United States Department of the Interior

BUREAU OF RECLAMATION
Central Valley Operations Office
3310 El Camino Avenue, Suite 300
Sacramento, California 95821

IN REPLY
REFER TO:

CVO-100
ENV-7.00

FEB 27 2014

Ms. Maria Rea
Assistant Regional Administrator
California Central Valley Area Office
National Marine Fisheries Service
650 Capitol Mall, Suite 5-100
Sacramento, CA 95814

Subject: Interim Contingency Plan for March Pursuant to Reasonable and Prudent Alternative (RPA) Action I.2.3.C of the 2009 Coordinated Long-term Operation of the Central Valley Project (CVP) and State Water Project (SWP) Biological Opinion (2009 BiOp)

Dear Ms. Rea:

The Bureau of Reclamation and the Department of Water Resources (DWR) prepared a Temporary Urgency Change (TUC) Petition which served as a drought contingency plan for the month of February, consistent with the drought exception procedures outlined in the 2009 BiOp RPA Action I.2.3.C. Reclamation and DWR propose to extend these provisions through March. Reclamation is seeking concurrence from the National Marine Fisheries Service (NMFS) that the drought response actions proposed by Reclamation and DWR in March are within the limits of the Incidental Take Statement (ITS) of the 2009 BiOp. Additionally, because actions under the TUC Petition and resultant Order from the State Water Resources Control Board (State Board) are in compliance with the drought exception procedures described in the 2009 BiOp, these actions do not jeopardize species or adversely modify or destroy designated critical habitat addressed in the 2009 BiOp.

As you are aware, California is facing unprecedented critically dry conditions in the current water year, following two previous dry years. As a result of this continued aridity, CVP and SWP reservoir levels are forecast to be significantly below historic conditions. In response to this water shortage crisis, Reclamation and DWR submitted a TUC Petition Regarding Delta Water Quality on January 29, 2014, requesting the State Board to temporarily modify requirements of D-1641 for 180 days, with specific requests for February. In response to the TUC Petition, the State Board issued an Order on January 31, 2014, and a revised Order on February 7, 2014 (see enclosure). Approval of the TUC Petition by the State Board has enabled changes in operations that will provide minimum human health and safety supplies and conserve water for later protections of instream uses and water quality. The revised Order provided for increased exports (limited to natural or abandoned flow) during such times when D-1641 requirements were met. Reclamation and DWR are proposing an extension of the February

actions related to Delta outflow and Delta Cross Channel (DCC) gate operations contained within the TUC Petition and resultant State Board orders through March 31, 2014.

As issued, the revised Order temporarily modified February D-1641 Delta outflow requirements, as well as DCC gate operations. The revised Order specified that the February outflow requirements, commonly known as X2 criteria, would be set at a minimum of 3,000 cfs, with the potential for higher pulse flow. The Order provides for minimum health and safety level of export of 1,500 cfs. In addition, reservoir releases would be reduced from those otherwise required to meet D-1641 in February to conserve storage for later fishery protection, minimum human health and safety needs, and if necessary, salinity control. In addition, the Order modified DCC gate operations to allow for opening of the gates as water quality and fishery conditions warrant and as restricted to specific monitoring of fish. Finally, the revised Order issued February 7 provided that if precipitation events occurred that allowed Reclamation and DWR to meet the Delta outflow and DCC requirements in D-1641, exports could increase if there is natural or abandoned flow in the Delta. Reclamation and DWR propose to extend all of the above described provisions through March.

Reclamation and DWR will continue close coordination on current and projected operations on a weekly basis through existing meetings (Delta Operations for Salmonids and Sturgeon, Delta Conditions Team, Water Operations Management Team, etc.). The Order also required DWR and Reclamation to convene a Real-Time Drought Operations Management Team with designated representatives from Reclamation, DWR, the State Board, Department of Fish and Wildlife (DFW), NMFS, and U.S. Fish and Wildlife Service to discuss potential changes to SWP and CVP operations to meet health and safety requirements and to reasonably protect all beneficial uses of water. The team will continue to meet at least weekly to ensure effective coordination among the pertinent agencies. We anticipate this group will help guide development of a CVP/SWP operational strategy and corresponding contingency plans to address operations through the spring as conditions continue to evolve. The results of these efforts would inform future determinations with both the 2009 BiOp and the 2008 Service Coordinated Long-term Operation of the CVP and SWP Biological Opinion (2008 Service BiOp) and additional TUC petitions to the State Board, if necessary.

RPA Action I.2.3.C is triggered based on the February forecast showing that end of September Shasta storage will be less than 1.9 million acre feet (MAF). Based on the 50 percent and 90 percent exceedance hydrology forecasts for February, Reclamation will be unable to meet 1.9 MAF of storage in Shasta Reservoir at the end of September. Under the 90 percent forecast, maintaining minimum releases during March from Shasta Reservoir should meet a Wilkins Slough flow not to exceed 4,000 cfs, and the minimum 3,000 cfs Delta outflow, but still may require modified operations of the DCC gates to maintain water quality standards in the Delta. Under this forecast, a temperature compliance point above Clear Creek on the Sacramento River may be met through July, but releases from Keswick Dam may be greater than 56°C by mid-August (see enclosed February 20, 2014, letter from Reclamation to NMFS regarding the February 2014 forecast). Reclamation will coordinate water temperature actions, as required by RPA Actions I.2.3.A, I.2.4, II.2, and III.1.2, towards continuing precautionary initial temperature plans and updating these to contain in-season adjustments to these actions.

Reclamation requests that NMFS consider the TUC Petition and enclosed Order as the interim contingency plan for March. On January 31, 2014, NMFS concurred that the TUC Petition and Order, as modified by more specific DCC gate closure criteria, are consistent with the drought contingency exceptions contemplated in the 2009 BiOp (RPA Action I.2.3.C). RPA Action IV.1.2 requires the DCC gates to be closed from February 1 through May 20 to protect winter-run, spring-run, and fall-run Chinook salmon, steelhead, and green sturgeon from entrainment into the interior Delta and prohibits elevated risks to these salmonids. These actions combined help to preserve Shasta storage for later in the year consistent with the Drought Exception Procedure in RPA Action I.2.3.C.

Specific to DCC gate operations, NMFS has convened an interagency team of biologists to further develop a set of biological triggers for operation of the DCC during the month of March. Reclamation looks forward to working with NMFS, DWR, Service, and DFW to further refine the biological triggers for operation of the DCC, as necessary.

The enclosed analysis supports Reclamation's conclusion that changes identified in the TUC Petition and resultant Orders, including the drought response actions proposed by Reclamation and DWR in March, are consistent with the drought exception procedures of the 2009 BiOp. Any incidental take resulting from these changes are within the limits of the existing incidental take limits in the 2009 BiOp. Because these actions are in compliance with the drought exception procedures described in the 2009 BiOp, they do not jeopardize species or adversely modify or destroy designated critical habitat addressed in the 2009 BiOp. Reclamation seeks NMFS' concurrence in this determination.

We look forward to working with you and your staff as we navigate through this extremely challenging water year and appreciate your willingness to work with us on this time sensitive matter.

Sincerely,

Paul Fujitani
Acting Manager, Operations

Enclosures - 3

cc: See next page.

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STATE OF CALIFORNIA
CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY
STATE WATER RESOURCES CONTROL BOARD

In the Matter of Specified License and Permits[1] of the Department of Water Resources and U.S. Bureau of Reclamation for the State Water Project and Central Valley Project

ORDER APPROVING A TEMPORARY URGENCY CHANGE IN LICENSE AND PERMIT TERMS AND CONDITIONS REQUIRING COMPLIANCE WITH DELTA WATER QUALITY OBJECTIVES IN RESPONSE TO DROUGHT CONDITIONS (WITH MODIFICATIONS DATED FEBRUARY 7, 2014)

BY THE EXECUTIVE DIRECTOR

1.0 INTRODUCTION

On January 29, 2014, the Department of Water Resources (DWR) and the United States Bureau of Reclamation (Reclamation) (hereinafter Petitioners) jointly filed a Temporary Urgency Change Petition (TUCP) pursuant to Water Code section 1435 et seq., to temporarily modify requirements in their water right permits and license for the State Water Project (SWP) and Central Valley Project (CVP) (hereinafter Projects) for the next 180 days, with specific requests for February 2014. The TUCP requests temporary modification of requirements included in State Water Resources Control Board (State Water Board) Revised Decision 1641 (D-1641) to meet water quality objectives in the Water Quality Control Plan (Plan) for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta). Specifically, the TUCP requests modifications to the Delta Outflow and Delta Cross Channel (DCC) Gate closure objectives. The TUCP also proposes limits on exports at the SWP and CVP pumping facilities in the south Delta and a process to determine other changes that will best balance protection of all beneficial uses. The Petitioners are requesting these temporary modifications in order to respond to unprecedented critically dry hydrological conditions as California enters its third straight year of below average rainfall and snowmelt runoff.

[1] The petition was filed for Permits 16478, 16479, 16481, 16482 and 16483 (Applications 5630, 14443, 14445A, 17512 and 17514A, respectively) of the Department of Water Resources for the State Water Project and License 1986 and Permits 11315, 11316, 11885, 11886, 11887, 11967, 11968, 11969, 11970, 11971, 11972, 11973, 12364, 12721, 12722, 12723, 12725, 12726, 12727, 12860, 15735, 16597, 20245, and 16600 (Applications 23, 234, 1465, 5638, 13370, 13371, 5628, 15374, 15375, 15376, 16767, 16768, 17374, 17376, 5626, 9363, 9364, 9366, 9367, 9368, 15764, 22316, 14858A, 14858B, and 19304, respectively) of the United States Bureau of Reclamation for the Central Valley Project.

The proposed changes are requested to conserve storage in upstream reservoirs for use later in the year if the drought continues, and to assure that salinity levels in the Delta are maintained at levels that protect public health and safety. Conserved storage will be available for minimum instream flows, temperature control, and to continue to repel salinity in the Delta. Without this change, stored water would likely be depleted by late spring or early summer. Also without this change, salinity levels in the Delta could rise to levels that would require much more water to be released from storage later in the year to restore water quality to levels that protect public health and safety.

The petition and supporting information are available via the State Water Board's website at http://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/index.shtml.

2.0 BACKGROUND

The Bay-Delta Plan specifies water quality objectives for the protection of beneficial uses of water in the Bay-Delta, including fish and wildlife, agricultural, and municipal and industrial uses. In part, D-1641 assigns responsibility for meeting the water quality objectives included in the Bay-Delta Plan.[2] D-1641 places responsibility on DWR and Reclamation for measures to ensure that specified water quality objectives included in Tables 1, 2, and 3 of D-1641 (attached) are met, in addition to other requirements. The flow objectives are intended to assist with fish migration, and also to keep the Delta and water exported from the Delta from getting too salty for municipal and agricultural uses. Flow and salinity objectives in the Bay-Delta Plan and D-1641 were developed based on historic hydrologic conditions. Provisions for the extreme dry conditions currently being experienced were therefore not considered in either the Bay-Delta Plan or D-1641.

The Delta Outflow objective is intended to protect estuarine habitat for anadromous fish and other estuarine dependent species. Delta outflows affect migration patterns of both estuarine and anadromous species and the availability of habitat. Freshwater flow is an important cue for upstream migration of adult salmon and is a factor in the survival of smolts moving downstream through the Delta. The populations of several estuarine-dependent species of fish and shrimp vary positively with flow as do other measures of the health of the estuarine ecosystem. Freshwater inflow also has chemical and biological consequences through its effects on loading of nutrients and organic matter, pollutant concentrations, and residence time.

The Delta Outflow objective includes requirements for calculated minimum net flows from the Delta to Suisun and San Francisco Bays (the Net Delta Outflow Index or NDOI) and maximum salinity requirements (measured as electrical conductivity or EC). Since salinity in the Bay-Delta system is closely related to freshwater outflow, both types of objectives are indicators of the extent and location of low salinity estuarine habitat. Listed in Table 3 of the Bay-Delta Plan, the Delta outflow objectives vary by month and water year type. With some flexibility provided through a limited set of compliance alternatives, the basic outflow objective sets minimum outflow requirements that apply year round. The Delta Outflow objectives included in the Bay-Delta Plan and D-1641for the February through June time frame are identified in Footnote 10 of Table 3 and Table 4 of Footnote 10. For this year, the requirements of Table 4 will likely not apply. In the event they do, this Order will be revisited. From February through June, Footnote 10 requires minimum daily net Delta outflows of 7,100 cubic-feet per second (cfs), calculated as

[2] D-1641 originally implemented the 1995 Bay-Delta Plan. Later, minor modifications were made to the Bay-Delta Plan in the 2006 Bay-Delta Plan.

a 3-day running average. The footnote specifies that the requirement may also be met if either the daily average or 14-day running average electrical conductivity of 2.64 mmhos/cm is met at the confluence of the Sacramento and the San Joaquin rivers near Collinsville (Station C2). Footnote 10 specifies that the Executive Director may relax the standard in March under specified low flow conditions. The footnote also specifies that the 7,100 cfs standard does not apply in May and June under specified low flow conditions and is replaced by a minimum 14-day running average flow of 4,000 cfs.

The DCC gates are located near Walnut Grove and at times allows for the transport of up to 3,500 cfs of water from the Sacramento River to Snodgrass Slough and the North Fork Mokelumne River to the interior Delta. The DCC was constructed in the early 1950s to convey Sacramento River water to the interior and southern Delta to improve water quality at the SWP and CVP export facilities. The DCC also benefits recreational uses by providing boat passage. The DCC gate objective was designed to protect fish and wildlife beneficial uses (specifically Chinook salmon) while simultaneously recognizing the need for fresh water to be moved through the interior Delta to the southern Delta for SWP and CVP uses. The current objective states that the DCC gates shall be closed for a total of up to 45 days for the November through January period, stay closed from February through May 20, and be closed for a total of 14 days for the May 21 through June 15 period. Closure of the DCC gates is important for the protection of salmon survival. Opening the DCC gates during winter and spring months can negatively affect juvenile Chinook salmon survival by causing straying into the interior and then southern Delta where survival is much lower than for fish that stay in the mainstem of the Sacramento River. Opening the DCC gates significantly improves water quality (e.g. lowers salinity) in the interior and southern Delta including at the SWP and CVP export facilities and Contra Costa Water District's diversions, particularly when Delta outflow is low.

2.1 Drought Conditions

In May 2013, due to near record-low precipitation, Governor Edmund G. Brown, Jr. issued Executive Order B-21-13, which directed the State Water Board and DWR, among other things, to take immediate action to address dry conditions and water delivery limitations by expediting the review and processing of voluntary transfers of water. In December 2013, the Governor formed a Drought Task Force to review expected water allocations and the state's preparedness for a drought.

Calendar year 2013 was the driest year in recorded history for many parts of California, and water year 2014 is the driest to date. So far this water year, the Northern Sierra 8-station precipitation accumulation is 4.5 inches; this is 9 percent of the annual average and 17 percent of the average to date. Statewide snow water content was at 9 percent of the April 1 average and 15 percent of the average to date, when measured by DWR snow survey on January 30, 2014. California generally receives half of its annual precipitation by mid- to late January. The three-month outlook weather forecast from the National Oceanic and Atmospheric Administration predicts below normal precipitation for California from now through the forecast horizon. Preceding dry years also add to the strain currently experienced on California's water resources. Water year 2012 was categorized as below normal.

On January 17, 2014, Governor Brown issued a Drought Emergency Proclamation. The Proclamation recited that California is experiencing record dry conditions, with calendar year 2014 projected to become the driest year on record. The Proclamation also recited that water supplies have dipped to alarming levels, as indicated by the fact that the snowpack is

approximately 20 percent of the normal average for January[3], the SWP and CVP reservoirs have very low water levels for January, California's major river systems, including the Sacramento and San Joaquin rivers, have significantly reduced surface water flows, and groundwater levels throughout the State have dropped significantly.

The Governor directed the State Water Board, among other things, to expedite processing of water transfers as called for in Executive Order B-21-13; to consider immediately petitions requesting consolidation of the places of use of the SWP and CVP; to accelerate funding for water supply enhancement projects; to put water right holders throughout the state on notice that they may be directed to reduce water diversions; and to consider petitions, such as this TUCP, to modify requirements for reservoir releases or diversion limitations that were established to implement a water quality control plan. As indicated in the Proclamation, such modifications may be necessary to conserve cold water stored in upstream reservoirs that may be needed later in the year to protect salmon and steelhead, to maintain water supply, and to improve water quality.

On January 17, 2014, the State Water Board issued a Notice of Surface Water Shortage and Potential for Curtailment of Water Right Diversions. The notice advised that if dry weather conditions persist, the State Water Board will notify water right holders in critically dry watersheds of the requirement to limit or stop diversions of water under their water right, based on their priority. The notice suggested that water right holders look into the use of alternative water supplies, such as groundwater wells, purchased water supplies under contractual arrangements, and recycled wastewater. Following persistent dry hydrologic conditions, the Board plans to issue Water Diversion Curtailment Notices to water right holders in water short areas in the near future.

On January 31, 2014, DWR also announced that except for a small amount of carryover water from 2013, customers of the SWP will get no deliveries in 2014 if current dry conditions persist and deliveries to agricultural districts with long-standing water right claims in the Sacramento Valley may be cut 50 percent – the maximum permitted by contract – depending upon future snow survey results. The first official 2014 CVP water allocation announcement is planned for late-February as required by contract terms. Water supply updates will then be made monthly or more often as appropriate and will be posted on Reclamation's website at: http://www.usbr.gov/mp/pa/water.

2.2 Effects of the Drought on Hydrologic Conditions

The permit terms and conditions contained in D-1641 were derived from the flow and water quality objectives contained in the Bay-Delta Plan. In adopting those objectives, the State Water Board considered the beneficial uses of water (municipal and industrial, agricultural, and fish and wildlife) based on a set of assumptions about the State's water supply, including the expected variability of this water supply. The magnitude of the current drought was not considered in the establishment of the Bay-Delta objectives or in the terms and conditions contained in D-1641. Water year 2013 was the driest year on record and 2014 is projected to be as dry or drier. Storage in major reservoirs is low, with Shasta, Oroville, Trinity, Folsom, San Luis, Exchequer, and Millerton Reservoirs all trending at or below the storage levels observed during the 1976 – 1977 drought, previously the most severe drought on record. Current projections indicate that without the requested change, there exists a substantial risk that by late spring 2014 and into

[3] As of January 30, 2014, the current snow pack is estimated at 12 percent of normal for this time of year and 7 percent of the average April 1 measurement when snowpack is normally at its peak.

2015 the Petitioners' major reservoirs will be drafted to dead pool or near dead pool levels at which point reservoir release capacities will be substantially diminished.

3.0 SUBSTANCE OF TEMPORARY URGENCY CHANGE PETITION

The flow and water quality requirements established by the State Water Board in D-1641 are summarized in the tables and figures contained in Attachment 1 to this Order: Table 1 (Municipal and Industrial Beneficial Uses), Table 2 (Agricultural Beneficial Uses), and Table 3 (Fish and Wildlife Beneficial Uses). Included in Attachment 1 are the footnotes to Table 3 that refer to definitions and other requirements contained in Figure 1 (Sacramento Valley Water Year Hydrologic Classification), Figure 2 (San Joaquin Valley Water Year Hydrologic Classification), Figure 3 (Formulas for Net Delta Outflow Index and Percent Inflow Diverted), and Table 4 (Chipps Island and Port Chicago Maximum Daily Average Electrical Conductivity).

The Petitioners have requested the following temporary modifications to D-1641 requirements:

1. **Temporary Modification of Delta Outflow and Export Requirements**

   The Petitioners request a combined modification of D-1641 requirements to help preserve water in storage to protect future cold water pool needs for listed species, future water supply, and maintain in-Delta water quality.

   The TUCP requests modification of Delta Outflow requirements described in D-1641, Table 3, Footnote 10, by modifying the Delta Outflow to the outflow that is expected to occur while maintaining SWP and CVP exports at health and safety levels of 1,500 cfs. Reclamation and DWR estimate that Delta outflow will range between 3,000 and 4,500 cfs. The petition states that this modification would provide some protection of Delta salinity levels and some protection of cold water pool for listed species later in the year. The 4,500 cfs Delta outflow level is the Petitioners' estimate of the flows that are needed to maintain salinity levels below 250 mg/l chloride at all export locations specified under Table 1 of D-1641. The Petitioners state that there are significant depletions of surface water flow that affect the certainty of the 4,500 cfs Delta Outflow estimate.

   The proposed Delta Outflow modification is based on an assumption that 1,500 cfs of combined SWP/CVP exports would be maintained to provide minimum health and safety flows to municipal and industrial diverters who rely solely on supplies from the Delta or the canal between the export pumps and San Luis Reservoir. The Petitioners requested that this modification to the maximum Export Limits, contained in D-1641 Table 3, be combined with the modification to Delta Outflow. The minimum health and safety flow level has been acknowledged by the 2009 National Marine Fisheries Service (NMFS) Biological Opinion and the 2008 U.S. Fish and Wildlife Service (USFWS) Biological Opinion. Through the Reporting and Management Plan described below, the Petitioners intend to review current conditions and health and safety needs, which might support periods of lower export levels that would be protective of health and safety.

2. **Temporary Modification of Delta Cross Channel (DCC) Gate Operation Requirements**

   D-1641 requires the closure of the DCC gates from February 1 through May 20. The Petitioners request permission to open the DCC gates for human health and safety

purposes, based on consultation with the Department of Fish and Wildlife (DFW), USFWS, and NOAA Fisheries (fishery agencies). The Petitioners state that they are currently discussing alternative operational strategies with the fishery agencies, and will continue to evaluate and discuss these strategies in consultation with the fishery agencies. As discussed above, opening of the DCC gate can help improve in-Delta salinity conditions. Normally, runoff and the Delta inflow/outflow needed to meet the Delta Outflow requirement would assist in meeting salinity requirements in the Delta with the DCC gates closed. Due to the critically dry hydrologic conditions, the TUCP states that there is a need to open the DCC gates to help achieve the salinity conditions in the interior and southern Delta needed for protection of municipal and industrial beneficial uses without expending large quantities of water needed for later use.

3. Reporting and Management Plan

In recognition of ordering paragraphs 8, 14, and 16 of the Governor's Proclamation, the Petitioners propose that this Order include regular monitoring, to ensure that this Order's terms and conditions and the requirements of Water Code Section 1435 are met.

The Petitioners also propose convening a team of managers, who would meet weekly during the period this Order is in effect, to review monitoring and operations data. These managers would be authorized to act to coordinate management of water supplies and protection of natural resources. The team of managers would consist of representatives from the Petitioners, the State Water Board, DFW, NMFS and USFWS.

4. Future Requests for Temporary Modifications

As a result of the reporting and management plan described above, the Petitioners state that they may submit to the State Water Board additional information regarding any further adjustments needed to regulatory requirements in order to balance the protection of beneficial uses, while protecting environmental resources and meeting health and safety needs. The TUCP states that future requests for temporary changes could include requests for possible modifications of other water quality objectives found in D-1641 Table 1 "Municipal and Industrial Beneficial Uses," Table 2 "Agricultural Beneficial Uses," and Table 3 "Fish and Wildlife Beneficial Uses."

4.0 APPLICABILITY OF THE CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) AND WATER CODE SECTION 13247

Ordinarily, the State Water Board must comply with any applicable requirements of the California Environmental Quality Act (CEQA) prior to issuance of a temporary urgency change order pursuant to Water Code section 1435. (See Cal. Code Regs., tit. 23, § 805.) The Governor's Proclamation concludes, however, that strict compliance with CEQA would "prevent, hinder, or delay the mitigation of the effects of the emergency." Accordingly, as authorized by Government Code section 8571, ordering paragraph 9 of the Governor's Proclamation suspends CEQA, and the regulations adopted pursuant to it, to the extent that CEQA would otherwise apply to specified actions necessary to mitigate the effects of the drought, including the State Water Board's action on the TUCP.

The Governor's Proclamation also suspends Water Code section 13247 to the extent that it would otherwise apply to specified activities, including action on the TUCP. Section 13247

requires state agencies, including the State Water Board, to comply with water quality control plans unless otherwise directed or authorized by statute. Absent suspension of section 13247, the State Water Board could not approve a change petition that modifies permits and licenses in a way that does not provide for full attainment of the water quality objectives in the Bay-Delta Plan, even during a drought emergency.

5.0 PROCEDURAL REQUIREMENTS CONCERNING THE TEMPORARY URGENCY CHANGE PETITION

The State Water Board may issue a temporary urgency change order in advance of public notice. (Wat. Code, § 1438, subd. (a).) Public notice must be provided as soon as practicable, unless the change will be in effect less than 10 days. (*Id*., § 1438, subds. (a), (b) & (c).) Any interested person may file an objection to a temporary urgency change. (*Id*., subd. (d).) The Board must promptly consider and may hold a hearing on any objection. (*Id*., subd. (e).) State Water Board Resolution 2012-0029 delegates to the Board Members individually and to the Executive Director the authority to hold a hearing, if necessary, and act on a temporary urgency change petition. (Resolution 2012-0029, ¶¶ 2.2, 4.4.1.)[4]

The State Water Board will issue and deliver to Petitioners as soon as practicable, a notice of the temporary urgency change petition pursuant to Water Code section 1438, subdivision (a). Petitioners will be required to publish the notice in newspapers in accordance with Water Code section 1438, subdivision (b)(1).

As soon as practicable, the State Water Board will provide formal notice of a public workshop to receive comments regarding drought-related activities, including the Petitioners' TUCP and this Order. The public workshop will not be an evidentiary hearing, and any comments on the TUCP will not be treated as testimony. If necessary, the State Water Board will hold an evidentiary hearing on any objections at a later date. The State Water Board will post on its website: (1) the notice of the TUCP, (2) the notice of the public workshop, (3) a copy of the TUCP and accompanying materials, and (4) this Order. The State Water Board also will distribute the notices through an electronic notification system.

6.0 REQUIRED FINDINGS OF FACT

Water Code section 1435 provides that a permittee or licensee who has an urgent need to change the point of diversion, place of use, or purpose of use from that specified in the permit or license may petition for a conditional temporary change order. The State Water Board's regulations set forth the filing and other procedural requirements applicable to TUCPs. (Cal. Code Regs., tit. 23, §§ 805, 806.) The State Water Board's regulations also clarify that requests for changes to permits or licenses other than changes in point of diversion, place of use, or purpose of use may be filed, subject to the same filing and procedural requirements that apply to changes in point of diversion, place of use, or purpose of use. (*Id*., § 791, subd. (e).)

Before approving a temporary urgency change, the State Water Board must make the following findings:

1. the permittee or licensee has an urgent need to make the proposed change;

[4] The Deputy Director for Water Rights may act on a temporary urgency change petition if there are no objections to the petition. (Resolution 2012-0029, ¶ 4.4.1.)

2. the proposed change may be made without injury to any other lawful user of water;
3. the proposed change may be made without unreasonable effect upon fish, wildlife, or other instream beneficial uses; and
4. the proposed change is in the public interest.

(Wat. Code, § 1435, subd. (b)(1-4).)

The State Water Board exercises continuing supervision over temporary urgency change orders and may modify or revoke temporary urgency change orders at any time. (Wat. Code, §§ 1439, 1440.) Temporary urgency change orders expire automatically 180 days after issuance, unless they are revoked or an earlier expiration date is specified. (*Id*., § 1440.) The State Water Board may renew temporary urgency change orders for a period not to exceed 180 days. (*Id*., § 1441.)

6.1 Urgency of the Proposed Change

Under Water Code section 1435, subdivision (c), an "urgent need" means "the existence of circumstances from which the board may in its judgment conclude that the proposed temporary change is necessary to further the constitutional policy that the water resources of the state be put to beneficial use to the fullest extent of which they are capable and that waste of water be prevented . . . ."

An urgent need exists for changes in the Petitioners' requirement to meet specified Delta Outflows, Export Limits and Delta Cross Channel Gate Closure objectives included in D-1641. As described in the Governor's drought proclamation and the petition, California is experiencing unprecedented dry conditions that were not foreseen or accounted for in the development of these requirements. Operations to meet the objectives, starting in February, would have a significant impact on stored water and the ability to meet minimum flows for the remainder of the season. Failure to act quickly to reduce releases from storage will further deplete already low storage levels in the reservoirs available for use throughout the year.

As stated in the petition, California is entering the third straight year of below average rainfall and very low snowmelt runoff. As a result of the dry hydrology, reservoir levels throughout the state were already significantly below average in October at the beginning of the 2013/2014 water year. The low initial storage and historically dry conditions experienced in the last 12 months, since January 2013, have resulted in significant reductions in water supplies and will likely lead to critical water shortages in 2014.

According to the petition, in order to meet the requirements of D-1641, the SWP and CVP have released water from storage to meet in-basin demands since April 2014. These demands upon the stored water of the SWP and CVP have been exacerbated by the unprecedentedly high use of river water on the Sacramento River and Feather River systems, referred to as depletions. DWR and Reclamation believe these depletions to be much greater than typically assumed which is resulting in further reductions in storage to meet Bay-Delta Plan water quality objectives.

According to the petition, at this time, total storage at the SWP's Lake Oroville is roughly 1.2 million acre-feet (MAF), and the total combined storage at the CVP's Shasta and Folsom reservoirs is also very low at about 1.8 MAF. Storage in all three reservoirs is below what they were at this time of year in 1977 when the state was in a severe drought. Of even more

concern is the lack of snowpack in the watersheds feeding into the Projects' major Sacramento Valley reservoirs. The current water year's lack of precipitation has resulted in a northern California snowpack which is a mere 4 percent of the typical seasonal peak.

The continuation of extremely dry conditions in the Bay-Delta watershed poses great challenges to the effective management of water resources, and the Petitioners do not believe that there is an adequate water supply to meet all obligations under D-1641. As discussed above, current projections indicate that without the requested change to the Petitioners' water right permits and license conditions, a substantial risk exists that by late spring 2014 and into 2015 the Petitioners' major reservoirs will be drafted to dead pool or near dead pool levels, at which point reservoir release capacities will be substantially diminished. As a result, there will be significant risks to temperature control, minimum instream flow requirements, and an inability to repel salinity in the Sacramento-San Joaquin Delta later this season. Under the current circumstances, the most prudent course of action is to conserve storage in upstream reservoirs until significant improvement of that storage is realized. Conservation of stored water supplies requires temporary modification of some terms and conditions contained in D-1641.

6.2 No Injury to Any Other Lawful User of Water

The proposed changes will not injure any other lawful user of water because the changes will not result in a decrease in natural flows. As used in Water Code section 1435, the term "injury" means invasion of a legally protected interest. (*State Water Resources Control Board Cases* (2006) 136 Cal.App.4th 674, 738-743.) Riparian and appropriative water right holders with rights to divert water below Project reservoirs only are entitled to divert natural and abandoned flows, and in the case of riparians only natural flows; they are not entitled to divert water previously stored or imported by the Projects that is released for use downstream. (*Id*. at pp. 738, 743, 771.)

Since March 2013, the Projects have been augmenting natural flows in the Delta with water released from storage in Project reservoirs in order to meet water quality objectives. If the proposed change to the requirement to meet the Delta Outflow objective is implemented, the Projects will reduce releases from storage, but the Projects will continue to augment natural flows with releases from storage. Accordingly, implementation of the proposed change will not reduce the natural or abandoned flows to which downstream riparian and appropriative water right holders may be entitled, and no water right holders will be injured by the proposed change.

At the present time, DWR and Reclamation have proposed changes to requirements to meet certain water quality objectives established to protect fish and wildlife beneficial uses. DWR and Reclamation have not yet requested any changes to requirements to meet water quality objectives established to protect municipal, industrial, or agricultural beneficial uses. For this reason, the proposed changes will not injure other water users due to a change in water quality. (See *State Water Resources Control Bd. Cases, supra* at pp. 744-45.) Moreover, it is questionable whether any other users could support a valid claim of injury due to a change in water quality under circumstances where the Projects are augmenting natural flows with stored water. Finally, it is worth pointing out that any impairment to water quality in the near term is likely to be outweighed by the significant impact to water quality that would occur if the proposed changes are not granted. Absent the proposed change, Project storage would be depleted, and DWR and Reclamation would no longer be able to control salinity encroachment in the Delta.

6.3 No Unreasonable Effect upon Fish, Wildlife, or Other Instream Beneficial Uses

As conditioned by this Order, the proposed changes to Delta Outflows, Export Limits and DCC Gate Closure requirements will not unreasonably impact fish, wildlife, or other instream beneficial uses of water. In determining whether the impact of the proposed changes on fish and wildlife is reasonable, the short-term impact to fish and wildlife must be weighed against the long-term impact to all beneficial uses of water, including fish and wildlife, if the changes are not approved.

According to the petition, the estimated impact to reservoir storage of not making the changes to the requirement to meet the Delta Outflow objective during February could be approximately 144 thousand acre-feet (TAF).[5] As discussed above, if the Delta Outflow requirements remain in effect through June, it could result in a "loss of control" over salinity levels in the Delta by late spring 2014 and into 2015 in a worst case scenario. If such a condition occurs, much of the Delta would be too salty to support health and safety and agricultural uses of water. It would also likely require more water than is currently available in storage to push salt back out of the Delta. This salty Delta condition would persist until Northern California receives a rainy season with sufficient runoff to flush the Delta of ocean water to once again allow for these in-Delta beneficial uses.

The DCC gates, when opened, allow high quality Sacramento River water to flow through the Central Delta, thus "freshening" the Delta. This flow path keeps water in the central Delta less saline than when the DCC gates are closed. The DCC gates are generally kept closed in the spring, however, to keep outmigrating salmon from straying into the central Delta where their survival is reduced.

A reduction in Delta outflow within the proposed range of 3,000 to 4,500 cfs may result in rapidly increasing salinity in the interior Delta if the gates are not opened at the same time this occurs which may pose a risk to minimum exports for public health and safety. Restoring Delta salinity to a range that would support public health and safety would take a much larger quantity of water than is required to maintain salinity at these levels. This would necessitate release of stored water to maintain public health and safety, and therefore jeopardize storage of water to maintain temperature control and for other environmental purposes later in the year.

The Petitioners propose to open the gates as soon as possible to reduce salinity in the central Delta. The principal benefit of opening the DCC gates in February is to move more fresh water to the interior Delta, using less storage releases than would be needed to achieve the same salinity with the gates closed. This freshening of the Delta will maintain water quality at the CVP and SWP export pumps and the intakes of Contra Costa Water District (CCWD) that are needed for the protection of public health and safety.

With the DCC gates open, there is potential for decreased survival of Sacramento River-origin species as they move through the central Delta. Potential hazards include increased entrainment, predation, and salvage. The Petitioners provided a detailed analysis of how these issues will not result in decreased survival, and state that they will continue to consult with the fishery agencies on these issues. The State Water Board concludes that the potential for impairment to instream beneficial uses from this temporary modification is not unreasonable

[5] According to the petitions this is the difference between the currently projected minimum outflow of 4,500 cfs and 7,100 cfs over the 28-day period.

considering the potential impacts to agricultural and municipal water supply that could occur if the temporary change in not approved. This Order includes a requirement for the Petitioners to continue consulting with the fish agencies on these issues.

In addition to protecting water supplies needed for consumptives uses, the proposed changes will serve to protect fish and wildlife and other instream beneficial uses of water by conserving water for use throughout the season to maintain minimal stream flows and Delta Outflows and to prevent excessive salinity intrusion into the Delta. As discussed above, without the changes, the Projects' limited water supplies would be released for short term benefits to fish and wildlife at the expense of storage and flows later in the season, which would likely have severe effects on fish and wildlife and other instream beneficial uses of water.

Providing year round Delta inflows and outflows is critically important to the survival of numerous fish and wildlife species in the Delta and upstream areas. Tributary flows, including adequate cold water resources, are needed throughout the season to provide appropriate habitat and passage conditions for anadromous species, including Endangered Species Act (ESA) listed Winter-Run and Spring-run Chinook Salmon, steelhead, and green sturgeon. Delta outflows and inflows are also needed throughout the year for the anadromous species listed above as well as various ESA listed pelagic species including long-fin smelt and Delta smelt. As discussed above, if the required Delta outflow objectives are met and the DCC gates are kept closed, the reservoirs will likely reach dead pool storage by spring, leaving little or no water in storage for later in the season for instream flows and Delta outflows needed for fish and wildlife and other instream uses. This would have serious detrimental impacts to fish and wildlife and other beneficial uses of water.

The proposed changes as conditioned by this Order balance the short-term and long-term habitat needs of fish and wildlife and other instream uses of water during the entirety of water year 2014. This Order requires the development of a Real-Time Drought Operations Management Team with designated representatives from DWR, Reclamation, the State Water Board, DFW, USFWS, and NMFS to coordinate operations consistent with this Order, and to protect fish and wildlife, other beneficial uses of water and public health and safety. The Real-Time Drought Operations Management Team will coordinate real time operations based on current conditions and fisheries information to ensure that the proposed changes pursuant to this Order do not unreasonable affect fish and wildlife and other instream uses of water. The State Water Board has ultimate authority regarding any changes.

While the TUCP does not request a specific Delta outflow level due to the uncertainty of channel depletions, to ensure that some minimal level of Delta outflow is provided to protect fish and wildlife and other instream uses of water without draining reservoir storage dramatically, the Order requires a minimum Delta outflow level of 3,000 cfs during February and also provides for a higher pulse flow to be scheduled to benefit fish species. The magnitude, timing, and duration of this pulse flow will be determined by the Real-Time Drought Operations Management Team. Further changes to Delta Outflows for the remainder of the season may be requested. At that time, State Water Board staff will evaluate current circumstances and information and determine what if any changes should be made to Delta Outflow requirements for the remainder of the year to reasonably protect fish and wildlife and other instream uses and meet the other requirements of the Water Code.

The Order limits SWP and CVP exports to SWP and CVP contractors to minimum health and safety levels to further conserve water in storage for future use to protect fish and wildlife and

other purposes. This export limitation is not intended to apply to transfers under non-Project water rights or between Project contractors. The Order requires DWR and Reclamation to refine their estimates of export needs for health and safety and provide such information to the State Water Board to inform decisions regarding changes to the allowable export limits.

This Order allows the DCC gates to be opened from February through May to reduce the need for upstream releases to maintain salinity conditions in the interior Delta. To ensure that gate opening avoids impacts to fish, decisions regarding operations of the gates are required to be made in consultation with the Real-Time Drought Operations Management Team based on real-time fisheries and hydrologic information.

To ensure that water conserved by the proposed change is available to use later in the season to reasonably protect fish and wildlife and other beneficial uses, the Order requires that DWR and Reclamation calculate and maintain a record of the amount of water conserved through the changes authorized by this Order. The Order requires that water conserved be maintained in storage to protect water needed for salmon and steelhead and other fish species, used to maintain water supplies, or used to improve water quality. The Order requires the use of the water to be coordinated through the Real-Time Drought Operations Management Team. To inform future decisions of the Real-Time Drought Operations Management Team and the State Water Board, the Order also requires DWR and Reclamation to develop monthly water balance estimates indicating actual and proposed operations through the end of the water year. In addition, the Order requires DWR and Reclamation to conduct necessary modeling and monitoring to inform real time operational decisions. The Order reserves the Executive Director's authority to require modifications to the Order to protect fish and wildlife or other uses of water based on additional information including the State Water Board workshop on February 18 and 19, 2014, concerning this Order and other drought issues.

Based on the above, the State Water Board concludes that the potential for impairment to instream beneficial uses from this temporary modification is not unreasonable considering the potential negative impacts to fish, wildlife and instream uses later in the year and the potential impacts to municipal and industrial water supply, instream beneficial uses, and recreation that could occur if the temporary change in not approved.

6.4 The Proposed Change is in the Public Interest

The proposed temporary change will help conserve stored water so that it can be released throughout 2014 to maintain instream flows for the benefit and protection of North of Delta, in-Delta, and South-of-Delta uses, including public trust uses. It is in the public interest to preserve these water supplies for these beneficial uses when hydrologic circumstances cause severe reductions to water supplies.

The changes, or temporary modifications, authorized in this Order will make the best use of a limited water supply in the near term. The temporary modifications contained in this Order are in the public interest because the changes will preserve water supplies to meet health and safety needs, and will increase the duration and likelihood of maintaining salinity control in the Delta later in year. As described in this Order, the retained water supply will be available later in the year for export flows adequate for maintaining health and safety and North-of-Delta and in-Delta environmental protection.

7.0 CONCLUSIONS

The State Water Board has adequate information in its files to make the evaluation required by Water Code section 1435.

I conclude that, based on the available evidence:

1. The permittee has an urgent need to make the proposed changes;

2. The petitioned changes, as conditioned by this Order, will not operate to the injury of any other lawful user of water;

3. The petitioned changes, as conditioned by this Order, will not have an unreasonable effect upon fish, wildlife, or other instream beneficial uses; and,

4. The petitioned changes, as conditioned by this Order, are in the public interest.

ORDER

NOW, THEREFORE, IT IS ORDERED that the petition for temporary urgency change in permit and license conditions under Permits 16478, 16479, 16481, 16482 and 16483 (Applications 5630, 14443, 14445A, 17512 and 17514A, respectively) of the Department of Water Resources (DWR) for the State Water Project (SWP) and License 1986 and Permits 11315, 11316, 11885, 11886, 11887, 11967, 11968, 11969, 11970, 11971, 11972, 11973, 12364, 12721, 12722, 12723, 12725, 12726, 12727, 12860, 15735, 16597, 20245, and 16600 (Applications 23, 234, 1465, 5638, 13370, 13371, 5628, 15374, 15375, 15376, 16767, 16768, 17374, 17376, 5626, 9363, 9364, 9366, 9367, 9368, 15764, 22316, 14858A, 14858B, and 19304, respectively) of the United States Bureau of Reclamation (Reclamation) for the Central Valley Project (CVP); is approved subject to the following terms and conditions. All other terms and conditions of the subject license and permits, including those added by the State Water Resources Control Board (State Water Board) in Revised Decision 1641 (D-1641) shall remain in effect. This Order shall be effective until July 30, 2014.

1. Except as otherwise provided in condition 2, below, ~~F~~for a period not to exceed 180 days or until such time as this Order is amended or rescinded based on changed circumstances, the requirements of D-1641 for DWR and Reclamation to meet specified water quality objectives are amended as follows:

    a. The minimum Delta Outflow levels specified in Table 3 are modified as follows: the minimum Net Delta Outflow Index (NDOI) described in Figure 3 of D-1641 during the month of February shall be no less than 3,000 cubic-feet per second (cfs). In addition to base Delta Outflows, pursuant to this Order, a higher pulse flow may also be required through the Real-Time Drought Operations Management Process described below.

    b. The maximum Export Limits included in Table 3 are modified as follows: the combined maximum SWP and CVP export rate for SWP and CVP contractors at the Harvey O. Banks and C.W. “Bill” Jones pumping plants shall be no greater than the minimum pumping levels required for health and safety purposes and

shall be no greater than 1,500 cfs on a 3-day running average. Deliveries to SWP and CVP export contractors from the SWP and CVP shall also be limited to health and safety needs. These limitations do not apply to water transfers under non-SWP or CVP water rights or between SWP and CVP contractors. DWR and Reclamation shall refine what export amounts and deliveries are required to maintain health and safety and shall provide documentation to the State Water Board to support that determination by February 14. Based on additional information or changed circumstances, the export limits imposed pursuant to this Order may be modified through the Real-Time Drought Operations Management Process described below.

c. The Delta Cross Channel (DCC) Gate Closure requirements included in Table 3 are modified as follows: the DCC gates may be opened from February 1 through May 20 as necessary to preserve limited storage in upstream reservoirs and reduce infiltration of high salinity water into the Delta while reducing impacts on migrating Chinook salmon. Requirements for closure of the DCC gates during March through May 20 shall be determined through the Real-Time Drought Operations Management Process described below.

2. <u>During the effective period of this Order, if precipitation events occur that enable DWR and Reclamation to comply with the Delta Outflow and DCC Gate Closure requirements contained in Table 3 of D-1641, then D-1641 requirements shall be operative, except that any SWP and CVP exports greater than 1500 cfs shall be limited to natural or abandoned flow, or transfers as specified in condition 1b.</u>

3. DWR and Reclamation shall convene a Real-Time Drought Operations Management Team with designated representatives from DWR, Reclamation, the State Water Board, Department of Fish and Wildlife, National Marine Fisheries Service and U.S. Fish and Wildlife Service (fisheries agencies). The Real-Time Drought Operations Management Team shall be convened to discuss potential changes to SWP and CVP operations to meet health and safety requirements and to reasonably protect all beneficial uses of water. The team shall meet on a regular basis, and no less than weekly, to discuss current conditions and may be combined with the existing Water Operations Management Team as appropriate. The State Water Board representative shall be designated by the Executive Director of the State Water Board and shall be authorized to make real-time operational decisions to modify requirements to meet pulse flows associated with the modification to the Delta Outflow objective described above, Export Limits, DCC gate closures, and the associated requirements of this Order. If the State Water Board approves any additional temporary urgency changes pursuant to the temporary urgency change petition that is the subject of this Order, or otherwise modifies this Order, the State Water Board will provide notice and an opportunity for interested persons to comment or object. Based on public comments or objections, further changes may be made to this Order. Information concerning changes to this Order will be posted on the State Water Board's website within 24 hours.

4. DWR and Reclamation shall calculate and maintain a record of the amount of water conserved through the changes authorized by this Order. The water conserved shall be maintained in storage to protect flows for fisheries, used to maintain water supplies, or used to improve water quality. The use of such water shall be determined through the Real-Time Drought Operations Management Team Process described above.

5. DWR and Reclamation shall develop monthly water balance estimates indicating actual and proposed operations through the end of the water year. Specifically, actual and projected inflows, north of Delta contract deliveries, other channel depletions, exports, and Delta outflows shall be identified. The water balance shall be posted on DWR's website and updated as necessary based on changed conditions.
6. DWR and Reclamation shall conduct necessary modeling and monitoring to inform real time operational decisions. Required modeling and monitoring shall be determined through the Real-Time Drought Operations Management Team Process or as may be required pursuant to any modification to this Order.

7. This Order may be further modified by the Executive Director based on additional public input or changed circumstances. Specifically, the State Water Board will hold a workshop on February 18 and 19, 2014, to receive public comment on what if any modifications should be made to this Order to ensure that the changes approved by this Order will not injure any lawful user of water, will not unreasonably affect fish and wildlife, and will be in the public interest.

8. This Order does not authorize any act that results in the taking of a candidate, threatened or endangered species, or any act that is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code sections 2050 to 2097) or the federal Endangered Species Act (16 U.S.C.A. sections 1531 to 1544). If a "take" will result from any act authorized under this Order, the Petitioners shall obtain authorization for an incidental take permit prior to construction or operation of the project. Petitioners shall be responsible for meeting all requirements of the applicable Endangered Species Act for the temporary urgency change authorized under this Order.

9. Petitioners shall immediately notify the Executive Director of the State Water Board if any significant change in conditions occurs that warrants reconsideration of this Order.

STATE WATER RESOURCES CONTROL BOARD

ORIGINAL SIGNED BY:

Thomas Howard
Executive Director

Dated: 2/7/2014

United States Department of the Interior

BUREAU OF RECLAMATION
Central Valley Operations Office
3310 El Camino Avenue, Suite 300
Sacramento, California 95821

IN REPLY
REFER TO:

CVO-400
WTR 1.10

FEB 20 2014

Ms. Maria Rea
Assistant Regional Administrator
California Central Valley Area Office
National Marine Fisheries Service
650 Capitol Mall, Suite 5-100
Sacramento, CA 95814

Subject: Transmittal of February 2014 Central Valley Project (CVP) Reservoir Operations Forecasts per 2009 National Marine Fisheries Service (NMFS) Biological Opinion

Dear Ms. Rea:

The 2009 NMFS Biological Opinion Reasonable and Prudent Alternative (RPA) Action I.2.3 requires Reclamation to submit a series of forecasts of CVP operations and corresponding Sacramento River temperature modeling runs to NMFS for review and concurrence. The RPA also includes a number of actions for Reclamation to implement to improve the Sacramento River water temperatures. Due to the unprecedented drought conditions being experienced in California, the forecasts of operations, temperature modeling, and actions are not completely developed at this time. However, for your information, Reclamation has developed preliminary operational analyses based on a range of operations under the 90% and the 50% exceedence hydrology and the corresponding preliminary Sacramento River temperature modeling runs.

Since the September carryover storage under the 90% exceedence hydrology is projected to be well under 1.9 million acre-feet (maf) and the Clear Creek temperature compliance point does not appear to be achievable, RPA Action I.2.3.c requires the development of a contingency plan. Reclamation is developing the interim contingency plan with the cooperation of NMFS, the Department of Water Resources (DWR), the U.S. Fish and Wildlife Service (FWS), the California Department of Fish and Wildlife (DFW), and the State Water Resources Control Board (SWRCB) to submit to NMFS by March 1. A final contingency plan is scheduled to be completed by April 1. This final contingency plan will seek to balance fishery needs and the water resource needs in this water short year and will address the actions required under RPA I.2.3.c. The contingency plan will reference the Temporary Urgency Change Petition submitted by Reclamation and DWR to the SWRCB on January 29, 2014, and the SWRCB Order approving the petition dated January 31, 2014, as well as the SWRCB modifications dated February 7, 2014.

Reclamation was not able to finalize a 90% exceedence operational analysis due to the challenges presented by the extreme hydrology. Under the 90% hydrology, it may not be possible to meet all operational objectives upstream and in the Delta. The reservoir storages may fall to near minimum power pools with elevated river temperatures, or the Net Delta Outflow Index may fall short of the water quality control plan objectives. Until a reasonable plan can be determined, we are showing the reservoir storages and releases as a range of potential values. The operations will be reviewed and refined further during the development of the final contingency plan.

Preliminary Sacramento River temperature model results for a 90% exceedence hydrology scenario with higher reservoir storages and a 50% exceedence hydrology are attached. We have less confidence in these temperature modeling results than normal due to the extremely dry hydrology and the near empty reservoir storage conditions. But the results for the 90% exceedence suggest that a temperature target location at Clear Creek is only possible through July. By August, the Temperature Control Device (TCD) intake level would be through the side gates. Shasta Dam release temperature would be expected to exceed 56° F by mid-August, nearing 62° F by mid-September. Temperatures will vary depending on the actual 90% exceedence scenario selected.

The 50% exceedence hydrology suggests that a temperature target location at Clear Creek is possible through mid-September. By September, the TCD intake would be through the side gates. Shasta Dam release temperature would be expected to exceed 56° F by early October.

Both the 90% exceedence hydrology and the 50% exceedence hydrology would be classified as a Critical year type under the Sacramento Valley Index. The forecasted inflow to Shasta Lake is 1.98 maf under the 90% exceedence forecast and 2.57 maf under the 50% exceedence forecast. Both exceedence inflows trigger the shortage criteria to water rights settlement contractors, water rights exchange contractors, and wildlife refuges.

Under these conditions, Reclamation proposes to announce the following water supply allocations to our agricultural contractors and refuges under the 90% hydrology:

- 0 % to North of Delta agricultural water service contractors
- 40% to 75% to North of Delta refuges
- 40% to 75% to Water Rights Settlement Contractors
- 40% to 75% to Water Rights Exchange Contractors
- 0% to South of Delta agricultural contractors
- 40% to 70% to South of Delta refuges

Reclamation informed the water rights settlement contractors, water rights exchange contractors, and refuges that they will initially receive a 40% water supply because of the limited water supply. Reclamation has contractual obligations to deliver 75% water supply under a Critical Year classification to these contractors and will work towards that percent if the hydrology and conditions improve.

With the understanding that Reclamation, in coordination with NMFS, FWS, DWR, DFW, and SWRCB will continue to develop a final contingency plan and submit that plan to NMFS by April 1, and will continue to refine the operations forecasts, Reclamation requests your concurrence regarding compliance with the NMFS Biological Opinion related to the water supply allocation.

If you have any questions, please contact Ms. Elizabeth Kiteck at 916-979-2684.

Sincerely,

Paul Fujitani
Acting Operations Manager

Enclosures

cc: Sue Fry
Bay-Delta Office
Bureau of Reclamation
801 I Street, Suite 140
Sacramento, CA 95814

February Operations Analysis
50% Exceedence Hydrology

	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Reservoir Storage (TAF)								
Trinity	1187	1257	1302	1178	993	818	636	457
Shasta	1795	1942	1993	1995	1770	1462	1221	1155
Foisom	290	405	419	454	367	326	285	281
New Melor	1055	1054	994	891	774	656	539	452
Reservoir Release (cfs)								
Lewistion	300	300	600	1498	782	450	450	450
Keswick	3500	3250	5000	6250	9250	9923	8723	6000
Nimbus	500	500	1630	686	2149	1232	1250	500
Goodwin	214	245	480	410	536	364	368	240
Exports (TAF)								
Jones PP	125	100	45	46	45	70	115	235

February Operations Analysis
90% Exceedence Hydrology

	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Reservoir Storage (TAF)								
Trinity	1148	1150	1111	963	795	639	484	334
Shasta	1678	1703	1566 to 1625	1326 to 1462	948 to 1244	442 to 928	194 to 707	150 to 690
Foisom	290	310	312 to 315	316 to 321	273 to 302	210 to 273	174 to 254	127 to 235
New Melones	1051	1026	962	876	782	875	569	491
Reservoir Release (cfs)								
Lewistion	300	300	600	1498	782	450	450	450
Keswick	3250	3250	5900 to 4900	7850 to 6600	10600 to 7900	12000 to 8889	7595 to 7095	4501 to 4000
Nimbus	500	500	500	534 to 500	908 to 500	1054 to 500	798 to 500	973 to 500
Goodwin	214	268	480	410	561	396	352	240
Exports (TAF)								
Jones PP	55	45	45	46	45	45	63 to 45	153 to 45

February 19, 2014

Upper Sacramento River – February 2014 Preliminary Temperature Analysis

Summary of Temperature Target Results by Month

Initial Target Location	JUN	JUL	AUG	SEP	OCT
90%-Exceedance Outlook (Figure 1)					
Sac. R. above Clear Creek (CCR)	**CCR**	**CCR**	**Keswick** ~ 56˚F to 62˚F		
50%-Exceedance Outlook (Figure 2)					
Sac. R. above Clear Creek (CCR)	**CCR**	**CCR**	**CCR**	**Keswick** ~ 56˚F to 57˚F	

Temperature Model Inputs, Assumptions, Limitations and Uncertainty:

1. Operation is based on the February 2014 Operation Outlooks (monthly flows, reservoir release, and end-of-month reservoir storage) for the 90% and 50% exceedances.
2. The profiles used for Shasta, Trinity and Whiskeytown were taken on February 5, February 17 (2010), and February 11, respectively.
3. Guidance on forecasted flows from the creeks (e.g., Cow, Cottonwood, Battle, etc.) between Keswick Dam and Bend Bridge is not available beyond 5 days. Model input side flows (Cottonwood Cr & Bend Bridge local flow w/o Cottonwood Cr) were selected from the historical record, and are consistent with the forecast exceedance frequency. During spring, the relatively warm creek flows can be a significant percentage of the flows at Bend Bridge.
4. Although mean daily flows and releases are temperature model inputs, they are based on the mean monthly values from the operation outlooks. Mean daily flow patterns are user defined.
5. Cottonwood Creek flows, Keswick to Bend Bridge local flows, and diversions are mean daily synthesized flows based on the available historical record for a 1922-2002 study period.
6. Meteorological inputs were derived from a database of 86 years of meteorological data (1920-2005). The meteorological inputs in the model represent "Average" meteorological conditions.
7. Meteorology, as well as flow volume and pattern, significantly influences reservoir inflow temperatures and downstream tributary temperatures; and consequently, the development of the cold-water pool during winter and early spring.

Temperature Analysis Results:

Note that for all exceedances, Lake Shasta storage is too low to utilize the upper gates of the TCD. This TCD limitation, along with the relatively small cold-water pool volume, significantly impacts temperature management.

90%-Exceedance:
A temperature target location at Clear Creek is possible through July (Figure 1). By August, the TCD intake level will be through the side gates. Shasta Dam release temperature is expected to exceed 56˚F by mid-August, nearing 62˚F by mid-September.

50%-Exceedance:
A temperature target location at Clear Creek is possible through mid-September (Figure 2). By September, the TCD intake will be through the side gates. Shasta Dam release temperature is expected to exceed 56˚F by early October.

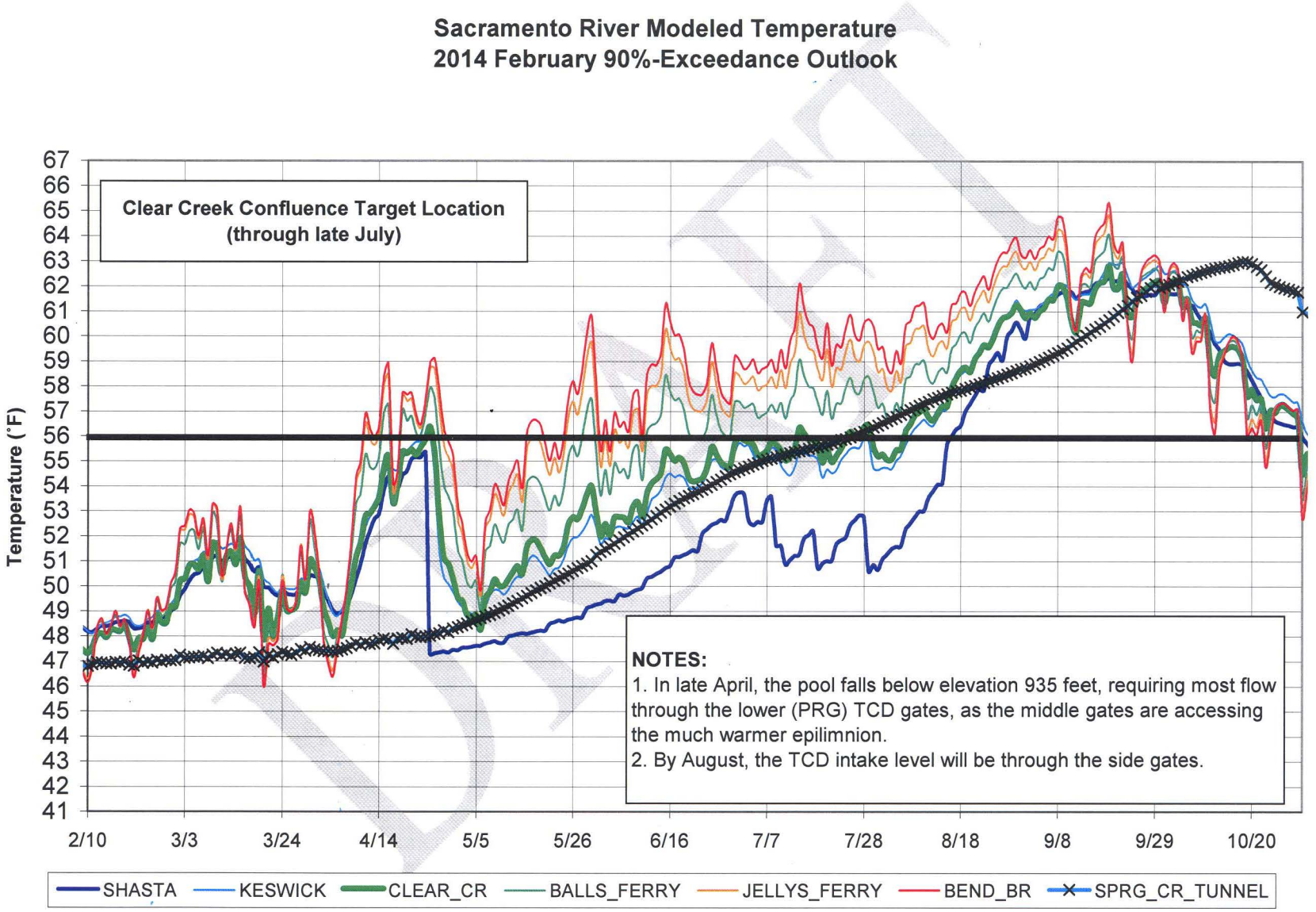
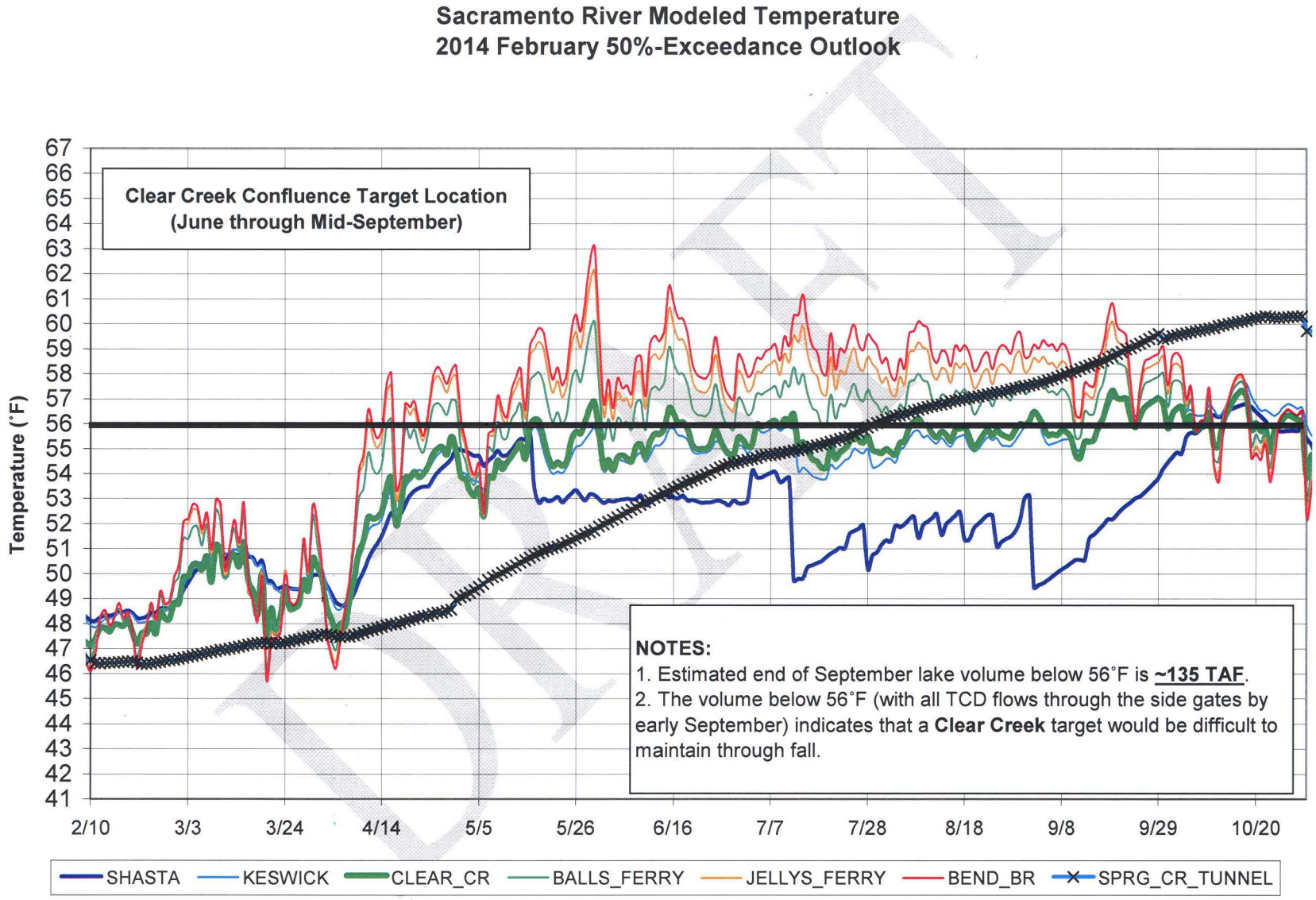

Sacramento River Modeled Temperature
2014 February 90%-Exceedance Outlook
Clear Creek Confluence Target Location
(through late July)
Temperature (°F)
67
66
65
64
63
62
61
60
59
58
57
56
55
54
53
52
51
50
49
48
47
46
45
44
43
42
41
2/10
3/3
3/24
4/14
5/5
5/26
6/16
7/7
7/28
8/18
9/8
9/29
10/20
NOTES:
1. In late April, the pool falls below elevation 935 feet, requiring most flow through the lower (PRG) TCD gates, as the middle gates are accessing the much warmer epilimnion.
2. By August, the TCD intake level will be through the side gates.
SHASTA
KESWICK
CLEAR_CR
BALLS_FERRY
JELLYS_FERRY
BEND_BR
SPRG_CR_TUNNEL

Figure 1


Sacramento River Modeled Temperature
2014 February 50%-Exceedance Outlook
Clear Creek Confluence Target Location
(June through Mid-September)
Temperature (°F)
67
66
65
64
63
62
61
60
59
58
57
56
55
54
53
52
51
50
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48
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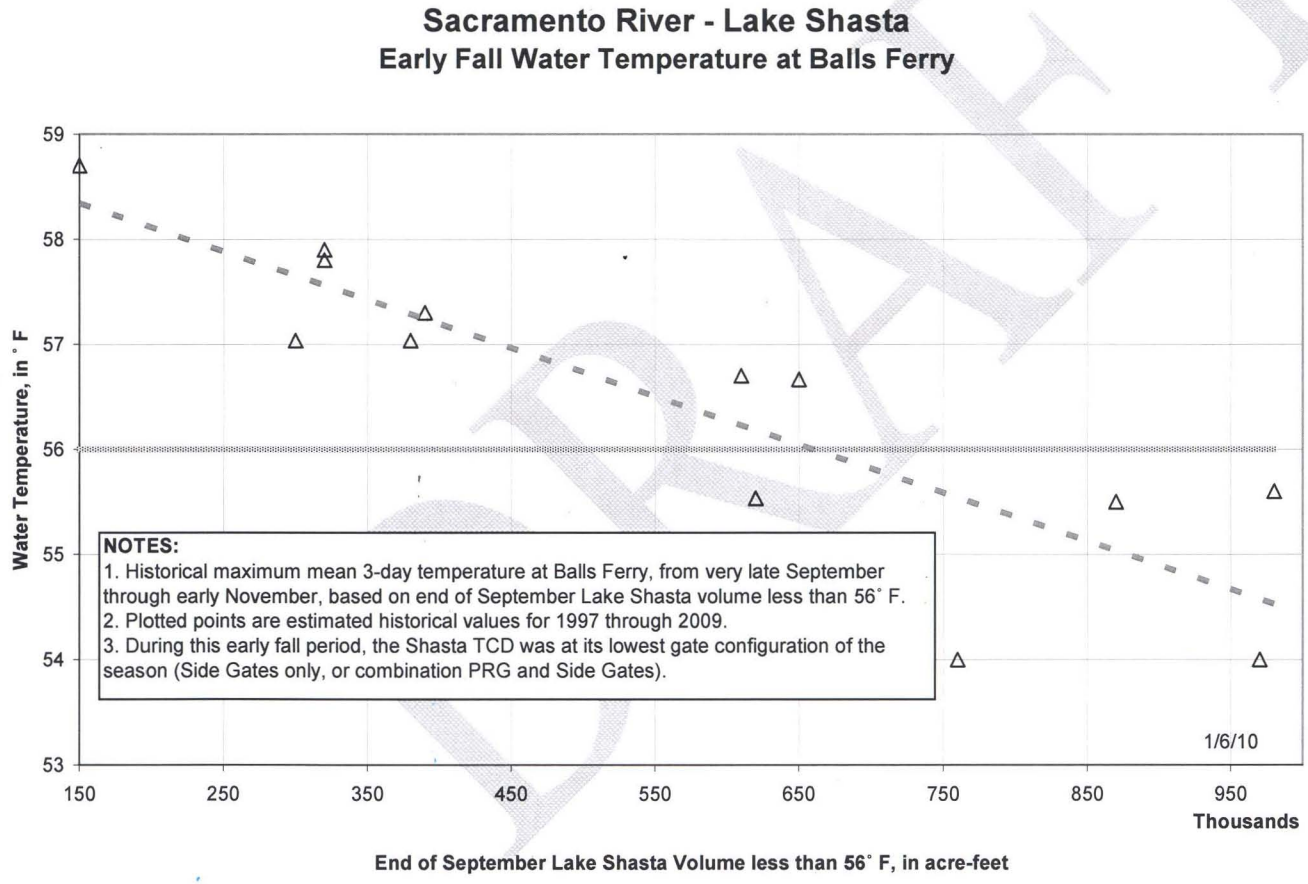
41
2/10
3/3
3/24
4/14
5/5
5/26
6/16
7/7
7/28
8/18
9/8
9/29
10/20
NOTES:
1. Estimated end of September lake volume below 56°F is ~135 TAF.
2. The volume below 56°F (with all TCD flows through the side gates by early September) indicates that a Clear Creek target would be difficult to maintain through fall.
SHASTA
KESWICK
CLEAR_CR
BALLS_FERRY
JELLYS_FERRY
BEND_BR
SPRG_CR_TUNNEL

Figure 2

Model Performance and Fall Temperature Index:

1. Based on past analyses, the temperature model does not perform well from late September through fall. One factor is that the modeled release temperatures are cooler than has historically been achieved when all release is through the side gates (lowest gates), especially when there's a large temperature gradient between the pressure relief gates (PRG) and the side gates.
2. Based on historical records, the end-of-September Lake Shasta volume below 56°F is a reasonable indicator of fall water temperature in the river reach to Balls Ferry.
3. For river temperatures not to exceed 56 °F downstream to Balls Ferry, the end-of-September lake volume less than 56°F should be greater than about 650 TAF, see figure below:



Status of Species

The status of species during the fall and early winter of water year 2014 was described in supplemental information attached to the February Temporary Urgency Change (TUC) Petition's Endangered Species Act compliance materials (Reclamation 2014). Changes to the status of the species during February are updated to identify potential exposure during March in the Sacramento River and Delta experienced by the species under an extension of the TUC Petition's actions.

Winter-run Chinook salmon

In February 2014, juvenile Winter-run Chinook salmon continued to emigrate past Red Bluff Diversion Dam and into the Delta. A pulse of Winter-run Chinook parr and smolts started passing Red Bluff Diversion Dam with large flow increases starting on February 9 (Figure 1-3).On February 10, 2014, Livingston Stone National Fish Hatchery released 193,224 hatchery produced Winter-run Chinook salmon into the upper Sacramento River near Redding (Caldwell Park). These fish will be co-occurring with naturally produced Winter-run emigrating downstream towards the Delta over the next several weeks. Of the estimated 4.3 million juvenile Winter-run Chinook expected to migrate past RBDD (based on the 2013 spawner escapement and JPE survival values), between 1.1 and 2.3 million fish have migrated past RBDD by February 11, 2014 (United States Fish and Wildlife Service (USFWS), Red Bluff, biweekly data). Based on these current estimates of passage and juvenile abundance, there is a reasonable likelihood that a smaller proportion of the Winter-run Chinook population remains above RBDD than as of January 31. On recent weekly DOSS calls, the topic of the position of Winter-run Chinook salmon has been discussed. There has been agreement that at least 50% of the 2013 brood-year juvenile population of Winter-run Chinook have entered the Delta.

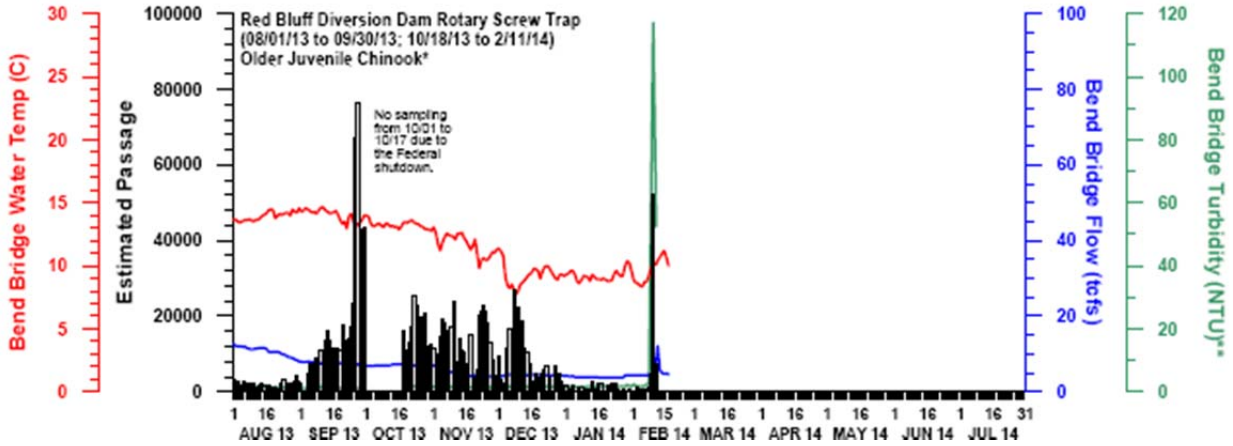


Figure 1. Red Bluff Diversion Dam Passage of Juvenile Older Chinook Salmon and Associated Environmental Data. [1]

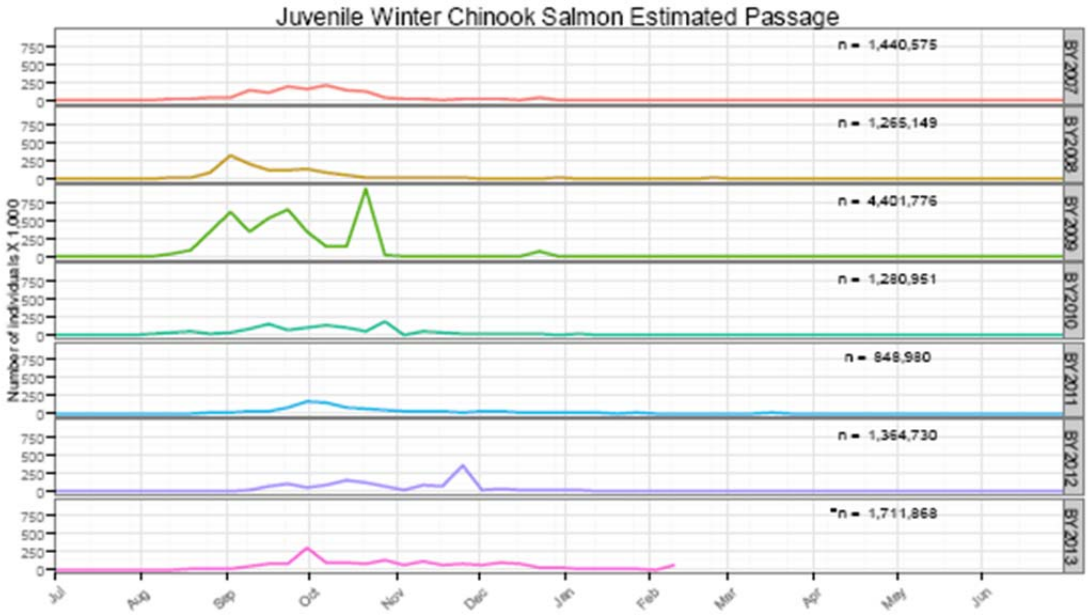


Figure 2. Weekly Estimated Passage of Juvenile Winter-run Chinook Salmon at Red Bluff Diversion Dam (RK 391) by Brood-Year (BY). [2]

Winter-run Chinook juveniles have been passing the location of the monitoring station at the Glen-Colusa Irrigation District (GCID) intake canal in the middle section of the Sacramento

[1] Figure supplied by DWR to DOSS on February 19, 2014.

[2] Fish were sampled using rotary-screw traps for the period July 1, 2007 to present. Winter-run passage value interpolated using a monthly mean for the period of October 1 through October 17, 2013, due to government shutdown. Figure supplied by USFWS on February 12 , 2014.

River since October 2013 (Figure 4). From February 1 through February 17, 3 Winter-run Chinook salmon smolts and 19 Winter-run juveniles had been observed in GCID fish monitoring. Due to high flows and heavy debris during February's storm, no sampling occurred from February 11 through 15, which was the period when the largest portion of the recent migration pulse were suspected to have passed. The continuing decline in the recovery trend of outmigrating Winter-run Chinook past GCID's screw traps in February may suggest that a majority of Winter-run Chinook, which emigrated past RBDD earlier in the fall and winter as fry and parr, have also moved downstream of GCID. Typically, fry and parr that cannot sustain territories in river flows outmigrate past Knights Landing and into the Lower Sacramento River when late fall/early winter Sacramento Valley rainstorms increase flows to greater than 7,500 cfs at Wilkins Slough. Flows associated with the most recent storm exceeded this level and subsequently exceeded the 14,125 cfs, which exceeded flow volumes identified to initiate juvenile Winter-run migration past Knights Landing (Del Rosario et al 2013; Figure 5). In February, more juvenile Winter-run Chinook have been observed at the monitoring stations at Tisdale Weir, on the Middle Sacramento River, and Knights Landing, in the Lower Sacramento River, than in the prior four months of water year 2014 (Table 1). During the February migration pulses past these locations, a distinctly larger juvenile size class (fork-length usually >100 mm) of Winter-run Chinook were observed compared to earlier recoveries of Winter-run Chinook (fork-length usually <80 mm) in the Sacramento River.

Juvenile Winter-run Chinook salmon have been observed in the lower Sacramento River and Delta beach seine and trawl fish monitoring surveys; most of the cumulative catch reported in Table 2 for WY 2014 occurred in February 2014. Juvenile winter-run Chinook salmon still have not been observed at the state and federal fish collection facilities at the South Delta CVP and SWP export pumps. On recent weekly DOSS calls, the topic of the proportion of the population of Winter-run Chinook salmon that has entered the lower Sacramento River or Delta has been discussed. There has been agreement that greater than 50% of the juvenile winter run Chinook salmon have passed Knights Landing and entered the Delta region. One juvenile Winter-run Chinook salmon have been observed in the Chipps Island trawl, which is considered the exit point for the Delta.

During March, adult Winter-run Chinook salmon will continue entering the Sacramento River and migrating to the upper reaches of the Sacramento River in preparation for spawning during the summer of 2014.

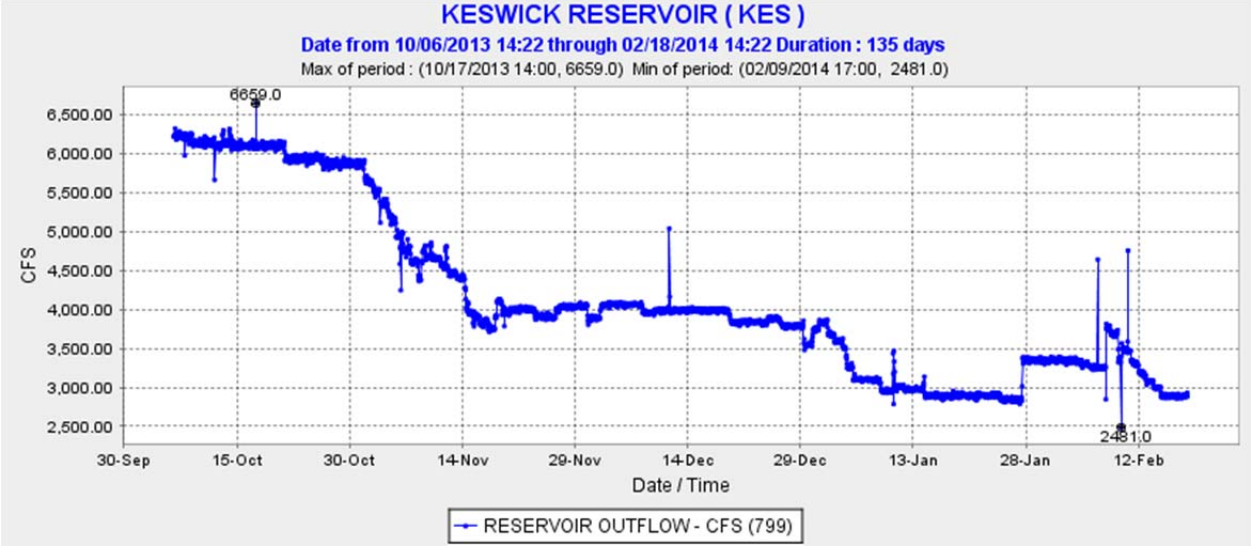


Figure 3. Keswick Reservoir Outflow for WY 2014.[3]

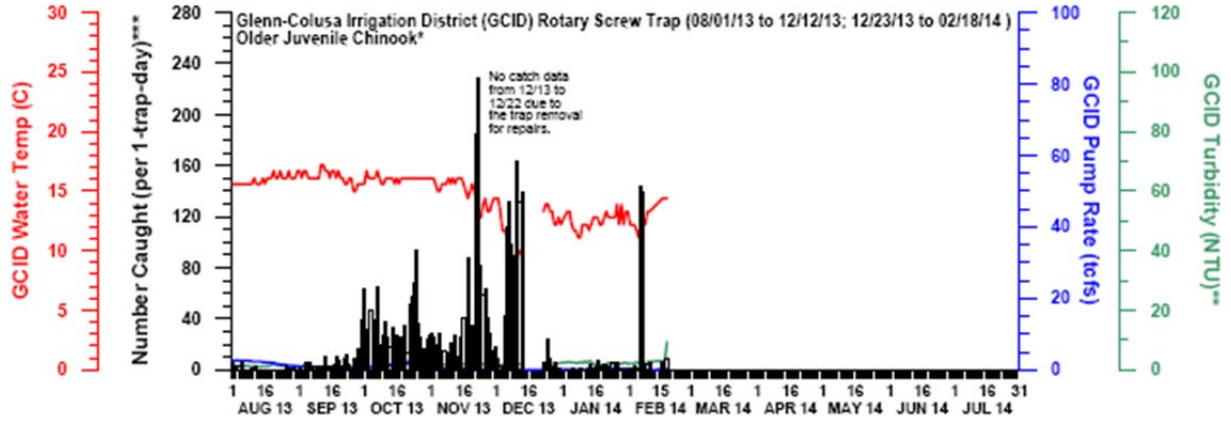


Figure 4. Glen-Colusa Irrigation District Rotary Screw Trap older juvenile Chinook salmon catch data and associated environmental data.[4]

[3] Downloaded from CDEC on February 18, 2014.

[4] Figure supplied by DWR to DOSS on February 19, 2014.

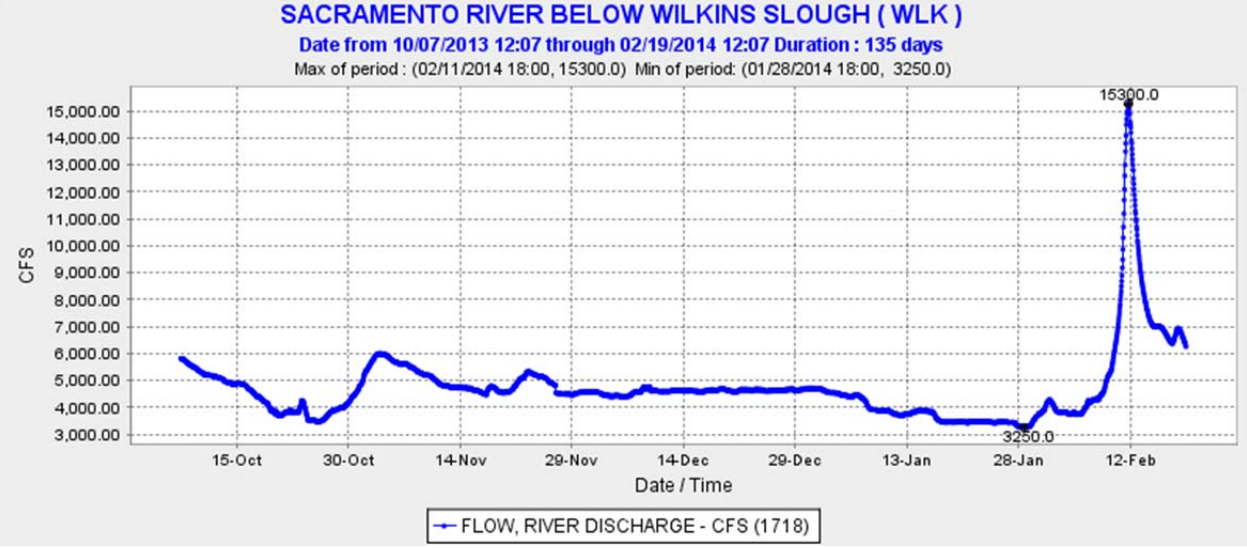


Figure 5. Sacramento River discharge (cubic feet per second) measured at Wilkins Slough during water year 2014.[5]

[5] Downloaded from CDEC on February 18, 2014

Table 1. Fish Observation Data from Tisdale and Knights Landing Rotary Screw Traps in WY 2014.[6]

Location	Gear	Start Date	Stop Date	Num. of Hours During Sampling Period	Flow cfs (@ WLK)	Cone RPM (8.3)	Cone RPM (8.4)	Total Cone Rev. (8.3)	Total Cone Rev. (8.4)	Total Hrs. Fished	Water T (F)	Secchi (ft)	Turbidity (FTU)	Unmarked Chinook CATCH	Min FL	Max FL	# Fall	# Spring	# Winter	# Late fall	# Ad-clip CS	# Ad-clip SH	# Unclip SH	Fall+Spring CPUE (catch per hour)	Winter+Late fall CPUE (catch per hour)	Unclip SH CPUE (catch per hour)
TIS	2 x 8' Cone	9/30/2013	10/1/2013	25.00	6,405	2.5	2.6	2,926	4,106	46.14	62	NA	4.5	1	34	34	0	0	1	0	0	0	0	0.000	0.022	0.000
TIS	2 x 8' Cone	10/2/2013	10/3/2013	23.50	5,987	2.6	2.6	3,323	3,816	46.06	61	NA	4.6	1	38	38	0	0	1	0	0	0	0	0.000	0.022	0.000
KL	2 x 8' Cone	10/4/2013	10/5/2013	21.00	5902	1.9	2.0	2488	2696	44.9	61	5.6	1.5	2	36	39	0	0	2	0	0	0	0	0.000	0.045	0.000
KL	2 x 8' Cone	10/4/2013	10/5/2013	21.00	5902	1.9	2.0	2488	2696	44.9	61	5.6	1.5	2	36	39	0	0	2	0	0	0	0	0.000	0.045	0.000
KL	2 x 8' Cone	10/8/2013	10/10/2013	44.00	5640	1.7	1.7	5099	5521	104.1	60	5.9	1.1	1	38	38	0	0	1	0	0	0	0	0.000	0.010	0.000
TIS	2 x 8' Cone	10/9/2013	10/10/2013	21.75	5,458	1.7	2.2	2,198	3,080	44.76	57	NA	5.5	1	37	37	0	0	1	0	0	0	0	0.000	0.022	0.000
KL	2 x 8' Cone	10/10/2013	10/11/2013	23.75	5269	1.9	1.8	2596	2842	49.7	60	6.0	2.8	1	41	41	0	0	1	0	0	0	0	0.000	0.020	0.000
TIS	2 x 8' Cone	10/22/2013	10/23/2013	23.50	3,845	0.0	1.9	0	1,014	9.09	59	NA	11.4	1	36	36	0	0	1	0	0	0	0	0.000	0.110	0.000
TIS	2 x 8' Cone	10/23/2013	10/24/2013	22.00	4,008	1.1	2.1	1,784	3,032	51.09	58	NA	6.7	1	39	39	0	0	1	0	0	0	0	0.000	0.020	0.000
KL	2 x 8' Cone	11/8/2013	11/8/2013	7.25	5310	1.3	1.6	590	759	15.7	57	3.9	3.9	1	38	38	0	1	0	0	0	0	0	0.064	0.000	0.000
TIS	2 x 8' Cone	11/10/2013	11/11/2013	16.25	5,057	1.3	2.1	829	1,214	20.13	54	NA	5.9	1	35	35	0	1	0	0	0	0	0	0.050	0.000	0.000
TIS	2 x 8' Cone	12/16/2013	12/16/2013	8.75	4,586	1.0	1.8	497	945	17.03	45	NA	8.0	1	79	79	0	0	1	0	0	0	0	0.000	0.059	0.000
TIS	2 x 8' Cone	12/21/2013	12/21/2013	8.25	4,633	1.3	1.7	493	878	14.93	45	NA	7.1	1	75	75	0	0	1	0	0	0	0	0.000	0.067	0.000
TIS	2 x 8' Cone	12/23/2013	12/24/2013	15.00	4,650	1.2	1.7	818	1,623	28.05	46	NA	8.9	1	94	94	0	0	1	0	0	0	0	0.000	0.036	0.000
TIS	2 x 8' Cone	12/30/2013	12/31/2013	15.25	4,689	1.2	2.0	886	1,597	25.61	45	NA	5.6	1	34	34	1	0	0	0	0	0	0	0.039	0.000	0.000
TIS	2 x 8' Cone	1/3/2014	1/4/2014	15.00	4,536	0.8	1.8	720	1,540	29.42	46	NA	8.6	1	37	37	1	0	0	0	0	0	0	0.034	0.000	0.000
TIS	2 x 8' Cone	1/4/2014	1/4/2014	8.25	4,458	1.3	1.8	625	936	16.68	46	NA	6.3	1	39	39	1	0	0	0	0	0	0	0.060	0.000	0.000
TIS	2 x 8' Cone	1/4/2014	1/5/2014	15.25	4,458	1.3	1.9	1,060	1,619	27.79	46	NA	7.8	1	39	39	1	0	0	0	0	0	0	0.036	0.000	0.000
TIS	2 x 8' Cone	1/5/2014	1/6/2014	15.50	4,416	0.9	1.6	914	1,457	33.18	48	NA	7.2	3	35	37	3	0	0	0	0	0	0	0.090	0.000	0.000
TIS	2 x 8' Cone	1/6/2014	1/6/2014	8.50	4,425	0.9	1.8	513	834	17.40	46	NA	NA	1	38	38	1	0	0	0	0	0	0	0.057	0.000	0.000
TIS	2 x 8' Cone	1/8/2014	1/8/2014	8.50	3,917	0.3	1.2	287	760	24.96	46	NA	6.1	1	33	33	1	0	0	0	0	0	0	0.040	0.000	0.000
TIS	2 x 8' Cone	1/8/2014	1/9/2014	14.75	3,917	0.7	1.4	311	1,106	21.05	43	NA	7.7	2	40	40	2	0	0	0	0	0	0	0.095	0.000	0.000
KL	2 x 8' Cone	1/10/2014	1/11/2014	13.75	3757	1.1	1.1	972	857	27.7	48	6.2	2.9	1	39	39	1	0	0	0	0	0	0	0.036	0.000	0.000
TIS	2 x 8' Cone	1/12/2014	1/13/2014	15.00	3,730	0.8	1.6	885	1,632	34.46	47	NA	6.0	3	36	41	3	0	0	0	0	0	0	0.087	0.000	0.000
KL	2 x 8' Cone	1/13/2014	1/14/2014	14.75	3880	1.3	1.3	1094	1053	27.5	49	6.0	2.4	1	37	37	1	0	0	0	0	0	0	0.036	0.000	0.000
TIS	2 x 8' Cone	1/13/2014	1/14/2014	14.75	3880	0.8	1.5	497	1,288	24.86	49	NA	10.9	1	38	38	1	0	0	0	0	0	0	0.040	0.000	0.000
TIS	2 x 8' Cone	1/14/2014	1/15/2014	15.00	3873	0.6	1.5	432	1,218	25.53	48	NA	7.4	2	38	39	2	0	0	0	0	0	0	0.078	0.000	0.000
KL	2 x 8' Cone	1/16/2014	1/17/2014	14.25	3520	1.2	1.0	1013	894	29.0	49	5.5	3.0	2	37	40	2	0	0	0	0	0	0	0.069	0.000	0.000
TIS	2 x 8' Cone	1/20/2014	1/21/2014	20.00	3476	2.8	2.2	2,728	2,823	37.63	48	NA	6.98	2	38	39	2	0	0	0	0	0	0	0.053	0.000	0.000
TIS	2 x 8' Cone	1/21/2014	1/22/2014	14.75	3492	2.5	2.4	2,230	1,953	28.78	47	NA	6.4	1	40	40	1	0	0	0	0	1	0	0.035	0.000	0.000
TIS	2 x 8' Cone	1/23/2014	1/24/2014	15.25	3483	2.6	2.1	2,348	2,002	30.86	48	NA	6.65	1	40	40	1	0	0	0	0	0	0	0.032	0.000	0.000
KL	2 x 8' Cone	1/24/2014	1/25/2014	14.00	3440	1.1	1.1	967	838	28.0	50	5.7	3.8	1	100	100	0	0	1	0	0	0	0	0.000	0.036	0.000
TIS	2 x 8' Cone	1/24/2014	1/25/2014	14.75	3450	2.5	2.0	2,167	1,818	29.58	48	NA	8.23	1	35	35	1	0	0	0	0	1		0.034	0.000	0.000
TIS	2 x 8' Cone	1/26/2014	1/27/2014	14.50	3395	2.2	1.8	1,935	1,786	31.20	48	NA	6.27	1	142	142	0	0	0	1	0	0	0	0.000	0.032	0.000
TIS	2 x 8' Cone	1/29/2014	1/29/2014	8.75	3353	2.2	2.1	1,234	1,163	18.45	50	NA	NA	1	102	102	0	0	1	0	0	0	0	0.000	0.054	0.000
TIS	2 x 8' Cone	2/2/2014	2/3/2014	14.75	3798	2.8	2.4	2,507	2,197	30.18	46	NA	9.5	1	88	88	0	0	1	0	0	0	0	0.000	0.033	0.000
KL	2 x 8' Cone	02/03/14	02/04/14	13.75	3810	1.5	1.0	1255	971	30.1	50	3.6	5.3	1	37	37	1	0	0	0	0	0	0	0.033	0.000	0.000
KL	2 x 8' Cone	02/08/14	02/09/14	13.25	5310	1.9	1.9	704	1514	19.5	51	2.3	11.4	0	0	0	0	0	0	0	0	0	0	0.000	0.000	0.000
KL	2 x 8' Cone	02/09/14	02/09/14	10.25	5940	1.9	1.7	1164	1456	24.5	52	1.2	22.7	0	0	0	0	0	0	0	0	0	0	0.000	0.000	0.000
TIS	2 x 8' Cone	2/9/2014	2/10/2014	16.00	5620	1.7	2.1	1,869	2,504	38.20	51	NA	15.5	216	34	100	215	0	1	0	0	0	0	5.629	0.026	0.000
KL	2 x 8' Cone	02/09/14	02/10/14	13.00	6960	1.6	1.8	1250	466	17.3	54	1.8	18.9	0	0	0	0	0	0	0	0	0	0	0.000	0.000	0.000
KL	2 x 8' Cone	02/10/14	02/10/14	11.00	8450	1.9	2.0	243	356	5.1	54	1.6	19.1	0	0	0	0	0	0	0	0	0	0	0.000	0.000	0.000
TIS	2 x 8' Cone	2/11/2014	2/11/2014	8.00	13838	2.0	3.7	772	650	9.36	52	NA	39.6	54	34	118	52	0	2	0	0	1	0	5.555	0.214	0.000
KL	2 x 8' Cone	02/10/14	02/11/14	10.50	13500	1.1	1.5	87	85	2.3	55	1.6	28.5	0	0	0	0	0	0	0	0	0	0	0.000	0.000	0.000
KL	2 x 8' Cone	02/11/14	02/11/14	8.50	15200	2.0	2.1	248	295	4.4	55	1.3	33.1	0	0	0	0	0	0	0	0	0	0	0.000	0.000	0.000
TIS	2 x 8' Cone	2/12/2014	2/12/2014	9.50	11000	1.9	2.8	1,390	1,920	23.62	52	NA	55.6	5,618	34	110	5,600	7	11	0	0	1	5	237.368	0.466	0.212
KL	2 x 8' Cone	02/12/14	02/12/14	9.00	11000	2.6	2.5	1172	1003	14.2	55	1.5	41.6	1133	33	140	1127	1	5	0	0	2	0	79.439	0.352	0.000
KL	2 x 8' Cone	02/12/14	02/12/14	9.00	11000	2.6	2.5	1055	1003	13.4	55	1.5	41.6	1133	33	140	1127	1	5	0	0	2	0	83.869	0.372	0.000
KL	2 x 8' Cone	02/13/14	02/13/14	9.50	8300	2.6	2.8	1297	1174	15.3	55	1.1	55.7	3153	34	118	3143	8	2	0	0	5	1	205.918	0.131	0.065
KL	2 x 8' Cone	02/13/14	02/13/14	9.50	8300	2.6	2.8	1297	1174	15.3	55	1.1	55.7	3153	34	118	3143	8	2	0	0	5	1	205.918	0.131	0.065
TIS	2 x 8' Cone	2/13/2014	2/13/2014	8.00	8300	1.4	2.3	650	2,123	23.12	52	NA	92.5	5,945	29	67	5937	8	0	0	0	1	1	257.113	0.000	0.000
KL	2 x 8' Cone	02/14/14	02/14/14	7.25	7260	2.5	2.4	1182	1062	15.3	51	0.7	66.7	9284	35	113	9260	11	13	0	0	5	0	607.735	0.852	0.000
TIS	2 x 8' Cone	2/13/2014	2/14/2014	15.50	8300	1.7	2.7	1,082	4,771	40.06	52	NA	38.0	7,767	33	62	7760	6	1	0	0	2	10	193.867	0.025	0.000
TIS	2 x 8' Cone	2/14/2014	2/14/2014	7.50	7260	1.4	2.5	391	2,283	20.22	54	NA	31.4	877	31	92	876	0	1	0	0	0	0	43.326	0.049	0.000
KL	2 x 8' Cone	02/15/14	02/15/14	9.75	6990	2.4	2.5	1325	1418	18.7	57	1.4	40.0	1465	33	57	1463	2	0	0	0	0	0	78.532	0.000	0.000
TIS	2 x 8' Cone	2/14/2014	2/15/2014	15.50	7260	1.4	2.5	1,835	5,110	55.20	52	NA	25.5	1,461	31	63	1459	2	0	0	0	0	1	26.467	0.000	0.000
TIS	2 x 8' Cone	2/15/2014	2/15/2014	7.00	6990	1.6	2.5	521	1,597	16.15	51	NA	24.9	348	27	54	348	0	0	0	0	0	0	21.552	0.000	0.000
KL	2 x 8' Cone	02/15/14	02/16/14	14.25	6970	2.5	2.7	2092	2333	28.6	56	2.2	31.2	3409	34	117	3405	3	1	0	0	1	0	119.025	0.035	0.000
KL	2 x 8' Cone	02/16/14	02/16/14	9.00	6750	2.6	2.7	1122	415	9.8	57	1.6	21.1	469	34	83	463	5	1	0	0	0	0	47.744	0.102	0.000
TIS	2 x 8' Cone	2/15/2014	2/16/2014	14.50	6970	1.5	2.8	1,654	4,404	44.73	55	NA	27.7	1,957	35	59	1956	0	1	0	0	0	1	43.729	0.022	0.000
TIS	2 x 8' Cone	2/16/2014	2/16/2014	7.00	6750	2.6	3.1	1,036	2,431	19.87	53	NA	20.2	183	34	57	182	1	0	0	0	0	0	9.208	0.000	0.000
KL	2 x 8' Cone	02/16/14	02/17/14	14.00	6500	2.4	2.7	2053	2331	28.6	55	1.7	24.6	2357	35	62	2352	5	0	0	0	0	0	82.281	0.000	0.000
KL	2 x 8' Cone	02/17/14	02/17/14	9.00	6400	2.5	2.6	1314	1472	18.4	56	1.4	22.2	301	35	77	300	0	1	0	0	0	0	16.327	0.054	0.000
TIS	2 x 8' Cone	2/16/2014	2/17/2014	15.50	6500	1.9	2.8	1,170	2,910	27.58	51	NA	19.1	2,053	34	76	2051	1	1	0	0	0	1	74.389	0.036	0.000
TIS	2 x 8' Cone	2/17/2014	2/17/2014	7.00	6400	1.9	2.9	869	2,062	19.47	54	NA	20.6	119	33	46	119	0	0	0	0	0	0	6.111	0.000	0.000
TIS	2 x 8' Cone	2/17/2014	2/18/2014	15.75	6400	2.6	2.7	2,302	3,107	33.94	56	NA	17.4	1,755	34	129	1753	0	2	0	0	0	0	51.657	0.059	0.000

[6] Data updated through February 17, 2014. Date provided by CDFW.

	Wild juveniles					Ad clipped		
Seine region	Fall	Late fall	Spring	Winter	Steelhead	Steelhead	Chinook	Region Total
Bay East								0
Bay West								0
Central Delta	18							18
Lower Sac	33		4	4		5	1	47
North Delta	8	1					1	10
Sacramento	537		36	36		35	2	646
South Delta								0
San Joaquin								0
Trawl								0
Chipps Island	0	4	0	1	1	12	11	29
Sacramento	732	0	40	40	5	230	32	1079
Species Total	1328	5	80	81	6	282	47	

Table 2. Lower Sacramento River and Delta beach seine recoveries of salmonids during WY 2014.[7]

[7] Data updated through February 15, 2014. Provided by USFWS Delta Juvenile Fish Monitoring Program.

Spring-run Chinook salmon

Similar to January, hundreds of spring-run Chinook salmon juveniles continue to be observed weekly in fish monitoring at Red Bluff Diversion Dam (Figure 6). Also in February, a pulse of juvenile spring-run Chinook was observed during the month's early storm event. From February 1 through February 17, 94 juvenile spring-run Chinook salmon were observed in the rotary screw trap sampling station at the GCID intake canal. This level of recovery is equal to the number of juvenile spring-run Chinook salmon observed at GCID over the previous four months of water year 2014. At the Tisdale Weir and Knights Landing fish monitoring stations, greater catches of spring-run Chinook salmon were observed during the February storm, than had been observed prior to the storm (Table 1). Similar to February, spring-run Chinook salmon from Butte Creek, and the Feather and Yuba rivers are outmigrating into the Delta during March. During February, spring-run Chinook salmon have been observed in the lower Sacramento and Delta beach seine and trawl fish monitoring surveys (Table 2), but not at the state and federal fish collection facilities at the South Delta CVP/SWP export pumps.

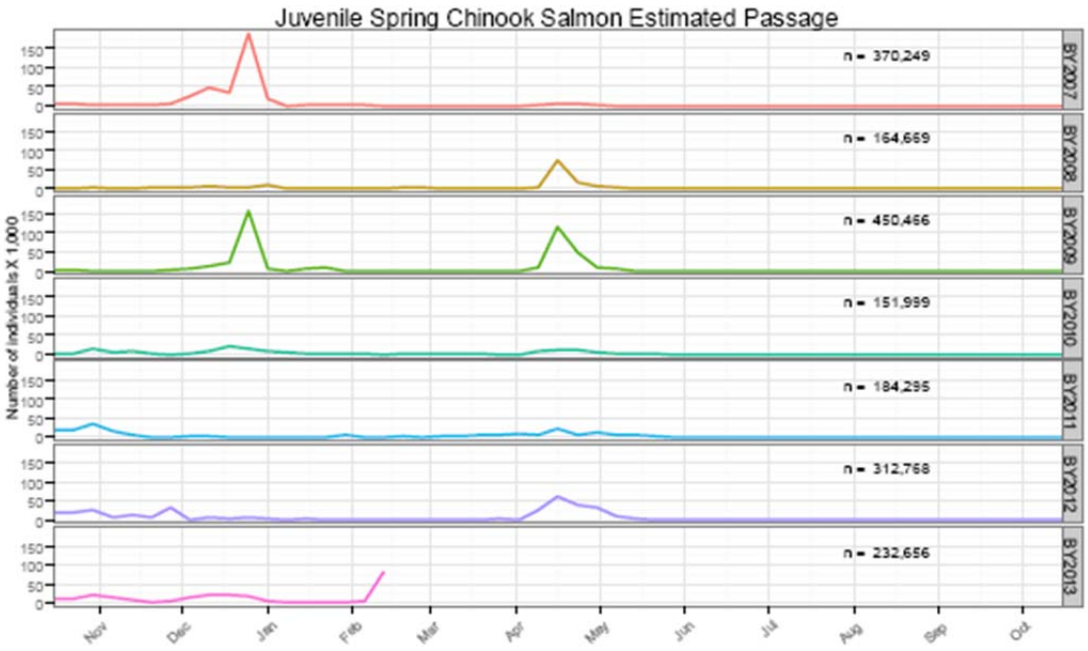


Figure 6. Weekly Estimated Passage of Juvenile Spring-Run Chinook Salmon at Red Bluff Diversion Dam (RK 391) by Brood-Year (BY).[8]

[8] Fish were sampled using rotary-screw traps for the period July 1, 2007 to present. Figure supplied by USFWS (February 12, 2014).

Steelhead

Steelhead smolts are seldom recovered in Sacramento River and Delta fish monitoring due to sampling biases related to their larger fish size and their enhanced swimming ability. Between February 1 and February 17, two wild steelhead were observed in GCID fish monitoring. In combination with the eight steelhead captured at GCID in October, one in December, and two in January; the total recovery of wild steelhead at GCID in WY 2014 is 13 individuals. At the Tisdale Weir and Knights Landing monitoring stations, no steelhead were observed prior to the February storm, but 32 hatchery and one wild steelhead smolts have been observed since then. Between 1998 and 2011, temporal observations of wild steelhead juveniles (n=2137) collected in these monitoring efforts in the Delta occurs less than 10% of the time in January, >30% of the time during February, >30% of the time during February, and >20% of the time during March. Prior to February, one steelhead was observed in the Sacramento Trawl (one 210mm fish on 01/31/14) and one steelhead was observed in the Chipps Island Trawl (one 300mm fish on 12/11/13). Since February 1, six wild steelhead (5 in Sacramento trawl, 1 in Chipps trawl) and 242 adipose-clipped steelhead (230 in Sacramento trawl, 12 in Chipps trawl) have been recovered. As of February 18, three clipped steelhead have been counted at the state and federal fish collection facilities at the South Delta CVP/SWP export pumps. As of February 17, no outmigrating steelhead have been observed in the Mossdale trawl this water year.

Green sturgeon

Information on green sturgeon is extremely limited and their recovery in monitoring is limited due to their low vulnerability to monitoring techniques. Adult green sturgeon are expected to start their 2014 spawning migration during March. On February 9, 1 juvenile green sturgeon (212mm TL) was recovered in Red Bluff Diversion Dam fish monitoring. As of February 17, no green sturgeon were observed in lower Sacramento and Delta fish monitoring surveys or at the state and federal fish collection facilities at the South Delta CVP/SWP export pumps. It is expected that brood year 2013 juvenile green sturgeon have migrated downstream from their natal spawning areas and are overwintering in the Lower Sacramento River and Delta (Israel and Klimley 2009).

Effects Analysis

February Forecasts

Current storage conditions in CVP/SWP reservoirs are extremely low. CVP/SWP operators and fishery agencies are attempting to conserve cold water in these reservoirs for listed species' summertime temperature and habitat requirements. The February 50% exceedance forecast for WY 2014 (Table 3) projects reservoir volumes throughout spring and summer operations below historic averages. End-of-September (EOS) storages, representing the storage at the end of the 2014 water year, are projected to be less than 1200 TAF. The February 90% exceedance forecast

projects EOS storage in Shasta Reservoir to be at a range between 194 and 707 TAF (Table 4). Neither the 50% nor 90% February forecasts project being able to meet summer temperature targets in the Sacramento River for the duration of Winter-run Chinook salmon egg incubation. This could lead to greater than 25%, and potentially 100%, egg mortality for brood year 2014 Winter-run Chinook below Keswick. There remains the possible likelihood that reservoir releases will be unable to control water temperature downstream of Keswick Reservoir during September and October. This may also lead to extremely high egg mortality or even complete brood year 2014 failure for spring-run Chinook below Keswick. Although current storage levels are tracking the close to the 50% forecasted end-of-February volumes at some CVP reservoirs, there remains a substantial difference between Shasta's current volume and the end-of February 90% forecast, suggesting considerable precipitation is necessary to attain these projected volumes prior to the March forecast.

Table 3. 50% Exceedance Forecast

February Operations Analysis
50% Exceedence Hydrology

	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Reservoir Storage (TAF)								
Trinity	1187	1257	1302	1178	993	818	636	457
Shasta	1795	1942	1993	1995	1770	1462	1221	1155
Foisom	290	405	419	454	367	326	285	281
New Melor	1055	1054	994	891	774	656	539	452
Reservoir Release (cfs)								
Lewistion	300	300	600	1498	782	450	450	450
Keswick	3500	3250	5000	6250	9250	9923	8723	6000
Nimbus	500	500	1630	686	2149	1232	1250	500
Goodwin	214	245	480	410	536	364	368	240
Exports (TAF)								
Jones PP	125	100	45	46	45	70	115	235

Table 4. 90% Exceedance Forecast.

February Operations Analysis
90% Exceedence Hydrology

	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Reservoir Storage (TAF)								
Trinity	1148	1150	1111	963	795	639	484	334
Shasta	1678	1703	1566 to 1625	1326 to 1462	948 to 1244	442 to 928	194 to 707	150 to 690
Foisom	290	310	312 to 315	316 to 321	273 to 302	210 to 273	174 to 254	127 to 235
New Melones	1051	1026	962	876	782	875	569	491
Reservoir Release (cfs)								
Lewistion	300	300	600	1498	782	450	450	450
Keswick	3250	3250	5900 to 4900	7850 to 6600	10600 to 7900	12000 to 8889	7595 to 7095	4501 to 4000
Nimbus	500	500	500	534 to 500	908 to 500	1054 to 500	798 to 500	973 to 500
Goodwin	214	268	480	410	561	396	352	240
Exports (TAF)								
Jones PP	55	45	45	46	45	45	63 to 45	153 to 45

During March, a continuation of minimum Keswick releases at the levels identified in the TUC Petition is hypothesized to increase emigration time for Chinook and steelhead smolts, which will result in reduced outmigration survival (Singer et al 2013) and a reduced smoltification window (McCormick et al 1998). The quantity of storage that can be gained by operating to the TUC Petition's outflow range may be similar to February (estimated to be 144 TAF), which will be critical to Shasta and Folsom operations necessary for the biological needs of winter-run Chinook, spring-run Chinook, steelhead, and green sturgeon downstream of these reservoirs during summer and fall of WY 2014. A continuation of the Petition's action regarding a reduced outflow range in March is a proactive approach by Reclamation and DWR to immediately implement appropriate contingency measures that may benefit brood year 2014 cold water listed species, as required in NMFS BiOp RPA I.2.3.C.

Reclamation is required to meet temperature criteria suitable for oversummer rearing of juvenile steelhead in the lower American River through NMFS BiOp RPA II.2. While the modeling required for this work is typically based initially on April's CVP/SWP forecast, current modeling suggests that conditions to meet temperature criteria throughout the spring and summer are not achievable. Folsom reservoir storage will be conserved by continuing the Petition's actions.

Delta Habitat Effects Regarding Salmonids and Green Sturgeon

Outflow Action

Juvenile and adult salmonids may experience similar outflow conditions under a continuation of the TUC Petition during March as described during February (Reclamation 2014). During March, green sturgeon adults may experience similar outflow conditions under a contribution of

the TUC Petition as described for adult Winter-run Chinook salmon during February (Reclamation 2014).

Minimum Pumping Level Action

Juvenile and adult salmonids may experience similar export conditions under a continuation of the TUC Petition during March as described during February (Reclamation 2014). If precipitation events occur that enable Reclamation to comply with D-1641 Delta outflow and DCC Gate closure requirement and thus increase CVP/SWP exports, NMFS BiOp Action IV.2.3 will continue to use fish loss density, daily loss, and loss of specific Coleman National Fish Hatchery (CNFH) releases of late fall and Winter-run Chinook salmon as triggers to reduce the vulnerability of emigrating ESA-listed salmon, steelhead, and green sturgeon to entrainment into South Delta channels and at the pumps between January 1 and June 15. A calendar-based requirement for the 14-day OMR average flow to be no more negative than -5,000 cfs started January 1, although it has rarely controlled export operations. Depending on what level of fish trigger is exceeded, combined exports are managed to a level so that the 5-day net average OMR flow is not more negative than -3,500 or -2,500cfs OMR until fish densities return below levels of concern. Daily flows in Old and Middle River averaged approximately -1900cfs in December 2013, approximately -1200 cfs in January 2014, and -2000 cfs during early February 2014 (Figure 7).

In March, impacts to juvenile and subadult life stages of green sturgeon are anticipated to remain minimal. Age 1 to 3 green sturgeon are expected to be rearing in the delta, and are typically exposed to a broad spectrum of flows over the course of the year during this rearing phase and freely move throughout the Delta to find suitable conditions for their needs.

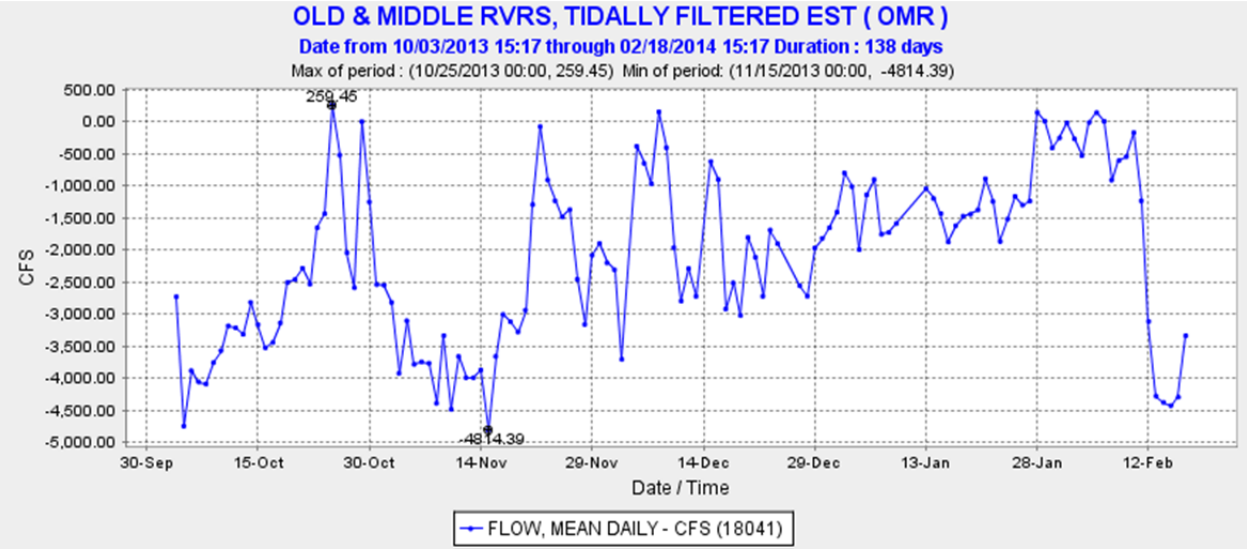


Figure 7. Old and Middle River tidally-filtered daily flows for WY 2014.[9]

DCC Gate Open Action

Juvenile and adult salmonids will experience similar DCC Gate operational conditions under a continuation of the TUC Petition during March as described during February (Reclamation 2014, NMFS 2014). Substantial catches of juvenile Winter-run Chinook and spring run Chinook at rotary screw traps from RBDD to Knights Landing support these populations entering the lower Sacramento River. Recovery of Winter-run and spring-run Chinook salmon in Delta monitoring efforts from the lower Sacramento and Sacramento regions indicate these populations are beginning to rear in the Delta throughout March. The catches of steelhead in the Delta fish monitoring efforts in recent weeks support these population having entered the Delta. The increased presence of these species in the Delta means increased risks to fishery protective objectives when the DCC Gates are opened during March compared to the risks posed by the DCC Gate being opened during early February.

Cumulative Effects of Action

Similar to February, an extension of the TUC Petition's action to: 1) Reduce the Delta outflow standard for March from 7100 cfs to a lower outflow range and operate in a combined export rate of 1,500cfs, and 2) Modify operations of the DCC gates as water quality and fisheries conditions warrant, affect juvenile and adult life stages of Winter-run and spring-run Chinook, juvenile steelhead, and juvenile green sturgeon.

[9] Downloaded from CDEC on February 18, 2014.

Similar to February, an extension of the petition's outflow action may reduce survival of juvenile listed salmonids, steelhead and green sturgeon, and may modify their designated critical habitat. The modification of juvenile Winter-run and spring-run Chinook salmon and steelhead survival due to changes in outflow would occur primarily through migratory corridors in the North Delta. The petition's outflow action avoids reservoir release operations which increase endangerment to brood year 2014 Winter-run and spring-run Chinook salmon due to releases that use cold water storage critical to reducing WY 2014 mortality of incubating eggs and holding adults. In March, an extension of the petition's combined export rate of 1,500 cfs may reduce entrainment and salvage of listed species at the CVP/SWP fish collection facilities adjacent to the South Delta export facilities.

In March, an extension of the petition's modified DCC Gate operation may increase mortality of juvenile outmigrating and rearing Winter-run and spring-run Chinook and juvenile steelhead dependent on implementation of closure requirements warranted by water quality and fisheries conditions. As part of the TUC Petition, if precipitation events occur that enable Reclamation and DWR to comply with D-1641 Delta outflow and DCC Gate closure requirement and thus increase CVP/SWP exports, previous opening of the DCC Gate may increase the vulnerability of Winter-run and spring-run Chinook salmon, steelhead, and green sturgeon to lower survival habitats in the interior and central Delta as well as loss at the CVP and SWP fish collection facilities. In March, the petition's DCC gate operations may also cause straying or delayed migration of adult listed salmonids and green sturgeon.

References

Chappell, E. 2004. Are the current EWA Chinook Decision Tree numeric criteria appropriate? Presentation to the EWA Technical Review Panel Supporting Documents. Available at: http://www.science.calwater.ca.gov/events/reviews/review_ewa_archive_04.html

Del Rosario, R.B, Y.J. Redler, K. Newman, P.L. Brandes, T. Sommer, K. Reece, and R. Vincik. 2013. Migration Patterns of Juvenile Winter-run-sized Chinook Salmon (*Oncorhynchus tshawytscha*) through the Sacramento-San Joaquin Delta. San Francisco Estuary and Watershed Science 11(1): 24p.

Horn, M.J. and A. Blake. 2004. Acoustic tracking of juvenile Chinook salmon movement in the vicinity of the Delta Cross Channel. 2001 Study results. U.S. Department of the Interior. Technical Memorandum No. 8220-04-04.

Israel, J.A. and A.P. Klimley, 2009. Life history conceptual model North American Green Sturgeon (*Acipenser medirostris*). Sacramento-San Joaquin Delta Regional Ecosystem Restoration Implementation Plan. 49 p.

McCormick, S.D., L.P. Hansen, T.P. Quinn, and R.L. Saunders. 1998. Movement, migration and smolting of Atlantic salmon (*Salmo salar*). Canadian Journal of Fisheries and Aquatic Science 55(Suppl. 1): 77-92.

National Marine Fisheries Service. 2009. Biological and Conference Opinion on the Long-Term Operations of the Central Valley Project and State Water Project. Central Valley Office, Sacramento CA.

National Marine Fisheries Service. 2014. Letter from Mrs. Maria Rea to Mr. David Murillo. Re: Contingency Plan for February Pursuant to Reasonable and Prudent Alternative (RPA) Action I.2.3.C of the 2009 Coordinated Long-term Operation of the Central Valley Project (CVP) and State Water Project (SWP) Biological Opinion (2009 BiOp). Central Valley Office, Sacramento CA.

Perry, R.W. and J.R. Skalski. 2008. Migration and survival of juvenile Chinook salmon through the Sacramento-San Joaquin River delta during the winter of 2006-2007. Report prepared for the U.S. Fish and Wildlife Service. September 2008. 32 p.

Perry, R.W., J. Skalski, P. Brandes, P. Sandstrom, A.P. Klimley, A. Amman, and R.B. MacFarlane. 2010. Estimating survival and migration route probabilities of juvenile Chinook salmon in the Sacramento-San Joaquin River Delta. North American Journal of Fisheries Management 30: 142-156.

Perry, R.W. 2010. Survival and migration dynamics of juvenile Chinook salmon (*Oncorhynchus tshawytscha)* in the Sacramento-San Joaquin river Delta. Dissertation. School of Aquatic and Fisheries Science, University of Washington, Seattle, WA p. 237.

Romine, J.G., R.W. Perry, S.J. Brewer, N.S. Adams, T.L. Liedtke, A.R. Blake, and J.R. Burau. 2013. The Regional Salmon Outmigration Study- survival and migration routing of juvenile Chinook salmon in the Sacramento-San Joaquin River Delta during the winter of 2008-2009. U.S. Geological Survey, Open File Report 2013-1142, 36 p.

Singer, G.P, A.R Hearn, E.D Chapman, M.L. Peterson, P.E. LaCivita, W.N. Brostoff, A. Bremmer, and A.P. Klimley. 2013. Interannual variation of reach specific migratory success for Sacramento River hatchery yearling late-fall run Chinook salmon (*Oncorhynchus tshawytscha*) and steelhead trout (*Oncorhynchus mykiss*). Environmental Biology of Fishes 96: 363-379.

U.S Bureau of Reclamation. 2008. Appendix B: Chinook Salmon Decision Tree *in* Biological Assessment on the Continued Log-term Operations of the Central Valley Project and the State Water Project. Mid-Pacific Region, Sacramento CA.

U.S Bureau of Reclamation. 2014. Letter from Mr. Paul Fujitani to Mrs. Maria Rea. Re: Contingency Plan for February Pursuant to Reasonable and Prudent Alternative (RPA) Action

I.2.3.C of the 2009 Coordinated Long-term Operation of the Central Valley Project (CVP) and State Water Project (SWP) Biological Opinion (2009 BiOp). Mid-Pacific Region, Sacramento CA

Vogel, D.A. 2004. Juvenile Chinook salmon radio-telemetry studies in the northern and central Sacramento-San Joaquin Delta, 2002-2003. Report to the National Fish and Wildlife Foundation, Southwest Region. January. 44 p.

Vogel, D.A. 2008. Pilot study to evaluate acoustic-tagged juvenile Chinook salmon smolt migration in the Northern Sacramento-San Joaquin Delta 2006-2007. Report prepared for the California Department of Water Resources, Bay/Delta Office. Natural Resource Scientists, Inc. March. 43 p.