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7/1-2/14 BOARD MEETING AGENDA ITEM 5
CURTAILMENT OF DIVERSIONS TO PROTECT SENIOR WATER RIGHTS

The SDWA joins in the comments of RDC Farms, the Del Carlo Family, Woods Irrigation Company and Central Delta Water Agency. To save time, we will only briefly mention some of those issues covered by those parties.

The Proposed Regulation is a Radical Unwarranted Departure from Existing Practice.

No senior water rights holders have complained to the Board asking that the Board go farther to protect their interests. In addition, the state and federal fishery agencies have not come to the Board asking for further emergency action to prevent imminent harm to fish and wildlife.

Despite this apparent success in managing a difficult situation, Board staff now asks this Board to relinquish all of its authority to staff to make further curtailment orders to senior water rights in a manner that (1) is unprecedented, (2) deprives

property owners of all due process of law and (3) removes all procedural safeguards otherwise available if the Board itself were to take the curtailment action.

The Proposed Regulation Deprives Curtailed Diverters of Due Process

The proposed regulation issues the order to stop diverting first, and then provides that the effected party can (1) petition for reconsideration (which can take 90 days), or (2) wait until an administrative civil liability is imposed to have an opportunity to contest the penalties. The diverter cannot immediately appeal to Court after issuance of a curtailment order by the Deputy Director.[1] In either case, the diverter is deprived of due process. This deprivation is particularly extreme in the case of irrigated agriculture because the irrigation season will be over before any petition for reconsideration or appeal to a Court could be had.

The Proposed Regulation is and Unlawful Delegation of Authority Because it removes All Procedural Safeguards.

As explained by the other commentators, if the Deputy Director is allowed to issue curtailment orders, as set forth in the proposed regulation, effected diverters will have not meaningful recourse if the orders are unlawful or unsubstantiated. They cannot obtain immediate relief from this Board or from a Court of law – which unlawfully impedes the separation of powers doctrine.

Absent a Complaint from a Prior Right Holder, a Premature Curtailment Order Will Violate the Rule of Priority and Effectuate an Unconstitutional Taking of Private Property.

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[1] Water Code section

The proposed regulations would allow the Deputy Director to issue curtailment orders prior to any complaints from senior right holders. We suspect that staff want this authority so that they can curtail senior water rights and leave water in the system for environmental purposes.

The state has the power to take private property for public purposes – provided it pays fair compensation. What it cannot do, is effectuate a taking of private property through back-door regulation.

As proposed, the regulation would allow staff to abuse their discretion and effectuate these unlawful takings. It is imperative that this Board retain the necessary procedural safeguards to ensure that the finding of unreasonable use or no water available for diversion is made only after a proper evidentiary hearing.

The Unique Conditions and Protections in the Delta Preclude any Finding That Water is Unavailable.

1. Diversions Are Always Possible in the Delta

The Delta always has water. This fact is apparent on its face but for the record needs clarification. Since the Delta channel bottoms are generally below sea level and the Delta is connected to the ocean the channels always have water. Being below sea level, water cannot flow "uphill" to the ocean and so water always remains in the channels. The evidence of the is not subject to dispute. Attached hereto are excerpts from the 1980 Report on the Effects of the CVP coauthored by SDWA and USBR (though it was briefly re-named at the time). The excerpts include text and graphs showing historic channel surveys which indicate that channel bottoms are well below the low tide level. Being below the low tide level means that (absent artificial impacts like export pumps) the channel water will not get any lower. In addition to this attached is the declaration of Chris Neudeck PE who recently took additional soundings/measurements of certain locations in the southern Delta to confirm the continuance of this "channel bottom still below low tide" fact. Of course depending on where one is, the depth of the water in any channel is dependent on many factors, but in general, there is always water in the channels.

The proposed regulations would allow the SWRCB staff to worsen in-Delta diverters' ability to divert when compared to "natural" conditions. As has been noticed many times before, under historical conditions ocean salts slowly intruded during times of drought/low inflow to the Delta. The "worst" intrusions are shown on one attached hereto which is a map with such intrusions indicated by lines of maximum extent. As can be seen by this map, the 1000 parts or chloride was considered the level at which crops could not be irrigated due to the salinity of the applied (in-channel) water. The map shows us that these intrusions all occurred at the very end

of the typical growing season. This means that a farmer could anticipate when he could no longer irrigate and plan accordingly. In the case of the south Delta, we see that occurred once, and it was in the later part of September; generally when irrigations would end anyway.

Also attached is a portion of an "offer for sale" document dated 1939 regarding a large farm on Roberts Island being sold by the estate of the previous landowner. AS can be seen from this document, diverters on and east end of Grant Line Canal were never faced with the need to cease diversions due to intruding ocean salts. Thus, although water quality certainly got steadily worse during drought times, significant portions of the area were never prevent fro diverting due to quality. This is of course not to say that poor quality water did not affect crop yields. For other areas farther downstream in the Delta, the instances when water quality became "toxic" depends on the distance inland and of course the crops grown and the decisions of the individual farmer.

In direct conflict with this historic ability to divert in drought years and during the necessary times for crop needs, the regulation will allow the SWRCG staff to shut off farmers who could have diverted even in the worst drought year on record (1931). This year turned out to be better than 1931, thus there is no basis for depriving a party who could divert when the projects were not operating in order to protect those projects' storage. The regulations propose to make local diverters worse off. Such actions are contrary to numerous laws.

2. Delta Use is Less Than Natural Use and Delta Agriculture improves Channel Quality

The farming operations in the Delta are a benefit to Delta water quality. As per the Investigation of the Sacramento-San Joaquin Delta Report #4 Quantity and Quality of Water Applied to and Drained From the Delta Lowlands, dated July 1956, the Delta lands "temporarily" stored the salts from the applied water in the soils during summer, or the main agricultural months resulting in a better water quality at the export pumps. This salt due, to the mechanics of the interaction between ground water and surface water and agricultural practices later re-enters the surface water at times when quality is not of concern. As the Report states:

> The Delta Lowlands act as a salt reservoir, storing salts obtained largely from the channels during the summer, when water quality in such channels is most critical and returning such accumulated salts to the channels during the winter when water quality there is least important. Therefore agricultural practices in that area enhanced rather then degraded the good quality Sacramento water enroute to the [export pumps]. Report at page 30. It is important to note here that the salts involved here include those which are present in the system due to the operation of the CVP, which delivers upwards of a million tons of salt to its service area in the San Joaquin Valley causing hundreds of thousands of tons to drain to the Delta in high concentrations. The same CVP which operates the Shasta dam and reservoir.]

In addition to this improvement in water quality, and even more importantly, the use of water by agriculture in the Delta ***saves*** water. Per U.C. Davis data attached hereto natural habitat including riparian lands/plans and open water lose more water from evapotranspiration or evaporation than do the various crops grown in the Delta. "Shutting down" in-Delta riparians and pre-1914 users means there is no incentive (and there is an economic incentive to the contrary) to maintain the land or the drain pumps. Failure to maintain the land means that natural vegetation, including weeds and riparian plants will quickly proliferate which will result in a greater consumption of water that the planned for agriculture. Not operating the drain pumps means that in many areas the ground water will rise above the surface. This promotes the growth of natural riparian plants and creates large open water areas; both of which will consume more water than the agriculture. In those areas the ground water will not rise above the land surface, it will rise higher than it is now, and also promote weed and riparian plant growth which will again consume more water than the agriculture.

Therefore, a curtailment order to in-Delta water users will have the opposite effect as intended; there will be no saving of water in Shasta, there will be an increased loss. Although the SWRCB may want to make a point about its incorrect position on the use of stored water by some parties, shutting off Delta diverters would be a futile act.

Use less water that natural condition which will result in shut down

3. The Projects Already Make Releases for in-Delta Use

The proposed regulations address an issue that does not exist. As the SWRCB knows, the "operation" of the Delta by DWR and USBR includes a calculation of the net depletion of Delta water due to in-Delta agriculture (http://www.water.ca.gov/swp/operationscontrol/deltaops.cfm). The projects have done this sort of calculation for at least the last 30 years. During that time, California has experienced a number of short and long term droughts. Neither DWR or USBR have complained about Delta diverters taking water during any hydrologic condition, except for a lawsuit filed by DWR at the time of the 1976-77 drought, which lawsuit was later dismissed by DWR. The USBR has never once complained about in-Delta diversions. To the contrary, both DWR and USBR include the provision of water for in-Delta use as part of their short and long term planning.

The reason for this lack of dispute is revealed in the long history of the development of the projects. Also attached is a brief summary of the efforts among the parties to resolve the issue of who is entitled to what water and when, and what are the obligations of the projects. After the time frame covered in that summary, the Declaration of John Herrick (attached hereto) provides the remainder of that history. As the Board can see, the parties understood a number of things from the very beginning. First, they knew that the issue was not one of supply, but one of quality. Since the Delta always has water, the question is "should additional water be provided to protect Delta diversions." Because a fight over water rights and obligations to protect quality

was deemed counter-productive and an unnecessary expense, the parties attempted to reach agreements, and did so sometimes. The "final" word as of today is evidenced by the projects' complete and continuous allocation of water for in-Delta consumptive use. That is to say, they have acted for the past 30 years in a manner that suggests they have accepted the obligation of providing a supply (via the maintenance of water quality protection) for in-Delta consumptive use. The reasoning and justifications for such an acceptance of that obligation are set forth at various places herein. However, it is relevant to question why the SWRCB is now contemplating stopping the projects from continuing to provide this supply when the projects have not, are not, and are not planning to make such an objection.

If DWR and USBR believe the continued use of water in the Delta by local diverters is somehow a trespass on their stored water, they are free to bring legal action, including a complaint with the SWRCB. Until such time as they do, there is no reason for the SWRCB to insert itself into the middle of a non-argument.

4. Payment for Use of Stored Water

It is the position of Staff and the exporters that in-Delta users must pay for the water needed to protect the Delta from salinity intrusion or poor quality San Joaquin River flows, and for water consumed in the Delta by in-Delta diverters when natural flow is insufficient to meet those in-Delta demands. This position falls apart under scrutiny. If in-Delta diverters must pay for the water released to maintain quality standards, and, cannot divert any such water when the "natural flow" is insufficient to meet in-Delta demands, then the projects' obligations to meet Delta water quality standards are only conditional. That is to say such obligations only exist when the natural flow is ***sufficient*** to either provide a supply or to maintain water quality. Obviously, this position is and cannot be. The water quality standards adopted by the SWRCB and applied to the projects are not conditional; they are not effective only under certain conditions, and the projects themselves do not operate so. Regardless of the amount of water flowing in the San Joaquin River, the projects must meet the Vernalis and other standards and do so by releasing stored water. Any use by downstream diverters under such conditions cannot be wrongful simply because stored water is in the system. Similarly, the projects' obligation to meet outflow and the Western Delta Agricultural (and other) standards is not an obligation only when surplus flow (and not stored water) is available. If it were, then water released to protect agricultural interests in the Delta during times of drought would be protecting no beneficial interest; in effect standards to protect nothing. This would also mean the obligations on the projects rarely if ever occur except when surplus water is available to meet such obligations. The thousands of pages of modeling results supporting D-1641 indicate otherwise. Nothing in D-1641 even remotely suggests that meeting standards in order to protect beneficial uses (the purpose of the underlying Water Quality Control Plan) is only required if there is sufficient surplus flow for the purpose or if some party pay for the stored water needed when surplus flow is absent. In fact, D-16141 states:

6.3.4.2.4 Protection of Salinity in the Southern Delta

> Notwithstanding the unavailability of water to satisfy existing water rights in the southern Delta during certain periods, the SWRCB has determined that protection of agriculture in the southern Delta is in the public interest. Water quality objectives have been set for this purpose, and the USBR is responsible for meeting the Vernalis salinity objective. The months in which the southern Delta water users' needs exceed their rights to water under riparian claims are the same months in which water quality violations tend to occur. Consequently, the southern Delta agricultural uses should not be deprived of water of useable quality as a result of this decision. However, the SWRCB urges the SDWA to seek water supply contracts to fill its water supply needs during water shortages. These shortages occur relatively frequently because of natural changes in the water supply.

As indicated in this quote, the SWRCB incorrectly analyzed the "supply" issue for the southern Delta as being solely dependent on San Joaquin River flows. This assumption is refuted herein and by the fact that the SWRCB anticipates shutting down southern Delta diverters to protect Shasta releases. If the southern Delta supply was solely dependent on San Joaquin River flows, then shutting them down would have njo effect on the amount of Shasta water needed to repulse ocean salinity and meet other Delta obligations.]

Thus, the SWRCB has already addressed this issue and in effect found that the water needed to protect water quality must be released notwithstanding any argument about available supply. The various statutes, regulations and permit conditions referenced herein are for the purpose of identifying the needed protections, ands assigning responsibility for meeting those protections. The Bureau and DWR are not obligated to meet outflow, and agricultural salinity standards regardless of the availability of natural flow and regardless of the amount of water consumed in the Delta by parties who always have a supply and who are supposed to be provided supply and quality protections.

5. *Butte Canal* and the Comingling of Water

As referenced and discussed in CDWA's comments, the issue of diverting water when one party has "freshened" the stream by adding "non-natural" water is directly answered in the Butte Canal & Ditch v. Vaughn, 11 Cal. 143 case. That case stands for the proposition that one who freshens a stream by adding water cannot deprive others from diverting from that stream if they could have diverted in the absence of the added water. The court held, and appropriately so that any benefit from comingled water is a result of ***adding*** the water which the original diverters had no control over. The decision is the only one possible; otherwise the simple act of adding water to a stream could prevent all the prior users' ability to divert.

The draft emergency regulations are stated to be for the protection of senior water right holders and to prevent the illegal diversion of stored water. At this time, no significant demands by senior right holders are the subject of any complaint before the Board. In addition, the unspoken illegal diversions include only in-Delta diversions, which are not illegal. The provision of water to those parties is mandated by both law and regulation. The actual reason for the regulations is to protect storage in Shasta reservoir for future needs by fish and wild life. However, the record for the adoption of the regulations contains no information on how much water is needed for what purpose and when; topics which should be the subject of evidentiary hearing conducted by the Board. SDWA opposes the regulations.

6. The Projects Refuse to Give SDWA a Contract

SDWA's long and torturous history of trying to negotiate a contract with DWR and USBR is one difficult to believe. After years of discussions and a law suit to force USBR to the table, SDWA, DWR and USBR developed a draft contract which addressed many of the issues associated with the projects impacts on the southern Delta. That the negotiating parties from DWR, USBR and SDWA signed documents encouraging their superiors to officially sign the contract. At the time, the parties were operating as if the contract was in effect, but abruptly the USBR declined further participation and walked away. Although DWR and SDWA continued to work on solutions to southern Delta problems, DWR declined to enter into any contract without the USBR being a party.

Just under 20 years later and after two other failed attempts to re-start the negotiations, SDWA again tried to get DWR to the table. The topic was one of supply, with the more complicated issue of salinity being deferred. SDWA suggested that since the projects already operate to provide a supply (an amount equal to the estimated consumptive use by in-Delta diversions) a supply contract by DWR (and/or USBR) would have no effect on project operations. That is because if you already make releases to cover outflow, export and in-Delta supply, providing in-Delta supply would not affect what you already do. SDWA even speculated that such a supply contract might have a drought exclusion depending on how the projects intended to operate during such times.

The response from DWR was two years of correspondence in which DWR denied reality. DWR's official position was that the projects did NOT make releases to cover in-Delta consumptive use and that releases from the Sacramento system could not supply the south Delta with water. Both of these assertions are of course demonstratively false. The attached declaration by John Herrick gives a more complete discussion of this. We know that per the DWR operations information at http://www.water.ca.gov/swp/operationscontrol/deltaops.cfm the projects do indeed have an input for in-Delta consumptive use and thus adjust reservoir releases to cover this amount. We also know from the proposed regulations that the SWRCB now believes that consuming water in the south Delta affects reservoir releases and thus means southern Delta channels do receive Sacramento system water.

Regardless, the importance of this is twofold. First, the incorrect and factually incorrect positions of DWR have prevented SDWA from obtaining a supply or water quality contract from DWR, while USBR's simple refusal to even talk prevents any such contract from that agency. Recall that NDWA has a contract which guarantees water quality while recognizing supply is really not an issue. Second,. The projects have for many years operated to indeed provide for in-Delta consumptive use (via maintaining sufficient outflow) and have made no objection to such consumptive use even during the most recent droughts. Given this, there is no basis for the SWRCB to take a position to endorse the projects failure to enter into contract with SDWA, and certainly no basis for denying Delta diverters the benefits of the projects actions.

7. SWRCB Calculations of Available Water are Unreliable

The SWRCB's method of calculating the available supply is too coarse for use in determining what water right holders might be ordered to cease diversion. As stated to staff many times, the intricacies of surface and subsurface inflows to the various stream remain unknown. Although various models and gauge measurements can give a general idea of available water, the failure ot identify the source of such flows prevents a determination of which right holders have a supply and which may not. If the SWRCB concludes that unknown surface return flows are the source of water measured at Vernalis, that might indicate pre-1914 right holders have a supply but riparians do not. Conversely, if the supply as measuired at Vernalis is from subsurface accretions, it might mean that riparians and not pre-1914 right holders have a supply. Thus, without and better inquiry, we are unable to know which right holder has a supply and which does not. Although the drought emergency suggests to the SWRCB it must act, that urgency does not authorize or excuse the necessary factual determination underlying water rights.

Important to this issue is the fact that the SWRCB has delayed addressing this issue. Although the projects are glaringly guilty for not having planned on meeting minimum permit conditions during a two year drought, the SWRCB is equally guilty for not having undertaken any actions until this very last minute. Although hindsight is 20/20, there is little doubt that after last spring the system would be sorely tested absent fall and winter rainfall. It was incumbent upon the SWRCB to begin the examination of the issues at least last fall rather than wait until the last minute. The TUCP was submitted at the last minute and the permit terms of the projects changed at the last minute. Subsequent and numerous changes to the TUCP Order were again, and over changed each time a new standard kicked in, or conditions changed slightly; last minute after last minute. Rather than hold a number of evidentiary hearing where parties could present evidence on supply, use or resolutions, the SWRCB decided to not seek public and right holder input. No hearing have been held, except non-evidentiary ones.

In light of this failure to act promptly and allow each and every right holder to present evidence or test others evidence (including the SWRCB staff evidence and process) the SWRCB should not make any factual determinations about available supply. Such an approach is a

double hit on the right holders and deprives them of their due process. Convenience and monetary savings on the part of the SWRCB does not substitute for due process.

8. Protection of senior rights

As argued before, SDWA believes the current proposal, like the various TUCP Orders is a wrongful violation of the rules of water rights priority. The projects are specifically obligated to meet various obligations, including ocean salinity repulsion, agricultural water quality protection, fishery flow protection, supply protection for in-Delta uses. The subject regulations, like the TUCP Orders before them are simply a method by which the projects are relieved from their obligations while superior rights holders are given those obligations. When project stored water is protected from the burden of project obligations it means that all other right holders must make up the shortage. Thus, rather than have the projects meet their obligation to repulse the ocean salinity, in-Delta riparians must now give up their rights to help supply that repulsion amount.

As previously stated in comments on the TUCP Orders, the projects have exported at least one million acre feet of water since last September. Much of that water went to San Luis reservoir. The permits to operate San Luis by DWR and USBR are No.'s 16482 and 15764, respectively. Each of these are burdened with meeting virtually all the D-1641 water quality objectives including outflow and agricultural standards (see pages 146, 149, 155, and 159 of D-1641. This means that any and all water in San Luis reservoir is susceptible to release to meet outflow, ocean salinity repulsion, southern Delta water quality standards (salinity) and other standards. To protect all of the beneficial uses in the Delta, the SWRCB could easily require that the San Luis water be released into the San Joaquin River to help meet both the salinity standards in the southern Delta and to protect the Delta as a whole from the threat of ocean salinity intrusion. Such actions would protect storage in Shasta for future needs and meet the quality and supply mandates contained in Water Code Section 12202. Much of that rerleased water could be re-exported as available.

The USBR has done this "recirculation" of water at least four times in the last 30 years under "emergency" conditions and could certainly do so this year. Should the Bureau or DWR insist on any party paying for this "added" water or the use thereof, they could certainly seek such reimbursement. Whether or not such reimbursement is sought should of no consequence to the SWRCB.

9. Laws Supporting Project Obligations to Provide Water.

We refer to and adopt the CDWA's comments especially with regard to this topic.

10. Protecting Riparian Rights

The underlying issue to the draft emergency regulations is of course the control of diversions in order to protect the water supply for future use by beneficial needs, specifically fish and wildlife needs. The SWRCB has already notified all post-1914 right holders to curtail all diversions based on it calculation that there is no available water for diversion under those appropriative rights. The SWRCB has also indicated that it is considering notifying other water right holders that they too must curtail diversions due to a lack of available water. For a number of months the SWRCB webpage has indicated that some "junior" pre-1914 right holders might be so curtailed, and the possibility of other pre-1914 and riparian right holders similarly curtailed.

However, the SWRCB has also indicated that "settlement contractors" and those North Delta diverters covered by the NDWA contract with DWR would be allowed to continue diversions of stored water; the SWRCB somehow determining that stored water provided under contracts to "superior right holders" was appropriate. The SWRCB indicated that the protection of these superior right holders trumps any other current need or future fishery needs.

As explained below, the SWRCB is choosing to protect some parties with riparian claims who may not have a water supply under "natural conditions" while shutting down parties with riparian claims who would have a supply under "natural conditions."

The Delta always has water. This undeniable fact is evidence by numerous sources attached hereto and all parties. Because the various channels in Primary Zone of the Delta are below the low tide level, the ocean acts as either a backstop to water flowing into the Delta, or in the absence of such flow, actually contributes to the Delta Pool. Of course, under the numerous possible scenarios of inflow and tides, at any particular time, the Delta Pool consists of varying quantities of current inflow, previous inflow and ocean water. To our knowledge this condition is and cannot be disputed by any party, and is recognized in the attached sources, not the least of which is the language in the NDWA contract with DWR.

There is of course additional discussion on this issue (dealt with below) in which various parties, including the SWRCB staff argue that as the water in the Delta gets worse due to the increasing amount of ocean water (under low inflow times) the riparian right to divert is somehow decreased or adversely affected. However, no legal support for this position has ever been presented. The SWRCB staff also argues that when previously stored water begins replacing the Delta Pool water from current and previous inflow, then too in-Delta riparian rights are decreased or adversely affected.

Regardless of these arguments (dealt with below) the point is clear; the Delta always has water to divert notwithstanding the quality therein.

Hence, under "natural conditions" in-Delta riparian claimants can always divert. In the instance case, in-Delta diverters could divert regardless of any inflow to the Delta. Contrarily, under "natural conditions" settlement contractors who claim riparian rights would only be able to divert to the extent that water was in the stream or river to which they are riparian. If water were present in such rivers or streams, riparians along those rivers or streams would have to share in any shortage with all other riparians (absent some additional argument about when the riparian rights of the various parties arose). In our current situation, the SWRCB calculations about the available "natural flow" indicate that either now, or in a very short time from now, there will either be insufficient water for riparains on streams upstream of the Delta, or actually no water at all.

However, those upstream settlement contractors will be allowed to divert because they have a contract with either DWR or USBR. These settlement contractors include both those on the Sacramento River and its tributaries and the San Joaquin River and its tributaries. The settlement contracts of these parties were entered into sometime after or during the time frame when the projects' large dam/reservoir projects were being contemplated.

Similar efforts at securing such contracts were undertaken a number of times by in-Delta interests (see attached) but those efforts failed. In the case of the SDWA, the efforts failed specifically due to the USBR ending negotiations and the DWR's repeated efforts to frustrate any further negotiations. For example, the most recent effort by SDWA to negotiate a contract with DWR (the fourth such effort since 1980) revolved around DWR insisting for nearly two years that the projects do not make any allowance for in-Delta diversions/consumptive use in DWR and USBR Delta operations. This absurdity is evidenced by a simply examination of DWR operations webpage which daily indicates the amount of water that Agency calculates as removed from the Delta by local diversion.

In addition to the Delta Water Agencies attempting to negotiate both supply and water quality contracts, they assert that the language of various statutes mandates the projects provide both the quantity and quality of water needed for in-Delta consumptive use. For example, Water Code Section 12202 states:

> Among the functions of the (State Water Project), in coordination with the activities of the United States in providing salinity control for the Delta through the operation of the Federal Central Valley Project, ***shall be the provision of salinity control and an adequate supply*** for the users of water in the Sacramento-San Joaquin Delta. [Emphasis added]

It is hard to imagine anything clearer than this, but of course there are interests who claim the plain language does not mean what it says and/or that the mandated supply or quality must be

paid for. Regardless, there is a clear directive in statute for the projects to provide in-Delta supply and water quality control.

For the purposes of this initial argument, we see that if an upstream riparian diverter who has no water supply during a drought, and has no State statute requiring the projects to provide it water, it will be provided a supply in that drought if it has a contract with DWR or the Bureau. Conversely, an in-Delta riparian who ***has*** a supply during a drought, is apparently protected by statutory mandates for supply and quality, but who has been prevented from getting a contract by DWR and USBR will ***not*** be protected by the SWRCB.

The logic underlying the protection of one without a supply while failing to protect one with a supply is difficult to imagine Not only is it appropriate to protect riparians along the tributary streams and rivers flowing to the Delta, but it is also appropriate to protect those riparians in the Delta. This protection is both explicit and inherent in the statutory and regulatory mandates placed upon the projects. Such protections are not the source or cause of the drought, nor the source or cause of the dwindling supply for future fishery needs. The excruciating lack of planning by the projects, the failure of the SWRCB to properly regulate those projects and the projects bad-faith efforts to deny in-Delta parties contracts to protect their supply and quality of water simply cannot support any decision to shut off Delta diverters when others are protected. Upstream settlement contractors have no greater entitlement to stored project water than the other obligation on the projects, including the statutory mandate to provide water supply and quality protection.

11. Projects Have Assumed Burden of Providing Stored Water

From the very beginning, the issue of in-Delta water rights, the amount of water needed to protect the Delta, necessary outflow and project obligations in relation to these issues was hotly debated. Any review of the history of the projects or the Delta includes numerous investigations, proposals, agreements and disagreements about in-Delta supply and quality. SDWA records, like SWRCB records include literally scores of boxes evidencing the state and federal governments involvement in these matters and the involvement of various local interests. As far back as the 1952 Memorandum of Agreement between the state and the federal government the parties were trying to address these issues as they tried to determine who much water they might be able to export after providing for the superior rights of others and after providing for the Delta. There was the 1956 Cooperative Study Program, the 1964 Delta Lowlands (and Uplands) studies, D-990, D-1275, D-1291, D-1379, D-1485, etc. In addition innumerable discussions and negotiations between Sacramento Valley water users and Delta water users included the same issues of water rights and Delta needs and who should provide or pay for them. In all these process each party asserted its own view of the underlying rights and the responsibilities of it and the projects with regard to protecting the Delta. At every turn the

parties agreed that a full determination of the in-Delta rights would take too much time and would cost too much money. Thus the final determination of those rights was deferred. In addition, the obligations of the projects, also in dispute by some, were deferred as necessary. However, SWRCB decision and project operational decision went forward and placed various obligations on the projects notwithstanding the prior disagreements. The result is our current situation; the projects are obligated t meet water quality standards in the Delta, and they do so without regard to the underlying rights of in-Delta diversions or available "natural" flow. This is evidenced by the DWR operations information located at http://www.water.ca.gov/swp/operationscontrol/deltaops.cfm (click on Hydrologic Conditions Summary (daily) which clearly shows the projects take into account in-Delta consumptive use amounts when operating the Delta. They do not do this only when surplus flow is in the system. The proposed regulations ignore not only the long history of the SWRCB imposing unconditional obligations on the projects to meet in-Delta needs, but also ignore the ongoing actions by the projects which appear to by default at least to indicate the projects accept the responsibility of proving in-Delta supply.

SDWA opposes the draft regulations.

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BEFORE THE

STATE WATER RESOURCES CONTROL BOARD

July 1-2, 2014, SWRCB Board Meeting; Agenda Item 5; Emergency Regulations	) DECLARATION OF) CHRISTOPHER H. NEUDECK))

I, Christoperh H. Neudeck, declare:

1. I am Christopher H. Neudeck, P. O. Box 844, Stockton, California 95201. I am a registered Civil Engineer in the State of California and have worked with the Delta Islands including flood control, drainage and irrigation for over thirty (30) years. I am the District Engineer for numerous reclamation districts in the Sacramento/San Joaquin Delta (Delta) and I am familiar with the history of reclamation of lands in the Delta including the Upper Division of Roberts Island which is the area of concern in this proceeding. The engineering firm of Kjeldsen, Sinnock & Neudeck, Inc. of which I am a principal is the engineer for Reclamation District No. 544 which encompasses the area of concern and adjoining districts Reclamation District No. 17 and Union Island Reclamation Districts 1 and 2. I am very familiar with the area including the waterways, levees, drains and irrigation facilities.

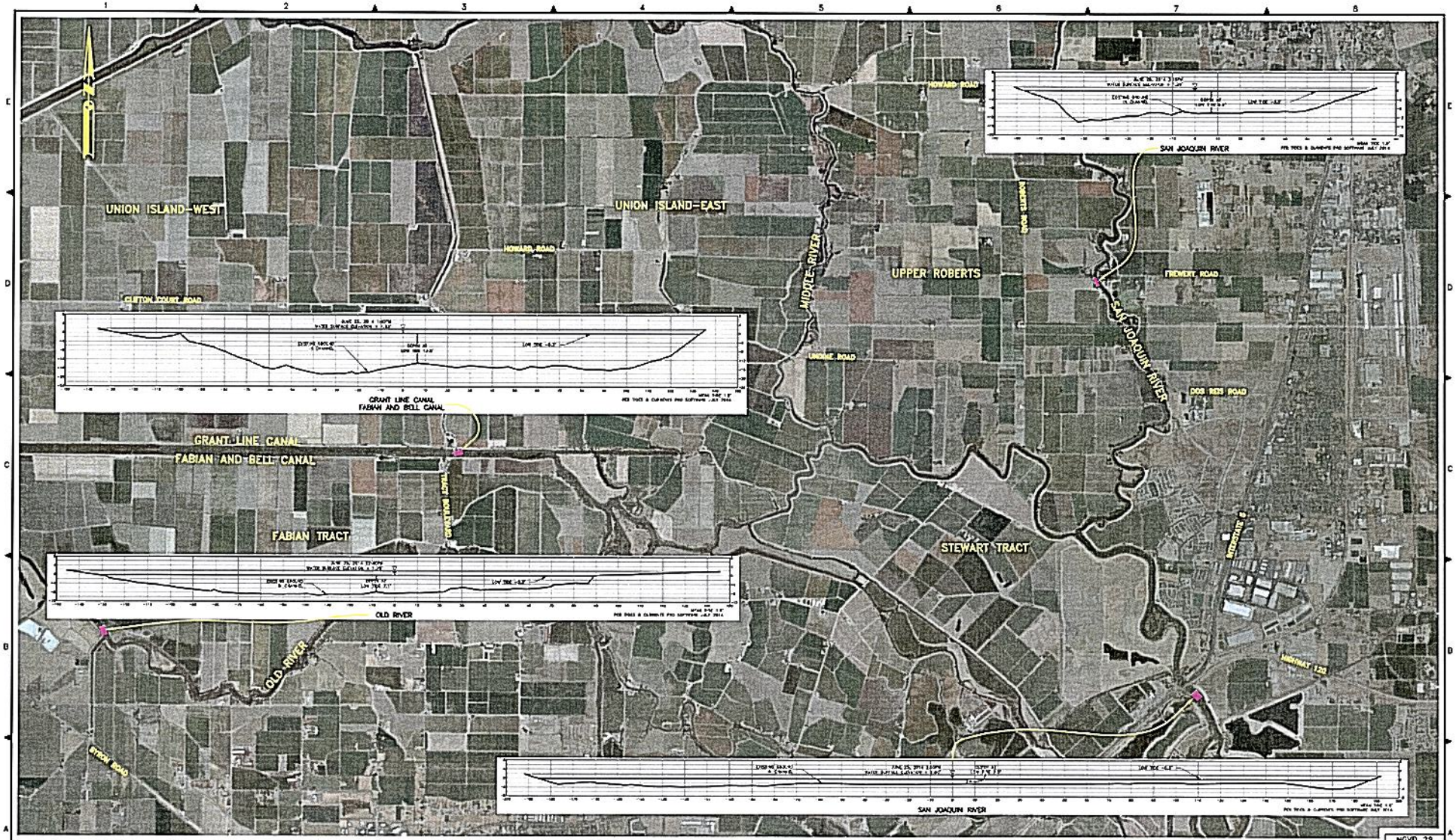
2. At the request of South Delta Water Agency, my company recently performed channel bottom surveys at a number of locations in the South Delta. The purpose of these surveys was to measure the depth of those channels at the various locations.

3. The results of those surveys are attached hereto. In general, the channel bottoms are a number of feet below sea level when I compared those channel bottoms to the tidal range data for the area, I conclude that the channels in general are always below sea levels as the channel bottoms measured are below the low, low tide level.

4. I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed this 30th day of June, 2014, at Stockton, California.

CHRISTOPHER H. NEUDECK



FILE SPEC: P:\1732_SDWA\2010-CA_Water_Exhibits\Survey\160623-Soundings\160623-Soundings.dwg
PLOT DATE: Jun 30, 2014 - 11:27am

Submittal	
#	Date

KSN INC. KJELDSEN SINNOCK NEUDECK
Civil Engineers and Land Surveyors
711 N. Pershing Avenue, Stockton, CA 95203, (209) 946-0268
1335 Halyard Drive, Suite 180, West Sacramento, CA 95691, (916) 403-5900
www.ksninc.com

SOUTH DELTA WATER ASSOCIATION
SAN JOAQUIN COUNTY

SOUNDING ELEVATIONS BASE MAP

Revisions				
No.	Description	Date	By	Approved By

Design LGB
Drawn LGB
Check CHN

Scale 1" = 2500'
Original Drawing Scale 0 ½" 1"

NGVD 29

Date JULY 2014
Sheet Number 1 Of 1
Project File No. 1732-0010

JOHN HERRICK, ESQ., S.B. #139125
Attorney at Law
4255 Pacific Avenue, Suite 2
Stockton, CA 95207
Telephone: (209) 956-0150
Fax: (209) 956-0154

Attorney for South Delta Water Agency

BEFORE THE

STATE WATER RESOURCES CONTROL BOARD

July 1-2, 2014, SWRCB Board Meeting; Agenda Item 5; Emergency Regulations	) DECLARATION OF JOHN HERRICK

I, JOHN HERRICK, declare as follows:

1. I am an attorney licensed to practice law in the State of California and in that capacity have been counsel and General Manager of the South Delta Water Agency ("SDWA") since 1994.

2. In my capacity as counsel for South Delta Water Agency, I have been involved in various processes dealing with water quality and water rights in the Delta.

3. Among those processes in which I have been involved with are the attempts at negotiations for a contract with the Department of Water Resources ("DWR") and the Bureau of Reclamation ("USBR") regarding water quality and supply in the South Delta as well as the adverse effects on water levels and flows in the South Delta resulting from the operation of those agencies' export projects.

4. When I first became counsel to South Delta Water Agency, that agency was involved in discussions regarding a draft contract between it, DWR, and USBR. Shortly after I became involved, USBR notified the parties that it would no longer participate in the negotiations and declined further efforts at reaching agreement. Subsequent to that time, DWR

and SDWA continued to work on various Southern Delta related issues, but DWR declined to enter into any contract without the presence and participation of USBR.

5. Approximately two years ago, I contacted a Deputy Director of DWR with the hopes of negotiating a supply contract only. The reason for this was to provide protection to local diverters whose water rights were being questioned. SDWA sought to finalize a contract dealing with "supply" in order to make sure that all diverters within the South Delta would be covered under any future water rights challenge.

6. The initial discussions with DWR included my proposal that since it and USBR already take into account water consumed in the Delta by local agricultural diversions, a supply contract would not adversely impact its current operations. That was because the current operations did indeed provide for such supply. After initial discussions and e-mail, the matter was turned over to an attorney for DWR who exchanged letters via e-mail with me over the next approximately year and one-half. Attached hereto is a summary of that year and one-half negotiation/discussion. Although DWR continually stated its willingness to negotiate a contract, it consistently insisted two things were factual: (1) they insisted that DWR and the USBR did not take into account in-Delta consumptive use in their operation of the Delta; and (2) they insisted that water supplied from the Sacramento River system would not reach the Southern Delta and thus they could not supply water to that area.

7. I continued to point out to DWR's counsel that these two assertions were factually incorrect but to no avail and no progress has been made on negotiations.

8. Also attached hereto are a number of documents supporting my written comments to the SWRCB's Consideration of Emergency Regulations to be held on July 1. Those documents are: Appendix X Memorandum of Understanding February, 1958; Bixler Listing 1939; Historical Salinity Highlights from CWD; Channel Depletion Information; Channel Bottoms Map; Declaration of Joseph Ratto; Delta Tidal Flows Map; Delta Hydrology 6-14-14; Draft Regulations; ER0 Zone Map and Calculations; NDWA contract First Page; SWP- CVP Acquisition of Sacramento San Joaquin Delta A Summary of Facts; Water Code 12000 - 12005; April 9, 2014 letter to Water Education Foundation.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct to the best of my knowledge, and if called as a witness would testify competently thereto.

Executed this 30th day of June, 2014, at Stockton, California.

John Herrick

John A. Wilson

DEPARTMENT OF WATER RESOURCES
State of California

STATEMENT OF DEPARTMENT OF WATER RESOURCES, STATE OF CALIFORNIA, TO SUBCOMMITTEE ON IRRIGATION AND RECLAMATION OF THE HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS RE STATUS OF WATER RIGHTS IN THE SACRAMENTO-SAN JOAQUIN DELTA AND PENDING APPLICATIONS FOR SURPLUS WATER THEREFROM

February 18, 1958

APPENDIX F

Memorandum of Understanding Relating to a General Approach to Negotiations for Settlement of Water Diversions From the Sacramento River and Sacramento-San Joaquin Delta with the Objective of Avoiding Litigation

MEMORANDUM OF UNDERSTANDING RELATING TO A GENERAL APPROACH TO NEGOTIATIONS FOR SETTLEMENT OF WATER DIVERSIONS FROM THE SACRAMENTO RIVER AND SACRAMENTO-SAN JOAQUIN DELTA WITH THE OBJECTIVE OF AVOIDING LITIGATION

The Federal Government acting through the Bureau of Reclamation is applying for certain permits to appropriate unappropriated water from the Sacramento River, in aid of the Central Valley Project. The water users along the Sacramento River, hereinafter referred to as "the water users", who are for the purposes hereof acting through the Sacramento Valley Water Users Committee, have protested the applications of the Federal Government for such permits and seek various conditions and limitations. The State Engineer, before whom the applications are pending, encourages satisfactory agreements between applicants and protestants providing for withdrawal of protests.

The Federal Government has also indicated that an authoritative determination of the validity and extent of rights to the use of water of the Sacramento River is necessary, and the parties hereto are in accord that this determination should be made by agreement, if possible, rather than by litigation.

The water users and the Federal Government are accordingly undertaking to negotiate an adjustment of the various matters just referred to without litigation and with a minimum of formal proceedings, for their mutual benefit. Such adjustment would eliminate the delay, expense and uncertainty attendant upon complex and difficult lawsuits, with a view of apportioning the water of the

Sacramento River in an equitable manner so that the Central Valley Project can function in the manner intended without injury to the water users. The State of California will participate and assist in these negotiations through its State Engineer and its Attorney General.

The outline that follows is of a plan which initially commends itself to the parties, on the basis of the discussions which have taken place thus far. The parties do not bind themselves to reach a final agreement by this approach; they merely agree to explore the full ramifications of the approach, in good faith and with the hope of agreement.

OUTLINE OF AN APPROACH

(1) This is to be a cooperative project between the water users, the Federal Government, and the State of California.

(2) State water law is to govern all water rights involved.

(3) Reasonable beneficial use (either past or potential) is to be the measure of all water rights.

(4) All water rights shall be governed by the general state policy as set forth in sections 100 to 107, inclusive, of the State Water Code.

(5) This general approach shall not in any way prejudice any water rights claimed by any of the parties, nor shall anything contained in this memorandum in any manner affect the powers, duties and responsibilities of the parties hereto as prescribed by law.

(6) Areas involved are:

a. That served by diversions above city of Sacramento.

b. That served by diversions from Sacramento-San Joaquin Delta.

(7) The riparian owners and appropriators above Sacramento may divert from the natural flow of the Sacramento River, including accretions thereto, to the extent of their present and potential beneficial use up to a maximum quantity expressed in acre feet per year, to be determined, to be available in accordance with the diversion schedule.

(8) The Federal Government may store and divert water available not in conflict with the rights of water users to the extent of reasonable requirements for the following purposes:

a. Navigation.

b. Salinity control.

c. Delta Mendota Canal

d. Contra Costa Canal.

e. Power.

(9) a. The Federal Government will release, without charge, water in sufficient quantities to preclude a deficiency in the scheduled diversions of more than a percentage to be determined. Pursuant to an agreement to be negotiated, the Federal Government will release water in sufficient quantities to further reduce the deficiency in the scheduled diversions to a lesser percentage, and the water users will pay a reasonable charge therefor. Such percentages and such charge are to be determined by negotiation between the water users and the Federal Government.

b. The parties recognize that to the extent the existing rights of the water users are adjusted and water is furnished in satisfaction of existing rights, the acreage limitation will not apply thereto.

c. Such agreements will not preclude the water users from acquiring an additional supply of water from the project pursuant to State and Federal law.

(10) In order to effectuate the provisions of (9) the legislative formation of a district comprising the area above Sacramento will be sought. The district will provide local government for the water users by administering the diversion schedule (although the quantities diverted will be measured by the State) and assessing the charges for project water to the landowners in accordance with benefits.

(11) The riparian owners and appropriators below Sacramento are entitled to the natural flow of the Sacramento River, including accretions thereto to the extent of their present and potential beneficial use, which is the full consumptive use of water required for the irrigable area. It is recognized that records and measurements of diversions below Sacramento are not available to the same extent that such records exist for users above Sacramento and for this reason a study of consumptive uses is proposed in order to develop an appropriate arrangement for the delta similar to that for upstream users so that the delta may have the use of stored water where required. Salinity control in the delta to the extent to be determined is an obligation of the Federal Government. It is intended that the interests of the

water users in the areas above and below Sacramento be coordinated and protected together.

(12) In furtherance of this approach the water users will proceed to the development of a diversion schedule. For this purpose the State Engineer will make available all information on diversions and on water rights acquired under the Water Code and will assign personnel to be of direct assistance; and the Federal Government will make available the facts developed by its studies of riparian and prescriptive rights, and appropriative rights initiated prior to 1914.

(13) It is anticipated that the development of the diversion schedule will have proceeded far enough by the early part of 1953 so that the water users will be able to present to the legislature a proposal for statutes to create a district above Sacramento, and to create such organization of delta users as may be found to be appropriate, in order that the formal agreement to the diversion schedule and to the contracts for water service may be completed and agreed to as soon thereafter as practicable. The parties will also negotiate during the development of the diversion schedule on a form of agreement to be entered into incorporating it.

(14) Within the limits of the statutory requirement of due diligence, the State and the Federal Government will suspend the further processing of the applications of the Federal Government on the Sacramento River in order that the

water users will not be required to file further protests or prepare for hearing during the pendency of negotiations.

Dated this seventh day of July, 1952, Sacramento, California.

APPROVED:

/s/ Henry Holsinger
Henry Holsinger
Principal Attorney
Division of Water Resources

APPROVED:

/s/ Edmund G. Brown
Edmund G. Brown
Attorney General
State of California

APPROVED:

/s/ Frank B. Durkee
Frank B. Durkee
Director of Public Works
State of California

APPROVED:

/s/ Thomas J. Clark
Thomas J. Clark
Acting Regional Counsel
United States Bureau of Reclamation
Region 2

APPROVED:

/s/ Martin McDonough
Martin McDonough
Attorney
Sacramento Valley Water
Users Committee

SACRAMENTO VALLEY WATER USERS COMMITTEE

By /s/ W. H. Baber

And /s/ Edward Hyatt

And /s/ John M. Luther

UNITED STATES BUREAU OF RECLAMATION,
REGION 2

By /s/ Richard L. Boke
Richard L. Boke, Regional Director

DIVISION OF WATER RESOURCES,
STATE OF CALIFORNIA

By /s/ A. D. Edmonston
A. D. Edmonston
State Engineer

Mr. Mullally

ESTATE OF ELIZABETH AUGUSTA BIXLER, deceased.

Stockton, California
February 14,1939.

TO WHOM IT MAY CONCERN:

Mr. Herbert W.Erskine, as Administrator with the Will Annexed of the Estate of ELIZABETH AUGUSTA BIXLER, deceased, has listed for sale, a tract of land comprising 2129.01 acres, more or less, located in Reclamation District No. 1, on Union Island, San Joaquin County, California.

SALE PRICE:

$175 per acre.

TERMS OF SALE:

Cash. Seller reserves all mineral rights. Offers to purchase may be tendered either to the Administrator or the Trust Department, Bank of America National Trust and Savings Association, Stockton Main Office, Stockton, California.

MAPS:

A plat showing the tract of land, cultivation units, irrigation and drainage ditches, is attached. The tract is bounded on the south by the Grant Line Canal, and on the north, by the County Road.

GENERAL:

Traces of peat are in evidence on various points over most of the area excepting the eastern portion of Reclamation District No. 1, where brown loam and silt loam of the Hanford type is present, capping the primary formation. Sil depth averages eight to nine feet, varying from two to fifteen feet and is controlled with drainage to a depth of five feet at the lowest point. The substructure is probably a clay or water-packed substance; the profile in the peat shows alternating strata of well decomposed peat and dark gray loam through the upper five feet of the soil column. There are sand pockets apparently of nominal extent through the soil column coming to the surface in occasional blowouts of nominal area and infrequent. The sand is sharp in places and micaceous in

GENERAL- continued

others. The soil of this property is of loam and is mapped by the U. S.Geological Survey as "Sacramento Series." Farming operations of this tract of land have been, in the main, satisfactory and conform in general to a better than average standard of excellence, for the several types. It is said that this land, when levelled, is well adapted to the production of asparagus. 127 acres bordering the Grant Line Canal have already been levelled and planted to alfalfa.

DRAINAGE:

Drainage of the tract has been limited to the seepage ditch along the south line near the toe of the Grant Line Canal levee and a seepage and drainage ditch to the north, and set back from the levee, a 10 HP pump with capacity of 2300 GPM. Drainage ditches at the present total 1 2/3 miles in length.

IRRIGATION:

Water for irrigation is obtained from the Grant Line Canal both by flood gates and by pumping. The pumping plant consists of 125 HP GE motor driving a 26" Krogh Cent. pump by belt with tightener. The plant includes a Cent. priming pump, DC 5HP GE motor. This plant and the flood gates supply water for the property distributed through a system of canals and ditches reaching practically all of this unit; said ditches total seven miles in length. The pumping unit is rated 19,000 GPM. The irrigation water being derived from the Delta water courses, the question naturally arises about its contamination by salt water. In a general sense, this area is free from such menace. The year of record drouth, 1931, readings of the State Reclamation Board show that there was an injurious concentration of chlorine At Clifton Court Ferry, six miles down stream along the Grant Line Canal, for a period September 15 to October 18. At Mossdale Bridge, a few miles upstream, concentration never did reach even a dangerous concentration.

SOIL ALKALI:

In common with all reclaimed land, the soil in this property may be considered to contain from a trace to a mild concentration of alkali. These salts are usually the soluble varities, Glauber and common salt, comprising the white alkalis. They areeadily leached out and controlled where pure water and adequate drainage are available. No areas of any consequence have been noticed where the effects of alkali were serious. Any comments herein made, however, as to the character or condition of the soil, salt water contamination, or alkali concentration, are to be construed as comments only and not, in any sense, as a warranty as to actual conditions.

IMPROVEMENTS:

The improvements on the various tracts shown on the plat are as follows:

IMPROVEMENTS: continued

Tract No. 1

(a) warehouse
(b) barn

Tracts No. 2 and 3

(a) dwelling
(b) barn
(c) granary
(d) bunkhouse
(e) storeroom
(f) garage
(g) harvester shed
(h) windmill, pump, tank, and frame
(i) pumphouse

Tracts 4 and 5.

(a) dwelling
(b) barn
(c) tankhouse and windmill
(d) storeroom
(e) garage
(f) bunkhouse- storeroom

Tracts 8 and 9.

(a) dwelling
(b) barn
(c) windmill and tank
(d) bunkhouse
(e) garage

Tract 10.

(a) dwelling
(b) barn
(c) storeroom
(d) storeroom
(e) windmill and tank
(f) tankhouse- also pumphouse, windmill, and tower furnishing water supply to Undine Headquarters not embraced in tract.

Tract 12.

(a) dwelling
(b) barn
(c) bunkhouse and mess hall
(d) blacksmith shop
(e) storeroom
(f) tank and frame

IMPROVEMENTS, continued

Tract 15

(a) barn
(b) barn
(c) toolhouse
(e) toolhouse
(f) pumphouse
(g) blacksmith shop
(i) fuel oil tank
(J) tankhouse
(k) tankhouse
(m) hog feed house
(n) storehouse
(o) hog shed
(q) hog barn
(r) milk house

The following is a list of tracts, showing total acreage, names of tenants, gross returns from each tract for the years 1936,1937, 1938. All of the tenancies are by year to year verbal lease only.

TRACT NO. 1- 160 acres. COX and ENGLANDER, tenants.

1936

40 acres	Canary seed	190 sx	18944 lbs	@ 2½¢ lb.	473.60
	Clover seed		6609 lbs.	@ 1 ¢ lb.	66.09
120 acres	Barley	1055 sx	104956 lbs	@ 1.15 cwt.	1206.99
160acres	Sheep pasture			@ .517 acre	82.72
					$1829.40

1937

20 acres	Pinto Beans	139 sx	13900 lbs.	@ 5¢ lb.	695.00
		16 sx	1620 lbs	@ 1¢ lb.	16.20
10 acres	Baled Barley hay	10 tons		@ 12.50 ton	125.00
150 acres	White Milo Corn	1767 sx	235238 lb.	@ 1.25 cwt.	2938.95
160 acres	Sheep pasture			@ .534 acre	85.44
					$3860.59

1938

120 acre	barley	1663 sx	164679 lbs.	@ .92½ cwt.	1523.28
40 "	not planted				
160 acres	sheeppasture			@ .625 acre	100.00
					$1623.28

TRACT No. 2 and 3- 550 acres, ALBERT MULLER, tenant.

1936

468 acres	barley	9740 sx	1008090 lbs	@ .95 cwt	9576.86

TRACTS No. 2 and 3, continued.

brought forward $9576.86

1936 continued

30 acres barley hay (loose)	30 tons	@ 6.00 ton	180.00
2 acres cash rental		@ 12.50 acre	25.00
50 acres barley hay (baled)	74.37 tons	@ 7.00 ton	520.59
250 acres barley stubble pasture		@ .50 acre	125.00
300 acres sheep pasture		@ .517 acre	155.10
			$10582.55

1937

Soil conservation payment			822.75
127 acres 1st year alfalfa	417.038 tons	@ 14.60 ton plus	6096.46
29 acres barley hay (loose)	29 tons	@ 10.00 ton	290.00
125 acres barley stubble pasture		@ .50 acre	62.50
394 acres barley, 7463 sx.	803360 lbs	@ 1.42 cwt. plus	11458.87
298 acres sheep pasture		@ .534 acre	159.13
			$18889.71

1938

40 acres barley hay (loose)	40 tons	@ 5.00 ton	200.00
3 acres cash rental		@ 12.50 acre	37.50
100 acres White Gyp corn	165168 lbs.	@ 1.05 cwt.	1734.26
240 acres barley 2065 sx.	217715 lbs.	@ .96 cwt	2090.06
225 acres stubble pasture-barley		@ .50	112.50
40 acres barley hay (baled)	50 tons	@ 7.00 ton	350.00
127 acres 2nd yr. alfalfa	482.2935 tons	@ 9.60 ton plus	4633.34
195 acres sheep pasture		@ .625 acre	121.87
			$9279.53

TRACT No. 4 and 5. 300 acres THOS. MOURNIAN, Tenant.

1936

150 acres barley	2055 sx 216126 lbs.	@ 1.07 cwt. plus	2319.56
146 acres white milo corn	1821 sx 234520 lbs.	@ 1.34 cwt. plus	3155.06
2 acres cash rental		@ 12.50 acre	25.00
300 acres sheep pasture		@ .517 acre	155.10
			$5654.72

1937

98 acres white gyp corn	1492 sx 193400 lbs.	@ 1.25 cwt.	2423.00
200 acres barley	3592 sx 405622 lbs.	@ 1.50 cwt.	6084.33
2 acres cash rental		@ 12.50 acre	25.00
298 acres sheep pasture		@ .534 acre	159.13
			$8691.46

1938

248 acres barley	3070 sx 341117 lbs.	@ .98 cwt.	3349.30
50 acres white gyp corn	61008 lbs.	@ 1.05 cwt.	640.58
2 acres cash rental		@ 12.50 acre	25.00
298 acres sheep pasture		@ .625 acre	186.25
			$4201.13

TRACT NO. 6 — 170 acres — F. BEROLDO, Tenant.

1936			
170 acres white milo corn	1884 sx 240585 lbs.	@ 1.50 cwt.	3608.78
170 acres sheep pasture		@ .517 acre	87.89
			$3696.67
1937			
170 acres barley	3278 sx 354024 lbs.	@ 1.35 cwt	4779.32
170 acres sheep pasture		@ .534 acre	90.78
			$4870.10
1938			
170 acres barley	2555 sx 278495 lbs.	@ .90 cwt.	2506.46
170 acres sheep pasture		@ .625 acre	106.25
			$2612.71

TRACT NO. 7 — 165 acres — E. P. NELSON, tenant

1936			
165 acres barley	2525 sx 265986 lbs.	@ 1.15	3058.84
165 acres sheep pasture		@ .517 acre	85.30
			$3144.14
1937			
165 acres barley	2648 sx 289804 lbs.	@ 1.35 cwt.	3912.35
165 acres sheep pasture		@ .534 acre	88.11
			$4000.46
1938			
165 acres barley	2051 sx 230081 lbs	@ 1.01¼ cwt.	2329.57
165 acres sheep pasture		@ .625 acre	103.12
			$2432.69

TRACT NO. 8 — 400 acres — RATTO BROS. tenants

1936			
300 acres barley	4620 sx 470287 lbs	@ 1.05 cwt.	4938.01
100 acres Red Milo corn	1464 sx 190320 lbs	@ 1.46 2/3 cwt.	2788.03
400 acres sheep pasture		@ .517 acre	206.80
			$7932.84
1937			
400 acres barley	8692 sx 934390 lbs	@ 1.35 cwt	12614.27
400 acres sheep pasture		@ .534 cwt.	213.60
			12827.87
1938			
400 acres barley	5793 sx 616375 lbs.	@ .90cwt	5547.38
400 acres sheep pasture		@ .625 acre	250.00
			$ 5797.38

TRACT NO. 10 — 174 acres — E. P. NELSON, tenant.

1936			
117 acres barley	1601 sx 177471 lbs	@ 1.07½ cwt.	1907.81
50 acres white milo corn	648 sx 62114 lbs	@ 1.45 cwt.	1100.65
7 acres barley (loose)	7 tons	@ 6.00 ton	42.00
174 acres sheep pasture		@ .517 acre	89.95
			$3230.41
1937			
154 acres barley	3948 sx 427745 lbs	@ 1.06 cwt.	5774.52
20 acres barley hay (baled)	20 tons	@ 12.50 ton	250.00
174 acres sheep pasture		@ .554 acre	92.91
			$6117.43
1938			
174 acres barley	2816 sx 310160 lbs	@ .85 cwt	2712.86
174 acres sheep pasture		@ .625 acre	108.75
			$2821.61

TRACT NO. 12 — 60 acres — F. E. THOMPSON, tenant.

1936			
38 acres barley	400 sx 43000 lbs	@ 1.00 cwt.	416.00
40 acres white gyp corn	716 sx 88428 lbs	@ 1.45 cwt	1282.10
2 acres barley hay(loose)	2 tons	@ 6.00 ton	12.00
60 acres sheep pasture		@ .517 acre	41.36
			$1751.64
1937			
72 acres barley	1200 sx 130240 lbs	@ 1.60 cwt.	2083.84
7 acres barley hay (baled)	7 tons	@ 12.00 ton	84.00
1 acre cash rental		@ 10.00	10.00
79 acres sheep pasture		@ .534 acre	42.18
			$2220.02
1938			
79 acres barley	840 sx 84255 lbs	@ .89 cwt	749.84
1 acre cash rental		@ 10.00 acre	10.00
79 acres sheep pasture		@ .625 acre	49.37
			$809.21

TRACT NO. 16 — 50 acres — COX and ENGLANDER, Tenants

1936			
50 acres cash rental		@ 15.00 acre	750.00
1937			
50 acres cash rental		@ 15.00 acre	750.00
1938			
50 acres cash rental		@ 15.00 acre	750.00

TRACT NO. 17 — 80 acres — COX AND ENGLANDER, Tenants.

1936			
80 acres barley	1200 sx 127375 lbs	@ 1.15 cwt	1552.09
80 acres sheep pasture		@ .517 acre	41.36
			$1593.95
1937			
80 acres barley	1242 sx 132094 lbs	@ 1.38 cwt	1754.07
80 acres sheep pasture		@ .554 acre	42.72
			1836.79

TRACT No. 17- continued

1938

80 acres barley	1065 sx 103175 lbs.	@ 92½ cwt.	1000.57
80 acres sheep pasture		@ .625 acre	50.00
			$1050.57

IRRIGATION COSTS

1936	$658.36
1937	$791.76
1938	$630.78

DRAINAGE COSTS

1936	$ 30.16
1937	$ 41.16
1938	$180.97

STATE AND COUNTY TAXES

Approximately $2475.

RECLAMATION DISTRICT NO. 1 ASSESSMENTS

1935	50¢ per acre
1936	50¢ per acre
1937	75¢ per acre
1938	1.00 per acre

INSPECTION OF PROPERTY:

Inspection of the property may be arranged at the Trust Department Bank of America National Trust and Savings Association, Stockton Main Office, Stockton, California.

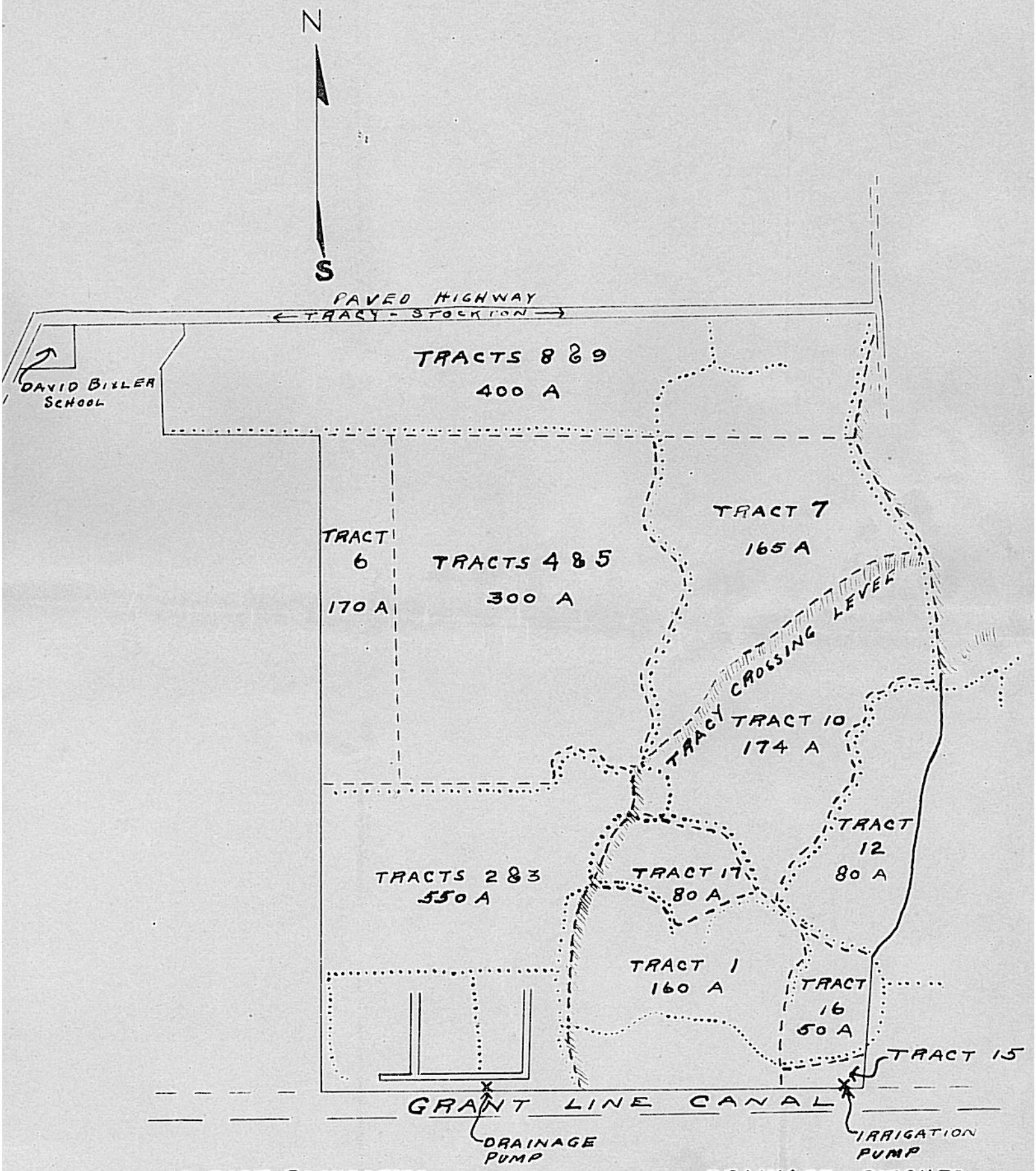
Any sale subject to confirmation by the Superior Court of the City and County of San Francisco, State of California.

Any offers accepted by the Administrator for confirmation by the Court should be accompanied by a reasonable deposit on account of purchase price, which will be returned to the depositor in the event that the sale is not so confirmed. Taxes and insurance to be pro rated as of date of confirmation of sale by the Court. Title insurance premium to be paid one half by the buyer and one half by the seller.

FOR FURTHER INFORMATION CONSULT: Mr. Herbert W.Erskine, 625 Market Street, San Francisco, California

or

Mr. W. H. Batting, Trust Officer, Bank of America N.T&SA Stockton Main Office, Stockton, Cal.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IRRIGATION PUMP
TRACT BOUNDARIES
DRAINAGE DITCHES
IRRIGATION DITCHES
E.A. BIXLER ESTATE

SOUTH DELTA WATER AGENCY

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April 9, 2014

jbowles@watereducation.org

Ms. Jennifer Bowles, Executive Director
Water Education Foundation
717 K Street, Suite 317
Sacramento, California 95814

Re: March 27, 2014, Executive Briefing

Dear Ms. Bowles and Board members:

I am general counsel and manager of the South Delta Water Agency, and have been so since 1994. If you would, please make sure this letter is forwarded to the WEF Board Members as well as the panel participants at the above-referenced Executive Briefing.

Briefly, I heard second-hand that at the above-referenced Executive Briefing, Dr. Jerry Meral made a statement to the effect that the Department of Water Resources was "ready and willing" to enter into a contract with the South Delta Water Agency, but that the SDWA was "not willing or not interested" in such an agreement. Since the truth is so far removed from such a statement to the degree to which it becomes difficult to breathe, I will have to assume Dr. Meral's statement got messed up in the retelling. It is inconceivable that a recent senior staff member of DWR could make such a statement. Again, assuming that he did not say anything so horribly wrong, I will take the opportunity to update the WEF Board Members on the status of the 30+ plus years of attempts by SDWA to get a contract from both DWR and the Bureau of Reclamation.

SDWA was constituted by statute in 1972 for two main purposes, in light of the development of the SWP and ongoing operations of the CVP. Those two purposes were, first, to protect the in-channel water supply and quality for current and future beneficial uses on the lands within the Agency boundaries, and second, to seek a water supply/quality contract with DWR and/or the Bureau. The underlying reasons for these mandates was the acknowledgment that the operations of the projects was and would adversely affect the southern Delta water and those dependent upon them. Incidentally, our area continues to suffer damages each year from the project operations which cause lowered water levels, reverse flows, stagnant areas and poor water quality. After nearly 54 years of project operations, these ongoing impacts and damages remain largely unaddressed.

When SDWA first approached the Bureau about a contract, the Bureau responded with the usual federal position of "we are the federal government and do not have to deal with you." This instigated legal action which resulted in an appellate court decision which dissuaded the Bureau of its less than friendly attitude and investigations and negotiations began. The investigations resulted in a 1980 Report authored by the Bureau (it at the time being under a different name during the Carter Administration) and SDWA which identified and quantified the impacts referenced above.

Based on this Report, DWR, USBR and SDWA began negotiations, which resulted in a draft contract which included such things as in-channel barriers and additional flows on the San Joaquin river. The participating personnel (from DWR, USBR and SDWA) signed a letter recommending their superiors execute the Contract. In the interim, SDWA undertook an election to authorize an assessment to fund its portion of the actions in the Contract. Sometime in 1995 or 1996, the parties attended one of their regularly scheduled negotiation/technical meetings wherein the Bureau abruptly stated, "We do not have anything else to discuss and we are withdrawing from the process." Again, the typical federal position on nearly all issues. In response to this DWR stated, "Well, since we don't do anything on the San Joaquin River we're out too."

Fortunately, this unexpected refusal to continue did not stop DWR from continuing its yearly efforts at installing, operating and removing the above-referenced barriers, which barriers provide needed mitigation for export pump effects on water levels. The SDWA representatives (Alex Hildebrand and I) returned from the meeting clueless as to what had just happened.

A few years later, Alex and I again tried to restart the discussion/negotiation. The Bureau said "no thanks" and DWR told us "sorry we can't help you."

A few years later, again during the CalFed fiasco, our local State Senator called DWR, SDWA and Central Delta Water Agency into a meeting and the issue of a contract for SDWA was among the topics. Our Senator naively thought that a contract protecting SDWA might allow for other efforts to go forward. The DWR representative attending was Director Lester Snow. Director Snow assured our Senator and us that DWR was of course willing to negotiate and enter into a contract with SDWA, actually acknowledging that it was DWR's obligation to do so under various statutes, including those relating to area of origin.

This resulted in two meetings between myself and various DWR legal, technical and Delta Division personnel. The first meeting included DWR's senior counsel and Chief of the Delta Division. Their position turned out to be the opposite of Director Snow's statements. DWR intoned that it was not possible for it to supply water to the southern Delta via releases from Sacramento River or Sacramento tributary rivers. Thus it could not enter into any agreement for supply. With regard to quality, DWR stated that the operation of the Oroville project and the SWP export pumps had no effect on water quality in the Delta. DWR stressed that it was "willing" to negotiate a contract but it interpreted the conditions as precluding it from doing anything. I made sure I "clarified" their position that they were "willing" but incapable.

Since each of the DWR statements was patently false, I suggested they have one modeler and one Delta Division person meet with me to see if we could agree on certain facts. In a rare moment of confusion, DWR agreed and I had a phone call and email exchange with the two

persons I had requested be involved. With regard to the ability of DWR to provide a supply to southern Delta diverters, we three AGREED that the Delta to a large extent operates like a bathtub with numerous inputs and outflows. If DWR increased Oroville releases but held exports and outflow steady, then that additional inflow could be diverted at virtually any interior Delta place even though the water molecules of the additionally released water may not be the ones diverted. The only caveat to this was that of course, depending on where the additional diversion occurred, there could be localized effects due to changes in channel flow or elevation. However, since the SDWA "supply" was not to increase any diversions but rather to cover existing diversions, even this notion of localized effects was moot.

We regard to the DWR impacts on southern Delta water quality, we found it was more difficult to reach any agreement. The DWR representatives understandably did not want to stray too far from the party line (my assumption, not their statements) and end up admitting to something that could have serious liability problems. Suffice to say that both CVP and SWP export pumps alter flows, lower water levels, cause and exacerbate stagnant zones and cause south valley drainage that yearly adds hundreds of thousands of tons of salt to the San Joaquin River, thus providing the foreign source of the River's horrible pollution problem. These facts are indisputable.

Our small "committee's" finding were forwarded by me in an email/letter to the larger group. In that and subsequent emails I repeatedly asked DWR to provide me with a draft contract covering those areas it thought we could resolve and listing those it thought we could not. The quality/salinity issue was of course a very difficult one and remains so today. However, the supply issue was and remains a very simple one. At first I thought DWR was struggling with how to add a new "SWP Contractor" in that the issue of paying towards the past forty years of capital costs appeared difficult. Recognizing this issue in writing, I also provided DWR with my arguments as to how other obligations of the project to both comply with statutory directives and provide mitigation would decrease any proposed payment for water supply.

As one might expect, DWR ceased any responses, and simply let the matter fade away (in their minds). I never received a draft contract, I never received a discussion about which issues would be agreeable and which would not. I never received any comments about pricing or arguments regarding pricing. DWR simply changed focus.

A few years late again and we were in the midst of the BDCP process. At some public meeting I asked Dr. Meral why DWR would not negotiate a contract with SDWA. He of course stated they would and agreed to meet with me. The meeting was set up at my office in Stockton. Invited were Dr. Meral and a senior staff counsel of DWR, though counsel may now be retired and working as a legal contractor. The day of the meeting I found out that also attending, but not invited were representatives of export contractors. I did not object to their attendance.

At this point I had come up with an extremely clever idea, if I do say so myself. You see, the projects operate the Delta by measuring reservoir releases, river flows and exports. From these data, they calculate outflow because a measuring device would be near useless given the ever changing channel morphology and tidal actions. One cannot accurately measure net outflow, even though we have specific outflow standards. As part of this calculation, DWR uses estimated interior Delta losses including evaporation and evapo-transpiration. This interior Delta

consumptive use data is of course necessary in order to know all (or as many as possible) variables, which allows for Delta operations to at least be close if not correct.

Given this current and perennial treatment of in-Delta use of course meant that since the projects were ALREADY taking in-Delta diversion into consideration, a supply contract with SDWA would have no effect on project operations. They could give SDWA a contract and nothing would change; not releases, not storage, not exports; nothing! This is of course why I thought my idea was so clever. Clever stupid.

When the uninvited export representatives at the meeting finally understood my proposal, I detected either burning hatred or some high degree of abject fear. We will probably never know which. Dr. Meral agreed we should begin negotiating the contract, and that we should address the issue of the ability to supply the southern Delta with Sacramento River inflow. I asked him if we could use the modeler previously involved in these discussions and he readily agreed.

Thereafter ensued a number of email, mostly on my part, including a draft contract dealing with the supply issue. I even had a provision dealing with drought conditions as I simply was unsure how the projects would operate during a severe drought. [Sadly we now know.] After a long period of inactivity by DWR in responding to my follow up email, punctuate by episodes of excruciating quiet, DWR assigned a new or different attorney to the matter. He became the sole DWR contact. This attorney began with a long letter to me informing me that I was ignorant of Delta operations and that DWR DID NOT take into account in-Delta diversions. He then repeated the same old litany of reasons why DWR could not supply SDWA with water. After this long mangle of reasons why DWR could not enter into an agreement and why I was congenitally misinformed of Delta operations, he ended with a polite statement that "DWR remains willing to negotiate a contract with SDWA."

The strong language "questioning " my knowledge of Delta operations took me aback to say the least. I therefore checked with others, more knowledgeable than I (including CCWD technical personnel, DWR technical personnel, and others all of whom will remain un-named). Although I may have incorrectly referenced the source of the estimated in-Delta consumptive use loss data, I was correct in noting that the project operations did indeed take this into consideration. See for example http://www.water.ca.gov/swp/operationscontrol/docs/delta/DeltaHydrology.pdf page two, column 3 "Delta Gross Channel Depletions."

I responded the DWR attorney affirming my position, referencing the support for this and noting that if the projects did not take in-delta depletions into account, then all outflow X2 calculations would be incorrect. The response from the DWR attorney was dated November 2013 and received by me in February 2014. Those dates are not typos. Incidentally, this email/letter exchange occurred over an approximate two-year period as apparently DWR had assigned it a ultra-high, double-secret priority. That last response by DWR included the same old tired, unfounded and incorrect statements of how DWR did not take our diversions into account, how it could not supply us with water, how they were not responsible for southern Delta water quality, and how any agreement could only be done if the Bureau was involved and if the salinity/quality issue was included.

Any notion that DWR is attempting a good faith negotiation with SDWA on a supply and/or water quality contract is fanciful. In my 20 years of representing SDWA I have personally participated in four attempts to negotiate such contract(s). Only the "original" draft contract negotiated when the Bureau was participating was ever offered. Since that time, DWR has specifically avoided even discussing the relevant issues, much less offering any meaningful draft contract conditions. I of course cannot read the minds of DWR personnel, but it is clear to me it is the policy of DWR to ensure that it never enters into a contract with SDWA as it has at every turn misrepresented the issues, the facts and its efforts. At the same time, DWR continues to repeat the mantra that its "ready, willing and able" to enter into a contract. DWR has informed elected officials, State Water Resources Control Board staff and members that it is willing to negotiate with SDWA while at the same time intentionally frustrating any efforts at doing so. Again, I assume that Dr. Meral's statements were misrepresented to me, but certainly I am obligated to make sure that WEF Board Members and attendees are made aware of what is actually going on.

If there is a contrary view to the above, please make sure it is brought to my attention so that I, as the sole SDWA representative in these efforts at negotiation, can help clarify the situation.

Very truly yours,

JOHN HERRICK

cc: Water Education
Foundation Board Members

Historical Freshwater & Salinity Conditions

in the Western Sacramento - San Joaquin Delta & Suisun Bay

REPORT HIGHLIGHTS

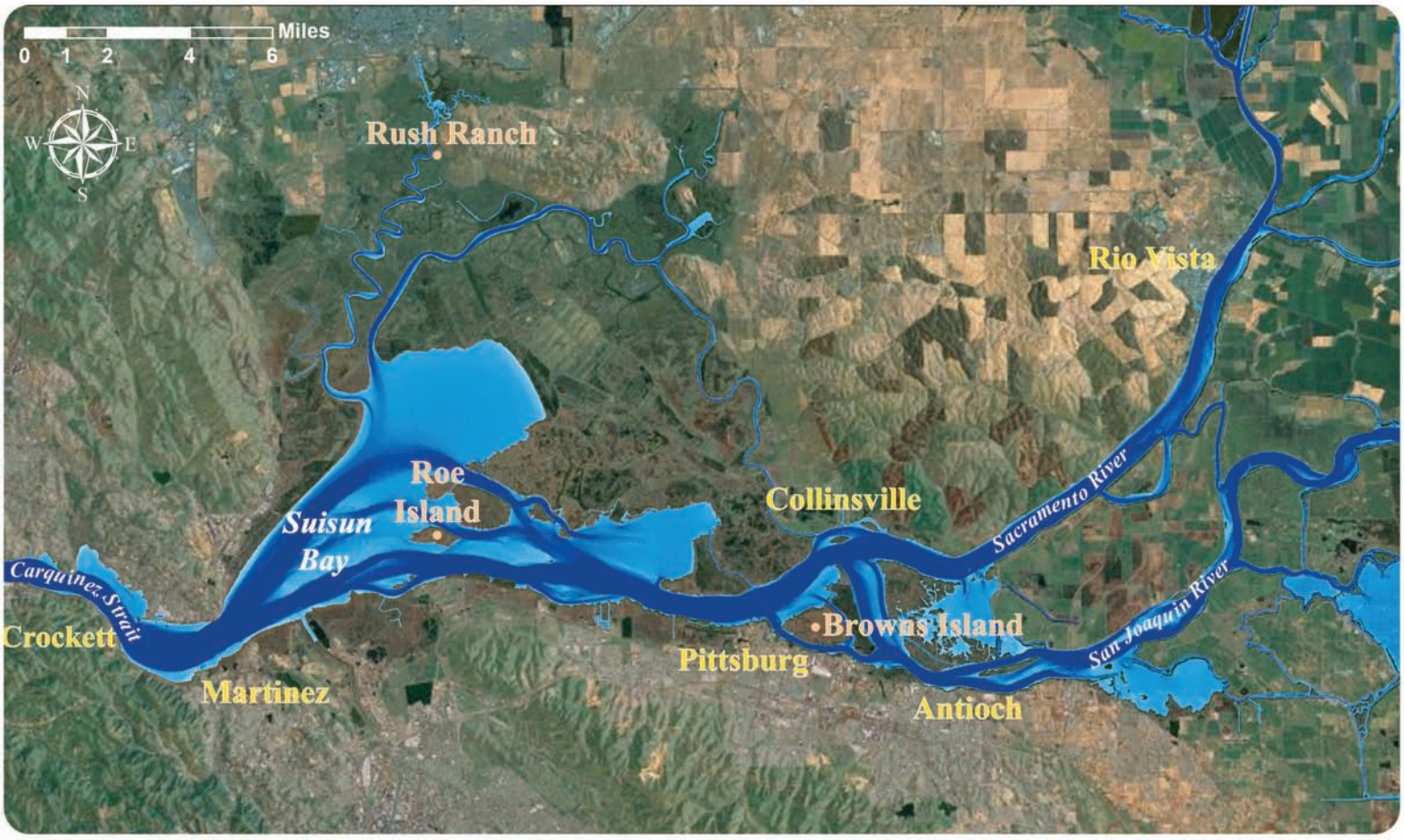
CONTRA COSTA
WATER DISTRICT
WATER RESOURCES

DECEMBER 2009

This document contains the highlights of Contra Costa Water District's technical review "Historical Freshwater and Salinity Conditions in the Western Sacramento-San Joaquin Delta and Suisun Bay".

For references and data sources, please review the full report available on CCWD's website at **www.ccwater.com/salt.asp**

The map on this page shows key locations mentioned in this document.



Acknowledgments

CCWD would like to thank the City of Antioch for their contribution towards funding a technical review of CCWD's draft report "Trends in Hydrology and Salinity in Suisun Bay and the Western Delta" (June 2007); their review substantially improved the work and led to the final report "Historical Freshwater and Salinity Conditions in the Western Sacramento San-Joaquin Delta and Suisun Bay". CCWD is grateful to the many reviewers, including Richard Denton, Matthew Emrick, Gopi Goteti, Phil Harrington, Susan Paulsen, David Pene, Mat Rogers, and Peter Vorster. We also thank the following for sharing their data and analysis: Roger Byrne, Chris Enright, Spreck Rosekrans, and Scott Starratt.

Establishing the Historical Baseline

The watershed of the Sacramento – San Joaquin Delta (Delta) provides drinking water to more than 23 million Californians as well as irrigation water to millions of acres of agriculture in the Central Valley. The Delta itself is a complex estuarine ecosystem, with populations of many native species now in serious decline. The Delta estuary as we know it began to form only 6,000 years ago, following the end of the last ice age. Because the estuary is connected to the Pacific Ocean through San Francisco Bay, seawater intrusion causes the salinity of Suisun Bay and the Delta to vary depending on hydrological conditions. Seawater intrusion into the Delta affects estuarine species as well as drinking water and irrigation water supplies.

Successful ecological restoration of the Delta will depend upon knowledge of the conditions under which native species evolved. Contra Costa Water District's report "Historical Freshwater and Salinity Conditions in the Western Sacramento-San Joaquin Delta and Suisun Bay" provides a review of more than 100 years of studies, monitoring data, scientific reports, and modeling analyses that establish the historical salinity conditions in the Western Delta and Suisun Bay. This document presents the highlights of that report.

Is the Delta "artificially" fresh?

Some have suggested that the Delta is now kept artificially fresh, and that historically the Delta was saltier. This report addresses the question of whether the Delta is, in fact, artificially fresh through comparison of recent Delta salinity levels to the estimates and measurements of historical salinity going back 2,500 years.

Key findings:

- Measurements of ancient plant pollen show that the Delta was predominately a freshwater marsh for the past 2,500 years, and that the Delta has become far more saline in the past 100 years because of human activity.
- Salinity intrusion today is typically 3 to 15 miles farther into the Delta compared to the early 20th century, when much less fresh water was diverted.
- Before freshwater diversions increased in the 1940's, the Delta and Suisun Bay would freshen every winter, even during the extreme drought of the 1930's. However, that pattern has changed – during recent droughts (1976-1977, 1987-1994, and 2007-2009), the Delta did not freshen. Without seasonal freshening, contaminants and toxics can accumulate in the system.
- While half of the past 25 years have been relatively wet, the autumn salinity levels in 21 of those 25 years have resembled dry year conditions: *in terms of salinity, the Delta is now in a state of drought almost every autumn because of human activity including water diversions.*

The Delta is not artificially fresh

The historical record and published studies demonstrate that the Delta is far saltier now than it would have been without human interference.

Historical reports chronicle unprecedented salinity intrusion, starting around 1917, due to upstream water use

The geography and freshwater characteristics of Suisun Bay and the Delta are recorded in writings of explorers and early settlers. In maps and journals from the 19th century, Suisun Bay was called "Freshwater Bay".

By the early part of the 20th century, it was recognized that human activities, including the diversion of fresh water from the system, were causing increased salinity intrusion into Delta. Starting in 1917, local industries and residents observed unprecedented salinity levels, leading a local sugar refinery to seek a new water supply, the Town of Antioch to file a lawsuit against upstream water users, and the State of California to launch a salinity monitoring program and investigation.

The misconception that the Delta is now artificially fresh and does not experience the full range of natural salinity intrusion may be due to superficial comparison of the maximum salinity intrusion diagrams in the Delta Atlas (DWR, 1993), which show greater salinity intrusion during six years in the 1920's and 1930's than occurred from 1945-1990. However, maximum salinity intrusion in the early 20th century was strongly influenced by upstream diversions and channelization of the Delta. The quotations below from early 20th century reports show that salinity intrusion in the 1920's should not be considered natural.

1928 - Thomas H. Means. Salt Water Problem, San Francisco Bay and Delta of Sacramento and San Joaquin Rivers

> *Under natural conditions, Carquinez Straits marked, approximately, the boundary between salt and fresh water in the upper San Francisco Bay and delta region of the two tributary rivers—the Sacramento and San Joaquin. Ordinarily salt water was present below the straits and fresh water was present above. Native vegetation in the tide marshes was predominately of salt water types around San Pablo Bay and of fresh water types around Suisun Bay.…*
>
> *The definite statement that salt water under natural conditions did not penetrate higher upstream than the mouth of the river, except in the driest years and then only for a few days at a time, is warranted.…*
>
> *At present [1928] salt water reaches Antioch every year, in two-thirds of the years running further upstream. It is to be expected that it will continue to do so in the future, even in the years of greatest runoff. In other words, the penetration of salt water has become a permanent phenomenon in the lower river region.*
>
> *The cause of this change in salt water condition is due almost entirely to the works of man.*

1931 - Department of Public Works, State of California. Bulletin No. 27. Variation and Control of Salinity in Sacramento-San Joaquin Delta and Upper San Francisco Bay.

> *The dry years of 1917 to 1919, combined with increased upstream irrigation diversions, especially for rice culture in the Sacramento Valley, had already given rise to invasions of salinity into the upper bay and lower delta channels of greater extent and magnitude than had ever been known before.*

Consistent with historical reports, paleosalinity records reveal a sustained period of freshwater conditions in the Delta, followed by a sharp, sustained increase in salinity starting about 100 years ago

In paleoclimatology, information from natural sources, such as atmospheric temperature (from ice cores) and precipitation cycles (from tree rings), is used to reconstruct past climate, providing a history of conditions before modern instruments. Salinity in the Bay and Delta tidal marshes has been reconstructed from sediment cores, providing evidence of salinity intrusion over the last 2,500 years.

The Delta was predominately a freshwater system for 2,500 years, even during century long droughts, until the early 1900's, as shown below at the Browns Island tidal marsh near the confluence of the Sacramento and San Joaquin Rivers (Figure 1). Although Suisun Bay experienced salinity intrusion during long drought periods (the last period ended approximately 700 years before present), salinity did not affect the western Delta to the same degree, likely due to the vast tidal marshes that existed until the early 20th century.

Furthermore, salinity levels in Suisun Bay during the past century exceed even the long drought periods of previous centuries, even though the watershed has received above average rainfall for the last 70 years. The abrupt increase in salinity during the last 100 years has been attributed to human activities, including reclamation of tidal marsh and diversion of fresh water.

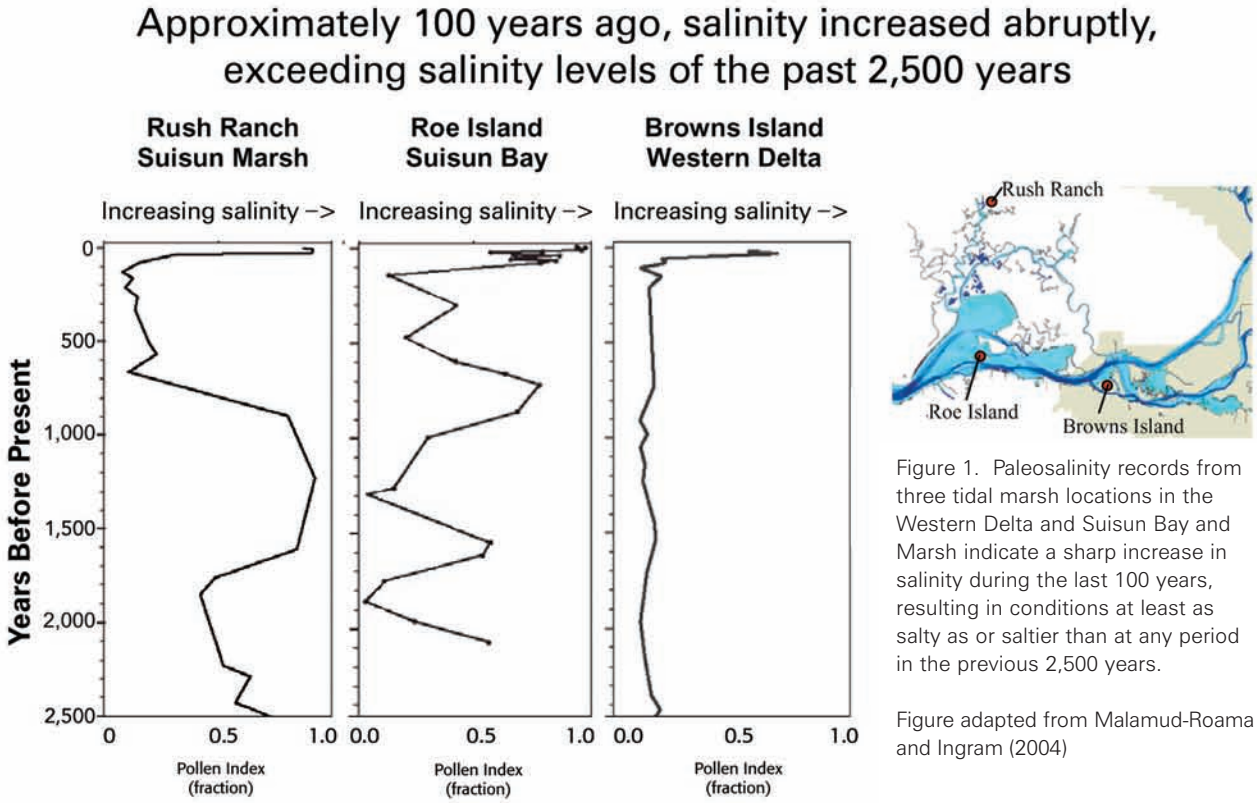


Figure 1. Paleosalinity records from three tidal marsh locations in the Western Delta and Suisun Bay and Marsh indicate a sharp increase in salinity during the last 100 years, resulting in conditions at least as salty as or saltier than at any period in the previous 2,500 years.

Figure adapted from Malamud-Roama and Ingram (2004)

Earliest salinity measurements reveal a fresher Suisun Bay in the winter/spring and less salinity intrusion into the Delta in the fall

The earliest salinity measurements in the Delta were recorded by the California & Hawaiian Sugar Refining Corporation (C&H) from 1908 to 1929. C&H obtained fresh water by sending barges that traveled upstream along Suisun Bay and into the Delta until they reached water with a chloride concentration of less than 50 milligrams per liter (mg/L). The distance the barges traveled is a measure of salinity intrusion; increasing distance indicates increasing salinity.

Salinity started increasing in 1917 and by 1920 the salinity had increased to the point that C&H abandoned the Sacramento and San Joaquin Rivers during the summer and fall, replacing the water supply with an agreement with Marin County. The increase in salinity recorded by C&H is consistent with the paleosalinity archives, reports from early settlers, and the conclusions of the State of California salinity investigation of the 1920's.

Comparison of the C&H observations for 1908 through 1917 (prior to significant upstream diversions) with recent salinity levels from two time periods of similar hydrology (Figure 2) indicates that fresh water was present further downstream in Suisun Bay and the western Delta more often and for a longer portion of the year from 1908 to 1917 compared to recent years. The colored (lower) parts of the graphs below show the progressive loss of fresh water from the system and the upper lines show the increasing salinity intrusion into the Delta.

Fresh water was available further downstream for a longer portion of the year in the early 1900's than in recent decades with similar hydrological conditions

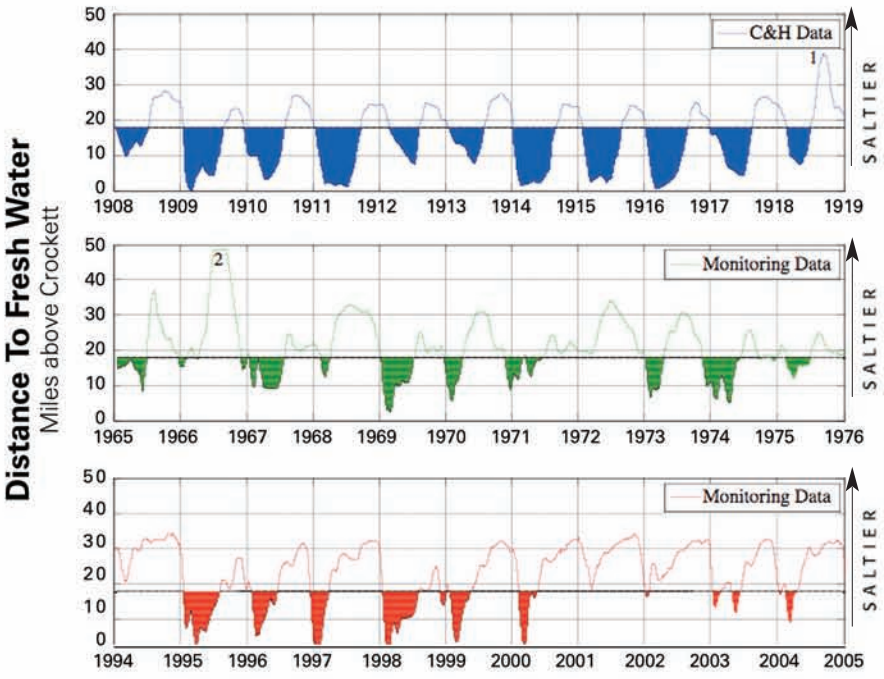


Figure 2. Fresh water was available within Suisun Bay for a longer time period each year during the early 1900's.

The colored portion on each chart represents the amount of fresh water (with less than 50 mg/L chloride or approximately 0.2 ppt salinity), that is available within Suisun Bay, downstream of the Delta boundary (approximately 18 miles above Crockett).

From 2001 to 2005, fresh water was seldom available below the Delta boundary, indicating that the Delta did not "flush". Without the seasonal freshening of the Delta, contaminants and toxics can accumulate in the system. Investigations found toxics to be a factor in the decline of the Delta ecosystem.

Note: While hydrological conditions were similar in the three time periods shown to the left, the sequence of wet and dry periods differs.

1 During August and September 1918, average water quality obtained by C&H exceeded 110 mg/L chloride

2 Salinity intrusion is likely an overestimate due to inadequate spatial coverage of monitoring stations in 1965 and 1966

The Delta no longer freshens during droughts and fall salinity is so high that drought-like conditions in the fall occur almost every year

Salinity at the confluence of the Sacramento and San Joaquin Rivers near Collinsville reveals the evolution of two factors identified as contributors to the decline of the Delta ecosystem: the accumulation of toxics (Figure 3) and the increase in fall salinity (Figure 4).

The Delta no longer freshens during droughts, creating the potential for toxic accumulation

Average Winter (Jan-Mar) Salinity at Collinsville

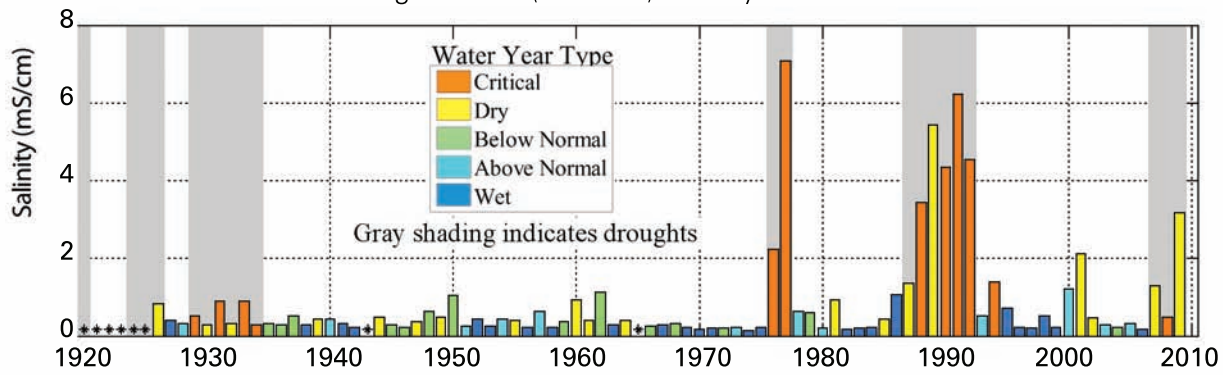


Figure 3. Even in the six-year drought from 1928 to 1934, the Delta still freshened every winter. However, the Delta has not freshened during more recent droughts (1976-1977, 1987-1994, and 2007-2009). This indicates that the Delta is not being "flushed" with fresh water as it was historically. The lack of flushing may allow waste from urban and agricultural developments upstream of and within the Delta to accumulate. Contaminants and toxics have been identified as a factor in the decline of the Delta ecosystem.

* Indicates no data are available

Historically, fall salinity was only high in relatively dry years. Recently, fall salinity is high almost every year

Average Fall (Oct-Dec) Salinity at Collinsville

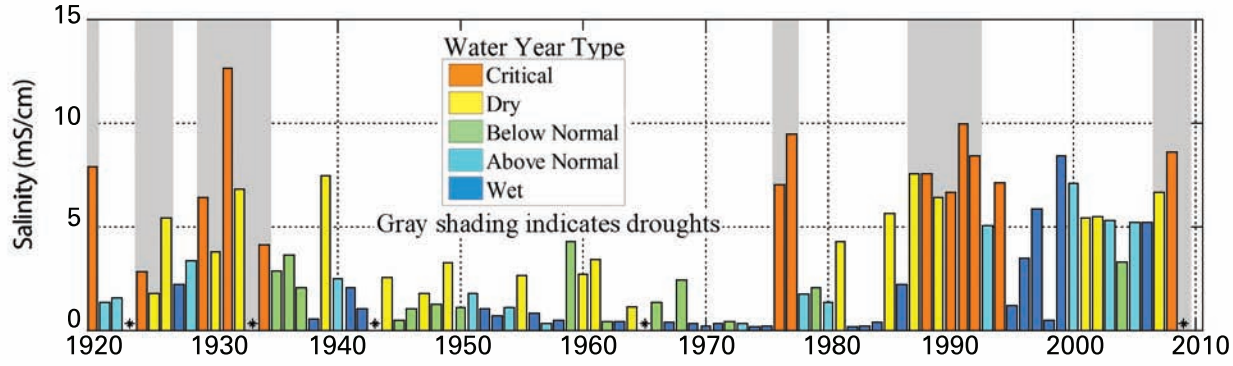
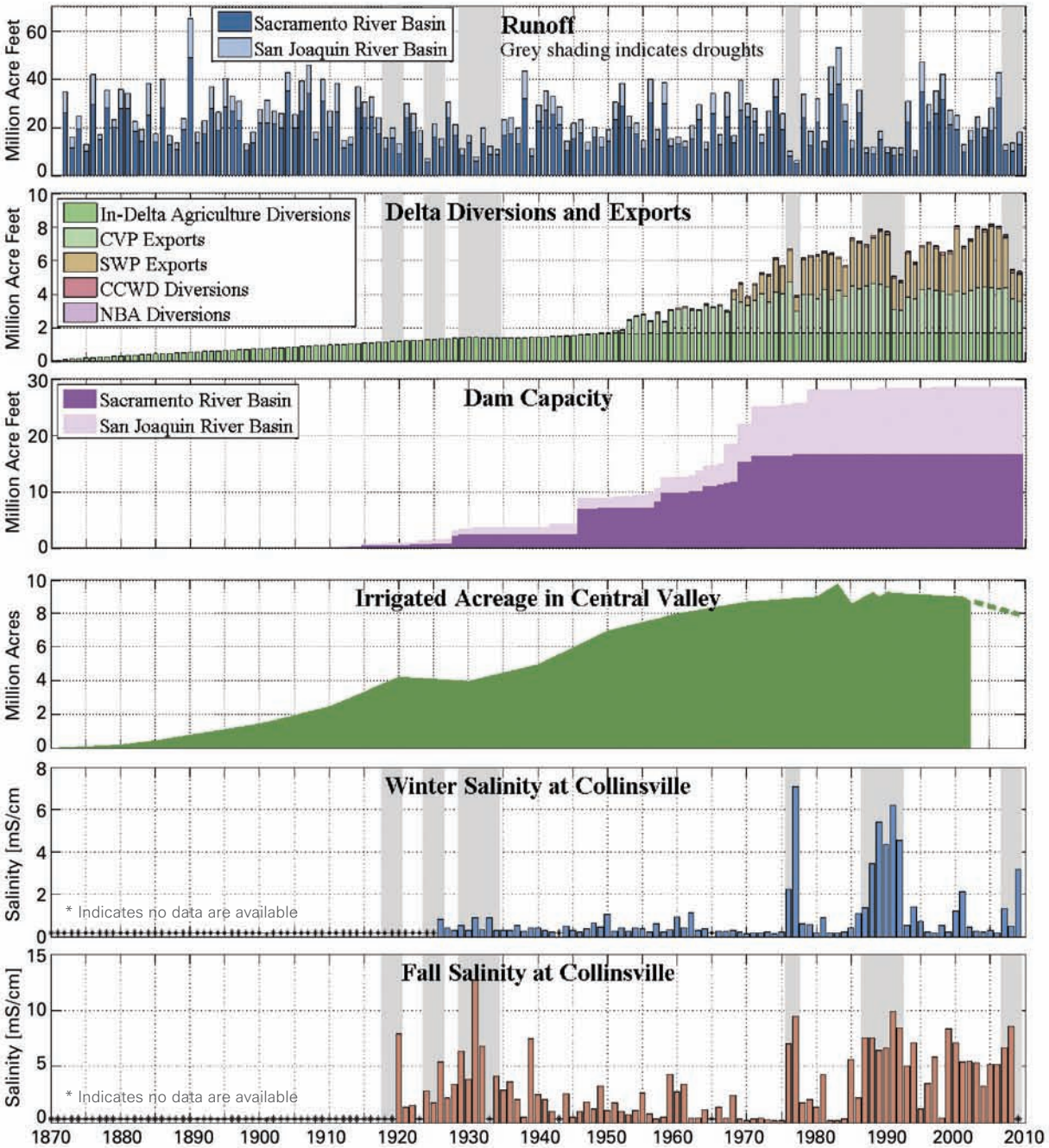


Figure 4. Fall salinity is now high almost every year, while historically, fall salinity was only high in dry and critical years. High salinity in the fall has been identified as a factor in the decline of the Delta ecosystem.

* Indicates no data are available

Salinity in the Bay and Delta responds to upstream runoff, diversion of fresh water, operation of upstream reservoirs, and the geometry of the Bay and Delta. From the mid-1800's until approximately 1920, the most significant impact on salinity was likely due to changes to the landscape of the Central Valley and Delta. Since 1920, reservoir operations and diversion of fresh water significantly increased salinity in the estuary.



CONTRA COSTA WATER DISTRICT

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CHAPTER VII

EFFECTS OF OPERATION OF CVP AND SWP EXPORTS PUMPS NEAR TRACY

CHANNEL DEPTHS AND CROSS SECTIONS

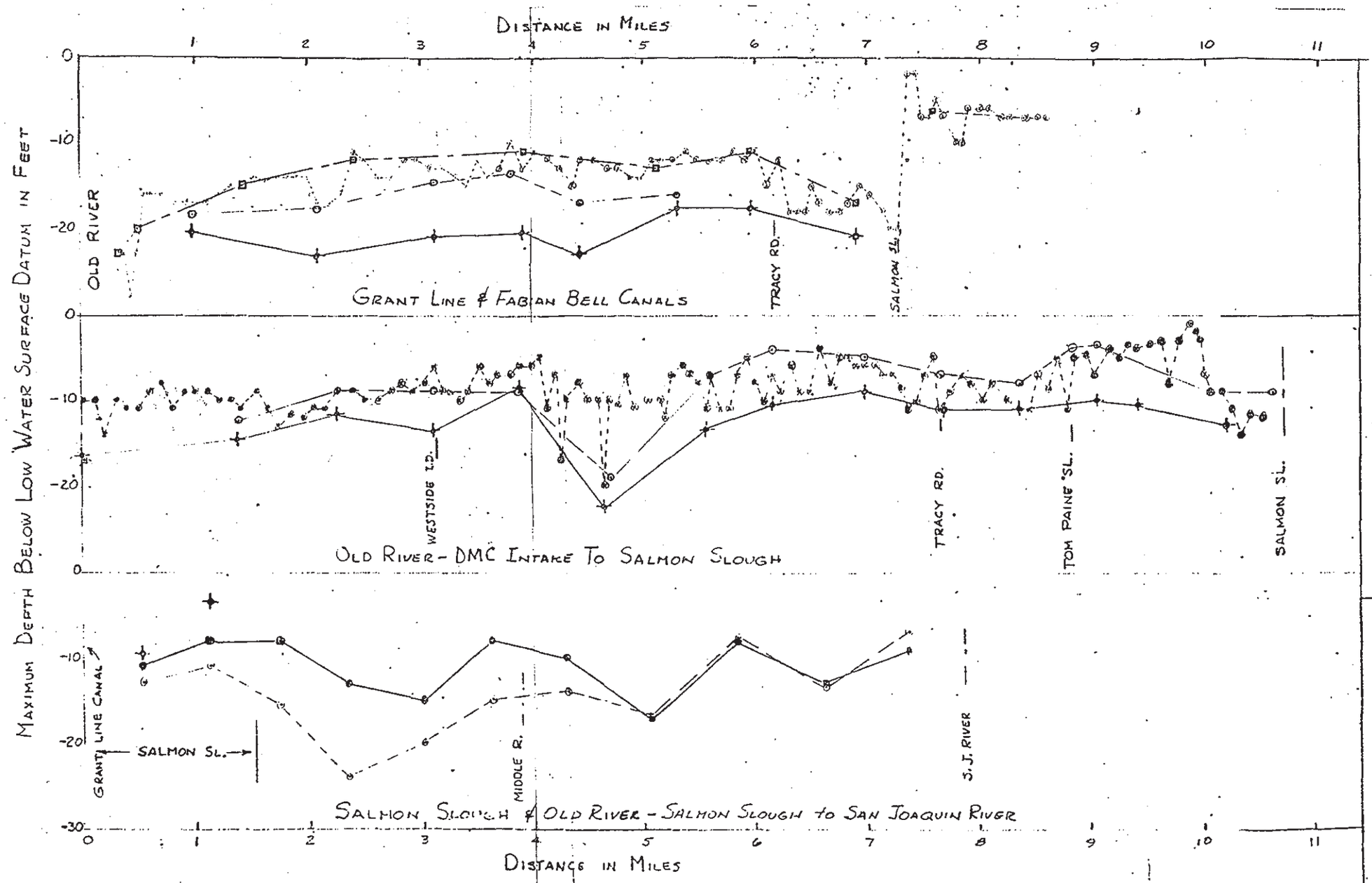
The geometry of the channels within the southern Delta was studied to determine whether the channel cross sections and bottom elevations have changed since the 1930's in such a way as to alter water circulation patterns and water depths to a degree that modifies the southern Delta water supply.

Channel Surveys

Prior to 1913, most existing channels within the South Delta Water Agency were well defined, due in part to the sidedraft clamshell dredge which was used over many years to construct the levee system within the South Delta and to keep channels clean of sediment. Since 1913 most of the channels in the South Delta have been surveyed several times. The results of surveys are summarized if figure VII-1.

Available survey data include:

Date of survey	Channels surveyed	Source of data
1913	Old River - Middle River to Victoria Canal Middle River - Old River to Victoria Canal Grant Line and Fabian Canals	USCE
1933-34	All SDWA channels	USC&GS
1957	Grant Line and Fabian Canals, plus Salmon Slough and Paradise Cut	DWR
1965	Grant Line and Fabian Canals	USCE
1973	Old River-San Joaquin River to Victoria Canal Middle River-Old River to Victoria Canal Grant Line and Fabian Canals	DWR
1976	San Joaquin River-Vernalis to Mossdale	DWR



LEGEND

- 1913 USCE SURVEY
- 1933-34 USC&G SURVEY
- 1957 DWR SURVEY
- 1965 USCE SURVEY
- 1973 DWR SURVEY
- 1976 DWR SURVEY

SOUTH DELTA CHANNEL DEPTH SURVEYS

WATER AND POWER RESOURCES SERVICE

DATED APRIL 1980

FIGURE VII-1.

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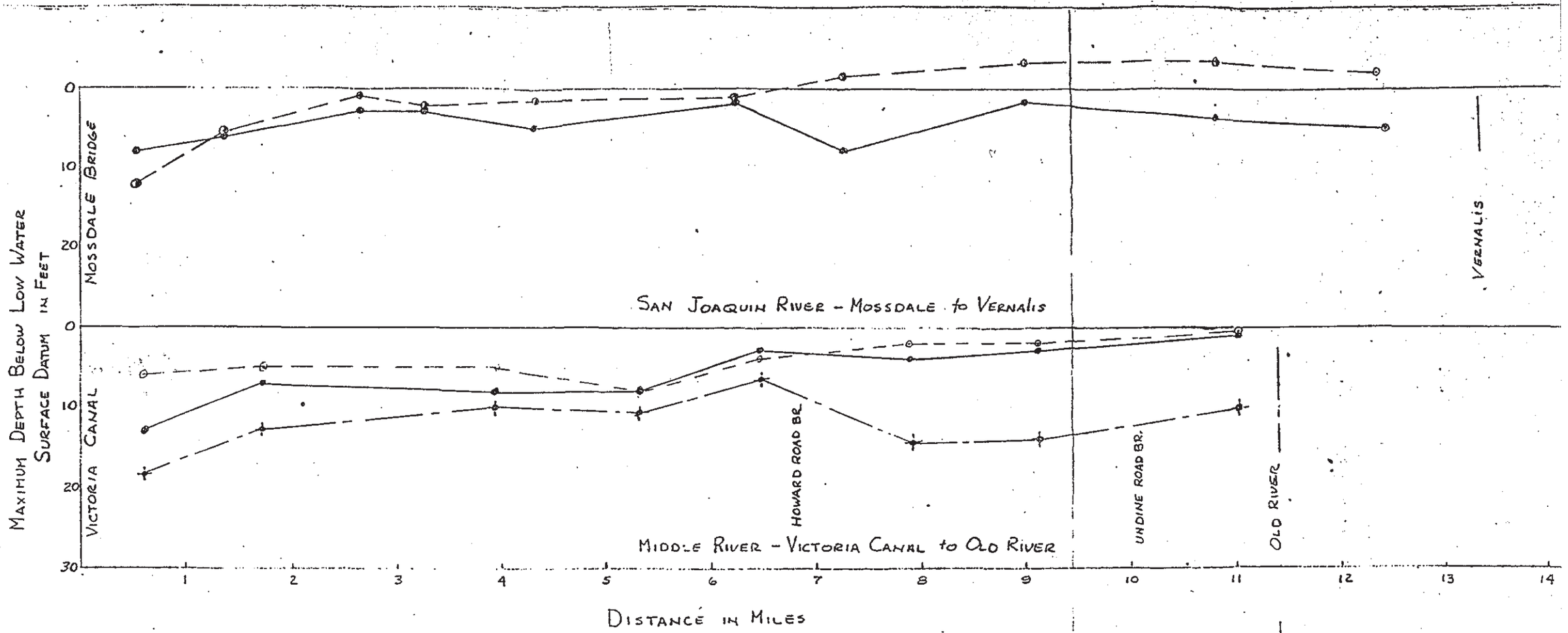


SOUTH DELTA CHANNEL
DEPTH SURVEYS

WATER AND POWER RESOURCES SERI

DATED APRIL 1980 FIGURE
(CONT

In describing the geometry of the channels, especially the depth, it is appropriate to use a fixed reference plane. For example, navigation charges which need to be site specific use local MLLW. However, this locally oriented datum varies from -0.2 ft MSL to +0.5 ft MSL within the SDWA and is dependent upon the condition of San Joaquin River inflow.

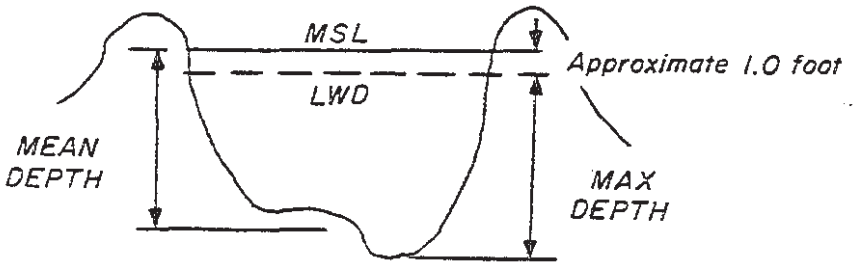
Much of the hydrographic data used in this study was taken from charts used by the Corps of Engineers to build the Sausalito model of the Bay-Delta, the low water datum, (LWD) of 1.0 foot below mean sea level as shown in the etch below, which was used by the Corps to integrate data from diverse ..ces, was also adopted for the present study. It is a conservative datum in that it is lower than the local MLLW levels throughout the SDWA by a foot or more.

Most of the channels, dredged prior to 1913, were 10 to 20 feet below the LWD. By 1933-34, however, most channels surveyed had aggraded significantly. Existing survey data indicate that in some channels, such as the southern reaches of Middle River, little dredging has been done. Data on dredging to maintain the levees and to provide fill for road construction were not available.

In the 1973 and 1976 surveys channel geometry was determined for reaches from Vernalis on the San Joaquin River to the State and Federal pumping plants near Clifton Court Forebay, including Old River and the Grant Line and Fabian-Bell Canals, and for the Middle River between Old River and Victoria Canal. To determine channel bottom profiles, bottom elevations taken at 1/2 to 1-1/2-mile intervals were averaged. The shapes of the channels studied were such that the average water depths approximated the hydraulic radius. An example of the channel mean depths and cross sections observed in the 1973 survey for the

reach of Old River between Clifton Court and the San Joaquin River is presented in figure VII-2.

The diagram below illustrates the differences between average and maximum depths and between LWD and MSL.



Bottom elevations of the major channels were further analyzed in relationship to the survey dates and the initial operations of the Federal and State pumping plants.

San Joaquin River--Vernalis to Mossdale Bridge. Most of this reach has aggraded since the 1933-34 surveys. By 1976 the elevation of the stream bottom had risen 0.5 to 9.5 feet above the 1933-34 levels, with an average increase of about 4.0 feet. The bottom elevation of the reach from Vernalis to a point approximately 4.8 miles north of the San Joaquin River club varied from 2 to 7 feet below the LWD in 1933 and varied from 1.5 to 3.5 feet above LWD in 1976. This aggradation generally causes a corresponding reduction in water depth.

Old River, San Joaquin River to and including Salmon Slough. In 1973, streambed elevations of this 7.5-mile reach were equal to or below that measured in the 1933-34 survey. The 1973 elevations ranged from 8 to 24 feet below LWD with an average of about 14 feet; the 1933-34 elevations varied from 8 to 17 feet with an average of about 10 feet. Therefore, during the intervening

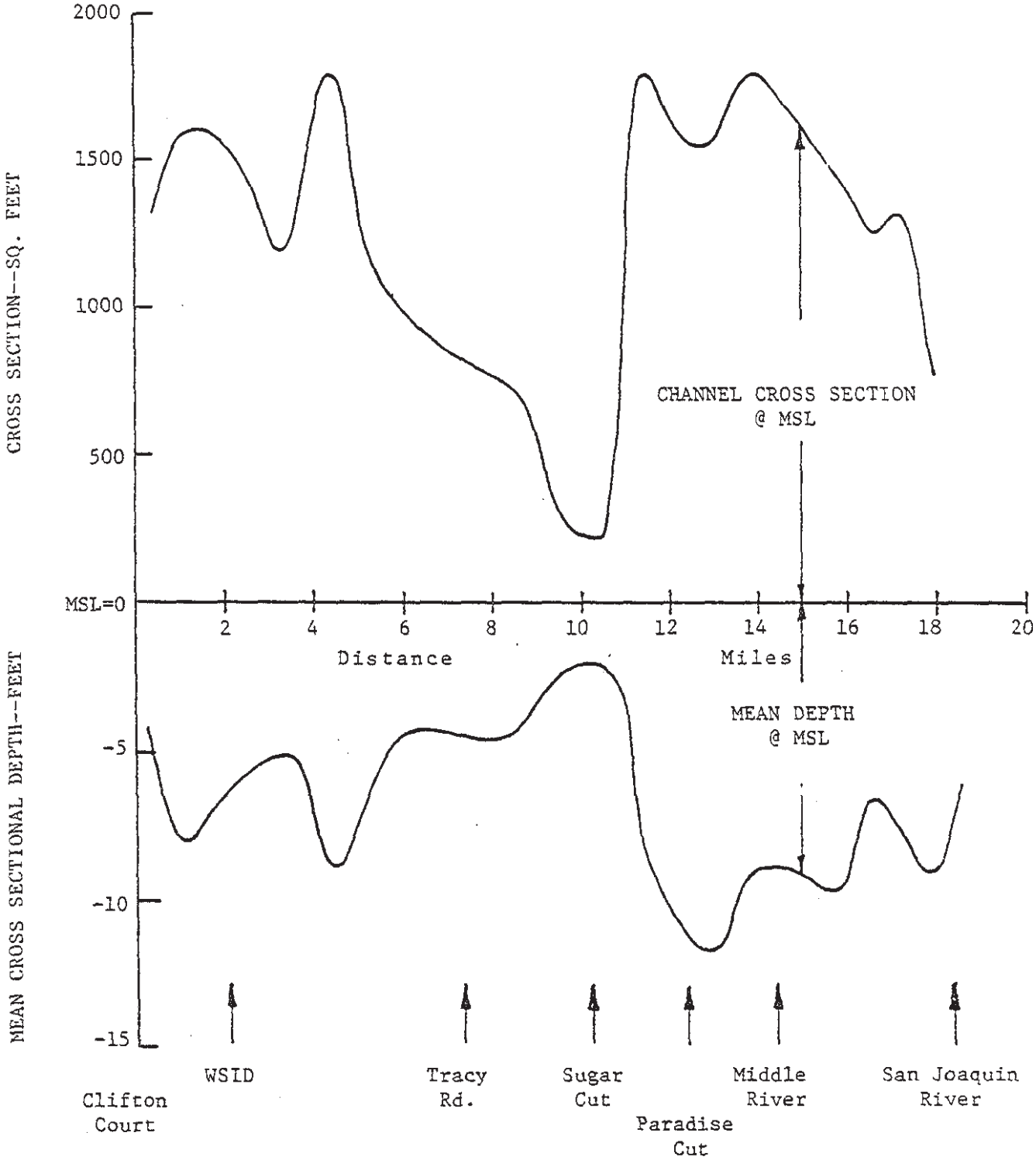


Figure VII-2 CHANNEL PROPERTIES, OLD RIVER, CLIFTON COURT TO SAN JOAQUIN RIVER
(Data from 1973 DWR Survey, Datum is Mean Sea Level)

40 years, the channel had degraded an average of 4 feet, but with very little change in the upstream 1/3 of the reach.

Old River, to Salmon Slough to Delta-Mendota Canal Intake Channel. Bottom elevations of this 11-mile channel averaged 12 feet in 1913, with a range of 9 to 22 feet below LWD. The channel had displayed a 3.5-foot aggradation by the 1933-34 survey. However, the channel had not had any further significant change by the 1973 survey. The 1933-34 and the 1973 surveys each indicated a similar channel restriction near the bifurcation of Old River and Tom Paine Slough. Maximum cross sectional depths measured in 1973 through the 4-mile restricted section averaged about 6 feet with a minimum of 4 feet with reference to LWD elevation. The mean elevation of the bottom of the most restricted area is about 2 feet below mean sea level as shown in figure VII-2. Where as the maximum depth below LWD was about 3.7 feet.

Grant Line and Fabian Canals--In 1913 the elevation of these paralleling 7-mile channels averaged more than 20 feet below LWD. By 1957 they had aggraded about 8 feet with an average depth of 12 feet below LWD, remaining at that depth until after the 1965 survey. By the 1973 survey, however, the channels had degraded to an average of about 16 feet below LWD. The channel depths could have been influenced by maintenance dredging and/or increases in channel velocities due to operation of Clifton Court Forebay. Flow restrictions have not been apparent in these channels.

Middle River--Old River to Victoria Canal--In 1913, the channel elevation of this 11.5-mile reach of Middle River varied between 7 and 18 feet below LWD with an average of about 12 feet below LWD. By the 1933-34 survey, channel bed had aggraded to an average of about 6 feet below LWD elevation. Further

aggradation was shown by the 1973 survey to an average depth of 4 feet below LWD elevation. However, the 6-mile reach directly north of Old River has only aggraded about 0.5 feet since the 1933-34 survey. Both the 1933-34 and 1973 surveys recorded a restriction 0.4 of a mile north of the head of Middle River with maximum depths of 1.0 in 1933-34 and 0.5 feet in 1973, below LWD elevation.

Calculated Hydraulic Resistance in Old River

The resistance to flow, assuming present channel geometry in Old River, was studied as a basis for examination of the effect of reduced water levels on water circulation through this channel.

Using channel cross section data obtained by the DWR in 1973, the hydraulic resistance characteristics were estimated for some 22 channel segments of Old River between Clifton Court and the main stem of the San Joaquin River. It can be shown by open channel flow hydraulics that resistance, the relationship between head loss and channel discharge, is proportional to the square of channel width and the 10/3 power of the mean depth. In essence, this means that a narrow, shallow channel greatly restricts flow--much more dramatically than might at first appear to be the case by inspection in the field. For example, simply reducing channel width and depth by one-half each, thereby reducing the effective area to one-quarter, increases hydraulic resistance for the same length and roughness more than 40 times. These effects are especially evident in the central section of Old River in the vicinity of Tom Paine Slough where mean channel depths below mean sea level average less than 3 feet and widths are less than 100 feet.

The channel cross sections and depths along Old River are illustrated graphically in figure VII-2. In figure VII-3 the cumulative hydraulic resistance

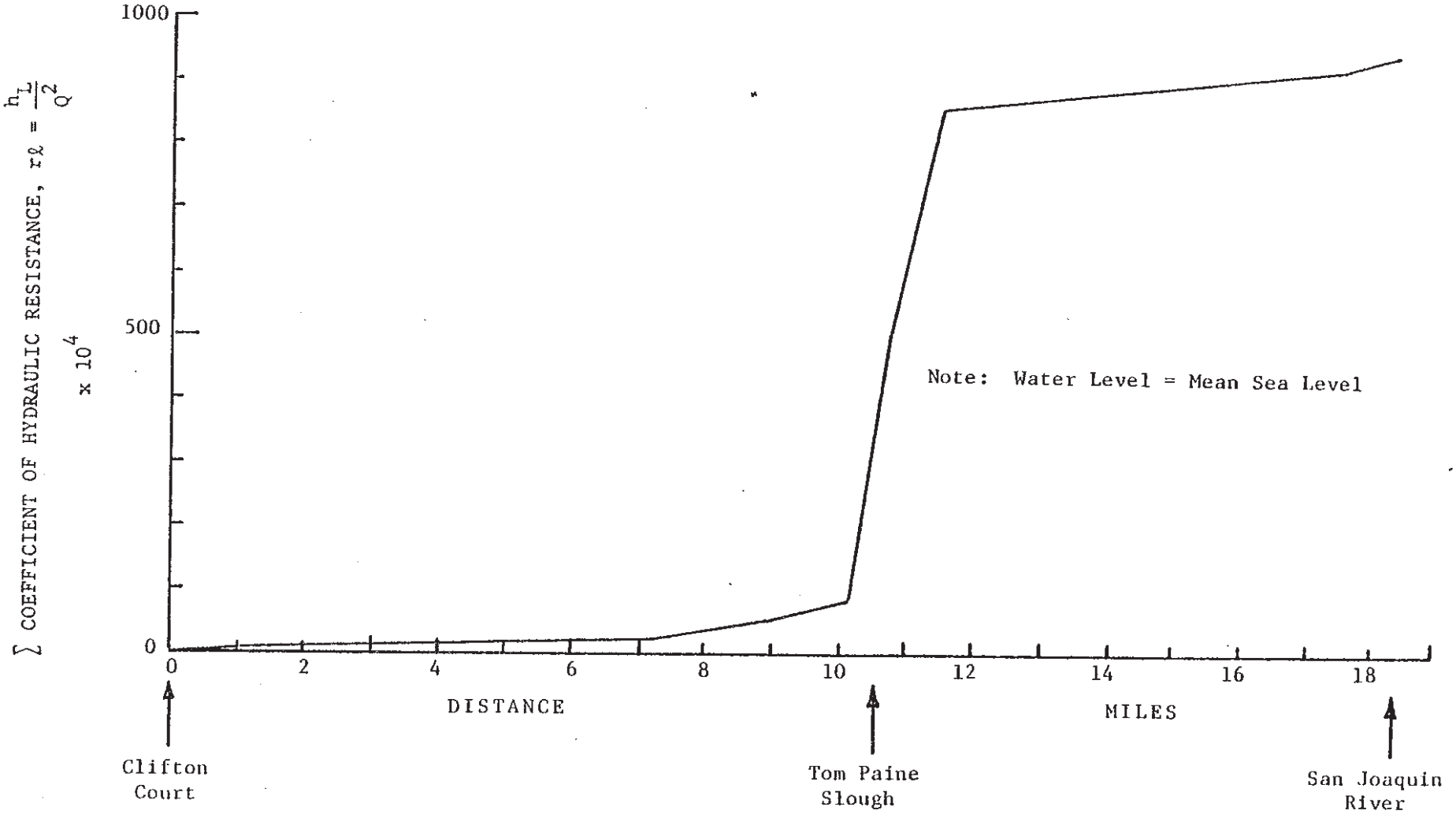


Figure VII-3 CUMULATIVE HYDRAULIC RESISTANCE IN OLD RIVER, CLIFTON COURT TO SAN JOAQUIN RIVER

to flow is plotted for the entire channel from Clifton Court to the San Joaquin River. The same data are visually keyed to a partial map of Old River in figure VII-4. It is noted that most of the effect, about 90 percent of the total, is concentrated in a short section about 2 miles long in the vicinity of Tom Paine Slough. This restriction was evident during the 1933-34 channel survey. Obviously, this area controls the rate of flow in an east-west direction through Old River. Actually, it forces the largest proportion of the east to west flow through Grant Line and Fabian-Bell Canals rather than through the westerly section of Old River.

Sediment Movement

In 1950, the USBR improved the operation of the Delta-Mendota Canal intake channel by dredging the Old River Channel to a minus 17-foot elevation from the Delta-Mendota Canal headworks downstream to approximately Grant Line Canal. By 1969 the dredged channel was nearly obliterated by sediment which continued to move into the Delta-Mendota Canal Intake Channel. The Old River Channel was dredged again in 1969 and in 1974. Another example of sediment movement is the accumulation of 60,000 cubic yards of sediment in Clifton Court Forebay during the first 4 years of its operation.

During the same period a large but unestimated amount of sediment was pumped into the Delta-Mendota Canal as suspended load and deposited within the canal, O'Neill Forebay and Mendota Pool. The available suspended solids data for both the DMC and State Aqueduct and vicinity are located in STORET, a Federal data storage system, and summarized below for the period of record:

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BEFORE THE

STATE WATER RESOURCES CONTROL BOARD

July 1-2, 2014, SWRCB Board Meeting; Agenda Item 5; Emergency Regulations	) DECLARATION OF JOSEPH RATTO

I, Joseph Ratto, declare as follows:

1. I am 71 years of age and a full-time family farmer, currently farming approximately 3,100 acres which includes lands owned and leased on Union Island, Roberts Island, and Jones Tract in the San Joaquin County. I conduct my farming through a number of partnerships or corporations. I have been a full-time farmer in the Delta for my entire adult life. I am also a member of the Board of Trustees of Reclamation District No. 544.

2. I make this declaration on the basis of my own personal knowledge of the matters stated herein and, if called as a witness, I could and would competently testify to these facts.

3. The entire (approximately) 3,100 acres I farm is presently planted with tomatoes, alfalfa, corn, wheat, cucumbers, safflower, and almonds. It is essential I continue to irrigate until the middle of September, 2014.

4. The lands I farm which are leased are generally on a crop share basis, meaning that the rent received by the landlord is a share of the crop itself rather than a cash rent, although I do have some rents which are paid in cash. The lands have various water rights, including claimed riparian rights, which are utilized to divert water for crop irrigation and related purposes

throughout the year. The lands I farm have riparian claims to Middle River, San Joaquin River, and Whiskey Slough.

5. Depending on the year and crop, we apply water at various times. This water use is essential for our crops.

6. The farms have no adequate water supply other than the adjoining waterways. Groundwater pumping is not an alternative, as there are no groundwater wells for farming purposes due to the poor quality of the groundwater.

7. There is always surface water in the adjoining waterways, as the bottom of these waterways adjoining the lands we farm are at such elevation as to be subject to tidal flows from the San Francisco Bay and Estuary, inflows from upstream, including return flows from groundwater irrigation and other surface water irrigation. During the drought in the 1970's, which was worse than the current conditions, the adjoining waterways were never dry.

8. Should the State Water Resources Control Board curtail the use of water for my farming operation, there will be a substantial crop loss and a risk of catastrophic failure of my farming operations. Virtually, my entire net worth is invested in farming, and a single year of crop loss would threaten to end my 50 plus years of farming. My family and I would be devastated, such a catastrophic loss would necessitate the liquidation of many of my properties. Based on past production and income, I estimate that if we cannot irrigate our crops this year beyond July 1, 2014, we will lose approximately $5,000,000. In addition, there will be impacts on the landowners of the properties I lease, most of whom are entitled to a share of the profits, of which there would be none.

9. There will also be effects of not farming upon the land itself. Weed growth will take place, and eradication efforts and expense will be required, as well as substantial vector control. My neighboring farmers are in similar situations and absent the ability of all of us to fund the drainage operations of the various local Reclamation Districts, much of the land will be become swampy and inundated by water, thereby resulting in a greater evaporation and loss of water than if we continued our farming. This will also create a haven for mosquitos, including those carrying the West Nile Virus, and will result in increased spraying by the county mosquito

abatement district. Complete mosquito control, however, is not possible.

10. Further, the consumptive use of water in the Delta is less if it is farmed than if unfarmed. It has been demonstrated that farming many crops actually utilizes less water than if it is fallow. Corn is one such crop.

11. Others dependent on our farming operation will also suffer if we cannot irrigate. I am employ 17 workers, 14 of which have families. A cessation of the ability to divert would mean no job or income for any of those workers and their families.

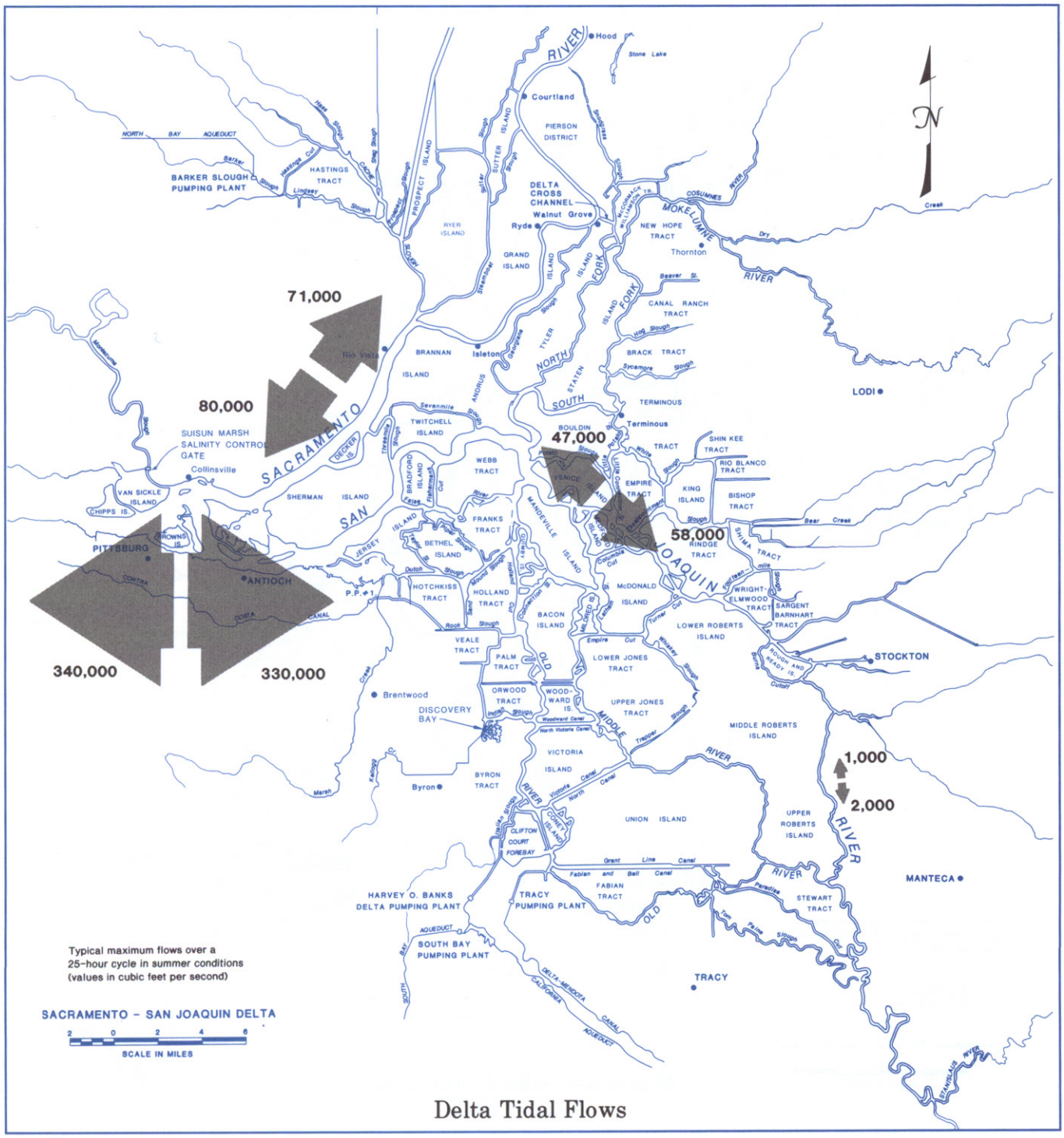
I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed this 26th day of June, 2014, at Stockton, California.

JOSEPH RATTO

Delta Tidal Flows and Levels

The Sacramento-San Joaquin Delta is at sea level. Water levels vary greatly during each tidal cycle, from less than a foot on the San Joaquin River near Interstate 5 to more than five feet near Pittsburg. During the tidal cycle, flows can also vary in direction and amount. For example and as shown on the map below, the flow near Pittsburg during a typical summer tidal cycle can vary from 330,000 cfs upstream to 340,000 cfs downstream. The "net" summer Delta outflow is a very small amount of the total water movement, generally 5,000 to 10,000 cfs.



Delta Tidal Flows

Delta Hydrology Conditions

Date	Sacramento River at Freeport + SRWTP cfs	Yolo Bypass cfs	East Side Streams cfs	San Joaquin River at Vernalis cfs	Rainfall inches	Clifton Court Forebay Intake cfs	Tracy Pumping Plant cfs	CCWD Pumping Plants cfs	Barker Slough Pumping Plant cfs	BBID Diversion cfs
5/25/2014	6,687	4	374	723	0.00	276	810	195	109	50
5/26/2014	6,610	5	352	692	0.00	286	811	189	135	50
5/27/2014	6,809	4	371	612	0.00	275	810	180	101	123
5/28/2014	7,557	4	383	562	0.00	292	850	187	100	94
5/29/2014	7,518	4	390	524	0.00	294	810	189	120	95
5/30/2014	7,569	4	405	510	0.00	488	810	203	143	81
5/31/2014	7,885	4	399	526	0.00	493	810	191	131	85
6/1/2014	7,584	4	362	485	0.00	485	809	203	111	76
6/2/2014	7,184	4	248	472	0.00	291	811	199	132	76
6/3/2014	8,332	4	316	452	0.00	285	809	209	129	81
6/4/2014	7,971	4	446	439	0.00	287	807	170	125	76
6/5/2014	7,816	4	506	400 e	0.00	292	836	186	133	85
6/6/2014	8,015	4	544	382	0.00	289	883	189	84	106
6/7/2014	8,197	4	512	382	0.00	283	592	188	69	102
6/8/2014	8,402	4	446	394	0.00	740	0	179	70	90
6/9/2014	7,892	4	355	391	0.00	746	0	201	70	60
6/10/2014	7,458	4	259	369	0.00	741	0	205	75	81
6/11/2014	7,702	4	254	342	0.00	735	0	219	59	101
6/12/2014	8,239	4	233	316	0.00	736	0	217	70	82
6/13/2014	8,180 e	4 e	267	310 e	0.00	740	0	214	71	86
6/14/2014	8,355	4	253	316	0.00	738	0	210	70	94
6/15/2014	8,701	4	222	316	0.00	745	0	196	70	87
6/16/2014	9,099	4	226	324	0.00	745	0	205	66	75
6/17/2014	9,986	4	205	309	0.00	740	0	209	69	68
6/18/2014	9,790	4	191	275	0.00	747	5	211	69	67
6/19/2014	9,749	4	203	276	0.00	742	0	185	75	81
6/20/2014	9,508	4	220	260	0.00	743	0	200	77	78
6/21/2014	9,521	4	236	244	0.00	744	0	206	81	91
6/22/2014	9,610	4	248	248	0.00	748	0	177	74	73
6/23/2014	9,878	4	226	287	0.00	743	6	186	80	54

SRWTP : Sacramento Regional Water Treatment Plant effluent.
Yolo Bypass : combined measurements of Cache Creek at Rumsey and Freemont Weir.
East Side Streams : combined stream flows of Cosumnes River at Michigan Bar, Mokelumne River at Woodbridge, miscellaneous streams estimated from Dry Creek at Galt (discontinued since Dec. 1997), and Calaveras River based on releases from New Hogan Dam.
Rainfall : incremental daily precipitation measured at Stockton Fire Station #4.
CCWD Pumpling Plants : combined pumping at the Old River, Rock Slough and Middle River Plants.

Delta Hydrology Conditions

Date	Banks Pumping Plant cfs	Delta Gross Channel Depletions cfs	Rio Vista Flow cfs	QWEST cfs	Net Delta Outflow Index cfs	Percent of Inflow Diverted		Delta Status
						3 day	14 day	
5/25/2014	172	2,750	3,943	-249	3,393	14.2%	13.9%	b
5/26/2014	203	2,750	4,203	-210	3,665	13.9%	14.0%	b
5/27/2014	109	2,800	4,123	-211	3,615	13.3%	13.6%	b
5/28/2014	188	2,850	4,280	-370	3,611	13.2%	13.6%	b
5/29/2014	156	2,900	4,915	-304	4,288	12.6%	13.4%	b
5/30/2014	125	2,950	4,867	-594	3,924	13.2%	14.3%	b
5/31/2014	170	3,000	4,897	-609	3,948	13.5%	14.8%	b
6/1/2014	203	3,050	5,157	-600	4,232	14.2%	15.6%	b
6/2/2014	172	3,100	4,882	-556	3,978	13.4%	14.6%	b
6/3/2014	313	3,150	4,522	-765	3,407	12.9%	13.6%	b
6/4/2014	309	3,200	5,503	-563	4,591	12.0%	12.7%	b
6/5/2014	250	3,250	5,176	-568	4,248	11.9%	12.6%	b
6/6/2014	172	3,300	5,027	-626	4,086	11.7%	12.7%	b
6/7/2014	463	3,350	5,186	-318	4,565	10.9%	11.5%	b
6/8/2014	650	3,400	5,330	-227	4,796	9.3%	9.8%	b
6/9/2014	696	3,450	5,494	-343	4,840	7.7%	8.2%	b
6/10/2014	866	3,500	5,037	-515	4,202	7.4%	7.7%	b
6/11/2014	742	3,550	4,647	-712	3,628	7.6%	7.6%	b
6/12/2014	578	3,600	4,845	-761	3,762	7.8%	7.5%	b
6/13/2014	611	3,650	3,800	-767	4,203	7.7%	7.5%	b
6/14/2014	774	3,700	2,661	726	4,138	7.5%	7.5%	b
6/15/2014	604	3,750	2,771	1,815	4,254	7.4%	7.5%	b
6/16/2014	604	3,800	3,002	1,833	4,503	7.3%	7.5%	b
6/17/2014	650	3,850	3,269	1,922	4,853	7.2%	7.5%	b
6/18/2014	604	3,900	3,882	2,098	5,638	6.9%	7.5%	b
6/19/2014	650	3,950	3,730	2,011	5,389	6.6%	7.4%	b
6/20/2014	611	4,000	3,687	1,961	5,290	6.5%	7.3%	b
6/21/2014	610	4,050	3,502	1,864	5,001	6.5%	7.1%	b
6/22/2014	610	4,100	3,497	1,842	4,979	6.6%	7.1%	b
6/23/2014	645	4,100	3,560	1,856	5,050	6.7%	7.2%	b

Delta Gross Channel Depletions from Dayflow Table 3.
Rio Vista Flow calculated from Dayflow equation.
QWEST calculated from Dayflow equation.
Net Delta Ouflow Index calculated from equation as specified in D-1641, revised June 1995.

Coordinated Operation Agreement Delta Status:
(Note: below label begins on October 1, 2013)
c = excess Delta conditions
b = balanced Delta conditions
r = excess Delta conditions with restrictions:

STATE WATER RESOURCES CONTROL BOARD
BOARD MEETING SESSION – DIVISION OF WATER RIGHTS
JULY 1, 2014

ITEM 5

SUBJECT

CONSIDERATION OF A PROPOSED RESOLUTION REGARDING DROUGHT-RELATED EMERGENCY REGULATIONS FOR CURTAILMENT OF DIVERSIONS TO PROTECT SENIOR WATER RIGHTS

DISCUSSION

Background

On January 17, 2014, Governor Brown declared a drought state of emergency. On that same day, the State Water Board issued a Notice of Surface Water Shortage and Potential for Curtailment of Water Right Diversions. The notice advised that if dry weather conditions persist, the State Water Board would notify water right holders in critically dry watersheds of the requirement to limit or stop diversions of water under their water right, based on their priority. These notices were distributed to specific watersheds beginning in May 2014. Water right holders receiving such notice are required to stop their diversions; however there is no immediate sanction to compel diverters to comply. As of June 17, 2014, approximately 79% of all water right holders that received a notice to curtail had not returned a curtailment certification to demonstrate compliance.

On March 1, 2014, Governor Brown signed a drought relief package, SB 104, which, among other things, expanded the State Water Board's authority under Water Code section 1058.5. Water Code section 1058.5 grants the State Water Board the authority to adopt emergency regulations in certain drought years in order to: "prevent the waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion, of water, to promote water recycling or water conservation, to require curtailment of diversions when water is not available under the diverter's priority of right, or in furtherance of any of the foregoing, to require reporting of diversion or use or the preparation of monitoring reports."

The proposed emergency regulations are intended to use the authority authorized by the March drought relief legislation to address the possible widespread lack of compliance. The regulation will have no new effect on water right holders that have acted to stop their diversion in response to a notice of curtailment and report on their compliance.

Proposed Emergency Regulations

The proposed emergency regulations provide the State Water Board with a more effective approach to prevent harm to senior water right holders if there is insufficient water to meet the needs of all right holders. The regulations would allow the Board to implement the State's water right priority system on a more real-time basis. An order, issued pursuant to the emergency regulations, would go into effect immediately. This means that the regulations will both:
1) increase the certainty that curtailed water rights holders will cease diverting water; and
2) provide greater assurance that curtailed water rights holders will report on the continued exercise of their senior rights and assist the Board to refine curtailments.

The proposed emergency regulations will:

- Apply to all water right holders where curtailments are undertaken.
- Describe the information to determine whether conditions warrant curtailment.
- Require reporting to demonstrate compliance with a curtailment order.

The emergency regulations will continue to allow for water sharing agreements as an alternative means of protecting senior water rights. Water sharing agreements must demonstrate that senior water right holders will not be harmed and there will be no unreasonable effect on fish and wildlife as a result of the agreement.

Request for Input: Minimum Human Health and Safety Needs

The Board recently added, by emergency regulations, article 24 to division 3, chapter 2 of California Code of Regulations, title 23. Article 24 contains section 878.1, which identifies certain limited minimum health and safety needs that may be authorized notwithstanding the need for curtailment, and declaring use under even more senior water rights to be a waste and unreasonable use when those minimum health and safety needs cannot be met. Currently, section 878.1 only applies to curtailment orders issued pursuant to section 877 of that article, which addresses minimum flows in Deer, Mill and Antelope Creeks.

During the State Water Board's workshop on curtailments in the Sacramento-San Joaquin Watershed held on May 20 and 21, 2014, some commenters suggested that health and safety considerations should be addressed by making changes in the water supply network, without the need for a health and safety exception. While proposed section 875 is currently written so as to not include the minimum health and safety exemption contained in section 878.1, the Board is interested in hearing comment on this issue. The Board is specifically asking interested parties to comment on whether the approach to ensure that minimum health and safety needs are addressed in the emergency regulations to address minimum flows in Deer, Mill and Antelope Creeks should be applied more broadly, or if there are alternative approaches to meeting this need.

POLICY ISSUE
Should the State Water Board adopt the proposed resolution?
Should proposed section 875 be subject to the minimum health and safety exemption from curtailments and water right seniority under section 878.1?

FISCAL IMPACT
This activity is budgeted within existing resources, and no additional fiscal demands will occur as a result of approving this item.

REGIONAL BOARD IMPACT
None.

STAFF RECOMMENDATION
Staff recommends that the State Water Board adopt the proposed resolution adopting the emergency regulation.

State Water Board action on this item will assist the Water Boards in reaching Goal 6 of the Strategic Plan Update: 2008-2012 to enhance consistency across the Water Boards, on an ongoing basis, to ensure our processes are effective, efficient, and predictable, and to promote fair and equitable application of laws, regulations, policies and procedures.

State Water Resources Control Board

NOTICE OF PROPOSED EMERGENCY RULEMAKING
June 20, 2014

Curtailment of Diversions due to Insufficient Flow for Senior Water Rights

Addition of Sections 875 and 878.3, to Article 24, Division 3 of Title 23 of the California Code of Regulations, and Amendment of Sections 878.1 and 879

Required Notice of Proposed Emergency Action
Government Code section 11346.1, subdivision (a)(2) requires that, at least five working days prior to submission of a proposed emergency regulation to the Office of Administrative Law (OAL), the adopting agency must provide a notice of the proposed emergency action to every person who has filed a request for notice of regulatory action with the agency. After the submission of the proposed emergency action to OAL, OAL shall allow interested persons five calendar days to submit comments on the proposed emergency regulations as set forth in Government Code section 11349.6. This document and the accompanying information provide the required notice.

Proposed Emergency Action
On January 17, 2014, Governor Brown declared a drought state of emergency. On that same day, the State Water Resources Control Board (State Water Board or Board) issued a Notice of Surface Water Shortage and Potential for Curtailment of Water Right Diversions. The notice advised that if dry weather conditions persist, the State Water Board would notify water right holders in critically dry watersheds of the requirement to limit or stop diversions of water under their water right, based on their priority. On March 1, 2014, Governor Brown signed a drought relief package, SB 104, which, among other things, expanded the State Water Board's authority under Water Code section 1058.5.

Water Code section 1058.5 grants the State Water Board the authority to adopt emergency regulations in certain drought years in order to: "prevent the waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion, of water, to promote water recycling or water conservation, to require curtailment of diversions when water is not available under the diverter's priority of right, or in furtherance of any of the foregoing, to require reporting of diversion or use or the preparation of monitoring reports."

On July 1, 2014, the State Water Board will consider a proposed resolution adding new sections 875 and 878.3 to title 23, division 3, chapter 2, article 24 of the California Code of Regulations and amending sections 878.1 and 879. In general, the emergency regulations would provide the State Water Board with a more streamlined and effective process to curtail diversions of water when water is not available under the diverter's priority of right and to require reporting relative to the curtailments. Under the proposed emergency regulations, the State Water Board would curtail water diversions on a water right priority basis to protect the rights of senior water

right holders and would require water users to report relative to the curtailments to inform curtailment and enforcement actions by the State Water Board. The emergency regulations allow for alternative water sharing agreements in lieu of State Water Board curtailments as an alternative means of protecting senior water rights. The proposed emergency regulations also indicate that the exceptions to curtailments for minimum health and safety needs included in section 878.1 do not apply to the curtailments under section 875. The Board has specifically requested public comment on this issue.

Proposed Text of Emergency Regulations
See the attached proposed text of the emergency regulations.

Finding of Emergency (Gov. Code, § 11346.1, subd. (b))
The State Water Board finds that an emergency exists due to severe drought conditions, as identified in the Governor's drought emergency proclamations. Immediate action is needed to effectively curtail diversions when water is not available under the diverter's priority of right in light of limited water availability during the drought. The State Water Board will need to curtail water diversions when natural flows decrease in order to make that water available for senior water right users.

The State Water Board is unable to address the situation through non-emergency regulations because the standard rulemaking process cannot timely address the current severe drought emergency that is the focus of these regulations. Furthermore, the Governor's April 25, 2014 Executive Order orders the State Water Board to adopt emergency regulations pursuant to Water Code section 1058.5 to address the issues that are the focus of these regulations.

Authority and Reference (Gov. Code, § 11346.5, subd. (a)(2))
Water Code sections 1058 and 1058.5 provide authority for the emergency regulations. The revised emergency regulations implement, interpret, or make specific Cal. Const., Art., X § 2; Sections 100, 100.5, 104, 105, 106.3, 109, 187, 275, 348, 1011, 1011.5, 1051, 1051.5, 1052, 1055, 1058.5, 1825, Water Code; *Environmental Defense Fund v. East Bay Muni. Util. Dist.* (1980) 26 Cal.3d 183; *City of Barstow v. Mojave Water Agency* (2000) 23 Cal.4th 1224.

Informative Digest (Gov. Code, § 11346.5, subd. (a)(3))
Under existing law, the State Water Board may initiate administrative proceedings to curtail diversions in order to protect senior water rights. (Wat. Code, §§ 1052, 1831.) Board enforcement action cannot, however, timely ensure water is actually made available to senior water rights holders who should have access to it. The Board must first determine whether water is available to a diverter and send a notice of curtailment. If the diverter does not curtail diversions at that time, and the Board has individualized information to that effect, the Board may issue a draft cease and desist order to the diverter. The Board must then hold a hearing, if requested, before it may issue a final, enforceable cease and desist order. If the cease and desist order is violated, the Board may impose administrative civil liability. (Wat. Code, § 1845, subd. (b)(1).) In the event that the Board has adopted a regulation under section 1058.5, the Board may immediately issue an enforceable curtailment order based on lack of water availability rather than individualized evidence of unlawful diversion, instead of a notice that water is unavailable, and may immediately issue a draft cease and desist order and simultaneously issue an administrative civil liability complaint in response to violations of the regulation. (Wat. Code, §§ 1058.5, subd. (d), 1845, subd. (d)(4), 1846.) Penalties for violations under the regulations would carry an additional penalty over those for unlawful diversion absent the regulations. (Wat. Code §§ 1845, 1846.) Water users would still have an opportunity to request a hearing before finalization of the cease and desist order and adoption of an

administrative civil liability order, but the scope of the hearing issues could be narrowed substantially due to the regulation.

The adoption of the proposed emergency regulations will improve the State Water Board's abilities to protect senior water right holders by providing the Board with the ability to more quickly and effectively ensure curtailment of unauthorized diversions and reporting of both curtailed and continued diversions. The improved enforceability of the regulations will increase the likelihood of compliance and enforcement, and remediation of noncompliance. At the same time, the increased return rate of reporting and compliance information will provide better information that will improve the State Water Board's abilities to effectively and efficiently enforce curtailments and make adjustments as necessary. Under the proposed regulations, the State Water Board would curtail diverters in water short watersheds in order of water right priority when water is not available under the diverter's priority of right, based on information identified in the regulation, so as to protect the rights of senior water right holders. The requirement to curtail diversions upon receipt of a curtailment order would constitute both a regulatory requirement and a condition of all water right permits, licenses, certificates and registrations, and would thus be more enforceable.

There is no comparable federal statute or regulation. The proposed regulation is not inconsistent or incompatible with existing state regulations.

Other Matters Prescribed by Statute (Gov. Code, § 11346.5, subd. (a)(4))
The proposed emergency regulations would be adopted to require curtailment of diversions when water is not available under the diverter's priority of right, and to require reporting of diversion or use, or curtailment of diversion, after receipt of a curtailment order. The proposed emergency regulation would be adopted in response to conditions which exist, or are threatened, in a critically dry year immediately preceded by two or more consecutive below normal, dry, or critically dry years or during a period for which the Governor has issued a proclamation of a state of emergency under the California Emergency Services Act (Chapter 7 (commencing with Section 8550) of Division 1 of Title 2 of the Government Code) based on drought conditions.

Local Mandate (Gov. Code, § 11346.5, subd. (a)(5))
The proposed emergency regulations do not impose a mandate on local agencies or school districts because they do not mandate a new program or a higher level of service of an existing program. The regulation is generally applicable to public and private entities, and is not unique to local government. No state reimbursement is required by part 7 (commencing with section 17500) of division 4 of the Government Code.

Estimate of Cost or Savings (Gov. Code, § 11346.5, subd. (a)(6))
Because the State Water Board already has the authority to curtail diversions, the only additional cost to state and local governments due to the regulation would be the costs associated with the additional reporting required by the regulation. The State Water Board estimates that the cost to state and local agencies and governments will be approximately $318,000 for completion of the mandatory certification forms.

If the Board chooses to make the curtailment exceptions for health and safety needs described in section 878.1 applicable to curtailments under proposed section 875, there would be additional costs to water users that must curtail to make water available for health and safety purposes who would not otherwise have been curtailed. There would also be a benefit to water users that are not curtailed due to the health and safety exception included in section 878.1 who

would have otherwise been curtailed. The fiscal effect on state and local government that will result from additional curtailments that result from allowing more junior health and safety diversions to continue, and thereby affecting more senior water rights is decreased revenue and increased costs totaling $19.1 million. This consists of reduction in agricultural and municipal water agency revenues from lost water sales of $7.9 million and a corresponding reduction in state and local tax revenues of $0.8 million. There will be additional loss in state and local tax revenue of $3.6 million associated with reduced agricultural production resulting from curtailed agricultural supply. Agricultural and municipal water agencies will also incur water replacement costs of $6.8 million. The fiscal effect on state and local government that will result from these government agencies being able to continue to divert a quantity of water by relying upon a health and safety exemption is a net benefit of $102.9 million. This consists of: 1) $93.5 million reduction in decreases of water agency revenue; and 2) a $9.4 million reduction in the corresponding decrease in state and local tax revenues. These are reductions in costs that state and local governments would otherwise incur absent the health and safety exemption. The proposed regulations are not anticipated to affect federal funding to the State.

The above summary information is explained in greater detail in the State Water Board's Emergency Regulations Digest, which is attached.

§ 875 Curtailments Due to Lack of Water Availability

(a) California is in a state of extreme drought, and the Governor has issued a proclamation of a state of emergency based on these drought conditions.

Under such drought circumstances, Water Code section 1058.5 provides for the State Water Resources Control Board to adopt emergency regulations to provide for curtailments in order of water right priority when water is not available under the diverter's priority of right.

(b) After the effective date of this regulation, when flows are sufficient to support some but not all diversions, the Deputy Director for the Division of Water Rights, or her designee, may issue curtailment orders to water right holders in order of water right priority, requiring the curtailment of water diversion and use except as provided in sections 878 and 878.3.

(c) In determining whether water is available under a diverter's priority of right and to issue curtailment orders, the Deputy Director for the Division of Water Rights, or her designee, may rely upon:

(1) Relevant available information regarding date of priority, including claims of first use in statements of water diversion and use and other information contained in the Division of Water Rights files. Absent evidence to the contrary, riparian water rights are presumed senior to appropriative water rights for purposes of curtailments pursuant to this section.

(2) Water right demand projections based on: recent reports of water use for permits and licenses, 2010, or later, statements of water diversion and use, or reports submitted by watermasters.

(3) Water availability projections based on:

i. Projected full natural flow data supplied by the Department of Water Resources, where available;

ii. Projections from the National Weather Service's River Forecasts website, where available;

iii. Stream gage data, where available; or

iv. Other data that the Deputy Director for the Division of Water Rights determines is appropriate, given data availability and reliability and staff resources.

(4) To the extent that it is available and staff resources permit, the Deputy Director for the Division of Water Rights may also consider additional pertinent and reliable information when determining water right priorities, water availability and demand projections.

(d) Curtailment orders will initially be mailed to each water right holder or the agent of record on file with the State Water Resources Control Board, Division of Water Rights. The water right holder or agent of record is responsible for immediately providing notice of the orders to all diverters and/or water users exercising the water right.

(e) Within 7 days of the effective date of this regulation, the State Water Resources Control Board will establish an email distribution list that water right holders should join to receive drought notices and updates regarding curtailments. Notice provided by email or by posting on the State Water Resources Control Board's drought web page shall be sufficient for all purposes related to drought notices and updates regarding curtailments.

(f) All curtailment orders issued under this article shall be subject to reconsideration under article 2 (commencing with section 1122) of chapter 4 of part 1 of division 2 of the California Water Code.

§ 878.1 Minimum Health and Safety Needs

(a) This section shall not apply to curtailments issued under section 875 of this article.

(~~a~~b) A diversion that would otherwise be subject to curtailment may be authorized if:

(1) The diversion is necessary for minimum health and safety needs; and therefore

(2) The diversion is necessary to further the constitutional policy that the water resources of the state be put to beneficial use to the full extent they are capable, and that waste and unreasonable use be prevented, notwithstanding the effect of the diversions on more senior water rights or instream beneficial uses.

(~~b~~c) Given the essential nature of water in sustaining human life, use even under a more senior right for any other purpose when domestic and municipal supplies required for minimum health and safety needs cannot be met is a waste and unreasonable use under the California Constitution, Article X, § 2.

(1) Diversions for domestic and municipal use under any valid basis of right, of less than 50 gallons per person, per day, and not exceeding 10 acre-feet per year of storage or 4,500 gallons per day of direct diversion, may continue after issuance of a curtailment order without further approval from the Deputy Director, subject to the conditions set forth in this section. Any diverter wishing to continue diversion under this subdivision must submit to the Deputy Director certification, under penalty of perjury, of compliance with the requirements of subdivisions (~~b~~c)(1)(A)-(G), below. The Deputy Director may request additional information or set additional requirements on continued diversion.

(A) Not more than 50 gallons per person per day will be diverted under all bases of right;

(B) The diversion is necessary to achieve the minimum amount of water necessary for health and safety, up to 50 gallons per person per day, after all other alternate sources of potable water have been

used. To the extent other potable water is available, those sources will be used first and the total used will not exceed 50 gallons per person, per day;

(C) The diverter or all end users are operating under the strictest existing conservation regime for that place of use, if such a plan exists for the area or service provider, or shall be operating under such regime within 30 days. If additional approvals are required before implementation of the conservation regime, the diverter must certify that all possible steps will be taken immediately to ensure prompt approval;

(D) No potable water will be used for outdoor landscaping while this approval is in effect. Water service providers must implement this provision as rapidly as possible, up to a limit of 15 days. If additional approvals are required before implementation of the conservation regime, the diverter must certify that all possible steps will be taken to ensure prompt approval;

(E) If the diverter has the authority to set rates, that such rates are set to encourage conservation, or that changing the rates to encourage conservation shall be considered at the next opportunity, but no later than 30 days from certification. If additional approvals are required before implementation of such a rate structure, the diverter must certify that all possible steps will be taken to ensure prompt approval. If the diverter does not implement rates to encourage conservation, it must submit to the Deputy Director with the next required reporting an explanation of why such rate setting is inappropriate despite the current drought;

(F) If the diverter is a public water supplier under Water Code section 350 et seq., that it has declared a water shortage emergency condition and adopted regulations and restrictions on the delivery of water or has noticed a meeting for adoption within the next 10 days, and shall adopt conservation and water delivery restrictions and regulations within the next 30 days. To the extent regulations and restrictions require additional approval, the diverter must certify that all possible steps will be taken to ensure prompt approval.

(G) The diverter has either pursued steps to acquire other sources of water, but has not yet been completely successful, as described in an attached report, or the diverter will pursue the steps in an attached plan to identify and secure additional water.

(2) To the extent that a diversion for domestic or municipal use requires more than 50 gallons per person, per day to meet minimum health and safety needs, or for up to 50 gallons per person, per day exceeding 10 acre-feet of storage or a total

of 4,500 gallons per day, the continuing diversion of water after issuance of a curtailment notice for the diversion requires submission of a petition and approval by the Deputy Director. The Deputy Director may condition the approval on implementation of additional conservation measures and reporting requirements. Any petition to continue diversion to meet minimum health and safety needs of more than 50 gallons per person, per day, or for up to 50 gallons per person, per day exceeding 10 acre-feet of storage or a total of 4,500 gallons per day, must:

(A) Describe the specific circumstances that make the requested diversion amount necessary to meet minimum health and safety needs, if a larger amount is sought.

(B) Certify compliance and provide documentation of the actions described in subdivision (~~b~~c)(1)(C) – (~~b~~c)(1)(G).

(C) Describe any other additional steps the diverter will take to reduce diversions and consumption.

(D) Provide the timeframe in which the diverter expects to reduce usage to no more than 50 gallons per person, per day, or why minimum health and safety needs will continue to require more water.

(~~c~~d) All other diversions for minimum health and safety needs, except for an imminent threat to life, require approval from the Deputy Director. The Deputy Director may approve a petition under this subdivision or subdivision (~~b~~c)(2) upon a finding that the diversion is in furtherance of the constitutional policy that the water resources of the state be put to beneficial use to the full extent they are capable, and that waste and unreasonable use be prevented, notwithstanding the effect of the diversion on senior water rights or instream beneficial uses, and may condition approval as appropriate to ensure that the diversion and use are reasonable and in the public interest.

(~~d~~e) "Minimum health and safety needs," as used in this article, means the amount of water necessary for prevention of adverse impacts to human health and safety, for which there is no reasonable alternate supply. "Minimum health and safety needs" include:

(1) Domestic and municipal supplies as described in subdivision (~~b~~c).

(2) Water supplies necessary for energy sources that are critical to basic grid reliability, as identified by the California Independent System Operator, California Public Utilities Commission, California Energy Commission, or a similar energy grid reliability authority, and as authorized by the Deputy Director.

(3) Water supplies identified by the California Department of Forestry and Fire Protection, or another appropriate authority, as regionally necessary for fire preparedness, and as approved by the Deputy Director.

(4) Water supplies identified by the California Air Resources Board, a local air quality management district, or other appropriate public agency with air quality expertise, as regionally necessary to address critical air quality impacts in order to protect public health, and as authorized by the Deputy Director.

(5) Water supplies necessary to address immediate public health or safety threats, as determined by a public agency with health or safety expertise, subject to approval of the Deputy Director. Such a petition should include a description of the public health need, a description of why the need is immediate, an estimate of the amount of water needed, and a certification that the supply will be used only for the stated need. If necessary to resolve immediate public health or safety threats, the diversion may continue while the petition is being prepared and is pending. The Deputy Director may require additional information to support the initial petition, as well as information on how long the diversion is expected to continue, and a description of other steps taken or planned to obtain alternative supplies.

(6) Other water needs not identified, which a state, local, tribal or federal health, environmental or safety agency has determined are critical to public health and safety, or to the basic infrastructure of the state, subject to Deputy Director approval. Petitioners wishing to continue diversions for these uses must identify the health and safety need, include approval from the appropriate public entity, describe why the amount requested is critical for the need and cannot be met through alternate supplies, state how long the diversion is expected to continue, certify that the supply will be used only for the stated need, and describe steps taken and planned to obtain alternative supplies.

(~~e~~f) Notice of certification, petitions and decisions under this section and section 878 will be posted as soon as practicable on the State Board's drought webpage. The Deputy Director may issue a decision under this article prior to providing notice. Any interested person may file an objection to the certification, petition or decision. The objection shall indicate the manner of service upon the certifier or petitioner. The State Board will consider any objection, and may hold a hearing thereon, after notice to all interested persons.

§ 878.3 Alternative Water Sharing Agreements

Water users may propose regional alternatives to curtailment that achieve the purposes of the curtailment process described under section 875. Petitions to implement alternative water sharing agreements to coordinate diversions or otherwise share water in place of State Water Resources Control Board-issued curtailment orders under this article may be submitted to the Executive Director at any time. Petitioners must demonstrate to the satisfaction of the Executive Director that any agreement under this section will not injure legal users of water not signatory to the agreement and that the agreement does not impose an unreasonable impact on fish and wildlife. The Executive Director may approve a petition, subject to conditions

appropriate to ensure that the standard of approval are met, including reporting requirements. Diversions covered by an approved agreement pursuant to this section are subject to this article and violations of such approved agreement shall be subject to enforcement as a violation of this article or as an unauthorized diversion or use.

Notice of petitions and decisions under this section will be posted as soon as practicable on the State Water Resources Control Board's drought webpage. The Executive Director may issue a decision under this article prior to providing notice. Any interested person may file an objection to the petition or decision. The objection shall indicate the manner of service upon the parties that petitioned for approval of the regional alternative. The State Water Resources Control Board will consider any objection, and may hold a hearing thereon, after notice to all interested persons.

§ 879. Reporting

(a) All water users or water right holders issued a curtailment order under this article are required within five days to submit under penalty of perjury a certification of the following actions taken in response to the curtailment order, certifying, as applicable, that:

(1) Diversion under the water right identified has been curtailed;

(2) Continued use is under other water rights not subject to curtailment, specifically identifying those other rights, including the basis of right and quantity of diversion;

(3) Diversions continue only to the extent that they are direct diversions for hydropower;

(4) A petition has been filed as authorized under section 878.1, that the diversion will be authorized if the petition is approved, that the subject water right authorizes the diversion in the absence of a curtailment order, and that diversion and use will comply with the conditions for approval of the petition, except that approval by other authorities may still be pending;

(5) A certification has been filed as authorized under section 878, subdivision (b) or section 878.1, subdivision (~~b~~c)(1), that the subject water right authorizes the diversion in the absence of a curtailment order; or

(6) The only continued water use is for instream purposes.

(b) All water users or water right holders whose continued diversion out of order of water right seniority are authorized under section 878.1 are required to submit, under penalty of perjury, monthly reports during the effective period of the curtailment order. In addition to any reporting required as a condition of certification or of approving a petition, such reports should describe:

(1) how the diverter complies with any conditions of continued diversion, including the conditions of certification under section 878.1, subdivision (~~b~~c)(1);

(2) any failures to comply with conditions, including the conditions of certification under section 878.1, subdivision (~~b~~c)(1), and steps taken to prevent further violations;

(3) conservation and efficiency efforts planned, in the process of implementation, and implemented, as well as any information on the effectiveness of implementation;

(4) efforts to obtain alternate water sources;

(5) if the diversion is authorized under section 878.1, subdivision (~~b~~c):

(i) progress towards implementing the measures described in section 878.1, subdivision (~~b~~c)(1)(C)-(F), to the extent that implementation was incomplete at the time of certification or petition under section 878.1, subdivision (~~b~~c) or the most recent report under this subdivision;

(ii) progress under any plan described in section 878.1, subdivision (~~b~~c)(1)(G) or

(~~b~~c)(2)(C); and

(6) if the diversion is authorized under section 878.1, subdivision (~~d~~e)(3):

(i) the rate of diversion if it is still ongoing;

(ii) whether the water has been used for any other purpose;

(iii) the date diversion ceased, if applicable.

FINDING OF EMERGENCY

The State Water Resources Control Board (State Water Board or Board) finds that an emergency exists due to severe drought conditions and that adoption of the proposed emergency regulation is necessary to address the emergency. Specifically, immediate action is needed to effectively and efficiently administer and enforce the state's water rights system in light of significant reductions in water availability due to the current drought. Pursuant to the State's water right priority system, the State Water Board needs to curtail water diversions when sufficient flows in a watershed are not available for 1) a water users' needs, based on their priority of right because the flows are instead needed to satisfy senior or other correlative rights; or 2) when water in the stream is from water imports or previously stored water released for downstream delivery or use, including meeting public trust and water quality requirements, to which certain diverters do not have any right. The State's current system for curtailing diversions and enforcing those curtailments will not provide for timely and effective implementation of the State's water right system during the current drought when numerous water diversions require curtailment and enforcement in a short period of time. The emergency regulation improves the State Water Board's abilities to quickly and effectively implement and enforce those curtailments during the current drought to ensure that the State's water right priority system is effectively implemented.

California is currently in the third year of a significant drought resulting in severe impacts to California's water supplies and its ability to meet all of the demands for water in the State. On January 17, 2014, Governor Edmund G. Brown, Jr. declared a drought state of emergency (described below). The same day, the State Water Board issued a Notice of Surface Water Shortage and Potential for Curtailment of Water Right Diversions. The notice advised that if dry weather conditions persist, the State Water Board will notify water right holders of the requirement to limit or stop diversions of water under their water rights, based on water right priority. Due to the dry hydrologic conditions, the State Water Board has issued Water Diversion Curtailment Notices to water right holders within some critically dry watersheds, and plans to issue more. However, without the proposed emergency regulations, the State Water Board will have difficultly effectively and efficiently ensuring compliance with these curtailments and enforcing for noncompliance on the large scale needed due to the drought. Without the proposed emergency regulations, senior water right holders may be injured because of the lengthy process involved in enforcing curtailments and the lack of sufficient reported information.

Due to these concerns, Governor Brown's Executive Order, dated April 25, 2014 (described below), directs the State Water Board to "adopt and implement emergency regulations pursuant to Water Code section 1058.5, as it deems necessary … to require curtailment of diversions when water is not available under the diverter's priority of right." This directive explicitly reinforces authority granted to the State Water Board as part of the drought relief legislation signed into law by Governor Brown on March 1, 2014, to adopt emergency regulations "to require curtailment of diversions when water is not available under the diverter's priority of right, or … to require reporting of diversion or use or the preparation of monitoring reports … during a

period for which the Governor has issued a proclamation of a state of emergency." (Wat. Code, § 1058.5, subd (a).)

Emergency Regulations Statutes

Water Code section 1058.5 grants the State Water Board the authority to adopt emergency regulations in certain drought years in order to: "prevent the waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion, of water, to promote water recycling or water conservation, to require curtailment of diversions when water is not available under the diverter's priority of right, or in furtherance of any of the foregoing, to require reporting of diversion or use or the preparation of monitoring reports."

Emergency regulations adopted under Water Code section 1058.5 remain in effect for up to 270 days. The finding of emergency is not subject to review by the Office of Administrative Law.

Government Code section 11346.1, subdivision (a)(2) requires that, at least five working days prior to submission of the proposed emergency action to the Office of Administrative Law, the adopting agency provide a notice of the proposed emergency action to every person who has filed a request for notice of regulatory action with the agency. After submission of the proposed emergency regulations to the Office of Administrative Law, the Office of Administrative Law shall allow interested persons five calendar days to submit comments on the proposed emergency regulations as set forth in Government Code Section 11349.6.

The information contained within this finding of emergency provides the information necessary to support the State Water Board's emergency rulemaking under Water Code section 1058.5 and also meets the emergency regulation criteria of Government Code section 11346.1 and the applicable requirements of section 11346.5.

Evidence of Emergency

Hydrology and Water Supplies

The U.S. Drought Monitor currently classifies the entire state of California as experiencing severe to exceptional drought conditions. In most years, California receives about half of its precipitation in the months of December, January and February, with much of that precipitation falling as snow in the Sierra. Only a handful of large winter storms can make the difference between a wet year and a dry one. In normal years, the snowpack stores water during the winter months and releases it through melting in the spring and summer to replenish rivers and reservoirs. However, relatively dry weather conditions this year have reduced the amount of snowpack in California's mountains. Each of this season's first four snow surveys – conducted in early January, late January, late February and early April – found a statewide snowpack water equivalent far below average for the dates of the surveys. The water equivalent of the 2014 statewide snowpack began falling in early April after reaching a peak of 10.1 inches and by late May had almost completely melted away, compared to late May's historic average of about 6 inches.

Rainfall also has been far below normal during this water year as recorded by weather stations throughout the state. Despite a few storms that brought rain in February and March, electronic readings indicate that precipitation at eight Northern California stations has been only about 60 percent of normal for late April. The electronic readings for San Joaquin stations show even drier conditions there – less than 50 percent of normal precipitation from October 1 to late May. As of May 31, statewide precipitation was 55 percent of average to date; runoff was 35 percent of average to date; and snow water equivalent was three percent of average for the date (one percent of the April 1 average).

Due to these drought conditions and dry conditions for the past several years, storage in California's reservoirs is also at below average levels, at 65 percent of average for the state at the end of May. Current storage levels in key reservoirs reflect this trend. Shasta Lake, California's and the Central Valley Project's (CVP) largest reservoir, is at 45 percent of its 4.5 million acre-foot (MAF) capacity (54 percent of its historical average for this date). Lake Oroville, the State Water Project's (SWP) principal reservoir, is at 47 percent of its 3.5 MAF capacity (57 percent of its historical average for the date). Trinity Reservoir is at 47 percent of its 2.4 MAF capacity (54 percent of historical average). San Luis Reservoir, a critical south-of-Delta reservoir for both the SWP and CVP, is at 38 percent of its 2 MAF capacity (52 percent of average for this date). Folsom Reservoir is at 53 percent of its 1 MAF capacity (64 percent of average for this date). New Melones Reservoir is at 32 percent of its 2.4 MAF capacity (50 percent of average for this date). New Don Pedro Reservoir is at 52 percent of its 2 MAF capacity (67 percent of average for this date) and Lake McClure is at 29 percent of its 1 MAF (42 percent of average for this date).

Local, state and federal water agencies across California have limited supplies due to the drought. In response, those agencies have taken various actions, including reducing or eliminating contract water deliveries and implementing mandatory and voluntary conservation efforts. A total of 46 Emergency Proclamations are known to have been issued by city, county, and tribal governments, as well as special districts addressing the drought. The State's two major water supply projects, the CVP and SWP, have also announced severe reductions in contract deliveries. The United States Bureau of Reclamation (Reclamation) has announced that its regular CVP agricultural contractors will receive no deliveries in 2014 and its municipal and industrial contractors will receive 50 percent of their historic use. The Department of Water Resources (DWR) has announced that its deliveries to its regular SWP contractors will be reduced to five percent for both municipal and agricultural contractors.

In addition to water supply reductions and conservation efforts, many water users have requested and received approvals for changes to regulatory requirements, including water right requirements, to extend limited supplies. Many water users have also pursued water transfers and purchases from willing sellers to make up for reduced supplies.

Planning and Responses to the Drought

Due to the dry conditions to date, in May 2013, Governor Brown issued Executive Order B-21-13, which directed the State Water Board and DWR, among other things, to take immediate action to address dry conditions and water delivery limitations. In December 2013, the Governor also formed a Drought Task Force to review expected water allocations and the

state's preparedness for a drought. Subsequently, on December 17, 2013, Governor Brown convened an interagency Drought Task Force to provide a coordinated assessment of the State's dry conditions and provide recommendations on current and future state actions. Then on January 17, 2014, Governor Brown issued a Drought Emergency Proclamation. The Proclamation directed the State Water Board, among other things to "…put water right holders throughout the state on notice that they may be directed to cease or reduce water diversions based on water shortages."

On January 17, 2014, the State Water Board issued a Notice of Surface Water Shortage and Potential for Curtailment of Water Right Diversions in light of anticipated supply shortages for junior and potentially senior water users. The notice encourages advanced conservation planning and suggests that water right holders look into the use of alternative water supplies, such as groundwater wells, purchased water under contractual arrangements and recycled wastewater. On February 18, 19 and 26, 2014, the State Water Board held public workshops to discuss the drought and responses to it. The workshops included staff presentations on potential curtailments to protect senior water right holders.

On March 1, 2014, Governor Brown signed legislation to assist drought-affected communities and provide funding to better manage local water supplies. The drought relief package, among other things, provided funding to improve water conservation, emergency supplies, reduce fire risk, and increase fire-fighting capabilities. The drought relief package also expanded the State Water Board's existing emergency regulation authority under Water Code section 1058.5 and made statutory changes to ensure existing water rights laws are followed, including streamlining authority to enforce water rights laws and increasing penalties for illegally diverting water during drought conditions. (SB 104)

On April 25, 2014, Governor Brown issued a Proclamation of a Continued State of Emergency related to the drought. The Proclamation finds that California's water supplies continue to be severely depleted despite a limited amount of rain and snowfall since January, with very limited snowpack in the Sierra Nevada mountains, decreased water levels in California's reservoirs, and reduced flows in the state's rivers. The Proclamation affirms that the provisions of the January 17, 2014 Proclamation remain in full force and also adds several new provisions related to water conservation, water transfers, fishery protection, water recycling, groundwater overdraft protection, water supply shortages, and fire response. Additionally, the Proclamation suspends California Environmental Quality Act requirements for certain activities, including adoption of emergency regulations under Water Code section 1058.5.

Starting in April 2014, the State Water Board posted information regarding lack of water availability and anticipated supply shortfalls for watercourses in several watersheds. Currently, analyses for the Sacramento-San Joaquin River watershed, the Tulare Lake Basin, the Russian River watershed and the Eel River watershed are available, and the State Water Board anticipates posting information for additional river systems throughout the drought. These analyses are updated as new information becomes available and resources allow.

In the latter half of May, the State Water Board issued curtailment notices to junior diverters in the Scott and Sacramento- San Joaquin River watersheds, and parts of the Russian River

watershed. Current projections indicate that additional curtailments may also be needed in portions of the Eel River watershed, the Salinas River, additional portions of the Russian River system, tributaries to the Sacramento River and the San Joaquin River and its tributaries.

On May 20 and 21, 2014, the State Water Board held a workshop to receive public comment regarding potential options for curtailing water rights in the Sacramento and San Joaquin Delta watershed. At the same meeting, the Board adopted emergency regulations for curtailments on three priority tributaries to the Sacramento River to protect drought emergency minimum flows to protect migration of threatened anadromous fish. (California Code of Regulations, title 23, art. 24.)

Need for the Regulation

Immediate action is needed to effectively and efficiently administer and enforce the State's water rights system in light of limited water availability during the drought. The State Water Board will need to curtail water diversions when natural flows decrease so that water is available for senior water right users, and to prevent the illegal diversion of previously stored water released for downstream use or rediversion, including water released to meet public trust or water quality requirements. The State's current system for curtailing diversions and enforcing those curtailments will not provide for timely and effective implementation of the State's water right system during the current drought when numerous water diversions require curtailment and enforcement in a short period of time. The emergency regulation improves the State Water Board's abilities to quickly and effectively implement and enforce those curtailments during the current drought to ensure that the State's water right priority system is effectively implemented during the drought emergency.

Water Rights Framework

In order to best understand the need for the regulation and how it will be applied, a generalized overview of water rights will be helpful.

Two main types of water rights constitute the vast majority of diversions in California: riparian rights and appropriative rights. Riparian rights do not require permits, licenses, or government approval, but are limited in several ways. A riparian water right generally provides a right to a correlative share to the natural flow of a water body to which the land is riparian. Broadly speaking, riparian land is land that touches a lake, river, stream, or creek. Water can only be diverted under a riparian right when that water is used on the riparian parcel on land that drains back to the lake, river, stream, or creek from which the water was taken. Riparian rights remain with the property when it changes hands, although parcels severed from the adjacent water source generally lose their right to the water. Only the natural flow of water can be diverted under a riparian right. Water that is imported into a watershed from another river, stream, or creek cannot be used under a riparian right. Water cannot be stored during a wet time for use during a drier time under a riparian right. Neither can water released from an upstream storage reservoir be used by a downstream user under a riparian right. Riparian rights generally have a higher priority of right to natural flows than appropriative rights, and water must be available to fulfill the needs of all riparians before an appropriator may divert. This is not always the case,

however. An appropriative right predating the patent date of riparian lands has seniority relative to the riparian right. The priorities of riparian right holders are correlative vis-à-vis each other; during a drought all share the shortage among themselves. Because a riparian right only allows the use of natural flow, it is possible to have water available under a riparian right during wetter years or months and not during drier years or months when natural flows are no longer available, including cases where stream flow is being supported by releases of previously stored water. This is particularly the case in dry years such as the current drought.

On the other hand, an appropriative water right is generally needed for any diversion of water that is not allowed under a riparian right, including diversion of water for use on non-riparian land or to store water for use when it would not be available under natural conditions. An appropriative right holder can use natural flow, and non-natural flows like imported water from other watersheds, or irrigation return flows. Prior to 1914, appropriative water rights were acquired by putting water to beneficial use. The exact priority date of a pre-1914 appropriation can vary depending on the circumstances, but depends on either posting notice under the then-applicable procedures of the Civil Code or otherwise clearly initiating the means necessary to divert or actually diverting. An appropriative water right that was acquired before 1914 is called a pre-1914 appropriative water right and is not subject to the permitting authority of the State Water Board. Appropriative water rights obtained after 1914 require a water right permit and subsequently a license issued by the State Water Board or its predecessors. Similar to pre-1914 water rights, the seniority of post-1914 water rights is based on a first-in-time concept with the date of seniority typically established by the date of the application for the permit. A water right permit confers the State Water Board's (or its predecessor's) authorization to develop a water diversion and use project. The right to use water is obtained through actual beneficial use of water within the limits described in the permit. A water right license is issued once full beneficial use of water has been made and other conditions of a water right permit are met and constitutes the confirmation by the State Water Board (or its predecessor) of the water right. As between appropriators, junior water right holders may only divert where there is sufficient water to completely fulfill the needs of more senior appropriators.

The water right priority system discussed above provides the primary basis for determining which users may divert, and how much, when there is insufficient water in the stream for all users. As discussed above, riparian right holders generally have the most senior priority to natural flows in a stream, and older, more senior appropriative water rights have priority over more junior appropriative water rights. Senior water right holders know that they are more likely to receive water at times of shortage than more junior water right holders. However, once water is stored or imported, the entity that stored or imported the water has the only right to it, though other appropriative water rights holders may acquire contingent junior rights to any abandoned or return flows. Riparian water right holders are only entitled to divert natural flow, so are not entitled to divert releases, or the return flows from releases, of stored water. The State Water Board has the authority to prevent illegal diversions and supervise the water right priority system. (See, e.g. Wat. Code §§ 174, 186, 1050, 1051, 1051.5, 1052, 1825.)

When the amount of water available in a surface water source is not sufficient to support the needs of existing water right holders, junior appropriators must cease diversion in favor of more

senior rights. However, it is not always clear to a junior diverter whether there is sufficient flow in the system to support their diversion and senior water uses downstream. It can also be difficult to determine whether releases of stored water are abandoned flows that may be diverted or whether those flows are not available for diversion because they are being released for downstream purposes. Similarly, it can be difficult for a riparian to know if water is natural flow, or stored or imported water and whether and when and to what extent correlative reductions in water use are needed due to the need to share limited supplies amongst riparians. As part of administrating water rights, the State Water Board may curtail water diversions based on California's water rights priority system.

Diversion of water when it is unavailable under a diverter's priority of right constitutes an unauthorized diversion and a trespass against the state. Absent adoption of the proposed regulation, the State Water Board may subject such unauthorized diversions to an Administrative Civil Liability (ACL) of up to $1,000 per day and $2,500 per acre-foot of water unlawfully diverted in a drought year, or refer a diverter to the Attorney General's office for enforcement. The State Water Board may also issue administrative cease and desist orders and request court injunctions to require that diversions stop.

Before issuing such an order, the State Water Board must have particularized information regarding an unlawful diversion or the potential of such a diversion: the Board may not issue an enforceable order requiring diversion to cease simply based on lack of water availability, absent information that there is a risk of or actual continued diversion. Additionally, before issuing a final enforcement order, the State Water Board must first issue a draft Cease and Desist Order or a proposed ACL. If such enforcement action is proposed, a water right holder is entitled to an evidentiary hearing on all issues before the order takes effect. This individualized enforcement-based system of curtailment, in the absence of a regulation, is cumbersome and time- and resource-intensive. The process of scheduling and holding full evidentiary hearings on each individual order prior to it becoming effective eviscerates any meaningful possibility of ensuring the water in fact reaches the rightful diverters during this drought emergency, and does not serve as an adequate deterrent for others during the curtailment period.

As such, enforcement in the absence of a regulation is incapable of ensuring proper implementation of the water rights seniority system in a timely manner during the current drought.

Need for Emergency Curtailment Regulations

Emergency regulations are needed to greatly increase timely compliance with and effective enforcement of the reporting requirements and water diversion curtailments issued by the State Water Board during the drought to ensure that senior water rights are protected. While the State Water Board has existing authority to issue curtailment notices for junior water users, and to initiate enforcement action, it is likely that there will be a high degree of noncompliance during the drought that will impact senior water right holders because water will not be available for their diversions due to unauthorized diversions and failure to report.

Due to the severity of the drought, large numbers of junior water rights will have to cease diverting statewide to protect senior water rights. Many of those water right holders that do not

have alternative water supplies, or only have costly alternate supplies, are likely to continue diverting after receiving a curtailment notice under the Board's current authorities. This situation is likely because existing penalties, and the lengthy process to impose them described above, may not provide an adequate deterrent to noncompliance when weighed against the potential benefits of continued noncompliance. In addition, if a large percent of water right holders simply fail to respond to curtailment notices issued by the Board under its current authorities because of the lack of prompt and meaningful repercussions under the State Water Board's existing authorities, identification of unauthorized diversions is difficult and slow.

Additionally, the State Water Board currently requests that recipients of a curtailment notice submit information regarding, among other things, their curtailment or reason for continued diversion. However, if many water right holders fail to respond to the request for reporting information under the curtailment notices issued under the current authorities, the State Water Board will be unable to focus curtailment investigations and refine future curtailment analyses to reflect actual hydrologic conditions and actual legal water use.

Appendix 1 lists, and has links to, the curtailment notices issued by the Board through June 10, 2014, including:

- All post-1914 water right holders in the Sacramento River and San Joaquin River watersheds to protect senior water rights (issued May 27 and 29, 2014)
- Water right holders in the Russian River watershed upstream of the Russian River's confluence with Dry Creek, with a priority date of February 19, 1954 or later (Application A015743 or higher) (issued May 27, 2014)
- Junior water right holders in the Scott River watershed to protect the senior water rights of the U.S. Forest Service (issued May 16, 2014)

Appendix 2 is the Curtailment Certification Form that recipients of these notices were required to submit within seven days. The same information will be required to be submitted for curtailment under the proposed regulations. This information is needed to confirm basic water rights information and to confirm that diversion of water under the curtailed water right has ceased, or for water users to explain why diversions have not ceased. As of June 13, 2014, out of the 9,528 curtailment notices issued to date on May 16 and 27, 2014, in the Scott River, Russian River, and the Sacramento and San Joaquin River watersheds, the State Water Board has only received 2,036 Curtailment Certification Forms. This is a response rate of 21.4 percent. Currently, without a regulation, there is no penalty for failure to submit the Curtailment Certification Form.

The proposed emergency regulation solves both the curtailment and reporting compliance issues identified above by: 1) providing greater assurance that curtailed water rights holders will cease diverting water; and 2) providing greater assurance that curtailed water rights holders will report information regarding continued exercise of their senior rights that will assist the Board to refine curtailments. As opposed to the State Water Board's existing authorities that require case-by-case investigations, issuance of a draft order or proposed ACL, and the opportunity for an evidentiary hearing, a violation of the emergency regulations is itself immediately enforceable by administrative civil liability of up to $500 for each day of violation. This more immediate

penalty would be in addition to any fines for violation of a CDO or to any ACL for unlawful diversion. It would be more efficient to enforce curtailments under the proposed regulation. This is expected to yield much greater compliance, and compliance promptly enough to prevent injury to senior water rights holders.

Minimum Health and Safety Needs

The Board recently added, by emergency regulations, article 24 to division 3, chapter 2 of California Code of Regulations, title 23. Article 24 contains section 878.1, which identifies certain limited minimum health and safety needs that may be authorized notwithstanding the need for curtailment, and declaring use under even more senior water rights to be a waste and unreasonable use when those minimum health and safety needs cannot be met. Currently, section 878.1 only applies to curtailment orders issued pursuant to section 877 of that article, which addresses minimum flows in Deer, Mill and Antelope Creeks.

If the proposed amendments to section 878.1 are adopted, the health and safety section would not apply to curtailment orders issued pursuant to proposed section 875. The minimum health and safety needs identified in section 878.1 are still important throughout the state, not just in the watershed identified in section 877. At the May 20 and 21, 2014 public meeting during which it adopted article 24 and held a workshop on further potential curtailments, the Board heard public comment opposed to the process contained in section 878.1, but no public or other agency comment supportive of it. Many of the comments made at the workshop on curtailments in the Sacramento-San Joaquin Watershed held on May 20 and 21, 2014, suggested that health and safety considerations should not be addressed in the regulation, but should be addressed by making changes in the water supply. Based on the balance of comments received, there is reason to believe that applying section 878.1 statewide could generate such concern that the energy and resources spent addressing the legal framework of section 878.1 would detract from efforts to ensure that all minimum health and safety needs are met. Minimum health and safety needs could be addressed instead on an individual basis through the petition for reconsideration process. There is a significant potential public benefit from section 878.1 in terms of defining a narrow scope for minimum health and safety needs where no alternatives are available and offering more certain protection for such needs, yet there is concern that adopting the measure could instead undermine the cooperation necessary statewide to ensure that all health and safety needs are met.

Mindful of this important policy issue, the Board is soliciting public and agency comment as to whether section 878.1 should apply to curtailment orders issued under proposed section 875, and may choose not to amend section 878.1. If the Board does not amend section 878.1, it would automatically apply to section 875.

Curtailment Analysis Methodology

The general analysis for determining the necessity for curtailment of water rights in any watershed compares the current and projected available water supply with the total water right diversion demand. Each of these is described further below.

Projected Supply

When available, the Board relies on the technical expertise and data produced by DWR in calculating projected supplies. DWR annually forecasts unimpaired runoff, or full natural flows, for certain watersheds in its Bulletin 120 (DWR, 2014), and in subsequent monthly updates. The full natural flow, as defined by DWR, is the natural water production of the river basin, unaltered by upstream diversions, storage, or export or import of water to or from other watersheds. This forecasted runoff data is uncertain. DWR therefore provides the data in the form of "levels of exceedance" or simply "exceedance" to show the statistical probability that the forecasted supply will actually occur. The exceedance is simply the percent of the time that the actual flow is expected to exceed the projected flow. The 90 percent exceedance hydrology assumes inflows from rainfall and snowmelt at levels that are likely to be met or exceeded by actual flows with a 90 percent probability, or in other words, there is a ten percent or less chance of actual conditions turning out to be this dry or drier. The 50 percent exceedance is the 50/50 forecast-- it is equally likely to be drier or wetter than projected.

The State Water Board also uses flow forecasts by the National Oceanic and Atmospheric Administration's (NOAA) National Weather Service using information available on the California Nevada River Forecast Center webpage (http://www.cnrfc.noaa.gov/; NOAA, 2014). If forecast data from these entities are unavailable for a particular watershed or river, the Board may look to other sources of data, such as available stream gage data. The Board may also look at these other data sources as a quality control-check against projected supply. Unlike full natural flow data, stream gage data shows the flow in rivers and streams after the effects of diversions, and includes the effects of both diversions to and releases from storage.

There are five on-line data sources available that can be used to analyze stream and reservoir conditions, including the California Data Exchange Center (CDEC); the United States Geological Survey (USGS) National Water Information System (NWIS) Surface Water Data for California; the USGS California Water Science Center; Reclamation's Mid Pacific Region Central Valley Operations Office; and the US Army Corps of Engineers Water Control Data System. Appendix 3 describes each of these data sources in more detail and provided links to the respective databases. Appendix 4 shows a list of stations for which full natural flow data is reported in CDEC and Appendix 5 has an expanded discussion of CDEC full natural flow data and illustrative data for 2014. Appendix 6 has a list stations (and links to data) for which of real-time flow data is available in the following watersheds. The number in parentheses below is the number of known gages in each watershed:

- Sacramento River (175)
- Mokelumne River/Eastside Streams (23)
- San Joaquin River (84)
- Tulare Basin (32)
- Klamath River (33)
- Eel River (9)
- Napa River (2)
- Russian River (12)
- Salinas River (10)

Gages, high in a watershed in particular, can be used to calculate the water available for diversion downstream. These gages, combined with reservoir operation data, can also be used to identify streams with flows augmented by releases of stored water from reservoirs.

Estimated Diverter Demand

Appropriative water rights typically include a "face value" with an authorized rate of diversion, an amount authorized to be collected to storage in any one year, if applicable, and a total amount authorized to be diverted in any one year. These amounts are further constrained by an authorized season of diversion, point of diversion, purpose of use and place of use. All water rights are limited to the amount that can be put to beneficial use in accordance with the terms of the right. These amounts are all maximum allowable diversion amounts[1] that can be diverted only when supplies are available under the specific priority of each water right. On average, water users generally use much less water than the maximum amount included in their water rights because they have multiple rights for the same diversion, they don't have a consistent need for the water and other reasons. Because of these factors the State Water Board does not use these maximum amounts to estimate demand for water. Instead, the Board uses monthly reported water diversion and use data provided by the water right holders and corrected for known errors to estimate demands for water. This data is reported to the State Water Board under penalty of perjury by each water user, and should represent the actual amounts of water diverted under each water right. The data is reported in monthly volumes and can be directly compared with the monthly supply projections. Although the data is reported for previous years' diversions, these amounts have reasonable seasonal distribution and provide a better estimate of maximum likely diverter demand under the water right than the face value of a water right.

Legislation was passed in 2009 strengthening the requirement that almost[2] all diverters claiming a riparian or pre-1914 water right file a Statement of Diversion and Use (Statement) with the State Water Board and report the amount of water they divert. (Wat. Code, § 5100 et seq.) Water Right Permit and License holders were already required to report their diversion amounts to the State Water Board. Changes to the California Code of Regulations require diversion data by all diverters to be reported to the State Water Board using the Board's online reporting system. (Cal. Code Regs., tit. 23, § 910 et seq.) These changes also modified the reporting cycle for Licensees from every three years to annually. However, those reporting diversions on Statements were still only required to report every three years. The year 2010 is the first year diversion data was reported to the Division in the online system. Due to the tri-annual reporting cycle of Statement holders, reporting of 2010 water use was only completed in the 2013 reporting year. This means that 2010 is the only reporting year for which all riparian and pre-1914 water right holders should have a report on record with the Board.

Because the water use information reported to the Board is self-reported, staff reviews the data for obvious errors before using the information in any curtailment analysis. Adjustments to the reported use data are made where necessary, and as staffing permits, to develop the best

[1] A maximum rate of diversion for permitted and licensed irrigation and municipal uses is typically a maximum 30-day average rate of diversions for permits and licenses. Often, the equivalent 30-day amount can be taken at a higher rate in a shorter time period, provided there is no injury.

[2] The requirements include minor exceptions for certain small diversions, and for waters otherwise being reported. (Wat. Code § 5101.)

available estimation of demand in the watershed. Adjustments include: 1) removal of water use reported under water rights authorizing direct diversion for power, when that water is returned to the stream in full; 2) incorrect units reported which often result in reporting diversion amounts far in excess of right; and 3) correcting obvious reporting errors such as reporting the same quantity of water as having been diverted under multiple rights. Demand data can then be organized into watersheds, geographic location and priority and compared to available estimated supplies. The Board generally uses its electronic water rights information management system (EWRIMS) database of water rights to determine water right priority dates (EWRIMS, 2014), but may also use other information as appropriate. This information is used to identify and prioritize demand estimates to determine which water users require curtailment given existing supplies.

Other Information

The Board can also rely upon other sources of information to refine a curtailment, but for the reasons explained below in the curtailment projection analysis section, much of this information may be of limited value without first curtailing diversions. Some other types of information the Board may rely upon include:

- Releases of stored water- any water released from storage for downstream beneficial uses, including meeting water quality or flow requirements, is not available for diversion by other water right holders, regardless of priority, unless the diverter has a contract for that water, or the released water has been abandoned, and the diversion is appropriative.
- Water supply contracts - terms of water supply contracts define the amounts of water that can be diverted.
- Wastewater discharges are not available for diversion by other water right holders, regardless of priority, unless the diverter has a contract for the discharges, or the discharges have been abandoned and the diversion is appropriative.
- Return flows – unless the return flows are from natural flow, which, as described below is less likely in such a drought year, such flows are unavailable for riparian right holders.
- Projected 2014 use estimates by water right holders, for field fallowing, or reduced diversions due to conservation measures.
- Observations of Board staff in conducting inspections of junior water rights that have been curtailed. Inspections will provide important information on tributary stream flow conditions, especially on ungaged streams that may lose continuity to lower, gaged, water bodies.
- Historic water use reports, for water right holders that failed to report diversions in recent years.
- Water transfers and Section 1707 petitions for instream beneficial uses.
- Permit terms and conditions that provide storage releases for instream beneficial uses.
- Adjudications and State Water Board Decisions and Orders that may provide certainty for some riparian and pre-1914 right holders.

The Delta watershed has more unimpaired flow and real time stream and reservoir gage information than much of the rest of the State, and it provides a good illustration of how such information can be used to assess water supply in large and complicated watersheds.

Schematics of some of the data that can be used to determine water supply in the Sacramento and San Joaquin River watershed are shown in appendices 7 and 8, respectively. This information can be used to determine streamflows along specific river reaches in a larger watershed, and thereby allow the Board to adjust the timing of initial curtailment orders. The detailed real-time information, based on flow changes that result from reduced diversions in response to curtailments, can also be used to either increase or decrease the extent of curtailment limits. Other, generally less complex, watersheds throughout the state have less detailed information, but many have similar interrelationships between reservoirs, storage releases from reservoirs, and instream flow measurements.

Curtailment Projections Analysis

Supply and demand data may be compared to determine when, and to what priority level, curtailments should occur. Demand data is first sorted by priority date to create a running list of demand data that starts with the most senior water right holders. Demand groupings for riparian, pre-1914, and post-1914 water rights are tallied to create different levels of demand to compare against projected, or observed, available supply. The groupings are developed based on the available supply and the need to refine what priorities of water rights require curtailment. These demand levels include the quantity of water needed to satisfy the demand under each priority level for each month. These demand levels may then be plotted against the monthly quantities of forecasted supply to create a graphical representation of supply and demand. The point at which the supply curve and demand curves intersect indicates the initial determination of what water right priority levels need to be curtailed at that time. Appendix 9 is an example of a supply and demand curve for the Sacramento River watershed. Other supply/demand curves are located on the Division of Water Rights webpage at:

http://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/analysis/

This initial determination may be refined to take into account return flows of water diverted from the watercourse. This additional quantity of water could change the priority level at which curtailments should occur. Specifically, the addition of return flows could mean that the priority under which a water right holder may divert may be lower (more junior) than the initial estimate and fewer water right holders may need to be curtailed than under the initial estimate. Other potential modifications to the initial curtailment numbers could show that the initial curtailment does not curtail enough water rights. In many parts of the state, groundwater elevations have been sufficiently lowered so that rivers and streams receive little or no groundwater accretions. In fact, instead of being a gaining stream with groundwater accretions, streams flowing over areas with lowered groundwater tables can lose surface water to groundwater. Rather than rely upon imperfect estimates of water supply, water demand, return flows from diverted water, and other system complexities, curtailments will be adjusted based on real time monitoring of hydrologic conditions as described in the next section.

In no case, however, is a riparian water right holder entitled to divert water other than natural flow. Unlike appropriators, riparian water right holders are not entitled to abandoned flow unless the source of the return flow itself was from natural flow. In many stream systems under the current severe drought conditions it is unlikely that there will be natural return flows as there already is no natural flow in the stream. Similarly, flow releases may be required at certain

locations as a condition of a water right permit or license or a water quality certification for a hydroelectric project, or as an agreement to satisfy senior water rights. This water too, may be available to the most senior appropriative water right holders downstream of this flow but not available to riparian right holders.

In a watershed that has not undergone any type of hydro-modification, such as: 1) installation of dams; 2) diversions from surface water; or 3) groundwater pumping in adjacent aquifers, any water that remains in rivers and streams after the end of the rainfall season comes from either melting snow or groundwater accretions. However, most watersheds in California have undergone at least some type of hydro-modification. Given increased losses to groundwater in a dry year such as this one there remains little or no natural flow in surface water shortly after rains have stopped and snow has melted. This means that when supply information shows that there is no longer any natural flow in the stream, there is no water available for riparian use. This also means that riparian water rights can and should be fully curtailed in tributaries and watersheds when there is no longer any natural flow in the system. The need for curtailment, however, may not be apparent to many riparian water rights holders in many streams because water is still being released from storage, and there are return flows from water released from storage.

Without first curtailing at least some junior water rights it is difficult to determine with precision exactly what rights must be curtailed because, absent a curtailment, there could be:
1) diversions of water by entities that are not entitled to divert under the current hydrologic condition; and 2) no, or limited, diversion of water under senior water rights because of lack of availability at their point of diversion. Timely compliance by curtailed water right holders is needed so that the Board can promptly make appropriate adjustments to curtailments, if needed. Timely responses by water right holders and timely adjustment to Board curtailments ensure that no water right holder is prematurely curtailed, and that no senior water right holder is injured due to lack of available water because of diversions by a more junior water right.

The goal of curtailments is principally to ensure that water to which senior water right holders are entitled is actually available to them. To ensure that this occurs generally requires that some water remain in most streams to satisfy senior demands at the furthest downstream point of diversion of these senior water rights. This in turn means there must also be some additional water, on top of the senior water right holder demand, to get that quantity of water to the senior water rights holder. This additional quantity of water, or “carriage” water, is defined here as the variable quantity of water needed to make up for losses to evaporation and groundwater, maintain water levels needed to facilitate pumping from a stream, and any other reasonable losses or factors that should be considered to ensure that a certain quantity of water to which a senior water right holder is entitled reaches that water right holder. Maintenance of this carriage water has the ancillary benefit of preventing normally wetted stream channels from running completely dry and may provide some additional benefit to fish and wildlife and to the riparian corridor.

Adjustment of Curtailments

Refinements can be made to curtailment analyses based on: 1) real-time information regarding water availability; and 2) information obtained from reports submitted to the Board in response to curtailment notices.

Real-time information regarding water availability includes gage data and field measurements and observations by field staff of stream flows, return flows, and any other such information in the curtailed watersheds, as described in more detail above.

Information obtained from the curtailment certification forms submitted to the Board in response to curtailments issued under the proposed emergency regulations will provide information on:

1) whether or not water rights holders are continuing to divert water
2) alternative sources of water or water rights that water users may be relying on
3) whether or not the diversion is the sole source of water for human health and safety, and if so, how much water is needed
4) if the water diversion is only for a nonconsumptive use such as hydropower
5) other information the recipient of curtailment orders believes supports continued diversion

This information may be used to refine the initial curtailment. Refinement could result either in: 1) releasing some water right holders from curtailment because the additional information demonstrates that there is sufficient water in the system to support the demand of additional water right holders; or 2) adding additional water right holders to the curtailment because the initial curtailment does not result in protection of senior water rights. Although adjustments could also be made to curtailments issued under the Board's current authorities, any such adjustment, absent the proposed regulation, will be less accurate and take longer to implement because: 1) delayed or no response to curtailments (i.e. not ceasing diversions) means that real time information will still include illegal diversions; or 2) delayed or no response to reporting means that confirmation of continued diversions and other information will not be available. Therefore, in the absence of the proposed regulations, senior water right holders are likely to be injured.

Informative Digest

Summary of Existing Laws and Regulations

A general description of existing law governing water rights, the water right priority system, and methods used to curtail water rights and enforce such curtailments is set forth above.

Description and Effect of Proposed Regulation

The proposed emergency adoption of sections 875 and 878.3, and amendment of sections 878.1 and 879, will set drought emergency curtailment methods and reporting requirements necessary to ensure the orderly curtailment of water rights to protect senior water rights. Under the proposed regulations, the State Water Board would curtail diverters in watersheds

throughout the state in the order of priority, as necessary, to maintain a reasonable assurance of protecting the needs of senior users. The requirement to curtail when water is unavailable would constitute both a regulatory requirement and a condition of all water right permits, licenses, certificates and registrations in the affected watersheds. The proposed regulation clarifies the potential information the State Water Board will rely on in issuing initial curtailments; makes the curtailment a system of enforceable orders, thereby increasing its effectiveness; and clarifies the procedures for contesting and making exceptions to curtailment orders.

Proposed Emergency Regulation Section 875

Proposed Section 875 provides that the Deputy Director for the Division of Water Rights may issue curtailment orders, and identifies sources of sufficiently reliable information upon which to base a decision to issue those orders. It additionally provides clarification that initial curtailment orders will be issue by mail, and establishes an electronic notice procedure for changes to curtailment orders. Finally, it clarifies that, unlike curtailment notices, curtailment orders issued pursuant to that section are subject to the State Water Board's petition for reconsideration process.

Proposed Emergency Regulation Section 878.1

Section 878.1 provides a process for water users, with no alternative supply for minimum health and safety needs, to be able to continue limited diversions, subject to conditions and reporting requirements in section 879, notwithstanding the receipt of a curtailment order pursuant to California Code of Regulations, title 23, division 2, chapter 2, article 24.

As proposed, section 878.1 would not apply to curtailments issued under proposed section 875.

Proposed Emergency Regulation Section 878.3

The State Water Board recognizes that strict application of the priority system can have harsh consequences for many water users that depend on diversions for water uses that are important on a personal, local, regional and state-wide level, and that many water users are working together to find mutually acceptable solutions to the water shortage. Section 878.3 would establish a methodology for water users to propose alternatives to following curtailment orders based on priority as issued under section 875, and would allow the Executive Director to approve such agreements, provided that the agreements do not injure other legal users of water and do not unreasonably harm to fish and wildlife as compared to the curtailment methods described in section 875.

Proposed Amendments to Section 879

Section 879 requires, for all water right holders who receive a curtailment order pursuant to California Code of Regulations, title 23, division 2, chapter 2, article 24, a written response with information regarding their compliance with the order and an explanation of any diversions under other water rights, and any exceptions to curtailment. Such information will be critical to improving information concerning water depletions in this drought year.

As modified, this section would track changes proposed to section 878.1. If the Board chooses not to amend section 878.1, no changes to section 879 are likely to be needed.

Information Relied Upon

California Data Exchange Center, accessed at: http://cdec.water.ca.gov/

California Department of Water Resources website on California's water conditions: http://www.water.ca.gov/waterconditions/waterconditions.cfm

California Governor Brown State of Emergency Declaration dated January 17, 2014: http://gov.ca.gov/news.php?id=18368

California Governor Brown Executive Order for State Drought Actions dated April 25, 2014: http://gov.ca.gov/news.php?id=18496

California Governor's Drought Task Force-Groundwater Basins with Potential Water Shortages and Gaps in Groundwater Monitoring, Report dated April 30, 2014: http://www.water.ca.gov/waterconditions/docs/Drought_Response-Groundwater_Basins_April30_Final_BC.pdf

California Governor's Office of Emergency Services, Weekly Drought Brief dated Monday, June 6, 2014: http://www.ca.gov/drought/pdf/Weekly-Drought-Update.pdf

National Oceanic and Atmospheric Agency- National Weather Service, California Nevada River Forecast, 2014: http://www.cnrfc.noaa.gov/

Pacific Gas & Electric website: http://www.pge.com/

Sacramento Municipal Utility District website: https://www.smud.org/en/index.htm

State of California, State Water Resources Control Board, Board Meeting, May 20-21, Transcript of Agenda Items 12 & 13:

State of California, State Water Resources Control Board, Drought Curtailment Website: http://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/water_availability.shtml

State of California, State Water Resources Control Board, Emergency Regulations Digest on Curtailment of Diversions due to Insufficient Flow for Specific Fisheries dated May 22, 2014: http://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/docs/mill_deer_antelope_creeks/doc3_final_tributary_emergency_regpackage4.pdf

State of California, State Water Resources Control Board staff powerpoint presentation to State Water Board on status of curtailment activities, June 17, 2014: http://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/docs/drought_update_061714.pdf

State of California, State Water Resources Control Board EWRIMS database, 2014 http://www.waterboards.ca.gov/waterrights/water_issues/programs/ewrims/

U.S. Army Corps of Engineers Water Control Data System: http://www.spk-wc.usace.army.mil/

U.S. Bureau of Reclamation, Daily Central Valley Project-State Water Project Coordinated Operation (Term 91) dated June 2014: http://www.usbr.gov/mp/cvo/vungvari/term91.pdf

U.S. Bureau of Reclamation, Mid Pacific Region Central Valley Operations Office: http://www.usbr.gov/mp/cvo/

U.S. Bureau of Reclamation, Mid Pacific Region website: http://www.usbr.gov/mp/

U.S. Geological Survey, California Water Science Center, California Water Data: http://ca.water.usgs.gov/data/

U.S. Geological Survey, National Weather Information System, Surface Water Data for California: http://waterdata.usgs.gov/ca/nwis/sw

U.S. Geological Survey, Water Resources of the United States: http://www.usgs.gov/water/

Authority and Reference Citations

For Section 875

Authority: Sections 1058, 1058.5, Water Code

Reference: Sections 174, 1050, 1051, 1051.5, 1052, 1058.5, 1122, 1825, Water Code

For Section 878.1

Authority: Sections 1058, 1058.5 Water Code

Reference: Cal. Const., Art. X § 2; Sections 100, 100.5, 104, 105, 106.3, 275, 1058.5, Water Code; *Environmental Defense Fund v. East Bay Muni. Util. Dist.* (1980) 26 Cal.3d 183.

For Section 878.3

Authority: Sections 1058, 1058.5, Water Code

Reference: Sections 109, 1011, 1011.5, 1051.5, Water Code; *City of Barstow v. Mojave Water Agency* (2000) 23 Cal.4th 1224.

For Section 879

Authority: Sections 1058, 1058.5, Water Code

Reference: Sections 186, 187, 879 Water Code

Mandate on Local Agencies or School Districts

The State Water Board has determined that adoption of sections 875 and 878.3, and amendment of sections 878.1 and 879, does not impose a new mandate on local agencies or school districts. The regulation is generally applicable law.

Suspension of California Environmental Quality Act

On April 24, 2014, Governor Brown issued a second Executive Order addressing the drought emergency, which, among other things, suspended the California Environmental Quality Act (CEQA) as applied to the State Water Board's adoption of emergency regulations to "prevent the waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of water, to promote water recycling or water conservation, and to require curtailment

of diversions when water is not available under the diverter's priority of right." The proposed emergency regulation falls under this suspension.

Cost Estimate

This cost estimate considers the fiscal effect of the proposed regulation both with and without inclusion of the exception to priority-based curtailments in order to protect public health and safety contained in California Code of Regulations, title 23, section 878.1. On June 2, 2014, the Office of Administrative Law approved California Code of Regulations, title 23, division 3, chapter 2, article 24, Curtailment of Diversions Based on Insufficient Flow to Meet All Needs. This article includes section 878.1, which identifies certain limited minimum health and safety needs that may be authorized notwithstanding the need for curtailment and declares use under even more senior water rights to be a waste and unreasonable use when those minimum health and safety needs cannot be met. Section 878.1 also sets out a process for diverters issued curtailment notices under article 24 to avail themselves of the protection from curtailment under that section. In noticing the proposed changes to article 24, the Board has invited comments as to whether it should include this exception for section 875 curtailments due to lack of water availability.

Fiscal Effect Without Section 878.1

Without the minimum health and safety needs exception contained in section 878.1, the only fiscal effect of the proposed regulation is the cost that would be incurred by local and state governments to complete and submit curtailment certification forms. All other costs of the regulation would be the same as for curtailments issued by the Board under its current authorities because local and state governments would need to comply just the same. State and local governments, like other diverters, are not required to respond with the requested reporting for curtailment notices issued under the Board's current authorities.

Based on information prepared by economists at the University of California, Davis, and using assumptions that show a higher projection of the potential range of costs, the State Water Board estimates that the cost to state and local agencies and governments to complete and submit curtailment certification forms will be approximately $318,000. The proposed regulations are not anticipated to have a fiscal impact on school districts or to result in costs or savings in federal funding to the State.

Fiscal Effect With the Health and Safety Exception

If the Board chooses to make the curtailment exceptions for health and safety needs described in section 878.1 applicable to curtailments under proposed section 875, there would be additional costs to water users that must curtail to make water available for health and safety purposes who would not otherwise have been curtailed. There is also a benefit to water users that are not curtailed due to the health and safety exception included in section 878.1 who would have otherwise been curtailed. The fiscal effect on state and local government that will result from additional curtailments that result from allowing exemptions for health and safety, e.g. curtailments, affecting more senior water rights is decreased revenue and increased costs totaling $ 19.1 million. This consists of reduction in agricultural and municipal water agency

revenues from lost water sales of $7.9 million and a corresponding reduction in state and local tax revenues of $0.8 million. There will be additional loss in state and local tax revenue of $3.6 million associated with reduced agricultural production resulting from curtailed agricultural supply. Agricultural and municipal water agencies will also incur water replacement costs of $6.8 million. The fiscal effect on state and local government that will result from these government agencies being able to continue to divert a quantity of water by relying upon a health and safety exemption is a net benefit of $102.9 million. This consists of: 1) $93.5 million reduction in decreases of water agency revenue; and 2) a $9.4 million reduction in the corresponding decrease in state and local tax revenues. These are reductions in costs that state and local governments would otherwise incur absent the health and safety exemption.

Appendix 10 provides more background information on the proposed estimate.

The State Water Board is the only agency that can implement this emergency regulation. As required by Government Code Section 11346.5, subdivision (a)(3)(D), the State Water Board has conducted an evaluation of this regulation and has determined that it is not inconsistent or incompatible with existing state regulations.

Appendix 1: State Water Board Curtailment Notices

As of June 10, 2014, the State Water Board has announced the following notices of curtailment in California watersheds:

Sacramento and San Joaquin River Watershed

The State Water Resources Control Board sent out curtailment notices to junior water right holders in the Sacramento River and San Joaquin River watersheds on May 27 and 29, 2014, to protect senior water rights.
Sacramento & San Joaquin River Watershed Curtailment Letter - May 27, 2014
Curtailment Certification Form

Russian River Watershed

The State Water Resources Control Board sent curtailment notices to water right holders in the Russian River Watershed upstream of the Russian River's confluence with Dry Creek on May 27, 2014 to protect senior water rights. With this notice, the State Water Board notified holders of post-1914 appropriative water rights within the Russian River watershed upstream of the confluence of Dry Creek with a priority date of February 19, 1954 or later (Application A015743 or higher), of the need to immediately stop diverting under their junior post-1914 water rights.
Russian River Watershed Curtailment Letter - May 27, 2014
Curtailment Certification Form

Scott River Watershed

The State Water Resources Control Board sent out curtailment notices to junior water right holders in the Scott River watershed on May 16, 2014, to protect the senior water rights of the U.S. Forest Service as identified in Scott River Adjudication Decree No. 30662. The priorities of the junior class water right holders were determined by the Superior Court of Siskiyou County and have been identified as either Surplus Class rights, Post-1914 water rights in Schedule E, or junior priority rights in Schedule D4.
Scott River Watershed Curtailment Letter - May 16, 2014
Scott River Adjudication Decree No. 30662
Curtailment Certification Form

APPENDIX 2: CURTAILMENT CERTIFICATION FORM

Please return within 7 days of receipt of the Notice of Curtailment of Water Diversion to:

State Water Resources Control Board
Division of Water Rights
P.O. Box 2000
Sacramento, CA 95814-2000

Email completed Curtailment Certification form to:
SWRCB-curtailment-certification@waterboards.ca.gov

Fax: 916-341-5400

WATER RIGHT SUBJECT TO THE 2014 WATER DIVERSION CURTAILMENT:

Please update Water Right Owner Information (if different from addressed):

Water Right Application or Statement No(s):_____
Owner:_____
Address:_____
City:_____ **State:**_____ **Zip:**_____

CURTAILMENT CERTIFICATION

Please check the applicable boxes below:

☐ **NO DIVERSION** – *I hereby certify that I will not be diverting any water under the above specified water right during the 2014 water diversion curtailment period.*

☐ **ALTERNATE SOURCE** – *I hereby certify that I will not be diverting any water under the specified water right during the 2014 curtailment period. However, I will be serving all or a portion of its place of use with my alternate source(s) of water, as specified below:*

- ☐ Ground (well) water
- ☐ Senior Post-1914 Appropriative Water Right (specify Permit/License No.):_____
- ☐ Riparian water right(s) and/or pre-1914 appropriative water right(s)*
  - ☐ Water use is reported under Statement of Water Diversion and Use No(s).: _____.
  - ☐ My use is excluded from filing a Statement of Water Diversion and Use under California Water Code section 5101 (generally, because the use included in other sufficient reports, or is from a spring that does not flow off your property).
  - ☐ None of the above.
- ☐ Contract (purchased) water from _____
- ☐ Will serve the place of use by withdrawing water stored under Permit/License No. ____ prior to start of this curtailment period.
- ☐ Other source (specify) _____

☐ **SOLE SOURCE OF WATER FOR HUMAN HEALTH & SAFETY** –

- ☐ *I hereby certify that the water right being curtailed is the only source of water available for human health & safety needs.*
- ☐ *I also certify that I have looked into alternative water supplies from the following:*
  - ☐ *Groundwater Well*
  - ☐ *Bottled Water*
  - ☐ *Purchase Supply*
  - ☐ *Other* _____

☐ **HYDROELECTRIC POWER GENERATION** – *I hereby certify that I am directly diverting water for hydroelectric power generation or other non-consumptive use and all water diverted is returned to the stream.*

☐ **OTHER –** *I have attached an additional sheet explaining how much water I am diverting, the use of that water, the measures being undertaken to reduce use, and the basis on which I contend that the diversion and use is legally authorized notwithstanding the very limited amounts of water available during this drought emergency.*_____

* Please note that only limited natural or abandoned water is available during a curtailment period. Water released from upstream storage projects is not available to divert under a riparian or pre-1914 right.

I declare that the information in this certification is true to the best of my knowledge.

Name:	_____	Phone No.:	_____
		Email:	_____
Signature:	_____	Date:	_____

Appendix 3: Real-Time Stream Flow Gage Information Sources

Five on-line data sources used by staff to analyze stream and reservoir conditions include the California Data Exchange Center (CDEC), the U.S. Geological Survey (USGS) National Water Information System (NWIS) Surface Water Data for California, the USGS California Water Science Center, the U.S. Bureau of Reclamation (USBR) Mid Pacific Region Central Valley Operations Office, and the U.S. Army Corps of Engineers (USACE) Water Control Data System (WCDS).

While some stream gage data are reported by multiple agencies such as CDEC, USGS, and USBR in slightly different formats, each agency also publishes gage data typically found only on its site. For example, CDEC includes some gages that are not USGS gages. The USACE publishes daily reservoir data not found on CDEC or USGS. USBR publishes data that can be found nowhere else, and so on.

CDEC
The CDEC installs, maintains, and operates an extensive hydrologic data collection network, including automatic snow reporting gages for the California Cooperative Snow Surveys Program and precipitation and river stage sensors for the flood forecasting program.

In addition, CDEC provides a centralized location to store and process real-time hydrologic information gathered by various cooperators throughout the State; and then disseminates this information to support forecasting and flood operation activities and to meet the data reporting needs of various cooperators, public and private agencies, the news media, and the public.

CDEC Database
The CDEC collects, stores, disseminates, and exchanges hydrometeorological data and related information. The data collection began as a small system designed to obtain data urgently needed to provide river stage forecasts and flood warnings for the North Coastal area and for the Central Valley. In the beginning, data was obtained from less than 100 telemetered precipitation and stream gage stations.

Since then, real-time hydrometeorological data needs have continuously grown. Currently, numerous federal, State, and local agencies collect data from hundreds of rain, snow, temperature, wind, atmospheric pressure, humidity, and stream stage sensors. The data enable forecasters to prepare flood forecasts and water supply forecasts; reservoir and hydroelectric operators to schedule reservoir releases; and water suppliers to anticipate water availability.

Currently, over one hundred and forty (140) agencies provide data to CDEC and also obtain data through CDEC's cooperative hydrologic database. The CDEC cooperative database contains information collected by:

1. Eighty-nine (89) remote data stations that have six hundred and forty-nine (649) sensors transmitting over the State microwave system. Real-time data include river stages, precipitation amounts, snow water content, temperature, and water quality.
2. Eight hundred and three (803) remote data stations that have 6,591 sensors transmitting via the GOES satellite.
3. There are two hundred and eleven stations (211) that have 1,270 sensors which are transmitted via network from federal, State, and other agencies via an automated data exchange program.

Data Exchange Program
CDEC operates a data exchange program with various federal and State agencies and other public agencies. This data exchange program involves the automated transfer and receipt of data and information via network connections. Following are the major agencies involved in data exchange:

- National Weather Service (NWS): weather forecasts, river bulletins, full weather data
- U.S. Bureau of Reclamation (USBR): reservoir operations, reservoir summary reports
- U.S. Army Corps of Engineers (USACE): precipitation, snow water content, reservoir operations, reservoir summary reports
- Pacific Gas & Electric (PG&E): precipitation, snow water content
- Sacramento Municipal Utility District (SMUD): precipitation, reservoir operations
- U.S. Geological Survey (USGS): river gage data, river flow rating tables and shifts

USGS Surface Water Data for California
The USGS NWIS is a comprehensive and distributed application that supports the acquisition, processing, and long-term storage of water data. NWISWeb serves as the publicly available portal to a geographically seamless set of much of the water data maintained within NWIS. The Surface-Water Data set for California includes comprehensive historical daily data information for 2,460 gaged sites in California, 492 of which are “real-time” gages.

USGS California Water Science Center
The California Water Science Center is the repository for the Water Resources Data for California, Vols. 1 – 4, annual report series of USGS stream gage data in California. Among other functions, the reports themselves are an index to all historical and currently active gaged streams operated or cooperatively operated by the USGS. These reports also include helpful stream and gage schematics that are indispensable. The California Water Science Center also has useful links to USGS NWIS real time data.

USBR Mid Pacific Region Central Valley Operations Office (CVO)
USBR-CVO maintains real time (or one-day lagged) stream and Central Valley Project reservoir data as well as various water accounting reports required by the State Water Project-Central Valley Project Coordinated Operating Agreement and other agencies including the State Water Resources Control Board and U.S. Fish and Wildlife Service. Some of the USBR’s accounting reports include pumping and or depletion data not obtainable elsewhere, including CDEC and USGS

USACE WCDS
The Sacramento District’s WCDS collects data necessary for the management of USACE reservoirs and flood control space in Non-USACE Reservoirs (i.e., Section 7 projects). The following information is available on the USGS WCDS:

- Midnight Reservoir Status for USACE and Section 7 projects.
- Monthly Reservoir Reports for USACE projects.
- California plots and Tabulations of Storage, Inflow, and Outflow for USACE and Section 7 Reservoirs.
- Great Basin/Upper Colorado River Basin plots and Tabulations of Storage, Inflow, and Outflow for Section 7 Reservoirs.
- Hourly Time Series Reports with the latest 48 hourly reservoir and flow values.
- Release Change Notifications for USACE and a select number of Section 7 projects.
- Average Reservoir Status for USACE and Section 7 projects.
- Special Reports
- Archived Reports and Plots

Appendix 4: CDEC Gages: Full Natural / Unimpaired Flow Data

Name	Gauge ID	Type
SAN JOAQUIN RIVER AT FRIANT DAM (MILLERTON)	MIL	FNF
STANISLAUS RIVER AT GOODWIN DAM	GDW	FNF
STANISLAUS RIVER AT NEW MELONES RESERVOIR	NML	FNF
TUOLUMNE R-LA GRANGE DAM	TLG	FNF
MERCED R NR MERCED FALLS	MRC	FNF
SACRAMENTO RIVER AT BEND BRIDGE	BND	FNF
SACRAMENTO RIVER AT SHASTA DAM	SHA	FNF
AMERICAN RIVER AT FOLSOM	AMF	FNF
AMERICAN RIVER AT FOLSOM DAM	FOL	FNF
INDIAN CREEK AT ANTELOPE LAKE	ANT	FNF
MF FEATHER RIVER AT LAKE DAVIS (DWR)	DAV	FNF
LITTLE LAST CHANCE CREEK AT FRENCHMAN DAM	FRD	FNF
FEATHER RIVER AT OROVILLE	FTO	FNF
FEATHER RIVER AT OROVILLE DAM	ORO	FNF
ARROYO SECO (SALINAS RIVER) NEAR SOLEDAD	ASS	FNF
KINGS NF NR CLIFF CAMP	KGC	FNF
KINGS R-PINE FLAT DAM	KGF	FNF
KINGS PRE-PROJECT PIEDRA	KGP	FNF
SAN JOAQUIN RIVER AT PINE FLAT DAM	PNF	FNF
KAWEAH R-TERMINUS DM	KWT	FNF
TERMINUS DAM	TRM	FNF
KERN RIVER AT ISABELLA DAM	ISB	FNF
KERN RIVER-BAKERSFIELD	KRB	FNF
KERN RIVER-BLW ISABELLA	KRI	FNF
KERN RIVER NEAR KERNVILLE	KRK	FNF
TULE RIVER AT SUCCESS DAM	SCC	FNF
COSUMNES RIVER AT MICHIGAN BAR	CSN	FNF
COSUMNES RIVER AT MICHIGAN BAR	MHB	FNF
MOKELUMNE RIVER-MOKELUMNE HILL	MKM	FNF
MOKELUMNE RIVER AT WEST POINT	MKW	FNF
CALAVERAS RIVER AT NEW HOGAN LAKE	NHG	FNF
KLAMATH RIVER AT ORLEANS	KLO	FNF
SCOTT RIVER NEAR FORT JONES	SFJ	FNF
TRINITY RIVER AT TRINITY LAKE	CLE	FNF
TRINITY RIVER AT LEWISTON	TNL	FNF
YUBA RIVER NEAR SMARTVILLE	YRS	FNF
EEL RIVER AT SCOTIA	ERS	FNF
RUSSIAN RIVER NEAR HEALDSBURG	RRH	FNF

Appendix 5: Unimpaired Flows from the California Data Exchange Center

Unimpaired flow estimates (also described as the "full natural flow" estimate by the Department of Water Resources (DWR)) can be compared to reported water diversion values to determine if water is available to divert under a post-1914, pre-1914 and riparian water rights or claims of water right.

"Full Natural Flow" or "Unimpaired Runoff" represents the natural water production of a river basin, unaltered by upstream diversions, storage, or by export or import of water to or from other watersheds. Gauged flows at the given measurement points are increased or decreased to account for these upstream operations. Where no diversion, storage, or consumptive use exists in the watershed, the historical gage data is often assumed to represent unimpaired flow.

DWR provides access to the state's operational hydrological data at its California Data Exchange Center[1] (CDEC) at: http://www.cdec.water.ca.gov/. CDEC provides a centralized database to store, process, and exchange real-time hydrologic information gather by various cooperators throughout the State. Currently, over 140 agencies provide data to CDEC and also obtain data through CDEC's cooperative hydrologic database. The data collected by CDEC enables forecasters to prepare water supply forecasts. DWR's Bulletin 120 is a publication issued four times a year, in the second week of February, March, April, and May by DWR. It contains forecasts of the volume of seasonal runoff from the state's major watersheds, and summaries of precipitation, snowpack, reservoir storage, and runoff in various regions of the State.

DWR's May 1, 2014 forecast of monthly unimpaired runoff (in thousands of acre-feet) for 26 California locations is shown at: http://www.cdec.water.ca.gov/cgi-progs/iodir/B120.

DWR also estimates the daily Full Natural Flow (FNF) for 16 locations. The daily FNF calculations are based on less data than is available at the completion of each month. The sum of daily FNF reported here will not exactly match the calculated monthly FNF reported on the seasonal and water year reports. Due to the lag between the effect of upstream operations and downstream flow measurements, calculated daily FNF will fluctuate from day to day. DWR reports the daily FNF based on calculations done by project operators on the respective rivers, the U.S. Army Corps of Engineers and/or Snow Surveys at: http://cdec.water.ca.gov/cgi-progs/stages/FNF.

DWR provides tables comparing the April and seasonal October-April measured flow to the 50-year average and seasonal total unimpaired runoff at: http://cdec.water.ca.gov/cgi-progs/stages/FLOWOUT and shown below. The table was updated on May 12, 2014. The next update will be issued about June 12, 2014, unless there are significant hydrologic changes.

[1] DWR periodically updates and publishes unimpaired flow estimates for various rivers in the Central Valley on a monthly basis. The latest edition is *California Central Valley Unimpaired Flow Data, Fourth Edition, Draft* (UF Report; DWR 2007a) provides unimpaired data for the 83-year period October 1920 through September 2003. The UF Report contains monthly estimates of the volume of unimpaired flow for all sub-basins within the Central Valley divided into 24 sub-basins, identified as sub-basins UF-1 through UF-24.
http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/water_quality_control_planning/docs/sjrf_spprtinfo/dwr_2007a.pdf.

Runoff Data for Water Year 2014

Report generated: 05/12/2014 14:32

Runoff Data for Water Year 2014

NORTH COAST

	APRIL				OCTOBER - APRIL			
	Unimpaired Runoff				Unimpaired Runoff			
Area, Stream, and Station (1)	Measured Flow (2) 1000 AF	50-Year Ave (3) 1000 AF	Monthly Total 1000 AF	% Ave	Measured Flow (2) 1000 AF	50-Year Ave (3) 1000 AF	Seasonal Total 1000 AF	% Ave
KLAMATH R, COPCO TO ORLEANS (4)	338.1	602.5	272.2	45	2001.7	3671.3	1584.2	43
* SALMON R AT SOMES BAR	94.9	171.0	94.9	55	511.6	967.0	511.6	53
TRINITY R AT LEWISTON LK	36.1	203.4	79.5	39	152.0	907.6	320.7	35
EEL R AT SCOTIA	339.2	556.0	341.3	61	1527.4	5429.4	1587.9	29
RUSSIAN R AT HEALDSBURG	53.3	74.4	56.0	75	213.5	869.5	213.6	25
SUBTOTAL	766.6	1436.3	749.0	52	3894.6	10877.8	3706.3	34

SAN FRANCISCO BAY

	APRIL				OCTOBER - APRIL			
	Unimpaired Runoff				Unimpaired Runoff			
Area, Stream, and Station (1)	Measured Flow (2) 1000 AF	50-Year Ave (3) 1000 AF	Monthly Total 1000 AF	% Ave	Measured Flow (2) 1000 AF	50-Year Ave (3) 1000 AF	Seasonal Total 1000 AF	% Ave
NAPA R NEAR ST HELENA	5.6	5.6	5.6	100	14.0	71.0	14.0	20
SUBTOTAL	5.6	5.6	5.6	100	14.0	71.0	14.0	20

CENTRAL COAST

	APRIL				OCTOBER - APRIL			
	Unimpaired Runoff				Unimpaired Runoff			
Area, Stream, and Station (1)	Measured Flow (2) 1000 AF	50-Year Ave (3) 1000 AF	Monthly Total 1000 AF	% Ave	Measured Flow (2) 1000 AF	50-Year Ave (3) 1000 AF	Seasonal Total 1000 AF	% Ave
ARROYO SECO NEAR SOLEDAD	1.9	14.4	1.9	13	11.2	113.3	11.2	10
NACIMIENTO BELOW NACIMENTO DAM	3.6	16.3	1.5	9	35.2	199.1	10.7	5
SUBTOTAL	5.5	30.6	3.4	11	46.4	312.3	21.9	7

SOUTH COAST								
	APRIL				OCTOBER - APRIL			
	Unimpaired Runoff				Unimpaired Runoff			
Area, Stream, and Station (1)	Measured Flow (2) 1000 AF	50-Year Ave (3) 1000 AF	Monthly Total 1000 AF	% Ave	Measured Flow (2) 1000 AF	50-Year Ave (3) 1000 AF	Seasonal Total 1000 AF	% Ave
ARROYO SECO NEAR PASADENA	0.1	0.8	0.1	11	1.2	7.0	0.8	11
SANTA ANA R NEAR MENTONE	2.5	7.8	2.7	35	8.4	40.4	7.3	18
SUBTOTAL	2.6	8.6	2.8	33	9.6	47.4	8.1	17

SACRAMENTO RIVER								
	APRIL				OCTOBER - APRIL			
	Unimpaired Runoff				Unimpaired Runoff			
Area, Stream, and Station (1)	Measured Flow (2) 1000 AF	50-Year Ave (3) 1000 AF	Monthly Total 1000 AF	% Ave	Measured Flow (2) 1000 AF	50-Year Ave (3) 1000 AF	Seasonal Total 1000 AF	% Ave
* SACRAMENTO R AT DELTA	47.6	119.6	47.6	40	213.8	664.8	213.8	32
* MCCLOUD R ABOVE SHASTA LAKE	33.0	131.5	81.8	62	196.5	819.6	482.5	59
* PIT R NR MONTGOMERY & SQUAW CR	223.5	362.1	206.4	57	1308.3	2105.1	1173.6	56
* SHASTA LAKE TOTAL INFLOW	359.5	683.7	356.7	52	1913.8	4419.9	1925.3	44
SACRAMENTO R ABOVE BEND BRIDGE	313.0	976.1	528.5	54	2309.5	6666.4	2746.9	41
FEATHER R AT OROVILLE	49.2	650.9	289.9	45	490.0	3227.1	1317.8	41
YUBA R NR SMARTVILLE & DEER CR	49.0	340.3	192.4	57	360.3	1632.5	716.3	44
AMERICAN R BLW FOLSOM LAKE	41.1	421.6	233.6	55	398.2	1845.3	750.1	41
SUBTOTAL	452.3	2389.0	1244.4	52	3558.0	13371.3	5531.1	41

SAN JOAQUIN RIVER								
	APRIL				OCTOBER - APRIL			
	Unimpaired Runoff				Unimpaired Runoff			
Area, Stream, and Station (1)	Measured Flow (2) 1000 AF	50-Year Ave (3) 1000 AF	Monthly Total 1000 AF	% Ave	Measured Flow (2) 1000 AF	50-Year Ave (3) 1000 AF	Seasonal Total 1000 AF	% Ave
COSUMNES R AT MICHIGAN BAR	15.6	63.3	18.4	29	60.5	317.7	73.4	23
MOKELUMNE R, INFL TO PARDEE RES	17.5	121.6	76.1	63	130.7	403.1	164.7	41
STANISLAUS R BELOW GOODWIN RES	92.4	189.0	111.2	59	212.9	635.2	234.7	37
TUOLUMNE R BELOW LA GRANGE RES	---	269.5	169.2	63	16.5	942.6	335.6	36
MERCED R BELOW MERCED FALLS	27.4	147.5	74.7	51	142.2	495.3	131.0	26
SAN JOAQUIN R BELOW MILLERTON L	73.5	237.8	111.6	47	138.4	723.7	225.3	31
SUBTOTAL	226.4	1028.6	561.2	55	701.1	3517.5	1164.8	33

TULARE LAKE								
	APRIL				OCTOBER - APRIL			
	Unimpaired Runoff				Unimpaired Runoff			
Area, Stream, and Station (1)	Measured Flow (2) 1000 AF	50-Year Ave (3) 1000 AF	Monthly Total 1000 AF	% Ave	Measured Flow (2) 1000 AF	50-Year Ave (3) 1000 AF	Seasonal Total 1000 AF	% Ave
KINGS R BELOW PINE FLAT RES	13.4	216.8	125.9	58	95.5	626.0	229.5	37
KAWEAH R BLW TERMINUS RES	1.7	65.4	27.4	42	12.5	215.6	53.5	25
TULE R BLW LAKE SUCCESS	0.2	24.3	3.9	16	3.8	104.2	12.4	12
* KERN R BLW LAKE ISABELLA	19.2	93.8	26.4	28	75.3	309.9	91.1	29
KERN R NEAR BAKERSFIELD	19.2	98.2	26.4	27	76.7	330.0	92.2	28
SUBTOTAL	34.5	404.7	183.6	45	188.4	1275.7	387.6	30

NORTH LAHONTAN								
	APRIL				OCTOBER - APRIL			
	Unimpaired Runoff				Unimpaired Runoff			
Area, Stream, and Station (1)	Measured Flow (2) 1000 AF	50-Year Ave (3) 1000 AF	Monthly Total 1000 AF	% Ave	Measured Flow (2) 1000 AF	50-Year Ave (3) 1000 AF	Seasonal Total 1000 AF	% Ave
TRUCKEE R FROM TAHOE TO FARAD (4)	35.3	68.4	27.4	40	163.1	209.0	95.9	46
WEST FK CARSON AT WOODFORDS	7.4	11.5	7.4	65	16.4	28.3	16.4	58
EAST FK CARSON NR GARDNERVILLE	22.9	33.5	22.9	68	56.6	96.9	56.4	58
WEST WALKER BLW LITTLE WALKER	13.2	17.5	13.2	76	24.1	45.2	24.1	53
EAST WALKER NEAR BRIDGEPORT	2.0	8.1	1.2	14	13.1	47.1	17.0	36
SUBTOTAL	80.9	139.0	72.1	52	273.3	426.5	209.7	49
SOUTH LAHONTAN								
	APRIL				OCTOBER - APRIL			
	Unimpaired Runoff				Unimpaired Runoff			
Area, Stream, and Station (1)	Measured Flow (2) 1000 AF	50-Year Ave (3) 1000 AF	Monthly Total 1000 AF	% Ave	Measured Flow (2) 1000 AF	50-Year Ave (3) 1000 AF	Seasonal Total 1000 AF	% Ave
OWENS R BELOW LONG VALLEY DAM	7.1	10.5	4.3	41	23.3	75.9	44.5	59
SUBTOTAL	7.1	10.5	4.3	41	23.3	75.9	44.5	59
COLORADO RIVER								
	APRIL				OCTOBER - APRIL			
	Unimpaired Runoff				Unimpaired Runoff			
Area, Stream, and Station (1)	Measured Flow (2) 1000 AF	50-Year Ave (3) 1000 AF	Monthly Total 1000 AF	% Ave	Measured Flow (2) 1000 AF	50-Year Ave (3) 1000 AF	Seasonal Total 1000 AF	% Ave
* COLORADO R INFL TO LAKE POWELL	774.1	1038.6	964.4	93	2995.7	3789.0	3376.9	89
SUBTOTAL	---	---	---	---	---	---	---	---
SUBTOTAL	---	---	---	---	---	---	---	---
STATEWIDE								
TOTAL	1581.5	5453	2826.4	51	8708.9	29975.7	11088.1	36

* THESE STATIONS ARE NOT INCLUDED IN AREA OR STATEWIDE TOTALS.
(1) AREA AND STATEWIDE TOTALS DO NOT INCLUDE MISSING DATA DENOTED BY '---'. IF THE MONTHLY UNIMPAIRED RUNOFF IS MISSING, THE SUBTOTAL'S PERCENT AVERAGE UNDERESTIMATES THE TRUE PERCENT AVERAGE. THE 50-YEAR AVERAGE CONSIDERS ALL SITES WHETHER OR NOT AN UNIMPAIRED RUNOFF VALUE EXISTS FOR A RIVER IN THE BASIN.
(2) MEASURED FLOW IS THE OBSERVED FLOW AT THE SITE.
(3) UNIMPAIRED RUNOFF AVERAGE BASED ON DATA YEARS 1961-2010.
(4) ACCRETIONS BETWEEN STATIONS.

Appendix 6: California Real-Time Gage Data

The U.S.Geological Survey (USGS) National Water Information System Surface Water Data for California web page lists approximately 770 active stream and reservoir gages in California shown on the following map: http://ca.water.usgs.gov/data/waterconditionsmap.html. In addition, there are about 130 additional cooperating agency gages published on California Data Exchange Center (CDEC) that are not USGS stream gages, for a total of approximately 900 active stream and reservoir discharge gages throughout the State.

The table below lists 380 stream and reservoir discharge gages compiled from USGS, CDEC, and cooperating agency websites for the following key watersheds:

- Sacramento River (175)
- Mokelumne River/Eastside Streams (23)
- San Joaquin River (84)
- Tulare Basin (32)
- Klamath River (33)
- Eel River (9)
- Napa River (2)
- Russian River (12)
- Salinas River (10)

The remaining 520 (900 minus 380) stream gages are located in watersheds such as the Truckee River, Santa Ana River, Pescadaro River, Owens River, Carmel River, and many other streams.

Sacramento River Watershed

Sacramento River

Gage Name	Gage ID CDEC	Gage ID USGS	Type
Sacramento River at Freeport	FPT	11447650	Flow
Sacramento R ab Bend Bridge	BND	11377100	Flow
Sacramento River at Butte City	BTC		Flow
Sacramento R at Colusa Weir	CLW		Flow
Sacramento River at Colusa	COL	11389500	Flow
Sacramento River at Delta	DLT	11342000	Flow
Sacramento Deep Water Shipping Channel	DWS		Flow
Sacramento River at Fremont Weir	FRE		Flow
Sacramento River below Georgiana Slough	GES		Flow
Sacramento R at Hamilton City - Main Ch	HMC		Flow
Sacramento River at I Street Bridge	IST		Flow
Keswick Reservoir	KES		Inflow
Keswick Reservoir	KES		Outflow
Keswick	KWK		Flow
Sacramento R at Keswick		11370500	Flow
Sacramento R at Moulton Wier	MLW		Flow
Sacramento R at Ord Ferry - Main Channel	ORD		Flow

Sacramento R at Red Bluff Diversion Dam	RDB		Flow
Sacramento River at Butte Slough	SBS		Flow
Sacramento R above Delta Cross Channel	SDC		Flow
Shasta Dam	SHA		Inflow
Shasta Dam	SHA		Outflow
Spring Creek Debris Dam	SPC		Inflow
Spring Creek Debris Dam	SPC		Outflow
Sac Regional Wastewater Treatment Plant	SPE		Flow
Sacramento River at Hood	SRD		Flow
Sacramento River at Rio Vista	SRV		Flow
Sacramento River at Tisdale Weir	TIS		Flow
Sacramento River at Vina Bridge-Main ch	VIN		Flow
Sacramento River at Vina East Bank	VNO		Flow
Sacramento River at Verona	VON	11425500	Flow
Whiskeytown Dam (USBR)	WHI		Inflow
Whiskeytown Dam (USBR)	WHI		Outflow
Sacramento River below Wilkins Slough	WLK	11390500	Flow
Sutter Bypass at Rd 1500 Pump	SBP		Flow
Willow Slough at sb West Burrow Pit	WSL		Flow
Yolo Bypass at Lisbon	LIS		Flow
Yolo Bypass near Woodland	YBY	11453000	Flow

Creeks Tributary to the Sacramento River

Big Chico Creek near Chico	BIC		Flow
Black Butte Generator	BBG		Flow
Butte Slough near Meridan	BSL		Flow
Clear Creek nr Igo	IGO	11372000	Flow
Colusa Drain nr Hwy 20	CDR		Flow
Cow Creek near Millville	COW	11374000	Flow
Elder Creek near Paskenta	ECP	11379500	Flow
Kelsey Ck Blw Kelseyville	KCK		Flow
Laguna C nr Elk Grove		11336585	Flow
Lindo Channel Nr Chico	LCH		Flow
Meridan Pumps	MPS		Flow
Middle Creek Nr Upper Lake	MCU		Flow
Morrison Creek at Florin Road	MRF	11336580	Flow
Mud Creek near Chico	MUC		Flow
Ridge Cut at Knights Landing	RCS		Flow
Thomes Creek at Paskenta	THO		Flow
Battle Creek near Manton	BAS		Flow
Battle Creek	BAT	11376550	Flow

North Fork Battle Creek near Manton	BNF		Flow
Deer Creek below Stanford Vina Dam	DVD	11383500	Flow
Deer Creek nr Vina	DCV		Flow
Mill Creek Below HWY 99	MCH		Flow
Mill Creek Nr Los Molinos	MLM	11381500	Flow
Cottonwood Creek Auxiliary Gage	CWA	11376000	Flow
N Fk Cottonwood Ck abv Lk at Brdg nr Ono	NCO		Flow
Cherokee Canal Nr Richvale	CHC		Flow
BW-12 Import to Butte Creek	BBW		Flow
Butte Creek nr Durham	BCD		Flow
Butte Creek near Chico	BCK	11390000	Flow
Parrot Div from Butte Creek	BPD		Flow

Cache Creek & Tributary Creeks

Cache Creek at Yolo	CCY	11452500	Flow
Indian Valley	INV		Flow
NF Cache Creek at Hough Springs	NFC	11451100	Flow
Cache Creek at Rumsey Bridge	RUM		Flow
Cache C nr Lower Lake		11451000	Flow
Bear Ck at Holsten Cyn nr Rumsey	BRK	11451715	Flow
Kelsey C nr Kelseyville		11449500	Flow

Putah Creek

Putah Creek near Guenoc	PCG	11453500	Flow
Putah Creek near Winters	PUT	11454000	Flow
Berryessa	BER		Inflow
Berryessa	BER		Outflow

Pit River & Tributary Creeks

Pit River near Canby	PCN	11348500	Flow
SF Pit R nr Likely	PLK	11345500	Flow
Pit R Bl Pit No 1 PH nr Fall River Mills	PP1	11355010	Flow
Hat Creek Blw Hat Creek	HCB		Flow
Hat Creek nr Hat Creek	HCN		Flow

McCloud River

McCloud River below McCloud Dam	MC7		Flow
McCloud R at Ah-di-Na	MCA		Flow
McCloud River near McCloud	MCD		Flow
McCloud River above Shasta Lake	MSS		Flow

Delta

Delta Cross Channel	DLC		Flow
Georgiana Slough at Sacramento River	GSS		Flow
Miner Slough at Hwy 44 Bridge	HWB		Flow
Liberty Island @ Approx Cntr S end	LIB		Flow
National Steel	NSL		Flow
Cache Slough at Ryder Island	RYI		Flow
Steamboat Slough btw Sac R and Sutter Sl	SSS		Flow
Sutter Slough at Courtland	SUT		Flow
Three Mile Slough at San Joaquin River	TSL		Flow
False River	FAL		Flow
Jones Tract	JTR		Flow
Middle River at Middle River	MDM		Flow
Old River at Bacon Island (USGS)	OBI		Flow
Old River at Delta Mendota Canal	ODM		Flow
Old River at Highway 4	OH4		Flow
Old River Near Tracy	OLD		Flow
Old & Middle Rvrs, tidally Filtered est	OMR		Flow
Old River at Franks Tract near Terminous	OSJ		Flow
Victoria Canal near Byron	VCU		Flow
DUTCH SLOUGH AT JERSEY ISLAND	DSJ		Flow
GRANTLINE CANAL (USGS)	GLC		Flow
GRANT LINE CANAL EAST	GLE		Flow
MIDDLE RIVER NEAR HOLT	HLT		Flow
HOLLAND CUT NEAR BETHEL ISLAND	HOL		Flow
LITTLE POTATO SLOUGH AT TERMINOUS	LPS		Flow
MIDDLE RIVER ABOVE BARRIER	MAB		Flow
MIDDLE RIVER AT UNDINE ROAD	MRU		Flow
OLD RIVER AT HEAD	OH1		Flow
OLD RIVER AT CLIFTON COURT INTAKE	ORI		Flow
OLD RIVER @ QUIMBLY IS NEAR BETHEL IS	ORQ		Flow
OLD RIVER ABOVE DOUGHTY CUT	ORX		Flow
PARADISE CUT	PDC		Flow
SUGAR CUT	SGA		Flow
TURNER CUT NEAR HOLT	TRN		Flow
WEST CANAL AT CLIFTON COURT INTAKE	WCI		Flow

Feather, Yuba, Bear & American River Watersheds

Feather River & Tributary Creeks

N Fork Feather River below Grizzly Creek	F56		Flow
N Fork Feather River below Rock Cr Div Dam	F57		Flow
Feather River at Boyd's Landing	FBL		Flow
Feather River above Star Bend	FSB		Flow
Feather River near Gridley	GRL		Flow
Hendricks Canal Diversion	HDC		Flow
Indian Creek below Indian Falls	ICR		Flow
Kelly Ridge Powerplant	KLL		Flow
Feather River at Merrimac	MER		Flow
Middle Fork Feather River near Portola	MFP		Flow
Miocene Canal Diversion	MIC		Flow
North Fork Feather River at Pulga	NFP		Flow
Oroville Dam	ORO		Inflow
Oroville Dam	ORO		Outflow
South Honcut Creek near Bangor	SFH		Flow
Spanish Ck above Blackhawk Ck at Keddie	SPK	11402000	Flow
Spanish C at Quincy		11401920	Flow
Total Release-Feather R blw Thermalito	THA		Flow
West Branch Feather R near Magalia	WFR		Flow

Yuba River

North Yuba - blw Goodyears Bar	GYB	11413000	Flow
Oregon Creek - blw Log Cabin	LCB		Flow
Middle Yuba - blw Our House Dam	ORH		Flow
South Yuba - at Jones Bar	JBR		Flow
Yuba River - abv New Bullards Bar	BUL		Flow
Yuba River - blw New Bullards Bar	BUL		Flow
Yuba River - nr Smartville	YRS		Flow
Deer Creek - nr Smartville	DCS	11418500	Flow
Yuba River - nr Marysville	MRY	11421000	Flow

Bear River & Tributary Creeks

South Canal from Bear River	BEV		Flow
Bear River at Pleasant Cove Rd	BPG		Flow
Bear River at Rollins Reservoir	BRE		Flow
Bear River at Wheatland	BRW	11424000	Flow
Bear River at Camp Far West	CFW		Flow
Dry Creek near Wheatland	DCW		Flow

American River & Tributary Creeks

American River at Fair Oaks	AFO	11446500	Flow
American R at Folsom	AMF		Flow
American SF nr Kyburz	AMK		Flow
American River at Chili Bar	CBR		Flow
Echo Lake Conduit	ECH		Flow
Folsom Dam	FOL		Inflow
Folsom Dam	FOL		Outflow
Folsom South Canal	FSC		Flow
Lake Valley Canal	LVC		Flow
Lake Natoma	NAT		Inflow
Lake Natoma	NAT		Outflow
Loon Lake (SMUD)	LON		Flow
NF American R at North Fork Dam	NFD	11427000	Flow
Middle Fk American R nr Oxbow PH	OXB		Flow
Arcade Ck nr Del Paso Hts	ACK	11447360	Flow
Silver Cr blw Camino Dam	SVC		Flow
Rainbow Diversion Dam	RBW		Flow
Black Butte	BLB		Inflow
Black Butte	BLB		Outflow

Mokelumne River/Eastside Streams Watersheds

Cosumnes River

COSUMNES R, NO. FK. NR EL DORADO	CNF		Flow
COSUMNES R AT MICHIGAN BAR	CSN		Flow
DRY CREEK NEAR GALT	DCG		Flow
COSUMNES RIVER AT MICHIGAN BAR	MHB		Flow
COSUMNES R, MID FK. NR SOMERSET	CMF		Flow
COSUMNES RIVER AT MICHIGAN BAR	MHB	11335000	Flow

Mokelumne River

CAMANCHE RESERVOIR	CMN		Inflow
CAMANCHE RESERVOIR	CMN		Outflow
NF MOKELUMNE R BL SALT SPRINGS DAM	M11		Flow
NF MOKELUMNE R AB TIGER CREEK	M38		Flow
NF MOKELUMNE R BL ELECTRA DIVERSION	M46		Flow
NF MOKELUMNE R BL TIGER CREEK AFTERBAY	MBT		Flow
MOKELUMNE R @ SAN JOAQUIN RIVER	MOK		Flow
NORTH MOKELUNME R @ W WALNUT GROVE RD	NMR		Flow
PARDEE	PAR		Inflow
PARDEE	PAR		Outflow

SOUTH MOKELUMNE R @ W WALNUT GROVE RD	SMR		Flow
MOKELUMNE RIVER AT WOODBRIDGE	WBR		Flow
USGS 11336930 MOKELUMNE R A ANDRUS ISLAND NR TERMINOUS CA		11336930	Flow

Calaveras River

MORMON SLOUGH AT BELLOTA (USACE)	MRS		Flow
NEW HOGAN LAKE	NHG		Inflow
NEW HOGAN LAKE	NHG		Outflow
SOUTH SAN JOAQUIN CANAL	SSJ		Outflow

San Joaquin River Watersheds

San Joaquin River	**CDEC**	**USGS**	
SAN JOAQUIN RIVER NEAR VERNALIS	VNS	11303500	Flow
SAN JOAQUIN R AT MAZE RD BRIDGE	MRB		Flow
SAN JOAQUIN RIVER NEAR PATTERSON	SJP		Flow
ORESTIMBA CREEK NR NEWMAN	ORE	11274500	Flow
SAN JOAQUIN R NR CROWS LANDING	SCL	11274550	Flow
ORESTIMBA CK AT RIVER RD NR CROWS LNDG	OCL	11274538	Flow
SAN JOAQUIN RIVER NEAR NEWMAN	NEW	11274000	Flow
SAN JOAQUIN R ABV MERCED R NR NEWMAN	SMN	11273400	Flow
SAN JOAQUIN R AT FREMONT FORD BRIDGE	FFB	11261500	Flow
SAN JOAQUIN RIVER NEAR STEVINSON	SJS		Flow
SAN JOAQUIN RIVER NEAR MENDOTA	MEN	11254000	Flow
SAN JOAQUIN R AT SAN MATEO RD NR MENDOTA	SJN	11253130	Flow
SAN JOAQUIN RIVER BELOW BIFURCATION	SJB		Flow
SAN JOAQUIN RIVER AT GRAVELLY FORD	GRF		Flow
SAN JOAQUIN R BLW HWY 145 (SKAGGS BR)	SKB		Flow
SAN JOAQUIN R AT DONNY BRIDGE	DNB		Flow
SAN JOAQUIN R AT HWY 41	H41		Flow
SAN JOAQUIN RIVER BELOW FRIANT	SJF	11251000	Flow
FRIANT DAM (MILLERTON)	MIL		Inflow
FRIANT DAM (MILLERTON)	MIL		Outflow
SAN JOAQUIN RIVER NEAR AUBERRY	SJA		Flow
SAN JOAQUIN R AT BRANDT BRIDGE	BDT		Flow
CHOWCHILLA BYPASS	CBP		Flow
COTTONWOOD CREEK NEAR FRIANT	CTK		Flow
EASTSIDE BYPASS BLW MARIPOSA BYPASS	EBM		Flow
EASTSIDE BYPASS NEAR EL NIDO	ELN		Flow
JAMES BYPASS	JBP		Flow
LITTLE DRY CREEK (USBR)	LDC		Flow

BEAR CREEK AT MC KEE ROAD	MCK		Flow
SAN JOAQUIN RIVER AT MOSSDALE BRIDGE	MSD		Flow
MUD SLOUGH NR GUSTINE	MSG		Flow
N FK WILLOW CK NR SUGAR PINE	NFW		Flow
SAN JOAQUIN RIVER ABOVE DOS REIS	SJD		Flow
SAN JOAQUIN RIVER AT GARWOOD BRIDGE	SJG		Flow
SAN JOAQUIN RIVER AT JERSEY POINT (USGS)	SJJ		Flow
SALT SLOUGH AT HWY 165 NR STEVINSON	SSH		Flow

Stanislaus River

STANISLAUS RIVER AT RIPON	RIP	11303000	Flow
STANISLAUS R AT ORANGE BLOSSOM BRIDGE	OBB		Flow
BLACK CREEK NR COPPEROPOLIS	BCC	11299600	Flow
NEW MELONES RESERVOIR	NML		Inflow
NEW MELONES RESERVOIR	NML		Outflow
SF STANISLAUS R NR STRAWBERRY DIV DAM	S83		Flow
MF STANISLAUS R BEARDSLEY LAKE	BRD		Outflow
MF STANISLAUS R BL SANDBAR DIV DAM	S12		Flow
MF STANISLAUS R AT KENNEDY MEADOWS	S52		Flow
NORTH FORK STANISLAUS RIVER NEAR AVERY	NSA		Flow
SF STANISLAUS R AT STRAWBERRY	S61		Flow
SF STANISLAUS R NR STRAWBERRY DIV DAM	S83		Flow

Tuolumne River

TUOLUMNE RIVER AT MODESTO	MOD	11290000	Flow
TUOLUMNE R AT WATERFORD	TRW		Flow
TUOLUMNE R BLW LA GRANGE DAM NR LA GRANG	LGN	11289650	Flow
TUOLUMNE R ABV EARLY INTAKE NEAR MATHER	TAI	11276600	Flow
TUOLUMNE R BL EARLY INTAKE NEAR MATHER	TBI	11276900	Flow
CHERRY CK BL DION R PH NR MATHER	CBD	11278400	Flow
CHERRY CREEK NEAR EARLY INTAKE	CEI	11278300	Flow
TUOLUMNE R AT THE GRAND CYN OF TUOLUMNE	TGC	11274790	Flow
TUOLUMNE RIVER NEAR HETCH HETCHY	TRH	11276500	Flow
CHERRY CK BL VALLEY DAM NR HETCH HETCHY	CBV	11277300	Flow
ELEANOR CK NR HETCH HETCHY	ECK	11278000	Flow
CHERRY CK BL VALLEY DAM NR HETCH HETCHY	CBV	11277300	Flow
ELEANOR CK NR HETCH HETCHY	ECK	11278000	Flow
DRY CREEK AT MODESTO AT CLAUS ROAD	DCM		Flow
LAKE ELEANOR DIV TUNNEL	EDT		Flow
FALLS CK NR HETCH HETCHY	FHH		Flow
MID CANAL AT LA GRANGE	MID		Flow

MF TUOLUMNE R NR OAKLAND REC CAMP	MTO		Flow
SF TUOLUMNE R NR OAKLAND REC CAMP	STO		Flow
TID CANAL AT LA GRANGE	TIL		Flow
TUOLUMNE MEADOWS	TUM		Flow
UPPER CHERRY CK	UCC		Flow

Merced River

MERCED RIVER NEAR STEVINSON	MST		Flow
MERCED RIVER AT CRESSY	CRS		Flow
MERCED R AT SHAFFER BRIDGE NR CRESSY	MBN		Flow
MERCED RIVER NEAR SNELLING	MSN		Flow
MERCED R BLW CROCKER-HUFFMAN DAM	MBH		Flow
MERCED RIVER BELOW MERCED FALLS	MMF		Flow
NEW EXCHEQUER-LK MCCLURE	EXC		Inflow
NEW EXCHEQUER-LK MCCLURE	EXC		Outflow
MERCED RIVER NEAR BRICEBURG	MBB		Flow
MERCED R AT POHONO BR NR YOSEMITE	POH	11266500	Flow
MERCED R AT HAPPY ISLES BR NR YOSEMITE	HIB	11264500	Flow
BIG CK DIVERSION NR FISH CAMP	BFG		Flow
DRY CREEK NR SNELLING	DSN		Flow
SOUTH FORK MERCED RIVER AT WAWONA	SMW		Flow

Tulare Watershed

Kings River

KINGS RIVER BELOW ARMY WEIR	AMW		Flow
KINGS RIVER BELOW CRESCENT WEIR	CSW		Flow
KINGS R NR TRIMMER	KRT		Flow
KINGS RIVER AT MEADOWBROOK	MBK		Flow
NF KINGS RIVER BLW DINKEY CREEK	NKD		Flow
MILL CREEK NEAR PIEDRA	PDR		Flow
PINE FLAT DAM	PNF		Inflow
PINE FLAT DAM	PNF		Outflow

Kaweah River

DRY CREEK NEAR LEMONCOVE	LCV		Flow
TERMINUS DAM	TRM		Inflow
TERMINUS DAM	TRM		Outflow
KAWEAH RIVER AT THREE RIVERS	TRR		Flow

Kern River

BOREL CANAL SIPHON	BOS		Flow
ISABELLA DAM	ISB		Inflow
ISABELLA DAM	ISB		Outflow
KERN R AT KERNVILLE	KKV		Flow
KERN R BL KERN CYN PH DIV DAM, KE-16	KRD		Flow
SOUTH FORK KERN RIVER NEAR ONYX	SKO	11189500	Flow

Fresno River

FRESNO R ABV HENLEY LAKE	FHL		Flow
FRESNO R LEWIS FORK NR OAKHURST	FRU		Flow
HIDDEN DAM (HENSLEY)	HID		Inflow
HIDDEN DAM (HENSLEY)	HID		Outflow

Tule River

ELK BAYOU	EBY		Flow
SUCCESS DAM	SCC		Inflow
SUCCESS DAM	SCC		Outflow
USGS 11204100 SF TULE R NR RESERVATION BNDRY NR PORTERVILLE CA		11204100	Flow
USGS 11203580 SF TULE R NR CHOLOLLO CAMPGROUND NR PORTERVILLE CA		11203580	Flow

Tributary to Tulare Basin

LOS GATOS CREEK NEAR COALINGA	LGC	11224500	Flow
USGS 11253310 CANTUA C NR CANTUA CREEK CA		11253310	Flow
USGS 11255575 PANOCHE C A I-5 NR SILVER CREEK CA		11255575	Flow
USGS 11200800 DEER C NR FOUNTAIN SPRINGS CA		11200800	Flow
WHITE RIVER AT ROAD 208	WRV		Flow

Klamath River Watershed

Klamath River

Indian Crk Nr Happy Camp	IHC	11521500	Flow
Klamath R. blw Iron Gate	KIG	11516530	Flow
Klamath R at Orleans	KLO		Flow
Klamath R. nr Klamath	KNK	11530500	Flow
Klamath R. nr Seiad Valley	KSV	11520500	Flow
Klamath R. at Orleans	OLS	11523000	Flow
Salmon River at Somes Bar	SMS	11522500	Flow
Shasta River nr Montague	SRM	11517000	Flow
Shasta River nr Yreka	SRY	11517500	Flow

Trinity River

Trinity Lake	CLE		Inflow
Trinity Lake	CLE		Outflow
Trinity River at Douglas City	DGC	11525854	Flow
Trinity River at Douglas City	DGC		Flow
Grass Valley Crk nr Lewiston	GVC	11525630	Flow
Trinity River at Hoopa	HPA	11530000	Flow
Indian Crk nr Douglas City	ICD	11525670	Flow
Lewiston	LEW		Inflow
Lewiston	LEW		Outflow
Lewiston (Water Quality)	LWS	11525500	Flow
Trinity R abv NF Trinity nr Helena	NFH	11526400	Flow
NF Trinity River at Helena	NTR	11526500	Flow
Rush Creek nr Lewiston	RCL	11525530	Flow
Trinity River blw Hyampom	TBH	11528700	Flow
Trinity River nr Burnt Ranch	TBR	11527000	Flow
Trinity River at Junction City	TJC	11526250	Flow
Trinity River blw Limekiln Gulch	TLK	11525655	Flow
Trinity River at Lewiston	TNL		Flow
Trinity River abv Coffee Crk nr Trinity Ctr	TRC	11523200	Flow

Scott River

Darbee Ditch nr Callahan	DDC		Flow
Sugar Crk blw Darbee Ditch nr Callahan	SDA		Flow
Scott R. nr Fort Jones	SFJ	11519500	Flow
Scott R. nr Fort Jones	SFJ		Flow

Miscellaneous Rivers

Smith River

Smith River nr Crescent City	JED	11532500	Flow

Eel River

Van Duzen - Bridgeville		11478500	Flow
Middle Eel - Dos Rios	DOS	11473900	Flow
South Eel - Leggett	LEG	11475800	Flow
South Eel - nr Miranda	MRD	11476500	Flow
Eel River blw Lake Pillsbury	ELP		Outflow
Eel River blw Van Arsdale Dam	EVA		Flow
Eel River - at Fort Seward	FSW	11475000	Flow
Eel River - Scotia	SCO	11477000	Flow
Bull Creek - nr Weott	BCW	11476600	Flow

Napa River

Napa River near Napa	NAP	11458000	Flow
Napa River near St Helena	STH	11456000	Flow

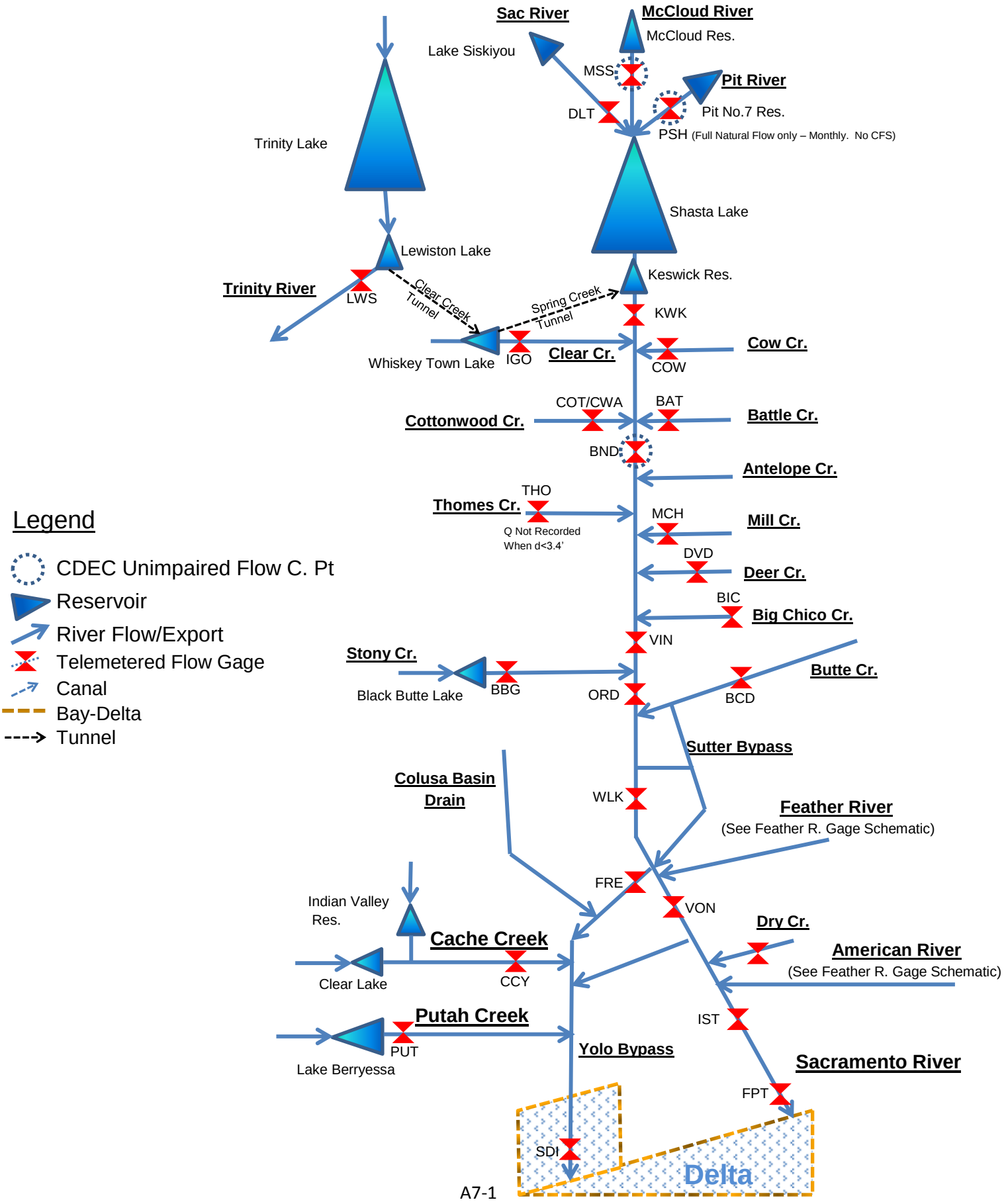
Russian River

East Russian - abv Lake Mendocino		11461500	Flow
Russian River - Below Lake Mendocino	COY		Outflow
Big Sulphur Cr - at Geysers Resort		11463170	Flow
Big Sulphur Cr - nr Cloverdale		11463200	Flow
Russian River - nr Ukiah	RRU	11461000	Flow
Russian River - at Hopland	HOP	11462500	Flow
Russian River -nr Cloverdale	CLV	11463000	Flow
Russian River - blw Warm Springs	WRS		Outflow
Russian River - nr Healdsburg		11464000	Flow
Dry Creek - nr Healdsburg	DRY		Flow
Russian River - nr Hacienda Bridge	HAC		Flow
Russian River - nr Hopland	HOP		Flow

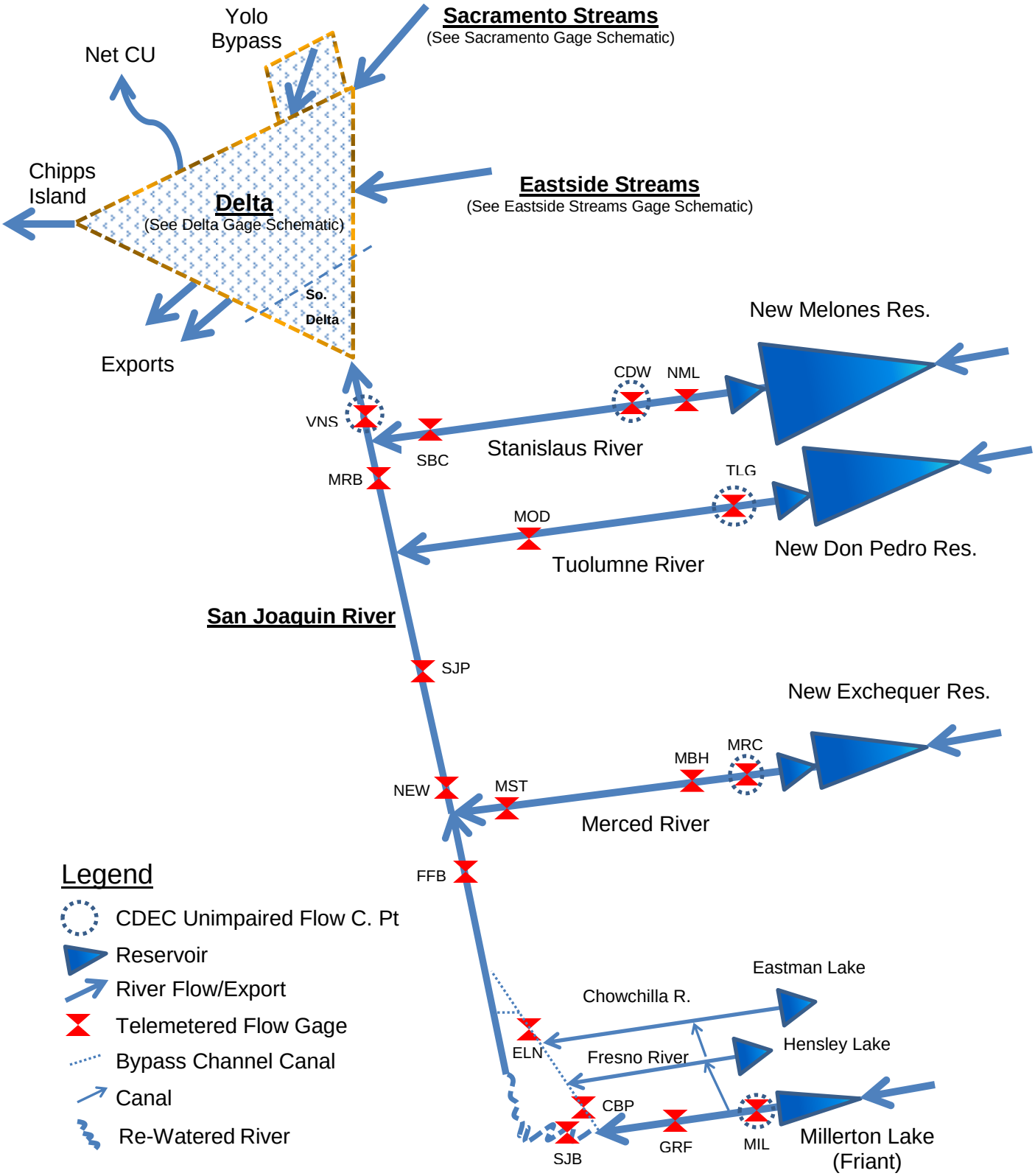
Salinas River

Arroyo Seco near Soledad	ASS	11152000	Flow
Arroyo Seco bl Reliz near Soledad		11152050	Flow
Gabilan Creek near Salinas		11152600	Flow
Reclamation Ditch near Salinas		11152650	Flow
Salinas River at Soledad		11151700	Flow
Salinas River near Bradley	BRA	11150500	Flow
Salinas River near Chualar		11152300	Flow
Estrella River near Estrella	EST		Flow
Salinas River at Paso Robles	PAS	11147500	Flow
Salinas River near Spreckels	SPR	11152500	Flow

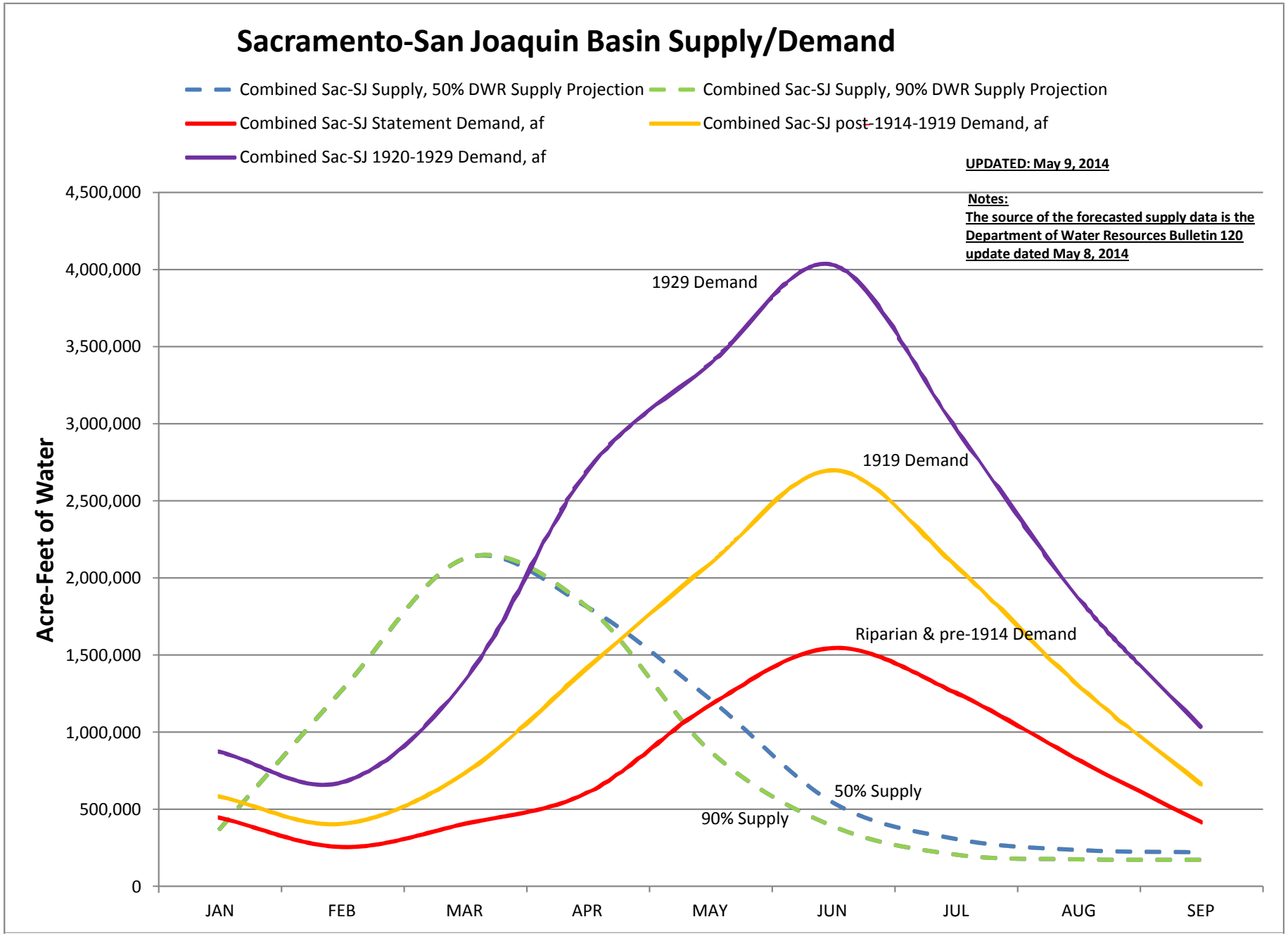
Appendix 7: Sacramento River Watershed Hydrology Schematic



Appendix 8: Delta Watershed Hydrology Schematic



Appendix 9: Sacramento-San Joaquin Basin Supply/Demand Plot



Appendix 10: Public Agency and Government Fiscal Impact Analysis

Summary

This cost estimate considers the fiscal effect of the proposed regulation both with and without inclusion of the exception to priority-based curtailments for public health and safety contained in California Code of Regulations, title 23, section 878.1. On June 2, 2014, the Office of Administrative Law approved California Code of Regulations, title 23, division 3, chapter 2, article 24, Curtailment of Diversions Based on Insufficient Flow to Meet All Needs. This article includes section 878.1, which identifies certain limited minimum health and safety needs that may be authorized notwithstanding the need for curtailment and declaring use under even more senior water rights to be a waste and unreasonable use when those minimum health and safety needs cannot be met. Section 878.1 also sets out a process for diverters issued curtailment notices under article 24 to avail themselves of the protection from curtailment under that section. This analysis therefore considers the fiscal effects of: 1) the proposed regulations, notwithstanding the inclusion, or not, of a health and safety exception; and 2) including the health and safety exception

Fiscal Effect without Section 878.1

Without the minimum health and safety needs exception contained in section 878.1, the only fiscal effect of the proposed regulation is the cost that would be incurred by local and state governments to complete and submit curtailment certification forms. All other costs of the regulation would be the same as for curtailments issued by the Board under its current authorities because local and state governments would need to comply just the same. State and local governments are not required to respond to the request for reporting in curtailment notices issued under the Board's current authorities. The State Water Board estimates that the cost to state and local agencies and governments to complete and submit curtailment certification forms will be approximately $320,000. The proposed regulations are not anticipated to have a financial impact on state agencies or school districts or to result in costs or savings in federal funding to the State.

Fiscal effect with the health and safety exception (Section 878.1)

The fiscal effect on state and local government that will result from additional curtailments that result from allowing exemptions for health and safety, e.g. curtailments affecting more senior water rights is decreased revenue and increased costs totaling $ 19.1 million. This consists of reduction in agricultural and municipal water agency revenues from lost water sales of $7.9 million and a corresponding reduction in state and local tax revenues of $0.8 million. There will be additional loss in state and local tax revenue of $3.6 million associated with reduced agricultural productions resulting from curtailed agricultural supply. Agricultural and municipal water agencies will also incur water replacement costs of $6.8 million.

The fiscal effect on state and local government that will result from these government agencies being able to continue to divert a quantity of water by relying upon a health and safety exemption is a net benefit of $102.9 million. This consists of: 1) $93.5 million reduction in decreases of water agency

revenue; and 2) a $9.4 million reduction in the corresponding decrease in state and local tax revenues. These are reductions in costs that state and local governments would otherwise incur absent the health and safety exemption.

Analysis of Fiscal Effects without Section 878.1

The proposed regulation requires only one obligation, or cost, to a diverter that does not already exist under the State Water Resources Control Board's (State Water Board or Board) existing process for curtailment. Currently, the Board has issued curtailment notices that direct the curtailed diverters to complete a certification form to confirm compliance with the curtailment notice (certification form). Because these curtailment notices are not Board orders, there is no mandate requiring that the diverters submit the certification forms to the State Water Board or otherwise file information with the Board regarding compliance with the curtailment. The proposed regulation requires diverters who receive orders of curtailment to complete and submit the certification form. Filling out this form is the only additional burden to public agencies associated with the emergency regulations. The curtailments themselves (and associated costs to diverters) are already part of the existing prohibition against unlawful diversion and associated Board authority.

To conservatively estimate the cost of the proposed regulation associated with changing from a request for information to a mandated obligation to submit the information, the Board determined the total number of state and local government agencies in California having a water right record and multiplied that number by an estimated average time to complete a simple online certification form multiplied by an average staff cost per hour.

The estimated costs associated with the proposed regulation are based on a worst case scenario that all water rights within the state will ultimately be included in a curtailment. Based on information compiled from the State Water Board eWRIMS database, there are approximately 2,446 water rights owned by the state or local government agencies (7.1% of all adjudicated, appropriated and riparian water rights) that could be affected by a curtailment. The estimated maximum amount of time to complete the required certification form as a result of the proposed regulation is 2 hours per water right. The estimated average total hourly staff costs of state and local government agency staff required to complete the certification form is $65 per hour or $130 per certification form. Therefore, the total maximum costs to state and local government agencies as a result of the proposed regulation is $317,980 (2,446 total water rights owned by state and local government agencies multiplied by the $130 cost per certification form).

Although it is projected that more curtailments will be necessary, the total number of water rights curtailed will likely be a small percentage of the total number of water rights owned by state or local government agencies throughout California. Therefore, the total costs to state and local government agencies will likely be much less than the maximum estimated cost.

Analysis of Fiscal Effects with Section 878.1

The proposed emergency regulations specify that section 878.1 does not apply to proposed section 875. This section of the fiscal analysis presents the methods used to estimate the fiscal effects on state and local government that could result if the State Water Board decides to modify the proposed emergency regulations to include exceptions to curtailments for minimum health and safety needs described in section 878.1 of title 23 of the California Code of Regulations. Accordingly, the fiscal effects described in this section would only be added to those described above for reporting in the event that the State Water Board decides to modify the proposed emergency regulations.

The State Water Board's current curtailment notices do not include a specific exception to curtailments for minimum health and safety needs. However, the State Water Board does have enforcement discretion that it could employ to achieve similar results. This fiscal effects analysis conservatively assumes that exceptions to curtailments for minimum health and safety needs would only be made under the regulation, and not through the exercise of enforcement discretion. To the extent that these exceptions would be applied under the State Water Board's existing curtailment methods, the fiscal effects would be less. To determine the fiscal effects of including the health and safety exception, this analysis identifies the maximum amount of water that could continue to be diverted under a health and safety exception to a curtailment. Continued diversions under 878.1 would require additional curtailments of other water right holders that would not otherwise have been curtailed. There would be two types of fiscal effects attributable to inclusion of a health and safety exemption:

1) Costs to state and local governments as a result of additional curtailments needed to facilitate the health and safety exemption; and
2) Benefits to state and local governments that would otherwise be curtailed if they could not continue to divert under a health and safety exemption.

The exceptions to curtailments for minimum health and safety needs are specified in section 878.1. The principal exception is for diversion of water for municipal and domestic use of no more than 50 gallons per person per day. The exception also includes other categories of health and safety water use that may be approved by the State Water Board. However, it is anticipated that these uses would be minimal and that the conservative assumptions used for the analysis of the fiscal effects of the municipal and domestic exceptions will encompass the quantity of water excepted from curtailment, and therefore the fiscal effect of the other categories of minimum health and safety uses that may be approved by the State Water Board. Accordingly, the following analysis is based on a conservative (assuming more exceptions will be made than likely will) assumption of the amount of exceptions to curtailments that will be made for health and safety purposes for minimum municipal and domestic uses.

The overall method used to determine the negative fiscal effect of the health and safety exemption (cots) on state and local governments is to determine the maximum likely number of people statewide who's domestic and municipal use rely on: 1) surface water rather than groundwater; 2) on direct diversion of surface water rather than releases from storage. This subset of the California population is

multiplied by 50 gallons per person per day, and again by 270 days, to determine the maximum possible quantity of additional curtailments that could be needed to meet the demand of these water users if they are all exempted from curtailment. This amount is further reduced to reflect the ability of these surface water users to rely on alternative sources of water such as groundwater pumping. The final net additional curtailment needed to satisfy this health and safety exemption means that water rights holders that would not have been curtailed absent the health and safety exemption will now be curtailed. To determine the effect on state and local government, EWRIMS is used to determine the percent of public water agencies, versus private, that could be potentially affected by the additional curtailment. This percent is assumed to be evenly distributed amongst all water rights. Finally the fiscal effect on state and local government is comprised of the following elements: 1) a reduction in agricultural and municipal water agency revenues from lost water sales; 2) a corresponding reduction in state and local tax revenues; 3) loss in state and local tax revenue associated with reduced agricultural productions resulting from curtailed agricultural supply; and 4) water replacement costs to agricultural and municipal water agencies.

There is also a fiscal benefit to state and local governments that use water for health and safety that would have been curtailed absent the health and safety exemption. This fiscal benefit is calculated by determining the quantity of water and the number of state and local agencies that may use the health and safety exemption to continue to divert water when otherwise curtailed.

Drinking water for the nearly 37 million residents of California (as of the 2010 U.S. census) is provided from a combination of groundwater and surface water sources. Of those, 25 million receive a portion of their water supply from the State Water Project (DWR 2014). The Central Valley Project (CVP) delivers about 600,000 acre-feet of surface water from direct diversion or storage releases for municipal use (USBR 2014). Assuming an average use of 192 gallons per person per day for overall municipal use (not just residential use), the CVP serves 2.8 million residents. The San Francisco Public Utilities District serves 2.6 million customers (including commercial and industrial), and gets most of its water from surface water sources mainly from the Tuolumne River (SFPUC 2014). These water suppliers all have adequate storage in their reservoirs such that curtailment of other diversions is not be needed to deliver a minimum health and safety amount for residential users of 50 gallons per person per day over the 270 day term of the emergency regulation. While these users do not get all of their water supplies from the above sources, in an emergency situation, it is assumed that those that require additional supplies could get those supplies from the various projects and would not require a health and safety exception under section 878.1. In the 2014 Drought Operations Plan for the SWP and CVP, it was estimated there is enough stored water to meet human health and safety needs through 2015 (DWR, USBR 2014). This leaves 6.6 million California residents that rely upon other sources of water for health and safety.

It is estimated that the municipal utilities servicing the remaining 6.6 million residents in California obtain about 40% of their supply from surface water diversions during drought years (Carle 2004). So for the approximately 2.6 million residents relying on surface water diversions for drinking water, and assuming conservatively that the water rights under which the 2.6 million remaining residents are served are curtailed, and that there are no other alternative sources or stored water available, at

50 gallons per day per person over the 270 day duration of the emergency regulations, curtailments of approximately 110,000 acre-feet would be required. This represents a very conservative assumption because it is highly unlikely that the water rights associated with the water supplies for all of these residents would be curtailed or that all of these users would not have or be able to obtain an alternate source of supply, such as groundwater or storage supplies, that could not be used instead of using the health and safety exception for these supplies. There are a number of other simplifying assumptions included in this analysis because of the uncertainty regarding exactly where curtailments will occur, how many may be needed, and how any curtailment exception for health and safety purposes would be needed and where. This analysis is assumed to present a conservatively high estimate of the impacts and benefits of section 878.1 if it is applied to the proposed emergency regulation.

Estimates of the Relative Percentage of Agricultural vs. Domestic and Other Uses and Public vs. Private Diversions that May be Affected by the Emergency Regulation

In order to determine the fiscal impacts of potentially including the health and safety exception in the emergency regulation, the fiscal analysis includes assumptions about the types of additional water use that will to be curtailed to make water available for health and safety needs. The fiscal impacts of curtailments vary based on the type of use that must be curtailed, primarily between agricultural and urban uses. In addition, pursuant to statutory and regulatory requirements, the State Water Board only needs to complete a fiscal analysis of the effects of the regulation on state and local governments. For the purpose of this gross analysis, agricultural water use is assumed to have one average value and domestic is assumed to have another. The values vary depending on a number of factors, but there is too much uncertainty about the specific circumstances of curtailments and potential health and safety exceptions to provide a more definitive estimate.

To estimate the relative percentage of agricultural versus domestic and other use, and the relative percentage of state and local governments that may be affected, the analysis is based on eWRIMS data from the Sacramento-San Joaquin Delta (Delta). The Delta watershed is appropriate for this analysis as that watershed encompasses a large portion of agricultural and municipal use in the state. Based on data from 2012 statements of water diversion and use for water rights in the Delta watershed, agricultural irrigation use represented 87 percent of water diverted from the watershed, with domestic and other uses accounting for the remaining 13 percent. Of the water used for agriculture, 94 percent was provided by public agencies (e.g. irrigation districts) with the remaining 6 percent being provided by private entities. Of the water used for domestic and other uses, 93 percent was provided by public agencies (e.g. municipalities) with the remaining 7 percent being provided by private entities. Based on these percentages, the 110 thousand acre-feet (taf) maximum amount of water that would be curtailed so that water is available to satisfy the minimum health and safety needs as provided by these regulations is assumed to be comprised of 90 taf of agricultural, 13 taf of municipal (that are not otherwise accruing the benefit of health and safety diversions under these regulations), and 7 taf of various private diverters.

Changes in Water Available For Sale by Public Agencies

Reductions in water available for diverters being curtailed, however, would likely then be offset by some level of groundwater pumping and water purchases. The net loss in water available for sale by public agencies is the amount of curtailed water they cannot replace in this fashion.

The time required to construct new wells is generally greater than the timeframe for the emergency regulations, but pumping from existing wells will likely be increased to replace a portion of the supplies reduced by curtailments. As not all affected water right holders will have access to additional groundwater pumping, however, only a portion of the curtailed water can be replaced by additional pumping. Agriculture is more likely to respond to curtailments with groundwater replacement pumping and fallowing, while municipal and urban areas have more capacity to trade water and to implement short term conservation (pers comm Medellin-Azuara 2014).

It is estimated that 20 percent of public agricultural supply and 50 percent of municipal supply reductions can be replaced by groundwater pumping during the curtailment period. It is also estimated that 5 percent of agricultural supply and 10 percent of municipal supply reductions can be replaced by additional purchases or water transfers. These replacement percentages are applied in the table below to the range of maximum overall curtailment amounts to provide an estimate of the net reduction in water available for sale and distribution by public agencies (pers comm Medellin-Azuara 2014).

The tables below summarize the net reductions, in taf, of water supply available for public agricultural and municipal water agencies being curtailed and the amount available for municipal agencies under the health and safety exemption. This does not include net reductions of 7 taf in supply for private diversions.

Agricultural Agency Curtailments	%	(TAF)
Surface Water Supply Curtailment:		(90)
Groundwater Replacement:	20%	18
Water Purchase Replacement:	5%	4
Net Reduction (TAF):		(67)
(negative = reduction in volume)		

Municipal Agency Net Reductions	%	(TAF)
Surface Water Supply Curtailment:		(13)
Groundwater Replacement:	50%	7
Water Purchases:	10%	1
Net Reduction (TAF):		(5)
(negative = reduction in volume)		

As curtailed water from one set of agricultural and municipal public agencies is made available to municipal suppliers through the health and safety exception in the emergency regulation, and to the

extent this curtailed water can be replaced by those agencies, there is an effective net increase in the total amount of water available by public agencies across the state and a net decrease in water available to agricultural water agencies. In effect, water is being curtailed from diverters that do not have a health and safety exception, to municipal agencies that by definition under section 878.1 have no ability to find alternative sources. Also, strictly from the perspective of public agencies, the curtailment of private diversions pursuant to these regulations would have the effect of increasing water available for public agencies.

Net Change in Water Available for Public Agencies	(TAF)
Health & Safety Exemption:	110
Agricultural Agency Net Reductions:	(67)
Municipal Agency Net Reductions:	(5)
Net Change:	37
(negative = reduction in volume)	

Reduction in Overall Water Available for Agricultural or Municipal Use

In addition to the replacement of curtailed water by public agricultural water agencies described above, there will likely also be an increase in groundwater pumping by farmers from privately owned wells. It is estimated that about 40 percent of overall supply reductions resulting from agricultural curtailments will be replaced by farmers in this fashion. This additional 40 percent supply will reduce the net shortage to public agricultural water users to about 35 of the total amount of agricultural water curtailed, or 31.5 TAF. Conservation and enforcement measures by public agricultural water agencies will need to be implemented to address these shortages and are discussed further in the section below.

It is estimated that urban water agencies will replace 60 percent of curtailed water supply (50 percent by additional groundwater pumping and 10 percent by water purchases) as described above, but generally they, or the customers they serve, will not have the option to obtain additional water from private wells. So this leaves a net shortage for municipal use of about 40 percent of the total amount of municipal water curtailed, or 5 TAF. Such shortages will need to be addressed through conservation and enforcement measures implemented by these agencies and are discussed further in the section below.

Fiscal Impacts to Public Water Supply Agencies

Fiscal impacts to both public agricultural and urban water agencies are assumed to result primarily from changes in water sale revenues and increased water replacement and conservation costs. These are calculated below by applying unit sales and cost values to the supply change estimates developed above.

Change in State and Local Agency Water Sale Revenues

Estimates of the price of water charged by public agricultural and urban water supply agencies were developed after an informal review by economists at University of California, Davis of publicly available information (pers comm Medellin-Azuara 2014). These prices are then applied in the table below to the net change in water available for sale as calculated in section 2.3 above. This provides an estimate of the total associated change in revenue to these agencies.

Health & Safety Exemption Increases			
Quantity of Diversion (TAF):	110		
$/ac.-ft.:	850	$	93,500,000
Agricultural Agency Net Reductions			
Quantity of Diversion (TAF):	(67)		
$/ac.-ft.:	50	$	(3,362,659)
Municipal Water Agency Net Reductions			
Quantity of Diversion (TAF):	(5)		
$/ac.-ft.:	850	$	(4,502,212)
Subtotal Change in Water Sale Revenues:		**$**	**85,635,129**
(negative = decreased revenue)			

Increased Public Agency Water Supply Replacement and Conservation Costs

As estimated in section 2.3, State and local agricultural and municipal agencies affected by curtailments pursuant to the proposed regulation are expected to pump groundwater and purchase additional supplies to replace a portion of their reduced surface water supplies. These agencies will also likely need to implement conservation and enforcement measures to address the shortages that remain after obtaining such replacement water.

The cost of replacing curtailed surface water diversions with groundwater will be primarily the energy costs associated with the additional pumping. Based on prevailing energy rates and groundwater depth and other information contained in the SWAP[1] model, an average of $84 per acre-foot of additional cost is estimated for replacement water obtained in this manner. The cost of purchasing replacement surface water (i.e. transfers) is estimated to be $500 per acre-foot. These costs are considered to apply the same for both agricultural and municipal agencies (pers comm Medellin-Azuara 2014).

In addition to the water replacement costs described above, public agencies are expected to incur costs associated with conservation and enforcement measures needed to address the overall shortage of water available for use in their service areas as described in above. The costs of implementing these measures are estimated to be $30 per acre-foot and $165 per acre-foot for the shortage amounts within the public agricultural and municipal water agency service areas respectively (pers comm Medellin-Azuara 2014).

[1] SWAP (Statewide Agricultural Production Model (SWAP, Howitt et al. 2012)

Agricultural Supply Replacement and Conservation

Groundwater Pumping Costs			
Quantity of Replacement (TAF):	18		
$/ac.-ft.:	84	$	(1,506,471)
Water Purchase Costs			
Quantity of Replacement (TAF):	4		
$/ac.-ft.:	500	$	(2,241,773)
Conservation/Enforcement Costs			
Demand Reduction (% curtailment)	35%		
Quantity of Curtailment (TAF):	90		
$/ac.-ft. for Conservation	30	$	(941,544)
Subtotal Irrigation Replace/Conserve Costs:		**$**	**(4,689,788)**
(negative = increased cost)			

Municipal Supply Replacement and Conservation

Groundwater Pumping Costs			
Quantity of Replacement (TAF):	7		
$/ac.-ft.:	84	$	(556,156)
Water Purchase Costs			
Quantity of Replacement (TAF):	1		
$/ac.-ft.:	500	$	(662,090)
Conservation/Enforcement Costs			
Demand Reduction (% curtailment)	40%		
Quantity of Curtailment (TAF):	13		
$/ac.-ft. for Conservation	165	$	(873,959)
Subtotal Municipal Replace/Conserve Costs:		**$**	**(2,092,204)**
(negative = increased cost)			

Total Fiscal Impact to Public Water Supply Agencies

The total fiscal impact to public agricultural and municipal water supply agencies (e.g. irrigation districts and municipalities) resulting from both decreased water sales and increased replacement and conservation costs are summarized below:

	Fiscal Impact $
Municipal Agencies:	$ 86,905,584
Agricultural Agencies:	$ (8,052,447)
Total:	**$ 78,853,137**

(negative = decreased revenue)

This represents an upper bound fiscal impact based on the curtailment estimates presented in section 2.1, with actual impacts likely being less depending on actual curtailments and the need for health and safety exceptions to those.

Changes to State and Local Government Tax Revenues

Changes to government tax revenues would be expected due to increased public agency water sales and reduced agricultural production (revenue) resulting from the curtailments associated with these emergency regulations.

Tax Revenue Impacts from Changed Public Agency Water Sales

Increased overall water sales by public water agencies as described in section 3.1 will increase associated government income tax revenues. An estimated tax rate was applied to the increased public agency revenues (calculated in section 3.1 above) to determine the corresponding impact on government income tax revenues. An average tax rate of $99 per $1,000 was determined using an IMPLAN[2] model evaluation (pers comm Medellin-Azuara 2014). This is an estimate of the impact primarily on income taxes collected by state government and local governments, yet it does not include a breakdown of these two categories or indirect and induced economic effects.

Tax Revenue Changes from Agricultural Agency Sales		
Change in Agency Revenue:	$ (3,362,659)	
Tax Rate:	10%	$ (336,266)

Tax Revenue Changes from Municipal Agency Sales		
Change in Exempted Agency Sales:	$ 93,500,000	
Change in Curtailed Agency Sales:	$ (4,502,212)	
Tax Rate:	10%	$ 8,899,779

Subtotal Tax Revenues Impacts: $ 8,563,513

(negative = decreased revenue)

Tax Revenue Impacts from Reduced Agricultural Production

Agricultural production (revenue) would be impacted as irrigation supplies are reduced by curtailments. Reduced agricultural production in turn would reduce associated income tax revenues.

[2] Economic impact analysis software - IMPLAN (http://www.implan.com)

An analysis of the impact of curtailments on agricultural production (revenue) was performed by multiplying an estimate of the amount of agricultural revenue generated per acre-foot of applied water by the total amount (from both public and private sources) of irrigation water reduced as a result of curtailments. The estimate of revenue per acre-foot of applied water was developed by calculating an average of such values ($1,065 per acre-foot) across the SWAP model geographic units covering the Delta watershed, where much of this agricultural production is located (pers comm Medellin-Azuara 2014). Revenue per acre-foot of applied water varies around the watershed, and given the uncertainty of knowing which water rights within the watershed would be affected by curtailments, an average value provides a reasonable estimate. This estimate is also somewhat conservative as it does not factor in the likelihood that farmers would fallow lower revenue crops first as water becomes more scare. The same income tax rate developed in section 4.1 above is then applied to this reduction in agricultural production to estimate the associated impact to income tax revenues.

Agricultural Production (Revenue) Impacts	
Reduced Agricultural Supply (ac-ft):	(33,495)
Revenue ($) per ac.-ft.:	1,068
Reduced Agricultural Production:	$ (35,772,660)
Tax Rate:	10%
Subtotal Tax Revenue Impact:	**$ (3,577,266)**

(negative = decreased revenue)

Total Tax Revenue Impacts for State and Local Governments

The total impact on income tax revenues resulting from both increased public agency water sales and reduced agricultural production are summarized below:

	Tax Revenue ($)
Due to Increased Public Agency Water Sales:	$ 8,563,513
Due to Reduced Agricultural Production:	$ (3,577,266)
Total:	**$ 4,986,247**

(negative = decreased revenue)

This is an estimate of impacts mainly on income taxes collected by the state and local governments, yet a breakdown of these two groups is not available and indirect and induced effects are not included. This represents an upper bound tax revenue impact based on the curtailment estimates presented in section 2.1, with actual impacts likely being less depending on actual curtailments. Also, fiscal support to local agencies from the state could in turn be affected, but such tax and funding relationships between the state and numerous local agencies are difficult to characterize and cannot be readily estimated.

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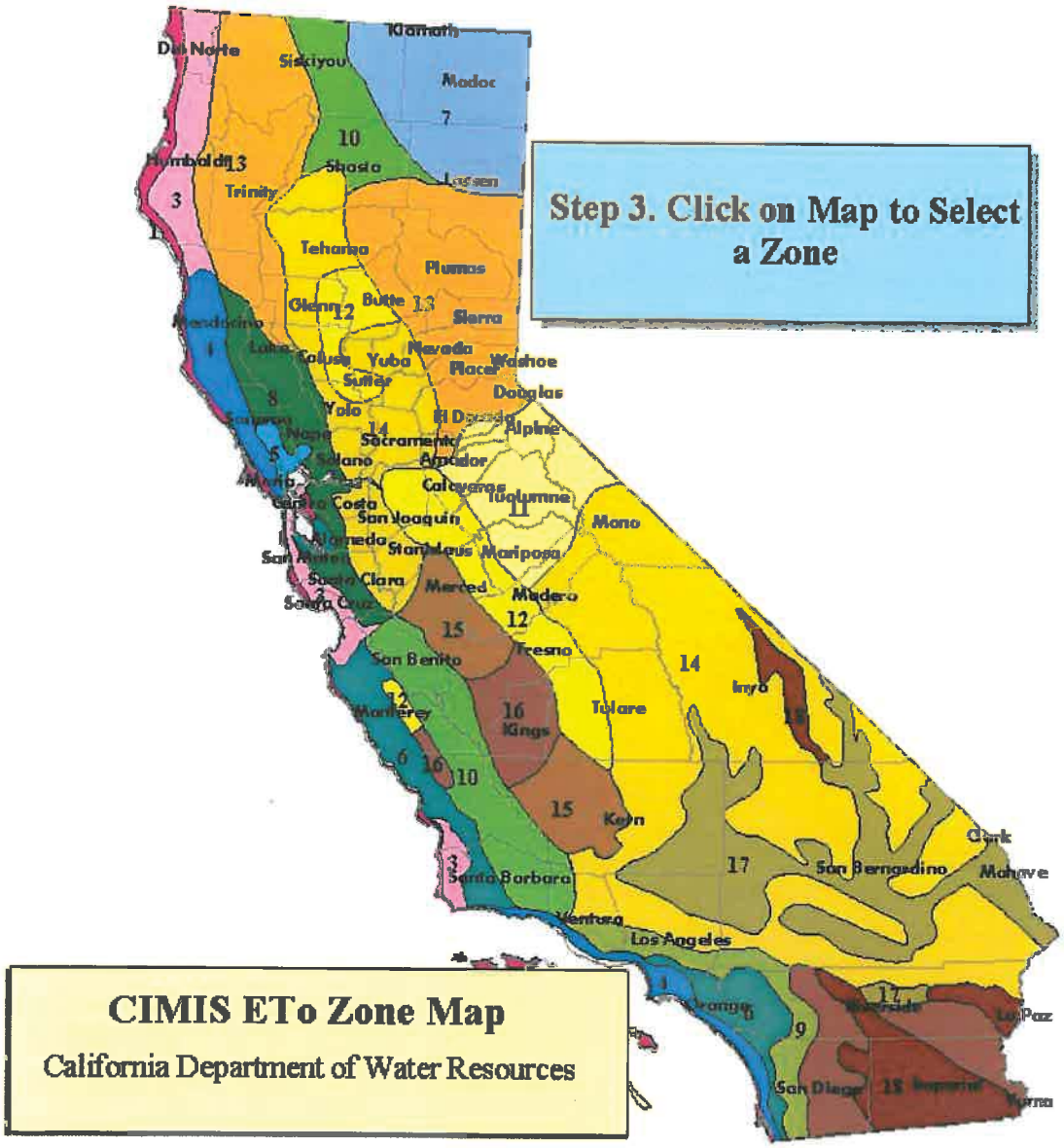
SWAP, Howitt et al. 2012

USBR 2014 - “Central Valley Project General Description”, U.S. Bureau of Reclamation (http://www.usbr.gov/projects/Project.jsp?proj_Name=Central+Valley+Project#Group39485), Retrieved June 19, 2014.


Step 3. Click on Map to Select a Zone
CIMIS ETo Zone Map
California Department of Water Resources
Del Norte
Siskiyou
Modoc
Humboldt
Trinity
Shasta
Lassen
Tehama
Plumas
Glenn
Butte
Sierra
Mendocino
Lake
Colusa
Yuba
Nevada
Placer
Washoe
Sutter
Douglas
Yolo
El Dorado
Alpine
Sacramento
Solano
Amador
Marin
Calaveras
Tuolumne
Contra Costa
San Joaquin
Mono
Alameda
Stanislaus
Mariposa
San Mateo
Santa Clara
Merced
Madera
Santa Cruz
Fresno
San Benito
Inyo
Monterey
Tulare
Kings
Kern
Clark
San Bernardino
Mohave
Santa Barbara
Ventura
Los Angeles
Orange
Riverside
La Paz
San Diego
Imperial
Yuma

ETc Table for Irrigation Scheduling and Design
Zone 12 Monthly Evapotranspiration
Surface Irrigation Typical Year
IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo
Table does not include adjustments for bare spots and reduced vigor

	1997 (Typical Year) January inches	February inches	March inches	April inches	May inches	June inches	July inches		August inches	September inches	October inches	November inches	December inches	Annual inches
Precipitation	6.81	0.27	1.34	0.22	0.21	0.2	0.13	Precipitation	0.34	0.07	0.64	4.15	2.12	16.5
Grass Reference ETo	0.73	2.12	4.01	5.56	7.32	7.58	7.98	Grass Reference ETo	6.76	5.39	3.47	1.05	0.99	52.96
Apple, Pear, Cherry, Plum and Prune	0.84	0.92	1.56	2.37	6.29	7.08	7.65	Apple, Pear, Cherry, Plum and Prune	6.47	4.85	2.25	0.45	0.95	41.68
Apples, Plums, Cherries etc w/covercrop	0.84	2.37	4.09	4.72	7.6	8.94	9.22	Apples, Plums, Cherries etc w/covercrop	7.64	5.97	3.44	0.85	1.19	56.88
Peach, Nectarine and Apricots	0.84	0.92	1.58	2.17	6.11	7.08	7.54	Peach, Nectarine and Apricots	6.45	4.76	2.37	0.46	0.95	41.21
Immature Peaches, Nectarines, etc	0.84	0.92	1.34	1.19	3.84	4.28	4.65	Immature Peaches, Nectarines, etc	4.1	2.86	1.67	0.46	0.95	27.11
Almonds	0.84	0.98	1.82	2.97	6.51	6.81	7.21	Almonds	6.29	4.71	2.95	0.54	0.95	42.59
Almonds w/covercrop	0.84	2.13	3.51	4.68	7.52	8.16	8.33	Almonds w/covercrop	7.24	5.37	3.42	0.79	1.17	53.17
Immature Almonds	0.84	0.96	1.56	2.02	4.68	5.11	5.1	Immature Almonds	4.69	3.33	2.41	0.49	0.95	32.14
Walnuts	0.83	0.92	1.71	1.78	5.76	8.48	8.72	Walnuts	7.36	5.24	2.87	0.57	0.95	45.18
Pistachio	0.84	0.92	1.11	1.14	2.62	6	8.27	Pistachio	7.09	5.34	2.73	0.53	0.95	37.53
Pistachio w/ covercrop	0.84	2.14	3.46	3.7	5.53	7.5	9.11	Pistachio w/ covercrop	7.79	6.05	3.51	0.99	1.17	51.79
Immature Pistachio	0.84	0.92	1.11	0.69	1.54	3.95	5.75	Immature Pistachio	4.95	3.71	2.02	0.52	0.95	26.94
Misc. Deciduous	0.84	0.92	1.56	2.28	5.94	6.84	7.27	Misc. Deciduous	6.28	4.56	2.39	0.45	0.95	40.29
Grain and Grain Hay	0.87	2.25	4.42	6.13	3.86	0.22	0.15	Grain and Grain Hay	0.34	0.07	0.63	0.49	1.03	20.46
Rice	0.86	0.91	1.11	0.75	7.13	9.19	9.74	Rice	8.22	2.53	0.63	0.49	0.95	42.49
Cotton	0.86	0.91	1.1	1	1.71	4.68	8.44	Cotton	7.4	5.19	1.63	0.49	0.95	34.37
Safflower and Sunflower	0.86	1.17	2.34	5.21	8.41	7.19	0.94	Safflower and Sunflower	0.34	0.07	0.63	0.49	0.95	28.61
Corn and Grain Sorghum	0.86	0.91	2.15	1.39	2.57	6.97	8.13	Corn and Grain Sorghum	5.51	0.49	0.63	0.49	0.95	31.04
Misc. field crops	0.86	0.91	2.15	1.39	2.55	7.12	7.74	Misc. field crops	2.92	0.07	0.63	0.49	0.95	27.77
Alfalfa Hay and Clover	0.86	2.25	4.23	5.16	6.68	7.02	7.19	Alfalfa Hay and Clover	5.97	4.91	2.15	0.87	1.17	48.46
Pasture and Misc. Grasses	0.86	1.43	2.84	4.61	7.25	7.53	7.87	Pasture and Misc. Grasses	6.67	5.33	3.07	0.8	0.95	49.2
Small Vegetables	0.87	1.55	3.92	5.95	1.91	0.21	0.15	Small Vegetables	1.44	1.54	1.59	0.76	1.15	21.04
Tomatoes and Peppers	0.86	0.91	1.66	0.78	3.77	8.1	7.01	Tomatoes and Peppers	0.91	0.07	0.63	0.49	0.95	26.14
Potatoes, Sugar beets, Turnip etc..	0.86	1.21	2.74	5.88	8.15	8.45	7.7	Potatoes, Sugar beets, Turnip etc..	0.44	0.07	0.63	0.49	0.95	37.57
Melons, Squash, and Cucumbers	0.86	0.91	1.1	0.22	1	1.48	5.06	Melons, Squash, and Cucumbers	5.61	1.58	0.63	0.49	0.95	19.89
Onions and Garlic	0.87	2.08	3.83	5	5.46	1.15	0.18	Onions and Garlic	0.34	0.07	0.63	1.03	1.03	21.67
Strawberries	0.86	0.91	2.15	1.39	2.55	7.12	7.74	Strawberries	2.92	0.07	0.63	0.49	0.95	27.77
Flowers, Nursery and Christmas Tree	0.84	0.92	1.56	2.28	5.94	6.84	7.27	Flowers, Nursery and Christmas Tree	6.28	4.56	2.39	0.45	0.95	40.29
Citrus (no ground cover)	0.84	2.22	3.73	4.24	5.23	5.36	5.62	Citrus (no ground cover)	4.98	3.69	2.87	0.85	1.18	40.8
Immature Citrus	0.85	1.56	2.38	2.52	3.39	3.24	3.36	Immature Citrus	3.28	2.4	1.82	0.67	1.09	26.55
Avocado	0.84	0.92	1.56	2.28	5.94	6.84	7.27	Avocado	6.28	4.56	2.39	0.45	0.95	40.29
Misc Subtropical	0.84	0.92	1.56	2.28	5.94	6.84	7.27	Misc Subtropical	6.28	4.56	2.39	0.45	0.95	40.29
Grape Vines with 80% canopy	0.84	0.92	1.27	1.14	3.52	5.9	6.38	Grape Vines with 80% canopy	4.91	3.12	0.63	0.46	0.95	30.05
Grape Vines with cover crop (80% canopy)	0.85	1.96	3.1	3.08	5.38	6.88	7.15	Grape Vines with cover crop (80% canopy)	5.8	3.6	2.35	0.74	1.15	42.04
Immature Grapes Vines with 50% canopy	0.85	0.91	1.21	0.82	2.42	4.3	4.46	Immature Grapes Vines with 50% canopy	3.73	1.87	0.63	0.47	0.95	22.63
Idle	0.87	0.9	1.11	0.22	0.22	0.21	0.15	Idle	0.34	0.07	0.63	0.5	0.96	6.18

ETc Table for Irrigation Scheduling and Design
Zone 14 Monthly Evapotranspiration
Surface Irrigation Typical Year
IRRIGATION TRAINING AND RESEARCH CENTER, California Polytechnic State University, San Luis Obispo
Table does not include adjustments for bare spots and reduced vigor

1997 (Typical Year)

	January inches	February inches	March inches	April inches	May inches	June inches	July inches		August inches	September inches	October inches	November inches	December inches	Annual inches
Precipitation	8.22	0.28	0.81	0.3	0.44	0.35	0.09	Precipitation	0.31	0.31	0.82	4.92	2.74	19.59
Grass Reference ETo	0.73	2.36	4.13	5.82	7.62	8	8.36	Grass Reference ETo	7.11	5.82	3.86	1.25	1.14	56.22
Apple, Pear, Cherry, Plum and Prune	0.86	0.92	1.22	2.58	6.85	7.83	8.18	Apple, Pear, Cherry, Plum and Prune	6.94	5.45	2.96	0.6	1.06	45.45
Apples, Plums, Cherries etc w/covercrop	0.88	2.56	3.87	4.91	8.21	9.5	9.78	Apples, Plums, Cherries etc w/covercrop	8.29	6.66	4.1	1.09	1.42	61.27
Peach, Nectarine and Apricots	0.86	0.92	1.24	2.37	6.68	7.93	7.99	Peach, Nectarine and Apricots	7	5.47	2.74	0.61	1.06	44.86
Immature Peaches, Nectarines, etc	0.86	0.93	1	1.34	4.24	5.04	5.11	Immature Peaches, Nectarines, etc	4.55	3.41	1.88	0.61	1.06	30.03
Almonds	0.86	0.92	1.45	3.16	7.03	7.72	7.72	Almonds	6.63	5.21	2.85	0.6	1.06	45.19
Almonds w/covercrop	0.88	2.26	3.31	4.84	8.06	8.9	9.03	Almonds w/covercrop	7.75	5.96	3.53	1.01	1.37	56.91
Immature Almonds	0.86	0.93	1.2	2.29	5.23	5.7	5.82	Immature Almonds	5.09	3.79	2.06	0.61	1.06	34.62
Walnuts	0.86	0.92	1.38	1.94	6.3	9.13	9.35	Walnuts	8.05	5.98	3.22	0.71	1.06	48.91
Pistachio	0.86	0.92	0.76	1.27	2.97	6.53	8.93	Pistachio	7.49	5.89	3.2	0.66	1.06	40.52
Pistachio w/ covercrop	0.88	2.26	3.13	3.99	5.9	8.22	9.65	Pistachio w/ covercrop	8.28	6.76	4.14	1.15	1.37	55.75
Immature Pistachio	0.86	0.93	0.76	0.79	1.87	4.43	6.19	Immature Pistachio	5.31	4.22	2.43	0.66	1.06	29.49
Misc. Deciduous	0.86	0.92	1.22	2.49	6.54	7.49	7.77	Misc. Deciduous	6.76	5.34	2.66	0.6	1.06	43.71
Grain and Grain Hay	0.88	2.52	4.55	6.43	4.14	0.38	0.1	Grain and Grain Hay	0.33	0.31	0.81	0.64	1.15	22.24
Rice	0.86	0.92	0.76	0.89	7.49	9.76	10.35	Rice	8.76	3.23	0.81	0.64	1.06	45.52
Cotton	0.86	0.92	0.76	1.09	1.98	5.19	8.91	Cotton	7.77	5.95	2.26	0.64	1.05	37.38
Safflower and Sunflower	0.88	1.22	2.17	5.52	8.8	8.21	1.28	Safflower and Sunflower	0.33	0.31	0.81	0.64	1.06	31.21
Corn and Grain Sorghum	0.86	0.92	1.75	1.6	2.84	7.55	8.66	Corn and Grain Sorghum	6.18	0.83	0.81	0.64	1.05	33.7
Misc. field crops	0.86	0.92	1.75	1.6	2.87	7.63	8.26	Misc. field crops	3	0.31	0.81	0.64	1.05	29.71
Alfalfa Hay and Clover	0.88	2.5	4.29	5.23	6.99	7.52	7.51	Alfalfa Hay and Clover	6.29	5.37	2.44	1.07	1.35	51.44
Pasture and Misc. Grasses	0.86	1.54	2.69	4.89	7.59	8.09	8.36	Pasture and Misc. Grasses	7.25	5.75	3.28	0.92	1.06	52.27
Small Vegetables	0.88	1.65	4.09	6.28	2.29	0.36	0.1	Small Vegetables	1.45	1.91	1.75	1	1.33	23.07
Tomatoes and Peppers	0.86	0.92	1.5	1.11	4.05	8.73	7.24	Tomatoes and Peppers	0.8	0.31	0.81	0.64	1.05	28.03
Potatoes, Sugar beets, Turnip etc..	0.86	1.27	2.69	6.19	8.55	8.89	7.75	Potatoes, Sugar beets, Turnip etc..	0.4	0.31	0.81	0.64	1.05	39.41
Melons, Squash, and Cucumbers	0.86	0.92	0.76	0.31	1.23	1.66	5.33	Melons, Squash, and Cucumbers	5.98	1.92	0.81	0.64	1.05	21.47
Onions and Garlic	0.88	2.3	3.78	5.33	5.29	1	0.11	Onions and Garlic	0.33	0.31	0.81	1.25	1.15	22.52
Strawberries	0.86	0.92	1.75	1.6	2.87	7.63	8.26	Strawberries	3	0.31	0.81	0.64	1.05	29.71
Flowers, Nursery and Christmas Tree	0.86	0.92	1.22	2.49	6.54	7.49	7.77	Flowers, Nursery and Christmas Tree	6.76	5.34	2.66	0.6	1.06	43.71
Citrus (no ground cover)	0.88	2.36	3.56	4.55	5.81	6.09	6.08	Citrus (no ground cover)	5.33	4.33	3.46	1.12	1.4	44.98
Immature Citrus	0.88	1.6	2.23	2.83	3.61	3.9	3.73	Immature Citrus	3.51	2.78	2.54	0.88	1.24	29.73
Avocado	0.86	0.92	1.22	2.49	6.54	7.49	7.77	Avocado	6.76	5.34	2.66	0.6	1.06	43.71
Misc Subtropical	0.86	0.92	1.22	2.49	6.54	7.49	7.77	Misc Subtropical	6.76	5.34	2.66	0.6	1.06	43.71
Grape Vines with 80% canopy	0.86	0.93	0.94	1.28	3.83	6.58	6.78	Grape Vines with 80% canopy	5.38	3.27	0.83	0.61	1.06	32.34
Grape Vines with cover crop (80% canopy)	0.88	2.04	2.92	3.2	5.89	7.49	7.53	Grape Vines with cover crop (80% canopy)	6.28	4.06	2.41	0.8	1.33	44.82
Immature Grapes Vines with 50% canopy	0.86	0.93	0.88	0.94	2.89	4.9	4.74	Immature Grapes Vines with 50% canopy	4.13	2.25	0.83	0.61	1.05	25.01
Idle	0.86	0.92	0.76	0.31	0.44	0.36	0.1	Idle	0.33	0.31	0.81	0.65	1.05	6.9

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

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

RECITALS

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

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

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

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

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

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

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

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

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

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

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

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

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

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

AGREEMENTS

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

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

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

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

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

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

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

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

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

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

SWP-CVP Acquisition of Water Rights

Applications to appropriate unappropriated water for both the State Water Project (SWP) and the Federal Central Valley Project (CVP) were originally filed by the State Department of Finance in 1927 (see State Filing). Applications for the State Water Project were assigned to the Department of Water Resources (DWR) and those for the CVP to the U.S. Bureau of Reclamation (USBR). The USBR also filed a number of applications in addition to those assigned to it.

Originally the State Water Rights Board (and now the State Water Resources Control Board) was responsible for administering the water rights permit program in California. Over the years, the above boards have issued a number of permits for water storage and diversion projects in the Central Valley. The major water rights decisions regarding the SWP and CVP are discussed below. All these decisions either incorporated Delta water quality criteria or reserved jurisdiction for the later addition of such criteria. Also, some of the decisions incorporated Delta water quality criteria previously established independent of the water rights decision. For a further discussion of these criteria reference is made to the discussion contained in the Delta Water Quality Criteria section of Chapter 5 and the table on Page 5-14, summarizing many of the water rights decisions.

Decision D-990 (Shasta Reservoir, et al)

Commencing in 1959 the State Water Rights Board (Board), predecessor of the State Water Resources Control Board (SWRCB), held hearings on the principal applications for the CVP to store water in Lake Shasta and to divert and redivert water from the Delta. In 1961, the Board issued Decision 990 which ordered issuance of permits to the USBR. Because of large surpluses of water in the river due to low demands for CVP water, the Board didn't include any salinity control requirements. However, they did retain jurisdiction for that purpose. The Board also reserved jurisdiction to coordinate terms and conditions in permits issued to the USBR for the CVP and to the DWR for the SWP. The USBR has challenged the reserved jurisdiction provisions by litigation (see U.S. v. California in Chapter 10).

Decision D-1275 and D-1291 (Lake Oroville, et al)

From July 1966 to April 1967, the State Water Rights Board (Board) conducted hearings on applications for the DWR to store water in Lake Oroville and the San Luis Reservoir and to divert and redivert water from the Delta. In 1967, the Board issued Decision 1275 as amended by Decision 1291 which approved issuance of permits to the DWR. These decisions included a reservation of jurisdiction similar to the reservation in Decision 990 for salinity control in the Delta and coordination of the SWP and CVP. Moreover, they also included an explicit reservation of jurisdiction over fish and wildlife requirements. Water right permits pursuant to Decision 1275 and 1291 were issued to the Department in 1972.

D-1275 was issued subject to numerous terms and conditions with regard to water quality criteria as the "yardstick" for assuring adequate water supplies in the Delta. The water rights for the SWP were conditioned on meeting the November 19, 1965 criteria. The Board added one additional criterion, the so-called "Blind Point Condition" (Condition 15), which limited storage or direct diversions from the Delta by SWP at any time the quality of water exceeds 250 ppm chloride at Blind Point on the San Joaquin River (lowest agriculture intake location at the San Joaquin River) during the period April 1 through June 30.

Decision D-1379 (Delta Water Rights Decision)

On July 22, 1969, the SWRCB commenced hearings to determine the degree of salinity control required in the Delta under the reservation of jurisdiction in all of the permits for the State Water Project and the Federal Central Valley Project. Issues were defined by the SWRCB Chairman as follows:

-- Terms and conditions relative to salinity control in the Sacramento-San Joaquin Delta that should be included in the aforesaid permits.

-- Whether any existing terms and conditions relative to salinity control should be revised.

-- Whether, and to what extent, terms and conditions and permits issued, or to be issued, to the USBR and to the DWR should be coordinated.

-- Terms and conditions for the protection of fish and wildlife in the Delta that should be included in permits to be issued to the DWR.

On July 28, 1971, the SWRCB adopted its Delta Water Rights Decision 1379 (D-1379). The SWRCB, on September 16, 1971, clarified and corrected certain criteria contained in D-1379. The general provisions of D-1379 are summarized on Page 5-14. Some of the water quality criteria included in the decision are the same, some approximately the same, and some are modifications of those in the November 19, 1965, criteria and the previous State and Federal standards. Additional criteria are also included which are more stringent and include protection for additional beneficial uses.

In addition to specific water quality parameters, D-1379 specifies positive downstream flows in all principal channels after construction of a Delta water transfer facility, minimized export during the peak striped bass spawning periods, a predominance of San Joaquin River water in the San Joaquin River during salmon migration, and a 95 percent salvage objective for salmon and steelhead at project diversion works. The Decision requires the DWR and USBR to prevent Delta channel quality from degrading beyond certain specified standards of water quality either by discontinuing pumping from the Delta or by passing natural flow or releasing stored water from upstream reservoirs.

Compliance with the more restrictive Delta water quality criteria contained in D-1379 as compared to the criteria previously developed in the November 19, 1965 agreement will substantially increase the required Delta outflow. It has been estimated that the increase in outflow requirements represents a reduction in future dependable SWP and CVP water supplies by some 1.8 million acre-feet per year during a dry year (1928-34 water supply). The reduction in yield for the individual projects would be 0.70 million acre-feet for the SWP and 1.10 million acre-feet for the CVP predicated on an approximate SWP-CVP split of 40-60 percent based on extension of the unsigned coordination agreement. A substantial portion of the additional water needed to comply with D-1379 is for protection of Delta fish and wildlife. Possible future dry and critical year relaxation of the criteria would reduce the impact on project water supplies.

Recognizing the insufficiency of data for setting definite standards to insure an adequate quality for all beneficial uses, the SWRCB again retained continuing jurisdiction relative to flows for salinity control and protection of fish and wildlife in the Delta. This is a limited-term decision with additional hearings, depdnding on availability of new information, to be reopened not later than July 1, 1978.

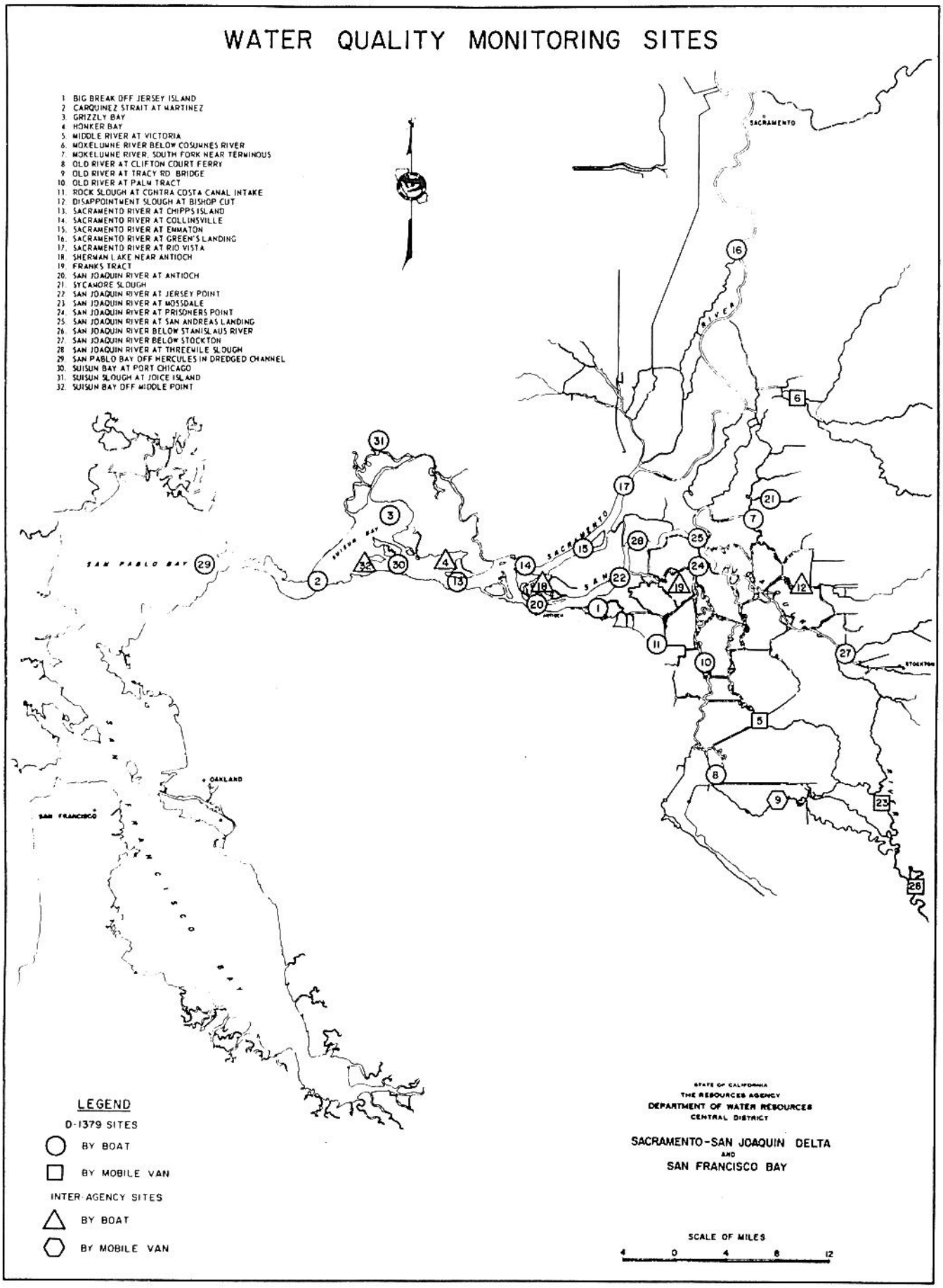
Under the provisions of D-1379, the USBR and DWR are required to conduct studies in the Delta concerning termperatures, velocity, algal growth, dissolved oxygen, scour, turbidity, productivity and water levels in southern channels. They are also required to conduct an extensive water quality monitoring program needed to fully understand conditions in the Delta. The water quality monitoring sites and the water quality parameters to be monitored are shown on Pages 9-8 and 9-9.

Implementation of D-1379 has been prevented by a Sacramento County Superior Court preliminary injunction issued on petition of several public agencies receiving or expecting to receive water from the CVP (see Central Valley East Side Project Association, et al v. State Water Resources Control Board in Chapter 10). In the interim, DWR is voluntarily meeting Decision 1379 criteria while operating the State Water Project under the water rights permits issued by the Board pursuant to its Decisions 1275 and 1291. Present State and Federal water quality standards in the Delta include critiera contained in the State Water Quality Control Policy, 1967, as supplemented by Resolutions 68-17 and 73-16 of the SWRCB.

Decision D-1400 (American River Decision)

In 1970 the SWRCB approved permits to the USBR for the proposed Auburn Reservoir Project by the Issuance of D-1356 which included a reservation of jurisdiction to require flow in the lower American River for recreation and for fish and wildlife enhancement. After further hearings, the SWRCB, in April 1972, issued D-1400 which specified that upon completion of Auburn Dam, a 1500 cfs flow must be maintained from May 15 to October 14 of each year in the lower American River. The Decision, in effect, requires about 747,000 acre-feet more water annually than the then existing agreement with the Department of Fish and Game. Compliance with the Decision will substantially reduce the water available for authorized features of Auburn Reservoir.

WATER QUALITY MONITORING SITES



WATER QUALITY PARAMETERS

BASE PARAMETERS: CHLORIDES, ELECTRICAL CONDUCTANCE, DISSOLVED OXYGEN, pH, SILICA, SUSPENDED SOLIDS, DISSOLVED SOLIDS, AIR AND WATER TEMPERATURE, TURBIDITY, ALKALINITY, INORGANIC AND ORGANIC NITROGEN, TOTAL PHOSPHATES, CHLOROPHYLL, WIND VELOCITY AND DIRECTION, PHYTO PLANKTON

MONITORING SITES	
1 BIG BREAK OFF JERSEY ISLAND	BASE PARAMETERS + BENTHOS, BOD, HEAVY METALS, PESTICIDES, PCB'S, LIGHT TRANSMITTANCE, PHOTOSYNTHESIS, ZOOPLANKTON
2 CARQUINEZ STRAIT AT MARTINEZ	BASE PARAMETERS + BENTHOS, BOD, HEAVY METALS, PESTICIDES, PCB'S, LIGHT TRANSMITTANCE, PHOTOSYNTHESIS, ZOOPLANKTON, FISHERY STUDIES
3 GRIZZLY BAY	BASE PARAMETERS + FISHERY STUDIES, PHOTOSYNTHESIS, ZOOPLANKTON
4 HONKER BAY	BASE PARAMETERS + LIGHT TRANSMITTANCE
5 MIDDLE RIVER AT VICTORIA	BASE PARAMETERS + BENTHOS, BOD, HEAVY METALS, PESTICIDES, PCB'S, LIGHT TRANSMITTANCE, PHOTOSYNTHESIS, ZOOPLANKTON
6 MOKELUMNE RIVER BELOW COSUMNES RIVER	BASE PARAMETERS + LIGHT TRANSMITTANCE, PHOTOSYNTHESIS RATE, ZOOPLANKTON
7 MOKELUMNE RIVER, SOUTH FORK NEAR TERMINOUS	BASE PARAMETERS + BENTHOS, BOD, PHOTOSYNTHESIS, ZOOPLANKTON
8 OLD RIVER AT CLIFTON COURT FERRY	BASE PARAMETERS + FISHERY STUDIES, HEAVY METALS, PESTICIDES, PCB'S, LIGHT TRANSMITTANCE, PHOTOSYNTHESIS, ZOOPLANKTON
9 OLD RIVER AT TRACY ROAD BRIDGE	BASE PARAMETERS + LIGHT TRANSMITTANCE
10 OLD RIVER AT PALM TRACT	BASE PARAMETERS + BENTHOS, BOD, FISHERY STUDIES, LIGHT TRANSMITTANCE, PHOTOSYNTHESIS, ZOOPLANKTON
11 ROCK SLOUGH AT CONTRA COSTA CANAL INTAKE	BASE PARAMETERS + PHOTOSYNTHESIS
12 DISAPPOINTMENT SLOUGH AT BISHOP CUT	BASE PARAMETERS + LIGHT TRANSMITTANCE
13 SACRAMENTO RIVER AT CHIPPS ISLAND	BASE PARAMETERS + BENTHOS, BOD, FISHERY STUDIES, HEAVY METALS, LIGHT TRANSMITTANCE, PHOTOSYNTHESIS, PESTICIDES, PCB'S, ZOOPLANKTON
14 SACRAMENTO RIVER AT COLLINSVILLE	BASE PARAMETERS + BENTHOS, BOD, FISHERY STUDIES, HEAVY METALS, PESTICIDES, PCB'S, PHOTOSYNTHESIS, ZOOPLANKTON
15 SACRAMENTO RIVER AT EMMATON	BASE PARAMETERS + FISHERY STUDIES, LIGHT TRANSMITTANCE, PHOTOSYNTHESIS, ZOOPLANKTON
16 SACRAMENTO RIVER AT GREEN'S LANDING	BASE PARAMETERS + BENTHOS, BOD, HEAVY METALS, PESTICIDES, PCB'S, LIGHT TRANSMITTANCE, PHOTOSYNTHESIS, ZOOPLANKTON
17 SACRAMENTO RIVER AT RIO VISTA	BASE PARAMETERS + FISHERY STUDIES, PHOTOSYNTHESIS, ZOOPLANKTON
18 SHERMAN LAKE NEAR ANTIOCH	BASE PARAMETERS + LIGHT TRANSMITTANCE
19 FRANK'S TRACT	BASE PARAMETERS + LIGHT TRANSMITTANCE
20 SAN JOAQUIN RIVER AT ANTIOCH	BASE PARAMETERS + BENTHOS, BOD, FISHERY STUDIES, HEAVY METALS, PESTICIDES, PCB's, PHOTOSYNTHESIS, ZOOPLANKTON
21 SYCAMORE SLOUGH	BASE PARAMETERS + BOD, LIGHT TRANSMITTANCE
22 SAN JOAQUIN RIVER AT JERSEY POINT	BASE PARAMETERS + FISHERY STUDIES, PHOTOSYNTHESIS, ZOOPLANKTON
23 SAN JOAQUIN RIVER AT MOSSDALE	BASE PARAMETERS + BENTHOS, BOD, PHOTOSYNTHESIS, ZOOPLANKTON
24 SAN JOAQUIN RIVER AT PRISONERS POINT	BASE PARAMETERS + HEAVY METALS, PESTICIDES, PCB'S, PHOTOSYNTHESIS, ZOOPLANKTON
25 SAN JOAQUIN RIVER AT SAN ANDREAS LANDING	BASE PARAMETERS + FISHERIES
26 SAN JOAQUIN RIVER BELOW STANISLAUS RIVER	BASE PARAMETERS + HEAVY METALS, PESTICIDES, PCB'S, LIGHT TRANSMITTANCE, PHOTOSYNTHESIS, ZOOPLANKTON
27 SAN JOAQUIN RIVER BELOW STOCKTON	BASE PARAMETERS + BENTHOS, BOD, FISHERY STUDIES, HEAVY METALS, PESTICIDES, PCB'S, PHOTOSYNTHESIS, ZOOPLANKTON
28 SAN JOAQUIN RIVER AT THREEMILE SLOUGH	BASE PARAMETERS + BENTHOS, BOD, PHOTOSYNTHESIS, ZOOPLANKTON
29 SAN PABLO BAY OFF HERCULES IN DREDGED CHANNEL	BASE PARAMETERS + BENTHOS, BOD, FISHERY STUDIES, HEAVY METALS, PESTICIDES, PCB'S, PHOTOSYNTHESIS, ZOOPLANKTON
30 SUISUN BAY AT PORT CHICAGO	BASE PARAMETERS + BENTHOS, BOD, FISHERY STUDIES, HEAVY METALS, PESTICIDES, PCB'S, PHOTOSYNTHESIS, ZOOPLANKTON
31 SUISUN SLOUGH AT JOICE ISLAND	BASE PARAMETERS + PHOTOSYNTHESIS, ZOOPLANKTON
32 SUISUN BAY OFF MIDDLE POINT	BASE PARAMETERS + LIGHT TRANSMITTANCE

Decision D-1422 (New Melones Decision)

The water rights application for the New Melones project of the U.S. Army Corps of Engineers (to be operated by the U.S. Bureau of Reclamation--USBR) was brought to hearing and Decision 1422 was issued by the State Water Resources Control Board (SWRCB) in April 1973. This Decision limited, until further order, storage in the reservoir to such quantity as needed for preservation and enhancement of fish and wildlife, and such additional water as needed to maintain a specified level of water quality in the Stanislaus River and to satisfy prior rights at the existing Melones Dam. As the storage required for these purposes would not exceed about one-half of the total storage capacity, "white water" reaches of the Stanislaus River would be preserved in the interim.

More specifically, the Decision obligated the USBR to release up to 70,000 acre-feet per year to maintain an upper limit of 500 ppm TDS and a dissolved oxygen level at or above 5 ppm in the lower San Joaquin River. The Decision further restricts storage in the reservoir to approximately one-half of its capacity unless a definite need is shown to store additional water to produce downstream benefits which outweighs any damage in the watershed above New Melones.

The SWRCB and the United States each filed suit to determine whether the Federal Central Valley Project is subject to the jurisdiction of the SWRCB when its decisions conflict with the intent of Congress in its original project authorization. In October, 1975, the Federal District Court ruled that the SWRCB cannot impose water right conditions that impair Federal Water Project operations. The State has appealed that ruling (see U.S. v. California in Chapter 10).

Delta Agricultural Water Entitlement Negotiations

During the 1950's the Department of Water Resources (DWR) cooperated with the U.S. Bureau of Reclamation (USBR) and the local water users in studies to identify individual entitlements to the waters of the Sacramento River and the Delta. These studies, using the classical approach to solution of water rights problems, considered priority of rights to quantities of water rather than quality. No resolution was reached in the Delta using this approach. In the Delta the question of quantity is of little concern since the Delta channels, being below sea level, are never short of water. If flows in the tributary streams are insufficient to meet Delta use, water from the Pacific Ocean induced by tidal action will flow through the San Francisco Bay system and maintain the tidal elevations in the Delta channels.

Over the years, the USBR and DWR have negotiated with various agricultural groups in the Delta for a dependable water supply and also for protection against salinity intrusion. The major negotiations are discussed below.

Delta Water Quality Criteria

Represenatives of two Delta groups -- Sacramento River and Delta Water Association and the Delta Water Users Association acting as the San Joaquin Water Rights Committee -- agreed with DWR and USBR that operation pursuant to the November 19, 1965 criteria (discussed further in Chapter 5) would assure that water of adequate quality would be available throughout the main Delta to protect water entitlements and to meet present and future needs without an unreasonable loss of future water. The specific water quality conditions contained in the criteria are given in Chapter 5.

Several drafts of a water supply contract were prepared, including the framework of a repayment article covering the betterment in Delta water quality conditions, based on the November 19, 1965 Delta Water Quality Criteria. Because the proposed contract was to include an article clarifying application of the Federal acreage limitation laws in the Delta, it was to be submitted to the Congress for approval. At this point, negotiations were suspended to await formation of an agency (see Delta Water Agency) in the Delta with whom the contract could be executed. The two associations listed above were not authorized to commit their constituents to binding agreements.

Delta Water Agency

The Delta Water Agency was formed in 1968 with the following purposes and powers:

> "Sec. 4.1 The general purposes of the agency shall be to negotiate, enter into, execute, amend, administer, perform, and enforce one or more agreements with the United States and with the State of California, or with either, which have for their general purposes the following:
>
> (a) To protect the water supply of the lands within the agency against intrusion of ocean salinity; and
>
> (b) To assure the lands within the agency a dependable supply of water of suitable quality sufficient to meet present and future needs."

Meetings of representatives of the agency, USBR and DWR began in February 1970. Work accomplished during the meetings included a review of the existing data and studies by the three organizations concerning base conditions and the water quality desired by Delta agriculture.

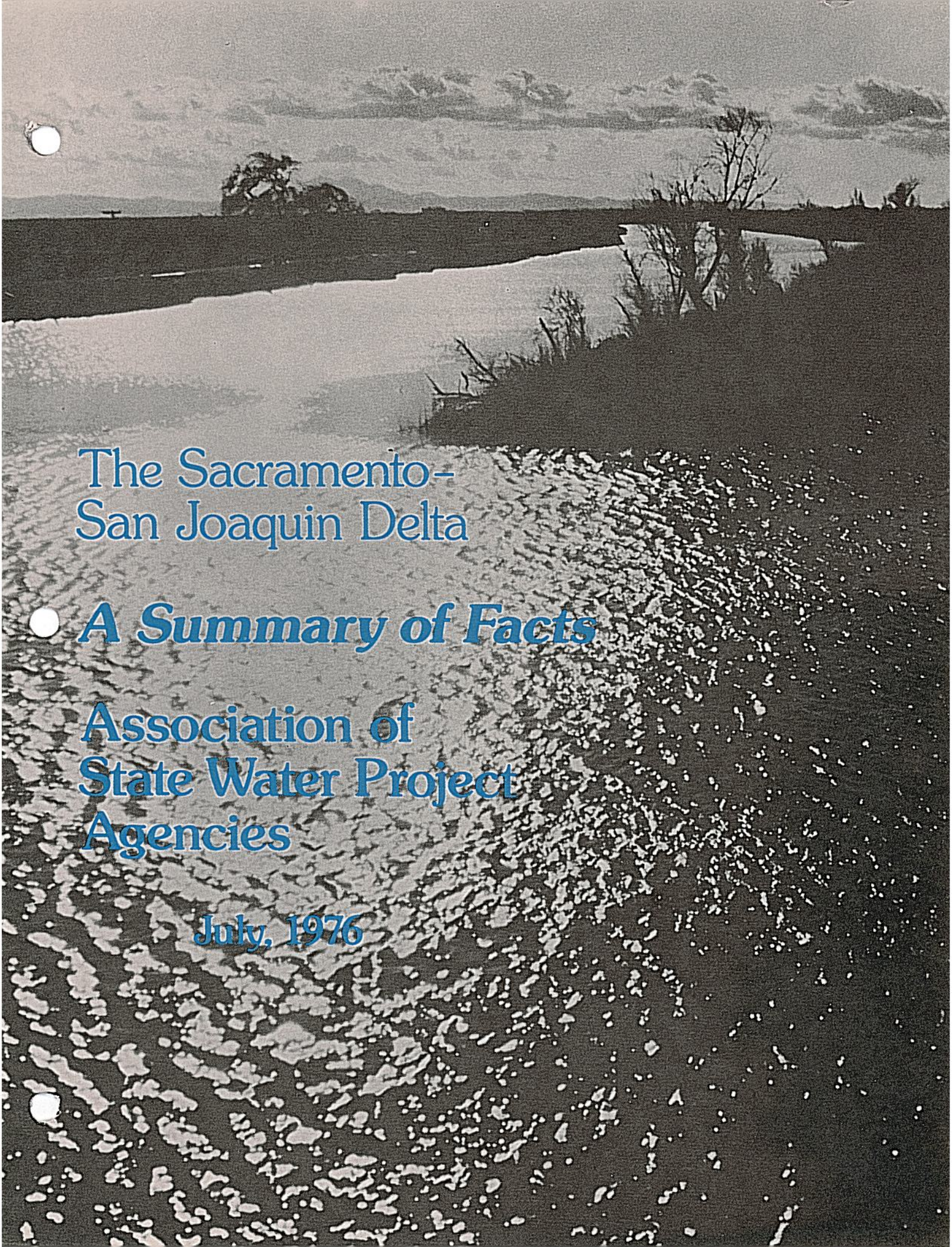
The Delta standards adopted by the State Water Resources Control Board in Decision 1379 (previously discussed in this Chapter) on July 28, 1971, changed the basic assumptions which had been used in the negotiations, and required that the State and Federal projects operate for significantly different outflow levels than had been planned. Some of the language contained in D-1379 regarding the repayment of obligation of the Delta interests for improved water quality conditions is discussed under the topic Delta Water Quality Criteria in Chapter 5.

On October 18, 1972, the agency's directors adopted Delta Water Quality Criteria which were based on prevailing water quality conditions in the Delta since the Central Valley Project's Shasta Reservoir began operation in 1944. However, these criteria met with opposition from Delta interests within and outside the agency. A final meeting, held on January 16, 1973, among the Delta Water Agency, USBR, and the DWR, brought out the opposing views within the agency on the basic issue of water quality criteria and on the diverse conditions and needs in different parts of the Delta.

Subsequently the Delta Water Agency was automatically dissolved on December 31, 1973 in accordance with the act creating it since the agency had voted not to request an extension of time. The Delta Water Agency has since been replaced by three new agencies and three existing agencies each with the task of negotiating an agreement for the different geographical areas of the Delta they respectively represent.

North, Central, and South Delta Water Agencies

The North, Central, and South Delta Water Agencies were created by the California Legislature effective January 1, 1974 to represent agriculture water interests in the Delta in contracting with DWR and USBR for a dependable water supply and protect against salinity intrusion. The existing agencies--Contra Costa County Water Agency, the East Contra Costa Irrigation District, and the Byron-Bethany Irrigation District--are also within the Delta's legal boundaries. These six agencies encompass all of the old Delta Water Agency's area except for a small parcel on Union Island and the City of Stockton which was excluded by the Legislature. The boundaries of the six-agencies and the former Delta Water Agency are shown on the following page.



The Sacramento–San Joaquin Delta

A Summary of Facts

Association of State Water Project Agencies

July, 1976

PREFACE

The Sacramento-San Joaquin Delta--A Summary of Facts (Fact Book) has been prepared by the Association of State Water Project Agencies. Its purpose is to provide, in as concise a form as possible, the essential facts about this complex area, and to analyze the problems of the Delta. Much of the material contained in the Fact Book comes from publications of the California Department of Water Resources and the U.S. Bureau of Reclamation.

The Fact Book is intended as a quick reference to provide answers to questions often asked about the Delta. It is not intended as a technical treatise on the many Delta subjects. For easy access to the many subjects in the Fact Book, a comprehensive Table of Contents has been prepared. A detailed map of the Delta area is located in the inside pocket of the report binder.

The Fact Book will be revised periodically to reflect changing conditions. The revisions will include corrections or clarifications found to be necessary as well as new material that may become available as studies of the Delta continue. In order to keep your Fact Book current, it is requested that the Association be notified (at the address given below) of the person in your organization responsible for maintaining the Fact Book.

Association of State Water Project Agencies
Room 320, Forum Building
Sacramento, California 95814

The Association's goal in publishing the Fact Book is to provide objective and factual information about the Delta. We invite your comments relating to any clarifications or additions you feel will make the Fact Book a more useful and informative publication.

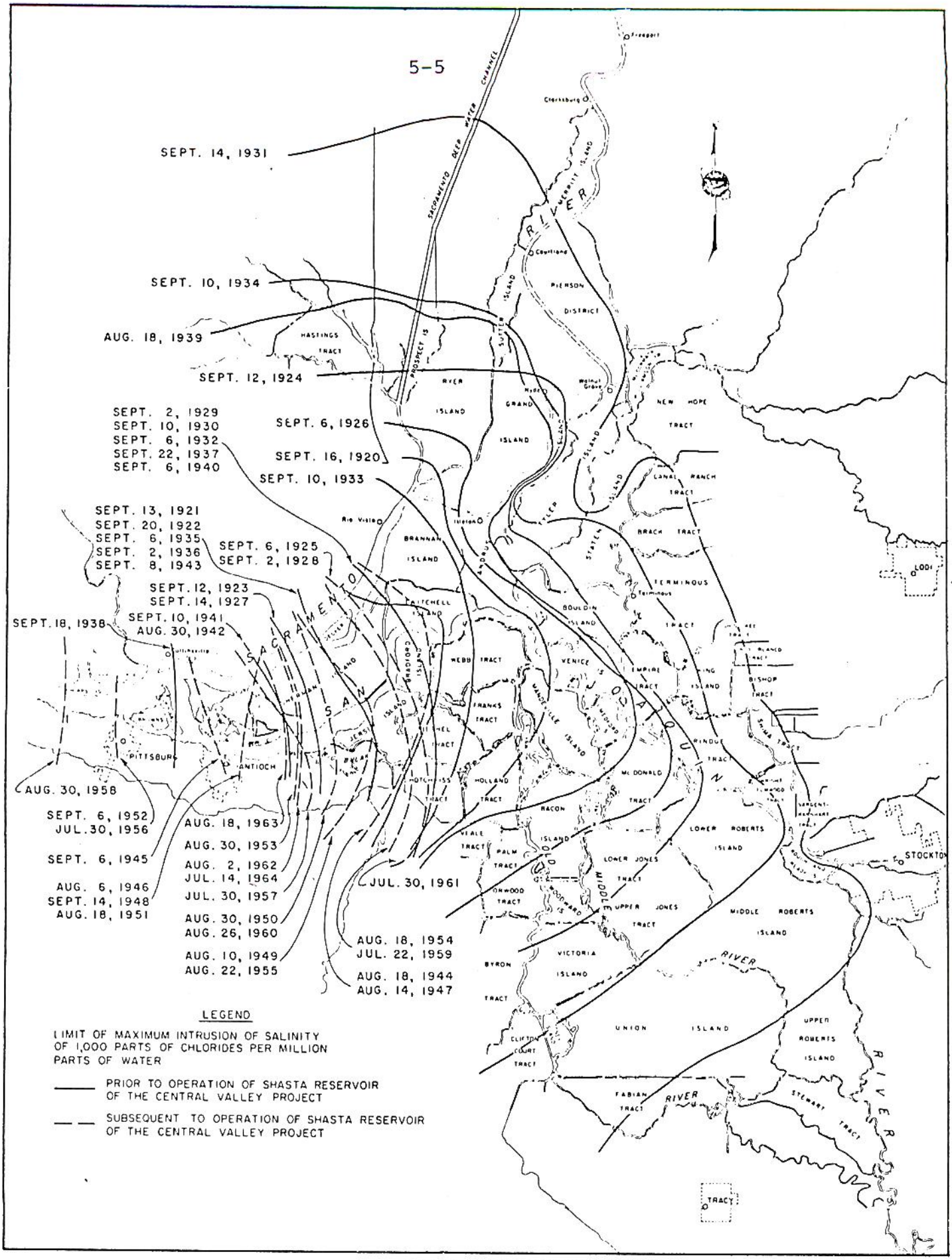
Salinity Intrusion

Since the bottom of the Delta channels is below sea level and the Delta is open to the Pacific Ocean, there is never a shortage of water in the Delta. Thus, the local water problem in the Delta becomes one of water quality, not a shortage in water quantity. Degradation by agriculture return flows and by municipal and industrial discharges compounds the water quality problem.

Fresh water outflow opposes the action of the flood tides in their tendency to push saline water upstream into the Delta. The interplay between the high salinity ocean waters and the fresh water outflow determines the extent of salinity intrusion. Very large winter outflows can push the interface between the saline water and the fresh water into San Francisco Bay. Small summer Delta inflows and outflows have allowed the tides to carry saline water upstream almost to Sacramento and beyond Stockton.

Delta water users have always relied on diversions from nearby Delta channels to meet most of their water needs. Before 1920, they were able to divert usable water in all but a few summer months of the driest years. But, as diversions from the Delta and diversions to the San Francisco Bay area from streams tributary to the Delta increased, the outflow remaining available to repulse salinity has decreased, particularly in late summer. Increasing diversions upstream from the Delta historically caused the salinity intrusion to become more frequent and to extend farther into the Delta. The maximum intrusion of saline water, as measured by the 1,000 ppm chloride ion level, occurred in September 1931, when an estimated 74 percent of the Delta water supply was rendered unusable. A map on the following page shows historical maximum annual salinity intrusion.

Several methods have been proposed for insuring that Delta channels are kept free of salt water intrusion from the ocean. The first and a recurring proposal was to place a physical barrier somewhere between the Delta and the Golden Gate. Other plans would provide capacity in Sacramento Valley reservoirs to store surplus winter flows and release water in the summertime to augment low natural summer flows.



Historical salinity intrusion, 1920-1964.

Since 1944, when the Central Valley Project (CVP) Shasta Dam and Reservoir went into operation, water released from reservoir storage has augmented natural Delta tributary inflow during the low-flow summer and fall months. This program has resulted in a Delta inflow sufficient to repulse salinity intrusion and provide fresh water in about 90 percent of the Delta. With completion of the State Water Project's (SWP) Oroville Reservoir in 1967, additional summertime fresh water releases have been made to further augment inflows. These releases are made to assure water adequate in quality at the export pumps of the CVP and SWP in the Southern Delta and to meet Delta water quality criteria.

Municipal and industrial water users in the extreme Western Delta area have two alternative sources of supply. They obtain their water supplies from offshore diversion and from the Contra Costa Canal, when offshore water quality is poor.

The first historical attempt to quantify Delta outflows for salinity control was set forth in Division of Water Resources Bulletin No. 27, entitled "Variation and Control of Salinity in Sacramento - San Joaquin Delta and Upper San Francisco Bay" published in 1931. The Bulletin recommends the following criteria for protection of Delta agriculture:

> "A quantity of 3300 second-feet has been adopted as the recommended amount of net control flow to be provided as a minimum flow in the combined river channels past Antioch into Suisun Bay. This would put the control point for a maximum degree of mean tidal cycle surface zone salinity of 100 parts of chlorine per 100,000 parts of water about 0.6 miles below Antioch,"

Bulletin No. 27 also reported on the effect of changes in the physical configuration of the Delta on salinity levels. The Bulletin concluded that there is a relationship between physical changes in the Delta and the increase in salinity intrusion. Modification of river channels, flooding of previously reclaimed land, and construction of deep-water ship channels change the configuration of the Delta. As a result, there is generally an increase in tidal flows and tidal diffusion with the fresh water. This then requires a net increase in stream fresh water outflows to repel the increased tidal
diffusion.

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WATER CODE
SECTION 12200-12205

12200. The Legislature hereby finds that the water problems of the Sacramento-San Joaquin Delta are unique within the State; the Sacramento and San Joaquin Rivers join at the Sacramento-San Joaquin Delta to discharge their fresh water flows into Suisun, San Pablo and San Francisco Bays and thence into the Pacific Ocean; the merging of fresh water with saline bay waters and drainage waters and the withdrawal of fresh water for beneficial uses creates an acute problem of salinity intrusion into the vast network of channels and sloughs of the Delta; the State Water Resources Development System has as one of its objectives the transfer of waters from water-surplus areas in the Sacramento Valley and the north coastal area to water-deficient areas to the south and west of the Sacramento-San Joaquin Delta via the Delta; water surplus to the needs of the areas in which it originates is gathered in the Delta and thereby provides a common source of fresh water supply for water-deficient areas. It is, therefore, hereby declared that a general law cannot be made applicable to said Delta and that the enactment of this law is necessary for the protection, conservation, development, control and use of the waters in the Delta for the public good.

12201. The Legislature finds that the maintenance of an adequate water supply in the Delta sufficient to maintain and expand agriculture, industry, urban, and recreational development in the Delta area as set forth in Section 12220, Chapter 2, of this part, and to provide a common source of fresh water for export to areas of water deficiency is necessary to the peace, health, safety and welfare of the people of the State, except that delivery of such water shall be subject to the provisions of Section 10505 and Sections 11460 to 11463, inclusive, of this code.

12202. Among the functions to be provided by the State Water Resources Development System, in coordination with the activities of the United States in providing salinity control for the Delta through operation of the Federal Central Valley Project, shall be the provision of salinity control and an adequate water supply for the users of water in the Sacramento-San Joaquin Delta. If it is determined to be in the public interest to provide a substitute water supply to the users in said Delta in lieu of that which would be provided as a result of salinity control no added financial burden

shall be placed upon said Delta water users solely by virtue of such substitution. Delivery of said substitute water supply shall be subject to the provisions of Section 10505 and Sections 11460 to 11463, inclusive, of this code.

12203. It is hereby declared to be the policy of the State that no person, corporation or public or private agency or the State or the United States should divert water from the channels of the Sacramento-San Joaquin Delta to which the users within said Delta are entitled.

12204. In determining the availability of water for export from the Sacramento-San Joaquin Delta no water shall be exported which is necessary to meet the requirements of Sections 12202 and 12203 of this chapter.

12205. It is the policy of the State that the operation and management of releases from storage into the Sacramento-San Joaquin Delta of water for use outside the area in which such water originates shall be integrated to the maximum extent possible in order to permit the fulfillment of the objectives of this part.
