929, the "Supplemental Report of the joint Committee of the Senate and Assembly dealing with the Water Problems of the State submitted to the Legislature of the State of California, April 9, 1929" stated that Kennett Dam should be constructed for the primary purpose of relieving the salinity problem in the Delta and furnishing water to the San Joaquin Valley (CCCWA 10A, p. 1). It was further stated that Kennett Reservoir would solve the salt water problem as far as Antioch, and make fresh water available for the industrial sites along Carquinez Strait by a conduit. It was also stated that these industries had "expressed a willingness to pay a reasonable price for water made available for their use" (Staff 9, p. 235).

It was announced in 1930 by "The California Joint Federal-State Water Resources Commission" that the building of Kennett Reservoir would make it possible at all times to

maintain a flow past Antioch and into Suisun Bay of not less than 3300 second-feet. "This flow will maintain fresh water to the lower end of the delta near Antioch, will substantially restore natural conditions in that area and will provide fresh water within reasonable distance and cost for the industries along Suisun Bay, which can easily be brought to these industries by a canal as a locally financed project" (CCCWA 11A, p. 1).

Under the State Water Plan (USBR 14, 1931), Kennett Reservoir would furnish salinity control by the release of fresh water to maintain a flow of not less than 3300 second-feet past Antioch. Studies and preliminary designs of a "Contra Costa County Conduit" were prepared with a capacity sufficient to supply the industries in the Antioch-Pittsburg area, together with the agricultural needs in the Antioch area, Clayton Valley, Ygnacio Valley and Walnut Creek. It was assumed by the State planners that the entire industrial and irrigation supply, as designed to be used, amounting to 43,500 acre-feet could be delivered at an annual cost of $300,000 (Staff 9, pp. 270, 322, 323 & 324). There was no mention of payment for salinity control to benefit Delta irrigation.

A Federal contribution of $7,000,000 toward the construction of Kennett Reservoir was recommended by the U. S. Board of Engineers for River and Harbors in 1933. It was estimated that the economic value of salinity control by means of a fresh water barrier of water released from Kennett was

$355,000 per year. A "minimum flow of 3,300 second-feet past Antioch will provide suitable irrigation water for the Delta and enable industries and municipalities located on the lower river and south shore of Suisun Bay to secure fresh water by means of a diversion canal from some point in the delta" (CCCWA 19A, p. 1).

When considering the problem of salinity control, the role of Folsom Dam should not be overlocked. In the Bashore Report of 1933 (Mr. W. A. Bashore was later Commissioner of Reclamation) the following appears, "It has been claimed that in dry years the diversion and use upstream of the Sacramento and San Joaquin River waters allow salt water from the ocean to advance through tidal action into the bay and delta channels and to cause the commingled waters to be unfit for use for irrigation purposes.

"To compensate for San Joaquin waters thus utilized and prevented from reaching the San Joaquin Delta, it is planned to construct Folsom Reservoir on the American River with a total capacity of 355,000 acre-feet and an active capacity of 326,000 acre-feet, and to release the stored waters into the delta, largely during July, August, and September, to resist salinity advances" (Staff 9, pp. 528-529). The following paragraphs and tables, while out of order in some respects, are presented at this time to show how Folsom Reservoir has been operated.

The capacity was increased to 1,000,000 acre-feet by agreement between the Corps of Engineers, which was empowered

to build it, and the Bureau, which was empowered to operate it. Water has been released from Folsom in the summer months for the development of power and, because neither the Folsom North nor Folsom South Canal has been built, this water must reach the Delta until they are constructed. Table 4 (page 33) was prepared on a monthly basis as a companion for Table 3 (page 32). The increase in flow of the American River at Fair Oaks is due to this release, as shown by Table 4, Item 8.

Table 3 was prepared to show the relationship between the flow of the Sacramento River entering the Delta and the chlorides in ppm at Antioch. The years chosen were not years of heavy runoff such as occurred in 1952, 1956 and 1958. The year 1954 has been omitted for lack of space in the table. The month of August was used as it is usually the month in which the chlorides at Antioch are greatest since Shasta Dam was placed in operation in 1944. Table 3 shows the great variations in chlorides at Antioch regardless of the inflow to the Delta as exemplified by the flow of the Sacramento River at Sacramento.

Table 3 shows that the Bureau apparently can regulate the outflow from Shasta Reservoir to control the amount of chlorides at the intake of the Contra Costa Canal but, in doing so, the chlorides at Antioch have no conformity with the results at the canal. This nonconformity is probably due to the operation of the intake gates on the Delta Cross Channel being harmonized with pumping at the Contra Costa and Tracy pumping plants.

TABLE 3

FLOWS OF SACRAMENTO RIVER AT SACRAMENTO BELOW AMERICAN RIVER AND CHLORIDE IONS AT ANTIOCH AND CONTRA COSTA CANAL FOR AUGUST

Aug.	1949		1951		1953		1955		1957	
	Flow	Chloride ion	Flow	Chloride ion	Flow	Chloride ion	Flow	Chloride ion	Flow	Chloride ion
	cfs	ppm	cfs	ppm	cfs	ppm	cfs	ppm	cfs	ppm
1	6,640		9,860		8,450		9,390		9,560	
2	6,870	840	10,100	430	8,350	1,090	9,380	1,690	9,460	1,760
3	6,820		9,860		8,470	(45)	8,940	(62)	9,310	(66)
4	6,770		9,500		8,400		8,420		9,330	
5	7,060		9,610		8,500		8,550		9,570	
6	6,740	1,160	9,630	530	8,660	624	9,030	2,270	9,630	1,350
7	6,820		9,530		8,850	(48)	9,410	(84)	9,670	(68)
8	6,870		9,620		8,800		9,270		9,480	
9	7,030		9,590		8,920		9,680		9,430	
10	6,870	1,920	9,470	430	8,890	1,170	9,550	1,890	9,670	1,140
						(45)		(100)		(80)
11	6,920		9,640		8,670		9,200		9,890	
12	7,000		9,740		8,530		9,200		9,980	
13	6,980		9,890		8,590		9,230		10,000	
14	7,060	1,140	9,600	470	8,680	1,090	9,350	2,100	9,910	579
15	7,000		9,680		8,580	(44)	9,280	(109)	9,870	(84)
16	6,820		9,940		8,620		9,200		9,660	
17	7,000		9,940		8,550		9,180		9,840	
18	6,900	850	9,560	970	8,270	492	9,260	2,670	9,660	1,090
19	7,170		9,520		8,380	(54)	9,030	(120)	9,690	(88)
20	7,060		9,460		8,520		8,970		9,890	
21	7,030		9,190		8,600		8,860		9,770	
22	7,420	880	9,290	870	8,600	668	8,780	3,320	9,780	1,110
23	7,140		9,910		8,770	(50)	8,650	(146)	9,620	(88)
24	6,980		8,840		8,890		8,770		9,600	
25	7,030		8,940		9,080		8,650		9,790	
26	7,030	1,700	9,160	600	8,930	1,350	8,510	1,400	9,810	1,310
27	7,300		9,480		8,930	(44)	8,550	(160)	9,670	(86)
28	7,440		10,000		9,050		8,630		9,860	
29	7,440		9,940		9,120		8,830		10,000	
30	7,560	900	10,000	610	9,380	1,440	8,910	1,790	10,200	N.R.
						(42)		(155)		(90)
31	8,120		9,900		9,990		9,150		10,200	
Mean	7,061	1,174	9,590	614	8,745	991	9,025	2,141	9,735	1,042

NOTE: Flow data are from USGS Water Supply Papers (Staff 7).

Values of chloride ions not within parentheses are for Antioch and are from Water Supervision Reports (Staff 6 and 6A). The maximum chloride concentration for the year is underlined. Maximum chloride concentration at Antioch for 1957 equalled 1850 ppm on July 30. Values of chloride ions within parentheses are for the Contra Costa Canal and are from USBR 187A, 187C and 187E, for same day as those indicated for Antioch.

TABLE 4

DISPOSAL OF WATER OF SACRAMENTO VALLEY AND DELTA DURING AUGUST OF NON-FLOOD YEARS

Item (1)	1949	1951	1953	1954	1955	1957
1. Shasta storage, first of month	3,185	3,262	4,112	3,716	3,078	3,978
2. Shasta storage, end of month	2,816	2,766	3,732	3,294	2,670	3,669
3. Computed inflow to Shasta (2)	3,034	3,232	3,785	4,105	3,224	3,629
4. Outflow from Keswick (3)	9,018	11,349	9,975	11,062	9,922	8,660
5. Sacramento River at Keswick	9,212	11,560	9,973	11,380	10,110	8,848
6. Sacramento River near Red Bluff	9,054	11,510	10,450	11,480	10,150	8,878
7. Feather River near Oroville	1,944	1,944	2,744	2,730	1,829	1,973
8. American River at Fair Oaks	184	294	447	243	2,158	3,273
9. Sacramento River at Sacramento, inclusive of American River	7,061	9,590	8,743	9,236	9,025	9,735
10. Total Diversions, Keswick to Sacramento (4)	8,213	8,392	8,977	9,416	8,798	8,164
11. Total Inflow to Delta minus diversions into Contra Costa and Delta-Mendota Canals (5)	7,806	9,384	7,286	7,139	6,083	7,205
12. Total diversions into Contra Costa and Delta-Mendota Canals (6)	62	1,206	2,506	2,944	3,098	3,172
13. Inflow to Delta from San Joaquin System (7)	807	1,000	1,049	815	156	642

NOTES: (1) Data from USGS Water Supply Papers (Staff 7) unless otherwise specified. Values for Items 1 and 2 are in thousands of acre-feet. Values for Items 3 through 13 are in cfs.

(2) USBR 262A.

(3) USBR 262B.

(4) USBR 100, Tables 88, 89, 90 and Staff 6A.

(5) USBR 155.

(6) USBR 162 plus 163.

(7) Computed by Item 11 plus Item 12 minus Item 9.

The values in Table 4 are mean daily flows in second feet for the month. This unit of measurement was used so that the figures could be compared with the testimony of various witnesses at former hearings. The inflow to Shasta Reservoir is the result of computations by the Bureau taking into account evaporation from the water surface and changes in storage. The outflow from Keswick Reservoir is measured by metering devices at the power house as reported by the Bureau. The measured flow at Keswick by the U. S. Geological Survey is the result of current meter measurements at the gaging station and related rating tables prepared therefrom.

The acre-foot equivalents to Table 4 have been prepared as Table 5 (page 35). These figures may be easier to understand in some instances. It should be noted that the diversions opposite Item 10 were the greatest of record in 1954, which was the first year under the trial distribution. The diversions above Sacramento include those from the Feather and Yuba Rivers.

During the hearing, when the discrepancy between the two figures for the same water at Keswick was called to the attention of the various parties, there was no one who could testify as to the reason. Table 4 shows these differences to amount to as much as 200 second feet with the flow measured by the USGS being the greater in most instances. In August 1958 this difference was 865 second feet or over 53,000 acre-feet. The USGS meters the flow of the Sacramento River at Red Bluff and other stations along the river in the same manner, and

TABLE 5

DISPOSAL OF WATER OF SACRAMENTO VALLEY AND DELTA DURING AUGUST OF NON-FLOOD YEARS
(Thousands of acre-feet)

Item (1)	1949	1951	1953	1954	1955	1957
1. Shasta storage, first of month	3,185	3,262	4,112	3,716	3,078	3,978
2. Shasta storage, end of month	2,816	2,766	3,732	3,294	2,670	3,669
3. Computed inflow to Shasta (2)	187	199	233	252	198	223
4. Outflow from Keswick (3)	555	698	613	680	610	533
5. Sacramento River at Keswick	566	711	613	700	621	544
6. Sacramento River near Red Bluff	557	708	642	706	624	546
7. Feather River near Oroville	120	120	169	168	112	121
8. American River at Fair Oaks	11	18	28	15	133	201
9. Sacramento River at Sacramento, inclusive of American River	434	590	538	567	555	599
10. Total Diversions, Keswick to Sacramento (4)	505	516	552	579	541	502
11. Total inflow to Delta minus diversions into Contra Costa and Delta-Mendota Canals (5)	480	577	448	439	374	443
12. Total diversions into Contra Costa and Delta-Mendota Canals (6)	4	74	154	181	191	195
13. Inflow to Delta from San Joaquin System (7)	50	61	64	50	10	39

NOTES: (1) Data from USGS Water Supply Papers (Staff 7) unless otherwise specified.

(2) USBR 262A.

(3) USBR 262B.

(4) USBR 100, Tables 88, 89, 90 and Staff 6A.

(5) USBR 155.

(6) USBR 162 plus 163.

(7) Computed by Item 11 plus Item 12 minus Item 9.

these results can be used for comparison purposes. The discrepancies become important when the natural flow of the Sacramento River is considered in the determination of available water if Shasta Reservoir had not been built. The importation of Trinity River water and its release into Keswick Reservoir will further complicate the determination of the natural flow of the Sacramento River at Shasta Reservoir. Continuing jurisdiction by the Board and a study program of evaporation losses from Shasta Reservoir and the proposed Whiskeytown Reservoir are necessary requirements in this regard, if the pre-Shasta rights of the water users are to be protected.

At a later time (1934), it was realized by the Corps of Army Engineers that the substitution of a fresh water barrier by releases from Shasta would make a great saving over what the United States would have spent on the barrier and locks to remedy the intrusion of salt water into the Delta. Based on this aspect of the case, as well as direct benefits to navigation and flood control on the Sacramento River, the Chief of Engineers found that "The Federal interest in the conservation of water by the construction of the Kennett (Shasta) Dam largely exceeds, in my opinion, that evaluated by the division engineer and the Board, since by remedying the intrusion of salt water into the Delta of the Sacramento and San Joaquin Rivers, it eliminates from consideration Federal participation in the construction and operation at great cost of locks and structures to prevent such intrusion, and assures

a free and open passage for the highly important navigation through the channels of the Delta. Based on this aspect of the case, as well as the direct benefits to navigation and flood control on the Sacramento River, I find that the general and Federal benefits from the construction of the Kennett Dam on the plans now proposed by the State warrant a special direct participation of the Federal Government of $12,000,000 in the cost of this structure" (Staff 9, p. 549). It will be noted that salinity control is directly tied in with navigation in this instance. In 1935, one year later, the Department of Interior stated that control of salinity in the Delta of the two rivers near Sacramento is part of the agricultural maintenance phase of the project (Staff 9, pp. 566-567).

The River and Harbor Act (Reclamation Project Authorization), 1937, provided that the $12,000,000 mentioned above should, "when appropriated, be available for expenditure in accordance with the said plans by the Secretary of the Interior instead of the Secretary of War: Provided, that the transfer of authority from the Secretary of War to the Secretary of the Interior shall not render the expenditure of this fund reimbursable under the reclamation law...." (Staff 9, p. 568). I fail to understand why this $12,000,000 is not included in the $18,083,000 allocation for navigation (Staff 9, p. 576).

The Contra Costa Canal was in operation after 1940 and we can assume that it was supplying water to the agricultural areas and municipal and industrial requirements on

the mainland at and below (west of) Antioch. This left the problem of salinity control to be solved for potential users of water on the mainland east of Antioch and by irrigators on the islands of the Delta and particularly at the lower end where the dredging of channels in 1917-20 had first upset the equilibrium between outflow and tidal inflow. It is significant that no mention of any conduit is made for either agriculture or industry on the mainland east of Antioch. I can only surmise that this was omitted on the assumption that salinity control (not to exceed 100 parts of chlorides per 100,000 parts of water at a point 0.6 mile west of Antioch) would be provided. Plate II of Bulletin 27 shows these upper bay lands, above Antioch, to be classed as industrial and agricultural uplands.

On September 1944, a committee of the Bureau of Reclamation set up a method of charging for alleged benefits to users of water in the Delta. Up to this time, probably in view of the damage done by the dredging and the inclusion of salinity control as a function of navigation, there had been no suggestion of a charge for salinity control.

There are many allusions in Bureau reports after Shasta Dam was built as to how the reimbursement cost, if any, for salinity control should be charged. Following are some examples:

In a letter by Secretary of Interior Krug, dated December 3, 1946, he said that "the Central Valley project has for its major purpose the transfer of Sacramento River water

southward to the San Joaquin Valley where it is needed for irrigation and municipal and industrial water supply. At the same time navigation, flood control and salinity repulsion benefits are accomplished as incidental parts of a well-rounded program of river regulation". He then allocated as non-reimbursable items - navigation at $18,083,000 and flood control at $31,444,000. He also made the direct tie between navigation and salinity control when he stated, "The Central Valley project has for its major purpose the transfer of Sacramento River southward to the San Joaquin Valley where it is needed for irrigation and municipal and industrial water supply. At the same time, navigation, flood control and salinity repulsion benefits are accomplished as incidental parts of a well-rounded program of river regulation." Later he stated, "The Central Valley project provides navigation benefits in the Sacramento River, flood control benefits in both the Sacramento and San Joaquin Valleys, and substantial salinity repulsion benefits in the Delta area" (Staff 9, pp. 575-576).

The Report on the Engineering Feasibility of the Central Valley Project, 1947, stated that the functions of salinity repulsion, fish protection and recreation are not specifically mentioned in the legislation but it was concluded that salinity repulsion may be classified as a supplemental irrigation function (Staff 9, p. 581).

Later, the report states that the estimate of flow at Antioch in order to prevent salinity repulsion ranges from

3300 to 5000 cubic feet per second (Staff 9, p. 586). At still a later discussion in this same report: "it is to be noted that salinity control and fish protection described above in Paragraphs 13 (c) and 13 (f) receive no allocation as project functions because no provision in law exists whereby they could be declared non-reimbursable and means are not available to collect revenues for services in this category". Paragraph 13 (c) referred to above reads "(c) Salinity repulsion - The maintenance of a minimum flow of approximately 3,300 cubic feet per second at Antioch as proposed in operating schedules for Shasta (estimates range from 3,300 to 5,000 cubic feet per second, and no final figure is closely assured) is believed sufficient to prevent salinity intrusion in the Sacramento-San Joaquin delta, thereby preventing such extensive crop damage as has been common in the recent past while at the same time permitting more beneficial use of lands in the affected area". Paragraph 13 (f) refers to recreation and fish protection (Staff 9, p. 586).

It is difficult to reconcile the statement that "no provision in law exists whereby they could be declared non-reimbursable" quoted in the preceding paragraph with statements in the decision of the United States Supreme Court in the so-called Ivanhoe Case (357 US 275, 78 Supreme Court Reporter 1174). This case was decided on June 23, 1958. The following quotations are from that decision with pages as used in the Supreme Court Reporter.

When commenting on the water supply available to the Central Valley Project, the Supreme Court said at pages 1179 and 1180:

"Nature has not regulated the timing of the runoff water, however, and it is estimated that half of the Sierra runoff occurs during the three months of April, May and June. Resulting floods cause great damage, and waste this phenomenal accumulation of water so vital to the valley's rich alluvial soil. The object of the Plan (CVP) is to arrest this flow and regulate its seasonal and year-to-year variations, thereby creating salinity control to avoid the gradual encroachment of ocean water, providing an adequate supply of water for municipal and irrigation purposes, facilitating navigation, and generating power....

"The water supply facilities along the Sacramento River will regulate its flow, store surplus winter runoff for use in the Sacramento Valley, maintain navigation in the channel, protect the Sacramento-San Joaquin Delta from salt intrusion from the Pacific, provide a water supply for the Contra Costa and Delta-Mendota Canals, and generate a great deal of hydroelectric power....

"The power facilities of the project will, when finally completed, have a capacity of near a million kilowatts. Transmission lines, steam plants, and other essential facilities will be constructed so as to obtain the maximum utilization. It is estimated that through the sale of this power the United States will receive reimbursement for over half of its total reimbursable expenditures....

"The over-all allocation of these enormous costs has not been definitely determined. That portion of the costs ultimately allocated to power facilities will be reimbursed at 4% interest but that allocated to irrigation facilities will be reimbursed at no interest. Moreover, the Federal Government will receive no reimbursement for that portion of the cost allocated to numerous aspects of the project, such as navigation, flood control, salinity prevention, fish and wildlife preservation and recreation. The irrigators will, therefore, be chargeable with but a small fraction of the total cost of the project."

At page 1186 the Court made further comment:

"In considering appellee's specific constitutional contentions, it is well to recapitulate. The Central Valley Project is multi-purpose in nature. That portion of the project expense attributable to navigation, flood control, salinity prevention, recreation and fish and wildlife preservation is nonreimbursable. The remainder of the total expense, and the only part that is reimbursable, is divided between two main sources. The first is hydroelectric power which estimates indicate will be chargeable with over 50 percent of the reimbursable expense, plus interest on the part representing electric plants in service. The other is irrigation, which pays the rest without interest charge. In short, the project is a subsidy, the cost of which will never be recovered in full."

Contra Costa County Water Authority Exhibit 30A contains several mentions of a sum amounting to $5,630,000 for salinity control. The first mention is in response to Question 9 as posed to a committee formed in 1943. This committee was composed of individuals and representatives from Federal and State agencies (Staff 9, p. 593). This question (9) was, "What allocations of costs should be made respectively to navigation, flood control, salinity control and national security?" The answer is quoted in part in CCCWA 30, page 2, that out of an estimated total cost of the project at $364,511,000 on June 15, 1945, $5,630,000 was allocated to navigation "for elimination of salt water barrier". Later, "The operation of Shasta Reservoir eliminates the necessity of constructing a barrier to prevent salt water intrusion. Such a barrier would seriously interfere with lower river navigation." This is the same feature for which the Chief of Engineers, War Department, advocated an allotment of $12,000,000 (Staff 9, p. 545). Mention is then made on page 3 of CCCWA 30A that a "subcommittee report directed attention to the fact that Congress has authorized $5,630,000 as a Federal contribution to the project because Shasta Reservoir eliminates from consideration the salt water barrier which has been proposed as an alternative salinity repulsion measure". With so many references to navigation coupled with salinity control, it is probable that any allotment for salinity control is lost in the navigation allotment of $18,083,000 approved and adopted by Secretary of Interior Krug by letter to President Truman, dated December 3, 1946 (Staff 9, p. 576).

The Bureau's asserted justification for a claim of annual benefits amounting to $1,600,000 for salinity control is contained in Senate Document 113, 1949, 81st Congress (the so-called Blue Book). It is claimed that an annual outflow of 3300 second-feet, equivalent to 2,400,000 acre-feet, must pass Antioch to protect the Sacramento-San Joaquin Delta from salinity intrusion of ocean water. It then states, "Controlled releases of water to the Sacramento-San Joaquin Delta for salinity repulsion will result in increased crop production, make possible a wider choice of crops to be grown, permit double-cropping and benefits now served from delta channels" (USBR 176, p. 78). If these benefits are to result, the quality of water will have to be on a parity with that guaranteed to the Contra Costa Canal and the Delta-Mendota Canal. The report continues with the statement that "the large future diversions which will be required for Central Valley lands could not equitably be made without maintaining salinity control for delta lands." The estimate of an annual benefit of $1,600,000 for repulsion of salinity is then presented (USBR 176, pp. 61, 78).

The President's Water Resources Policy Commission in 1950 declared that the Delta-Cross Channel furnishes water for irrigation and salinity control (CCCWA 37A, p. 1). In view of the record of water quality in the western portion of the Delta, the users of this water have received no benefits.

Maximum salinity of tidal flows at Antioch for the pre-Shasta period, 1925 through 1943, occurred on September 5

as an average. For the post-Shasta period, 1944 through 1954, the maximum was reached on August 18 as an average. These data would indicate that the growing season on the western portion of the Delta has been shortened by 18 days through the operation of Shasta Dam and the Delta Cross Channel. The same 18 day shortening applies to the dates of maximum salinity in the Delta above Antioch and, probably by coincidence, the dates are identical (Sacramento-San Joaquin Water Supervision Reports). Bureau Exhibit 157 is intended to show the decrease in chloride content of the flow at Antioch during the critical 77-day period June 16 to September 1, after Shasta Reservoir was put in operation in 1944. A study of the basic data will reveal that this so-called improvement is due to releases from Shasta Dam storage in excess of inflow to the reservoir during June. If the total inflow to the Delta during July and August is used for comparison purposes for both pre-Shasta and post-Shasta periods, this so-called improvement will disappear.

Testimony was given at a hearing before a Special Subcommittee on Irrigation and Reclamation on October 29-31, 1951, by witnesses for both the State and the Bureau. A witness for the Bureau testified that "in order to deliver 610 cubic feet per second at the pumps (July 1951), it required 8,000 second-feet of water." He continued, "Now the quantity of water required for salinity repulsion has been estimated both by the United States Bureau of Reclamation and the State at about 4,500 cubic feet per second. The Bureau

has estimated that the Delta consumptive use is also in the neighborhood of about 4,500 second-feet of water" (CCCWA 36A, p. 2). A flow of 4500 second-feet is about 276,750 acre-feet per month. This is the same amount (4500 cfs) as the State Engineer would have passed through the Delta under his proposed Feather River Project as set forth in his May 1951 report.

The Bureau furnished additional data in support of this testimony. The Superintendent of Central Valley Project Operations gave, as his opinion, that "under the conditions prevailing during July 1951 about 610 cubic feet per second were all that could be diverted without increasing the releases from Shasta Reservoir in order to maintain a suitable quality at the points of diversions." He furnished a table which showed that in July 1951, 11,580 cubic feet per second were released at Keswick Dam; 9,270 cubic feet per second were passing Sacramento below the confluence of the American River; and 10,240 cubic feet per second were entering the Delta (Staff 9, p. 741).

The Department of Finance filed Application 5626 on July 30, 1927. Saline control was listed as one of the purposes. Application 9364 was filed by the same Department on August 2, 1938 and included saline control among its purposes. On September 3, 1938, these applications were assigned to the Bureau with certain reservations to protect lands within the watershed of the Sacramento River above Kennett dam site (Staff 2 & USBR 86). The inclusion of

"saline control" as one of the purposes was omitted when the assignment was made (USBR 87). However, Bureau's Exhibit 87A shows these applications were amended in 1951 and among the uses are "To provide irrigation water of suitable quality for the Delta-Mendota and Contra Costa Canals, it is believed that up to 6,000 cfs of direct diversion and/or storage releases may be required to flow into Suisun Bay in order to dispose of the chemical elements that would otherwise accumulate in the irrigation waters flowing in the delta channels of the Sacramento and San Joaquin Rivers." It will be noted that all channels of the Delta are included, and not those which lead only to the Contra Costa and Tracy pumping plants.

A witness for the Bureau testified before the Assembly Interim Committee on Conservation, Planning and Public Works, in March 1952. His testimony was to the effect that the Bureau was able to store for later release from Shasta Reservoir water that formerly ran down the river uncontrolled into the ocean. He pointed out the locations of the lines representing isochlors of 100 parts per 100,000 on a map. These data covered the period 1943 through 1951. This same information appears on USBR Exhibit 154, together with other data. He testified that the same isochlor for the year 1947 reached a little further upstream than the Bureau intended and that "Salinity control, I think I am sure, will be effectuated from here on out to the degree that it has been exercised from 1943 to 1951", as shown on the map. He testified further that the Bureau's releases (from Shasta) will be about 12,000

second-feet to take care of the multiple uses of the project (CCCWA 37A, p. 4 & Table 4, line 4).

A witness for the State at this March 1952 hearing testified, "I think to answer that we first should define what we mean by salinity control. It is generally accepted that the water is satisfactory for irrigation use if its chlorine content does not go over 100 parts per 100,000 which would be 1000 parts per million. And that has been the criteria which we have used as indicating satisfactory salinity control during the past summer (1951). The final figures have not, as yet, been worked out but the line of salinity invasion - maximum line - lay approximately between Collinsville and Antioch, which has been approximately the point we consider satisfactory for salinity control in the Delta." When asked, "That is the point at which the project is planned to control salinity?", he replied, "Yes" (CCCWA 37 A, p. 3).

The Trial Distribution Report for 1954, dated April 1955, contains a "Memorandum of Understanding Relating to a General Approach to Negotiations for Settlement of Water Diversions from the Sacramento River and Sacramento-San Joaquin Delta with the Objective of Avoiding Litigation." After reciting the purpose of the "Understanding", namely, that the "water users and the Federal Government are accordingly attempting to negotiate an adjustment of the various matters" without litigation "so that the Central Valley Project can function in the manner intended without injury to the water users" with the State of California participating in these

negotiations through its State Engineer and its Attorney General, an "Outline of Approach" was adopted by representatives of the Bureau; Attorney General, State of California; State Engineer; and Sacramento Valley Water Users Committee (DWR 19, pp. 44-50).

It was understood by all parties "This general approach shall not in any way prejudice any water rights claimed by any of the parties, nor shall anything contained in this memorandum in any manner affect the powers, duties and responsibilities of the parties hereto as prescribed by law" (DWR 19, p. 47).

For the purposes of the approach to settlement "The Federal Government may store and divert water available not in conflict with the rights of water users to the extent of reasonable requirements for the following purposes: (a) Navigation, (b) Salinity Control, (c) Delta Mendota Canal, (d) Contra Costa Canal and (e) Power" (DWR 19, pp. 47 & 48).

It was agreed that "The legislative formation of a district comprising the area above Sacramento will be sought." It was also agreed that "The riparian owners and appropriators below Sacramento are entitled to the natural flow of the Sacramento River, including accretions thereto to the extent of their present and potential beneficial use, which is the full consumptive use of water required for the irrigable area"(DWR 19, p. 49). "Salinity control in the Delta to the extent to be determined is an obligation of the Federal Government" (DWR 19, pp. 48-49). When the Cooperative Study

Program was undertaken in 1956, "The assumption was made that all of the Delta lowlands, shown on Plate 3 of Volume 1 'Report on 1956 Cooperative Study Program' are riparian to channels of the Delta."

Needless to say, no agreement was reached. While we realize that as a general rule any matters discussed in an attempt by the parties to reach an agreement or compromise are not admissible as evidence, nevertheless, this memorandum is in evidence. The memorandum does have a bearing on the hearing in that it shows the atmosphere that prevailed at the time it was executed. It is also in line with the decision of the United States Supreme Court in the Ivanhoe Case previously cited.

The Regional Director for the Bureau, Mr. C. H. Spencer (Sacramento), addressed a letter, dated July 10, 1957, to the Director of the Department of Water Resources, in which he outlined the procedure of the Bureau for the future. He claimed the Bureau was not obligated legally to control salinity to a certain standard at a point near Antioch. He considered that "the obligations of the Central Valley Project are satisfied when a satisfactory quality of water is provided at the intakes to the Contra Costa and Tracy pumping plants" (USBR 154, p. 3).

Mr. Spencer stated that under his conception of the Bureau's obligation as regards salinity control, its past operation under this precept has protected 95% of the Delta against incursions of highly saline water. He attached a

diagram to his letter which he claimed would demonstate 3,000,000 acre-feet of fresh water during a critical 77-day period would have to flow into Suisun Bay if the last 20,000 acres are to receive water. Mr. Spencer then made the realistic suggestion that "if it is considered desirable to provide this 20,000 acre area with fresh water--or to furnish municipal and industrial water of good quality to nearby areas, I am confident it can be done at far less cost in precious water supplies" (USBR 154, p. 4).

I can assume Mr. Spencer means fresh water to be that of the maximum chlorinity which is used in the Contra Costa Canal contract (250 ppm of chlorides), or to be that which will not exceed an annual average of 450 parts per million of total dissolved solids as provided by Item (d) of the Amended Exchange Contract for the Delta-Mendota Canal (USBR 82).

A map which is also attached to his letter shows that water having maximum annual chlorides of 100 parts per 100,000 remained below the irrigated portion of Sherman Island during 1945, 1946, 1948, 1951, 1952 and 1958 in the regular operation of the project for the 14-year period 1944 through 1957. His letter, however, opens the way for agreement on a method by which water of acceptable quality can be furnished the 20,000 acres at far less cost than in precious water supplies (USBR 194).

Mr. Gerald H. Jones testified to the cost of carrying out an alternative for Sherman Island along the lines

suggested in the letter introduced as USBR Exhibit 154. Mr. Jones made a study of the irrigation and drainage needs of the portion of Sherman Island that is being irrigated (upstream from Mayberry Slough). He made an estimate of the cost of syphon diversions at Emmaton and opposite Jersey Point and the canals leading from the diversion points to serve the needs of the irrigators who at present are being served through their individual pump facilities along both the Sacramento and San Joaquin River sides of the island. He estimated that the delivery of water having a chlorinity of not to exceed 100 parts per 100,000 at high tide at these diversion points would require only 1800 cfs of outflow from the Delta.

Mr. Jones pointed out that amounts of diversions by syphons would be greatest at high tides. In his Exhibit SRDWA 86, he presents a tabulation showing the various outflows from the Delta that would be required to provide a certain salinity at Three Mile Slough, Emmaton, Mayberry Slough and at a point 0.6 mile west of Antioch for both high tide and the mean tidal cycle surface zone. An outflow of 4500 cfs for salinity control, as used by both the State Engineer and a Bureau witness in 1951 (CCCWA 36A, p. 2), would provide a mean tidal cycle surface zone salinity of 560 parts of chloride per million parts of water at Antioch, according to his tabulation. If a high tide salinity of 1000 parts of chloride per million is to be provided; 5200 cfs will be required at Antioch, 2750 cfs at Mayberry Slough and 1800 cfs at Emmaton.

The estimated capital cost of the required pumping facilities and canals was $150,000. Additional costs, such as power costs for pumping and drainage, were estimated at $15,000 per year. The saving in outflow by making diversions at Emmaton and opposite Jersey Point would be 2700 cfs over the amount used by the State Engineer and a Bureau witness in 1951; that is, 4500 cfs.

Following are my suggestions for terms and conditions to solve the salinity control problem on the Delta. The State is included in this discussion because I believe it eventually will have to bear part of any burden imposed on water released from storage.

1. If the users of water in the Delta are to be required to pay the Bureau for firming-up of irrigation water, the quality of this water should be equivalent to that furnished other contracting parties. A chlorinity of 250 parts per million (ppm) is guaranteed at the Contra Costa Canal and an annual average of not to exceed 450 ppm of total dissolved solids is the quality guaranteed for the Delta-Mendota Canal by the Amended Exchange Agreement.

A provision that the contracting parties would not have to pay if the water exceeded a chlorinity of 250 ppm would be meaningless as it would leave the Delta interests at the mercy of the Bureau and the State. I believe that water with a chlorinity of not to exceed 250 ppm could be called "fresh water" for the purposes of this discussion although water with such chlorinity would be considered only "fair"

in the Government's own classification of irrigation water.

If water were to be used for double-cropping in the Delta, as suggested in Blue Book, page 78, its quality should not exceed 250 parts of chlorides per 1,000,000 of water river-side (9e Contracts) at the point of diversion. Mr. C. H. Spencer, Regional Director, Region 2, Sacramento, stated in writing (USBR 154) that in order to furnish fresh water to the entire Delta, a release of 3,000,000 acre-feet from Shasta or Folsom during the critical 77-day period from June 16 to September 1 would be required. I believe that such a release for the limited area to be served would not be in the public interest if an alternative plan can be worked out.

2. It is my opinion that the requirement for a chlorinity of not to exceed 100 parts per 100,000 (1000 ppm) at a point 0.6 mile west of Antioch has been the objective of the Bureau and the State since Bulletin 27 was published in 1931 and continued up to the time of Mr. Spencer's letter of July 10, 1957 (USBR 154). Water of this quality 0.6 mile below Antioch would furnish water fit for domestic purposes to Delta lands at a point near Emmaton and Jersey Island and would require an outflow of from 3300 cfs to 5000 cfs (DWR 5, p. 237).

Bureau's Exhibit 154 (Mr. Spencer's letter - 1957) opens the door for negotiations among the Bureau, State and affected parties for a substitute plan which will eliminate such costly flows to the Delta as 3,000,000 acre-feet in the period June 16 to September 1. If the parties can agree on

the maintenance of a flow of water having a quality not exceeding 1000 ppm of chlorides at a north and south line passing through Emmaton, testimony shows that the expenditure of $150,000 in revamping the water facilities on Sherman Island and an annual operating cost of $15,000 would satisfy those users. No testimony was offered on the cost of similar facilities on Jersey Island and the mainland of Contra Costa County. Such an agreement would require from 1400 cfs to 1800 cfs (depending on the tidal phase) for salinity control, and result in a saving of from 1900 cfs to 3400 cfs of valuable water. The value to the Bureau and State in furtherance of their plans of the water thus conserved should more than offset any expenditures required to perfect such conservation.

The retention of jurisdiction in this feature will enable the Board to impose terms and conditions on the State for reimbursement to the Bureau at a ratio agreeable to both parties or at a ratio that the Board believes just for any money the Bureau expends in conserving water as suggested above, if and when the State seeks to divert water from any reservoir in the watershed of the Sacramento River or from the Delta when the natural inflow is not sufficient to maintain the desired salinity control.

The Bureau should maintain a quality of water at a point 0.6 mile below Antioch of not to exceed 1000 ppm of chlorides until some agreement, acceptable to the State and local interests, can be negotiated for any conservation plan requiring less water. The Board should maintain jurisdiction in this matter until such an agreement is reached.

Coordination of Federal - State Projects

The following data are presented to illustrate how the plans of the Bureau and the State have expanded since 1951. They also show there is a duplication of areas to be served. The solution of the problem presented by these conflicts lies largely in continuing jurisdiction by the Board.

The "Report on Feasibility of Feather River Project", May, 1951 (CCCWA 38) shows that with the construction of a dam providing 3,500,000 acre-feet of storage on the Feather River at Oroville, water to serve the needs of the Santa Clara Valley, the Upper San Joaquin Valley and Southern California would be supplied. When operated in conjunction with the Shasta and Folsom Dams of the Bureau, it would also serve the Bureau's Central Valley Project to the following extent:

"1. Riparian and appropriative rights along the Sacramento River from Shasta Reservoir to Sacramento.

"2. Maintenance of flow of 5,000 second feet at Knights Landing for navigation.

"3. Consumptive uses and evaporation in the Sacramento-San Joaquin Delta.

"4. A supply to the Contra Costa Canal of 55,000 acre-feet per year.

"5. A supply to the Delta Uplands of 80,000 acre-feet per year.

"6. Requirements under the Exchange Agreement.

"7. Salinity control of Antioch (4,500 second feet into Suisun Bay).

"Use was made of estimated return flows for meeting requirements downstream from Knights Landing.

"After meeting all of the foregoing requirements, the study showed that there would have been an additional firm yield from Shasta Reservoir under an irrigation schedule of 550,000 acre-feet per year and a firm irrigation yield from Folsom of 975,000 acre-feet per year" (CCCWA 38, p. 18).

The Feather River Service Area comprising 322,200 acres (gross) would be served with Feather River water, with return flows contributing to the Delta (CCCWA 38, pp. 22 & 23). "The study shows that with the available excess water in the Delta, supplemented by releases from Oroville Reservoir, it was possible to obtain a continuous flow for diversion of 3,930 cubic feet without deficiency, or about 2,845,000 acre-feet annually over the 27-year period of operation" (CCCWA 38, p. 22). This is the water that would be available for use in the Upper San Joaquin Valley and exportation to the Santa Clara Valley and Southern California. When Bureau witnesses were questioned by a Board member whether the items numbered 1 through 7 (CCCWA 38, p. 18) did not represent the aims of the Bureau at that time (1951) there was no negative response.

The Bureau presented its most recent plans for the Central Valley by Exhibit USBR 164. The water supply used in making this study consisted of the Trinity River importations,

Sacramento River, Shasta Reservoir unit and the American River unit of the Central Valley Project. The Board had granted permits to the United States previous to this hearing on the Trinity, American and San Joaquin Rivers. The entire flow of the Feather River was included as a tributary of the Sacramento River. When the attorney for the Bureau was asked if this plan as proposed would interfere with the State's Feather River Project of the State Water Plan, he stated that it would. The State's attorney then suggested that the hearing might be recessed while the State and Bureau attempted to work out a solution of this problem. The Bureau's attorney agreed to the suggestion and a recess was taken on November 4, 1959. The Bureau and Protestants were asked by the Board at that time to attempt to reach a solution of their differences.

When the Board reconvened the hearing on April 19, 1960, the representatives of the State and Bureau stated they had arrived at an agreement, as to how the unappropriated water reaching the Delta would be divided between the Bureau and State which was finalized on May 16, 1960 (DWR 77).

The agreement between the State and the United States provides for a division of the water on the basis of the water yield to the United States pursuant to its applications on the Trinity, American and Sacramento-San Joaquin Delta under applications and permits, being 8,300,000 acre-feet per year, and those of the State on its Feather River and Delta Diversion projects as outlined in applications, being 5,260,000 acre-feet per year. The agreement states that in

event of a shortage the available water shall be divided between the two parties on the ratio of 8,300,000 to 5,260,000 (DWR 77, p. 6).

The annual diversion requirements of the United States are set forth in the Agreement (DWR 77) on page 7 as follows:

1.	Sacramento River and bypass rivers	3,000,000 acre-feet
2.	Delta Uplands	400,000 acre-feet
3.	Sacramento Canals, Cow Creek and Yolo-Zamora Units	740,000 acre-feet
4.	Folsom Service Area	910,000 acre-feet
5.	Amended Exchange Contract 11r-1144, Delta-Mendota Canal losses and service along Fresno Slough	1,070,000 acre-feet
6.	Delta-Mendota Canal	645,000 acre-feet
7.	Contra Costa Canal	195,000 acre-feet
8.	Shasta County	65,000 acre-feet
9.	Additional irrigation from Delta	735,000 acre-feet
10.	Additional municipal and industrial from Delta	540,000 acre-feet

Testimony was presented that the proposed East Side Canal would receive its water supply from one or more of the above items.

The State (Department) claims an annual diversion requirement of 5,260,000 acre-feet which includes 1,250,000 acre-feet allocated to the proposed Federal San Luis service area. This 1,250,000 acre-feet shall be transferred to the Federal Central Valley Project if the United States constructs and operates works to deliver water to the proposed Federal

San Luis service area. Congress approved the San Luis Project on June 3, 1960, and the people of the State of California approved the bond issue for the State Water Plan on November 8, 1960, while the hearing was in progress.

The agreement also states "In addition to the annual diversion requirements described above, the State and Federal projects will meet certain requirements for navigation, fish conservation, outflow from the Delta and water service through direct diversion from the Feather River, in the Upper Feather River Basin and to the Delta Lowlands." It will be noted that there is no direct reference to salinity control unless it is included in the "outflows from the Delta". It will also be noted that the uses set forth in the abowe quotation are included in vested rights under the County of Origin Law, rights under the Watershed Protection Law, or are nonreimbursible items under Federal Reclamation Law. In the absence of particular reference to liability for salinity control, the Board can only conclude that it is included as above quoted.

At the time the Director of the Department of Water Resources of the State testified at the hearing he was asked if any agreement had been reached with the United States as to how any allocation of water for salinity control would be allocated. He stated that this phase of the problem would have to be worked out when the operational agreement between the United States and the State was negotiated.

Section 12934 of the Water Code gives a description of the State Water Facilities to be financed through sale of State Water Resources Development Bonds. The amount to be diverted beyond the Tehachapi Mountains will be conveyed by an aqueduct having a capacity of 2,500 cubic feet per second. If the aqueduct were operated to capacity for one year it would deliver 1,810,000 acre-feet. According to the Agreement of May 16, 1960, the Department's annual diversion requirements is 5,260,000 acre-feet. The facilities outlined under Section 12934 of the Water Code, in addition to the San Joaquin-Southern California Aqueduct, include the North Bay Aqueduct, South Bay Aqueduct and the Pacheco Tunnel-Santa Clara Valley Aqueduct. The last three units overlap the Federal Central Valley Project service area. The amount allocated to the San Joaquin Valley, Southern California and the Santa Clara Valley under the Feather River Project Report was only 2,845,000 acre-feet per year.

During the course of the hearing, the Bureau presented an exhibit which showed the ultimate results it would accomplish by means of its Trinity, Shasta and American River facilities. The Board has permitted the Bureau to extend the service area of the Trinity River diversion facilities to include all the service areas of the original Trinity, Shasta, Folsom and Friant Dam facilities and additional areas around Merced, Westland I. D., Friant-Kern Canal and other small areas that had been omitted when the maps accompanying the original

applications for the four facilities mentioned above were prepared. Under this decision, Trinity River water may be used to firm up the supplies of the Sacramento River (Shasta Dam), American River (Folsom Dam) and the San Joaquin River (Friant Dam).

The variances between the Bureau's Central Valley Project and the Department's Feather River Project of 1951 and the plans as presented at the hearing, involving no more water than was available in 1951 (except for the Trinity River diversion), poses a problem that cannot be solved by the Board. All it can do is maintain continuing jurisdiction until the Department receives its permits for the State Water Plan and has arrived at an operational agreement with the Bureau as proposed in the testimony of the Director of the Department.

WATERSHED PROTECTION

What is presented under this heading is submitted to show that the Watershed Protection Law is not nearly as burdensome to the Bureau as its counsel contended during the hearing. The year 1943 was one of median runoff for the period 1921-1954, inclusive. It was also the last year of natural conditions on the Sacramento River prior to the commencement of storage behind Shasta Dam although 5,000 acre-feet were stored in July and released later in the season. The addition of 5,000 acre-feet to the discharges at downstream gaging points during July would permit their use with reasonable accuracy in a hydrological study under natural conditions along the Sacramento River and into the Delta.

A study of the hydrological data before Shasta Dam began to store water shows that the months of July and August were the months of minimum runoff from the mountains and the months of maximum diversion of water when it was available. Such a study also shows that the reach of the Sacramento River from Red Bluff to the entrance of Colusa Drain above Knights Landing was the critical one. The largest diversions occur in this reach. The return flows from applied irrigation; runoff from mountain and foothill streams; rainfall going into ground water storage; and local bank storage (water that percolates from the river at high stages) and its later return to the river or drains, are all contributing factors to the water supply for this reach.

Diversion from the Sacramento River between Red Bluff and the entrance of Colusa Drain during July and August 1943 was the greatest in history up to that year, except for minor differences of less than 3,000 acre-feet for the various sections of the reach. Such exceptions were two in number when the maximum diversions were in July 1942.

Table 6 (page 65) illustrates the disposition of water in July and August of 1943 for the reach between Red Bluff and the Colusa Drain entry. Table 7 (page 66) indicates the acreage irrigated between Red Bluff and Knights Landing, during 1943 and 1954.

The return flow from the Glenn-Colusa Irrigation District reaches Colusa Drain and is rediverted for further use on lands distant from the Sacramento River, which in turn provides return flow. The balance of the water from Colusa Drain is either turned down the Yolo By-Pass for users with rights on that channel or is returned to the river at Knights Landing and is not available for use in the reach under discussion.

It will be noted that claimed rights to divert water from the river exceed the actual diversions in these two months. A further study also shows the increased diversions from this reach of the river from 1944-1954, inclusive, were possible only because of releases of stored water from Shasta Reservoir during every August and in 6 years during July.

Diversions during July and August of 1954 for the reach of the Sacramento River between Red Bluff and entry of

TABLE 6

FLOWS, DIVERSIONS, AND CLAIMED RIGHTS
FROM SACRAMENTO RIVER
JULY AND AUGUST, 1943
(Thousands of acre-feet)

Station	July			August		
	Flow (1)	Diverted (2)	Claimed Rights (3)	Flow (1)	Diverted (2)	Claimed Rights (3)
Shasta Dam	270			234		
Red Bluff	288(4)	119	241	244	119	219
Butte City	217(4)	11	37	156	12	33
Colusa	208(4)	68	112	149	69	102
Wilkins Slough (5)	160(4)	30	46	103	29	42
Colusa Drain	148(4)			94		
Knights Landing	161(4)			116		
Verona	259(4)			175		
Sacramento(6)	304(4)			175		

NOTES: (1) USBR 100, Tables 3 through 10

(2) USBR 100, Tables 83 through 86 and Staff 6

(3) USBR 108

(4) 5000 acre-feet added for storage in Shasta Reservoir, USBR 100, Table 40

(5) Staff 6

(6) Below mouth of American River

TABLE 7

AREA IRRIGATED BETWEEN
RED BLUFF AND KNIGHTS LANDING
(Acres)

Reach	1943			1954		
	Rice	Other	Total	Rice	Other	Total
Knights Landing to Wilkins Slough	9,299	4,594	13,893	14,631	14,449	29,080
Wilkins Slough to Colusa	35,777	29,580	65,357	40,093	34,667	74,760
Colusa to Butte City	4,275	4,765	9,040	19,644	10,712	30,356
Butte City to Red Bluff	55,316	62,663	117,979	84,198	38,114	122,312
TOTAL	104,667	101,602	206,269	158,566	97,942	256,508

NOTE: All acreages were taken from Water Supervision Reports (Staff 6).

Colusa Drain were the greatest of record to that year. These increased diversions were possible only because of releases of stored water from Shasta Reservoir. Table 8 (page 68) illustrates the disposal of water during these months has been prepared similar to that for 1943.

The diversions shown in Table 8 for July and August 1954, were only possible in the amounts shown because of releases from storage at Shasta Dam. The tabulation shows that the claimed pre-1954 rights exceeded the actual diversions even in this year. If the diverters between Red Bluff and Knights Landing had to rely on the flow of the Sacramento River (if Shasta Dam had not been built), their diversions would have been a great deal less in July and August.

The year 1941, during which the discharge of the Sacramento River (July plus August) was the greatest of record for the period 1922 through 1954, was also the only year which would have permitted diversions in the full amount of the claimed pre-1954 rights between Red Bluff and Knights Landing. The problem would then become one of available land on which to use the water. The Report of Analysis on "Trial Water Distribution 1954" (DWR 19) contains a map of 8 sheets showing the land irrigated in the Sacramento Valley for the year 1954. An examination of this map shows that there are large acreages which are not irrigated with water either diverted from the Sacramento River or return flows. These acreages could be irrigated only from wells or other tributary streams.

TABLE 8

FLOWS, DIVERSIONS, AND CLAIMED RIGHTS
FROM SACRAMENTO RIVER
JULY AND AUGUST, 1954
(Thousands of acre-feet)

Station	July			August,		
	Flow (1)	Diverted (2)	Claimed Rights (3)	Flow (1)	Diverted (2)	Claimed Rights (3)
Inflow, Shasta Reservoir	207			199		
Release, Shasta Reservoir	503			499		
Red Bluff	706	178	241	706	163	219
Butte City	539	32	37	539	29	33
Colusa	522	102	112	535	95	102
Wilkins Slough (4)	424	44	46	457	39	42
Colusa Drain	431			479		
Knights Landing	438			523		
Verona	493			593		
Sacramento (5)	498			568		

NOTES: (1) USBR 100, Tables 3 through 10

(2) USBR 100, Tables 83 through 86 and Staff 6

(3) USBR 108

(4) Staff 6

(5) Below mouth of American River

There are frequent references to the underground water in the Sacramento Valley. Bulletin No. 21 (1929) at page 76 describes the El Camino Irrigation District, which was supplied entirely with water pumped from the underground supply. Bulletin No. 26 (1931) at page 81 states, "about 203,000 acres, or 28% of the irrigated lands in the Sacramento Valley and adjacent foothills in 1929 were served by pumping from ground water". Appendices "F and C" of Bulletin 26 explain the ground water resources of the ground water in the Sacramento Valley. Table F-1 of Appendix "F" shows the estimated ground water capacity to be 3,019,000 acre-feet in a zone 35 feet thick.

It should be apparent, in the light of the evidence introduced at the hearing, that the problem of claimed rights and their amounts is of no concern to the Board, once the pertinency of the Watershed Protection Law is established including a provision that the Sacramento Valley and Delta lands are to be guaranteed water by contract before stored water from Shasta Dam is exported to the San Joaquin Valley. The Board has no jurisdiction at this time to determine the amount of any party's right to use water. Furthermore, the Board has no jurisdiction over the use of the underground water basin underlying the Sacramento Valley. This provides the basis for establishing the need for applying watershed protection to stored water. It also shows that the Project operators would not be impaired by application of the Watershed Protection Law.

Signed at Sacramento, California, this 9th day of February, 1961.

/s/ W. P. Rowe
W. P. Rowe, Member

STATE OF CALIFORNIA
STATE WATER RIGHTS BOARD

In the Matter of Applications 5625, 5626, 9363, 9364, 9365, 9366, 9367, 9368, 10588, and 15764,

UNITED STATES OF AMERICA, BUREAU OF RECLAMATION,

Applicant

SACRAMENTO RIVER AND DELTA WATER ASSOCIATION, ET AL.,

Protestants

Sources: Sacramento River, Rock Slough, Old River, and Channels of the Sacramento-San Joaquin Delta

Adopted December 23, 1964

ORDER EXTENDING TIME IN WHICH TO FORMULATE TERMS AND CONDITIONS RELATIVE TO SALINITY CONTROL PURSUANT TO DECISIONS D 990 AND D 1020

Condition No. 25 of the Board's order under Decision D 990, made on February 9, 1961, and condition No. 9 of the Board's order under Decision D 1020, made on June 30, 1961, reserved continuing jurisdiction over permits issued pursuant to Applications 5625, 5626, 9363, 9364, 9365, 9366, 9367, 9368, 10588, and 15764 until March 1, 1964, or such additional time as may be prescribed by the Board, for the purpose of formulating terms and conditions relative to salinity control in the Sacramento-San Joaquin Delta.

The initial period of three years was considered reasonable in order to allow the United States, the State of California, and the water users in the Delta an opportunity to work out their problems by mutual agreement; or, failing to reach agreement, to provide the Board with information upon which to make such further order as may be necessary and proper relating to salinity control in the Delta.

The Board finds that no emergency has arisen in the interim requiring imposition of specific permit terms; that additional time for the parties to resolve their problems would not cause injury to any lawful user of water; and that there has been no material change in project operations which would alter the conditions under which salinity incursion is now controlled.

Upon such findings, the Board concludes that the reservation of continuing jurisdiction should be extended.

IT IS HEREBY ORDERED that the State Water Rights Board reserve continuing jurisdiction over permits issued pursuant to Applications 5625, 5626, 9363, 9364, 9365, 9366, 9367, 9368, 10588, and 15764 until further order of the Board, for the purpose of formulating terms and conditions relative to salinity control in the Sacramento-San Joaquin Delta.

Adopted as the order of the State Water Rights Board at a meeting duly called and held in Sacramento, California, on the day of , 19 .

/s/ Kent Silverthorne
Kent Silverthorne, Chairman

/s/ Ralph J. McGill
Ralph J. McGill, Member

/s/ W. A. Alexander
W. A. Alexander, Member