ENGINEER'S REPORT AND REPORT OF THE

ASSESSMENT COMMISSIONERS

FOR THE

NORTH DELTA WATER AGENCY

ASSESSMENT ADJUSTMENT

Pursuant to Article XIII D of the California Constitution

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November 3, 2010

Board of Directors
North Delta Water Agency
910 K St., Ste. 310
Sacramento, CA

Gentlemen:

In accordance with your request, enclosed are six copies of the final Engineer's Report and Report of the Assessment Commissioners for the North Delta Water Agency Assessment Adjustment. We have prepared this report pursuant to the requirements of Article XIIID of the California Constitution, and to support North Delta Water Agency's (Agency's) need to propose an increase in assessments.

We appreciate the opportunity to assist the Agency and hope it is successful in its effort to provide continued service to the landowners within the Agency.

Please call if you have any questions.

Sincerely,

George Basye, Commissioner

Mike Hardesty, Commissioner

Gary R. Kienlen, P.E., Comissioner

cc: Melinda Terry
Kevin O'Brien

CERTIFICATION

I, Gary R. Kienlen, 1771 Tribute Road, Suite A, Sacramento, California, hereby certify that this Engineer's Report and Report of the Assessment Commissioners, which includes the assessments and charges identified herein, was prepared, pursuant to the direction of the North Delta Water Agency Board of Directors, to the best of my knowledge of the available data and project development, and in accordance with Article XIII D of the California Constitution

REGISTERED PROFESSIONAL ENGINEER
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GLOSSARY OF TERMS

Appropriative Water Right – A water right obtained by use or diversion of water for reasonable and beneficial purposes

Agency – North Delta Water Agency

CVP – Central Valley Project

C-2BR – Study of water use and water rights along the Sacramento River and in the Sacramento – San Joaquin River Delta conducted subsequent to the 1956 Cooperative Studies by the U.S. Bureau of Reclamation

C-650-B – Study of water use and water rights along the Sacramento River and in the Sacramento – San Joaquin Delta conducted subsequent to the 1956 Cooperative Studies by the California Department of Water on behalf of the Sacramento River and Delta Water Association

Deficiency –As used in this report deficiency is the water supply which, under pre-Project conditions, is not available to meet water requirements or water rights within the Agency.

Delta – Sacramento San Joaquin Delta as defined in Water Code § 12220 situated within Sacramento, San Joaquin, Solano and Yolo Counties

Delta Lowlands – Lands within the legal Delta that lie at an elevation of five feet or less above mean sea level

Delta Uplands – Lands within the periphery of the legal Delta that are higher than an elevation of five feet above mean sea level

Delta Water Agency – Created by the Delta Water Agency Act – Cal Statutes 1968 Chapter 419 – officially organized January 23, 1069. Dissolved on December 31, 1973 in accordance with Article 8 of the Delta Water Agency Act

DWR – Department of Water Resources

Four Basin Index – Sum of the projected unimpaired inflow to the Sacramento, Feather, Yuba, and American River Basins

Modified Natural Flow – As used in various studies referenced in this Engineers Report, modified natural flows comprise flows that would have existed without diversions from the Sacramento River but with the historical impairment of diversions on tributaries to either the Sacramento River or the channels of the Delta

MOU – Memorandum of Understanding dated May 26, 1998 between the Agency and DWR

Pre-Project Conditions – The baseline prior to Delta exports and the construction and operations of the CVP and SWP storage facilities

Pre-1914 Water Right – An appropriative water right initiated prior to the Water Commission Act of December 14, 1914

Post-1914 Water Right – An appropriate water right initiated in accordance with the Water Commission Act of December 19, 1914

Riparian Water Right – A water right that exists by reason of ownership of land abutting upon a stream or body of water. Riparian rights apply only to lands within the watershed of the stream or body of water; and with certain exceptions only to the smallest parcel abutting the water body

SRDWA – Sacramento River and Delta Water Users Association (active dates 1954-1970)

SWP – State Water Project.

SWRCB – State Water Resources Control Board

Unimpaired Flow –The natural flow of a river basin or watershed unaltered by upstream diversions, storage, or by export or import of water to or from other watersheds

USBR – United States Bureau of Reclamation

1956 Cooperative Study Program – Study of water use and water rights along the Sacramento River and in the Sacramento-San Joaquin Delta by the U.S. Bureau of Reclamation, the California Department of Water Resources, and the Sacramento River and Delta Water Association

Section 1 – Introduction

The North Delta Water Agency (Agency) Board of Directors is considering whether to increase the Agency's annual assessment (2011 Assessment Adjustment), which is levied upon lands receiving special benefits from the 1981 Contract Between State of California Department of Water Resources and North Delta Water Agency for the Assurance of a Dependable Water Supply of Suitable Quality (1981 Contract or Contract) (Exhibit I). To prepare the 2011 Assessment Adjustment, three assessment valuation commissioners (Commissioners) were appointed[1] to view and fix upon the lands of the Agency an assessment valuation per acre for each parcel which is in proportion to the benefits to be derived from the Agency's administration of the Contract and to prepare an assessment roll based upon that valuation. (North Delta Water Agency Act Section 5.20 (Stats. 1973, c. 283, as amended (Agency Act)) § 5.20; Water Code §§ 51322, 51323, 51346.) Proposition 218 imposes additional procedures, including the requirement that all assessment increases be supported by a detailed engineer's report. This Engineer's Report and Report of the North Delta Water Agency Assessment Valuation Commissioners (Engineer's Report) has been prepared to support any Assessment Adjustment to be adopted by the Agency's Board of Directors pursuant to the requirements of Article XIII D § 4(a) & 4(b) of the California Constitution; Government Code § 53750-53754; Agency Act § 5.20; and Water Code § 51200–51409.

North Delta Water Agency

The North Delta Water Agency was formed by the Agency Act, a special act of the legislature adopted in 1973. The Agency's boundaries encompass approximately 302,000 acres which includes portions of the Sacramento – San Joaquin Delta, as defined in Water Code § 12220 situated within Sacramento, Yolo and Solano Counties. The Agency also includes a small portion of the northeastern part of San Joaquin County comprising New Hope Tract, Canal

[1] The commissioners were appointed by the Sacramento County Board of Supervisors on March 24, 2009. In 2009, the Agency Act was amended to give the North Delta Water Agency Board of Directors the role and responsibilities otherwise granted to the Board of Supervisors under Water Code Section 51200 et seq. Agency Act § 5.20(a).

Ranch and Staten Island. (Agency Act § 9.1) A map showing the boundaries of the Agency along with the county boundaries is attached to this Engineer's Report (see Map 1). The purpose of the Agency is to take all reasonable and lawful actions, including to negotiate, enter into, administer, and enforce an agreement or agreements with the United States and the State of California, or either of them, to (1) protect the water supply of the lands within the Agency against intrusion of ocean salinity and (2) assure the lands within the Agency of a dependable supply of water of suitable quality sufficient to meet present and future needs for reasonable beneficial uses.

1981 Contract

Upon its formation, the Agency entered into negotiations with the State of California and the United States for contracts to assure adequate water quality and quantity for the water users within the Agency. In the process of those negotiations, the U.S. Bureau of Reclamation (USBR), on behalf of the United States, withdrew from the negotiations, which were then pursued solely with the State of California. These negotiations resulted in the 1981 Contract, executed on January 28, 1981, which provides for the assurances as to quality and quantity required by the Agency Act (See Exhibit I). To meet these assurances, the 1981 Contract requires the Department of Water Resources (DWR) to operate the State Water Project (SWP) to meet fixed water quality criteria at seven locations within the Agency. These criteria are in effect throughout the year, and must be met except under defined drought emergency conditions (which have not occurred since execution of the 1981 Contract). The Contract also states that DWR shall not through the conveyance of SWP water cause changes in the natural flow, flow direction, or water surface elevations to the detriment of the water users within the Agency. Further, DWR is required to repair or alleviate seepage or erosion damages resulting from the conveyance of SWP water to lands outside Agency and is responsible for modifications to diversion facilities should they be required as a result of the conveyance of SWP water (Contract § 6). Through the Contract DWR acknowledges the right of landowners within the Agency to divert water and agreed to furnish such water as may be required for reasonable and beneficial uses to the extent not authorized under water users' water rights.

In exchange, the 1981 Contract requires an annual payment to DWR, in two installments, to compensate for the reimbursable benefits provided to water users within the Agency. The reimbursable benefits are the enhanced water quality and quantity that result from SWP storage releases in excess of the natural flows available for diversion pursuant to Agency water users' water rights.

The Agency's Board of Directors has successfully administered and enforced the Contract since its execution in 1981 to assure that the required quality of water is maintained, and to assure the rights of water users within the Agency to utilize that water for agricultural, municipal and industrial purposes on lands within the Agency are acknowledged.

Compliance with the California Constitution

Proposition 218 requires any agency that proposes to levy a special assessment to identify all parcels that receive a special benefit from the property-related service being funded. For each identified parcel, the proportionate special benefit must be determined in relationship to the entire cost of the service. The agency must also separate the general benefits from the special benefits conferred on a parcel. Parcels owned or used by a governmental entity must be assessed unless they can be shown, by clear and convincing evidence, to receive no special benefit. (Cal. Const. Art. XIII D, § 4, subd. (a).).

This Engineer's Report describes the lands that receive special benefits from the 1981 Contract, and defines and explains the special benefits these lands receive from continued operation and maintenance of the 1981 Contract, and from the Agency's activities to enforce, administer, and otherwise ensure the benefits of the 1981 Contract. The amount of the assessment is proportional to the special benefits conferred and is distributed based on the acreage of land that receives the 1981 Contract's water quality and water supply benefits. This Engineer's Report also analyzes the nature of the benefits derived from the 1981 Contract, and concludes that the 1981 Contract does not provide any general benefits. Prior to the levy of an assessment, Article XIII D also requires the assessing agency to conduct an assessment ballot proceeding, and the assessment cannot be approved without approval by a

majority of votes cast. This Engineer's Report is intended to provide the voters with factual information to assist in deciding whether or not to approve an increased assessment.

Section 2 – Background

Impact of the Federal and State Water Projects on Historical Water Rights within the Delta

The Agency is an outgrowth of the Delta Water Agency which, in turn, is an outgrowth of the negotiations and settlement between the Sacramento River Settlement Contractors and the USBR during the 1950s and 1960s. Completion of the Shasta Dam on the Sacramento River raised questions regarding the respective rights of water users and the USBR, as project operator, to water flowing down the river and into the Delta. Water users along the Sacramento River and within the Delta asserted their prior rights, which essentially had allowed development of most of the valley and of the entire Delta for agriculture before the Federal Central Valley Project (CVP) with its dam at Shasta was commenced. Negotiations extended over a period from the late-1940s to the mid-1960s in an attempt to resolve the nature of the water rights of the CVP and the rights of the prior or potential diverters of water from the Sacramento River and Delta.

These negotiations led to the development of the 1956 Cooperative Study Program. This program collected and analyzed extensive information and data concerning the hydrology, diversions, and water rights for the Sacramento River, and was conducted jointly by agreement among DWR, the USBR and the Sacramento River and Delta Water Association (SRDWA). SRDWA included most of the major water users on the Sacramento River, including those in the northerly portion of the Delta. Data on stream flow, diversions, and return flows available from the U.S. Geological Survey and DWR were collected. Calculations were made of modified natural flows.[2] USBR had previously made detailed studies of which lands next to the Sacramento River upstream of the City of Sacramento had appurtenant riparian water rights (generally the senior-most water rights in the State); these earlier determinations by the parties to the 1956 Cooperative Study Program were reviewed to

[2] Modified natural flows, as used in the various studies, comprise flows that would have existed without diversions from the main stem of the Sacramento River but with historical impairment of diversions from tributaries to the Sacramento River and from the channels of the Delta.

verify that the methods used were reasonable and accurate. Lands downstream of the City of Sacramento were not included in these detailed studies; however, the parties determined it was reasonable, for the purposes of the studies, to assume that all lands within the area described as the Delta Lowlands were riparian to the channels of the Delta, the Sacramento River, and other tributaries to the Delta. Information concerning appropriative water rights initiated under the common law[3] prior to 1914 (which are also very senior rights) was obtained, tabulated, and reviewed. Information on Post-1914 appropriative water rights was tabulated from the files of the State Water Rights Board, predecessor to the State Water Resources Control Board (SWRCB). Determinations of the extent of overlap between lands covered by various water rights, both appropriative and riparian, were reviewed and verified. Using this information and more, numerous studies were conducted to determine the scope of all known and assumed water rights on the Sacramento River system. Deficiencies in the available water supply necessary to satisfy those rights together with supplemental water requirements of diverters along the Sacramento River and the Delta in the absence of the operation of the CVP were also determined. Other information, such as water supply remaining at various points along the Sacramento River and in the Delta after satisfaction of water rights of various priorities was also computed.

In the early 1960s the USBR, acting at the direction of the U.S. Department of the Interior, concluded that it would be difficult to resolve the issues of the respective water rights on the Sacramento River and those within the Delta in the same negotiation. This was because the Delta involved water supply as well as a complex question of water quality. Accordingly, the USBR proceeded with negotiations leading to settlement contracts with the Sacramento River diverters above Sacramento and set aside the negotiations with the Delta water users for later consideration.

[3] The California Legislature adopted the common law of England as the rule of decision for legal cases in the State. The common law is a system of legal rules that judges made in deciding upon cases, rather than by statute or regulation.

Formation of North Delta Water Agency

In order to move forward with a possible settlement of the Delta water quality and quantity issues, the California Legislature formed a Delta Water Agency comprising the entire Delta as defined in Water Code Section 12220. The Delta Water Agency was formed in 1968 with the purpose of attempting to obtain a contract with the USBR as well as DWR, since the SWP had begun operation from its reservoir at Oroville on the Feather River.

Due to a difference in objectives and strategy among its various geographical sections, the Delta Water Agency failed to negotiate a contract and dissolved pursuant to a five-year "sunset clause." Before it expired, the representatives in the northern part of the Delta expressed the desire to form a separate agency. The North Delta Water Agency was formed by an act of the California Legislature on January 1, 1974. Following that lead, the Central Delta Water Agency and South Delta Water Agencies were subsequently formed by the California Legislature.

History of North Delta Water Agency Contract Negotiations

Although many Agency landowners hold significant riparian and appropriative rights, in some years the natural flow of the tributaries to the Delta (without being supplemented by upstream storage releases) is not adequate to supply the volume to sustain the necessary water quality for uses within the entire North Delta area for the entire year. In some years, insufficient inflow could potentially also lead to legal restrictions on diversions by even the senior-most water right holders within the Agency. Following its creation and organization, the Agency entered into negotiations with the USBR and DWR to develop a three-party agreement regarding water rights and water quality. These negotiations continued for five years (1974 through 1978). In March 1979, the Agency was informed that the U.S. Secretary of the Interior had decided to work directly with the State of California to resolve Delta water quality issues. As a result of the Secretary's decision, the Agency was advised by USBR representatives that it would be inappropriate to contract with individual Delta agencies to assure that the CVP would meet any particular water quality standards, including those set forth in SWRCB Decision 1485 (D-1485).

Following the withdrawal of the USBR from the negotiations, discussions were initiated for an agreement between DWR and the Agency. Agreement on a proposed contract was reached on January 17, 1980. The Contract was overwhelmingly approved by a vote of the landowners within the Agency; 154,723 votes were cast in favor of executing the Contract, and 20,296 votes were cast against. The 1981 Contract was executed on January 28, 1981. On May 14, 1981, the Sacramento County Superior Court issued a judgment determining that the 1981 Contract is valid in all respects, binding on the Agency and DWR, and in the best interests of landowners within the boundaries of the Agency.

Water Rights Background

Between 1974 and 1979 various analyses were conducted by DWR and the Agency to better understand the water rights within the Agency, the outflow required to meet Delta agricultural water quality standards, allocation of water right deficiencies, and the Delta Storage concept, which is explained below.

A longstanding and fundamental basis for classifying water rights in the northern Delta is the distinction between the Delta Lowlands and the Delta Uplands. The Delta Lowlands lie at elevations of five feet or less above mean sea level and are largely irrigated by gravity through siphons. The Delta Uplands are peripheral lands higher than five feet above mean sea level and are irrigated by pumping from the channels and sloughs. County Assessors' records obtained from Sacramento, San Joaquin, Solano, and Yolo Counties identify assessed parcels consisting of approximately 194,000 acres of the Agency lying within the Delta Lowlands and approximately 94,000 acres within the Delta Uplands. The County Assessors' acreages do not include areas such as the Sacramento River, the Deep Water Ship channel, and other waterways within the Agency's boundaries. A map of the Delta Upland and Delta Lowland areas within the Agency is attached (Map 2).

In January 1963 the USBR published a series of reports titled "Delta Uplands Service Area Investigations" (Delta Uplands Investigations). For the purposes of the reports, the USBR divided the Delta Uplands into thirteen areas. A separate report summarizing factual data on historic water use, land ownership, water rights, and irrigation and drainage facilities was prepared for each of the Delta Upland areas. In addition, detailed land ownership data was

collected in order to identify which areas in the Delta Uplands could be credited with assumed riparian status. Although no legal determination was made, based on the USBR's review, the Delta Uplands Investigations identify approximately 12,000 acres of Delta Uplands within the Agency that were assumed to have riparian status. As explained in more detail later in this report, according to the files of the SWRCB approximately 39,000 additional acres within the Delta Uplands hold appropriative water rights.

As previously discussed, the 1956 Cooperative Study Program, for the purposes of the various studies, classified all lands within the Delta Lowlands as riparian. These lands were originally identified as "swamp and overflowed" lands by the California State Surveyor through his surveys which were approved by the U.S. Secretary of the Interior in the 1850s and 1860s. California acquired title to these lands pursuant to the "Arkansas Act" adopted by the U.S. Congress in 1850. That act allowed the states to receive title to all lands deemed "swamp and overflowed," provided the buyer of such lands would "reclaim" these lands to make them productive. At the time levees were constructed by reclamation districts in the late 19th Century to reclaim and protect these lands for agriculture, facilities and infrastructure were also constructed to convey water throughout the islands, clearly demonstrating an intent to maintain the riparian status of these lands.

In January 1964 the USBR published a series of reports titled Delta Lowland Service Area Investigations (Delta Lowlands Investigations). For the purposes of these reports the Delta Lowlands were divided into ten areas. The Delta Lowlands Investigations conclude that portions of the Delta Lowlands are also covered by appropriative water rights.

Water Quality Standards

The water quality standards that controlled the operation of the CVP and SWP (Projects) during this period (1974 to 1979) were the agricultural standards set forth in SWRCB Decision 1379 (D-1379). These standards, together with the estimated outflows required to meet these standards, were based on pre-Project conditions (i.e., with no exports from the Delta and no storage in the CVP and SWP reservoirs) and are as follows:

Table 1: D-1379 Agricultural Water Quality Standards

Station	Type of Year	Period	
		April thru July	**August thru December**
Blind Point	Non-Critical	350 ppm. Cl.	1,000 ppm. Cl
		2,800 cfs.	1,600 cfs.
	Critical	1,000 ppm. Cl.	1,000 ppm. Cl.
		1,600 cfs.	1,600 cfs.
Jersey Island & Emmaton	Normal and Below Normal	10 consecutive days between April 1 and May 31, 200 ppm. Cl. 3,100 cfs.	

Negotiations with DWR

By the time the USBR withdrew from the negotiations, most of the preliminary technical work to understand the Projects' impacts upon water users in the Delta had been completed. One significant change after the USBR's withdrawal was the revised water quality requirements as a result of D-1485, which was issued in August 1978. D-1485 did not change the basic agricultural water quality requirements in D-1379 but utilized different control points and limited the period of the requirements from April 1 to August 15 (formerly April 1 to December 31). To assure a water supply of suitable quality and quantity for all of the lands and users within the Agency, water quality criteria for the entire year were developed through discussions with DWR. As discussed in the 1979 memorandum by the Agency's engineer (Exhibit II) the criteria proposed by DWR were modified to allow for ramping of flows which provide for uniform transition between changes in criteria. These criteria, depicted graphically, formed Exhibit A of the 1981 Contract. The criteria are based on the Four-Basin Index which is the sum of the projected unimpaired inflow to the Sacramento, Feather, Yuba, and American River Basins, rather than year type, i.e. Critical, Dry, Normal, Wet, etc. This reflects the fact that the Delta receives flow from multiple watersheds; and therefore, the water supply is not easily classified by year type.

The 1956 Cooperative Study Program and subsequent studies determined the volume of water required to meet Delta water quality standards and satisfy riparian and appropriative water rights based on various assumptions. Pre-Project water supplies available to meet these

requirements were also determined. This information was used by the Agency to determine the available water supply which existed in the Delta absent Project operations during the period 1924 through 1954. The analysis found that in some years the pre-Project water supply was insufficient to meet all of the demands, including riparian demands, within the Agency. It was further determined by the Agency that these "deficiencies" should be allocated to the water users. The analysis gave credit for water supplies available to Delta water users under the "Delta Storage" concept.

The Delta Storage concept recognizes that, under natural conditions (i.e., pre-Project operations), the Delta operated not as a flowing stream but as a storage reservoir which filled with fresh water during the high flows of winter and thereby sustained a usable level of quality for agriculture for a large part of the Delta until quite late in the season, often after the irrigation season had been completed. The Projects have changed the effect of the Delta storage by withholding, through storage upstream, much of the high winter flows that historically held out salt water from the San Francisco Bay and thus developed and maintained the high Delta water quality. This storage, combined with the effect of the pumping plants located at the southerly end of the Delta drawing water across the Delta channels, changed what had previously been storage of high winter flows of good quality water within the Delta into a condition more like a flowing stream. In short, much of the water released and exported by the Projects essentially replaces the naturally stored, usable water supply historically available to users within the Delta.

In negotiating with the Agency DWR did not evaluate the individual water rights of the water users within the Agency, but instead determined deficiencies in the ability of the pre-Project water supply to meet the quantity and quality demands within the Delta. This determination was based on studies it performed using water supply scenarios with and without the operation of the Projects. Based on its studies DWR proposed, and the Agency accepted, a deficiency figure for the purpose of developing the Contract payment for Project benefits. The original Contract payment was $170,000, and is subject to periodic escalation as set forth in the Contract. The 1981 Contract thus represents a Water Right Settlement Agreement between DWR and the Agency on behalf of its landowners recognizing the water rights of the lands within the North Delta area. Although the Projects' water rights are junior to almost all

rights in the northern Delta, the Contract recognizes that these junior rights provide benefits to Delta water users by supplying flows which nature periodically fails to provide.

The Agency's Contract payment was based on the average annual deficiency in the water supply available to meet the water supply and water quality requirements of water rights of the lands within the Agency. The Contract payment represents the majority of the Agency's annual costs. The Agency is supported through annual assessments charged to the lands within its boundaries. Since the 1981 Contract was executed, however, considerable acreage within the Agency has been and is being acquired by State or Federal agencies. The Agency has received no contribution from many of these State and Federally owned lands for the benefits provided by the 1981 Contract. Proposition 218 requires all local agencies, including the Agency, to include State and Federal lands in an assessment to the extent they are benefited, and not to exempt them from payment unless clear and convincing evidence shows that they do not, in fact, benefit. (Cal. Const. Art. XIII D, § 4, subd. (a).). Because the Federal government's sovereign immunity exempts it from local assessments, however, the Agency will likely need to work with Federal agencies to make alternative payment arrangements in lieu of the assessment.

Section 3 – Existing Assessments

The Agency Act currently authorizes the Agency to assess a uniform charge per acre and a minimum charge of up to ten dollars ($10) per parcel. (Agency Act §§ 5.2, 5.3.) The current uniform charge per acre and the minimum charge per parcel were last increased by the Agency in 1997, and are as follows:

Uniform Charge per Acre = $1.80

Minimum Parcel Charge = $8.00

Section 4 – Description of Special Benefits

Special Benefits

Article 4, Sec. 4.1 of the North Delta Water Agency Act (Chapter 283 of the Statutes of 1973, amended by Chapter 332 of the Statutes of 2009) provides:

> *"The general purposes of the agency shall be to take all reasonable and lawful actions, including to negotiate, enter into, execute amend administer, perform and pursue legislative and legal actions to enforce one or more agreements with the United States, the State of California, or other entities that have for their general purposes either of the following:*
>
> *(a) To protect the water supply of the lands within the agency against intrusion of ocean salinity; and*
>
> *(b) To assure the lands within the agency a dependable supply of water of suitable quality sufficient to meet present and future needs."*

The special benefits conveyed to the lands within the Agency are derived directly from the 1981 Contract that the Agency negotiated pursuant to this authority, and are the assurance of a dependable water supply of suitable quality. Other than the 1981 Contract payment, all of the Agency's expenses and obligations are incurred in order to perform, enforce or otherwise ensure that Agency landowners receive the full benefits of the 1981 Contract.

Water Quality

The Agency ensures a suitable water quality for Agency landowners by enforcing the criteria set forth in Article 2 and Attachment A of the 1981 Contract. Article 2(a)(i) of the Contract states that *"[t]he State will operate the SWP to provide qualities at least equal to the better of: (1) the standards adopted by the SWRCB as they may be established from time to time; or (2) the criteria established in this contract…"*

A landowner's water rights do not entitle the diverter to the benefit of artificially enhanced levels of quality that would occur by the release of water from an upstream reservoir. (*Hudson v. West,* 47 Cal.2d 823, 842 (1957); *Pasadena v. Alhambra,* 33 Cal.2d 908, 947 (1949); State *Water Resources Control Bd. Cases*, 136 Cal.App.4th 674, 771 (2006) ("[a]s for the argument…that the Delta Protection Act gives Delta riparians and appropriators a right to water stored upstream by others, we disagree.").) Under natural (i.e., pre-Project) conditions, water quality in the Delta would vary seasonally, and in dry years could become unusable late in the season for beneficial purposes without diminishing crop yields, requiring expensive treatment, or causing other injuries and costs. The release of water by DWR to offset Project operations and meet the Contract criteria ensures a water quality that will be suitable for beneficial purposes regardless of the natural condition. The Contract criteria and the release of water by DWR pursuant to the Contract are not intended to provide a uniform water quality throughout the Agency, but to maintain a gradient or variation in water quality similar to that which occurs naturally. The Contract criteria were established to assure the DWR will maintain a dependable supply of water of adequate quality for agricultural, municipal, and industrial purposes within the Agency year round. As such, the Contract criteria are not limited to the major growing season of April 1 to August 15 as defined in D-1485 and other SWRCB decisions regarding water quality criteria for the Delta.

If DWR fails to meet the 1981 Contract criteria due to a defined drought emergency, it must compensate landowners for any crop losses or reduced yields that result. (Contract § 4(b)(iv).) Under this provision of the Contract, a special contract claims procedure is to be established by the State to expedite and facilitate the payment of compensation based on the reduced yield due to the drought emergency.

The SWRCB issued Revised Decision 1641 (D-1641) on March 15, 2000. This decision was part of the SWRCB's implementation of the 1995 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (1995 Plan) which in part set forth water quality objectives for various purposes within the Delta. The SWRCB conducted workshops in 2004 and 2005 to receive new information regarding water quality objectives contained in the 1995 Plan. In December 2006 the SWRCB adopted an amended Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (2006 Plan) based on an evaluation of

information received. Only minor changes were made to the 1995 Plan.[4] The water quality objectives contained in D-1641 and the 2006 Plan are identical to those identified in D-1485 for the uses identified in the 1981 Contract.

Water Supply

Article 8 (a) (ii) of the 1981 Contract provides that water users within the Agency may divert water for reasonable and beneficial uses for agricultural, municipal and industrial purposes. Article 8 (a) (ii) also provides that DWR shall furnish such water as may be required within the Agency to the extent not otherwise available under the water rights of water users.

These are significant benefits. Even the most senior water rights in the Delta (riparian and pre-1914) experience deficiencies during critical years when there would be insufficient water supplies for all users. The SWRCB has issued notices to all Delta diverters to cease diverting during such periods. For example, in the critical year of 1977, four years before the 1981 Contract was executed, in addition to appropriative water right holders the SWRCB sent notices to Delta riparian landowners stating that the natural flow of the Sacramento and San Joaquin River systems would be sufficient to supply only a fraction of Delta riparian water needs for the months of June, July and August. This was so even though fresh water was physically present in the channels due to operation of the Projects. Even riparians are not legally entitled to divert water attributable to Project storage releases. When there is insufficient water supply available for riparians, appropriators—even those with rights dating back prior to 1914—may not divert at all. More junior water right holders are also subject to periodic mandatory cutbacks in order to meet the salinity objectives of D-1641, which imposes fresh water outflow requirements within the Delta.

The 1981 Contract provides a supplemental water supply to offset the deficiencies of the water rights within the Agency. Therefore, since execution of the 1981 Contract, landowners within the Agency are no longer subject to these hydrological and regulatory deficiencies in supply. Water users within the Agency are able to continue to divert water for reasonable and beneficial

[4] Plan Amendment Report, Appendix 1 to the 2006 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary December 13, 2006

use under the 1981 Contract when notices such as those sent in 1977 are sent to other Delta water users. Article 8 (a) (ii) provides for all diversions from the Delta channels for beneficial use on lands within the Agency's boundaries without restriction, with DWR furnishing the required water with releases from the SWP. The provisions of these articles are supported by a May 26, 1998 Memorandum of Understanding (MOU) between the Agency and DWR. The MOU states that it is the joint position of the Agency and DWR that any obligation imposed upon the use of water within the Agency to assist in achieving the objectives of the D-1641 is satisfied by the 1981 Contract. This is further supported by D-1641, which implements the water quality objectives for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary and assigns responsibility for any obligation within the Agency to DWR so long as the Contract and 1998 MOU remain in effect.

Benefited Lands

Proposition 218 requires the assessing agency to determine which lands receive special benefits from the services being funded by the assessment. The 1981 Contract—which is the source of the special benefits provided by the Agency—applies to all lands within the Agency exclusively. The benefited lands do not include the lands underlying the Delta channels or other permanent watercourses, since they are physically incapable of having water applied for beneficial purposes.

General Benefits

Proposition 218 requires any local agency proposing to increase or impose a special assessment to "separate the general benefits from the special benefits conferred on a parcel." (Cal. Const. art. XIIID § 4.) The rationale for separating special and general benefits is to ensure that property owners are not charged a special benefit assessment in order to pay for general benefits provided to the general public or to property outside the area being assessed. Thus, a local agency carrying out a project that provides both special and general benefits may levy an assessment to pay for the special benefits, but must acquire separate funding to pay for the general benefits. (*Silicon Valley Taxpayers' Assn., Inc. v. Santa Clara County Open Space Authority*, 44 Cal. 4th 431, 450 (2008).)

But the 1981 Contract provides only special benefits. Special benefits are benefits "particular and distinct over and above general benefits conferred on real property located in the district or to the public at large." (Cal. Const. art. XIIID § 2(i).) Because the Contract ensures a supply of water of suitable quality for the benefit of parcels of land within the Agency, the benefits by their nature do not accrue directly to the general public. This conclusion is supported by the fact that the 1981 Contract functions as a settlement agreement between the benefited landowners and DWR. The Contract established a means by which the DWR can operate the SWP while ensuring a water supply to those whose property may otherwise by deprived of a suitable water supply during the entire year. By contrast, general benefits provided to the public at large are discussed in terms of general enhanced property values, provision of general public services such as police and fire protection, and recreational opportunities that are available to people regardless of the location of their property. (*See, e.g.,* Cal. Const. art. XIIID §§ 2(i), 6(2)(b)(5); *Silicon Valley Taxpayers,* 44 Cal. 4th 431. 450–56.)

Section 5 – Analysis of Special Benefits

Overview and Summary of Allocation

The Agency does not directly deliver water, operate or maintain water storage or conveyance facilities, or own water rights. Rather, the property-related services provided by the Agency are to administer, enforce, and otherwise ensure the receipt of benefits provided by the 1981 Contract, which assures a dependable water supply of suitable quality for lands within the Agency. Most such lands had appurtenant water rights before the execution of the Contract (and lands that did not would presumably be entitled to acquire water rights senior to those of the Projects pursuant to Water Code §§ 11460-11465, 12200-12227). The special benefits derived from the Contract are provided by the release of sufficient water from the SWP to ensure a minimum quality of water in the northern Delta at all times and to furnish such water supplies as may be required within the Agency to the extent not otherwise available under water rights. In short, the Contract ensures the release of stored water to make up for the deficiency in natural flow needed to supply water of suitable quality to lands within the Agency regardless of hydrological shortages. The payment for the 1981 Contract is to compensate DWR to the extent of the average deficiencies which were estimated by the parties to the Contract to occur. Each parcel in the Agency therefore benefits to the extent that the Contract makes up for that parcel's portion of the deficiency.

Much technical work has been done by the USBR, DWR, and the water users to determine and classify the water right deficiencies within the Agency, beginning with the 1956 Cooperative Study Program. The 1956 Cooperative Study Program and subsequent related studies determined water right deficiencies based on priority groups. These determinations served as the basis for negotiation of the project water quantities contained in the settlement contracts between the USBR and water right holders along the Sacramento River. The priority groups used in the 1956 Cooperative Study Program for the purposes of analyzing the yields and deficiencies of water rights along the Sacramento River and the Delta are as follows:

- Riparian – All Lands within the Delta Lowlands,
- Pre-1927 – Appropriative and "other" rights with priorities on or before July 30, 1927,[5]
- 1927-1938 – Appropriative and "other" rights with priorities between July 30, 1927 and August 2, 1938[6],
- 1938-1954 – Appropriative and "other" rights with priorities between August 2, 1938 and December 31, 1954[7], and
- Post-1954 – Appropriative and "other" rights with priorities after December 31, 1954.

The 1981 Contract makes up for the entire deficiency in all surface water rights within the Agency, thereby ensuring the necessary quality for all uses throughout the year and providing a sufficient quantity to satisfy all reasonable and beneficial uses. The entire volume required to offset the deficiency is the collective measure of special benefit to all lands within the Agency. The proportional special benefit under the Contract to each parcel within the Agency is it's share of that deficiency. The 1956 Cooperative Study Program classified each priority group by its relative water right deficiencies; and therefore, is the foundation upon which to define the proportional special benefit that the Contract confers upon the individual parcels within the Agency.

Because the water quality benefits afforded by the Contract are dependent upon a sufficient supply of water to hold back the intrusion of salt water from the San Francisco Bay, these benefits are inseparable from the water supply benefits of the Contract. Therefore the special benefit is providing the volume of water that, absent the Contract, would not be available to meet either or both the water quality and quantity requirements of the lands within the Agency.

[5] Priority date of initial water rights filed for the CVP
[6] Priority date of supplemental water rights filed for the CVP
[7] End of period covered in the 1956 Cooperative Study Program and subsequent studies

Delta Uplands and Lowlands

The 1956 Cooperative Study Program was a landmark for defining the Delta. For the purposes of the studies, the 1956 Cooperative Study Program adopted a new definition of the Delta which was ultimately incorporated into Section 12220 of the Water Code in 1959. The Delta can be divided into the following area groupings:

Table 2: Delta Areas

Water Surfaces	51,000	acres
Upland land areas	266,000	acres
Lowland land areas	421,000	acres
Total Delta Area	738,000	acres

Riparian Water Rights

There is no California statute defining riparian rights; rather they are defined by the common law. Under that law, lands that bordered a natural watercourse at the time title was originally transferred from the Federal or State government acquired an appurtenant right enabling the owner to share in the reasonable and beneficial use of that watercourse's natural flow within the watershed.

Riparian Water Rights within NDWA

For the various studies conducted for the 1956 Cooperative Study Program all of the Delta Lowlands were classified as riparian to the channels of the Delta, with the correlative right to share the natural flow of the Sacramento River and other tributary streams of the Delta.[8] This classification is empirically reasonable. Due to the many sloughs and other watercourses in the Delta Lowlands, most if not all parcels were riparian at the time of Federal patenting. The ditch and distribution systems throughout the Delta Lowlands demonstrate landowners' general intention to preserve the riparian entitlement for all parcels that were ultimately separated from

[8] Department of Water Resources "Report on 1956 Cooperative Study program - Water Use and Water Rights Along Sacramento River and in Sacramento-San Joaquin Delta" Vol. 1, March 1957. (p. 21).

the watercourse. In connection with related study programs including the Delta Upland Investigations and to aid in future negotiations with individuals, the USBR also identified certain parcels in the Delta Uplands that could be credited with riparian status. This determination was made by identifying the smallest ownership parcels abutting the various unaltered natural water courses within the Delta Upland areas from a review of County Assessor's plats. The Delta Upland Investigations thus identified approximately 12,000 acres within the Agency which could be credited with riparian status.

Appropriative Water Rights

An appropriative right may be acquired for the irrigation of a particular tract of land, or for other beneficial purposes, by performing certain acts required by California law, including taking or diverting the water from a stream or other sources and using it on or in connection with the land. When a supply of water to which several appropriative rights have attached is not enough for all, the prior rights have preference over those rights initiated at a later date. Each water right is entitled to its full quantity of water before any water may be taken for rights that are later in time. This superiority over later rights is called the priority of an appropriative right. In California riparian rights since they have a priority dating to when the appurtenant land was first acquired from the government, are normally senior to appropriative rights.

Prior to 1872, appropriative water rights in California could be acquired by simply taking and beneficially using water. In 1872 the Civil Code established a permissive procedure for perfecting an appropriation of water. This procedure involved posting a notice and recording it with the County Recorder of the county within which the water was intended to be used, the date of priority being the date of posting. If the statutory procedure was followed, and appropriation of water was made with due diligence, the priority of the right relates back to the date of posting. Since 1914, appropriative rights have been acquired by filing an application with a designated State agency, currently the SWRCB, obtaining a permit and then putting the water to beneficial use. The State itself made filings for use in coordinated development of the water resources of the State, including filings on Sacramento, Feather and American River waters in 1927 and 1938. Some of these filings were ultimately assigned to the USBR.

Appropriative Water Rights within NDWA

Appropriative rights in the northern Delta include pre-1914 rights as well as rights authorized by SWRCB-issued permits and licenses. All permits and licenses are available for public review. Many pre-1914 right holders have filed Statements of Diversion and Use with the SWRCB.[9] For this Engineer's Report, a thorough search was made of the SWRCB files to document the appropriative rights held by landowners within the Agency.

This search found that the places of use of some of the appropriative rights overlap the places of use of other appropriative or riparian rights. When the place of use covered by appropriative water rights are reduced for overlap with other appropriative or riparian rights, lands within the Delta Uplands of the Agency with identifiable appropriative rights amount to approximately 39,128 acres. Approximately 43,000 acres within the Delta Upland areas of the Agency were found to have no identifiable water rights. Some of these lands may have unreported pre-1914 or other water rights, may be diverting pursuant to the entitlements of the 1981 Contract, may be utilizing groundwater, or may not have historically utilized water.

Evaluation of Water Requirements for Delta Water Users

To determine the benefits that the 1981 Contract provides to water users in the northern Delta, it is imperative to understand the availability of water to supply the various priority classes of Delta water right holders under natural conditions (prior to the operation of the Projects) and after development of the Projects (damming and regulation of the Delta tributaries). Water supplies available under natural conditions are considered to be part of the landowners' water rights. Additional supplies available (and corresponding needs met) as a result of the development of the Projects are considered to be the benefits of the 1981 Contract, per Contract Recital (a). The supplies are considered both in terms of water quantity and quality.

[9] With certain exceptions, beginning July 1, 2010, most surface water diversions will need to be reported to the SWRCB annually under threat of financial penalty. (Water Code § 5100 et seq.)

Delta Water Requirements

Because riparian rights are correlative among all riparians along a particular watercourse, the riparians in the Delta must share the available water not only with each other, but also with riparians along the Sacramento River and other tributary streams. The amount of water used[10] by riparians in the Delta and along the Sacramento River for the months of April through October were derived based on numerous historical studies (discussed further below) as follows:

Table 3: Riparian Water Demands

Riparian Area	Apr	May	June	July	Aug	Sep	Oct	Total
			*(In **1,000** acre-feet)*					
Delta Lowlands 421,000 ac	78	82	130	193	177	128	134	922
Delta Uplands 28,700 ac	3	8	10	12	12	8	1	54
Along Sacramento River 169,000 ac	19	60	75	82	75	45	14	370
Total	100	150	215	287	264	181	149	1,346

To calculate the water supply available to satisfy these riparian demands without the influence of the Projects, it was first necessary to estimate the historically available modified natural flows. These flows (which are reported in Table 306, Volume II**,** of the 1956 Cooperative Study Report) were calculated or taken from records for the period April through October of each year from 1924 through 1954.[11]

The USBR concluded from their studies that sufficient water was available to satisfy all riparian requirements in the Delta and along the Sacramento River except during July and August of critical years. This conclusion can be confirmed by reducing the monthly quantities of water

[10] The amount of water used in the Delta Lowlands is based on channel depletion. Channel depletion, or the total amount of water removed from the channels for beneficial use without being pumped back into the watercourse, is considered an accurate measure of water use in the Delta and has been relied on by DWR and the Agency for decades.

[11] The months of November through March were excluded from the study period because for all years, sufficient flows were found to exist during those months to satisfy all assumed local rights along the Sacramento River and in the Delta.

initially available in the Delta identified in the 1956 Cooperative Study Report, by the total riparian requirements along the Sacramento River and the Delta. The results of these computations are given in attached Table A which indicates water was available to satisfy the estimated riparian requirements in all months except for July and August of the critical years 1924, 1931 and 1934, and in August of 1939 as indicated by zero water remaining after satisfaction of riparian demands.

As part of the negotiations between the USBR and the SRDWUA several additional studies were conducted after the 1956 Cooperative Study Program. These additional studies relied on the same data and information developed for the 1956 Cooperative Study Program; however, different assumptions on water rights and irrigation demands were made. Two of these studies – C-2BR, conducted by the USBR, and C-650B, conducted by the DWR at the request of Sacramento River and Delta water users – became the basis for negotiations of the Sacramento River Settlement Contracts. In those negotiations the yields of the water rights determined by the two studies were averaged. Delta water users were involved in the discussions that led to the assumptions used in the Studies C-2BR and C-650B which included water use within the Delta as well as along the Sacramento River. Therefore, these two studies provide an appropriate basis for determining Project benefits of water users within the Agency.

The results of Studies C-2BR and C-650B are summarized in a series of tables which identify the water supply remaining at various locations along the Sacramento River for various water right priority groups. Both studies used the same numbering convention for the tables as was used in the 1956 Cooperative Study Program. Four of the tables from these two studies[12] summarize the water remaining in the Delta after the satisfaction of water rights of various priorities. Table B through Table E, attached; show the monthly quantity of water remaining in the Delta for various water right priority groups determined by averaging the available water determined in Studies C-2BR and C-650B. Months in which zero water remains in the Delta[13] indicates the studies found insufficient water supplies available to satisfy the assumed rights of the water users within a

[12] Tables 317, 326, 330, and 334 from Studies C-2BR and C-650B

[13] The studies did not literally find there would be no water in the Delta. The Delta can never be emptied because it is refilled both by fresh water from upstream sources and, when upstream flows diminish, from the inexhaustible San Francisco Bay. "Zero water" refers to how much usable water is left in the channels after all water users in a particular class have been satisfied.

particular water right priority group. In other words, zero water remaining indicates a deficiency in the supply available to meet the water rights of the priority group.

Outflow Required for Delta Agricultural Standards

Usable quality is an indispensable element of the water supply in the Delta. The Projects are significant undertakings designed to redistribute the principal water resources of California. To harness the Central Valley Basin waters and make them available where they would be of greatest benefit to water users outside the area where the water originates, the Projects modify the natural water distribution and are intended to regulate and control the flow of its rivers and streams, including the flows and hydraulics of the Delta channels. These massive changes in natural flow would inevitably alter the historical water quality in the Delta, and required the SWRCB to develop minimum salinity standards that would need to be maintained by the Projects as a condition of their operation so landowners could continue putting water to beneficial use in the Delta. To meet these criteria, the Projects would need to ensure a sufficient outflow of fresh water to hold out the saline waters of the San Francisco Bay.

The SWRCB proposed water quality standards for the protection of agricultural uses in the western Delta in D-1379. These criteria were:

> For non-critical years, at Blind Point on the San Joaquin River, April through July, 350 mg/l chloride content; August through March, 1,000 mg/l chloride content (based on a running average of mean daily readings for any 14 consecutive days).
>
> For critical years the April through July criteria may be relaxed to 1,000 mg/l chlorine content.
>
> For normal and below normal years at Jersey and Emmaton, an average of mean chloride content for at least 10 consecutive days between April 1 and May 31 maximum 200 mg/l.

SWRCB Criteria for the interior channels at Rio Vista, San Andreas Landing, Clifton Court Ferry and Terminous are:

Table 4: D-1379 Water Quality Criteria

Period	Type of Year	Jan thru Mar	Apr thru Jul	Aug thru Dec
		(EC maximum millimhos)		
Running average of mean daily for any consecutive 14 days	Normal or above	1.25	1.25	1.25
	Below normal	1.25	1.25	1.40
	Dry or critical	1.25	1.40*	1.40*
Average of mean daily for any calendar month	Normal or above	0.88	0.88	0.88
	Below normal	0.88	0.88	1.05*
	Dry or critical	0.88	1.05*	1.05*
Average of mean daily for any calendar year	Normal or above	0.80	0.80	0.80
	Below normal	0.80	0.80	0.88*
	Dry or critical	0.80	0.88*	0.88*

*The EC value at any of these 4 stations may reach, but not exceed the starred value shown, but the average of the EC value at the 4 stations shall not exceed the adjacent unstarred value.

The criteria allowed for certain adjustments for interior channels at Terminous, Rio Vista, San Andreas Landing and Clifton Court Ferry whenever the recorded EC in Sacramento River at Green's Landing exceeded a running average 14-day or a mean monthly value of 0.240 millimhos. These interior water quality criteria generally are considered to be met when the Blind Point criteria is maintained.

Prior to the operation of Shasta Dam the limit of maximum intrusion of salinity of 1,000 parts of chlorides per million parts of water remained just below Blind Point on the San Joaquin River and Toland Landing near Emmaton on the Sacramento River during 1923 and 1927, as shown on the map prepared by DWR entitled Historical Salinity Intrusion (Exhibit III). On the basis of this information and a chart prepared by Consulting Engineer Gerald H. Jones (Exhibit IV), showing outflows from Sacramento-San Joaquin Delta required for control of salinity within the Delta, the following estimate of outflow requirements for D-1379 agricultural standards was prepared:

Table 5: D-1379 Agricultural Water Quality Standards

		Period	
Station	Type of Year	April thru July	Aug. thru Dec.
Blind Point	Non-Critical	350 ppm Cl	1,000 ppm Cl
		2,800 cfs	1,600 cfs
	Critical	1,000 ppm Cl	1,000 ppm Cl
		1,600 cfs	1,600 cfs
Jersey Island & Emmaton	Normal and Below Normal	10 consecutive days between Apr 1 and May 31, 200 ppm Cl 3,100 cfs	

Monthly outflow schedules for various types of years required to maintain the agricultural standards for the period April through October, assuming that the 200 ppm Cl for 10 days requirement would be delivered in April, are:

Table 6: Estimated Monthly Outflow to Meet D-1379 Standards

Year Type	Apr	May	June	July	Aug	Sept	Oct	Total
				*(In **thousands** of acre-feet)*				
Non-critical	174	173	168	173	99	96	99	982
Critical	126	99	96	99	99	96	99	714

The D-1379 water quality standards were intended to be maintained as first priority operating criteria for any and all projects or parts thereof that may be constructed and operated as part of the CVP and SWP facilities.[14] Under this restriction the Delta water quality standards must be maintained before any water is diverted for Project uses or to supplement the water rights of appropriators along the Sacramento and Feather Rivers and in the Delta. Therefore, these standards are assumed to be equivalent to riparian rights in priority.

Neither D-1485 nor D-1641 changed the basic agricultural water quality requirements contained in D-1379. However, these later decisions utilize different control points and limit the season to April 1 to August 15 and utilize flow criteria for fish and wildlife benefits for the period outside this season. The monthly outflows shown in Table 6 based on the D-1379 requirements provide

[14] California SWRCB, "Delta Water Rights Decision, Decision 1379" (July 1971) p. 50.

a reasonable estimate of the water quantity required for meeting Delta water quality requirements for agricultural, municipal and industrial uses.

Deficiencies in Water Rights

There are no specific outflows associated with the 1981 Contract criteria. However, the monthly outflow schedule developed for D-1379 provides a reasonable basis for allocating the special benefits of the Contract associated with maintaining water quality. Assuming a different outflow requirement changes the overall deficiencies of the various water right classifications, but does not significantly change the proportionality of those deficiencies among the various water right classifications.

To account for the water supply required to meet water quality requirements, the estimated monthly outflows identified in Table 6 were subtracted from the water supply remaining in the Delta identified in Table A through Table E. The results are shown in Table F through Table J. Months showing zero water remaining in the Delta indicate insufficient water supplies are available under pre-Project conditions to meet the water quality standards and the water supply requirements for that particular water right classification; in other words the water rights were "deficient". For example, attached Table F identifies the water available in the Delta after meeting the riparian and Delta outflow requirements identified in Table 6. Table F indicates that during the 31-year study period there were 41 months in which the water supply was insufficient to meet both the riparian and the Delta outflow requirements. During these months the supplemental water supply afforded by the 1981 Contract would allow the riparian water users within the Agency to continue to divert and to fully satisfy their water requirements. During the 31-year study period, deficiencies in flows required to maintain the agricultural standards occurred during some months for all water right classifications. The number of months in which deficiencies occurred for each water right classification, the months showing zero water available, were summarized and are shown in Table 7.

Table 7: Summary of Monthly Water Supply Deficiencies by Water Right Group
(Number of months in which deficiency occurs)

Priority Group	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
Riparian	0	0	3	14	19	5	0	41
Pre-1927	0	1	5	25	31	9	0	71
1927-1938	0	2	7	26	31	22	4	92
1938-1954	2	5	13	27	31	31	22	131
Post 1954	2	5	13	30	31	31	24	136

In part to account for area of origin considerations, the parties to the negotiations of the Sacramento River Settlement Contracts assumed that there were no deficiencies in riparian and appropriative water rights of the local users during the months of April, May, or October. They further agreed that the assumed deficiencies for June would be 50% of the calculated deficiency[15]. The 1981 Contract is similar to the Sacramento River Settlement Contracts in that it settled a dispute as to the respective water rights of the Projects and the local water users while also requiring a payment for the benefits provided by the Projects to the local users. Additionally, the Agency, like the Sacramento River Settlement Contractors, is within the area of origin of the Sacramento River and its tributaries. Therefore, it is reasonable, for the purposes of allocating the benefits of the 1981 Contract, to utilize similar assumptions regarding the average yields and deficiencies for the water rights within the Agency.

Table 8 shows the frequency of deficiency in the water supply available to the various water right priority groups identified above after adjusting for the assumptions used in the negotiations of the Sacramento River Settlement Contracts:

- No deficiencies in water rights within the Agency during the months of April, May and October; and,
- Deficiencies in the month of June are assumed to be 50% of the average deficiencies determined by Studies C-2BR and C-650B.

[15] It was recognized that sufficient water was generally available to meet the water rights of local users through mid-June. Therefore, the USBR and the Sacramento River Settlement Contractors agree to use 50% of the deficiencies determined by the C-2BR and C-650B studies during their negotiations.

Table 8: Adjusted Monthly Water Supply Deficiencies by Water Right Group
(Number of months in which deficiency occurs)

Priority Group	Apr	May	Jun	Jul	Aug	Sep	Oct	Total	Average Water Supply Deficiency %
Riparian	0	0	1.5	14	19	5	0	39.5	18.2%
Pre-1927	0	0	3	25	31	9	0	68	31.1%
1927-1938	0	0	4	26	31	22	0	83	38.0%
1939-1954	0	0	7	27	31	31	0	96	44.0%
Post-1954	0	0	7	30	31	31	0	99	45.4%

The water right priority groups were established as follows: (1) riparian, (2) pre-1927 appropriative, which are the appropriative rights senior to all water rights for the CVP; (3) 1927-1938 appropriative, which are the appropriative rights senior to a substantial portion of the water rights of the CVP; (4) 1939-1954 appropriative, which are the appropriative rights senior to the water rights of the CVP but junior to the water rights of the SWP; and (5) post-1954 appropriative, which are the appropriative rights junior to the CVP and the SWP. These are the classifications used as the basis for the Sacramento River Settlement Contracts.

Summary of Proportional Special Benefits

The special benefits afforded by the 1981 Contract are the ability to continue to divert water when water supplies absent the Contract would be insufficient to satisfy the rights of the water users within the Agency. The benefits of the Contract accrue in the order of the deficiency of the water right (i.e., the more senior water rights receive the least benefit and the more junior water rights receive the most. As described previously in this report, riparian rights have the lowest average annual deficiency; and therefore, parcels with riparian rights receive the least benefit under the Contract. Conversely, post-1954 water rights are deficient most often; and therefore, parcels with post-1954 water rights receive the greatest benefit.

Allocation of the special benefits afforded by the 1981 Contract are based on the average annual deficiency for each water right priority group as shown in Table 8. Table 9 identifies the

proportional benefit attributable to the lands within each water right classification. The proportional benefit for each water right priority group is based on the percentage of time the water rights for a particular water right priority are determined to be deficient as shown in Table 8. The proportional benefit attributable to each acre within the water right priority group is determined by dividing the Average Annual Deficiency for a particular water right priority by the Average Annual Deficiency for Riparian Water Rights. For example, for Pre-1927 Appropriative water rights, the Average Annual Water Right Deficiency of 31.1% is divided by 18.2%, the deficiency for Riparian water rights, to arrive at the Proportional Special Benefit of 1.71.

Table 9: Proportional Special Benefits by Water Right Priority

Water Right Priority	Average Annual Water Right Deficiency [1]	Proportional Special Benefit [2]
Delta Lowlands		
Riparian	18.2%	1.00
Delta Uplands		
Riparian	18.2%	1.00
Pre-1927 Appropriative	31.1%	1.71
1927-1938 Appropriative	38.0%	2.09
1938-1954 Appropriative	44.0%	2.42
Post-1954 Appropriative	45.4%	2.49
No Identifiable Right	45.4%	2.49

[1] Average Annual Deficiencies are based on Study C-650-B conducted by DWR for SRDWA, and USBR Study C-2BR

[2] Special benefits are proportional to the deficiency, with a factor of 1.0 for riparian, and weighting factors in relation to 1.0 for the other priorities.

Landowners within the Agency with non-riparian lands that are not covered by an existing appropriative water right can divert water for beneficial uses pursuant to the 1981 Contract. Any water right application filed to cover these lands would have a priority as of the date the application is accepted by the SWRCB. Therefore, as indicated in Table 9, lands with no identifiable water rights have deficiencies equivalent to those of other post-1954 water rights.

Other Assessment Classifications

As shown in this report all lands within the Agency receive special benefits pursuant to the 1981 Contract. As described above the special benefits received are proportional to the relative deficiency of the water rights attributable to each parcel within the Agency. The Assessment Commissioners have determined the special benefits afforded to certain parcels may not accrue in direct accordance with the water right priorities described above. These exceptions include privately owned lands on Sherman Island and lands that do not abut or have physical access to surface water channels. The latter are referred to herein as Isolated Lands. The proportional special benefits attributable to the Sherman Island Private Lands and the Isolated Lands are described below.

Sherman Island Private Lands

Article 5 of the 1981 Contract specifically provides for the construction of facilities to serve water overland to Sherman Island. These facilities are described in the report entitled "Overland Agricultural Water Facilities Sherman Island," dated January 1980. The Contract states that when these facilities are in place, the water quality criteria for the Sacramento River at Emmaton shall apply at the overland facility's intended intake on Three Mile Slough. Water quality within the remainder of the Agency is protected by the standards at the upstream interior stations and the steep gradient resulting from these standards.

DWR never built the overland facility, however, and instead acquired the majority of the lands on Sherman Island through a land acquisition program. Water quality easements were obtained on certain other lands not acquired by DWR. These easements released DWR from meeting specific water quality requirements in the Delta Channels adjacent to the affected lands. On January 21, 1997, the Agency and DWR executed an amendment to the 1981 Contract allowing the Emmaton criteria to be moved upstream to the northwest end of Three-Mile Slough as provided in the 1981 Contract. On May 29, 1998, the Sacramento County Superior Court issued a judgment determining that all the provisions of the amendment are valid, binding on the Agency and DWR, and in the best interests of the Agency and landowners within the boundaries of the Agency.

Following the 1997 Contract Amendment, the Agency's payment to DWR was reduced to account for lands owned in fee by DWR including the lands purchased on Sherman Island. No corresponding reduction in the payment was made for the lands on which DWR acquired water

quality easements. Lands on Sherman Island not purchased by DWR are still covered by the Contract and continue to receive the special benefits of the assurance of a dependable supply of suitable quality. DWR has recognized that lands on Sherman Island continued to receive benefits pursuant to the 1981 Contract.

Moving the water quality monitoring station to Three Mile Slough results in some reduction in the water quality that would otherwise accrue to lands on Sherman Island under the Contract had the overland facility been built. Agency records of water quality at Emmaton and Three Mile Slough do demonstrate that meeting the quality criteria at Three Mile Slough, despite the steep salinity gradient, assures a relatively high water quality at Emmaton as well at most times. But based on a review of the Agency's water quality monitoring data during critical years such as 1991, the Agency's engineering staff have concluded that, in the channels off Sherman Island, the water quality would be expected to drop below the criteria level during at least half of the months in which there is a pre-Project water supply deficiency for riparians.[16] Regardless of the exact water quality, the Contract nonetheless ensures Sherman Island landowners may legally divert as much water as is necessary for any reasonable and beneficial uses during all deficiency periods, and Sherman Island landowners have never, to the Agency's knowledge, stopped diverting water since execution of the Contract (as occurred periodically prior to construction of the Projects). To reflect the reduced water quality, the proportional special benefit for the privately owned lands on Sherman Island is adjusted to 50% of the special benefits allocated to Delta Lowland Riparian parcels.

Lands Not Utilizing Surface Water Supplies

As described previously in this report, lands utilizing surface water supplies that hold post-1954 or no underlying water rights receive the greatest proportional benefit under the 1981 Contract and therefore are assessed at the highest rate. The Commissioners' understand there are certain lands within the Agency that have no underlying water right and do not have physical access to Delta channels. For the purposes of this report these lands are referred to as Isolated Lands. There are two types or classifications of Isolated Lands within the Agency: lands with no physical access to Delta channels that are utilizing groundwater in lieu of surface water supplies

[16] Creating a model to determine the number of days in which the water quality has been reduced below the Contract criteria during riparian deficiency periods would be prohibitively expensive, and at any rate could not reflect landowners' decisions to use the water anyway when quality is only slightly below the criteria.

and lands with no physical access to Delta channels that have not been and are not being irrigated or otherwise using water.

Although these Isolated Lands may not currently be utilizing surface water supplies they do derive special benefits under the Agency's Contract. The proportional special benefits attributable to the Isolated Lands within the Agency are described below.

Isolated Groundwater Lands

Isolated Groundwater Lands are parcels that use water but which do not currently have physical access to surface water supplies; that is, there are no diversion or conveyance facilities connecting these parcels to the surface channels. These parcels have historically used groundwater to meet beneficial use requirements. The special benefits enjoyed by Isolated Groundwater Lands include:

a) The right and ability under the Contract to divert surface water for reasonable and beneficial use when and if access to a channel is acquired;

b) Maintenance of groundwater levels as a result of percolation from drainage or surface water irrigation on adjacent or nearby lands pursuant to the 1981 Contract; and

c) Reduced competition for groundwater supplies by those utilizing surface water pursuant to the 1981 Contract

The groundwater level and reduced competition benefits enjoyed by these lands are directly related to the diversion and use of water by neighboring lands afforded by the 1981 Contract. The proportional benefits to Isolated Groundwater Lands are determined to be forty percent (40%) of the special benefits allocated to post-1954 appropriative water rights, which is the priority classification applied to lands that do not already have surface water appropriative rights.

Isolated Non-Irrigated Lands

Isolated Non-Irrigated Lands are parcels that do not have physical access to surface water supplies; that is, there are no diversion or conveyance facilities connecting these parcels to the surface channels. These parcels have historically not used surface water or ground-water for irrigation or other beneficial uses. The special benefits enjoyed by Isolated Non-Irrigated Lands

are the right and ability under the 1981 Contract to divert surface water for reasonable and beneficial use at any time in the future. The proportional benefits to Isolated Non-Irrigated Lands are determined to be twenty-five percent (25%) of the special benefits allocated to post-1954 appropriative water rights, which is the priority classification applied to lands that do not already have surface water appropriative rights.

Determination of Isolated Lands

The counties do not keep records of which parcels use groundwater or use no water. It is recommended that the Agency adopt a policy under which landowners may petition the Agency to be assessed as Isolated Lands until such time as surface water use may begin. Landowners with parcels to be considered for the Isolated Lands assessment should be required to submit appropriate evidence that the lands qualify under the policy. Such evidence may include but not be limited to the following:

a) History of aerial photography showing the land is undeveloped;

b) Soil reports demonstrating the land is non-irrigable; and

c) History of pump tests, power records, and other data to demonstrate only groundwater is used on the lands.

Section 6 – Allocation of Proportional Special Benefits

As previously identified in this Engineer's Report, the special benefits derived from the 1981 Contract are the assurance of a dependable water supply of suitable quality. Because the water quality benefits afforded by the Contract depend on a sufficient supply of water to repel intrusion of salt water from the San Francisco Bay, these benefits are inseparable from the water supply benefits of the Contract. The water supply required to meet certain water quality requirements is analyzed in Section 5 of this report and incorporated into the water supply benefits associated with the Contract. The Commissioners have determined it is appropriate to allocate the special benefits of the Contract on the basis of the deficiencies in the water rights appurtenant to the lands within the Agency as described in the Section 5 of this report. Table 10 summarizes the proportional special benefit to be allocated to each parcel within the Agency.

Table 10: Allocation of Proportional Special Benefits

Water Right Priority	Average Annual Water Right Deficiency [1]	Proportional Special Benefits [2]
Delta Lowlands		
Riparian	18.2%	1.00
Sherman Island Private Lands [3]	-	0.50
Delta Uplands		
Riparian	18.2%	1.00
Pre-1927Appropriative	31.1%	1.71
1927-1938 Appropriative	38.0%	2.09
1938-1954 Appropriative	44.0%	2.42
Post-1954 Appropriative	45.4%	2.49
No Identifiable Water Rights	45.4%	2.49
Isolated Groundwater Lands [4]	-	1.00
Isolated Non-Irrigated lands [5]	-	0.62

[1] Average Annual Deficiencies are based on Study C-650-B conducted by DWR for SRDWA, and USBR Study C-2BR
[2] Special benefits are proportional to the Average Annual Water Right Deficiencies of the Riparian Water Right Priority Group
[3] Adjusted to 50% of the proportional special benefit allocated to Delta Lowland Riparians.
[4] Determined as 40% of the proportional special benefit allocated to lands with no identifiable water right.
[5] Determined as 25% of the proportional special benefit allocated to lands with no identifiable water right.

In accordance with the 1997 Contract Amendment the Agency does not assess parcels owned by DWR. However, should ownership of these lands change; these parcels should be assessed based on the water right priority appurtenant to those lands.

Privately owned lands on Sherman Island continue to receive special benefits in water supply and certain water quality from the 1981 Contract. As identified in Section 5 of this report the Commissioners recognize the water quality benefits to these lands may have diminished as a result of moving the change in the water quality compliance location upstream from Emmaton to Three mile Slough. The water supply benefits, the ability to continue to divert water for reasonable beneficial uses during times of shortage, however, remain unchanged. Therefore, the privately owned lands should be assessed as described in Section 5 of this report.

The Commissioners recognize there are lands within the Delta Uplands for which no water rights have been identified. Absent the 1981 Contract appropriative water rights would need to be acquired before water could be delivered to them. These lands with no identifiable water rights generally receive the greatest benefit and therefore should be assessed at the highest level as identified in Table 10. The Commissioners recognize however, that some of these lands have no access to the surface water channels within the Agency, i.e., they are Isolated Lands. Assessments for Isolated Lands should be reduced if and when the owners of these lands provide adequate evidence to the Agency to support a reduced assessment as shown in Table 10.

Classification of Parcels within NDWA Based on Water Right

To prepare the Assessment Roll, the Commissioners classified each parcel within the NDWA based on its appurtenant water rights as explained in Section 5. Although these classifications are based on a detailed technical review of the best information available to the NDWA, the Commissioners recognize that some classifications could be appropriately modified based on further information submitted by the landowner. It is therefore recommended that the Agency, in approving this Assessment Adjustment, reserve to itself the right to modify a classification based upon evidence submitted by the landowner if (1) deemed by the Agency Board to be justified by the facts presented, and (2) the modification would be consistent with the determinations in this Engineer's Report.

Minimum Assessment

As allowed under the Agency Act and identified previously in this report, the Agency currently assesses a minimum charge for small parcels. It is assumed that the Agency will exercise its authority to levy a minimum assessment for small parcels to ensure that the landowners pay for their special benefit while also covering the Agency's cost in collecting a relatively small payment per parcel.

ATTACHED TABLES

LIST OF ATTACHED TABLES

Table A – Water Remaining in the Delta after Satisfaction of Riparian Demands
(Before water quality requirements are satisfied)[1]

*(In **thousands** of acre-feet)*

Year	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
1924[2]	643	336	33	0	0	46	221	1,279
1925	4,079	3,163	1,260	291	68	144	361	9,366
1926	3,945	1,274	296	47	14	126	299	6,001
1927	5,328	3,305	2,118	473	171	199	407	12,001
1928	3,932	1,954	510	147	80	171	329	7,123
1929	1,205	1,170	529	58	17	134	271	3,384
1930	2,082	1,385	626	113	64	213	387	4,870
1931[2]	536	304	75	0	0	41	160	1,116
1932[2]	2,026	2,870	2,024	474	52	79	206	7,731
1933[2]	1,453	1,239	1,147	106	2	82	239	4,268
1934[2]	1,056	397	139	0	0	31	177	1,800
1935	6,758	4,009	2,150	309	84	160	396	13,866
1936	3,651	2,886	1,742	330	88	184	317	9,198
1937	4,119	3,720	1,849	319	60	129	432	10,628
1938	7,251	6,871	4,840	1,426	373	334	577	21,672
1939	1,261	539	147	3	0	127	281	2,358
1940	7,271	2,843	1,301	234	107	247	381	12,384
1941	6,608	4,955	2,813	993	290	238	446	16,343
1942	5,023	4,324	3,419	971	250	289	511	14,787
1943	4,360	2,869	1,681	378	200	215	476	10,179
1944	1,491	1,742	752	40	63	165	349	4,702
1945	2,541	2,791	1,596	324	140	210	523	8,125
1946	2,665	2,606	906	174	111	240	379	7,081
1947	1,706	604	469	26	32	169	510	3,516
1948	4,000	3,600	2,456	350	106	228	430	11,170
1949	2,509	1,831	496	18	37	147	215	5,253
1950	3,139	2,295	1,178	114	31	198	753	7,708
1951	2,044	2,324	614	55	82	271	493	5,883
1952	6,698	6,721	3,886	1,025	308	404	511	19,553
1953	2,369	2,774	2,289	550	189	393	526	9,090
1954	4,207	2,028	568	128	180	318	472	7,901
Total	**105,956**	**79,729**	**43,909**	**9,576**	**3,199**	**5,932**	**12,035**	**260,336**
Average	**3,418**	**2,572**	**1,416**	**309**	**103**	**191**	**388**	**8,398**
Number of Deficient Months	**0**	**0**	**0**	**3**	**4**	**0**	**0**	**7**

[1] Includes satisfaction of all riparian demands along the Sacramento River, the Delta Uplands and the Delta Lowlands before water quality requirements are met.

[2] Denotes Critical Year.

Table B – Water Remaining in the Delta after Satisfaction of all Pre-1927 Appropriative and Other Rights

(Before water quality requirements are satisfied)[1]

*(In **thousands** of acre-feet)*

Year	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
1924[2]	511	103	0	0	0	0	215	829
1925	3,950	2,980	1,004	0	0	101	386	8,421
1926	3,816	1,091	46	0	0	62	310	5,325
1927	5,199	3,122	1,862	116	0	156	432	10,887
1928	4,024	1,771	254	0	0	128	354	6,531
1929	1,076	987	273	0	0	70	282	2,688
1930	1,953	1,202	370	0	0	170	412	4,107
1931[2]	410	76	0	0	0	0	154	640
1932[2]	1,897	2,687	1,768	206	0	36	231	6,825
1933[2]	1,324	1,056	891	0	0	18	250	3,539
1934[2]	927	214	0	0	0	0	188	1,329
1935	6,629	3,826	1,894	0	0	117	421	12,887
1936	3,522	2,703	1,486	25	0	141	342	8,219
1937	3,990	3,537	1,593	4	0	86	457	9,667
1938	7,122	6,688	4,584	1,069	30	291	602	20,386
1939	1,132	356	0	0	19	63	292	1,862
1940	7,142	2,660	1,045	0	0	204	406	11,457
1941	6,479	4,772	2,557	636	0	195	471	15,110
1942	4,894	4,141	3,163	614	0	246	536	13,594
1943	4,231	2,686	1,425	21	0	172	501	9,036
1944	1,362	1,559	496	0	0	122	374	3,913
1945	2,412	2,608	1,340	41	0	167	548	7,116
1946	2,536	2,423	650	0	0	197	404	6,210
1947	1,577	421	213	0	0	126	535	2,872
1948	3,871	3,417	2,200	0	0	185	455	10,128
1949	2,380	1,648	240	0	0	104	240	4,612
1950	3,010	2,112	922	0	0	155	778	6,977
1951	1,915	2,141	358	0	0	228	518	5,160
1952	6,569	6,538	3,630	668	0	361	536	18,302
1953	2,240	2,591	2,033	193	0	350	551	7,958
1954	4,078	1,845	312	0	0	275	497	7,007
Total	**102,178**	**73,961**	**36,609**	**3,593**	**49**	**4,526**	**12,678**	**233,594**
Average	**3,296**	**2,386**	**1,181**	**116**	**2**	**146**	**409**	**7,535**
Number of Deficient Months	**0**	**0**	**4**	**20**	**29**	**3**	**0**	**56**

[1] Includes satisfaction of all assumed Riparian and Pre-1927 Appropriative and Other Rights of local water users along the Sacramento River above Sacramento and in the Delta Uplands and Lowlands to the extent of the available supply and before water quality requirements are met.

[2] Denotes Critical Year.

Table C – Water Remaining in the Delta after Satisfaction of all Pre-1938 Appropriative and Other Rights

(Before water quality requirements are satisfied)[1]

*(In **thousands** of acre-feet)*

Year	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
1924[2]	376	100	0	0	0	0	78	554
1925	3,167	2,612	806	0	0	29	220	6,834
1926	3,322	888	39	0	0	13	157	4,419
1927	4,196	2,718	1,642	98	0	63	268	8,985
1928	3,454	1,443	183	0	0	49	202	5,331
1929	704	763	232	0	0	43	152	1,894
1930	1,559	935	351	0	0	106	260	3,211
1931[2]	230	67	0	0	0	0	33	330
1932[2]	1,505	2,335	1,652	201	0	5	100	5,798
1933[2]	864	755	766	0	0	3	131	2,519
1934[2]	636	90	0	0	0	0	67	793
1935	5,446	3,328	1,774	0	0	56	270	10,874
1936	3,047	2,412	1,308	20	0	84	202	7,073
1937	3,136	3,173	1,383	0	0	44	304	8,040
1938	6,505	6,326	4,177	966	36	158	432	18,600
1939	832	262	0	0	0	22	152	1,268
1940	6,525	2,316	933	0	0	121	242	10,137
1941	5,360	4,410	2,169	523	0	87	302	12,851
1942	4,029	3,528	2,743	512	0	123	317	11,252
1943	3,518	2,280	1,169	0	0	66	298	7,331
1944	1,022	1,289	395	0	0	31	209	2,946
1945	1,970	2,234	1,151	36	0	104	377	5,872
1946	1,999	2,082	551	0	0	92	242	4,966
1947	1,160	350	26	0	0	30	364	1,930
1948	3,000	3,055	1,778	0	0	49	290	8,172
1949	1,796	1,317	204	0	0	21	99	3,437
1950	2,422	1,817	888	0	0	87	390	5,604
1951	1,440	1,723	295	0	0	121	348	3,927
1952	5,799	6,127	3,280	563	0	168	366	16,303
1953	1,639	2,010	1,594	111	0	167	380	5,901
1954	3,155	1,483	156	0	0	111	326	5,231
Total	**83,813**	**64,228**	**31,645**	**3,030**	**36**	**2,053**	**7,578**	**192,383**
Average	**2,704**	**2,072**	**1,021**	**98**	**1**	**66**	**244**	**6,206**
Number of Deficient Months	**0**	**0**	**4**	**22**	**30**	**3**	**0**	**59**

[1] Includes satisfaction of all assumed Riparian, Pre-1927, 1927-38 Appropriative and Other Rights of local water users along the Sacramento River above Sacramento and in the Delta Uplands and Lowlands, and the assumed 1927 Right of the United States at Shasta Dam to the extent of the available supply and before water quality requirements are met.

[2] Denotes Critical Year.

Table D – Water Remaining in the Delta after Satisfaction of all Pre-1954 Appropriative and Other Rights

(Before water quality requirements are satisfied)[1]

*(In **thousands** of acre-feet)*

Year	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
1924[2]	87	0	0	0	0	0	0	87
1925	2,980	2,501	639	0	0	0	25	6,145
1926	3,135	708	0	0	0	0	0	3,843
1927	4,009	2,665	1,497	0	0	0	71	8,242
1928	3,274	1,344	0	0	0	0	0	4,618
1929	524	604	0	0	0	0	0	1,128
1930	1,372	817	5	0	0	0	51	2,245
1931[2]	0	0	0	0	0	0	0	0
1932[2]	1,330	2,241	1,403	0	0	0	0	4,974
1933[2]	677	651	526	0	0	0	0	1,854
1934[2]	463	0	0	0	0	0	0	463
1935	5,259	3,213	1,529	0	0	0	0	10,001
1936	2,860	2,306	1,121	0	0	0	60	6,347
1937	2,949	3,078	1,228	0	0	0	0	7,255
1938	6,325	6,231	4,112	0	0	0	96	16,764
1939	661	0	0	699	0	0	241	1,601
1940	6,345	2,213	680	0	0	0	45	9,283
1941	5,180	4,315	2,102	266	0	0	110	11,973
1942	3,842	3,413	2,666	244	0	0	88	10,253
1943	3,331	2,165	1,060	0	0	0	71	6,627
1944	867	1,173	131	0	0	0	13	2,184
1945	1,783	2,143	975	0	0	0	187	5,088
1946	1,819	1,986	285	0	0	0	43	4,133
1947	973	38	0	0	0	0	174	1,185
1948	2,820	2,960	1,728	0	0	0	94	7,602
1949	1,609	1,219	0	0	0	0	0	2,828
1950	2,235	1,712	557	0	0	0	200	4,704
1951	1,253	1,608	0	0	0	0	157	3,018
1952	5,619	6,032	3,209	298	0	2	175	15,335
1953	1,452	1,895	1,523	0	0	0	190	5,060
1954	2,975	1,388	0	0	0	0	136	4,499
Total	**78,008**	**60,619**	**26,976**	**1,507**	**0**	**2**	**2,227**	**169,339**
Average	**2,516**	**1,955**	**870**	**49**	**0**	**0**	**72**	**5,463**
Number of Deficient Months	**1**	**4**	**11**	**27**	**31**	**30**	**11**	**115**

[1] Includes satisfaction of all assumed Riparian and Appropriative and Other Rights water users along the Sacramento River above Sacramento and in the Delta Uplands and Lowlands with priorities prior to January 1, 1954, including the assumed 1927 and 1938 Rights of the United States at Shasta Dam and in the Delta, to the extent of the available supply before water quality requirements are met.

[2] Denotes Critical Year.

Table E – Water Remaining in the Delta after Satisfaction of all Pre-1955 Appropriative and Other Rights

(Before water quality requirements are satisfied)[1]

*(In **thousands** of acre-feet)*

Year	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
1924[2]	114	0	0	0	0	0	0	114
1925	3,030	2,446	555	0	0	0	11	6,042
1926	3,185	651	0	0	0	0	0	3,836
1927	4,059	2,552	1,413	0	0	0	34	8,058
1928	3,316	1,288	0	0	0	0	0	4,604
1929	574	547	0	0	0	0	0	1,121
1930	1,422	761	0	0	0	0	24	2,207
1931[2]	30	0	0	0	0	0	0	30
1932[2]	1,375	2,181	1,319	0	0	0	0	4,875
1933[2]	727	601	442	0	0	0	0	1,770
1934[2]	505	0	0	0	0	0	0	505
1935	5,309	3,163	1,445	0	0	0	28	9,945
1936	2,910	2,256	1,037	0	0	0	0	6,203
1937	2,999	3,007	1,144	0	0	0	55	7,205
1938	6,367	6,160	4,036	590	0	0	193	17,346
1939	701	0	0	0	0	0	0	701
1940	6,387	2,158	596	0	0	0	21	9,162
1941	5,222	4,244	2,030	157	0	0	65	11,718
1942	3,892	3,363	2,589	135	0	0	79	10,058
1943	3,381	2,115	976	0	0	0	60	6,532
1944	891	1,118	53	0	0	0	5	2,067
1945	1,833	2,080	891	0	0	0	139	4,943
1946	1,861	1,928	201	0	0	0	20	4,010
1947	1,023	9	0	0	0	0	126	1,158
1948	2,862	2,889	1,619	0	0	0	51	7,421
1949	1,659	1,163	0	0	0	0	0	2,822
1950	2,285	1,663	473	0	0	0	152	4,573
1951	1,305	1,563	0	0	0	0	111	2,979
1952	5,661	5,961	3,140	56	0	0	127	14,945
1953	1,502	1,845	1,452	133	0	0	142	5,074
1954	3,017	1,317	0	0	0	0	88	4,422
Total	**79,404**	**59,029**	**25,411**	**1,071**	**0**	**0**	**1,531**	**166,446**
Average	**2,561**	**1,904**	**820**	**35**	**0**	**0**	**49**	**5,369**
Number of Deficient Months	**0**	**4**	**12**	**26**	**31**	**31**	**11**	**115**

[1] Includes satisfaction of all assumed water rights of local water users along the Sacramento River above Sacramento and in the Delta Uplands and Lowlands, and the United States at Shasta Dam and in the Delta with priorities prior to January 1, 1955 to the extent of the available supply before water quality requirements are met.

[2] Denotes Critical Year.

Table F – Water Remaining in the Delta after Satisfaction of all Riparian and Water Quality Requirements [1]

*(In **thousands** of acre-feet)*

Year	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
1924[2]	517	237	0	0	0	0	122	876
1925	3,905	2,990	1,092	118	0	48	262	8,415
1926	3,771	1,101	128	0	0	30	200	5,230
1927	5,154	3,132	1,950	300	72	103	308	11,019
1928	3,758	1,781	342	0	0	75	230	6,186
1929	1,031	997	361	0	0	38	172	2,599
1930	1,908	1,212	458	0	0	117	288	3,983
1931[2]	410	205	0	0	0	0	61	676
1932[2]	1,900	2,771	1,928	375	0	0	107	7,081
1933[2]	1,327	1,140	1,051	7	0	0	140	3,665
1934[2]	930	298	43	0	0	0	78	1,349
1935	6,584	3,836	1,982	136	0	64	297	12,899
1936	3,477	2,713	1,574	157	0	88	218	8,227
1937	3,945	3,547	1,681	146	0	33	333	9,685
1938	7,077	6,698	4,672	1,253	274	238	478	20,690
1939	1,087	366	0	0	0	31	182	1,666
1940	7,097	2,670	1,133	61	8	151	282	11,402
1941	6,434	4,782	2,645	820	191	142	347	15,361
1942	4,849	4,151	3,251	798	151	193	412	13,805
1943	4,186	2,696	1,513	205	101	119	377	9,197
1944	1,317	1,569	584	0	0	69	250	3,789
1945	2,367	2,618	1,428	151	41	114	424	7,143
1946	2,491	2,433	738	1	12	144	280	6,099
1947	1,532	431	301	0	0	73	411	2,748
1948	3,826	3,427	2,288	177	7	132	331	10,188
1949	2,335	1,658	328	0	0	51	116	4,488
1950	2,965	2,122	1,010	0	0	102	654	6,853
1951	1,870	2,151	446	0	0	175	394	5,036
1952	6,524	6,548	3,718	852	209	308	412	18,571
1953	2,195	2,601	2,121	377	90	297	427	8,108
1954	4,033	1,855	400	0	81	222	373	6,964
Total	**100,802**	**74,736**	**39,166**	**5,934**	**1,237**	**3,157**	**8,966**	**233,998**
Average	**3,252**	**2,411**	**1,263**	**191**	**40**	**102**	**289**	**7,548**
Number of Deficient Months	**0**	**0**	**3**	**14**	**19**	**5**	**0**	**41**

[1] Includes satisfaction of all riparian demands along the Sacramento River, the Delta Uplands and the Delta Lowlands and water quality requirements to the extent of the available supply.

[2] Denotes Critical Year.

Table G – Water Remaining in the Delta after Satisfaction of all Pre-1927 Water Rights and Water Quality Requirements [1]

*(In **thousands** of acre-feet)*

Year	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
1924[2]	385	4	0	0	0	0	116	505
1925	3,824	2,881	908	0	0	5	287	7,905
1926	3,690	992	0	0	0	0	211	4,893
1927	5,073	3,023	1,766	0	0	60	333	10,255
1928	3,898	1,672	158	0	0	32	255	6,015
1929	950	888	177	0	0	0	183	2,198
1930	1,827	1,103	274	0	0	74	313	3,591
1931[2]	284	0	0	0	0	0	55	339
1932[2]	1,771	2,588	1,672	107	0	0	132	6,270
1933[2]	1,198	957	795	0	0	0	151	3,101
1934[2]	801	115	0	0	0	0	89	1,005
1935	6,503	3,727	1,798	0	0	21	322	12,371
1936	3,396	2,604	1,390	0	0	45	243	7,678
1937	3,864	3,438	1,497	0	0	0	358	9,157
1938	6,996	6,589	4,488	970	0	195	503	19,741
1939	1,006	257	0	0	0	0	193	1,456
1940	7,016	2,561	949	0	0	108	307	10,941
1941	6,353	4,673	2,461	537	0	99	372	14,495
1942	4,768	4,042	3,067	515	0	150	437	12,979
1943	4,105	2,587	1,329	0	0	76	402	8,499
1944	1,236	1,460	400	0	0	26	275	3,397
1945	2,286	2,509	1,244	0	0	71	449	6,559
1946	2,410	2,324	554	0	0	101	305	5,694
1947	1,451	322	117	0	0	30	436	2,356
1948	3,745	3,318	2,104	0	0	89	356	9,612
1949	2,254	1,549	144	0	0	8	141	4,096
1950	2,884	2,013	826	0	0	59	679	6,461
1951	1,789	2,042	262	0	0	132	419	4,644
1952	6,443	6,439	3,534	569	0	265	437	17,687
1953	2,114	2,492	1,937	94	0	254	452	7,343
1954	3,952	1,746	216	0	0	179	398	6,491
Total		**70,915**	**34,067**	**2,792**	**0**	**2,079**	**9,609**	**217,734**
Average		**2,288**	**1,099**	**90**	**0**	**67**	**310**	**7,024**
Number of Deficient Months	**0**	**1**	**5**	**25**	**31**	**9**	**0**	**71**

[1] Includes satisfaction of all assumed Riparian and Pre-1927 Appropriative and Other Rights of local water users along the Sacramento River above Sacramento and in the Delta Uplands and Lowlands and water quality requirements to the extent of the available supply.

[2] Denotes Critical Year.

Table H – Water Remaining in the Delta after Satisfaction of all Pre-1938 Appropriative and Other Rights and Water Quality Requirements [1]

*(In **thousands** of acre-feet)*

Year	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
1924[2]	250	1	0	0	0	0	0	251
1925	3,041	2,513	710	0	0	0	121	6,385
1926	3,196	789	0	0	0	0	58	4,043
1927	4,070	2,619	1,546	0	0	0	169	8,404
1928	3,328	1,344	87	0	0	0	103	4,862
1929	578	664	136	0	0	0	53	1,431
1930	1,433	836	255	0	0	10	161	2,695
1931[2]	104	0	0	0	0	0	0	104
1932[2]	1,379	2,236	1,556	102	0	0	1	5,274
1933[2]	738	656	670	0	0	0	32	2,096
1934[2]	510	0	0	0	0	0	0	510
1935	5,320	3,229	1,678	0	0	0	171	10,398
1936	2,921	2,313	1,212	0	0	0	103	6,549
1937	3,010	3,074	1,287	0	0	0	205	7,576
1938	6,379	6,227	4,081	867	0	62	333	17,949
1939	706	163	0	0	0	0	53	922
1940	6,399	2,217	837	0	0	25	143	9,621
1941	5,234	4,311	2,073	424	0	0	203	12,245
1942	3,903	3,429	2,647	413	0	27	218	10,637
1943	3,392	2,181	1,073	0	0	0	199	6,845
1944	896	1,190	299	0	0	0	110	2,495
1945	1,844	2,135	1,055	0	0	8	278	5,320
1946	1,873	1,983	455	0	0	0	143	4,454
1947	1,034	251	0	0	0	0	265	1,550
1948	2,874	2,956	1,682	0	0	0	191	7,703
1949	1,670	1,218	108	0	0	0	0	2,996
1950	2,296	1,718	792	0	0	0	291	5,097
1951	1,314	1,624	199	0	0	25	249	3,411
1952	5,673	6,028	3,184	464	0	72	267	15,688
1953	1,513	1,911	1,498	0	0	71	281	5,274
1954	3,029	1,384	0	0	0	15	227	4,655
Total		**61,200**	**29,120**	**2,270**	**0**	**315**	**4,628**	**177,440**
Average		**1,974**	**939**	**73**	**0**	**10**	**149**	**5,724**
Number of Deficient Months	**0**	**2**	**7**	**26**	**31**	**22**	**4**	**92**

[1] Includes satisfaction of all assumed all Riparian, Pre-1927, 1927-38 Appropriative and Other Rights of local water users along the Sacramento River above Sacramento and in the Delta Uplands and Lowlands, including the assumed 1927 Right of the United States at Shasta Dam and water quality requirements, to the extent of the available supply.

[2] Denotes Critical Year.

Table I – Water Remaining in the Delta after Satisfaction of all Pre-1954 Appropriative and Other Rights and Water Quality Requirements [1]

*(In **thousands** of acre-feet)*

Year	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
1924[2]	0	0	0	0	0	0	0	0
1925	2,854	2,402	543	0	0	0	0	5,799
1926	3,009	609	0	0	0	0	0	3,618
1927	3,883	2,566	1,401	0	0	0	0	7,850
1928	3,148	1,245	0	0	0	0	0	4,393
1929	398	505	0	0	0	0	0	903
1930	1,246	718	0	0	0	0	0	1,964
1931[2]	0	0	0	0	0	0	0	0
1932[2]	1,204	2,142	1,307	0	0	0	0	4,653
1933[2]	551	552	430	0	0	0	0	1,533
1934[2]	337	0	0	0	0	0	0	337
1935	5,133	3,114	1,433	0	0	0	0	9,680
1936	2,734	2,207	1,025	0	0	0	0	5,966
1937	2,823	2,979	1,132	0	0	0	0	6,934
1938	6,199	6,132	4,016	0	0	0	0	16,347
1939	535	0	0	600	0	0	142	1,277
1940	6,219	2,114	584	0	0	0	0	8,917
1941	5,054	4,216	2,006	167	0	0	11	11,454
1942	3,716	3,314	2,570	145	0	0	0	9,745
1943	3,205	2,066	964	0	0	0	0	6,235
1944	741	1,074	0	0	0	0	0	1,815
1945	1,657	2,044	879	0	0	0	88	4,668
1946	1,693	1,887	189	0	0	0	0	3,769
1947	847	0	0	0	0	0	75	922
1948	2,694	2,861	1,632	0	0	0	0	7,187
1949	1,483	1,120	0	0	0	0	0	2,603
1950	2,109	1,613	461	0	0	0	101	4,284
1951	1,127	1,509	0	0	0	0	58	2,694
1952	5,493	5,933	3,113	199	0	0	76	14,814
1953	1,326	1,796	1,427	0	0	0	91	4,640
1954	2,849	1,289	0	0	0	0	37	4,175
Total		**58,007**	**25,112**	**1,111**	**0**	**0**	**679**	**159,176**
Average		**1,871**	**810**	**36**	**0**	**0**	**22**	**5,135**
Number of Deficient Months	**2**	**5**	**13**	**27**	**31**	**31**	**22**	**131**

[1] Includes satisfaction of all assumed Riparian and Appropriative and Other Rights water users along the Sacramento River above Sacramento and in the Delta Uplands and Lowlands with priorities prior to January 1, 1954, including the assumed 1927 and 1938 Rights of the United States at Shasta Dam and in the Delta and water quality requirements, to the extent of the available supply.

[2] Denotes Critical Year.

Table J – Water Remaining in the Delta after Satisfaction of all Pre-1955 Appropriative and Other Rights and Water Quality Requirements [1]

*(In **thousands** of acre-feet)*

Year	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
1924[2]	0	0	0	0	0	0	0	0
1925	2,904	2,347	459	0	0	0	0	5,710
1926	3,059	552	0	0	0	0	0	3,611
1927	3,933	2,453	1,317	0	0	0	0	7,703
1928	3,190	1,189	0	0	0	0	0	4,379
1929	448	448	0	0	0	0	0	896
1930	1,296	662	0	0	0	0	0	1,958
1931[2]	0	0	0	0	0	0	0	0
1932[2]	1,249	2,082	1,223	0	0	0	0	4,554
1933[2]	601	502	346	0	0	0	0	1,449
1934[2]	379	0	0	0	0	0	0	379
1935	5,183	3,064	1,349	0	0	0	0	9,596
1936	2,784	2,157	941	0	0	0	0	5,882
1937	2,873	2,908	1,048	0	0	0	0	6,829
1938	6,241	6,061	3,940	491	0	0	94	16,827
1939	575	0	0	0	0	0	0	575
1940	6,261	2,059	500	0	0	0	0	8,820
1941	5,096	4,145	1,934	0	0	0	0	11,175
1942	3,766	3,264	2,493	0	0	0	0	9,523
1943	3,255	2,016	880	0	0	0	0	6,151
1944	765	1,019	0	0	0	0	0	1,784
1945	1,707	1,981	795	0	0	0	40	4,523
1946	1,735	1,829	105	0	0	0	0	3,669
1947	897	0	0	0	0	0	27	924
1948	2,736	2,790	1,523	0	0	0	0	7,049
1949	1,533	1,064	0	0	0	0	0	2,597
1950	2,159	1,564	377	0	0	0	53	4,153
1951	1,179	1,464	0	0	0	0	12	2,655
1952	5,535	5,862	3,044	0	0	0	28	14,469
1953	1,376	1,746	1,356	0	0	0	43	4,521
1954	2,891	1,218	0	0	0	0	0	4,109
Total		**56,446**	**23,630**	**491**	**0**	**0**	**297**	**156,470**
Average		**1,821**	**762**	**16**	**0**	**0**	**10**	**5,047**
Number of Deficient Months	**2**	**5**	**13**	**30**	**31**	**31**	**24**	**136**

[1] Includes satisfaction of all assumed water rights of local water users along the Sacramento River above Sacramento and in the Delta Uplands and Lowlands, and the United States at Shasta Dam and in the Delta with priorities prior to January 1, 1955 to the extent of the available supply before water quality requirements are met.

[2] Denotes Critical Year.

EXHIBITS

LIST OF EXHIBITS

Exhibit I – North Delta Water Agency Contract

CONTRACT
BETWEEN
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
AND
NORTH DELTA WATER AGENCY

FOR THE ASSURANCE
OF A DEPENDABLE WATER SUPPLY OF SUITABLE QUALITY

TABLE OF CONTENTS

CONTRACT BETWEEN THE STATE OF CALIFORNIA DEPARTMENT OF WATER RESOURCES AND THE NORTH DELTA WATER AGENCY FOR THE ASSURANCE OF A DEPENDABLE WATER SUPPLY OF SUITABLE QUALITY

THIS CONTRACT, made this 28 day of Jan., 1981, between the STATE OF CALIFORNIA, acting by and through its DEPARTMENT OF WATER RESOURCES (State), and the NORTH DELTA WATER AGENCY (Agency), a political subdivision of the State of California, duly organized and existing pursuant to the laws thereof, with its principal place of business in Sacramento, California.

RECITALS

(a) The purpose of this contract is to assure that the State will maintain within the Agency a dependable water supply of adequate quantity and quality for agricultural uses and, consistent with the water quality standards of Attachment A, for municipal and industrial uses, that the State will recognize the right to the use of water for agricultural, municipal, and industrial uses within the Agency, and that the Agency will pay compensation for any reimbursable benefits allocated to water users within the Agency resulting from the Federal Central Valley Project and the State Water Project, and offset by any detriments caused thereby.

(b) The United States, acting through its Department of the Interior, has under construction and is operating the Federal Central Valley Project (FCVP).

(c) The State has under construction and is operating the State Water Project (SWP).

(d) The construction and operation of the FCVP and SWP at times have changed and will further change the regimen of rivers tributary to the Sacramento-San Joaquin Delta (Delta) and the regimen of the Delta channels from unregulated flow to regulated flow. This regulation at times improves the quality of water in the Delta and at times diminishes the quality from that which would exist in the absence of the FCVP and SWP. The regulation at times also alters the elevation of water in some Delta channels.

(e) Water problems within the Delta are unique within the State of California. As a result of the geographical location of the lands of the Delta and tidal influences, there is no physical shortage of water. Intrusion of saline ocean water and municipal, industrial and agricultural discharges and return flows, tend, however, to deteriorate the quality.

(f) The general welfare, as well as the rights and requirements of the water users in the Delta, require that there be maintained in the Delta an adequate supply of good quality water for agricultural, municipal and industrial uses.

(g) The law of the State of California requires protection of the areas within which water originates and the watersheds in which water is developed. The Delta is such an area and within such a watershed. Part 4.5 of Division 6 of the California Water Code affords a first priority to provision of salinity control and maintenance of an adequate water supply in the Delta for reasonable and beneficial uses of water and relegates to lesser priority all exports of water from the Delta to other areas for any purpose.

(h) The Agency asserts that water users within the Agency have the right to divert, are diverting, and will continue to divert, for reasonable beneficial use, water from the Delta that would have been available therein if the FCVP and SWP were not in existence, together with the right to enjoy or acquire such benefits to which the water users may be entitled as a result of the FCVP and SWP.

(i) Section 4.4 of the North Delta Water Agency Act, Chapter 283, Statutes of 1973, as amended, provides that the Agency has no authority or power to affect, bind, prejudice, impair, restrict, or limit vested water rights within the Agency.

(j) The State asserts that it has the right to divert, is diverting, and will continue to divert water from the Delta in connection with the operation of the SWP.

(k) Operation of SWP to provide the water quality and quantity described in this contract constitutes a reasonable and beneficial use of water.

(l) The Delta has an existing gradient or relationship in quality between the westerly portion most seriously affected by ocean salinity intrusion and the interior portions of the Delta where the effect of ocean salinity intrusion is diminished. The water quality criteria set forth in this contract establishes minimum water qualities at various monitoring locations. Although the water quality criteria at upstream locations is shown as equal in some periods of some years to the water quality at the downstream locations, a better quality will in fact exist at the upstream locations at almost all times. Similarly, a better water quality than that shown for any given monitoring location will also exist at interior points upstream from that location at almost all times.

(m) It is not the intention of the State to acquire by purchase or by proceeding in eminent domain or by any other manner the water rights of water users within the Agency, including rights acquired under this contract.

(n) The parties desire that the United States become an additional party to this contract.

AGREEMENTS

1. **Definitions.** When used herein, the term:

(a) "Agency" shall mean the North Delta Water Agency and shall include all of the lands within the boundaries at the time the contract is executed as described in Section 9.1 of the North Delta Water Agency Act, Chapter 283, Statutes of 1973, as amended.

(b) "Calendar year" shall mean the period January 1 through December 31.

(c) "Delta" shall mean the Sacramento-San Joaquin Delta as defined in Section 12220 of the California Water Code as of the date of the execution of the contract.

(d) "Electrical Conductivity" (EC) shall mean the electrical conductivity of a water sample measured in millimhos per centimeter per square centimeter corrected to a standard temperature of 25° Celsius determined in accordance with procedures set forth in the publication entitled "Standard Methods of Examination of Water and Waste Water", published jointly by the American Public Health Association, the American Water Works Association, and the Water Pollution Control Federation, 13th Edition, 1971, including such revisions thereof as may be made subsequent to the date of this contract which are approved in writing by the State and the Agency.

(e) "Federal Central Valley Project" (FCVP) shall mean the Central Valley Project of the United States.

(f) "Four-River Basin Index" shall mean the most current forecast of Sacramento Valley unimpaired runoff as presently published in the California Department of Water Resources Bulletin 120 for the sum of the flows of the following: Sacramento River above Bend Bridge near Red Bluff; Feather River, total inflow to Oroville Reservoir; Yuba River at Smartville; American River, total inflow to Folsom Reservoir. The May 1 forecast shall continue in effect until the February 1 forecast of the next succeeding year.

(g) "State Water Project" (SWP) shall mean the State Water Resources Development System as defined in Section 12931 of the Water Code of the State of California.

(h) "SWRCB" shall mean the State Water Resources Control Board.

(i) "Water year" shall mean the period October 1 of any year

through September 30 of the following year.

2. **Water Quality.**

(a) (i) The State will operate the SWP to provide water qualities at least equal to the better of: (1) the standards adopted by the SWRCB as they may be established from time to time; or (2) the criteria established in this contract as identified on the graphs included as Attachment A.

(ii) The 14-day running average of the mean daily EC at the identified location shall not exceed the values determined from the Attachment A graphs using the Four-River Basin Index except for the period February through March of each year at the location in the Sacramento River at Emmaton for which the lower value of the 80 percent probability range shall be used.

(iii) The quality criteria described herein shall be met at all times except for a transition period beginning one week before and extending one week after the date of change in periods as shown on the graphs of Attachment A. During this transition period, the SWP will be operated to provide as uniform a transition as possible over the two-week period from one set of criteria to the next so as to arrive at the new criteria one week after the date of change in period as shown on the graphs of Attachment A.

(b) While not committed affirmatively to achieving a better water quality at interior points upstream from Emmaton than those set forth on Attachment A, the State agrees not to alter the Delta hydraulics in such manner as to cause a measurable adverse change in the ocean salinity gradient or relationship among the various monitoring locations shown on Attachment B and interior points upstream from those locations, with any particular flow past Emmaton.

(c) Whenever the recorded 14-day running average of mean daily EC of water in the Sacramento River at Sacramento exceeds 0.25 mmhos, the quality criteria indicated on the graphs of Attachment A may be adjusted by adding to the value taken therefrom the product of 1.5 times the amount that the recorded EC of the Sacramento River at Sacramento exceeds 0.25 mmhos.

3. **Monitoring.** The quality of water shall be measured by the State as needed to monitor performance pursuant to Article 2 hereof with equipment installed, operated, and maintained by the State, at locations indicated on "Attachment B". Records of such measurements shall at regular intervals be furnished to the Agency. All monitoring costs at North Fork Mokelumne River near Walnut Grove, Sacramento River at Walnut Grove, and Steamboat Slough at Sutter Slough incurred by the State solely for this contract shall be shared equally by the Agency and the State. All monitoring costs to be borne by the Agency for monitoring at the above locations are included in the payment under Article 10.

4. **Emergency Provisions.**

(a) If a structural emergency occurs such as a levee failure or a failure of an SWP facility, which results in the State's failure to meet the water quality criteria, the State shall not be in breach of this contract if it makes all reasonable efforts to operate SWP facilities so that the water quality criteria will be met again as soon as possible. For any period in which SWP failure results in failure of the State to meet the water quality criteria, the State shall waive payment under Article 10, prorated for that period, and the amount shall be deducted from the next payment due.

(b) (i) A drought emergency shall exist when all of the following occur:

(1) The Four-River Basin Index is less than an average of 9,000,000 acre feet in two consecutive years (which occurred in 1933-4 and 1976-7); and

(2) An SWRCB emergency regulation is in effect providing for the operation of the SWP to maintain water quality different from that provided in this contract; and

(3) The water supplied to meet annual entitlements of SWP agricultural contractors in the San Joaquin Valley is being reduced by at least 50 percent of these agricultural entitlements (it being the objective of the SWP to avoid agricultural deficiencies in excess of 25 percent) or the total of water supplied to meet annual entitlements of all SWP contractors is being reduced by at least 15 percent of all entitlements, whichever results in the greater reduction in acre feet delivered.

(ii) A drought emergency shall terminate if any of the conditions in (b) (i) of this Article ceases to exist or if the flow past Sacramento after October 1 exceeds 20,000 cubic feet per second each day for a period of 30 days.

(iii) Notwithstanding the provisions of Article 2 (a), when a drought emergency exists, the emergency water quality criteria of the SWRCB shall supersede the water quality requirements of this contract to the extent of any inconsistency; provided, however, that the State shall use all reasonable efforts to preserve Delta water quality, taking into consideration both the limited water supply available for that purpose and recognizing the priority established for Delta protection referred to in Recital (g).

(iv) When a drought emergency exists, and an overland supply is not available to an individual water user comparable in quality and quantity to the water which would have been available to the user under Attachment A, the State shall compensate the user for loss of net income for each acre either (A) planted to a more salt-tolerant crop in the current year, (B) not planted to any crop in the current year provided such determination not to plant was reasonable based on the drought emergency, or (C) which had a reduced yield due to the drought emergency, calculated on the basis of the user's average net income for any three of the prior five years for each such acre. A special contract claims procedure shall be estalished by the State to expedite and facilitate the payment of such compensation.

5. **Overland Water Supply Facilities.**

(a) Within the general objectives of protecting the western Delta areas against the destruction of agricultural productivity as a result of the increased salinity of waters in the Delta channels resulting in part from SWP operation, the State may provide diversion and overland facilities to supply and distribute water to Sherman Island as described in the report entitled "Overland Agricultural Water Facilities Sherman Island" dated January 1980. Final design and operating specifications shall be subject to approval of the Agency and Reclamation District No. 341. The Agency or its transferee will assume full ownership, operation, and maintenance responsibility for such facilities after successful operation as specified. After the facilities are constructed and operating, the water qualitry criteria for the Sacramento River at Emmaton shall apply at the intake of the facilities in Three Mile Slough.

(b) The State and the Agency may agree to the construction and operation of additional overland water supply facilities within the Agency, so long as each landowner served by the overland facilities receives a quality of water not less than that specified in Attachment A for the upstream location nearest to his original point of diversion. The design and operation of such facilities and the cost sharing thereof are subject to approval of any reclamation district which includes within its boundaries the area to be served. The ownership, operation, and maintenance of diversion works and overland facilities shall be the subject of a separate agreement between the Agency or its transferees and the State.

6. **Flow Impact.** The State shall not convey SWP water so as to cause a decrease or increase in the natural flow, or reversal of the natural flow direction, or to cause the water surface elevation in Delta channels to be altered, to the detriment of Delta channels or water users within the Agency. If lands, levees, embankments, or revetments adjacent to Delta channels within the Agency incur seepage or erosion damage or if diversion facilities must be modi-

fied as a result of altered water surface elevations as a result of the conveyance of water from the SWP to lands outside the Agency after the date of this contract, the State shall repair or alleviate the damage, shall improve the channels as necessary, and shall be responsible for all diversion facility modifications required.

7. **Place of Use of Water.**

(a) Any subcontract entered into pursuant to Article 18 shall provide that water diverted under this contract for use within the Agency shall not be used or otherwise disposed of outside the boundaries of the Agency by the subcontractor.

(b) Any subcontract shall provide that all return flow water from water diverted within the Agency under this contract shall be returned to the Delta channels. Subject to the provisions of this contract concerning the quality and quantity of water to be made available to water users within the Agency, and to any reuse or recapture by water users within the Agency, the subcontractor relinquishes any right to such return flow, and as to any portion thereof which may be attributable to the SWP, the subcontractor recognizes that the State has not abandoned such water.

(c) If water is attempted to be used or otherwise disposed of outside the boundaries of the Agency so that the State's rights to return flow are interfered with, the State may seek appropriate administrative or judicial action against such use or disposal.

(d) This article shall not relieve any water user of the responsibility to meet discharge regulations legally imposed.

8. **Scope of Contract.**

(a) During the term of this contract:

(i) This contract shall constitute the full and sole agreement between the State and the Agency as to (1) the quality of water which shall be in the Delta channels, and (2) the payment for the assurance given that water of such quality shall be in the Delta channels for reasonable and beneficial uses on lands within the Agency, and said diversions and uses shall not be disturbed or challenged by the State so long as this contract is in full force and effect.

(ii) The State recognizes the right of the water users of the Agency to divert from the Delta channels for reasonable and beneficial uses for agricultural, municipal and industrial purposes on lands within the Agency, and said diversions and uses shall not be disturbed or challenged by the State so long as this contract is in full force and effect, and the State shall furnish such water as may be required within the Agency to the extent not otherwise available under the water rights of water users.

(iii) The Agency shall not claim any right against the State in conflict with the provisions hereof so long as this contract remains in full force and effect.

(b) Nothing herein contained is intended to or does limit rights of the Agency against others than the State, or the State against any person other than the Agency and water users within the Agency.

(c) This contract shall not affect, bind, prejudice, impair, restrict, or limit vested water rights within the Agency.

(d) The Agency agrees to defend affirmatively as reasonable and beneficial the water qualities established in this contract. The State agrees to defend affirmatively as reasonable and beneficial the use of water required to provide and sustain the qualities established in this contract. The State agrees that such use should be examined only after determination by a court of competent jurisdiction that all uses of water exported from the Delta by the State and by the United States, for agricultural, municipal, and industrial purposes are reasonable and beneficial, and that irrigation practices, conservation efforts, and groundwater management within areas served by such exported water should be examined in particular.

(e) The Agency consents to the State's export of water from the Delta so long as this contract remains in full force and effect and the State is in compliance herewith.

9. **Term of Contract.**

(a) This contract shall continue in full force and effect until such time as it may be terminated by the written consent and agreement of the parties hereto, provided that 40 years after execution of this contract and every 40 years thereafter, there shall be a six-month period of adjustment during which any party to this contract can negotiate with the other parties to revise the contract as to the provisions set out in Article 10. If, during this period, agreement as to a requested revision cannot be achieved, the parties shall petition a court of competent jurisdiction to resolve the issue as to the appropriate payment to be made under Article 10. In revising Article 10, the court shall review water quality and supply conditions within the Agency under operation of the FCVP and SWP, and identify any reimbursable benefits allocated to water users within the Agency resulting from operation of the FCVP and SWP, offset by any detriments caused thereby. Until such time as any revision is final, including appeal from any ruling of the court, the contract shall remain in effect as without such revision.

(b) In the event this contract terminates, the parties' water rights to quality and quantity shall exist as if this contract had not been entered into.

10. **Amount and Method of Payment for Water.**

(a) The Agency shall pay each year as consideration for the assurance that an adequate water supply and the specific water quality set forth in this contract will be maintained and monitored, the sum of one hundred seventy thousand dollars ($170,000.00). The annual payments shall be made to the State one-half on or before January 1 and one-half on or before July 1 of each year commencing with January 1, 1982.

(b) The payment established in (a) above shall be subject to adjustment as of January 1, 1987, and every fifth year thereafter. The adjusted payment shall bear the same relation to the payment specified in (a) above that the mean of the State's latest projected Delta Water Rate for the five years beginning with the year of adjustment bears to $10.00 per acre foot; provided that, no adjusted payment shall exceed the previous payment by more than 25 percent.

(c) The payments provided for in this article shall be deposited by the State in trust in the California Water Resources Development System Revenue Account in the California Water Resources Development Bond Fund. The trust shall continue for five years (or such longer period as the State may determine) but shall be terminated when the United States executes a contract as provided in Article 11 with the State and the Agency at which time the proportion of the trust fund that reflects the degree to which the operation of the FCVP has contributed to meeting the water quality standard under this contract as determined solely by the State shall be paid to the United States (with a pro rata share of interest). In the event that the United States has not entered into such a contract before the termination of the trust, the trust fund shall become the sole property of the State.

11. **Participation of the United States.** The Agency will exercice its best efforts to secure United States joinder and concurrence with the terms of this contract and the State will diligently attempt to obtain the joinder and concurrence of the United States with the terms of this contract and its participation as a party hereto. Such concurrence and participation by the United States in this contract shall include a recognition ratified by the Congress that the excess land provisions of Federal reclamation law shall not apply to this contract.

12. **Remedies.**

(a) The Agency shall be entitled to obtain specific perfor-

mance of the provisions of this contract by a decree of the Superior Court in Sacramento County requiring the State to meet the standards set forth in this contract. If the water quality in Delta channels falls below that provided in this contract, then, at the request of the Agency, the State shall cease all diversions to torage in SWP reservoirs or release stored water from SWP reservoirs or cease all export by the SWP from Delta channels, or any combination of these, to the extent that such action will further State compliance with the water quality standards set forth in this contract, except that the State may continue to export from Delta channels to the extent required to meet water quality requirements in contracts with the Delta agencies specified in Section 11456 of the California Water code.

(b) To the extent permitted by law, the State agrees to forego the use of eminent domain proceedings to acquire water rights of water users within the Agency or any rights acquired under this contract for water or water quality maintenance for the purpose of exporting such water from the Delta. This provision shall not be construed to prohibit the utilization of eminent domain proceedings for the purpose of acquiring land or any other rights necessary for the construction of water facilities.

(c) Except as provided in the water quality assurances in Article 2 and the provisions of Article 6 and Article 8, neither the State nor its officers, agents, or employees shall be liable for or on account of:

(i) The control, carriage, handling, use, disposal, or distribution of any water outside the facilities constructed, operated and maintained by the State.

(ii) Claims of damage of any nature whatsoever, including but not limited to property loss or damage, personal injury or death arising out of or connected with the control, carriage, handling, use, disposal or distribution of any water outside of the facilities constructed, operated and maintained by the State.

(d) The use by the Agency or the State of any remedy specified herein for the enforcement of this contract is not exclusive and shall not deprive either from using any other remedy provided by law.

13. **Comparable Treatment.** In the event that the State gives on the whole substantially more favorable treatment to any other Delta entity under similar circumstances than that accorded under this contract to the Agency, the State agrees to renegotiate this contract to provide comparable treatment to the Agency under this contract.

GENERAL PROVISIONS

14. **Amendments.** This contract may be amended or terminated at any time by mutual agreement of the State and the Agency.

15. **Reservation With Respect to State Laws.** Nothing herein contained shall be construed as estopping or otherwise preventing the Agency, or any person, firm, association, corporation, or public body claiming by, through, or under the Agency, from contesting by litigation or other lawful means, the validity, constitutionality, construction or application of any law of the State of California.

16. **Opinions and Determinations.** Where the terms of this contract provide for action to be based upon the opinion, judgment, approval, review, or determination of either party hereto, such terms are not intended to be and shall never be construed as permitting such opinion, judgment, approval, review, or determination to be arbitrary, capricious, or unreasonable.

17. **Successors and Assigns Obligated.** This contract and all of its provisions shall apply to and bind the successors and assigns of the parties hereto.

18. **Assignment and Subcontract.** The Agency may enter into subcontracts with water users within the Agency boundaries in which the assurances and obligations provided in this contract as to such water user or users are assigned to the area covered by the subcontract. The Agency shall remain primarily liable and shall make all payments required under this contract. No assignment or transfer of this contract, or any part hereof, rights hereunder, or interest herein by the Agency, other than a subcontract containing the same terms and conditions, shall be valid unless and until it is approved by the State and made subject to such reasonable terms and conditions as the State may impose. No assignment or transfer of this contract or any part hereof, rights hereunder, or interest herein by the State shall be valid except as such assignment or transfer is made pursuant to and in conformity with applicable law.

19. **Books, Records, Reports, and Inspections Thereof.** Subject to applicable State laws and regulations, the Agency shall have full and free access at all reasonable times to the SWP account books and official records of the State insofar as the same pertain to the matters and things provided for in this contract, with the right at any time during office hours to make copies thereof, and the proper representatives of the State shall have similar rights with respect to the account books and records of the Agency.

20. **Waiver of Rights.** Any waiver at any time by either party hereto of its rights with respect to a default, or any other matter arising in connection with this contract, shall not be deemed to be a waiver with respect to any other default or matter.

21. **Assurance Relating to Validity of Contract.** This contract shall be effective after its execution by the Agency and the State. Promptly after the execution and delivery of this contract, the Agency shall file and prosecute to a final decree, including any appeal therefrom to the highest court of the State of California, in a court of competent jurisdiction a special proceeding for the judicial examination, approval, and confirmation of the proceedings of the Agency's Board of Directors and of the Agency leading up to and including the making of this contract and the validity of the provisions thereof as a binding and enforceable obligation upon the State and the Agency. If, in this proceeding or other proceeding before a court of competent jurisdiction, any portion of this contract should be determined to be constitutionally invalid, then the remaining portions of this contract shall remain in full force and effect unless modified by mutual consent of the parties.

22. **Notices.** All notices that are required either expressly or by implication to be given by one party to the other shall be deemed to have been given if delivered personally or if enclosed in a properly addressed, postage prepaid, envelope and deposited in a United States Post Office. Unless or until formally notified otherwise, the Agency shall address all notices to the State as follows:

Director, Department of Water Resources
P.O. Box 388
Sacramento, California 95802

and the State shall address all notices to the Agency as follows:

North Delta Water Agency
921 - 11th St., Rm. 703
Sacramento, California 95814

IN WITNESS WHEREOF, the parties hereto have executed this contract on the date first above written.

Approved as to legal form and sufficiency:

By /s/ P. A. TOWNER
Chief Counsel
Dept. of Water Resources

STATE OF CALIFORNIA

By /s/ RONALD B. ROBIE
Dept. of Water Resources

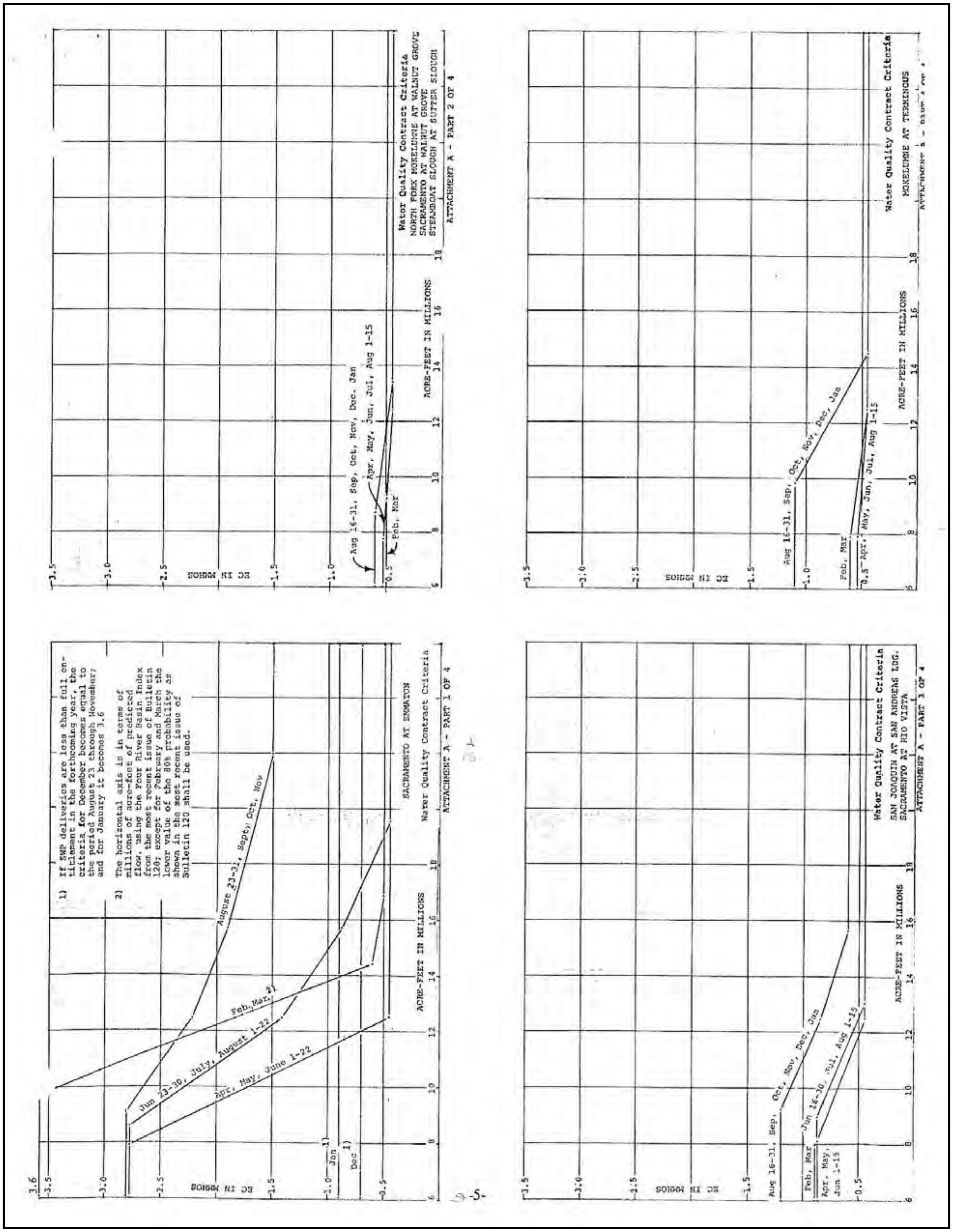
Approved as to legal form and sufficiency:

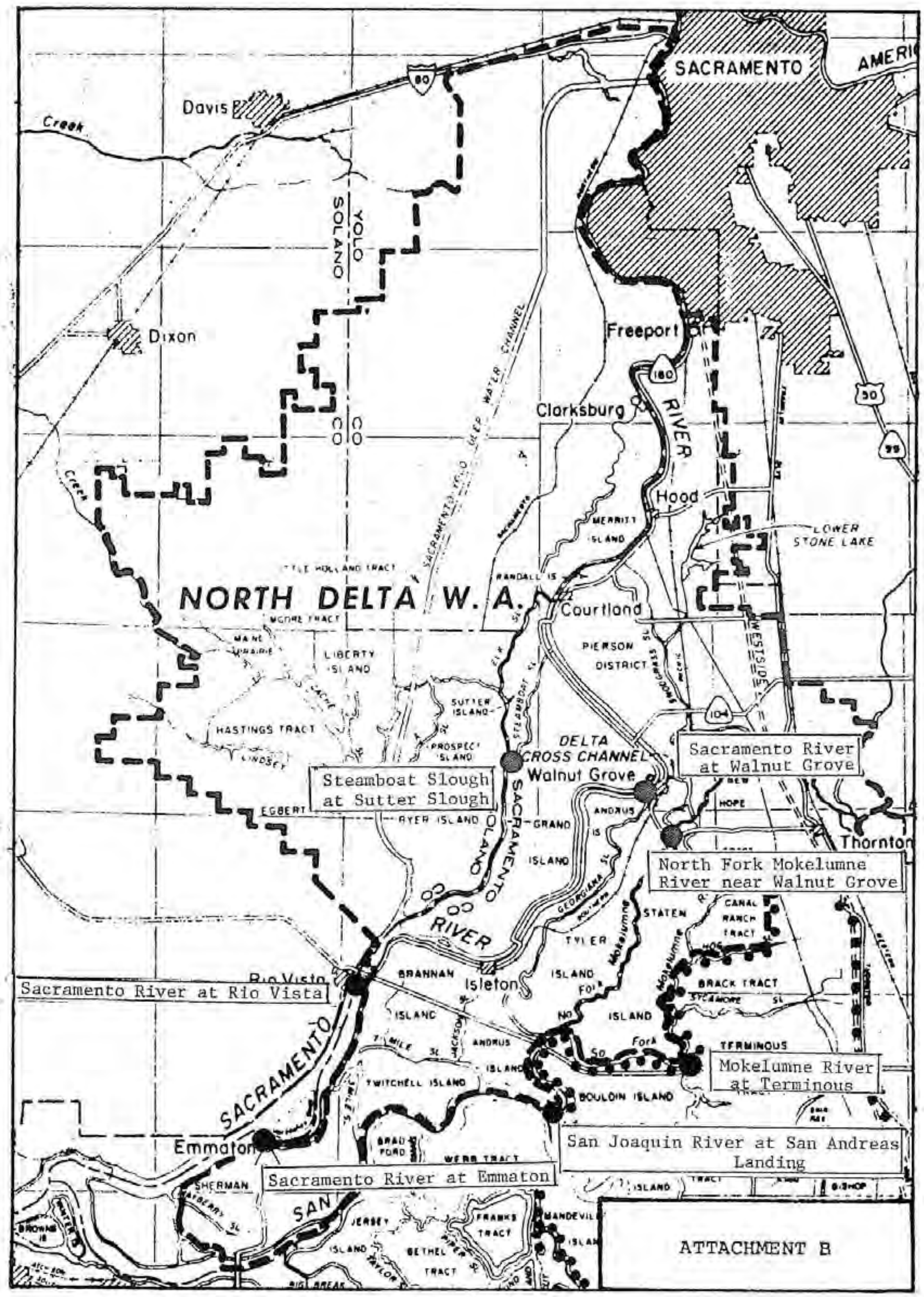
By /s/ GEORGE BASYE
General Counsel
North Delta Water Agency

NORTH DELTA WATER AGENCY

By /s/ W. R. DARSIE
Chairman
Board of Directors

-4-


1) If SWP deliveries are less than full entitlement in the forthcoming year, the criteria for December becomes equal to the period August 23 through November; and for January it becomes 3.6
2) The horizontal axis is in terms of millions of acre-feet of predicted flow, using the Four River Basin Index from the most recent issue of Bulletin 120; except for February and March the lower value of the 80% probability as shown in the most recent issue of Bulletin 120 shall be used.
SACRAMENTO AT EMMATON
Water Quality Contract Criteria
ATTACHMENT A - PART 1 OF 4
Water Quality Contract Criteria
NORTH FORK MOKELUMNE AT WALNUT GROVE
SACRAMENTO AT WALNUT GROVE
STEAMBOAT SLOUGH AT SUTTER SLOUGH
ATTACHMENT A - PART 2 OF 4
Water Quality Contract Criteria
SAN JOAQUIN AT SAN ANDREAS LDG.
SACRAMENTO AT RIO VISTA
ATTACHMENT A - PART 3 OF 4
Water Quality Contract Criteria
MOKELUMNE AT TERMINOUS
ACRE-FEET IN MILLIONS
EC IN MMHOS
-5-


SACRAMENTO
Davis
Creek
YOLO
SOLANO
CO
CO
Dixon
Freeport
Clarksburg
RIVER
Hood
LOWER
STONE LAKE
NORTH DELTA W. A.
Courtland
PIERSON
DISTRICT
LIBERTY
ISLAND
HASTINGS TRACT
SUTTER
ISLAND
DELTA
CROSS CHANNEL
Walnut Grove
Sacramento River
at Walnut Grove
Steamboat Slough
at Sutter Slough
SACRAMENTO
RYER ISLAND
GRAND
ISLAND
Thornton
North Fork Mokelumne
River near Walnut Grove
STATEN
TYLER
ISLAND
BRACK TRACT
TERMINOUS
RIVER
Rio Vista
Sacramento River at Rio Vista
BRANNAN
Isleton
TWITCHELL ISLAND
BOULDIN ISLAND
Mokelumne River
at Terminous
SACRAMENTO
San Joaquin River at San Andreas
Landing
Emmaton
Sacramento River at Emmaton
SHERMAN
SAN
WEBB TRACT
JERSEY
BETHEL
TRACT
FRANKS
TRACT
ATTACHMENT B

-6-

Exhibit II – 1979 Memorandum

NDWA Directors November 2, 1979

D. E. Kienlen

Water Quality Criteria Graphs and Ramping

In accordance with your request during your meeting on October 3, I am submitting further information on the use of graphs to define the water quality criteria for the NDWA and the suggested ramping criteria under the proposed contract with the State.

Water Quality Criteria Graphs

The water quality criteria set forth in Table A (1)* provides for substantial changes in water quality at some locations between different types of years. Since the year type forecast (2) is an estimate of runoff based on prior precipitation, snow pack, and future precipitation, a small difference can change the type of year and can result in substantial changes in water quality. In order to eliminate any pressure in making the forecast and also to eliminate the large water quality changes, DWR has developed a set of graphs to define the quality within the NDWA. These graphs are based on the Table A water quality criteria but provide for a uniform change depending on the estimated runoff.

The attached set of graphs (3) shows the proposed criteria as developed by DWR on which the divisions between the type of years corresponding to Table A are shown. In order to illustrate the procedure used to develop the graphs two additional graphs for Emmaton are attached (4) and (5).

Graph (4) is for the period June 23 through August 15. (Note that June 23-30 has been included with July and August but June 1-22 has been included with April and May. This reduces the June variations and simplifies the criteria. The dashed stepped line on (4) shows the criteria given in Table A for this period. The hatched triangles above the solid line show improved water quality from that given in Table A and the shadded triangles below the solid line show reduced water quality from that given in Table A.

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* Number in parenthesis refers to attachment.

Memorandum to NDWA Directors November 2, 1979
Re: Water Quality Criteria Graphs and Ramping.

-2-

As may be seen, there is a good balance between the areas indicating a nearly equal split between improvements and detriments. However, improvements result in reducing the flow at the point of the poorest water quality. For example, an EC of 2.78 under Table A occurs at a flow of 10,200,000 AF (10.2 MAF) but with the graph this value is not reached until 8.9 MAF.

Graph (5) shows similar results for the period August 16 through November 30. All other graphs were prepared in a similar manner and provide equivalent results.

In my opinion, the graphs are an improvement over Table A and the elimination of the pressure to define the type of year is important for future operation. In addition, the poorest quality is not reached until there is lower runoff or flow. Therefore I recommend that you accept the graphs to define water quality criteria within NDWA.

There will be an additional advantage in using the graphs. The contract as presently drafted indicates that the best quality will prevail as either established by the contract criteria or Decision 1485 of the State Water Resources Control Board. This means that until the Board modifies Decision 1485, during the period April 1 through August 15 NDWA would receive the improvements shown by the hatched triangles above the solid line but would not receive the reduced quality shown by the shaded triangles below the solid line on Graphs (4) and (5).

Ramping

The water quality criteria can result in a substantial change from one day to the next. From a practical operation standpoint this is impossible to obtain. To overcome this point DWR is proposing a ramping criteria which will provide for a uniform transition from one criteria to the next. The proposal originally was for a four-week period which we said was unacceptable. We finally arrived at a two-week period beginning one week before the date of change and ending one week later. Graph (6) shows an example of ramping with an assumed four river runoff of 13.0 MAF. The dashed line shows the criteria from the graphs on sheet 1 of (3). The solid lines show the uniform transition brought about by ramping over a two-week period.

Without a ramping criteria the 14-day average will permit some flexibility to DWR but most of the change or ramping will have to occur before and after the better quality criteria. There is no

Memorandum to NDWA Directors November 2, 1979
Re: Water Quality Criteria Graphs and Ramping.

-3-

doubt that the ramping both reduces and improves quality in equal amounts and in that respect is fair. A more important point, however, is what effect it may have during the growing season. If there may be an effect, the ramping should not be accepted. An alternative may be to accept ramping outside of the main growing season of April through August.

D. E. Kienlen

cc: Mr. G. L. Renoud
Mr. George Basye

(1)

TABLE A

NORTH DELTA WATER AGENCY
AGRICULTURAL WATER QUALITY STANDARDS

Maximum 14-day running average of mean daily EC in mmhos.

Period	Type of Year[1] Wet	Above Normal	Below Normal	Dry	Critical
Sacramento River at Emmaton					
Feb. 1 to Apr. 1[2]	0.5	0.5	0.6	3.0	3.6
Apr. 1 to June 1	0.45	0.45	0.45	0.45	2.78
June 1 to July 1	0.45	0.45	--	--	2.78
July 1 to Aug. 15	0.45	0.63	--	--	2.78
June 1 to June 20	--	--	0.45	--	--
June 20 to Aug. 15	--	--	1.14	--	--
June 1 to June 15	--	--	--	0.45	--
June 15 to Aug. 15	--	--	--	1.67	--
Aug. 15 to Dec. 1	1.5	1.8	2.0	2.4	2.8
Dec. 1 to Jan. 1[3]	0.7	0.7	0.7	0.7	0.7
Jan. 1 to Feb. 1[3]	0.9	0.9	0.9	0.9	0.9
San Joaquin River at San Andreas Landing					
Sacramento River at Rio Vista					
Feb. 1 to Apr. 1	0.45	0.45	0.45	0.45	0.6
Apr. 1 to Aug. 15	0.45	0.45	0.45	--	0.87
Apr. 1 to June 25	--	--	--	0.45	--
June 25 to Aug. 15	--	--	--	0.58	--
Aug. 15 to Feb. 1	0.6	0.6	0.7	1.0	1.2
Mokelumne River at Terminous					
Feb. 1 to Apr. 1	0.45	0.45	0.45	0.45	0.6
Apr. 1 to Aug. 15	0.45	0.45	0.45	0.45	0.54
Aug. 15 to Feb. 1	0.45	0.45	0.45	1.0	1.1
North Fork Mokelumne River near Walnut Grove					
Sacramento River at Walnut Grove					
Steamboat Slough at Sutter Slough					
Feb. 1 to Apr. 1	0.45	0.45	0.45	0.45	0.5
Apr. 1 to Aug. 15	0.45	0.45	0.45	0.45	0.54
Aug. 15 to Feb. 1	0.45	0.45	0.45	0.5	0.6

1/ Type of year determined by the forecast of unimpaired runoff as published in DWR Bulletin 120 assuming normal precipitation to follow except for February and March at Emmaton. (see footnote 2)

2/ Type of year determined by the forecast of unimpaired runoff using lower value of the 80% probability range from DWR Bulletin 120.

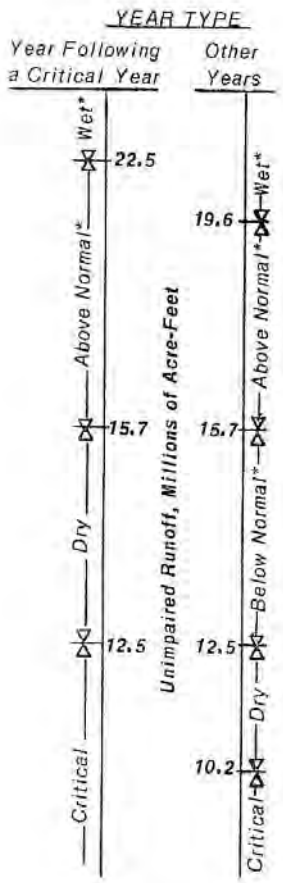
3/ If SWP deliveries are to be less than full entitlement in forthcoming year, the criteria becomes:

	Wet	Above Normal	Below Normal	Dry	Critical
Dec. 1 to Jan. 1	1.5	1.8	2.0	2.4	2.8
Jan. 1 to Feb. 1	3.6	3.6	3.6	3.6	3.6

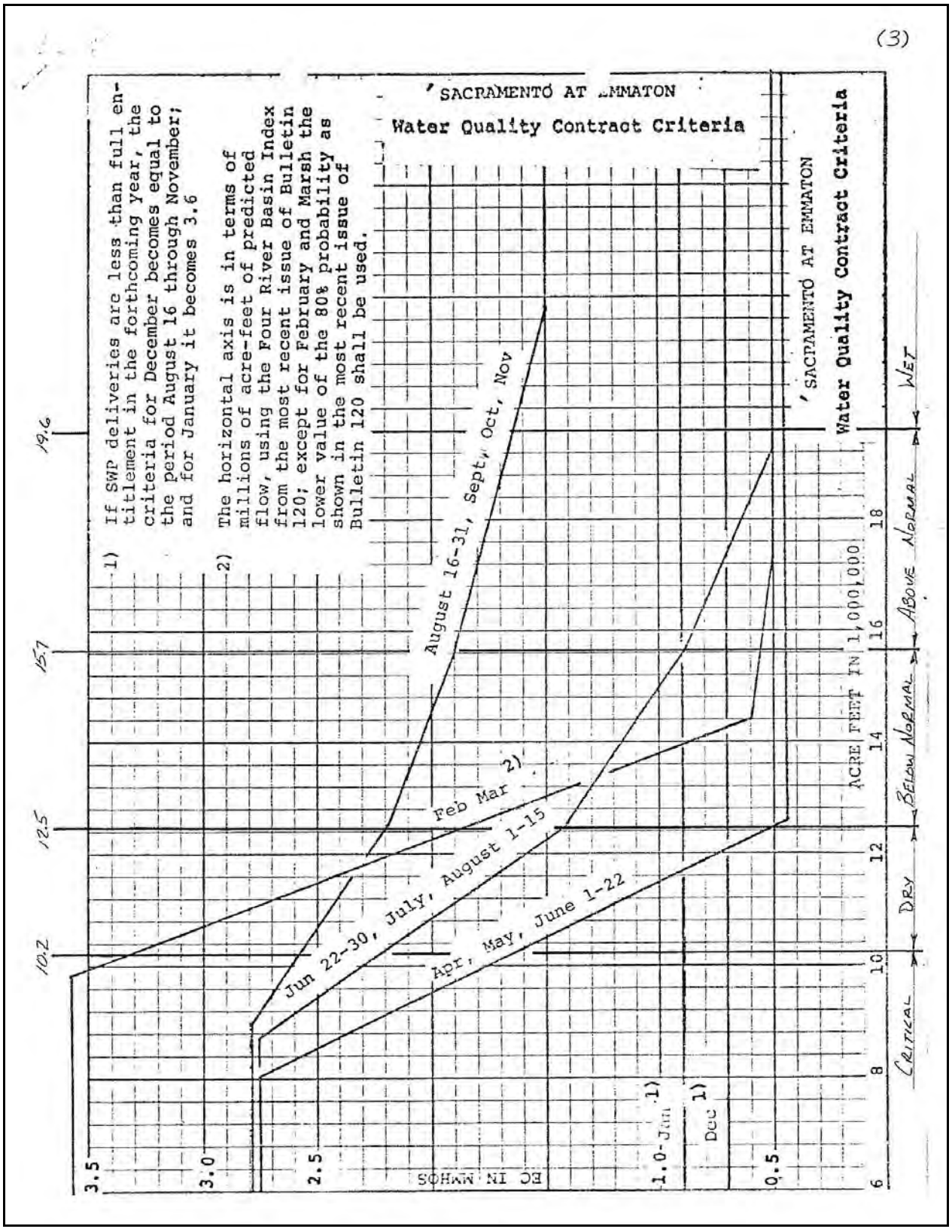
(2)

Year classification shall be determined by the forecast of Sacramento Valley unimpaired runoff for the current water year *(October 1 of the preceding calendar year through September 30 of the current calendar year)* as published in California Department of Water Resources Bulletin 120 for the sum of the following locations: Sacramento River above Bend Bridge, near Red Bluff; Feather River, total inflow to Oroville Reservoir; Yuba River at Smartville; American River, total inflow to Folsom Reservoir. Preliminary determinations of year classification shall be made in February, March and April with final determination in May.

YEAR TYPE	RUNOFF, MILLIONS OF ACRE-FEET
Wet*	equal to or greater than 19.6 except equal to or greater than 22.5 in a year following a critical year.
Above Normal*	greater than 15.7 and less than 19.6 except greater than 15.7 and less than 22.5 in a year following a critical year
Below Normal*	equal to or less than 15.7 and greater than 12.5 except in a year following a critical year.
Dry	equal to or less than 12.5 and greater than 10.2 except equal to or less than 15.7 and greater than 12.5 in a year following a critical year.
Critical	equal to or less than 10.2 except equal to or less than 12.5 in a year following a critical year.



* *Any otherwise wet, above normal, or below normal year may be designated a subnormal snowmelt year whenever the forecast of April through July unimpaired runoff reported in the May issue of Bulletin 120 is less than 5.3 million acre-feet.*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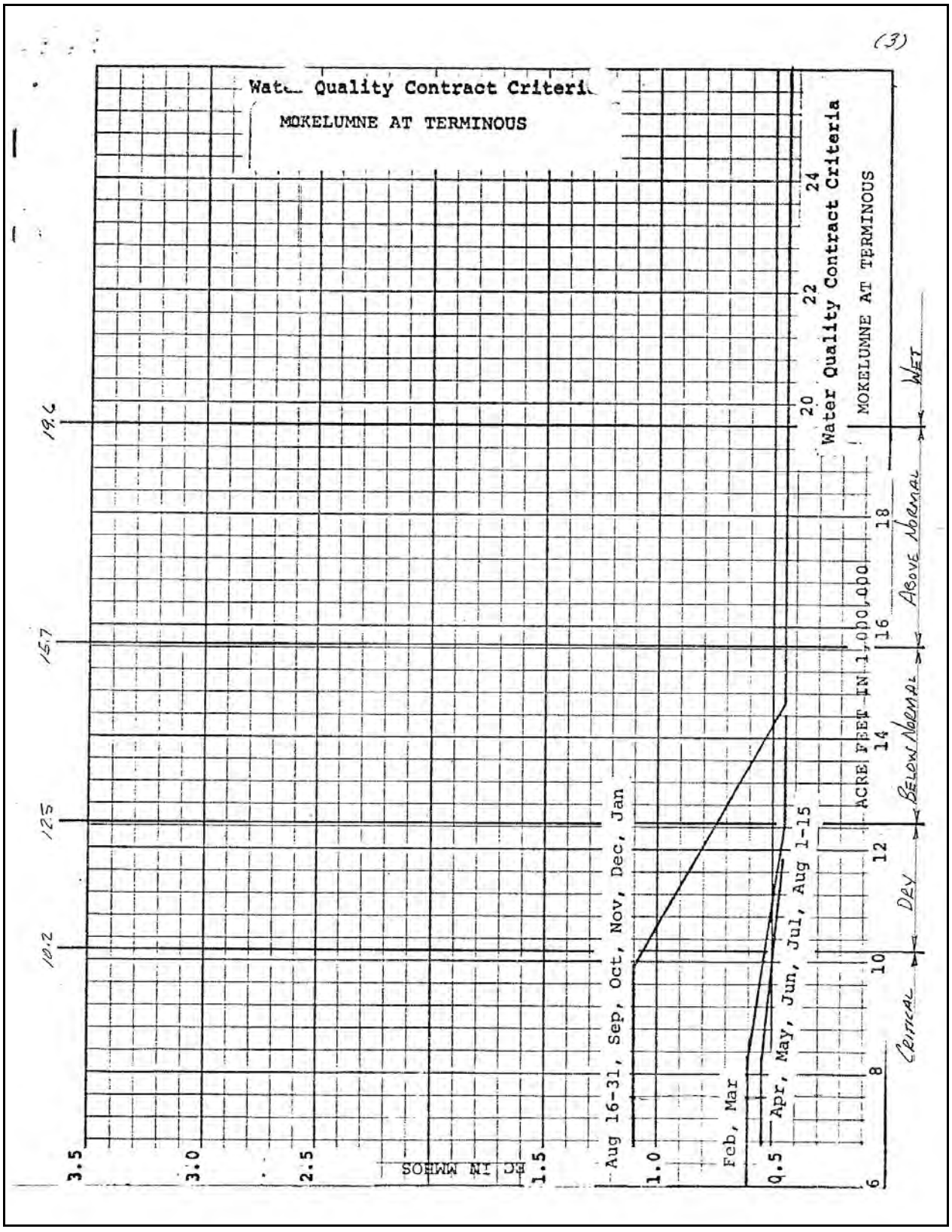
SACRAMENTO AT EMMATON
Water Quality Contract Criteria
If SWP deliveries are less than full entitlement in the forthcoming year, the criteria for December becomes equal to the period August 16 through November; and for January it becomes 3.6
1)
The horizontal axis is in terms of millions of acre-feet of predicted flow, using the Four River Basin Index from the most recent issue of Bulletin 120; except for February and Marsh the lower value of the 80% probability as shown in the most recent issue of Bulletin 120 shall be used.
2)
August 16-31, Sept., Oct, Nov
Feb Mar 2)
Jun 22-30, July, August 1-15
Apr, May, June 1-22
Dec 1)
1.0-Jan 1)
EC IN MMHOS
3.5
3.0
2.5
1.0
0.5
19.6
15.7
12.5
10.2
ACRE FEET IN 1,000,000
18
16
14
12
10
8
6
WET
ABOVE NORMAL
BELOW NORMAL
DRY
CRITICAL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Water Quality Contract Criteria
MOKELUMNE AT TERMINOUS
Water Quality Contract Criteria
MOKELUMNE AT TERMINOUS
WET
ABOVE NORMAL
BELOW NORMAL
DRY
CRITICAL
ACRE FEET IN 1,000,000
EC IN MMHOS
Aug 16-31, Sep, Oct, Nov, Dec, Jan
Feb, Mar
Apr, May, Jun, Jul, Aug 1-15
19.2
15.7
12.5
10.2
3.5
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24
22
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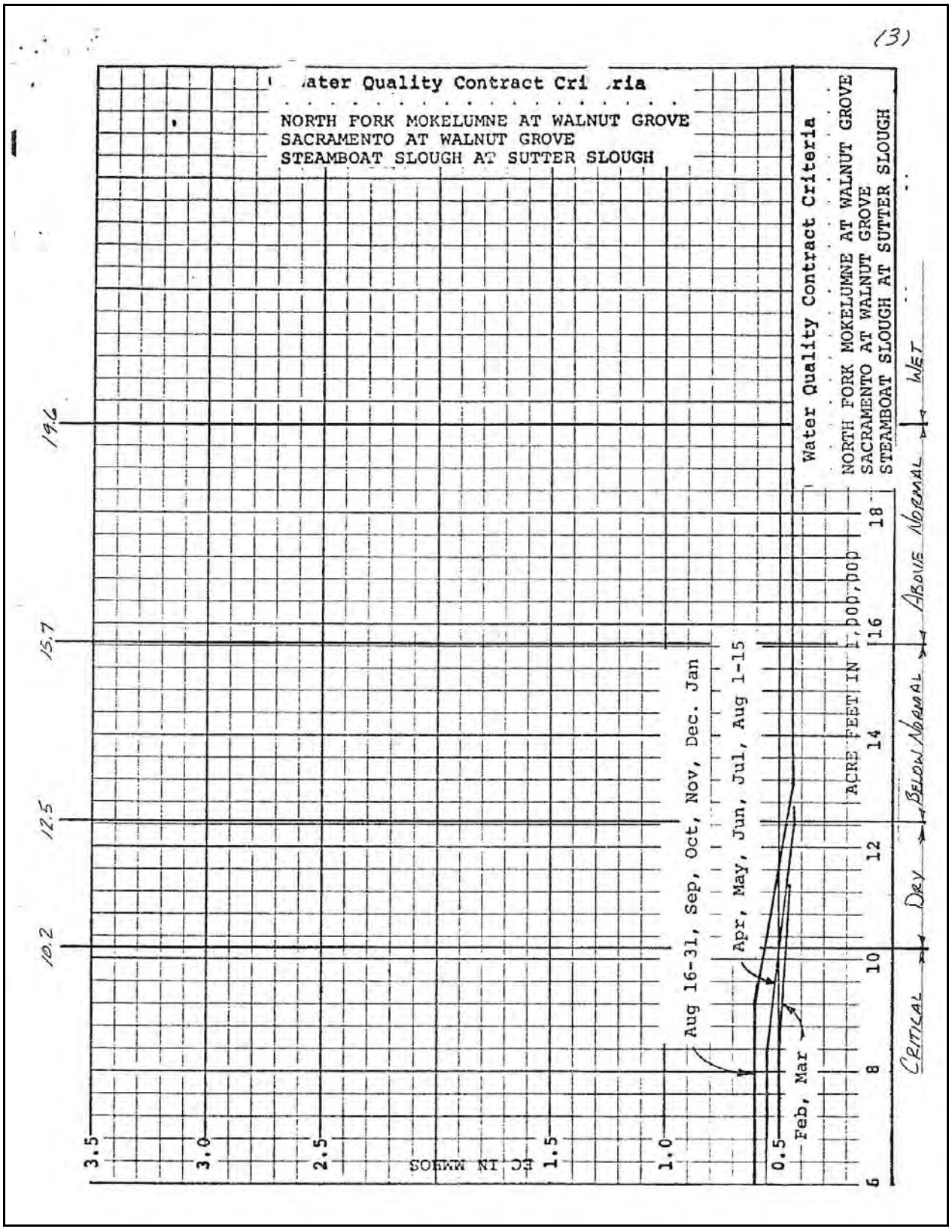
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Water Quality Contract Criteria
NORTH FORK MOKELUMNE AT WALNUT GROVE
SACRAMENTO AT WALNUT GROVE
STEAMBOAT SLOUGH AT SUTTER SLOUGH
Water Quality Contract Criteria
NORTH FORK MOKELUMNE AT WALNUT GROVE
SACRAMENTO AT WALNUT GROVE
STEAMBOAT SLOUGH AT SUTTER SLOUGH
19.6
15.7
12.5
10.2
WET
ABOVE NORMAL
BELOW NORMAL
DRY
CRITICAL
Aug 16-31, Sep, Oct, Nov, Dec. Jan
Apr, May, Jun, Jul, Aug 1-15
Feb, Mar
ACRE FEET IN 1,000,000
3.5
3.0
2.5
1.5
1.0
0.5
18
16
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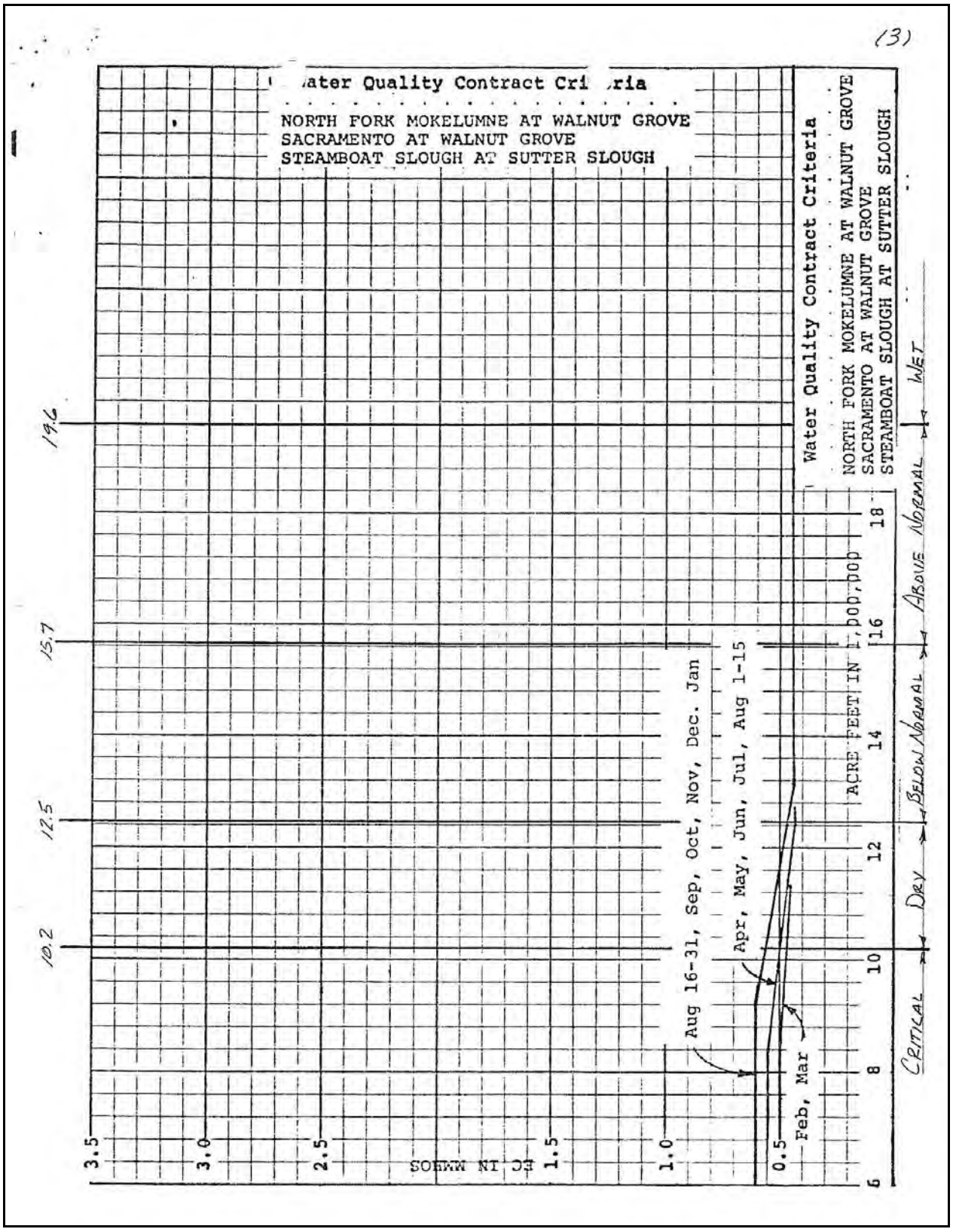
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Water Quality Contract Criteria
NORTH FORK MOKELUMNE AT WALNUT GROVE
SACRAMENTO AT WALNUT GROVE
STEAMBOAT SLOUGH AT SUTTER SLOUGH
Water Quality Contract Criteria
NORTH FORK MOKELUMNE AT WALNUT GROVE
SACRAMENTO AT WALNUT GROVE
STEAMBOAT SLOUGH AT SUTTER SLOUGH
19.6
15.7
12.5
10.2
WET
ABOVE NORMAL
BELOW NORMAL
DRY
CRITICAL
Aug 16-31, Sep, Oct, Nov, Dec. Jan
Apr, May, Jun, Jul, Aug 1-15
Feb, Mar
ACRE FEET IN 1,000,000
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3.0
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1.5
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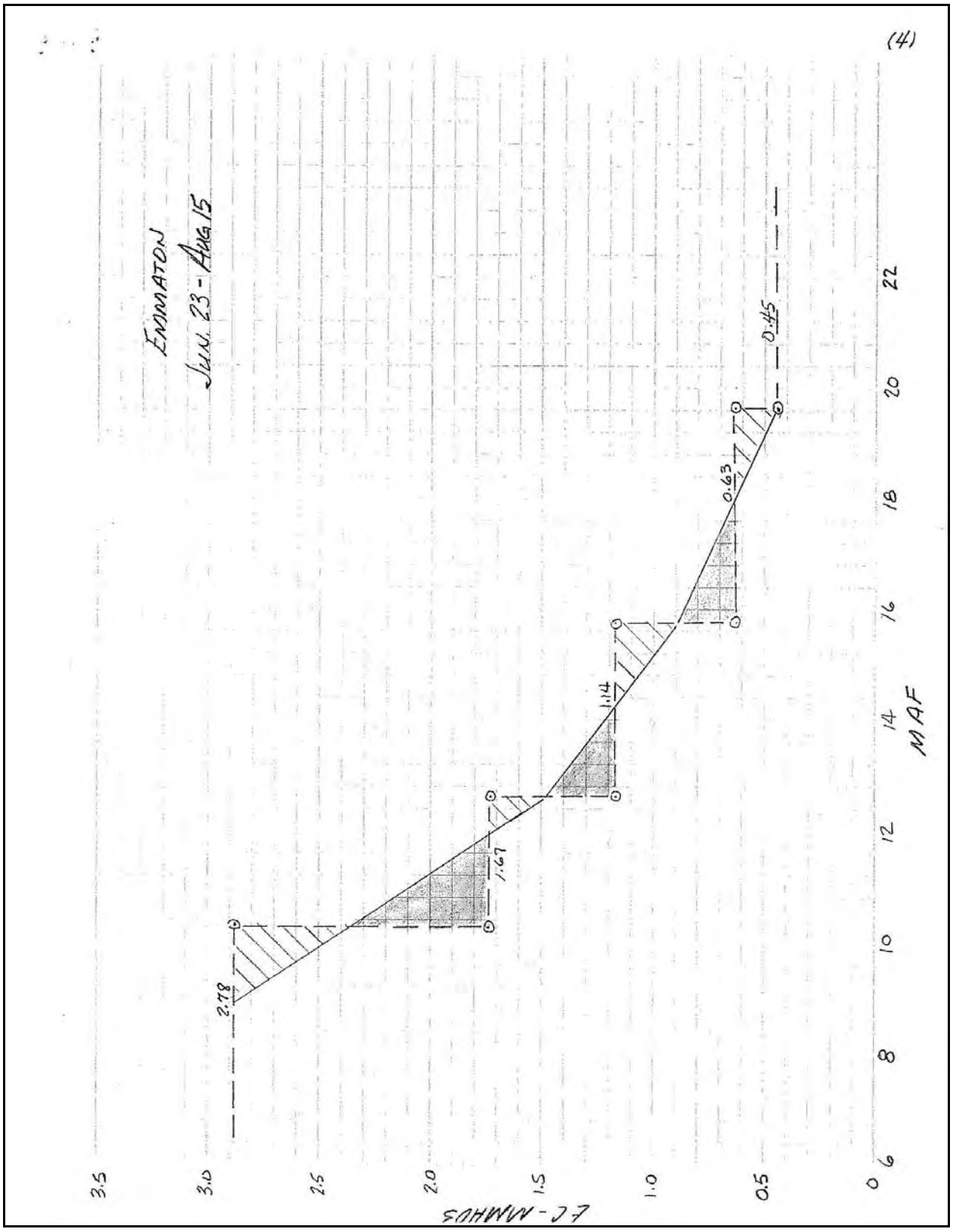
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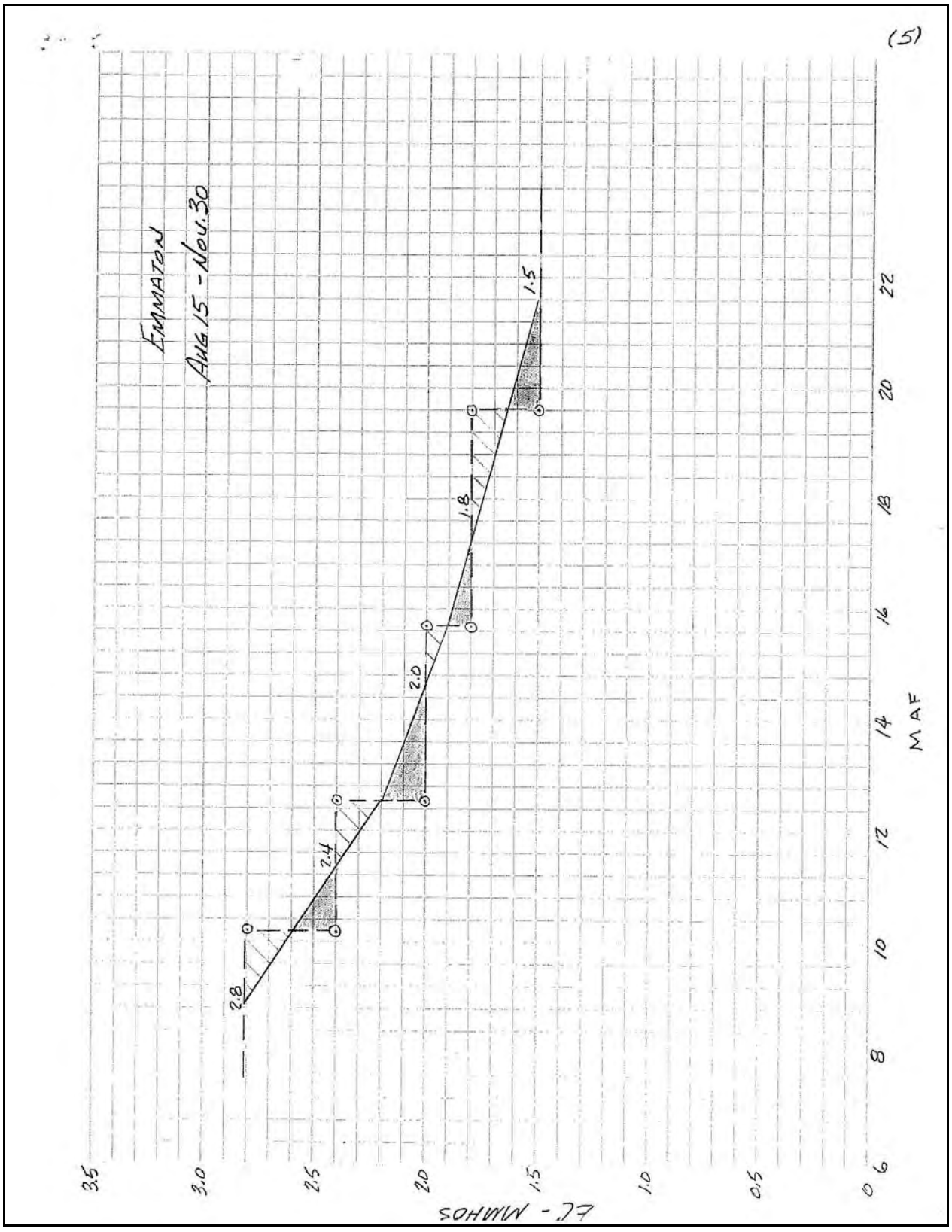
ENDNATON
JUN. 23 - AUG 15
2.78
1.67
1.14
0.63
0.45
MAF
CC - MMHOS
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0
6
8
10
12
14
16
18
20
22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EMMATON
AUG. 15 - NOV. 30
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1.8
2.0
2.4
2.8
MAF
22
20
18
16
14
12
10
8
6
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0
CFS - MINUS

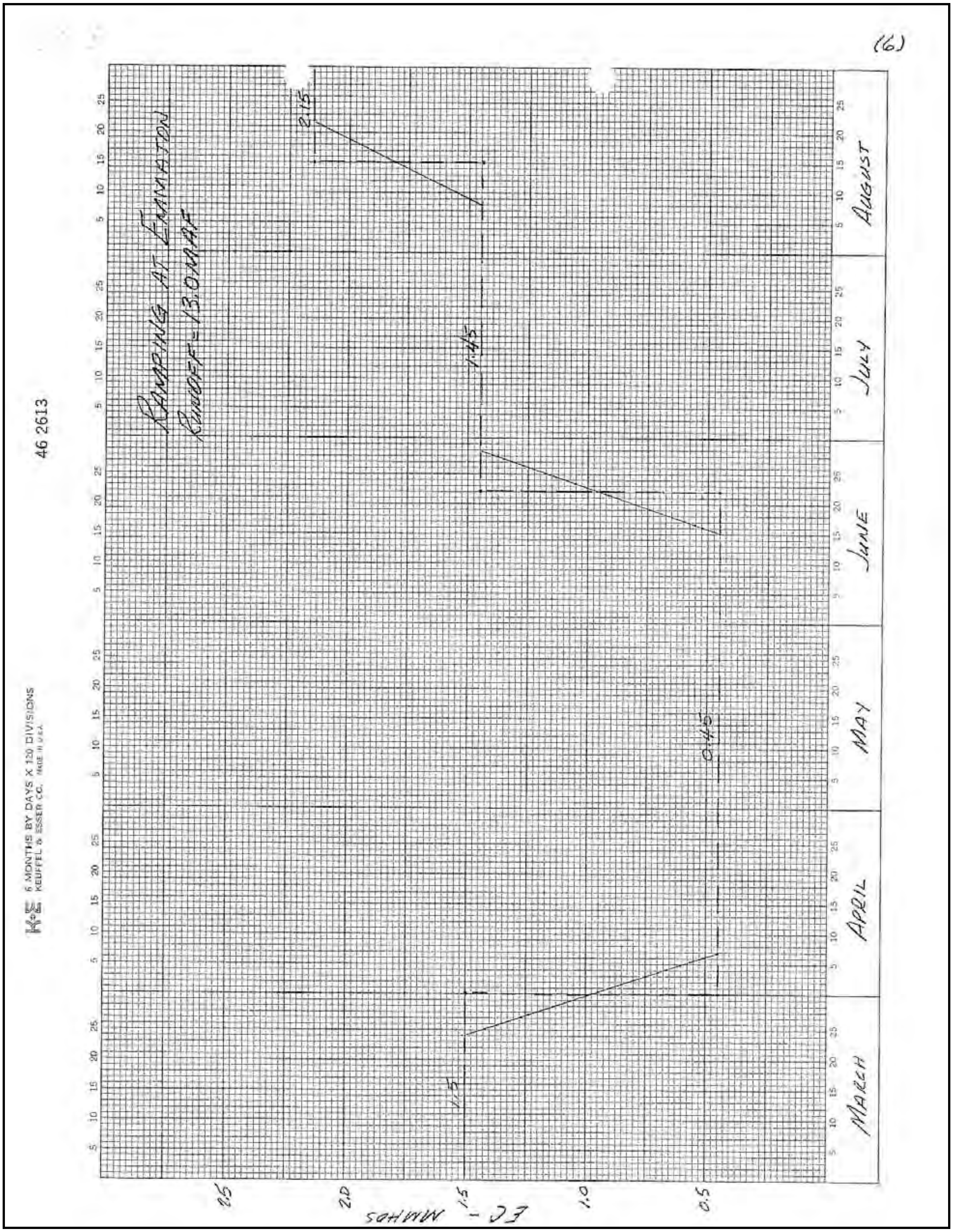

(6)
46 2613
K+E 6 MONTHS BY DAYS X 120 DIVISIONS
KEUFFEL & ESSER CO.
PUMPING AT EMMATON
RUNOFF = 13.0 MAF
2.15
1.45
0.45
1.5
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
2.5
2.0
1.5
1.0
0.5
EC - MMHOS

Exhibit III – Map of Historic Salinity Intrusion

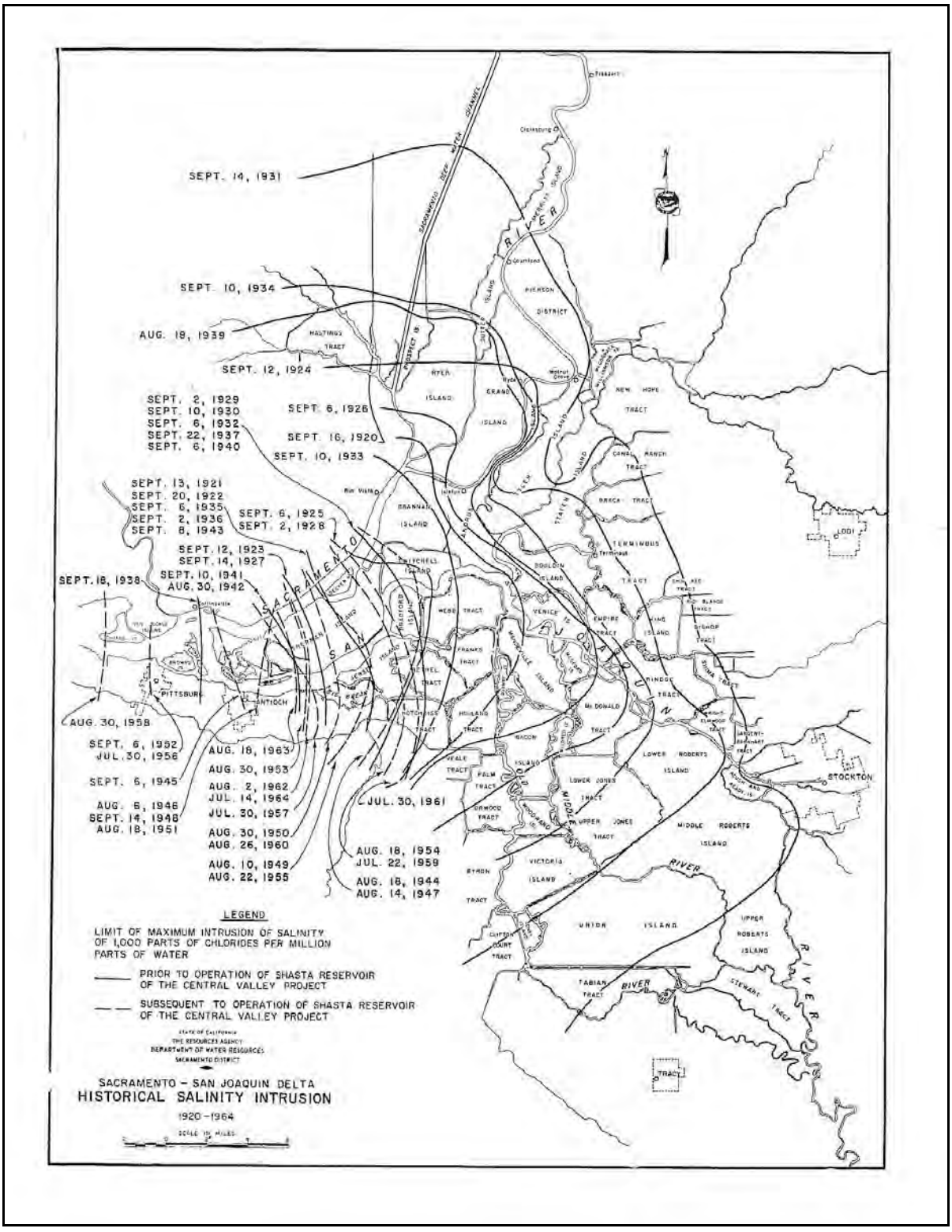
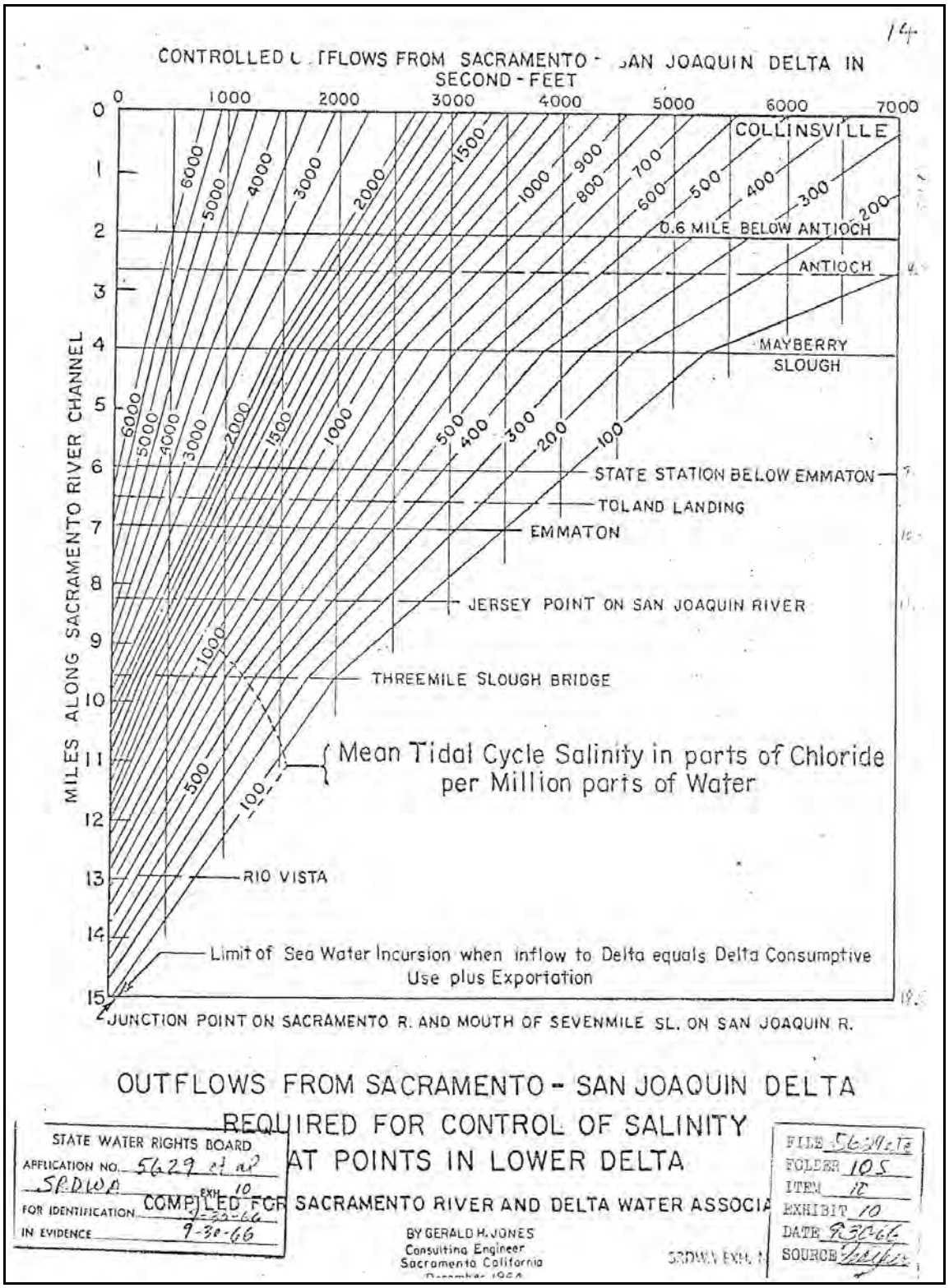


Exhibit IV – Outflow from Sacramento-San Joaquin Delta for Control of Salinity at Points in Lower Delta



MAPS

LIST OF MAPS

Map 1 – Boundary of North Delta Water Agency

Map 2 – Delta Upland and Lowland Areas within North Delta Water Agency

N

Yolo County

Solano County

Sacramento County

San Joaquin County

NDWA

Sacramento

MBK ENGINEERS
1771 Tribute Road, Suite A
Sacramento, California 95815-4401
(916) 456-4400

Map 1 - Boundary of North Delta Water Agency

0 1.5 3
Scale in Miles

N

Yolo County

Solano County

Sacramento County

San Joaquin County

Legend

- Delta Lowlands within NDWA
- Delta Uplands within NDWA

Sacramento

NDWA

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Map 2 - Delta Upland and Lowland Areas within the North Delta Water Agency

0 1.5 3
Scale in Miles