



CENTRAL DELTA WATER AGENCY

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August 16, 2021

Via Email Only to:

Office of Administrative Law
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Re: Objection to Emergency Reporting and Curtailment Regulation for the
Sacramento –San Joaquin Delta Watershed OAL #2021-0809-3

The Central Delta Water Agency encompasses approximately 120,000 acres of the legal Delta in western San Joaquin County. Our interest is the protection of the water supply and water quality in the Delta channels. The USBR and DWR are legally responsible for providing salinity control for the Delta. The Projects have been exporting water from the Delta without regard to meeting regulatory requirements (which include salinity control) in subsequent dry periods sometimes historically extending 6 years or more. This has at least since 2009 been a pattern and practice which has been condoned by the State Water Resources Control Board due in our view primarily to its State regulating State conflict of interest. As drafted the proposed regulation is an unlawful action to allow the Projects to export water while at the same time curtailing and punishing holders of water rights senior to those of the Projects. The issue as to the Projects exports junior priority to the water needs in the legal Delta has been litigated with the SWRCB, DWR, USBR, and their contractors in the following case.

Referencing Water Code 12200 et seq. the court decision in United States vs State Water Resources Control Board 182 Cal.App.3d 82 (1986) at page 139 determined:

“The act prohibits project exports from the Delta of water necessary to provide water to which the Delta users are ‘entitled’ and water which is needed for salinity control and an adequate supply for Delta users.”

The SWP and CVP Projects have been operating to provide water to their contractors including those outside the legal Delta receiving water exported from the Delta in priority to meeting water quality standards, other regulatory requirements and permit conditions in subsequent dry years. This has resulted in the depletion of project reservoir storage such that the Projects reportedly cannot meet cold water requirements for salmon in the Sacramento River system and cannot meet the salinity control Delta outflow requirements in D1641. The Projects requested and the SWRCB (through an unlawful delegation) facilitated a Temporary Urgency

Change relaxing the salinity control requirements while allowing for exports to continue at 1500 cubic feet per second. In addition to being contrary to the above court decision, this resulted in increased salinity intrusion into the Delta which is expected to worsen with the subject regulation. Operation of the export pumps increases the draw of saline water into the Delta from the west and the planned export of allegedly “stored water” and much of the transferred water will aggravate the shortage of cold water and/or water otherwise contributing to the Delta outflow.

There is a Pattern and Practice of the SWP and CVP Exporting Water While Disregarding the Need to Meet Senior Requirements in Current and Subsequent Years

The current crises is due to the wrongful failure of the USBR and DWR Projects to Operate the Projects so as to meet the regulatory requirements in anticipation of subsequent dry years. The water previously delivered and exported by the Projects disregarding the need to meet regulatory requirements in the current and subsequent dry years depleted storage to the extent that it may now be impossible to maintain sufficient cold water to save salmon in the Sacramento River system. The wrongfully exported water including that which is stored in San Luis, water banks or other facilities south of the Delta should be recaptured and restored to the Delta either directly by way of the San Joaquin River or by way of exchanges. These sources can help provide salinity control and relieve demand for releases of stored water otherwise needed for cold water fish protection. Attached hereto as **Exhibit A and Attachment C** are graphs showing the hydrology used for planning for both the CVP and SWP. The then anticipated 1929 (sometimes 1928) through 1934 six year drought is shown. Project operations in recent dry years resulted in the claimed lack of Project water in the first or second dry year due to a claimed lack of expectation of the dry conditions. Since 2009 the evidence shows that had exports been curtailed the water quality standards would have been met. Similarly had the Projects operated as planned in 2018 -2020 it appears the current crises could have been avoided. The current crises is simply the result of continuing the same pattern and practice of the SWRCB, DWR and USBR which wrongly favors exports over senior water rights, regulatory requirements and the public trust. Attached hereto as **Exhibit B** are excerpts from the March 2021 Report to the Legislature on the 2012-2016 Drought showing the SWRCB and DWR knowledge of reoccurring droughts contrary to their claim of lack of expectation. A copy of the entire report is available on the web and incorporated by reference. The report was prepared under the direction of the DWR with review and assistance from the SWRCB and other State agencies. Page vii of such report clearly shows the understanding of the historical occurrence of droughts:

“The 2012-2016 drought was the latest of five severe droughts in the last 120 years. ...2012-2015 were the four driest consecutive years on record. The single year 2014 was the third driest on record.”

Attached hereto as **Exhibit C Attachment B** is an excerpt from DWR’s February 2015 California’s Most Significant Droughts: Comparing Historical and Recent Conditions. A copy of the entire report is available on the web and incorporated by reference. Droughts as long as 12 and 21 years are listed. The SWRCB, DWR and the USBR have huge staffs with well qualified and recognized experts in the field of hydrology and certainly operation of the SWP and CVP.

In spite of the clear history of droughts including the 1976-77 drought and the preparatory work on the 2012-2016 Drought Report the SWP and CVP exports from the Delta were allowed to continue at rates without the recognition that 2021 and following years could be dry. The huge shortage in SWP and CVP firm supply versus demand from their contractors is not featured in the Drought Report and the disregard of compliance with regulatory requirements is not mentioned. The only reference in the 2012-2016 Drought Report that remotely reaches the critical problem is on page 57 which provides:

“The Water Board should continue to pursue development of a more proactive temperature management plan for Reclamation’s Shasta Dam, to be developed early in the season before delivery decisions are made, in collaboration with Reclamation and in consultation with other resource agencies.”

No mention is made of compliance with requirements for salinity control, Water Code 12200 et seq., Water Code 11460 et seq. Water Code 85054 (coequal goals), Water Code 85021(reduced reliance on the Delta), the need to honor water rights priorities or the need to comply with the Court decision in United States vs State Water Resources Control Board 182 Cal.App.3d 82 (1986).

Exhibit D contains data from the California Data Exchange Center (CDEC) for The CVP Tracy Pumping Plant and Shasta Dam, the SWP Clifton Court Forebay and Oroville Dam. This data is on the web and shows that a reduction in exports from the Delta in prior years would have avoided the shortage in the current year. **Exhibit E** contains the CVP monthly deliveries for the years 2015 through June of 2021 these are available on the web from the Bureau of Reclamation Central Valley Operations website. **Exhibit F** contains the SWP deliveries from 1962 through 2019 as shown in DWR Bulletin 132-20 Appendix B which is also on the web. **Exhibit G** contains excerpts from Bulletin 132-16 through 18 which are on the web summarizing the Diversions from the Delta as follows:

2015 SWP Banks Pumping Plant 845,421 acre feet, CVP Jones Pumping Plant 688,723 acre feet.
2016 SWP Banks Pumping Plant 2,595,218 acre feet, CVP Jones Pumping Plant 1,749,325 acre feet.

2017 SWP Banks Pumping Plant 3,434,071 acre feet, CVP Jones Pumping Plant 2,794,654 acre feet.

The experience of the 2015 drought did not deter the Projects from continuing to export water from the Delta without regard to meeting regulatory requirements in subsequent dry years. There has been a total disregard by the SWRCB, DWR and the USBR of Water Code section 85201 adopted in 2010 which establishes the policy of the State to reduce reliance on the Delta for future water supply needs. Water Code section 85031 makes it clear that this policy applies to Delta exports and does not diminish, impair, or otherwise affect in any manner any area of origin, watershed of origin, county of origin or any other water rights protection, including but not limited to water appropriated prior to December 19,1914 and protections provided pursuant to Water Code sections 11460 et seq. and 12200 et seq.

Conflict of Interest with State and Federal Agencies Operating Projects to Export Water from the Delta Results in a Bias Against Those in the Delta and Other Areas of Origin

The State Water Resources Control and DWR have a close working relationship on a wide variety of matters including those relating to water rights matters. The DWR develops and operates models used by the SWRCB including those incorporated into the subject regulation. They gather data and measurements for use by the SWRCB in regulating third party water rights in conflict with those held by DWR. They share staff and jointly implement programs such as the Sustainable Groundwater Management Act. The SWRCB historically has not been able to enforce regulations against DWR, another State agency. Governors have in a number of cases interceded. Severe penalties levied on other water right holders which could put them out of business are not imposed on DWR and if levied on DWR would be of doubtful impact since the taxpayers of the State would likely bear the burden. DWR clearly wears two hats, one as operator of the SWP and the other as protector of the public trust. The former is the hat most apparent. The SWRCB is restrained by this conflict in regulating DWR. DWR operates the SWP in coordination with the CVP and the CVP also asserts independence. The result is real bias in favor of the water Projects.

The Huge Shortage of Surplus Water and Relaxation of Restrictions on Use of Temporarily Available Water to Support Permanent Demand Such as for Residential Development and Permanent Crops Is Being Ignored By the SWRCB, SWP and CVP.

The plan to develop water projects in the North Coast to seasonally provide to the Delta 5 million acre feet of surplus water by the year 2000 was not implemented. See attached excerpt from the December 1960 Bulletin 76 (**Exhibit H Attachment A**). The lack of this 5 million acre feet results in the SWP not having a water supply of water surplus to the needs of the Delta and other areas of origin to serve the roughly 4.25 million acre feet of so called Table A SWP contract entitlement. The CVP also suffers from a shortage in meeting even the so called firm water entitlements in its contracts. The contracts of both the SWP and CVP clearly contained language conditioning the delivery of water on first meeting senior water rights, salinity control and other regulatory requirements including the rights of those in the areas of origin to recapture project water for local needs. The modification of SWP and CVP contracts, including allowing Contractors to transfer water entitlement for profit (including CVP subsidized water), expansion of places of use, elimination of effective acreage limitations, liberal internal project transfers of water, carry over storage, delivery of nonproject water, and elimination of restrictions on permanent demand creation with temporary supply are some of the actions building demand beyond supply. Other actions such as the failure to provide a San Joaquin Valley drain with an outlet to the Ocean thus requiring greater amounts of water for dilution of salts coordinated operation of the SWP and CVP, joint use of points of diversion, the Tracy intertie of the California Aqueduct and Delta Mendota Canal, the Cross Valley Canal, various water banks and local storage all added demand for exports from the Delta.

BACKGROUND

The guiding principle for federal and state development of the Central Valley Project is reflected in Water Code section 11460 which provides:

11460. Prior right to watershed water

In the construction and operation by the department of any project under the provisions of this part a watershed or area wherein water originates, or an area immediately adjacent thereto which can conveniently be supplied with water therefrom, shall not be deprived by the department directly or indirectly of the prior right to all of the water reasonably required to adequately supply the beneficial needs of the watershed, area, or any of the inhabitants or property owners therein. (*Added by Stats. 1943, c. 370, p. 1896. Amended by Stats. 1957, c. 1932, p. 3410, section 296.*)

Water Code section 11128 provides that the limitations also apply to any agency of the State or Federal Government.

Although physically apparent, Water code section 12931 makes it clear that as to state water resources development the Sacramento-San Joaquin Delta shall be deemed to be within the watershed of the Sacramento River.

A summary of the promises made on behalf of the United States to those in the watershed areas is contained in the 84th Congress, 2D Session House Document No. 416, Part One Authorizing Documents 1956 at Pages 797-799 as follows:

"My Dear Mr. Engle: In response to your request to Mr. Carr, we have assembled excerpts from various statements by Bureau and Department officials relating to the subject of diversion of water from the Sacramento Valley to the San Joaquin Valley through the operation of the Central Valley Project.

A factual review of available water supplies over a period of more than 40 years of record and the estimates of future water requirements made by State and Federal agencies makes it clear that there is no reason for concern about the problem at this time.

For your convenience, I have summarized policy statements that have been made by Bureau of Reclamation and Department of the Interior officials. These excerpts are in the following paragraphs:

On February 20, 1942, in announcing the capacity for the Delta-Mendota Canal, Commissioner John C. Page said, as a part of his Washington D.C., press release:

"The capacity of 4,600 cubic feet per second was approved, with the understanding that the quantity in excess of basic requirements mainly for

replacement at Mendota Pool, **will not be used to serve new lands in the San Joaquin Valley if the water is necessary for development in the Sacramento Valley below Shasta Dam and in the counties of origin of such waters.**" (Emphasis added)

On July 18, 1944, Regional Director Charles E. Carey wrote a letter to Mr. Harry Barnes, ' chairman of a committee of the Irrigation Districts Association of California. In that letter, speaking on the Bureau's recognition and respect for State laws, he said:

"They [Bureau officials] are proud of the historic fact that the reclamation program includes as one of its basic tenets that the irrigation development in the West by the Federal Government under the Federal reclamation laws is carried forward in conformity with State water laws."

On February 17, 1945, a more direct answer was made to the question of diversion of water in a letter by Acting Regional Director R. C. Calland, of the Bureau, to the Joint Committee on Rivers and Flood Control of the California State Legislature. The committee had asked the question, "What is your policy in connection with the amount of water that can be diverted from one watershed to another in proposed diversions?" In stating the Bureau's policy, Mr. Calland quoted section 11460 of the State water code, which is sometimes referred to as the county of origin act, and then he said:

"As viewed by the Bureau, it is the intent of the statute that no water shall be diverted from any watershed which is or will be needed for beneficial uses within that watershed. The Bureau of Reclamation, in its studies for water resources development in the Central Valley, consistently has given full recognition to the policy expressed in this statute by the legislature and the people. The Bureau has attempted to estimate in these studies, and will continue to do so in future studies, what the present and future needs of each watershed will be. **The Bureau will not divert from any watershed any water which is needed to satisfy the existing or potential needs within that watershed. For example, no water will be diverted which will be needed for the full development of all of the irrigable lands within the watershed, nor would there be water needed for municipal and industrial purposes or future maintenance of fish and wildlife resources.**" (Emphasis added)

On February 12, 1948, Acting Commissioner Wesley R. Nelson sent a letter to Representative Clarence F. Lea, in which he said:

"You asked whether section 10505 of the California Water Code, also sometimes referred to as the county of origin law, would be applicable to the Department of the Interior, Bureau of Reclamation. The answer to this question is: No, except insofar as the Bureau of Reclamation has taken or may take assignments of applications which have been filed for the appropriation of water under the

California Statutes of 1927, chapter 286, in which assignments reservations have been made in favor of the county of origin.

The policy of the Department of the Interior, Bureau of Reclamation, is evidenced in its proposed report on a Comprehensive Plan for Water Resources Development Central Valley Basin, Calif., wherein the Department of the Interior takes the position that "In addition to respecting all existing water rights, the Bureau has complied with California's 'county of origin' legislation, which requires that water shall be reserved for the presently unirrigated lands of the areas in which the water originates, **to the end that only surplus water will be exported elsewhere.**" (Emphasis added)

On March 1, 1948, Regional Director Richard L. Boke wrote to Mr. A. L. Burkholder, secretary of the Live Oak Subordinate Grange No. 494, Live Oak, Calif., on the same subject, and said:

"I can agree fully with the statement in your letter that it would be grossly unjust to 'take water from the watersheds of one region to supply another region until all present and all possible future needs of the first region have been fully determined and completely and adequately provided for.' That is established Bureau of Reclamation policy and, I believe, it is consistent with the water laws of the State of California under which we must operate." (Emphasis added)

On May 17, 1948, Assistant Secretary of the Interior William E. Warne wrote a letter to Representative Lea on the same subject, in which he said:

"The excess water made available by Shasta Reservoir would go first to such Sacramento Valley lands as now have no rights to water." (Emphasis added)

Assistant Secretary Warne goes on to say, in the same letter:

"As you know, the Sacramento Valley water rights are protected by: (1) Reclamation law which recognizes State water law and rights thereunder; (2) the State's counties of origin act, which is recognized by the Bureau in principle; and (3) the fact that Bureau filings on water are subject to State approval. I can assure you that the Bureau will determine the amounts of water required in the Sacramento Valley drainage basin to the best of its ability so that only surplus waters would be exported to the San Joaquin. We are proceeding toward a determination and settlement of Sacramento Valley waters which will fully protect the rights of present users; we are determining the water needs of the Sacramento Valley; **and it will be the Bureau's policy to export from that valley only such waters as are in excess of its needs.**" (Emphasis added)

On October 12, 1948, Secretary of the Interior Krug substantiated former statements of policy in a speech given at Oroville, Calif. Secretary Krug said, with respect to diversion of water:

"Let me state, clearly and finally, the Interior Department is fully and completely committed to the policy that no water which is needed in the Sacramento Valley will be sent out of it."

He added:

"There is no intent on the part of the Bureau of Reclamation ever to divert from the Sacramento Valley a single acre-foot of water which might be used in the valley now or later."(Emphasis added)

The California Water Resources Development Bond Act provides in Water Code Section 12931 that the Sacramento-San Joaquin Delta shall be deemed to be within the watershed of the Sacramento River.

The 1960 ballot argument in favor of the California Water Resources Development Bond Act which spawned the State Water Project (SWP). Of particular note are the following representations:

"No area will be deprived of water to meet the needs of another nor will any area be asked to pay for water delivered to another."(Emphasis added)

"Under this Act the water rights of Northern California will remain securely protected."

"A much needed drainage system and water supply will be provided in the San Joaquin Valley."

The Delta Reform Act Water Code section 85031(a) provides:

"(a) **This division does not diminish, impair, or otherwise affect in any manner whatsoever any area of origin, watershed of origin, county of origin, or any other water rights protections,** including, but not limited to, rights to water appropriated prior to December 19, 1914, provided under the law. **This division does not limit or otherwise affect the application of Article 1.7** (commencing with Section 1215) of Chapter 1 of Part 2 of Division 2, Sections 10505, 10505.5, 11128, 11460, 11461, 11462, and 11463, and Sections 12200 to 12220, inclusive." (Emphasis added.)

Water Code Sections 11460 et seq. and 12200 et seq. are particularly specific in defining the limitation on the export of water from the Delta by the SWP and CVP. Water Code Sections 11460 et seq. were added by Statutes 1943, around the time of commencement of the CVP. Water Code Section 12200 et seq. was added by Statutes 1959, c. 1766, p. 1766 around the time of commencement of the SWP.

The limitation of the projects to the export of only surplus water and the obligation of the projects to provide salinity control and assure an adequate water supply sufficient to maintain and expand agriculture, industry, urban, and recreational development in the Delta is clear.

Water Code "12200 through 12205 are particularly specific as to the requirements to provide salinity control for the Delta and provide an adequate water supply in the Delta sufficient to maintain and expand agriculture, industry, urban and recreational development.

For ease of reference, the following Water Code sections are quoted with emphasis added:

'12200. Legislative findings and declaration

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.** (*Added by Stats. 1959, c. 1766, p. 4247, '1.*)

'12201. Necessity of maintenance of water supply

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. (*Added by Stats. 1959, c. 1766, p 4247, '1.*)

'12202. Salinity control and adequate water supply; substitute water supply; delivery

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. *(Added by Stats. 1959, c. 1766, p 4247, '1.)*

'12203. Diversion of waters from channels of delta

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. *(Added by Stats. 1959, c. 1766, p 4249, '1.)*

'12204. Exportation of water from delta

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. *(Added by Stats. 1959, c. 1766, p 4249, '1.)*

'12205. Storage of water; integration of operation and management of release of water

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. *(Added by Stats. 1959, c. 1766, p 4249, '1.)*

The December 1960 DWR Bulletin 76 which includes a contemporaneous interpretation by DWR of Water code Section 12200 through 12205 provides at page 12:

"In 1959 the State Legislature directed that water shall not be diverted from the Delta for use elsewhere unless adequate supplies for the Delta are first provided. (Emphasis added.)

Similarly, the DWR confirmed its interpretation of law in the 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 dated January 28, 1981, which provides:

"(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."

"(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." (Emphasis added.)

In United States vs. State Water Resources Control Board 182 Cal.App.3d 82 (1986) at page 139 the appellate court provided:

"In 1959, when the SWP was authorized, the Legislature enacted the Delta Protection Act. (§§ 12200-12220.) The Legislature recognized the unique water problems in the Delta, particularly 'salinity intrusion,' which mandates the need for such special legislation 'for the protection, conservation, development, control and use of the waters in the Delta for the public good.' (§ 12200.) The act prohibits project exports from the Delta of water necessary to provide water to which the Delta users are 'entitled' and water which is needed for salinity control and an adequate supply for Delta users. (§§ 12202, 12203, 12204.)

In SWRCB D-1485 at page 9 the SWRCB provided:

"The Delta Protection Act accords first priority to satisfaction of vested rights and public interest needs for water in the Delta and relegates to lesser priority all exports of water from the Delta to other areas for any purpose."

WC 12205 provides:

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

The objectives include salinity control and an adequate water supply.

The export projects must additionally fully mitigate their respective impacts and meet the affirmative obligations to the Delta and other watershed areas including those related to flow. Failure to do so results in a shift of the cost of the project to someone else.

The California Water Resources Development Bond Act was intended to preclude such a shift in costs. See also Goodman v. Riverside (1993) 140 Cal.App.3d 900 at 906 for the requirement that the costs of the entire project be paid by the contractors. In footnote 3 the court provided the following:

"Governor Pat Brown's press comments at the time are also informative:

"Governor, what is your answer to people who say, 'I don't want to pay for somebody else's water.' Like San Franciscans. 'I have already paid for one water project. Why should I be compelled to buy another?'"

"Governor Brown: Well, they won't. The plan itself is completely self-supporting. The law provides that the contracts have to provide for the repayment of the cost of the entire Project. That's the real answer to it."

Water Code Section 11912 requires that the costs necessary for the preservation of fish and wildlife be charged to the contractors. The term "preservation" appears to be broader than mitigation and appears to create an affirmative obligation beyond mitigation.

Title 34 of Public Law 102-575 referred to as the Central Valley Project Improvement Act in Section 3406(b) (1) authorizes and directs the Secretary of Interior to enact and implement a program which makes all reasonable efforts to ensure by the year 2002 natural production of anadromous fish (including salmon, steelhead, striped bass, sturgeon and American shad) will be sustainable on a long term basis at levels not less than twice the average levels attained during the period of 1967-1991

The Delta Reform Act of 2009 includes provisions intended to provide additional protection for the Delta. Such provisions include Water Code §85054 which provides:

"§85054. Coequal goals

'Coequal goals' means the two goals of providing a more reliable water supply for California and protecting restoring, and enhancing the Delta ecosystem. The coequal goals shall be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place."

Water Code §85021 provides:

"§85021. Reduction of reliance on Delta for future water supply needs

The policy of the State of California is to reduce reliance on the Delta in meeting California's future water supply needs through a statewide strategy of investing in improved regional supplies, conservation, and water use efficiency. Each region that depends on water from the Delta watershed shall improve its regional self-reliance for water through investment in water use efficiency, water recycling, advanced water technologies, local and regional water supply projects, and improved regional coordination of local and regional water supply efforts."

876.1(b) and (e) of the Regulation is in Direct Conflict with Water Code Section 85230 (b). Authority of Delta Watermaster

The regulation provides:

"(b)... Before issuing curtailment orders to water right holders in the Legal Delta, the Deputy Director will consult with and obtain the concurrence of the Delta Watermaster."

"(e)... Before making any determinations within the Legal Delta, the Deputy Director will consult with the Delta Watermaster."

WC 85230 (b) does not mention the Deputy Director and provides:

"The Delta Watermaster shall exercise the Board's authority to provide timely monitoring and enforcement of Board orders and license and permit terms and conditions. The Delta Watermaster's delegated authority shall include authority to require monitoring and reporting, authority for approvals delegated to an officer or employee of the Board by the terms of a water right permit or license, authority to approve temporary urgency changes pursuant to Chapter 6.6 (commencing with Section 1435) of Part 2 of Division 2, and authority to issue a notice of a proposed cease and desisted order or civil liability complaint. The Delta Watermaster's authority shall be limited to diversions in the Delta, and for monitoring and enforcement of the board's orders and license and permit terms and conditions that apply to the Delta."

The diversions in the Delta including the diversions of the SWP and CVP are within the jurisdiction of the Delta Watermaster and the regulation granting authority to the Deputy Director only with consultation with the Delta Watermaster violates 85230 (b). It also appears

that the Temporary Urgency Change which underpins this emergency regulation was delegated in contravention to Water Code 85230 (b) in that such authority is by statute delegated to the Delta Watermaster not the Executive Director. The regulation should be rejected and returned to the SWRCB for revision making it clear that the Deputy Director does not have authority over diversions in the Delta as that authority is delegated by statute to the Delta Watermaster.

The Procedure for Curtailment Provided in 876.1 (c) and (d) Constitutes a Violation of Due Process and an Unlawful Taking of Private Property Without Just Compensation

The issuance of a curtailment notice or even a notice of unavailability of water could have serious consequences to the water right holder. Crop and other financing dependent on water can be denied on the basis that water might not be available to generate the revenue to repay the loan. Marketability and values of property will be impacted. Health and safety concerns as to degraded water quality including propagation of dangerous toxins will deter recreational uses and the food supply for those who depend upon recreational fishing. The availability and rights to water is very complicated and specific to the very point of diversion of the individual diverter. No curtailment order or notice of unavailability of water should be allowed without first providing an opportunity to the specific diverter for an adjudicatory hearing on the availability and right to divert water. Water Code section 85230 (c) requires that due process be provided in an adjudicatory hearing. In Water Code section 85230 (b) the authority to issue a notice of a proposed cease and desist order or notice of an administrative civil liability complaint. In both cases the impacted diverter should be afforded the opportunity to request an adjudicatory hearing with access to and opportunity to contest the facts supporting the basis for the notice of proposed action. The complexity of the factual and legal issues relating to water availability requires that opportunity for discovery and cross-examination be afforded for due process. It would appear that the 85230 (c) requirement that due process be provided in an adjudicatory hearing would apply even to diversions outside the Legal Delta. The proposed regulation should be rejected and returned to the SWRCB for correction consistent with Water Code section 85230.

876.1 (d) of the Regulation Incorporating the Referenced Water Availability Analysis Should be Deleted as the Availability Analysis is Too Uncertain to be Incorporated into Law

The water availability analysis admits to lack of information as to unmeasured streamflow, lack of data on accretions from and losses, lack of data on effects of groundwater pumping and other matters. Unsupported assumptions are substituted for fact. The analysis ignores the regulatory and statutory limitations on the SWP and CVP, ignores the difference between what is impounded behind a dam and what is water legally stored in compliance with permit terms and conditions and water right physical solution requirements, and ignores the interrelationship of ground and surface water flows. The availability of water for any particular water right diversion is a matter to be determined in the adjudicatory hearing following a proposed cease and desist order and in the case of riparian and pre 1914 rights a watershed adjudication.

A Credible Quantification of the Available Water Supply of the CVP and SWP to Meet the Year by Year Regulatory Requirements is Critical to Any Proper Determination of Water Availability for Others in the Delta Watershed Especially as it Relates to Drought Conditions

The largest water diverters in the Sacramento-San Joaquin Delta Watershed are the federal CVP and SWP. They are projects operated by the United States through its Department of Interior and the State of California through its Resources Agency. As such they are regulated by sister agencies thus creating a conflict of interest between public trust and the interest of their water contractors. The conflict is amplified by the interest of the political leadership of our nation and State.

Both projects are based upon the premise that they would construct dams and other facilities to capture surplus flows wasting to the ocean to meet the present and future needs in the watersheds of origin and supply flows excess to the watershed needs to other areas of the State. Neither project was intended nor had planned to meet all the recognized water needs in the State. The CVP was to serve and subsidize water for farms meeting the 160 acre limitation in limited service areas. It was not intended to meet the water needs of the large land holdings which included large areas of arid land. The CVP built water projects and then contracted water based on classes reflecting the expected firmness of supply. The SWP was a build "as you go" project with contractors paying the entire cost with a limitation and share based on Table A entitlements of about 4.2 million acre feet per year. The SWP plan expected demand in the watersheds of origin to build over time with the demand of its contractors such that by the year 2000, 5.0 million acre feet per year would be needed in the Delta from development of dams and pipelines capturing surplus water on North Coast Rivers. See **Attachment A**. Such North Coast development did not take place and the SWP is now operating without the planned supply of surplus water thereby driving the effort to take water away from meeting the needs in the watersheds of origin.

Both projects have the obligation to provide salinity control for the Delta which protects the quality for local and project export diversions, the multiple fish, wildlife, recreation and life safety uses and public trust. Both projects have the obligation to mitigate their adverse impacts including among others blocking fish access to spawning grounds of suitable temperature, altering natural flows, inducing upstream water diversions and delivering water to the salt loaded portions of the Central Valley without the provision of a valley drain with an outlet to the ocean which was a precondition to the supply of water to the San Luis Unit. The fish and wildlife obligations of the CVP include the requirements of the CVPIA and those of the SWP the obligations to preserve fish and wildlife. (See Water Code 11912)

DWR contends that the SWP/CVP have had a high degree of success in meeting all operative water quality standards since 1978 claiming that the temporary urgency changes granted by the SWRCB using emergency authority were justifiable due to factors beyond the SWP/CVP reasonable control. Drought conditions are really not emergencies but historically reoccurring events. See **Attachment B**. There is some future variability that cannot be accurately predicted and the information available to describe the past variability has limitations. The fact remains

that the planning for both the SWP and CVP anticipated a reoccurrence of hydrology similar to the 6 year drought of 1928 through 1934 to estimate the firm yield of the projects to supply such firm yield in the sixth year of such drought. The importance of determination of such firm yield is to alert contractors of the reasonable expectation of delivery. The contracts contained exculpatory provisions making even such firm yield delivery subject to senior rights (including watershed of origin rights to recapture water from the Projects), variable hydrology and other measures not controllable by the Projects. In determining firm yield, the depletion of reservoir storage in the early years of a drought impacts the ability to supply water in the later years. It appears that optimism or political factors have influenced the Project decisions to take more water in the early years and gamble with availability in the later years. This practice and changes in contract provisions have fueled the increased development of permanent type demand based on infirm supply.

In the past regulatory compliance has been equated to water quality control plan standards as relaxed by temporary urgency changes. By way of example the D-1641 water quality standards do not contain fixed objectives for cold water requirements to protect salmon spawning. Instead there is a process for developing a recommendation to the executive director of the SWRCB who determines the requirement on a real time basis. This process has resulted in the SWP and CVP inability to meet regulatory fishery requirements in even the first or second year of a drought. Water quality standards reflect a balancing process to establish minimum requirements protective of specific uses and allow for substantial degradation of pre-existing water quality in various areas of the watersheds including by example the San Joaquin River. Adequate control of health and safety threats such as microcystis and increasing methylation of mercury are absent.

The original planning for the SWP and CVP appears to have underestimated the needs to protect fish both as to flow requirements and carryover storage required for temperature control. Without the planned 5 million acre feet of water per year from the North Coast the problem is greater and there is no truly surplus water for export except in wet years.

In 2009 after only two (2) dry years, the SWP and CVP violated the February outflow requirements claiming that meeting the outflow requirements would reduce storage below the point necessary to meet cold water requirements for salmon later in the year. Although the project operators lied and the real reason for the violation was the ongoing pumping of the unregulated flow to help fill San Luis Reservoir, the incident clearly shows the inability of the projects to provide surplus water for export in the 3rd, 4th, 5th and 6th years of drought.

In May of 2013 the SWP and CVP again claimed a need to preserve cold water in storage for fish. They requested and were allowed by the SWRCB to reduce outflow by changing the year classification so as to exceed the western and interior Delta agricultural water quality objectives to save such cold water in storage. They did not suggest and did not reduce export pumping which would have had the same effect as reducing outflow.

In 2014 the 2nd or 3rd year of drought, the SWRCB issued curtailment notices to post 1914 water right holders in the areas of origin and reduced exports due to the lack of water.

The events surrounding the 2009 and 2013 Water Quality Standard Violations reveal disturbing collaboration among the USBR, DWR, state and federal fish agencies and the SWRCB to facilitate exports rather than meet legal obligations in the Bay Delta watershed.

In 2009 the Fishery Agency Representatives did not object to the planned violation of the standards and even though the water needed to meet the standards was being exported the SWRCB did not even admonish the state and federal agencies to seek relief in advance of violation. Although the need for retention of water in storage to meet cold water requirements for fish was the alleged motivation for the violation of the standards, exports continued at an increasing rate including water that could have been held in storage for cold water requirements. See **Attachment D**.

In 2013 again the reason for the violation was to retain water in storage to meet cold water requirements for fish. Following the violation the USBR and DWR requested that the standards for protection of agriculture in the central and western Delta be relaxed by allowing operation to critical year standards rather than dry year standards. The California Department of Fish and Wildlife Service, the United States Fish and Wildlife Service, and NOAA's National Marine Fishery Service supported the request. Although the SWRCB staff and all such agencies conferred on the matter, there was no suggestion that exports be reduced in lieu of water quality standards relaxation. Most disappointing was the SWRCB Executive Director's agreement not to recommend taking any enforcement action for the future operation to the relaxed standard thereby effectuating a change in standards without even a public hearing. See **Attachment E**.

In both the 2009 and 2013 cases exports continued at a relatively high rate even though the need for retention of water in storage for meeting cold water fish requirements was clearly recognized. See **Attachment E**.

It is clear that the CVP and SWP have not operated the projects in a manner so as to meet water quality standards during a reoccurrence of six years or even two years of drought.

Six year droughts can be expected and even longer droughts are possible. The historic occurrence of multi-year droughts was reported in a DWR Report, California's Most Significant Droughts: Comparing Historical and Recent Conditions (February 2015). **Attachment B** is Table 2.1 from such report.

The State Water Project Final Delivery Capability Report 2015 shows for Table A, a long-term average (1921-2003) as 2,550,000 acre feet per year; a single dry year (1977) as 454,000 acre feet and a 6-year drought (1987-1992) as 1,182,000 acre feet per year. These figures can be contrasted to the Maximum Possible SWP Table A Delivery of 4,132,000 acre feet per year. See **Attachment F** excerpts from SWP Final Delivery Capability Report 2015. It should be noted that the delivery amounts are the average for the period and do not reflect the year to year availability of water.

The failure of the SWP and CVP to carry out the plan for development of water projects to yield sufficient surplus water including the 5 million acre feet from the North Coast to meet

the needs and obligations within the Delta and other areas of origin and the expectations of the export contractors is at the root of the crisis in the Delta.

The availability analysis fails to correctly reflect the unique physical characteristics of the Delta and the basis for the obligation of the SWP and CVP to provide Salinity Control. This failure creates an unfair bias in the complex determination of water availability for the purpose of Curtailment.

THE DELTA ALWAYS HAS WATER

Water right priorities and availability of water are based on quantity. For Riparian and Pre-1914 water rights the quantification requires basin wide adjudication. For the legal Delta the connection to the Bay and thence to the Ocean renders quantity a non-issue. Historically the physical aspects of the Delta were clearly recognized and water diversion reporting was not required. If absent Project operations the Delta channel bottom is below tide level it will always have water. Sea level at the Golden Gate has risen about 8.5 inches in the last 150 years and is expected to continue rising. Prediction by DWR and others is that the rate of rise will increase.

The Delta Pool is somewhat like a lake. The volume of water in the channels constitutes the pool or lake which actually extends westerly beyond the legally defined Delta. There are inflows from the tributary rivers to the North, South, East and West, there is inflow from the Bay, there is precipitation, and there are local sources such as accretions from groundwater, artesian flows and return flows from drainage pumps which recycle the water. The water quality in the pool will vary depending upon conditions including the residual effect from prior freshwater flushing flows and there will be changes in volume due to tides and flood flow but absent project operations there will be no lack of water. Even without river flow, the lands within the tidal range are riparian to the pool. It is generally understood that the Delta Pool has an outlet at Carquinez for the inflow from the multitude of tributaries flowing into and through the Delta. For most of the time in most years there is river flow into and out of the Delta Pool. Even without river flow, the tides move water into and out of the Delta pool. On the ebb tides, water flows out of the pool through Suisun Bay and the Carquinez Strait. On the flood tides, water from the ocean flows into San Francisco Bay mixing with the blend of fresh and salt water in the bay and then flows inland through Carquinez Strait into Suisun Bay and thence the Delta. The mix varies by location and time adding to the complexity. The meeting of Ebb and Flood tide water varies constantly by time and location. At times fresh water extends to the west and at times of flood even into the ocean. Absent export project operations, most of the time there is a net outflow. The tidal cycle includes two ebb tides and two flood tides about every 25 hours. Tidal effects extend inland to about West Sacramento on the Sacramento River and to Vernalis on the San Joaquin River.

The law is crystal clear that riparian rights extend to lands contiguous to lakes and ponds and similar waterbodies just as they do to lands contiguous to flowing rivers and streams.

“It is not essential to a watercourse that the banks shall be unchangeable, or that there shall be everywhere a visible change in the angle of ascent, marking the line

between bed and banks. The law cannot fix the limits of variation in these and other particulars. As was said, in effect, by Curtis, J. (*Howard v. Ingersoll*, 13 How. 428), the bed and banks or the channel is in all cases a natural object, to be sought after not merely by the application of any abstract rules, but, 'like other natural objects, to be sought for and bound by the distinctive appearances it presents.' Whether, however, worn deep by the action of the water, or following a natural depression without any marked erosion of soil or rock; whether distinguished by a difference of vegetation or otherwise rendered perceptible, a channel is necessary to the constitution of a watercourse.

. . . We can conceive that along the course of a stream there may be shallow places where the water spreads and where there is no distinct ravine or gully. Two ascending surfaces may rise from the line of meeting very gradually for an indefinite distance on each side. In such case, if water flowed periodically at the portion of the depression, it flowed in a channel, notwithstanding the fact that, the water being withdrawn, the 'distinctive appearances' that it had ever flowed there would soon disappear." *Lux v. Haggin* (1886) 69 Cal. 255, 418 and 419.

The Delta Pool is wide where the tidal influence intersects the flow from the numerous tributaries and generally narrows as flow moves west becoming a very distinct single channel at Carquinez Strait.

Even without flow, the Delta pool is a water body to which riparian rights attach. In the case of *Turner v. James Canal Co.* (1909) 155 Cal. 82, the California Supreme Court addressed the question of riparian rights to Fresno Slough during the very considerable period of each year when there was no flow from the Kings River. At page 87, the Court states:

"The right of a riparian owner to the use of water bordering upon his land does not, as plaintiffs content, arise from the fact that the water is flowing, and that any part thereof taken from the stream is immediately replaced by water from the current above it. It comes from the situation of the land with respect to the water, the opportunity afforded thereby to divert and use the water upon the land, the natural advantages and benefits resulting from the relative positions, and the presumption that the owner of the land acquired it with a view to the use and enjoyment of those opportunities, advantages, and benefits. *Duckworth v. Watsonville, etc., Co.*, 150 Cal. 526, 89 Pac. 338. Out of regard to the equal rights of others whose lands may abut upon the same water, the law has declared, as will hereafter be more fully shown, that the use of the water for irrigation, so far as it affects the right of others similarly situated, must be reasonable, and must be confined to a reasonable share thereof; but, with this common limitation, the right to use water upon adjoining land applies as well to the water of a lake, pond, slough, or any natural body of water, by whatever name it may be called, as to a running stream."

At page 88, the Court concludes:

“As we have concluded that riparian rights do exist in a body of water not flowing, it is unnecessary to discuss the question of the things essential to a water course.”

Beginning at page 88 the court went on to include numerous citations of authority including a citation to (1 Farnham on Waters, Sec. 62, p. 278) as follows: “The principle upon which these rights are founded is equally applicable to all bodies of water, whether large or small, tidal or non-tidal.”

For the Delta, the water available for diversion from the Delta pool by pre-1914 and riparian water right holders includes water from the Bay and (in turn the Pacific Ocean) natural surface flow from the tributaries, the accretions from groundwater, artesian flows into Delta islands and channels, precipitation, return flow from upstream use of natural surface flow and below ground flow, return flow from power diversions, return flow from Delta diversions, physical solution flows, commingled water, water provided pursuant to agreements and water provided by reason of statutory entitlements.

Except perhaps in limited areas along the edges of the Delta due to siltation, the Delta channels are of sufficient depth and size that in the absence of river flow, water would always be available for diversion in sufficient quantities.

The Delta as defined in 12220 of the Water Code encompasses the tidal zone. With rising sea levels, the extent of the tidal zone is expected to increase. There are two high (flood) tides and two low (ebb) tides about every 25 hours. (See **Attachment H** - Representative reflection of tides.)

The tidal exchange in the Delta at the western edge is typically in the range of 330,000 cfs which can be contrasted to summer inflows in the range of 10,000 cfs and net Delta outflows in the range of 5,000 cfs. (See **Attachment I** page 21 from DWR 1993 Delta Atlas.)

In the June 1969 DWR Memorandum Report - the “Delta and the State Water Project” in describing the purpose and history of negotiations with Delta interests the Department explained:

“During the 1950’s the Department of Water Resources cooperated with the Bureau of Reclamation and the local Delta 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 quantity of water rather than quality. No resolution was reached in the Delta using this approach. **Actually, in the Delta, the question of quantity is of little concern, since the Delta is never short of water. If flow from the tributary streams were insufficient to meet Delta use, water from the Pacific Ocean would flow through the San Francisco Bay system and fill the Delta channels.**” (Emphasis added)

“Since water shortage in the Delta is not a problem, it was necessary to develop a quality “yardstick” to guide project operation in the Delta.”

(See **Attachment J**, pages 35 and 36 of excerpts from DWR Memorandum Report June 1969 titled The Delta and The State Water Project.)

The contract between the State of California Department of Water Resources and North Delta Water Agency for the Assurance of a Dependable Water Supply of Suitable Quality dated January 28, 1981, provides further confirmation of the unique physical setting of the Delta in that it has additional natural flow from the bay and ocean. The Contract provides agreement that:

“(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.” (See **Attachment K** - excerpt from said NDWA Contract.)

The projects fail to recognize the natural flows of water from the west which are comprised of Bay water which is a mixture of ocean water, precipitation, fresh water from tributaries flowing into the Bays, groundwater accretions, artesian flows and flow from other sources.

The argument that absent project operations water would not be present in the Delta channels is unsupported. Similarly unsupported is the contention that absent project operation Sacramento River water would not naturally be available in south Delta channels. Even today Georgiana Slough and Three Mile Slough directly contribute to Sacramento River flow to the south Delta in addition to the mix of Sacramento and other tributary water which enters the south Delta from the west through tidal action.

Prior to levee construction along the Sacramento River flow also appears to have entered the south Delta directly from the Sacramento River from what is now called Snodgrass Slough and what appears to have been another natural connection in the vicinity of the present Delta cross-channel. Additionally, Water Code section 12931 (Part of California Water Resources Development Bond Act) provides:

“For the purpose of this chapter the Sacramento-San Joaquin Delta shall be deemed to be within the watershed of the Sacramento River.” (Emphasis added)

Surely there can be no debate that the Delta consumed more water in its natural swamp and overflowed land condition than is consumed by way of farming of the Delta today.

Diversion of water is critical to sustaining farming in the Delta. Farming is the engine driving the Delta economy. With few exceptions, maintenance of levees and continuous drainage of the lands relies on funding from farming.

Without such drainage, the lands would become inundated by reason of seepage and rising groundwater or would experience substantially raised groundwater. The resulting condition would be a body of water or a highly vegetated area served by a high water table.

Evaporative losses from an open body of water and from riparian vegetation are much higher than from the same area subjected to farming.

Attachment L hereto is Table A-5 from DWR Bulletin 168 - October 1978, page A-10 showing the 1976-77 Estimated Crop Et Value for the Delta Service Area. For October 1976 through September 1977 the data shows:

Alfalfa	45.8 inches
Tomatoes	34.3 inches
Field Corn	33.8 inches
Riparian Veg and Water Surface	67.8 inches

California Water Plan Update 2009, Vol. 4 Reference Guide - Topic Crop Water Use, Article 19, contains the "Historical Estimates of Agricultural and Wetland Water Use in the San Joaquin-Sacramento River Delta" by Morteza N. Orang, Richard L. Snyder, Sara Sarreshteh.

The study included both uplands and lowlands and concluded:

"For the entire Delta, the Etc for the wetlands, cattails and tules was about 16% (1998), 20% (2000) and 22% (2001) higher than the agriculture-crop land-use group, which included irrigated pasture, alfalfa, all field crops, sugar beets, irrigated grain, rice, truck crops, tomato, orchard, vineyard and non-irrigated grain (Figure 7-9)."

See **Attachment M** which is page 7 from said study.

Curtailement of water diversions in the Delta will decrease or eliminate farming thereby resulting in substantially increased water loss due to evaporation.

The Department of Water Resources Investigation of the Sacramento-San Joaquin Delta Report No. 4 Quantity and Quality of Waters Applied To And Drained From the Delta Lowlands - July 1956 concluded as follows:

"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 than degraded the good quality Sacramento River water en route to the Tracy Pumping Plant."

The Delta is unique. It would appear that curtailment of Delta diversions could result in increased salinity degradation at the export pumps thereby adding to the negative impact to the projects and others that would result from their efforts.

The water projects and their export contractors make assertions that water to which they are entitled may be unlawfully diverted by Delta diverters yet they ignore the statutory obligations of the projects, including that:

“In 1959 the State Legislature directed that water shall not be diverted from the Delta for use elsewhere unless adequate supplies for the Delta are first provided.”
(Emphasis added) (See Water Code section 12200 et seq. and December 1960 DWR Report to the Legislature Bulletin 76 Excerpt in **Attachment N.**)

The water projects and their export contractors claim water which is commingled with water to which Delta diverters are entitled yet they make no attempt to meet their burden as required by law and rather seek to shift the burden onto those users of water in the Delta.

The applicable law which is most relevant is reflected in Water Code Section 7075 which provides:

“§ 7075. Reclamation of water

Water which has been appropriated may be turned into the channel of another stream, mingled with its water, and then reclaimed; but in reclaiming it the water already appropriated by another shall not be diminished. (Stats. 1943, c. 368, p. 1669, § 7075.)”

In Butte Canal & Ditch Co. v. Vaughn, 11 Cal. 143, the California Supreme Court made it clear that in cases of the commingling of water where it is difficult to determine with exactness the quantity of water which parties are entitled to divert:

“The burden of proof rests with the party causing the mixture. He must show clearly to what portion he is entitled. He can claim only such portion as is established by decisive proof. The enforcement of his right must leave the opposite party in the use of the full quantity to which he was originally entitled.”

The threshold question should be whether or not the projects and their export water contractors have any water in the Delta to which they are entitled which is being diverted by Delta diverters?

The next question is can such water to which the projects and their export contractors are entitled be reclaimed without diminution of the entitlement of Delta users?

The entitlement of Delta users includes statutory protections and rights as against the projects which are in addition to the traditional water rights.

Water stored or diverted in violation of the terms and conditions of permits and licenses or statutory requirements is not water to which the projects or their contractors are entitled.

Water is commingled throughout the system and exports from the Delta are surely a mix of water naturally in the Delta pool and numerous other sources, including natural flow from Suisun Bay.

In most reservoirs stored water is commingled with natural flow in the reservoir itself. Segregation of stored water from natural flow is complex. The already commingled stored water released from the originating reservoir must travel many miles to reach the Delta. As water passes down the river channels it is exposed to numerous diversions. Along the way water seeps, percolates and accretes between the river channels, adjoining lands and groundwater basins. Contributing flows occur from major and minor tributaries, from drainage systems, from precipitation and from groundwater. If the commingled water released from the originating reservoir reaches the Delta, it could go out as outflow or it may be dispersed through portions of the Delta depending greatly upon how the Delta cross channel and export pumps are being operated.

There are a number of statutes both State and Federal intended to protect and benefit Delta diverters as related to the federal Central Valley Project and State Water Project.

The Delta Protection Act of 1959 (WC 12200-12205) requires that the water needs of the Delta be given priority over exports by the SWP and CVP. The Act has been interpreted by DWR to provide: "In 1959 the State Legislature directed that water shall not be diverted from the Delta for use elsewhere unless adequate supplies for the Delta are first provided." (See **Attachment N.**) The Delta Protection Act of 1959 requires the SWP and CVP to provide salinity control and "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 . . ." (See WC 12201 and 12202.) In 1959 fishing was the predominant recreational use of the Delta. Since the commencement of SWP operation in the late 1960's, fish populations in the Delta have plummeted. The Water Quality Objectives define what is an adequate supply.

The 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 dated January 28, 1981, provides:

"(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."

“(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.”

The Watershed Protection Act (WC 11460 et seq.) prohibits the projects from directly or indirectly depriving the Delta and other areas of origin of an adequate supply. In pertinent part the Act provides:

“§ 11460. Prior right to watershed water

In the construction and operation by the department of any project under the provisions of this part a watershed or area wherein water originates, or an area immediately adjacent thereto which can conveniently be supplied with water therefrom, shall not be deprived by the department directly or indirectly of the prior right to all of the water reasonably required to adequately supply the beneficial needs of the watershed, area, or any of the inhabitants or property owners therein. (Added by Stats.1943, C. 370, p. 1896. Amended by Stats.1957, c. 1932, p. 3410, § 296.)

The Act also applies to the United States Department of Interior, Bureau of Reclamation. (See WC 11128.)

The interpretation of WC 11460 was explained in a letter dated February 17, 1945 to the Joint Committee on Rivers and Flood Control of the California State Legislature from the Acting Regional Director of the Bureau of Reclamation. The letter provided:

“The committee had asked the question: What is your policy in connection with the amount of water that can be diverted from one watershed to another in proposed diversions?” In stating the Bureau’s policy, Mr. Calland quoted section 11460 of the State water code, which is sometimes referred to as the county of origin act, and then he said: ‘As viewed by the Bureau, it is the intent of this statute that no water shall be diverted from any watershed which is or will be needed for beneficial uses within that watershed. The Bureau of Reclamation, in its studies for water resources development in the Central Valley, consistently has given full recognition to the policy expressed in this statute by the legislature and the people. The Bureau has attempted to estimate in these studies, and will continue to do so in future studies, what the present and future needs of each watershed will be. The Bureau will not divert from any watershed any water

which is needed to satisfy the existing or potential needs within that watershed. For example, no water will be diverted which will be needed for the full development of all of the irrigable lands within the watershed, nor would there be water needed for municipal and industrial purposes or future maintenance of fish and wildlife resources. (Emphasis added) (See **Attachment O.**)

In contrast to the protections for the Delta in Water Code 12200 et seq. Water Code Section 11460 when applied to portions of the watershed outside the delta arguably does not assure an adequate water supply to the watershed area by way of compelled allocation of CVP water provided pursuant to the Tehama - Colusa Canal Authority contract but rather precludes actions by the CVP and SWP from directly or indirectly depriving the protected area of the prior right to all of the water reasonably required to adequately supply the beneficial needs of the watershed, area, or any of the inhabitants or property owners therein.

In the Tehama-Colusa Canal Authority v. U.S. Department of Interior case, 721 F.3d 1086 (2013) the court confirmed rejection of the Authority contractor claim for preferential access to CVP contract water supply under the area of origin statutes citing the SWRCB rejection of such claim. In so doing the Court provided:

“The SWRCB interpreted CWC Section 11460 as protecting areas of origin, but with no guarantee that the water supply needs of the entire area of origin, or any particular waters users within the area of origin, would be met. Rather, CWC section 11460 protected water users within the area of origin against export appropriations. In other words, **CWC provided a guarantee that the SWRCB would not reject new applications in the area of origin due to unavailability of water for appropriation. Area of origin protection was secured by filing an application with the SWRCB and receiving a water rights permit with seniority vis a vis the state Department of Water Resources and the Federal Bureau of Reclamation as exporters.**” (Emphasis added)

The issue of area of origin use, pursuant to 11460, of already diverted and stored water subject to payment remains outstanding as to the SWP and likely still as to the CVP.

NEW APPLICATIONS TO THE SWRCB FOR WATER SOLEY TO MEET THE PRESENT AND FUTURE NEEDS WITHIN THE WATERSHEDS OF ORIGIN ARE CURRENTLY BEING OBSTRUCTED BY THE APPLICATION OF TERM
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Such obstruction is contrary to process cited above.

The subject recommendations should include a requirement that the SWRCB accept applications and grant permits for water to be used solely within the specific watershed area of origin with preference over SWP and CVP exports. There could be

conditional limitations as to diversion of water previously diverted and stored by the Projects. Such conditions could be conditioned on agreeable payment. Protective mechanisms should be instituted to prevent direct or indirect transfer or other depletion from groundwater or surface water offsetting the net gain towards meeting the present and future needs in the watershed from such permitted use. The protective mechanisms should apply to the SWP and CVP and any other exporter.

WATER QUALITY CONTROL PLAN OBJECTIVES PROVIDE MINIMUM LEVELS OF PROTECTION AND HAVE NOT BEEN PERIODICALLY UPDATED TO AVOID DEGRADATION

An adequate supply for the Delta is minimally provided by the Water Quality Control Plan Objectives. If exports from the Delta are to take place, especially those beyond the real needs for health and safety, then the SWP and CVP must meet the D-1641 Water Quality Objectives to satisfy their statutory obligations even if it requires stored water.

The SWP and CVP have failed to properly operate the projects so as to assure that water quality objectives, senior water rights and other senior obligations will be met in the expected reoccurrence of critically dry years and multiple years of drought. Instead, the projects have been operated to maximize exports from the Delta. The likely occurrence of multiple years of drought has been well documented and the basic planning for the SWP and CVP focused on the six years of drought during the period of 1929 through 1934. Climate change has for many years been predicted to increase the frequency of droughts. The reduced availability of surplus water to serve export needs has been known for many years and yet the projects have exported water knowing that the ability to meet water quality objectives would be jeopardized.

The Delta Protection Act of 1959 in WC 12200 specifically provides: “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.” The emergency authority shall not be used for favoring exports over needs within the Delta and other areas of origin except to meet true health and safety needs.

The degradation of water quality in the Delta adversely impacts agricultural, industrial, urban and recreational (including fish and wildlife) uses in the Delta and surrounding areas as well as areas served with exports from the Delta. The Delta Protection Act of 1959 was passed to prohibit the very wrongdoing which is now underway. Neither the Executive Director, the Deputy Director, the Delta Watermaster nor the State Water Resources Control Board has the authority to prefer export needs over those in the Bay-Delta except for true health and safety.

PL99-546 (HR3113) specifically provides:

“(b)(1) Unless the Secretary of the interior determines that operation of the Central Valley project in conformity with State water quality standards for the San Francisco Bay/Sacramento-San Joaquin Delta and Estuary is not consistent with the congressional directives applicable to the project, the Secretary is

authorized and directed to operate the project, in conjunction with the State of California water project, in conformity with such standards. Should the Secretary of the Interior so determine, then the Secretary shall promptly request the Attorney General to bring an action in the court of proper jurisdiction for the purposes of determining the applicability of such standards to the project.

(2) The Secretary is further directed to operate the Central Valley project, in conjunction with the State water project, so that water supplied at the intake of the Contra Costa Canal is of a quality equal to the water quality standards contained in the Water Right Decision 1485 of the State of California Water Resources Control Board, dated August 16, 1978, except under drought emergency water conditions pursuant to a declaration by the Governor of California. Nothing in the previous sentence shall authorize or require the relocation of the Contra Costa Canal intake.”

Section (b)(1) does not allow for the Bureau of Reclamation to operate the CVP without conforming to the State water quality standards for the San Francisco Bay/Sacramento-San Joaquin Delta and Estuary even if the Executive Director and SWRCB is willing to look the other way. (See **Attachment P.**)

There are specific processes and procedures for changes to Water Quality Control Plans including review by the United States EPA, which are not a part of the emergency process previously applied by the SWRCB.

Section (b)(1) is thus applicable and requires USBR and USF&WS compliance unless the Secretary of Interior makes a determination that compliance is inconsistent with congressional directives applicable to the project and then the Attorney General is to be requested to bring a legal action for a court determination of the applicability of the standards.

Section (b)(2) provides an additional constraint with regard to the water quality at the intake to the Contra Costa Canal. Even if the standards were determined by the court to not be applicable to the CVP, then the D-1485 water quality standards would be applicable to the intake of the Contra Costa Canal except under drought emergency water conditions pursuant to a declaration by the Governor of California.

In 2004 Congress passed another law to ensure that Delta water quality standards and objectives would be met.

PL 108-361 (HR 2828) in pertinent part provides:

“(D) Program to Meet Standards. -

- (i) In General. - Prior to increasing export limits from the Delta for the purposes of conveying water to south-of-Delta Central Valley Project contractors **or increasing deliveries through an intertie**, the Secretary shall, not later than 1 year after the date of enactment of this Act, in consultation with the Governor, develop and initiate implementation of a

project to meet all existing water quality standards and objectives for which the Central Valley Project has responsibility.” (Emphasis added) (See **Attachment Q.**)

Emergency or other actions including facilitating transfers are clearly for the purpose of increasing exports from the Delta or likely result in use of the intertie which to the extent such are for serving south-of-Delta Central Valley Project contractors would be directly contrary to the direction of Congress which was to assure that all existing (October 25, 2004) water quality standards and objectives would first be met.

Water storage projects typically store natural flow in the winter and spring. The winter and spring natural flows, except in wetter years, would provide flushing of salts from the rivers flowing into the Delta and from the Delta into the Bay such that salt balance in the soil can be maintained and adequate protection can be provided to fish and wildlife and other Delta water uses. This flushing action drives saline water farther out into the Bay thereby prolonging the availability of good water quality in the Delta pool. When the stored water is used within the watershed, the return flow is basically delayed return of natural flow. The improved summer flow is an offset or mitigation for reduced winter and spring flows. The balance is in effect a physical solution that advances the beneficial use of water.

The equity of such a physical solution is reflected in the statutory obligations of the SWP and CVP to the Delta including salinity control and in the conditions imposed on the water rights for such projects. Such statutory obligations require both mitigation and improvement.

The adverse impacts to Delta water supply and quality from State and Federal actions were clearly recognized. The near complete re-diversion of the Upper San Joaquin River to the south by way of the Friant Dam and Friant Kern canal deprived the Delta of the late spring and summer natural flow from the high Sierra snowmelt; the reverse flows and induced Bay salinity intrusion caused by export diversions; the increased salinity entering the San Joaquin River by reason of delivery of water to the west side of the San Joaquin River without a valley drain with an outlet to the ocean; the induced salinity intrusion from the Bay caused by channel enlargement for the Stockton and Sacramento ship channels, the reduced late spring and summer natural flows resulting from the State and Federal flood control projects; inducement of salinity intrusion by reason of planned permanent flooding of areas in the Delta which increase the tidal prism and the project inducement of upstream development are examples. All of the above have the result of degradation of water quality in the Delta for which the projects are responsible.

In addition to the mitigation or physical solution aspects driving the statutory commitments of the SWP and CVP to provide stored water to the Delta was the purpose of providing such salinity control to benefit a broad range of purposes. Such purposes include protection of water quality at the CVP Tracy export pumps, the SWP export pumping facilities at Clifton Court, the Contra Costa Water District intakes, the Montezuma Slough gates to serve the Suisun Marsh, and the North Bay Aqueduct. Protection of fish and wildlife, water quality in the bays and meeting project contractual commitments are also served.

There should be no dispute that the Delta Protection Act (Water Code Section 12200 et seq.) prohibits project exports from the Delta unless the Delta is first provided an adequate supply.

DWR Bulletin 76, December 1960, report to the Legislature provided:

“In 1959 the State Legislature directed that water shall not be diverted from the Delta for use elsewhere unless adequate supplies for the Delta are first provided.”
(See Attachment N)

The DWR and NDWA Contract provides:

“(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.”

In United States vs State Water Resources Control Board 182 Cal.App.3d 82 (1986) at page 139 the appellate Court provides:

“In 1959, when the SWP was authorized, the Legislature enacted the Delta Protection Act. (§§ 12200-12220.) The Legislature recognized the unique water problems in the Delta, particularly ‘salinity intrusion,’ which mandates the need for such special legislation ‘for the protection, conservation, development, control and use of the waters in the Delta for the public good.’ (§ 12200.) The act prohibits project exports from the Delta of water necessary to provide water to which the Delta users are ‘entitled’ and water which is needed for salinity control and an adequate supply for Delta users. (§§ 12202, 12203, 12204.)

But the crucial question left unanswered by the protective legislation is exactly what level of salinity control the projects must provide . . .”

SWRCB D-1485 at page 9 provides:

“The Delta Protection Act accords first priority to satisfaction of vested rights and public interest needs for water in the Delta and relegates to lesser priority all exports of water from the Delta to other areas for any purpose.”

The level of salinity control the projects must provide is now set by federal statute, SWRCB water quality standards and contracts such as those for export and the contract with the North Delta Water Agency.

PL-99-546 (HR 3113) October 27, 1986, put to rest the Congressional intent as to the level of salinity control obligated by the CVP and the question as to any related payment to the CVP. For meeting water quality standards in D-1485 the cost is to be allocated among the project purposes in accordance with existing reclamation law and policy - water and power contractors. The costs for complying with State water quality standards above those standards is to be non-reimbursable. (See **Attachment P**)

Also relevant to the matter of application of the Watershed Protection Act (Water Code 11460 et seq.) and Delta Protection Act of 1959 (Water Code 12200 et seq.) is the April 13, 1984 113 page Superior Court decision in the above referenced case of United States v State Water Resources Control Board case. Eight separate cases were coordinated into Judicial Council Coordination Proceeding No. 548. The parties fell into nine groups: (1) the Board – SWRCB, (2) Delta industries, (3) the central Delta riparians, (4) the south Delta riparians, (5) the U. S. Bureau of Reclamation (the U.S.), (6) the federal contractors, (7) the California Department of Water Resources, (8) the state contractors, and (9) the Contra Costa municipal users. The court addressed the Delta water users’ “inchoate right to ‘recapture’ water being exported by the state and federal projects” under the Watershed of Origin Statute and Delta Protection Act. The court generally concluded that perfection of the right to recapture water being exported would require a Delta user to obtain an appropriation permit and a contract to pay for the recaptured water that was “developed by the projects and that was released specifically for his benefit”. Specific to the payment issues the court provided that “Delta users need not pay for salinity control water even if they are incidentally benefited unless the water is released specifically for their benefit”, “Delta water users need not pay for the enhanced water quality that results from water released by the projects to maintain adequate water quality at the export pumping stations”, “Delta users need not pay for the enhanced water quality resulting from the release of abandoned water”, and “Delta users need not pay for the enhanced water quality resulting from water released to preserve or enhance fish or wildlife resources”. **Attachment R** hereto are excerpts from such Superior Court decision.

It is critical to any water right curtailment effort to properly recognize and allow perfection of the Watershed of Origin rights through the SWRCB permit process. The quantification of what is really validly Project “stored water“ and natural flow at any particular location needs to be more responsibly addressed. Curtailment should not be applied without affording procedural due process.

The SWP and CVP Obligation to Provide Salinity Control for the Delta Was Supported by Many Factors

The importance of agricultural production from the Delta was of great importance and avoidance of the 1931 salinity intrusion and other detrimental intrusions was critical. It was recognized that diverting the San Joaquin River Flow at Friant would deprive the Delta of much of the historical flows of high quality Sierra snow melt. It was recognized that export pumps

would create an additional draw of water from the Bay that needed to be offset to protect Delta water quality including water quality at the export pumps. It was recognized that channels were enlarged in the Western Delta for flood control and navigation and that such induced salinity intrusion. It was also recognized that the projects would as intended induce greater use of water in the watershed thus reducing flow through the Delta. The policy was clearly intended to meet the present and future needs for full development within the Delta and other areas of origin and only export surplus water. The logic of not developing arid lands by depriving areas near the water supply holds true today.

The water availability analysis incorporates Term 91 which has been wrongfully applied to prevent those within the watershed from securing Post 1914 water rights for meeting needs within the watershed.

As currently applied if one drop of stored water is released to meet Project obligations to meet water quality standards, the remainder of natural flow and recapture of water previously for export is precluded from appropriation for use in the watershed. While the Projects should be insulated from the adverse impacts of competing exports of water the Project obligations under Water Code Sections 11460 et seq. and 12200 et seq. should not be circumvented.

The water availability incorporates the 55 gallon per person per day priority which is uncertain as to application to real health and safety needs.

As currently applied it is used to justify increased export pumping from the Delta. The export pumps supply water into huge multi-purpose aqueducts and reservoirs which commingles water for multiple purposes including growing cannabis in city warehouses, water features in the desert etc. The SWRCB has programs which are directed at meeting the needs of the specifically affected people. The exception should be eliminated from the regulation.

879.2(a) providing that diversion or use in violation of the Article constitutes an unreasonable use of water has no supporting evidence and should not be a part of a regulation. Similarly the conclusion in (c) as to trespass should not be a part of a regulation.

These are legal conclusions which for due process purposes require factual determinations from an adjudicatory hearing.

The penalties referenced in 879.2 (d) are discriminatory and disproportionate to any particular harm. The State and Federal Government are water right violators who would be unaffected by such penalties and a usually given a political pass.

These penalties should be revised to be equally effective and comparable to those applied to state and federal water right holders.

878 Non-Consumptive Uses introduces uncertainty and some provisions are inconsistent with water right priority and law.

Return of water to a different stream or point on a stream or different time could significantly impact a downstream diverter. (a), (b) and (d) should be eliminated or be further conditioned on no downstream diverter or prospective diverter being adversely impacted. As to (c) this does not appear to be appropriate as a regulation. The exemptions for instream flow for the benefit of fish and wildlife and the exemption for non- consumptive uses lack definition and are outside the realm of water right priority. Many Delta and other senior water right diversions serve environmental purposes. Wildlife friendly agricultural practices including winter flooding also provide benefits to waterfowl. Farmland, ditches and canals all provide habitat for terrestrial species. Alfalfa for Swainson Hawks and corn land for Sandhill Cranes should not be junior to some undefined instream use.

879 Reporting. The scope of information requests is overly broad. The time deadlines for response are unnecessarily short and are without sufficient justification.

Penalties are excessive and unrelated to any harm caused.

The regulation is unnecessary, ambiguous, and overly broad and designed to favor SWP and CVP exports over senior water rights. It should be rejected.

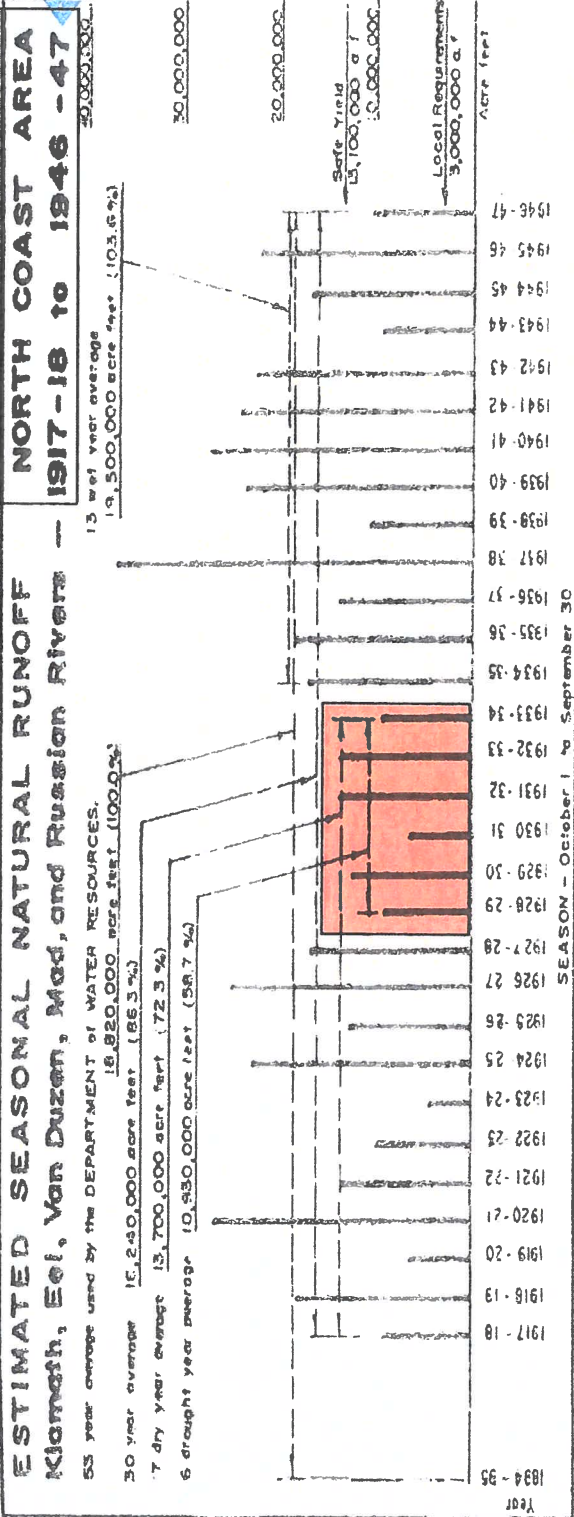
Respectfully submitted,



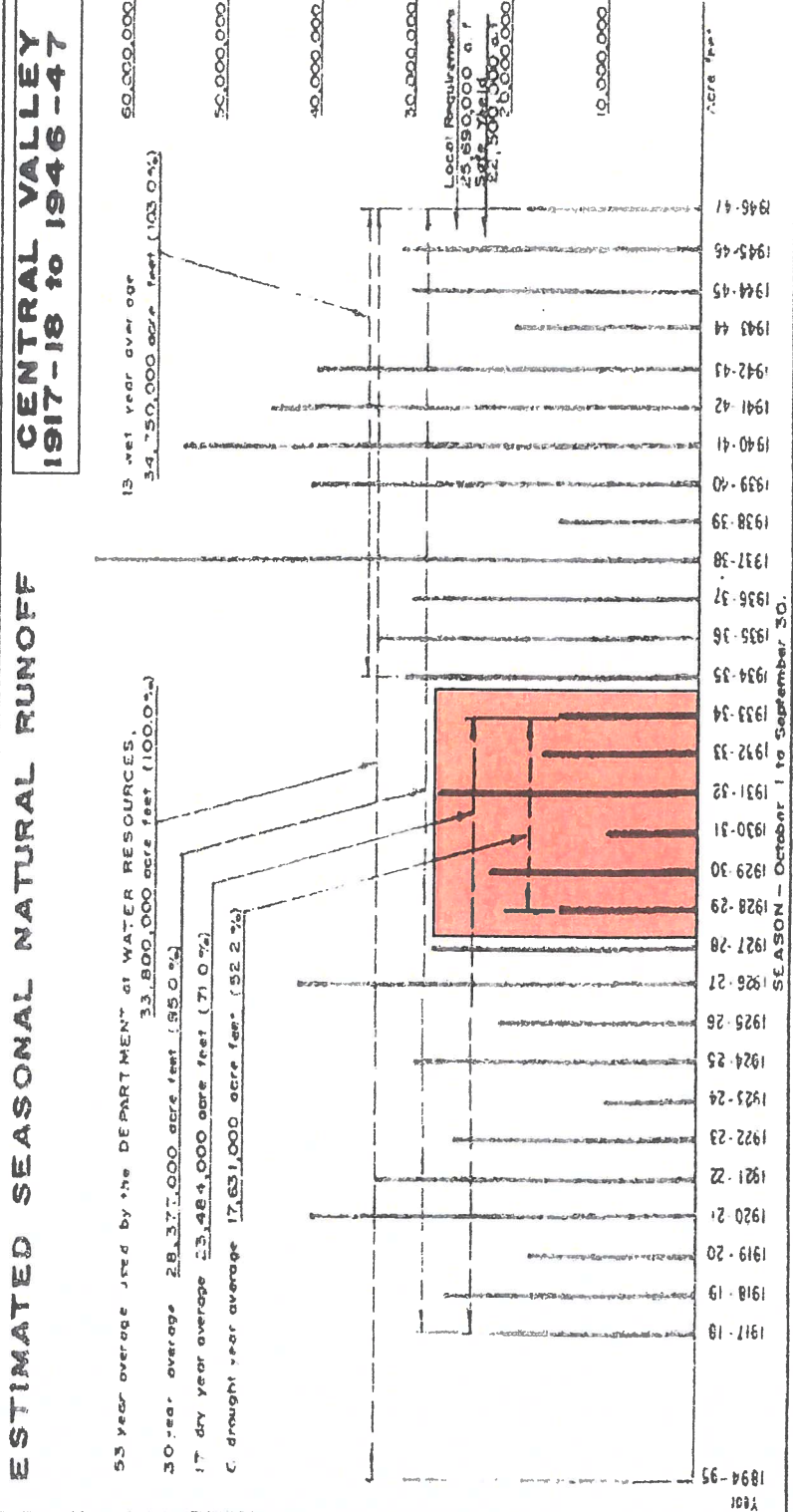
Dante John Nomellini Sr

WEBER FOUNDATION STUDIES

Surplus
7,930,000 AF/ Yr



SHORTAGE
8,049,000 AF/ Yr





Report to the Legislature on the 2012-2016 Drought

As Required by Chapter 340 of 2016

March 2021

Executive Summary

California's drought between Water Years 2012 and 2016 was one of the most severe in state history. A string of five dry winters left some rural communities without water, interrupted surface water deliveries to some farmers in the Sacramento and San Joaquin valleys for two consecutive years, disrupted thousands of farming jobs, pushed some fish populations toward extinction, and created conditions that fueled some of the most catastrophic wildfires in state history.

The State response included actions not taken since the short but intense drought of 1976–1977. For example, water right administrators curtailed thousands of diversions on the mainstem Sacramento and San Joaquin rivers in order to protect fish and wildlife and senior water right holders.

Distinctive features of this drought included an unprecedented State response to drinking water problems associated with small water systems and private wells, mandatory state-imposed urban water use reduction, recognition of the cumulative impacts of vast land subsidence in the San Joaquin Valley, massive tree mortality in the central and southern Sierra Nevada, and greatly increased wildfire activity and harmful algal blooms.

The 2012–2016 drought was the latest of five severe droughts to grip the state in the last 120 years. It unfolded in a context of record statewide temperatures, which exacerbated the impacts of water shortage, setting new markers for extreme conditions. The Sierra Nevada snowpack in 2015, for example, was the lowest on record.

Based on statewide precipitation, 2012–2015 were the four driest consecutive years on record. The single year 2014 was the third driest on record.

The drought revealed some strengths in the State's largely decentralized systems for managing water. Large urban water districts that had previously invested to diversify their supply sources and build new storage handled the drought without major disruption, and Californians responded heartily to the Governor's call for a reduction in water use of at least 25 percent.

But 2012–2016 showed serious problems, too. Water deliveries by the State's two largest water projects fell to unprecedentedly low levels. Growers turned to groundwater to make up the difference, and heavy pumping triggered record declines in groundwater levels. This accelerated land subsidence in parts of the San Joaquin Valley that in turn continued to damage water supply and flood risk management infrastructure.

Groundwater pumping by growers also contributed to the stranding of hundreds of wells used by individual families and small water systems. Faucets ran dry for some residents in rural communities, and at the drought's peak, the State was spending about half a million dollars a month for bulk and bottled water in these communities. Farmers followed an estimated 500,000 acres of farmland, and the State delivered more than two million boxes of food to community food banks in counties with the highest drought-related unemployment due to agricultural job losses.

The impact of record warm temperatures on marine and freshwater fisheries cannot be overstated. The combination of elevated temperatures and low precipitation harmed cold-water fisheries in many areas and also challenged water project operations to protect the fisheries. Wildlife managers conducted hundreds of separate rescues of stranded, native fish. A record number of young hatchery salmon were trucked directly to the ocean to avoid

hazardous stream conditions. On the upper Sacramento River below Shasta Dam, 95 percent of winter-run Chinook salmon production was lost in both 2014 and 2015 due to elevated temperatures. Wildlife managers imposed a record number of closures of commercial and recreational fisheries.

State leaders enacted several major legislative and regulatory changes during or after the 2012–2016 drought. These changes:

- » require local agencies to bring overdrafted groundwater basins into sustainable conditions by 2042;
- » establish new standards for indoor, outdoor, and industrial use of water;
- » fund solutions for disadvantaged communities lacking access to safe drinking water;
- » increase the frequency of water use reporting;
- » give the State authority to order failing public water systems to consolidate with better-run systems; and
- » tighten landscape efficiency standards for new developments.

Implementation of these laws and regulations is underway and should help California cope with extended dry conditions in the future. But there is still more to do. Recent experience makes clear that effective response depends heavily on capacity built before drought deepens. That includes reducing the drought vulnerability of water users and ecosystems, making key policy decisions in advance, improving hydroclimate forecasting to provide longer lead times for decision-making, having at hand the information necessary to make well-informed decisions,

and creating the capacity to communicate effectively across governments and to the public about a rapidly changing situation.

The recommendations for State action in this report include providing longer lead times for State financial assistance to local agencies, dedicating staff to ongoing drought preparedness and response work, better accounting for wildlife needs before and during drought, improving the quality and timeliness of forecasting and data, and restoring forest health in upper watersheds. Some recommendations for State action in this report are narrow, others are broad, but all fit within the Newsom Administration's effort to address long-standing water problems and strengthen California's ability to cope with a changing climate.

- » The Water Board should seek opportunities to streamline water rights enforcement processes for protection of senior water rights holders. Earlier notices of likely unavailability of water under the diverter's priority, combined with adoption of regulations setting curtailment requirements, may help.
- » Longer lead times are needed for effectively administering curtailments on the State's major river systems, and for supporting water rights holders' decisions to trigger temporary transfers or secure alternative supply sources.
- » Dedicated State staff are needed to support ongoing drought planning and preparedness work, and these resources could be used during droughts to form the core of a larger drought response team.
- » The Water Board should continue long-term planning efforts, including efforts to develop and implement instream flow objectives for the reasonable protection of beneficial uses, including fish and wildlife, and include drought provisions in these planning processes to the extent possible.

Water Supply

- » The Water Board should continue to pursue development of a more proactive temperature management plan for Reclamation's Shasta Dam, to be developed early in the season before delivery decisions are made, in collaboration with Reclamation and in consultation with other resource agencies.
- » Continue and expand investments to improve sub-seasonal to seasonal precipitation forecasting ability. Continue support for leading-edge remote sensing

technologies for monitoring high-elevation snowpack to improve snowpack runoff forecasting.

- » Invest in improved information technology to enable State agencies to take advantage of available opportunities to use satellite-based remote sensing data to estimate evapotranspiration and water use.
- » Develop a tool for communicating the status of drought and statewide water supplies that can be easily understood by a general audience.
- » Prior to drought, water suppliers that have received State emergency assistance in multiple droughts should be a special focus for drought preparedness assistance or technical, managerial, and financial capacity review.
- » Regional water supply security in times of drought depends upon a diversified portfolio of supply sources. These sources will vary by region, but water use efficiency, recycling, and stormwater capture all can play important roles in building drought resilience. State policies and investments should continue to encourage such projects.

Water Quality

- » Implement AB 834 and create an effective statewide system for monitoring, reporting, and tracking harmful algal blooms. Statewide programs should focus on minimizing erosion, fertilizers, and other nutrient-rich nonpoint sources of pollution.

Fish and Wildlife

- » Allocate additional staff resources for drought preparedness, environmental resilience actions, technical support, and communication.

A photograph of a dry reservoir with exposed rocks and a clear blue sky. The foreground is filled with large, rounded, reddish-brown rocks. In the middle ground, a small pool of water is visible, surrounded by more rocks. The background shows a range of hills under a clear blue sky.

FEBRUARY 2015

California's Most Significant Droughts:

Comparing Historical and Recent Conditions

State of California | California Department of Water Resources

Exhibit C

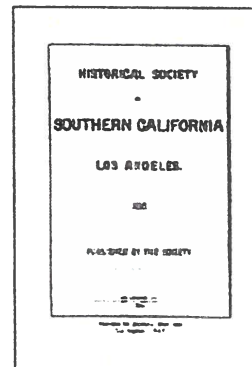
Table 2.1: Dry Periods in Combined Reconstructed and Instrumental Periods

Klamath River at Keno		Sacramento River Runoff		San Joaquin River Runoff	
Years	Length, years	Years	Length, years	Years	Length, years
1515-1522	8	921-924	4	946-950	5
1540-1543	4	945-950	6	977-981	5
1547-1552	6	975-981	7	1072-1075	4
1578-1582	5	1072-1075	4	1143-1148	6
1592-1597	6	1130-1136	7	1155-1158	4
1642-1646	5	1143-1148	6	1172-1177	6
1648-1665	21	1150-1158	9	1210-1213	4
1738-1744	7	1170-1177	8	1233-1239	7
1756-1761	6	1233-1239	7	1294-1301	8
1764-1767	4	1292-1301	10	1395-1402	8
1775-1779	5	1390-1393	4	1407-1410	4
1783-1787	5	1395-1400	6	1425-1428	4
1792-1798	7	1407-1410	4	1450-1461	12
1843-1846	4	1425-1432	8	1463-1466	4
1848-1852	5	1451-1457	7	1471-1483	13
1873-1876	4	1475-1483	9	1505-1508	4
1880-1884	5	1515-1521	7	1518-1523	6
1912-1915	4	1540-1543	4	1540-1545	6
1917-1920	4	1569-1572	4	1569-1572	4
1924-1935	12	1578-1582	5	1578-1582	5
1937-1992	6	1592-1595	4	1592-1595	4
		1636-1639	4	1629-1632	4
		1645-1648	4	1645-1648	4
		1652-1655	4	1652-1655	4
		1753-1760	8	1688-1691	4
		1780-1783	4	1753-1757	5
		1783-1846	4	1780-1783	4
		1856-1859	4	1793-1796	4
		1917-1922	6	1843-1846	4
		1926-1935	10	1855-1859	5
		1946-1951	6	1928-1931	4
		1959-1962	4	1946-1950	5
		1987-1992	6	1959-1962	4
				1987-1992	6
				2000-2004	5

Data courtesy of Dave Meko, University of Arizona

The Medieval Climate Anomaly

The Medieval Climate Anomaly in North America (sometimes called the medieval warm period or medieval climate optimum) is considered to span from as early as about 800 AD to as late as 1300 AD depending on the specific location. The warmer (and in some places, drier, climate) has been linked with historical events such as Norse settlement of Greenland and Iceland and changing settlement patterns in some Southwestern ancestral Pueblo communities whose agricultural production may have been affected by drought conditions. This time period is associated with severe droughts in the Southwest and California. Paleoclimate data and climate modeling suggest that this period was characterized by cool surface waters in the eastern Pacific Ocean, or La Niña-like conditions (e.g., Seager et al. 2007).



The Great Drought of 1863-64

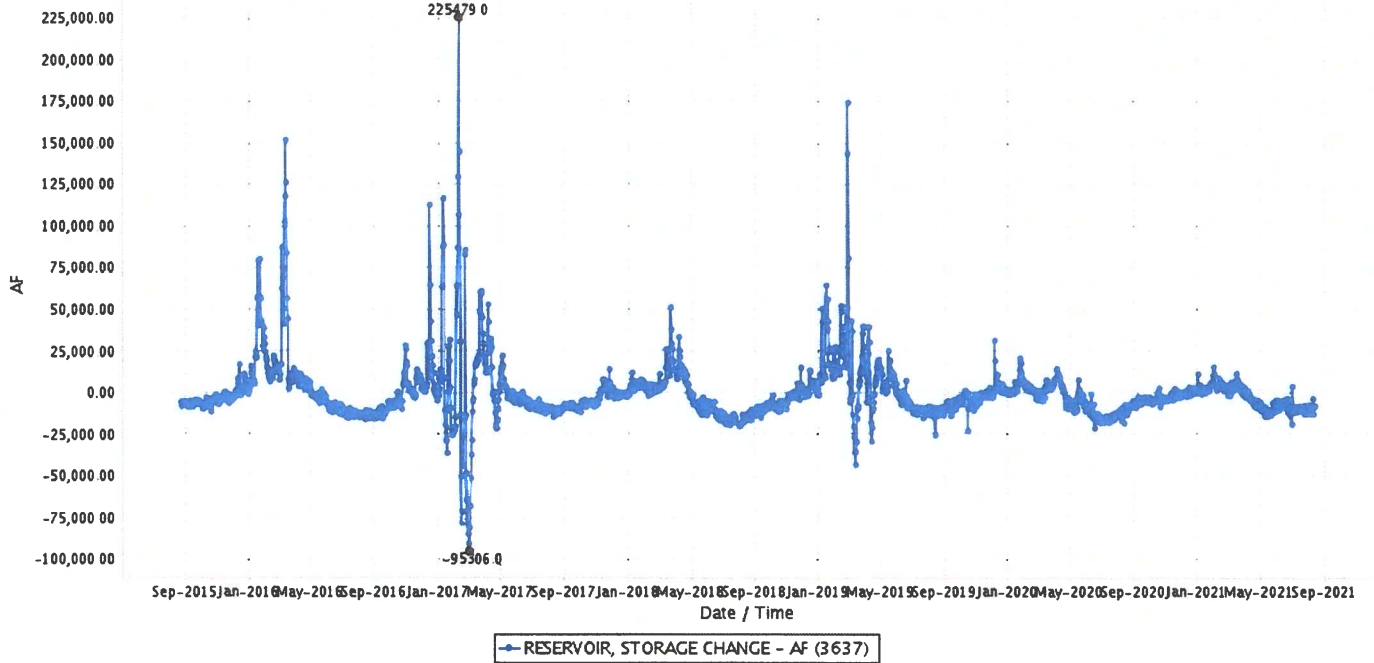
An excerpt from *Exceptional Years: A History of California Floods and Droughts* J.M. Guinn, 1890

1862-63 did not exceed four inches, and that of 1863-64 was even less. In

the fall of 1863 a few showers fell, but not enough to start the grass. No more fell until March. The cattle were dying of starvation... The loss of cattle was fearful. The plains were strewn with their carcasses. In marshy places and around the cienegas, where there was a vestige of green, the ground was covered with their skeletons, and the traveler for years afterward was often startled by coming suddenly on a veritable Golgotha—a place of skulls—the long horns standing out in defiant attitude, as if protecting the fleshless bones.

SHASTA DAM (USBR) (SHA)

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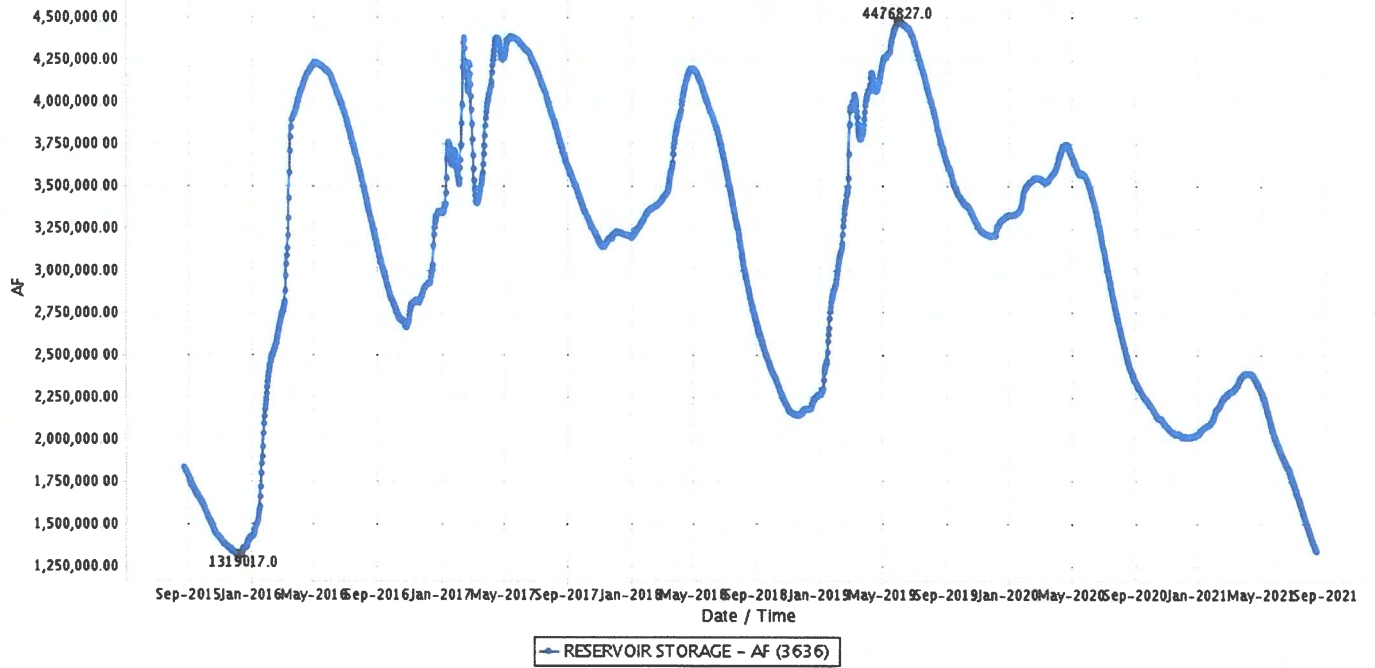
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[Plot all SHA Sensors](#) | [Real-Time SHA Data](#) | [SHA Data](#) | [Daily SHA Data](#) | [Show SHA Map](#) | [SHA Info](#)

Plot from ending date: 08/14/2021 14:57 Span: 2184 days

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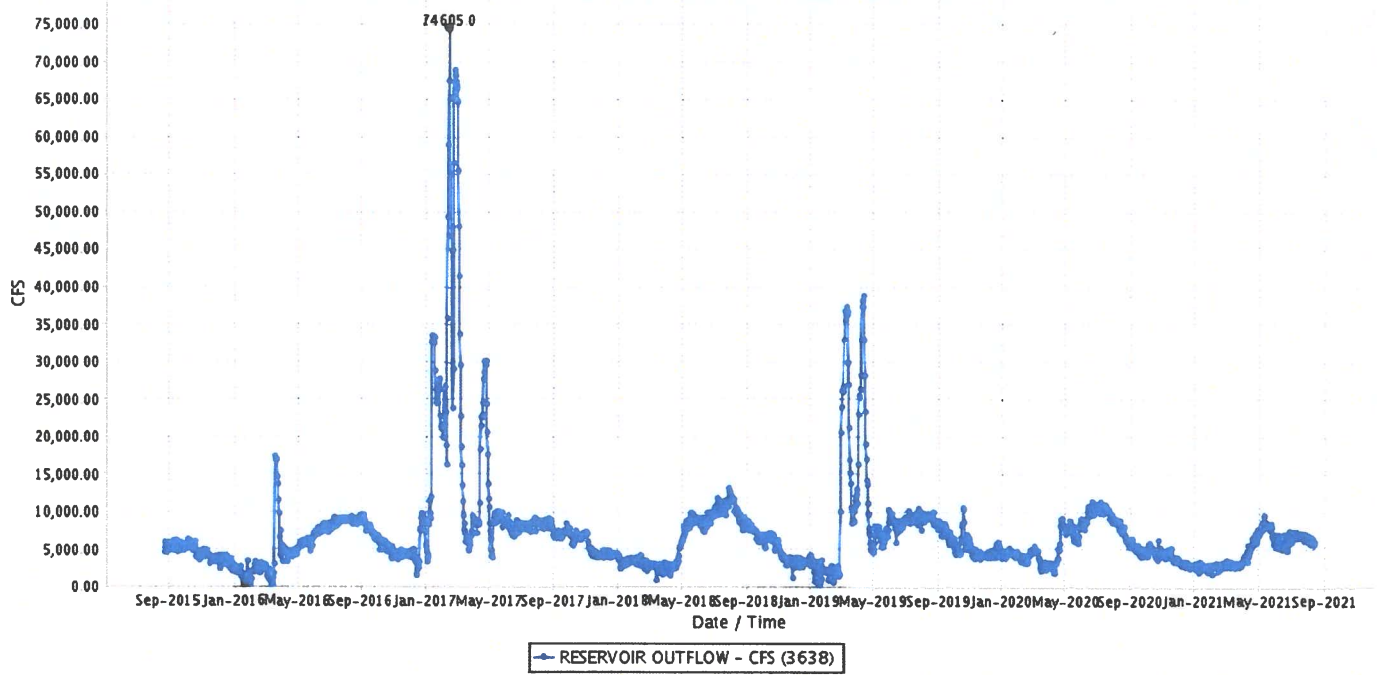
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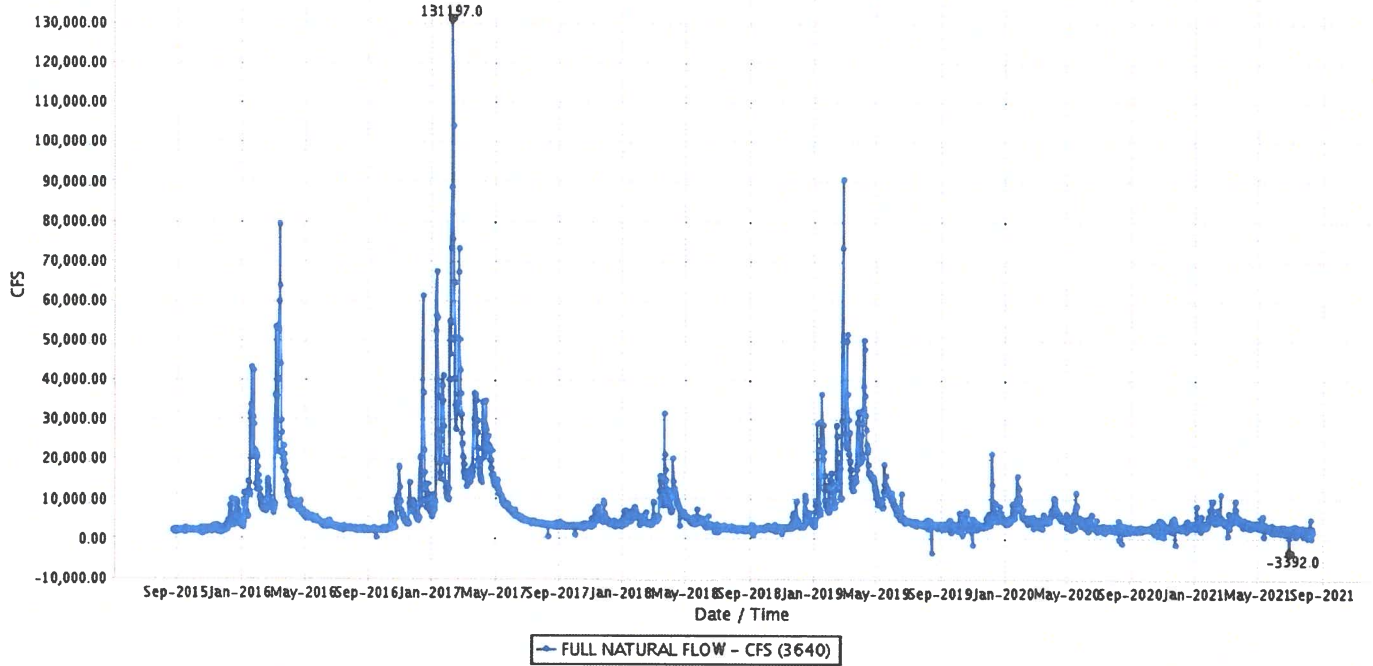
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[Plot all SHA Sensors](#) | [Real-Time SHA Data](#) | [SHA Data](#) | [Daily SHA Data](#) | [Show SHA Map](#) | [SHA Info](#)

Plot from ending date: 08/14/2021 14:40 Span: 2184 days

SHASTA DAM (USBR) (SHA)

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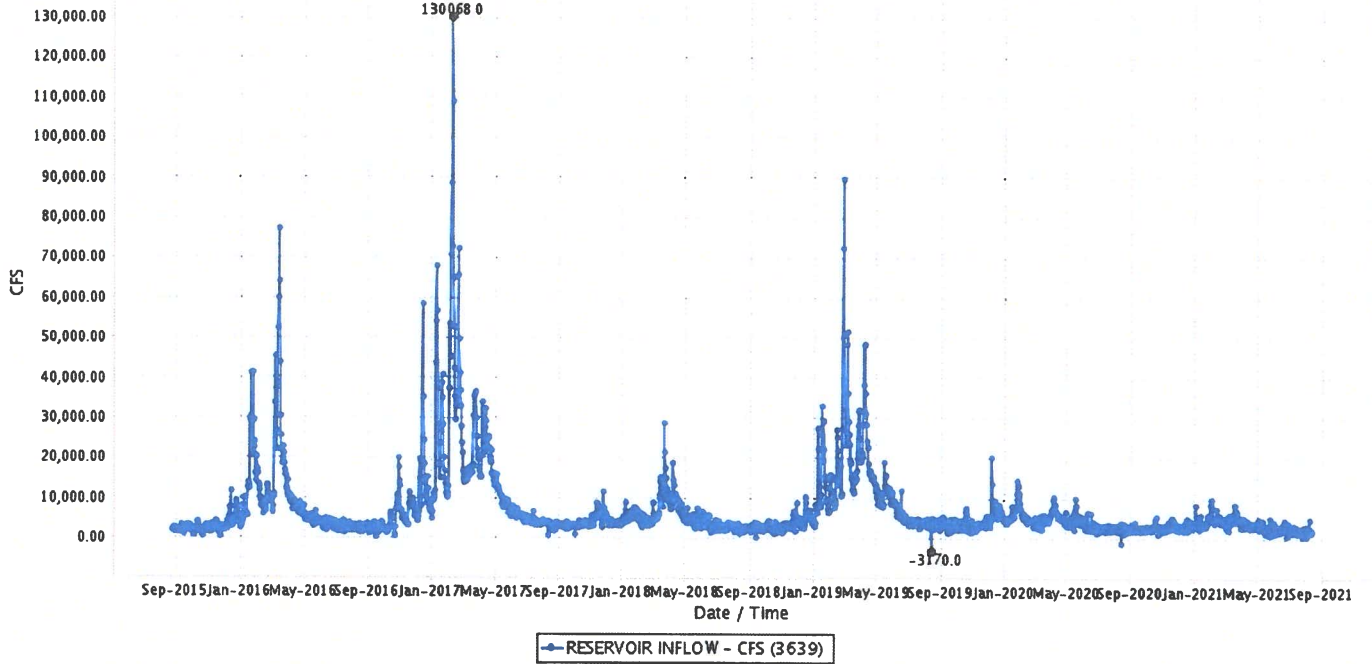
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[Plot all SHA Sensors](#) | [Real-Time SHA Data](#) | [SHA Data](#) | [Daily SHA Data](#) | [Show SHA Map](#) | [SHA Info](#)

Plot from ending date: 08/14/2021 14:32 Span: 2184 days

SHASTA DAM (USBR) (SHA)

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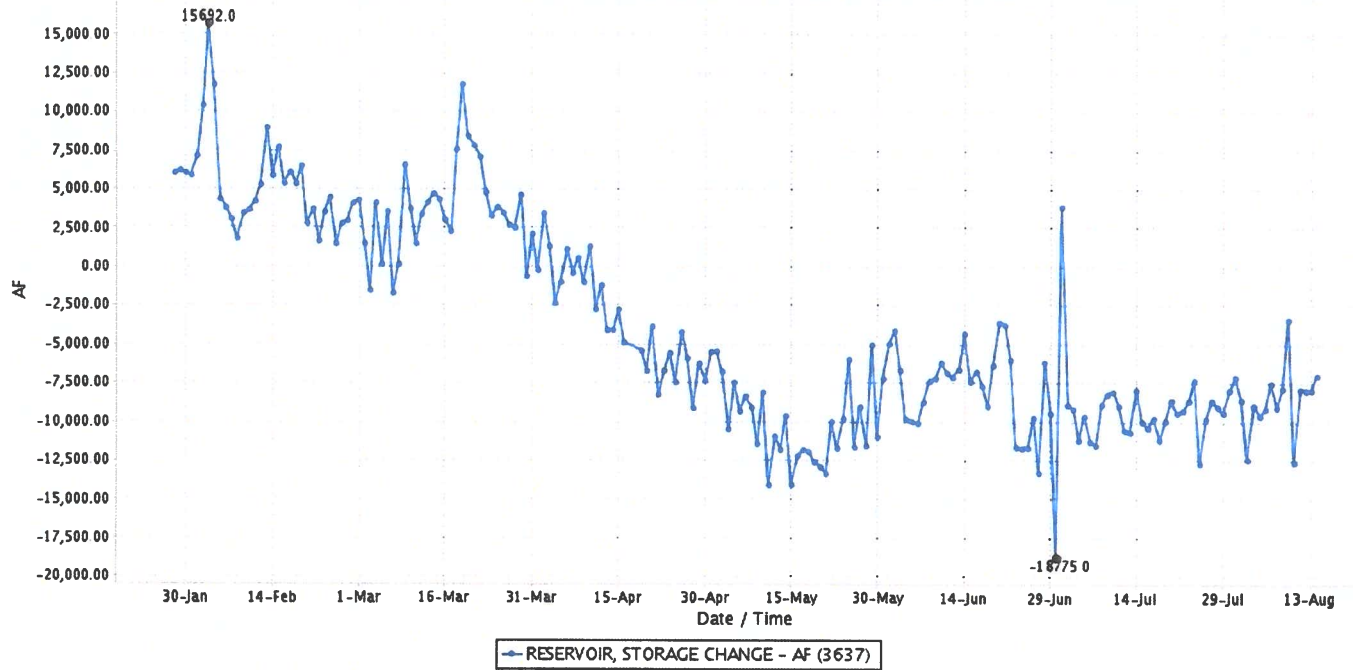
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[Plot all SHA Sensors](#) | [Real-Time SHA Data](#) | [SHA Data](#) | [Daily SHA Data](#) | [Show SHA Map](#) | [SHA Info](#)

Plot from ending date: 08/14/2021 14:34 Span: 2184 days

SHASTA DAM (USBR) (SHA)

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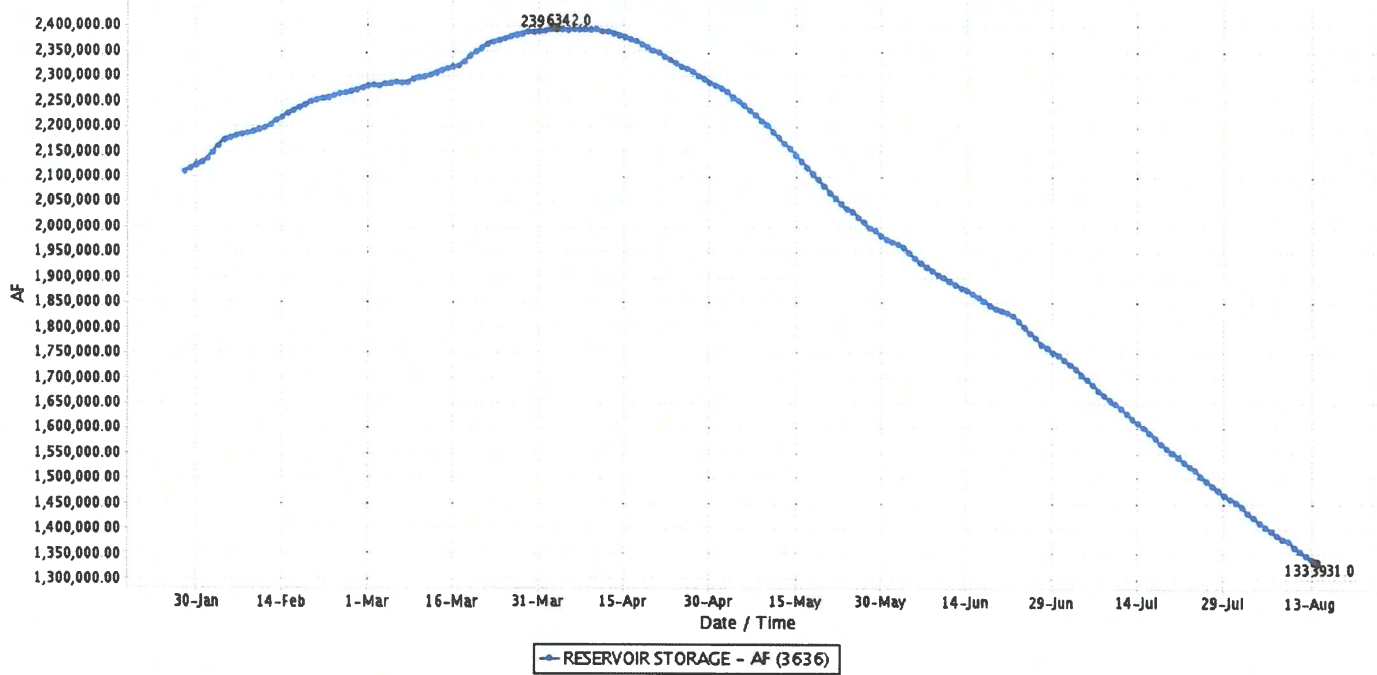
Generated on Sun Aug 15 13:35:35 PDT 2021

[Plot all SHA Sensors](#) | [Real-Time SHA Data](#) | [SHA Data](#) | [Daily SHA Data](#) | [Show SHA Map](#) | [SHA Info](#)

Plot from ending date: 08/15/2021 13:35 Span: 200 days

SHASTA DAM (USBR) (SHA)

Date from 01/27/2021 13:36 through 08/15/2021 13:36 Duration : 199 days
Max of period : (04/03/2021 00:00, 2396342.0) Min of period: (08/14/2021 00:00, 1333931.0)



Generated on Sun Aug 15 13:36:50 PDT 2021

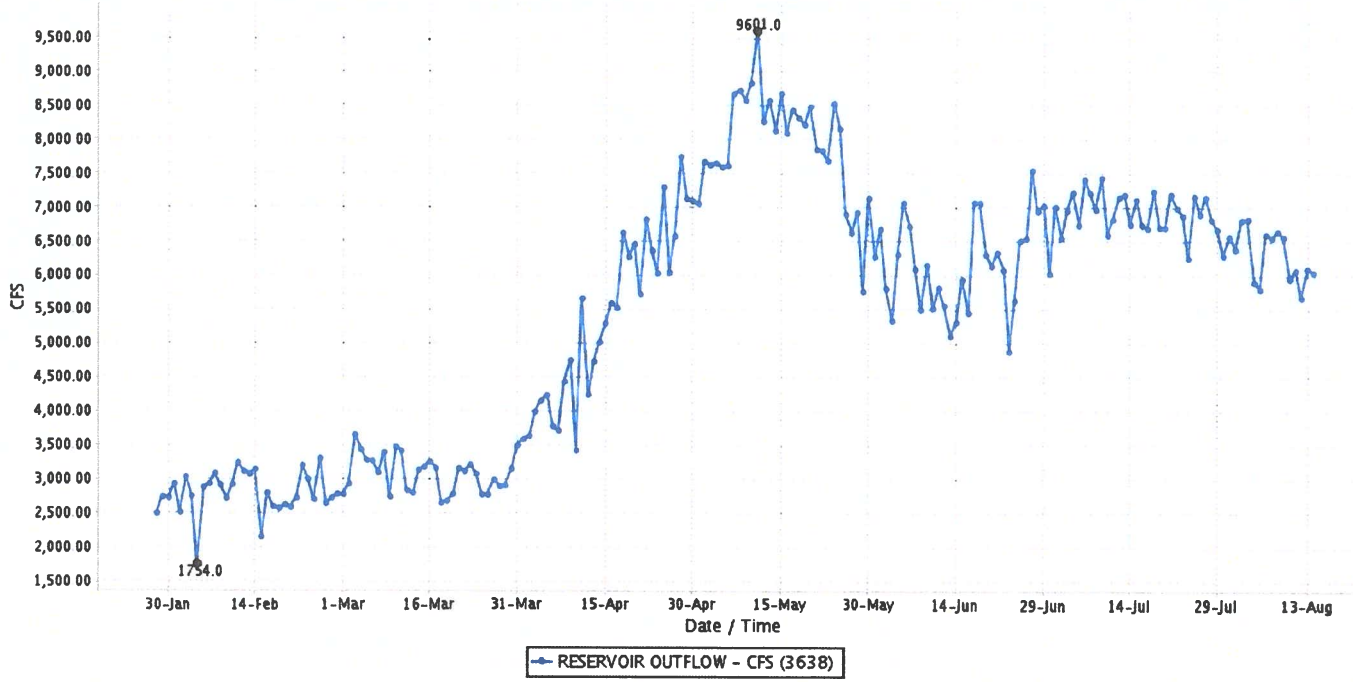
[Plot all SHA Sensors](#) | [Real-Time SHA Data](#) | [SHA Data](#) | [Daily SHA Data](#) | [Show SHA Map](#) | [SHA Info](#)

Plot from ending date: 08/15/2021 13:36 Span: 200 days

SHASTA DAM (USBR) (SHA)

Date from 01/27/2021 10:55 through 08/15/2021 10:55 Duration : 199 days

Max of period : (05/11/2021 00:00, 9601.0) Min of period: (02/04/2021 00:00, 1754.0)



Generated on Sun Aug 15 10:55:57 PDT 2021

[Plot all SHA Sensors](#) | [Real-Time SHA Data](#) | [SHA Data](#) | [Daily SHA Data](#) | [Show SHA Map](#) | [SHA Info](#)

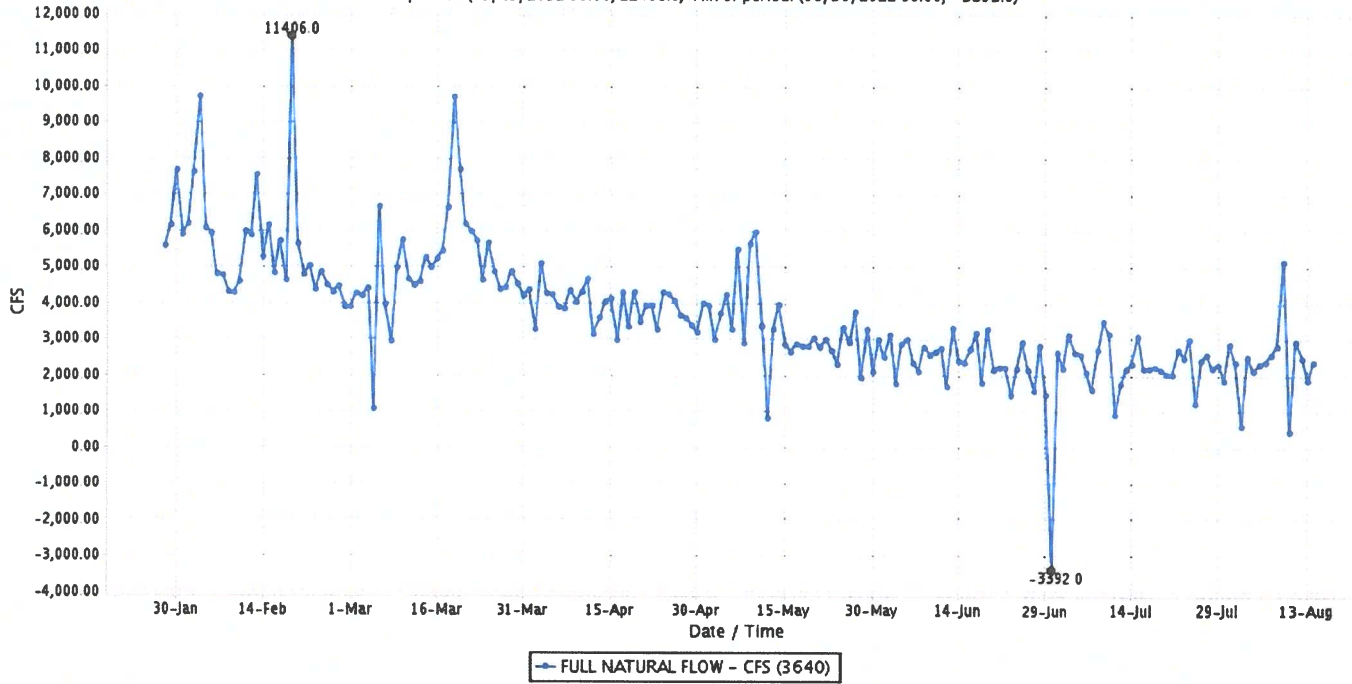
Plot from ending date: 08/15/2021 10:55

Span: 200

days

SHASTA DAM (USBR) (SHA)

Date from 01/27/2021 10:38 through 08/15/2021 10:38 Duration : 199 days
Max of period : (02/19/2021 00:00, 11406.0) Min of period: (06/30/2021 00:00, -3392.0)



Generated on Sun Aug 15 10:39:11 PDT 2021

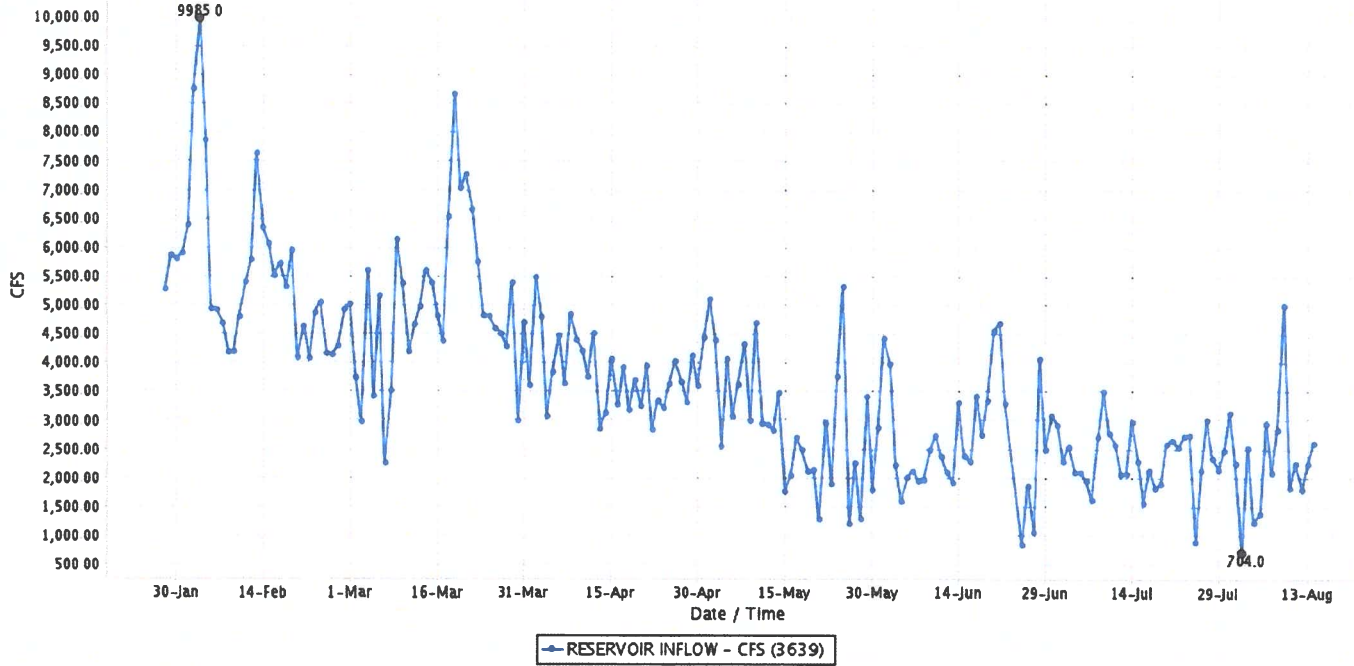
[Plot all SHA Sensors](#) | [Real-Time SHA Data](#) | [SHA Data](#) | [Daily SHA Data](#) | [Show SHA Map](#) | [SHA Info](#)

Plot from ending date: 08/15/2021 10:38 Span: 200 days

SHASTA DAM (USBR) (SHA)

Date from 01/27/2021 10:52 through 08/15/2021 10:52 Duration : 199 days

Max of period : (02/03/2021 00:00, 9985.0) Min of period : (08/02/2021 00:00, 704.0)



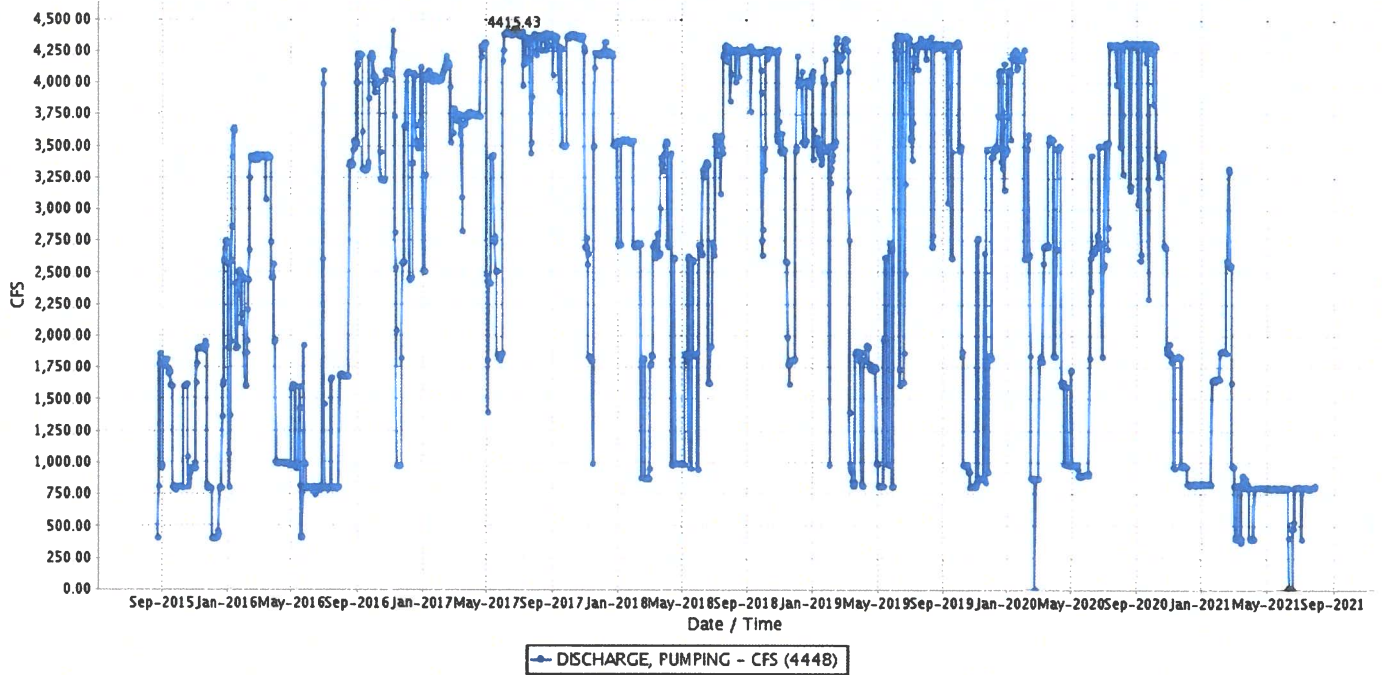
Generated on Sun Aug 15 10:52:56 PDT 2021

[Plot all SHA Sensors](#) | [Real-Time SHA Data](#) | [SHA Data](#) | [Daily SHA Data](#) | [Show SHA Map](#) | [SHA Info](#)

Plot from ending date: 08/15/2021 10:52 Span: 200 days

TRACY PUMPING PLANT (TRP)

Date from 08/22/2015 14:59 through 08/14/2021 14:59 Duration : 2184 days
Max of period : (06/23/2017 00:00, 4415.43) Min of period: (06/11/2021 00:00, 0.0)



Generated on Sat Aug 14 15:00:04 PDT 2021

[Plot all TRP Sensors](#) | [Real-Time TRP Data](#) | [TRP Data](#) | [Daily TRP Data](#) | [Show TRP Map](#) | [TRP Info](#)

Plot from ending date: 08/14/2021 14:59 Span: 2184 days

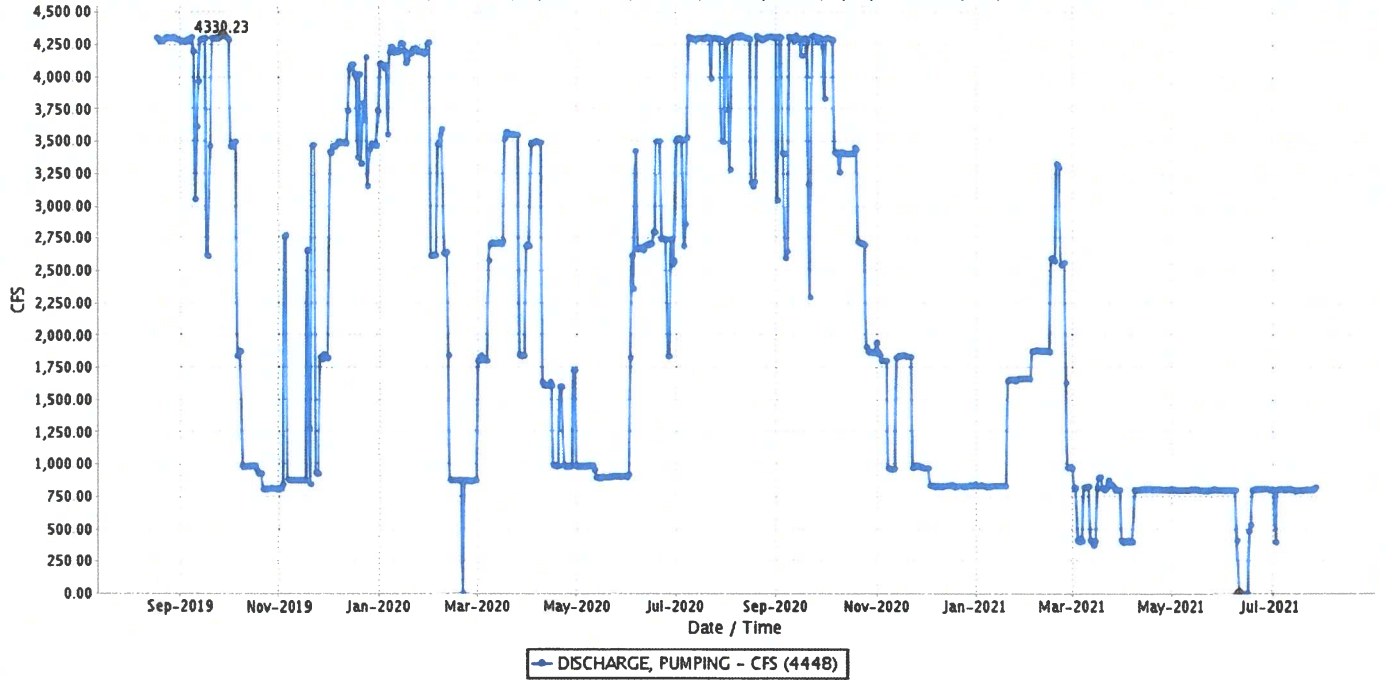
Station Comments:

- 07/15/2021 AUXFLOW sensor is USBR flow
- 05/30/2019 Chlorophyll data has been temporarily ended.

TRACY PUMPING PLANT (TRP)

Date from 08/17/2019 14:59 through 08/14/2021 14:59 Duration : 728 days

Max of period : (09/27/2019 00:00, 4330.23) Min of period: (06/11/2021 00:00, 0.0)



Generated on Sat Aug 14 15:01:03 PDT 2021

[Plot all TRP Sensors](#) | [Real-Time TRP Data](#) | [TRP Data](#) | [Daily TRP Data](#) | [Show TRP Map](#) | [TRP Info](#)

Plot from ending date: 08/14/2021 14:59 Span: 728 days

Station Comments:

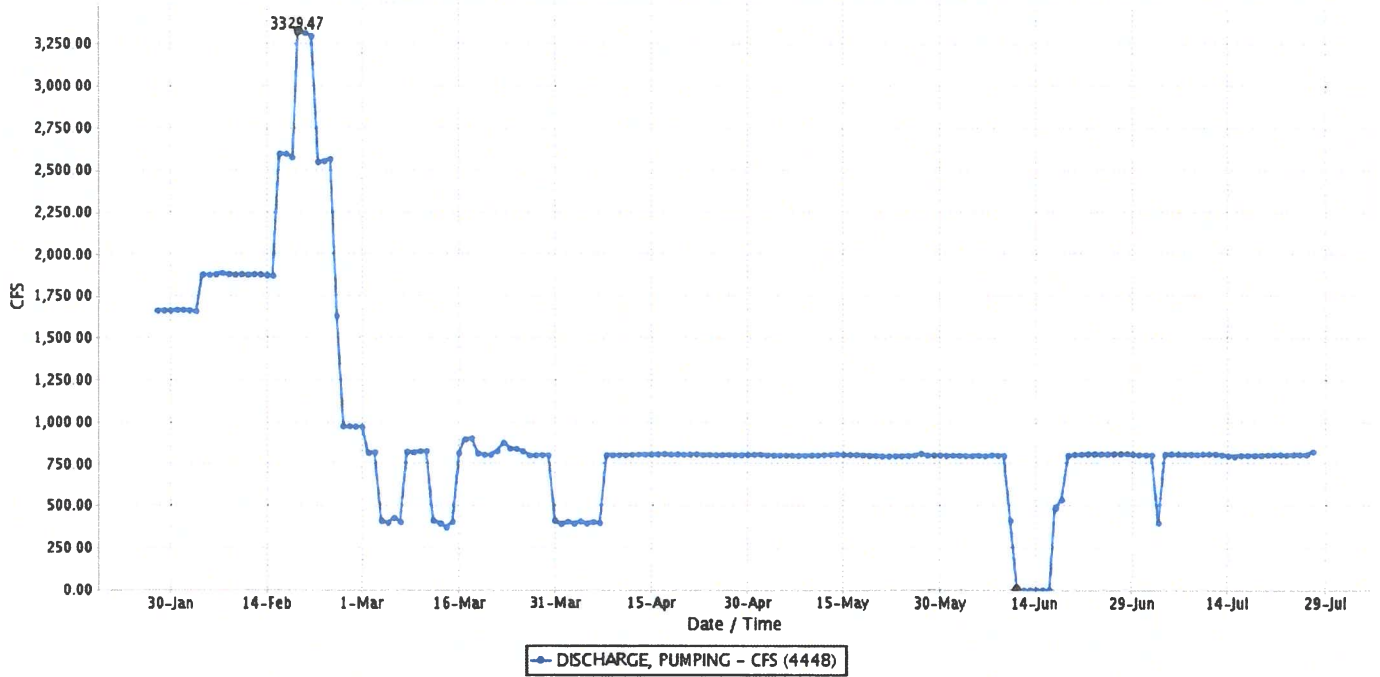
07/15/2021 AUXFLOW sensor is USBR flow

05/30/2019 Chlorophyll data has been temporarily ended.

TRACY PUMPING PLANT (TRP)

Date from 01/27/2021 10:58 through 08/15/2021 10:58 Duration : 199 days

Max of period : (02/19/2021 00:00, 3329.47) Min of period: (06/11/2021 00:00, 0.0)



Generated on Sun Aug 15 10:59:12 PDT 2021

[Plot all TRP Sensors](#) | [Real-Time TRP Data](#) | [TRP Data](#) | [Daily TRP Data](#) | [Show TRP Map](#) | [TRP Info](#)

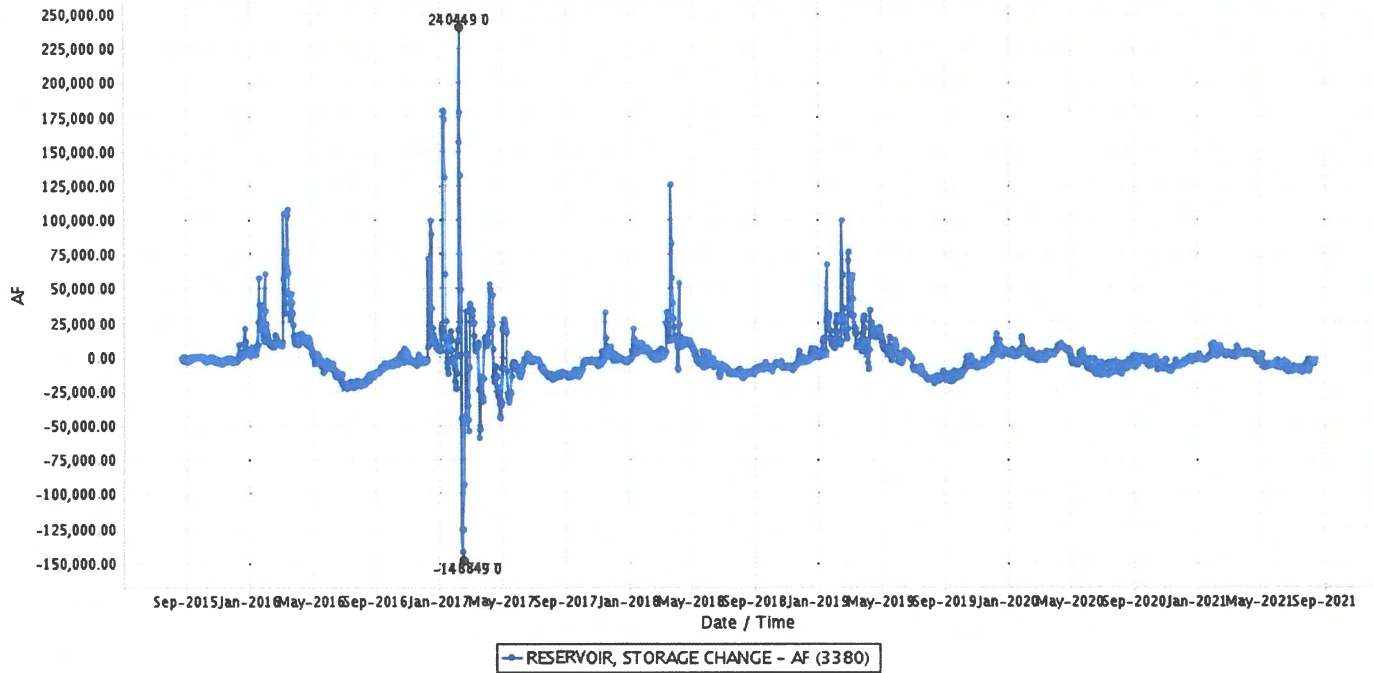
Plot from ending date: 08/15/2021 10:58 Span: 200 days

Station Comments:

- 07/15/2021 AUXFLOW sensor is USBR flow
- 05/30/2019 Chlorophyll data has been temporarily ended.

OROVILLE DAM (ORO)

Date from 08/22/2015 14:50 through 08/14/2021 14:50 Duration : 2184 days
Max of period : (02/09/2017 00:00, 240449.0) Min of period : (02/15/2017 00:00, -148849.0)



Generated on Sat Aug 14 14:51:38 PDT 2021

[Plot all ORO Sensors](#) | [Real-Time ORO Data](#) | [ORO Data](#) | [Daily ORO Data](#) | [Show ORO Map](#) | [ORO Info](#)

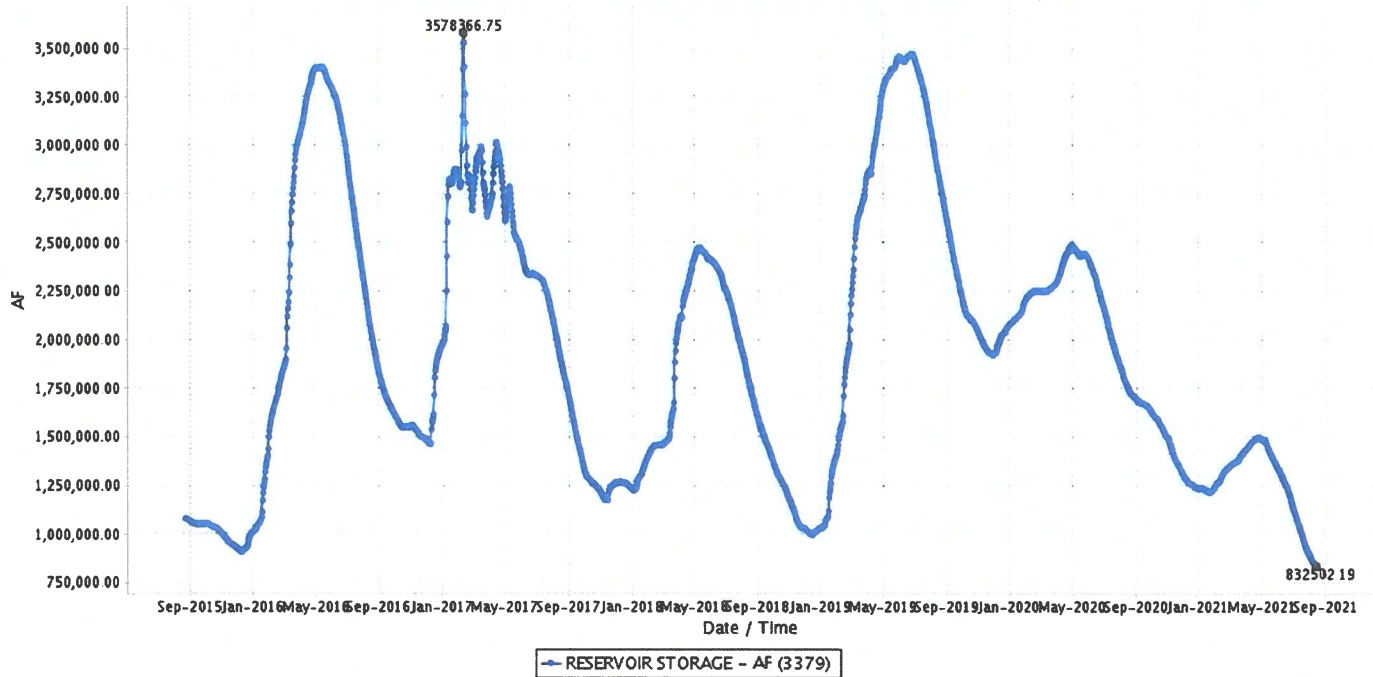
Plot from ending date: 08/14/2021 14:50 Span: 2184 days

Station Comments:

- 08/06/2021** Historic low reservoir storage levels may affect sensors and occasionally result in irregular data. Sensors are recalibrated daily.
- 08/04/2021** Due to the historic lows reached at Lake Oroville this week, there was an issue with the positioning of the sensors that measure the lake levels which resulted in erroneous data. Daily data for 8/1 and 8/2 has been revised.
- 04/16/2019** Transmission equipment repaired. Hourly data is back online as of 4/15/2019 10:00.
- 04/15/2019** Beginning 4/12/2019 16:00, reservoir elevation and storage are not transmitting correctly. Data is being flagged automatically.
- 12/26/2018** Reservoir elevation and storage reporting correctly starting 12/24/2018 at 10:00.
- 12/21/2018** Beginning 12/20/2018 14:00 reservoir elevation and storage are not transmitting correctly. Data is being flagged automatically.
- 02/23/2017** Outflow from Oroville includes all releases from the Oroville Dam (i.e.: Hyatt, spillway, low flow outlet), while River Release (RIV REL) pertains to the Oroville Complex as a whole which includes any releases from the Diversion Dam gates and Thermalito Afterbay River Outlet.
- 12/31/2014** Sensor for reservoir elevation has been repaired. Data from 12/30/14, 0900 is valid.
- 12/30/2014** Hourly elevation and storage data is invalid since 12/25/2014. Data is being flagged.

OROVILLE DAM (ORO)

Date from 08/22/2015 14:46 through 08/14/2021 14:46 Duration : 2184 days
Max of period : (02/11/2017 00:00, 3578366.75) Min of period : (08/13/2021 00:00, 832502.19)



Generated on Sat Aug 14 14:46:17 PDT 2021

[Plot all ORO Sensors](#) | [Real-Time ORO Data](#) | [ORO Data](#) | [Daily ORO Data](#) | [Show ORO Map](#) | [ORO Info](#)

Plot from ending date: 08/14/2021 14:46 Span: 2184 days

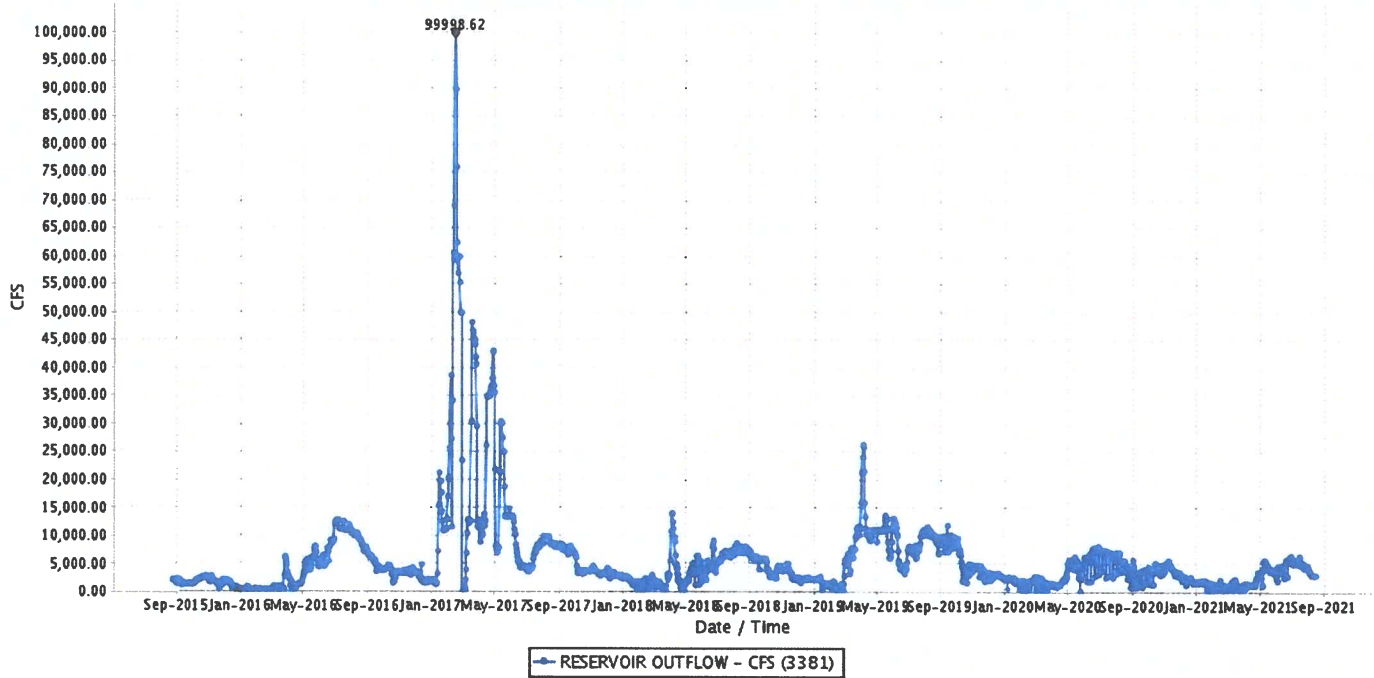
Station Comments:

- 08/06/2021** Historic low reservoir storage levels may affect sensors and occasionally result in irregular data. Sensors are recalibrated daily.
- 08/04/2021** Due to the historic lows reached at Lake Oroville this week, there was an issue with the positioning of the sensors that measure the lake levels which resulted in erroneous data. Daily data for 8/1 and 8/2 has been revised.
- 04/16/2019** Transmission equipment repaired. Hourly data is back online as of 4/15/2019 10:00.
- 04/15/2019** Beginning 4/12/2019 16:00, reservoir elevation and storage are not transmitting correctly. Data is being flagged automatically.
- 12/26/2018** Reservoir elevation and storage reporting correctly starting 12/24/2018 at 10:00.
- 12/21/2018** Beginning 12/20/2018 14:00 reservoir elevation and storage are not transmitting correctly. Data is being flagged automatically.
- 02/23/2017** Outflow from Oroville includes all releases from the Oroville Dam (i.e.: Hyatt, spillway, low flow outlet), while River Release (RIV REL.) pertains to the Oroville Complex as a whole which includes any releases from the Diversion Dam gates and Thermalito Afterbay River Outlet.
- 12/31/2014** Sensor for reservoir elevation has been repaired. Data from 12/30/14, 0900 is valid.
- 12/30/2014** Hourly elevation and storage data is invalid since 12/25/2014. Data is being flagged.

OROVILLE DAM (ORO)

Date from 08/23/2015 13:47 through 08/15/2021 13:47 Duration : 2184 days

Max of period : (02/15/2017 00:00, 99998.62) Min of period : (12/27/2015 00:00, 0.0)



Generated on Sun Aug 15 13:47:33 PDT 2021

[Plot all ORO Sensors](#) | [Real-Time ORO Data](#) | [ORO Data](#) | [Daily ORO Data](#) | [Show ORO Map](#) | [ORO Info](#)

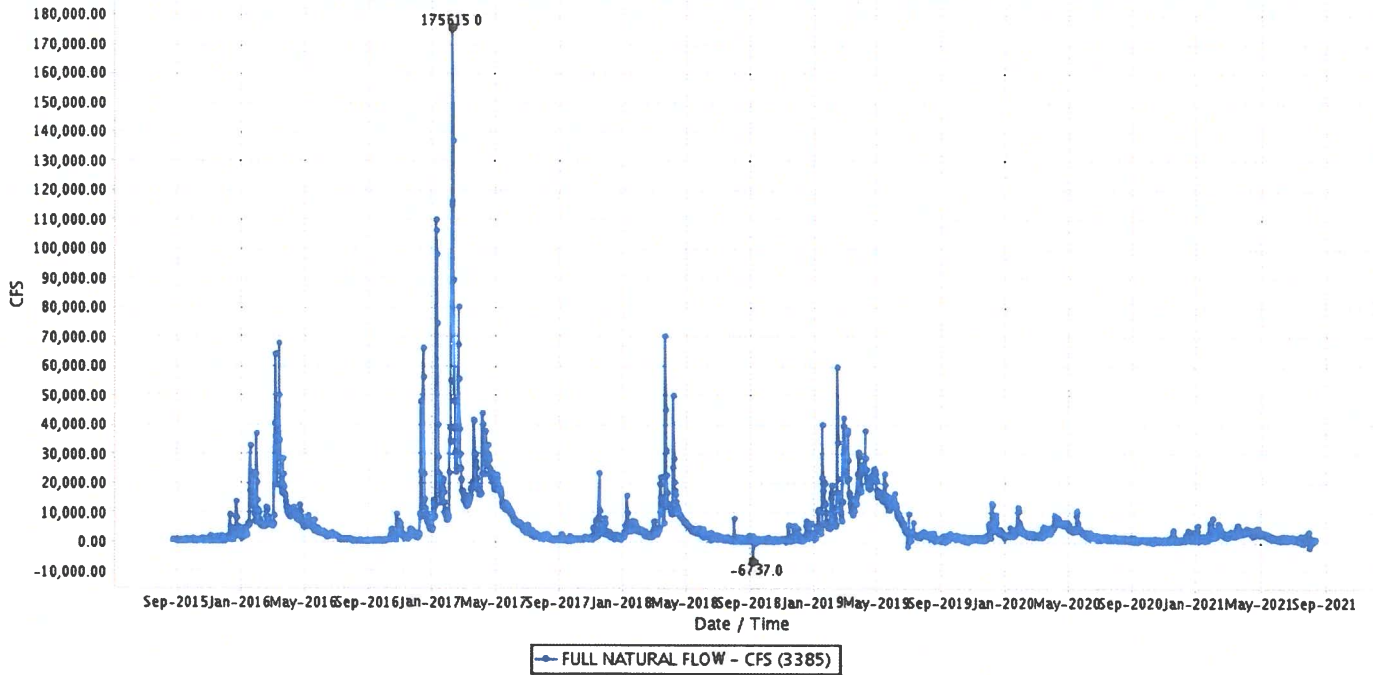
Plot from ending date: 08/15/2021 13:47 Span: 2184 days

Station Comments:

- 08/06/2021** Historic low reservoir storage levels may affect sensors and occasionally result in irregular data. Sensors are recalibrated daily.
- 08/04/2021** Due to the historic lows reached at Lake Oroville this week, there was an issue with the positioning of the sensors that measure the lake levels which resulted in erroneous data. Daily data for 8/1 and 8/2 has been revised.
- 04/16/2019** Transmission equipment repaired. Hourly data is back online as of 4/15/2019 10:00.
- 04/15/2019** Beginning 4/12/2019 16:00, reservoir elevation and storage are not transmitting correctly. Data is being flagged automatically.
- 12/26/2018** Reservoir elevation and storage reporting correctly starting 12/24/2018 at 10:00.
- 12/21/2018** Beginning 12/20/2018 14:00 reservoir elevation and storage are not transmitting correctly. Data is being flagged automatically.
- 02/23/2017** Outflow from Oroville includes all releases from the Oroville Dam (i.e.: Hyatt, spillway, low flow outlet), while River Release (RIV REL) pertains to the Oroville Complex as a whole which includes any releases from the Diversion Dam gates and Thermalito Afterbay River Outlet.
- 12/31/2014** Sensor for reservoir elevation has been repaired. Data from 12/30/14, 0900 is valid.
- 12/30/2014** Hourly elevation and storage data is invalid since 12/25/2014. Data is being flagged.

OROVILLE DAM (ORO)

Date from 08/22/2015 14:43 through 08/14/2021 14:43 Duration : 2184 days
Max of period : (02/09/2017 00:00, 175615.0) Min of period : (09/07/2018 00:00, -6737.0)



Generated on Sat Aug 14 14:44:02 PDT 2021

[Plot all ORO Sensors](#) | [Real-Time ORO Data](#) | [ORO Data](#) | [Daily ORO Data](#) | [Show ORO Map](#) | [ORO Info](#)

Plot from ending date: 08/14/2021 14:43 Span: 2184 days

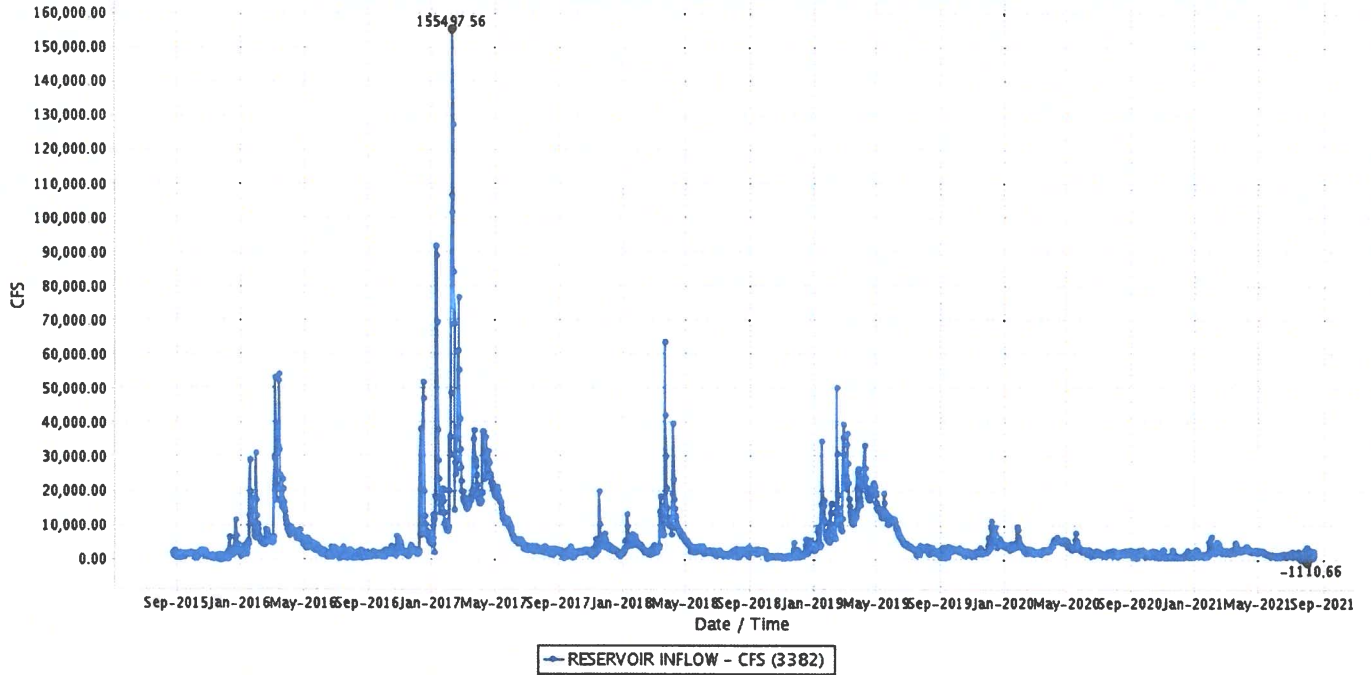
Station Comments:

- 08/06/2021** Historic low reservoir storage levels may affect sensors and occasionally result in irregular data. Sensors are recalibrated daily.
- 08/04/2021** Due to the historic lows reached at Lake Oroville this week, there was an issue with the positioning of the sensors that measure the lake levels which resulted in erroneous data. Daily data for 8/1 and 8/2 has been revised.
- 04/16/2019** Transmission equipment repaired. Hourly data is back online as of 4/15/2019 10:00.
- 04/15/2019** Beginning 4/12/2019 16:00, reservoir elevation and storage are not transmitting correctly. Data is being flagged automatically.
- 12/26/2018** Reservoir elevation and storage reporting correctly starting 12/24/2018 at 10:00.
- 12/21/2018** Beginning 12/20/2018 14:00 reservoir elevation and storage are not transmitting correctly. Data is being flagged automatically.
- 02/23/2017** Outflow from Oroville includes all releases from the Oroville Dam (i.e.: Hyatt, spillway, low flow outlet), while River Release (RIV REL) pertains to the Oroville Complex as a whole which includes any releases from the Diversion Dam gates and Thermalito Afterbay River Outlet.
- 12/31/2014** Sensor for reservoir elevation has been repaired. Data from 12/30/14, 0900 is valid.
- 12/30/2014** Hourly elevation and storage data is invalid since 12/25/2014. Data is being flagged.

OROVILLE DAM (ORO)

Date from 08/22/2015 14:45 through 08/14/2021 14:45 Duration : 2184 days

Max of period : (02/09/2017 00:00, 155497.56) Min of period : (08/01/2021 00:00, -1110.66)



Generated on Sat Aug 14 14:45:17 PDT 2021

[Plot all ORO Sensors](#) | [Real-Time ORO Data](#) | [ORO Data](#) | [Daily ORO Data](#) | [Show ORO Map](#) | [ORO Info](#)

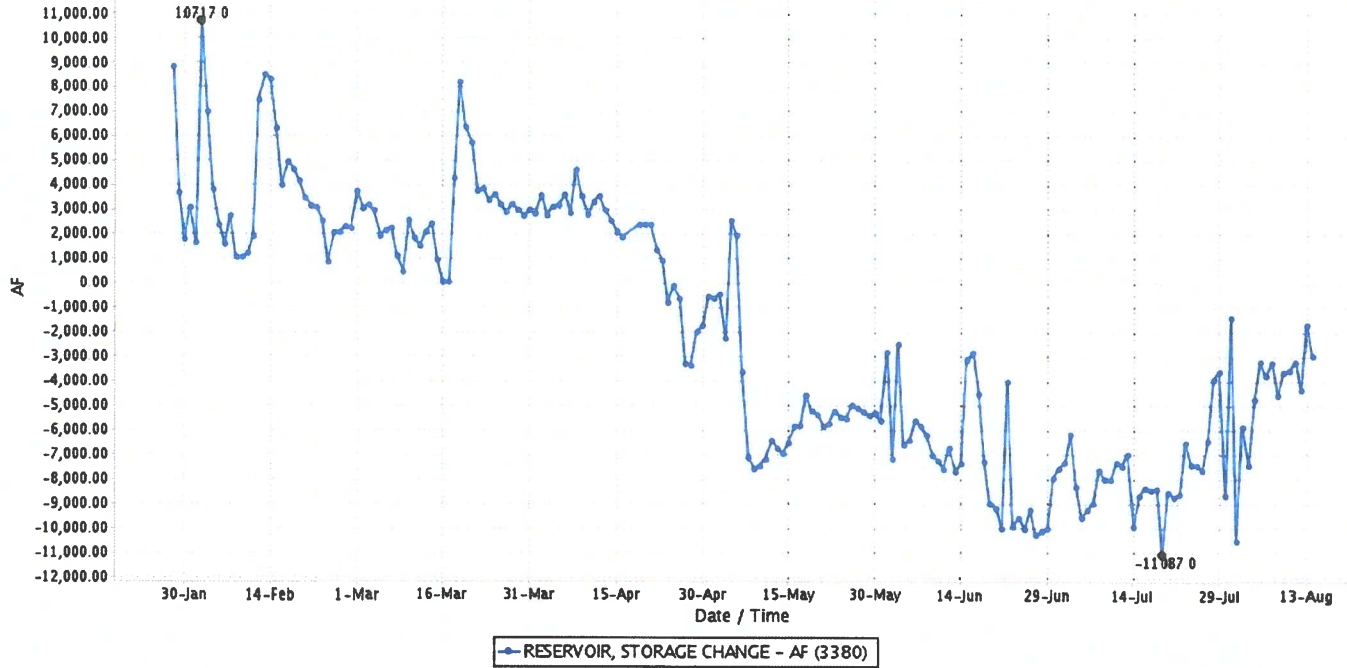
Plot from ending date: 08/14/2021 14:45 Span: 2184 days

Station Comments:

- 08/06/2021** Historic low reservoir storage levels may affect sensors and occasionally result in irregular data. Sensors are recalibrated daily.
- 08/04/2021** Due to the historic lows reached at Lake Oroville this week, there was an issue with the positioning of the sensors that measure the lake levels which resulted in erroneous data. Daily data for 8/1 and 8/2 has been revised.
- 04/16/2019** Transmission equipment repaired. Hourly data is back online as of 4/15/2019 10:00.
- 04/15/2019** Beginning 4/12/2019 16:00, reservoir elevation and storage are not transmitting correctly. Data is being flagged automatically.
- 12/26/2018** Reservoir elevation and storage reporting correctly starting 12/24/2018 at 10:00.
- 12/21/2018** Beginning 12/20/2018 14:00 reservoir elevation and storage are not transmitting correctly. Data is being flagged automatically.
- 02/23/2017** Outflow from Oroville includes all releases from the Oroville Dam (i.e.: Hyatt, spillway, low flow outlet), while River Release (RIV REL) pertains to the Oroville Complex as a whole which includes any releases from the Diversion Dam gates and Thermalito Afterbay River Outlet.
- 12/31/2014** Sensor for reservoir elevation has been repaired. Data from 12/30/14, 0900 is valid.
- 12/30/2014** Hourly elevation and storage data is invalid since 12/25/2014. Data is being flagged.

OROVILLE DAM (ORO)

Date from 01/27/2021 10:49 through 08/15/2021 10:49 Duration : 199 days
Max of period : (02/02/2021 00:00, 10717.0) Min of period: (07/19/2021 00:00, -11087.0)



Generated on Sun Aug 15 10:49:51 PDT 2021

[Plot all ORO Sensors](#) | [Real-Time ORO Data](#) | [ORO Data](#) | [Daily ORO Data](#) | [Show ORO Map](#) | [ORO Info](#)

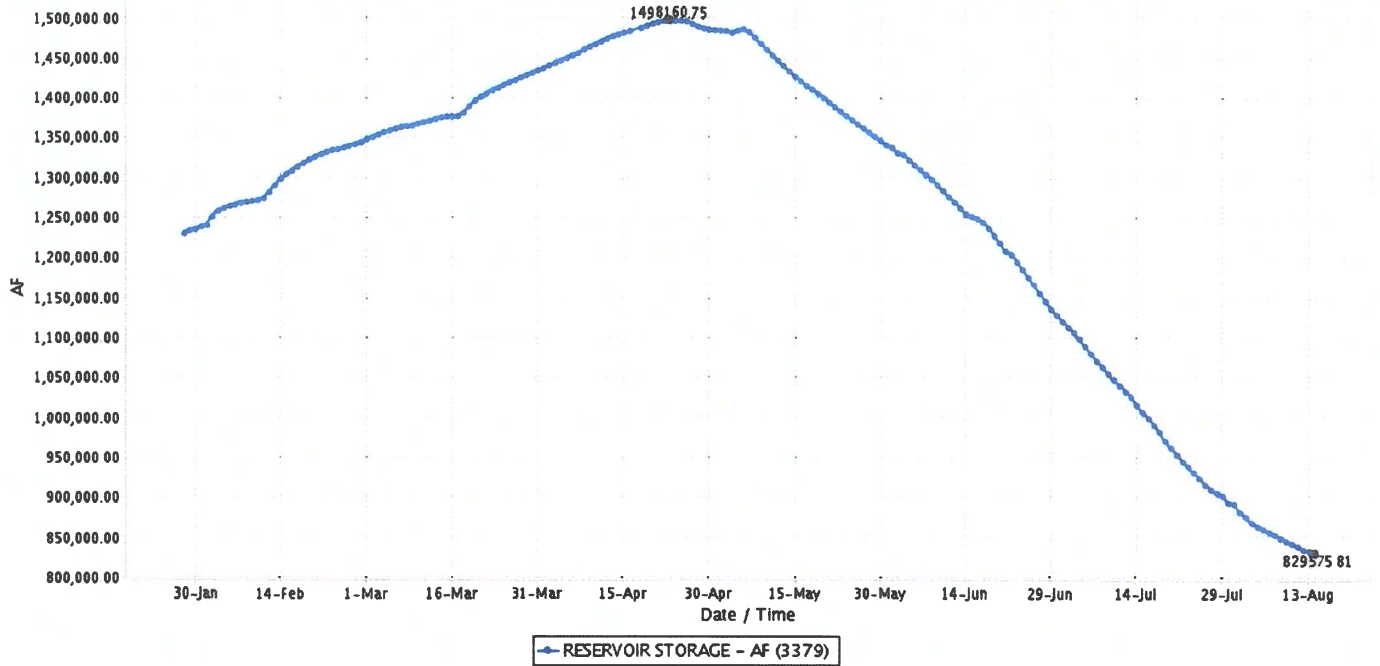
Plot from ending date: 08/15/2021 10:49 Span: 200 days

Station Comments:

- 08/06/2021** Historic low reservoir storage levels may affect sensors and occasionally result in irregular data. Sensors are recalibrated daily.
- 08/04/2021** Due to the historic lows reached at Lake Oroville this week, there was an issue with the positioning of the sensors that measure the lake levels which resulted in erroneous data. Daily data for 8/1 and 8/2 has been revised.
- 04/16/2019** Transmission equipment repaired. Hourly data is back online as of 4/15/2019 10:00.
- 04/15/2019** Beginning 4/12/2019 16:00, reservoir elevation and storage are not transmitting correctly. Data is being flagged automatically.
- 12/26/2018** Reservoir elevation and storage reporting correctly starting 12/24/2018 at 10:00.
- 12/21/2018** Beginning 12/20/2018 14:00 reservoir elevation and storage are not transmitting correctly. Data is being flagged automatically.
- 02/23/2017** Outflow from Oroville includes all releases from the Oroville Dam (i.e.: Hyatt, spillway, low flow outlet), while River Release (RIV REL) pertains to the Oroville Complex as a whole which includes any releases from the Diversion Dam gates and Thermalito Afterbay River Outlet.
- 12/31/2014** Sensor for reservoir elevation has been repaired. Data from 12/30/14, 0900 is valid.
- 12/30/2014** Hourly elevation and storage data is invalid since 12/25/2014. Data is being flagged.

OROVILLE DAM (ORO)

Date from 01/27/2021 13:48 through 08/15/2021 13:48 Duration : 199 days
Max of period : (04/23/2021 00:00, 1498160.75) Min of period : (08/14/2021 00:00, 829575.81)



Generated on Sun Aug 15 13:48:29 PDT 2021

[Plot all ORO Sensors](#) | [Real-Time ORO Data](#) | [ORO Data](#) | [Daily ORO Data](#) | [Show ORO Map](#) | [ORO Info](#)

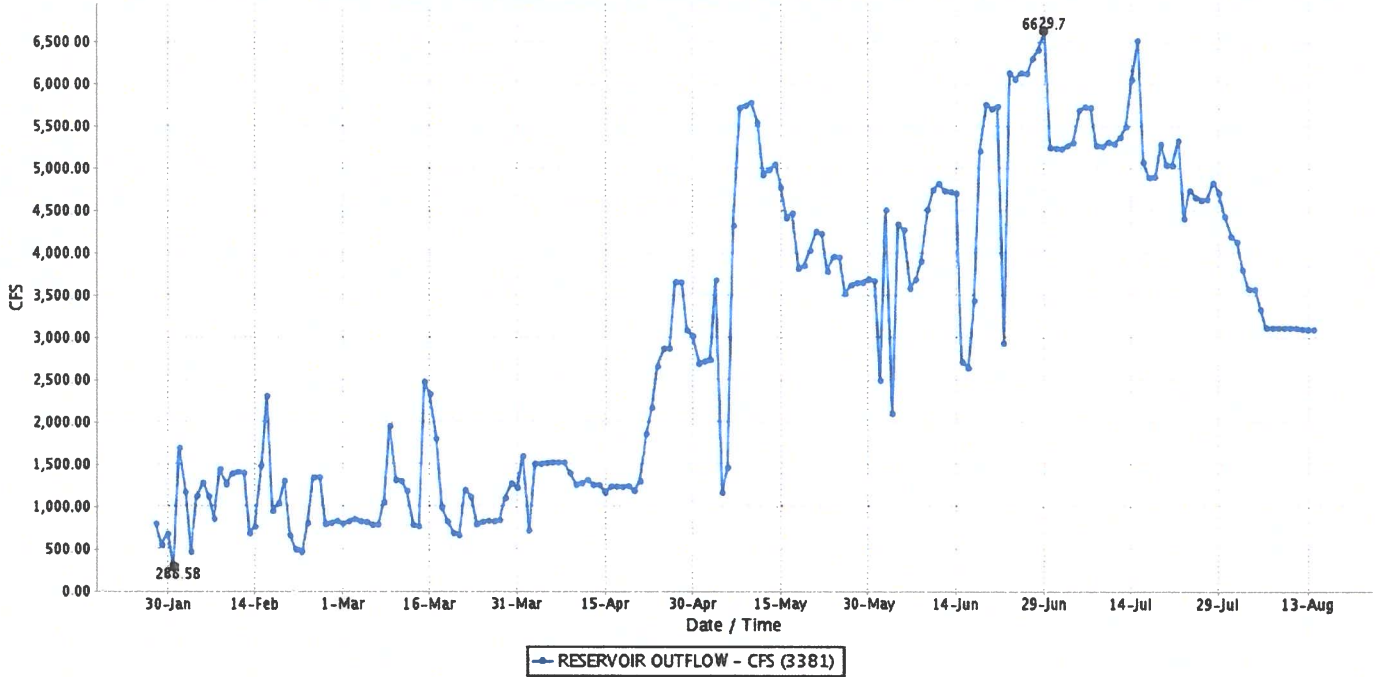
Plot from ending date: 08/15/2021 13:48 Span: 200 days

Station Comments:

- 08/06/2021** Historic low reservoir storage levels may affect sensors and occasionally result in irregular data. Sensors are recalibrated daily.
- 08/04/2021** Due to the historic lows reached at Lake Oroville this week, there was an issue with the positioning of the sensors that measure the lake levels which resulted in erroneous data. Daily data for 8/1 and 8/2 has been revised.
- 04/16/2019** Transmission equipment repaired. Hourly data is back online as of 4/15/2019 10:00.
- 04/15/2019** Beginning 4/12/2019 16:00, reservoir elevation and storage are not transmitting correctly. Data is being flagged automatically.
- 12/26/2018** Reservoir elevation and storage reporting correctly starting 12/24/2018 at 10:00.
- 12/21/2018** Beginning 12/20/2018 14:00 reservoir elevation and storage are not transmitting correctly. Data is being flagged automatically.
- 02/23/2017** Outflow from Oroville includes all releases from the Oroville Dam (i.e.: Hyatt, spillway, low flow outlet), while River Release (RIV REL) pertains to the Oroville Complex as a whole which includes any releases from the Diversion Dam gates and Thermalito Afterbay River Outlet.
- 12/31/2014** Sensor for reservoir elevation has been repaired. Data from 12/30/14, 0900 is valid.
- 12/30/2014** Hourly elevation and storage data is invalid since 12/25/2014. Data is being flagged.

OROVILLE DAM (ORO)

Date from 01/27/2021 11:11 through 08/15/2021 11:11 Duration : 199 days
Max of period : (06/29/2021 00:00, 6629.7) Min of period: (01/31/2021 00:00, 288.58)



Generated on Sun Aug 15 11:12:28 PDT 2021

[Plot all ORO Sensors](#) | [Real-Time ORO Data](#) | [ORO Data](#) | [Daily ORO Data](#) | [Show ORO Map](#) | [ORO Info](#)

Plot from ending date: 08/15/2021 11:11 Span: 200 days

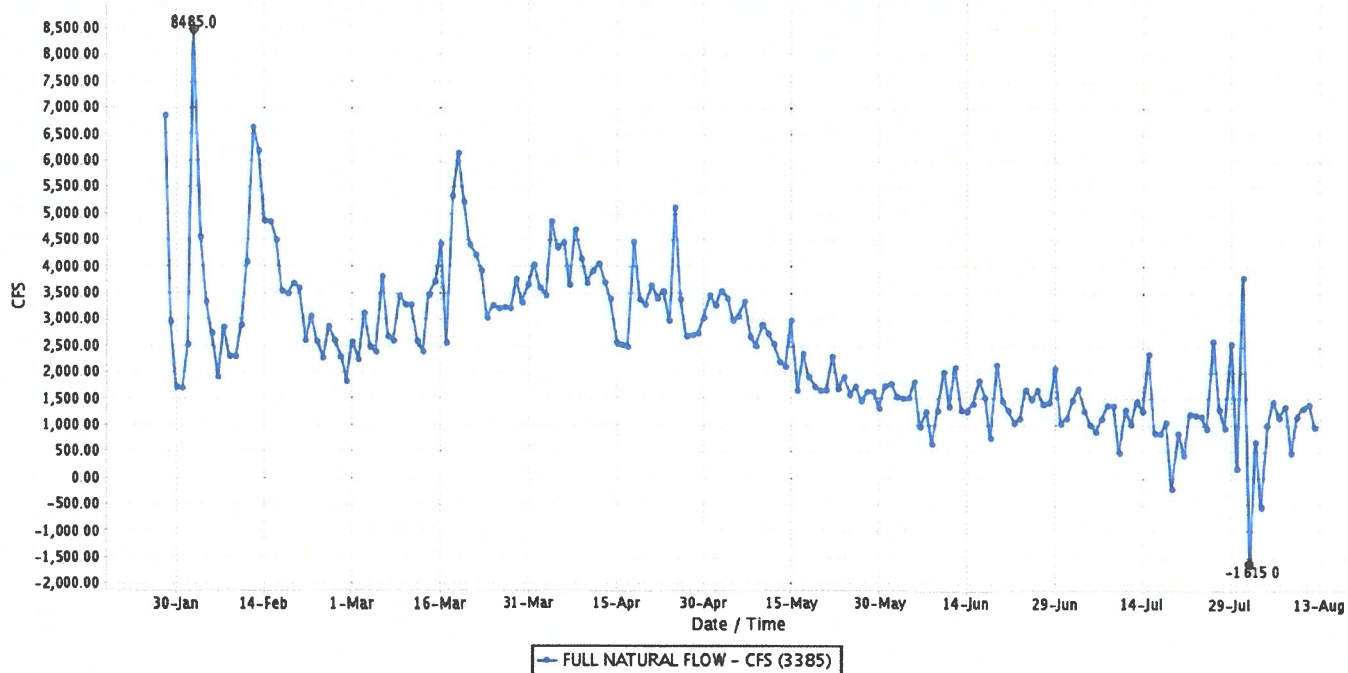
Station Comments:

- 08/06/2021** Historic low reservoir storage levels may affect sensors and occasionally result in irregular data. Sensors are recalibrated daily.
- 08/04/2021** Due to the historic lows reached at Lake Oroville this week, there was an issue with the positioning of the sensors that measure the lake levels which resulted in erroneous data. Daily data for 8/1 and 8/2 has been revised.
- 04/16/2019** Transmission equipment repaired. Hourly data is back online as of 4/15/2019 10:00.
- 04/15/2019** Beginning 4/12/2019 16:00, reservoir elevation and storage are not transmitting correctly. Data is being flagged automatically.
- 12/26/2018** Reservoir elevation and storage reporting correctly starting 12/24/2018 at 10:00.
- 12/21/2018** Beginning 12/20/2018 14:00 reservoir elevation and storage are not transmitting correctly. Data is being flagged automatically.
- 02/23/2017** Outflow from Oroville includes all releases from the Oroville Dam (i.e.: Hyatt, spillway, low flow outlet), while River Release (RIV REL.) pertains to the Oroville Complex as a whole which includes any releases from the Diversion Dam gates and Thermalito Afterbay River Outlet.
- 12/31/2014** Sensor for reservoir elevation has been repaired. Data from 12/30/14, 0900 is valid.
- 12/30/2014** Hourly elevation and storage data is invalid since 12/25/2014. Data is being flagged.

OROVILLE DAM (ORO)

Date from 01/27/2021 10:43 through 08/15/2021 10:43 Duration : 199 days

Max of period : (02/02/2021 00:00, 8485.0) Min of period : (08/01/2021 00 00, -1615.0)



Generated on Sun Aug 15 10:43:37 PDT 2021

[Plot all ORO Sensors](#) | [Real-Time ORO Data](#) | [ORO Data](#) | [Daily ORO Data](#) | [Show ORO Map](#) | [ORO Info](#)

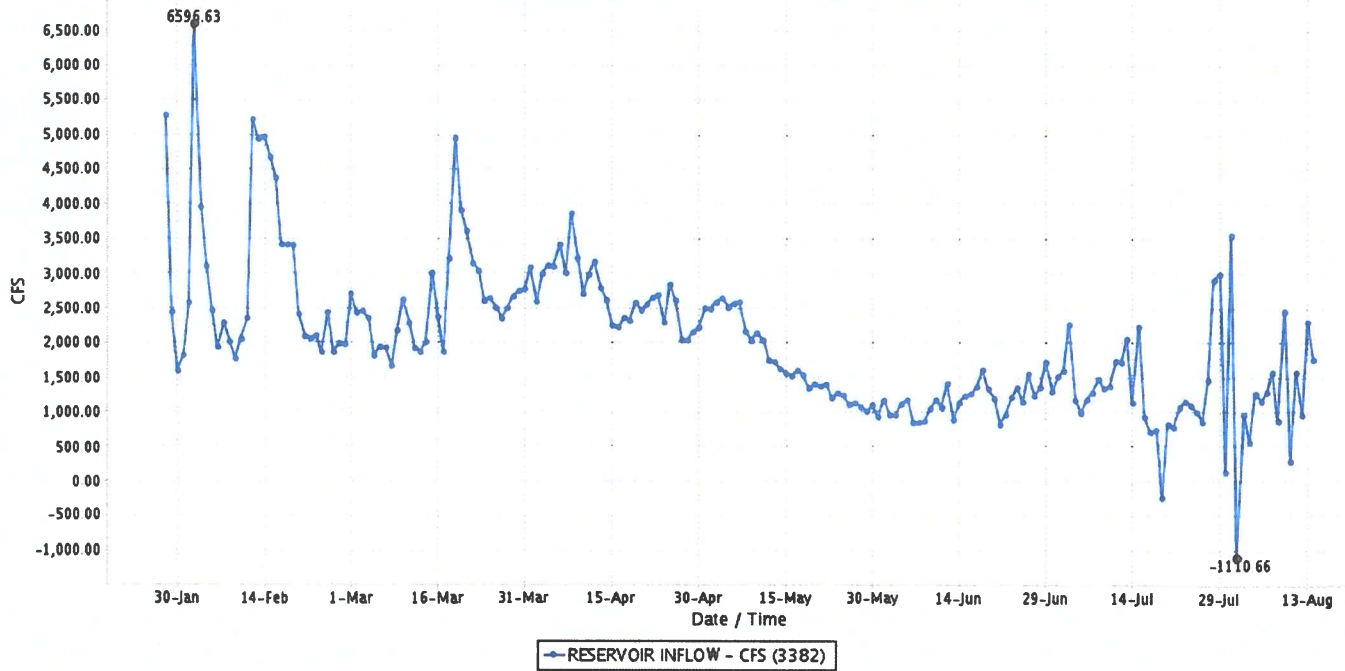
Plot from ending date: 08/15/2021 10:43 Span: 200 days

Station Comments:

- 08/06/2021** Historic low reservoir storage levels may affect sensors and occasionally result in irregular data. Sensors are recalibrated daily.
- 08/04/2021** Due to the historic lows reached at Lake Oroville this week, there was an issue with the positioning of the sensors that measure the lake levels which resulted in erroneous data. Daily data for 8/1 and 8/2 has been revised.
- 04/16/2019** Transmission equipment repaired. Hourly data is back online as of 4/15/2019 10:00.
- 04/15/2019** Beginning 4/12/2019 16:00, reservoir elevation and storage are not transmitting correctly. Data is being flagged automatically.
- 12/26/2018** Reservoir elevation and storage reporting correctly starting 12/24/2018 at 10:00.
- 12/21/2018** Beginning 12/20/2018 14:00 reservoir elevation and storage are not transmitting correctly. Data is being flagged automatically.
- 02/23/2017** Outflow from Oroville includes all releases from the Oroville Dam (i.e.: Hyatt, spillway, low flow outlet), while River Release (RIV REL) pertains to the Oroville Complex as a whole which includes any releases from the Diversion Dam gates and Thermalito Afterbay River Outlet.
- 12/31/2014** Sensor for reservoir elevation has been repaired. Data from 12/30/14, 0900 is valid.
- 12/30/2014** Hourly elevation and storage data is invalid since 12/25/2014. Data is being flagged.

OROVILLE DAM (ORO)

Date from 01/27/2021 10:44 through 08/15/2021 10:44 Duration : 199 days
 Max of period : (02/02/2021 00:00, 6596.63) Min of period: (08/01/2021 00:00, -1110.66)



Generated on Sun Aug 15 10:44:51 PDT 2021

[Plot all ORO Sensors](#) | [Real-Time ORO Data](#) | [ORO Data](#) | [Daily ORO Data](#) | [Show ORO Map](#) | [ORO Info](#)

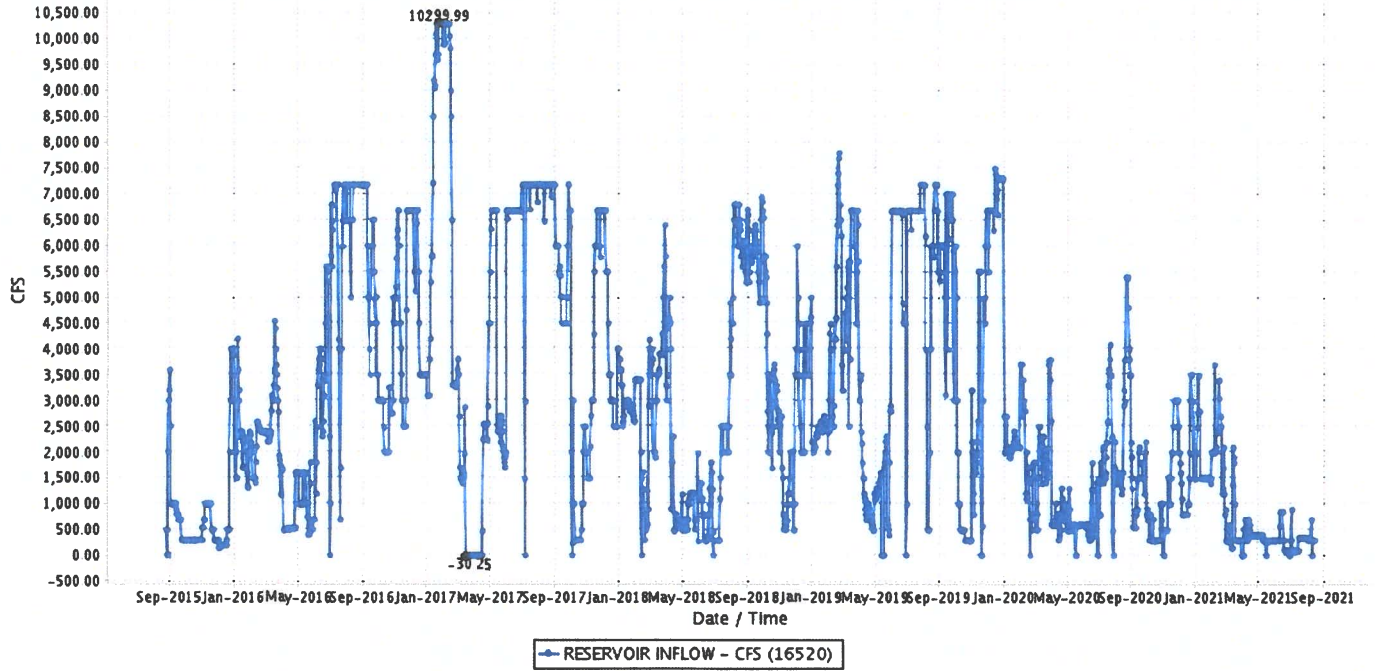
Plot from ending date: 08/15/2021 10:44 Span: 200 days

Station Comments:

- 08/06/2021** Historic low reservoir storage levels may affect sensors and occasionally result in irregular data. Sensors are recalibrated daily.
- 08/04/2021** Due to the historic lows reached at Lake Oroville this week, there was an issue with the positioning of the sensors that measure the lake levels which resulted in erroneous data. Daily data for 8/1 and 8/2 has been revised.
- 04/16/2019** Transmission equipment repaired. Hourly data is back online as of 4/15/2019 10:00.
- 04/15/2019** Beginning 4/12/2019 16:00, reservoir elevation and storage are not transmitting correctly. Data is being flagged automatically.
- 12/26/2018** Reservoir elevation and storage reporting correctly starting 12/24/2018 at 10:00.
- 12/21/2018** Beginning 12/20/2018 14:00 reservoir elevation and storage are not transmitting correctly. Data is being flagged automatically.
- 02/23/2017** Outflow from Oroville includes all releases from the Oroville Dam (i.e.: Hyatt, spillway, low flow outlet), while River Release (RIV REL) pertains to the Oroville Complex as a whole which includes any releases from the Diversion Dam gates and Thermalito Afterbay River Outlet.
- 12/31/2014** Sensor for reservoir elevation has been repaired. Data from 12/30/14, 0900 is valid.
- 12/30/2014** Hourly elevation and storage data is invalid since 12/25/2014. Data is being flagged.

CLIFTON COURT FOREBAY (CLC)

Date from 08/23/2015 13:54 through 08/15/2021 13:54 Duration : 2184 days
Max of period : (01/25/2017 00:00, 10299.99) Min of period : (03/15/2017 00 00, -30.25)



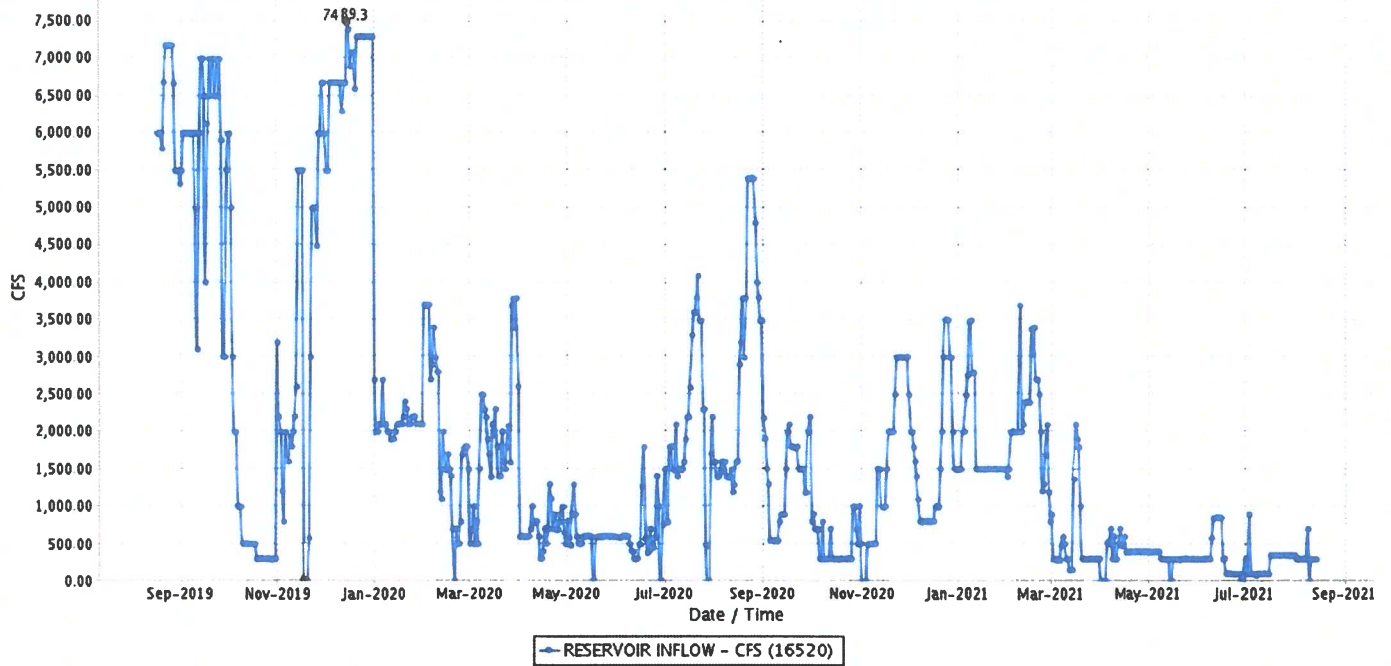
Generated on Sun Aug 15 13:54:44 PDT 2021

[Plot all CLC Sensors](#) | [Real-Time CLC Data](#) | [CLC Data](#) | [Daily CLC Data](#) | [Show CLC Map](#) | [CLC Info](#)

Plot from ending date: 08/15/2021 13:54 Span: 2184 days

CLIFTON COURT FOREBAY (CLC)

Date from 08/17/2019 15:06 through 08/14/2021 15:06 Duration : 728 days
Max of period : (12/15/2019 00:00, 7489.3) Min of period: (11/18/2019 00:00, 0.0)



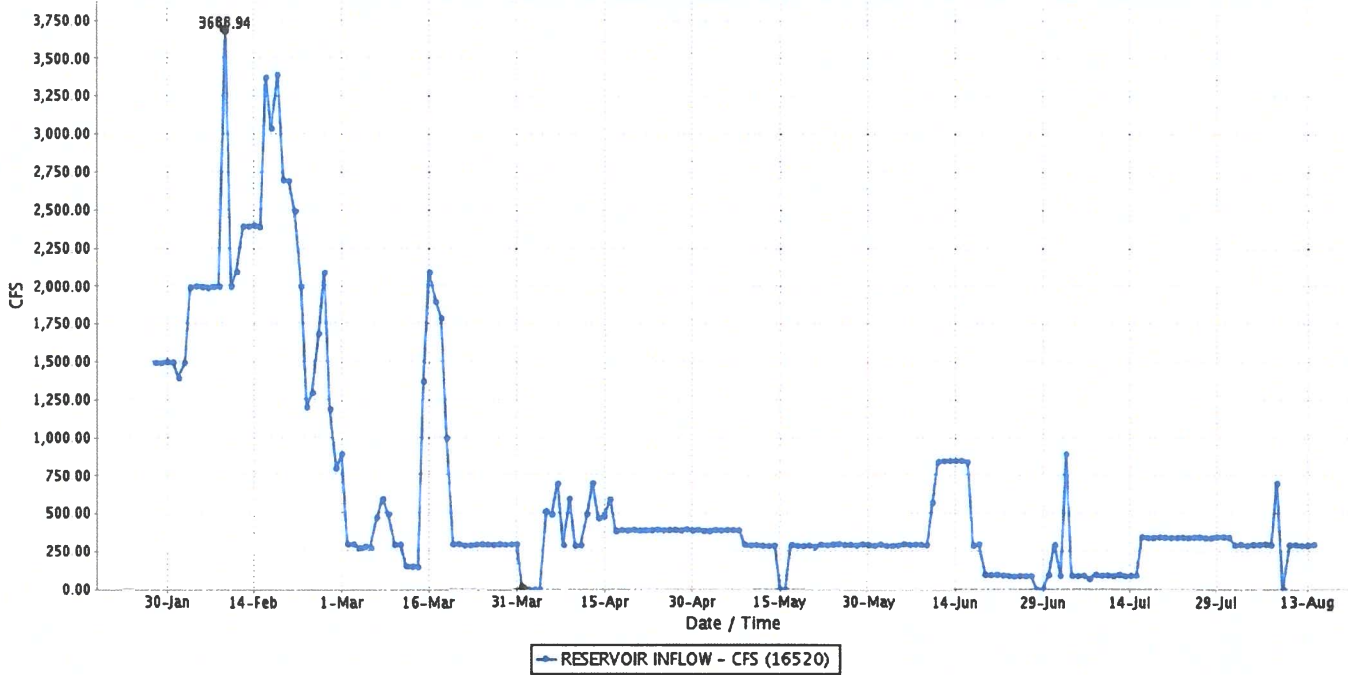
Generated on Sat Aug 14 15:06:24 PDT 2021

[Plot all CLC Sensors](#) | [Real-Time CLC Data](#) | [CLC Data](#) | [Daily CLC Data](#) | [Show CLC Map](#) | [CLC Info](#)

Plot from ending date: 08/14/2021 15:06 Span: 728 days

CLIFTON COURT FOREBAY (CLC)

Date from 01/27/2021 11:00 through 08/15/2021 11:00 Duration : 199 days
Max of period : (02/09/2021 00:00, 3688.94) Min of period: (04/01/2021 00:00, 0.0)



Generated on Sun Aug 15 11:00:28 PDT 2021

[Plot all CLC Sensors](#) | [Real-Time CLC Data](#) | [CLC Data](#) | [Daily CLC Data](#) | [Show CLC Map](#) | [CLC Info](#)

Plot from ending date: 08/15/2021 11:00 Span: 200 days

Table 21

U. S. Department of Interior - Bureau of Reclamation
Central Valley Operations Office

Preliminary-Subject to Change
Monthly Diversions in AF

**Central Valley Project - California
2021**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
CANALS													
Contra Costa	2732	2423	7780	8573	11188	11298							43994
Delta-Mendota	70850	114055	43639	42311	49301	36349							356505
Actual Fed Dos Amigos	10892	13325	18176	27028	44556	NA							113977
Madera	0	0	0	0	0	16191							16191
Friant-Kern	2539	16618	10001	11314	17816	37250							95538
Corning	0	202	260	169	40	167							838
Folsom-South	379	399	361	532	1047	1513							4231
Tehama-Colusa	944	13498	5661	11449	18288	20930							70770
CACHUMA PROJECT													
Tecolote Tunnel	1158	1532	1973	2443	2502	2372							11980
ORLAND PROJECT													
Stony Creek	0	0	0	5282	5584	10663							21529
North Canal	0	0	0	2021	2116	4080							8217
South Canal	0	0	0	3261	3468	6583							13312
SOLANO PROJECT													
Putah South Canal	2261	2957	11114	24466	28433	33029							102260

Table 21

U. S. Department of Interior - Bureau of Reclamation
Central Valley Operations Office

Preliminary-Subject to Change
Monthly Diversions in AF

Central Valley Project - California
2020

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
CANALS													
Contra Costa	6624	6999	5974	8239	10161	11076	12101	11793	11285	9622	6697	3857	104428
Delta-Mendota	256214	95862	162145	114461	57291	153776	245319	255017	236798	193974	87058	51948	1909863
Actual Fed Dos Amigos	32828	74102	20439	41131	79170	100749	104182	58680	23117	39420	14922		588740
Madera	0	0	0	0	12827	42104	46449	14705	0	0	0	0	116085
Friant-Kern	8498	41411	4543	7158	45695	84058	130085	98577	59156	39120	2311	0	520612
Corning	0	304	535	1393	2054	1460	3133	1585	1303	784	84	93	12728
Folsom-South	376	580	362	327	800	1201	1050	620	488	1539	717	290	8350
Tehama-Colusa	0	12988	23438	35077	51459	38060	41947	25653	15680	18169	9049	2138	273658
CACHUMA PROJECT													
Tecolete Tunnel	538	1110	724	979	1556	1686	1971	2119	1929	1779	1515	1697	17603
ORLAND PROJECT													
Stony Creek	0	1436	2085	8329	11882	13498	14757	14542	10866	8759	0	0	86154
North Canal	0	597	639	334	5111	5244	5792	5574	4608	3535	0	0	31434
South Canal	0	839	1446	4985	6771	8254	8965	8968	6258	5224	0	0	51710
SOLANO PROJECT													
Putah South Canal	3037	2040	9563	14780	24598	32714	34331	27279	19770	15593	1747	1858	187310

Table 21

U. S. Department of Interior - Bureau of Reclamation
Central Valley Operations Office

Preliminary-Subject to Change
Monthly Diversions in AF

**Central Valley Project - California
2019**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
CANALS													
Contra Costa	3751	4884	183	14648	8036	9226	10997	12132	10378	9375	12657	5256	101523
Delta-Mendota	219856	212077	134289	95998	86544	226186	244895	252276	242885	88253	83674	219481	2106414
Actual Fed Dos Amigos	28205	39954	45796	98232	119084	165352	181614	135471	77443	68815	39349	12054	1011369
Madera	0	1529	19226	52011	48973	66570	61324	45789	27469	35733	2017	0	360641
Friant-Kern	12623	96237	153507	244988	186616	243177	220754	170492	119914	105155	50089	15430	1618982
Corning	0	99	0	474	712	1976	1902	1861	1208	904	438	0	9574
Folsom-South	0	0	676	651	791	1414	1720	1553	1450	1113	506	192	10066
Tehama-Colusa	0	519	428	14285	26101	43607	46339	34578	19288	13734	16786	2178	217843
CACHUMA PROJECT													
Tecolete Tunnel	403	520	347	1130	781	1259	1706	1939	2090	1614	1268	474	13531
ORLAND PROJECT													
Stony Creek	0	0	0	2319	6657	12630	13672	13560	9760	7976	2957	0	69531
North Canal	0	0	0	647	2214	4263	4405	4510	3047	2454	1087	0	22627
South Canal	0	0	0	1672	4443	8367	9267	9050	6713	5522	1870	0	46904
SOLANO PROJECT													
Putah South Canal	3126	2892	3749	8779	14934	25407	28717	24871	18270	13811	2003	2424	148983

Table 21

U. S. Department of Interior - Bureau of Reclamation
Central Valley Operations Office

Preliminary-Subject to Change
Monthly Diversions in AF

Central Valley Project - California
2018

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
CANALS													
Contra Costa	5922	5442	1861	14728	13133	10542	12346	11352	10810	10110	7488	6204	109938
Delta-Mendota	204834	101839	168187	113549	102118	161056	237298	260962	240769	250116	150041	240151	2230920
Actual Fed Dos Amigos	54398	102472	18888	49859	97920	134687	148979	107296	67770	57538	35075	12964	887846
Madera	0	280	0	35432	48761	44862	47519	20418	643	0	0	0	197915
Friant-Kern	12532	43413	11070	162611	133401	92973	164968	114674	57272	46251	21509	12303	872977
Corning	0	752	135	311	1153	1989	2312	1888	2572	1468	518	0	13098
Folsom-South	446	720	316	232	1112	1553	1652	1466	1549	1090	995	759	11890
Tehama-Colusa	434	14389	4491	14075	40599	49355	49966	27902	34975	26870	14792	0	277848
CACHUMA PROJECT													
Tecolete Tunnel	863	949	365	1003	1306	1853	2470	2321	1878	1715	1447	322	16492
ORLAND PROJECT													
Stony Creek	0	2072	0	3233	12482	13228	14579	13453	10727	6052	2360	0	78186
North Canal	0	1023	0	1170	4558	4836	5409	4959	3921	2537	839	0	29252
South Canal	0	1049	0	2063	7924	8392	9170	8494	6806	3515	1521	0	48934
SOLANO PROJECT													
Putah South Canal	2594	1869	3682	7490	21551	27730	30623	25740	17650	10988	1928	2180	154025

Table 21

U. S. Department of Interior - Bureau of Reclamation
Central Valley Operations Office

Preliminary-Subject to Change
Monthly Diversions in AF

Central Valley Project - California
2017

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
CANALS													
Contra Costa	10250	11810	5100	13196	11077	9533	10808	11708	9973	8530	7080	6008	115073
Delta-Mendota	231895	221172	226205	234750	149049	260891	261041	267724	241670	268240	182515	249502	2794654
Actual Fed Dos Amigos	6222	28247	45669	75584	149716	179674	176218	133963	79618	70544	45492	44355	1035302
Madera	49427	43149	53451	47687	59596	64373	62024	46432	37105	23682	5378	0	492304
Friant-Kern	141600	55586	77214	143018	189109	241167	258358	209475	127306	111833	37559	24299	1616524
Corning	0	0	0	73	1456	1678	2243	2056	1503	1161	54	111	10335
Folsom-South	91	0	280	329	1476	1651	1472	2459	1374	1052	222	800	11206
Tehama-Colusa	0	0	2622	6042	39797	44220	48752	34844	20545	15845	1991	7737	222395
CACHUMA PROJECT													
Tecolote Tunnel	223	272	595	985	1396	2007	2117	2026	1906	2243	1653	1724	17147
ORLAND PROJECT													
Stony Creek	0	0	0	0	11236	12980	14623	13550	11328	7702	694	0	72113
North Canal	0	0	0	0	3669	4433	5310	4913	3913	2527	244	0	25009
South Canal	0	0	0	0	7567	8547	9313	8637	7415	5175	450	0	47104
SOLANO PROJECT													
Putah South Canal	3104	2614	3491	4629	21124	26039	31099	23555	17712	11983	1517	1590	148457

Table 21

U. S. Department of Interior - Bureau of Reclamation
Central Valley Operations Office

Preliminary-Subject to Change
Monthly Diversions in AF

Central Valley Project - California
2016

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
CANALS													
Contra Costa	921	5312	5784	17210	17611	20373	17235	16587	19505	8484	5991	5844	140857
Delta-Mendota	144689	166360	190265	59176	66057	63986	59199	161337	227324	234387	158857	217688	1749325
Actual Fed Dos Amigos	5894	11384	15874	21010	36378	63020	48262	18937	27046	17292	10839	5463	281399
Madera	0	0	12206	31922	21196	43455	43395	21307	288	0	0	0	173769
Friant-Kern	514	1444	54929	134073	56206	86326	136419	110961	79661	49173	4790	514	715010
Corning	0	0	0	422	750	1821	2380	2537	818	415	0	0	9143
Folsom-South	480	1095	466	859	1196	1611	1841	1545	1577	1111	801	555	13137
Tehama-Colusa	0	2894	2916	19046	34096	43988	56266	36411	10365	8749	0	0	214731
CACHUMA PROJECT													
Tecolete Tunnel	646	657	782	1208	1333	1559	1751	1755	1585	1432	946	547	14201
ORLAND PROJECT													
Stony Creek	0	0	0	4674	9955	12143	13163	12819	10451	3862	0	0	67067
North Canal	0	0	0	1732	4187	5090	5534	4935	4332	1710	0	0	27520
South Canal	0	0	0	2942	5768	7053	7629	7884	6119	2152	0	0	39547
SOLANO PROJECT													
Putah South Canal	3332	3441	3497	12454	23715	29019	29899	25107	18278	6448	2174	2967	160331

Table 21

U. S. Department of Interior - Bureau of Reclamation
Central Valley Operations Office

Preliminary-Subject to Change
Monthly Diversions in AF

**Central Valley Project - California
2015**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
CANALS													
Contra Costa	3574	2588	15225	6893	3574	4653	6552	6714	7110	6355	4417	3961	71616
Delta-Mendota	76955	55580	104410	56115	19626	21571	18811	32274	81548	64241	89319	68273	688723
Actual Fed Dos Amigos	6744	8650	15363	24384	36304	49924	28654	16169	15100	17120	9476	6418	234306
Madera	0	0	0	0	0	5351	4461	1789	0	0	0	0	11601
Friant-Kern	0	0	772	3388	3906	11510	11248	11703	10475	8368	4846	2126	68342
Corning	0	95	91	83	0	879	1773	327	0	0	0	0	3248
Folsom-South	916	1186	1432	1392	1632	1811	1628	1430	1250	1258	1049	534	15518
Tehama-Colusa	0	3699	5566	9261	17538	15924	16102	12260	8466	6129	0	0	94945
CACHUMA PROJECT													
Tecolete Tunnel	789	614	1304	1559	1565	1345	1666	1950	1806	1642	1405	1189	16834
ORLAND PROJECT													
Stony Creek	0	0	5243	8049	11232	13450	13483	13325	9378	8380	0	0	82540
North Canal	0	0	1730	2949	4639	5732	5609	5474	4274	3848	0	0	34255
South Canal	0	0	3513	5100	6593	7718	7874	7851	5104	4532	0	0	48285
SOLANO PROJECT													
Putah South Canal	3429	2821	10405	19375	26081	30889	32811	24639	18936	7085	2009	3602	182082

**Bulletin 132-20
Appendix B**

**Data and Computations
Used to Determine
2021 Water Charges**

Tables B-5B through B-31

Note: Where applicable, the projected data values shown in this appendix are shaded and the bill year data are in **bold** type.

TABLE B-5B Annual Water Quantities Delivered to Each Contractor (acre-feet)

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA ¹				CENTRAL COASTAL AREA		
	Napa ²	Solano	Total	Alameda-Zone 7	Alameda County	Santa Clara	Total	San Luis Obispo	Santa Barbara	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1962	0	0	0	494	8,412	0	8,906	0	0	0
1963	0	0	0	1,731	10,914	0	12,645	0	0	0
1964	0	0	0	1,673	19,238	0	20,911	0	0	0
1965	0	0	0	2,605	16,407	15,014	34,026	0	0	0
1966	0	0	0	5,511	14,864	34,538	54,913	0	0	0
1967	0	0	0	4,780	12,882	39,101	56,763	0	0	0
1968	1,214	0	1,214	6,133	24,817	70,105	101,055	0	0	0
1969	2,687	0	2,687	6,635	813	62,264	69,712	0	0	0
1970	3,618	0	3,618	9,249	0	80,311	89,560	0	0	0
1971	2,521	0	2,521	5,017	5,961	87,606	98,584	0	0	0
1972	3,647	0	3,647	10,489	27,671	100,266	138,426	0	0	0
1973	3,792	0	3,792	2,975	2,521	88,582	94,078	0	0	0
1974	4,870	0	4,870	1,314	4	88,000	89,318	0	0	0
1975	6,840	0	6,840	4,618	986	88,000	93,604	0	0	0
1976	7,122	0	7,122	17,131	21,300	88,000	126,431	0	0	0
1977	8,226	0	8,226	12,644	18,840	76,220	107,704	0	0	0
1978	6,034	0	6,034	10,984	5,863	95,727	112,574	0	0	0
1979	6,561	0	6,561	19,325	10,874	91,991	122,190	0	0	0
1980	6,707	0	6,707	16,790	11,034	88,000	115,824	0	0	0
1981	9,001	0	9,001	19,590	21,917	88,000	129,507	0	0	0
1982	1,213	0	1,213	13,123	6,316	88,000	107,439	0	0	0
1983	2,287	0	2,287	4,766	3,157	86,733	94,656	0	0	0
1984	2,923	0	2,923	6,784	3,338	88,000	98,122	0	0	0
1985	4,039	0	4,039	15,072	19,016	88,000	122,088	0	0	0
1986	3,519	1,400	4,919	10,609	12,379	88,000	110,988	0	0	0
1987	7,693	1,550	9,243	23,406	25,390	88,000	136,796	0	0	0
1988	5,392	9,726	15,118	25,830	33,464	87,961	147,255	0	0	0
1989	6,195	17,256	23,451	26,227	26,042	90,000	142,269	0	0	0
1990	6,940	19,131	26,071	33,034	31,703	92,000	156,737	0	0	0
1991	1,380	6,972	8,352	9,411	12,648	28,200	50,259	0	1,240	1,240
1992	4,001	14,773	18,774	14,669	19,153	42,839	76,661	0	0	0
1993	5,286	29,180	34,466	33,635	10,271	62,065	105,971	0	0	0
1994	6,792	25,256	32,048	20,542	22,911	57,115	100,568	0	0	0
1995	5,182	21,345	26,527	30,091	17,793	28,756	76,640	0	0	0
1996	4,893	29,999	34,892	18,903	19,662	89,850	128,415	100	0	100
1997	4,341	33,530	37,871	27,522	24,063	95,601	147,186	1,199	7,439	8,638
1998	5,359	29,766	35,125	17,941	19,075	63,410	100,426	3,592	18,618	22,210
1999	5,304	34,753	40,057	50,910	37,652	82,945	171,507	3,743	20,137	23,880
2000	4,958	37,015	41,973	58,617	35,978	101,988	196,583	3,962	22,741	26,703
2001	9,345	34,586	43,931	34,409	18,004	77,922	130,335	4,283	18,946	23,229
2002	6,875	38,560	45,435	53,261	27,811	62,186	143,258	4,355	27,636	31,991
2003	7,646	33,951	41,597	45,450	36,590	108,981	191,021	4,453	26,968	31,421
2004	8,134	43,002	51,136	52,364	27,884	59,458	139,706	4,165	29,705	33,870
2005	7,669	37,819	45,488	47,512	44,599	128,249	220,360	4,251	23,344	27,595
2006	7,789	35,516	43,305	54,527	43,079	128,210	225,816	4,209	23,275	27,484
2007	10,957	47,300	58,257	40,157	24,391	75,382	139,930	3,776	27,740	31,516
2008	13,292	41,320	54,612	41,186	22,902	59,160	123,248	3,402	18,393	21,795
2009	10,904	30,950	41,854	31,087	19,496	76,363	126,946	3,801	15,452	19,253
2010	12,417	30,816	43,233	47,343	22,571	107,871	177,785	3,757	17,775	21,532
2011	11,314	27,995	39,309	52,726	36,610	129,062	218,398	3,819	32,945	36,764
2012	9,907	29,347	39,254	55,239	20,831	63,794	139,864	3,944	19,474	23,418
2013	12,538	35,869	48,407	44,856	23,640	84,623	153,119	3,681	18,018	21,699
2014	14,164	19,679	33,843	34,296	30,066	67,446	131,808	3,206	16,757	19,963
2015	11,199	23,836	35,035	32,432	27,259	82,888	142,579	3,438	11,673	15,111
2016	8,993	23,605	32,598	53,484	27,357	107,164	188,005	4,199	35,537	39,736
2017	8,225	28,265	36,490	56,458	29,036	127,155	212,649	2,845	51,105	53,950
2018	11,682	35,072	46,754	39,523	18,161	121,736	179,420	2,427	28,348	30,775
2019	11,285	31,482	42,767	52,296	21,731	104,985	179,012	2,642	20,557	23,199
2020	12,591	27,658	40,249	21,406	25,351	86,153	132,910	4,644	6,823	11,467
2021	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,256	27,292	40,548
2022	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,294	27,292	40,586
2023	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,370	27,292	40,662
2024	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,406	27,292	40,698
2025	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,406	27,292	40,698
2026	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,406	27,292	40,698
2027	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,406	27,292	40,698
2028	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,406	27,292	40,698
2029	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,406	27,292	40,698
2030	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,406	27,292	40,698
2031	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,406	27,292	40,698
2032	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,406	27,292	40,698
2033	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,406	27,292	40,698
2034	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,406	27,292	40,698
2035	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,406	27,292	40,698
TOTAL	628,688	1,398,090	2,026,778	2,216,357	1,540,698	5,489,976	9,247,031	288,685	950,026	1,238,711

¹ For the period June 1962 through November 1967, deliveries were supplied by non-project water

² For the period 1968 through 1987, deliveries are non-project water pumped through an interim facility.

TABLE B-5B Annual Water Quantities Delivered to Each Contractor (acre-feet)

Sheet 2 of 4

Calendar Year	SAN JOAQUIN VALLEY AREA								
	Dudley Ridge	Empire	Kern			Kings	Oak Flat	Tulare	Total
			Municipal and Industrial	Agricultural	Total				
[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	
1962	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0
1968	26,360	1,978	0	127,384	127,384	900	3,084	25,100	184,806
1969	31,375	56	0	141,265	141,265	100	3,016	9,923	185,735
1970	40,407	3,942	0	204,634	204,634	0	5,911	9,578	264,472
1971	41,053	5,990	0	360,151	360,151	3,700	7,212	122,485	540,591
1972	42,443	5,795	0	490,781	490,781	1,400	8,166	258,393	806,978
1973	22,057	3,000	0	341,469	341,469	1,500	3,214	50,464	421,704
1974	33,390	3,000	23,708	323,292	347,000	1,500	3,471	72,289	460,650
1975	40,555	3,000	14,529	396,291	410,820	1,600	3,576	86,258	545,809
1976	41,421	3,000	46,719	392,531	439,250	1,600	4,112	58,811	548,194
1977	11,153	738	27,882	163,425	191,307	1,530	1,472	18,081	224,281
1978	51,747	454	76,895	590,452	667,347	2,070	3,906	12,053	737,577
1979	38,544	1,739	62,997	683,049	746,046	2,000	6,149	155,121	949,599
1980	41,000	894	45,943	588,557	634,500	2,200	5,700	75,444	759,738
1981	41,000	5,859	75,758	615,642	691,400	2,300	4,300	83,438	828,297
1982	41,000	361	47,477	697,823	745,300	1,750	3,838	18,551	810,800
1983	42,900	0	6,854	587,653	594,507	3,550	3,822	1,006	645,785
1984	45,100	0	90,904	769,696	860,600	3,100	5,700	5,743	920,243
1985	46,251	5,197	88,515	800,381	888,896	3,400	5,433	109,791	1,058,968
1986	50,249	1,170	77,240	829,101	906,341	3,700	5,107	79,355	1,045,922
1987	46,288	2,525	117,174	852,731	969,905	4,000	5,625	93,084	1,121,427
1988	47,994	3,475	122,409	887,111	1,009,520	4,000	4,412	95,866	1,165,267
1989	57,049	3,000	123,896	1,022,166	1,146,062	4,000	6,091	127,950	1,344,152
1990	36,296	1,279	127,837	584,611	712,448	2,000	2,922	57,070	812,015
1991	927	221	33,122	8,965	42,087	0	141	2,180	45,556
1992	23,770	1,354	62,326	420,894	483,220	1,806	2,239	46,728	559,117
1993	50,618	2,741	128,316	1,039,614	1,167,930	4,000	4,858	124,468	1,354,615
1994	28,793	1,666	87,139	570,020	657,159	2,116	3,071	62,362	755,167
1995	60,686	1,631	135,415	1,016,114	1,151,529	4,000	5,169	101,869	1,324,884
1996	56,948	1,868	135,654	1,049,409	1,185,063	4,000	4,904	236,875	1,489,658
1997	71,308	0	120,708	987,451	1,108,159	0	5,238	22,369	1,207,074
1998	55,650	542	89,765	768,825	858,590	15	4,401	20,677	939,875
1999	59,697	3,176	138,153	1,039,985	1,178,138	4,000	4,871	289,735	1,539,617
2000	60,539	1,799	40,697	1,183,440	1,224,137	3,600	4,508	201,294	1,495,877
2001	41,902	1,360	3,116	651,175	654,291	1,560	3,592	84,726	787,431
2002	48,915	1,405	12,589	812,870	825,459	2,854	4,885	96,502	980,020
2003	46,082	1,436	47,070	917,160	964,230	3,692	4,266	105,841	1,125,547
2004	49,080	3,562	126,933	712,193	839,126	9,053	4,629	90,021	995,471
2005	79,005	3,834	69,594	1,328,387	1,397,981	19,806	4,194	140,279	1,645,099
2006	72,080	3,282	98,199	1,164,671	1,262,870	9,530	4,242	108,207	1,460,211
2007	45,135	2,084	79,144	949,601	1,028,745	5,746	3,567	87,083	1,172,360
2008	22,174	947	24,572	702,099	726,671	3,836	1,985	33,904	789,517
2009	21,237	1,034	2,912	779,826	782,738	3,391	1,993	36,836	847,229
2010	27,967	3,259	8,183	689,917	698,100	4,679	2,906	70,238	807,149
2011	60,560	1,915	37,112	1,157,336	1,194,448	6,556	2,715	63,141	1,329,335
2012	30,450	2,242	27,500	778,144	805,644	7,405	3,208	95,717	944,666
2013	27,046	1,567	33,501	711,840	745,341	4,645	2,820	48,361	829,780
2014	40,535	516	1	516,001	516,002	1,256	1,520	8,934	568,763
2015	41,733	624	11,976	508,842	520,818	1,229	1,077	17,336	582,817
2016	20,908	1,822	9,633	634,649	644,282	3,660	1,855	42,387	714,914
2017	64,245	1,698	35,965	1,159,922	1,195,887	6,645	2,893	61,920	1,333,288
2018	41,006	1,591	4,207	608,151	612,358	3,713	2,289	51,451	712,408
2019	33,030	1,938	10,197	970,487	980,684	4,929	2,184	93,273	1,116,038
2020	21,758	1,108	8,914	481,842	490,756	4,044	2,243	24,417	544,326
2021	26,169	1,800	59,322	533,816	593,138	5,583	3,420	52,483	682,593
2022	26,169	1,800	59,322	533,816	593,138	5,583	3,420	52,483	682,593
2023	26,169	1,800	59,322	533,816	593,138	5,583	3,420	52,483	682,593
2024	26,169	1,800	59,322	533,816	593,138	5,583	3,420	52,483	682,593
2025	26,169	1,800	59,322	533,816	593,138	5,583	3,420	52,483	682,593
2026	26,169	1,800	59,322	533,816	593,138	5,583	3,420	52,483	682,593
2027	26,169	1,800	59,322	533,816	593,138	5,583	3,420	52,483	682,593
2028	26,169	1,800	59,322	533,816	593,138	5,583	3,420	52,483	682,593
2029	26,169	1,800	59,322	533,816	593,138	5,583	3,420	52,483	682,593
2030	26,169	1,800	59,322	533,816	593,138	5,583	3,420	52,483	682,593
2031	26,169	1,800	59,322	533,816	593,138	5,583	3,420	52,483	682,593
2032	26,169	1,800	59,322	533,816	593,138	5,583	3,420	52,483	682,593
2033	26,169	1,800	59,322	533,816	593,138	5,583	3,420	52,483	682,593
2034	26,169	1,800	59,322	533,816	593,138	5,583	3,420	52,483	682,593
2035	26,169	1,800	59,322	533,816	593,138	5,583	3,420	52,483	682,593
TOTAL	2,611,951	135,674	3,689,180	44,777,266	48,466,446	267,411	256,002	4,882,230	56,619,714

TABLE B-5B Annual Water Quantities Delivered to Each Contractor (acre-feet)

Calendar Year	SOUTHERN CALIFORNIA AREA									
	AVEK	Coachella	Crestline	Desert	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel	San Gorgonio
	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0
1972	53	0	464	0	338	55	0	1,275	0	0
1973	20	5,800	389	9,000	290	0	0	32,426	0	0
1974	1,259	6,400	627	10,000	400	14	0	16,605	612	0
1975	8,068	7,000	825	11,000	520	0	0	13,865	5,450	0
1976	27,782	7,600	1,002	12,000	589	0	0	12,273	6,071	0
1977	11,202	0	1,109	0	111	80	0	24,833	8,996	0
1978	44,137	10,084	1,209	15,300	208	0	0	4,055	7,771	0
1979	60,493	10,063	1,260	15,000	133	4,000	0	18	290	0
1980	72,407	10,884	1,239	17,000	191	4,000	0	0	1,085	0
1981	79,375	12,105	1,485	19,000	1,270	4,000	0	16,021	3,619	0
1982	50,291	13,326	1,238	21,000	0	10,500	0	8,409	12,599	0
1983	32,961	14,547	911	23,000	38	0	0	5,994	734	0
1984	32,662	15,768	1,128	25,000	1	0	0	5,556	7,656	0
1985	37,064	16,989	1,422	27,000	0	0	1,558	7,390	5,028	0
1986	32,449	18,210	1,506	29,000	163	0	3,096	6,421	9,454	0
1987	34,089	19,431	1,849	31,500	1,085	17	5,379	18,751	10,630	0
1988	34,079	20,652	2,006	34,000	419	9	1,770	21,386	8,948	0
1989	45,280	21,873	2,170	36,500	971	200	9,009	20,782	12,839	0
1990	47,206	23,100	1,827	38,100	1,747	0	8,608	18,831	16,649	0
1991	9,568	6,930	849	11,430	522	3,423	3,914	3,661	5,399	0
1992	30,265	10,427	519	17,197	251	10,686	4,035	3,358	7,908	0
1993	43,102	23,100	439	38,100	734	11,514	7,761	4,361	14,397	0
1994	49,153	14,102	785	23,257	1,098	16,852	8,418	9,135	15,230	0
1995	47,286	23,100	409	38,100	480	8,722	6,961	696	12,922	0
1996	56,356	62,219	485	102,622	494	7,427	11,434	6,064	15,989	0
1997	62,393	68,340	651	69,990	444	10,374	11,861	9,654	18,175	0
1998	52,926	85,709	187	70,647	404	3,925	8,752	1,878	9,310	0
1999	69,073	50,480	1,132	58,100	342	8,144	13,278	12,874	21,729	0
2000	83,577	42,323	1,194	58,234	0	11,380	9,060	18,399	15,140	0
2001	62,857	9,100	1,057	15,010	0	4,433	10,427	26,488	2,360	0
2002	58,171	16,755	2,189	27,640	0	4,346	18,496	72,069	24,851	0
2003	60,029	14,443	1,563	23,819	0	14,435	11,547	26,113	21,934	116
2004	59,731	15,465	2,006	21,190	0	13,176	12,162	57,030	12,541	841
2005	59,831	42,519	807	49,089	0	13,561	11,712	31,493	13,984	749
2006	80,384	121,100	641	50,000	0	34,014	12,492	35,172	16,284	4,437
2007	80,203	73,228	1,768	30,234	0	46,109	19,634	56,997	4,024	4,054
2008	54,436	46,791	848	26,428	25	25,396	14,255	34,858	7,212	5,192
2009	45,670	46,022	894	18,263	42	29,047	15,339	39,072	11,520	6,671
2010	58,489	85,592	357	31,183	0	38,152	10,969	49,256	19,180	8,363
2011	94,046	90,279	474	36,379	0	5,099	16,881	38,017	23,591	10,612
2012	111,207	117,587	624	45,101	0	11,244	18,897	112,808	22,058	11,174
2013	51,022	66,539	1,368	20,791	0	7,483	10,567	31,905	9,252	9,625
2014	18,532	12,870	1,233	3,049	0	3,581	8,406	10,854	1,200	5,146
2015	14,308	37,596	1,253	11,217	0	8,830	5,836	23,926	5,760	3,935
2016	41,356	69,422	1,084	21,893	0	22,283	10,516	61,649	16,088	11,463
2017	124,284	83,908	897	31,636	0	34,815	14,210	77,598	22,056	15,844
2018	72,341	139,089	1,193	47,746	0	5,471	10,210	43,498	17,055	13,175
2019	78,057	34,588	75	13,938	226	21,930	12,066	78,478	23,220	14,329
2020	18,723	108,928	2,019	36,238	411	8,062	4,192	23,510	4,543	8,006
2021	86,906	83,010	3,480	33,450	1,380	32,149	18,780	61,560	17,280	10,380
2022	86,906	83,010	3,480	33,450	1,380	32,170	18,780	61,560	17,280	10,380
2023	86,906	83,010	3,480	33,450	1,380	32,193	18,780	61,560	17,280	10,380
2024	86,906	83,010	3,480	33,450	1,380	32,219	18,780	61,560	17,280	10,380
2025	86,906	83,010	3,480	33,450	1,380	32,219	18,780	61,560	17,280	10,380
2026	86,906	83,010	3,480	33,450	1,380	32,219	18,780	61,560	17,280	10,380
2027	86,906	83,010	3,480	33,450	1,380	32,219	18,780	61,560	17,280	10,380
2028	86,906	83,010	3,480	33,450	1,380	32,219	18,780	61,560	17,280	10,380
2029	86,906	83,010	3,480	33,450	1,380	32,219	18,780	61,560	17,280	10,380
2030	86,906	83,010	3,480	33,450	1,380	32,219	18,780	61,560	17,280	10,380
2031	86,906	83,010	3,480	33,450	1,380	32,219	18,780	61,560	17,280	10,380
2032	86,906	83,010	3,480	33,450	1,380	32,219	18,780	61,560	17,280	10,380
2033	86,906	83,010	3,480	33,450	1,380	32,219	18,780	61,560	17,280	10,380
2034	86,906	83,010	3,480	33,450	1,380	32,219	18,780	61,560	17,280	10,380
2035	86,906	83,010	3,480	33,450	1,380	32,219	18,780	61,560	17,280	10,380
TOTAL	3,701,843	3,097,533	104,866	1,923,671	34,647	949,929	645,408	2,159,162	792,543	289,432

TABLE B-5B Annual Water Quantities Delivered to Each Contractor (acre-feet)

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA				South Bay Area Future Contractor	GRAND TOTAL
	Santa Clarita ^{3,4}	Metropolitan	Ventura	Total	Yuba City	Butte	Plumas	Total		
	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]
1962	0	0	0	0	0	0	0	0	0	8,906
1963	0	0	0	0	0	0	0	0	0	12,645
1964	0	0	0	0	0	0	0	0	0	20,911
1965	0	0	0	0	0	0	0	0	0	34,026
1966	0	0	0	0	0	0	0	0	0	54,913
1967	0	0	0	0	0	0	0	0	0	56,763
1968	7,382	0	0	7,382	0	0	0	0	0	294,457
1969	9,970	0	0	9,970	0	0	0	0	0	268,104
1970	11,739	0	0	11,739	0	0	70	70	0	369,459
1971	12,490	0	0	12,490	0	192	64	256	0	654,442
1972	13,905	71,938	0	88,028	0	186	505	691	0	1,037,770
1973	9,418	159,883	0	217,226	0	53	679	732	0	737,532
1974	9,700	277,717	0	323,334	0	127	648	775	0	878,947
1975	10,700	526,491	0	583,919	0	253	405	658	0	1,230,830
1976	11,700	618,451	0	697,468	0	527	382	909	0	1,380,124
1977	5,075	189,755	0	241,161	0	706	303	1,009	0	582,381
1978	11,362	507,565	0	601,691	0	579	278	857	0	1,458,733
1979	19,145	477,074	0	587,476	0	302	329	631	0	1,666,457
1980	15,092	531,727	0	653,625	0	267	295	562	0	1,536,456
1981	18,461	795,846	0	951,182	0	221	355	576	0	1,918,563
1982	22,216	691,192	0	830,771	0	334	305	639	0	1,750,862
1983	22,135	343,521	0	443,841	0	325	262	587	0	1,187,156
1984	24,218	457,582	0	569,571	108	177	272	557	0	1,591,416
1985	24,500	683,625	0	804,576	62	308	254	624	0	1,990,295
1986	27,229	708,840	0	836,368	328	313	317	958	0	1,999,155
1987	27,988	712,424	0	863,143	88	459	452	999	0	2,131,608
1988	30,438	902,564	0	1,056,271	303	385	523	1,211	0	2,385,122
1989	36,364	1,156,698	0	1,342,686	403	300	486	1,189	0	2,853,747
1990	28,579	1,396,423	4,836	1,585,906	494	380	548	1,422	0	2,582,151
1991	4,562	391,447	988	442,693	265	328	420	1,013	0	549,113
1992	20,699	710,313	0	815,658	642	117	485	1,244	0	1,471,454
1993	23,039	652,190	0	818,737	746	256	444	1,446	0	2,315,235
1994	26,441	807,866	0	972,337	1,035	329	492	1,856	0	1,861,976
1995	27,233	436,042	0	601,951	910	203	308	1,421	0	2,031,423
1996	32,500	593,380	0	888,970	820	257	360	1,437	0	2,543,472
1997	27,712	721,810	1,850	1,003,254	1,005	185	231	1,421	0	2,405,444
1998	20,093	410,065	1,850	665,746	1,054	527	0	1,581	0	1,764,963
1999	32,899	852,617	1,850	1,122,518	1,096	286	0	1,382	0	2,898,961
2000	40,680	1,522,412	4,050	1,806,449	901	586	0	1,487	0	3,569,072
2001	31,939	1,023,169	1,850	1,188,690	1,065	513	0	1,578	0	2,175,194
2002	68,817	1,408,919	4,998	1,707,251	1,181	419	0	1,600	0	2,909,555
2003	55,736	1,701,615	5,000	1,936,350	1,324	551	0	1,875	0	3,327,811
2004	83,761	1,724,380	5,250	2,007,533	1,434	1,440	0	2,874	0	3,230,590
2005	59,456	1,528,045	1,665	1,812,911	1,894	527	0	2,421	0	3,753,874
2006	62,752	1,512,186	1,850	1,931,312	5,342	468	0	5,810	0	3,693,938
2007	60,190	1,499,688	3,000	1,879,129	2,327	956	0	3,283	0	3,284,475
2008	42,878	898,313	3,798	1,160,430	1,923	451	243	2,617	0	2,152,219
2009	42,085	930,871	3,891	1,189,387	2,114	581	200	2,895	0	2,227,564
2010	57,900	1,420,331	4,075	1,783,847	2,331	807	243	3,381	0	2,836,927
2011	33,191	1,686,570	4,000	2,039,139	2,297	1,092	98	3,487	0	3,666,432
2012	50,473	1,224,907	4,353	1,730,433	2,695	1,374	79	4,148	0	2,881,783
2013	61,754	892,550	2,890	1,165,746	4,850	908	366	6,124	0	2,224,875
2014	29,448	387,392	93	481,804	4,237	1,617	251	6,105	0	1,242,286
2015	29,189	573,526	1,000	716,376	3,004	2,763	285	6,052	0	1,497,970
2016	37,828	1,083,900	3,000	1,380,482	1,229	2,518	387	4,134	0	2,359,869
2017	83,622	1,626,357	14,251	2,129,478	1,746	2,320	363	4,429	0	3,770,284
2018	42,897	679,544	1,750	1,073,969	1,715	3,029	508	5,252	0	2,048,578
2019	48,345	1,347,162	19,538	1,691,952	1,655	2,955	436	5,046	0	3,058,014
2020	52,702	399,706	8,837	675,877	4,900	3,177	405	8,482	0	1,413,311
2021	57,120	1,146,900	12,000	1,564,395	5,760	270	730	6,760	0	2,473,936
2022	57,120	1,146,900	12,000	1,564,416	5,760	270	730	6,760	0	2,473,995
2023	57,120	1,146,900	12,000	1,564,439	5,760	270	730	6,760	0	2,474,094
2024	57,120	1,146,900	12,000	1,564,465	5,760	270	730	6,760	0	2,474,156
2025	57,120	1,146,900	12,000	1,564,465	5,760	270	730	6,760	0	2,474,156
2026	57,120	1,146,900	12,000	1,564,465	5,760	270	730	6,760	0	2,474,156
2027	57,120	1,146,900	12,000	1,564,465	5,760	270	730	6,760	0	2,474,156
2028	57,120	1,146,900	12,000	1,564,465	5,760	270	730	6,760	0	2,474,156
2029	57,120	1,146,900	12,000	1,564,465	5,760	270	730	6,760	0	2,474,156
2030	57,120	1,146,900	12,000	1,564,465	5,760	270	730	6,760	0	2,474,156
2031	57,120	1,146,900	12,000	1,564,465	5,760	270	730	6,760	0	2,474,156
2032	57,120	1,146,900	12,000	1,564,465	5,760	270	730	6,760	0	2,474,156
2033	57,120	1,146,900	12,000	1,564,465	5,760	270	730	6,760	0	2,474,156
2034	57,120	1,146,900	12,000	1,564,465	5,760	270	730	6,760	0	2,474,156
2035	57,120	1,146,900	12,000	1,564,465	5,760	270	730	6,760	0	2,474,156
TOTAL	2,557,427	59,060,089	290,513	75,607,063	145,923	41,984	25,286	213,193	0	144,952,490

³ Devil's Den Water District merged with Castaic Lake Water Agency effective January 1, 1992.

⁴ Castaic Lake Water Agency's SWP Water Supply Contract was transferred to Santa Clarita Valley Water Agency effective November 2, 2018

Diversions from the Delta

The SWP diverts water from the Sacramento-San Joaquin Delta (Delta), through the Barker Slough and Banks pumping plants, for delivery to SWP water contractors' storage facilities. The SWP diverts water from Barker Slough Pumping Plant to the North Bay Aqueduct. Water is delivered from Banks Pumping Plant to the South Bay Area through the South Bay Aqueduct, and to the San Joaquin Valley, Central Coastal, and Southern California areas through the California Aqueduct. The Central Valley Project (CVP) diverts water to similar areas from the Delta through Jones Pumping Plant and Contra Costa Pumping Plant.

In 2017, the North Bay Aqueduct received 38,129 af of water from the Barker Slough Pumping Plant.

Figure 8-6 shows the amounts of water pumped each month for 2017 at Banks Pumping Plant, totaling 3,434,071 af. Of this amount, the SWP diverted 3,419,171 af. There was no water pumped for the Cross Valley Canal, and 14,900 af was wheeled for the CVP.

The CVP diverted 2,794,654 af at Jones Pumping Plant and 115,521 af at Contra Costa Pumping Plant in 2017.

The combined Delta exports include all of these plants. Figure 8-7 shows the monthly amounts of water diverted from the Delta in 2017 by the SWP and CVP. Maximum daily Delta exports occurred on February 2 at 29,136 af. Combined SWP and CVP monthly Delta exports in 2017 varied from a low of 286,131 af in March, to a high of 718,279 af in January. Delta exports totaled approximately 6.3 maf in 2017.

Figure 8-8 shows monthly total amounts pumped at Dos Amigos Pumping Plant for 2017. Dos Amigos Pumping Plant diverts

water from O'Neill Forebay to the California Aqueduct. Dos Amigos pumped the largest amount in August at 555,316 af.

Figure 8-9 shows the amount of water pumped each month in 2017 at Edmonston Pumping Plant. Water pumped through the Edmonston Pumping Plant for delivery to Southern California totaled 1,965,395 af.

2016 Southern Reservoir Operations

During normal operating conditions, DWR maintains its four southern reservoirs—Pyramid, Castaic, Silverwood, and Perris—at or near full operating capacity to ensure uninterrupted delivery of water to Southern California SWP water contractors.

At the beginning of 2016, these reservoirs held 409,546 af, which is 59 percent of their combined normal maximum operating capacity of 689,021 af. At the end of 2016, the reservoirs held 468,256 af, 68 percent of combined normal maximum operating capacity.

Diversions from the Delta

The SWP diverts water from the Sacramento-San Joaquin Delta, through the Barker Slough and Banks pumping plants, for delivery to SWP water contractors' storage facilities. The SWP diverts water from Barker Slough Pumping Plant to the North Bay Aqueduct. Water is delivered from Banks Pumping Plant to the South Bay Area through the South Bay Aqueduct, and to the San Joaquin Valley, Central Coastal, and Southern California areas through the California Aqueduct. The Central Valley Project (CVP) diverts water to similar areas from the Delta through Jones Pumping Plant and Contra Costa Pumping Plant.

In 2016, the North Bay Aqueduct received 33,150 af of water from the Barker Slough Pumping Plant.

Figure 8-6 shows the amounts of water pumped each month for 2016 at Banks Pumping Plant, totaling 2,595,218 af. Of this amount, the SWP diverted 2,591,228 af. There was 3,990 af pumped for the Cross Valley Canal, and no water was wheeled for the CVP.

The CVP diverted 1,749,325 af at Jones Pumping Plant and 137,244 af at Contra Costa Pumping Plant in 2016.

The combined Delta exports include all of these plants. Figure 8-7 shows the monthly amounts of water diverted from the Delta in 2016 by the SWP and CVP. Maximum daily Delta exports occurred on September 7 at 23,580 af. Combined SWP and CVP monthly Delta exports in 2016 varied from a low of 116,211 af in April, to a high of 604,503 af in August. Delta exports totaled approximately 4.5 maf in 2016.

Figure 8-8 shows monthly total amounts pumped at Dos Amigos Pumping Plant for 2016. Dos Amigos Pumping Plant diverts water from O'Neill Forebay to the California Aqueduct. Dos Amigos pumped the largest amount in June at 365,112 af.

Figure 8-9 shows the amount of water pumped each month in 2016 at Edmonston Pumping Plant. Water pumped through the Edmonston Pumping Plant for delivery to Southern California totaled 1,310,458 af.

2015 Southern Reservoir Operations

During normal operating conditions, DWR maintains its four southern reservoirs—Pyramid, Castaic, Silverwood, and Perris—at or near full operating capacity to ensure uninterrupted delivery of water to Southern California SWP water contractors.

At the beginning of 2015, these reservoirs held 406,879 af, which is 59 percent of their combined normal maximum operating capacity of 689,021 af. At the end of 2015, the reservoirs held 409,546 af, 59 percent of combined normal maximum operating capacity.

Diversions from the Delta

The SWP diverts water from the Sacramento-San Joaquin Delta, through the Barker Slough and Banks pumping plants, for delivery to SWP water contractors' storage facilities. The SWP diverts water from Barker Slough Pumping Plant to the North Bay Aqueduct. Water is delivered from Banks Pumping Plant to the South Bay Area through the South Bay Aqueduct, and to the San Joaquin Valley, Central Coastal, and Southern California areas through the California Aqueduct. The Central Valley Project (CVP) diverts water to similar areas from the Delta through Jones Pumping Plant and Contra Costa Pumping Plant.

In 2015, the North Bay Aqueduct received 35,179 af of water from the Barker Slough Pumping Plant.

Figure 8-6 shows the amounts of water pumped each month for 2015 at Banks Pumping Plant, totaling 845,801 af. Of this amount, the SWP diverted 837,421 af. There was no pumping for the Cross Valley Canal, and 8,380 af was wheeled for the CVP. All CVP pumping at Banks Pumping Plant occurred in May and August.

The CVP diverted 688,723 af at Jones Pumping Plant and 71,621 af at Contra Costa Pumping Plant in 2015.

The combined Delta exports include all of these plants. Figure 8-7 shows the monthly amounts of water diverted from the Delta in 2015 by the SWP and CVP. Maximum daily Delta exports occurred on February 12 at 13,797 af. Combined SWP and CVP monthly Delta exports in 2015 varied from a low of 42,300 af in July, to a high of 318,941 af in January. Delta exports totaled approximately 1.6 maf in 2015.

Figure 8-8 shows monthly total amounts pumped at Dos Amigos Pumping Plant for 2015. Dos Amigos Pumping Plant diverts water from O'Neill Forebay to the California Aqueduct. Dos Amigos pumped the largest amount in July at 190,325 af.

Figure 8-9 shows the amount of water pumped each month in 2015 at Edmonston Pumping Plant. Water pumped through the Edmonston Pumping Plant for delivery to Southern California totaled 735,381 af.

Additional water supply information can be found on DWR's website.

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

STATEMENT OF CLARIFICATION

This preliminary edition presents a comparison of alternative solutions to the Delta problems. This bulletin shows that the Single Purpose Delta Water Project is the essential minimum project for successful operation of the State Water Facilities. This bulletin also presents, for local consideration, optional modifications of the Single Purpose Delta Water Project which would provide additional local benefits.

The evaluation of project accomplishments, benefit-cost ratios, and costs of project services, are intended only to indicate the relative merit of these solutions and should not be considered in terms of absolute values. Benefits related to recreation are evaluated for comparative purposes. Detailed recreation studies, presently in progress, will indicate specific recreation benefits.

Subsequent to local review and public hearings on this preliminary edition, a final edition will be prepared setting forth an adopted plan. The adopted plan will include, in addition to the essential minimum facilities, those justifiable optional modifications requested by local entities.

Bulletin No. 76

REPORT TO THE
CALIFORNIA STATE LEGISLATURE

ON THE

DELTA WATER FACILITIES

John A. Wilson

AS AN INTEGRAL FEATURE OF

THE STATE WATER RESOURCES DEVELOPMENT SYSTEM

EDMUND G. BROWN
Governor



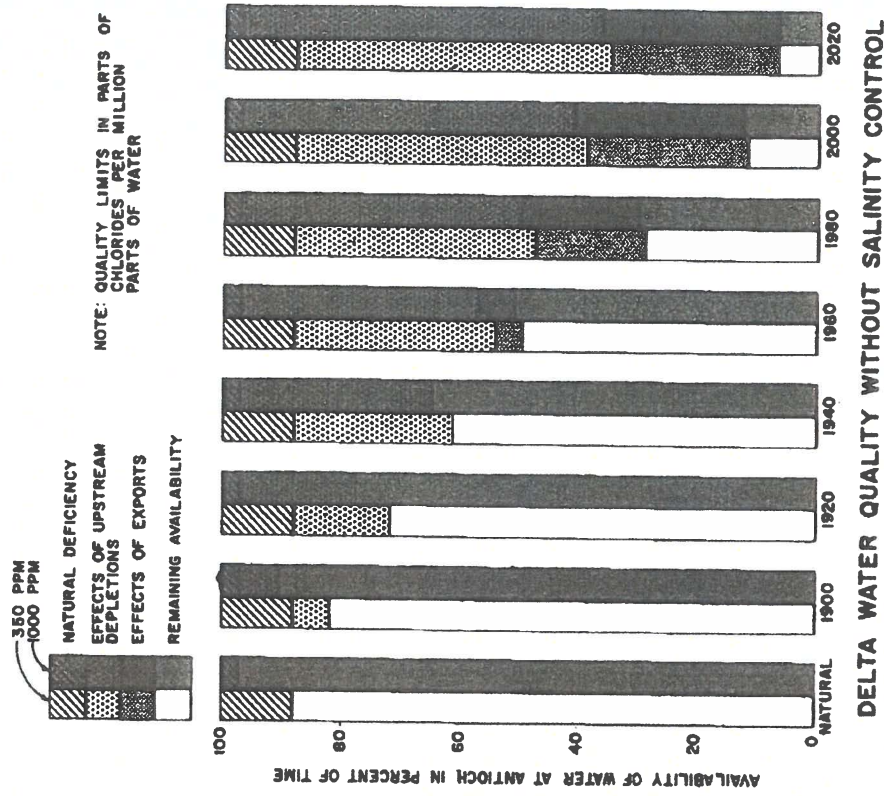
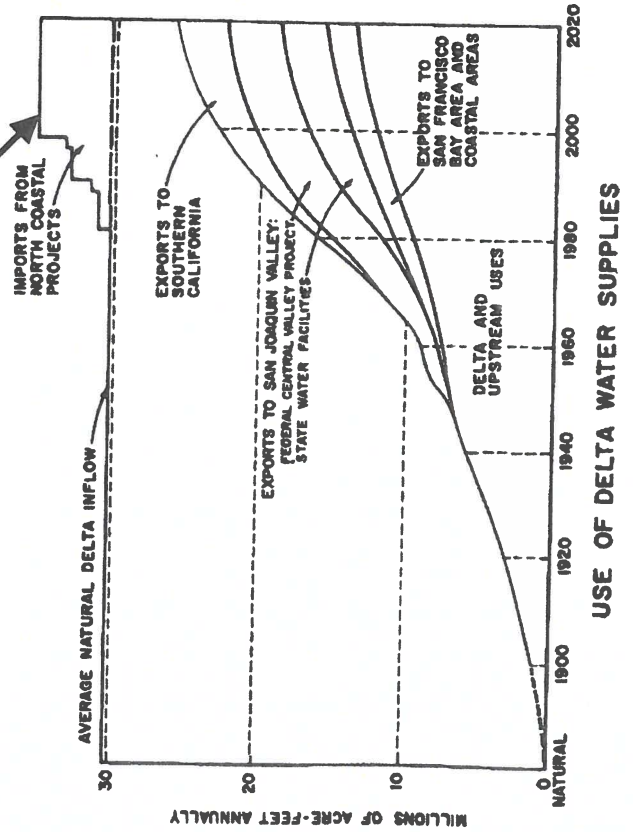
HARVEY O. BANKS
Director

December, 1960

Exhibit H

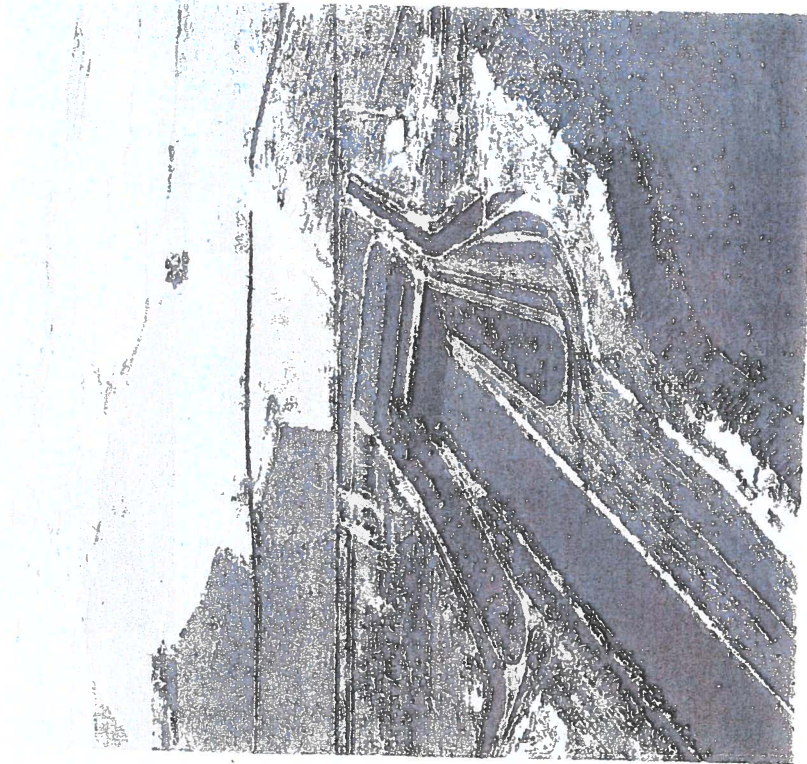
The natural availability of good quality water in the Delta is directly related to the amount of surplus water which flows to the ocean. The graph to the right indicates the historic and projected availability of water in the San Joaquin River at Antioch containing less than 350 and 1,000 parts chlorides per million parts water, under long-term average runoff and *without* specific releases for salinity control. It may be noted that even under natural conditions, before any significant upstream water developments, there was a deficiency of water supplies within the specified quality limits. It is anticipated that, without salinity control releases, upstream depletions by the year 2020 will have reduced the availability of water containing less than 1,000 ppm chlorides by about 60 percent, and that exports will have caused an additional 30 percent reduction.

**5 million acre ft per year
Not Developed**



The magnitude of the past and anticipated future uses of water in areas tributary to the Delta, except the Tulare Lake Basin, is indicated in the diagram to the left. It may be noted that, while the present upstream use accounts for reduction of natural inflow to the Delta by almost 25 percent, upstream development during the next 60 years will deplete the inflow by an additional 20 percent. By that date about 22 percent of the natural water supply reaching the Delta will be exported to areas of deficiency by local, state, and federal projects. In addition, economical development of water supplies will necessitate importation of about 5,000,000 acre-feet of water seasonally to the Delta from north coastal streams for transfer to areas of deficiency.

The coordinated use of surplus water in and tributary to the Delta and of regulated or imported supplements to this supply, as required, is referred to as the Delta Pooling Concept. Under this concept of operation the State will ensure a continued supply of water adequate in quantity and quality to meet the needs of export water users. Advantage will be taken of surplus water available in the Delta, and as the demand for water increases and the available surplus supply is reduced by further upstream uses, the State will assume the responsibility of guaranteeing a firm supply of water, which will be accomplished by construction of additional storage facilities and import works. At the same time, the water needs of the Delta will be fully met.



Tracy Pumping Plant

Full demands on the State Water Resources Development system can be met until about 1981 from surplus water in and tributary to the Delta with regulation by the proposed Oroville and San Luis Reservoirs. However, upstream depletions will reduce the available surplus supplies and water will have to be imported from north coastal sources after that year. It is anticipated that coordinated operation of the State Water Resources Development System and the Federal Central Valley Project will afford a limited increase in usable surplus Delta supplies beginning in 1981. As indicated in the chart, upstream depletions will continue to decrease the available surplus supplies.

