



BUREAU OF RECLAMATION  
2800 Cottage Way, E-1604  
Sacramento, California 95825



DEPARTMENT OF WATER RESOURCES  
1416 Ninth Street, Room 1115-1  
Sacramento, California 95814

IN REPLY REFER TO:

CVO-100  
WTR-4.10

JAN 29 2014

STATE WATER RESOURCES  
CONTROL BOARD  
2014 JAN 29 PM 3:51  
DIV OF WATER RIGHTS  
SACRAMENTO

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

Subject: Temporary Urgency Change Petition Regarding Delta Water Quality

Dear Mr. Howard:

The Bureau of Reclamation (Reclamation) and California Department of Water Resources (DWR) submit the attached Temporary Urgency Change Petition to request the State Water Resources Control Board (Water Board) consider modifying requirements of Reclamation's and DWR's water right permits to enable changes in operations that will provide minimum human health and safety supplies and conserve water for later protections of instream uses and water quality.

Reclamation and DWR, operators of the Central Valley Project (CVP) and State Water Project (SWP), respectively, have grave concerns over current hydrologic conditions in the Sacramento-San Joaquin Delta/San Francisco Bay watershed. These dry conditions and persistent lack of precipitation create an urgent need to act as announced by the Governor in his January 17, 2014, Emergency Proclamation on drought conditions. The continuation of extremely dry conditions in the Bay-Delta watershed poses a threat to the effective management of water resources because forecasts by Reclamation and DWR indicate there is not an adequate water supply to meet water right permit obligations under Water Rights Decision 1641 (D-1641) to support instream and Delta beneficial uses. Thus, this Temporary Urgency Change Petition is submitted consistent with Directives 8 and 9 of the Governor's Emergency Proclamation.

As described in the Temporary Urgency Change Petition, Reclamation and DWR request the Water Board change certain terms of the Projects' water rights permits from what is currently provided in D-1641 for the next 180 days, with a specific request for the month of February 2014, and for future changes to be determined through monitoring and management provisions as

described in the Petition. Reclamation and DWR specifically request modification of February Delta outflow requirements and Delta Cross Channel (DCC) gate operations. The changes would modify the February outflow requirement, commonly known as X2 criteria, to allow management of reservoir releases on a pattern that will conserve storage for later fishery protection and minimum human health and safety needs. In addition, the request includes modifying the February closure requirement of the DCC gates as water quality and fishery conditions warrant and as restricted by specific monitoring of fish. Under this proposal the Projects would maintain reservoir releases that would sustain minimum health and safety export levels, currently estimated to be 1500 cubic feet per second. Before Reclamation implements any action which may be approved by the Water Board, Reclamation will utilize the drought exception procedures described in the 2009 NMFS CVP/SWP Long Term Operation Biological Opinion, as applicable, and complete the regulatory process with the Fish and Wildlife Service related to delta smelt provided for in the 2008 CVP/SWP Long Term Operation Biological Opinion.

Reclamation and DWR believe that the severe dry conditions support the Water Board taking immediate action where the changes in operations will not injure other lawful users of water, will not unreasonably effect fish, wildlife or other instream beneficial uses, and are in the public interest. If sufficient precipitation were to occur to systemically recover upstream storage, then the Projects could resume operating to the D-1641 objectives, as appropriate.

However, if critically dry conditions in the Bay-Delta watershed persist, Reclamation and DWR, through a team of managers from their agencies, will continue to meet with the Water Board staff to consider additional modifications of D-1641 water quality objectives and to coordinate management of water supplies during the course of the declared drought emergency.

We urge the Water Board to approve the Petition and look forward to cooperatively working with the Board and its staff during this challenging period to manage Bay-Delta water resources for the benefit of the people and natural resources of the state of California.

Sincerely,



Mark W. Cowin  
Director  
Department of Water Resources

Date: 1/29/2014



David Murillo  
Regional Director  
Bureau of Reclamation

Date: 1/29/2014

cc: See next page.

cc: Ms. Maria Rea  
National Oceanic &  
Atmospheric Administration  
National Weather Service  
650 Capitol Mall  
Sacramento, California 95814

Mr. Ren Lohofener  
U.S. Fish and Wildlife Service  
2800 Cottage Way  
Sacramento, California 95825

Mr. Dan Castleberry  
U.S. Fish and Wildlife Service  
2800 Cottage Way  
Sacramento, California 95825

Mr. Carl Wilcox  
Department of Fish and Wildlife  
4001 North Wilson Way  
Stockton, California 95205

Mr. Chuck Bonham  
Department of Fish and Wildlife  
4001 North Wilson Way  
Stockton, California 95205

Mr. Les Grober  
State Water Resources Control Board  
1001 I Street  
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Mr. Craig Wilson  
State Water Resources Control Board  
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Mr. Carl Torgersen  
Department of Water Resources  
1416 Ninth Street, Room 1115-9  
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Ms. Laura King Moon  
Department of Water Resources  
1416 Ninth Street, Room 1115-1  
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Mr. Paul Helliker  
Department of Water Resources  
1416 Ninth Street, Room 1115-9  
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Mr. David Roose  
Department of Water Resources  
1416 Ninth Street, Room 605-1  
Sacramento, California 95814

Mr. James Mizell  
Department of Water Resources  
1416 Ninth Street, Room 1104  
Sacramento, California 95814

Ms. Cathy Crothers  
Department of Water Resources  
1416 Ninth Street, Room 1104  
Sacramento, California 95814

Mr. Ronald Milligan  
Central Valley Operations  
Bureau of Reclamation  
3310 El Camino Avenue, Suite 300  
Sacramento, California 95821

Please indicate County where your project is located here:

various

MAIL FORM AND ATTACHMENTS TO:
State Water Resources Control Board
DIVISION OF WATER RIGHTS
P.O. Box 2000, Sacramento, CA 95812-2000
Tel: (916) 341-5300 Fax: (916) 341-5400
http://www.waterboards.ca.gov/waterrights

PETITION FOR CHANGE

Separate petitions are required for each water right. Mark all areas that apply to your proposed change(s). Incomplete forms may not be accepted. Location and area information must be provided on maps in accordance with established requirements. (Cal. Code Regs., tit. 23, § 715 et seq.) Provide attachments if necessary.

- Point of Diversion, Point of Rediversion, Place of Use, Purpose of Use, Distribution of Storage, Temporary Urgency, Instream Flow Dedication, Waste Water, Split, Terms or Conditions, Other, Application, Permit, License, Statement

I (we) hereby petition for change(s) noted above and described as follows:

Point of Diversion or Rediversion - Provide source name and identify points using both Public Land Survey System descriptions to 1/4-1/4 level and California Coordinate System (NAD 83).

Present: Not requested
Proposed: No change

Place of Use - Identify area using Public Land Survey System descriptions to 1/4-1/4 level; for irrigation, list number of acres irrigated.

Present: Not requested
Proposed: No change

Purpose of Use

Present: Not requested
Proposed: No change

Split

Provide the names, addresses, and phone numbers for all proposed water right holders.

Not requested

In addition, provide a separate sheet with a table describing how the water right will be split between the water right holders: for each party list amount by direct diversion and/or storage, season of diversion, maximum annual amount, maximum diversion to offstream storage, point(s) of diversion, place(s) of use, and purpose(s) of use. Maps showing the point(s) of diversion and place of use for each party should be provided.

Distribution of Storage

Present: Not requested
Proposed: No change

**Temporary Urgency**

This temporary urgency change will be effective from  to

Include an attachment that describes the urgent need that is the basis of the temporary urgency change and whether the change will result in injury to any lawful user of water or have unreasonable effects on fish, wildlife or instream uses.

**Instream Flow Dedication** – Provide source name and identify points using both Public Land Survey System descriptions to ¼-¼ level and California Coordinate System (NAD 83).

Upstream Location:

Downstream Location:

List the quantities dedicated to instream flow in either:  cubic feet per second or  gallons per day:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Will the dedicated flow be diverted for consumptive use at a downstream location?  Yes  No  
If yes, provide the source name, location coordinates, and the quantities of flow that will be diverted from the stream.

**Waste Water**

If applicable, provide the reduction in amount of treated waste water discharged in cubic feet per second.

Will this change involve water provided by a water service contract which prohibits your exclusive right to this treated waste water?  Yes  No

Will any legal user of the treated waste water discharged be affected?  Yes  No

**General Information** – For all Petitions, provide the following information, if applicable to your proposed change(s).

Will any current Point of Diversion, Point of Storage, or Place of Use be abandoned?  Yes  No

I (we) have access to the proposed point of diversion or control the proposed place of use by virtue of:  
 ownership  lease  verbal agreement  written agreement

If by lease or agreement, state name and address of person(s) from whom access has been obtained.

Give name and address of any person(s) taking water from the stream between the present point of diversion or redirection and the proposed point of diversion or redirection, as well as any other person(s) known to you who may be affected by the proposed change.

This petition does not involve a change in point of diversion. No person(s) will be injured by the proposed change. See supplement for additional information.

**All Right Holders Must Sign This Form:** I (we) declare under penalty of perjury that this change does not involve an increase in the amount of the appropriation or the season of diversion, and that the above is true and correct to the best of my (our) knowledge and belief. Dated  at

*[Signature]*  
Right Holder or Authorized Agent Signature

*[Signature]*  
Right Holder or Authorized Agent Signature

NOTE: All petitions must be accompanied by:  
(1) the form Environmental Information for Petitions, including required attachments, available at: [http://www.waterboards.ca.gov/waterrights/publications\\_forms/forms/docs/pet\\_info.pdf](http://www.waterboards.ca.gov/waterrights/publications_forms/forms/docs/pet_info.pdf)  
(2) Division of Water Rights fee, per the Water Rights Fee Schedule, available at: [http://www.waterboards.ca.gov/waterrights/water\\_issues/programs/fees/](http://www.waterboards.ca.gov/waterrights/water_issues/programs/fees/)  
(3) Department of Fish and Wildlife fee of \$850 (Pub. Resources Code, § 10005)

## ENVIRONMENTAL INFORMATION FOR PETITIONS

This form is required for all petitions.

Before the State Water Resources Control Board (State Water Board) can approve a petition, the State Water Board must consider the information contained in an environmental document prepared in compliance with the California Environmental Quality Act (CEQA). This form is not a CEQA document. If a CEQA document has not yet been prepared, a determination must be made of who is responsible for its preparation. As the petitioner, you are responsible for all costs associated with the environmental evaluation and preparation of the required CEQA documents. Please answer the following questions to the best of your ability and submit any studies that have been conducted regarding the environmental evaluation of your project. If you need more space to completely answer the questions, please number and attach additional sheets.

### DESCRIPTION OF PROPOSED CHANGES OR WORK REMAINING TO BE COMPLETED

For a petition for change, provide a description of the proposed changes to your project including, but not limited to, type of construction activity, structures existing or to be built, area to be graded or excavated, increase in water diversion and use (up to the amount authorized by the permit), changes in land use, and project operational changes, including changes in how the water will be used. For a petition for extension of time, provide a description of what work has been completed and what remains to be done. Include in your description any of the above elements that will occur during the requested extension period.

As described in Attachment 1, historically dry conditions in the current water year following two previous dry years, the projections for continued dry conditions, and the regulatory demands upon the water supply remaining in storage of the State Water Project (SWP) and the Central Valley Project (CVP) (jointly the Projects) cause the Department of Water Resources (DWR) and the United States Bureau of Reclamation (Reclamation) to request a change to certain terms of their water rights permits as provided in D-1641 for the next 180 days, with a specific request for February 2014, consistent with Governor Brown's January 17, 2014 Emergency Proclamation (Proclamation). Reclamation and DWR request modification of D-1641: (1) modifying the Habitat Protection Outflow at Collinsville – commonly known as X2 criteria, during February 2014 and providing alternative method of compliance by operating to sustainable health and safety combined export rates of 1500 cfs at the CVP and SWP delta pumps; (2) modifying the February closure requirement of the Delta Cross Channel (DCC) gates, as water quality and fishery conditions warrant, in conjunction with balancing Delta salinity requirements. Reclamation proposes to open the DCC gates as soon as possible to reduce salinity in the central Delta. A monitoring and management process would be established to provide the necessary tools to address changes to DCC gate operations and other changing conditions.

CEQA requirements for the purposes of this Petition are waived pursuant to Directives 8 and 9 of the Proclamation. These directives read: "The Water Board will consider modifying requirements for reservoir releases or diversion limitations, where existing requirements were established to implement a water quality control plan," and "for purposes of carrying out directives 5 and 8, Water Code section 13247 and Division 13 (commencing with section 21000) of the Public Resources Code and regulations adopted pursuant to that Division are suspended on the basis that strict compliance with them will prevent, hinder, or delay the mitigation of the effects of the emergency."

Recent operations forecasts completed by the CVP and SWP operations offices, which incorporate the Projects' low storage and record low runoff forecasts have identified an unacceptable level of risk of the Projects' major reservoirs dropping to dead pool or near dead pool levels at which reservoir release capacities will be substantially diminished. As a result, without modification to D-1641 significant risks to temperature control, minimum in-stream flow requirements, and complete loss of salinity control in the Sacramento-San Joaquin Delta could result later this season. As a consequence the Projects are contemplating not releasing any additional water from upstream reservoirs until significant improvement of upstream storage is realized. DWR and Reclamation have an urgent need for modification of the objectives set forth in D-1641 in order to protect the public interest.

Insert the attachment number here, if applicable:

1

**Coordination with Regional Water Quality Control Board**

For change petitions only, you must request consultation with the Regional Water Quality Control Board regarding the potential effects of your proposed change on water quality and other instream beneficial uses. (Cal. Code Regs., tit. 23, § 794.) In order to determine the appropriate office for consultation, see: [http://www.waterboards.ca.gov/waterboards\\_map.shtml](http://www.waterboards.ca.gov/waterboards_map.shtml). Provide the date you submitted your request for consultation here, then provide the following information.

Date of Request

N/A

Will your project, during construction or operation, (1) generate waste or wastewater containing such things as sewage, industrial chemicals, metals, or agricultural chemicals, or (2) cause erosion, turbidity or sedimentation?

Yes  No

Will a waste discharge permit be required for the project?

Yes  No

If necessary, provide additional information below:

Insert the attachment number here, if applicable:

**Local Permits**

For temporary transfers only, you must contact the board of supervisors for the county(ies) both for where you currently store or use water and where you propose to transfer the water. (Wat. Code § 1726.) Provide the date you submitted your request for consultation here.

Date of Contact

N/A

For change petitions only, you should contact your local planning or public works department and provide the information below.

Person Contacted:  Date of Contact:

Department:  Phone Number:

County Zoning Designation:

Are any county permits required for your project? If yes, indicate type below.  Yes  No

- Grading Permit
- Use Permit
- Watercourse
- Obstruction Permit
- Change of Zoning
- General Plan Change
- Other (explain below)

If applicable, have you obtained any of the permits listed above? If yes, provide copies.  Yes  No

If necessary, provide additional information below:

Insert the attachment number here, if applicable:

**Federal and State Permits**

Check any additional agencies that may require permits or other approvals for your project:

- Regional Water Quality Control Board     Department of Fish and Game
- Dept of Water Resources, Division of Safety of Dams     California Coastal Commission
- State Reclamation Board     U.S. Army Corps of Engineers     U.S. Forest Service
- Bureau of Land Management     Federal Energy Regulatory Commission
- Natural Resources Conservation Service

Have you obtained any of the permits listed above? If yes, provide copies.     Yes     No

For each agency from which a permit is required, provide the following information:

Agency	Permit Type	Person(s) Contacted	Contact Date	Phone Number
N/A				

If necessary, provide additional information below:

Insert the attachment number here, if applicable:

**Construction or Grading Activity**

Does the project involve any construction or grading-related activity that has significantly altered or would significantly alter the bed, bank or riparian habitat of any stream or lake?     Yes     No

If necessary, provide additional information below:

Insert the attachment number here, if applicable:



**Archeology**

- Has an archeological report been prepared for this project? If yes, provide a copy.  Yes  No
- Will another public agency be preparing an archeological report?  Yes  No
- Do you know of any archeological or historic sites in the area? If yes, explain below.  Yes  No

If necessary, provide additional information below:

Insert the attachment number here, if applicable:

**Photographs**

For all petitions other than time extensions, attach complete sets of color photographs, clearly dated and labeled, showing the vegetation that exists at the following three locations:

- Along the stream channel immediately downstream from each point of diversion
- Along the stream channel immediately upstream from each point of diversion
- At the place where water subject to this water right will be used

**Maps**

For all petitions other than time extensions, attach maps labeled in accordance with the regulations showing all applicable features, both present and proposed, including but not limited to: point of diversion, point of redirection, distribution of storage reservoirs, point of discharge of treated wastewater, place of use, and location of instream flow dedication reach. (Cal. Code Regs., tit. 23, §§ 715 et seq., 794.)

Pursuant to California Code of Regulations, title 23, section 794, petitions for change submitted without maps may not be accepted.

**All Water Right Holders Must Sign This Form:**

I (we) hereby certify that the statements I (we) have furnished above and in the attachments are complete to the best of my (our) ability and that the facts, statements, and information presented are true and correct to the best of my (our) knowledge. Dated  at .

  
Water Right Holder or Authorized Agent Signature

  
Water Right Holder or Authorized Agent Signature

**NOTE:**

- Petitions for Change may not be accepted unless you include proof that a copy of the petition was served on the Department of Fish and Game. (Cal. Code Regs., tit. 23, § 794.)
- Petitions for Temporary Transfer may not be accepted unless you include proof that a copy of the petition was served on the Department of Fish and Game and the board of supervisors for the county(ies) where you currently store or use water and the county(ies) where you propose to transfer the water. (Wat. Code § 1726.)

**SUPPLEMENT TO 2014 TEMPORARY URGENCY CHANGE TO CERTAIN DWR AND RECLAMATION PERMIT TERMS AS PROVIDED IN D-1641**

**California Department of Water Resources**

Application Numbers 5630, 14443, 14445A, 17512, 17514A, Permits 16478, 16479, 16481, 16482, 16483

**U.S. Bureau of Reclamation Permits for the Central Valley Project**

Application Numbers: 23, 234, 1465, 5626, 5628, 5638, 9363, 9364, 9366, 9367, 9368, 13370, 13371, 14858A, 14858B, 15374, 15375, 15376, 15764, 16767, 16768, 17374, 17376, 19304, 22316

License Number 1986 and Permit Numbers: 11885, 11886, 12721, 11967, 11887, 12722, 12723, 12725, 12726, 12727, 11315, 11316, 16597, 20245, 11968, 11969, 11970, 12860, 11971, 11972, 11973, 12364, 16600, 15735

**I. Requested Change**

Due to the record setting dry conditions faced by California in the current water year, and following two previous dry years and the projections for continued dry conditions, the Department of Water Resources (DWR) and the United States Bureau of Reclamation (Reclamation) (collectively Projects) are requesting the State Water Resources Control Board (SWRCB) change terms of the Projects' water rights permits from what is currently provided in Water Rights Decision 1641 (D-1641) for the next 180 days, with specific requests for the month of February, 2014, and future requests as determined through a multi-party coordination process. (described below in section II(1)(d)) Consistent with Directives 8 and 9 of Governor Brown's January 17, 2014 Emergency Proclamation (Proclamation; Attached to this petition), Reclamation and DWR request modification of D-1641 outflow and Delta cross-channel standards described in D-1641 Table 3. The changes would modify the February outflow requirement, commonly known as X2 criteria, to allow management of reservoir releases on a pattern that will conserve storage for later fishery protection and minimum health and safety needs. In addition, the request includes modifying the February closure requirement of the DCC gates as water quality and fishery conditions warrant and as restricted by specific monitoring of fish. Under this proposal the Projects would maintain reservoir releases that would sustain minimum health and safety export levels, currently estimated to be 1500 cfs. DWR and Reclamation also request implementation of an ongoing management team to meet weekly through the effective window of this urgency change that will coordinate management of water supplies by proposing additional standards modifications necessary to protect health and safety, water quality, and protection of listed species cold water pool. Before Reclamation implements any action which may be approved by the Water Board, Reclamation will utilize the drought exception procedures described in the 2009 NMFS CVP/SWP Long Term

Operation Biological Opinion, as applicable, and complete the regulatory process with the Fish and Wildlife Service related to delta smelt provided for in the 2008 CVP/SWP Long Term Operation Biological Opinion. These requested modifications are summarized below and described in detail in later sections of this Supplement.<sup>1</sup>

### **1) Modification of February Outflow**

Reclamation and DWR propose maintaining exports at minimum health and safety levels of 1,500 cfs as an emergency drought measure to protect cold water pools for salmon and Steelhead. This will also maintain water supply and improve water quality consistent with Directive 8 of the Proclamation. This modification is necessary because of the extraordinarily dry conditions currently existing, the forecasts of limited future precipitation, extremely low reservoir storage, and the competing needs for water later in the year. The Projects are currently operating to D-1641 water quality requirements but forecasts indicate that relief in some of these operations is needed in order to have water available later in the year for health and safety, Delta salinity control and listed species cold water pool protection. Our best estimate of a sustainable minimum health and safety level is currently a maximum combined export rate of 1,500 cfs. DWR and Reclamation intend to review current conditions and health and safety needs, which might support periods of lower levels that would be protective of health and safety.

### **2) Modification of DCC Gate Operations**

D-1641 requires the closure of the DCC gates from February 1 through May 20. However, under the Governor's Emergency Proclamation, the Projects are seeking the use of the DCC gates as a means of controlling salinity conditions in the Delta. Normally, runoff and the Delta inflow/outflow needed to meet the X2 requirement would assist in meeting salinity requirements in the Delta with the DCC gates closed. Under these extremely low flow conditions, however, DCC gate operations may be needed to protect interior Delta salinity conditions sufficient to meet minimum human health and safety water quality requirements.

## **II. Basis to Authorize Modification of Water Rights**

The California Water Code, Section 1435, authorizes the State Water Board to grant a temporary change order for any permittee or licensee who has an urgent need to change a permit or license, where the State Water Board finds: 1) the permittee has an urgent need for the proposed change, 2) the proposed change may be made without injury to any other lawful user of water, 3) the proposed change can be made without unreasonably affecting fish, wildlife, or other instream beneficial uses, 4) the proposed change is in the public interest. The law also requires consultation with representatives of the Department of Fish and Wildlife.

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<sup>1</sup> In addition, given the dry conditions, there may need to be additional requests for modification to D-1641 standards described in Tables 1, 2 and 3 as provided through the process described in section II.1.d of this supplement.

DWR and Reclamation provide the information below to support the findings necessary under California Water Code section 1435. The current hydrology and storage are critically low and without the modifications requested there exists an unacceptable risk that DWR and Reclamation will be unable to provide future protection of beneficial uses that rely upon storage from the Projects. Therefore, the modifications requested are urgent and critical and can be implemented in a manner satisfying requirements of section 1435, as described below. .

**1) DWR and Reclamation Have an Urgent Need for the Change**

California is entering its third straight year of below-average rainfall and very low snowmelt runoff. As a result of this continued aridity, 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.

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 2013. 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, commonly referred to as depletions. There is anecdotal evidence that water users within the Delta are diverting much greater quantities than is typically assumed for this period. These depletions further reduce the amount of storage remaining for future protection of beneficial uses.

If the requested February modification in Delta outflow requirement is granted, Reclamation and DWR forecast that a Delta Outflow of at between 3,000 and 4,500 cfs will provide additional preservation of cold water pool for listed species later in the year. Such an outflow rate can also provide the water quality necessary to maintain minimum exports of 1,500 cfs for minimum human health and safety deliveries, and is contingent upon modification of Delta salinity standards. The 4,500 cfs Delta outflow is the estimated minimum nominal rate assumed to maintain salinity levels above 250 mg/l chloride at all export locations specified under Table 1 of D-1641. This outflow forecast, however, cannot be used to guarantee an outflow level because of the significant depletions occurring and is based on an assumption of 1,500 cfs minimum health and safety exports.

In December 2013, DWR announced its initial 2014 allocations of Table A water supplies for the State Water Contractors at 5 percent. Because of the relentless dry pattern, the Department of Water Resources anticipates that no 2014 supply would be allocated this year, which if not increased over the course of the year would represent the largest reduction in SWP allocations for its Municipal and Industrial contractors on

record. Furthermore, DWR anticipates that the February 1 Bulletin 120 hydrologic criterion will be met to trigger for 50% shortages to its Feather River settlement contractors. Concurrently, Reclamation will announce its initial allocation for CVP contractors in February. Under the current conditions there would be significant deficiencies to the water supply available to all CVP users throughout the system.

Forecasts for Water Year 2014 indicate it is likely to be one of the most severe drought years in California's history. The current precipitation trend for both the Northern Sierra 8-station and Southern Sierra 5-station indices is drier than the two driest water years on record (1924 and 1977) (see [http://cdec.water.ca.gov/cgi-progs/products/PLOT\\_ESI.pdf](http://cdec.water.ca.gov/cgi-progs/products/PLOT_ESI.pdf) and [http://cdec4gov.water.ca.gov/cgi-progs/products/PLOT\\_FSI.pdf](http://cdec4gov.water.ca.gov/cgi-progs/products/PLOT_FSI.pdf)). Extremely low reservoir storage levels are forecasted for this year in Northern California, in some cases surpassing prior record low levels.

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 in 1977 when the state was in a severe drought (see <http://cdec.water.ca.gov/cgi-progs/products/rescond.pdf>).

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% of the typical seasonal peak (see [http://cdec.water.ca.gov/cgi-progs/products/PLOT\\_SWC.pdf](http://cdec.water.ca.gov/cgi-progs/products/PLOT_SWC.pdf)).

The continuation of extremely dry conditions in the Bay-Delta watershed poses great challenges to the effective management of water resources, and Reclamation and DWR do not believe that there is an adequate water supply to meet all obligations under D-1641. Current projections indicate that without the requested change to Reclamation and DWR's water rights permits, there exists a substantial risk that by late spring 2014 and into 2015 the Projects' 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, significant risks to health and safety, temperature control, minimum in-stream flow requirements, and an inability to repel salinity in the Sacramento-San Joaquin Delta could result later this season, (see attachment A). Under the current circumstances the Projects believe the most prudent course of action is to conserve storage in upstream reservoirs until significant improvement of that storage is realized. Such a decision may mean that some objectives set forth in D-1641 would require modification, as discussed below in section II.1.d.

a. Authorization to Take Extraordinary Measures

As a result of these extraordinary conditions, the Governor signed the Proclamation on January 17, 2014. This Proclamation includes the following two directives:

Directive 8 - “the Water Board to consider modifying requirements for reservoir releases or diversion limitations, where existing requirements were established to implement a water quality control plan. These changes would enable water to be conserved upstream later in the year to protect cold water pools for salmon and steelhead, maintain water supply, and improve water quality.”

Directive 9 – “The Department of Water Resources and the Water Board will take actions necessary to make water immediately available, and, for the purposes of carrying out directives 5 and 8, Water Code section 13247 and Division 13 (commencing with section 21000) of the Public Resources Code and regulations adopted pursuant to that Division are suspended on the basis that strict compliance with them will prevent, hinder, or delay the mitigation of the effects of the emergency.”

DWR has initiated a number of actions to minimize drought impacts and meet minimum health and safety needs including aggressive conservation efforts and taking a lead role in the Governor’s Interagency Drought Task Force. Under the Proclamation, the SWRCB is authorized to modify D-1641.

b. Modification of Outflow at Collinsville (X2)

The Projects are allowed to meet the habitat protection outflow requirement, commonly known as X2, in one of three ways:

- Daily Electrical Conductivity (EC) of 2.64 millimhos per cm (mmhos/cm) or less at Collinsville; or
- 14-day average EC of 2.64 mmhos/cm or less at Collinsville; or
- 3-day average of the Net Delta Outflow Index of 7,100 cfs.

Reclamation and DWR propose modifying D-1641 to recognize that reducing exports to minimum health and safety levels of 1,500 cfs is an emergency drought measure to protect cold water pools for salmon and Steelhead, maintain water supply, and improve water quality, consistent with Directive 8 of the Proclamation, which recognizes the extraordinarily dry conditions and operational projections resulting from satisfying all the competing requirements on water under D-1641 as currently written. The most crucial of these are storage to be released to the Delta for health and safety, salinity control, and for listed species cold water protection later in the year. The best estimate from DWR and Reclamation of a sustainable health and safety level is a maximum combined export rate of 1,500 cfs.

The sustainable level of 1,500 cfs is primarily related to operational considerations for municipal and industrial diverters who rely solely for their export supply from the delta or the canal between the Project export pumps and San Luis Reservoir. This sustainable level of exports for health and safety is recognized in the USFWS Delta Smelt Biological Opinion for CVP and SWP Operations on page 296, and the NMFS Salmonid Biological Opinion for CVP and SWP Operations on pages 643 and 644. However, Reclamation and DWR are re-evaluating this level based on current conditions that might support a lower export level.

Without a modification of the X2 requirement, Reclamation and DWR would be forced to increase releases from upstream reservoirs in February to meet Delta outflow levels up to 7,100 cfs. The estimated impact to reservoir storage could be approximately 144 TAF, which is the difference between the currently projected Delta Outflow of at between 3,000 and 4,500 cfs will provide additional preservation of cold water pool for listed species later in the year. Such an outflow rate can also provide the water quality necessary to maintain minimum exports of 1,500 cfs for minimum human health and safety deliveries, and is contingent upon modification of Delta salinity standards. The 4,500 cfs is the estimated minimum nominal rate assumed to maintain salinity levels above 250 mg/l chloride at all export locations specified under Table 1 of D-1641. This outflow forecast, however, cannot be used to guarantee an outflow level because of the significant depletions occurring and is based on an assumption of 1,500 cfs minimum health and safety exports.

In addition, if X2 requirements remain in effect as currently mandated in D-1641, the outflow requirements will decrease the likelihood that adequate cold-water reserves will be available to meet regulatory requirements protecting salmon and other cold-water fish species in the summer and fall of 2014 and could even result in a "loss of control" over salinity encroachment in the Delta by late spring 2014 and into 2015 in a worst case scenario. "Loss of control" is a term associated with a condition when due to storages at or near dead pool the major Project reservoirs will have insufficient release capability to expel encroachment of ocean water into the Delta, which will make the Delta waters incompatible with in-Delta beneficial uses. This condition will 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. Additionally, failure to sufficiently control Delta salinity will jeopardize the ability to provide for human health and safety.

Reclamation and DWR, however, propose continued discussions, as described in subsection (d) below, in order to consider potential modification of other standards in conjunction with the outflow requirement that will best balance protection of all beneficial uses.

c. Health and Safety Modifications of Delta Cross Channel Operation to Maintain Acceptable Interior Delta Salinity Conditions

D-1641 requires the closure of the DCC gates from February 1 through May 20. However, under the Governor's Emergency Proclamation, the Projects are seeking the use of the DCC gates as a means of controlling salinity conditions in the Delta. Normally, runoff and the Delta inflow/outflow needed to meet the X2 requirement would assist in meeting salinity requirements in the Delta with the DCC gates closed. Under these extremely low flow conditions, however, DCC gate operations may be needed to protect interior Delta salinity conditions sufficient to meet minimum human health and safety water quality requirements.

Immediate relaxation of interior Delta salinity control standards would create unacceptable risk to minimum human health and safety requirements. The imprecise nature of salinity control within the Delta in combination with a steep salinity gradient, which does not allow for an adequate margin of error, and the persistence of human health and safety concerns once triggered, supports maintaining existing interior delta salinity control standards as operational targets.

Towards that end, Reclamation and DWR request permission to open the gates for human health and safety purposes based on consultation with the fishery agencies as described in (d) below. Several different operational concepts to balance human health and fishery concerns are currently under discussion between Reclamation, DWR and the fishery agencies, including a possible diurnal open/close schedule. We propose to continue evaluation and discussion of these concepts and associated fish presence monitoring needs through the process described in (d) below.

d. Proposed Reporting and Management

As stated in the Proclamation, the dry conditions and water supply levels are of a magnitude that they present peril to the safety of persons and property. In order to facilitate declarations 8, 14 and 16 of the Governor's proclamation, DWR and Reclamation propose that the operations and regulatory changes requested in this petition include regular monitoring, to ensure that the objectives of this proposal and the requirements of Water Code Section 1435 are met under any changed conditions. Thus, DWR and Reclamation propose convening a team of managers from their agencies authorized to act in order to coordinate management of water supplies during the course of the declared drought emergency to meet weekly with appropriate managers at the SWRCB, California Department of Fish and Wildlife (DFW), National Marine Fisheries Service (NMFS) and the Fish and Wildlife Service (FWS) also authorized to act in order to coordinate management of water supplies and protection of natural resources during the course of the declared drought emergency. DWR and Reclamation expect to work with DFW, NMFS, and FWS to ensure that this process meets the requirements of CESA and ESA, including complying with the drought



contingency provision (RPA Action I.2.3.c.) in the 2009 NMFS Biological Opinion. This process will be structured to allow the regulatory agencies to provide feedback and concur on potential project operations and related effects on an ongoing basis as the drought emergency is addressed. As a result of this coordination, DWR and Reclamation may submit to the SWRCB additional information on any further adjustments needed to regulatory requirements in order to balance the protection of health and safety, water quality and cold water pool for listed species.

The discussions and any future requests for possible modifications of 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." This team will report periodically to the SWRCB on the necessity of changes to south Delta agricultural salinity standards outside the control of DWR, western, interior and export area agricultural salinity standards, Suisun Marsh salinity standards dependent upon outflows, San Joaquin River flows that endanger health and safety or the protection of listed species cold water pool, and western Delta municipal and industrial salinity standards that can be modified without harming health and safety.

## **2) There Will be no Impact to Other Legal Users of Water**

The Projects have been augmenting natural flow by releasing previously stored water to meet in-stream requirements and to maintain minimum outflows in the Delta to control salinity intrusion. Under the proposed changes to outflow requirements, the Projects will continue to augment natural flow with storage releases. The Projects do not propose to cease all reservoir releases, but rather to significantly reduce the releases to levels necessary to maintain salinity standards but below those that would be required to meet the existing minimum flow requirement of 7,100 cfs in February.

The Projects have not been appropriating natural flow and Term 91 went into effect in March 2013. Term 91 conditions remain in effect. It is anticipated that Term 91 conditions will continue until the hydrology within the Delta watershed improves significantly. The Projects have been making significant releases of Project storage to meet the water quality objectives contained in D-1641. As a result, Project storage levels continue to decline. No other legal users of water are entitled to divert Project storage releases. In the absence of those releases, the water quality in the tributaries with Project facilities as well as the Delta would likely see declines beyond existing conditions.

Although Term 91 continues to be in place to prevent water rights holders who are subject to Term 91 from diverting Project releases intended to protect fish and wildlife, it is clear that other appropriative and riparian users are diverting greater quantities of water than typical for this time of year and those quantities are not supported by natural flow. The amount of river accretion measured between the Project reservoirs and the

Freeport gage on the Sacramento River is at historical lows for this time of year. This infers that non-Project diversions are at record highs in the Sacramento Valley. In addition, there is anecdotal evidence that water users within the Delta are diverting much greater quantities than is typically assumed for this period. This anecdotal evidence is supported by continued observations of degrading salinity conditions in the western and central Delta despite the Projects meeting the nominal 4,500 cfs outflow requirement throughout the month of January, which would typically be sufficient to maintain salinity conditions. More specifically, the actual in-Delta consumptive use, (a subtractive component of the net Delta outflow index) which cannot be measured directly, is likely much greater than the assumed value in the index. In other words, due to the extreme lack of precipitation, additional and unexpected diversions are occurring to compensate for the weather. These facts support a determination that the proposed changes to the Delta outflow standard will not injure any other legal user of water. Rather, reductions in stream flow will stem from the release of less stored water that is not legally available for appropriation absent the changes.

If natural flows increase and senior in-basin water rights are satisfied, the appropriation of natural flows in upstream Project reservoirs will be necessary to protect beneficial uses later in the year. These beneficial uses include necessary water later in the summer for temperature control for fish and releases for Delta salinity control when unstored flow is insufficient to meet these critical system needs.

### **3) The Change Will Not Result in Unreasonable Impacts to Fish and Wildlife or Other Instream Uses**

Extreme drought conditions are well known to stress the aquatic resources of the San Francisco estuary and its watershed. Dry conditions during winter are expected to adversely affect spawning and rearing conditions for Longfin Smelt, migration and spawning conditions for Delta Smelt, and migration conditions for Winter-run Chinook salmon, Spring-run Chinook salmon, Steelhead Trout, and Southern DPS Green Sturgeon. While maintaining flows would provide some short-term support for these species, continued dry conditions may lead to even worse impacts later in the year. For example, reduced flows may decrease survival of the salmonids during winter, but a failure to maintain adequate reservoir storage could lead to a loss in ability to maintain cold water later in the year for Winter-run Chinook Salmon egg survival, and to provide suitable upstream conditions for Spring-run Chinook Salmon and Steelhead Trout rearing. Similarly, it is critical to maintain the ability to provide a water storage pool to support Delta Smelt and Longfin Smelt rearing and maturation later in the year. Hence, this proposal seeks to balance the short-term and long-term habitat needs of some of the covered anadromous and pelagic species during the entirety of water year 2014.

Specifically, the proposed reduced reservoir release operations are intended to minimize adverse impacts to cold water pool for fisheries benefits, and allow for some

level of salinity and temperature control later in season. The proposed DCC gate operations are intended to provide benefits to both water quality and Delta outmigrating anadromous fish protection during February, when there may be substantial immigration of listed salmonids into the Delta. This immigration event has yet to be observed in the 2014 water year.

A supporting factor for the proposed operations is that the current distribution of key fish species of concern is such that they are at relatively low risk of entrainment at the South Delta water diversions. (For Salmonid and Green Sturgeon see attachment B: Salmonid and Green Sturgeon Monitoring and Exposure Evaluation.) The evidence includes the following:

*Winter-Run Chinook Salmon:* The current data suggest that young Winter-run have not yet initiated their migration into the Delta. This is expected as published statistical analyses have shown that Winter-run migration is largely triggered when flows reach 14,000 cfs, a level well above this year's drought conditions. Note that this analysis is based on a multi-agency study published by authors from NMFS, USFWS, DFW, and DWR (del Rosario, et al. 2013- published in San Francisco Estuary and Watershed Science). At this point, most Winter-run sized fish appear to be distributed well-upstream of the Delta. Monitoring data through 1/25/14 show moderate catch of Winter-run sized Chinook in the upper Sacramento River (Red Bluff), catch at the Knights Landing and the Sacramento Trawl monitoring stations considered entry points to the Delta has been rare over the migration season. Given the current upstream distribution, as well as analysis of historic data indicating 14,000 cfs as a trigger for substantial downstream migration, the proposal to open the DCC gates then close them if Wilkins Slough flows reach 7,500 cfs or if older juvenile salmonids are observed in elevated levels at Knights Landing or in the Sacramento River trawls is a reasonable measure for protection once Winter-run sized Chinook enter the Lower Sacramento River and Delta in February.

*Spring-run Chinook Salmon:* A small, but greater than average spawning run of Spring-run Chinook returned to the upper Sacramento River. In 2013, this greater-than-average return of spawners was observed across many tributaries supporting Spring-run Chinook Salmon. Rain events during mid-November increased daily average flows in upper Sacramento River tributaries conducive to triggering outmigration of yearling Spring-run Chinook into the main-stem, although the rapid return to stable tributary flows and low temperature suggest these fish may have abandoned outmigration. Hundreds of smaller-sized Spring-run Chinook Salmon juveniles continue to be observed weekly in fish monitoring at Red Bluff Diversion Dam in larger numbers than previous years. Fifty-one juvenile spring run Chinook were observed in middle (GCID) Sacramento fish monitoring stations through January 14 2014. Two juvenile Spring-run Chinook Salmon were observed in late October and early November at the Tisdale Weir

and Knights Landing fish monitoring stations. Since then, no Spring-run Chinook have been observed in lower Sacramento and Delta beach seine and trawl fish monitoring surveys or at the state and federal fish collection facilities at the South Delta CVP/SWP export pumps. Given the current upstream distribution, as well as analysis of historic data indicating 14,000 cfs as a trigger for substantial downstream migration of older juvenile salmonids, the proposal to open the DCC gates then close them if Wilkins Slough flows reach 7,500 cfs or older juvenile salmonids are observed in elevated levels at Knights Landing or in the Sacramento River trawls is a reasonable measure for protection once spring-run Chinook salmon enter the Lower Sacramento River and Delta in February.

*Longfin Smelt:* There has been no salvage of Longfin Smelt this water year. Although adult Longfin Smelt were not collected in the San Joaquin River or South Delta this December, low numbers of larval Longfin Smelt have been collected in the region by last week's Smelt Larva Survey. Importantly, the majority of larval Longfin Smelt appear to be distributed in the Cache Slough Complex, lower Sacramento River, and Suisun Bay. As the proposed operations will not result in increased outflow, and exports will be maintained at low levels, it is unlikely that they will trigger a change in the Longfin Smelt distribution that will increase the population's risk of entrainment. Juvenile Longfin Smelt salvage at the CVP/SWP pumping facilities is generally higher when their distribution puts them at risk of entrainment (i.e., significant portion of the population in the South and Central Delta) and exports, as indexed by Old and Middle River flows, are high (Grimaldo et al., 2009, published in the *North American Journal of Fisheries Management*). Thus, current larval distributions and minimal pumping operations as proposed in this petition are highly unlikely to result in increased entrainment.

In addition, it is worth noting here that new, ongoing research conducted by DWR, SWC, DFW, and UC Davis is investigating the possibility of Longfin Smelt spawning and rearing in the Napa River and tributaries to the South Bay that are not currently surveyed during routine monitoring. Longfin Smelt are not at risk of entrainment in these areas. While research on these areas is only just beginning, anecdotal evidence suggests that these areas may be productive for Longfin Smelt and there are already observations of Longfin Smelt in South Bay tributaries in 2014.

Notably, larval Longfin Smelt have been detected at the station 716 near the Barker Slough pumping plant, pumping restrictions under the DFW Incidental Take Permit for Barker Slough operations have been triggered. Hence, DFW has provided formal advice to the Water Operations Management Team (WOMT) group to limit pumping to 50 cfs until Longfin Smelt are not detected at station 716.

*Delta Smelt:* As for Longfin Smelt, no Delta Smelt have been salvaged this water year at the South Delta fish facilities. This is expected as adult Delta Smelt appear to be

distributed well away from entrainment risk this winter. For example, the first Spring Kodiak Trawl survey (1/13/14-1/14/14) collected 148 Delta Smelt, with over half the catch in the Suisun Bay region, with the rest in Cache Slough Complex and the lower Sacramento River and confluence region. The Spring Kodiak Trawl is conducted on a monthly basis, with the second survey planned for the week of February 10. Adult Delta Smelt are highly unlikely to shift their distribution towards the South Delta until a “first flush” event occurs (e.g. high turbidities brought on by a major precipitation event) and triggers upstream movement. As the proposed operations will involve conditions of reduced exports and outflow, it is highly unlikely that they will result a change in Delta Smelt distributions that would increase entrainment risk to the population. Published analyses of a 13-year dataset of salvage records at the CVP/SWP fish collection facilities indicate that increased salvage of Delta Smelt at the CVP/SWP occurs when turbidities increase in the South Delta and Old and Middle River flows are highly negative (Grimaldo et al., 2009, published in the *North American Journal of Fisheries Management*). Given the present low turbidity conditions throughout the Delta, and the proposed reduction in export levels to minimum health and safety standards, there is no reason to expect the proposed operations to create conditions that would trigger movement toward the CVP/SWP pumps.

The Smelt Larval Survey has not collected any Delta Smelt this year during the two January surveys. Unless there is a shift in current weather patterns that brings about increased turbidities and outflow, adult and juvenile Delta Smelt are unlikely to be an entrainment issue this year.

*Steelhead:* Information on steelhead is extremely limited. Observed 2013 patterns of outmigrating *O. mykiss* juveniles during the summer at RBDD were similar to previously observed patterns, although a greater abundance appears to have passed than in the past 5 years. Smolts are seldom observed in Sacramento River and Delta fish monitoring due to sampling biases related to the large fish size and their swimming ability. False negatives are more likely with Steelhead smolts than Winter-run sized Chinook salmon, but historic data can be assessed to consider their typical periodicity in Delta monitoring efforts. Between 1998 and 2011, observations of natural-origin Steelhead juveniles (n=2137) in these efforts in the Delta occurred less than 10% of the time in January, >30% of the time during February, and >20% of the time during March. A single Steelhead was observed in lower Sacramento and Delta seine and trawl surveys in water year 2014 (one 300mm observed 12/11/13 in the Chipps Island Trawl). One Steelhead has also been observed at the state and federal fish collection facilities at the South Delta CVP/SWP export pumps. While outmigrating Steelhead have not been observed in the Mossdale trawl this winter, it is feasible the fish observed in salvage was from the San Joaquin or Sacramento River. Given the general pattern of the majority of juvenile Steelhead presence in the Delta during March, as well as their

larger size making them less susceptible to predation, and longer residency within the Delta, the proposal to open the DCC gates but close them if Wilkins Slough flows reach 7,500 cfs or older juvenile salmonids are observed in elevated levels at Knights Landing or in the Sacramento River trawls is a reasonable measure for protection prior to the majority of smolts migrating through the Lower Sacramento and San Joaquin rivers and into the Delta before March. The lack of observational data on Steelhead create significant uncertainties surrounding the risk to these populations due to entrainment into the South Delta due to opening the Delta Cross Channel

*Green Sturgeon:* Information on Green Sturgeon is extremely limited. Spawning in the upper Sacramento River during 2013 was documented. Juveniles were observed at RBDD and more juveniles (n=443) were enumerated than the long-term average of 426 fishes. Green Sturgeon observations are extremely rare in the Delta and none have been observed in lower Sacramento and Delta fish monitoring surveys, or at the fish collection facilities at the South Delta CVP/SWP export pumps in recent years. In 2011, over a thousand juvenile Green Sturgeon were enumerated at RBDD and none were observed in Delta or Bay fish monitoring. While this paucity of Green Sturgeon in the Bay/Delta monitoring data may suggest no impact due to Delta Cross Channel operations or export operations, it may also suggest the recruitment of juveniles may be limited before the species reaches one year of age due to habitat, predation, or multiple stressors. Green Sturgeon also may not have produced sufficient juveniles to recruit into an emigrating juvenile lifestage that can be detected during monitoring activities. This lack of observational fish data on Green Sturgeon creates significant uncertainties surrounding the species' entrainment risk due to opening the Delta Cross Channel.

Under the proposed modified operations, the Interagency Ecological Program (IEP) will continue to monitor risks to key species of concern. Planned monitoring activities will allow for adequate monitoring for all species of concern, without incurring additional take. Key oversight groups (e.g. Smelt Working Group; Delta Operations for Salmon and Sturgeon; WOMT) will continue to evaluate the data on a weekly basis, or more frequently if necessary. In addition, USFWS has held and continues to host discussions regarding the potential for enhanced field monitoring and modeling activities. Moreover, DWR is currently working on a contract to expedite the implementation of the SmeltCAM, a promising new monitoring tool with multiple applications (e.g. take reduction, habitat assessments).

#### Consultation with California Department of Fish and Wildlife

DWR and Reclamation have met numerous times during the past few months with representatives of the DFW, as well as with NMFS and FWS, to discuss the hydrologic situation and potential measures to address it. On December 18, 2013, this group met to discuss water system operations, including additional openings of Delta Cross

Channel gates during the winter and spring of 2014. On January 15, 2014, DWR and Reclamation presented the water system operations proposal and the requested Delta outflow Delta Cross Channel gate operations modifications contained in this petition to DFW, NMFS and FWS (as well as to representatives of the SWRCB), and discussed it with this group again on January 24, 2014. During each of these meetings, DWR and Reclamation provided answers to questions posed by DFW. Furthermore, consultation between DWR, Reclamation, and DFW has occurred by virtue of the Governor's creation of a Drought Task Force. Both direct talks concerning this petition and discussions on the drought more generally have presented opportunities to consult as required under the State Water Code.

#### **4) The Change is in the Public Interest**

The change is in the public interest by preserving water supplies to meet health and safety needs, by increasing the duration and likelihood of maintaining at least minimal salinity control later in year, and by increasing the duration and likelihood of success in maintaining cold water pool sufficient for sensitive species through the remainder of the year.

The public interest is best served by maintaining sustainable minimum exports and water quality necessary for the protection of human health and safety. DWR and Reclamation will inquire with the local agencies receiving water from the Projects to better understand the minimum health and safety needs of those agencies as the water year progresses.

In addition, by modifying the Delta outflow as proposed in this petition the probability that the Projects will be able to prevent the "loss of control" over Delta salinity this summer will increase. If Delta outflow continues to drop as a result of insufficient storage to control seawater intrusion, this condition will persist until the Northern California receives a rainy season with sufficient runoff to flush the Delta of ocean water to once again allow for in-delta beneficial uses. In this event, the enormous amount of water necessary to flush the delta could constitute an unreasonable use of water.

#### **III. Due Diligence has been Exercised**

DWR exercised due diligence to avoid this situation in reducing allocations to its water supply contractors in 2013 when the current severe dry pattern began to emerge, and by making an initial allocation for 2014 that was the lowest on record. As discussed earlier this allocation may be reduced further and possibly no 2014 water would be allocated to SWP water supply contractors and Feather River settlement contractors may see a 50 percent shortage in allocation.

In addition, prior to this petition DWR and Reclamation have reduced exports and maintained the minimum outflow necessary for salinity control. All avenues to conserve water in storage were exercised while continuing to meet regulatory requirements.

The drafting of this petition began immediately upon the issuance of the Governor's Proclamation of a State of Emergency , and information supportive of this petition was developed through the marshalling of staff resources to examine and determine narrow and focused changes to address the problem. As noted above, DWR and Reclamation have met with SWRCB staff and with representatives of DFW, NMFS and FWS, to discuss the elements of this petition, and to seek their input on how best to manage multiple needs for water supply.



## A PROCLAMATION OF A STATE OF EMERGENCY

**WHEREAS** the State of California is experiencing record dry conditions, with 2014 projected to become the driest year on record; and

**WHEREAS** the state's water supplies have dipped to alarming levels, indicated by: snowpack in California's mountains is approximately 20 percent of the normal average for this date; California's largest water reservoirs have very low water levels for this time of year; 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; and

**WHEREAS** dry conditions and lack of precipitation present urgent problems: drinking water supplies are at risk in many California communities; fewer crops can be cultivated and farmers' long-term investments are put at risk; low-income communities heavily dependent on agricultural employment will suffer heightened unemployment and economic hardship; animals and plants that rely on California's rivers, including many species in danger of extinction, will be threatened; and the risk of wildfires across the state is greatly increased; and

**WHEREAS** extremely dry conditions have persisted since 2012 and may continue beyond this year and more regularly into the future, based on scientific projections regarding the impact of climate change on California's snowpack; and

**WHEREAS** the magnitude of the severe drought conditions presents threats beyond the control of the services, personnel, equipment and facilities of any single local government and require the combined forces of a mutual aid region or regions to combat; and

**WHEREAS** under the provisions of section 8558(b) of the California Government Code, I find that conditions of extreme peril to the safety of persons and property exist in California due to water shortage and drought conditions with which local authority is unable to cope.

**NOW, THEREFORE, I, EDMUND G. BROWN JR.,** Governor of the State of California, in accordance with the authority vested in me by the state Constitution and statutes, including the California Emergency Services Act, and in particular, section 8625 of the California Government Code **HEREBY PROCLAIM A STATE OF EMERGENCY** to exist in the State of California due to current drought conditions.

### **IT IS HEREBY ORDERED THAT:**

1.State agencies, led by the Department of Water Resources, will execute a statewide water conservation campaign to make all Californians aware of the drought and encourage personal actions to reduce water usage. This campaign will be built on the existing Save Our Water campaign ([www.saveourh20.org](http://www.saveourh20.org)) and will coordinate with local water agencies. This campaign will call on Californians to reduce their water usage by 20 percent.

2.Local urban water suppliers and municipalities are called upon to implement their local water shortage contingency plans immediately in order to avoid or forestall outright restrictions that could become necessary later in the drought season. Local water agencies should also update their legally required urban and agricultural water management plans, which help plan for extended drought conditions. The Department of Water Resources will make the status of these updates publicly available.

3.State agencies, led by the Department of General Services, will immediately implement water use reduction

plans for all state facilities. These plans will include immediate water conservation actions, and a moratorium will be placed on new, non-essential landscaping projects at state facilities and on state highways and roads.

4. The Department of Water Resources and the State Water Resources Control Board (Water Board) will expedite the processing of water transfers, as called for in Executive Order B-21-13. Voluntary water transfers from one water right holder to another enables water to flow where it is needed most.

5. The Water Board will immediately consider petitions requesting consolidation of the places of use of the State Water Project and Federal Central Valley Project, which would streamline water transfers and exchanges between water users within the areas of these two major water projects.

6. The Department of Water Resources and the Water Board will accelerate funding for water supply enhancement projects that can break ground this year and will explore if any existing unspent funds can be repurposed to enable near-term water conservation projects.

7. The Water Board will put water right holders throughout the state on notice that they may be directed to cease or reduce water diversions based on water shortages.

8. The Water Board will consider modifying requirements for reservoir releases or diversion limitations, where existing requirements were established to implement a water quality control plan. These changes would enable water to be conserved upstream later in the year to protect cold water pools for salmon and steelhead, maintain water supply, and improve water quality.

9. The Department of Water Resources and the Water Board will take actions necessary to make water immediately available, and, for purposes of carrying out directives 5 and 8, Water Code section 13247 and Division 13 (commencing with section 21000) of the Public Resources Code and regulations adopted pursuant to that Division are suspended on the basis that strict compliance with them will prevent, hinder, or delay the mitigation of the effects of the emergency. Department of Water Resources and the Water Board shall maintain on their websites a list of the activities or approvals for which these provisions are suspended.

10. The state's Drinking Water Program will work with local agencies to identify communities that may run out of drinking water, and will provide technical and financial assistance to help these communities address drinking water shortages. It will also identify emergency interconnections that exist among the state's public water systems that can help these threatened communities.

11. The Department of Water Resources will evaluate changing groundwater levels, land subsidence, and agricultural land fallowing as the drought persists and will provide a public update by April 30 that identifies groundwater basins with water shortages and details gaps in groundwater monitoring.

12. The Department of Water Resources will work with counties to help ensure that well drillers submit required groundwater well logs for newly constructed and deepened wells in a timely manner and the Office of Emergency Services will work with local authorities to enable early notice of areas experiencing problems with residential groundwater sources.

13. The California Department of Food and Agriculture will launch a one-stop website ([www.cdffa.ca.gov/drought](http://www.cdffa.ca.gov/drought)) that provides timely updates on the drought and connects farmers to state and federal programs that they can access during the drought.

14. The Department of Fish and Wildlife will evaluate and manage the changing impacts of drought on threatened and endangered species and species of special concern, and develop contingency plans for state Wildlife Areas and Ecological Reserves to manage reduced water resources in the public interest.

15. The Department of Fish and Wildlife will work with the Fish and Game Commission, using the best available science, to determine whether restricting fishing in certain areas will become necessary and prudent as drought conditions persist.

16. The Department of Water Resources will take necessary actions to protect water quality and water supply in the Delta, including installation of temporary barriers or temporary water supply connections as needed, and will coordinate with the Department of Fish and Wildlife to minimize impacts to affected aquatic species.

17. The Department of Water Resources will refine its seasonal climate forecasting and drought prediction by advancing new methodologies piloted in 2013.

18. The California Department of Forestry and Fire Protection will hire additional seasonal firefighters to suppress wildfires and take other needed actions to protect public safety during this time of elevated fire risk.

19. The state's Drought Task Force will immediately develop a plan that can be executed as needed to provide emergency food supplies, financial assistance, and unemployment services in communities that suffer high levels of unemployment from the drought.

20. The Drought Task Force will monitor drought impacts on a daily basis and will advise me of subsequent actions that should be taken if drought conditions worsen.

**I FURTHER DIRECT** that as soon as hereafter possible, this Proclamation be filed in the Office of the Secretary of State and that widespread publicity and notice be given of this Proclamation.

**IN WITNESS WHEREOF** I have hereunto set my hand and caused the Great Seal of the State of California to be affixed this 17th day of January, 2014.

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EDMUND G. BROWN JR.,  
Governor of California

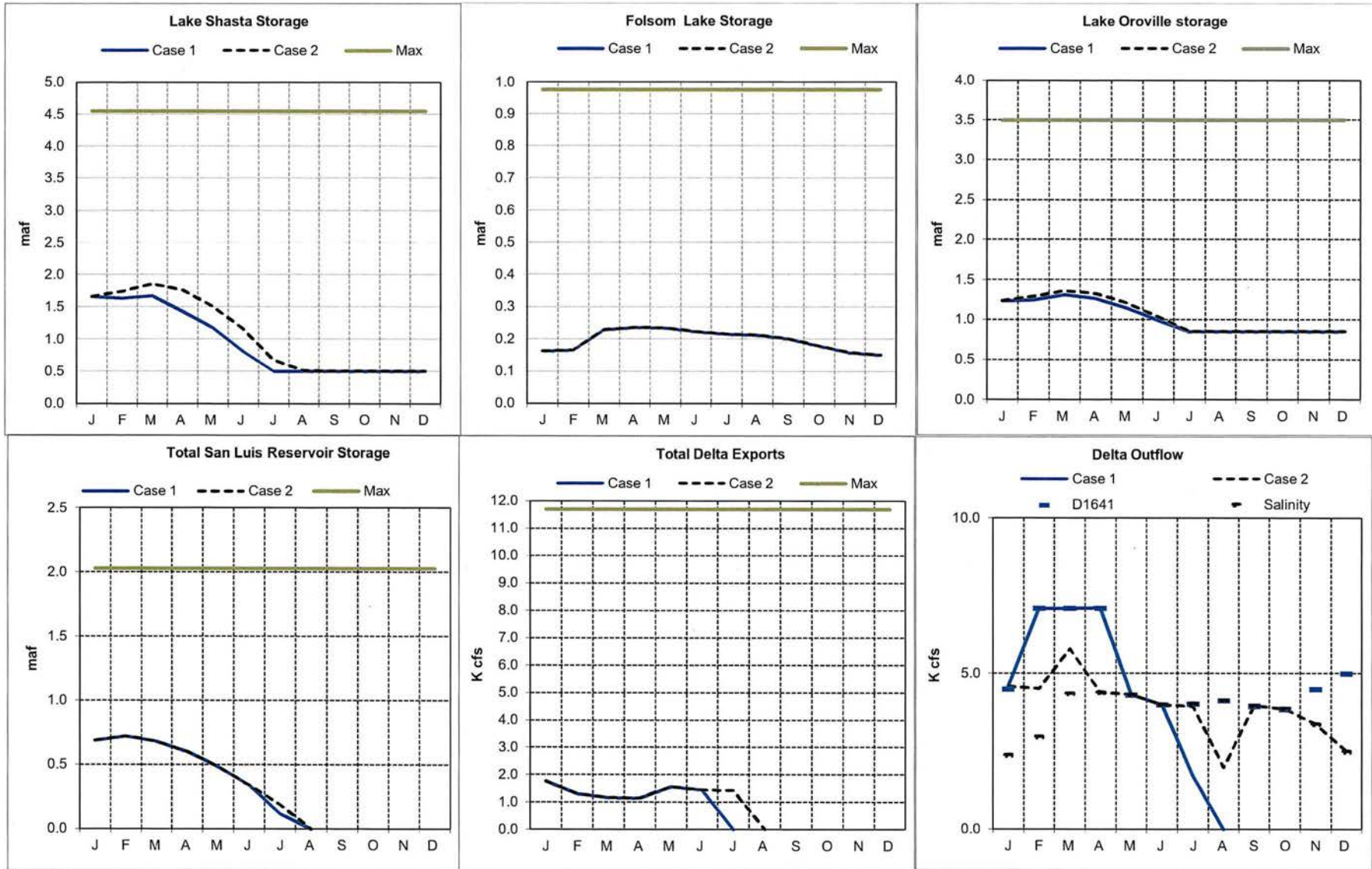
ATTEST:

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DEBRA BOWEN,  
Secretary of State

# Attachment A

## January 1st WSI Forecast



Flows are monthly averages.

## Attachment B

### Salmonid and Green Sturgeon Monitoring and Exposure Evaluation

#### Summary

Juvenile winter run and spring run Chinook salmon, steelhead, and green sturgeon are experiencing unprecedented river conditions in WY2014. Persistent lack of precipitation, minimum flows to conserve storage, and minimum exports to slow degradation of Delta water quality are challenging biologists to understand the distribution of these species through the Sacramento River and Delta. Maintaining life history diversity of salmonids is important to increasing viability of winter run and spring run Chinook salmon, and multiple juvenile life history strategies occur in the Central Valley resulting in bimodal patterns of outmigration for these species. These bimodal patterns of outmigration have not been materialized in WY2014 fish monitoring data.

Some physical triggers documented to be drivers of salmonid outmigration have not yet been met on the Sacramento River. While uncertainty exists in the current WY 2014 fish monitoring dataset, trapping conditions when recoveries of outmigrating fish are observed at rotary screw traps appear more sensitive to capturing these fish in comparison to WY 2012. In WY 2014, the capture of older juvenile sized Chinook salmon at rotary screw traps in reduced flow and turbidity conditions suggests the rotary screw traps detect fish at very low densities (indicated by 1 or 2 individuals being captured) and thus the presence of fish in higher densities (indicated by recovery of pulse > 3 fish) would be detectable when this elevated density of fish pass the trapping locations. Older juvenile winter run and spring run Chinook salmon continue to be seen is higher-than-usual levels in upper Sacramento River fish monitoring thus far in WY2014.

While entrainment risks increase when listed salmonids and green sturgeon are emigrating past an open Delta Cross Channel (DCC), biological and physical observations in winter 2014 and review of historical species presence suggest a low, but increasing, risk of population-level impacts from opening the DCC between February 1 and February 28 . Winter run and spring run Chinook salmon populations appear to remain throughout the upper and middle Sacramento River area and no pulse has been observed entering the lower Sacramento River. Historic analysis of fish monitoring suggests in Critical and Dry years 93% of winter run Chinook salmon enter the Lower Sacramento River by the end of February. Potential risks from opening the Delta Cross Channel may be further minimized by maintaining minimum combined pumping, utilizing biological and physical triggers for protective DCC gate closures, increasing fish monitoring to assess where listed salmonids are actually distributed, and utilizing these data to inform DCC gate operations.

Current Old and Middle River (OMR) flows are more positive than the most protective conditions (-2,500 cfs) that can be put into effect by the NMFS BiOp when there is an elevated risk (due to fish salvage), suggesting a decreased risk to South Delta entrainment and salvage

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than when NMFS BiOp RPA actions are taken due to maximum risk (as measured via fish salvage) with moderate certainty in biological data and high certainty in the physical data.

### **Approach**

To describe potential impacts to listed salmonids and green sturgeon, the following approach is taken.

1. Describe current status and weekly monitoring of broodyears of winter run Chinook, spring run Chinook, steelhead and green sturgeon potentially impacted by the requested DCC opening and biological and physical operational criterion between February 1 and February 28, 2014.
2. Review Delta Cross Channel Gates winter closure biological rationale and biological, behavioral, and physical mechanisms underlying action.
3. Review pertinent biological and physical concern levels regarding listed salmonids, additional recent papers regarding salmon and steelhead movement patterns, current Delta hydrodynamics, recovery of tagged salmonid groups.
4. Assess the certainty we have in these monitoring data, protection triggers, and papers germane to quantifying risks to listed salmonids and green sturgeon through discussion and documenting alternate interpretations.
5. Analyze risks to affected species with this petitions relative to risks with the unmodified D-1641 action.

#### **1. Current status**

##### **Winter run Chinook salmon**

A modest spawning run of winter run Chinook salmon (n=6,075) returned to the upper Sacramento River in 2013, which was larger than the spawning run that produced these fish in the Sacramento River during the summer of 2010. Redd surveys detected <0.5% of the winter run Chinook salmon redds built in 2013 to be downstream of the 2013 temperature compliance point at Airport Bridge. Typically a pulse of fry outmigrates from the upper Sacramento River in early October and rear in the middle Sacramento River. In fact, a pulse of Winter run Chinook fry appeared to have moved downstream of Red Bluff Diversion Dam (RBDD) during early October, although monitoring of this pattern is uncertain due to the federal furloughs that kept biologists from monitoring this site (Figure 1 and 2). If flows remain high in the fall, a substantial proportion of winter run Chinook can be transported downstream of Red Bluff Diversion Dam. However, thousands of larger-sized winter run Chinook continue to be observed weekly in fish monitoring at Red Bluff Diversion Dam in larger numbers than previous years (Figure 2). 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), approximately 1.6 million fish have migrated past RBDD by January 14, 2014 (USFWS, Red Bluff, biweekly data).

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While the absence of the majority of winter run Chinook moving past RBDD this late in the winter in RBDD screw trap monitoring records has not previously been observed, such a protracted and significant daily passage of winter run Chinook salmon past this location in January has also not been observed (Bill Poytress, USFWS, pers. comm.). Based on these current estimates of passage and juvenile abundance, there is a fair likelihood that a substantial proportion of the winter run Chinook population remains above RBDD. On recent weekly DOSS calls, the topic of the position of winter run Chinook salmon has been discussed. There has been agreement that the center of winter run Chinook distribution lies between Red Bluff and Colusa with fish going from above Red Bluff all the downstream into the Delta.

Winter run Chinook juveniles have been passing the monitoring station at the Glen-Colusa Irrigation District intake in the middle Sacramento River since October (Figure 3). As of January 27 2014, 13 winter run Chinook salmon smolts, but no fry or parr, have been observed in GCID fish monitoring in January. The declining recovery trend of outmigrating winter run Chinook past GCID's screw traps in January may suggest that winter run Chinook, which past RBDD earlier in the fall and winter as fry and parr, have abandoned outmigration to rear between RBDD and GCID. Typically, fry and parr that cannot sustain territories in river flows maintain outmigration past Knights Landing and into the Lower Sacramento River with late fall/early winter Sacramento Valley rainstorms when flows are typically greater than 7500 cfs. Infrequent, rare juvenile winter run Chinook were observed in October and December at the Tisdale Weir fish monitoring station on the Middle Sacramento River and in October at the Knights Landing fish monitoring station on the Lower Sacramento River (Table 1). Rosario et al (2013) described multiple pulses of distinctly different sized winter run Chinook salmon typically moving through the Lower Sacramento River at Knights Landing between November and January. However, there seems to have been almost a complete lack of smaller winter run Chinook fry outmigration during WY2014 through the Lower Sacramento River and Delta (Table 1), although Rosario et al (2013) did not report on any uniquely dry water years similar to WY2014. Unlike the typical pattern of substantial proportions of winter run salmonid rearing in the Delta rearing, a substantial proportion of winter run Chinook parr are undergoing smoltification while in the middle and upper Sacramento River waiting for physiological or environmental cues.

Based on 2013 escapement, the juvenile production estimate for winter run Chinook salmon juveniles entering the Delta ranges from approximately 1.32 million fish (using the JPE method from WY2013) to approximately 400,000 fish (using limited winter run Chinook specific riverine survival estimates of 0.16). No juvenile winter run Chinook salmon have been observed in lower Sacramento and Delta beach seine and trawl fish monitoring surveys or at the state and federal fish collection facilities at the South Delta CVP/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 are a diversity of opinions, and estimates of <5%, based on the information in this assessment, to as much as

>30%, based on expert opinion, of the winter run Chinook salmon are downstream of Knights Landing and in the Delta.

### **Spring run Chinook salmon**

A small, but greater than average spawning run of spring run Chinook returned to the upper Sacramento River. In 2013, this greater-than-average return of spawners was observed across many tributaries supporting spring run Chinook salmon. Rain events during mid-November increased daily average flows in upper Sacramento River tributaries conducive to triggering outmigration of yearling spring run Chinook into the mainstem, although the rapid return to stable tributary flows and low temperature suggest these fish may have abandoned outmigration (Matt Johnson, CDFW, pers comm.). Hundreds of smaller-sized spring run Chinook salmon juveniles continue to be observed weekly in fish monitoring at Red Bluff Diversion Dam in larger numbers than previous years (Figure 4). Since October, 90 juvenile, but no smolting, spring run Chinook salmon were observed in middle (GCID) Sacramento fish monitoring stations (Figure 4, these are included in the “older juvenile” data presented) through January 27 2014. Only two juvenile spring run Chinook salmon during late October and early November have been observed at the Tisdale Weir and Knights Landing fish monitoring stations in WY 2014 (Table 1). Spring run Chinook salmon have been observed outmigrating past rotary screw traps on Butte Creek and the Feather River, and will not be observed downstream due to the confluences of these watersheds to be downstream of mainstem rotary screw traps. Thus, there is additional uncertainty in being able to quickly observe pulses of these spring run Chinook entering the Delta. Since late Fall, no spring run Chinook have been observed in lower Sacramento and Delta beach seine and trawl fish monitoring surveys or at the state and federal fish collection facilities at the South Delta CVP/SWP export pumps.

### **Steelhead**

Information on steelhead is extremely limited. Observed 2013 patterns of outmigrating *O. mykiss* parr (young of year) during the summer at RBDD were similar to previously observed patterns, although a greater abundance appears to have passed than in the past previous 5 years (Figure 5). Smolts are seldom observed in Sacramento River and Delta fish monitoring due to sampling biases related to the large fish size and their swimming ability. False negatives are more likely with steelhead smolts than smaller older juvenile Chinook salmon, but historic data can be assessed to consider their typical periodicity in Delta monitoring efforts. Between 1998 and 2011, observations of natural steelhead juveniles (n=2137) in these 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. A single steelhead was observed in lower Sacramento and Delta seine and trawl surveys (one 300mm steelhead observed 12/11/13 in the Chipps Island Trawl). Multiple steelhead smolts were observed in American River fish monitoring and will not be observed anywhere before entering the Delta due to the American River confluence being downstream of the mainstem rotary screw traps. Thus, there is additional



uncertainty in being able to quickly observe pulses of American River steelhead entering the Delta. One steelhead was observed at the state and federal fish collection facilities at the South Delta CVP/SWP export pumps on January 1/23/14. No outmigrating steelhead have been observed in the Mossdale trawl this winter.

### **Green sturgeon**

Information on green sturgeon is extremely limited. Spawning in the upper Sacramento River during 2013 was documented. Juveniles were observed at RBDD and more juveniles (n=443) were enumerated than the long-term average of 426 fishes (Figure 6). Green sturgeon observations are extremely rare in the Delta and none have been 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 in recent years. In 2011, over a thousand juvenile green sturgeons were enumerated at RBDD and none were observed in river, Delta, or Bay fish monitoring. While this absence in the monitoring may suggest no impact due to Delta Cross Channel operations or export operations, it may also suggest the recruitment of juveniles may be limited before the species reaches one year old due to habitat, predation, or multiple stressors; which is a phenomenon that has been observed in other North American sturgeon species.

2. Review Delta Cross Channel Gates winter closure biological rationale and biological, behavioral, and physical mechanisms underlying action.

Emigrating salmonids are vulnerable to diversion into the DCC when the gates are open. Calendar-based closure of the DCC Gates between February and May 20 protect winter run, spring run, and fall run Chinook salmon and steelhead from entrainment into the Interior Delta and prohibits elevated risks to these salmonids. Analysis of historic recovery data from Knights Landing suggest in Critical and Dry years, on average 72% and 92% of winter run Chinook salmon enter the Lower Sacramento River by the end of January or February, respectively. Calendar-based closures of the DCC are based on historical patterns of outmigrating fish; with some exceptions allowed prior to January 31.

A series of studies conducted by Reclamation and USGS (Horn and Blake 2004) used acoustic tracking of released juvenile Chinook salmon to follow their movements in the vicinity of the DCC under different flows and tidal conditions. The study results indicate that the behavior of the Chinook salmon juveniles increased their exposure to entrainment through both the DCC and Georgiana Slough. Horizontal positioning along the east bank of the river during both the flood and ebb tidal conditions enhanced the probability of entrainment into the two channels. Upstream movement of fish with the flood tide demonstrated that fish could pass the channel mouths on an ebb tide and still be entrained on the subsequent flood tide cycle. In addition, diel movement of fish vertically in the water column exposed more fish at night (~70%) to entrainment into the DCC than during the day (~30%; Jon Burau, pers. comm.). Additional studies have shown that the mortality rate of the fish diverted into the DCC and subsequently

into the Mokelumne river system is quite high (Perry and Skalski 2008; Vogel 2004, 2008). Closure of the DCC gates during periods of salmon emigration eliminates the potential for entrainment into the DCC and the Mokelumne River system with its high mortality rates. In addition, closure of the gates appears to redirect the migratory paths of emigrating fish into channels with relatively less mortality (*e.g.*, Sutter and Steamboat Sloughs), due to a redistribution of river flows among the channels. The overall effect is an increase in the apparent survival rate of these salmon populations as they move through the Delta.

### 3. Pertinent biological and physical concern levels for salmonids

While it has been hypothesized that winter run Chinook fry and parr simply migrate downstream daily regardless of environmental cues, the interactions between a fish's physiology and behavior make this process more complex. Smolting is observable as interwoven endocrine system and behavioral shifts that appear to be affected by ecological drivers (*i.e.* prey density, photoperiod, temperature, flow, turbidity). Fry, not washed out by sufficient flows or lack of habitat (a density-dependent process), use positive rheotaxis (swim into flow) to establish feeding stations close to their natal redds. These bottom-oriented parr effectively defend territories until a physiological shift makes the fish more receptive to environmental cues. At the same time, the behavior of these fish change towards schooling and active movement downstream. Biologists have adapted using observations of these environmental cues and movement patterns to precautionarily operate the DCC gates and export facilities for the last decade since the Environmental Water Account used the Chinook Salmon Decision Tool. The Chinook Salmon Decision Tree was last revised in 2007 (USBR 2008), although it was modified (and codified operationally) in the Biological Opinion (BiOp, NMFS 2009).

**First Alert:** The First Alert of the Chinook Salmon Decision Tree was codified in the NMFS BiOp RPA Action IV.1.1 and modified to replace the yearling Chinook catch component with a flow component for implementation in October and November 2013. Both components of this Alert were exceeded on November 20, 2013 indicating conditions conducive to yearling spring run Chinook salmon migration from the tributaries to the mainstem Sacramento River. These components were mean daily flows greater than 110 cfs in Deer or Mill creeks and mean daily flow increasing more than 50% in Deer and Mill creeks. These conditions quickly returned to levels less than the Alert's criteria within five days (Figure 7 and 8).

**Second Alert:** The Second Alert of the Chinook Salmon Decision Tree was codified in the NMFS BiOp RPA Action IV.1.1. The Sacramento River water temperature at Wilkins Slough criterion of 56.3F was exceeded on November 9, 2013 and although somewhat variable has remained below this criterion since November 15, 2013 (Figure 9). The second component, a Wilkins Slough flow are greater than 7,500 cfs, has not been exceeded in water year 2014 (Figure 10).

Related to the Second Alert's second component regarding flow triggers for downstream migration pulses, recent synthesis of mainstem fish monitoring have shown that there is an abrupt and substantial winter run Chinook migration into the Lower Sacramento River at Knights Landing when flow at Wilkins Slough exceed 14,125cfs. When this magnitude of a pulse is observed, the first day of the pulse nearly coincided with a catch spike increase of 5% of the season's cumulative catch (del Rosario et al. 2013). Flows of this magnitude have not been observed in WY 2014. Rather, flows remained relatively stable to decreasing below Wilkins Slough throughout December to January 14, but have decreases substantially with Upper and Middle Sacramento in-river depletions (Figure 10). There is a likelihood that in water year 2014, where there has not been a large pulse flow that triggers considerable downstream migration, spring and winter run Chinook may reside in territories until reaching physiological conditions optimal for outmigration and environmental conditions optimal for reduced outmigration passage risks.

**Action Triggers:** Action Triggers in the Chinook salmon Decision Tree were modified and codified in NMFS BiOp RPA Action IV.1.2. These Action Triggers use fish monitoring catch indices from Knights Landing and Sacramento River to detect substantial winter run Chinook migration into the lower Sacramento River. Catch index exceedance values were based on analyses of historic screw trap, beach seine, and trawl data (Chappell 2004).

Although WY 2001 was somewhat different regarding Sacramento River flow, it is as close as a comparison we have for the conditions we've observed in WY 2014. In WY 2001, fall and early flows were low, very stable, and only achieved the Salmon Decision Tree Wilkins Slough flow exceedance Second Alert twice before February. Also, the Knights Landing Catch Index was exceeded with both of these flow alerts being exceeded. However, a substantial older juvenile Chinook catch pulses did not occur until February. In 2000-2001, the intermittent catch of older juveniles during the Fall and early winter accounted for 8-10% of the year's total recoveries of older juveniles at those monitoring stations. This 8-10% moving past Knights Landing provided distinctly different Knights Landing rotary screw trap, Sacramento River trawl, and beach seining recovery patterns and numbers than the monitoring results of the current WY 2014 effort (Table 2, Figure 11 and 12). In comparison, the juvenile production estimate of winter run Chinook entering the Delta for WY2001 was estimate to be approximately 370,000 fish, which is less than the estimates of approximately 1.3 million to 410,000 fishes entering the delta using 2013 adult spawner escapement and a range of river survival estimates from 0.53 to 0.16, respectively. However, there were approximately twice as many older juvenile Chinook salmon (n= 37) recovered at Knights Landing and two exceedances of the Knights Landing Catch Index compared to Knights Landing and Tisdale rotary screw traps combine (n= 17) in WY 14 (Table 2). Also, unlike WY 2014 when older juvenile Chinook salmon have yet to be recovered in beach seine or trawl monitoring (up to January 26, 2014), in WY 2001 there were 46 older juveniles captured during this dry period in beach seines and an additional 7 fish in the Sacramento Trawl monitoring observed in Delta monitoring during this period, prior to

substantial flows on the Sacramento River in WY2001 (Table 2). This comparison of dry hydrology fish monitoring suggests that WY2014 monitoring results suggest that less fish have entered currently than in comparable years when 8-10% were approximated to have entered the Delta undetected.

Multiple exceedance levels exist to modify DCC operations in a manner that reduces risks due to the elevated presence of spring run and winter run Chinook salmon upstream of the Delta. Neither the Knights Landing Catch Index nor Sacramento River Catch Index have exceeded any action trigger threshold in WY 2014, so no DCC gate closure was required by the NMFS BiOp until December 1, the first calendar based date for DCC closure. The DCC gates were occasionally closed in October and November to assist in meeting the Rio Vista flow criterion in D-1641.

The NMFS BiOp RPA Action IV.1.2 modified the Chinook Salmon Decision Tree to precautionarily close the DCC later in the winter when Knights Landing Catch and Sacramento River Catch indices may be under-representative of the number of fish passing these locations due to poor trap efficiencies and detection rate or low production. The flow and turbidity conditions when juvenile winter and spring run Chinook salmon have been observed at in these rotary screw traps in WY 2014 appear to be similar and even lower in most cases than when these levels (1 or 2 individuals) of capture have occurred previously at these sites in recent years (Table 2). In WY 2014, these data indicate under lower turbidity and flows, these rotary screw traps are capable of detecting low densities of migrating fish (1 or 2 individuals). Additionally, mainstem rotary screw traps have been operating during the night for the greater portion of WY2014, when the perceived bias due to fish visual cues and behavior caused by clear water is less likely. These lines of evidence suggest that Sacramento River mainstem rotary screw traps have captured winter run and spring run Chinook of small and large sizes in 2013 and these monitoring efforts are sensitive to detecting the distribution of individual, and thus pulses, of these species.

A bias is inherent in every type of fish monitoring technique used to evaluate fish presence and distribution along the Sacramento River and through the Delta. It is hypothesized that passage becomes less detectable due to decreased ability to avoid the traps under high water velocities and increased turbidity. While false negatives in the fish monitoring system are possible, in WY2014 the recovery of fish in a broad range of densities between Red Bluff Diversion Dam and Chipps Island suggests false negatives are very unlikely. Monitoring results from rotary screw traps in WY2014 in comparison to these same locations in WY 12 show current efforts are capable of detecting similar very low densities of individuals migrating under low flow and turbidity conditions (Table 2). In WY 2014, the capture of older juvenile sized Chinook salmon at rotary screw traps in reduced flow and turbidity conditions suggests the rotary screw traps detect fish at very low densities (indicated by 1 or 2 individuals being captured) and thus the

presence of fish in higher densities (indicated by recovery of larger pulses of fish) would be detectable when this elevated density of fish pass the trapping locations.

The Chinook Salmon Decision Tree Action Triggers proposed in the 2008 Biological Assessment (USBR 2008) included operational water quality criteria to assess when there is an elevated risk of exceeding D-1641 water quality standards when the DCC is closed and export levels are maintained. Increased susceptibility to salinity intrusion in the South Delta is indicated when the following EC levels are exceeded: Jersey Point >1.8 EC, Bethel Island >1.0, and Holland Tract >0.8. Currently, export levels are at combined minimum pumping levels and all three operational water quality concern criteria have been exceeded at least once during January (Figure 13-15). Water quality modeling demonstrating the incremental benefit to water quality at these locations is included in Appendix A and B.

### **Current Delta Cross Channel Operations, and Delta Hydrodynamics and Survival:**

Action IV.2.3 in the 2009 NMFS BiOp uses fish loss density, daily loss, and surrogate Coleman National Fish Hatchery (CNFH) releases of winter run and late fall 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 -5,000cfs started January 1, although it has not yet 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.

Earlier in January 2014, operational considerations for D-1641 outflow standards controlled exports to 1,500 cfs combined exports at the state and federal export facilities, and in the past weeks operational consideration for D-1641 Municipal and Industrial water quality standards in the South Delta surpassed outflow considerations, and these considerations have controlled exports to combined exports of 1500cfs pumping. . Although some flow gauges remain inoperable along Old and Middle River, average daily flows in Old and Middle River have averaged approximately -1800cfs in December 2013, and are averaging approximately -1400 in January 2014 (Figure 16). Currently, combined export levels are less than 1,500 cfs, and are required due to the lack of Delta inflow and consideration for South Delta water quality. These export levels, and those described in the petition, maintain Old and Middle River conditions less negative than the most protective Action Response in NMFS BiOp Action IV.2.3 and provide south Delta hydrodynamic conditions more conducive to salmonids successfully exiting the Delta at Chipps Island (relative to a condition with more negative OMR conditions).

The anticipated Delta inflow levels (4500 cfs) described in this petition necessary to maintain currently degraded water quality conditions are much lower than are afforded under minimum standards to meet the D-1641 X2 standard in February. As stated in the petition, 7,100 cfs would

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be necessary as the D-1641 Habitat Protection Flow this month if not for extraordinary meteorological and hydrologic conditions. This reduction in Delta inflow from 7100 cfs to 4500 cfs may influence survival of fish entering the Delta. A decrease in inflows increases fish's residence time in the Delta, as well as reverse advection of these fish in the north Delta, and these are likely to increase mortality. The potential for tidal "sloshing" of salmonids past Georgiana Slough and the DCC will increase with reduced inflow, and this will increase exposure of individuals to these routes into the Interior Delta, which may increase mortality of these fishes. The quantity of increased mortality is uncertainty, since no available models link residence time or Interior Delta entrance passages to a quantifiable level of mortality. The difference between 7100 and 4500 cfs is small compared to the daily tidal flux, and tidal hydrodynamics become a greater drivers of the hydraulics around the DCC gates at lower inflows. Mortality may also increase with lower inflows than mandated in D-1641, due to disorientation of salmonids making them more susceptible to predation, caused by entrainment into the DCC.

**Recovery of tagged salmonid groups:** The majority of tagged salmon releases have not yet been made in WY2014, but two groups provide some information useful to assessing Chinook salmon risks. A November release of 100,000 fall Chinook in the Mokelumne River and a December release of 267,000 late fall Chinook in Battle Creek may provide information in the river and Delta monitoring of listed species. As of January 13 2014, no fish from the November release of 100,000 fall Chinook in the Mokelumne River have been recovered in the Delta or salvage fish monitoring. As of January 13 2014, the December release of 267,000 late fall Chinook in Battle Creek has resulted in detection of 40 fish at the GCID rotary screw trap and five of these fish exiting the Delta at Chipps Island in the past week, but not in salvage fish monitoring effort. Although these fish were recovered in the middle River and Delta, they were not observed in other monitoring efforts at Tisdale, Knights Landing, Sacramento trawl, or in the Delta Juvenile Fish Monitoring Program beach seines. The absence of the larger Battle Creek tagged late fall Chinook from these efforts may be indicative of their large size. These groups of tagged Chinook are likely in different physiological condition, are almost twice the size, and thus do not make good surrogates for winter run Chinook salmon. Using information from these fish to assess outmigration of winter or spring run Chinook salmon is highly uncertain. Further, these data suggest uncertainty exists in our monitoring system regarding recovery of groups of fish as large as 267,000 fish. While the actual number of winter run Chinook passing these monitoring stations is unknown, more winter run Chinook were seen at most these locations than the tagged CWT group. This information creates uncertainty in interpreting fish monitoring results regarding quantities of a fish population migrating past monitoring stations and indicates a substantial quantity of winter run Chinook could migrate downstream undetected.

**4. Quantifying risks to listed salmonids and green sturgeon and assessing the certainty we have in the evidence for these risks.**

Fish monitoring observations made through January 27, 2014 suggest that pulses of listed salmon have passed middle Sacramento River monitoring sites at Glen-Colusa Irrigation District, and continue to rear and slowly migrate downstream, but these pulses have not passed Knights Landing into the Lower Sacramento River. The second component of the second alert of NMFS BiOp RPA IV.1.1 and the Chinook Salmon Decision Tree exceeding 7,500 cfs at Wilkins Slough (adjacent to Knights Landing) has not been exceeded. While clear water and low flows may influence the efficiency of monitoring stations, the detection of older juveniles in WY2014 appears to be occurring at conditions perceived to be worse for detecting fishes. While it is improbable that fish are captured randomly in rotary screw traps at low densities and then not recovered during higher density migration quantities, considerably more juveniles may have to pass downstream in order for 1 or 2 to be detected at monitoring stations. On occasion, these stations have operated for up to 24 hour periods during WY2014, when clear water would not influence efficiencies at night. While the absence of detecting fish in the Knights Landing and Tisdale rotary screw traps should not lead to the assumption that listed fish have not passed this location, recent assessments of these data suggest that catch spikes of as little as 5% cumulative catch are observable and are nearly coincident with rapid increases in flow greater than 14,125 cfs. Historic analyses (Chappell 2004) developed a catch index value of greater than or equal to 3 fish/TAF at Knights Landing rotary screw trap or Sacramento fish monitoring, indicative of recovery of older juveniles moving past the site at higher densities and elevating the risk of entrainment into an open Delta Cross Channel.

Observations made through January 14, 2014 suggest that abiotic triggers for pulsed migration of a substantial, detectable percentage (>5%) of winter run Chinook salmon have not occurred in WY2014. Detection of low densities of older juveniles in rotary screw traps appears to have increased over normal environmental conditions, suggesting there has been a decreased risk to missing fish moving by at higher densities due to poor turbidity and flow conditions at trapping sites. Substantial catches of larger-size juvenile winter run Chinook continue daily at RBDD rotary screw traps, the majority of an estimated JPE has not been observed to have not past RBDD rotary screw trap, and the catch index at Knights Landing has not exceeded 1 fish/day. These lines of evidence support the winter run Chinook population remaining above the lower Sacramento River, which keeps risks from opening the DCC under current fish distribution conditions very low. The fish monitoring surveys used for the Knights Landing and Sacramento Catch indices appear to be detecting low density of fish, and thus using established biological and physical triggers for closing the DCC gates maintains protection for these older juvenile Chinook salmon (i.e winter run and spring run Chinook). Thus, the risks to winter run and spring run Chinook salmon, steelhead, and green sturgeon populations with this petition are not greater than with the unmodified action at the population scale, however, there is a risk of entraining individuals through an open DCC gate. While the monitoring system continues to perform adequately, Chinook Salmon Decision Tree biological trigger of Knights Landing Catch Index exceeding 3 fish/day and Wilkins Slough flows greater than 7500cfs provides for protective closure of the DCC during the petition's February period.

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Based on observational fish and physical data, currently there is not an elevated risk of entrainment into the Interior Delta to winter run Chinook, spring run Chinook salmon, and green sturgeon populations from opening the Delta Cross Channel. The risk to these populations will increase when flow and associated physical cues change, as well as, the later into the winter a significant proportion of winter and spring run Chinook remain rearing above the Lower Sacramento River. Green sturgeon likely did not produce sufficient juveniles to recruit into an emigrating juvenile lifestage. The lack of observational fish data on steelhead and green sturgeon create significant uncertainties surrounding the risk to these populations due to entrainment into the South Delta due to opening the Delta Cross Channel. Entrainment into the Interior Delta likely exposes individuals from these populations to lower survival than through the western Delta or mainstem Sacramento River, but a previous study on steelhead (Singer et al 2013) did not demonstrate this to be always true. In that study, survival was estimated to be higher through the eastern Delta route (i.e. Georgiana, Mokelumne, and San Joaquin River routes) than the western Delta route (Sutter and Steamboat Sloughs) in one of two years studied, although survival was highest along the Sacramento mainstem route in both years.

The Delta trawl fish monitoring efforts are detecting low densities of outmigrating tagged Chinook salmon. Thus, the presence of tagged fish in the Delta monitoring and the rare observation of smaller outmigrating salmonids, suggest pulses of outmigrants and even individuals are detectable under current Delta monitoring efforts. It is unlikely that we would be able to detect fish sized larger (tagged) and smaller (fall run) but not winter run Chinook and yearling spring run Chinook in the Delta, further suggesting the majority of these populations remain upstream of these sampling sites in the Delta. While the weather conditions remain the same and D-1641 compliance standard become more stringent into the winter and spring, there is a high certainty that combined 1,500cfs export levels are likely to be all the exports combined. Thus, while the necessity to reduce the vulnerability of emigrating winter run Chinook, yearling spring run Chinook, and CV steelhead in the lower Sacramento River to entrainment into channel of the South Delta is very low due to the lack of their presence in these areas, current Delta hydrodynamic conditions are better than those used by the agencies to protect emigrating salmonids from entrainment into the south Delta from the Sacramento River and Interior Delta (i.e. Forks of the Mokelumne). The Delta conditions observed in December 2013 and January 2014 may have led to our observation on no recovery of tagged Chinook in the salvage, yet recovery of these fish at Chipps Island. Based on observation and physical data, currently these is a lower risk to winter run Chinook, spring run Chinook, steelhead and green sturgeon to hydrodynamic conditions in the Interior and South Delta caused by CVP/SWP export operations than if the D-1641 Operational Standard was being implemented to its greatest extent.

**5. Analyze risks to affected species with this petition relative to risks with the unmodified D-1641 operational standard.**



The relative risks of the petition vs. an unmodified operation may be considered in two ways. First, one can consider the relative risk for any individual salmonid that passes the Delta Cross Channel. For that individual, the risk of diversion into the DCC, and into a migratory pathway that has been shown to be associated with lower outmigration success, is increased for the petition (open DCC with physical and biological triggers for fish protection) compared to the unmodified action (closed DCC). The likelihood of entrainment of an individual into a closed DCC is zero. The likelihood of entrainment of an individual into an open DCC (the measure of increased risk) depends on the local flow regime and the position of the individual in that flow regime. It should be noted that individuals that pass the DCC, whether open or closed, may still enter a lower survival migratory pathway via Georgiana Slough.

Second, one can consider the relative risk for the different populations of green sturgeon and listed salmonids (winter-run and spring-run Chinook, steelhead). Quantification of this population-level risk requires an estimate of the exposure of the population (in terms of number of individuals or fraction of the population), multiplied by the individual risk assessment described in the paragraph above. An assessment of the distributions of the listed sturgeon and salmonid populations is provided in section 1 through 4; the degree of increased risk increases with the fraction of the population assumed to be exposed to an open DCC.

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Table 1. Fish observation data from Tisdale and Knights Landing rotary screw traps in WY 2014. Data updated through January 27, 2014.

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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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	7.1	1	38	38	1	0	0	0	0	0	0	0.057	0.000	0
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
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
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
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
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
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
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
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
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
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
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
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
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	0.034	0.000	0
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	0	1	0	0	0.000	0.032	0

Table 2. Environmental data from Tisdale and Knight Landing rotary screw trap for WY 2014 when winter run and spring run Chinook salmon were enumerated between October 1 and January 27, but only through January 14 during other observational periods. NA = Not accessed or available.

Location and number of fish recovered	Number of fish observed	Turbidity			Daily flows at Wilkins slough		
		Average	Min	Max	Average	Min	Max
<b>Combined Tisdale and Knights Landing WY 2014</b>							
1 fish	13	6.1	1.1	11.4	4465	3395	6405
2 fish	4	4.7	1.5	7.7	4431	3476	5902
<b>Tisdale 2011-2012</b>							
1 fish	7	8.41	5.8	12.4	7069	4870	11900
2 fish	6	9.27	8	10.6	6040	5050	7690
<b>Knights Landing 2011-2012</b>							
1 fish	4	9.39	7.8	10.6	6967	8440	5893
2 fish	6	6.73	6.1	7.3	9299	9454	9144
<b>Knights Landing 2000-2001</b>							
1 fish	8	NA	NA	NA	NA	NA	NA
2 fish	2	NA	NA	NA	NA	NA	NA
>3 fish	27	NA	NA	NA	NA	NA	NA
<b>Beach Seine 2001-2001</b>							
1 fish	6	NA	NA	NA	NA	NA	NA
> 4 fish	42	NA	NA	NA	NA	NA	NA
<b>Sacramento Trawl 2000-2001</b>							
1 fish	2	NA	NA	NA	NA	NA	NA
2 fish	2	NA	NA	NA	NA	NA	NA
3 fish	3	NA	NA	NA	NA	NA	NA

Figure 1. Red Bluff Diversion Dam passage of juvenile older Chinook salmon and associated environmental data. Figure supplied by DWR to DOSS on January 27, 2014.

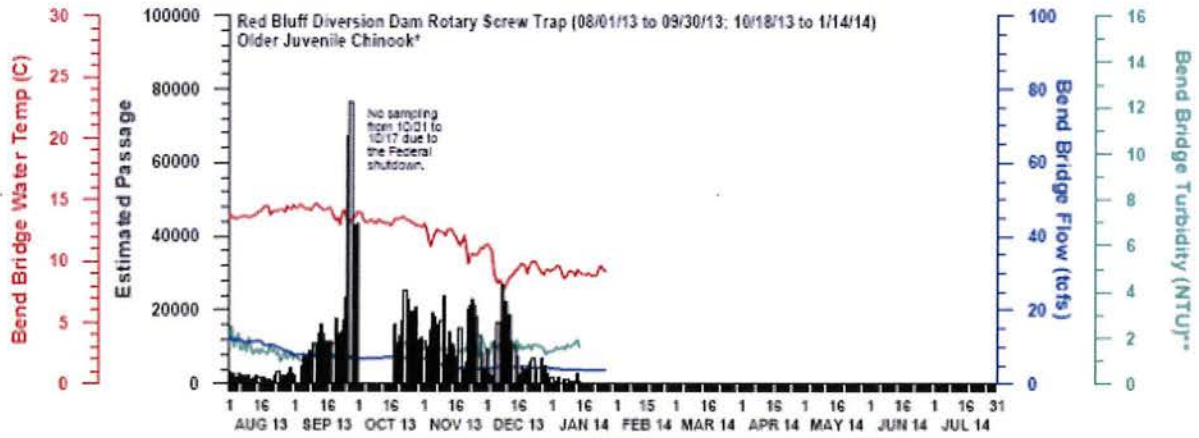


Figure 2. Weekly estimated passage of juvenile winter run Chinook Salmon at Red Bluff Diversion Dam (RK 391) by brood-year (BY). Fish were sampled using rotary-screw traps for the period July 1, 2007 to present. Winter run passage value interpolated using a monthly mean for the period of October 1 through October 17, 2013 due to government shutdown. Figure supplied by USFWS (2014).

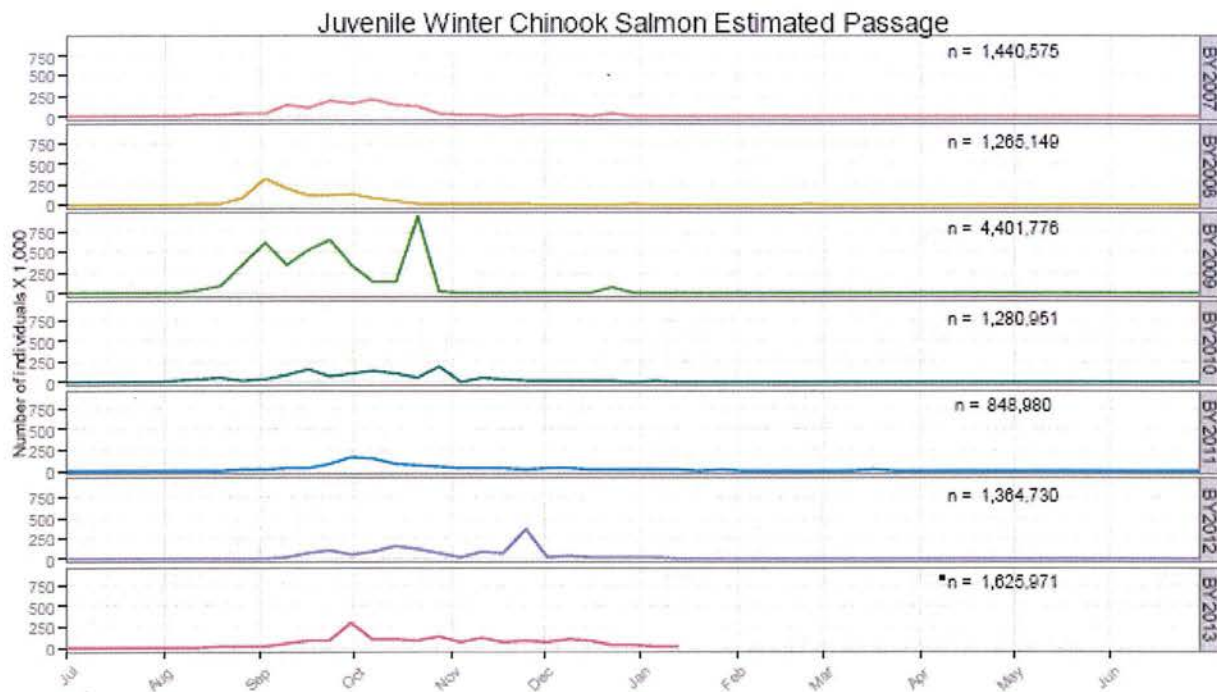


Figure 1. Weekly estimated passage of juvenile winter Chinook Salmon at Red Bluff Diversion Dam (RK391) by brood-year (BY). Fish were sampled using rotary-screw traps for the period July 1, 2007 to present.

\*Winter run passage value interpolated using a monthly mean for the period October 1, 2013 - October 17, 2013 due to government shutdown.

Figure 3. Glen-Colusa Irrigation District Rotary Screw Trap older juvenile Chinook salmon catch data and associated environmental data. Figure supplied by DWR to DOSS on January 27, 2014.

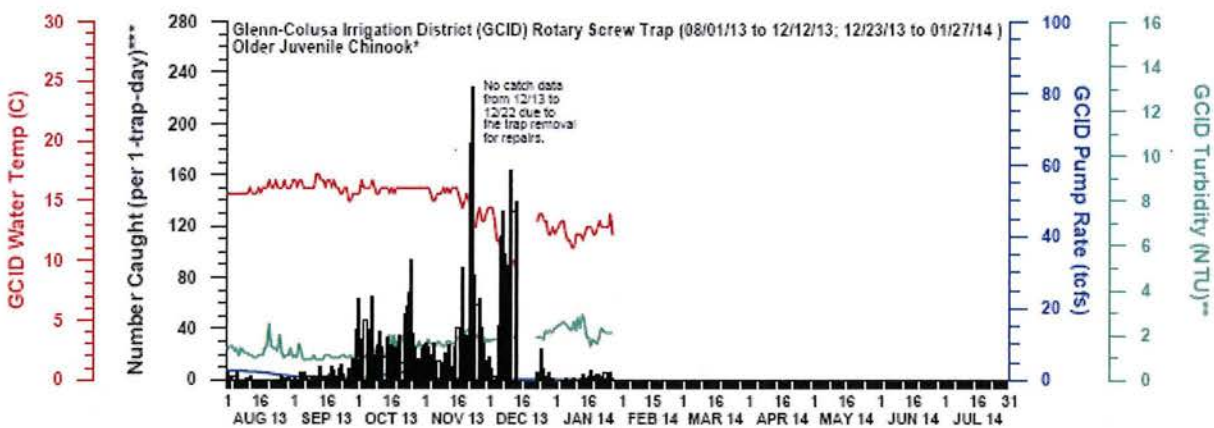


Figure 4. Weekly estimated passage of juvenile spring run Chinook Salmon at Red Bluff Diversion Dam (RK 391) by brood-year (BY). Fish were sampled using rotary-screw traps for the period July 1, 2007 to present. Figure supplied by USFWS (2014).

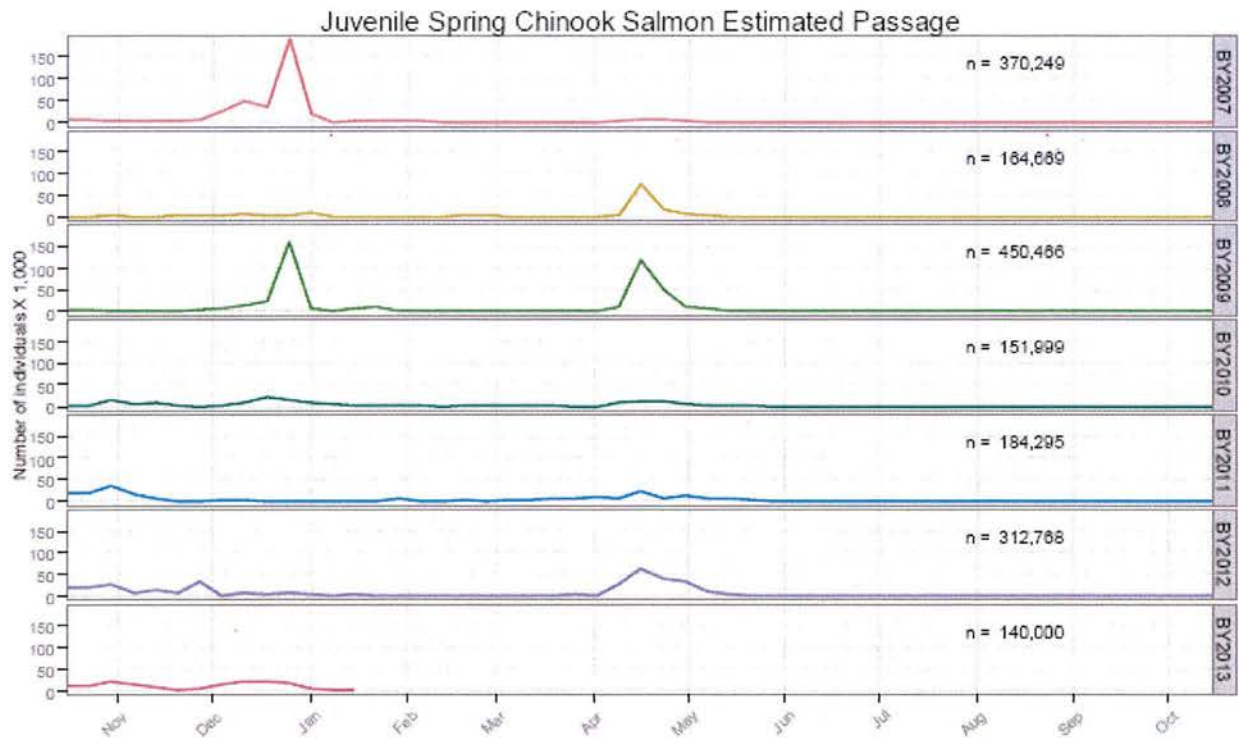


Figure 2. Weekly estimated passage of juvenile Spring Chinook Salmon at Red Bluff Diversion Dam (RK391) by brood-year (BY). Fish were sampled using rotary-screw traps for the period October 16, 2007 to present.



Figure 5. Weekly estimated passage of *O. mykiss* at Red Bluff Diversion Dam (RK 391) by brood-year (BY). Fish were sampled using rotary-screw traps for the period July 1, 2007 to present. Figure supplied by USFWS (2014).

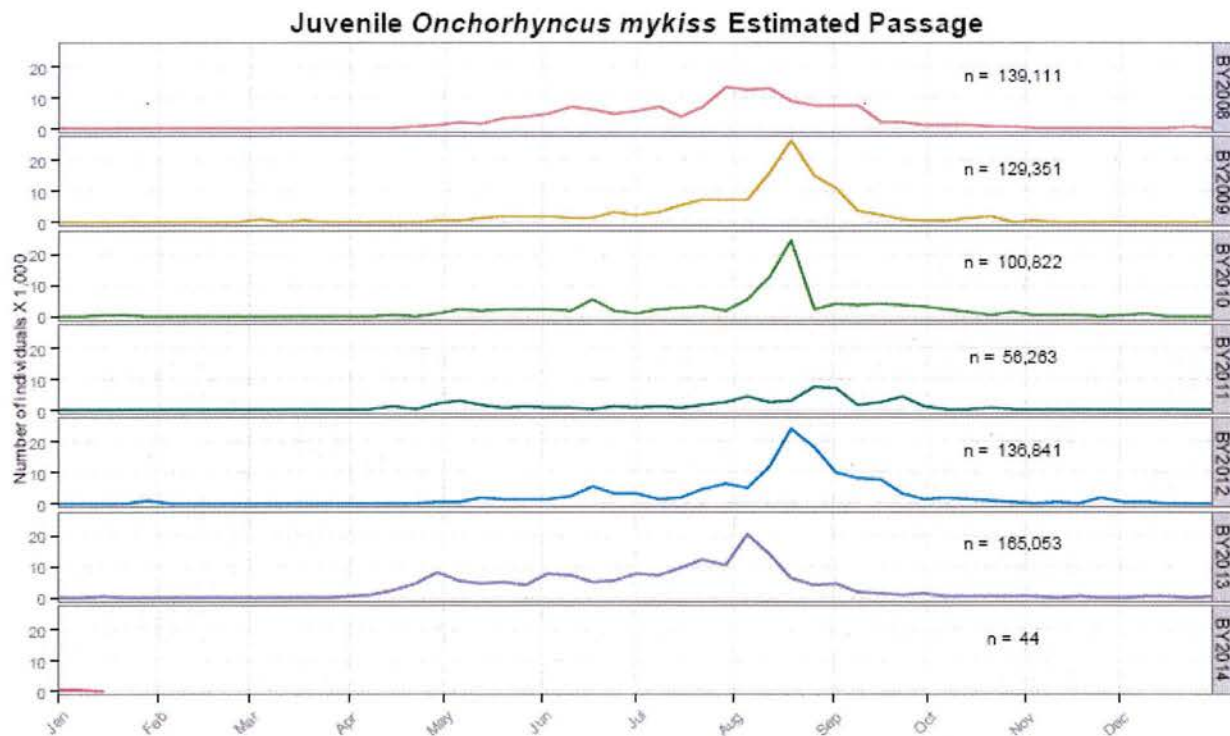


Figure 3. Weekly estimated passage of juvenile Rainbow/Steelhead trout at Red Bluff Diversion Dam (RK391) by brood-year (BY). Fish were sampled using rotary-screw traps for the period January 1, 2008 to present.

Figure 6. Juvenile Green sturgeon counted at Red Bluff Diversion Dam rotary screw traps. The dataset annual average is 426 fish. In 2011, an egg was observed directly above the rotary traps, thus the large number of fish in 2011 is a unique annual sampling of a spawning event (Josh Gruber, USFWS, pers comm.) If this data is removed the annual average of fish counted in 183 fishes.

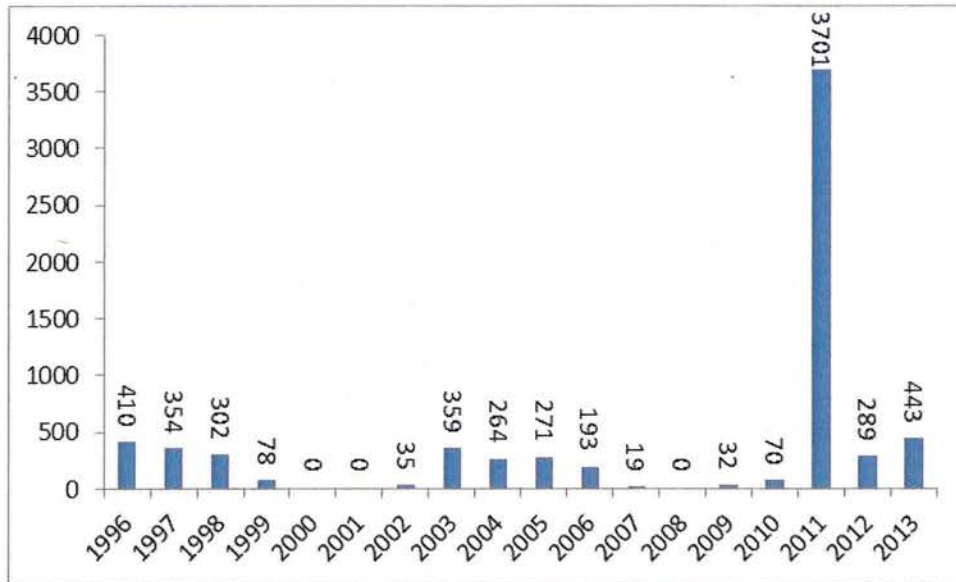
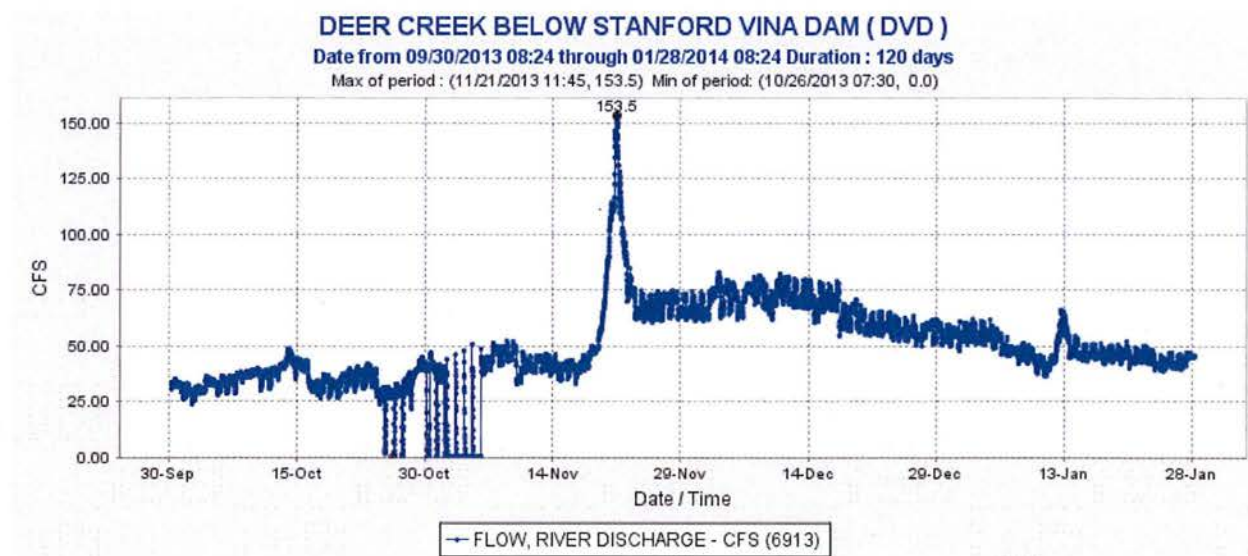
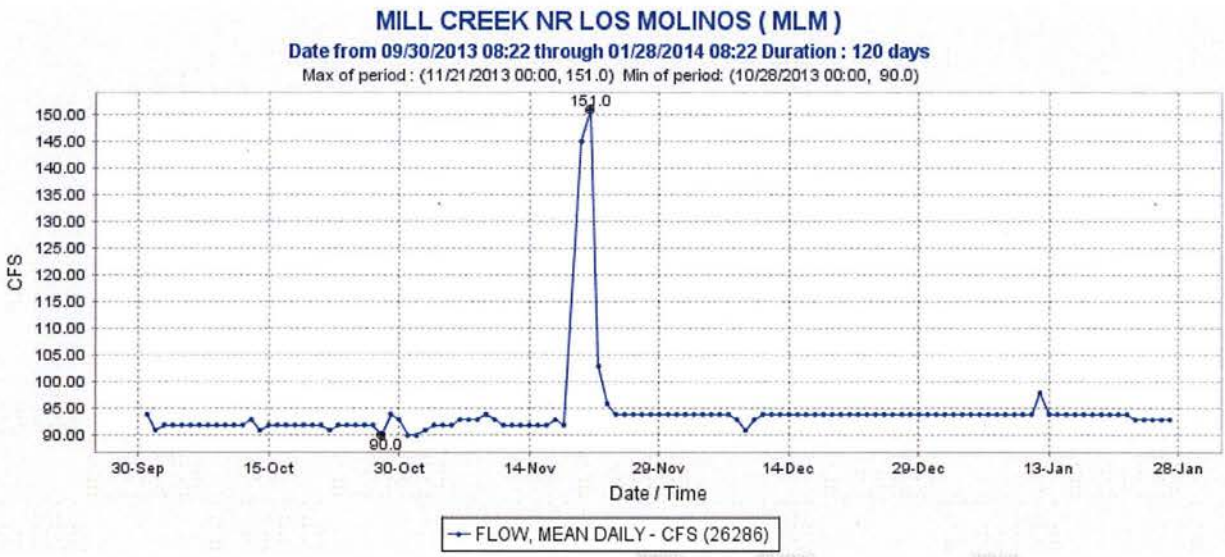


Figure 7. Deer Creek daily flow data for WY 2014. Downloaded from CDEC on January 28, 2014.



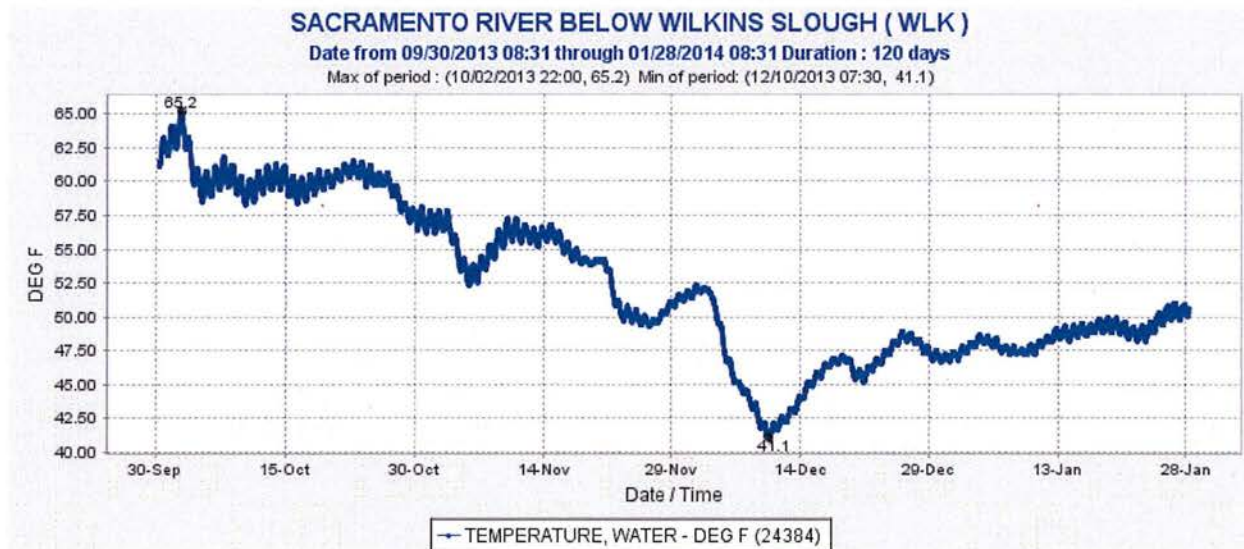
January 28, 2014

Figure 8. Mill Creek Daily flow data for WY 2014. Downloaded from CDEC on January 28, 2014



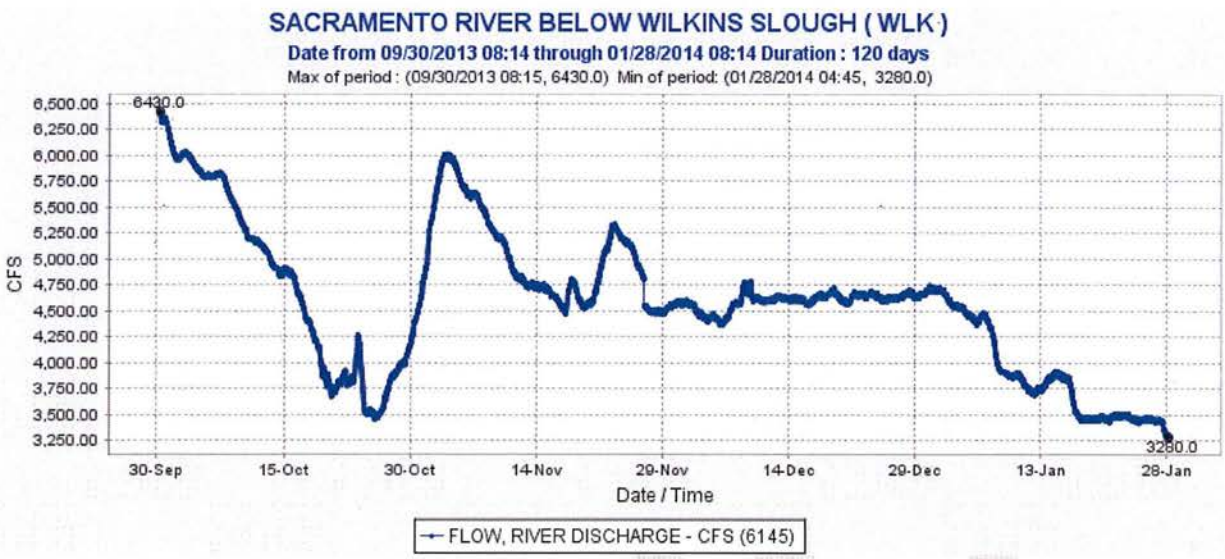
DRAFT

Figure 9. Wilkins Slough temperature date for WY 2014. Downloaded from CDEC on January 28, 2014.



January 28, 2014

Figure 10. Wilkins Slough flow data for WY 2014. Downloaded from CDEC on January 28, 2014.



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Figure 11. Knights Landing and Sacramento River indices and hydrology from October through March 2001. Figure taken and adapted from Chappell 2004. Red lines represent indice trigger exceedance values.

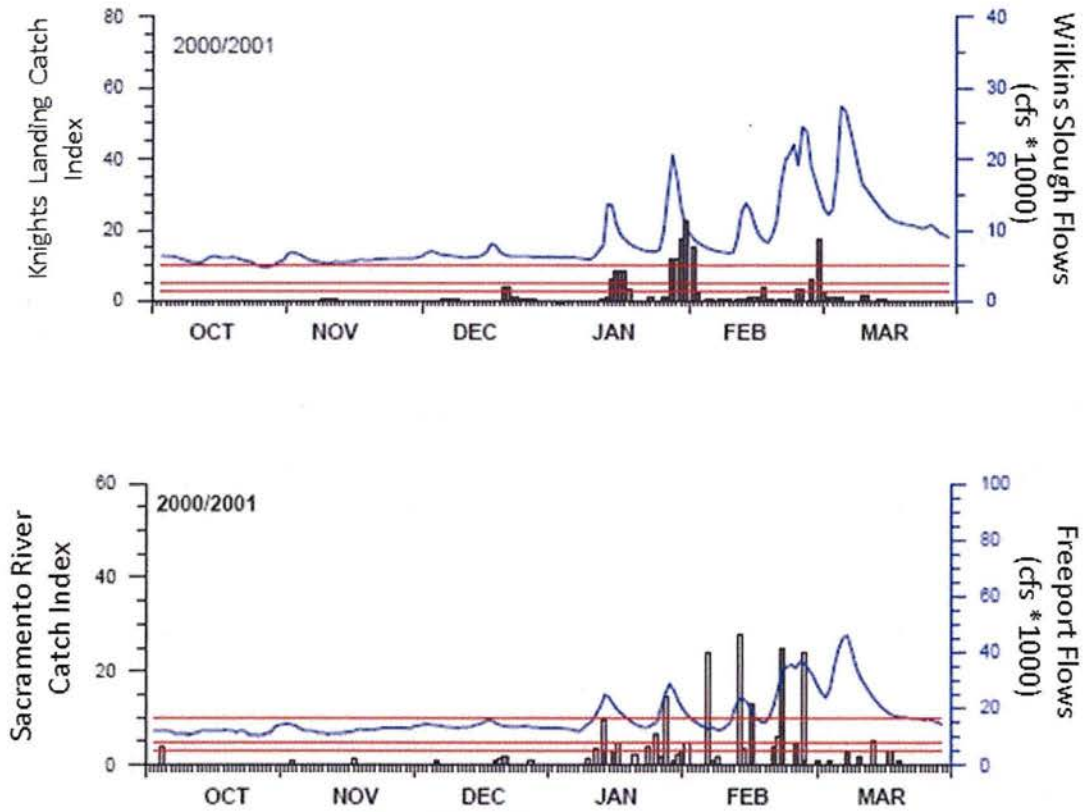


Figure 12. Knights Landing and Sacramento River indices and hydrology from August 2013 until January 13, 2014. Figures taken from DWR's Data Assessment Team weekly monitoring packet provided to DOSS on January 28, 2014.

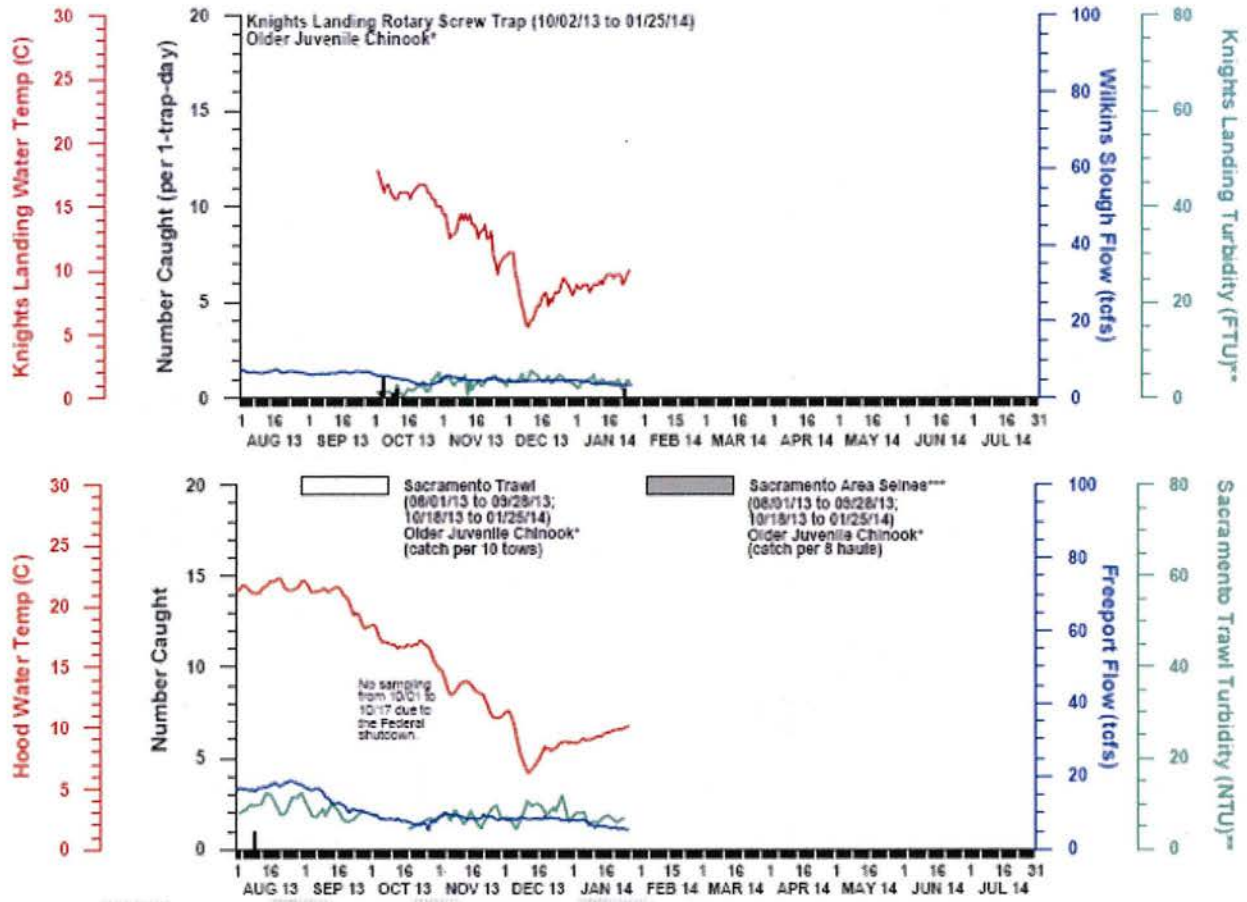




Figure 13. Jersey Point EC for WY 2014. Downloaded from CDEC on January 28, 2014. Operational water quality concern criteria is when EC is greater than 1.8, which has occurred numerous times in WY 2014.

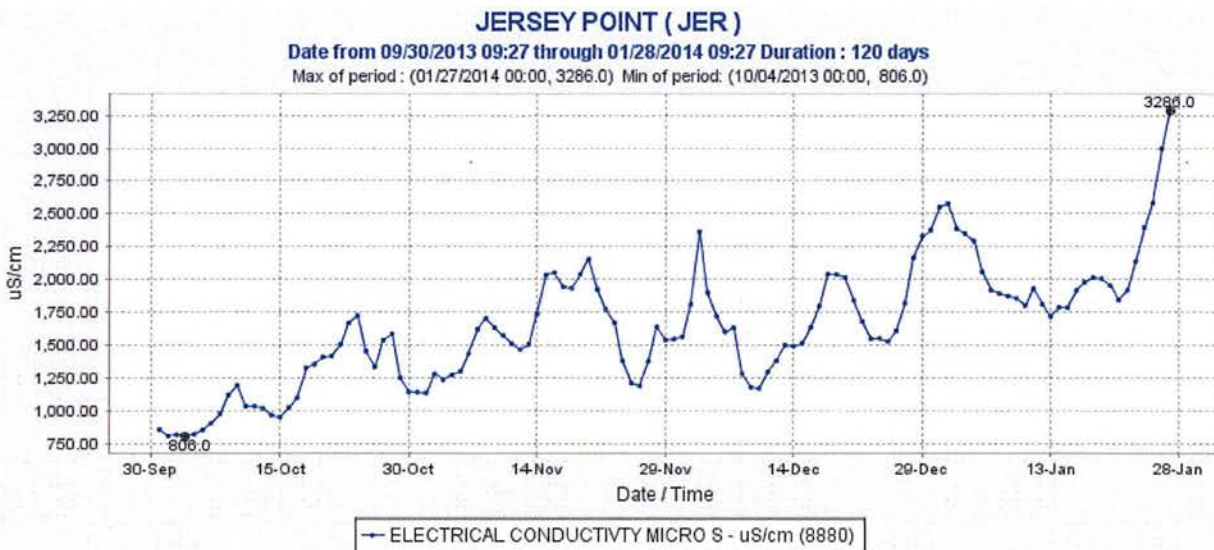


Figure 14. Bethel Island EC for WY 2014. Downloaded from CDEC on January 28, 2014. Operational water quality concern criteria is when EC is greater than 1.0, which has been exceeded for all of January thus far in WY 2014.

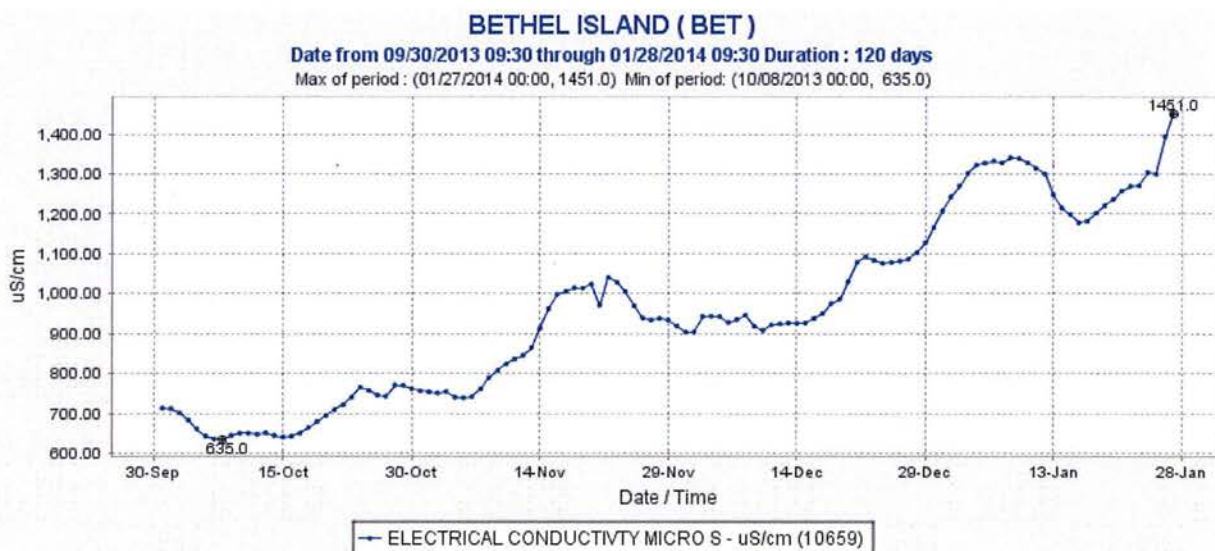


Figure 15. Holland Tract EC for WY 2014. Downloaded from CDEC on January 28, 2014. Operational water quality concern criteria is when EC is greater than 0.8, which has been exceeded for all of January in WY 2014.

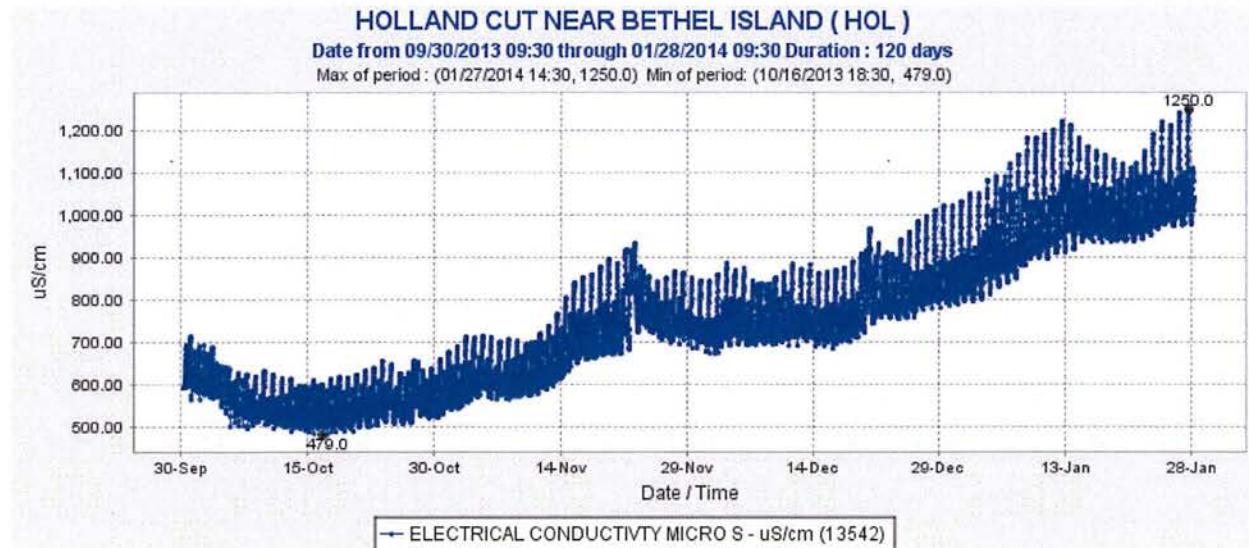
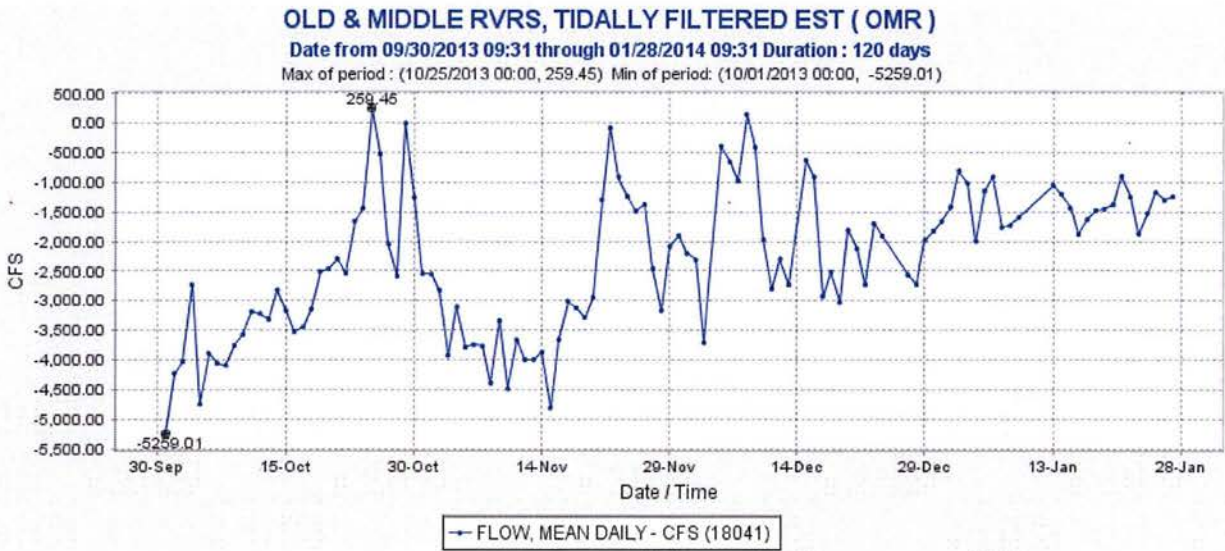
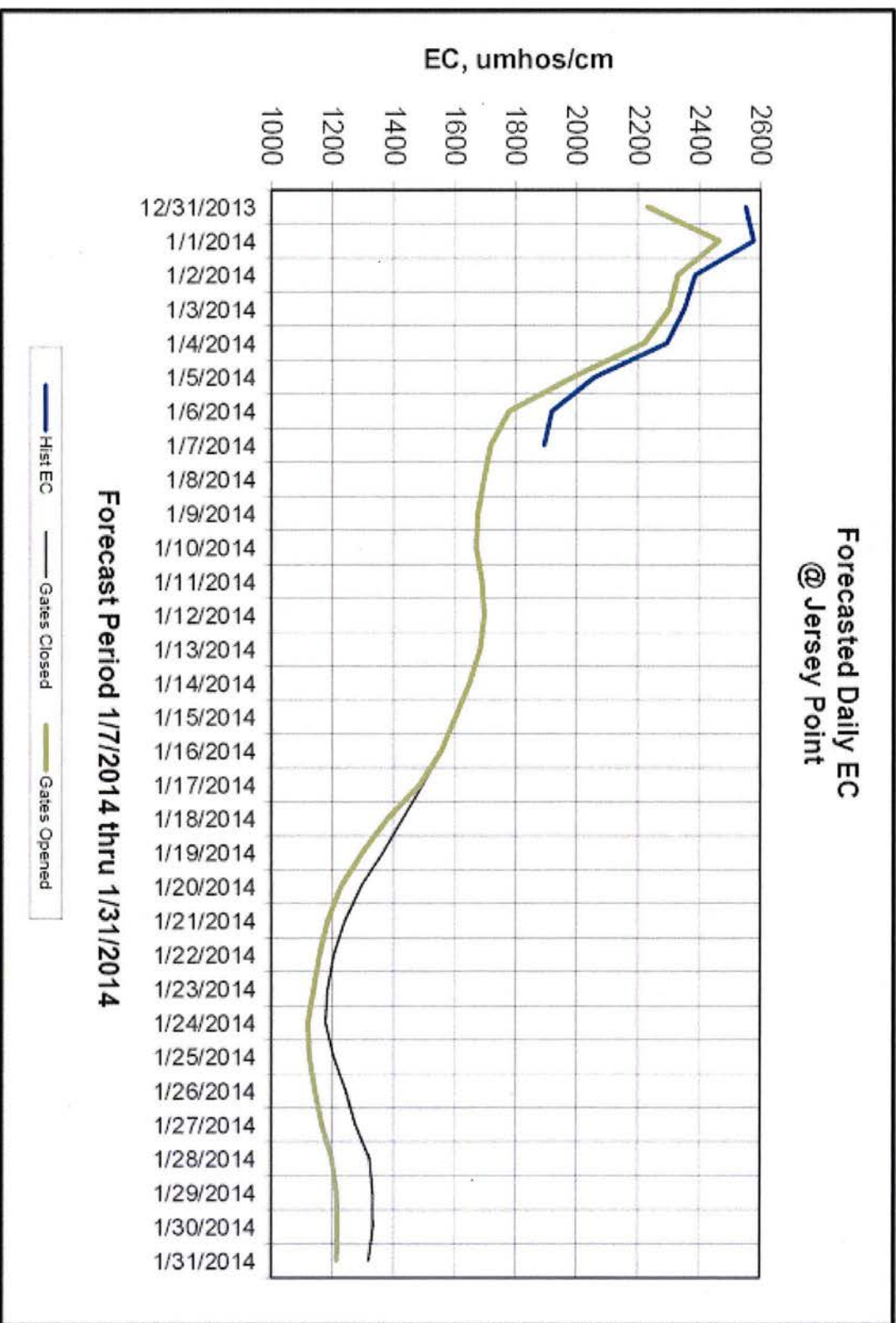


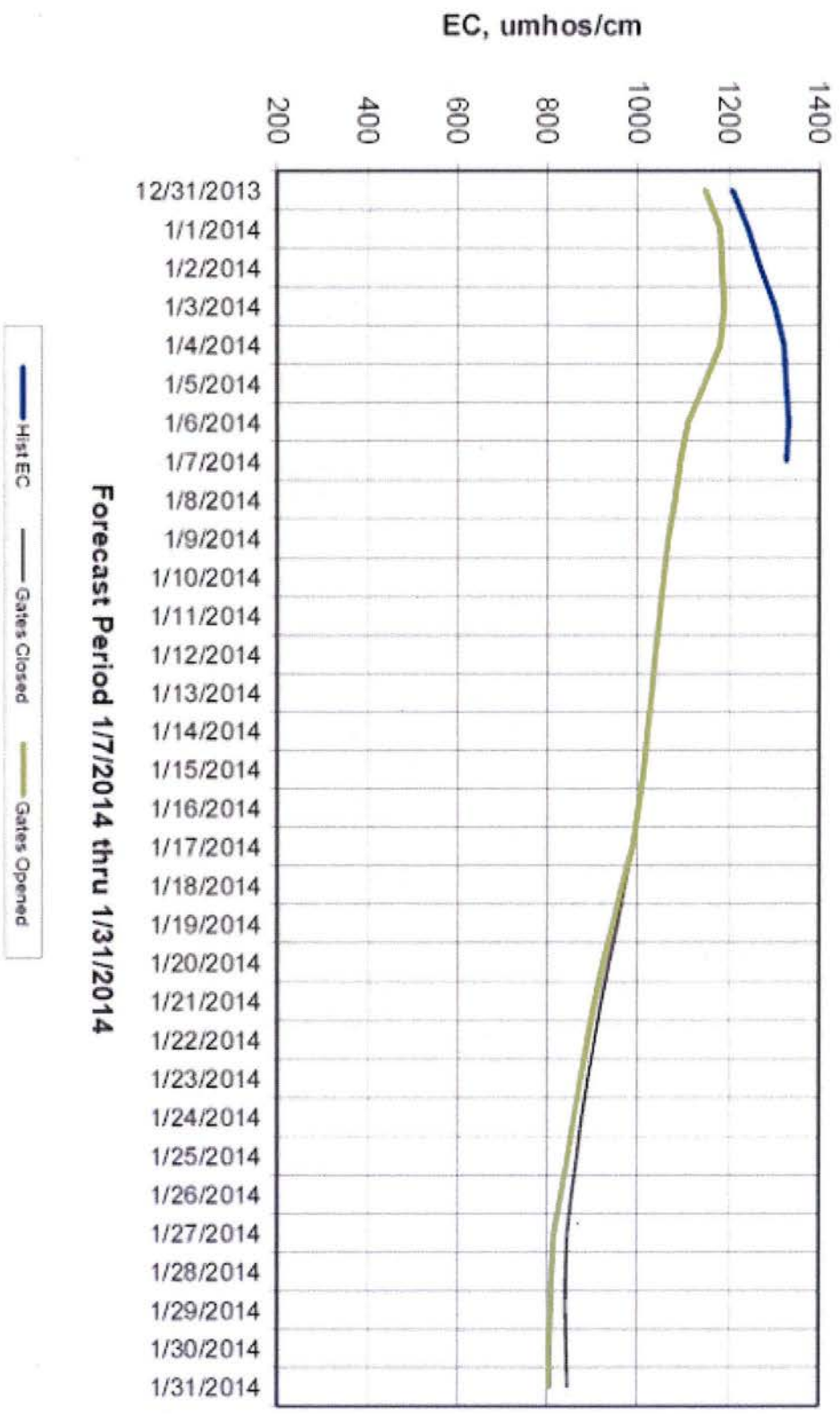
Figure 16. Old and Middle River tidally-filtered daily flows for WY 2014. Downloaded from CDEC on January 14, 2014.



January 28, 2014

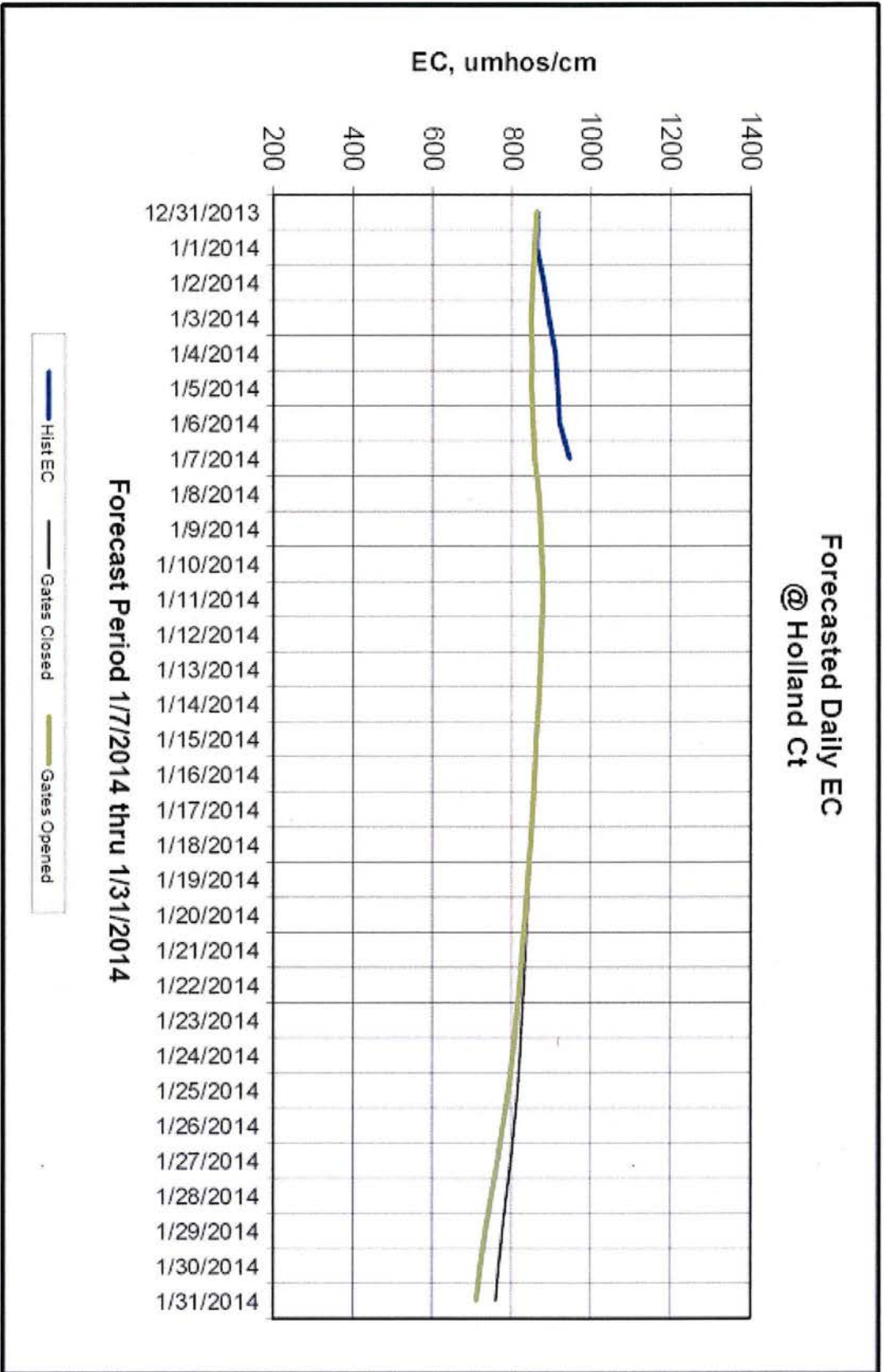


Forecasted Daily EC  
@ Bethel



Forecast Period 1/7/2014 thru 1/31/2014

— Hist EC    — Gates Closed    — Gates Opened



Appendix B Department of Water Resource's Water Quality Modeling of Operational Water Quality Criteria Locations.

Base case: combined exports of 1,500 cfs with current reservoir releases

Gates Open: same exports as the base case with the cross channel gates closed from January 22nd to January 31st.

