D R A F T

Curtailment of Diversions due to Insufficient Flow for Specific Fisheries Emergency Regulation Digest

March 12, 2015

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In Title 23, Division 3, Chapter 2, Article 24, add Sections 877, 878, 878.1, subdivisions (b) though (f); 878.2; 879, subdivisions (a) and (b); 879.1 and 879.2 to read:

Article 24. Curtailment of Diversions Based on Insufficient Flow to Meet All Needs

§ 876 [reserved]

§ 877 Emergency Curtailment Where Insufficient Flows are Available to Protect Fish in Certain Watersheds

The State Water Resources Control Board (State Board) has determined that it is a waste and unreasonable use under Article X, section 2 of the California Constitution to continue diversions that would cause or threaten to cause flows to fall beneath the drought emergency minimum flows listed in subdivision (c), except as provided in section 878.1.

(a) For the protection of threatened and endangered fish, no water shall be diverted from the streams listed below during the effective period of a curtailment order under this article, except as provided under sections 878, 878.1 or 878.2.

(b) The Deputy Director for the Division of Water Rights (Deputy Director) may issue a curtailment order upon a determination that without curtailment of diversions flows are likely to be reduced below the drought emergency minimum flows specified in subdivision (c). Curtailment orders shall be effective the day after issuance. Except as provided in sections 878, 878.1, and 878.2, where flows are sufficient to support some but not all diversions, curtailment orders shall be issued in order of priority.

In determining which diversions should be subject to curtailment, the Deputy Director shall take into account the need to provide reasonable assurance that the actual drought emergency minimum flows will be met.

If maintaining the flows described in subdivision (c) would require curtailment of uses described in section 878.1, then the Executive Director may decide whether or not those diversions should be allowed to continue based on the most current information available regarding fish populations, health and safety needs and the alternatives available to protect both public health and safety and threatened or endangered fish.

(c) The State Board has authority to ensure the protection and preservation of streams and to limit diversions to protect critical flows for species, including for state and federally threatened and endangered salmon and steelhead species. To prevent the waste and unreasonable use of water, the Deputy Director may issue curtailment orders as described in subdivision (b). The flows described in this subdivision may be less than otherwise desirable

minimum flows for fisheries protection, but have been developed to ensure bare minimum instream flows for migratory passage during the drought emergency, given the unprecedented nature of the current drought and the drought impacts to these fisheries.

This section shall only go into effect if the Executive Director determines that any agreements in any applicable watersheds entered into by diverters, National Marine Fisheries Service and California Department of Fish and Wildlife either do not cover substantially all of the water diverted in the watershed or that the agreements are no longer in effect.

(1) Mill Creek. Mill Creek enters the Sacramento River at Army Corps of Engineers river mile 230 from the east near Los Molinos and approximately one mile north of the town of Tehama. All water right holders in the Mill Creek watershed are subject to curtailment pursuant to subdivision (b) and responsible to meet the drought emergency minimum flows identified in this subdivision. For purposes of this article, the following flows are the drought emergency minimum flows necessary for migratory passage of state and federally listed Central Valley spring-run Chinook salmon (CV SR salmon) and federally listed California Central Valley steelhead (CCV steelhead) through the Sacramento Valley floor stream reaches in Mill Creek:

(A) April 1 up to June 15, if Adult CV SR Salmon are present -

(i) Base Flows – 50 cubic feet per second (cfs) or full flow without diversions, whichever is less. (ii) Pulse Flows – 100 cfs or full flow without diversions, whichever is less. A flow ramp down period at the end of a pulse flow may be included if requested by California Department of Fish and Wildlife or National Marine Fisheries Service. Pulse flows may be required when adult CV SR salmon are observed between Ward dam and the Sacramento River. When required, pulse flows are in lieu of, not in addition to, base flow requirements. Pulse flows will last a minimum of 24 hours to a maximum of 72 hours, and will be determined based on the presence of fish observed and desired migration movements upstream. Pulse flow duration will be determined by the Deputy Director in consultation with California Department of Fish and Wildlife or the National Marine Fisheries Service. The flow ramp down period is part of the pulse flow period. Pulse flows may be required if either of the following conditions occurs prior to the end of the migration period:

A. The average daily full natural flow measured at United States Geological Survey Mill Creek Near Los Molinos CA gauge (MLM/#11381500) is 100 cfs or less for three consecutive days; or

B. California Department of Fish and Wildlife or the National Marine Fisheries Service submits a request to provide the pulse flow and it is approved by the Deputy

Director.

(B) June 1 up to June 15, if Juvenile CV SR Salmon or Juvenile CCV Steelhead are present -

(i) Pulse Flows – 100 cfs or full inflow without diversions, whichever is less. A flow ramp down period at the end of a pulse flow may be included if requested by California Department of Fish and Wildlife or National Marine Fisheries Service. Pulse flows may be required when juvenile CV SR salmon or CCV steelhead are observed in the lower reaches of Mill Creek. When required, pulse flows are in lieu of, not in addition to, base flow requirements. Pulse flows will last a minimum of 24 hours to a maximum of 48 hours, and will be determined based on the presence of fish observed and desired migration movements downstream into the Sacramento River. Pulse flow duration will be determined by the Deputy Director in consultation with California Department of Fish and Wildlife or the National Marine Fisheries Service. The flow ramp down period is part of the pulse flow period. Pulse flows may be required if both of the following occur:

A. California Department of Fish and Wildlife or the National Marine Fisheries Service conducts field surveys and observes juvenile CV SR salmon or CCV steelhead in the lower reaches of Mill Creek in June; and

B. California Department of Fish and Wildlife or the National Marine Fisheries Service submits a request to provide the pulse flow and it is approved by the Deputy Director.

(C) October 15 - March 31, if Adult CCV Steelhead are present –

(i) Base Flows – 50 cfs or full flow without diversions, whichever is less.

(D) October 15 – June 30, if Juvenile CV SR Salmon or Juvenile CCV Steelhead are present and Adult CV SR Salmon or Adult CCV Steelhead are not present –

(i) Base Flows – 20 cfs or full flow without diversions, whichever is less.

(E) The California Department of Fish and Wildlife or the National Marine Fisheries Service may conduct field surveys and notify the Deputy Director when the pertinent migration periods have ended. Upon such notice, the Deputy Director shall, no later than the next business day, suspend relevant portions of curtailment orders that are based on the need for a particular flow volume when presence of adult or juvenile CV SR salmon and CCV steelhead no longer supports the need for the required flows. The Deputy Director may independently determine that hydrologic conditions no longer support the need for the required flows, and suspend relevant portions of curtailment orders.

(F) The California Department of Fish and Wildlife or the National Marine Fisheries Service may conduct field surveys and notify the Deputy Director

that the pertinent migration periods have not yet begun. The Deputy Director may choose not to issue curtailment orders for purposes of meeting the drought emergency minimum flows identified in this subdivision if these agencies have not determined that fish are present and in need of the identified flows.

(2) Deer Creek. Deer Creek enters the Sacramento River at Army Corps of Engineers river mile 220 from the east approximately one mile west of the town of Vina. All water right holders in the Deer Creek watershed are subject to curtailment pursuant to subdivision (b) and responsible to meet the drought emergency minimum flows identified in this subdivision. For purposes of this article, the following flows are the drought emergency minimum flows necessary for migratory passage of state and federally listed CV SR salmon and federally listed CCV steelhead through the Sacramento Valley floor stream reaches in Deer Creek:

(A) April 1 up to June 15, if Adult CV SR Salmon are present –

(i) Base Flows – 50 cfs or full flow without diversions, whichever is less.

(ii) Pulse Flows – 100 cfs or full flow without diversions, whichever is less. A flow ramp down period at the end of a pulse flow may be included if requested by California Department of Fish and Wildlife or National Marine Fisheries Service. Pulse flows may be required when adult CV SR salmon are observed between Vina Dam and the Sacramento River. When required, pulse flows are in lieu of, not in addition to, base flow requirements. Pulse flows will last a minimum of 24 hours to a maximum of 72 hours, and will be determined based on the presence of fish observed and desired migration movements upstream. Pulse flow duration will be determined by the Deputy Director in consultation with California Department of Fish and Wildlife or the National Marine Fisheries Service. The flow ramp down period is part of the pulse flow period. Pulse flows may be required if either of the following conditions occur prior to the end of the migration period:

A. The average daily flow measured at United States Geological Survey Deer Creek Near Vina CA gauge (#11383500) is 100 cfs or less for three consecutive days; or

B. California Department of Fish and Wildlife or the National Marine Fisheries Service submits a request to provide the pulse flow and it is approved by the Deputy Director.

(B) June 1 up to June 15, if Juvenile CV SR Salmon or Juvenile CCV Steelhead are present -

(i) Pulse Flows – 100 cfs or full flow without diversions, whichever is less. A flow ramp down period at the end of a pulse flow may be included if requested by California Department of Fish and Wildlife or National

Marine Fisheries Service. Pulse flows may be required when juvenile CV SR salmon or CCV steelhead are observed in the lower reaches of Deer Creek. When required, pulse flows are in lieu of, not in addition to, base flow requirements. Pulse flows will last a minimum of 24 hours to a maximum of 48 hours, and will be determined based on the presence of fish observed and desired migration movements downstream into the Sacramento River. Pulse flow duration will be determined by the Deputy Director in consultation with California Department of Fish and Wildlife or the National Marine Fisheries Service. The flow ramp down period is part of the pulse flow period. Pulse flows may be required if both of the following occur:

A. California Department of Fish and Wildlife or the National Marine Fisheries Service conducts field surveys and observes juvenile CV SR salmon or CCV steelhead in the lower reaches of Deer Creek in June; and

B. California Department of Fish and Wildlife or the National Marine Fisheries Service submits a request to provide the pulse flow and it is approved by the Deputy Director.

(C) October 15 - March 31, if Adult CCV Steelhead are present –

(i) Base Flows – 50 cfs or full flow without diversions, whichever is less.

(D) October 15 – June 30, if Juvenile CV SR Salmon or Juvenile CCV Steelhead are present and Adult CV SR Salmon or Adult CCV Steelhead are not present–

(i) Base Flows – 20 cfs or full flow without diversions, whichever is less.

(E) The California Department of Fish and Wildlife or the National Marine Fisheries Service may conduct field surveys and notify the Deputy Director when the pertinent migration periods have ended. Upon such notice, the Deputy Director shall, no later than the next business day, suspend relevant portions of curtailment orders that are based on the need for a particular flow volume when presence of adult or juvenile CV SR salmon and CCV steelhead no longer supports the need for the required flows. The Deputy Director may independently determine that hydraulic conditions no longer support the need for the required flows, and suspend relevant portions of curtailment orders.

(F) The California Department of Fish and Wildlife or the National Marine Fisheries Service may conduct field surveys and notify the Deputy Director that the pertinent migration periods have not yet begun. The Deputy Director may choose not to issue curtailment orders for purposes of meeting the drought emergency minimum flows identified in this subdivision if these agencies have not determined that fish are present and in need of the identified flows.

(3) Antelope Creek. Antelope Creek enters the Sacramento River at Army Corps of Engineers river mile 235 from the east approximately nine miles southeast of the town of Red Bluff. All water right holders in the Antelope Creek watershed are subject to curtailment pursuant to subdivision (b) and responsible to meet the drought emergency minimum flows identified in this subdivision. For purposes of this article, the following flows are the drought emergency minimum flows necessary for migratory passage of state and federally listed CV SR salmon and federally listed CCV steelhead through the Sacramento Valley floor stream reaches in Antelope Creek:

(A) April 1 up to May 15, if Adult CV SR Salmon are present -

(i) Base Flows – 35 cfs or full flow without diversions, whichever is less.

(ii) Pulse Flows – 70 cfs or full flow without diversions, whichever is less. A flow ramp down period at the end of a pulse flow may be included if requested by California Department of Fish and Wildlife or National Marine Fisheries Service. Pulse flows may be required when adult CV SR salmon are observed between the Edwards/Los Molinos Mutual diversion dam and the Sacramento River. When required, pulse flows are in lieu of, not in addition to, base flow requirements. Pulse flows will last a minimum of 24 hours to a maximum of 72 hours, and will be determined based on the presence of fish observed and desired migration movements upstream. Pulse flow duration will be determined by the Deputy Director in consultation with California Department of Fish and Wildlife or the National Marine Fisheries Service. The flow ramp down period is part of the pulse flow period. Pulse flows may be required if either of the following conditions occur prior to the end of the migration period:

A. The average daily full natural flow measured upstream of the Edwards/Los Molinos Mutual diversion dam is 70 cfs or less for three consecutive days; or

B. California Department of Fish and Wildlife or the National Marine Fisheries Service submits a request to provide the pulse flow and it is approved by the Deputy Director.

(B) May 1 up to May 15, if Juvenile CV SR Salmon or Juvenile CCV Steelhead are present -

(i) Pulse Flows – 70 cfs or full flow without diversions, whichever is less. A flow ramp down period at the end of a pulse flow may be included if requested by California Department of Fish and Wildlife or National Marine Fisheries Service. Pulse flows may be required when juvenile CV SR salmon or CCV steelhead are observed in the lower reaches of Antelope Creek. When required, pulse flows are in lieu of, not in addition to, base flow requirements. Pulse flows will last a minimum of 24 hours to a maximum of 48 hours, and will be determined based

on the presence of fish observed and desired migration movements downstream into the Sacramento River. Pulse flow duration will be determined by the Deputy Director in consultation with California Department of Fish and Wildlife or the National Marine Fisheries Service. The flow ramp down period is part of the pulse flow period. Pulse flows may be required if both of the following occur:

A. California Department of Fish and Wildlife or the National Marine Fisheries Service conducts field surveys and observes juvenile CV SR salmon or CCV steelhead in the lower reaches of Antelope Creek in June; and

B. California Department of Fish and Wildlife or the National Marine Fisheries Service submits a request to provide the pulse flow and it is approved by the Deputy Director.

(C) November 1 - March 31, if Adult CCV Steelhead are present –

(i) Base Flows – 35 cfs or full flow without diversions, whichever is less.

(D) November 1 – May 30, if Juvenile CV SR Salmon or Juvenile CCV Steelhead are present and Adult CV SR Salmon or Adult CCV Steelhead are not present–

(i) Base Flows – 15 cfs or full flow without diversions, whichever is less.

(E) The California Department of Fish and Wildlife or the National Marine Fisheries Service may conduct field surveys and notify the Deputy Director when the pertinent migration periods have ended. Upon such notice, the Deputy Director shall, no later than the next business day, suspend relevant portions of curtailment orders that are based on the need for a particular flow volume when presence of adult or juvenile CV SR salmon and CCV steelhead no longer supports the need for the required flows. The Deputy Director may independently determine that hydraulic conditions no longer support the need for the required flows, and suspend relevant portions of curtailment orders.

(F) The California Department of Fish and Wildlife or the National Marine Fisheries Service may conduct field surveys and notify the Deputy Director that the pertinent migration periods have not yet begun. The Deputy Director may choose not to issue curtailment orders for purposes of meeting the drought emergency minimum flows identified in this subdivision if these agencies have not determined that fish are present and in need of the identified flows.

(4) The drought emergency minimum flows identified in subdivision (c)(1) through (c)(3) shall extend through the confluences with the Sacramento River. Compliance with the drought emergency minimum flows will be determined by the Deputy Director, measured at the most downstream gauge available. The Deputy Director may

require additional compliance points as needed.

(d) (1) Initial curtailment orders will be mailed to each water right holder or the agent of record on file with the Division of Water Rights. The water right holder or agent of record is responsible for immediately providing notice of the order(s) to all diverters exercising the water right.

(2) The State Board has established an email distribution list that water right holders may join to receive drought notices and updates regarding curtailments. Notice provided by email or by posting on the State Board's drought web page shall be sufficient for all purposes related to drought notices and updates regarding curtailments.

Authority: Sections 1058, 1058.5, Water Code

Reference: Cal. Const., Art., X § 2; Sections 100, 100.5, 104, 105, 275, 1058.5, Water Code; *National Audubon Society v. Superior Court* (1983) 33 Cal.3d 419; *Light v. State Water Resources Control Board* (2014) 226 Cal.App.4th 1463.

§ 878. Non-Consumptive Uses

Some water diverters will not be required to curtail in response to a curtailment order under this article because their use of water does not decrease downstream flows. This section applies to:

(a) Direct diversions solely for hydropower.

(b) Other direct diversions solely for non-consumptive uses, if those diverters file with the Deputy Director a certification under penalty of perjury that the diversion is non- consumptive and does not decrease downstream flows in the applicable watershed. The certification must describe the non-consumptive use and explain, with supporting evidence, why the diversion and use do not decrease downstream flows in the applicable watershed. The Deputy Director may request additional information, or may disapprove any certification if the information provided is insufficient to support the statement, or if more convincing evidence contradicts the claims. If a certification submitted pursuant to this section is disapproved, the diversions are subject to any curtailment order issued regarding that basis of right.

Authority: Sections 1058, 1058.5, Water Code

Reference: Cal. Const., Art., X § 2; Section 100, Water Code

§ 878.1 Minimum Health and Safety Needs

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

(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.

(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 (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 toencourage 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; and

(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 (c)(1)(C) – (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.

(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 (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.

(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 (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.

(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.

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.

§ 878.2. Local cooperative solutions

If the National Marine Fisheries Service and the California Department of Fish and Wildlife enter into an agreement with a diverter or diverters, that the National Marine Fisheries Service or California Department of Fish and Wildlife determines provides watershed-wide protection for

the fishery that is comparable to or greater than that provided by this article, the diverter or diverters may request approval from the Deputy Director to implement the agreement in place of State Board-issued curtailment orders under this article. The Deputy Director shall approve the request so long as other users of water will not be injured.

The Deputy Director's approval may be subject to any conditions, including reporting requirements, that the Deputy Director determines to be appropriate. If the Deputy Director does not act on a request within one week of receipt, the request will be deemed approved.

Other local cooperative solutions may also be proposed to the Deputy Director as an alternative means of reducing water use to preserve drought emergency minimum flows. Requests to implement voluntary agreements to coordinate diversions or share water in place of State Board-issued curtailment orders under this article may be submitted to the Deputy Director at any time. The Deputy Director may approve a request, or approve it subject to any conditions including reporting requirements that the Deputy Director determines to be appropriate, if the Deputy Director determines:

(a) The continued diversion is reasonable;
(b) That other users of water will not be injured; and
(c) That the relevant minimum flows identified in this article will be met.

If a local solution is already in place at the time a curtailment order is issued, a diverter subject to a curtailment order must, within five days of issuance of the curtailment order, submit a petition to the Deputy Director and submit a certification under penalty of perjury that the diversion meets the conditions described in section 879, subdivision (a)(4). Diversions covered by an agreement approved by the Deputy Director to coordinate diversions or share water pursuant to this section are subject to this article and violations of such an approved agreement shall be subject to enforcement as a violation of this article. Notice of petitions and decisions under this section 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.

Authority: Sections 1058, 1058.5 Water Code

Reference: Sections 109, 1010, 1011, 1011.5, 1051.5, Water Code; *City of Barstow v. Mojave Water Agency* (2000) 23 Cal.4th 1224.

§ 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 or 878.2, 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 (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 (c)(1);
(2) Any failures to comply with conditions, including the conditions of certification under section 878.1, subdivision (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 (c):
(i) Progress towards implementing the measures described in section 878.1, subdivision (c)(1)(C)-(F), to the extent that implementation was incomplete at the time of certification or petition under section 878.1, subdivision (c) or the most recent report under this subdivision; and
(ii) Progress under any plan described in section 878.1, subdivision (c)(1)(G) or(c)(2)(C).
(6) If the diversion is authorized under section 878.1, subdivision (e)(3):
(i) The rate of diversion if it is still ongoing;
(ii) Whether the water has been used for any other purpose; and
(iii) The date diversion ceased, if applicable.

(c) Upon receipt of a complaint alleging interference with a water right by a riparian or pre-1914 appropriative water right holder or upon receipt of information that indicates unlawful diversions of stored water by riparians or pre-1914 appropriative water rights holders, the Deputy Director may issue an order under this article requiring such water right holders to provide additional information regarding the property patent date, the date of initial appropriation, and diversions made or anticipated during the current drought year. Any

water right holder receiving an order under this subdivision shall provide the requested information within five (5) days.

Authority: Sections 1058, 1058.5, Water Code

Reference: Sections 100, 187, 275, 348, 1051, 1058.5, Water Code

§ 879.1. Conditions of permits, licenses and registrations

Compliance with this article, including any conditions of approval of a petition under this article, shall constitute a condition of all water right permits, licenses, certificates and registrations.

Authority: Sections 1058, 1058.5, Water Code

Reference: Sections 100, 187, 275, 348, 1051, 1058.5, Water Code

§ 879.2. Compliance and Enforcement

Diversion or use in violation of this article constitutes an unauthorized diversion or use. A diverter must comply with a curtailment order issued under any section of this article, including any conditions of approval of a petition under this article and any water right condition under this article, notwithstanding receipt of more than one curtailment order based on more than one section or water right condition. To the extent of any conflict between the requirements of applicable orders or conditions of approval, the diverter must comply with the requirements that are most stringent. Violations of this article shall be subject to any applicable penalties pursuant to Water Code sections 1052, 1831, 1845 and 1846.

Authority: Sections 1058, 1058.5, Water Code

Reference: Sections 1052, 1055, 1058.5, 1825, 1831, Water Code; *National Audubon Society v. Superior Court* (1983) 33 Cal.3d 419.

FINDING OF EMERGENCY

The State Water Resources Control Board (State Water Board or Board) finds that an emergency exists due to severe drought conditions. Immediate action is needed to prevent the waste and unreasonable use of water diverted from priority water bodies that provide habitat for threatened and endangered species 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: (1) senior water right users; (2) minimum flows for migration of state and federally listed fish in three Sacramento River tributaries, Mill Creek, Deer Creek and Antelope Creek; and (3) minimum health and safety needs.

On January 17, 2014, Governor Edmund G. Brown Jr. declared a drought state of emergency (January 2014 Proclamation). On April 25, 2014, the Governor issued a Proclamation of a Continued State of Emergency (April 2014 Proclamation) to strengthen the state's ability to manage water and habitat effectively in drought conditions. The April 2014 Proclamation orders that the provisions of the January 2014 Proclamation remain in full force and also adds several new provisions. The April 2014 Proclamation also suspends the California Environmental Quality Act (CEQA) to allow drought emergency regulations and other actions to take place as quickly as possible. On December 22, 2014, Governor Brown issued Executive Order B-28-14, which extended the CEQA suspension for certain activities, including adoption of emergency regulations, through May 31, 2016.

On January 23, 2015, the State Water Board issued a Notice of Surface Water Shortage and Potential for Curtailment of Water Right Diversions for 2015. The notice advises that if dry weather conditions persist, the State Water Board will notify water right holders in critically dry watersheds of the requirement to limit or stop diversions of water under their water right, based on their water right seniority. Due to the dry hydrologic conditions, the State Water Board issued Water Diversion Curtailment Notices in 2014 and may issue Water Diversion Curtailment Notices in 2015 to water right holders within some critically dry watersheds if the dry trend continues.

Emergency Defined

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.

In this document, the State Water Board is providing the necessary specific facts demonstrating compliance with Government Code section 11346.1, subdivision (b)(2) and Water Code section 1058.5, subdivision (a). 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 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 information 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

As of March 2015, the U.S. Drought Monitor classifies almost the entire state of California as experiencing severe to exceptional drought conditions (United States Drought Monitor, 2015). 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, warm and relatively dry weather conditions this year have reduced the amount of snowpack in California's mountains. As of March 3, 2015, Sacramento Region cumulative precipitation was 87 percent of average for that date (8-Station Index). However, most of that precipitation fell as rain, and Northern Sierra snow water content remained extremely low, at 16 percent of average for that date. Similarly, Central and Southern Sierra snowpacks are at 20 and 21 percent of average, respectively. Without significant March snowfall, the Sierra snow water content will be the lowest in recorded history. Due to the dry conditions, on January 23, 2015, the State Water Board issued a Notice of Surface Water Shortage and Potential for Curtailment of Water Right Diversions.

California is currently in the fourth year of this drought. Water year 2012 was categorized as below normal, calendar year 2013 was the driest year in recorded history for many parts of California, water year 2014 was the third driest in the 119 years of record, and water year 2015 began on a similar dry trend with the driest January on record for portions of the state. Storage in the largest reservoirs across the state is far below average (DWR, 2015a).

In May 2013, Governor Brown issued Executive Order B-21-13, which directed the State Water Board and the Department of Water Resources (DWR) to, among other things, 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.

Governor Brown's January 2014 Proclamation recognizes, among other things, that changes to water supplies and diversions might be necessary to protect salmon and steelhead, to maintain water supplies, and protect water quality. The January 2014 Proclamation ordered the State Water Board 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," which the State Water

Board did on January 17, 2014 and again on January 23, 2015. The State Water Board's January 23, 2015 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 potential responses to it.

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 (Senate Bill 104; Statutes 2014; Chapter 3; Committee on Budget and Fiscal Review). On April 25, 2014, Governor Brown issued a Proclamation of a Continued State of Emergency related to the drought. The April 2014 Proclamation ordered that the provisions of the January 2014 Proclamation remain in full force and also added several new provisions. Of note here, the April Proclamation directs the State Water Board to adopt and implement emergency regulations as appropriate to promote water recycling and curtail diversions when water is not available, and suspended environmental review under CEQA for the adoption of emergency regulations pursuant to Water Code section 1058.5.

As recognized in Water Code section 106.3, access to water for human consumption, cooking and sanitation is a basic human right. Cities, counties and water districts across the state have enacted drought emergency measures to conserve supplies. As of March 6, 2015, the State Water Board's Division of Drinking Water has not identified any public water systems that are currently at severe risk of running out of water. However, it is anticipated that much of the state will again be severely impacted in the months to come by the continuing drought. The State Water Board will continue to evaluate the condition of public water systems in the state and take action to provide assistance to systems whose water supplies it determines reach critically low levels. This oversight does not include residences supplied by a privately owned well or water systems with less than 15 customers.

Fire risk is also greatly increased throughout the state due to the drought. Preliminary data from the California Department of Forestry and Fire Protection (CAL FIRE) show that over 5,000 fires burned in California in 2014, which is roughly 20 percent more fires than the five year average (CAL FIRE, 2015b). In 2014, CAL FIRE and other Wildland Fire agencies responded to over 50 fires of at least 300 acres in size; these large fires burned a total of 535,724 acres (CAL FIRE, 2014a). If the dry trend continues, the 2015 fire season is anticipated to be extremely severe. Already, the 2015 fire season is off to a severe start. According to CAL FIRE, 3,187 acres have burned during the period of January 1, 2015 through March 7, 2015 (CAL FIRE, 2015a). Over the same period in 2014, only 1,289 acres burned (CAL FIRE, 2015a).

Need for the Regulation

Immediate action is needed to prevent the waste and unreasonable use of water 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: (1) senior water right users; (2) minimum flows for migration of state and federally listed fish in priority water bodies; and (3) minimum health and safety needs.

Water Rights Framework

In order to best understand the need for the regulation and how it will be applied, a very 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. A riparian water right generally provides a right to use 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 senior (higher relative priority) right to natural flows as against 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 water that is diverted 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.

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, 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.

The State Water Board has continuing authority under Water Code sections 100 and 275 to enforce the requirements of the California Constitution, Article X, § 2, which directs that the water resources of the state be put to beneficial use to the fullest extent, and that water not be wasted or unreasonably used. It further provides that rights to the use of water are limited to such water as is reasonably required for the beneficial use served, and does not extend to the waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of the water.

The reasonable use doctrine applies to the diversion and use of both surface water and groundwater, and it applies irrespective of the type of water right held by the diverter or user. (*Peabody v. Vallejo* (1935) 2 Cal.2d 351, 366-367.) What constitutes an unreasonable use, method of use, or method of diversion depends on the facts and circumstances of each case. (*People ex rel. State Water Resources Control Board v. Forni* (1976) 54 Cal.App.3d 743, 750.) Under the reasonable use doctrine, water right holders may be required to endure some inconvenience or to incur reasonable expenses. (*Id*. at pp. 751-752.)

Diverting water when it is unavailable under your priority of right constitutes an unauthorized diversion and a trespass against the state. Violations could be subject to an Administrative Civil Liability (ACL) under the Water Code, or referred to the Attorney General. Administrative cease and desist orders and court injunctions may also be issued to require that diversions stop. An ACL for an unauthorized diversion may impose liability up to $1,000 a day plus $2,500 per acre foot of water that is illegally diverted for violations during the current drought. The State Water Board may also issue administrative cease and desist orders and request court injunctions to require that diversions stop.

Need for Emergency Protective Flows in Mill Creek, Deer Creek and Antelope Creek

In this particular case, application of the reasonable use doctrine requires consideration of the benefits of diverting water for current uses from the identified water bodies and the potential for harm to the protected species from such diversions under the current drought conditions.

The purpose of the proposed regulation is to protect ESA-listed species in this extremely dry year in high-priority streams by maintaining minimum streamflow for adult salmonid passage at critical migration periods, providing pulses of flow at times to ensure successful migration, and maintaining minimum streamflow for out-migrating juvenile fish.

On May 21, 2014, the State Water Board adopted an emergency regulation for curtailment of diversions due to insufficient flow for specific fisheries for Mill, Deer and Antelope Creeks. The emergency regulation became effective on June 2, 2014 and expired on February 28, 2015 (effective for 270 days). Drought emergency minimum instream flow requirements were provided for Central Valley spring-run Chinook salmon (CV SR salmon) and California Central Valley steelhead (CCV steelhead) during May and June 2014 and from October 15 through December 31, 2014 under voluntary agreements in Mill Creek and Antelope Creek. Voluntary agreements were entered into on May 13, May 16, May 19, May 30, June 2, and June 5, 2014. Fish passage data provided by the California Department of Fish and Wildlife (CDFW) suggests the instream flows provided for successful fish passage during these time periods. Daily average flow data in Mill Creek as measured at the MCH gauge (below highway 99) from April 2014 through June 2014 indicate that flows remained above or near 50 cfs until after the pulse flow ended on June 14, 2014. Flows on Mill Creek were then reduced to on or about 20 cfs, the juvenile voluntary agreement levels, for five days before declining through the remainder of the month. Daily average flows on Antelope Creek as measured at the former USGS Canyon Mouth gauge site (measured by CDFW) from April through May indicate that flows remained above 35 cfs until about May 23, 2014. Discharge records show that flows declined after May 23, 2014 until equipment malfunction ended the record on May 29, 2014 with daily average flows in the range of 24 cfs (CDFW, 2015c).

Drought emergency minimum instream flow requirements were required under California Code of Regulations, title 23, section 877 in Deer Creek from June 2 through June 30, 2014 and October 1, 2014 through February 28, 2015. A curtailment order was issued to water right holders in Deer Creek on June 5, 2014, for the period of June 5 through June 24, 2014 to provide for the required minimum flows for CV SR salmon and CCV steelhead. Gauge data shows that the minimum flows were not met in Deer Creek until June 12, 2014. Fish passage data provided by CDFW suggests the instream flows in Deer Creek during this time period were inadequate and did not provide for successful fish passage. Mill Creek and Deer Creek are similar watersheds. If the required instream flows had been provided, fish passage in Deer Creek during this time period would likely have been similar to that in Mill Creek (i.e., it would of provided adequate passage). Daily average flows in Deer Creek as measured at the DVD gauge (below the Stanford Vina Dam) from April through June 2014 indicate that flows remained above 50 cfs until about May 13, 2014 when they fell below 50 cfs for several days. Flows rose above 50 cfs for three days beginning May 18, then continued to decline to about 13 cfs by June 10, 2014. During a three day pulse flow beginning June 12, 2014 flows again exceeded 50 cfs for two days, then continued to recede through the remainder of the month,

reaching 3.2 cfs by June 30. A curtailment order was issued to water right holders in Deer Creek on October 14, 2014, which required water right holders to provide for the required instream flows for CV SR salmon and CCV steelhead from October 15, 2014 through February 28, 2015. These flows were met, and fish passage data provided by CDFW suggests the instream flows provided in Deer Creek from October 15, 2014 through February 28, 2015 provided for successful fish passage.

The drought emergency minimum flow requirements in the 2015 drought-related emergency regulation for curtailment of diversions due to insufficient flow for specific fisheries are similar to those adopted in 2014, with clarifications and edits to the regulation and minor adjustments to the minimum flows and flow periods based on an assessment of last year's implementation of the regulation. In summary, the 2015 minimum flow requirements on Mill and Deer Creeks remain unchanged, and the 2015 minimum base flow requirements for juvenile CV SR salmon and CCV steelhead decreased in Antelope Creek. Except in one case, the flow periods required under the 2015 regulation are shorter than the flow periods required in the 2014 regulation. The one case when the flow period was extended, rather than shortened, in the 2015 regulation is for the initiation of the juvenile CV SR salmon and CCV steelhead minimum base flow in Mill and Deer Creeks, which would begin on October 15, rather than November 1.

In a letter and memorandum to the State Water Board dated February 2, 2015, the National Marine Fisheries Service (NMFS) in consultation with CDFW recommended to the State Water Board minimum instream flows in Mill, Deer, and Antelope Creeks to address drought impacts on ESA-listed fish species in these creeks (Attachment 11; NMFS, 2015). The memorandum supports minimum instream flows of 50 cubic feet per second (cfs) October 15 through June 15 in Mill Creek and Deer Creek and 35 cfs November 1 through May 15 in Antelope Creek for the protection of adult CV SR salmon and CCV steelhead migration. In addition, for Mill Creek, Deer Creek and Antelope Creek, the memorandum provides evidence supporting 20 cfs for juvenile fish outmigration from October 15 through June 30 on Mill Creek and Deer Creek and 15 cfs for juvenile fish outmigration from November 1 through May 30 on Antelope Creek. The memorandum also requests and provides support for pulse flows in addition to base flow in Mill Creek, Deer Creek, and Antelope Creek for a minimum duration of 24 hours every two weeks from April 1 through June 15 on Mill Creek and Deer Creek and April 1 through May 15 on Antelope Creek (Attachment 11; NMFS, 2015). This memorandum is in accord with other studies and information regarding fishery needs, as described below.

Status of Species

Since settlement of the Central Valley in the mid-1800s, populations of native Chinook salmon (*Oncorhychus tshawytscha*) and steelhead (*O. mykiss*) have declined dramatically (Moyle, 2002). California's salmon resources began to decline in the late 1800s, and continued to decline in the early 1900s, as reflected in the decline of commercial harvest. The total commercial catch of Chinook salmon in 1880 was 11 million pounds, by 1922 it had dropped to 7 million pounds, and reached a low of less than 3 million pounds in 1939 (Lufkin 1996, as cited in NMFS, 2009). Twenty- eight evolutionarily significant units (ESUs) and distinct population segments (DPSs) of salmonids have been listed under the ESA by NMFS on the West Coast of the United States since 1989 (NMFS, 2009).

The Central Valley is made up of four distinct geological zones which create different watershed systems, which in turn are the basis for diverse fisheries. These varying habitats supported different life history strategies leading to genetically distinct populations of salmon and steelhead. Central Valley salmon and steelhead developed different life history strategies by evolving with habitat factors that reflected differences in these watersheds such as: the availability of cold water, adequate substrate, cover, and flow. Fish ecologists believe that this variability in life history traits was caused by the limitations on or availability of habitat features between watersheds, and geographic isolation of populations, which led to genetic separation and to independent salmonid populations within the Central Valley. Although CV SR salmon were probably the most abundant salmonid in the Central Valley under historical conditions, large dams eliminated access to almost all historical habitat, and CV SR salmon populations have suffered the most severe declines of any of the four Chinook salmon runs in the Sacramento River Basin (Fisher, 1994 as cited in NMFS, 2009).

CV SR salmon, were proposed as endangered by NMFS on March 9, 1998. However, in the final determination made by NMFS on September 16, 1999, NMFS determined that new information indicated that CV SR salmon should be listed as threatened. NMFS concluded that the CV SR salmon ESU was in danger of extinction because native CV SR salmon have been extirpated from all tributaries in the San Joaquin River Basin, which represented a large portion of the historic range and abundance of the ESU as a whole (NMFS, 1998). Moreover, the only streams considered to have wild CV SR salmon at that time were Mill Creek and Deer Creek, and possibly Butte Creek (tributaries to the Sacramento River). These populations were considered relatively small with sharply declining trends. Hence, demographic and genetic risks due to small population sizes were considered to be high. NMFS also determined that habitat problems were the most important source of ongoing risk to this ESU (NMFS, 1998).

On August 9, 1996, NMFS proposed to list CCV steelhead as endangered (61 C.F.R. 41541). NMFS concluded that the CCV steelhead ESU was in danger of extinction because of habitat degradation and destruction, blockage of freshwater habitats, water allocation problems, the pervasive opportunity for genetic introgression resulting from widespread production of hatchery steelhead and the potential ecological interaction between introduced stocks and native stocks. On January 5, 2006, NMFS issued a final determination, which listed CCV steelhead as threatened (71 C.F.R. 834). CCV steelhead are threatened due to negative trends in CCV steelhead abundance and productivity (71 C.F.R. 834).

Extensive extirpation of historical populations has placed the Chinook salmon ESUs in threat of extinction. The proximate problem afflicting these ESUs and the CCV steelhead DPS is that their historical spawning and rearing areas are largely inaccessible (NMFS, 2009). Threats to CCV steelhead are similar to those for Chinook salmon and fall into three broad categories: loss of historical spawning habitat; degradation of remaining habitat; and threats to the genetic integrity of the wild spawning populations from hatchery steelhead production programs in the Central Valley. As reported by Armentrout et al. (1998), Mill Creek (in addition to Antelope and Deer Creeks) still support the majority of their original native aquatic species assemblages.

The Deer Creek, Mill Creek and Antelope Creek watersheds have been identified as high-priority tributaries for the protection and recovery of wild populations of CV SR salmon and CCV steelhead. The watersheds have been rated as having high "biotic integrity" defined as "the

ability to support and maintain a balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of the natural habitat of the region." (Moyle and Randall, 1996, as cited in Armentrout et al., 1998). The anadromous fish habitat in Mill Creek (along with Deer, Antelope, Battle and Butte Creeks[1]) are the best remaining accessible habitat in the Central Valley for anadromous salmonids, and serve as important anchors for their recovery (NMFS, 2009).

Watershed Descriptions

Mill Creek

The Mill Creek watershed is approximately 134 square miles, contains nearly 60 river miles, and ranges in elevation from 8,000 feet in Lassen National Park to 200 feet at the confluence with the Sacramento River. Mill Creek is one of three Sacramento River tributaries to support a self-sustaining wild population of CV SR salmon; Mill Creek also supports populations of fall-run Chinook salmon, and all life history stages of steelhead. Mill Creek contains the highest elevation of CV SR salmon spawning activity in California at approximately 5,300 feet, and is one of the few undammed streams in California where fish still have access to the upper stream reaches. Current anadromous fish populations in the watershed are not influenced by the presence of Federal, state, or private fish hatcheries. CV SR salmon and CCV steelhead trout critical habitat was designated in 2005, which included habitat in Mill Creek (NOAA, 2005).

Mill Creek is vulnerable to inadequate instream flows, particularly during drought years such as 2014 and 2015. Adequate streamflow during salmonid migration periods will support the survival of adult CV SR salmon and CCV steelhead by increasing critical passage riffle depth and reducing water temperatures in Mill Creek.

Mill Creek is characterized as having a high potential to support a viable independent population of CV SR salmon and a high potential to support recovery of a viable population of CCV steelhead (NMFS, 2009). Mill Creek is recognized as supporting one of three remaining self-sustaining CV SR salmon populations. Habitat used for holding and spawning is located at high elevations and is considered to be high quality (CDFG, 1998). When considering watersheds in the Central Valley that contribute current viable populations for CV SR salmon, Mill Creek is considered a conservation stronghold for the ESU. Lindley et al. (2007) classified the Mill Creek CV SR salmon population as having a moderate risk of extinction (NMFS, 2009). In recent years, the abundance of the Mill Creek population has been in steep decline, and the extinction risk may be trending toward moderate to high. The decline in population over three or more years, such as has been seen over the drought period, is particularly concerning, as Chinook salmon populations typically include three year-classes, each of which tends to follow a three-year life cycle. This consistent decline means that each year-class has been affected. The anadromous fish habitats in Mill Creek (along with Deer, Antelope, Battle and Butte Creeks) are probably the best remaining habitat above the Central Valley for anadromous salmonids, and serve as important anchors for their recovery (NMFS, 2009).

[1] Information suggests that curtailments for fish passage are not necessary at this point to support listed salmonid populations in Butte and Battle Creeks.

There are two pre-1914 appropriative, six licensed appropriative, and 12 riparian diversions within the Mill Creek watershed, with a total of approximately 45,000 acre-feet per year diverted. The Superior Court of Tehama County adjudicated the water rights in Mill Creek in 1920. This decree apportions all flows in Mill Creek up to 203 cfs and appoints Los Molinos Mutual Water Company as watermaster (Tehama County Superior Court Decree #3811, 1920). Flow records show that diversions in lower Mill Creek have the potential to entirely eliminate natural streamflow in June-September of a normal water year, and also at other times of year in drought conditions.

Deer Creek

Deer Creek also supports one of three remaining self-sustaining populations of threatened CV SR salmon (Lindley et al., 2007), and is considered essential to the recovery and perpetuation of wild stocks of CCV steelhead in the Central Valley (Reynolds et al., 1993; McEwan and Jackson, 1996). Deer Creek originates near the summit of Butt Mountain (7,320 feet elevation) defined previously and flows in a southwesterly direction for approximately 60 miles to the Sacramento River (180 feet elevation), draining 134 square miles (NFMS, 2009; see Figure 1). Deer Creek contains approximately 42 miles of anadromous fish habitat with approximately 25 miles of adult spawning and holding habitat, most of which is located on public lands managed by Lassen National Forest. While no major water storage facilities exist on Deer Creek, three diversion dams and four diversion ditches along the lower 10 miles of the creek, as well as two natural falls, can be passage barriers to migrating fish depending on flows. The Upper Deer Creek Falls constitutes the limit of anadromy for CV SR salmon; however, Upper Falls fish ladder is operational during the time steelhead would be migrating upstream in normal years (NMFS, 2009; Amentrout et al., 1998). CV SR salmon and CCV steelhead trout critical habitat was designated in 2005, which included habitat in Deer Creek (NOAA, 2005).

CCV steelhead and CV SR salmon face thermal barriers as well as inadequate flows over diversion dams and falls during migration. Adult CV SR salmon migrate from March to early June (NMFS, 2009). In 2007, a dry year, a total of 644 CV SR salmon were observed in Deer Creek with only 3% of the population held above the Lower Falls. Normally, up to 28% of the population holds between Upper Falls and Lower Falls. The low flows of the drought will likely intensify the conditions faced in 2007. In addition, in 2007, a total of 403 complete redds, 21 practice redds, 18 carcasses and 87 live fish on redds were observed (NMFS, 2009). Attraction flows in the Lower Falls fish ladder have been declining in recent years (NMFS, 2009) and are expected to be less in 2015. From 1991 to 2007, Deer Creek CV SR salmon counts in Deer Creek have ranged from 209 to 2,759. According to Cramer and Hammack (1952), from 1940-1948 the end of adult CV SR salmon counts made in Deer Creek were always brought about by lack of sufficient water below irrigation diversions for salmon to ascend readily, in addition to the onset of lethal water temperatures (Armentrout et al., 1998). Adult CCV steelhead migration is believed to occur from late fall to winter. No direct studies have been conducted on CCV steelhead migration; however, incidental catch from Chinook salmon studies have occurred November through June, with the most CCV steelhead seen from December to March (NMFS, 2009).

From 1994-2010, juvenile CCV steelhead and CV SR salmon juvenile out-migration occurred from October to June. Low flows expected in early summer and fall of 2015 will likely create

harsh conditions for outmigration of juvenile salmonids. Juvenile CCV steelhead and juvenile CV SR salmon have peak migrations occurring in November and again from February through March. During the 1994-2010 period, 89,526 juvenile CV SR salmon, mostly ocean type life history, and 1,169 juvenile CCV steelhead were sampled (CDFW, 2010).

There are 36 riparian, 11 licensed appropriative, and three pre-1914 appropriative water rights in the Deer Creek watershed, totaling approximately 48,000 acre-feet per year of cumulative diversions. The Tehama County Superior Court adjudicated water rights on lower Deer Creek in 1923 by dividing 100% of Deer Creek's natural flows, with approximately 66% allocated to Stanford Vina Ranch Irrigation Company (SVRIC), approximately 33% allocated to the Deer Creek Irrigation District (DCID), and 1% to a third holder (Tehama County Superior Court Decree No. 4189, 1923). One study has assessed diversions as follows: during the irrigation period, typically from May through October, DCID diverts an average of 29 cfs at the DCID Dam, and the remaining flow can be diverted by SVRIC at Cone-Kimball Dam (5 cfs average) and Stanford-Vina Dam (70 cfs average), reducing flow in the lower five miles of Deer Creek to less than 5 cfs at times of intensive irrigation (Tompkins and Kondolf, 2007). In critically dry years, these diversions and resulting low flows may occur earlier in the year, especially if the irrigation season starts earlier.

Antelope Creek

The Antelope Creek watershed encompasses approximately 123 square miles. Antelope Creek stretches approximately 38 miles and enters the Sacramento River at River Mile 235, nine miles south of Red Bluff. At least 47 springs feed Antelope Creek and help sustain its flow through the summer months. The main channels are bounded by canyon walls and the stream is actively eroding downward into the underlying geology. Much of the upper watershed is contained within public lands including both Tehama State Wildlife Area and Lassen National Forest. The lower portion of Antelope Creek splits into a series of braided channels when it enters the Sacramento Valley floor. Approximately six miles of the Sacramento River receives water from Antelope Creek through the series of braided channels that branch off of the mainstem Antelope Creek and flow directly into the Sacramento River. These channels include: New Creek, Craig Creek, Butler Slough, and Antelope Creek.

Antelope Creek historically supported fall-, late-fall-, and spring-run Chinook salmon as well as CCV steelhead. Within the upper watershed, CV SR salmon and CCV Steelhead use habitat within the North and South Forks of Antelope Creek. CV SR salmon critical habitat was designated in 2005, which included habitat in Antelope Creek (NOAA, 2005). Antelope Creek has approximately 15 miles of critical spawning and over-summer holding habitat for spring-run adults. The few CV SR salmon that enter Antelope Creek currently ascend the North Fork four miles upstream of the Middle, North Fork junction to where a natural boulder cascade is located. The CV SR salmon are also able to ascend approximately seven miles upstream from the junction on the South Fork, to a series of bedrock chutes. It is thought that this is probably their historical upper limit, beyond which there is little suitable habitat. CV SR salmon critical habitat within the lower limit of Antelope Creek include all segments of the braided channel as well as the full length of Butler Slough, Craig Creek, New Creek, and two irrigation canals (TCRCD 2010; Yoshiyama et al 1996). CCV steelhead trout critical habitat was also designated in 2005, which included habitat in Antelope Creek (NOAA, 2005).

Potential adverse conditions within Antelope Creek occur primarily in the lower watershed, downstream of the mouth of the canyon, and are chiefly related to low stream flows. Low stream flows are a result of seasonal agricultural diversions and the braided nature of the channel below the major diversion dam. These low flow conditions will likely be exacerbated by the drought conditions of 2015. It is thought that low flows are a migration barrier to both adult and juvenile salmonids. In the upper watershed, Federal land management practices are guided by a long-term anadromous fish conservation strategy. Private timberland management plans lack a comprehensive anadromous habitat protection strategy (TCRCD, 2010; NMFS, 2009).

Maintenance of adequate stream flow will benefit adult CV SR salmon and CCV steelhead by increasing the overall volume of flow in Antelope Creek, and reducing water temperatures. Increasing flows will make entry into Antelope Creek more attractive to adult fish and passage through critical riffles possible, especially during migratory periods. In addition, increased water volume and reduced water temperatures will benefit rearing and out-migrating juvenile salmonids that may be present in lower Antelope Creek.

There are 53 riparian, two appropriative, and two pre-1914 diversions in the Antelope Creek watershed according to a search of the eWRIMS database, corresponding to reported use of approximately 13,000 acre-feet reported (2010 reports). Flow records show that diversions in lower Antelope Creek have the potential to entirely eliminate natural streamflow during the summer irrigation season, usually dewatering the stream when Edwards Ranch and Los Molinos Mutual Water District diversions operate (Armentrout et al., 1998; TCRCD, 2010).

Similarity of Watersheds

Antelope Creek, Deer Creek and Mill Creek are eastside tributaries to the Sacramento River and drain approximately 123, 200, and 134 square miles, respectively (Mill and Ward, 1996; NMFS, 2009). The watersheds are contiguously located within the southernmost extension of the Cascade Range (Armentrout, 1998) and southwest of Lassen Peak. The Tuscan formation, comprised primarily of mudflows with andesitic plugs, dominates the geology of the watersheds (Guffanti et al, 1989). The Tuscan Formation is overlain by voluminous flows of rhyolite which form Mill Creek and Lost Creek Plateaus in the Mill Creek and Deer Creek watersheds. Marine sedimentary rocks have minor exposures in the watersheds, and at lower elevations the creeks cut through quaternary sediments from the Sacramento Valley. Soils generated in the watersheds are andesitic soils and rhyolitic soils. Antelope Creek has less rhyolitic soils than Deer Creek and Mill Creek and thus, has lower surface erosion rates and less mass wasting than these other watersheds (Armentrout, 1998).

While the Mill Creek watershed has higher elevations than the Deer Creek and Antelope Creek watersheds (8,200 feet, 7,320 feet and 6,800 feet, respectively) all three watersheds contain relatively undisturbed habitat in their upper reaches. All three watersheds receive a portion of precipitation as snow, with Mill Creek generally receiving the greatest amount of precipitation as snow due to its higher elevations. Glacial processes have shaped some of the landforms at the higher elevations of the watersheds. The upper portion of Mill Creek is a glacial valley, and glacial deposits have been mapped at the headwaters of Deer Creek on Butt Mountain (Lydon, 1968, as cited in Armentrout, 1998). Wilson (1961) suggests that the headwaters of Antelope

Creek around Turner Mountain have also been glaciated (cited in Armentrout, 1998). All three watersheds are relatively narrow and initially flow through meadows and dense forests before descending through steep rock canyons into the Sacramento Valley (NMFS, 2009; Armentrout, 1998). The geology and geomorphology of the Antelope, Deer and Mill Creeks upper watersheds produce exceptional fish habitat.

The lower reaches of all three watersheds are made up of alluvial fan deposits with evidence of stream meandering and multiple distributaries (TCRCD, 2010; Kondolf, 2001; CALFED, 2000). The lower watersheds contain alternating pools and riffles of gravel sized sediment (TCRCD, 2010; Berens, 2002; Kondolf, 2001). Deer Creek and Mill Creek's upper alluvial reaches are able to meander but are bound by wide bluffs of older cemented river gravels, typically 800 feet for Mill Creek and 1,000-2,000feet for Deer Creek. Downstream of the bluffs evidence of the multiple channels characteristic of alluvial fans can be observed (Kondolf et al., 2001; CALFED, 2000). The 25,000-ft alluvial reach of Mill Creek compares in sediment size and downstream change in sediment size with the upper 25,000 feet of Deer Creek, measured from where it leaves confined upper basin (Kondolf, 2001). Antelope Creek, unlike Mill and Deer Creeks, is unconfined when it reaches the valley floor providing the stream the opportunity to meander as Deer and Mill Creeks did before incising into the older river sediments (TCRCD, 2010).

Antelope and Mill Creeks still have active distributaries; however, the North Fork Mill Creek distributary is only active during high flows. Historical aerial photographs, taken in 1939, show the lower portion of Deer Creek was sinuous, with small-scale bends, point bars, and alternating pools and riffles (CALFED 2000). However, 16 kilometers of levees were built along lower Deer Creek resulting in the straightening of channels, the abandoning of natural distributaries and increased gravel flushing (Berens, 2002; MacWilliams et al, 2004). The similar sedimentary and geomorphic characteristics of the lower watersheds of Antelope Creek, Deer Creek and Mill Creek create comparable fish passage environments.

Runoff patterns for all three watersheds are similar (NMFS, 2009; Armentrout, 1998). The three watersheds have peak flows that are dominated by rain on snow events (December- February) with later snowmelt peaks (mid-March-May) and low flows during the summer. Mean June flows in the drought year of 1977 in Antelope, Deer and Mill Creeks were 33 cfs, 75 cfs, and 99 cfs, respectively. Deer Creek and Mill Creek watersheds typically produce over 200,000 acre-feet of water per year. Antelope Creek produces much less water, at 110,800 acre-feet of water per year (Armentrout,1998).

Mill Creek, Deer Creek, and Antelope Creek support multiple self-sustaining natural populations of anadromous salmonids, including ESA-listed CV SR salmon and CCV steelhead. In these tributary systems, adult CV SR salmon migration typically occurs from March through July with a peak in migration during April through June, and CV SR salmon juveniles are typically present from October through June, with a peak in out-migration in January and February (NMFS 2009). Adult CCV steelhead are typically present in these tributary systems during February through June and October through December, and juveniles can be present year-round (NMFS 2009).

Mill Creek, Deer Creek and Antelope Creek share much of the same geology and geomorphology in their upper watersheds, in addition to similar run off patterns. Their characteristics diverge in the lower watersheds, with Antelope Creek braiding and distributing

into three channels. However, all three streams have characteristics of alluvial fans and similar sediment grain size. The typical nature of the region leads the State Water Board to conclude that studies and findings of flows and fish habitat characteristics in one of the watersheds may be applied to the others.

Informative Digest

Summary of Existing Laws and Regulations

A general description of the following is set forth above: existing law governing water rights; the water right priority system; and the constitutional prohibition against the waste, unreasonable diversion, unreasonable method or diversion, or unreasonable use of water.

Under existing law, the State Water Board may take enforcement action to prevent unauthorized diversions of water or violations of the terms and conditions of water rights permits and licenses. Diverting water when it is unavailable under a water right holder's priority of right constitutes an unauthorized diversion and a trespass against the state. Violations are subject to an Administrative Civil Liability (ACL) under the Water Code. (Wat. Code, § 1052.) Administrative cease and desist orders and court injunctions may also be issued to require that diversions stop. (Wat. Code, § 1831.) An ACL order for an unauthorized diversion may impose liability up to $1,000 a day plus $2,500 per acre foot of water that is illegally diverted for violations during the current drought. The same enforcement mechanisms exist for violations of permit and license terms and conditions such as Term 91. For the State Water Board to take an enforcement action, each illegal diversion may be investigated and charged separately, and water right holders may request a full evidentiary hearing on issues that include availability of water under the water right holder's priority, and the administrative decision is then subject to review in the courts.

Under existing law, the State Water Board also may initiate administrative proceedings to prevent the waste or unreasonable use of water. (Wat. Code, § 275.) The State Water Board lacks authority, however, to take direct enforcement action against the waste or unreasonable use of water. The State Water Board must first determine whether a given diversion or use is unreasonable, either in a State Water Board order or decision or in a regulation, and direct the diverter or user to cease the unreasonable diversion or use. In the event that the State Water Board has issued an order or decision, the State Water Board may issue a cease and desist order to enforce the order or decision. (Wat. Code, § 1831, subd. (d)(3)). If the cease and desist order is violated, the State Water Board may impose administrative civil liability. (Wat. Code, § 1845, subd. (b)(1).) In the event that the State Water Board has adopted a regulation under section 1058.5, the State Water Board may issue a cease and desist order and simultaneously impose administrative civil liability in response to violations of the regulation. (Wat. Code, §§ 1058.5, subd. (d), 1846, subd. (a)(2).)

Description and Effect of Proposed Regulation

The proposed emergency regulation will set drought emergency minimum flows necessary to maintain fish passage in three priority tributaries to the Sacramento River for protection of

threatened CV SR salmon and CCV steelhead. Under the proposed regulation, the State Water Board would curtail diverters in these watersheds in the order of priority as necessary to maintain a reasonable assurance of meeting the minimally protective flows, and the needs of senior users. The requirement to curtail when water in excess of drought emergency minimum flows is unavailable would constitute both a regulatory requirement and a condition of all permits and licenses in the affected watersheds. The proposed regulation also establishes procedures for important exceptions to priority-based curtailments in order to protect public health and safety.

Proposed Emergency Regulation Section 877

Proposed section 877 would establish drought emergency minimum flow levels in Deer Creek, Mill Creek and Antelope Creek to allow for migratory passage of adult and juvenile CV SR salmon and CCV steelhead. The description and rationale for the flows is detailed below.

The State Water Board recognizes that the drought emergency minimum flows described below do not represent optimal passage conditions for Chinook salmon and steelhead under these drought conditions and these minimum passage flows will result in stressful passage conditions for salmonids. The State Water Board has identified the need for these drought emergency minimum flows during this drought period due to the lack of developed alternative water supplies to meet the emergency water supply conditions that exist during this drought period. All water users should take measures this year and in future years to develop alternative water supplies, since it is likely more protective and appropriate minimum flows for similar water shortage conditions will be established in the future.

Emergency Minimum Instream Base Flows and Pulse Flows if Adult CV SR Salmon and Adult CCV Steelhead are Present October 15 through June 15 on Mill and Deer Creeks and November 1 through May 15 on Antelope Creek

Adult Base Flows: The State Water Board has determined that the drought emergency minimum base flows recommended by NMFS in consultation with CDFW of 50 cfs or full inflow without diversions in Mill Creek and Deer Creek and 35 cfs or full inflow without diversions in Antelope Creek are necessary to provide adequate protection of adult CV SR salmon under the existing drought conditions from October 15 through June 15 on Mill Creek and Deer Creek and November 1 through May 15 on Antelope Creek. This determination is based on a review of the best available science and information discussed below.

Justification for Mill Creek Adult CV SR Salmon and Adult CCV Steelhead Base Flow

NMFS has recommended in consultation with CDFW a base flow of 50 cfs during this drought emergency for the protection of adult salmonids during the October 15 through June 15 time period.

D.W. Alley & Associates' (1996) Instream Flow Incremental Methodology (IFIM) instream flow study concluded that a minimum flow of 74 cfs for adult spring-run and fall-run Chinook salmon passage was necessary during critically dry years, and that these drought emergency minimum flows are representative of stressful passage conditions for adult Chinook salmon. Additionally,

they recommend higher minimum instream flows when additional flows are available, recognizing that higher instream flows will provide more favorable passage conditions for adult Chinook salmon.

CDFW (2009) summarized 2006-2008 adult CV SR salmon migration data collected on Mill Creek, and concluded that CV SR salmon migration ended with instream flows remaining above 70 cfs in all three years due to sustained minimum daily water temperatures above 67 degrees, which appeared to halt adult CV SR salmon migration.

Observations made by J. Louden indicate that fall-run Chinook salmon have reached Ward Dam after releases of 28-70 cfs, although a critical riffle in lower Mill Creek required modification prior to fish passage in one instance (J. Louden pers. Communication, as cited in D.W. Alley & Associates, 1996).

In 2014, the first CV SR salmon was observed at Ward Dam on February 28, 2014. The total Mill Creek CV SR salmon escapement estimate is 679 fish with 8 percent of the run passing after June 1, with all but one passing before June 15. On June 20, 2014 the last adult SR salmon passed over the Ward Dam (CDFW, 2015a unpublished data). Since the majority of CV SR salmon passed before June 15 in 2014 this would indicate that base flows through June 15 should be sufficiently protective for migrating CV SR salmon during this drought period.

During the 1928 to 2015 time period in which U.S. Geological Survey stream gauge number 11381500 (Mill Creek near Los Molinos, California) was in operation, average daily stream flows greater than 50 cfs were observed 100 percent of the time from October 15 to June 15. This flow gauge is located just upstream of significant water diversions on the valley floor. However, further downstream below significant water diversions, at DWR gauge Station ID MCH (Mill Creek Below Highway 99), stream flows were much lower during the 1998 through 2014 time period of available data, especially during October and June. At this MCH gauge during November 1 through April 30, flows were greater than 50 cfs 100 percent of the time. Therefore, there is a high probability that the 50 cfs minimum flow requirement can be met from November 1 through April 30, even with historic diversion patterns. During May, flows greater than 50 cfs were observed approximately 98 percent of the time. However, based on the 2015 90 and 50 percent exceedence forecasts for Mill Creek, it is anticipated that in May 2015 reduced diversions will be necessary to meet the 50 cfs flow requirement. During June 1-15, flows greater than 50 cfs have been observed approximately 86 percent of the time under historic diversion patterns. Additionally, during October 15-31 flows greater than 50 cfs have been observed approximately 53 percent of the time at the MCH gauge, indicating that meeting this flow during this drought period is unlikely without reduced diversions. During the months of June and October, the flow requirement of 50 cfs will be relaxed if adult salmonids are not present and in need of higher flows. However, if adult salmonids are present, indicating a need for higher flows, then this requirement will be implemented.

Justification for Deer Creek Adult CV SR Salmon and Adult CCV Steelhead Base flow

NMFS, in consultation with CDFW, has recommended a base flow of 50 cfs during this drought emergency for the protection of adult CV SR salmon and steelhead during the October 15 through June 15 time period.

In 2007, as part of the Deer Creek Flow Enhancement Program, CDFW developed an adult upstream fish transportation flow objective of 50 cfs in Deer Creek. This minimum preliminary flow objective was derived from the comparable east-side streams in the Northern Sacramento Valley, such as Mill Creek (Deer Creek Flow Enhancement Program Memorandum of Agreement, 2007). Due to the similarities in the geology, geomorphology and hydrology of Deer Creek and Mill Creek, the State Water Board has concluded that comparison between these two watersheds is justified.

From October 15, 2014 to December 15, 2014 a total of 88 CCV steelhead were observed passing through the two fish ladders at the SVRIC Dam. The first CCV steelhead was observed on October 25, 2014, indicating that base flow of 50 cfs beginning on October 15 should be sufficient to attract and protect returning CCV steelhead (CDFW, 2015b unpublished data).

During the 1911 to 2015 time period in which U.S. Geological Survey stream gauge number 11383500 (Deer Creek Near Vina, California) was in operation, average daily stream flows greater than 50 cfs were observed approximately 100 percent of the time from October 15 to June 15. This gauge is located upstream of the significant diversions on the valley floor. However, further downstream below significant water diversions, at DWR gauge Station ID DVD (Deer Creek Below Stanford Vina Dam), flows greater than 50 cfs were observed more than 95 percent of the time from November 1 to April 30. Therefore, there is a high probability that the 50 cfs minimum flow requirement can be met from November 1 through April 30, even with historic diversion patterns. During May, flows greater than 50 cfs were observed approximately 83 percent of the time. However, based on the 2015 90 and 50 percent exceedence forecasts for Deer Creek, it is anticipated that in May 2015 reduced diversions will be necessary to meet the 50 cfs flow requirement. During June 1-15, flows greater than 50 cfs have been observed approximately 44 percent of the time under historic diversion patterns, which indicates that meeting this flow requirement during this drought period is unlikely without reduced diversions. Additionally, during October 15-31 flows greater than 50 cfs have been observed approximately 60 percent of the time at DWR's DVD gauge, which indicates that meeting this flow during this drought period is unlikely without reduced diversions If adult salmonids are present indicating a need for higher flows, then this requirement will be implemented.

Justification for Antelope Creek Adult CV SR Salmon and Adult CCV Steelhead Base Flow

NMFS, in consultation with CDFW, has recommended a base flow of 35 cfs during this drought emergency for the protection of adult CV SR salmon and CCV steelhead during the November 1 through May 15 time period.

During the 1940 to 1982 time period in which U.S. Geological Survey stream gauge number 11379000 (Antelope Creek Near Red Bluff, California) was in operation, average daily stream flows greater than 35 cfs were observed more than 96 percent of the time from November 1 to June 30, and during October average daily stream flows greater than 35 cfs were observed 80 percent of the time. Therefore, 35 cfs represents a very extreme historical low flow condition that salmon and steelhead would have faced under pre-diversion conditions on Antelope Creek. This flow gauge is located upstream of significant valley floor diversions, and instream flows below these diversions have likely been lower since the time the diversions were installed. There is not a flow gauge located below these diversions.

Recent adult salmon migration observations (CDFW, 2014a unpublished data) suggest that salmon generally migrate past Craig Creek and Edwards Diversion Dam when instantaneous flows are greater than 30 cfs in Craig Creek. There is one observation of adult passage on record when flows in Craig Creek were 4 cfs, but this observation is thought to be an outlier. From January to June 2014, all salmon passed at average daily flows of 30 cfs or greater at the mouth of Antelope Canyon (CDFW, 2015c unpublished data).

Adult Pulse Flows: A pulse flow is a substantial increase in river discharge over a period of days or weeks, which among other benefits, provides fishes with an opportunity and often the necessary cues to move to seasonal habitats. Pulse flows can help juvenile fish to swim towards the ocean, or help adult fish to swim towards spawning habitats. Additionally, pulse flows can result in water temperature reductions or provide fish access to floodplain habitats, which can both benefit native fishes. Furthermore, a ramping down period for pulse flows is common practice and aids in the prevention of stranding of fish (Nagrodski et al., 2012). Historically in the Central Valley, relatively low-magnitude natural pulse flows occurred from late autumn until early spring in response to rainfall, followed by snow melt-driven pulses from spring through early summer (Zeug et al., 2014).

The State Water Board has determined that the pulse flows recommended by NMFS, in consultation with CDFW, of full inflow without diversions in Mill Creek, Deer Creek and Antelope Creek exceeds the pulse flow volume necessary to provide adequate protection of Adult CV SR salmon under the existing drought conditions during April 1 to June 15 in Mill Creek and Deer Creek and April 1 to May 15 in Antelope Creek. The State Water Board has determined that pulse flows of 100 cfs or full natural flow without diversions, whichever is less, in Mill Creek and Deer Creek (April 1-June 15) and 70 cfs or full natural flow without diversions, whichever is less, in Antelope Creek (April 1-May 15) are necessary to balance beneficial uses existing under these drought conditions. These flows provided a positive response in 2014. A flow ramping down period at the end of a pulse flow may be required by the Deputy Director if requested by CDFW or NMFS. Pulse flows may be required when Adult CV SR salmon are observed in the lower reaches of Deer Creek, Mill Creek, or Antelope Creek. This requirement applies to each pulse flow event, of the magnitude and time period indicated above. The flow ramp down

period is part of the pulse flow period. When required, pulse flows are in lieu of and not in addition to base flow requirements. The pulse flow duration will last a minimum of 24 hours to a maximum of 72 hours determined by the presence of fish observed and desired migration movements upstream. The duration will be determined by the Deputy Director in consultation with CDFW, and NMFS. This determination is based on a review of the best available science and information discussed below.

Justification for Mill Creek Adult CV SR Salmon Pulse Flow

NMFS, in consultation with CDFW, has recommended a pulse flow of full natural flows once every two weeks during this drought emergency for the protection of adult salmonids during the April 1 to June 15 time period. The State Water Board has determined that pulse flows of 100 cfs or full inflow without diversions, whichever is less, in Mill Creek is necessary to balance beneficial uses existing under these drought conditions from April 1 through June 15. A flow ramping down period at the end of a pulse flow may be included if requested by CDFW or NMFS. The flow ramp down period is part of the pulse flow period.

Observations of adult CV SR salmon in lower Mill Creek demonstrate a strong correlation between pulse flow events and adult CV SR salmon migration. From 2007-2013, CDFW has documented (CDFW, 2014b unpublished white paper) adult CV SR salmon migration through lower Mill Creek, and the data show correlations between increased flows and increased numbers of adult CV SR salmon observations. CDFW (2014b) documented the results of a May 24-27, 2013 lower Mill Creek pulse flow event due to a temporary cessation of water diversions at Ward Dam, thirty-two adult CV SR salmon were observed passing through a video monitoring station during this time. Flow data were recorded at DWR's MCH gauge, located below Ward Dam, and recorded a pre-pulse base flow of 55 cfs and a maximum pulse flow of 94 cfs. Based on this information, the State Water Board has determined that a spring pulse flow of 100 cfs following a base flow period of 50 cfs should be expected to facilitate adult CV SR salmon migration. In 2014, 13 percent of the CV SR salmon run in Mill Creek (88 fish) passed during pulse flows (CDFW, 2014n).

Pulse flow events have demonstrated effectiveness in facilitating adult CV SR salmon migration in other Bay-Delta tributaries. For example, the Clear Creek Technical Team (2013) reported increased observations of adult CV SR almon following a pulse flow event that occurred over several days in June 2013. The pulse flow event had a peak of 400 cfs that followed a base flow period of 175 cfs. Snorkel surveys reported 400 adult CV SR salmon before the pulse flow event, and 561 adult CV SR salmon after the pulse flow event.

Justification for Deer Creek Adult CV SR Salmon Pulse Flow

NMFS in consultation with CDFW has recommended a pulse flow of 50 cfs over base flow or full natural flows once every two weeks during this drought emergency for the protection of adult salmonids during the April 1 to June15 time period. The State Water Board has determined that pulse flows of 100 cfs or full inflow without diversions, whichever is less, in Deer Creek is necessary to balance beneficial uses existing under these drought conditions from April 1 through June 15. A flow ramp down period at the end of a pulse flow may be included if requested by CDFW or NMFS. The flow ramp down period is part of the pulse flow period.

In the 2007 Deer Creek Flow Enhancement Program Memorandum of Agreement, CDFW proposed one or two day pulse flows for the purpose of attracting salmon upstream of the Stanford-Vina Ranch Irrigation Company Dam. These pulse flows were proposed: for periods of maximum daily water temperatures reaching 65°F to 70°F as measured at DWR's Deer Vina Dam (DVD) gauge below the Stanford-Vina Ranch Irrigation Company Dam, and to allow critical riffles to reach their minimum critical passage depths.

See the Justification provided for Mill Creek above. Mill and Deer Creeks are similar watersheds and similar results are expected from a pulse flow which doubles base flows over a period of 24 to 72 hours.

Justification for Antelope Creek Adult CV SR Salmon Pulse Flow

NMFS in consultation with CDFW has recommended a pulse flow of 40 cfs over base flow or full natural flows once every two weeks during this drought emergency for the protection of adult salmonids during the April 1 to May 15 time period. The State Water Board has determined that pulse flows of 70 cfs or full flow without diversions, whichever is less, in Antelope Creek is necessary to balance beneficial uses existing under these drought conditions from April 1 through May 15. A flow ramping down period at the end of a pulse flow may be included if requested by CDFW or NMFS. The flow ramp down period is part of the pulse flow period.

See the Justification provided for Mill Creek above. Mill Creek and Antelope Creek are similar watersheds and similar results are expected from a pulse flow which doubles base flows over a period of 24 to 72 hours.

Emergency Minimum Instream Base Flows and Pulse Flows if Juvenile CV SR Salmon or Juvenile CCV Steelhead are Present and Adult CV SR Salmon and/or Adult CCV Steelhead are not Present from October 15 through June 30 on Mill Creek and Deer Creek and November 1 through May 30 on Antelope Creek

Juvenile Base Flows: The State Water Board has determined that the emergency minimum base flow recommended by NMFS in consultation with CDFW of 20 cubic feet per second (cfs) or full inflow without diversions in Mill Creek and Deer Creek (October 15-June 30) and 15 cfs or full natural flow without diversions in Antelope Creek (November 1-May 31) are necessary to provide adequate protection of juvenile CV SR salmon and CCV steelhead under the existing drought conditions. This determination is based on a review of the best available science and information discussed below.

Justification for Mill Creek Juvenile CV SR Salmon and Juvenile CCV Steelhead Base Flow

NMFS, in consultation with CDFW, has recommended a base flow of 20 cubic feet per second (cfs) during this drought emergency for the protection of juvenile salmonids during the October 15 through June 30 time period.

A critical riffle assessment conducted in 1995 (D.W. Alley & Associates, 1996) concluded that 27 cfs is expected to provide good juvenile passage conditions in the lower 5.25 miles of Mill Creek. Additionally, D.W. Alley & Associates (1996) assumed that CCV steelhead and CV SR salmon juveniles would out-migrate at comparable sizes, and that 27 cfs is appropriate for both species.

CDFW (2012) collected daily rotary screw trap data on Mill Creek juvenile spring-run and fall-run Chinook out-migrants over the period of 1996-2009, and found that mean daily flows above 20 cfs were typical during juvenile outmigration.

During the 1928 to 2015 time period in which U.S. Geological Survey stream gauge number 11381500 (Mill Creek Near Los Molinos, CA) was in operation, average daily stream flows greater than 20 cfs were observed 100 percent of the time from October 15 to June 30. However, at DWR's MCH gauge which is below significant valley diversions, flows greater than 20 cfs were observed 90 percent of the time during June, 80 percent of the time from October 15 through October 31, 98 percent of the time during November, and 100 percent of the time from December 1 through May 31. Therefore a 20 cfs flow requirement from November 1 through May 31 has a high probability of being met under historical diversion patterns, but during June and October it is more likely that diversion reductions will be necessary.

Justification for Deer Creek Juvenile CV SR Salmon and Juvenile CCV Steelhead Base Flow

NMFS has recommended a base flow of 20 cubic feet per second (cfs) during this drought emergency for the protection of juvenile salmonids during the October 15 through June 30 time period.

A Mill Creek critical riffle study found that 27 cfs is expected to provide good juvenile passage conditions in the lower 5.25 miles of Mill Creek (D.W. Alley & Associates, 1996). Additionally, D.W. Alley & Associates (1996) assumed that CCV steelhead and CV SR salmon juveniles would out-migrate at comparable sizes, and that 27 cfs is appropriate for both species. Mill Creek and Deer Creek are similar watersheds and similar levels of protectiveness are expected for juvenile base flows.

During the 1911 to 2015 time period in which U.S. Geological Survey stream gauge number 11383500 (Deer Creek Near Vina, California) was in operation, average daily stream flows greater than 20 cfs were observed 100 percent of the time from October 15 to June 30. However, at DWR's DVD gauge which is below significant valley diversions, flows greater than 20 cfs were observed 64 percent of the time during June, 73 percent of the time from October 15 through October 31, 99 percent of the time during November, 100 percent of the time from December 1 through April 30, and in 96 percent of the time during May. Therefore a 20 cfs flow requirement from November 1 through May 31 has a high probability of being met under historical diversion patterns, but during June and October it is more likely that diversion reductions will be necessary.

Justification for Antelope Creek Juvenile CV SR Salmon and Juvenile CCV Steelhead Base Flow

NMFS has recommended a base flow of 15 cfs during this drought emergency for the protection of juvenile salmonids during the November 1 through May 30 time period.

On Mill Creek, which is an adjacent watershed, a critical riffle study found that 27 cfs is expected to provide good juvenile passage conditions in the lower 5.25 miles of Mill Creek (D.W. Alley & Associates 1996). Additionally, D.W. Alley & Associates (1996) assumed that CV steelhead and CV SR salmon juveniles would out-migrate at comparable sizes, and that 27 cfs is appropriate for both species. Mill Creek and Antelope Creek are similar watersheds and similar levels of protectiveness are expected for juvenile base flows; however, the Antelope Creek watershed is approximately 8 percent smaller than the Mill Creek watershed and therefore the base flow in Antelope Creek is lower to reflect this difference.

During the 1940 to 1982 time period in which U.S. Geological Survey stream gauge number 11379000 (Antelope Creek Near Red Bluff, California) was in operation, daily stream flows never dropped below 15 cfs during the November 1 and May 30 time period. The lowest daily flow on record during this time period was approximately 31 cfs which occurred during November. November and May typically had the lowest flows during this time period. In November daily flows greater than 36 cfs were observed 95 percent of the time and in May daily flows greater than 36 cfs were observed 100 percent of the time. Additionally, daily flows in November greater than 49 cfs were observed 50 percent of the time, and daily flows in May greater than 132 cfs were observed 50 percent of the time. This gauge is located upstream of significant valley floor diversions, and stream flows below these diversions may have been much lower during this period of record as a result of diversions.

Juvenile Pulse Flows: The State Water Board has determined that pulse flows of 100 cfs or full flow without diversions, whichever is less, in Mill Creek and Deer Creek (June 1-June 15) and 70 cfs or full flow without diversions, whichever is less, in Antelope Creek (May 1-May 15) are necessary to provide adequate protection of juvenile CV SR salmon and juvenile CCV steelhead under the existing drought conditions. Pulse flows may be required when juvenile CV SR salmon or CCV steelhead are observed in the lower reaches of Deer Creek, Mill Creek, or Antelope Creek. When required, pulse flows are not in addition to base flow requirements. A flow ramp down period at the end of a pulse flow may be included if requested by CDFW or NMFS. The flow ramp down period is part of the pulse flow period. The pulse flow duration will last a minimum of 24 hours to a maximum of 48 hours determined by the presence of fish observed and desired migration movements downstream into the Sacramento River. This pulse flow is designed to push juvenile salmonids out of each tributary and into the Sacramento River before curtailments are ceased and low streamflow conditions occur and instream habitat connectivity with the Sacramento River is lost. The duration will be determined by the Deputy Director in consultation with CDFW, and NMFS. This determination is based on a review of the best available science and information discussed below.

Justification for Mill Creek, Deer Creek, and Antelope Creek Juvenile CV SR Salmon and Juvenile CCV Steelhead Pulse Flows

Pulse flow events provide short-term benefits to juvenile Chinook out-migrants, and are hypothesized to synchronize downstream movement of juveniles (Jager and Rose 2003). Juvenile outmigration data from several Bay-Delta tributary watersheds indicates that pulse flow events tend to prompt juvenile Chinook outmigration. For example, Demko and Cramer (1995) collected rotary screw trap data in the Stanislaus River during a four-day pulse flow event in spring 1995, and found that the increase in flow was correlated with an abundance of out-migrants over the four-day period. This pulse flow event occurred from April 8-12 1995, with a pre-pulse base flow of 320 cfs and a peak of 578 cfs. Montgomery et al. (2009) collected rotary screw trap data on the lower Merced River, and reported that peak daily catch coincided with a peak flow event that occurred from May 7-12, 2009. Similarly, a 2003 rotary screw trap study on the lower Tuolumne River concluded that juvenile Chinook catches appear to be correlated to changes in river flow, and that flow increases tend to initiate juvenile outmigration (CDFW, 2004). Although the State Water Board lacks juvenile steelhead outmigration data for Bay-Delta tributaries, juvenile steelhead are expected to benefit from spring pulse flows because juvenile steelhead and juvenile Chinook have similar rearing and passage requirements. Furthermore, a ramping down period for pulse flows is common practice and aids in the prevention of stranding of fish (Nagrodski, et al., 2012).

Proposed Emergency Regulation Section 878

This proposed section would clarify that non-consumptive uses, such as direct diversion for hydroelectric power generation, are not required to curtail in response to orders issued under section 877.

Proposed Emergency Regulation Section 878.1

This section would establish a methodology to allow limited diversions to meet minimum health and safety needs outside of the order of priority in furtherance of the constitutional prohibition against the unreasonable diversion or use of water. The State Water Board has reviewed evidence suggesting that 37 to 50 gallons per person per day are necessary for meeting basic human needs (Burton, 2014, email correspondence). Based on the recommendation of the California Department of Public Health, Division of Drinking Water (now the State Water Board, Division of Drinking Water), the proposed regulation uses 50 gallons per person per day as a benchmark for minimum health and safety diversions for municipal and domestic needs. State Water Board regulations provide that between 55 and 75 gallons per person per day are reasonably necessary to supply the needs of fully plumbed homes, without restricting water to basic human needs. (Cal. Code Regs. tit. 23, § 697 (b).) In this drought emergency using a lower figure than in California Code of Regulations, title 23, section 697, subdivision (b) as a benchmark is reasonable.

In 2014, 210 Human Health and Safety Claims were filed with the State Water Board, 139 of which were associated with the Sacramento River watershed. Only one Human Health and Safety Claim was filed by a water right diverter in the three tributaries associated with the emergency regulation. The claim was filed by Lassen Mutual Water Company, on Mill Creek,

on June 30, 2014. A total of 17 water rights diverters on Mill, Deer and Antelope Creeks claim domestic use.

The proposed regulation establishes a flexible process, as the evidence also indicates that lower or higher amounts of water could be necessary to meet minimum health and safety needs across California's varied communities and climates. To ensure that any diversions are truly required for health and safety needs, diverters must certify that they are not using the water for outdoor watering and that any applicable drought plan measures are in place, and must pursue alternative water sources. Diverters under the exception must continue to report progress towards conserving more water and seeking alternate sources, as described in Section 879.

Throughout the state, there are tens of thousands of diversions small enough to qualify for small domestic registrations yet together these constitute only a small portion of the water diverted. To prioritize State Water Board resources, these diverters of up to 4,500 gallons per day or 10 acre-feet per annum to storage may self-certify that their diversions not exceeding 50 gallons per person per day meet applicable requirements. For larger municipal or domestic diversions, and for any diversion for health and safety needs of more than 50 gallons per person per day, Deputy Director approval is required.

Additionally, drought workshops and the Drought Task Force have identified potential health and safety effects from heightened fire risk, air quality problems and energy grid problems that are linked to the lack of available water. Section 878.1 describes a process for the Deputy Director to approve exceptions to the priority system based on public health and safety needs when the appropriate public agencies identify these more localized risks.

Proposed Emergency Regulation Section 878.2

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. Similarly, the State Water Board understands that fishery agencies are working closely with water users across the state to implement voluntary measures to meet fishery needs in this extreme drought. Section 878.2 would establish a methodology for water users to propose alternatives to following curtailment orders based on priority as issued under section 877, and would allow the Deputy Director to approve such agreements, provided that diversions subject to the agreements are reasonable, do not injure other lawful users of water and provide the required flows or the same or greater level of protection to the fishery as the required flows, as affirmed by the NMFS and the CDFW.

Proposed Emergency Regulation Section 879

Section 879 would establish a requirement that all water users who receive a curtailment order respond with information regarding their compliance with the order and an explanation of any diversions under other rights, and any exceptions to curtailment. Such information will be critical to improving information concerning water depletions in this drought year.

This section would further establish reporting requirements the for health and safety claims to ensure that diversions out of priority remain minimal and are truly necessary.

Proposed Emergency Regulation Section 879.1

This section would make compliance with proposed article 24 a condition of all water right permits, licenses, certificates and registrations.

Proposed Emergency Regulation Section 879.2

This section would confirm that diversion or use of water in violation of proposed article 24 is unauthorized and subject to enforcement, and would clarify that when a diverter is subject to multiple requirements, the most stringent applies.

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Mandate on Local Agencies or School Districts

The State Water Board has determined the proposed sections and subdivisions do 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 Edmund G. Brown Jr. issued a second Executive Order and Proclamation 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." On December 22, 2014, Governor Brown issued Executive Order B-28-14, which extended the suspension of CEQA for certain drought-emergency-related activities, including adoption of emergency regulations under Water Code section 1058.5 through May 31, 2016.

Cost Estimate

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 local agencies and governments will be approximately $1.8 million, including lost revenue in water sales, replacement water costs, and projected tax losses. The proposed regulation is 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. Attachment 1 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.

Attachment 1. Fiscal Impact Statement

Fiscal Impact Statement

B. Fiscal Effect on Local and State Government

Assumptions

Cost assumptions and replacement percentages were taken from the "Estimating Fiscal Impacts of Implanting Water Diversion Curtailments in the Sacramento-San Joaquin Delta Watershed" report prepared for the State Water Resources Control Board (State Water Board) by Josué Medellín-Azuara, Richard E. Howitt, and Jay R. Lund of the University of California, Davis (UCD; Medellin-Azuara et al., 2014a; Medellin-Azuara et al., 2014b). Specific assumptions and percentages are detailed below. Sources for costs include peer reviewed models for agricultural production and water use such as Statewide Agricultural Production Model (SWAP) V6 (http://swap.ucdavis.edu), mainstream impact analysis software such as Impact Analysis for Planning (IMPLAN) Model 2002 and secondary sources in the public domain that provide information required to undertake this fiscal impact analysis. The 60% agricultural groundwater replacement with 20% from district wells and 40% from private wells was based on expert judgment by UCD. Reduction in water use was estimated at 35% for agricultural use, based on expert judgment by UCD. An average groundwater replacement cost of $83.65 per acre-foot from the SWAP model was used to calculate water replacement costs from groundwater pumping. The maximum water sales values as well as maximum costs of conservation and enforcement for both urban and agriculture were used to conservatively estimate the fiscal impact to state and local government. An agricultural water sales value of $100 per acre-foot was determined by an informal review of publicly available information by UCD and was used to calculate lost water sales revenue. Conservation and enforcement costs were assumed to be $350 per acre-foot (urban) and $50 per acre-foot (agriculture), based on expert judgment by UCD. State and local tax revenue from agriculture is assumed to be 10% of revenue from the IMPLAN Model.

A 90% exceedance scenario was used to conservatively estimate the fiscal impact to state and local governments. The State Water Board calculated the monthly supply exceedance scenarios based on supply forecasts from the California Nevada River Forecast Center using United States Geological Survey (USGS) and the California Department of Water Resources (DWR) gauges (http://www.cnrfc.noaa.gov/). Water demand was determined using the Division of Water Rights 2010-2013 average demand dataset (Division demand dataset) updated February 20, 2015 (http://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/analysis/).

Lassen Mutual Water Company

Lassen Mutual Water Company (LMWC) holds a post-1914 appropriative water right (Application Number: A014396) and serves 25 individuals year-round and 118 cabins used seasonally during the summer (Minasian, Meith, Soares, Sexton & Cooper, LLP, 2014). The average reported demand for 2010-2013 is 17.09 acre-feet per year. LMWC was issued an order from the State Water Board's Division of Drinking Water, dated October 17, 2014, requiring it to, among other things: secure adequate alternate water supplies; install water meters and adopt and implement a water rate structure based on metered water usage; and comply with California Code of Regulations, title 23, section 865. Under Section 878.1 of the proposed regulation, LMWC would be authorized to continue to divert water within the limits specified in that section for basic municipal and domestic health and safety needs and would incur costs due to conservation and enforcement. LMWC's ability to divert water from Mill Creek would potentially be affected by the proposed regulation in May, June, October and November. During this time period LMWC has an annual reported demand of 7.96 acre-feet for a total estimated conservation and enforcement cost of $2,787.

Deer Creek Irrigation District

The Deer Creek Irrigation District (DCID) holds an adjudicated water right (Statement Number: S000731) for 33% of Deer Creek's flow (Tehama County Superior Court Decree No. 4189). From 2010 to 2013, DCID reported an average annual water demand of 16,648 acre-feet of water directly diverted and beneficially used. The water was beneficially used to irrigate 1,900 acres. Under the water right associated with Statement S000731, DCID may divert water for domestic uses as well as irrigation and stockwatering uses. No domestic use was reported on the 2010 through 2013 DCID statements and domestic use was not analyzed in this fiscal impact report. The February 20, 2015 Division demand dataset was used to estimate the fiscal impact of the proposed emergency regulation.

The proposed emergency regulation would be in effect for 270 days. It is estimated that DCID would sustain an estimated impact of 6,749 acre-feet of water no longer available due to the emergency regulation. It is assumed that 20% of this water would be replaced by district groundwater pumping and no water purchases would be available. In addition, it is assumed that DCID will reduce its demand by 35%. The enforcement and conservation costs associated with the emergency regulation is estimated to be $100 per acre-foot of water. The remaining water loss would lead to lost revenue from water sales for DCID. The maximum agricultural water sales price ($100 per acre-foot) was used to conservatively estimate the fiscal impact to DCID. The estimated total potential fiscal impact to DCID from the proposed emergency regulation is $524,957 (Table 1).

Tehama County

The Tehama County 2013 Crop Report states that in 2013 the total revenue from agriculture was $254,034,900 (TCRCD, 2013) generating an estimated $25,403,490 in state and local tax revenue (10%). In Tehama County, three watersheds will be affected by the emergency regulation: Antelope, Mill and Deer Creeks. Within the Mill Creek, Deer Creek and Antelope Creek watersheds 15,276 acres are reported as irrigated lands. Based on the

February 20, 2015 Division demand dataset 99% of the water used in the watersheds is used for irrigation, therefore the State Water Board assumed all proposed water reductions would affect irrigated lands. For purposes of this fiscal impacts analysis, the State Water Board conservatively assumed walnut (high value) crop water use (3 acre-feet per acre per month).

Summary of Tehama County Estimated Tax Loss

The proposed emergency regulation would be in effect for 270 days. Based on calculated demand (division demand dataset) and 90 percent exceedance supply scenarios from the California Nevada River Forecast Center (http://www.cnrfc.noaa.gov/), the proposed emergency regulation would affect appropriative and pre-1914 water users in May-June and October 15 - November in Mill and Deer Creeks. Antelope Creek appropriative and pre-1914 water users are likely to be affected in April, May and November. Riparian water users were found to likely be affected in November and December in Antelope Creek, and for the month of November in Deer Creek (Attachments 8, 9, and 10). The State Water Board estimated total supply using the 90% exceedance water supply scenario in each watershed. The total amount of water required per the emergency regulation was subtracted from the 90% exceedance supply leaving the total supply available to water users. Water demand was subtracted from the water supply available to water users giving the total water reduction under the proposed regulation. It was assumed that 60% of the water reduction would be replaced by groundwater and 40% of the water reduction would not be replaced. The affected acreage was based on the projected supply to water users and an assumed crop use of 3 acre-foot per acre per month (Table 2).

Potential Tehama County tax loses were based on the affected acreage provided in Table 2, total revenue of crops in 2013, total irrigated acres in Tehama County and the assumption of a 10% tax on agriculture (Table 3). Total tax dollars potentially lost due to the proposed emergency regulation were calculated by multiplying tax dollars generated per acre in 2013 by the affected acreage. This analysis resulted in an estimated $1,327,244 in lost tax revenue due to the emergency regulation (Table 3).

Month	April	May	June 1-15*	June 16-30*	October 15-31*	November	December	Total
Reported amount used	1836.36	1897.27	918.18	918.18	948.64	1836.36	0.00	8355.00
acre-feet used per acre of irrigation	0.97	1.00	0.48	0.48	0.50	0.97	0.00	4.40
Supply	6400	4700	1700.00	1700.00	1000.00	2100.00	3100.00	20700.00
Emergency Regulations in stream flow requirements	3271.95	3668.55	1784.70	555.24	1586.40	2974.50	3073.65	16914.99
Supply available	3128.05	1031.45	0.00	1144.76	0.00	0.00	26.35	5330.61
Riparian use	337.00	337.00	337.00	338.00	338.14	337.23	337.14	2361.51
Supply available to Pre-1914	2791.05	694.45	0.00	806.76	0.00	0.00	0.00	4292.26
DCID allocation	921.05	229.17	0.00	266.23	0.00	0.00	0.00	1416.45
DCID Replacement due to Public Trust flows	915.32	1668.10	918.18	651.95	948.64	1836.36	0.00	6938.55
20% Groundwater replacement	183.06	333.62	183.64	130.39	189.73	367.27	0.00	1387.71
Cost of Ground Water Replacement (dollars)	$15,313.26	$27,907.38	$15,361.18	$10,907.14	$15,870.69	$30,722.36	$0.00	116082.01
Reduced applied water (35%)	642.73	664.05	321.36	321.36	332.02	642.73	0.00	2924.25
Conservation and enforcement costs	$32,136.36	$33,202.27	$16,068.18	$16,068.18	$16,601.14	$32,136.36	$ -	$146,212.50
Water Sales Loss (acre-feet)	89.53	670.44	413.18	200.20	426.89	826.36	0.00	2626.59
Lost Water Sales Revenue	$8,952.64	$67,043.79	$ 41,318.18	$20,019.72	$42,688.64	$82,636.36	$ -	$262,659.34
Total Cost to district	$56,402.26	$128,153.45	$72,747.55	$46,995.04	$75,160.46	$145,495.09	$ -	**$524,953.85**

*Monthly demand and monthly supply where divided by 2 to represent the demand and supply for the half-month periods

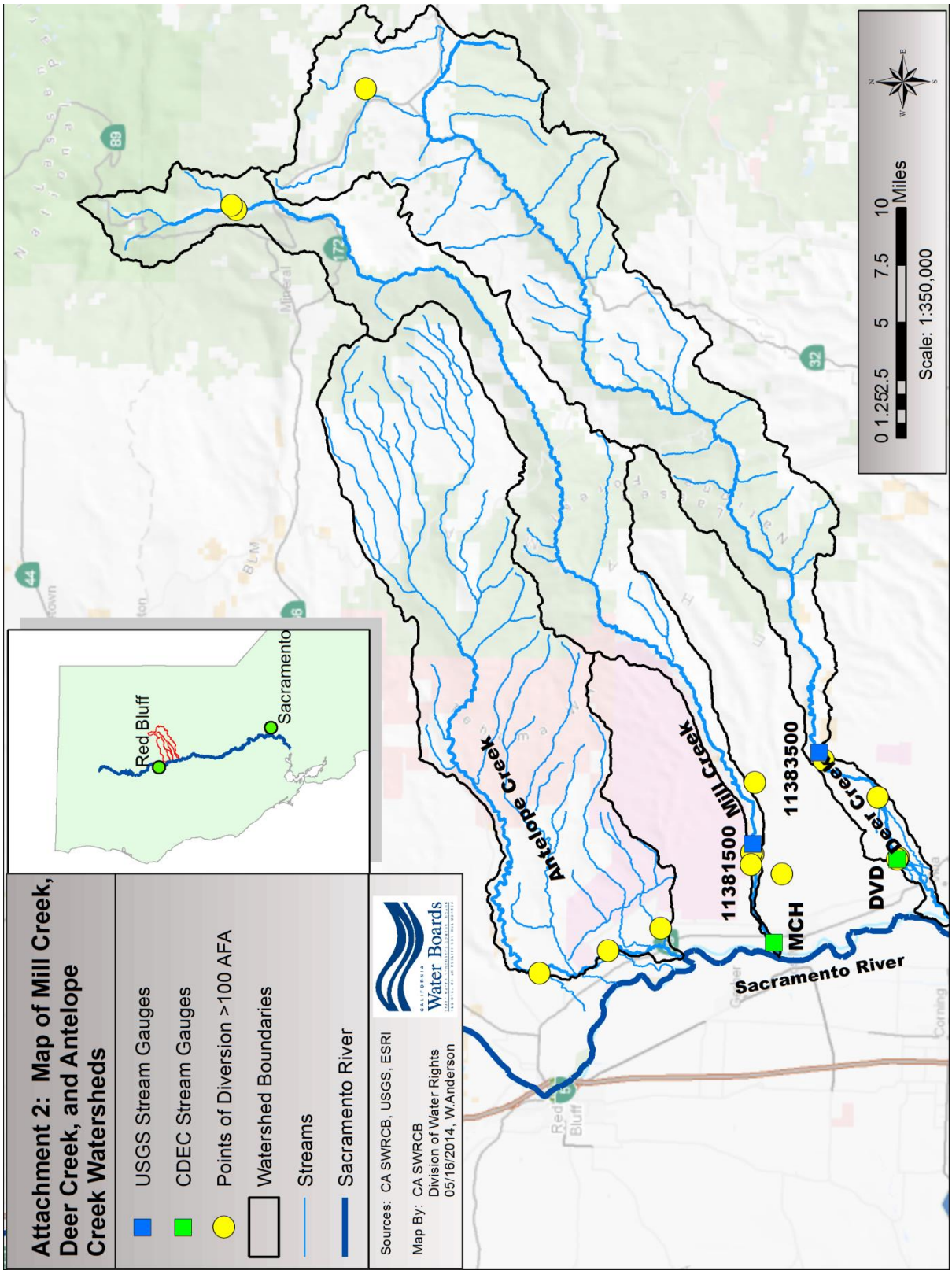
Table 1. Cost estimate for groundwater replacement, conservation and enforcement, and water sales loses for DCID in a 90% exceedance scenario. Instream flows are not required under the regulation July 1 through October 15 This time period is not shown because the regulation does not have a fiscal impact. Volumes in acre-feet.

	Affected Acreage		
	Deer	Mill	Antelope
Total Projected Supply	21700.00	29400.00	11536.56
Total Emergency Regulation Requirements	16914.99	16914.99	8249.28
Total Supply to Riparian	5659.51	12559.51	5127.35
Riparian Demand	2022.40	2064.39	14.72
Total Supply to Pre-1914 and Appropriative	4284.76	10496.57	5113.61
Total Pre-1914 and Appropriative Demand	16055.28	23831.09	9438.51
Total Water Replacement due to Emergency Regulation Flow Requirements	12746.93	17755.56	4325.89
Total Groundwater Replacement	7648.16	10653.34	2595.54
Total Water Lost	5098.77	7102.22	1730.36
Affected Acreage	1699.59	2367.41	366.22

Table 2. Affected acreage for Deer, Mill and Antelope Creeks. Volumes in acre-feet.

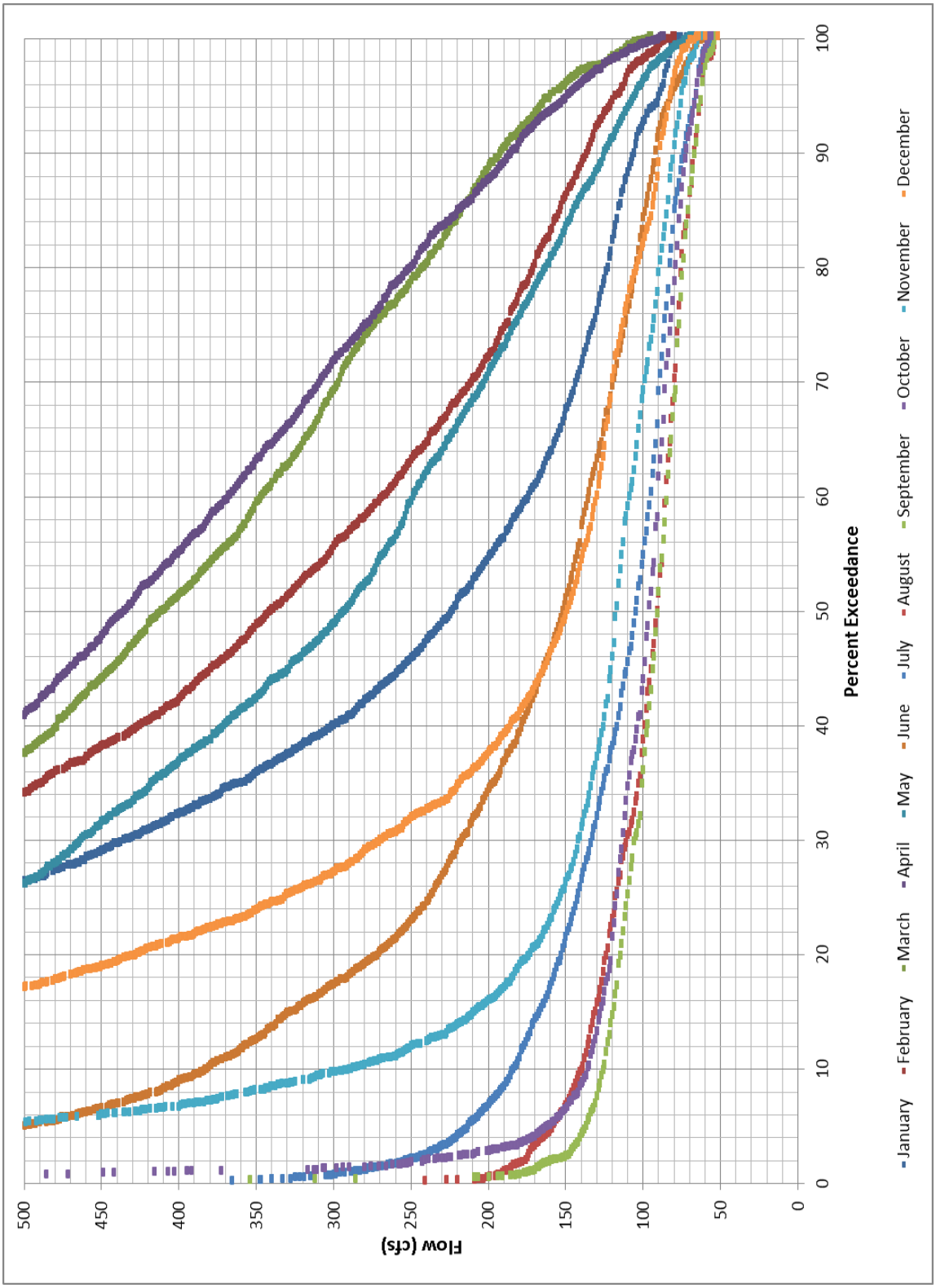
Tehama County Tax Losses	
2013 Irrigated acres in Tehama County	84,852
2013 Fruit and Nut Crops	$215,608,600.00
2013 Nursery Crops	$11,332,700.00
2013 Vegetable crops	$350,000.00
2013 Pasture & Range	$7,824,800.00
2013 Seed Crops	$4,891,000.00
2013 Field Crops	$14,027,800.00
Total 2013 Revenue	$254,034,900.00
Total 2013 Tax Revenue (10%)	$25,403,490.00
Dollars generated per acre	$299.39
Deer Affected Acres	1699.59
Mill Affected Acres	2367.41
Antelope Affected Acres	366.22
Total Affected Acres	4433.22
Percent Acres Affected	5.22
Estimated Agricultural Tax Revenue lost due to Emergency Regulations	**$1,327,244.12**

Table 3. Tehama County Tax loses. For affected acres calculations see Table 2.

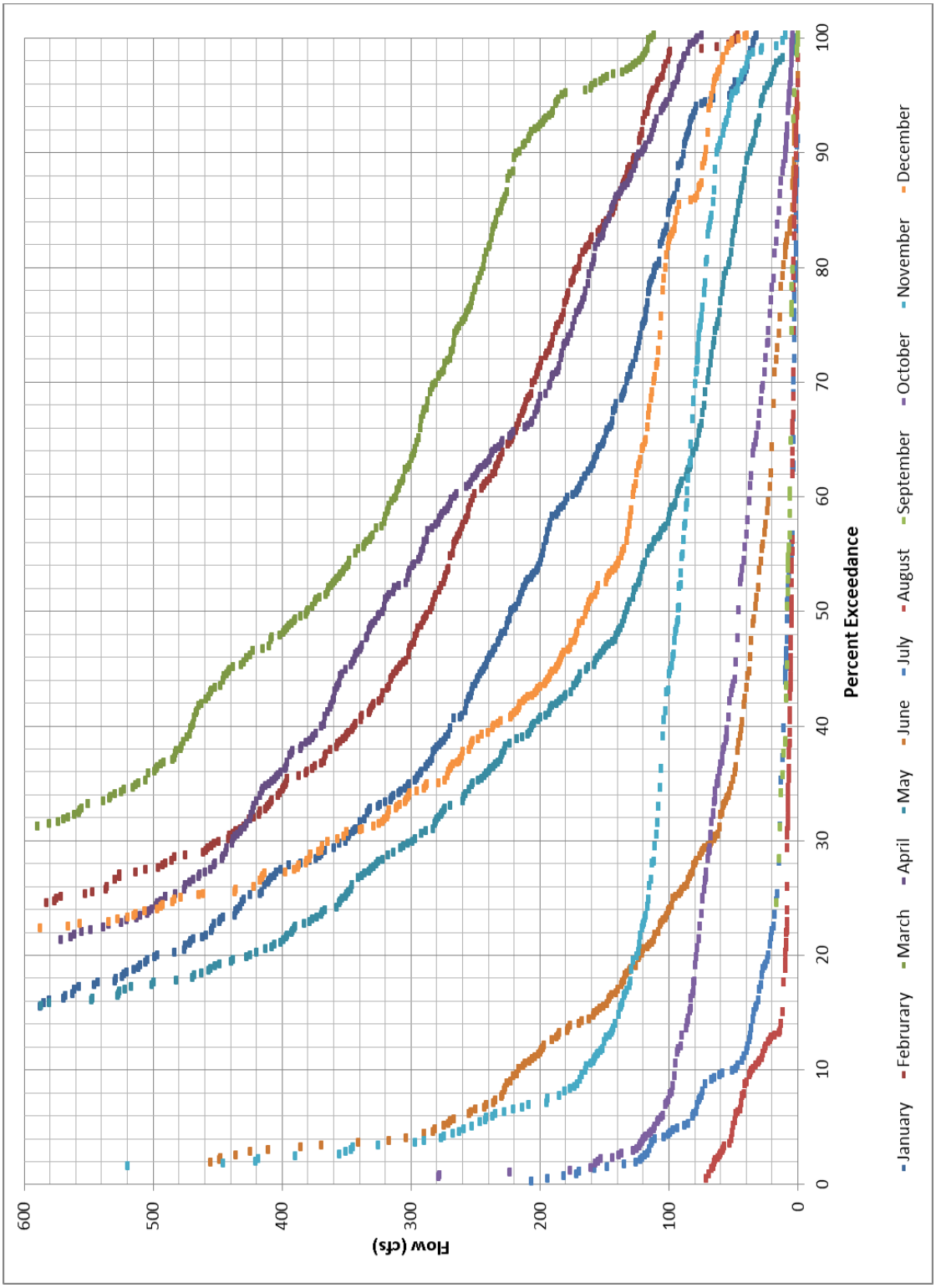


***Map not to scale**

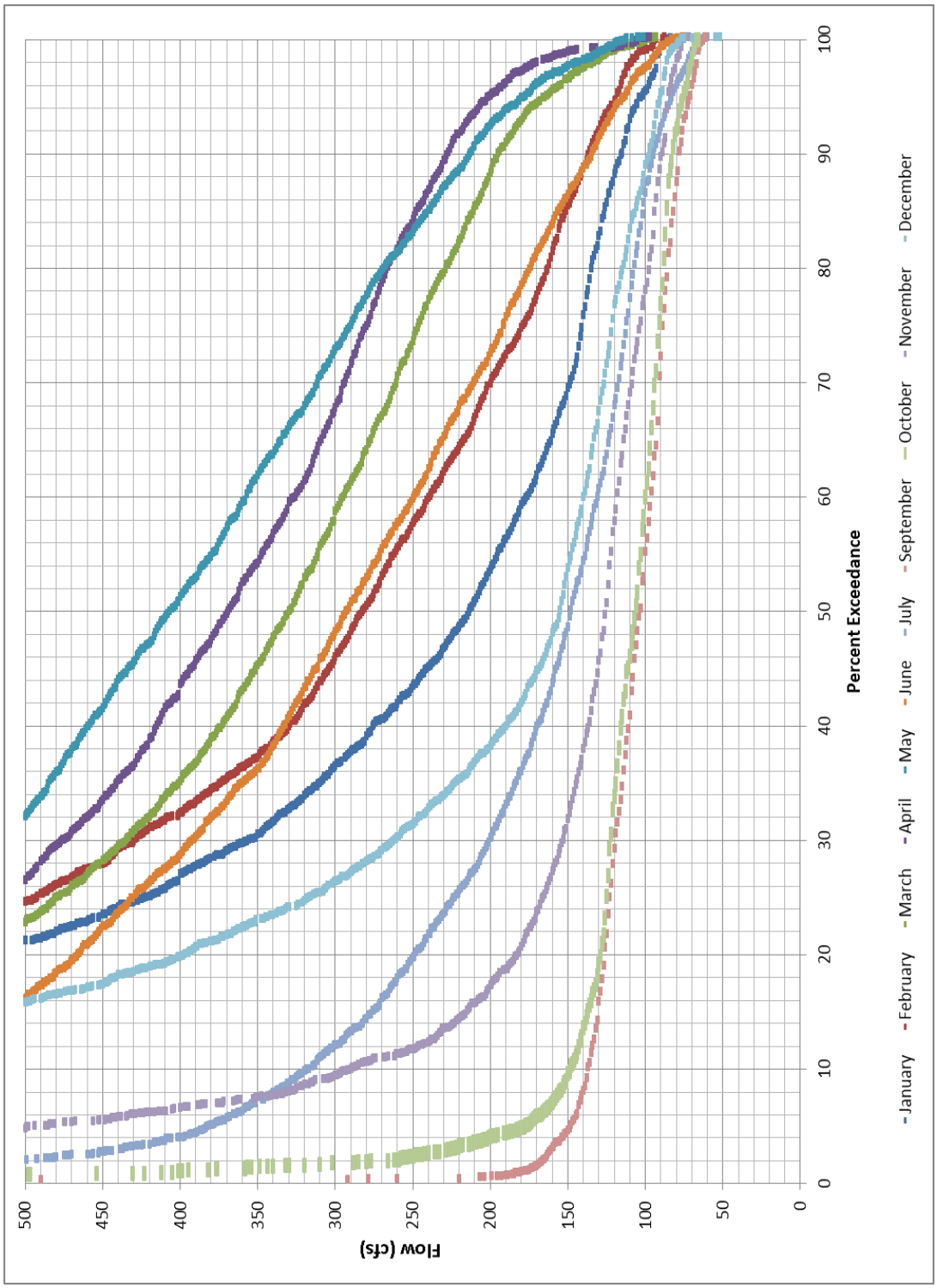
Attachment 3
Deer Creek Exceedance Plot
United States Geological Survey Deer Creek Near Vina CA Gauge (#11383500)
Period of record: 1912-2014



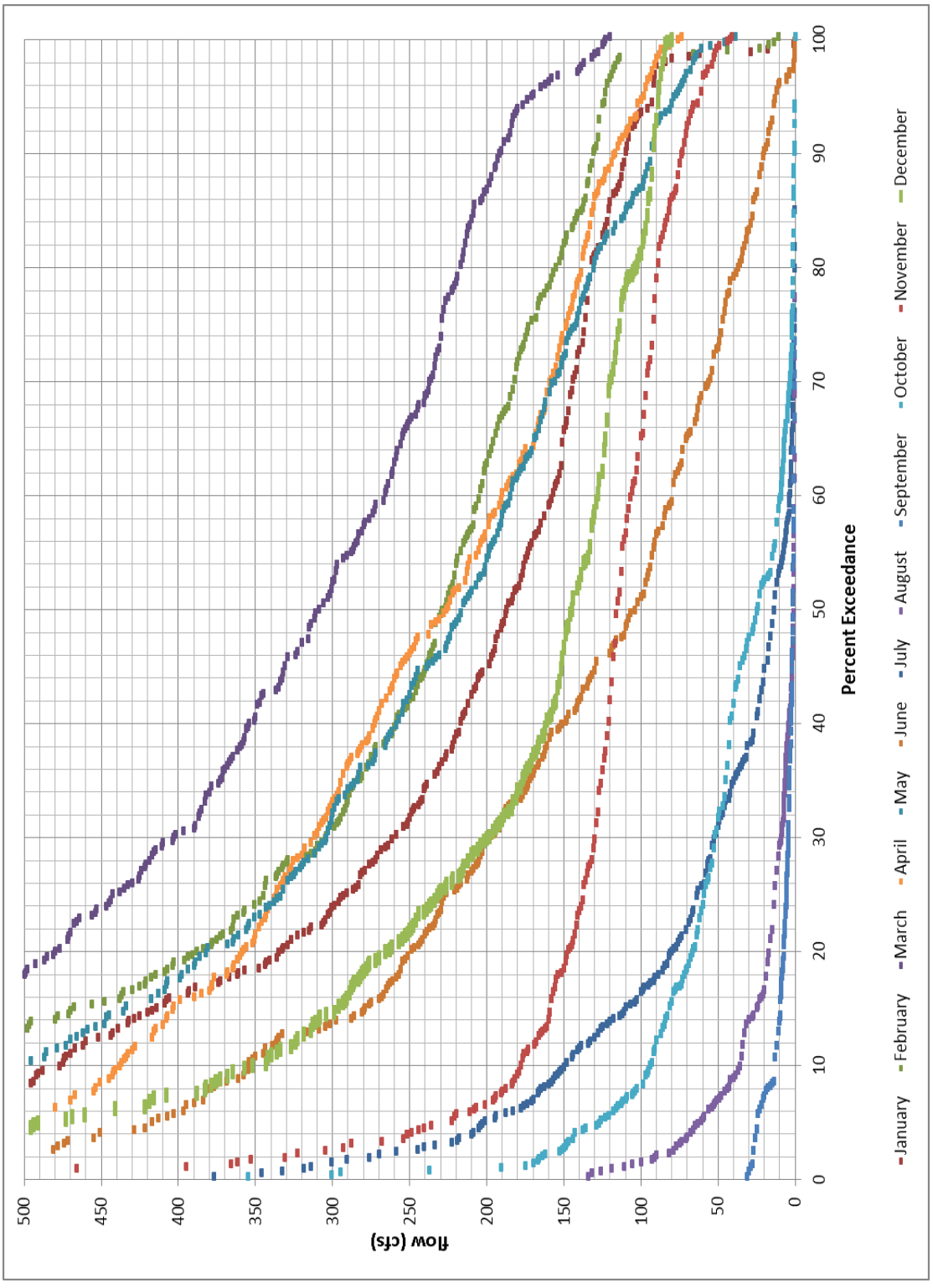
Attachment 4
Deer Creek Exceedance Plot
Department of Water Resources Deer Creek Below Stanford Vina Dam Gauge (DVD)
Period of record: 1998-2014



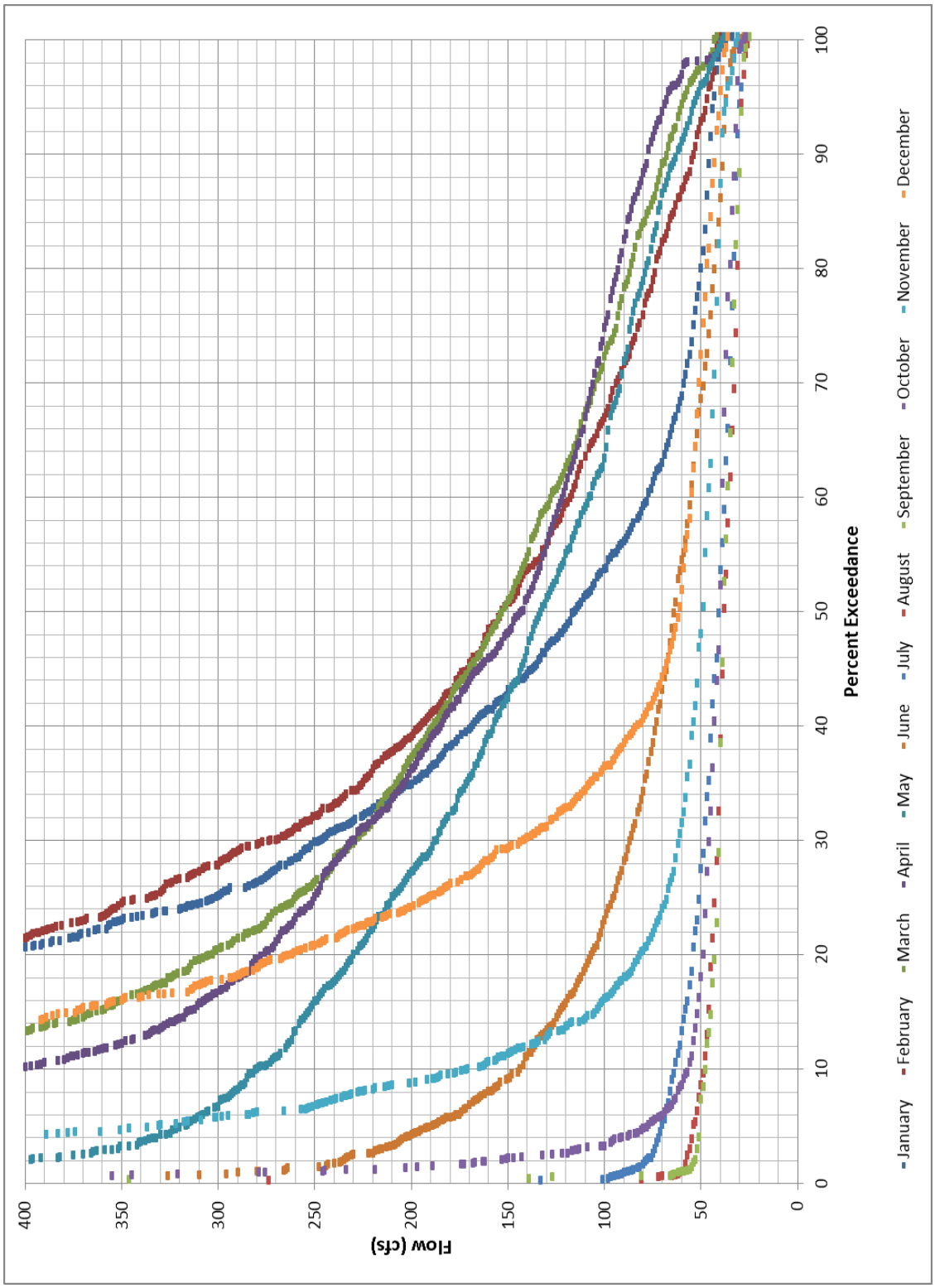
Attachment 5
Mill Creek Exceedance Plot
United States Geological Survey Mill Creek Near Los Molinos CA Gauge
(MLM/#11381500)
Period of record: 1928-2014



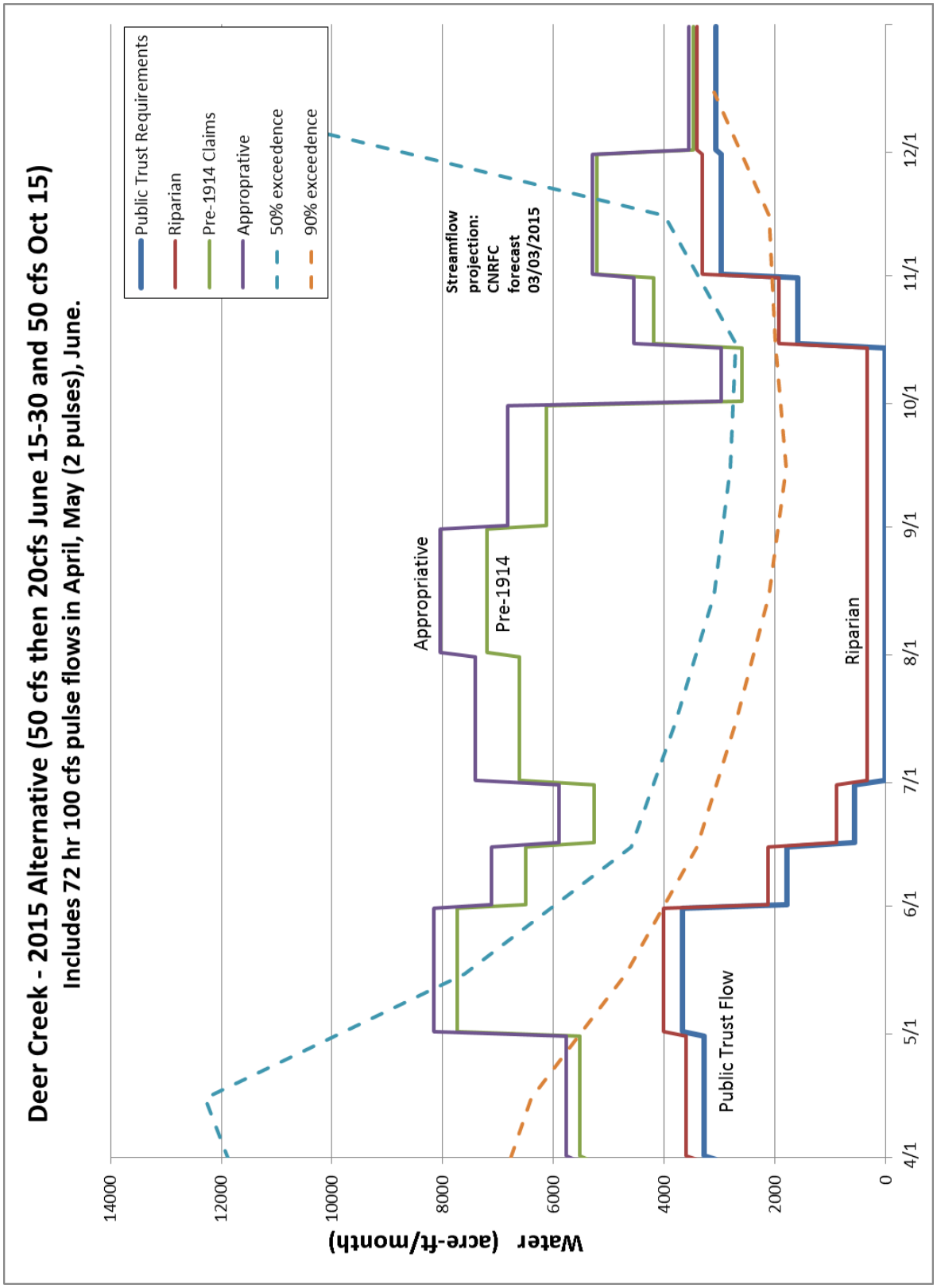
Attachment 6
Mill Creek Exceedance Plot
Department of Water Resources Mill Creek Below Highway 99 Gauge (MCH)
Period of Record: 1998-2014



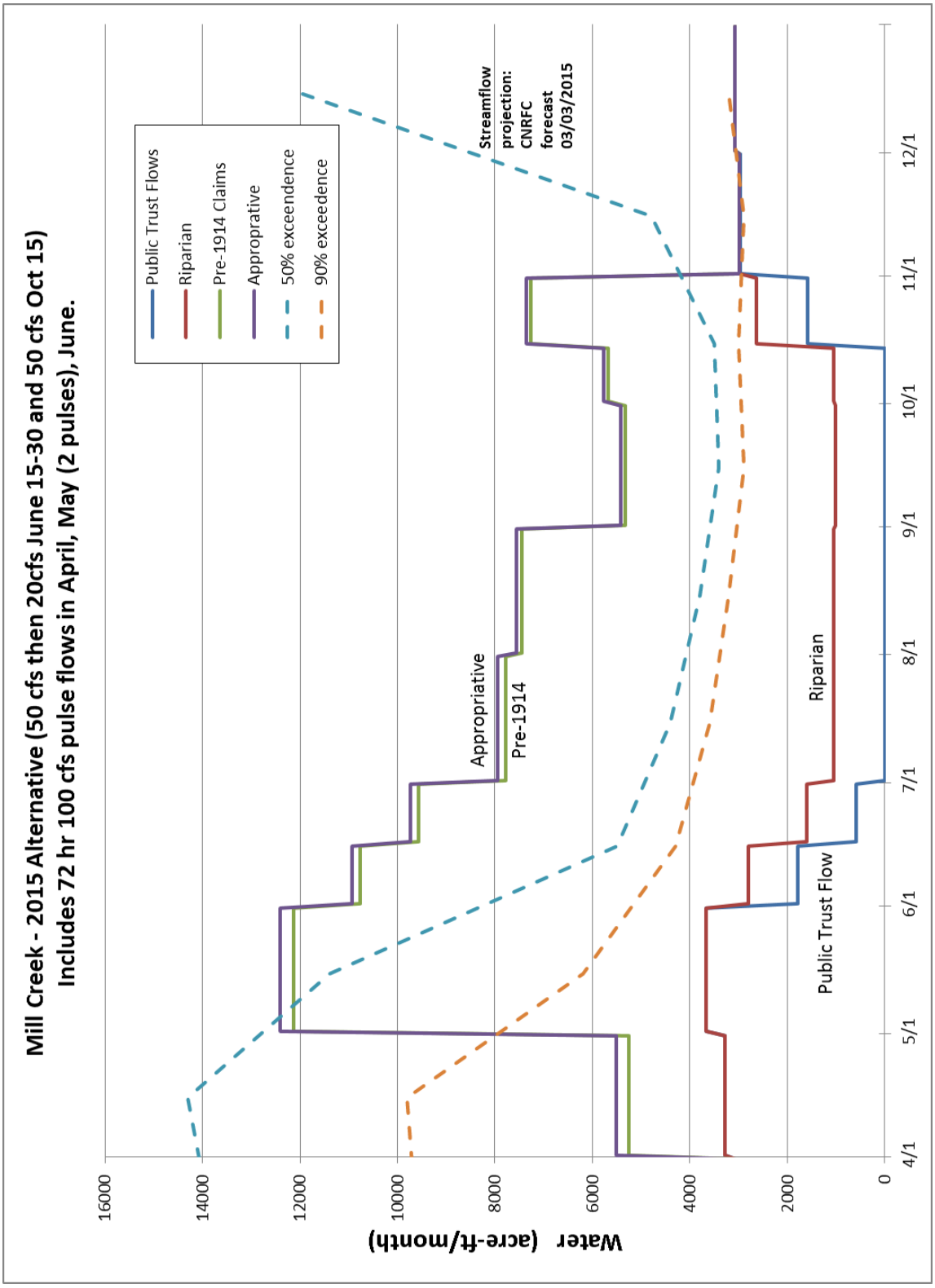
Attachment 7
Antelope Creek Exceedance Plot
United States Geologic Service Antelope Creek Near Red Bluff CA Gauge (#11379000)
Period of Record: 1940-1981



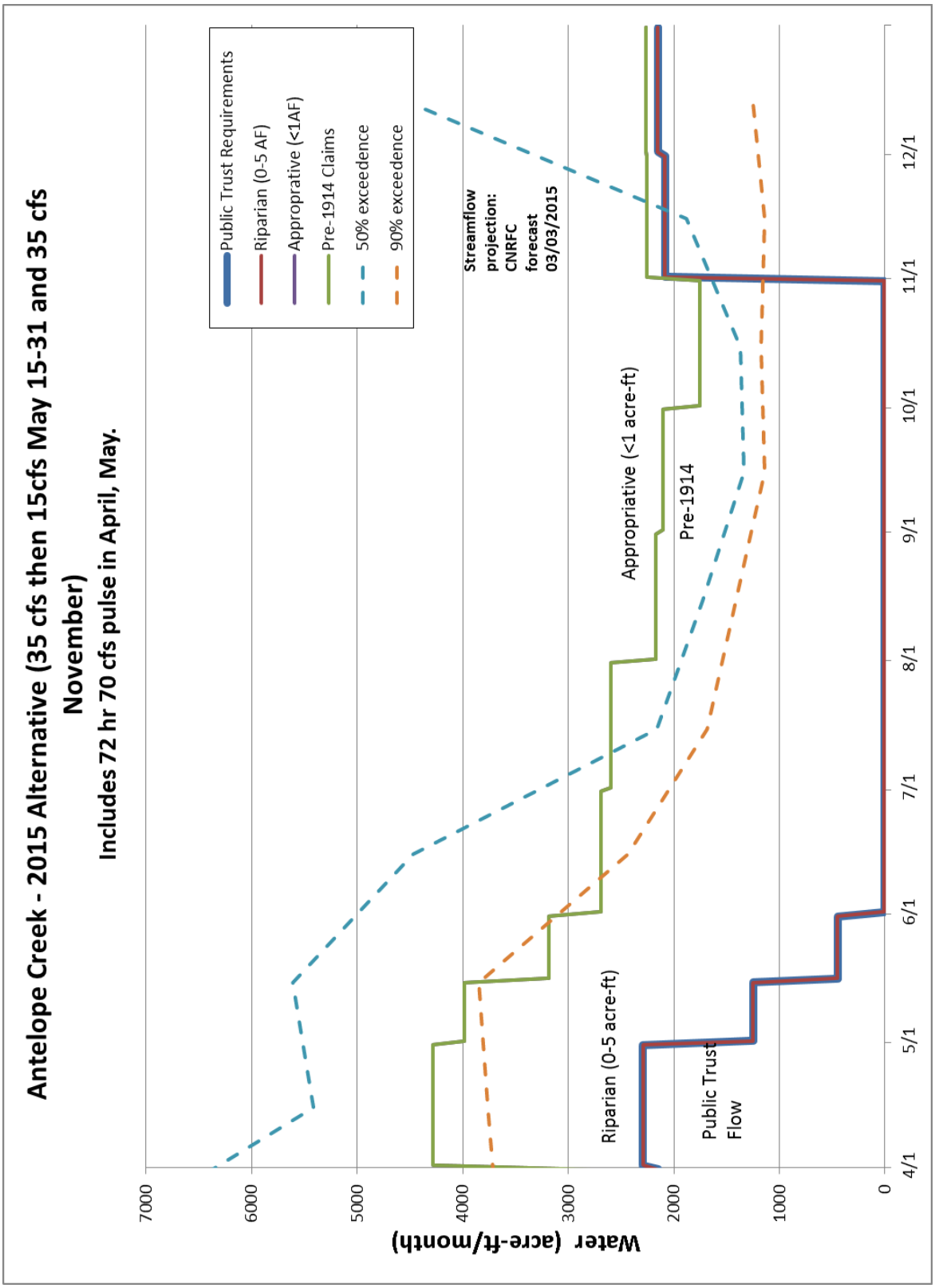
Attachment 8
Deer Creek Curtailment Plot



Attachment 9
Mill Creek Curtailment Plot



Attachment 10
Antelope Creek Curtailment Plot



Attachment 11
National Marine Fisheries Service Memorandum

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
650 Capitol Mall, Suite 5-100
Sacramento, California 95814-4700

FEB 2 2015

Mr. Tom Howard
Executive Director
State Water Resources Control Board
1001 I Street
Sacramento, California 95814

Re: Minimum Protection Flows for Listed Salmonids during the 2015 California Drought for Mill, Deer and Antelopes creeks in the California Central Valley

Dear Mr. Howard:

NOAA's National Marine Fisheries Service (NMFS) has been has been working collaboratively with the California Department of Fish and Wildlife (CDFW) and the State Water Resources Control Board (SWRCB) to address the ongoing drought and its impact on Federal and State listed fish species in Mill, Deer and Antelope creeks, all tributaries of the Sacramento River. These streams contain migration, spawning and rearing habitat for some of the last remaining naturally-produced populations of State and Federally threatened Central Valley spring-run Chinook salmon (*Oncorhynchus tshawytscha*) and Federally threatened California Central Valley steelhead (*O. mykiss*).

NMFS and CDFW provided minimum flow recommendations to the State Water Resources Control Board (SWRCB) on Mill, Deer, and Antelope creeks, along with supplemental references in an email to your office on May 7, 2014. These flow recommendations were provided for developing emergency regulations. The range of in-stream flows that were proposed are still considered by NMFS and CDFW to be the minimal flows that are necessary to allow for adult and juvenile salmonid migration on lower Mill, Deer and Antelope creeks. The range of flows provided for base flows and pulse flows incorporate, to the best of our knowledge, the uncertainty associated with a variety of fish passage considerations in these streams, including passage past critical riffles, fish ladders and other obstacles. The range also incorporates consideration for the variable run timing of target salmonid species. These are not optimal flows, but the minimum, reasonable targets that will minimize the ongoing effect of the drought while balancing fish and agricultural interests. Flows below those provided to the SWRCB, would be expected to cause significant harm to target species.

The flows recommended by NMFS and CDFW provided substantial benefit to migrating salmonids where they occurred in 2014. NMFS and CDFW are concerned that the emergency regulations adopted by the SWRCB in 2014 will soon expire. Also, all of the 2014 NMFS Voluntary Drought Agreements and CDFW California Endangered Species Act (CESA) Memoranda of Understanding (MOUs) for these streams expired on December 31, 2014. We have begun working with water users in Mill, Deer and Antelope Creeks to sign new Voluntary

Drought Agreements and CESA MOUs for 2015. In order to protect target species in this ongoing extreme drought, it is imperative that the SWRCB adopt similar regulations for Deer, Mill and Antelope Creeks for 2015. NMFS in collaboration with CDFW propose similar flow recommendations in 2015. Please refer to the attached technical memorandum for specific recommendations.

Please direct questions regarding this letter to Howard Brown, Sacramento River Basin Branch Chief, California Central Valley Area Office, at (916) 930-3608 or via e-mail at Howard.Brown@noaa.gov.

Sincerely,

Maria Rea
Assistant Regional Administrator
California Central Valley Area Office

Attachment (1) Technical Memorandum: Minimum Protection Flows for Listed Salmonids during the 2015 California Drought for Mill, Deer and Antelopes creeks in the California Central Valley

cc: Chron File: ARN: 151416WCR2015SA00044

ec: Mr. Tom Howard and Ms. Barbara Evoy
State Water Resources Control Board
Tom.Howard@waterboards.ca.gov, Barbara.Evoy@waterboards.ca.gov

Mss. Sandra Morey and Nancee Murray
Messrs. Neil Manji, Scott Cantrell, Curtis Milliron and Jason Roberts
California Department of Fish and Wildlife
Sandra.Morey@wildlife.ca.gov, Nancee.Murray@wildlife.ca.gov,
Scott.Cantrell@wildlife.ca.gov, Curtis.Milliron@wildlife.ca.gov,
Jason.Roberts@wildlife.ca.gov

Technical Memorandum: Minimum Protection Flows for Listed Salmonids during the 2015 California Drought for Mill, Deer and Antelopes creeks in the California Central Valley

Introduction

The following recommendations were developed by the National Marine Fisheries Service (NMFS) and California Department of Fish and Wildlife (CDFW) and are provided to support State Water Resources Control Board proposed emergency regulations to protect listed fish species in Deer, Mill, and Antelope creeks which may be adversely affected by on-going drought conditions in 2015. The magnitude and timing of flows outlined in this document are less than desirable minimum flows needed for fisheries protection in these watersheds during normal to dry water years. At this time, exceptional drought conditions are expected during the spring and fall of 2015. The following base and pulse flow recommendations will provide minimum instream flows needed to provide successful passage through the full range of adult and juvenile salmonid migration periods in 2015, with particular emphasis on late migrating run components, while maintaining historical agricultural stream diversion practices in these watersheds. These recommendations are guided by stream-flow, water temperature, and fish passage observations on Antelope, Deer, and Mill creeks made during extreme drought conditions experienced in 2014.

Deer, Mill, and Antelope creeks, Tehama County, have been identified by NMFS and CDFW as high priority streams due to their high resource value, importance in maintaining Central Valley endangered and threatened anadromous fish populations, and historically recognized need for low flow protection. Deer and Mill Creeks are two of only three streams in northern California that support self-sustaining wild populations of State and Federally listed Central Valley spring-run Chinook salmon (*Oncorhynchus tshawytscha*) (spring-run) and are considered conservation strongholds for the Central Valley spring-run Evolutionary Significant Unit (NMFS 2009). These creeks also support Federally listed Central Valley steelhead trout (*O. mykiss*) (steelhead). The watersheds of these tributaries are relatively small and do not have upstream water storage facilities that could be utilized to buffer the effects of the on-going drought. Diversions from these streams decrease the amount of instream flow and make it difficult for adult spring-run and steelhead to swim past critical riffles and diversion structures during their migration to spawning grounds in the upper watersheds. In addition to physically lowered stream flows, agricultural diversions contribute to increased water temperatures, resulting in thermal stress for adult and juvenile salmonids, increased predation on juvenile salmonids, and in some cases mortality. The limited pre-diversion water available in these tributaries during this drought must be carefully managed to provide the minimum instream flows specified by stream and date outlined in this document to prevent the extirpation of late-returning adult spring-run and late emigrating juvenile spring-run and steelhead. It is recognized by NMFS and CDFW that instream flows required for successful fish passage, spawning, and/or rearing in these watersheds under a wide range of water year types still needs to be determined through additional studies.

Base Flows

Adult spring-run enter Deer, Mill, and Antelope creeks over a large run-timing window, between late February and early July. This assertion is made based on a review of historical data

(Appendix B, Figure 1), nine years of real-time monitoring on Mill Creek between 2006 and 2013 (Appendix B, Figure 2), and two years of real-time monitoring on Deer Creek between 2013 and 2014 (Appendix B, Figures 3 and 4). Since 2006, peak entry of adult spring-run into Mill Creek has occurred between April 15 and May 31 (Appendix B, Figure 2). However, adult spring-run consistently enter Mill Creek through June when sufficient flow is provided. For example, in 2014 spring-run continued to enter Mill Creek through June 15 (Appendix B, Figure 5) under base flow requirements in a CESA MOU agreed to by the Los Molinos Mutual Water Company and other water-rights holders. In contrast, Deer Creek spring-run prematurely ended migrations on June 4, 2014, when diverters began taking water in excess of the base flows recommended by NMFS and CDFW (Appendix B, Figure 6).

In recent years adult fall-entry steelhead have entered Mill Creek as early as October 8 (Appendix B, Figure 7). Appendix B, Figure 8 details steelhead run-timing in Mill Creek based on video counts obtained between 2009 and 2013. Restoration of fall flows on October 15 in 2014 on Mill Creek through CESA MOU's, and Deer Creek through SWRCB curtailment, resulted in passage of adult steelhead beginning October 18, 2014 on Mill Creek, and October 25, 2014 on Deer Creek.

Rotary screw trap studies conducted by CDFW from 1994 to 2010 show juvenile steelhead and spring-run emigration occurs October to June on Mill and Deer creeks (Appendix A, Table 1). Peak juvenile steelhead and spring-run emigration is in November and again February through April. However, late-out-migrating salmonids were detected during snorkel surveys in diverted stream sections of Deer and Mill throughout June in 2014 (Appendix A, Table 2). Juvenile salmonids are more tolerant of high water temperatures compared to adults, and require a smaller volume of water to complete their emigrations due to their small size.

Low flows expected in late spring and early summer in 2015 will likely create harsh conditions for both adult and juvenile salmonids. If minimum instream flows identified in this document are not left in Deer, Mill, and Antelope creeks, the late-migrating life history component of adult and juvenile spring-run and juvenile steelhead could be extirpated in 2015, and the genetic and life-history diversity of the populations will be diminished. This could have the result of significantly limiting the recovery of both species and will increase the risk of extirpation and/or extinction.

Pulse Flows

In an average water year base-flow increases resulting from rain or snowmelt are a natural part of the spring hydrograph Central Valley salmonids have evolved under. Drought conditions and consistent, large-volume stream diversions in late spring and early summer create a static , chronically low hydrograph, which increases water temperatures and inhibits salmonid migration. Multi-day cessation of stream diversion results in sudden increase in base flows which mimics a snow-melt or rain event. These "pulse flows" are proven to attract adult spring-run holding near natal tributaries waiting for a positive environmental trigger (e.g. flow increase) before committing to entering the tributary. Prescribed pulse flow events were very successful in attracting adult spring-run into Mill and Deer Creeks in 2014 as long as minimum base flows were maintained prior to initiation of pulse flow events (Appendix B Figures 9 and 10). NMFS and CDFW expect similar results from pulse flows in 2015.

Water Temperature Thresholds

Spring-run occupy the southern range of Pacific Coast Chinook salmon populations. Adult spring-run passage observations in 2013 and 2014 on Mill and Deer creeks prove that these fish continue to enter these tributaries at water temperatures greater than had previously been believed and as predicted in Pacific salmon literature sources (e.g. Boles et.al 1988) and even some recent CDFW reports (e.g. Harvey-Arrison 2009). Appendix A, Table 3 documents adult spring-run passage at monitoring stations on lower Mill and Deer creeks and daily minimum and maximum post-diversion water temperatures the fish migrated through.

Water temperatures are not defined by a static, steady sate in these tributaries. Diurnal swings in daily maximum and minimum temperature recorded between June 1 and June 15 (the last two weeks of 50 cfs adult base-flow requirements in 2014) on Mill Creek ranged between 9.2 and 15.8 degrees Fahrenheit (°F), averaging 14.0 °F in 2014. (Attachment A, Table 4). Heat waves occurring during low flow periods can elevate water temperatures to a point where salmonid migration may be inhibited, but cooling periods and even small low pressure systems are not uncommon in the Northern Central Valley in June. For example, in spring 2014 lowering water temperatures following periods of atmospheric cooling resulted in increased spring-run passage on May 19, May 28, and June 13 (Attachment B, Figure 11). Providing the broadest migration period possible is critical in maintaining life-history diversity for salmonids during drought conditions. Rather than defining a temperature threshold signaling the end of adult and juvenile migrations, NMFS and CDFW recommend specific dates for termination of base-flow requirements by tributary outlined below. In the event that potentially extreme drought conditions in 2015 result in post-diversion minimum water temperatures meeting or exceeding 75 °F for a seven day period during adult base-flow requirement periods defined below, reduction of adult base flow requirements to juvenile base-flow requirements (defined below) will be recommended by CDFW.

Specific Flow Recommendations by Tributary

Mill Creek:

Adult Minimum Base Flow:
A minimum base flow of 50 cubic feet per second (cfs) for passage through the 2.8 miles of stream between Ward Dam and the confluence with the Sacramento River January 1 through June 15, and October 15 through December 31 as measured at the Department of Water Resources (DWR) flow gage below Ward Dam (CDEC Station ID: MCH). This minimum base-flow is required to support juvenile and adult salmonids that may already be 1) holding in the Sacramento River waiting to enter Mill Creek; 2) in Mill Creek but may not have passed to upper elevations; or (3) may not have moved out to the Sacramento River.

Juvenile Minimum Base Flow:
A minimum base flow of 20 cfs for passage through the 2.8 miles of stream between Ward Dam and the confluence with the Sacramento River January 1 through June 30, and October 15 through December 31 as measured at the DWR flow gage below Ward Dam

(CDEC Station ID: MCH).

If stream temperatures measured at MCH meet or exceed a daily minimum of 75 °F for a seven day consecutive period January 1 through June 15, or October 15 through December 31, adult base flows can be reduced to juvenile base-flow requirements until the end of the juvenile base-flow period is reached.

If monitoring and/or evaluations conducted by CDFW determine that juvenile salmonids are not present in lower Mill Creek during juvenile base-flow requirement periods June 16 through June 30, juvenile base flow requirements may be relaxed.

Pulse Flows:
Magnitude of pulse flows: Full natural flow (as measured above Upper Dam at USGS gage #11381500), achieved through closure of all agricultural diversion structures (as measured at CDEC Station ID: MCH) for a minimum of 48 hours, not to exceed 72 hours. It is assumed that stock water needs will be anticipated, and will not be provided via stream diversions during pulse flow events.

Time period of pulse flows: April 1 through June 15, up to, once every two weeks. CDFW shall notify diverters at least 72 hours in advance when said pulse flow will be required.

Deer Creek:

Adult Minimum Base Flow:
A minimum base flow of 50 cfs for passage through the five miles of stream between SVRIC Dam and the confluence with the Sacramento River January 1 through June 15, and October 15 through December 31 as measured at the DWR flow gage below SVRIC Dam (CDEC Station ID: DVD). This minimum base-flow is required to support juvenile and adult salmonids that may already be 1) holding in the Sacramento River waiting to enter Deer Creek; 2) in Deer Creek but may not have passed to upper elevations; or (3) may not have moved out to the Sacramento River.

Juvenile Minimum Base Flow:
A minimum base flow of 20 cfs for passage through the five miles of stream between SVRIC Dam and the confluence with the Sacramento River January 1 through June 30, and October 15 through December 31 as measured at the DWR flow gage below SVRIC Dam (CDEC Station ID: DVD).

If stream temperatures measured at DVD meet or exceed a daily minimum of 75 °F for a seven day consecutive period January 1 through June 15, or October 15 through December 31, adult base flows can be reduced to juvenile base-flow requirements until the end of the juvenile base-flow period is reached.

If monitoring and/or evaluations conducted by CDFW determine that juvenile salmonids are not present in lower Deer Creek during juvenile base-flow requirement periods June 16

through June 30, juvenile base flow requirements may be relaxed.

Pulse Flows:
Magnitude of pulse flows: Full natural flow as measured at the USGS flow gage above Deer Creek Irrigation District Dam (CDEC Station ID: DVC), achieved through closure of all agricultural diversion structures (as measured at CDEC Station ID: DVD) for a minimum of 48 hours, not to exceed 72 hours. It is assumed that stock water needs will be anticipated, and will not be provided via stream diversions during pulse flow events.

Time period of pulse flows: April 1 through June 15, up to, once every two weeks. CDFW shall notify diverters at least 72 hours in advance when said pulse flow will be required.

Antelope Creek:

Adult Minimum Base Flow:
A minimum base flow of 35 cfs for passage through the four miles of stream between Edwards Diversion Dam and the confluence with the Sacramento River January 1 through May 15, and November 1 through December 31 measured at Cone Grove Park. This minimum base-flow is required to support juvenile and adult salmonids that may already be 1) holding in the Sacramento River waiting to enter Antelope Creek; 2) in Antelope Creek but may not have passed to upper elevations; or (3) may not have moved out to the Sacramento River. Continuous flow measurement will be recorded at Cone Grove Park using temporary stream gauges or hydraulic measuring devices, such as pressure transducers. Additionally, CDFW staff will measure flow utilizing the Standard Operation Procedure for Discharge Measurements in Wadeable Streams in California for calibration of temporary flow recording devices (https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=74169).

Juvenile Minimum Base Flow:
A minimum base flow of 15 cfs for passage through the four miles of stream between Edwards Diversion Dam and the confluence with the Sacramento River January 1 through May 30, and November 1 through December 31 measured at Cone Grove Park. Continuous flow measurement will be recorded at Cone Grove Park using temporary stream gauges or hydraulic measuring devices, such as pressure transducers. Additionally, CDFW staff will measure flow utilizing the Standard Operation Procedure for Discharge Measurements in Wadeable Streams in California for calibration of temporary flow recording devices (https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=74169).

If stream temperatures measured at Cone Grove Park meet or exceed a daily minimum of 75 °F for a seven day consecutive period January 1 through May 15, or November 1 through December 31, adult base flows can be reduced to juvenile base-flow requirements until the end of the juvenile base-flow period is reached. Water temperature at Cone Grove Park will be monitored by CDFW using a Hobo temperature logger. This logger will be downloaded and analyzed once per week.

If monitoring and evaluations conducted by the CDFW determine that juvenile salmonids are not present in lower Antelope Creek during juvenile base-flow requirement periods May 15 through May 30, juvenile base flow requirements may be relaxed.

Pulse Flows:
Magnitude of pulse flows: Full natural flow, achieved through closure of all agricultural diversion structures for a minimum of 48 hours, not to exceed 72 hours. It is assumed that stock water needs will be anticipated, and will not be provided via stream diversions during pulse flow events.

Time period of pulse flows: April 1 through May 15, up to, once every two weeks. CDFW shall notify diverters at least 72 hours in advance when said pulse flow will be required.

Monitoring
Monitoring: CDFW or its agent will carry out specific monitoring activities to determine the presence or absence of salmonids in these tributaries during required adult and juvenile base-flow periods. Post diversion water temperatures in Deer and Mill Creek will be monitored daily by CDFW staff using CDEC to determine when post diversion water temperatures exceed the 75 °F daily minimum for a seven day consecutive period during adult base-flow periods defined by tributary. Flow measurement at Cone Grove Park will be conducted one time per week during juvenile base-flow periods on Antelope Creek by CDFW utilizing the Standard Operation Procedure for Discharge Measurements in Wadeable Streams in California (https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=74169). Water temperature at Cone Grove Park will be monitored by CDFW staff using a Hobo temperature logger. This logger will be downloaded and analyzed once per week.

Snorkel surveys will be conducted two times per week in Deer and Mill Creek and one time per week in Antelope Creek during juvenile base-flow requirement periods. It is the intent of CDFW to make accurate and valid detections of juvenile salmonids to inform diverters when juvenile base-flow requirements may be relaxed. In addition to evaluating juvenile salmonid presence or absence, these snorkel surveys will identify any adult salmonid stranding issues before mortalities are observed, so that sufficient time is provided to inform diverters and to take proactive flow restoration or other fish rescue actions.

Literature Cited

Boles, G. L. S. M. Turek, C. C. Maxwell, and D. M. McGill. 1988 Water Temperature Effects on Chinook Salmon (Onchorhynchus tshawytscha) With Emphasis on the Sacramento River. A Literature Review. California Department of Water Resources.

Harvey-Arrison, C. 2009. Surface Flow Criteria for Salmonid Passage Lower Mill Creek Watershed Restoration project. California Department of Fish and Game. In Cooperation with Mill Creek Conservancy and Los Molinos Mutual Water Company.

Appendix A

Table 1. — Occurrence, by month, of adult and juvenile Chinook salmon and steelhead in the diverted stream sections of lower Mill, Deer, and Antelope creeks.

Species	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July
Adult spring-run Chinook (upstream migration)										
Adult steelhead (upstream migration)										
Adult fall-run Chinook (upstream migration and spawning)										
Juvenile Chinook (downstream migration)										
Juvenile steelhead (downstream migration)										

Table 2. — Date, daily minimum and maximum post-diversion water temperature, and observations of juvenile salmonids by snorkel survey in lower Deer and Mill creeks, Jun, 2014.

Date	Location	Min Post-Diversion Water Temp F	Max Post Diversion Water Temp F	Salmonids Detected/Life Stage
6/2/2014	Deer Creek, below SVRIC Dam	67.4	78.8	15 juv. Chinook; 3 juv. *O. mykiss*
6/3/2014	Mill Creek, below Ward Dam	64.4	79.0	150 juv. Chinook; 40 juv. *O. mykiss*
6/6/2014	Mill Creek, below Ward Dam	68.7	83.9	15 juv. Chinook; 5 juv. *O. mykiss*
6/6/2014	Deer Creek, below SVRIC Dam	71.9	83.5	2 juv. Chinook; 5 juv. *O. mykiss*
6/9/2014	Mill Creek, below Ward Dam	69.8	84.8	86 juv. Chinook; 7 juv. *O. mykiss*
6/9/2014	Deer Creek, below SVRIC Dam	73.1	85.1	1 juv. *O. mykiss*
6/16/2014	Mill Creek, below Ward Dam	66.2	79.4	21 juv. Chinook; 77 juv. *O. mykiss*
6/16/2014	Deer Creek, below SVRIC Dam	69.1	78.7	2 juv. *O. mykiss*
6/23/2014	Mill Creek, below Ward Dam	68.3	84.0	2 juv. Chinook; 160 juv. *O. mykiss*
6/23/2014	Deer Creek, below SVRIC Dam	70.9	82.4	1 juv. *O. mykiss* *mort

Table 3. – Observations of adult Central Valley spring-run Chinook salmon water temperature tolerances observed in Deer and Mill creeks 2013-2014

Date	Stream	Monitoring Location	Min Post-Diversion Water Temp	Max Post-Diversion Water Temp
6/5/2013	Deer	river mile 2	72	82
6/10/2013	Deer	river mile 2	72	80
6/3/2014	Deer	SVRIC Dam	67.6	78.6
6/4/2014	Deer	SVRIC Dam	68.3	79.9
6/9/2014	Mill	Ward Dam	69.8	84.8
6/10/2014	Mill	Ward Dam	70.4	83.5
6/20/2014	Mill	Ward Dam	66.9	82.7

Table 4. – Diurnal difference in daily maximum and minimum post-diversion water temperature readings recorded between June 1, 2014 and June 15, 2014 on Mill Creek at xyz location.

Date	Min Daily Water Temp	Max Daily Water Temp	Diurnal Difference
6/1/2014	62.4	78.2	15.8
6/2/2014	63.8	79	15.2
6/3/2014	64.4	79	14.6
6/4/2014	65	80.4	15.4
6/5/2014	66.5	82.6	16.1
6/6/2014	68.7	83.9	15.2
6/7/2014	69.6	83.8	14.2
6/8/2014	69.3	83.1	13.8
6/9/2014	69.8	84.8	15
6/10/2014	70.4	83.5	13.1
6/11/2014	70.1	83.5	13.4
6/12/2014	68.8	81.9	13.1
6/13/2014	67.3	77.9	10.6
6/14/2014	65.8	75	9.2
6/15/2014	65.1	79.8	14.7
Average	**67.1**	**81.1**	**14.0**

Appendix B

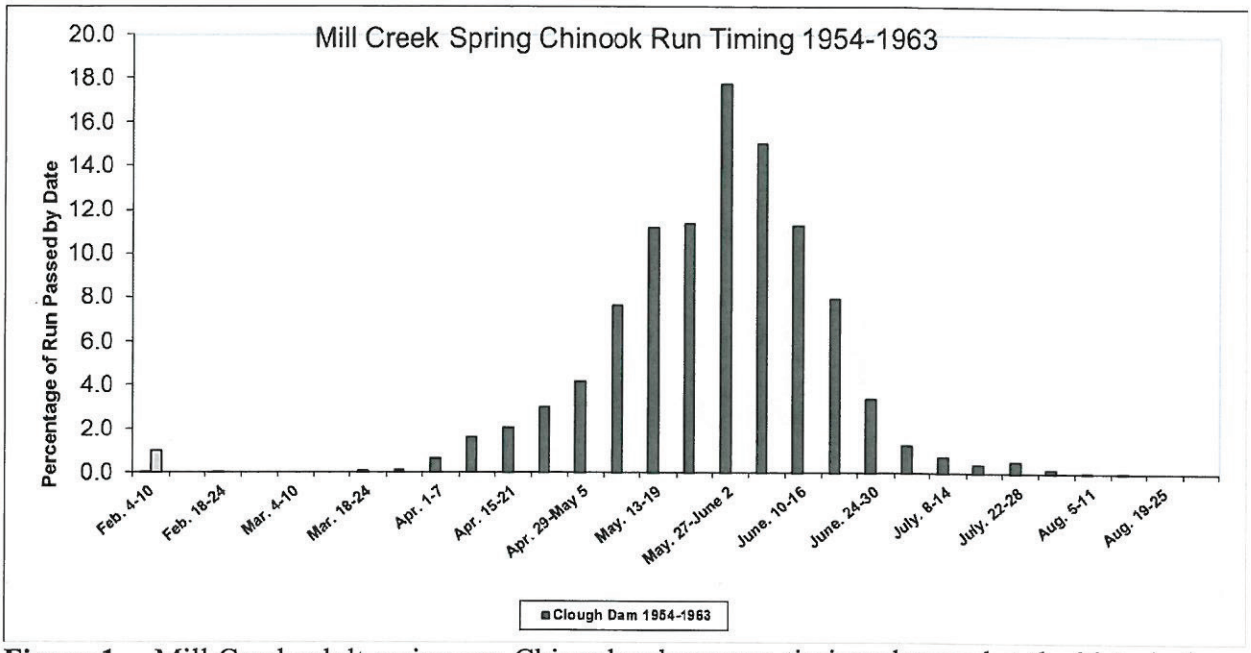


Figure 1.— Mill Creek adult spring-run Chinook salmon run-timing observed at the historical Clough Dam fish counting station located river mile 4.5 for years 1954 -1963.

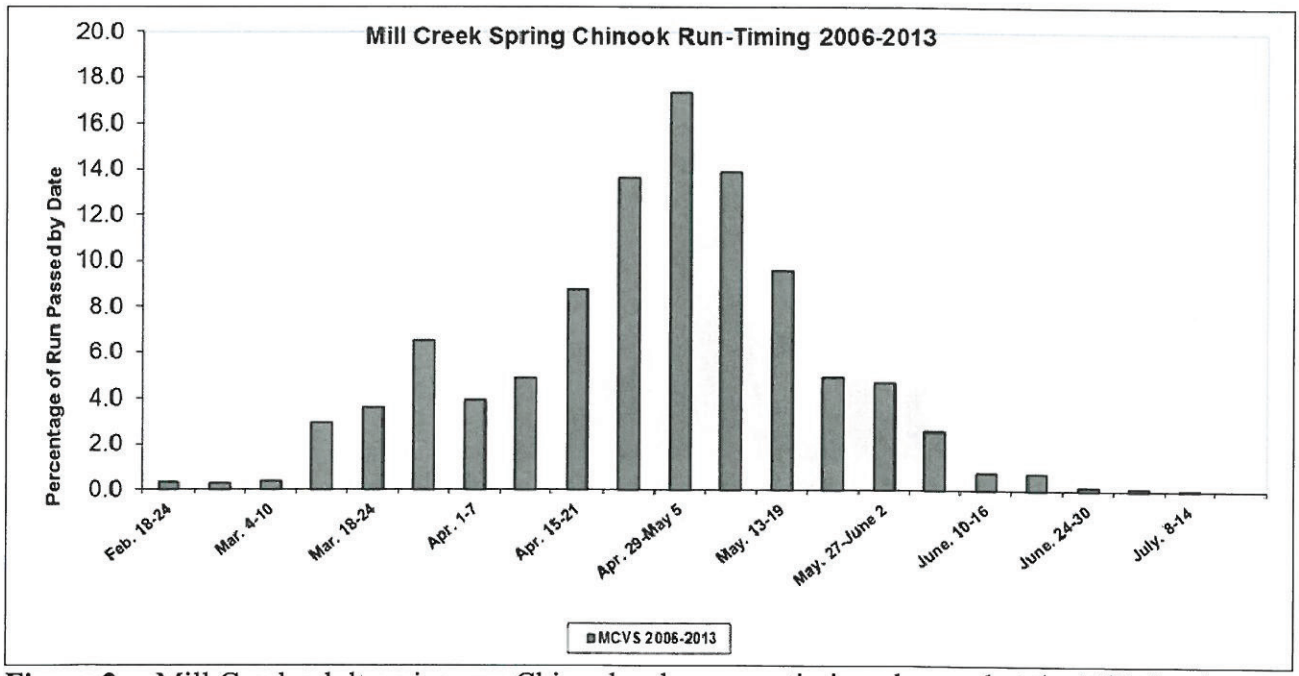


Figure 2.— Mill Creek adult spring-run Chinook salmon run-timing observed at the Mill Creek Video Station located at Ward Dam (river mile two) for years 2006 -2013.

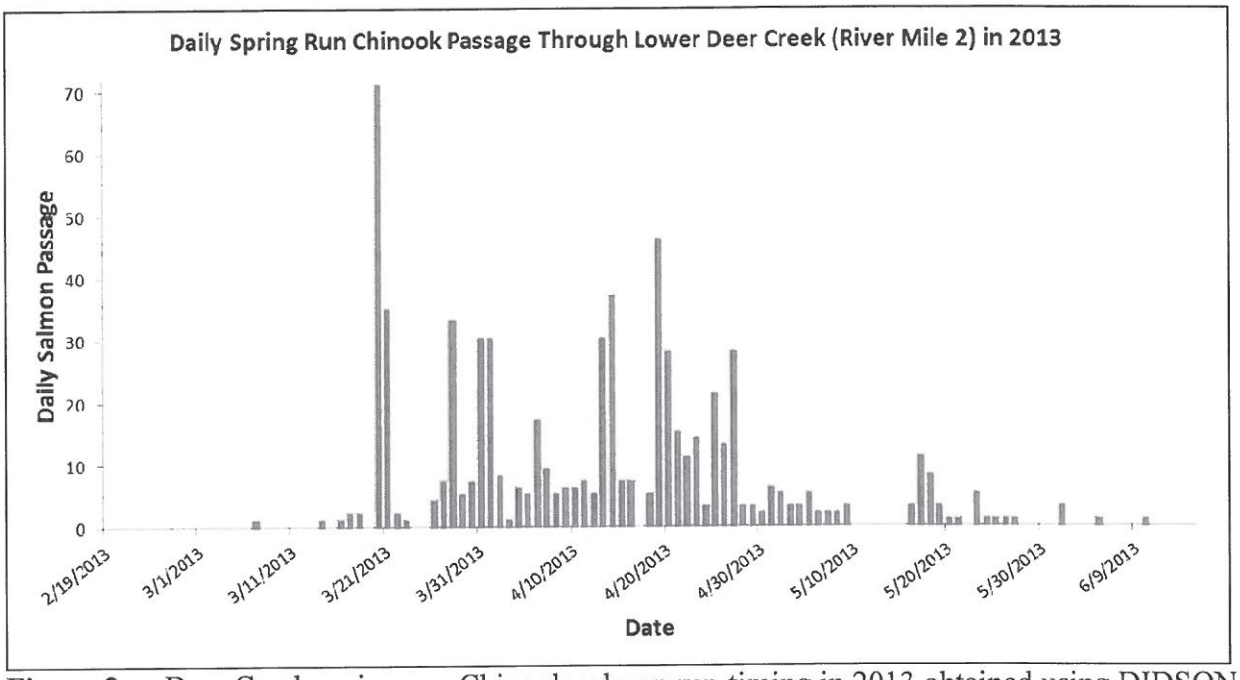


Figure 3. — Deer Creek spring-run Chinook salmon run-timing in 2013 obtained using DIDSON counts at an experimental electronic monitoring station located at river mile two.

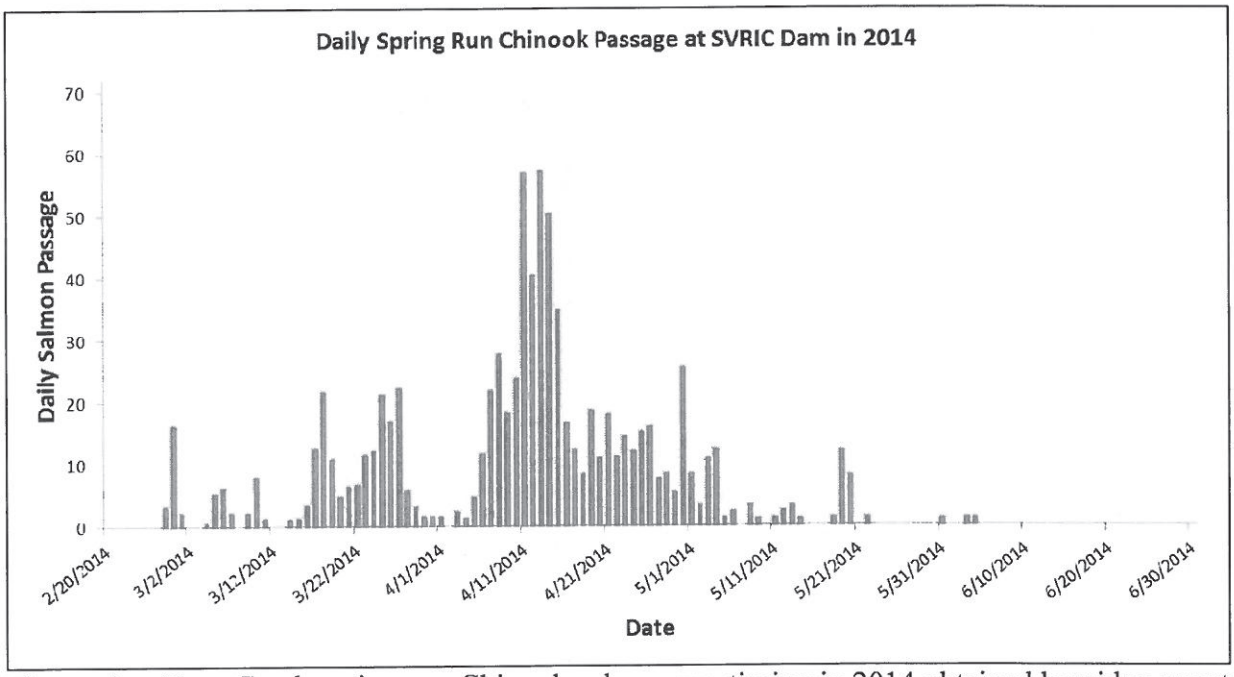


Figure 4. — Deer Creek spring-run Chinook salmon run-timing in 2014 obtained by video counts at Stanford Vina Irrigation Company Dam.

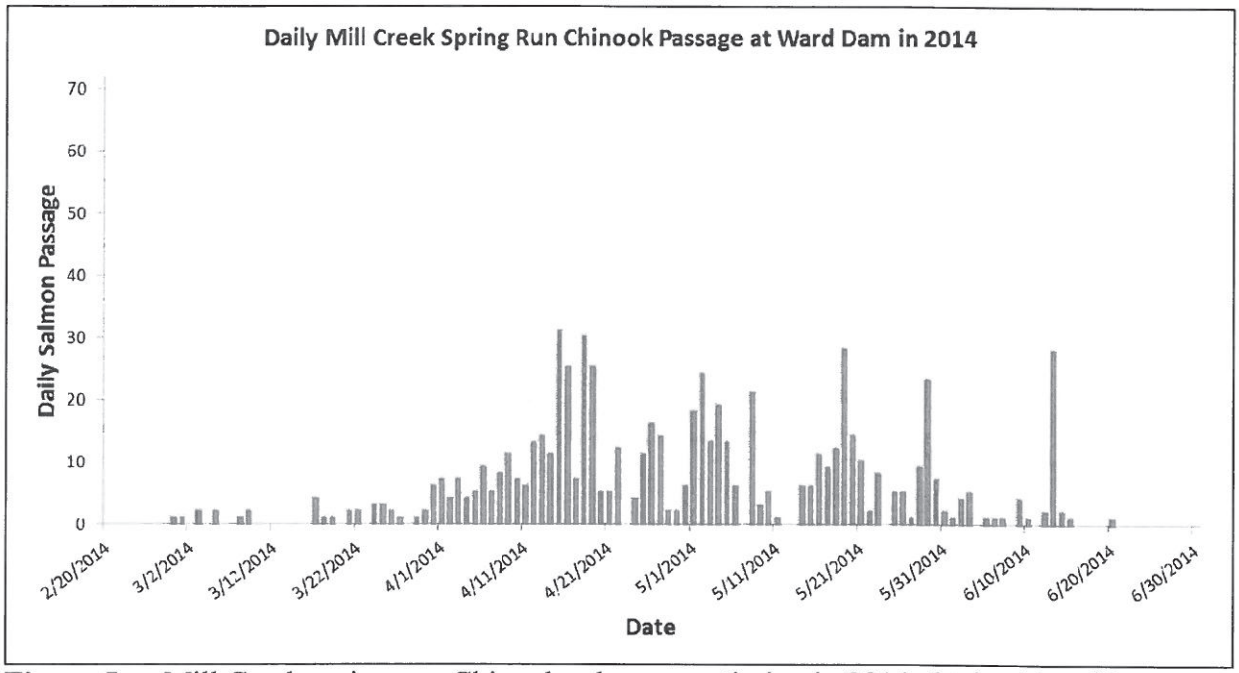


Figure 5. — Mill Creek spring-run Chinook salmon run-timing in 2014 obtained by video counts at Ward Dam.

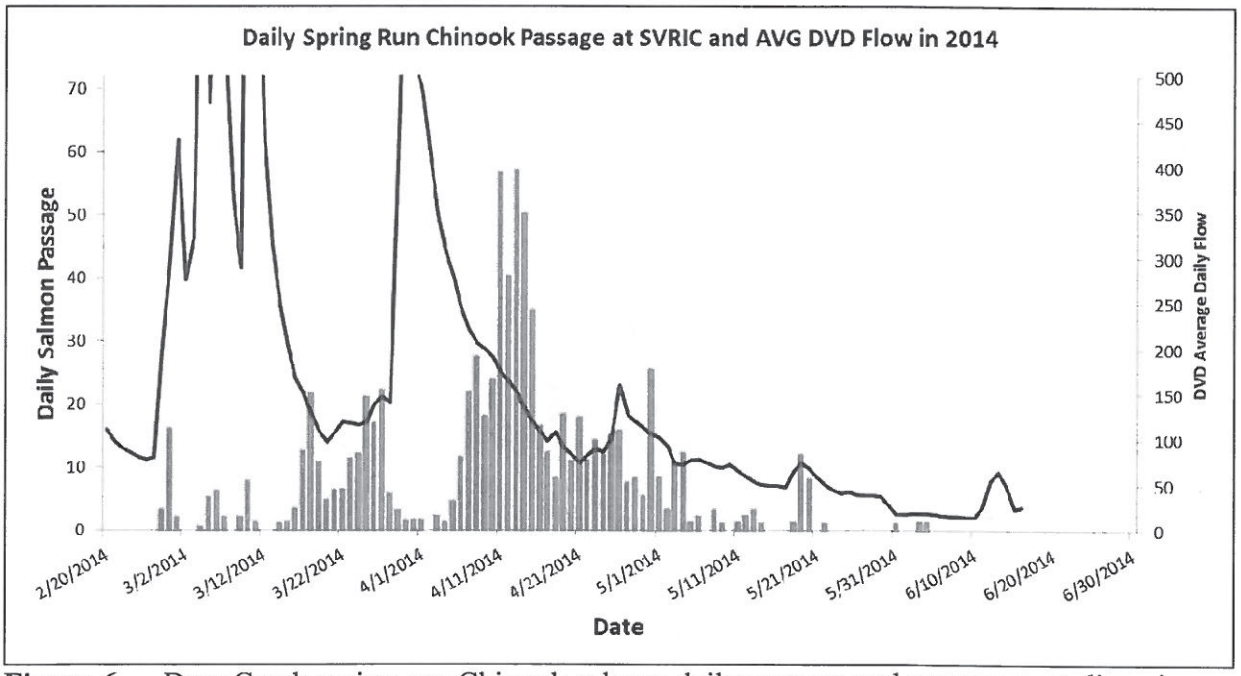


Figure 6. — Deer Creek spring-run Chinook salmon daily passage and average post-diversion stream flow measured at DVD in 2014.

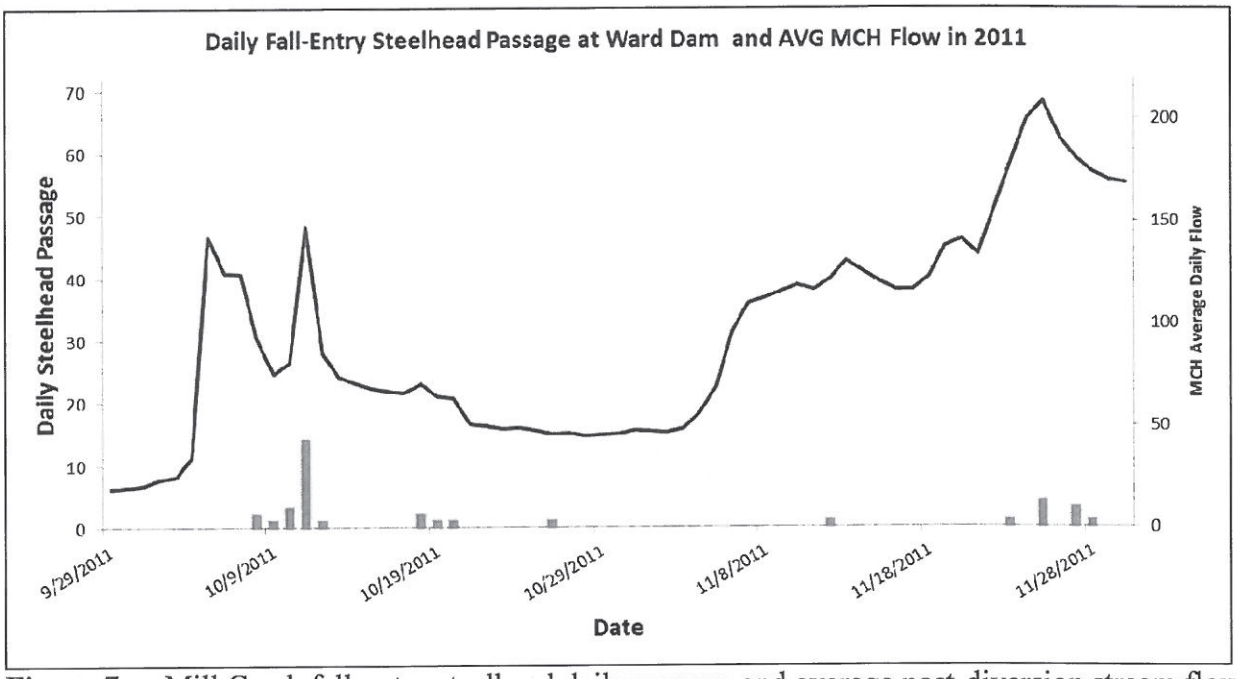


Figure 7. – Mill Creek fall-entry steelhead daily passage and average post-diversion stream flow measured at MCH in 2011.

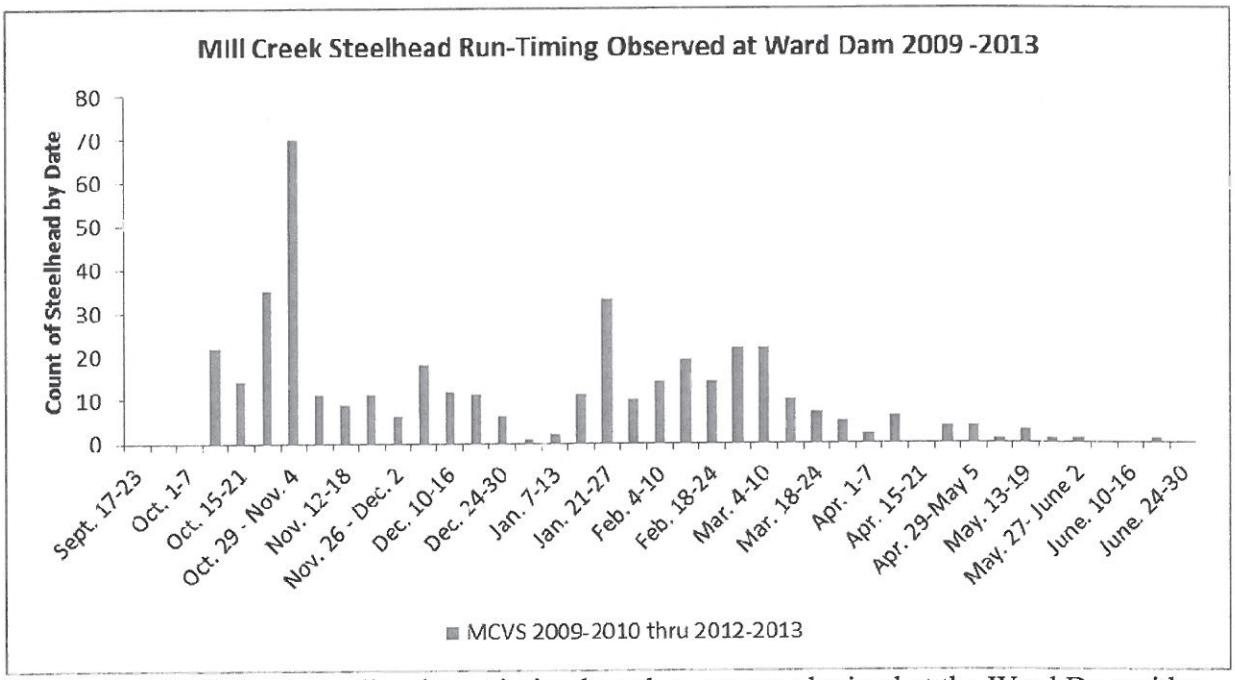


Figure 8. – Mill Creek steelhead run-timing based on counts obtained at the Ward Dam video station 2009-2013

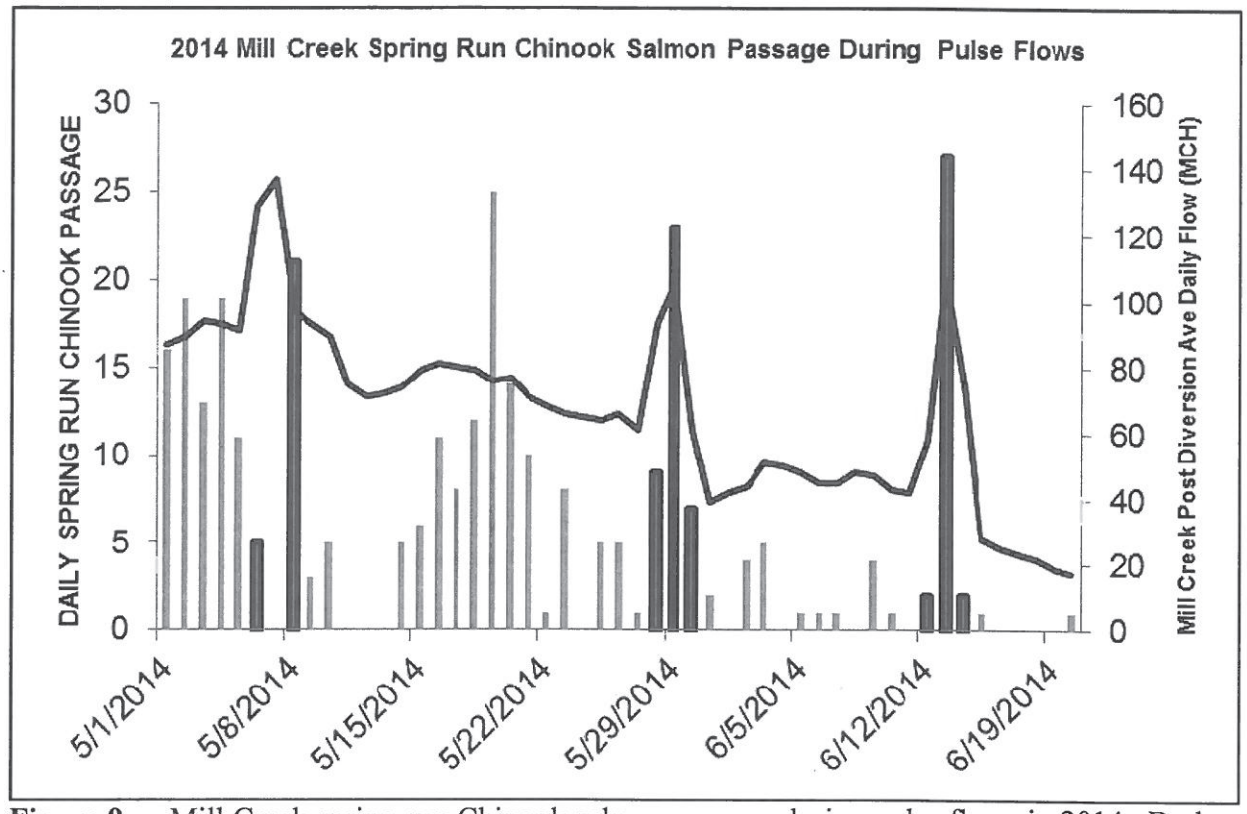


Figure 9. – Mill Creek spring-run Chinook salmon passage during pulse flows in 2014. Dark bars represent spring-run Chinook salmon passing Ward Dam during pulse flows. The black line represents post-diversion flow.

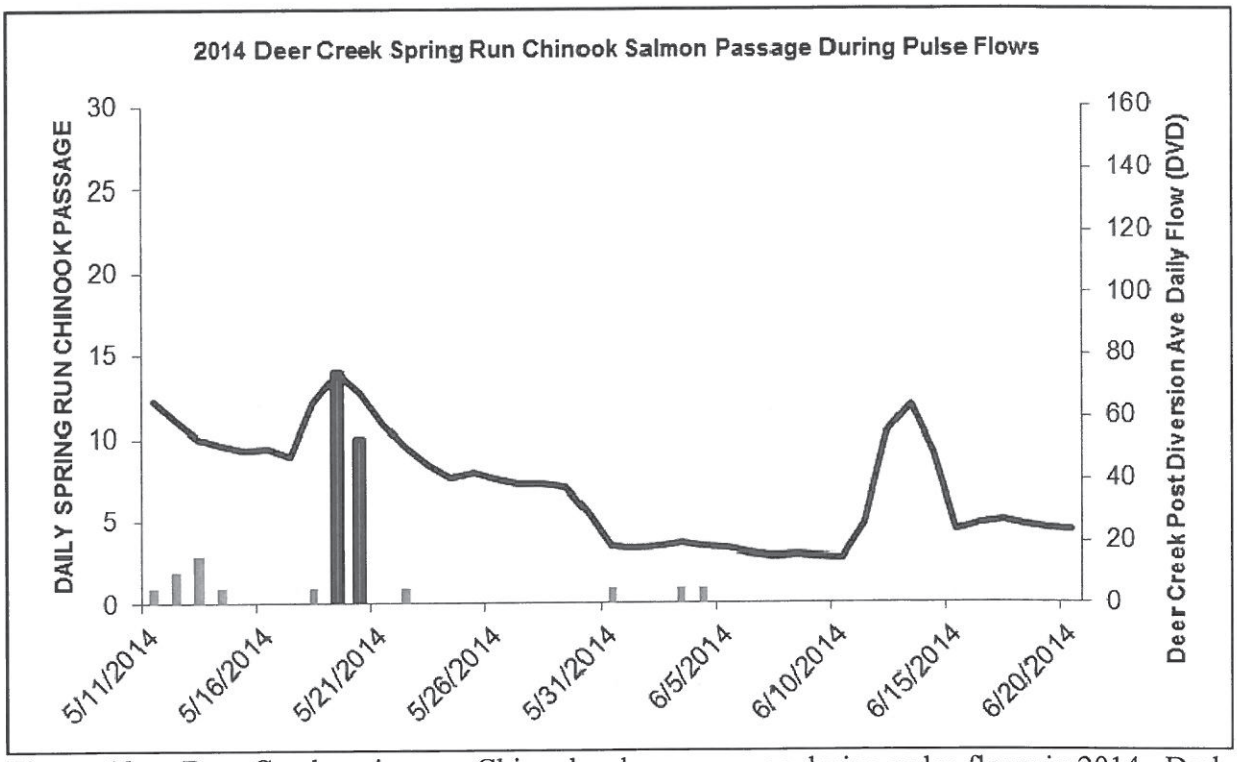


Figure 10. — Deer Creek spring-run Chinook salmon passage during pulse flows in 2014. Dark bars represent spring-run Chinook salmon passing SVRIC dam during pulse flows. The black line represents post-diversion flow.

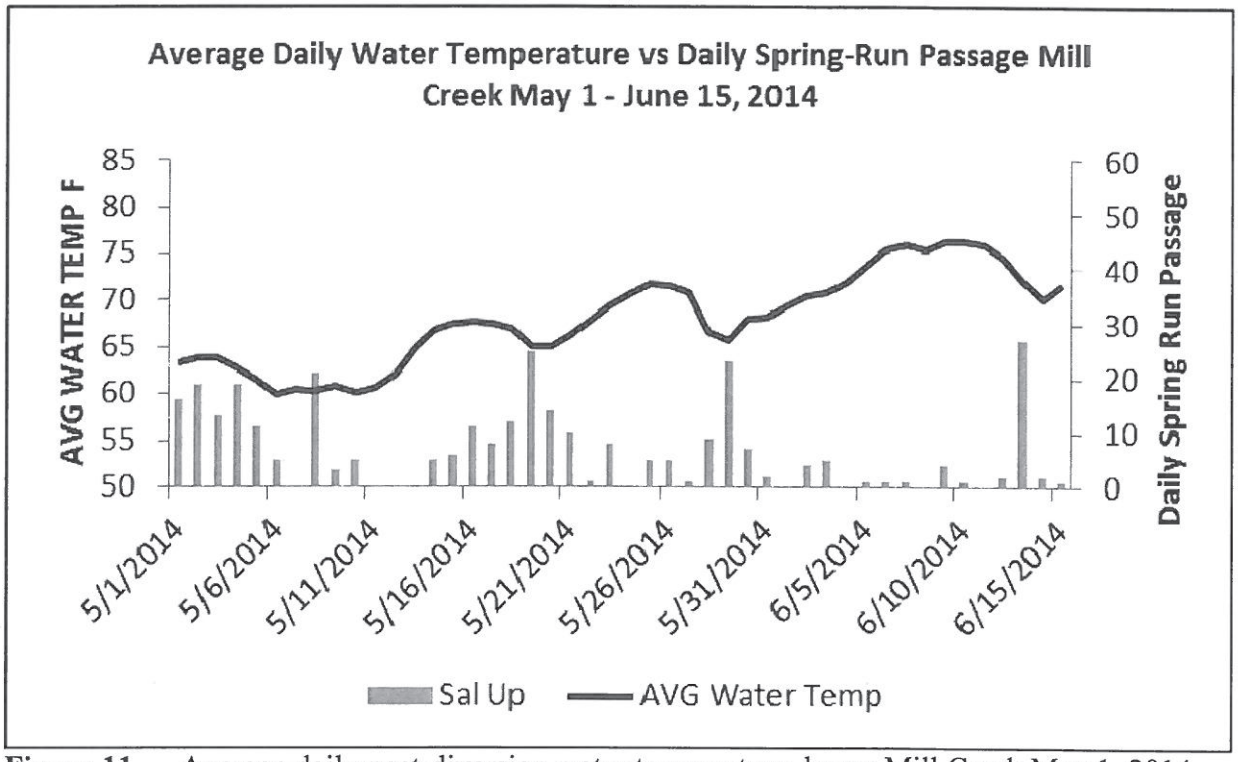


Figure 11. — Average daily post-diversion water temperature, lower Mill Creek May 1, 2014 through June 15, 2014 and daily spring-run Chinook salmon passage showing the correlation between decreases in daily water temperature and increases in daily spring-run Chinook salmon passage.

Attachment 11
National Marine Fisheries Service Memorandum