§ 875 Curtailments Due to Lack of Water Availability

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

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

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

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

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

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

(3) Water availability projections based on:

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

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

iii. Stream gage data, where available; or

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

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

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

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

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

§ 878.1 Minimum Health and Safety Needs

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

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

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

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

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

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

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

(B) The diversion is necessary to achieve the minimum amount of water necessary for health and safety, up to 50 gallons per person per

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

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

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

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

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

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

(2) To the extent that a diversion for domestic or municipal use requires more than 50 gallons per person, per day to meet minimum health and safety needs, or for

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

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

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

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

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

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

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

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

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

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

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

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

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

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

§ 878.3 Alternative Water Sharing Agreements

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

on fish and wildlife. The Executive Director may approve a petition, subject to conditions appropriate to ensure that the standard of approval are met, including reporting requirements. Diversions covered by an approved agreement pursuant to this section are subject to this article and violations of such approved agreement shall be subject to enforcement as a violation of this article or as an unauthorized diversion or use.

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

§ 879. Reporting

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

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

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

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

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

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

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

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

(1) how the diverter complies with any conditions of continued diversion, including

the conditions of certification under section 878.1, subdivision (~~b~~c)(1);

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

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

(4) efforts to obtain alternate water sources;

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

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

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

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

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

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

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

(iii) the date diversion ceased, if applicable.

FINDING OF EMERGENCY

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

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

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

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

Emergency Regulations Statutes

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

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

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

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

Evidence of Emergency

Hydrology and Water Supplies

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

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

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

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

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

Planning and Responses to the Drought

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

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

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

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

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

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

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

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

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

Need for the Regulation

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

Water Rights Framework

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

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

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

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

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

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

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

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

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

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

Need for Emergency Curtailment Regulations

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

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

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

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

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

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

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

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

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

Minimum Health and Safety Needs

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

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

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

Curtailment Analysis Methodology

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

Projected Supply

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

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

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

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

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

Estimated Diverter Demand

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

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

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

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

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

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

Other Information

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

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

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

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

Curtailment Projections Analysis

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

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

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

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

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

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

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

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

Adjustment of Curtailments

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

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

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

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

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

Informative Digest

Summary of Existing Laws and Regulations

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

Description and Effect of Proposed Regulation

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

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

Proposed Emergency Regulation Section 875

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

Proposed Emergency Regulation Section 878.1

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

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

Proposed Emergency Regulation Section 878.3

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

Proposed Amendments to Section 879

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

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

Information Relied Upon

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Authority and Reference Citations

For Section 875

Authority: Sections 1058, 1058.5, Water Code

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

For Section 878.1

Authority: Sections 1058, 1058.5 Water Code

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

For Section 878.3

Authority: Sections 1058, 1058.5, Water Code

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

For Section 879

Authority: Sections 1058, 1058.5, Water Code

Reference: Sections 186, 187, 879 Water Code

Mandate on Local Agencies or School Districts

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

Suspension of California Environmental Quality Act

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

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

Cost Estimate

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

Fiscal Effect Without Section 878.1

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

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

Fiscal Effect With the Health and Safety Exception

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

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

Appendix 10 provides more background information on the proposed estimate.

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

Appendices 1 through 9

are located in a separate file named:

State Water Board Statewide Emergency Regulations Appendices 1-9.

Appendix 10: Public Agency and Government Fiscal Impact Analysis

Summary

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

Fiscal Effect without Section 878.1

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

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

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

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

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

Analysis of Fiscal Effects without Section 878.1

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

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

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

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

Analysis of Fiscal Effects with Section 878.1

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

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

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

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

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

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

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

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

It is estimated that the municipal utilities servicing the remaining 6.6 million residents in California obtain about 40% of their supply from surface water diversions during drought years (Carle 2004). So for the approximately 2.6 million residents relying on surface water diversions for drinking water, and assuming conservatively that the water rights under which the 2.6 million remaining residents are served are curtailed, and that there are no other alternative sources or stored water available, at 50

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

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

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

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

Changes in Water Available For Sale by Public Agencies

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

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

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

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

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

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

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

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

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

Reduction in Overall Water Available for Agricultural or Municipal Use

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

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

Fiscal Impacts to Public Water Supply Agencies

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

Change in State and Local Agency Water Sale Revenues

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

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

Increased Public Agency Water Supply Replacement and Conservation Costs

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

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

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

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

Agricultural Supply Replacement and Conservation

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

Municipal Supply Replacement and Conservation

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

Total Fiscal Impact to Public Water Supply Agencies

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

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

(negative = decreased revenue)

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

Changes to State and Local Government Tax Revenues

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

Tax Revenue Impacts from Changed Public Agency Water Sales

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

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

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

Subtotal Tax Revenues Impacts:	**$ 8,563,513**

(negative = decreased revenue)

Tax Revenue Impacts from Reduced Agricultural Production

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

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

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

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

Total Tax Revenue Impacts for State and Local Governments

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

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

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

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State Water Board Statewide Emergency Regulations Appendices 1-9.

Appendix 1: State Water Board Curtailment Notices

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

Sacramento and San Joaquin River Watershed

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

Russian River Watershed

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

Scott River Watershed

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

APPENDIX 2: CURTAILMENT CERTIFICATION FORM

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

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

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

Fax: 916-341-5400

WATER RIGHT SUBJECT TO THE 2014 WATER DIVERSION CURTAILMENT:

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

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

CURTAILMENT CERTIFICATION

Please check the applicable boxes below:

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

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

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

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

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

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

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

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

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

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

Appendix 3: Real-Time Stream Flow Gage Information Sources

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

- Average Reservoir Status for USACE and Section 7 projects.
- Special Reports
- Archived Reports and Plots

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

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

Appendix 5: Unimpaired Flows from the California Data Exchange Center

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

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

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

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

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

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

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

Runoff Data for Water Year 2014

Report generated: 05/12/2014 14:32

Runoff Data for Water Year 2014

NORTH COAST

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

SAN FRANCISCO BAY

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

CENTRAL COAST

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

SOUTH COAST

	APRIL				OCTOBER - APRIL			

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

SACRAMENTO RIVER

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

SAN JOAQUIN RIVER

	APRIL				OCTOBER - APRIL			
Area, Stream, and Station (1)	Unimpaired Runoff Measured Flow (2) 1000 AF	50-Year Ave (3) 1000 AF	Monthly Total 1000 AF	% Ave	Unimpaired Runoff Measured Flow (2) 1000 AF	50-Year Ave (3) 1000 AF	Seasonal Total 1000 AF	% Ave
COSUMNES R AT MICHIGAN BAR	15.6	63.3	18.4	29	60.5	317.7	73.4	23
MOKELUMNE R, INFL TO PARDEE RES	17.5	121.6	76.1	63	130.7	403.1	164.7	41
STANISLAUS R BELOW GOODWIN RES	92.4	189.0	111.2	59	212.9	635.2	234.7	37
TUOLUMNE R BELOW LA GRANGE RES	---	269.5	169.2	63	16.5	942.6	335.6	36
MERCED R BELOW	27.4	147.5	74.7	51	142.2	495.3	131.0	26

MERCED FALLS								
SAN JOAQUIN R BELOW MILLERTON L	73.5	237.8	111.6	47	138.4	723.7	225.3	31
SUBTOTAL	226.4	1028.6	561.2	55	701.1	3517.5	1164.8	33

TULARE LAKE

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

NORTH LAHONTAN

	APRIL				OCTOBER - APRIL			
	Unimpaired Runoff				Unimpaired Runoff			
Area, Stream, and Station (1)	**Measured Flow (2) 1000 AF**	**50-Year Ave (3) 1000 AF**	**Monthly Total 1000 AF**	**% Ave**	**Measured Flow (2) 1000 AF**	**50-Year Ave (3) 1000 AF**	**Seasonal Total 1000 AF**	**% Ave**
TRUCKEE R FROM TAHOE TO FARAD (4)	35.3	68.4	27.4	40	163.1	209.0	95.9	46
WEST FK CARSON AT WOODFORDS	7.4	11.5	7.4	65	16.4	28.3	16.4	58
EAST FK CARSON NR GARDNERVILLE	22.9	33.5	22.9	68	56.6	96.9	56.4	58
WEST WALKER BLW LITTLE WALKER	13.2	17.5	13.2	76	24.1	45.2	24.1	53
EAST WALKER NEAR BRIDGEPORT	2.0	8.1	1.2	14	13.1	47.1	17.0	36
SUBTOTAL	80.9	139.0	72.1	52	273.3	426.5	209.7	49

SOUTH LAHONTAN

	APRIL				OCTOBER - APRIL			
	Unimpaired Runoff				Unimpaired Runoff			
Area, Stream, and Station (1)	**Measured Flow (2) 1000 AF**	**50-Year Ave (3) 1000 AF**	**Monthly Total 1000 AF**	**% Ave**	**Measured Flow (2) 1000 AF**	**50-Year Ave (3) 1000 AF**	**Seasonal Total 1000 AF**	**% Ave**
OWENS R BELOW LONG	7.1	10.5	4.3	41	23.3	75.9	44.5	59

VALLEY DAM								
SUBTOTAL	7.1	10.5	4.3	41	23.3	75.9	44.5	59
COLORADO RIVER								
	APRIL				**OCTOBER - APRIL**			
		Unimpaired Runoff					**Unimpaired Runoff**	
Area, Stream, and Station (1)	**Measured Flow (2) 1000 AF**	**50-Year Ave (3) 1000 AF**	**Monthly Total 1000 AF**	**% Ave**	**Measured Flow (2) 1000 AF**	**50-Year Ave (3) 1000 AF**	**Seasonal Total 1000 AF**	**% Ave**
* COLORADO R INFL TO LAKE POWELL	774.1	1038.6	964.4	93	2995.7	3789.0	3376.9	89
SUBTOTAL	---	---	---	---	---	---	---	---
SUBTOTAL	---	---	---	---	---	---	---	---
STATEWIDE								
TOTAL	1581.5	5453	2826.4	51	8708.9	29975.7	11088.1	36

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

Appendix 6: California Real-Time Gage Data

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

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

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

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

Sacramento River Watershed

Sacramento River

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

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

Creeks Tributary to the Sacramento River

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

Battle Creek	BAT	11376550	Flow
North Fork Battle Creek near Manton	BNF		Flow
Deer Creek below Stanford Vina Dam	DVD	11383500	Flow
Deer Creek nr Vina	DCV		Flow
Mill Creek Below HWY 99	MCH		Flow
Mill Creek Nr Los Molinos	MLM	11381500	Flow
Cottonwood Creek Auxiliary Gage	CWA	11376000	Flow
N Fk Cottonwood Ck abv Lk at Brdg nr Ono	NCO		Flow
Cherokee Canal Nr Richvale	CHC		Flow
BW-12 Import to Butte Creek	BBW		Flow
Butte Creek nr Durham	BCD		Flow
Butte Creek near Chico	BCK	11390000	Flow
Parrot Div from Butte Creek	BPD		Flow

Cache Creek & Tributary Creeks

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

Putah Creek

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

Pit River & Tributary Creeks

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

McCloud River

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

Delta

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

Feather, Yuba, Bear & American River Watersheds

Feather River & Tributary Creeks

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

Yuba River

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

Bear River & Tributary Creeks

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

American River & Tributary Creeks

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

Mokelumne River/Eastside Streams Watersheds

Cosumnes River

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

Mokelumne River

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

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

Calaveras River

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

San Joaquin River Watersheds

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

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

Stanislaus River

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

Tuolumne River

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

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

Merced River

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

Tulare Watershed

Kings River

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

Kaweah River

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

Kern River

BOREL CANAL SIPHON	BOS		Flow

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

Fresno River

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

Tule River

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

Tributary to Tulare Basin

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

Klamath River Watershed

Klamath River

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

Trinity River

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

Scott River

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

Miscellaneous Rivers

Smith River

Smith River nr Crescent City	JED	11532500	Flow

Eel River

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

Napa River

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

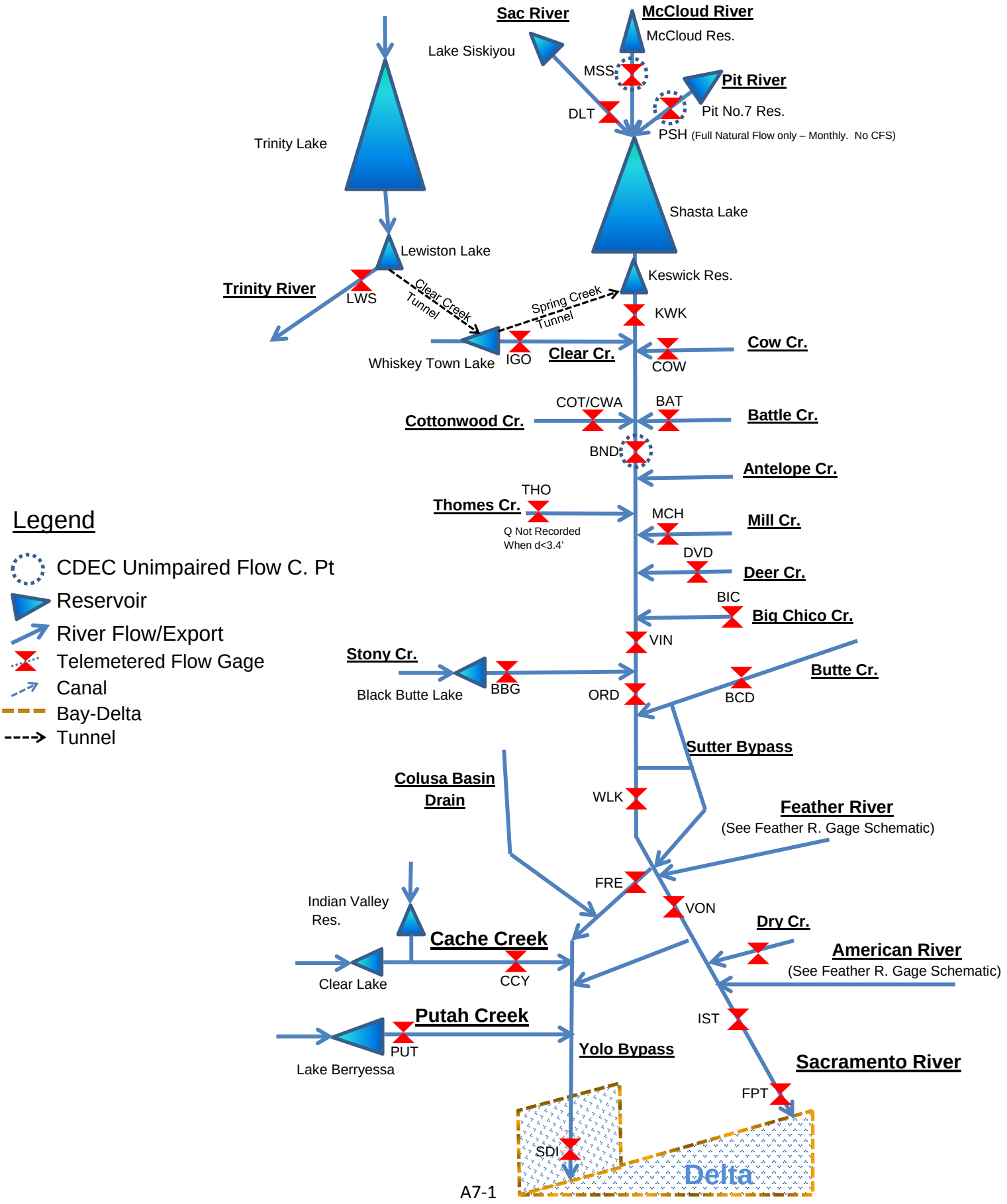
Russian River

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

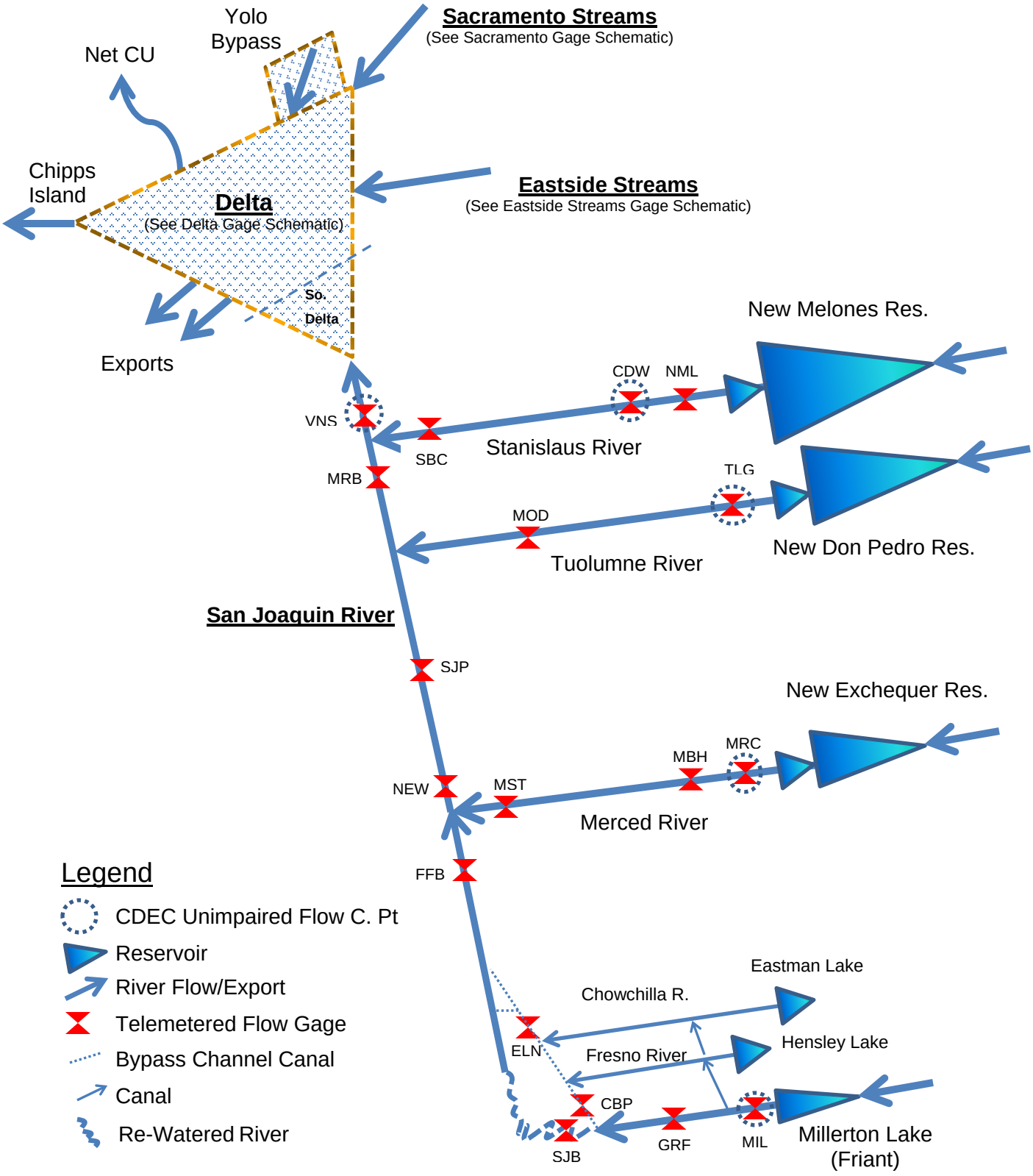
Salinas River

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

Appendix 7: Sacramento River Watershed Hydrology Schematic



Appendix 8: Delta Watershed Hydrology Schematic



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