SOUTH DELTA HYDROLOGY AND WATER RIGHTS

Comments of the

SAN JOAQUIN RIVER GROUP AUTHORITY

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Merced Irrigation District	City and County of San Francisco
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Central California Irrigation District	Firebaugh Canal Water District
San Luis Canal Company	Columbia Canal Company

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EXECUTIVE SUMMARY

In preparation for the anticipated workshops regarding South Delta Salinity, one of the "emerging issues" identified in the State Water Resources Control Board *2006 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary*, O'Laughlin & Paris LLP compiled this report on South Delta salinity conditions and water rights on the behalf of the San Joaquin River Group Authority ("SJRGA").

South Delta hydrology is heavily influenced by the pattern of unimpaired runoff from the San Joaquin Valley and by export operations. Unimpaired runoff consistently demonstrates the same pattern, peaking in May, decreasing in June, and then plummeting to almost nothing in July, with almost no San Joaquin River flow entering the Delta until November. The hydraulic gradients created by the CVP and SWP export pumps draw the majority of San Joaquin River flow entering the Delta. Installing tidal barriers in the Interior South Delta greatly diminishes the amount of San Joaquin River flow drawn to the export pumps, but absent such barriers, the majority of water available for diversion in the Interior South Delta comes from the San Joaquin River.

Due to the trickle of late-summer flow, only the most senior water right holders in the South Delta can legally divert and use any water. Despite claims that the "mass bulk" of the South Delta has riparian rights, a review of South Delta land transfers shows that the opposite is likely true. Of the nearly 45,000 irrigated acres on Union and Roberts Island, less than 15 percent have riparian rights that are not questionable. Although many of the 45,000 irrigated acres hold appropriative rights, their rights are junior to those upstream. As natural flow diminishes, the riparian owners must gradually cease diverting. As appropriated water diminishes, the appropriators must cease diverting.

Due to the nature of the South Delta water rights, there are certain areas in the Interior South Delta when no water users may legally divert and use water. At such times and in such places, Agriculture Supply is not a beneficial use. Since water quality objectives are adopted for the reasonable protection of beneficial uses, the SWRCB does not have authority to adopt salinity objectives for the protection of agricultural beneficial uses for areas of the Delta where and when nobody can legally divert and use water. Even assuming there were water users who could legally divert and use water in the Interior South Delta, using dilution flow to implement such a limited beneficial use would constitute waste and unreasonable use of water under Article X, § 2 of the Constitution.

South Delta water users, however, have been known to divert and use water even when they were prohibited from doing so. Illegal diversion and use of water could deprive the Delta of a quarter-million acre feet of water every year, water that would otherwise be available for legal water users or instream beneficial uses. As demand for water supplies for all beneficial uses continually increase, the need to enforce water rights becomes more critical. In its *June 2008 Draft Strategic Workplan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary*, the SWRCB proposes greater enforcement of water rights in the Delta. The SJRGA has surveyed the water rights on Union and Roberts Island and discovered a number of potentially "suspect" riparian owners and, due to the importance of the South Delta and long-overdue need to comprehensively define South Delta water rights we recommend the Water Rights Division use this work as a starting point.

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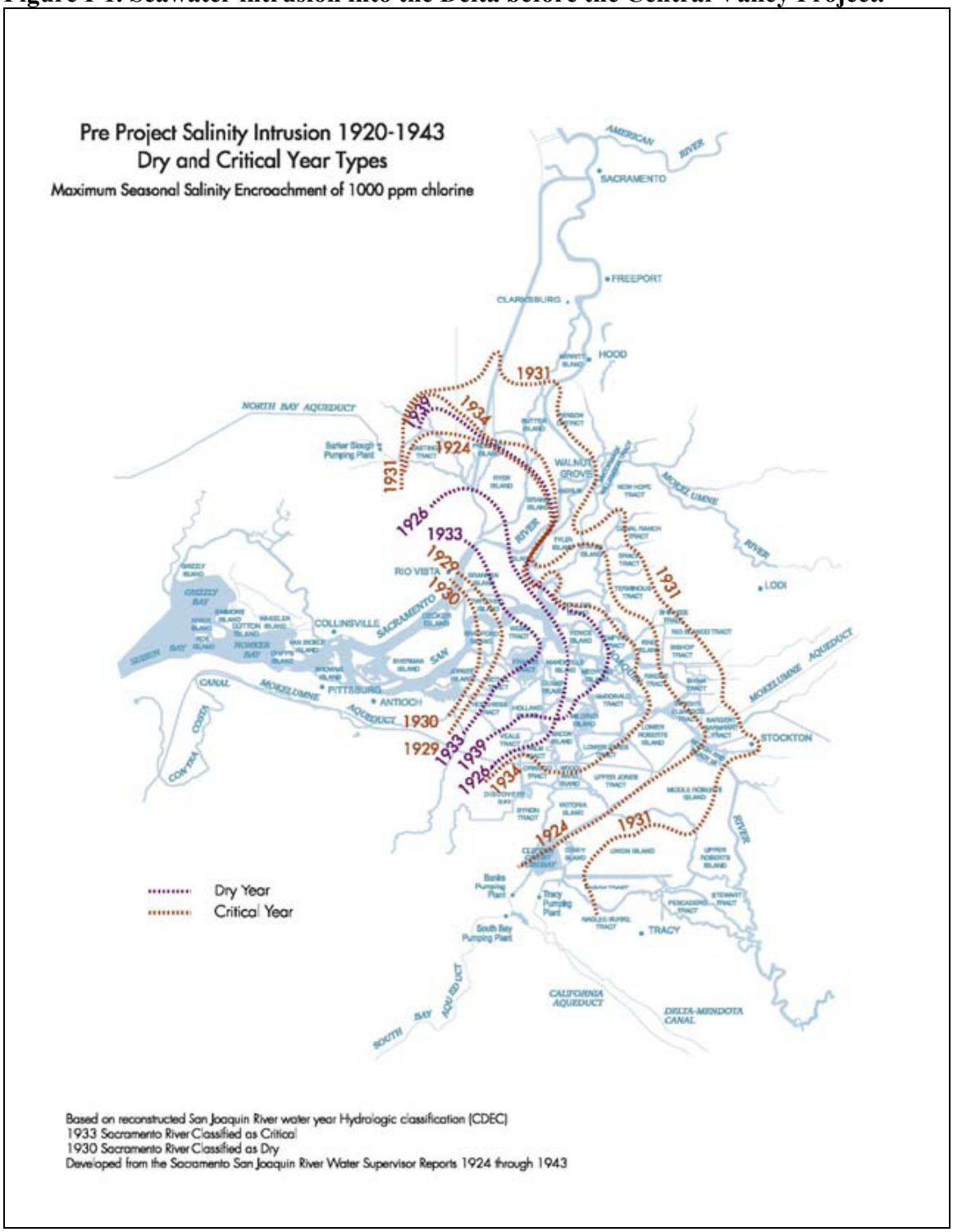
I. History of the South Delta

A. The South Delta Water Agency Emerges from the Need to Repay the Central Valley Project for Controlling Salinity Intrusion

The South Delta Water Agency ("SDWA") began with its predecessor the Delta Water Agency. The State Water Plan of 1931 assumed, as had the federal reclamation officials who took responsibility for the project, that the Delta would benefit from reservoir releases and other operations that controlled salinity intrusions into the agricultural Delta. (Jackson, W. Turrentine and Paterson, Alan M., *The Sacramento-San Joaquin Delta: The Evolution and Implementation of Water Policy*, Department of History, University of California, Davis, California Water Resources Center (June 1977), p121.) Prior to the construction of the CVP and SWP, in Dry and Critical years, seawater encroached far into the Delta. (Department of Water Resources, Sacramento Delta San Joaquin Atlas, p; *see* Figure I-1.) For these benefits, compensation, in the form of repaying a portion of overall project costs, was expected from Delta irrigators. (Id.) In 1968, repayment was estimated at $200,000 per year. (Id.)

Figure I-1. Seawater intrusion into the Delta before the Central Valley Project.[1]



[1] 1000 mg/l Chloride is about 2800 µS/cm. 250 mg/l Chloride is about 1000 µS/cm EC. 150 mg/l Chloride is about 700 µS/cm EC. 1000 µS/cm also equals 1.0 dS/m.

Although it was anticipated that the Central Valley Project ("CVP") and State Water Project ("SWP") would provide overall improvements in the quality of water available to agriculture by repelling salt intrusion, it was also realized that not all areas of the Delta would benefit equally. (Id.) Some areas, particularly the southern Delta, would experience diminished water quality attributable in part to CVP operations. (Id.) The USBR, in applying for water right permits, therefore affirmed its policy "to recognize and protect all water rights on the Sacramento River and in the Delta existing under State law at the time [its] applications were filed, including riparian, appropriative and others." (St. Water Rights Control Bd. Water Right Decision 990 (1961), 75.) However, since such rights had never been "comprehensively defined," it was "imperative" that the holders of existing rights and the United States reach agreement concerning such rights and the supplemental water required to provide the holders with a firm and adequate water supply if a lengthy and extremely costly adjudication of the waters of the Sacramento River and its tributaries were to be avoided. (Id.)

By 1965 the Sacramento River and Delta Water Association, the USBR, the DWR, and the Delta Water Users Association successfully negotiated an agreement for basic water quality criteria. (Jackson and Paterson (1977), p121; *See also* SWRCB 1998 Bay-Delta Hearing Phase 1-8 SWRCB Exh. 137.) The Delta Water Users Association represented water users in San Joaquin County and parts of Contra Costa County. (Jackson and Paterson (1977), p121.) The agreement established water quality criteria for the Delta, later referred to as the "November 19th criteria," assumed to equal the limits of intrusion that would be maintained by the CVP and comparable to salinity control proposed in connection with Peripheral Canal operations. (Id.) The agreement provided

that, if New Melones reservoir were ever used for water quality control purposes, the CVP would release water from New Melones sufficient to maintain an average salinity concentration of 500 ppm TDS for any 30 consecutive day at Vernalis. (Id.) However, the agreement required the CVP to release no more than 70,000 acre-feet from New Melones in any single calendar year for water quality control purposes.[2] (Jackson and Paterson (1977), p121; *See also* SWRCB 1998 Bay-Delta Hearing Phase 1-8 SWRCB Exh. 137.) Outflow levels were not specified, because the parties assumed 1,500 cfs would be sufficient to maintain the agreed-upon water quality objectives. (Jackson and Paterson (1977), p121.)

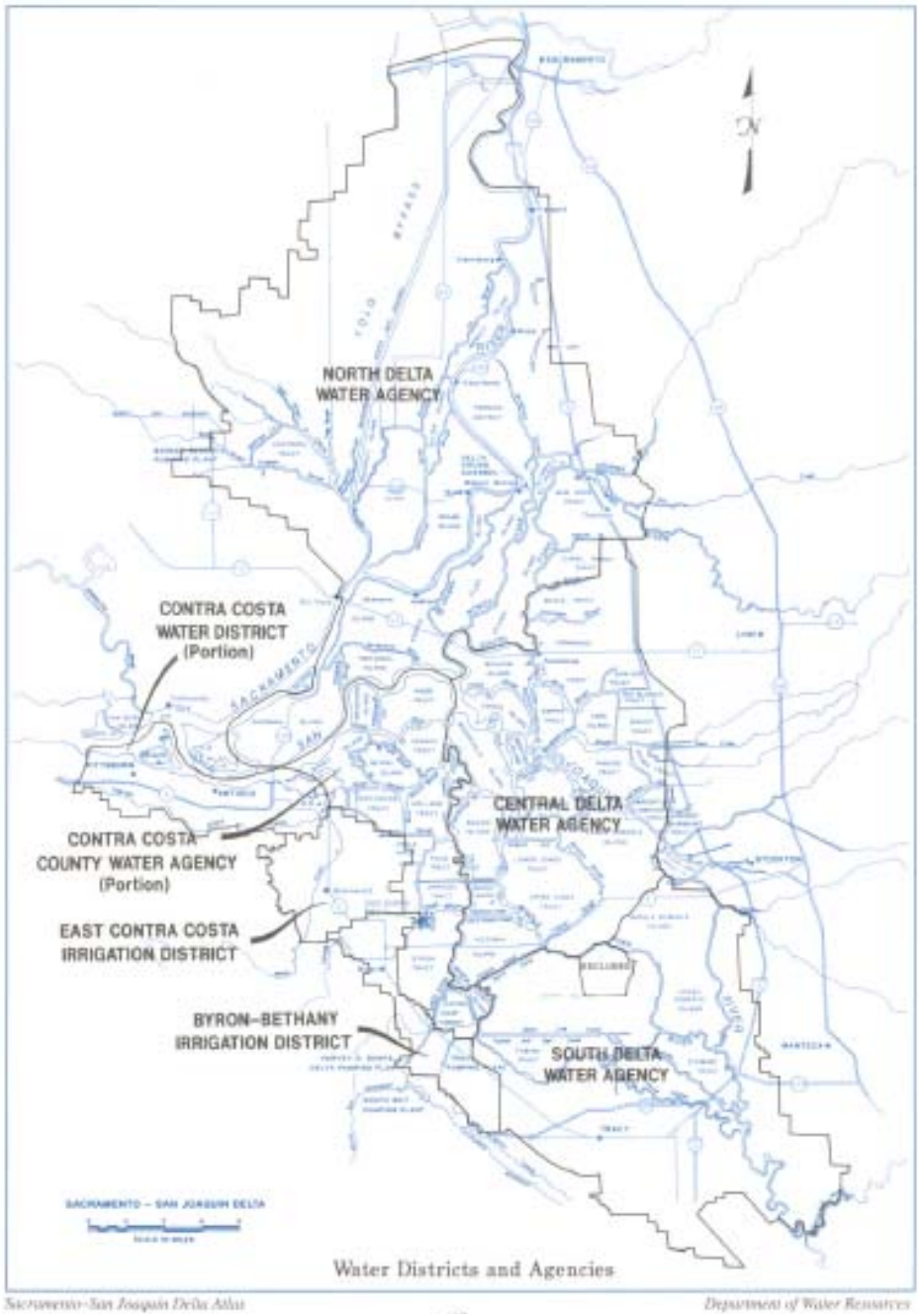
Although the Sacramento River and Delta Water Association and Delta Water Users Association represented over 95 percent of the agricultural Delta, they lacked authority to bind their members or levy assessments to pay for the supplemental supplies and water quality controls. (Jackson and Paterson (1977), p121.) In order to execute a contract, thereby enabling repayment, the Delta Water Association and Delta Water Users Association entered into a memorandum of understanding, forming the Delta Water Agency. (Id.) Legislation establishing the Delta Water Agency was adopted in 1968, with the adoption of the Delta Water Agency Act. (Water Code App. §108-1.1 (Stats.1968, c. 419, p. 866).) Section 4.1 of the Delta Water Agency Act provided that the general purpose of the agency was to negotiate, enter into, execute, amend, administer, perform, and enforce one or more agreements with the United States and/or the State of California to protect the water supply of its lands from salt intrusion and to assure the lands within its jurisdiction a dependable supply of water of suitable quality sufficient to

[2] The agreement's salinity objective at Vernalis was identical to that contained in the USBR's 1969 Memorandum of Agreement with the Central Valley Regional Water Quality Control Board.

meet present and future needs. The agency would automatically terminate at the end of 1973 if a contract with neither the United States nor the State of California were executed. (Section 8.1 of Stats.1968, c. 419, p. 866.)

Disputes between factions representing the north, south, and central regions of the Delta prevented the Delta Water Agency's board of directors from agreeing to any contract terms or water quality objectives. (Jackson and Paterson (1977), p121.) Nomellini Farms, Salyer Properties, and Victoria, Inc. filed suit almost immediately, alleging that the new agency was illegal and unconstitutional and without power to levy taxes or bind landowners. (Id.) The suit failed. (Id.) When no contract was executed, the Delta Water Agency dissolved pursuant to its statute and the Legislature then adopted legislation creating the North, South, and Central Delta Water Agencies (*see* Figure I-2, below.). The North Delta Water Agency eventually executed a contract, but no contracts were executed by either the SDWA or Central Delta Water Agency.

Figure I-2. The North, South, and Central Delta Water Agencies



B. Adoption of Water Quality Control Objectives for the Interior South Delta

In D-1485 and the *1978 Water Quality Control Plan for the Sacramento-San Joaquin Delta and Suisun Marsh* ("1978 Delta Plan") the SWRCB reiterated the need to reach an agreement between the CVP and SWP to avoid an adjudication of water rights. It stated that agriculture in the Delta was a beneficial use to be protected and the most practical solution for long-term protection of southern Delta agriculture was construction of physical facilities to provide adequate circulation and substitute supplies. If necessary physical facilities were constructed, the circulation flows needed would only be a "moderate" increase above those committed from New Melones, which at the time were 70 TAF annually. (1978 Delta Plan, Ch. VI, p23.) The SWRCB cautioned, however, that "If an agreement is not executed by January 1, 1980, the Board will examine in detail southern Delta water rights, determine the causes and sources of any encroachment, and take appropriate action to the extent of the Board's authority." (D-1485, p. 11.) The salinity objective at Vernalis would provide interim protection until the facilities could be constructed. (United States v. St. Water Resources Control Bd. (1987) 182 Cal.App.3d 82, 121.)

The 1978 Delta Plan also established three new salinity objectives in the South Delta. (1978 Delta Plan, Ch. VI, p29.) The three new objectives, often referred to as the "Interior South Delta Salinity Objectives," were located at Old River at Tracy Road Bridge, Old River near Middle River, and Brandt Bridge on the San Joaquin River. (Id.) The Interior South Delta Salinity Objectives would require a maximum 30-day running average mean daily electrical conductivity ("EC") of 0.7 mmhos/cm from April 1 through August 31 and of 1.0 mmhos/cm the rest of the year. (Id.) However, the Interior South

Delta Objectives would become effective only when suitable circulation and water supply facilities were constructed. (1978 Delta Plan, p VI-29.)

In 1982, the SDWA sued the Department of the Interior (*South Delta Water Agency v. the U.S. Department of the Interior*), seeking a declaration of the rights of the parties in addition to preliminary and permanent injunctions requiring that the projects operate to protect the South Delta. (Department of Water Resources/ United States Bureau of Reclamation. 2005. South Delta Improvements Program Environmental Impact Statement/Environmental Impact Report ("SDIP EIR/EIS"). Sacramento, CA, p 1-15.) The complaint alleged that CVP operations on the San Joaquin River, primarily Friant Dam, unlawfully reduced the quantity and degrade the quality of water flowing in the San Joaquin River to the south Delta, that SWP and CVP pumping operations violated SDWA rights by lowering water levels, reversing flows, and diminishing the influence of the tides; and that the CVP's designation of the Stanislaus River basin for allocation of water from New Melones Reservoir violated SDWA rights by not including the South Delta in the basin. (Id. at 1-16.) A relief, the SDWA sought a declaration of its rights and of the obligations and duties of the defendants with respect to the effects of the CVP and SWP on the in-channel water supply in the South Delta. (South Delta Water Agency v. Dept. of the Interior (1985) 767 F.2d 531, 541 fn 15.) It further sought to enjoin and restrain the CVP and SWP in an unlawful manner that would violate its rights. (Id.) However, since the nature and extent of Delta water rights were still unknown, nothing supported an injunction against the CVP to protect and preserve water rights in the Delta. (Id.) The Court stated "there has been no judicial determination whether South Delta has rights to

the water it asserts the CVP is affecting. Logically, a court cannot adjudicate the administration of water rights until it determines what those rights are." (Id.)

By 1990, the SWRCB was once again conducting hearings, this time for what would become the *1991 Water Quality Control Plan for the Salinity in the Sacramento-San Joaquin Delta* ("1991 Salinity Plan"). During the hearings, the Department of Water Resources ("DWR") recommended that the SWRCB allow negotiations with the SDWA to continue. (Edward Huntley, Tr. Bay-Delta Hrg. (Feb. 2, 1990), p16-17.) The likely solution for the interior South Delta (Old River at Middle River and Old River at Tracy Road Bridge) would be new infrastructure in the South Delta channels to improve circulation and water levels. (Id.) The DWR discouraged use of specific salinity objectives for the Interior South Delta, due the geometry of the channels, poor circulation in the channels, and waste discharges from agriculture return flows and other sources. (Id. at 18.) Such factors made salinity control in the Interior South Delta impossible, even if upstream flows were augmented or Delta diversions curtailed. (Id.)

The 1991 Salinity Plan would implement the Southern Delta Agriculture objectives in three stages. (1991 Salinity Plan, p 5-9.) In Interim Stage One, the 500 mg/l salinity objective at Vernalis would continue, with no new objectives or other changes in the Southern Delta. (Id.) In Interim Stage Two, to be implemented no later than 1994, the objective would become a 30-day running average electrical conductivity ("EC") of 0.7 mmhos/cm from April 1 through August 31 and 1.0 mmhos/cm the rest of the year. The compliance locations would be Vernalis and Brandt Bridge. (Id.) In the final stage, two additional compliance locations would be added, one at Old River near Middle River and another at Old River at Tracy Road Bridge. (Id.) The SWRCB would revise the

objectives and/or compliance locations, as appropriate, if the DWR, USBR, and SDWA executed a three-party contract. (Id.)

With adoption of the *1995 Water Quality Control Plan for the San Francisco Bay-Sacramento San Joaquin Delta Estuary* ("1995 Bay-Delta Plan"), the Brandt Bridge and Vernalis compliance locations became effective upon adoption of the plan. (1995 Bay-Delta Plan, p17 Table 2.) The compliance locations at Old River near Middle River and Old River at Tracy Road Bridge would be implemented no later than December 31, 1997. (Id. at fn 4.) However, the SWRCB would still revise the objectives and/or compliance locations, as appropriate, if the DWR, USBR, and SDWA executed a three-party contract. (Id.) When the SWRCB implemented the 1995 Bay-Delta Plan through Water Right Decision 1641 ("D-1641") it conditioned the water right permits for the SWP and CVP on compliance with the interior South Delta salinity objectives. Compliance with the South Delta salinity objective at Vernalis remained the CVP's sole responsibility. (*2006 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary* ("2006 Bay-Delta Plan"), p28.)

No contract was ever executed between the SDWA, DWR, and USBR. When the SWRCB adopted the 2006 Bay-Delta Plan it deleted the footnote in the 1995 Bay-Delta Plan calling for revisions of the Interior South Delta salinity objectives if DWR, USBR, and SDWA executed a three-party contract. (2006 Bay-Delta Plan, p13 Table 2, App. I, p15.)

C. Attempts at Salinity Management in the South Delta

In July 1982, the SDWA sued the USBR and DWR in federal court. (South Delta Water Agency v. U.S. Dept. of the Int. (1986) 767 F.2d 531, 533.) The SDWA alleged

that the CVP and SWP violated the water rights of its members by operating in violation of state and federal law. (Id.) After the Ninth Circuit held that the United States had waived its sovereign immunity the parties settled. Since 1985 there have been on-going efforts, via temporary measures, to resolve water level and circulation problems in the South Delta. (D-1641 EIR, p IX-6.)

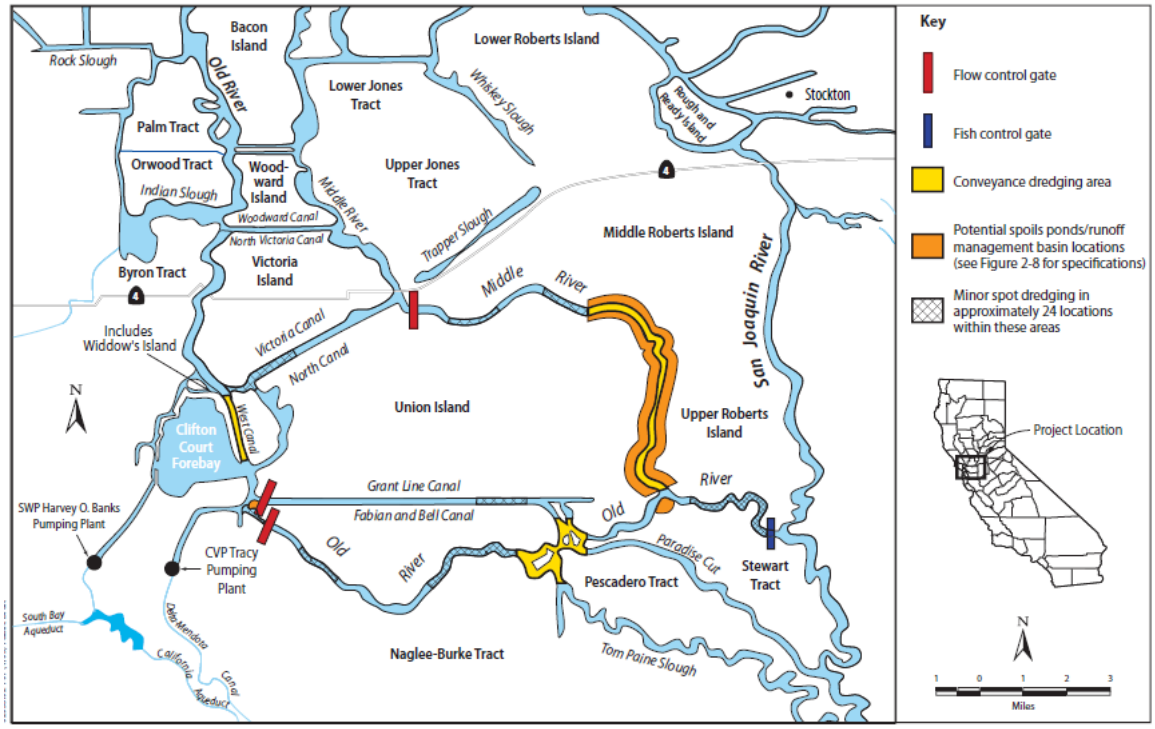
In October 1986, the DWR, USBR, and SDWA agreed to work together to develop a mutually acceptable, long-term solution to the water supply problems of SDWA water users. (Id.) In 1990, the parties agreed to a draft settlement which contained short-term and long-term actions to resolve the water supply problems in the southern Delta. (Id.) The settlement provided for interim releases by the USBR from New Melones Reservoir to resolve the portion of the litigation relating to San Joaquin River flows, and it set forth the framework for the USBR and SDWA to negotiate an amendment to the agreement. (Id.) A subsequent draft contract was proposed to resolve the portion of the SDWA's lawsuit relating to the effects of CVP and SWP export pumps and operations on water levels within SDWA channels. (Id.)

As a result of the litigation and framework agreement, the DWR dredged Tom Paine Slough and installed siphons to improve the water levels, initiated the Temporary Barrier Project to test and construct barrier facilities in the South Delta channels, which would improve water levels and water quality in the South Delta channels, and initiated the South Delta Water Management Program ("SDWMP") to bring permanent improvements to the area. (Id.) In June 1990, a draft Environmental Impact Report/Environmental Impact Statement ("EIR/EIS") for the SDWMP was released for

public review; however, the draft was not finalized due to the controversy surrounding a variety of unresolved Delta issues. (Id.)

The Temporary Barrier Project involves the seasonal installation of four rock barriers: one in Middle River, two in Old River, and one in Grant Line Canal. (Id., *see* Figure I-3, below.) Three of the barriers are designed to improve water levels and circulation for agricultural diversions and operate during the growing season. (Id.) A fourth barrier, at the head of Old River at San Joaquin River ("HORB"), is designed to assist fish migration on the San Joaquin River. (Id. at IX-9.) The HORB has been installed intermittently during the fall since 1963 to improve flow and dissolved oxygen conditions in the lower San Joaquin River, principally for the benefit of adult fall-run Chinook salmon migrating to upstream spawning locations. (Id.)

Figure I-3. The South Delta, with infrastructure planned for the South Delta Improvements Program.



The DWR and USBR have long proposed building permanent tidal gates in the South Delta as part of the South Delta Improvements Program ("SDIP"). (Id. at IX-6.) The DWR and USBR expected the gates project to assist in achieving the salinity objectives at the two Old River compliance measurement locations by improving water circulation in the South Delta. (Id.) However, by April 2005, when the Interior South Delta salinity objectives were scheduled to change from 1.0 to 0.7 mmhos/cm, construction of the permanent barriers had yet to even begin. The DWR and USBR both informed the SWRCB that, without the permanent barriers, they expected exceedances of the Interior South Delta salinity objectives to occur. (SWRCB Water Right Order ("WRO") 2006-0006, p17.[3]) In response, the SWRCB initiated a water right enforcement proceeding and adopted an order instructing the agencies to report their progress in implementing the Permanent Barrier Project or "equivalent measures" and to immediately report any actual or expected non-compliance. (Id., p25.) A project-specific EIR/EIS for the SDIP, which included construction of the permanent barriers, was released in December 2006.

D. The 2006 Bay-Delta Plan

The 2006 Bay-Delta Plan identified South Delta salinity as an "emerging issue." (2006 Bay-Delta Plan, p5.) During the workshops, the SWRCB collected information regarding salinity in the South Delta, particularly irrigation salinity needs in the South Delta. (2006 Bay-Delta Plan, App. I, p64, 72.) Although the SWRCB concluded it lacked sufficient information to change the objectives, it did decide to initiate a process to review the objectives with current science and, based on the outcome of the investigation,

[3] The final order is available at http://www.waterrights.ca.gov/Hearings/WaterRightOrders/2006/wro2006_0006.pdf.

amend the objectives and/or the program of implementation as appropriate. (2006 Bay-Delta Plan, p29.)

Currently, the Delta waterways in the export area, western portion, northwestern portion, and southern portion are listed as water quality limited segments for EC. A TMDL is scheduled for 2019. (SWRCB Resolution 2006-0079, Attach. A, p145-150.[4])

E. Endangered Species Act Issues Sideline South Delta Barriers

In 2007, the Eastern District Court for the United States found that the §10 permits issued for the incidental take of Delta Smelt by the CVP were deficient. The Interim Remedial Order prohibited any new construction activities, including activities involving construction of permanent barriers, pending issuance of a new Biological Opinion by the United States Fish & Wildlife Service by September 15, 2008. Additionally, the order prohibited installation of the spring Head of Old River Barrier, from about April 16 through May 15, by either the DWR or USBR until the end of the VAMP action implementation. It also required that the DWR and USBR tie open all flap gates on the barriers from the time of their installation until the end of the VAMP action implementation to minimize or avoid tidal impacts of the barriers. Tying open the tidal gates would, however, prevent the agriculture barriers from improving Interior South Delta water supply and water quality.

II. South Delta Hydrology

A. Hydraulic Gradients Created by Tides, River Inflows, and In-Delta Activities Dictate Hydrologic Conditions in the Delta.

The principal factors affecting Delta hydrology are the tides, river inflow from the Sacramento and San Joaquin river systems, net Delta outflow and total SWP/CVP Delta

[4] Resolution 2006-0079 and its attachments are available at http://www.waterboards.ca.gov/resdec/resltn/2006/rs2006_0079.pdf.

exports. (D-1641 EIR, Vol. I, p. XIII-11.) Many of the channels within the Delta, including the South Delta, are below sea level and the flows in these channels are affected by tides. (Susan Paulsen and Gang Zhao, Flow Science Inc., *Technical Memorandum re SDWA Diversions* (June 2008), p. 1; *see* Appendix D.) At high tides the direction of the flow is into the Delta (negative flow rate) and the river stage increases. (Id.) At low tides, the river water flows out of the Delta and the river stage falls. (Id.)

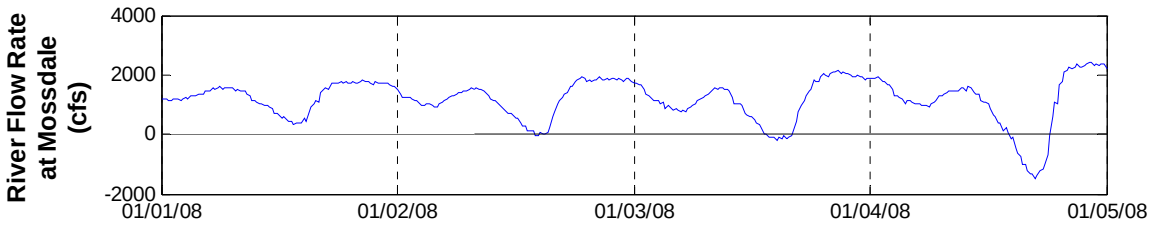
Most fresh water inflow to the Delta comes from the rivers around the Delta. Rivers flow into the Delta, particularly the Sacramento River and San Joaquin River, and they continue flowing through the Delta into the Suisun Bay, the San Francisco Bay, and eventually into the Pacific Ocean. (Id., p. 2.) Water is also exported from the Delta and diverted within the Delta. (Id.) As water travels through and ultimately out of the Delta, it mixes with waters from other sources. (Id.) Water is not retained within the Delta in perpetuity, but rather is flushed from the system by both tidal action and by replacement with new inflows. (Id.) The average residence time within the Delta varies from weeks to about three months in wet and dry years, respectively. (Id.)

As a result of the various factors influencing Delta hydrology, water flows from locations with higher hydraulic heads to places with lower hydraulic heads (i.e. the down gradient direction). (Id., p. 5.) These gradients in surface waters are primarily a function of inflows (as the stage at locations where flows enter the Delta is a function of the flows themselves, with higher stages resulting from higher inflows), tides, and events that may induce gradients locally. (Id., p. 6.) For example, pumping water from the export locations induces hydraulic gradients toward the pump locations. (Id.) Similarly, local diversions via pumps that draw water from Delta channels induce local gradients, such

that water flows toward the diversion pumps. (Id.) Water removed from Delta channels is replaced by water flowing toward the diversion or export locations; in this manner, removing water from Delta channels alters hydraulic gradients throughout the system. (Id.) Large export flow rates can induce hydraulic gradients within the Delta that are large enough to make rivers flow "backwards" or "upstream." (Id.)

For example, for four days from January 1, 2008 to January 5, 2008, the hydraulic head at Mossdale was higher than that at the head of Old River for most of the time, and as a result, the direction of the flow was from Mossdale to the head of Old River for most of the time. (Id., p5, *see* Figure II-1, below.) For two short periods of time, however, the hydraulic head at Old River was higher than that at Mossdale, and correspondingly, the flow direction was from the Old River head to Mossdale. (Id.)

Figure II-1. River flow at Mossdale influenced by hydraulic gradients.



As a result of higher pressure gradients produced by high tides, ocean water intrudes in to the Delta, bringing in high salinity water. (Id., p. 6.) If freshwater inflows are insufficient to repel seawater entering the Delta with the tides, salinity in the Delta increases. (Id.) Historically, when there was less freshwater inflow from the tributaries, seawater intruded farther into the Delta. (*see* Figure I-1, above.) In 1931, a Critical year, San Joaquin River salinity reached 2,800 µS/cm as far into the Delta as Upper Roberts Island and Union Island. (Id.)

Some inflows, especially agriculture drainage, are more saline than river inflows. (Id., p. 7.) As a result, agriculture diversions have multiple impacts in the Delta by removing freshwater inflow, decreasing net Delta outflow, and discharging saltier return flow. (Id. , p. 8.)

B. Natural Flow of the San Joaquin River at Vernalis.

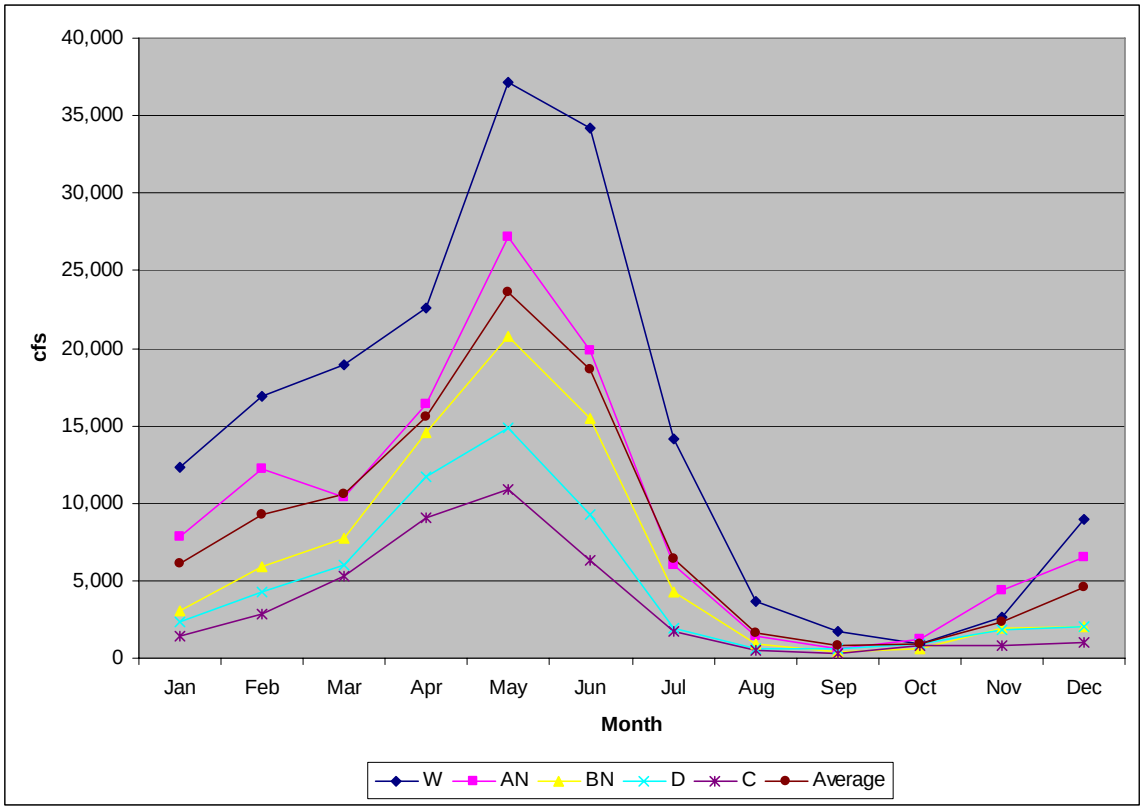
Snowmelt from the Sierra Nevada is the major contributor to local water supply for the eastern San Joaquin Valley floor. (D-1641 EIR, Vol. I, p. III-74.) The primary sources of surface water in the San Joaquin River Basin are the rivers draining the western slope of the Sierra Nevada Mountains - the Merced, Tuolumne, Stanislaus, Calaveras, Mokelumne, and Cosumnes Rivers. (Id.) Most of these rivers drain large areas of high elevation watershed that supply snowmelt runoff during the late spring and early summer months. (Id.) Snow storage in the high Sierra delays the runoff from that area until the snow melts in April, May, and June. (Id. at III-3.) Normally, half of the annual runoff occurs in these months. (Id.)

In D-1641, the SWRCB estimated natural flow by using unimpaired flow data for the San Joaquin River from 1921 through 1992. (D-1641, p. 30-31.) Unimpaired flow is the total water supply available for all uses after removing the impacts of most upstream alterations. (Id.) Channel improvements, levees, and flood bypasses are assumed to exist. (Id.) Unimpaired flow for the San Joaquin Valley was based on the sum of unimpaired flows from 1921 through 1992 for the San Joaquin River at Millerton, the Stanislaus River at Melones, the Tuolumne River at Don Pedro, the Merced River at Exchequer Reservoir, the Chowchilla River at Buchanan Reservoir, the Fresno River near Daulton,

Tulare Lake Basin, the San Joaquin Valley floor, and minor west side streams of the San Joaquin Valley. (D-1641 Exh. SCWA-18, p20.)

Reflecting its snowmelt-driven hydrology, unimpaired flow in the San Joaquin Valley increases in April, dramatically peaks in May, diminishes in June, plummets through July and August, and then continues diminishing until reaching its lowest levels in October. (*see* Figure II-2, below; *see also* Appendix E.)

Figure II-2. San Joaquin Valley unimpaired (natural) flow.



C. Department of Water Resources Discharge Survey.

In response to the 2006 Bay-Delta Plan's direction to initiate a process to review the Interior South Delta Salinity Objectives, the DWR surveyed discharge points in the South Delta. (Department of Water Resources, Sources of Salinity in the Southern Delta (Jan. 11, 2007), p1.) The DWR identified 74 discharge sites. Most were agriculture

discharges, but others were treated sewage, urban runoff, and groundwater effluent. Discharges from agricultural drains in the South Delta ranged from 350 to 4,500 µS/cm and averaged about 1,496 µS/cm. The high-saline discharges are due in part to the composition of South Delta soils, which are primarily eroded, heavily mineralized, marine sedimentary rock from the Diablo range. EC was consistently higher at Old River near Tracy Road Bridge than at any other monitoring point in the South Delta, most likely due to the sheer number of diversions and discharges. EC measurements were typically 100 to 185 µS/cm higher than those at Vernalis.

Figure II-3. Agriculture drainage returns identified in the South Delta

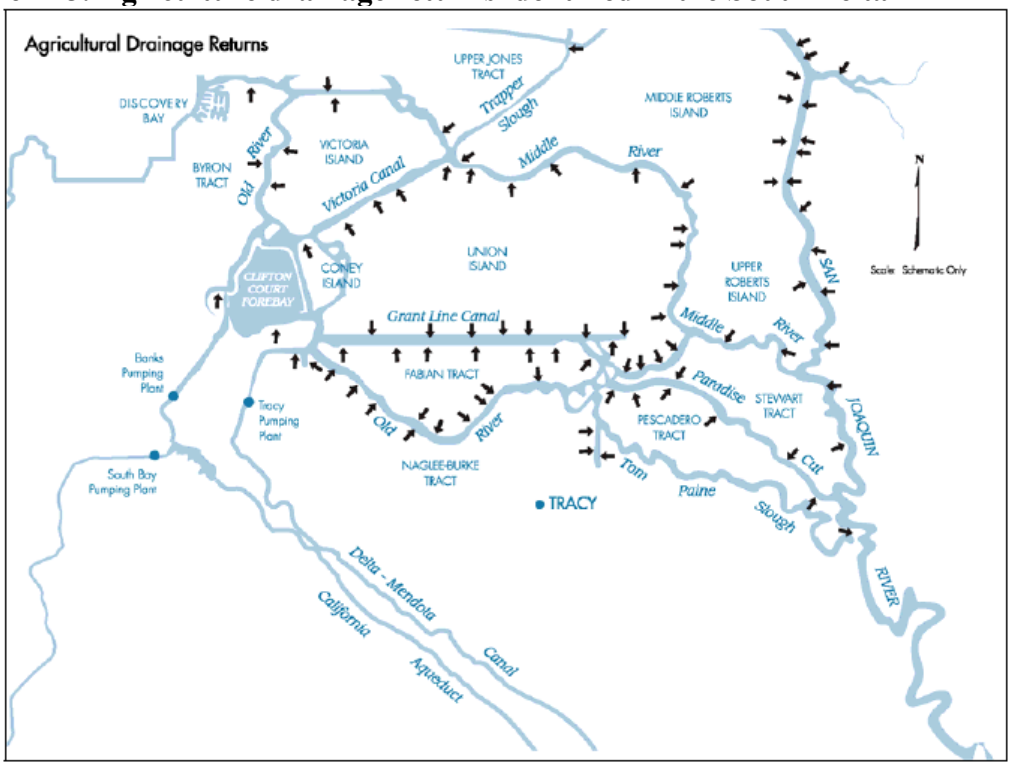


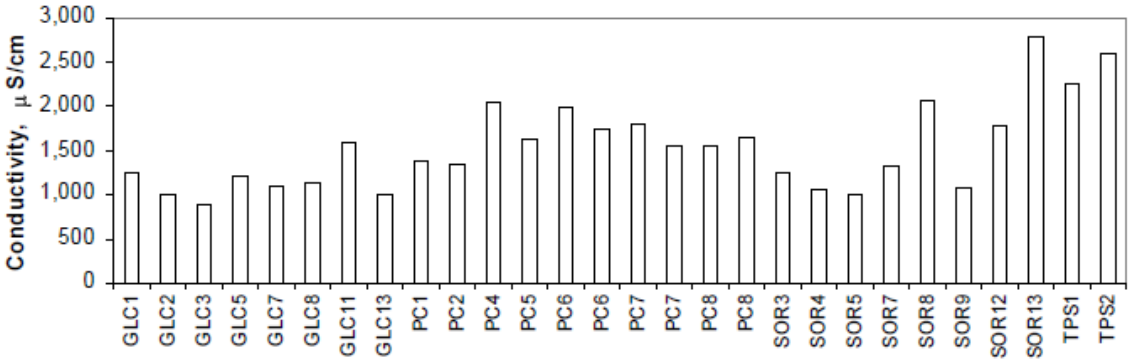
Figure II-4. Summary of selected South Delta discharges.[5]

Name	Map Station Identification	Station Type	Minimum	Maximum	Average	% 700 µS/cm Objective
Grant Line Canal	GLC1	Drainage Pump	864	2,100	1,238	177
Grant Line Canal	GLC2	Drainage Pump	810	1,200	1,007	144
Grant Line Canal	GLC3	Drainage Pump	620	1,500	868	124
Grant Line Canal	GLC5	Drainage Pump	718	3,230	1,202	172
Grant Line Canal	GLC7	Drainage Pump	820	1,420	1,096	157
Grant Line Canal	GLC 8	Drainage Pump	720	1,400	1,124	161
Grant Line Canal	GLC 11	Drainage Pump	550	2,600	1,589	227
Grant Line Canal	GLC 13	Drainage Pump	550	1410	999	143
Paradise Cut	PC1	Deuel Vocational Institute Wastewater Discharge	700	2,500	1,382	197
Paradise Cut	PC2	Paradise Mutual	450	2,150	1,352	193
Paradise Cut	PC4	Pescadero	1,400	3,060	2,037	291
Paradise Cut	PC5	Stewart Tract	710	2,300	1,641	234
Paradise Cut	PC6	Pescadero, Pescadero RD (RD #2058) pump	1,200	3,160	1,988	284
Paradise Cut	PC6	Pescadero, Pescadero RD (RD #2058) pump	1,400	2,900	1,740	249
Paradise Cut	PC7	Pescadero, Pump west of Tom Paine Slough	1,230	2,710	1,798	257
Paradise Cut	PC7	Pescadero, Pescadero RD (RD #2058) pump	1,100	2,600	1,543	220
Paradise Cut	PC8	Pescadero, Pescadero RD (RD #2058) pump	545	2,680	1,558	223
Paradise Cut	PC8	Pescadero, Pescadero RD (RD #2058) pump	1,200	2,400	1,659	237
Sugar Cut	SC1	Urban Runoff, Groundwater Effluence, Agricultural Drainage	2,071			
South Old River	SOR3	Drainage Pumping (one or more)	350	2,550	1,253	179
South Old River	SOR4	Drainage Pumping (one or more)	750	1,800	1,058	151
South Old River	SOR5	Drainage Pumping (one or more)	620	2,500	1,009	144
South Old River	SOR7	Drainage Pumping (one or more)	780	2,700	1,323	189
South Old River	SOR8	Drainage Pumping (one or more)	1,100	3,880	2,063	295
South Old River	SOR9	Drainage Pumping (one or more)	920	1,400	1,076	154
South Old River	SOR12	Drainage Pumping (one or more)	1,200	2,600	1,785	255
South Old River	SOR13	Drainage Pumping (one or more)	2,400	4,100	2,779	397
South Old River	SOR16	Urban Runoff, Groundwater Effluence, Agricultural Drainage	2,566			
Tom Paine Slough	TPS1	Pescadero RD (RD #2058)	1,300	3,570	2,238	320
Tom Paine Slough	TPS2	RD 1007 / Pescadero RD (RD #2058)	1,100	4,500	2,597	371
	All stations combined (n=24)		350	4,500	1,496	214
	Middle River Drains (n=8)		121	3,290	947	135
	Victoria Canal Drains (n=5)		350	3,010	821	117
	West Delta Drains (n=8)		270	2,800	862	123
	South Delta Tile Drainage (n=14)		1,900	4,230	3,098	443
	West Delta Tile Drainage (n=14)		780	2,870	1,822	260
Clifton Court Forebay	CCF1 to CCF4		897	6,970	3,822	546

[5] Discharges listed as EC in µS/cm.

Discharges occur in the South Delta regardless of year type. Some can, at times, exceed the Interior South Delta Salinity Objective by over 400 percent! Conductivity in all South Delta drains sampled ranged from 350 to 4,500 µS/cm with a median and average of 1,300 and 1,496 µS/cm, respectively. (Department of Water Resources, Sources of Salinity in the Southern Delta (Jan. 11, 2007), p11.) Values were usually well above those measured in the California Aqueduct. Annual average conductivity at Banks Pumping Plant usually ranges between 250 and 500 µS/cm and individual monthly measurements have rarely exceeded 1,000 µS/cm. (Id.)

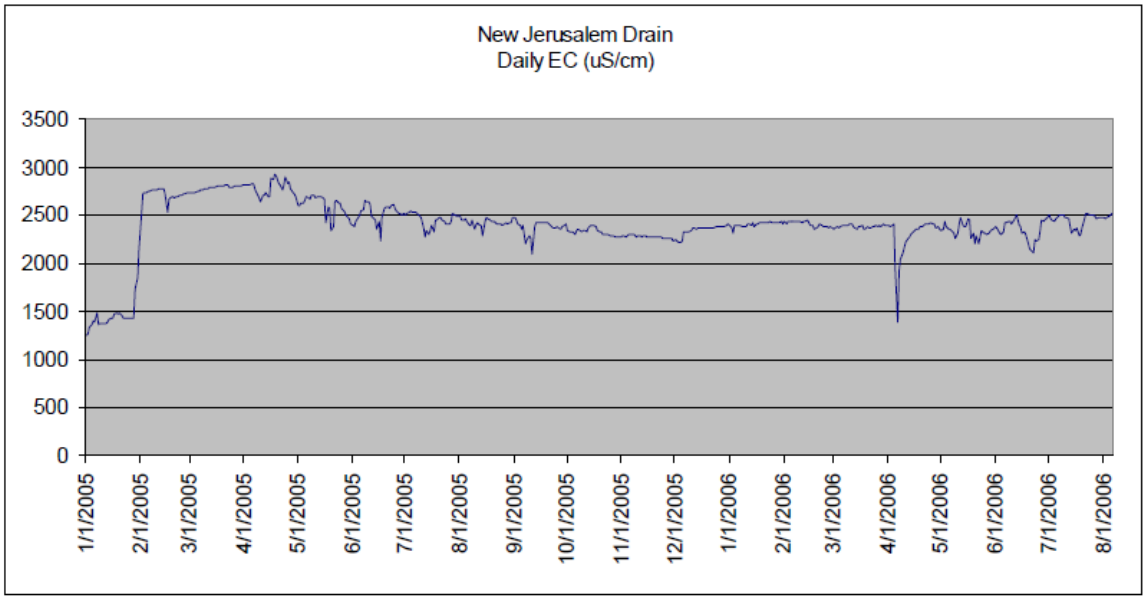
Figure II-5. Average conductivity of drains in the South Delta.



Agricultural drains along Grant Line Canal, Old River, and their tributaries were particularly saline compared to other drains around the Delta. (Id., p. 12.) The average EC for South Delta drains, 1,496 µS/cm, was 58 to 82 percent higher than averages for drains located further north on Middle River, Victoria Canal, and north Old River. (Id.) It also exceeded the average EC of tile drainage in the western Delta by an average or 70 percent. South Delta drains exhibited the highest conductivities throughout the Delta, with averages of 1,597 and 3,359 µS/cm on Paradise Cut and Old River, respectively. (Id.)

One of the largest and most significant agricultural discharges in the South Delta is the New Jerusalem Drain, located at River Mile 63.4. (Id., p. 3.) Tile drainage from the New Jerusalem Drain exceeded 25 cfs throughout most of the year and its EC, which typically exceeded 2,000 µS/cm, often exceeded 2,500 µS/cm.

Figure II-6. California Data Exchange Center data for the New Jerusalem Drain.



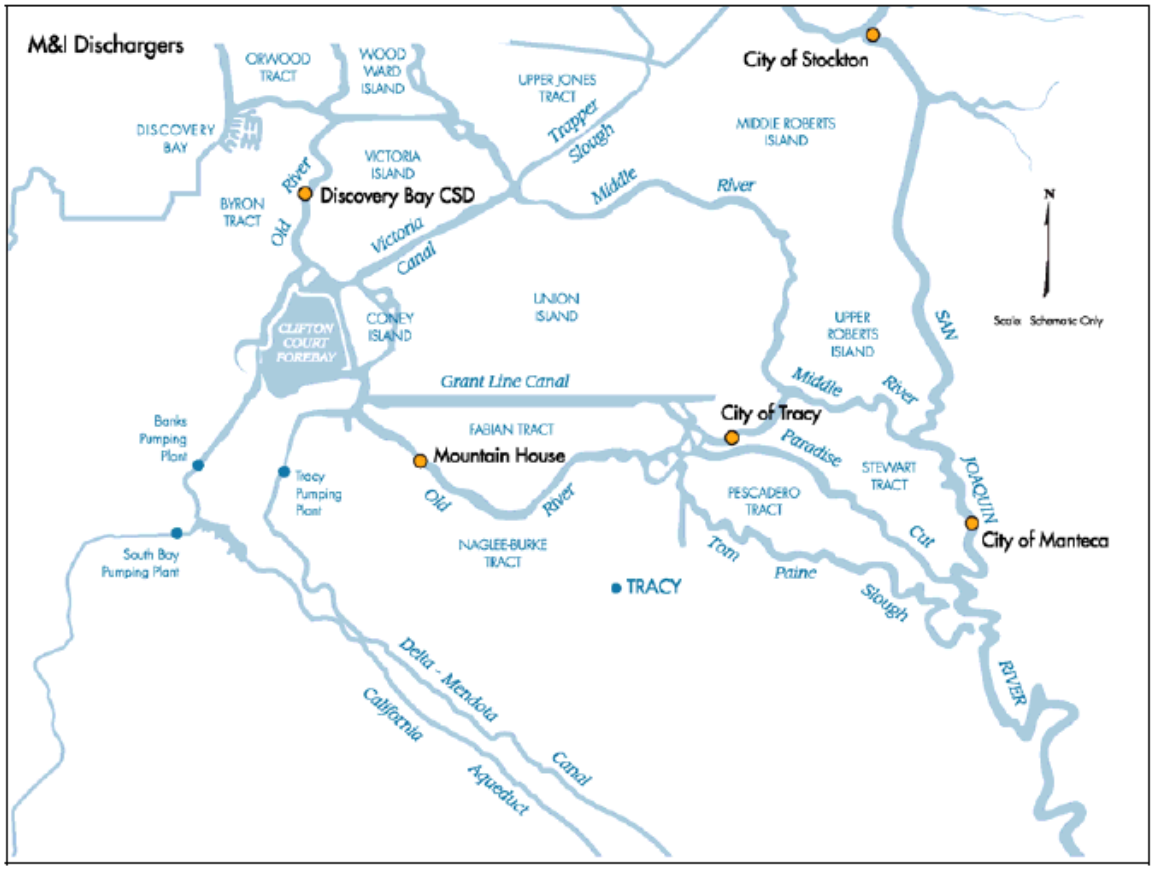
The highest discharge of all came from Pescadero Reclamation District (RD #2058), who, pursuant to an appropriative right (Application No. 2286, March 3, 1921) may divert up to 88 cfs from Paradise Cut and Tom Paine Slough from May through October. However, its discharge at times reached 4.5 dS/m, *nearly 650 percent of the objective*. It also has one of the highest average discharges of nearly 2.6 dS/m, *over 370 percent of the objective*. If Pescadero RD continues diverting and using water, even when there is insufficient water available for appropriation and, under its priority would normally be required to cease diverting, it not only reduces the supply available for legitimate, legal users, but also worsens the water quality for such persons.

Municipal and industrial discharges are even larger and routinely exceed the salinity objectives. Only the City of Manteca has a permit limiting the EC of its discharge and, even then, its permitted discharge may exceed the salinity objective.

Table II-1. South Delta municipal and industrial dischargers.

Discharger	Permitted Flow (mgd)	Permitted Flow (cfs)	Average EC (mmhos/cm)	Receiving Water
City of Tracy	9	14	1.7	Old River
Mountain House CSD	3	8	1.1	Old River
City of Stockton	55	85	1.1	San Joaquin River
City of Manteca	8.11	12	1.0	San Joaquin River
Discovery Bay CSD	2.1	3	1.9-2.3	Old River

Figure II-7. Locations of municipal and industrial discharges in the South Delta.



Based on its sampling of the South Delta, North and Central Delta, east side tributaries, and other areas, upland areas served by water coming from the eastern side do not contribute to any excursions above salinity goals in the South Delta, but west side drains below Vernalis and upstream from Old River have significant potential to degrade South Delta water quality. (Department of Water Resources, *Comments to January 16-19, 2007 SWRCB South Delta Salinity Workshop*, p. 13-14 (January 2007).)

D. Interior South Delta Hydrology.

1. Barrier Operations Significantly Alter Hydrologic Conditions in the Interior South Delta.

The DWR has conducted extensive computer simulations of flows and water quality in the South Delta.[6] In the January 2007 workshops regarding Interior South Delta Salinity, the DWR simulated Interior South Delta EC with varying factors such as SWP and CVP exports, barrier operations, and flow regimes from April through August. The first set of simulations evaluated the impacts of altering CVP and SWP export operations. (*see* Table II-2, below.) The second set of simulations evaluated the impacts of altering barrier operations. (*see* Table II-3, below.)

No exceedances of the Interior South Delta Salinity Objectives occurred in either simulation. (*see* Table II-2 and Table II-3, below.) The Bay-Delta Plan evaluates compliance with water quality objectives based on running averages starting on the last day of the averaging period. (1995 Bay-Delta Plan, p17 Table 2 fn2; 2006 Bay-Delta Plan, p13 Table 12 fn2.) If the objective uses a 30-day running average, then the Bay-Delta Plan assesses compliance on the 30th day. The Interior South Delta Salinity

[6] The DWR is currently in the process of simulating Interior South Delta salinity under historic conditions, primarily in Dry and Critical years, for the purposes of simulating the water quality impacts of seawater intrusion.

Objectives change from a 1.0 dS/m objective to a 0.7 dS/m objective beginning on April 1. (2006 Bay-Delta Plan, p13 Table 12.) As a result, the Bay-Delta Plan does not evaluate compliance with a 30-day running average EC of 0.7 dS/m until April 30th. Although the simulations depict exceedances of a 30-day running average EC of 0.7 dS/m in the first 15 days of April, they do not depict any exceedances in the second half of April. Consequently there are no projected violations of the Interior South Delta Salinity Objective. (*see* Table II-3, below.)

Export operations did not change compliance with the Interior South Delta Salinity Objectives. Depending on the export scenario, salinity conditions may improve or worsen. (*see* Table II-2, below.) Ceasing all export operations actually caused an *exceedance* of the 30-day running average EC at Old River near the DMC. (Id.) However, since the exceedance only occurred in the first half of April, rather than the second half, it was not a violation of the objective.

Barrier operations, however, significantly impacted hydrologic conditions in the Interior South Delta. If the HORB is not installed, reverse flows occur in the San Joaquin River immediately downstream from the Head of Old River in July and August. (*see* Table II-3, below.)[7] Reverse flows beginning in July reflect the San Joaquin River's natural flow conditions, wherein runoff from snowmelt plummets markedly from July through August. (*see* Figure II-2, above.)

Ironically, a reverse flow in the San Joaquin River can improve salinity conditions at Brandt Bridge, because better quality Sacramento River water becomes the dominant water quality influence. (SWRCB Water Right Order ("WRO") 2006-0006, DWR

[7] Exceedances of the Dissolved Oxygen objective in the Stockton Deep Water Ship Channel ("Ship Channel") become much more frequent beginning in July.

Exhibit-20C, p5.) On average, EC at Brandt Bridge is 8% higher than EC at Vernalis. (Id. at 1.) Based on the regression equation, the DWR has estimated that the USBR would need to maintain an EC of 565 μS/cm at Vernalis in order to maintain an EC of 700 μS/cm at Brandt Bridge and an EC of 845 μS/cm at Vernalis in order to maintain an EC of 1,000 dS/m at Brandt Bridge. (Department of Water Resources, *Testimony for the SWRCB Hearing on Cease and Desist Order: Investigation of the Factors Affecting Water Quality at Brandt Bridge, Middle River at Union Point, and Old River at Tracy* (2005), p. 1.)

Although barrier operations can improve salinity conditions in the Interior South Delta, they do not change compliance rates with the Interior South Delta Salinity Objectives.

Table II-2. Impact of CVP and SWP pumping on South Delta salinity.

Simulation	Simulation Period		Barrier Operation				Inflow (cfs)		Exports (cfs)			30-Day Running Average EC (dS/m)				
	From	To	Middle R Barrier	Old R Barrier	GLC Barrier	HOR Barrier	Sac R	SJR R	CVP	SWP	CVP + SWP	Old R near DMC	Old R at Tracy Rd	Vernalis	Brandt Bridge	RMID040
4a	4/1/2002	4/14/2002	No	No	No	No	16,320	1,820	3,500	3,990	7,490	0.7	0.9	0.8	0.9	0.9
4b	4/15/2002	4/30/2002	Yes	Yes	No	Yes	13,560	3,220	1,100	690	1,790	0.5	0.7	0.5	0.6	0.7
4c	5/1/2002	5/24/2002	Yes	Yes	No	Yes	12,700	3,000	840	570	1,410	0.3	0.5	0.3	0.3	0.4
4d	6/7/2002	6/30/2002	Yes	Yes	Yes	No	14,110	1,370	2,430	2,330	4,760	0.3	0.6	0.7	0.7	0.7
4e	7/1/2002	7/31/2002	Yes	Yes	Yes	No	18,820	1,280	4,350	6,220	10,570	0.3	0.6	0.6	0.6	0.6
4f	8/1/2002	8/31/2002	Yes	Yes	Yes	No	16,960	1,150	4,330	6,730	11,060	0.5	0.6	0.6	0.6	0.6
5a	4/1/2002	4/14/2002	No	No	No	No	12,340	1,820	3,500	0	3,500	0.7	0.9	0.8	0.9	0.9
5b	4/15/2002	4/30/2002	No	No	No	No	12,660	3,220	1,100	0	1,100	0.6	0.6	0.5	0.6	0.6
5c	5/1/2002	5/24/2002	No	No	No	No	12,120	3,000	840	0	840	0.4	0.3	0.3	0.3	0.3
5d	6/7/2002	6/30/2002	No	No	No	No	11,770	1,370	2,430	0	2,430	0.5	0.7	0.7	0.7	0.7
5e	7/1/2002	7/31/2002	No	No	No	No	12,600	1,280	4,350	0	4,350	0.3	0.6	0.6	0.6	0.6
5f	8/1/2002	8/31/2002	No	No	No	No	10,230	1,150	4,330	0	4,330	0.4	0.6	0.6	0.6	0.6
6a	4/1/2002	4/14/2002	No	No	No	No	8,830	1,820	0	0	0	0.9	0.9	0.8	0.9	0.9
6b	4/15/2002	4/30/2002	No	No	No	No	11,770	3,220	0	0	0	0.7	0.6	0.5	0.6	0.6
6c	5/1/2002	5/24/2002	No	No	No	No	11,290	3,000	0	0	0	0.4	0.3	0.3	0.3	0.3
6d	6/7/2002	6/30/2002	No	No	No	No	9,347	1,370	0	0	0	0.7	0.7	0.7	0.7	0.7
6e	7/1/2002	7/31/2002	No	No	No	No	8,250	1,280	0	0	0	0.7	0.6	0.6	0.6	0.6
6f	8/1/2002	8/31/2002	No	No	No	No	5,900	1,150	0	0	0	0.6	0.6	0.6	0.6	0.6
7a	4/1/2002	4/14/2002	No	No	No	No	21,320	1,820	3,500	3,990	7,490	0.7	0.9	0.8	0.9	0.9
7b	4/15/2002	4/30/2002	Yes	Yes	No	Yes	18,560	3,220	1,100	690	1,790	0.5	0.7	0.5	0.6	0.7
7c	5/1/2002	5/24/2002	Yes	Yes	No	Yes	17,700	3,000	840	570	1,410	0.3	0.5	0.3	0.3	0.4
7d	6/7/2002	6/30/2002	Yes	Yes	Yes	No	19,110	1,370	2,430	2,330	4,760	0.3	0.6	0.7	0.7	0.7
7e	7/1/2002	7/31/2002	Yes	Yes	Yes	No	23,817	1,280	4,350	6,222	10,572	0.2	0.6	0.6	0.6	0.6
7f	8/1/2002	8/31/2002	Yes	Yes	Yes	No	21,960	1,150	4,330	6,730	11,060	0.2	0.6	0.6	0.6	0.6

Table II-3. Impact of South Delta barrier installation on South Delta flow and salinity.

Simulation	Simulation Period		Barrier Operation				Inflow			Exports		San Joaquin River Flow (cfs)				30-Day Running Average EC (dS/m)				
	From	To	Middle R Barrier	Old R Barrier	GLC Barrier	HOR Barrier	Sac R	SJR R	CVP	SWP	CVP + SWP	Middle R	Old R	Head of Old R	SJR < Old R	Old R near DMC	Old R at Tracy Rd	Vernalis	Brandt Bridge	RMID040
9a	4/1/2002	4/14/2002	No	No	No	No	16,320	1,820	3,500	3,990	7,490	40	1,270	1,320	430	0.7	0.9	0.8	0.9	0.9
			No	No	No	No						40	1,270	1,320	430	0.7	0.9	0.8	0.9	0.9
			Yes	Yes	No	Yes						-40	1,270	500	1,240	0.6	0.8	0.8	0.9	0.8
9b	4/15/2002	4/30/2002	Yes	Yes	No	Yes	13,560	3,220	1,100	690	1,790	-10	550	-550	2,590	0.5	0.7	0.5	0.6	0.7
			No	No	No	No						100	1,640	1,760	1,430	0.6	0.6	0.5	0.6	0.6
			Yes	Yes	No	Yes						-10	550	550	2,590	0.4	0.6	0.5	0.6	0.5
9c	5/1/2002	5/24/2002	Yes	Yes	No	Yes	12,700	3,000	840	570	1,410	-10	520	530	2,380	0.3	0.5	0.3	0.3	0.4
			No	No	No	No						100	1,520	1,630	1,280	0.4	0.3	0.3	0.3	0.3
			Yes	Yes	No	Yes						-10	520	530	2,380	0.4	0.5	0.3	0.3	0.5
9d	6/7/2002	6/30/2002	Yes	Yes	Yes	No	14,110	1,370	2,430	2,430	4,860	88	580	690	480	0.3	0.6	0.7	0.7	0.7
			No	No	No	No						70	890	990	180	0.5	0.7	0.7	0.7	0.7
			Yes	Yes	No	Yes						0	340	380	790	0.3	0.5	0.7	0.7	0.6
9e	7/1/2002	7/31/2002	Yes	Yes	Yes	No	18,820	1,280	4,530	6,220	10,750	80	680	780	300	0.3	0.6	0.6	0.6	0.6
			No	No	No	No						40	1,110	1,170	-90	0.4	0.6	0.6	0.6	0.6
			Yes	Yes	No	Yes						-20	430	440	640	0.3	0.4	0.6	0.6	0.4
9f	8/1/2002	8/31/2002	Yes	Yes	Yes	No	16,960	1,150	4,330	6,730	11,060	58	650	730	290	0.5	0.6	0.6	0.6	0.6
			No	No	No	No						10	1,120	1,150	-130	0.5	0.6	0.6	0.3	0.6
			Yes	Yes	No	Yes						-50	460	430	590	0.5	0.5	0.6	0.6	0.4

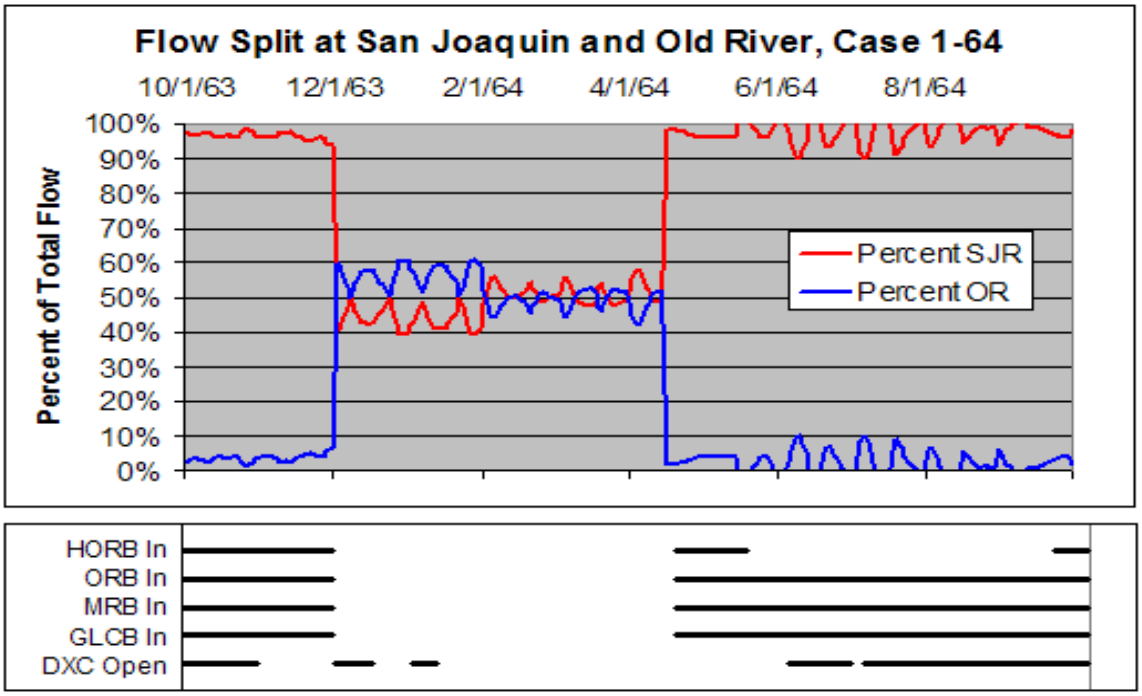
2. When the Barriers Do Not Operate Almost all of the Available Flow for Diversion in the Interior South Delta Comes from the San Joaquin River.

Simulations using the Fischer Delta Model ("FDM") have also shown barrier operations have significant impacts on Interior South Delta hydrodynamics. (SWRCB Resolution 2006-0098, SJRG Exh-04, p1.) On average, about 68 percent of San Joaquin River water is exported in a Dry year and about 62 percent is exported in a Critical year. (Id., p. 4.)

From April through November, which includes the entire irrigation season, operations of the Head of Old River Barrier ("HORB"), Grant Line Canal Barrier ("GLCB"), Middle River Barrier ("MRB"), Old River Barrier at Tracy ("ORB"), and Delta Cross Channel Barrier ("DXC") cause nearly 100% of the water from the San Joaquin River remains in the San Joaquin River. (Id.; *see* Figure II-8, below.)

From December through March, when the barriers do not operate, the flow split is approximately 50 percent. Half of the San Joaquin River flow enters Old River, the other half remains in the San Joaquin River. (Id.) Even if the HORB does not operate and the other three agricultural barriers do operate, very little San Joaquin River water flows into Old River. (Id.)

Figure II-8. Flow split at confluence of Old and San Joaquin Rivers with standard HORB schedule in a Dry year.[8]



When the Interior South Delta barriers do not operate export operations have a significant impact on the fate of San Joaquin River water. In a Dry year, the sum of all exports, diversions and Delta outflow is about 93-98 percent. (SWRCB Resolution 2006-0098, SJRG Exh-34, App. E p. 9.) In a Critical year, the sum of all exports, diversions and Delta outflow is about 83-86 percent. (Id.) As a result, in the Dry year, only 2 to 7 percent of the San Joaquin River water entering the Delta between February 1 and April 15 remained in the Delta by September 30, the end of the modeling period. (Id.) In the Critical year only 14 to 17 percent remained by September 30. (Id.) By September 30, all of the San Joaquin River water remaining in the Delta was either diverted for agricultural

[8] *See* SWRCB Resolution 2006-0098, SJRG Exh-04, p12. In the simulation, 1964 was used as a Dry year. 1988 was a Critical year. Monthly Vernalis flow, in TAF, and based on average monthly cfs, was:

WY	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total TAF	%	Remainder	cfs	Type
1964	98	57	45	43	39	24	27	53	386	7	27	27	D
1988	80	137	127	109	102	83	96	86	821	17	140	140	C

use or diluted to immeasurable concentrations. (Id.) Based on the proportion of remainder water from February through September, 27 TAF in the Dry year and 140 TAF in the Critical year was diverted. On average, the rate of diversion would have been 117 and 101 cfs, respectively. Any additional water in the Delta must have come from somewhere other than the San Joaquin River.

III. Water Rights in the South Delta.

A. California's Hybrid Water Right System.

California operates under a "dual" or hybrid system of water rights which recognizes both doctrines of riparian rights and appropriation rights. (U.S. v. St. Water Resources Control Bd. ("U.S. v. SWRCB") (1986) 182 Cal.Ap.3d 82, 101.) When California achieved statehood, the Legislature adopted the common law of England and thereby incorporated the *riparian* doctrine. (Id.) The riparian doctrine confers upon the owner of land the right to divert the water flowing by his land for use upon his land, without regard to the extent of such use or priority in time. (Id.) For land to possess a riparian right, it must be contiguous to or abut a stream, but the right only extends to the smallest tract held under one title in the chain of title and the land must be within the stream's watershed. (Rancho Santa Margarita v. Vail (1938) 11 Cal.2d 501, 528-529.)

Riparian rights only attach to natural stream flow. (U.S. v. St. Water Resources Control Bd. ("U.S. v. SWRCB") (1986) 182 Cal.Ap.3d 82, 101.) Consequently, riparian owners have no right to divert water stored upstream during earlier periods. (St. Water Resources Control Bd. Cases ("SWRCB Cases") (2006) 136 Cal.App.4th 674, 743.)

> [The riparian user] is not in a position to demand that the [upstream appropriator] shall, by its artificial works, furnish a constant flow of water in [the watercourse] throughout the year. His only rights are those which he would have had under the

> natural conditions existing before the dam was erected, subject to the deduction of so much of the water as [the upstream appropriator] has continuously applied to a beneficial use. In other words, he cannot require the [upstream appropriator] to discharge any water into the stream during those months in which there would be no flow if no dam had ever been built. He may merely insist that, during the months of natural flow, the [upstream appropriator] shall permit the escape into the [watercourse] of the surplus of the natural flow over and above what is required to enable the [upstream appropriator] to meet its reasonable needs....

(Id. (citing Lindblom v. Round Valley Water Co. (1918) 178 Cal. 450, 457).)

A riparian owner can, however, claim flow that has been abandoned, such as when an appropriator chooses not to exercise a right to divert water. (Stevens v. Oakdale Irrigation Dist. (1939) 13 Cal.2d 343, 351.) If an appropriator chooses to resume diverting the riparian cannot claim an injury. (Id.)

Additionally, riparian rights generally only attach only to the natural watercourses, and not to artificial channels such as canals. (Tusher v. Gabrielson (1998) 68 Cal.App.4th 131, 147.) A riparian right only attaches to an artificial watercourse if an existing watercourse is diverted into a new channel and the artificial channel is permanently substituted for the natural one. (Id.) A party relying on a riparian right has the burden to demonstrate the riparian character of his land, the quantity of water or proportion of the stream claimed, and the location of his land relative to lands of other parties. (Hudson v. West 91957) 47 Cal.2d 823.)

The appropriation doctrine confers upon one who actually diverts and uses water the right to do so provided that the water is used for reasonable and beneficial uses and is surplus to that used by riparians or earlier appropriators. (U.S. v. SWRCB, *supra* 82 Cal.Ap.3d at 101.) Appropriators need not own land contiguous to the watercourse, but appropriation rights are subordinate to riparian rights so that in times of shortage

riparians are entitled to fulfill their needs before appropriators are entitled to any use of the water. (Id. at 102.) As between appropriators, the rule of priority is "first in time, first in right." (Id.; *see also* Water Code §1450.) The senior appropriator is entitled to fulfill his needs before a junior appropriator is entitled to use any water. (U.S. v. SWRCB, *supra* 82 Cal.Ap.3d at 102.) The priority of an appropriative right is based on the date the appropriator applied to appropriate water, with a lower application number conferring higher priority.

Prior to the enactment of the Water Commission Act in 1914, the Civil Code established the method of appropriating water. First, the appropriator must have intended to put water to beneficial use. (Water Code § 1415.) Second, there must have been an actual diversion from the natural watercourse using a means sufficient to put the water to beneficial use. (Id.) Third, the appropriator must have applied the water to beneficial use within a reasonable period. (Id.) Finally, the appropriator had to record notice of the appropriation in the county of jurisdiction within 10 days. (Id.) Compliance with the notice and recordation procedures in these sections provided evidence that could be used to establish a priority of right. The courts, however, held that in the absence of such compliance, a person could legally appropriate water, but would need another form of proof if there were a dispute. (Duckworth v. Watsonville Water & Light Co. (1915) 158 Cal. 206, 211; Lower Tule etc. Co. v. Angiola etc. Co. (1906) 149 Cal. 496, 499; Pleasant Valley Canal Co. v. Borror (1998) 61 Cal.App.4th 742, 774-775.) With the adoption of the Water Commission Act in 1914, all unappropriated water became the property of the state and applying to the state became the sole means of appropriating water. (Water Code §§ 1201-1202.)

Appropriations prior to 1914 are senior to all appropriative rights obtained after 1914.[9] The lower the application number the more senior the right. In times of shortage, a senior appropriator is entitled to fully divert and use the permitted or licensed amount of water before any other junior appropriator may divert and use any water. (Cal. Civ. Code §1414.) There are several large pre-1914 appropriative water right holders upstream of the Delta. (*see* Table III-4, below.)

Riparian rights are senior to appropriative water rights.[10] (U.S. v. SWRCB, *supra* 182 Cal.Ap.3d at 101-102.) During water shortages riparian owners must reduce their usage in equal proportion based on acreage, because riparian owners on a stream system are vested with a common ownership. (US v. SWRCB, *supra* 182 Cal.App.3d at 101; Wiggins v. Muscupiabe Land & Water Co. (1896) 113 Cal. 182, 195.)

During water shortages riparian owners must reduce their usage in equal proportion, because riparian owners on a stream system are vested with a common ownership. (US v. SWRCB, *supra* 182 Cal.App.3d at 101.) Between appropriators, the right to divert and use water is based on seniority. (U.S. v. SWRCB, *supra* 182 Cal.Ap.3d at 101-102; *see also* Water Code §§1450, 10500.) First in time is first in right. Similar to riparian owners, appropriators cannot claim flow previously stored water, but they can claim abandoned flow. (SWRCB Cases, *supra* 136 Cal.Ap.4th at 743; El Dorado Irrigation Dist. v. St. Water Resources Control Bd. (2006) 142 Cal.App.4th 937, 962.)

[9] If a pre-1914 appropriator fails to comply with the requirements of the Civil Code, but later demonstrates a pre-1914 appropriation, the appropriator's right is limited to the amount of water diverted and used before 1914. (Borror, *supra* 61 Cal.App.4th at 777.)

[10] Riparian rights are not always senior to appropriative rights. (Borror, *supra* 61 Cal.App.4th at 774.) If a water user began appropriating water on public land, but then later obtained title by government patent, the riparian right was subject to prior appropriations. (Id.)

B. There is Insufficient Natural Flow at All Times for South Delta Water Rights, Instream Beneficial Uses, and Upstream Water Rights.

1. Prior Analysis of the Impacts of Changes in San Joaquin River Flow on South Delta Water Rights Assumed the Entire South Delta had Riparian Rights and That There were no Upstream Senior Water Rights.

During the D-1641 proceedings, the SWRCB considered whether permit changes applied for by the CVP and SWP would harm riparian rights in the South Delta. The net amount of flow South Delta riparian owners could divert was based on information provided by the SDWA, who maintained that the "mass bulk" of land in the South Delta was riparian. (D-1641, p31-32; *see* Table III-1, below.)

Table III-1. South Delta diversion requirements estimated by the South Delta Water Agency.[11]

Month	Vernalis Flow (cfs)	TAF[12]
January	573	35
February	483	27
March	548	34
April	745	44
May	849	52
June	1,124	67
July	1,400	86
August	1,334	82
September	1,057	63
October	902	55
November	759	45
December	719	44
Total		634

The estimated diversion requirements were developed through the SDWA's engineer, Mr. Jerry Orlob, from calculations set forth in its draft contract with the CVP and SWP. (D-1641 Exh. SDWA-22.) In conducting its analysis, the SWRCB assumed that all lands in the South Delta were riparian owners and that there no riparian owners

[11] Dr. Orlob estimated the diversion requirement for the entire South Delta, which differed from the analysis performed by Mr. Wee, who focused on Union and Roberts Island.
[12] TAF = thousand acre-feet

upstream of the Delta with whom the Southern Delta riparian owners would be required to share water during a period of shortage. (D-1641, p33.) If the former were incorrect then the South Delta diversion requirement would be less than that espoused by the SDWA. If the latter were incorrect then, in times of shortage, South Delta riparian owners would have to make more significant reductions in diversions since more riparian owners would share common ownership to waters of the San Joaquin River.

2. Only a Fraction of the South Delta has Riparian Rights.

a. Initial Land Grants by the Swamp & Overflow Land Act on 1850 and Mexican Governor.

Land ownership in the South Delta and, consequently, riparian rights, derive from the Swamp and Overflow Land Act of September 28, 1850 and from a Mexican land grant, known as Rancho El Pescadero. One of the major barriers to resolving conflicts regarding water quality and water rights in the Interior South Delta has been the indefinite nature of South Delta water rights. Given their proximity to Old and Middle River, Union and Roberts islands provide a starting point for quantifying and defining South Delta water rights.

The vast majority of the acreage on Union and Roberts islands was designated as Swamp & Overflow land under the Swamp & Overflow Land Act of September 28, 1850.[13] (Steven Wee, JRP Historical Consulting LLC, *Summary Report Roberts Island and Union Island Riparian Water Rights Investigation San Joaquin County, California,* p. 3 (June 2008).) By this act, Congress granted to the state swamp lands on the public domain, requiring drainage to make them fit for cultivation, and overflowed lands subject to periodic flooding, requiring levees to protect the land and make it productive. (Id.)

[13] This historical analysis of South Delta riparian water rights and property conveyances was developed by Mr. Steven Wee of JRP Consulting. His entire report is attached as Appendix C.

This federal grant to the State of California transferred more than two million acres of public land from federal possession to the State of California, who then sold the Swamp & Overflow lands to private landowners who promised to reclaim them. (Id. at 4.) Nearly one-quarter, or 500,000 acres, of the Swamp & Overflow land was located in the Sacramento-San Joaquin Delta. (Id.)

Sale of Swamp & Overflow land on the two islands began in 1859 and continued at an irregular pace through 1872 when the last Swamp & Overflow Certificate of Purchase was issued by the state. (Id. at 5.) With the exception of the Mexican grant land at the southern edge of Union Island and Roberts Island, this thirteen year period marked the initial subdivision of the islands into private possession and corresponded with the earliest efforts to erect systems of protective levees on the rim of the island adjacent to the rivers and major sloughs and cross levees on the interior of the islands along high ridges or property boundary lines. (Id.) The patents also separated the individual properties into riparian and non-riparian parcels, but over the years, consolidation of these small parcels into large single blocks of land also occurred. (Id. at 5 fn. 5.) These large blocks were sometimes later subdivided a second time into smaller parcels with a configuration different from that existing before consolidation.[14] (Id.)

Extensive subdivision, consolidation, and reconfiguration of parcels occurred in eastern Union Island, where the land was initially subdivided into many Swamp & Overflow tracts, consolidated under a single owner, and then subdivided a second time irrespective of the original Swamp & Overflow parcel lines. (Id.) The latter subdivision

[14] When small parcels that are differentially riparian and non-riparian are consolidated, the riparian right does not expand to include the whole consolidated parcel. Thus, in certain situations, a parcel, or a portion of a parcel, may appear riparian on the face of a map, even though only part of the parcel may have riparian rights, if any.

created parcels adjacent to waterways, but with acreage from two or more former Swamp & Overflow tracts, with the result that only parts of the subdivided, reconsolidated, and reconfigured parcels retained riparian rights. (Id.) Interior portions of many properties bordering on streams are partially non-riparian, because the interior portions once belonged to different parcels. (Id.) Although many of the interior parcels continued in irrigated agriculture and bordered streams, the streams they bordered were artificial waterways, contiguity to which did not confer riparian rights. (Id.)

The remaining acreage on Union and Roberts islands not classified as Swamp & Overflow land was part of a Mexican land grant, known as Rancho El Pescadero. (Id. at 5.) It became private property in 1843 when the Mexican Governor of California, Manuel Micheltorena, granted a 35,546 acre tract southwest of present day Stockton to Antonio Maria Pico. (Id.) The United Stated confirmed the grant and issued a patent for the property on March 10, 1865 to Pico and Henry M. Naglee. (Id. at 6.) The rancho included nearly all of the acreage at the southern end of both islands bordering on Old River. (Id.)

b. Subdivision and Consolidation after 1859.

Between 1859 and 1868, the topography of the land largely determined the location of the early parcels. Generally, wide strips of high land lined the river channels surrounding both islands, but the center of each island was low, poorly drained, and frequently flooded. The upstream areas of each island were higher than the downstream areas. By 1914, elevations of ten feet above sea level were common in southern Roberts Island and southeastern Union Island, but the remaining portions of each island were at or below sea level. Properties along the rivers in the higher areas were the most practical to farm and were the earliest tracts sold as Swamp & Overflow land.

i. Subdivision, Consolidation, and Reconfiguration of Roberts Island.

In 1868, George D. Roberts of the Tideland Reclamation Company, who claimed over 60,000 acres on both islands via four Certificates of Purchase in 1869, began buying swamplands throughout the Delta. Roberts formed the Tideland Reclamation Company in 1869. The company began reclamation work by constructing levees on Roberts Island in 1870 and Union Island in 1876, hoping to profit by selling the higher valued reclaimed tracts of agricultural land protected from flood by levees to individual farmers.

Minimal subdivisions occurred through the 1880s. Landowners undertook the first large reclamation projects, but their efforts proved insufficient against floodwaters and levee breaches frequently occurred. As a result, small farmers were reluctant to invest in or improve the flood-prone interior parcels, forestalling subdivision of interior lands and the lower parts of each island.

By the late 1880s, property owners on Roberts Island began forming reclamation districts to facilitate cooperative construction of sturdier levees. As the districts were formed, the large parcels extending from the banks to the deepest peat lands in the center of the island were subdivided, creating a large number of non-riparian parcels. Reclamation District No. 524 formed on Middle Roberts Island in 1889 and RD 544 formed on Upper Roberts Island in 1892.

ii. Subdivision, Consolidation, and Reconfiguration of Union Island.

On Union Island, north of Rancho El Pescadero all of the Swamp & Overflow tracts in the east part of the island were consolidated under the ownership of Thomas H. Williams and David Bixler. By 1879, Williams and Bixler owned all but 200 acres Union

Island north of the grant line. Following the death of Thomas H. Williams in 1886, Williams and Bixler divided their holdings, with the Williams Estate receiving all of western Union Island and roughly half of the eastern part of the island. David Bixler retained large acreage in the east and central part of the island.

c. Current Riparian Rights on Union and Roberts Island.

From the initial Swamp & Overflow land patents issued by the State of California to individuals on Union and Roberts islands between 1859 and 1872 and subsequent land transactions and subdivisions continuing through 2007, the vast majority of land on both islands has been severed from contiguity to natural waterways, either by the original grants or patents, or by subsequent subdivision and changes in ownership. Virtually the only tracts still riparian are those around the perimeter of each island. Approximately seventy percent of the parcel divisions creating non-riparian tracts occurred by 1915.

Since at least the 1870s, sloughs and canals were constructed on Union and Roberts Island to improve access to surface water supply for irrigation, but riparian rights only attached to lands contiguous to natural watercourses. Today, on Roberts Island, the San Joaquin River; Burns Cutoff; Middle River; Old River; Whiskey Slough to the NE 1/4 of Section 8, T1N/5E, MDM; and Turner Cut from Section 31 to the SE 1/4 of Section 30, T2N/R5E, MDM, are natural waterways. (Id. at 8.) The remainder of Whiskey Slough and Turner Cut, as depicted on current USGS topographic maps, along with that portion of Trapper Slough in Section 21, T1N/R5E, MDM, and the unnamed body of water between the head of Trapper Slough and Whiskey Slough in Sections 21 and 16, T1N/R5E, MDM are artificial waterways. (Id.) Mapping evidence from the 1870s and 1880s shows Whiskey Slough terminating in the NE 1/4 of Section 8, T1N/R5E

MDM; the natural part of Turner Cut reaching the SW 1/4 of Section 30, T2N/R5E MDM; and Trapper Slough ending in Section 30, T1N/R5E, MDM. (Id.) On Union Island, the natural waterways are Middle River and Old River. (Id.) The Grant Line Canal, Fabian and Bell Canal, North Canal, Doughty Cut, and that portion of Salmon Slough in Section 27, T1S/R5E, MDM, are artificial waterways. (Id.) In addition, high water sloughs that were cut off by reclamation and levee construction on the two islands have been assumed not to convey riparian status to lands once contiguous to these sloughs. (Id.) Although lands located on the interiors of Roberts and Union Island may use surface water for irrigation, if they rely on an artificial waterway for their surface water supplies, they do not have riparian rights. (Id.)

By 2008, the vast majority of the interior parcels on both Union and Roberts Island were no longer riparian to natural waterways by virtue of subdivision and ownership changes. (*see* Figure III-1 and Figure III-2, below.) A total of 228 subdivisions of property resulting in non-riparian parcels had occurred on both islands: 176 on Roberts Island and 52 on Union Island. In terms of area, this is approximately 45,617 non-riparian acres out of about 65,033 total acres on both islands, or 70 percent. This breaks down as 24,008 non-riparian acres out of about 32,879 total acres on Roberts Island, or 73 percent; and approximately 21,609 acres of about 32,154 total acres on Union Island, or 67 percent. Between the two islands, subdivision and ownership changes eliminated riparian rights for nearly two-thirds of the lands.

Figure III-1. Union Island, present riparian and non-riparian parcels.

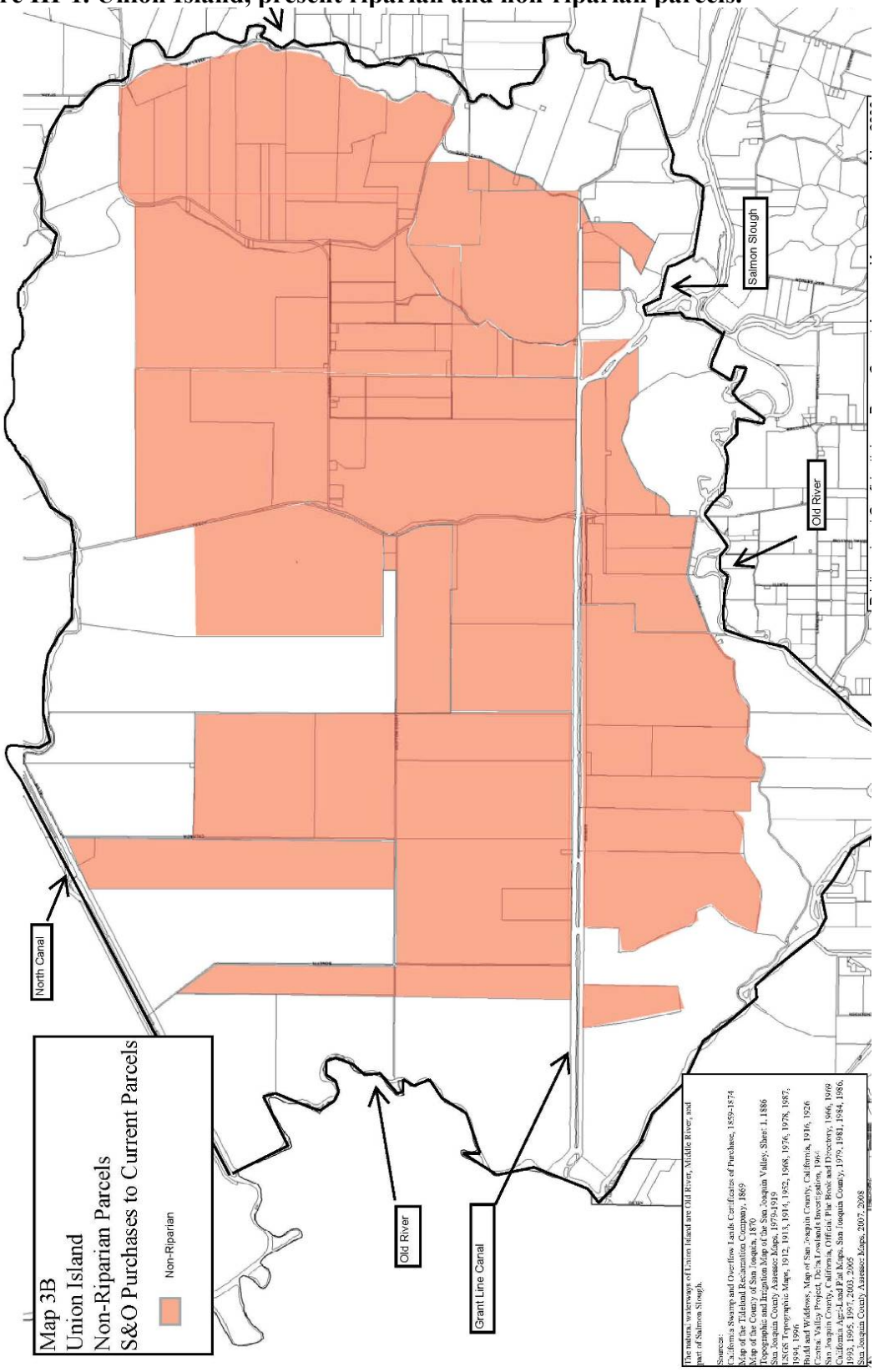
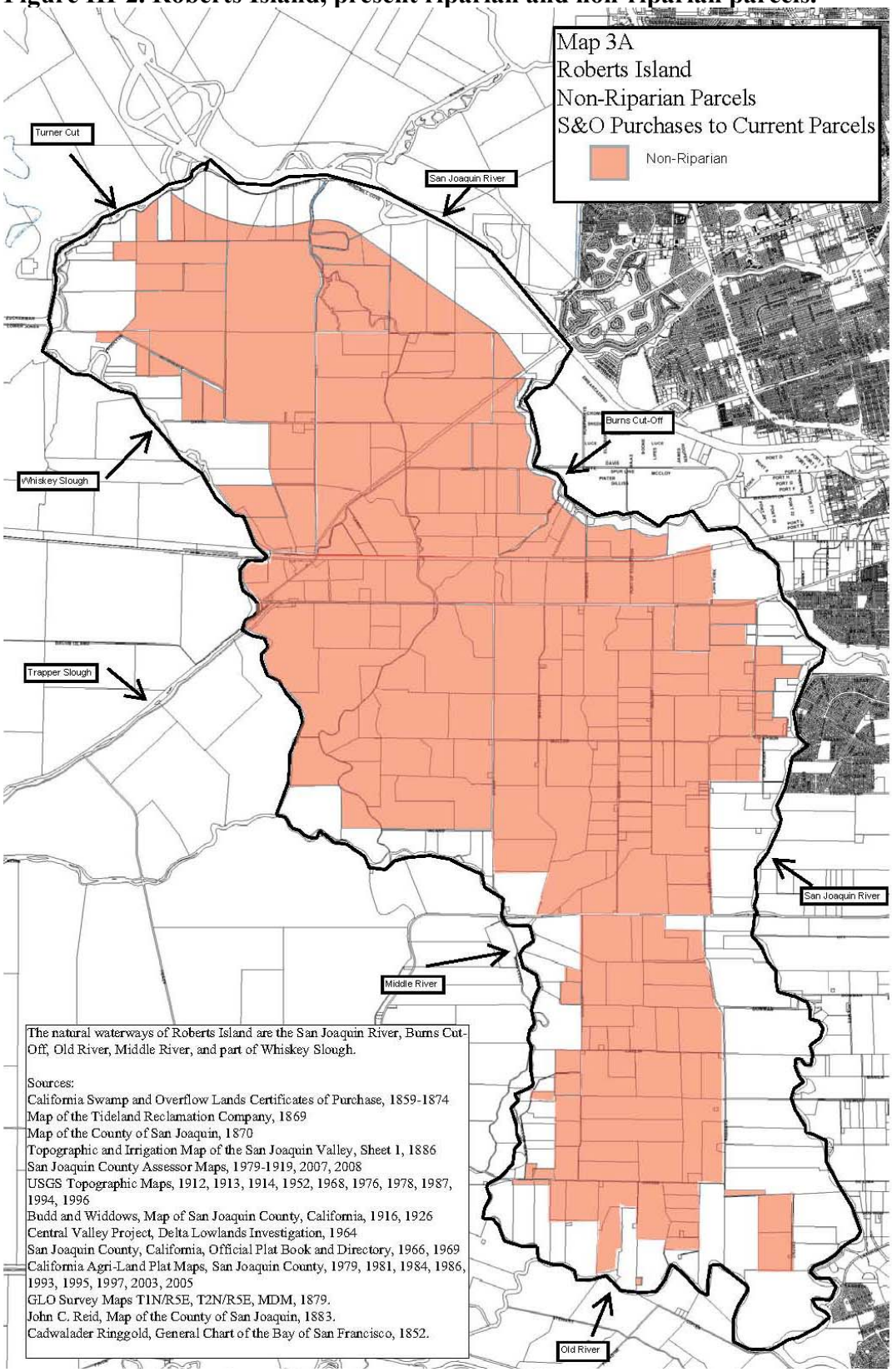


Figure III-2. Roberts Island, present riparian and non-riparian parcels.



3. Appropriation of Water on Union and Roberts Island.

Despite SDWA's oft-cited claim that its "mass bulk" has riparian rights or that there is always water available for riparian diversion, many water users in the South Delta nonetheless found it necessary to appropriate water from the State. There are currently 75 licenses for appropriation on Union and Roberts Island. (*see* Appendix A.) In all, the licenses for appropriation may use up to 505 cfs of water, or about 248 TAF annually. With 43,297 acres as places of use, Union and Roberts Island may apply on average, over 5.5 acre-feet of water per acre.[15] Union Island applies almost 6 acre-feet per acre.

[15] The actual amount of water used in a season may be much less. For example, if a water right provides for 180 days of diversion, but the diverter only grows a 90-day crop in the period, the diverter would only use half the total amount of water.

Table III-2. Summary of water rights for Union and Roberts Island[16]

Rights	Roberts Island	Union Island	Roberts + Union
Rights	55	29	84
Acres	10,739	33,823	44,562
Diversion (cfs)	121	398	519
Diversion (af)	50,276	202,378	252,654
Water Use (af/acre)	4.68	5.98	5.67
Appropriative Rights			
Rights	47	28	75
Diversions	52	58	110
Acreage	9,626	33,671	43,297
Diversion (cfs)	108	396	505
Diversion (af)	45,944	202,378	248,322
Water Use (af/acre)	4.77	6.01	5.74
Riparian Rights[17]			
Rights	11	6	17
Acres	1,719	4,849	6,568
Diversion (cfs)	19	54	74
Diversion (afa)	6,875	19,397	26,271
Pre-1914			
Rights	4	3	7
Acres	1,023	4,198	5,221
Diversion (cfs)	13	52	65
Diversion (afa)	5,852	4,198	10,051
Riparian w/Pre-1914 Rights			
Rights	1	3	4
Acres	240	4,198	4,438
Diversion (cfs)	3	52	55
Diversion (afa)	1,200	24,193	25,393
Pre-1914 Rights, No Riparian			
Rights	3	0	3
Acres	783	0	783
Diversion (cfs)	10	0	10
Diversion (afa)	4,652	0	4,652
Riparian Rights, No Pre-1914			
Rights	10	3	13
Acres	1,479	4,198	5,677
Diversion (cfs)	17	47	64
Diversion (afa)	5,915	16,793	22,708

[16] Water rights, diversion rates and amounts, and acreage were based on water right files held by the SWRCB Water Rights Division. If a statement of diversion did not disclose a diversion rate or amount, then the rate and amount was estimated based on the acreage, assuming a 180-day irrigation season and 4 acre-feet applied per acre per season.

[17] The number of riparian owners was initially based on the analysis performed by Mr. Steven Wee. Diverters from artificial stream, and parcels that were severed or subdivided during their chain of title lacked riparian rights. The findings of the Term 91 Hearings (Water Right Order No. 2004-0004) were also considered. (*see* Table IV-1.)

Almost all of the licenses have multiple special conditions attached. (*see* Table III-3, below.) Some of the terms merely recognize existing law. The second condition, included in even the highest priority licenses on Union and Roberts Island, recognizes the rule of priority established in the Water Code (§§1450, 10500) and implement the rule of priority by authorizing the Department of Water Resources to regulate use of the diversion.

Table III-3. Special Terms Included in South Delta Licenses for Appropriation of Water.[18]

Term	Term Conditions	Licenses with this Term
1	As the right of the United States to control streams in the interests of navigation is superior to any other water right, this permit will in no way hinder the United States if it desires to stop this diversion under claim of its interference with navigation.	50
2	As there is a possibility that there will not be sufficient water in the San Joaquin River during the latter part of the irrigation season to satisfy all requirements, this permit is issued subject to the express condition that the use hereunder may be regulated by the Division of Water Rights during such periods of water scarcity to the end that such use will not interfere with rights under prior applications.	42
3	In case of rotation the equivalent of such continuous flow allowance for any thirty day period may be diverted in a shorter time if there be no interference with other vested rights.	59
4	Allowance of the amount named in this permit shall not be construed as vesting in permittee any right or color of right to water in excess of what may be reasonably needed for beneficial use in connection with the specific purpose described in the application which is hereby approved.	1

In addition to their licenses for appropriation, some of the lands have "supplemental" water rights, such as a pre-1914 appropriation, a riparian right, or both. (*see* Table III-2, above.) Approximately 14 percent of the lands with appropriative water rights also claim riparian rights. A far smaller number, only seven diverters, claim pre-

[18] Almost all licenses have multiple conditions. Three licenses have Conditions 1 and 2, thirty-eight licenses have Conditions 1, 2, and 3, nine licenses have conditions 1 and 3, one license has Conditions 2 and 3, and 1 license has Conditions 3 and 4.

1914 rights.[19] Claimed pre-1914 rights total 62 cfs and riparian rights total 68 cfs. However, many pre-1914 appropriators and riparian owners also have licenses for appropriation.

C. The Majority of South Delta Water Rights are Junior to Those Upstream.

As a result, many of the appropriators have rights junior to pre-1914 appropriators. There are many riparian owners and pre-1914 appropriators upstream of Union and Roberts Island. (*see* Table III-4, below.) Upstream riparian owners and pre-1914 appropriators claim at least 10,000 cfs, but on Union and Roberts Island only seven water users claim pre-1914 rights. (*see* Table III-2, above.) Their claims total 65 cfs and 5,221 acres. (Id.)

Excluding claimed pre-1914 water rights on Union and Roberts Island, the most senior licensee, the Loretta Holt Corporation (Application No. 732) only has priority from 1917. (*see* Appendix A.) Even it is junior to the pre-1914 water rights claimed by members of the San Joaquin River Group Authority upstream.[20] Additionally, other pre-1914 appropriators upstream of the Delta claim fights to divert, at times, up to 217 cfs. (*see* Table III-4, below.) Upstream riparian owners claim rights to irrigate 2,632 acres, a flow rate of approximately 57 cfs. (Id.)

[19] The presence of a pre-1914 appropriation was based solely on whether a licensee claimed appropriation, diversion, and use of water before 1914.

[20] The SJRGA members recognize that some of their post-1914 water rights are no senior to the majority of licenses held on Union and Roberts Island. The SJRGA recognizes these rights would need to be met before the SJRGA's

Table III-4. Selected water rights upstream of Vernalis.[21]

Water Right Holder	Irrigated Acres	Statements Number	Term Start	Term End	Diversion Amount (acre-feet)	Diversion Amount (cfs)
Arnold Souza & Sons	350	S005469	1-Mar	1-Nov	1,644	3.375
Bogetti Farms	1,100	Riparian	1-Mar	31-Oct	4,400	24
Cabral Farms	159	Riparian	1-Mar	31-Oct	636	4
Enciso	90	Riparian	1-Mar	31-Oct	360	2
Eskue	7	Riparian	1-Mar	31-Oct	28	0
Gallo, RJ		S014002	9-Mar	9-Nov	1,200	8.9
Gillmeister, Bouzenerais		S007681	1-Feb	1-Nov	9,668	17.82
Hailwood Ranch	520	Riparian	1-Jan	31-Dec	1,807	2.5
Houk, Dean	117	Riparian	1-Apr	1-Oct	536	1.47
Island Dairy	275	Riparian	1-Apr	1-Oct	5,465	15
Lone Tree Mutual Water Co		S010411	1-Jan	1-Dec	12,000	40
Mendonca, Francisco		S007393	1-May	1-Sep	11,662	47
Patterson ID	13,555	S009320	1-Mar	1-Sep	54,945	150
RD #2099	364	Riparian	1-Mar	31-Oct	1,456	8
TOTAL	16,537				105,807	324

1. There is Insufficient Water at All Times for South Delta Water Rights.

In conducting its analysis of South Delta water rights, the SWRCB assumed that riparian owners would have no right to divert any flow in excess of unimpaired flow, because any flow exceeding unimpaired flow would consist of previously stored water.[22] (D-1641, p. 31.) Based on the comparison of unimpaired flow to South Delta diversion requirements, the SWRCB determined that, on average, sufficient natural flow from the San Joaquin Valley was only available throughout the year in Wet years. (D-1641, p33.)

[21] Upstream water right information was obtained from the SWRCB Water Rights Division and *Water Diversion and Discharge Points Along the San Joaquin River: Mendota Pool Dam to Mossdale Bridge,* a survey published by the CVRWQCB in 1989. Season of diversion and diversion amounts were not available for all of the listed water rights. Riparian rights were assumed to apply 4 acre-feet of water per year over a 180-day irrigation season beginning March 1 and ending October 31.

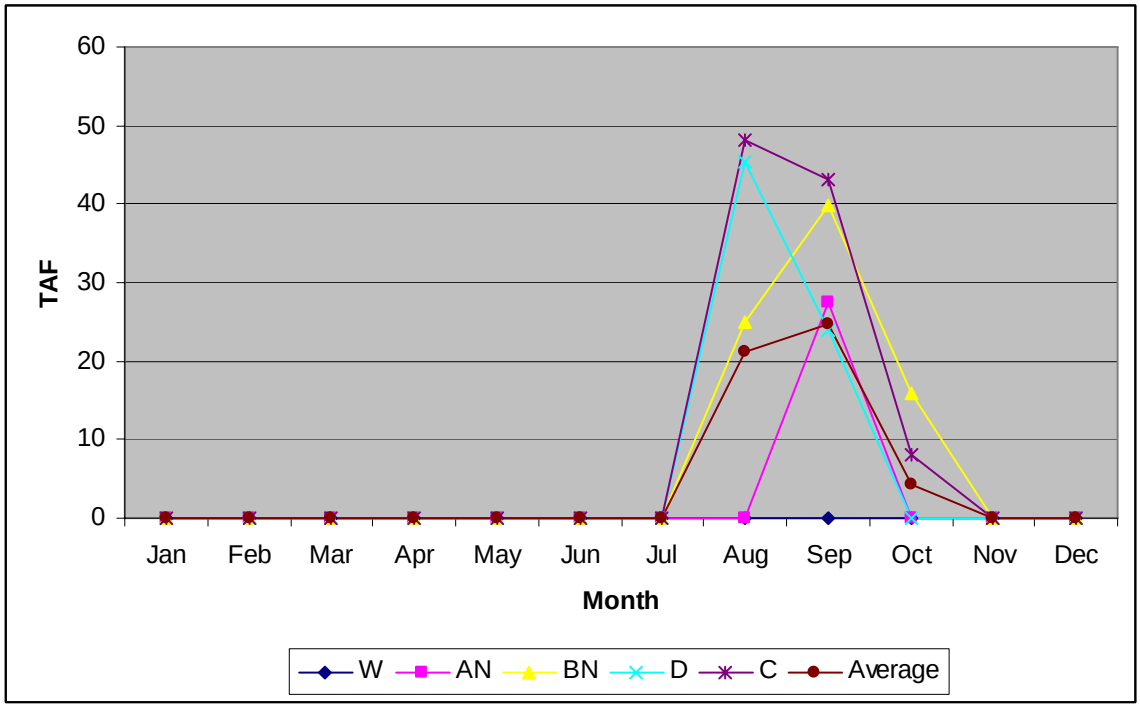
[22] Although unstated, the SWRCB's analysis also had to assume that none of the flow was abandoned.

In Below Normal, Dry and Critical Dry years in August, September and October there was insufficient natural flow from the San Joaquin Valley to satisfy all South Delta water rights. (Id.) In Critical years the deficit would reach nearly 100,000 acre-feet. (*see* Figure I-1, above.)

Table III-5. Additional supply required for South Delta diversion requirement when there is insufficient unimpaired flow. [23]

Year Type	Flow (TAF) Aug	Sept	Oct	Annual Total
W				
AN		28		28
BN	25	40	16	81
D	45	24		69
C	48	43	8	99
Average	21	25	4	50

Figure III-3. Additional supply required for South Delta diversion requirement and the San Joaquin River Flow Objectives when there is insufficient unimpaired flow.



[23] Only months requiring additional supply are depicted.

2. There is Insufficient Natural Flow at All Times for South Delta Water Rights and Instream Beneficial Uses.

The Division of Water Rights analysis excluded instream flow requirements, such as San Joaquin River Flow Objectives for Fish & Wildlife Beneficial Uses, Vernalis Adaptive Management Plan ("VAMP") flows, and water quality dilution flows. The Bay-Delta Plan sets forth minimum flow requirements for the San Joaquin River at Vernalis for fish and wildlife beneficial uses from February through June and in October. (*see* Table III-6, below.)

Table III-6. River flow objectives for Fish & Wildlife beneficial uses required for the San Joaquin River at Vernalis.

Year Type	Time Period	Flow (cfs)	
W,AN	Feb-Apr 14, May 16-Jun	2,130 or 3,420[24]	
BN,D		1,420 or 2,280	
C		710 or 1,140	
All	Apr 15- May 15[25]	VAMP Pulse Flow Targets	
		Existing Flow	Target Flow
		0-1999	2,000
		2,000-3,199	3.200
		3,200-4,449	4,450
		4,450-5,699	5,700
		5,700-6,999	7,000
		> or = 7000	Existing Flow
All	Oct	1,000[26]	

Based on information presented in 1995, the SWRCB concluded that, unlike water quality parameters such as dissolved oxygen, temperature, and toxic chemicals,

[24] The higher flow objective applies when the 2-ppt isohaline (measured as 2.64 mmhos/cm surface salinity) is required to be at or west of Chipps Island. (2006 Bay-Delta Plan, p. 16 fn14.)

[25] Flows from April 15 through May 15 are based on the VAMP. Existing Flow is determined by the San Joaquin River Technical Committee. It is defined as forecasted flows in the San Joaquin River at Vernalis during the pulse flow period that would exist absent the San Joaquin River Agreement or water acquisitions. (2006 Bay-Delta Plan, p. 25 fn. 9.) In some years the VAMP may require higher flows based on hydrologic conditions in the current year and the preceding year. (Id.) The San Joaquin River Technical Committee also determines the exact timing of the VAMP, based on whether salmon migrations begin early or late, the availability of coded-wire tagged hatchery fish, and other factors. (Id.)

[26] Plus up to an additional 28 TAF pulse/attraction flow during all water year types. The amount of additional water will be limited to that amount necessary to provide a monthly average flow of 2,000 cfs. The additional 28 TAF is not required in a critical year following a critical year.

which have threshold levels beyond which adverse impacts to beneficial uses begin occurring, no defined threshold conditions could be used to set objectives for flows and project operations. (2006 Bay-Delta Plan, p11.) Instead, the SWRCB concluded a "continuum of protection" existed wherein higher flows and lower exports provided greater protection for the bulk of estuarine resources up to the limit of unimpaired conditions. (Id.) The SWRCB therefore established objectives based on a subjective determination of the reasonable needs of all the consumptive and non-consumptive demands on the waters of the Delta. (Id.) Since the San Joaquin River Flow Objectives only establish minimum flows from February through June, sufficient unimpaired flow is generally available to satisfy the San Joaquin River Flow Objectives, but the October pulse flow, which must average 2,000 cfs, exceeds unimpaired flow regardless of year type.[27] (*see* Table III-6, above.) As a result, once San Joaquin River flow objectives are satisfied, no flow would ever be available for riparian owners in October.

As unimpaired flows diminish, less flow becomes available for both South Delta riparian owners and the San Joaquin River Flow Objectives. Water released for the San Joaquin River Flow Objectives that has been diverted and stored in previous seasons is released to meet non-consumptive, instream beneficial uses in the Delta. It is not abandoned flow and is not available for diversion and use by riparian owners in the Delta. (SWRCB Cases, *supra* 136 Cal.App.4th at 743.) Much like trying to fill a leaky bucket,

[27] For simplicity, VAMP flows, which occur from about mid-May through mid-April, have not been included, but due to the magnitude of unimpaired flow during the VAMP period the analysis would not change.

riparian owners who continue diverting when stored water is being released for instream beneficial uses harm instream beneficial uses.[28]

3. There is Insufficient Natural Flow from the San Joaquin River at All Times for Junior Appropriators in the South Delta.

The SWRCB also assumed, for the purposes of its analysis in D-1641, that all of the water users in the South Delta had riparian rights and that there were no other upstream riparian owners. (D-1641, p. 33.) Both of the SWRCB's assumptions were incorrect. First, there are upstream water users claiming pre-1914 and riparian rights. (*see* Table III-4, above.) Furthermore, based on Union and Roberts Islands, only a fraction of the South Delta has riparian rights. (*see* III.B.2, p. 43, above.) As a result, the majority of South Delta water users must rely on pre and post-1914 appropriative rights in Dry and Critical years.

2004, a Dry year, and 2007, a Critical year, represented the typical pattern of unimpaired flow, with flow peaking in May, diminishing through June, dropping sharply through July, and then finally turning into a trickle until November. (*see* Figure II-2, above.) In both years, less than 1,500 cfs of flow reached Vernalis on July 15, 2004 and June 21, 2007. (*see* Figure III-4 and Figure III-5.) However, the foregoing analysis presents best case scenarios by assuming that all water would pass the reservoirs and that

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[28] Riparian owners may still harm instream beneficial uses even when stored water is not being released for San Joaquin River Flow Objectives. A riparian owner has no right to any mathematical or specific amount of the water of a stream as against other like owners. (Prather v. Hoberg (1944) 24 Cal.2d 549, 560.) He has only a right in common with the owners to take a proportional share from the stream-a correlative right which he shares reciprocally with the other riparian owners. (Id.) No mathematical rule has been formulated to determine such a right, for what is a reasonable amount varies not only with the circumstances of each case but also varies from year to year and season to season. (Id.) It would therefore be possible for riparian owners on a stream to collectively deprive the stream from enough flow to fully support instream beneficial uses, even if each riparian owner, individually, is putting his or her riparian water to reasonable use, in a reasonable manner, with a reasonable method.

no depletions or evaporations would occur, even though, conveyance losses from Friant due to percolation and uncontrolled diversion would reach 50 percent. (D-1641, p. 83.)

Figure III-4. San Joaquin River unimpaired runoff for 2004 (Dry year).[29]

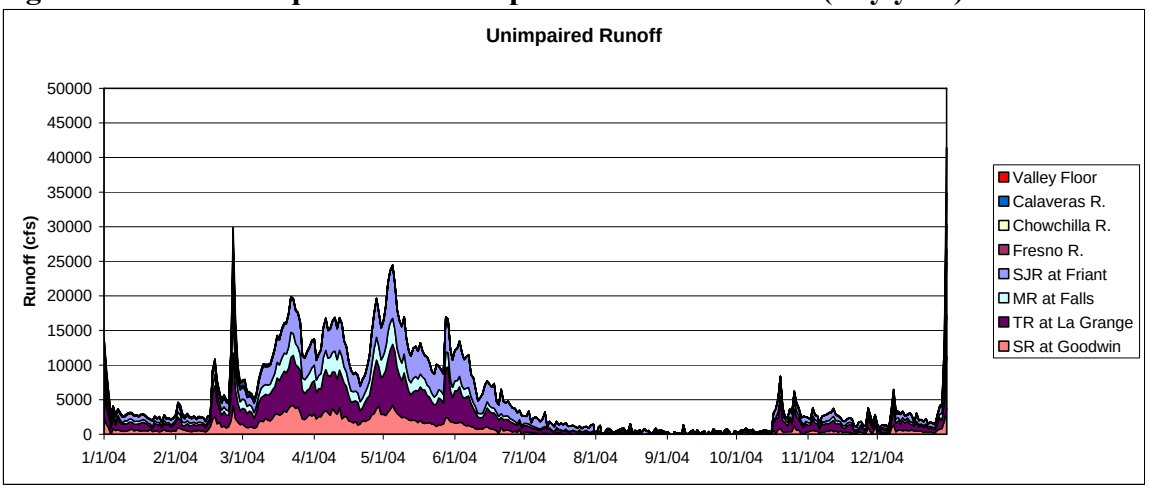
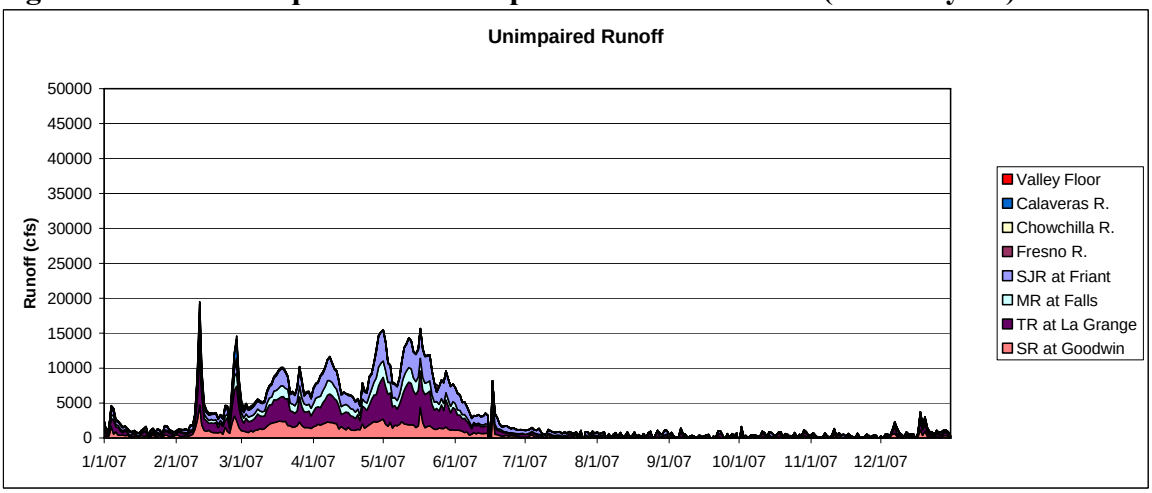


Figure III-5. San Joaquin River unimpaired runoff for 2007 (Critical year).



The analysis also assumes that no depletions due to legal diversions when, to the contrary, there are legal diversions upstream of Vernalis, those of the SJRGA members agencies and others, on the order of nearly 14,000 cfs. (*see* Table III-4, above.) As a

[29] *See* Appendix E, Figure 1.

result, no water would be available for junior appropriators in the South Delta in Dry and Critical years.[30]

IV. ANALYSIS AND RECOMMENDATIONS

A. In Reviewing the Interior South Delta Salinity Objectives the SWRCB Should Consider Whether Agricultural Supply is an Actual, Existing Beneficial Use.

When formulating, adopting, and revisiting water quality objectives the SWRCB and regional boards must adequately consider all relevant factors and demonstrate a rational connection between those factors, the choice made, and the purposes of the enabling statute. (Kucharczyk v. Regents of U. of Cal. (1996) 946 F.Supp. 1419, 1438; *see also* US v. SWRCB, *supra* 182 Cal.App.3d at 113; City of Arcadia v. St. Water Resources Control Bd. (2006) 135 Cal. App.4th 1392, 1408.) The SWRCB and regional boards must also consider past, present, and future beneficial uses of water, environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto, water quality conditions that can reasonably be achieved through the coordinated control of all factors affecting water quality in the area, economic considerations, the need for developing housing in the region, and the need to develop and use recycled water. (Water Code §13241.) Furthermore, since water quality objectives are adopted for "reasonable protection of beneficial uses… in a specific area," the SWRCB and regional boards lack authority to adopt water quality objectives to protect beneficial uses that do not exist. (Water Code §13050(h).)

The Basin Plan lists nearly every beneficial use as an Existing Use for the Sacramento-San Joaquin Delta. (Basin Plan, p. II-8.00.) However, the Basin Plan notes

[30] The SJRGA does not concede that water is available for appropriation in the South Delta in other year types. Furthermore, flow may be available for appropriation, even in Dry and Critical years, if the flow has been abandoned.

that "beneficial uses may vary throughout the Delta and will be evaluated on a case-by-case basis." (Id. n. 8.) As a result, the Basin Plan therefore does not establish Agricultural Supply as an existing use at all times and in all places in the South Delta. When and where there are no rights to divert and use water, Agricultural Supply is not a beneficial use and the SWRCB lacks authority to adopt water quality objectives for Agricultural Supply. In order to act within its authority the SWRCB must therefore establish, based on evidence, that Agricultural Supply is an existing beneficial use at all times and in all places protected by whatever objective it adopts for the purposes of protecting Agricultural Supply beneficial uses. It cannot simply assume Agricultural Supply beneficial uses exist at all times and in all places.

Even if the SWRCB could adopt salinity objectives for South Delta agricultural beneficial uses, even when Agricultural Supply is not a beneficial use in the time or place protected by the objective, use of dilution flow to maintain water quality for irrigated agriculture, even though few water users, if any, could legally divert and use the water, would constitute waste and unreasonable use, prohibited by Article X, §2. **(**Meridian, Ltd., v. S.F. (1939) 13 Cal.2d 424, 447.) Using flow to maintain water quality when and where there is no existing Agricultural Supply beneficial` use and no legal diverters or water users would result in hundreds of thousands of acre-feet of water flowing to the ocean without benefit, constituting waste in its most classic sense. [31] (Id.)

[31] "An accepted definition of the term 'waste', as applied to the use of water, may be said to be: 'To use needlessly or without valuable result; to employ prodigally or without any considerable return or effect, and to use without serving a purpose.' The term is necessarily relative. As denounced by the amendment of 1928, it was the use of water by a riparian owner under an asserted, and theretofore protected right to compel the waters of the stream, without any benefit to himself, to flow to a lower level and on to the sea when otherwise a beneficial use could be made of the same." **(**Meridian, Ltd., v. S.F. (1939) 13 Cal.2d 424, 447.)

D-1641 does not require the CVP and SWP to use flow to implement the South Delta Water Quality Objectives for Agricultural Beneficial Uses. However, it does not exclude them from liability if violations of the Delta Water Quality Objectives for Agricultural Beneficial Uses occur if using flow would have constituted a waste and unreasonable use of water and doing so would have prevented the violations from occurring. (D-1641, p. 159-162.)

Even if water users could legally divert and use water, Agricultural Supply would only exist as a beneficial use to the degree water can be diverted and used for agricultural purposes. Since the SWRCB must consider the needs of all beneficial uses, it must also consider the need to keep limited water resources available for all beneficial uses. (Water Code §13241; U.S. v. SWRCB, *supra* 182 Cal.App.3d at 144.) Under its Interim Plan of Operations, the CVP allocates from 70 TAF to 250 TAF for water quality control purposes. (D-1641, p. 80.) However, riparian owners on Union and Roberts Island whose rights are not suspect only irrigate 6,568 acres, less than 15 percent of the irrigable acreage. (*see* Table III-2, above.) Appropriators with pre-1914 claims only divert 65 cfs, a total of 10,051 acre-feet. (Id.) In a Critical year using 250 TAF for water quality control would mean using at least 25 acre-feet for every acre-foot diverted.

By comparison, in the 1978 Delta Plan, the SWRCB eliminated the 150 mg/l chloride standard at Antioch, in part because doing so would require at least 22 acre-feet of outflow for every acre-foot diverted. (1978 Delta Plan, p. VI-25.) Finding the waste associated with protecting industrial use of Delta water at Antioch would be unreasonable, the SWRCB was not only fully authorized to eliminate the burdensome Antioch standard from the Plan, but in light of Article X, §2, it also had "little choice" to

do otherwise. (U.S. v. SWRCB, *supra* 182 Cal.App.3d at 144.) The SWRCB would similarly have little choice but to eliminate (or at least revise) the South Delta Water Quality Objectives for Agricultural Beneficial Uses if it finds that the waste of the necessary dilution flows would constitute an unreasonable use of water.

Although the SWRCB also decided to eliminate the Antioch standard since all principal water users in the vicinity of Antioch had secured a substitute supply, the SDWA's failure thus far to secure a contract with the Projects is not relevant in the setting of water quality objectives. (Id.) Since the SWRCB was not required to protect water rights when it established the objectives in the 1978 Delta Plan, it could have eliminated the Antioch standard regardless of whether the principal water users in the vicinity of Antioch had secured a substitute supply. (U.S. v. SWRCB, *supra* 182 Cal.App.3d at 144.)

In reviewing the South Delta Water Quality Objectives for Agricultural Beneficial Uses, the SWRCB must first show that Agricultural Supply beneficial uses exist in the South Delta based on the existing water rights. Even assuming such rights exist, if the program of implementation would result in waste and unreasonable use of water, the objectives must either be revised or eliminated altogether.

B. The Water Rights Division Should Enforce Water Rights in the South Delta.

Under Water Code §1825, it is the intent of the Legislature that the state should take "vigorous" action to enforce the terms and conditions of permits, licenses, certifications, and registrations to appropriate water, to enforce SWRCB orders and decisions, and to prevent the unlawful diversion of water. As recognized by the Water

Rights Division in its draft *Strategic Workplan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary*:

> Increasing demands on water from the Bay-Delta and its tributaries, the effects of climate change, and mounting environmental concerns have intensified the need for the State Water Board to vigorously enforce water right requirements to ensure that sufficient flows are available to meet water quality objectives and to prevent DWR's, USBR's, and other water right holders' developed water supplies from being adversely affected by unauthorized diversions. The identification and curtailment of unauthorized diversions will contribute to the protection of beneficial uses in the Bay-Delta watershed, and will ensure the efficient allocation of water resources.

(*June 2008 Draft Strategic Workplan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary* ("*Bay-Delta Strategic Workplan*") (St. Water Resources Control Bd., June, 2008), p. 80.)

Illegal diversion and use of water harms everyone in the watershed, because it deprives other legal users and other beneficial uses of adequate supply. The SWRCB, however, has yet to even develop a policy for water rights enforcement. Although the SWRCB has taken enforcement action against illegal diverters, most notably in the *Term 91 Hearings*, such efforts have been time consuming and expensive. (*In the Matter of Administrative Civil Liability Complaints for Violations of Licenses 13444 and 13274 of Lloyd L. Phelps, Jr.; License 13194 of Joey P. Ratto, Jr.; License 13315 of Ronald D. Conn and Ron Silva, et al.* (Water Right Order No. 2004-0004) (St. Water Resources Control Bd., Feb. 19, 2004).)

Fortunately, the Water Rights Division can focus its resources by starting with questionable diversions. There are many undocumented diversions in the Delta that warrant investigating. (*Bay-Delta Strategic Workplan*, p. 82.) Furthermore, licensees

have filed reports claiming diversion and use of water outside the authorized season of use.[32]

Questionable claims should also be verified. A review of all of the statements, permits, and licenses for Union and Roberts Island showed that 36 water users claimed riparian rights, but fewer than half, only 15, could potentially claim a valid riparian right. (*see* Table IV-1, below.) All water users claiming pre-1914 rights also claimed riparian rights, but pre-1914 rights could not be verified.

[32] In obtaining information regarding South Delta water rights, several reports were observed claiming diversion and use of water outside the licensed season of use.

Table IV-1. Summary of riparian and pre-1914 water right claims on Union and Roberts Island.[33]

Application/ Statement	Diverter	Diversion	Island	Riparian	Pre-1914 Claim
S000137	Robert G. Ohm	San Joaquin R.	Roberts	Insufficient information provided	1913
S001027	Krohn Family Trust	Old R.	Union	Yes	
S002888	Donald Zeller	San Joaquin R.	Roberts	Yes	
S003109	Donald Zeller	Middle R.	Roberts	Partial	
S006506	Grupe Operating Company	San Joaquin R.	Roberts	Insufficient information provided	
S009020	Newt Robinson	San Joaquin R.	Roberts	Severed	
S009021	Newt Robinson	Middle R.	Roberts	Severed	
S009022	Newt Robinson	Middle R.	Roberts	Yes	
S009023	Newt Robinson	Middle R.	Roberts	Yes	
A003701	Theodore Witt	San Joaquin R.	Roberts	Subdivided	
A004161	Cerri & Son, a Partnership	Old R.	Roberts	Yes	
A004275	Philip F. Fleisig	Fabian & Bell Canal, Old R.	Union	Severed	
A004276	Ralph D. Grunauer, Jr.	Old R.	Union	Subdivided	
A004429	Arnaudo Bros.	Old R.	Union	Subdivided	
A004432	Jal Farms, Inc.	Old R., Grant Line Canal	Union	Yes	1899
A004452	Yamada Brothers	Middle R., Grant Line Canal	Union	Yes	1899
A004520	Ivan Cerri	San Joaquin R.	Roberts	Yes	
A004537	Alan Giovannoni	Burns Cutoff	Roberts	Subdivided	
A004562	Rudy M. Mussi	San Joaquin R.	Roberts	Severed	1907
A004820	Ivan Cerri	Old R.	Roberts	Yes	
A005120	Jack Klein Trust Partnership	Middle R.	Union	Yes	1913
A005121	Eddie Vierra Farms LLC	Burns Cutoff	Roberts	Severed	
A005201	Main Stone Corporation	Old R.	Union	Yes	
A010113	Gloria A. Bacchetti	Old R.	Union	Subdivided	
A010233	Melvin Muela	Middle R.	Roberts	Yes	
A011412	Albert Muller	Old R.	Roberts	Yes	
A011847	Union Mutual Water Company, Inc.	Grant Line Canal	Union	Subdivided, diversion from artificial waterway	
A012239	Arnaudo Brothers, a Partnership	Old R.	Union	Yes	
A013177	Glenn W. Saunders	San Joaquin R.	Roberts	Yes	
A014022	Augusta Bixler Farms	Grant Line Canal	Union	Diversion from artificial waterway.	
A014023	FRE 288 LLC	Middle R.	Union	Subdivided	
A017475	Kathy K. Logemann Revocable Trust 9/2/92	Whiskey Slough	Roberts	Subdivided, diversion from artificial waterway.	1913
A017592	Louis & Beverly C. Vierra Revocable Trust 2/6/57	Whiskey Slough	Roberts	Diversion from artificial waterway.	1907
A020957	Lloyd L. Phelps & Thelma B. Phelps Family Trust Dated 5/13/92	San Joaquin R.	Roberts	Severed. *See* WRO 2004-0004	
A021162	Lloyd L. Phelps & Thelma B. Phelps Family Trust Dated 5/13/92	San Joaquin R.	Roberts	Severed. S*ee* WRO 2004-0004	
A022598	Joey R. Ratto, Jr.	Middle R.	Roberts	Severed. S*ee* WRO 2004-0004	

[33] For additional information regarding specific water rights, see the water rights tables in Appendix A.

A quarter of the water users on Union and Roberts Island, a total of nine, diverted under statements of diversion, but provided very limited information. Two (S006506 and S000137) stated a total amount of acre-feet diverted each season. Other statements claimed a maximum pumping capacity, ranging from 4,000 gpm (8.9 cfs) to 17,000 gpm (37.9 cfs). None of the statements provided a map showing place of use. Five provided the assessor parcel number, as requested on the form, but two merely described the place of use relative to road intersections and two others provided no place of use information at all. Where a place of use was provided, more than half the rights claimed no longer existed, because the land was either severed from contiguity with a natural watercourse by Swamp & Overflow Act Certificates of Purchase or subsequently severed through subdivision and sale. Others claimed riparian rights, but diverted from artificial watercourses. For such water users claiming supplemental rights, either riparian or pre-1914, the Water Rights Division should request the additional information necessary to verify the existence of such rights. If, after sufficient notice, the water user fails to respond, that right should be deemed waived.

Verifying South Delta water rights and eliminating illegal diversion and use, despite the challenges, would provide significant benefits, especially in Dry and Critical years. On Union and Roberts Island alone, unverified and suspect water rights amount to *252,654 acre-feet per year*. In a 180-day irrigation season this would average a rate of diversion of approximately 700 cfs, more than the late summer unimpaired flows (August-September) in Dry and Critical years and more than September unimpaired flows even in Above Normal years. The potential magnitude of illegal diversions is also a

problem every October, regardless of year type, due to the increased flow necessary to meet the pulse flow objective.

As the competition among competing uses becomes fiercer and many uses demanding even more supply, present conditions, analogous to attempting to fill a leaky bucket, cannot continue. Nearly 30 years ago, the SWRCB told the Projects and the SDWA that if no agreement were reached, it would examine in detail southern Delta water rights, determine the causes and sources of any encroachment, and take appropriate action." (D-1485, p. 11.) To date, no such action has occurred. The inaction cannot continue.

V. Conclusion

We hope the information presented in this initial report aids the SWRCB and staff. The water rights priority system is the foundation of California water law. We support the SWRCB in tackling this issue that festered for so long.

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