San Luis & Delta-Mendota Water Authority
Monday, June 7, 2021, 10:00 a.m.

Notice of Water Resources Committee Regular Telephonic Meeting and Joint Water Resources Committee Regular Telephonic Meeting-Special Board Workshop

Join Zoom Meeting

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NOTE: In accordance with the Governor's Executive Order (N-29-20) and the declared State of Emergency as a result of the threat of COVID-19, members of the Water Resources Committee, Board of Directors, and Water Authority staff will be participating in this meeting remotely from multiple locations. This meeting will occur exclusively through ZOOM. If members of the public have any problems using the call-in number during the meeting, please contact the Authority office at 209-826-9696.

NOTE FURTHER: Any member of the public may address the Water Resources Committee/Board concerning any item on the agenda before or during consideration of that item, as appropriate.

Because the notice provides for a telephonic regular meeting of the Water Resources Committee ("WRC") and a joint telephonic regular WRC Meeting/Special Board Workshop, Board Directors/Alternates may discuss items listed on the agenda; however, only WRC Members/Alternates may correct the agenda or vote on action items.

Agenda

1. Call to Order/Roll Call

2. Water Resources Committee to Consider Additions and Corrections to the Agenda for the Water Resources Committee Meeting only, as Authorized by Government Code Section 54950 *et seq*.

3. Opportunity for Public Comment – Any member of the public may address the Water Resources Committee/Board concerning any matter not on the agenda, but within the Committee's or Board's jurisdiction. Public comment is limited to no more than three minutes per person. For good cause, the Chair of the Water Resources Committee may waive this limitation.

ACTION ITEMS

4. **Water Resources Committee to Consider Approval of the April 5, 2021 Meeting Minutes**

5. **Water Resources Committee to Consider Recommendation to Board of Directors to Adopt Resolution Authorizing Execution of Agreement for the Transfer of Water By and Among the Oakdale Irrigation District, the South San Joaquin Irrigation District, and the San Luis & Delta-Mendota Water Authority and Authorizing Actions Related Thereto; CEQA Exemption**, Mizuno

6. **Water Resources Committee to Consider Recommendation to Board of Directors to Adopt Resolution Authorizing Execution of Agreement for the Transfer of Water Between the Stockton East Water District and the San Luis & Delta-Mendota Water Authority and Authorizing Actions Related Thereto; CEQA Exemption**, Mizuno

REPORT ITEMS

7. Executive Director's Report, Barajas
   - A. Water Transfers
   - B. DMC Subsidence Mitigation Project
   - C. May include reports on activities within the Water Resources Committee's jurisdiction related to 1) CVP/SWP water operations; 2) California storage projects; 3) regulation of the CVP/SWP; 4) existing or possible new State and Federal policies; 5) Water Authority activities; 6) COVID-19 response

8. Update on Water Policy/Resources Activities, Petersen
   (May include reports on activities related to 1) Reinitiation of Consultation on Long-Term Operations of the Central Valley Project and State Water Project, including environmental compliance; 2) State Water Resources Control Board action; 3) San Joaquin River Restoration Program; 4) Delta conveyance; 5) Reclamation action; 6) Delta Stewardship Council action; 7) San Joaquin Valley Water Blueprint)

9. Update on Water Operations and Forecasts, Boardman

10. Committee Member Reports

11. Closed Session

CONFERENCE WITH LEGAL COUNSEL – ANTICIPATED LITIGATION
Initiation of Litigation Pursuant to paragraph (4) of Subdivision (d) of Government Code Section 54956.9 – 3 potential cases

CONFERENCE WITH LEGAL COUNSEL – ANTICIPATED LITIGATION
Significant Exposure to Litigation Pursuant to Paragraph (2) or (3) of Subdivision (d) of Government Code Section 54956.9 – 2 potential cases

CONFERENCE WITH LEGAL COUNSEL – EXISTING LITIGATION
Existing Litigation Pursuant to paragraph (1) of Subdivision (d) of Section 54956.9

A. Natural Resources Defense Council, et al. v. Haaland, et al., U.S. District Court, E.D. Cal., Case No. 1:05-cv-01207-DAD-EPG, 9th Cir. Case No. 21-15163 (2005 DMC Contract Renewals)

B. Pacific Coast Federation of Fishermen's Associations, et al. v. Donald R. Glaser and San Luis & Delta-Mendota Water Authority, U.S. District Court, E.D. Cal., Case No. 2:11-CV-02980-KJM-CKD (PCFFA v Glaser or GBP Citizens Suit)

C. Delta Stewardship Council Cases, Sacramento County Superior Court, Case No. JCCP 4758 (formerly San Luis & Delta-Mendota Water Authority and Westlands Water District v. Delta Stewardship Council, et al., Sacramento County Superior Court, Case No. 34-2013-80001500) (Delta Plan Litigation)

D. City of Fresno, et al. v. United States, U.S. Court of Federal Claims, Case No. 1:16-cv-01276-EDK (2014 Friant Breach of Contract)

E. Monterey Coastkeeper, et al. v. Central Valley Regional Water Quality Control Board, et al., Third District Court of Appeal Case No. C093513, Sacramento County Superior Court Case No. 34-2018-80002853; Environmental Law Foundation v. State Water Resources Control Board, Third District Court of Appeal Case No. C093513, Sacramento County Superior Court Case No. 34-2018-80002851; Protectores del Agua Subterranea v. State Water Resources Control Board, Third District Court of Appeal Case No. C093513, Sacramento Superior Court Case No. 34-2018-80002852 (Waste Discharge Requirement Cases)

F. North Coast Rivers Alliance v. Delta Stewardship Council, Sacramento County Superior Court, Case No. 34-2018-80002898; Central Delta Water Agency v. Delta Stewardship Council, Sacramento County Superior Court, Case No. 34-2018-80002900; Friends of the River v. Delta Stewardship Council, Sacramento County Superior Court, Case No. 34-2018-80002901; California Water Impact

Network v. Delta Stewardship Council, Sacramento County Superior Court, Case No. 34-2018-80002904 (Delta Plan Amendment Cases)

G. North Coast Rivers Alliance, et al. v. San Luis & Delta-Mendota Water Authority, et al., Merced County Superior Court, Case No. 19CV-04989 (GBP Long-Term Storm Water Management Plan)

H. Pacific Coast Federation of Fishermen's Associations, et al. v. Raimondo, et al., U.S. District Court, E.D. Cal., Case No. 1:20-cv-00431-DAD-EPG (ROC on LTO BiOps)

I. California Natural Resources Agency, et al. v. Raimondo, et al., U.S. District Court, E.D. Cal., Case No. 1:20-cv-00426-DAD-EPG (ROC on LTO BiOps)

J. CDWR Water Operation Cases, Sacramento County Superior Court, Case No. JCCP 5117 (formerly Tehama-Colusa Canal Authority et al. v. California Department of Water Resources et al., Fresno County Superior Court, Case No. 20CECG01303) (SWP EIR Challenge)

K. AquAlliance, et al. v. U.S. Bureau of Reclamation, et al., U.S. District Court, E.D. Cal., Case No. 1:20-cv-00878-DAD-EPG (Long-Term Water Transfers EIS/EIR)

L. Winnemem Wintu Tribe et al. v. State Water Resources Control Board et al., Merced County Superior Court, Case No. 19CV-04989 (GBP Waste Discharge Requirements)

M. SWRCB Administrative Hearing Office: County of San Joaquin Permit to Appropriate Water from the South Fork American River at the Freeport Regional Water Authority Facility on the Sacramento River, Pending Application A029657 (Permit Application Protest)

12. Return to Open Session

13. Report from Closed Session, if any, Required by Government Code Section 54957.1

14. Reports Pursuant to Government Code Section 54954.2(a)(3)

15. ADJOURNMENT

Persons with a disability may request disability-related modification or accommodation by contacting Cheri Worthy or Sandi Ginda at the San Luis & Delta-Mendota Water Authority Office via telephone (209) 826-9696 or email [cheri.worthy@sldmwa.org or sandi.ginda@sldmwa.org] at least 3 days before a regular meeting or 1 day before a special meeting/workshop.

This agenda has been prepared as required by the applicable laws of the State of California, including but not limited to, Government Code Section 54950 et seq. and has not been prepared with a view to informing an investment decision in any of the Authority's bonds, notes or other obligations. Any projections, plans or other forward-looking statements included in the information in this agenda are subject to a variety of uncertainties that could cause any actual plans or results to differ materially from any such statement. The information herein is not intended to be used by investors or potential investors in considering the purchase or sale of the Authority's bonds, notes or other obligations and investors and potential investors should rely only on information filed by the Authority on the Municipal Securities Rulemaking Board's Electronic Municipal Market Access System for municipal securities disclosures, maintained on the World Wide Web at https://emma.msrb.org/.

SAN LUIS & DELTA-MENDOTA WATER AUTHORITY
WATER RESOURCES COMMITTEE REGULAR TELEPHONIC MEETING
AND JOINT WATER RESOURCES COMMITTEE REGULAR
TELEPHONIC MEETING - SPECIAL BOARD WORKSHOP MINUTES
APRIL 5, 2021

The Telephonic Water Resources Committee and Joint Telephonic Water Resources Committee Regular Meeting and Special Board Workshop of the San Luis & Delta-Mendota Water Authority convened at approximately 10:00 a.m. This meeting was held via teleconference/ZOOM in accordance with the Governor's Executive Order (N-29-20) and the declared State of Emergency as a result of the threat of COVID-19, with Committee Chair Tom Birmingham presiding.

Water Resources Committee Members Present

Ex-Officio

Cannon Michael

William Bourdeau

Division 1

Anthea Hansen, Alternate

Division 2

Bill Diedrich, Member

Division 3

Absent

Division 4

Vincent Gin, Member - Jeff Cattaneo, Alternate

Division 5

Tom Birmingham, Member -Manny Amorelli, Alternate

Board of Directors Present

Division 1

Anthea Hansen, Director

Rick Gilmore, Director

Division 2

William Bourdeau, Director

Michael Linneman, Alternate

Bill Diedrich, Director

Division 3

Jarrett Martin, Alternate

Cannon Michael, Director

Division 4

Jeff Cattaneo, Director

Sara Singleton, Alternate

Division 5

Tom Birmingham, Director

Manny Amorelli, Director

Authority Representatives Present

Federico Barajas, Executive Director

Pablo Arroyave, Chief Operating Officer

Scott Petersen, Water Policy Director

Rebecca Akroyd, General Counsel

Frances Mizuno, Special Projects Administrator

Stewart Davis, IT Officer

Others Present

Tom Boardman, Westlands Water District

1. Call to Order/Roll Call

Committee Chair Tom Birmingham called the meeting to order and roll was called.

2. The Water Resources Committee to Consider Additions or Corrections to the Agenda of Items, as authorized by Government Code Section 54950 et seq.

No additions or corrections.

3. Opportunity for Public Comment

No public comment.

4. Water Resources Committee to Consider Approval of the January 11, 2021 Meeting Minutes.

Chair Tom Birmingham pronounced the March 1, 2021 meeting minutes approved without correction.

5. Water Resources Committee to Consider Recommendation to Board of Directors to

Award to and Authorize Execution of Contract for State Government Relations and Legislative Advocacy.

Water Policy Director Scott Petersen reported that the Authority's Fiscal Year 2022 budget, adopted by the Board on February 4, 2021, includes funds to contract with a consultant(s) to provide State Government Relations and Legislative Advocacy. Petersen reported that staff issued a Request for Proposal (RFP) for State Government Relations and Legislative Advocacy services, and received proposals from five interested consultants and/or consultant groups. Petersen reported that proposals were received from California Strategies and Strategic Solutions Advisors, and joint proposals from Greenberg Traurig/Vista Consulting, Lighthouse Public Affairs/Smith Policy Group, and the Law Office of Alberto Torrico/John Doherty Law Group/MJM Advocacy. Petersen reported that Authority staff formed a working group that included staff from Grassland Water District, the San Joaquin River Exchange Contractors Water Authority, Valley Water, and Westlands Water District to review the proposals, conduct interviews, and provide a recommendation to the Water Resources Committee to consider a recommendation for the Board of Directors. Petersen reported that the working group analyzed and scored the Technical Proposals, then opened and scored the Proposed Cost/Fee Proposals, consistent with the Evaluation Process outlined in the RFP. Petersen reported that staff recommends award to the highest ranked proposal, which was submitted by California Strategies. Petersen reported that given the close rankings among the top three ranked proposals (the top three were separated by less than 2% of total points available), the Water Resources Committee may want to recommend an alternative, whereby the Board would select a proposal from among the top three proposals.

Ex Officio Member William Bourdeau made a motion, seconded by Member Bill Diedrich, to recommend that, given the close rankings between the top three firms, that the top three firms be provided an opportunity to make a presentation to the Board and that the Board make the final selection, consistent with the process outlined in the RFP. The vote on the motion was as follows:

AYES:	Michael, Bourdeau, Hansen, Diedrich, Gin, Birmingham
NAYS:	None
ABSTENTIONS:	None

6. Water Resources Committee to Consider Recommendation to Board of Directors to Adopt Staff Recommendation for Positions on Legislation.

a. Draft S. __ (Feinstein)/Draft H.R. __ (Costa), Canal Conveyance Capacity Restoration Act

b. Draft S. __ (Feinstein), STREAM Act
c. S. 914 (Duckworth), Drinking Water and Wastewater Infrastructure Act of 2021
d. H.R. 1563 (Garcia), To extend the authorities under the Water Infrastructure Improvements for the Nation Act of 2016 providing operational flexibility, drought relief, and other benefits to the State of California.

Water Policy Director Scott Petersen reported that a number of pieces of legislation have been introduced and/or advanced in the California Legislature and Congress over the last month that, if enacted, would provide tangible benefits to the Authority and its member agencies. Petersen reported that included in the packet is a memo outlining the four pieces of legislation that staff is recommending the Board adopt "Support" and "Favor" (H.R. 1563) positions at this time. Following discussion regarding the difference between "Support" and "Favor" positions, Petersen orally modified the staff recommendation to include a recommended "Support" position on all four pieces of legislation.

Member Bill Diedrich made a motion, seconded by Member/Chair Tom Birmingham, to Recommend to Board of Directors to Adopt Staff Recommendation for a Support Position on the presented Legislation. The vote on the motion was as follows:

AYES:	Michael, Bourdeau, Hansen, Diedrich, Gin, Birmingham
NAYS:	None
ABSTENTIONS:	None

7. Executive Director's Report.

A. **Update on Water Transfers** – Special Projects Administrator Frances Mizuno reported that through the Yuba transfers an estimate of about 60,000 af of surface water will be available, but there will be no groundwater substitution water this year.

Mizuno reported that there will be an estimate of up to 165,000 af of water available through North of the Delta transfers minus 25-35% carriage losses. Mizuno reported that there is a possibility some water if not all will be kept in storage at Shasta to assist in the temperature management plan. Chair Tom Birmingham confirmed the 2019 BiOps EIS includes an expanded transfer window.

Mizuno reported that last month the Board approved an agreement with OID and SSJID for purchase of release water, but unfortunately Reclamation has not approved that agreement so it is unlikely that water will be made available this year.

B. **DMC Subsidence Mitigation Project** – Executive Director Federico Barajas reported that staff is putting together an RFP for geotechnical exploration work, and are coordinating with Reclamation.

8. Update on Water Policy/Resources Activities.

Water Policy Director Scott Petersen reported that late in March the Authority along with several other water agencies provided a comment letter to the State Water Board on the "Water Rights Response to Climate Change" staff report. Petersen reported that a series of comment letters were sent to the State Water Board related to Shasta Temperature Operations in coordination with other water agencies.

Petersen reported that FWS/NMFS published 90-day findings for petitions to list under the federal Endangered Species Act, which includes the Shasta Snow Wreath, and the Spring-run Chinook Salmon. Petersen reported that the comment period on the lower Klamath Spring-run Chinook Salmon opened March 16, and will be open for 90-days, and Authority staff is evaluating possible comments.

9. Agenda Item 11: Update on Water Operations and Forecasts

Westlands Water District's Tom Boardman reported that Shasta began drawing down from a storage of just below 2.4 MAF on April 4. The draw down was prompted by two 500 cfs increases during the past week to meet the Delta outflow requirement per D1641. Folsom storage withdrawals have also increased to meet the D1641 requirement. A cycling of a single unit at Jones has been necessary during the past several days as part of Reclamation's effort to meet the outflow requirement. SWP exports have been at zero during the past week to meet the State's share of the outflow obligation.

Boardman stated that Reclamation's latest conservative operations forecast shows the SWP owing the CVP about 165 TAF under the COA accounting by the end of August. The COA debt will contribute to the CVP needing to borrow about 90 TAF of San Luis storage by the end of August. As a result, total San Luis storage is expected to be about 150 TAF at the low point. Boardman stated that the COA imbalance was due to anticipated low Oroville storage and that DWR wants to avoid drawing the reservoir below 900 TAF – the minimum allowable level needed to maintain power generation.

Responding to a question from Director Diedrich, Boardman stated that Reclamation's demand estimates were comparable to his estimates. Boardman noted, however, that historical

information from which to derive demand estimates is limited, thus; demand estimates can be very subjective.

10. Agenda Item 12: Committee Member Reports.

No Committee Member reports.

11. Agenda Item 13: Closed Session

Committee Chair Tom Birmingham adjourned the open session to address the items listed on the Closed Session Agenda at approximately 11:00 a.m. Upon return to open session at approximately 11:16 a.m., General Counsel Rebecca Akroyd reported that there were no reportable actions taken in closed session.

12. Reports Pursuant to Government Code Section 54954.2

None.

13. Adjournment

The meeting was adjourned at approximately 11:17 a.m.

MEMORANDUM

TO: SLDMWA Water Resources Committee Members and Alternates

FROM: Scott Petersen, Water Policy Director

DATE: June 7, 2021

RE: Update on Water Policy/Resources Activities

BACKGROUND

This memorandum is provided to briefly summarize the current status of various agency processes regarding water policy activities, including but not limited to the (1) Reinitiation of Consultation on Long-Term Operations ("ROC on LTO"), (2) State Water Resources Control Board Action, including the Bay-Delta Water Quality Control Plan update, (3) San Joaquin River Restoration Program, (4) Delta Conveyance, (5) Delta Stewardship Council, and (6) Water Blueprint for the San Joaquin Valley.

POLICY ITEMS

Reinitiation of Consultation on Long-Term Operations of the Central Valley Project and State Water Project

In August 2016, the Bureau of Reclamation and California Department of Water Resources (DWR) requested reinitiation of consultation with NOAA Fisheries, also known as National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (FWS) due to multiple years of drought, low populations of listed species, and new information developed as a result of ongoing collaborative science efforts over the last 10 years.

On Jan. 31, 2019, Reclamation transmitted its Biological Assessment to the Services. The purpose of this action is to continue the coordinated long-term operation of the CVP and SWP to optimize water supply delivery and power generation consistent with applicable laws, contractual obligations, and agreements; and to increase operational flexibility by focusing on nonoperational measures to avoid significant adverse effects to species.

The biological opinions carefully evaluated the impact of the proposed CVP and SWP water operations on imperiled species such as salmon, steelhead and Delta smelt. FWS and NMFS documented impacts and worked closely with Reclamation to modify its proposed operations to minimize and offset those impacts, with the goals of providing water supply for project users and protecting the environment.

Both FWS and NMFS concluded that Reclamation's proposed operations will not jeopardize threatened or endangered species or adversely modify their critical habitat. These conclusions

were reached for several reasons – most notably because of significant investments by many partners in science, habitat restoration, conservation facilities including hatcheries, as well as protective measures built into Reclamation's and DWR's proposed operations.

On Oct. 21, 2019, FWS and NMFS released their biological opinions on Reclamation's and DWR's new proposed coordinated operations of the CVP and SWP.

On Dec. 19, 2019, Reclamation released the final Environmental Impact Statement analyzing potential effects associated with long-term water operations for the CVP and SWP.

On Feb. 18, 2020, Reclamation approved a Record of Decision that completes its environmental review for the long-term water operations for the CVP and SWP, which incorporates new science to optimize water deliveries and power production while protecting endangered species and their critical habitats.

On January 20, 2021, President Biden signed an Executive Order: "Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis", with a fact sheet[1] attached that included a non-exclusive list of agency actions that heads of the relevant agencies will review in accordance with the Executive Order. Importantly, the NOAA Fisheries and U.S. Fish and Wildlife Service Biological Opinions on the Long-Term Operation of the Central Valley Project and State Water Project were both included in the list of agency actions for review. It's unclear what this agency review will analyze, but staff will be engaged.

Reclamation Manual

Documents out for Comment

Draft Directives and Standards

- There are currently no Directives and Standards out for review.

Draft Facilities Instructions, Standards, and Techniques (FIST)

- There are currently no Facilities Instructions, Standards, and Techniques out for review.

Draft Reclamation Safety and Health Standards (RSHS)

- Reclamation Drilling Standards, RSHS 27 (comments due 6/7/2021)
- Record of Performance Inspection and Test – Crawler, Locomotive, Truck, and Wheel Cranes, RSHS Appendix F (comments due 6/14/2021)

Draft Reclamation Design Standards

- Appurtenant Structures for Dams (Spillways and Outlet Works)(comments due 6/27/2021)

[1] https://www.whitehouse.gov/briefing-room/statements-releases/2021/01/20/fact-sheet-list-of-agency-actions-for-review/

State Water Resources Control Board (State Water Board) Activity

Documents out for Comment

2020-2022 California Integrated Report

The State Water Resources Control Board (State Water Board) will accept comments on the draft Statewide Clean Water Act Section 303(d) list of water quality limited segments portion of the 2020-2022 California Integrated Report. The draft statewide list includes new listing and delisting recommendations for waterbodies in the Central Coast, Central Valley, Colorado River Basin, and San Diego regions.

The proposed 303(d) list for the 2020-2022 California Integrated Report and the supporting Draft Staff Report will be posted on the State Water Board's web site on or before June 4, 2021 at: https://www.waterboards.ca.gov/water_issues/programs/water_quality_assessment/2020_2022_integrated_report.html. You may request a paper copy of the Draft Staff Report by contacting Keara Tuso at keara.tuso@waterboards.ca.gov.

Submission of Comments

The State Water Board will accept written comments on the Draft 2020-2022 California 303(d) List and Draft Staff Report. All written comments must be received no later than 12:00 noon on Friday, July 16, 2021.

Drought Operations and Policy

During the last month, a significant amount of activity has taken place related to Central Valley Project and State Water Project operations and associated regulatory requirements in response to evolving dry conditions throughout California.

Specifically, on March 22, 2021, in response to dry conditions in California, the State Water Resources Control Board released a notice that ongoing dry conditions exist in most California watersheds and that preparations for drought should begin. As dry conditions continued, the State Water Board released curtailment notices[2] for Term 91 condition water rights on April 29, 2021. Following this action, in response to additional information received from the May water update, on May 17, 2021, the Department of Water Resources (DWR) and the United States Bureau of Reclamation (Reclamation) (collectively referred to as the Petitioners) filed a Temporary Urgency Change Petition (TUCP) with the State Board pursuant to California Water Code section 1435 et seq. in order to address critically dry conditions in the San Francisco Bay/Sacramento-San Joaquin Delta (Bay-Delta). The TUCP requests that the State Water Board temporarily change the Petitioners' permit and license terms for the State Water Project (SWP) and Central Valley Project (CVP) (collectively the SWP and CVP are also referred to as the Projects).

[2] See Appendix A.

Specifically, the TUCP requests temporary changes to conditions imposed pursuant to State Water Board Revised Decision 1641 (D-1641) that requires the Petitioners to meet specified flow and water quality objectives established in the Bay-Delta Water Quality Control Plan (Bay-Delta Plan). Unless renewed, the changes sought by a TUCP may remain in effect for 180 days. The Petitioners are expected to submit an additional TUCP later this summer that will propose changes during the fall time period.

The May 17 TUCP seeks modifications to D-1641 requirements that apply from June through August 15 that, if approved, will: (1) change the minimum Net Delta Outflow Index (NDOI) in June and July from a monthly average of 4,000 cubic-feet per second (cfs) to an average of 3,000 cfs with a 14-day running average in June and a monthly average in July (7-day running average in July of no less than 2,000 cfs); (2) limit the combined maximum export rate in June and July to no greater than 1,500 cfs when Delta outflow is below 4,000 cfs, and allow the 1,500 cfs limit to be exceeded when the Petitioners are meeting Delta outflow requirements pursuant to D-1641 or for moving transfer water; and (3) change the Western Delta agricultural salinity requirement at Emmaton to a compliance location at Three mile Slough on the Sacramento River from June through August 15.

In response to the submittal of a draft Temperature Management Plan (TMP), on May 21, State Board Executive Director Eileen Sobeck sent a response letter[3] to Reclamation related to conditions that would be required for Project operations in order for the State Board staff to approve the TMP. This letter outlines a number of conditions that would affect water supply for Authority members, including most importantly an end of September carryover storage requirement of 1.25 million acre-feet at Shasta Reservoir.

On May 25, State Board staff released a draft report[4] on a "Water Unavailability Methodology for the Delta Watershed" that outlines the methodology for determining water unavailability in the Sacramento-San Joaquin Delta watershed and would be used for the associated curtailment notices likely to be issued if dry conditions continue into the future. Also on May 25, water unavailability notices[5] were issued for post-1914 water rights holders in the Russian River watershed and warning letters[6] were issued for pre-1914 water rights holders in the same area.

On May 26, Reclamation announced a reduction in allocations for north and south of delta agricultural water service contractors from 5% to 0% and a separate reduction in allocation for municipal and industrial contractors from 55% to 25% of historic use. The Authority released a statement in response to this allocation reduction that was picked up in a couple of Valley publications.

[3]See Appendix B.
[4]https://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/drought_tools_methods/delta_method.html
[5] See Appendix C.
[6] See Appendix D.

On May 28, 2021, Reclamation submitted a final Sacramento River Temperature Management Plan[7] pursuant to Order 90-5, and Reclamation and the Department of Water Resources issued a Drought Contingency Plan[8] for the SWP and CVP from May 1 through September 30, 2021.

Separately, on June 1, 2021, State Board Executive Director Eileen Sobeck issued an order[9] that conditionally approves the Temporary Urgency Changes to License and Permit Terms and Conditions related to Delta Water Quality objectives for the operations of the CVP and SWP. Specifically, the following changes were conditionally approved for the period of June 1 through August 15:

1. Change the minimum Delta outflow objective (NDOI) in June and July from 4,000 cubic-feet per second (cfs) to 3,000 cfs. June would be measured as a 14-day running average, and July would be measured as a monthly average. The 7-day running average shall be no less than 1,000 cfs below 3,000 cfs;
2. From June 1 through August 15, 2021, change the Western Delta agricultural salinity objective compliance location on the Sacramento River at Emmaton to Threemile Slough on the Sacramento River;
3. From June 1 through August 15, 2021, the combined maximum exports at SWP Banks Pumping Plant and the CVP Jones Pumping Plant, excluding transfers, shall be limited to pumping no greater than 1,500 cfs, as a 3-day running average. Combined exports may be increased above 1,500 cfs when the Petitioners are in full compliance with D-1641 Delta outflow and Sacramento River at Emmaton salinity requirements, but exports other than transfers shall be limited to natural and abandoned flow.

Bay Delta Water Quality Control Plan Update

The State Water Board is currently considering updates to its 2006 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary ("Bay Delta Plan") in two phases (Plan amendments). The first Plan amendment is focused on San Joaquin River flows and southern Delta salinity ("Phase I" or "San Joaquin River Flows and Southern Delta Salinity Plan Amendment"). The second Plan amendment is focused on the Sacramento River and its tributaries, Delta eastside tributaries (including the Calaveras, Cosumnes, and Mokelumne rivers), Delta outflows, and interior Delta flows ("Phase II" or "Sacramento/Delta Plan Amendment").

[7] See Appendix E
[8] See Appendix F.
[9] https://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/tucp/docs/2021/20210601_swb_tuco.pdf

During the December 12, 2018 Water Board Meeting, the Department of Water Resources ("DWR") and Department of Fish and Wildlife presented proposed "Voluntary Settlement Agreements" ("VSAs") on behalf of Reclamation, DWR, and the public water agencies they serve to resolve conflicts over proposed amendments to the Bay-Delta Plan update.[10] The State Water Board did not adopt the proposed VSAs in lieu of the proposed Phase 1 amendments, but as explained below, directed staff to consider the proposals as part of a future Delta-wide proposal.

Phase 1 Status: The State Water Board adopted a resolution[11] to adopt amendments to the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary and adopt the Final Substitute Environmental Document during its December 12, 2018 public meeting.

Phase 2 Status: In the State Water Board's resolution adopting the Phase 1 amendments, the Water Board directed staff to assist the Natural Resources Agency in completing a Delta watershed-wide agreement, including potential flow and non-flow measures for the Tuolumne River, and associated analyses no later than March 1, 2019. Staff were directed to incorporate the Delta watershed-wide agreement as an alternative for a future, comprehensive Bay-Delta Plan update that addresses the reasonable protection of beneficial uses across the Delta watershed, with the goal that comprehensive amendments may be presented to the State Water Board for consideration as early as possible after December 1, 2019. As the State Water Board further refines this update, there will be opportunity for public comment.

The effort has made significant progress since an initial framework was presented to the State Water Board on December 12, 2018.

On March 1, 2019, the California Department of Water Resources and the Department of Fish and Wildlife submitted documents[12] to the State Water Board that reflect progress since December to flesh-out the previously submitted framework to improve conditions for fish through targeted river flows and a suite of habitat-enhancing projects including floodplain inundation and physical improvement of spawning and rearing areas.

Since the March 1 submittal, significant work has taken place to develop the package into a form that is able to be analyzed by State Water Board staff for legal and technical adequacy. On

[10] Available at https://water.ca.gov/-/media/DWR-Website/Web-Pages/Blogs/Voluntary-Settlement-Agreement-Meeting-Materials-Dec-12-2018-DWR-CDFW-CNRA.pdf.
[11] Available at https://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2018/rs2018_0059.pdf.
[12] Available at http://resources.ca.gov/docs/voluntary-agreements/2019/Complete_March_1_VA_Submission_to_SWRCB.pdf

June 30, 2019, a status update with additional details was submitted to the Board for review. Additionally, on February 4, 2020, the State team released a framework for the Voluntary Agreements to reach "adequacy", as defined by the State team.

Further work and analysis is needed to determine whether the agreements can meet environmental objectives required by law and identified in the State Water Board's update to the Bay-Delta Water Quality Control Plan.

Water Blueprint for the San Joaquin Valley Activity

Background

The Water Blueprint for the San Joaquin Valley[13] (Blueprint) is a broad group of stakeholders, working to better understand shared goals for water solutions that support environmental stewardship with the needs of communities and industries throughout the San Joaquin Valley. The Blueprint has engaged with stakeholders to try and ensure that everyone has safe, reliable and affordable access to water for drinking, supporting their farms and communities and a thriving ecology.

The SJV faces significant impacts to its long-term economic, social, and environmental health if nothing is done to address water scarcity, as highlighted in Phase I of Dr. David Sunding's Economic Impact Assessment (EIA).

The Large Group and committees are pursuing the goals of Blueprint, including outreach, technical support and working in conjunction with other stakeholders.

2021 Strategy & Focus: The Blueprint is discussing the overall focus for 2021, its organizational structure, role with sub basins, project pursuits, fundraising and work with the San Joaquin Valley Water Collaborative Action Partnership (SJVW CAP).

Technical Work & Phase II: SJV Blueprint is engaged with the sub-basins through GSAs and otherorganizations to discuss the SJV Blueprint: new water sources, new conveyance, expanded beneficial use: groundwater recharge, wetland & riparian habitats and how to make these projects, costs and governance a reality. A scope of work and cost estimate from ESA are being reviewed to develop a path forward for the Blueprint. This would be a detailed plan listing of all permits needed, the approvals, the reports and documents essential to prepare and obtain from the Federal and/or State Agencies for the solutions provided.

The Blueprint has many components, stretching from the Delta to Eastern Tulare County with plans to divert 6-million-acre feet or more to groundwater storage in wet years (double the capacity of Shasta). Consensus is to commence with a related programmatic EIR. Blueprint will keep the Water Commission informed of its progress and has submitted a comment letter that highlighted State grants to construct infrastructure, balanced approach to water resources, low

[13] https://www.waterblueprintca.com

interest loans for farmers unable to farm and focus on inter-regional conveyance and habitat restoration.

The technical committee is working on solution sets to be added to the EIA to illustrate reduced economic impacts. A critical part will be project proponents 'evaluation and development of these activities in coordination with the Blueprint. These solution sets will ideally have input and support from the coalition of interest groups formally engaging in the SJV Collaborative Action Program.

SJV Water Collaborative Action Program: Stanford University working in coordination with the Blueprint, Central Valley Community Foundation, Fresno State, NGOs and others are convening to create a collaborative solution to the water issues we face in the SJV.

Facilitator Jim Waldo and team have begun meeting with participants to start framing an inter-caucus Problem Statement; CAP is contemplating near term drought actions and pilot projects in addition to its original mission. Including multi-benefit replenishment projects, strategic land repurposing, infrastructure improvements, ecosystem restoration, data development, well modifications, interconnections/consolidation.

Funding: A $380,000 budget was approved and a financial prospectus is being circulated, DWR has committed $49,500, $30,000 committed from the Heron Foundation, CVCF has committed $50,000. The Blueprint has committed $50,000 and the Collaborative will be looking to other stakeholders for the remaining funding needs including possible funds from Reclamation.

The Plenary Group of the San Joaquin Valley Water Collaborative Action Program (SJVWCAP) has held three meetings. The Plenary Group unanimously approved an interim governance structure that includes a Plenary Group, Steering Group, and Planning Group.

- The Plenary Group is a "Big Tent" consensus-oriented decision-making body currently with 70 members.
- The Steering Group organizes the agenda and meeting materials for Plenary Group meetings, a 10-member Group.
- The Planning Group currently has 20 members divided among five caucuses (safe drinking water, environmental NGOs, the agricultural industry, water agencies and local government). The Planning Group approved a Vision Statement and is reviewing draft problem statements by each caucus.

Vision Statement: Success means that all interest groups secure a better future. Building trust among the interest groups will be essential; Trust allows the interest groups to collaborate on creative solutions.

DAC Drinking Water Feasibility Study – FKC : A funding application was submitted by FWA, Fresno State University, Self Help, Sustainable Conservation and Leadership Council to study a five county area within the Millerton Place of Use boundary related to surface water supply,

recharge and drinking water supplies. State Board and DWR staff has been meeting with us regarding the processing of an application.

WaterSmart: The Water Blueprint was selected by Reclamation to present a proposal under the 2021 WaterSmart Water Management Options Pilot (WMOP) Program. An application was submitted onFebruary 17th and focused on increased conjunctive management and groundwater recharge. The Pilot Area is the entire Blueprint Area; however, the focus will be on the areas served by the Friant-Kern Canal and south of Delta facilities. Stantec was engaged to prepare the application. Blueprint has obtained support letters from districts, water agencies, municipalities and elected. Additional results may be available in May.

Water Resiliency Portfolio: A meeting was held with Nancy Vogel to discuss the status of the Governor's Water Resiliency Portfolio and the alignment with Blueprint efforts. This is complementary with the briefings with State and Federal legislators and local elected.

APPENDIX A

State Water Resources Control Board

April 29, 2021

«First_Name» «Last_Name»
«Company_Name»
«Attention_Line»
«Address»
«City», «State»«Zip_Code»

NOTICE OF IMMEDIATE CURTAILMENT
TERM 91 WATER RIGHT "INTERESTED PARTY" WATER RIGHT PERMIT/LICENSE NO. «Permit_ID_» «License_ID» (APPLICATION NO. «StatementApp_»)

You are receiving this notice because your Permit/License No. «Permit_ID_» «License_ID» (Application No. «StatementApp_») contains Standard Water Right Term 91 (Term 91) that prohibits diversion of water within the Sacramento-San Joaquin River Delta (Delta) watershed when (i) the Delta is in "Balanced Condition" and (ii) Supplemental Project Water (SPW) releases are being made by the Central Valley Project (CVP) or State Water Project (collectively Projects). The Delta is referred to be in "Balanced Condition" when the Projects are being operated to meet water quality and flow requirements in the Delta. SPW releases[1] are releases of imported and previously stored Project water to meet inbasin entitlements,[2] including maintenance of Delta water quality and flow requirements.

Curtailment of Term 91 Water Rights:
The State Water Resources Control Board (State Water Board), Division of Water Rights (Division) has determined that the Delta is in "Balanced Condition" and (ii) SPW releases are being made by the Projects.

[1] SPW is calculated as the net storage releases from Shasta, Folsom, and Oroville reservoirs, plus water imported to the Delta Watershed from the Trinity River CVP facilities, minus the sum of the Projects' Delta exports, Project inbasin deliveries, and Carriage Water calculated from the Delta Export Index.
[2] Inbasin entitlements are defined as all rights to divert water from the Delta or streams tributary to the Delta for use within the respective basins of origin or the Legal Delta, unavoidable natural requirements for riparian habitat and conveyance losses, and flows required by the State Water Board for maintenance of water quality and fish and wildlife. Export diversions and Project carriage water are specifically excluded from the definition of inbasin entitlements.

With this notice, the State Water Board is invoking Term 91 and ordering you to immediately stop diverting water under the above water right. This condition of curtailment will continue until water conditions improve. Even if there is water physically available at your point of diversion, that water is necessary to meet senior water holders' needs or water quality objectives, or is water released from storage, that you are not entitled to divert under the above water right. You should not commence diversion under the above water right before being notified by the State Water Board that water is legally available for diversion under this priority of right.

Please note that future notices related to Term 91, including notices of lifting of Term 91 curtailments, will only be provided by email to the "Term 91 Updates" email list and posted on the Division's website at: https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/term_91/ You will be responsible for subscribing to electronic notices and/or monitoring the Division's website to determine when Term 91 curtailments are lifted and if they go back into effect after lifting this year in order to maintain compliance with Term 91.

To sign up for electronic notices, please visit: https://www.waterboards.ca.gov/resources/email_subscriptions/swrcb_subscribe.html and subscribe to the "Term 91 Updates" email list found under the "Water Rights" section of the page.

Compliance Certification Required:
Curtailed Term 91 diverters should document receipt of this Notice by completing the Curtailment Certification Survey (Survey) on the Division's Water Right Form and Survey Submittal Portal. The web address for the Survey Portal is: https://public.waterboards.ca.gov/WRInfo

To access the Survey Portal, use the same login credentials that you use when filing your annual reports of diversion and use. Please complete and submit the Survey online within seven (7) days of receipt of this Notice. The Survey confirms cessation of diversion under the specific water right (listed above) that includes Term 91, or, if applicable, either (i) identifies the alternative water supply to be used in lieu of the curtailed water right, or (ii) claims there is no hydraulic continuity between the surface water at the authorized point of diversion and the surface water in the Sacramento-San Joaquin Delta. A claim of no hydraulic continuity should be supported by photographs and additional information submitted/uploaded via the Survey website. Completion of the Survey and identification of alternate rights can avoid unnecessary enforcement proceedings. State Water Board staff may perform a field inspection to determine compliance with this Notice.

Status of Curtailment of Term 91 Water Rights:
A graph depicting the status of SPW releases and whether the Delta is in Balanced or Excess Conditions is available on the Division's website at: https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/docs/term91graph.pdf.

If you plan to use water during a Term 91 curtailment period, you must arrange to obtain an alternate source of water such as a more senior water right that is not under curtailment, ground water, or contract water purchased from entities with available water.

Potential Enforcement:
Those who are found to have diverted or used water beyond what is legally available to them or found to have violated a term of a permit or license, or other State Water Board order may be subject to administrative fines, Cease and Desist Orders, or prosecution in court. The State Water Board may levy fines of $500 per day for each day on which the unauthorized diversion or use of water or the violation occurred. (Wat. Code, §§ 1052, 1055, 1846.) Additionally, if the State Water Board issues a Cease and Desist Order against an unauthorized diversion or use of water, a violation of a term of a permit or license, or other State Water Board order, violation of the Cease and Desist Order can result in a fine of $1000 per day. (Wat. Code, §§ 1831, 1845.)

We recognize the burden and loss this notice creates for you during the irrigation season, and we want to ensure that others do not illegally benefit from your curtailments. The State Water Board encourages water right holders to assist in the prevention of unlawful diversion of water and in discouraging any waste or unreasonable use of water. To assist the State Water Board, you may file a complaint at:

https://calepacomplaints.secure.force.com/complaints/Complaint

No later than 30 days after issuance of this notice, any interested person may petition the State Water Board for reconsideration in accordance with Water Code section 1122 and sections 768 through 770 of the State Water Board's regulations. (Cal. Code Regs., tit. 23, §§ 768-770.)

Due to the current COVID-19 emergency, most Division staff are working from home. Accordingly, if you have any questions concerning this notice, the best means of contact is by email to Bay-Delta@waterboards.ca.gov.

Sincerely,

ORIGINAL SIGNED BY

Erik Ekdahl, Deputy Director
Division of Water

cc: continued on next page.

cc: (continued)

John Leahigh, Department of Water Resources (via email only)
John.Leahigh@water.ca.gov

Molly White, Department of Water Resources (via email only)
Molly.White@water.ca.gov

Kristin White, U.S. Bureau of Reclamation (via email only)
knwhite@usbr.gov

Jeff Sandberg, U.S. Bureau of Reclamation (via email only)
JSandberg@usbr.gov

APPENDIX B

May 21, 2021

Kristin White
Central Valley Project Operations Manager
U.S. Bureau of Reclamation
knwhite@usbr.gov

ORDER 90-5 SACRAMENTO RIVER DRAFT TEMPERATURE MANAGEMENT PLAN

Dear Ms. White:

This letter provides comments on the Draft Temperature Management Plan (TMP) submitted by the U.S. Bureau of Reclamation (Reclamation) on May 5, 2021, pursuant to State Water Resources Control Board (State Water Board or Board) Water Right Order 90-5. The Draft TMP was based on an April 1 operations forecast at the 90 percent hydrologic exceedance level. The Draft TMP did not reflect updated hydrologic conditions that degraded significantly between the April 1 Department of Water Resources (DWR) Bulletin 120 forecast and the May 1 DWR forecast, resulting in nearly 700 thousand acre-feet (TAF) less projected inflow to the Sacramento River Watershed.[1]

Since submittal of the Draft TMP, there has been significant coordination among Reclamation, DWR, the State Water Board, state and federal fisheries agencies, and water users to address these shortfalls, water supply concerns, and temperature management on the Sacramento River. Our understanding is that actions are being taken to achieve a minimum end of September storage target of 1.25 million acre-feet (MAF) and that this storage target will be reflected in the final TMP submitted next week. Based on the extensive coordination, analysis, and information sharing that has occurred among the agencies over the last few weeks, a 1.25 MAF end of September

[1] The Bulletin 120 forecast also identified 100 TAF less inflow to the San Joaquin River Watershed. There have also been further reductions in expected inflows to the Sacramento River Watershed since the May 1 Bulletin 120 was issued.

carryover storage target represents a reasonable balance between temperature control this year, maintaining some carryover storage going into next year, and providing for consumptive water supply needs.

This minimum 1.25 MAF end of September storage target would both address the reductions in inflows expected for the Sacramento River and provide a modest increase in storage that will improve temperature control on the Sacramento River this year as compared to what would be achieved by the draft TMP if that plan were implemented under the current hydrologic conditions. While there is still uncertainty, modeling from the National Marine Fisheries Service Southwest Fisheries Science Center indicates that these end of September storage levels and associated operations could provide for temperature dependent mortality (TDM) levels for winter-run Chinook salmon eggs as low as 50 percent (with a range up to over 80 percent). This is compared to estimated best case TDM levels of nearly 80 percent (with a range up to nearly 85%) for Reclamation's proposed operations under the draft TMP with the reductions in inflows projected in the May hydrology update (end of September storage level under 1 MAF).

Given the information summarized above, I will not approve Reclamation's TMP if it does not include the following:

- An end of September carryover storage requirement of at least 1.25 MAF. Of course, the Board recognizes that the carryover storage requirement will only be one of the actions outlined in the TMP, and that other reasonable temperature control measures will also be used to optimize temperature control.
- A description of the operations, including releases from Shasta and Keswick, and deliveries to contractors, that will be implemented to achieve the carryover requirement in a manner that will not impact critically low storage levels in other Project reservoirs (including Trinity, Folsom, and Oroville Reservoirs). We recognize that preserving systemwide carryover storage will depend in part on the ongoing efforts to manage this year's limited water supplies in collaboration with the State Water Board, other state and federal agencies, and water users in the watershed.
- A provision that Reclamation will report to the Executive Director in writing within 2 business days in the event that Reclamation's operations deviate from those outlined in the plan. The report would explain why actual operations deviated from the TMP, address whether the carryover storage requirements and other TMP objectives will be achieved, and include a plan to address any deficiencies within Reclamation's reasonable control.
- A provision for consultation on real-time management on a weekly basis with staff from the fisheries agencies, the State Water Board, and other appropriate entities to optimize real time temperature management for the protection of fish

and wildlife, including winter-run and fall-run Chinook salmon, and other native species.

- A provision for monitoring, modeling, and other evaluations needed to ensure that temperature management actions are optimized and in order to inform future management actions.

Failure to obtain the Board's approval of the TMP and to operate Shasta Dam and Reservoir in accordance with the TMP as approved during periods when elevated temperatures are detrimental to the fishery would constitute a violation of Reclamation's water right permits and licenses, and Reclamation could be subject to enforcement action.

The State Water Board appreciates the significant coordination that has occurred to date to address the shortages in supplies that have manifested (including groundwater substitution, delayed transfers, and increased releases from New Melones Reservoir). The State Water Board is committed to continue to work with Reclamation, other state and federal agencies, and other parties to take actions to address the critically dry conditions this year, including taking actions related to water unavailability and needed temporary urgency change requests to modify water right requirements.

If you have any questions regarding this letter, please contact Diane Riddle at diane.riddle@waterboards.ca.gov. Please be aware that due to the public health concerns regarding the COVID-19 virus and the resulting pandemic, many State Water Board staff are telecommuting; therefore, the best avenue of communication at this time is via email.

Sincerely,

ORIGINAL SIGNED BY

Eileen Sobeck
Executive Director
State Water Resources Control Board

APPENDIX C

State Water Resources Control Board

May 25, 2021

Water Right ID Login:
«APPLICATION_NUMBER»
Password: «REPORTING_IDENTIFIER»
Water Right Priority Date:
«ASSIGNED_PRIORITY_DATE»

«MAIL_RECEIVER_NAME»
«MAIL_RECEIVER_ADDRESS»
«MAIL_RECEIVER_CITY», «MAIL_RECEIVER_STATE» «MAIL_RECEIVER_ZIP»

In Regard to Water Right: «APPLICATION_NUMBER»
To: «APPLICATION_PRIMARY_OWNER»

NOTICE OF UNAVAILABLE WATER FOR YOUR WATER RIGHT

Water supply in the Russian River watershed is insufficient to meet the needs of all water rights holders. Our records show you have a post-1914 appropriative water right within the Russian River watershed upstream of the Dry Creek confluence. Our records further show that your right has a priority of «ASSIGNED_PRIORITY_DATE». **Our information indicates there is currently insufficient water for water rights with a priority date later than January 28, 1949. Our information also indicates that by June 1 there will be insufficient water for all post-1914 appropriative water rights.**

We are sending you this notice to ensure you are aware of the river's declining flow conditions, have reliable information regarding the amount of water available for your water right, and understand that even though water may be physically available at your point of diversion, it is not available under your water right. Our information indicates by June 1st water will not be available for all post-1914 appropriative water rights nor sufficient to fulfill riparian and pre-1914 claims. We will provide you updated information on the availability of water for your water right through our email subscription list. Please subscribe to receive email updates by subscribing to the Water Rights "Russian River Drought" at: http://www.waterboards.ca.gov/resources/email_subscriptions/swrcb_subscribe.shtml.

Water Unavailability Information Form Request
Please complete a Water Unavailability Certification Form (Form). The Form will advise us of the water right(s) you divert under and whether you divert under other rights. If you divert under multiple rights, it will inform us of when you stopped diverting under those rights. Your timely response helps us better manage limited water supplies.
Please do the following:

1. Visit: https://public.waterboards.ca.gov

2. Login using the Water Right ID Login and Password provided at the top of this notice.
3. Complete the Russian River Water Unavailability Certification Form.

Warning of Potential Future Curtailment of Pre-1914 or Riparian Water Rights
Declining supplies make your conservation actions vitally important. If current conditions persist, there may not be enough water for even pre-1914 appropriators or riparian diverters by June. We are developing emergency regulations that may result in curtailment orders directing water right holders to stop diverting, including riparian or pre-1914 water right holders.

Potential Exceptions
We may be able to assist you with identifying alternatives and exceptions on a case-by-case basis. Exceptions include the following:

- Your diversion is your only source of water for human health and safety purposes, you have no other water supply, **and** you already conserve as much as possible;
- Your diversion is for hydroelectric generation and you return all water you divert to the stream; or
- You have a contract or transfer order allowing you to divert stored water that has been released from a reservoir.

If you divert under any of the above circumstances, please identify it on the Form described above and provide the information requested.

Potential Enforcement
Diverting water that is not available for your water right may subject you to cease and desist orders, prosecution in court, or fines as high as $1,000 per day of violation and $2,500 for each acre-foot you divert or use that is not available for any of your water rights. (See Water Code sections 1052 and 1055.)

If you have questions, please contact us by email at: RussianRiverDrought@waterboards.ca.gov, review our drought year webpage at: http://www.waterboards.ca.gov/drought, or call our Drought Hotline at (916) 341-5318.

Sincerely,

Erik Ekdahl
Deputy Director, Division of Water Rights
State Water Resources Control Board

APPENDIX D

State Water Resources Control Board

May 25, 2021

«MAIL_RECEIVER_NAME»
«MAIL_RECEIVER_ADDRESS»
«MAIL_RECEIVER_CITY», «MAIL_RECEIVER_STATE» «MAIL_RECEIVER_ZIP»

In Regard to Water Right Statement ID: «APPLICATION_NUMBER»
To: «APPLICATION_PRIMARY_OWNER»

Diminishing Russian River Water Supply – Please Conserve

Water supply in the Russian River watershed is declining due to this year's dry conditions. Data indicates that by early June water supply will be insufficient to meet the needs of post-1914 water rights holders. That supply will continue to decrease rapidly and further limit the availability of water for pre-1914 appropriative rights and riparian diverters.

Our records show you have a pre-1914 appropriative or riparian claim in the Russian River watershed upstream of the Dry Creek confluence. We are sending you this letter to ensure you are aware of the river's declining flow conditions and so you can prepare for the possibility of water becoming unavailable for your water right. We will provide you updated information on the availability of water for your water right through our email subscription list. In the meantime, please conserve and sign up to receive email updates by subscribing to Water Rights "Russian River Drought" at: http://www.waterboards.ca.gov/resources/email_subscriptions/swrcb_subscribe.shtml.

Development of Emergency Regulations
We are developing emergency regulations to respond to the dry conditions in the Russian River. These emergency regulations may result in curtailment orders directing water right holders to stop diverting, even those with a pre-1914 or riparian water right. Declining supplies make your conservation actions vitally important.

Potential Exceptions
If you receive a notice that water is unavailable for your water right, we may be able to assist you with identifying alternatives and exceptions on a case-by-case basis. Exceptions include the following:

- Your diversion is your only source of water for human health and safety purposes, you have no other water supply, **and** you already conserve as much as possible;
- Your diversion is for hydroelectric generation and you return all water you divert to the stream; or
- You have a contract or transfer order allowing you to divert stored water released from a reservoir.

If you divert under any the above circumstances, you will be asked to identify that information after receiving a Notice of Unavailability.

If you have questions, please contact us by email at: RussianRiverDrought@waterboards.ca.gov, or review our drought year webpage at: http://www.waterboards.ca.gov/drought.

Sincerely,

Erik Ekdahl
Deputy Director, Division of Water Rights
State Water Resources Control Board

APPENDIX E

United States Department of the Interior

BUREAU OF RECLAMATION
Central Valley Operations
3310 El Camino Ave #300
Sacramento, California 95821

IN REPLY REFER TO:

CVO-400
2.2.4.21

VIA ELECTRONIC MAIL

Mr. Erik Ekdahl
Deputy Director, Division of Water Rights
State Water Resources Control Board
1001 I Street, 14th Floor, Office 54
Sacramento, CA 95814

Subject: Transmittal of 2021 Sacramento River Temperature Management Plan - Order 90-5

Dear Mr. Ekdahl:

This letter transmits the Bureau of Reclamation's Sacramento River Temperature Management Plan (Plan) for Water Year 2021 (Enclosure A) pursuant to Order 90-5. Factors beyond the reasonable control of Reclamation prevent Reclamation from meeting 56°F at the Red Bluff Diversion Dam. The Plan will best protect the fishery by conserving cold water for later release and is necessary to implement measures to conserve winter-run Chinook salmon.

While Reclamation ended the 2020 water year with a Shasta storage of 2.2 million acre-feet, the 2nd highest storage for Dry hydrologic year types since the implementation of D-1641, CVPIA, and ESA requirements, water Year 2021 is currently the driest on record since 1977. The snowpack on the Sacramento River Basin at the start of April was 69 percent of average, but with very little rainfall. Conditions also significantly changed at the end of April when forecasted reservoir inflow from snowmelt did not materialize. This year, allocations to agricultural water service and repayment contracts are 0% and allocations to municipal and industrial contractors are only 25%. Storage in Trinity, Oroville, and Folsom reservoirs are low, and Reclamation is operating to water rights, Delta standards, and health and safety deliveries while seeking to facilitate water transfers to provide supplies to areas of the state in dire need.

Reclamation has been coordinating weekly with the State and Federal agencies through the Water Operations Management Team (WOMT) called for in the 2020 Record of Decision for the Long-Term Operation (LTO) of the Central Valley Project (CVP) and State Water Project (SWP). Starting in January, Reclamation provided and discussed 12-month operation outlooks in topic specific meetings with State Water Resources Control Board (Water Board) staff. The March forecasts identified the potential for a Tier 3 or a Tier 4 year under the LTO. Accordingly, Meet and Confer provisions with the Sacramento River Settlement Contractors (SRSC) were initiated. In the course of these discussions, a warm water bypass of power generation at Shasta Reservoir was discussed, coordinated through the SRTTG, and implemented, preserving over 300 TAF of cold water for later in the year. In March, Reclamation convened the Sacramento River Temperature Task Group (SRTTG) to consult with the California Department of Fish and Wildlife (CDFW), the U.S. Fish and

Wildlife Service, the National Marine Fisheries Service (NMFS), and the U.S. Western Area Power Administration. These meetings also included the SRSC, Water Board, and Tribes.
Reclamation also participated in the Water Board's April 21 workshop on 2021 Sacramento River Temperature Management and provided the Water Board a Draft Sacramento River Temperature Management Plan (Draft Plan) on May 4.

We received written comments on the Draft Plan from the Water Board on May 21st and respond to the input as follows:

- End-of-September carryover storage target of 1.25 MAF: Given the unique circumstances this year, the Governor's Drought Proclamation, and anticipated actions by the Water Board to curtail non-project diversions, the enclosed Plan shows an end-of-September storage in Shasta Reservoir of 1.25 MAF.
- Provisions for weekly coordination, reporting of anticipated changes and modeling and monitoring to inform decisions: Reclamation agrees with these provisions and has incorporated these commitments in the Temperature Management Plan.

We received written comments on the Draft Plan from NMFS on May 14, and respond to the input as follows:

- Continue to consider life history diversity for shaping the temperature season: Targeted lower temperatures (approximately 54.5°F) for the critical egg incubation period with 57°F shoulder temperatures. The recommended criteria of 53.7F for egg incubation was considered in earlier scenario development but would likely expend cold water pool prior to the end of August.
- Continue to preserve redds downstream to the Highway 44 Bridge: Reclamation will target the SAC gage located at the Highway 44 Bridge.
- Continue to use real-time management to respond to actual meteorological conditions: Reclamation will continue to anticipate warm meteorological conditions and take actions in advance to reduce the likelihood of exceed target temperatures.
- Represent the effect of power bypass operations: Reclamation incorporated the reservoir profile as of May 19 that includes cold water remaining following the majority of the power bypass. The power bypass concluded on May 24.
- Model an additional scenario with the driest hydrology and hottest meteorology on record to reflect a conservative forecast of conditions: Reclamation has requested this scenario be developed by the NMFS Southwest Fisheries Science Center and provided to SRTTG.
- Include a section committed to uncertainty and assumptions including those related to hydrology, meteorology, snowpack, accretions, and depletions: Reclamation has included this suggestion under the section titled "Key Areas of Uncertainty."

We received written comments on the Draft Plan from the SRSC on May 19 and respond to the input as follows:

- Balanced Release Schedule from Keswick: Reclamation has developed a release schedule less than suggested in June, July, and August in an effort to address comments from the Water Board suggesting an end of September carryover storage target of 1.25 MAF. This schedule is only feasible given the voluntary actions taken by the SRSC to reduce demands from the Sacramento River. If Delta water quality objectives require additional releases, and

additional releases from other reservoirs would place other objectives at risk, Reclamation would need to discuss at WOMT and revisit the carryover target with the Water Board.

Storage in Shasta Reservoir is the result of inflows less releases. Shasta Reservoir supports downstream diversions and Delta requirements in coordination with other CVP and SWP facilities and in response to non-project diverters. Reclamation coordinated with the SRSC on the voluntary actions for the lowest possible releases from Shasta Reservoir while meeting other system requirements. Actions include voluntary demand reductions, groundwater substitution, water transfers, and intense coordination to match releases to demand. These releases also account for system-wide drought actions such as modifying delta outflow and water quality requirements described in the Temporary Urgency Change Petition filed by Reclamation and the California Department of Water Resources (DWR), watershed-wide curtailments, increased releases from New Melones reservoir to meet delta objectives, reduced CVP and SWP allocations and other water management actions that decrease reliance on stored water throughout the summer. If requirements administered by the State of California, including those overseen by the Water Board, call for more water than anticipated, and other CVP and SWP reservoirs cannot be impacted, Reclamation will protect Health and Safety and storage in Shasta Reservoir may be less than estimated. Reclamation commits to weekly discussions on operational conditions for major CVP and SWP facilities, including Shasta Reservoir, during WOMT and commits to notifying the Water Board in writing in the event that the 1.25 MAF end-of-September storage is no longer feasible.

DWR is coordinating with Reclamation to update the Drought Continency Plan required in the 2020 Incidental Take Permit for the State Water Project. The Drought Contingency Plan describes the system-wide operational conditions, approach, monitoring, and coordination that fall beyond the scope of Order 90-5. The Drought Contingency Plan supplements sections of this Temperature Management Plan and will be available by June 1, 2021.

While approval is not required under Order 90-5, if the Water Board objects to the enclosed Plan, the Water Board's objection must include identification of an alternative location for managing water temperatures to 56°F. In the absence of the Water Board providing an alternative location, Reclamation will implement this Plan until such time as alternative location can be provided or agreed upon.

For additional information, please contact me or Ms. Elizabeth Kiteck, Chief, Water Operations at (916) 979-2684 or ekiteck@usbr.gov.

Sincerely,

Kristin White
Operations Manager

Enclosures

May 28, 2021

SACRAMENTO RIVER TEMPERATURE MANAGEMENT PLAN FOR WATER YEAR 2021

INTRODUCTION

Conditions in the Central Valley are critically dry, and consequently, Shasta temperature management is limited by these dry conditions. Although temperature management in Water Year 2020 (a dry year) resulted in low temperature dependent mortality (3-7%) for brood year (BY) 2019 Sacramento River winter-run Chinook salmon, the overall survival was low. Although Water Year 2021 started with higher storage than previous critical years in recent history, hydrologic conditions supporting Shasta temperature management are critically low. The Northern Sierra Precipitation 8-Station Index indicates that this year's hydrologic conditions are the driest since 1977. In early April, Shasta Reservoir's cold water pool used to protect winter-run Chinook salmon was projected to be the smallest since 1977.

Unfortunately, conditions have deteriorated significantly from the April 1st forecast and expected inflow to the Sacramento River system (including the Yuba. Feather and American River watersheds) has decreased by approximately 685 TAF. On May 10, 2021, the Governor issued an Emergency Proclamation on drought conditions for the Sacramento –San Joaquin Bay-Delta (Delta) and other watersheds because of the continuing extreme dry conditions in the Delta watersheds. As such, numerous drought actions were rapidly planned and/or finalized to lessen the impact of the drought on fish and wildlife, water supply, public health and safety and carryover storage for next year. A report outlining these actions and the expected response from the Sacramento-San Joaquin system as a whole will be available by June 1, 2021. This temperature management plan includes many assumptions of drought actions in order to reach the forecasted Shasta and Keswick monthly releases; however, these actions are not fully explained in this report as they are system-wide actions rather than specific temperature management actions.

This Water Year 2021 Sacramento River Temperature Management Plan (Plan) reflects coordination starting in February 2021 to manage operations of Shasta Reservoir for water temperatures on the Sacramento River using conservative assumptions in modeling, taking advantage of opportunities to increase the cold water pool, and managing to real-time conditions. The Plan describes how the U.S. Bureau of Reclamation (Reclamation) plans to operate Shasta Reservoir and the Temperature Control Device (TCD) on Shasta Dam consistent with the 2020 Record of Decision on the Coordinated Long-Term Operation of the Central Valley Project and State Water Project (LTO) (2020 ROD) in compliance with:

- RPM 1.a. of the 2019 National Marine Fisheries Service (NMFS) Biological Opinion to, in coordination with the Sacramento River Temperature Task Group (SRTTG), consider technical assistance from NMFS regarding the development of an annual temperature management plan and to submit a final temperature management plan to NMFS by May 20 of each year;
- Order 90-5 to consult with the California Department of Fish and Wildlife (CDFW), U.S. Fish and Wildlife Service (USFWS), NMFS, and Western Area Power Administration on the designation of a location upstream of the Red Bluff Diversion Dam where Reclamation will meet a daily average water temperature of 56°F; and
- Order 90-5 to provide an operation plan to the State Water Resources Control Board (Water Board), Chief of the Division of Water Rights, on Reclamation's strategy to meet the temperature requirement at a location upstream of the Red Bluff Diversion Dam.

The Plan was developed in coordination with and with input from the SRTTG. It includes temperature

locations and targets through October 31, modeled winter-run Chinook salmon egg mortality, estimated dates for operation of the side gates on the TCD, and the estimated end-of-September cold water pool. Throughout Plan implementation, Reclamation will monitor the cold water pool, compare measured conditions to actual performance, and provide regular updates through the SRTTG. In the event measured cold water pool conditions vary from what is projected and temperature performance appears at risk, Reclamation will reconvene the SRTTG in preparation for an adjustment of this Plan. If the adjustment impacts the temperature Tier and/or other warranted indicators as discussed by the SRTTG, then a modified summer temperature release strategy will be evaluated to remain within the Tier's anticipated performance level. Reclamation will work with NMFS and the other members of the SRTTG during fall operations to conserve storage and address the potential for redd dewatering.

Based on the February 90% exceedance forecast, Reclamation identified that Water Year 2021 was likely to be a Tier 4 year and initiated interagency coordination activities regarding Shasta reservoir seasonal management. In a Tier 4 year, there is less than 2.5 MAF of total storage in Shasta Reservoir at the beginning of May, and/or Reclamation cannot meet 56°F at CCR. Conditions on May 1 along with modeling based on measured reservoir profiles confirm that Water Year 2021 is a Tier 4 temperature management season.

BACKGROUND

The 2020 ROD requires use of conservative forecasts through the seasonal planning process for reservoir releases (including developing initial and updated allocations) and temperature management planning, such that monthly release forecasts and associated allocations are typically based on a 90 % exceedance inflow forecast through September. The Plan manages the cold water pool at Shasta Reservoir using a tiered strategy to better manage the limited cold water resource for winter-run Chinook salmon egg survival. The tiered approach recognizes the substantial influence of hydrology on available cold water and targets a temperature of 53.5°F in the upper Sacramento River above Clear Creek from May 15 to October 31. The 2020 ROD incorporates a number of measures to improve Shasta storage and the related cold water pool for the upcoming temperature management season. Reclamation will manage water temperatures based on the following tiers, depending on the actual size of the cold water pool in a given year:

- Tier 1 – Sufficient volume of cold water to target 53.5°F or lower starting May 15 through October 31
- Tier 2 – Sufficient volume of cold water to target 53.5°F during critical egg incubation period
- Tier 3 – A volume of cold water that can target 53.5-56°F during critical egg incubation period; and consideration of intervention measures in lower Tier 3 years
- Tier 4 – Insufficient cold water to maintain 56°F or lower; and consideration of intervention measures

Reclamation's Plan uses modeling and professional expertise to identify the most protective tier that can be achieved given the available cold water. Before the reservoir stratifies and the volume of cold water is known, Reclamation estimates temperature capabilities based on projections of storage.

PRE-SEASON ACTIONS

As Water Year 2021 began to shape out, Reclamation worked with water users, the State and Federal fishery agencies and other stakeholders to implement several actions prior to the start of the temperature management season. These actions are listed below with a brief description:

Winter-run Chinook Salmon Conservation Hatchery Production: In February 2021, a multi-agency team discussed increasing Livingston Stone National Fish Hatchery (LSNFH) winter-run Chinook salmon production targets for Water Year 2021. Typically, the USFWS would collect 60 females and 100 males out of the Keswick fish trap; however, due to poor conditions and anticipated low survival of BY 2021 natural winter-run Chinook salmon, they anticipate collecting 120 females and 180 males.

Reclamation is also preparing chillers for use later in the season in the event that deliveries to the hatchery become too warm.

Shasta Critical Year Determination: In February, Reclamation notified senior water right holders on the Sacramento River of a Shasta Critical Year and a reduction to 75% of contract totals under the Sacramento River Settlement Contract.

Water Transfers and Reduced Diversions: Sacramento River Settlement Contractors' (SRSC) scheduled diversions and transfers to other Sacramento Valley Water Users for 2021 are 1,117,000 AF, an amount that is less than the volumes diverted and transferred in Water Year 2015. Diversions and transfers are approximately 65% of Settlement Contract totals, an additional 10% reduction from the 75% shortage provisions. SRSC have made available 170,000 AF of water available for transfer to other areas of the State in critical need. This transfer water will be held in Shasta Reservoir over the summer to assist with managing cold water pool. SRSC are also considering alternatives to rice decomposition water that will provide additional water savings. The SRSC propose to establish, in cooperation with Reclamation, an emergency groundwater pumping program to further reduce diversions and address the migratory needs of the Pacific Flyway. Weekly coordination with Reclamation and contractors on diversions maximizes efficiencies to retain as much water in Shasta as possible while meeting demands.

Shasta Warm Water Power Bypass: On April 18, 2021 Reclamation adjusted operations to bypass Shasta Dam's powerplant and temperature control device (TCD) due to the low water elevation in Shasta Reservoir. Reclamation released water from the warmer, upper layers of Shasta Reservoir directly through the dam's river outlets into the Sacramento River. The purpose of this warm water release was to maintain Sacramento River flows through the spring while preserving the limited supply of colder water for use later in the summer when most critical for endangered winter-run Chinook salmon. Fishery agencies provided preliminary guidance on the maximum temperatures (60 deg F at Clear Creek - CCR) and Reclamation has been coordinating with the Agencies weekly on the need for potential revisions. Monitoring for unanticipated effects includes monitoring temperatures and their impacts to hatchery winter-run Chinook salmon at LSNFH and monitoring winter-run Chinook salmon in the Sacramento River (e.g., observations of pre-spawning mortality in adults). When fisheries conditions showed possible adverse effects from the warmer release, Reclamation received updated guidance from the Fishery agencies and began to manage the river temperatures to 57 deg F at the SAC gage (Sacramento River upstream from Highway 44 bridge) beginning on May 15 by adjusting the release blend from the bypass with the powerplant and TCD. The bypass was further reduced as water temperatures in Shasta Lake increased in order to maintain downstream river temperatures at 57 deg F at SAC. The warm water bypass ended on May 24th due to warming temperatures and is estimated to have conserved over 300 TAF of cold water (<53 deg F) for use later in the summer and fall and resulted in a reduction in power generation worth approximately $5 million.

SYSTEM-WIDE DROUGHT OPERATIONS

As mentioned previously, a series of drought actions are being implemented or planned for implementation for Water Year 2021 that will support reduced releases from Shasta Reservoir in order to support temperature management through the summer. These actions will be described in more detail in

the Drought Contingency Plan (to be released by June 1, 2021) and are briefly listed below for reference:

- Temporary Urgency Change Petition to modify Delta requirements
- Emergency drought barrier to minimize Delta salinity intrusion
- Minimum exports to limit releases needed to support Delta needs
- Limited use of New Melones to meet delta outflow and salinity requirements
- Urban water conservation to limit releases needed to support system needs
- Curtailments from the SWRCB to reduce demands throughout the system
- Low or zero allocations to CVP and SWP contractors

The combination of these actions may allow for the reduced releases from Shasta Reservoir without causing devastating impacts to other CVP or SWP reservoirs. A description of the system wide operation is included in the Drought Contingency Plan.

MODELING ASSUMPTIONS AND LIMITATIONS

A seasonal water temperature forecast describes future expected downstream water temperature. This forecast, or simulation of expected water temperature performance is based on the targets specified in the TMP. Future water temperature is forecasted using computational tools, at various elevations in the reservoirs and downstream in the river. These tools are based on conservative assumptions regarding hydrology, operations, and meteorology. Because this forecast (using conservative estimates in May to estimate what might happen at the end of October) can never exactly predict the actual hydrology, operations, and meteorology, the model results are not expected to precisely match actual water temperatures. The expectation is, however, that forecasted downstream water temperatures generally have an accepted measure of error regardless of the uncertain future conditions. In this case, there are generally two types of simulation error: uncertainty of the future conditions (e.g. inputs such as meteorology) and inherent model error or bias. To better understand the inherent model error or bias, a hindcast evaluation is typically performed. A hindcast, rather than looking forward to forecast, simply uses the actual input/forcing data after it's observed (e.g. hydrology, operations, and meteorology) to determine how well the model reproduced a condition such as actual downstream water temperatures.

Reclamation's draft Plan submitted in early May did not specifically model the anticipated power bypass for May and only captured the effects of the power bypass through the end of April. This was due to a model limitation where releases from elevations other than that of the TCD were not an option in Reclamation's version of HEC-5Q model. As stated above, the power bypass ended May 24 due to warming conditions in the river. This model includes the effects of the power bypass through May 19, the date of the profile used for the modeling. Between May 19 and May 24, the power bypass was significantly less than it has been in late April and early May. Although Reclamation expects to see minor benefits with the remainder of the power bypass action, its reduced volume is unlikely to have a significant impact on the temperature management plan included in this report. Profile and modeling updates will be provided to SRTTG regularly to include any benefit of the power bypass not captured by this Plan. Moving forward, Reclamation is working with other agencies through a collaborative effort to build a more flexible model that can simulate power bypass and other operations for analyzing unique operations in the future.

Water transfers between the SRSC and South of Delta contractors were not finalized at the time of the Draft Plan released in early May and were therefore not included in the modeling for the Draft Plan. The anticipated effect of both reducing demands to make this water available and delivering this water to the purchasers have been incorporated into the release schedule and temperature modeling for this Final Plan.

This release schedule assumes approximately 170 TAF being made available for transfer to CVP contractors south of the delta through crop idling and groundwater substitution. This analysis assumes this water is delivered only across the month of October. Reclamation will continue to evaluate conditions and work with both SRTTG members and the south of delta purchasers on the best timing for delivery of this water given the temperature management plan.

Reclamation has proposed the use of NOAA-NWS Local Three-Month Temperature Outlooks (L3MTO) and historical meteorology as a means of estimating air temperature expectations for modeling purposes. In coordination with SRTTG, Reclamation has the choice of five exceedance threshold options, varying from those that serve more conservative stream temperature planning (e.g., 10% exceedance) to those that serve more aggressive planning (e.g., 90% exceedance). In past years, SRTTG has recommended the use of a conservative approach that uses the 25% exceedance L3MTO forecast. However, when Reclamation approached this process similarly this year, the combination of historical data and the 25% exceedance L3MTO forecast created data quality issues and the data was not usable. The 50% exceedance L3MTO forecasted temperatures were used in the April temperature modeling and development of the draft temperature management plan. This is a less conservative approach than was historically used. Reclamation was able to correct the data quality error from the previous draft to use the 25% exceedance L3MTO forecast for the Final Plan. In addition, NMFS' comment letter requested more conservative meteorology and hydrology be considered in a sensitivity study. This study will be completed by the NMFS Southwest Fisheries Science Center and shared with the SRTTG.

RELEASE OUTLOOK

The Shasta Reservoir release strategy included in this plan and temperature modeling relies on numerous drought actions throughout the Sacramento and San Joaquin watersheds to reduce reliance on stored water from CVP and SWP reservoirs this summer. These drought actions have added a degree of flexibility to help manage storage at Shasta, Oroville and Folsom reservoirs for meeting public health and safety needs, repelling salinity in the delta, producing hydropower and providing additional cold water for fishery protection throughout the summer. In their May 17 comment letter (revised on May 24), NMFS provided feedback to reduce releases from the "base" run submitted in the draft plan and to set an end of September carryover target. Similarly, the SRSC also suggested reduced releases from the "base" run. The Water Board also provided feedback in their May 21st comment letter to support an end-of-September carryover target of 1.25 MAF. In response to these comments, Reclamation has crafted this release schedule to be less than the "base" scenario and to meet 1.25 MAF by the end of September. This release schedule is intended to guide the monthly average releases from Keswick Dam. Daily releases may vary from these flows to adjust for real-time operations.

Significant uncertainties exist within the forecast that will require intensive real-time operations management throughout the summer to achieve the various goals and targets throughout the system. As requested in the May 21 Water Board comment letter, Reclamation commits to reporting out on the status of this release outlook, temperature management and overall system operations at the weekly WOMT meeting. Table 1 describes the monthly forecasted operations for releases and storage targets.

Table 1. Monthly forecasted operations for Shasta and Keswick Reservoir releases and estimated storage.

Operations Information/Month	June	July	August	September
Shasta Releases (TAF)	332	351	346	255

Keswick Releases (cfs)	7,100	7,500	7,100	5,800
Keswick Releases (TAF)	422	461	436	345
Spring Creek Power Plant (TAF)	90	110	90	90
Shasta End-of-Month Storage (TAF)	1,822	1,598	1,379	1,250

KEY AREAS OF UNCERTAINTY

Operational decisions on the upper Sacramento River are influenced by local and CVP and SWP system-wide multi-purpose objectives, including those that are planned and uncertain. Many factors contribute to operational actions including, but not limited to: flood protection, forecasted inflows, facility maintenance schedules, physical/mechanical facility limitations, upstream operations, minimum in-stream flow criteria, downstream Delta regulatory requirements, Delta exports, power generation, recreation, fish hatchery accommodations, temperature management capabilities, and others. In addition, uncertain or unplanned events can also influence real-time operation decisions (e.g., wildfires and equipment malfunctions). To address uncertainty, Reclamation typically uses conservative estimates of future conditions in the modeling assumptions (e.g., hydrology, operations, and meteorology) and projections are updated through the management period.

The release forecast used for this temperature management plan is based on a number of assumptions that each come with a level of uncertainty. A brief list of these assumption areas along with their areas of uncertainty is listed below:

Inflow hydrology: This forecast is based off the 90% exceedance inflow hydrology for both Shasta reservoir and the remainder of the watershed. By May, the difference between the 90% and the 99% exceedance forecast is fairly low. For Water Year 2021, this difference is only 45 TAF for June through September. Inflows below the 90% may cause challenges in meeting the 1.25 MAF storage target at the end of September; however lower inflows do not necessarily confirm this number cannot be met as it will depend on the flexibility in the remainder of the system in the late summer. As stated above, Reclamation commits to reporting out on the status of this release outlook, temperature management and overall system operations at the weekly WOMT meeting.

Meteorology: California's climate is sensitive to large-scale ocean-atmosphere oscillations and is highly variable from year to year. California has the greatest variation in precipitation compared to all other U.S. States. Significantly higher ambient air temperatures than assumed in this forecast may result in the need to adjust the temperature management plan and increase target temperatures. Conversely, some events such as wildfires can have a large influence on reducing water temperatures as was observed during Water Year 2020. Smoke and haze may dampen the effects of unusually warm air temperature conditions on reservoir heating and downstream in-river warming.

Lake temperature profile and modeling updates will be provided to SRTTG regularly to communicate uncertainties in modeling throughout the temperature management season. A comparison between modeled profiles and actual profiles will be presented to SRTTG to help track the accuracy of forecasts and how

uncertainties with the meteorology impacted Shasta Lake temperature model results.

Accretions and Depletions: Accretions/depletions are the net gain or loss between the main upstream reservoirs (Shasta, Oroville, and Folsom) and the Delta, as measured at Freeport along the Sacramento River. They include the net of inflow from smaller tributaries and creeks, diversions from various water users north of the Delta and natural losses due to infiltration and evaporation. The forecasted releases used in this modeling were developed to both meet the end of September storage target of 1.25 MAF and avoid causing devastating impacts to other parts of the system. The system response to the planned Shasta releases is partly determined using the assumptions for the monthly accretion/depletions. The methodology for forecasting these accretions and depletions in Water Year 2021 is unique to previous years due to the significant drought actions being taken to reduce depletions throughout the system. This methodology, explained in more detail in the Drought Action Plan, comes with significant uncertainty. While minor changes in accretions/depletions may cause adjustments in other parts of the system, major increases in system-depletions may lead to an increase in Shasta releases in order to maintain salinity control in the Delta. As stated above, Reclamation commits to reporting out on the status of this release outlook, temperature management and overall system operations at the weekly WOMT meeting.

Delta Water Quality: Similar to the accretion/depletion description above, the forecasted releases made assumptions regarding necessary flows from the system to meet delta outflow and water quality objectives. These assumptions, explained in more detail in the Drought Contingency Plan, include anticipated approval of the TUCP to relax both outflow and water quality standards in June and July and actions by the Water Board to curtail other diversions. While minor changes in flows required to meet delta water quality may cause adjustments in other parts of the system, major increases may lead to an increase in Shasta releases in order to maintain salinity control in the Delta. As stated above, Reclamation commits to reporting out on the status of this release outlook, temperature management and overall system operations at the weekly WOMT meeting.

TEMPERATURE STRATEGY

Preliminary temperature analyses, presented to the SRTTG in February and March 2021, included model runs with CCR target temperature at 56°F. These preliminary simulation results showed that the temperature target of 56°F could not be maintained for the entire temperature management season. These runs are characterized by end-of-September cold water pool volumes less than 400 TAF, early side gate use, and rising temperatures above target thresholds at the end of the simulation.

In March 2021, Reclamation estimated stage-dependent and stage-independent temperature-dependent mortalities (TDMs), End-of-September Cold Water Pool (EOS CWP), and side gate operations for all 358 scenarios using the Temperature Tier Selection Protocol (TTSP). However, because the TTSP tool was developed for Tier 2 and Tier 3 Year types, it did not perform well for Water Year 2021 considering this year is a Tier 4 Water Year. This assessment of scenarios suggested no temperature management scenario could meet Tier 1-3 biological objectives and facility configuration criteria to avoid loss of temperature control (exceed 56°F) throughout the duration of the temperature control period. The 358 examined TTSP scenarios achieved temperature dependent mortality ranging from 90% to 99%. Reclamation commits to updating this TTSP to address future Tier 4 years through SRTTG prior to the Water Year 2022 temperature management season.

Since the TTSP approach was unable to inform target temperature criteria or duration for a Tier 4 year, Reclamation gathered input from the Water Board, NOAA Fisheries, the USFWS, CDFW, Tribes, and

other stakeholders on these elements of the TMP. The agencies and stakeholders provided advice on temperature criteria for the protection of salmonids.

Reclamation crafted a Plan to minimize modelled temperature dependent mortality with available cold water within the following criteria and approaches:

- Fall Certainty: Approach seeks to avoid use of the side gates until September or later, if possible. Reclamation was able to develop a Draft Plan with scenarios that would rely on the side gates (i.e., full side gate use) by August 29 (Table 2).
- Life History Timing Diversity: Approach seeks to develop a temperature window to target 2 standard deviations of historical spawning, starting May 15. Reclamation was able to develop a Plan that starts June 15 and extends through August.
- Critical Egg Incubation Timing and Shoulder Temperatures: Approach seeks to develop a temperature plan with a colder window during the critical egg incubation period with potentially warmer shoulder temperatures, if necessary. Reclamation used the 53.7°F egg incubation criteria to guide the temperature management approach. Reclamation was able to develop a plan that targets temperatures of 54.5°F during the critical egg incubation time period and shoulder temperatures near 57°F for holding adult winter-run Chinook salmon (Table 1). The egg incubation criteria of 53.7°F was used as critical threshold input parameter for the temperature dependent mortality modelling efforts (see Attachment for more information on model assumptions).
- Spatial Diversity: Approach seeks to target temperatures are the most downstream point possible while balancing the approaches listed above. Reclamation was able to develop a plan that targets preserving redds down to the Highway 44 Bridge.
- Cold water efficiency: Reclamation would operate to temperatures at SAC (Highway 44 Bridge) and respond to actual meteorological conditions.

This plan approach, Scenario 13, includes an initial shaping of temperatures to best meet the above goals and that would be refined through further SRTTG input on tradeoffs. The TDM results for scenario 13 ranged from 64-78% (Table 3).

Reclamation has also included a separate reference alternative that starts June 15 and operates to 55°F at Highway 44 Bridge (Scenario 14; Table 1). The TDM results for scenario 14 ranged from 73-97% (Table 3).

Important performance metrics (TDM, side gate operations, end-of-September cold water pool volume) for each scenario are described in Table 3. Assumptions and more information for these scenarios are described in Attachments 1-2.

Table 2. Water temperature target in degrees Fahrenheit at Keswick and Highway 44 for proposed scenarios. HEC-5Q does not perform well after September 14. Water temperatures may be warmer than these targets and HEC-5Q results. Warmer water temperatures described in Attachment 2 describe the late season water temperatures that were used for the temperature dependent mortality modeling.

Month/ Scenario	Keswick S13	Hwy 44 S13	Keswick S14	Hwy 44 S14
May	56.2	56.1	56.2	56.1
June	55.1	55.1	55.7	55.6
July	54.5	54.6	55.0	55.1
August	54.3	54.4	55.2	55.2
September	54.9	54.9	54.9	54.8

October	55.7	55.5	54.6	54.4
November	53.0	52.5	52.7	52.3

Table 3. TDM, Storage, and first side gate usage for different scenarios.

Metric/Scenario	S13	S14
HEC-5Q TDM - Anderson (%)	78.2 – 78.4	94.4 – 96.6
HEC-5Q TDM - Martin (%)	66.6 – 77.3	80.1 – 87.6
RAFT TDM – Mean / Median Martin (%)*	64 / 71	73 / 81
End of Sept CWP Storage (TAF)	173	230
First Side Gate Use	7/13/21	8/8/21
Full Side Gate	8/29/21	9/19/21
End of September Storage (MAF)	1.25	1.25

* Included in Attachment 3

The TDM results achieved with HEC-5Q modeling resulted in higher values than those from the CE-QUAL modeling as referenced in NMFS' comment letter on the Draft Plan. Although these models use different input assumptions, the difference in results was larger than expected. Reclamation hypothesizes this is related to the HEC-5Q and CE-QUAL predicted temperatures after September 15. River temperatures are adjusted post-September 15 from the HEC-5Q targets rather than the CE-QUAL's post-September 15 predictions to estimate temperature dependent mortality. In Table 3, TDM ranges that represent HEC-5Q temperature targets (e.g. lower estimate) and the adjusted post-September 15 temperatures. Reclamation will continue to coordinate through SRTTG to review these and other model results and may update these TDM estimates based on those discussions.

Two additional factors were considered to evaluate a feasible scenario that reduces the risk of losing control of temperature management in the fall period. The first factor is the end-of-September cold water pool estimate. Reclamation considers a minimum of 460 TAF as a conservative buffer to achieve a temperature performance of 56°F at CCR from September 15 through October 31. Neither of the scenarios reflect a range of end-of-September cold water volumes sufficient to manage unknown factors during September and October. Therefore, the two scenarios in the Plan may not be able to provide temperature management in late-September and October. The other factor is the timing of opening of the first TCD side gate. Reclamation modeling found improving temperature conditions would result in the first TCD side gate being used on July 13. Based on Reclamation's operational experience, the later the first side gate is deployed, the greater the likelihood to maintain temperature management control into the fall.

Reclamation anticipates working with SRTTG prior to June 15 to discuss the risks and tradeoffs between scenarios S13 and S14 along with any suggestion adjustments to determine the final approach. To implement the Plan, Reclamation will monitor the cold water pool projections and compare to actual performance during implementation to ensure sufficient cold water pool throughout the Plan's duration. The primary risk management criterion is defined as a cold water pool less than 49°F which is more than 10 percent less than the projected volume. In addition, ongoing modeling results will be completed for each monthly SRTTG meeting and more often as necessary. These results will be considered should they indicate increased or decreased risk to fall temperature performance, which is a concern to Reclamation based on the uncertainty in meteorology, hydrology, and real-time operation conditions unknown to

Reclamation at the time of TMP selection. In the event that actual cold water pool conditions vary from what is projected and the fall temperature performance appears at risk, Reclamation will reconvene the SRTTG in preparation for an adjustment of the TMP. As in past years, Reclamation will work with NMFS and the other members of the SRTTG during fall operations to both reduce releases to conserve storage and to address the potential for Chinook salmon redd dewatering.

TECHNICAL ASSISTANCE AND CONSULTATION

Year-around

Agencies meet weekly in the WOMT to discuss operations at all major CVP and SWP facilities. In addition, technical teams meet regularly to review observed data and make adjustments to the Plan as needed. The combination of WOMT and technical team meetings will allow for discussion and feedback on real-time management on at least a weekly basis with staff from the fisheries agencies, the Water Board, and other appropriate entities.

December to January – Conservation of Cold Water Pool and Inactive Temperature Management Period

Reclamation provided monthly updates via e-mail to the SRTTG, outlining current river and reservoir conditions, operations, hydrology, meteorology, and long-range precipitation forecast information. No significant issues concerning temperature management arose during this period and the SRTTG was not convened.

February through April – Temperature Management Preparation

Reclamation convened SRTTG meetings, starting in February 2021, on a monthly basis to ensure communication and coordination among the parties in preparation for the temperature management season.

In mid-February 2021, Reclamation prepared initial projections of anticipated temperature management capability and considerations based on the 90% February hydrologic and runoff forecasts from DWR and National Weather Service River Forecast Center. Reclamation's February projections showed that a Tier 4 year was likely. Reclamation initiated interagency coordination through the Drought and Dry Year activities and stakeholder coordination through the Meet and Confer activities described in the 2020 ROD.

In February 2021, a multi-agency team discussed increasing LSNFH winter-run Chinook salmon production targets for Water Year 2021. Typically, the USFWS would collect 60 females and 100 males out of the Keswick fish trap; however, due to poor conditions and anticipated low survival of BY 2021 natural winter-run Chinook salmon, they anticipate collecting 120 females and 180 males.

In mid-March 2021, the Sacramento River Settlement contractors initiated the meet and confer commitments under the 2020 Record of Decision and began discussions on voluntary measures for Shasta Cold Water Pool Management Dry Years, Drought Years, and Successive Dry Years. Reclamation's Proposed Action 4.12.5 describes that in Tier 3 and 4 years, Reclamation shall meet and confer with USFWS, NMFS, DWR, CDFW, and Sacramento River Settlement Contractors on voluntary measures to be considered if drought conditions continue into the following year, including measures that may be beyond Reclamation and DWR's discretion. If dry conditions continue, Reclamation will regularly meet with this group (and potentially other agencies and organizations) to evaluate current hydrologic conditions and the potential for continued dry conditions that may necessitate the need for development of a drought contingency plan (that may include actions from the toolkit) for the water year.

In mid-March 2021, Reclamation prepared updated projections of anticipated temperature management capability based on 90% March hydrologic and runoff forecasts and historical performance. These projections were provided to the SRTTG in advance of the March SRTTG meeting. In March, the projected total Shasta storage on May 1 was less than 2.5 MAF, so Reclamation continued discussions regarding Tier 4 operations.

In mid-April, Reclamation prepared updated projections of anticipated temperature management capability including considerations from updated 90% hydrologic and runoff forecasts. These updated projections were also shared with the SRTTG in advance of scheduled SRTTG meetings and served as the first assessment of candidate scenarios for the WY2021 temperature management plan.

On April 13, 2021, Reclamation sent a letter to the Water Board seeking support for early temperature management actions. On April 15, 2021, the Water Board responded to Reclamation's letter that they were supportive of early actions that improve temperature management.

On May 5, 2021, Reclamation distributed and requested input on the draft Temperature Management Plan to the Water Board and SRTTG.

On May 17, 2021, Reclamation submitted a Temporary Urgency Change Petition to request the Water Board to consider modifying requirements of Reclamation and DWR water right permits to enable changes in operations of the CVP and SWP that would allow for delivery of water with conservation for later instream uses and water quality requirements. As announced by the Governor in his May 10, 2021 Emergency Proclamation on drought conditions for the Bay-Delta and other watersheds, the continuation of extremely dry conditions in the Delta watershed has resulted in an inadequate water supply that is not able to meet both water right permit obligations for instream flows and water quality under Water Rights Decision 1641 (D-1641). For more information:
https://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/tucp/index.html

In mid-late May, Reclamation received letters from the Water Board, NMFS, and SRSC commenting on the draft Temperature management Plan. Reclamation reviewed these comments and took them into consideration when developing the final Plan. These letters are posted to the SWRCB's web page.

October to May – Spring Pulse Flow

On October 20, 2020, a multiagency team began meeting to plan for spring pulse flow actions. During WY 2021, the Spring Pulse Flow sub-team of the Upper Sacramento River Scheduling Team developed a Spring Pulse Flow Study Plan and a WY 2021 Spring Pulse Operations Plan. The Spring Pulse Operations Plan was shared with the Upper Sacramento Scheduling Team and the Sacramento Temperature Task Group in March and April. Projected Shasta Reservoir storage for May did not meet the initial criteria for implementation of a spring pulse flow action. Therefore, a spring pulse flow will not occur on the Upper Sacramento River during Water Year 2021 and is not included in this plan.

MONITORING AND REPORTING

CDFW, PSMFC, and USFWS started weekly carcass and redd surveys for winter-run Chinook salmon in April. Monitoring efforts by these agencies increased to twice weekly surveys in spawning reaches on May 3. This monitoring allows for observations of pre-spawn mortality or potential effects associated with spring TMP operations. These data are being shared in real-time so Reclamation and others are notified regarding pre-spawn mortality and the initiation of spawning during May. From June through

October, Reclamation plans to convene SRTTG meetings each month, or more often as warranted by any changing conditions, to ensure tracking and monitoring of the temperature strategy. Temporary exceedances of the daily average temperature criteria of more than 3 consecutive days will be reported to the SRTTG. Should changes to the strategy be necessary, those changes will be developed through communication and coordination with the SRTTG, and other interested parties as warranted.

In October 2021, data collection by CDFW and communication to Reclamation operations will be coordinated to determine the ending date of the temperature management period: October 31, or when the SRTTG determines, based on real-time monitoring that an estimated 95 percent of Winter-run Chinook Salmon eggs have hatched, and alevin have emerged, whichever is earlier.

In November 2021, Reclamation will operate the TCD to minimize in-river thermal impacts with remaining cold water pool resources after the end of the temperature management season, if available, until seasonal changes and ambient conditions dominate river cooling downstream.

For Water Year 2021, Reclamation will complete, in coordination with SRTTG as appropriate, the following monitoring and reporting practices:

- Monthly letters to the Water Board containing relevant data and information as identified in Order 90-5.
- Near-real-time reporting through Reclamation's web interface of relevant information, located at the following website: https://www.usbr.gov/mp/cvo/vungvari/sactemprpt.pdf.
- Transmittal of pertinent data and information to the SRTTG prior to meetings or more often as conditions warrant, including applicable modeling and tracking information during the course of the temperature management season. The modeling and tracking information that support the Plan are attached (Attachments 1 and 2). Meeting information can be accessed at the following website: https://www.usbr.gov/mp/bdo/sacramento-river-temperature-task-group.html and https://www.usbr.gov/mp/cvo/temperature.html
- Monitoring and communication to determine on-set of winter-Run Chinook Salmon spawning.
- Monitoring and communication to determine when an estimated 95% of winter-Run Chinook Salmon eggs have hatched and alevin have emerged.

Reclamation intends to provide temperature profile measurements for Shasta, Whiskeytown, and Trinity Reservoirs in Water Year 2021 as shown in Table 3 below:

Table 3. Frequency and detail of Northern Central Valley Project temperature profile monitoring

Reservoir	Every Month	Every 2 Weeks	Every Week	Comment
Shasta	01/01–03/01 12/1–12/31	03/01–04/01 11/15–12/01	04/01–11/15	25 ft intervals for "Every Month," otherwise 5 ft intervals
Whiskeytown	01/01–12/31			25 ft intervals
Trinity	01/01–12/31			25 ft intervals

The time and depth intervals identified above are linked to the historical stratification and de-stratification of the lakes. When the lake is de-stratified and temperature management is inactive, a finer resolution of the thermal profile at Shasta Reservoir is not needed.

The monthly temperature profiles for Whiskeytown and Trinity are sufficient to capture the thermal dynamics; both have limited abilities to actively manage selective withdrawal and the cold-water-pool volume does not rapidly change for most of the year. Reclamation will post the corresponding isothermobaths on its website identified above as soon as the information becomes available.

Reclamation has relied on CDFW's carcass and redd surveys to determine onset of winter-run Chinook salmon spawning and will rely on CDFW to calculate when an estimated 95% of eggs and alevin have hatched and emerged. As in past years, Reclamation intends to use the CDFW redd dewatering survey to provide information on potential redd dewatering and stranding for informing real-time operations of Shasta and Keswick Dams during the fall transition period.

Reclamation will continue to support and conduct monitoring, modeling, and other evaluations needed to ensure that temperature management actions are optimized and in order to inform future management actions. Reclamation will continue to coordinate with CDFW on river operations and flood control releases to ensure this program can be safely and effectively implemented. Evaluations of operational actions on the Upper Sacramento River will be documented in the Shasta Cold Water Pool and Winter-Refill seasonal reports.

Reclamation's website (https://www.usbr.gov/mp/cvo/vungvari/sactemprpt.pdf) and letters provide the information to meet the needs of the SWRCB and fisheries agencies for the locations currently being monitored. Should the SWRCB or fisheries agencies require the data from any of the monitoring stations outlined above in other formats or need to obtain data from other monitoring sites that Reclamation maintains or has access to, Reclamation can work with the SWRCB or fisheries agencies to provide that data.

Reclamation will report to the Executive Director in writing within 2 business days in the event that Reclamation's operations deviate from those outlined in the plan. The report would explain why actual operations deviated from the TMP, address whether the carryover storage requirements and other TMP objectives will be achieved and will include a plan to address any deficiencies within Reclamation's reasonable control.

WATER RIGHTS ORDER 90-5

Order 90-5 identified a 56°F temperature objective as "the temperature that will protect the fishery from adverse thermal effects during salmonid spawning and egg incubation." It further recognizes that Reclamation's ability to control temperatures is dependent on the amount of water in storage at Shasta Reservoir, ambient air temperatures, tributary inflow and other factors, and that the length of the reach to be protected must be flexible and requires careful planning. Order 90-5 provides that factors beyond Reclamation's reasonable control include conditions where protection of the fishery can best be achieved by allowing a higher temperature in order to conserve cool water for a later release, and conditions where allowing a higher temperature is necessary to implement measures to conserve winter run Chinook salmon.

For Water Year 2021, Reclamation has determined that it cannot reasonably maintain 56°F at Red Bluff Diversion Dam and that:

- Protection of the fishery can best be achieved by allowing a higher temperature in order to

conserve cool water for later release,
- A higher temperature is necessary to implement measures to conserve winter-run Chinook salmon.

Reclamation's Plan to conserve cold water for the duration of the temperature management period and operate to a higher temperature at Red Bluff Diversion Dam will best protect the fishery from adverse thermal effects during salmonid spawning and egg incubation. More specifically, Reclamation will be operating to the temperatures and compliance locations included in the Plan which are upstream of Red Bluff Diversion Dam.

CONSTRAINTS

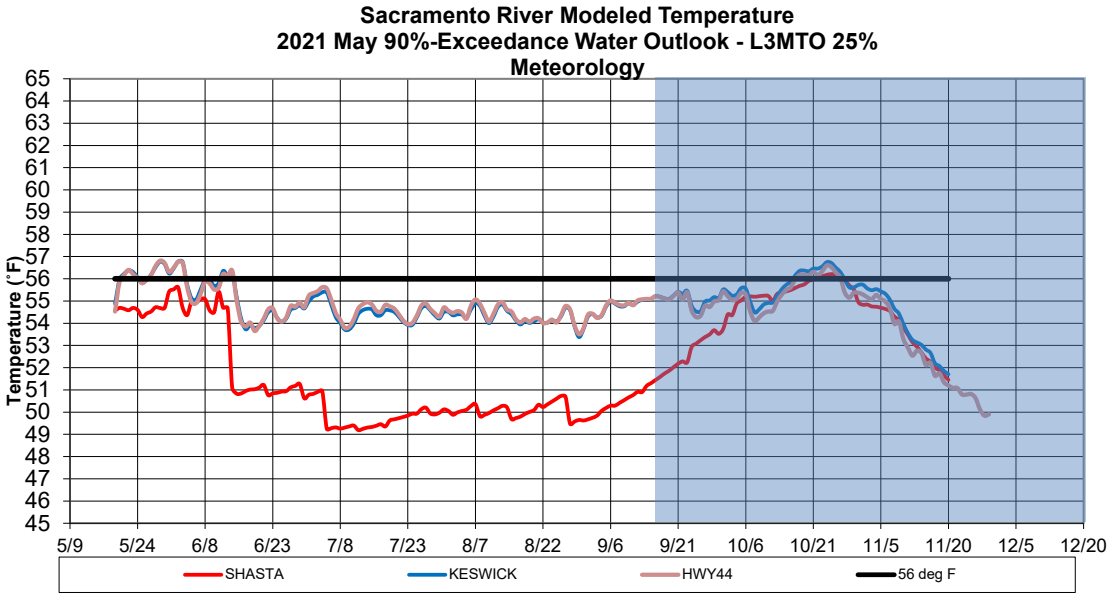
Reclamation operates the CVP to deliver water under existing agreements and contracts, including the Sacramento River Settlement (SRS) contracts, water service contracts (for irrigation and municipal and industrial purposes), refuge water supply contracts, other agreements, and other requirements such as D-1641.

The SRS contracts are settlement contracts executed with senior water right holders along the Sacramento River below Shasta Dam to address senior water rights managed by the State of California. The SRS contracts provide for the delivery of approximately 2.1 (MAF) of water. Article 5(a) of the SRS contracts provides that the Contract Total will be reduced by 25% in a Shasta Critical Year. This remains a Critical Year, so the SRS Contract Totals were reduced by 25% for water year 2021.

Under the Coordinated Operation Agreement (COA) (as amended in 2018), the CVP is responsible for 60% of water released from storage to meet all in-basin uses in the Sacramento River watershed under balanced conditions in Critical years. In-basin uses include all accretions and depletions within the Sacramento River watershed, which include delivery of water to SWP settlement contractors along the Feather River, among other demands. These Feather River settlement agreements provide over 1 million acre-feet of water each year and Shasta Reservoir delivers 60% of that amount. DWR has reduced contract deliveries to the Feather River Contractors this water year, and Reclamation assumed a 50% allocation for them in the analysis. The State Water Board lifted Term 91 on December 24, 2020, and reestablished it with a curtailment notice on April 29, 2021. Reclamation anticipates the Water Board will pursue curtailment of other water users in the Central Valley and Delta.

CVP water service and repayment contracts are met after satisfying senior water rights and regulatory requirements. Water service contract allocations are a product of an integrated operation of the entire Central Valley Project in coordination with the State Water Project that considers available water supply, regulatory obligations including temperature management, conveyance ability and physical capacities. CVP water service contractors were initially allocated 5% for agricultural and 55% for municipal and industrial of their Contract Total; however, these allocations were updated to 0% and 25% by late May.

Attachment 1: HEC-5Q Output for Scenario 13



	Shasta deg F	Keswick deg F	Hwy44 deg F	Igo deg F	Trinity deg F	Lewiston deg F
May	54.7	56.2	56.1	51.3	46.0	49.4
Jun	52.7	55.1	55.1	53.5	46.2	49.5
Jul	49.8	54.5	54.6	56.7	46.8	50.9
Aug	50.1	54.3	54.4	58.7	47.8	50.9
Sep	51.5	54.9	54.9	58.1	50.2	52.1
Oct	55.4	55.7	55.5	55.3	52.0	53.1
Nov	52.6	53.0	52.5	52.9	51.6	51.8

Run date: 5/25/21 S13

EOM Sept storage: 1.25 MAF

Trinity profile date: 5/13/21

Whiskeytown profile date: 5/18/21

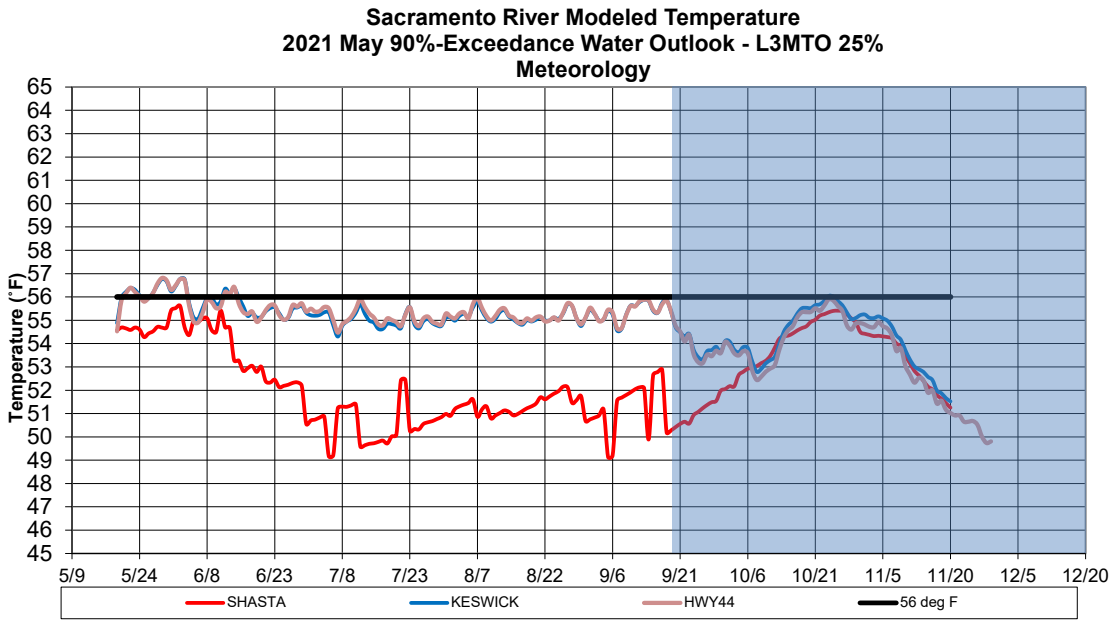
Shasta profile date: 5/19/21

Projected Side gates: First Jul 13 Full Aug 29

Shaded area denotes period of model limitations - see Fall Temperature Index

End of September Cold-Water-Pool less than 56 deg F: 173 TAF

Attachment 1: HEC-5Q Output for Scenario 14



	Shasta deg F	Keswick deg F	Hwy44 deg F	Igo deg F	Trinity deg F	Lewiston deg F
May	54.7	56.2	56.1	51.3	46.0	49.4
Jun	53.5	55.7	55.6	53.5	46.2	49.5
Jul	50.5	55.0	55.1	56.7	46.8	50.9
Aug	51.3	55.2	55.2	58.7	47.8	50.9
Sep	51.2	54.9	54.8	58.1	50.2	52.1
Oct	54.1	54.6	54.4	55.3	52.0	53.1
Nov	52.3	52.7	52.3	52.9	51.6	51.8

Run date: 5/25/21 S14

EOM Sept storage: 1.25 MAF

Trinity profile date: 5/13/21

Whiskeytown profile date: 5/18/21

Shasta profile date: 5/19/21

Projected Side gates: First Aug 8 Full Sep 19

Shaded area denotes period of model limitations - see Fall Temperature Index

End of September Cold-Water-Pool less than 56 deg F: 230 TAF

Attachment 2

HEC5Q Temperature and Temperature Dependent Modeling Methods and Assumptions

Spatially-explicit daily average Sacramento River water temperatures forecasts from the HEC-5Q model results are used as inputs to generate temperature-dependent egg mortality estimates. For this period, historical temperatures on the Sacramento River at Shasta Dam, Keswick Dam, above Clear Creek, Balls Ferry, Jelly's Ferry, and Bend Bridge are interpolated to estimate temperatures at river miles where simulated redds were located. Actual water temperatures at KWK and CCR were used from 1/1/21 to 5/24/21. HEC-5Q output estimates water temperatures at Keswick Dam; however, there is no temperature gauge at the Keswick Dam, and therefore, the KWK gauge was used for TDM temperature input for the time period 1/1/21 to 5/24/21.

Between September 15 and November 29, daily temperatures at the simulated redds' river miles are typically estimated based on a relationship between cold water pool volume less than 56 degrees F at the end of September in Shasta Lake and water temperatures above Clear Creek derived by Central Valley Operations. Reclamation thinks this relationship is more reliable in that time period than outputs from the HEC-5Q model. The 90% confidence interval value from this analysis was used as a conservative estimate. The average difference between the simulated temperatures above Clear Creek and the simulated temperatures at the redds' river miles during this period are used to adjust above Clear Creek estimated temperatures for each river mile. Forecasted water temperatures in degrees Fahrenheit temperatures shown below were used for TDM modeling, instead of HEC-5Q modeled temperatures for 9/15/2021-11/29/21.

Scenario 13 Forecasted Water Temperatures at Keswick:
-0.0067 * (Cold Water Pool Storage) + 58.9900 + 1.7
-0.0067 * 173 + 58.9900 + 1.7 = **59.53 degrees Fahrenheit**

Scenario 13 Forecasted Water Temperatures at Clear Creek:
-0.0062*(Cold Water Pool Storage) + 59.2742+2.5=60.286
-0.0062*173 + 59.2742 + 2.5 = **60.70 degrees Fahrenheit**

Scenario 14 Forecasted Water Temperatures at Keswick:
-0.0067 * (Cold Water Pool Storage) + 58.9900 + 1.7
-0.0067 * 230 + 58.9900 + 1.7 = **59.15 degrees Fahrenheit**

Scenario 14 Forecasted Water Temperatures at Clear Creek:
-0.0062* (Cold Water Pool Storage) + 59.2742+2.5=60.286
-0.0062* 230 + 59.2742 + 2.5 = **60.35 degrees Fahrenheit**

We provide TDM estimates using both the water temperature time series adjusted using the regression relationship described above (Table 1), as well as TDM estimates using water temperature time series that used HEC-5Q forecasted water temperatures later in the season (Table 2).

Temperature-dependent egg mortality estimates are calculated by modeling a redd's lifetime based on the days required to cross a known cumulative degree-day threshold and estimating mortality as an increasing function of temperature past a temperature threshold. Two models were used: 1. Martin et al (2017)[1] for stage independent modeling whereby a single temperature threshold is used from spawning and

[1] Martin B.T. et al. (2017). Phenomenological vs. biophysical models of thermal stress in aquatic eggs. Ecology Letters 10:50-59.

incubation through emergence; and 2. Anderson et al. (2018)[2] for stage dependent modeling for targeting different temperatures before, during, and after the most sensitive stages during egg incubation. The methods are applied to a set of simulated redds representative of redd construction timing and location from 2012-2020 and the results summarized on a seasonal level for comparison. Further information about the model's assumptions are documented in Table 1 below.

[2] Anderson, J. (2018). Using river temperature to optimize fish incubation metabolism and survival: a case for mechanistic models. ResearchGate Preprint. 10.1101/257154.

Table 1. Water temperature and winter-run Chinook salmon temperature-dependent mortality assumptions with adjusted end of season water temperatures.

Parameter	Scenarios 13 and 14 Run Date 05/25/21	Scenarios 13 and 14 05/25/21
Meteorology source	Forecasted Meteorology 25% L3MTO	Forecasted Meteorology 25% L3MTO
Operations Forecast	May forecast (based on May 1 90% hydrology)	May forecast (based on May 1 90% hydrology)
Time period	HEC5Q forecast: 5/19/21-11/29/21 TDM Input: 1/1/2021-11/29/2021	HEC5Q forecast: 5/19/21-11/29/21 TDM Input: 1/1/2021-11/29/2021
Reservoir Model used	HEC-5Q	HEC-5Q
River Model used	HEC-5Q until 9/14 then historic relationship to end of September storage below 56 degrees F	HEC-5Q until 9/14 then historic relationship to end of September storage below 56 degrees F
Shasta Profile date	5/19/21	5/19/21
TCD Gate operations	HEC-5Q	HEC-5Q
Sacramento water temperatures used for TDM	• 1/1/2021-5/24/21: Actual KWK and CCR water temperatures. • 5/25/21-9/14/21: HEC-5Q output at Keswick Dam and Clear Creek • 9/15/21-12/31/21: Regression relationship at KWK (59.53 F for S13 and 59.15 F for S14) and CCR (60.70 F for S13 and 60.35 F for S14)	• 1/1/2021-5/24/21: Actual KWK and CCR water temperatures. • 5/25/21-9/14/21: HEC-5Q output at Keswick Dam and Clear Creek • 9/15/21-12/31/21: Regression relationship at KWK (59.53 F for S13 and 59.15 F for S14) and CCR (60.70 F for S13 and 60.35 F for S14)
Biological Model used	SacPAS Fish model	SacPAS Fish model
Temperature Mortality Model	Stage-independent mortality (Martin)	Stage-dependent mortality (Anderson)
Egg emergence timing model	Linear. 958 ATUs (degrees C), as indicated for Zeug et al. on SacPAS under Egg to emergence timing model.	487 (degree C days)
TDM redd time distribution	Observed 2012-2020	Observed 2012-2020
TDM redd space distribution	Observed 2012-2020	Observed 2012-2020
TDM Tcrit (50th percentile)	53.7°F (12.056°C)	53.7°F (12.056°C)
TDM bT (50th percentile)	$0.026°C^{-1}d^{-1}$ ($0.0144°F^{-1}d^{-1}$)	$1.17°C^{-1}d^{-1}$ ($0.65°F^{-1}d^{-1}$)
Critical Days	All	3
TDM Output (%)	Scenario 13: 77 Scenario 14: 88	Scenario 13: 78 Scenario 14: 95

Table 2. Water temperature and winter-run Chinook temperature-dependent mortality assumptions with HEC-5Q end of season water temperatures.

Parameter	**Scenarios 13 and 14 Run Date 05/28/21**	**Scenarios 13 and 14 05/28/21**
Meteorology source	Forecasted Meteorology 25% L3MTO	Forecasted Meteorology 25% L3MTO
Operations Forecast	May forecast (based on May 1 90% hydrology)	May forecast (based on May 1 90% hydrology)
Time period	HEC5Q forecast: 5/19/21-11/29/21 TDM Input: 1/1/2021-11/29/2021	HEC5Q forecast: 5/19/21-11/29/21 TDM Input: 1/1/2021-11/29/2021
Reservoir Model used	HEC-5Q	HEC-5Q
River Model used	HEC-5Q until 9/14 then historic relationship to end of September storage below 56 degrees F	HEC-5Q until 9/14 then historic relationship to end of September storage below 56 degrees F
Shasta Profile date	5/19/21	5/19/21
TCD Gate operations	HEC-5Q	HEC-5Q
Sacramento water temperatures used for TDM	• 1/1/2021-5/24/21: Actual KWK and CCR water temperatures. • 5/25/21-12/31/21: HEC-5Q output at Keswick Dam and Clear Creek	• 1/1/2021-5/24/21: Actual KWK and CCR water temperatures. • 5/25/21-12/31/21: HEC-5Q output at Keswick Dam and Clear Creek
Biological Model used	SacPAS Fish model	SacPAS Fish model
Temperature Mortality Model	Stage-independent mortality (Martin)	Stage-dependent mortality (Anderson)
Egg emergence timing model	Linear. 958 ATUs (degrees C), as indicated for Zeug et al. on SacPAS under Egg to emergence timing model.	487 (degree C days)
TDM redd time distribution	Observed 2012-2020	Observed 2012-2020
TDM redd space distribution	Observed 2012-2020	Observed 2012-2020
TDM Tcrit (50th percentile)	53.7°F (12.056°C)	53.7°F (12.056°C)
TDM bT (50th percentile)	$0.026°C^{-1}d^{-1}$ ($0.0144°F^{-1}d^{-1}$)	$1.17°C^{-1}d^{-1}$ ($0.65°F^{-1}d^{-1}$)
Critical Days	All	3
TDM Output (%)	Scenario 13: 67 Scenario 14: 80	Scenario 13: 78 Scenario 14: 94

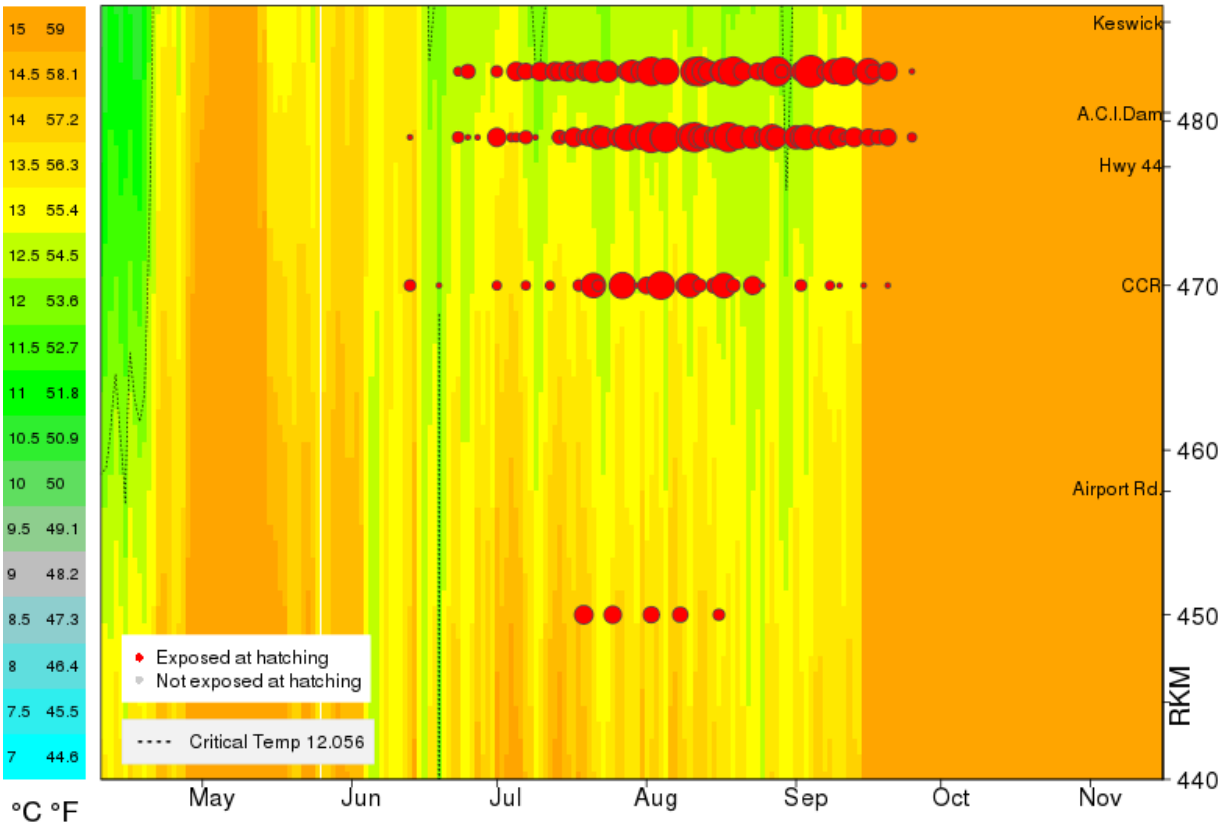


Figure 1. Forecasted Sacramento River winter-run Chinook salmon redd exposure at hatching to forecasted water temperatures described in Scenario 13 using temperatures adjusted end-of-season regression approach.

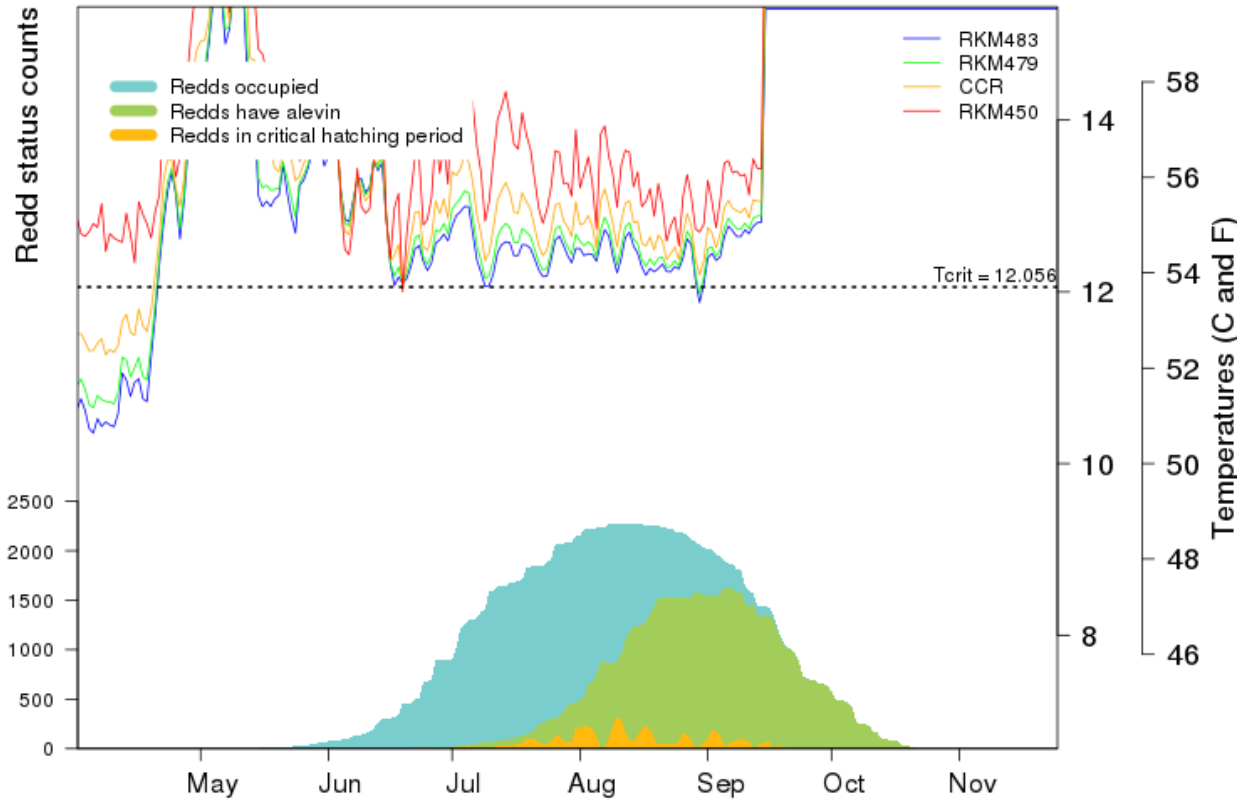


Figure 2. Winter-run Chinook salmon redd and egg incubation timing with forecasted water temperatures from Scenario 13 using temperatures adjusted end-of-season regression approach.

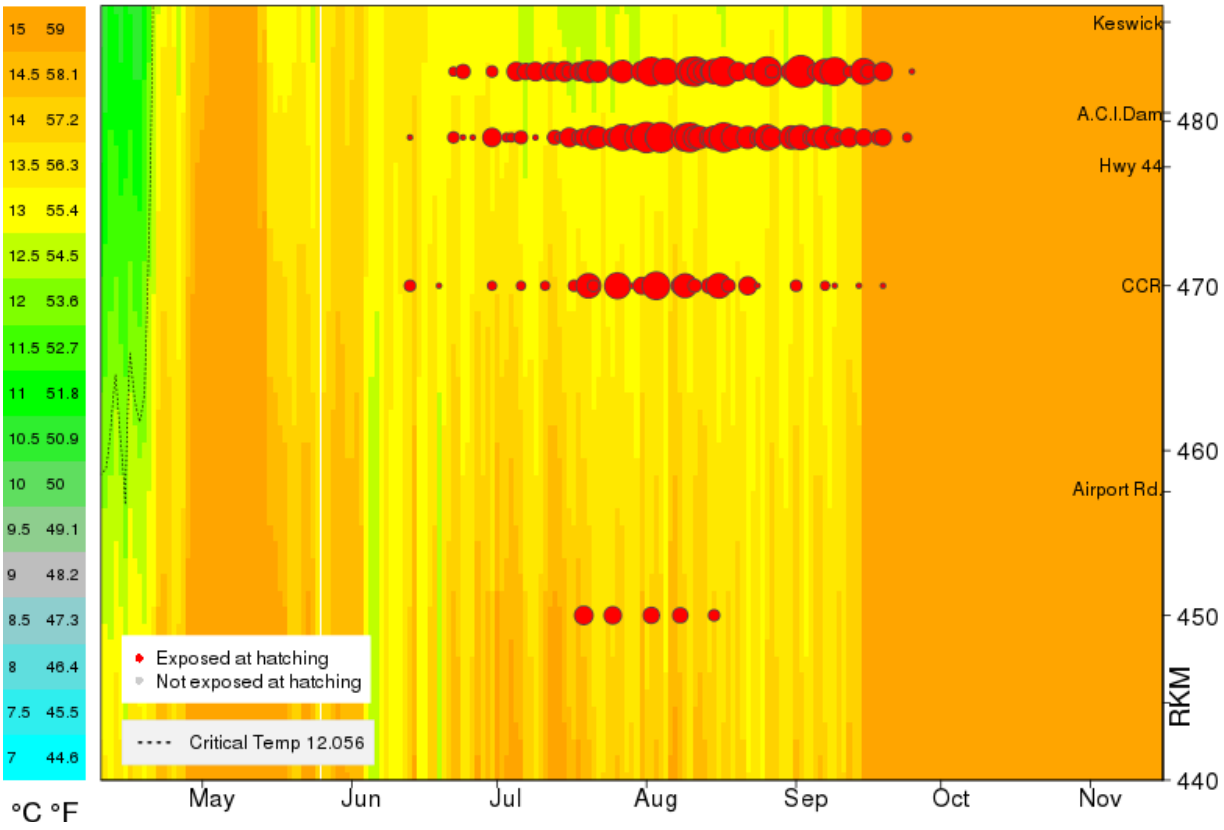


Figure 3. Forecasted Sacramento River winter-run Chinook salmon redd exposure at hatching to forecasted water temperatures described in Scenario 14 using temperatures adjusted end-of-season regression approach.

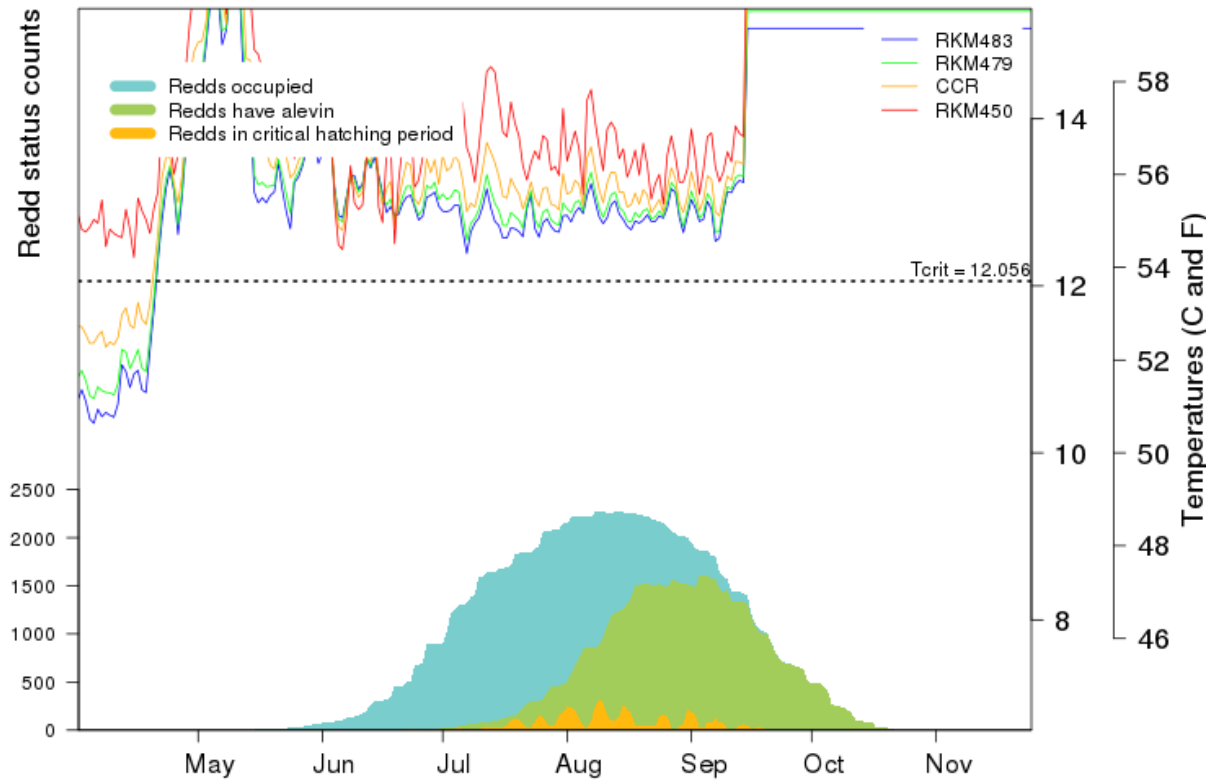


Figure 4. Winter-run Chinook salmon redd and egg incubation timing with forecasted water temperatures from Scenario 14 using temperatures adjusted end-of-season regression approach.

Attachment 3: Summary Document for Shasta/Keswick Operational Scenarios
Prepared by the Southwest Fisheries Science Center on May 27th, 2021

Below are results for two USBR scenario ran May 26th 2021. The scenarios have hydrology (Input 90% exceedance) and air temperature (25% exceedance of L3MTO) as inputs. Outputs from the scenarios are used to generate daily average Sacramento River water temperatures using the RAFT model and associated temperature-dependent egg mortality and survival estimates using the NMFS stage-independent temperature mortality model (Martin et al. 2017) for the 2021 temperature management season.

Further details of modeling methods are at: https://oceanview.pfeg.noaa.gov/CVTEMP/

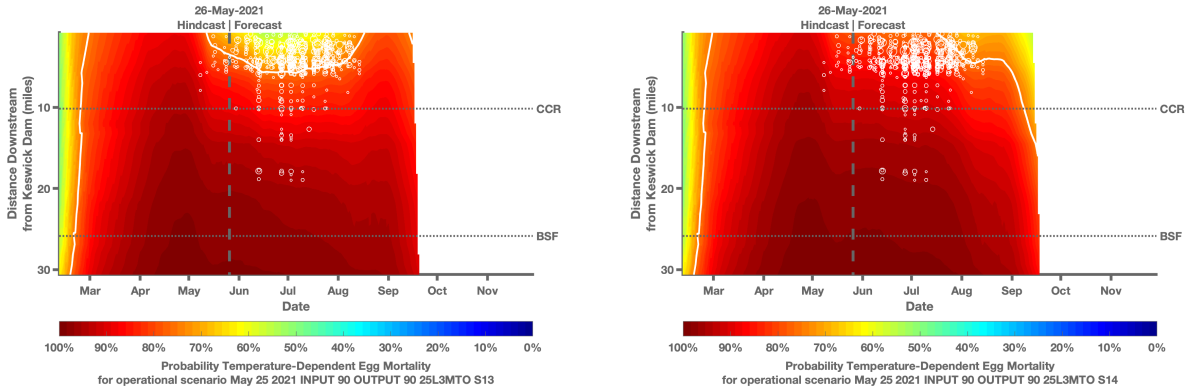


Figure1: Estimated temperature-dependent egg mortality produced by the NMFS stage-independent temperature mortality model under the two May 25th 2021 scenarios. 2012-2019 redd distributions are used for all plots with meteorology from 2009-2018. The plot is assuming the mean from the 10-year meteorological ensemble (2009-2018).

Table 1: Estimated temperature-dependent egg mortality under different scenarios assuming a 2012-2019 spatial and temporal redd distribution using output from the RAFT water temperature model.

Scenario	RIVER MODEL	Mean (%)	Median (%)
MAY_25_2021_INPUT_90_OUTPUT_90_25L3MTO S13	RAFT	64	71
MAY_25_2021_INPUT_90_OUTPUT_90_25L3MTO S14	RAFT	73	81

Reference: Martin, B. T., Pike, A., John, S. N., Hamda, N., Roberts, J., Lindley, S. T. and Danner, E. M. (2017), Phenomenological vs. biophysical models of thermal stress in aquatic eggs. Ecology Letters 20: 50–59. doi:10.1111/ele.12705

APPENDIX F

State Water Project and Central Valley Project
Drought Contingency Plan
May 1, 2021 – September 30, 2021

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State Water Project and Central Valley Project
Drought Contingency Plan
May 1, 2021 – September 30, 2021

This Drought Contingency Plan (Drought Plan) is prepared by the California Department of Water Resources (DWR) and the U.S. Bureau of Reclamation (Reclamation) in an effort to provide updated information about areas of potential concern given the current dry hydrology of 2021. DWR and Reclamation operate the State Water Project (SWP) and the Central Valley Project (CVP), respectively, to the 2020 Record of Decision (ROD) as analyzed in the 2019 U.S. Fish and Wildlife Service (USFWS) Biological Opinion and 2019 National Marine Fisheries Service (NMFS) Biological Opinion on the Coordinated Long-Term Operation of the Central Valley Project and the State Water Project (Collectively the 2019 Biological Opinions), and DWR also operates the SWP to the 2020 California Department of Fish and Wildlife (CDFW) Incidental Take Permit (ITP). This updated Drought Plan will be submitted by DWR to CDFW in response to Condition 8.21 of CDFW's ITP. Concurrently, this plan will be shared with the Water Operations Management Team (WOMT) which includes representatives from DWR, Reclamation, USFWS, NMFS, CDFW, and the State Water Resources Control Board (SWRCB) (collectively referred to as Agencies). This report was first drafted in February and subsequently updated in March, April, and May 2021.

Over the past several months, as part of implementing the action included in the 2019 Biological Opinions and ITP, DWR and Reclamation have worked with the Agencies to identify actions that could potentially be implemented during a drought (not specifically for Water Year (WY) 2021) to manage the State's limited water supplies and protect species. These actions (known as the Drought Toolkit) describe the anticipated coordination, process, planning and potential drought response actions in the event of a drought. DWR and Reclamation are committed to continued development of the Drought Toolkit and will continue to coordinate with the Agencies as any actions from that Drought Toolkit are being considered for implementation in WY 2021.

On May 10, 2021, the Governor issued an Emergency Proclamation on drought conditions for the Sacramento –San Joaquin Bay-Delta (Delta) and other watersheds because of the continuing extreme dry conditions in the Delta watersheds. As such, this updated Drought Plan includes the latest hydrological conditions, species status update, drought monitoring plan, drought actions, and SWP and CVP (collectively referred to as Projects) May operations forecast that incorporate the May 1 Bulletin 120 (B120) and planned drought actions that are known at this time.

DWR and Reclamation will continue to provide weekly hydrology and condition updates through WOMT and will provide updates and seek Agency input on how best to manage multiple needs for water supply. In addition, DWR and Reclamation will coordinate with the existing Long-term Operation Agency working groups and Drought Relief Year (DRY) Team to develop a robust drought monitoring program with updates to WOMT and other forums as necessary.

I. Current Hydrologic Conditions

Water Year 2021 has developed into one of the driest on record—drier than 2014 and 2015, and the driest since 1977—and together WYs 2020 and 2021 are the second driest two-year period on record, behind only 1976-77. Both the Sacramento Valley and San Joaquin River indices are classified as Critical. Although well below average rainfall, the snowpack in March 2021 indicated that sufficient reservoir inflow was likely available to meet Project requirements. Conditions significantly changed at the end of April 2021 when it became clear that expected reservoir inflow from snowmelt failed to materialize. The May 90% exceedance forecast for the Sacramento River Index identified a reduction of expected

runoff of 685 TAF from those generated only a month earlier in April. The combination of factors, including the May 2021 inflow forecast deficit being far less than predictable with available forecasting methods, parched watershed soils and extremely low rainfall, continued dry and warm conditions, and limited available water supplies in the Sacramento – San Joaquin Bay-Delta (Delta) have created extremely critical conditions that require significant drought actions across the Projects and the State. As announced by the Governor in his May 10, 2021 Emergency Proclamation, the continuation of extremely dry conditions in the Delta watershed mean there is not an adequate water supply to meet minimum needs throughout the State.

As shown in blue on the following chart, the Northern Sierra Precipitation total as of May 28, 2021, is 23 inches and 47% of average to date. As of May 28, 2021, the snowpack has essentially dissipated across the entire Sierra Nevada.

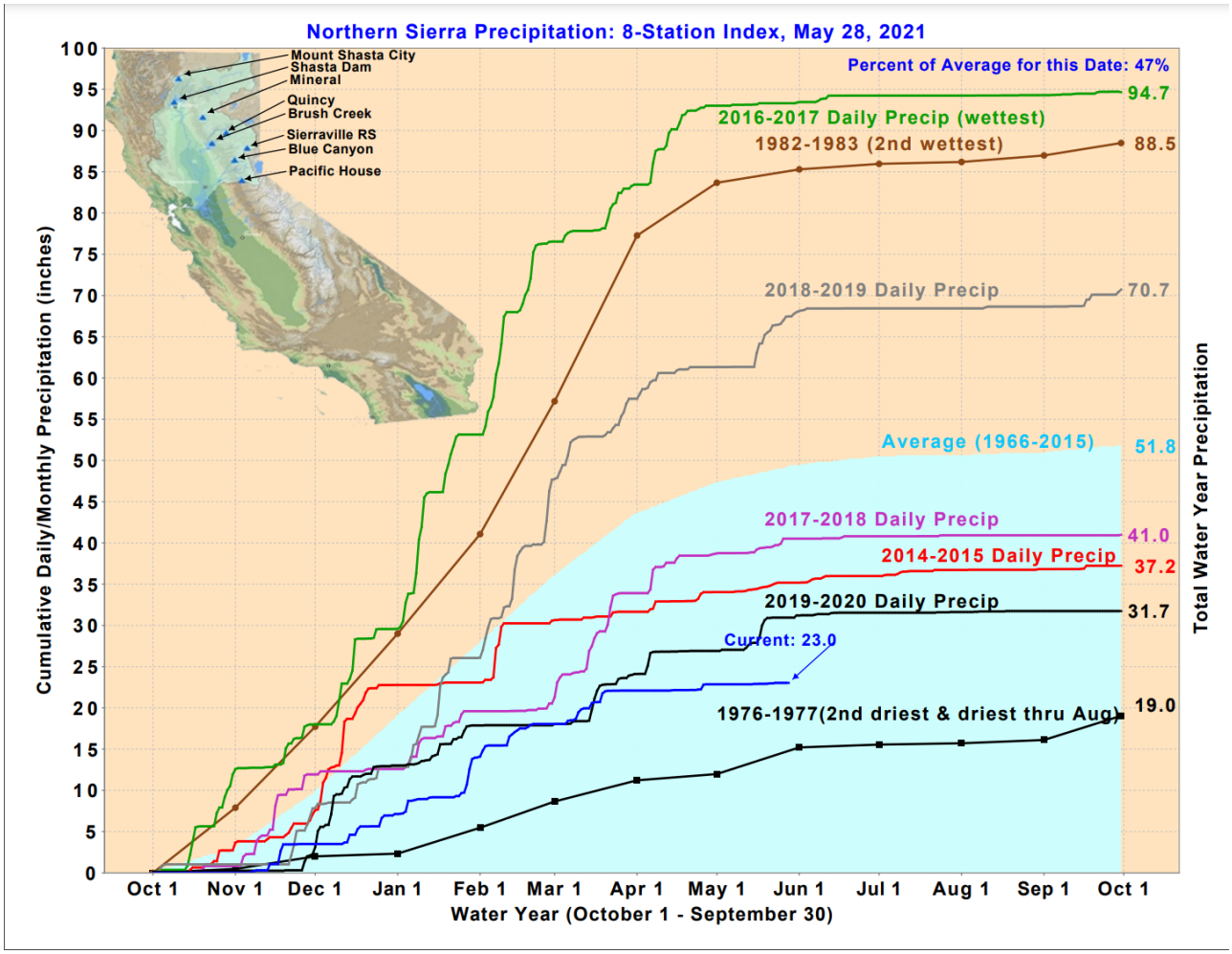

Figure1. Northern Sierra Precipitation: 8-Station Index through May 28, 2021

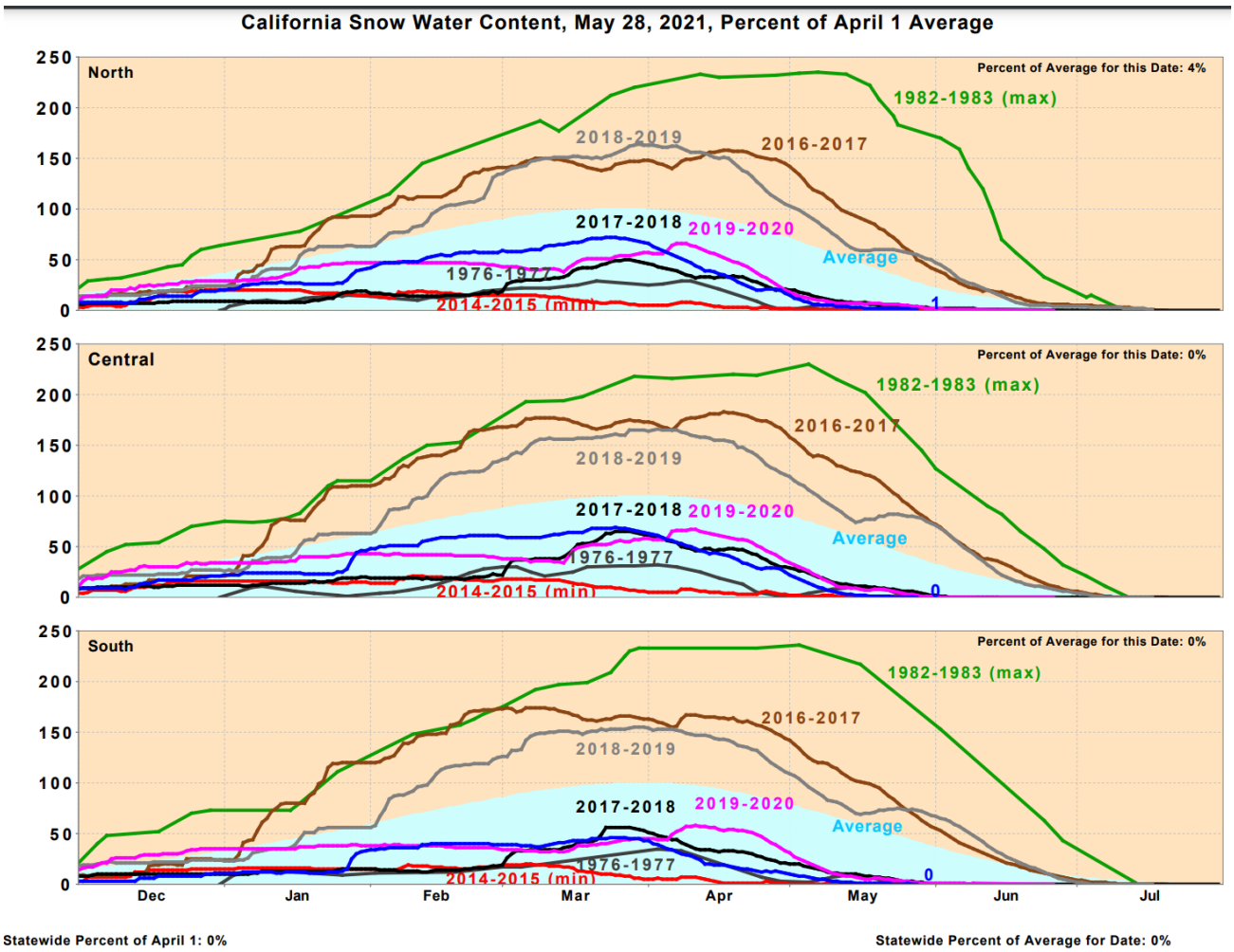

Figure 2. California Snow Water Content through May 28, 2021

A. Water Quality

Based on the April 1 operational forecast, the Projects are expected to meet D-1641 objectives through the spring and summer months; however, dry and warm conditions flipped the system into a depletion mode much earlier than normal. By early May, operations forecasts identified substantial hydrologic deficits. Due to growing concern about water temperature and water supply, it became apparent the Projects would have difficulty meeting D-1641 objectives without modifications to the D-1641 standards. Consequently, on May 17, 2021, the Projects submitted a Temporary Urgency Change Petition (TUCP) to the SWRCB, requesting modifications to the Outflow objective and relocation of the Emmaton compliance point to Threemile Slough for June through August 15.

Water quality in the Delta continues to be monitored, and salinity is expected to increase during the spring through fall, as is typical during dry conditions. As a first step to moderate the gradual salinity degradation in the Delta, the Projects have planned minimal exports and sufficient outflow to maintain Delta water quality. With the likely issuance of a TUCP Order from the SWRCB, the net delta outflow index (NDOI) will be modified in June and July to 3,000 cfs from 4,000 cfs. However, the Projects expect that slightly higher outflow will be needed, in combination with the minimal exports, to maintain sufficiently low salinity in the Delta. These conditions will be necessary until the first significant runoff events begin to improve Delta salinity condition, likely later in the year.

The Delta Cross Channel (DCC) gates control the diversion channel near Walnut Grove, about 30 miles south of Sacramento. They are typically opened for recreational purposes on weekends between May 21 and June 15 - opening on Saturday, closing on Monday, with an extended gate opening during the Memorial Day weekend. However, ongoing drought conditions require that the DCC gates remain closed until further notice to help maintain water quality standards in the Sacramento River channel. The Projects will continue to coordinate with the Agencies through the relevant technical teams and WOMT for DCC operations.

B. SWP and CVP Upstream Reservoir Storage

In the Sacramento River watershed, storage in upstream reservoirs remains well below average for this time of year. Lake Oroville's end-of-April storage was approximately 1.49 million acre-feet (MAF) (42% of capacity and 52% of historical average) and about 1.0 MAF lower than in 2020. Lake Shasta's end-of-April storage was approximately 2.28 MAF (50% of capacity and 58% of historical average), and Folsom Lake's end-of-April storage was approximately 360 TAF (37% of capacity and 49% of historical average), both of which were 1.42 MAF and 230 TAF lower than in WY 2020, respectively. Trinity Reservoir, which also supports flows on the Sacramento River, was approximately 1.30 MAF at the end of April (53% of capacity and 66% of historical average).

In the San Joaquin watershed, end-of-April storage in New Melones Reservoir was 1.46 MAF, which is 65% of capacity and 97% of historical average, but about 444 TAF lower than this time last year.

C. Biology

i. Salmonids

DWR and Reclamation are implementing the 2020 ROD, and DWR also operates to the ITP. The Salmon Monitoring Team (SaMT) convenes weekly to consider and discuss relevant data and factors, provide information to the WOMT, Reclamation, and DWR, and develop an operations plan to reduce adverse effects of Delta operations of the Projects to salmonids and green sturgeon. For information on weekly SaMT meeting materials (Operations Outlook, notes, and Proposed Action Assessment documents), please visit the Salmon Monitoring Team page. The webpage provides a log of weekly documents downloadable through links.

As of May 6, 2021, the preliminary estimate of outmigrating salmonids past the Red Bluff Diversion Dam (RBDD) USFWS Rotary Screw Trap (RST) was 2,096,218 natural juvenile winter-run Chinook salmon, 118,104 juvenile spring-run Chinook salmon, and about 8.1 million juvenile fall-run Chinook salmon. In addition, the SaMT considers historic and current observations at key monitoring locations in the lower Sacramento River Basin (e.g., Knights Landing, Tisdale, Sacramento trawls and beach seines), hatchery releases, and acoustic-tagged salmonids in the system.

The SaMT produces weekly distribution estimates for salmonids. Juvenile salmonids are in the Delta and significant proportions have migrated out of the Delta past Chipps Island. The SaMT also conducts a weekly assessment and determines the likelihood of exceeding single-year loss thresholds in the Proposed Action (50%, 75%, or 90% of threshold for each salmonid species / run) and daily loss thresholds as recommended in the ITP. On May 18, 2021, the SaMT determined the likelihood of exceeding any of the aforementioned thresholds remained unlikely due to persistent low-flow, low turbidity conditions, and an Old and Middle River (OMR) index more positive than –5,000 cfs. Risk level for the daily entrainment threshold can change quickly with a precipitation-driven high flow event; however, no such events were in the near-term (7-day) forecast. The members of SaMT are not confident in projecting beyond seven days (longer-term) due to uncertainty regarding weather forecasting.

The recent use of the warm water power bypass at Shasta Dam created warm Sacramento River temperatures in April and May to conserve cold water in Shasta Reservoir for use later in the year. When pre-spawn mortality of winter-run Chinook salmon was recently observed, the bypass was reduced to provide colder water downstream. The Shasta warm water power bypass is estimated to have conserved approximately 340 TAF of cold water (<52 deg F) for water temperature management this summer and fall. As of May 20, adult winter-run Chinook salmon carcasses have been collected, indicating spawning in the Sacramento River upstream of the confluence of Clear Creek. Many adult salmon have been observed holding downstream of the Keswick Dam fish trap, which likely are winter-run and spring-run Chinook salmon. Many spring-run Chinook salmon have been observed in many upper Sacramento River tributaries including Clear Creek, Butte Creek, Mill Creek, and Deer Creek. These spring-run Chinook salmon are expected to over summer in these tributaries and the upper Sacramento River.

ii. Delta Smelt

DWR and Reclamation operate to the 2020 Record of Decision, and DWR also operates to the ITP. The Smelt Monitoring Team (SMT) began meeting to discuss current WY 2021 conditions in November 2020. Delta Smelt catch has been low (Table 1). The 2020 Fall Midwater Trawl was completed in December 2020, and the 2020 index was zero ("0") for the third year in a row. Additionally, the Spring Kodiak Trawl (SKT) did not detect any Delta Smelt in WY 2021 (CDFW, 2021).

Since the start of WY 2021, Enhanced Delta Smelt Monitoring (EDSM) has caught seven Delta Smelt of year class (YC) 2020 and eight of YC 2021 as of May 18, 2021. Additionally, two YC 2020 Delta Smelt were collected in hatchery broodstock sampling by the Fish Conservation and Culture Laboratory (FCCL). The 20-mm Survey collected one larva (YC 2021) in the Sacramento Deep Water Ship Channel (DSWC) in May 2021. No Delta Smelt have been detected at either the Tracy Fish Collection Facility or the Skinner Fish Collection Facility in WY 2021. This overall lack of detections reflects the overall decline in the population to levels where we can no longer reliably detect them. Based on sampling and hydrology to date, it is likely that Delta Smelt are at a low risk of entrainment into the South Delta and the export facilities, and the situation continues to be closely monitored by the SMT in their weekly assessments. Protections continue to rely upon environmental surrogates.

As of May 20, Barker Slough Pumping Plant (BSPP) restrictions for the protection of young of year Delta Smelt are not in place due to lack of detections at 20mm station 716. Larvae have been detected nearby in the lower Deepwater Ship Channel (DWSC), but the SMT has not made any recommendations for BSPP restrictions based on these detections.

Table 1. Catch of Delta Smelt from major monitoring surveys in fall of 2020 and spring of 2021

Survey	Year Class	Date	Number of fish	Location
FMWT	No catch	2020	0	
EDSM	2020	September 2020	1	Suisun Marsh
EDSM	2020	November 2020	1	Suisun Marsh
EDSM	2020	January 2021	2	SDWSC
Hatchery	2020	January 2021	2	SDWSC

Broodstock				
EDSM	2021	March	3	SDWSC
EDSM	2020	March	1	SDWSC
EDSM	2021	May	1	Lower Sacramento
EDSM	2021	May	3	SDWSC
20mm	2021	May	1	Lower Sacramento
Spring Kodiak Trawl	No catch	2021	0	
Salvage	No catch	2021	0	

iii. Longfin Smelt

DWR operates to the ITP which includes Longfin Smelt operational considerations. Salvage data from WY1994 through WY2014 indicates that salvage of adult Longfin Smelt is generally rare and typically occurs between the months of December and February. In WY2020, young ofyear (age 0) Longfin Smelt were mostly observed at the salvage facilities between April and May. The majority of Longfin Smelt salvage typically occurs after February when young of year fish rearing in the south and central Delta have grown large enough to be effectively screened by the fish collection facilities. As of May 11, 2021, 531 juvenile Longfin Smelt have been salvaged at the state facility, and 184 juvenile Longfin Smelt have been salvaged at the federal facility. (Salvage estimates are expanded based on sampling effort.)

The SMT tracks Longfin Smelt distribution and salvage to assess risk and make appropriate operational recommendations consistent with the Longfin Smelt ITP, and the most recent assessment concluded that no recommendation would change salvage trajectory of Longfin Smelt in the South Delta. However, because of continuing dry conditions, the OMR recommendations are unlikely to control SWP operations in the foreseeable future. The SMT has not made any OMR recommendations for the protection of Longfin Smelt since March 16, 2021.

II. SWP and CVP Operational Considerations

DWR and Reclamation have developed a May operational forecast through December 31, 2021, using the 90% exceedance forecast from the May 1 B120 forecast from DWR's Hydrology and Flood Operations Office within the Division of Flood Management. The operational forecast developed for this Drought Plan is designed to make the most efficient use of the limited water resources in WY 2021 for multiple beneficial uses while meeting regulatory requirements and managing the potential risks of continued drought conditions into the next water year.

There are three main goals of SWP and CVP Project operations with the May operations forecast:

1. Meet health and safety requirements throughout the Projects' service areas,including those that rely on Project exports;
2. Preserve upstream Project storage to the extent possible for temperature management, instream uses in the water year, peak-summer power production, and carry-over storage for future drought protection; and
3. Meet regulatory and water right obligations.

The operational forecast provided in this Drought Plan reflects potential outcomes given the hydrologic forecast on May 1 and assumptions on regulatory and policy decisions regarding prioritization of an extremely limited water supply. However, the real-time operations are expected to vary to adjust to real-time system conditions. The hydrologic and operational scenario used in this Drought Plan are discussed in the Projected Hydrology and Runoff section later in the document.

The following are the Projects' critical operational considerations and objectives under the current drought conditions, reflected in the operational forecast. Drought conditions along with potential concerns and actions are primarily reflected in the 90% exceedance forecast.

A. Health and Safety Requirements

Operations of the SWP and CVP must provide for, at a minimum, essential human health and safety needs throughout the SWP and CVP service areas and retain the capability to provide for such minimum needs throughout WY 2021 and WY 2022 should extremely dry conditions persist. For clarity, DWR and Reclamation's consideration of these essential human health and safety needs includes adequate water supplies and water quality for drinking water, sanitation, and fire suppression, but does not extend to other urban water demands (e.g., outdoor landscape irrigation). While most California communities may have reserve water supplies, some communities will require continued delivery of limited amounts of water through the CVP and SWP facilities to meet these basic needs.

Reclamation currently uses its Municipal and Industrial (M&I) Water Shortage Policy to determine the amount of water to be provided to its M&I contractors in those years where human health and safety needs govern CVP allocations to these contractors. Under these conditions, M&I contractors are required to update population estimates and non-CVP water source information to determine how much water will be needed from the CVP to meet their overall human health and safety demand for that year. The vast majority of CVP contractors throughout the entire service area that receive M&I water from the CVP have other available supplies to help meet their demand.

B. Fish and Wildlife Protections

The SWP and CVP operations outlined in this Drought Plan are based on the requirements set forth in the Incidental Take Statements in the 2019 Biological Opinions and the ITP to address unavoidable impacts to the effects on endangered species due to drought. DWR and Reclamation will coordinate with agencies to address the potential for exceedances. This Drought Plan also includes actions taken by other entities to help reduce the supplemental water needed from the Projects for meeting health and safety needs. While these actions are not within control of the Projects, they affect the operation of the Projects. Therefore, these actions are included as assumptions for the purposes of describing project operations.

The operations forecast included in this Drought Plan covers May 1 to December 31, 2021. This Drought Plan outlines actions that are being implemented this year in response to the extreme dry conditions. The primary objectives of the spring and summer action presented in this Drought Plan is to preserve additional storage upstream for water temperature management and health and safety needs while also maintaining instream flows and Delta protective actions.

C. Regulatory and Senior Water Right Requirements

Both DWR and Reclamation have commitments to deliver water for Delta salinity and outflow, to senior water rights holders with contracts for either SWP or CVP water supplies, and to wildlife refuges. These commitments are made through D-1641, various contracts and agreements which preserve state-granted pre-Project (senior) water rights, and through the Central Valley Project Improvement Act (CVPIA). D-1641 includes reduced requirements in dry and critically dry conditions to recognize the limited water supply in those years. The various senior water right contracts and wildlife refuge deliveries also include provisions for reduced deliveries in critically dry years. To date, all the dry and critically dry-year provisions mentioned above have been triggered in 2021.

Reclamation and DWR allocate water to agricultural and M&I contractors based on available water supply after meeting other obligations as described above. Given the critically dry hydrology, this available supply is extremely limited.

D. Operational Flexibility

Another objective of this Drought Plan is to maximize Project operations flexibility to meet critical water supply deliveries while meeting Delta standards. The flexibility allows Project operators to adjust quickly to changes in the weather and environment and to maximize the beneficial use of the limited water supply.

III. Operations Forecasts - Projected Hydrology and Runoff, Releases and Storage

A. May 1, 2021 – Projected Hydrology and Runoff

The DWR's Hydrology and Flood Operations Office within the Division of Flood Management produces estimates of water year runoff for the major watersheds of the Sacramento and San Joaquin River basins beginning in December and updates these as part of DWR's Bulletin 120 (B120) update process through May of each year. The Water Supply Index (WSI) forecasts that are utilized for this Drought Plan are unique to this water year and informed by precipitation, runoff, and other antecedent hydrologic conditions as they existed on May 1, 2021. The May 1 B120 runoff forecast also incorporates actual snowpack measurements through the end of April.

The May operational forecast included in this Drought Plan combines the runoff associated with antecedent conditions with the anticipated runoff resulting from precipitation predicted to occur through September 30 under the 90% hydrologic exceedance scenario. For example, the 90% exceedance hydrology assumes inflows from rainfall and snowmelt at levels that are likely to be exceeded with a 90% probability, or in other words, there is a 10% or less chance of actual conditions turning out to be this dry or drier from this point forward.

The May 1 WSI forecast is the last WSI that will be issued for WY 2021 and includes the final determination of the water year classifications for the Sacramento Valley (based on the 50% exceedance) and the San Joaquin Valley (based upon the 75% exceedance) as shown below:

Sacramento River Unimpaired Runoff	50% Exceedance: 6.7 MAF (38% average)
Sacramento Valley Index (50% exceedance)	4.0 MAF - Critical WY Oct-Apr Sacramento Region Runoff: 34% of historical average
San Joaquin Valley Index (75% exceedance)	1.3 MAF - Critical WY Oct-Apr San Joaquin Region Runoff: 34% of historical average

In December, the estimates of the water year runoff range widely at the various exceedances due to the large hydrologic uncertainty. The forecasts are updated monthly, and over time the uncertainty decreases and result in the forecasts converging. By May, at this point, the 50% forecast reflects the dry conditions.

B. SWP and CVP Operations Forecasts

Monthly operations forecasts are generally updated monthly and are typically completed by the third week of the month. The current operational forecast uses the 90% exceedance hydrologic forecast as model inputs to simulate SWP and CVP Project operations under various regulatory requirements and produce forecasted reservoir storages, releases, flows, and deliveries under the same set of hydrologic exceedance. The operations forecast gives general guidance for annual water delivery, storage management, and power planning purposes for each exceedance assumption. Actual hydrologic events act in time steps shorter than a month and are often unpredictable more than a few days to a week out. Day-to-day operations are driven by operating criteria such as those found in U.S. Army Corps of Engineers flood control manuals, D-1641, the NMFS and USFWS 2019 Biological Opinions, and the ITP for the SWP. Output from the forecast model as provided in this Drought Plan represents system responses to the overlay of very specific operating criteria.

The operations forecast assumptions utilize existing storage conditions, actual precipitation through April 2021, forecasted precipitation based on the hydrology, projected water supply deliveries, meeting existing flow and water quality standards, and fish and wildlife protections and major known actions by other agencies that may have an impact on project operations. These actions are described in more detail below. The operations forecast includes monthly storage levels, reservoir releases, Delta export rates, and Delta outflow through December 31, 2021. Considering the lack of snowpack remaining in the Northern Sierra basin as of May 1, 2021 and the minimal average rainfall through the summer, variation in expected runoff is minimal absent uncharacteristic late season precipitation events. Therefore, DWR and Reclamation will be planning potential operations based on only the 90% exceedance hydrological scenario. The storage and flows under the May 1, 2021 90% hydrologic scenario are included in Attachment 1.

In addition to the inflow forecast (B120) developed by DWR, an accretion/depletion forecast is also developed. This forecast uses hydrologic data and statistical correlation to estimate accretions/depletions which are the net gain or loss between the main upstream reservoirs (Shasta, Oroville and Folsom) and the Delta, as measured at Freeport along the Sacramento River. This forecast includes expected inflow from smaller tributaries and creeks, diversions from various water users north of the Delta and natural losses due to infiltration and evaporation. Generally, this forecast provides an adequate estimate of what the Projects can expect for losses or gains between the reservoirs and the Delta, and therefore can help determine the necessary releases for meeting Delta needs throughout the year. During drought years when significant, unique actions are taken by other agencies to either reduce demands or increase releases from other water management systems, these estimates may not capture those specific actions. As an example, in the drought years of 2014 and 2015, the estimated accretions/depletions varied significantly from the May forecast due to the various actions taken throughout the basin. Figures 3 and 4 show the difference between the May forecasted accretion/depletions and the actual observed accretion/depletions. Between 2014 and 2015, the May forecasts for seasonal accretions/depletions differed by approximately 340 TAF from the observed data. A similar pattern of depletions is forecasted for 2021, as shown in Figure 5.

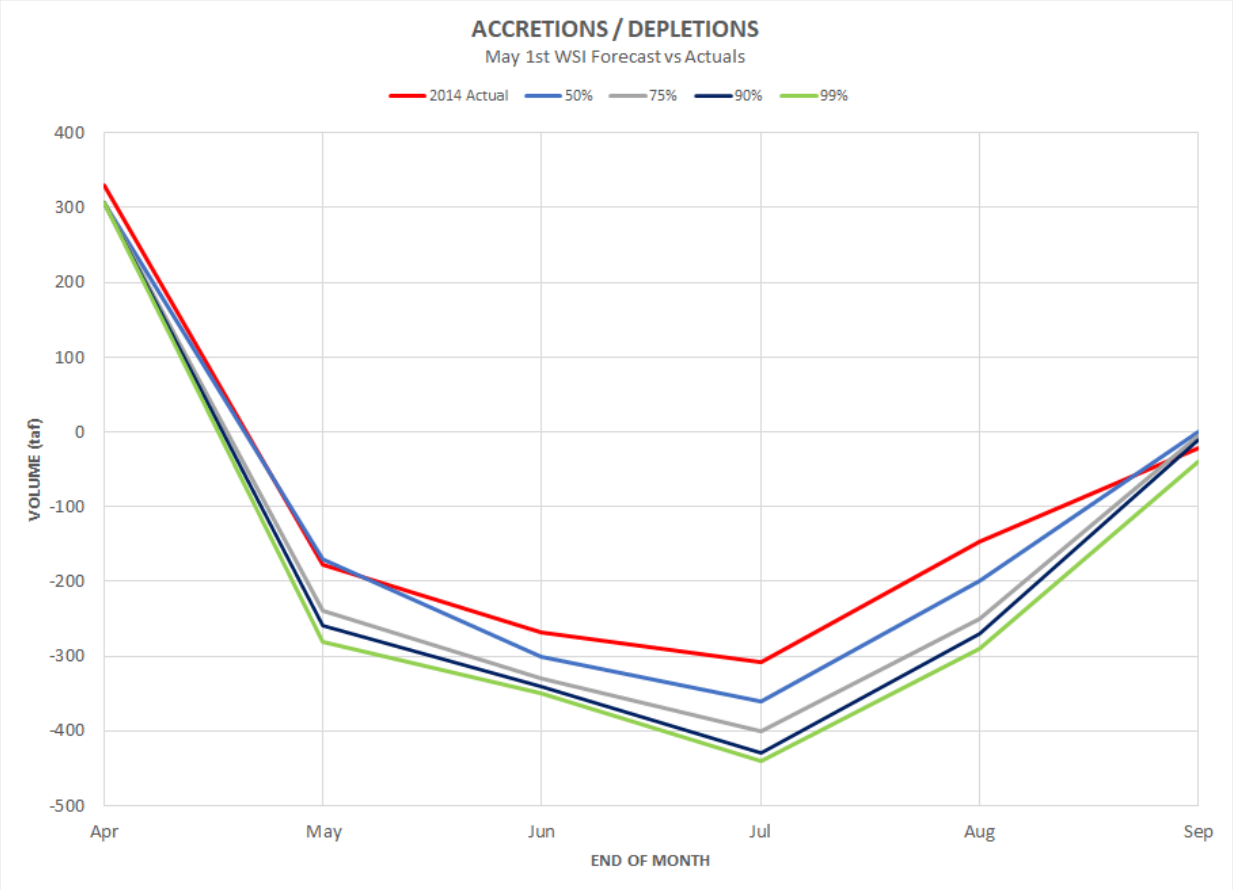

Figure 3. Comparison of 2014 Accretions/Depletions (between May 1 and September 30)

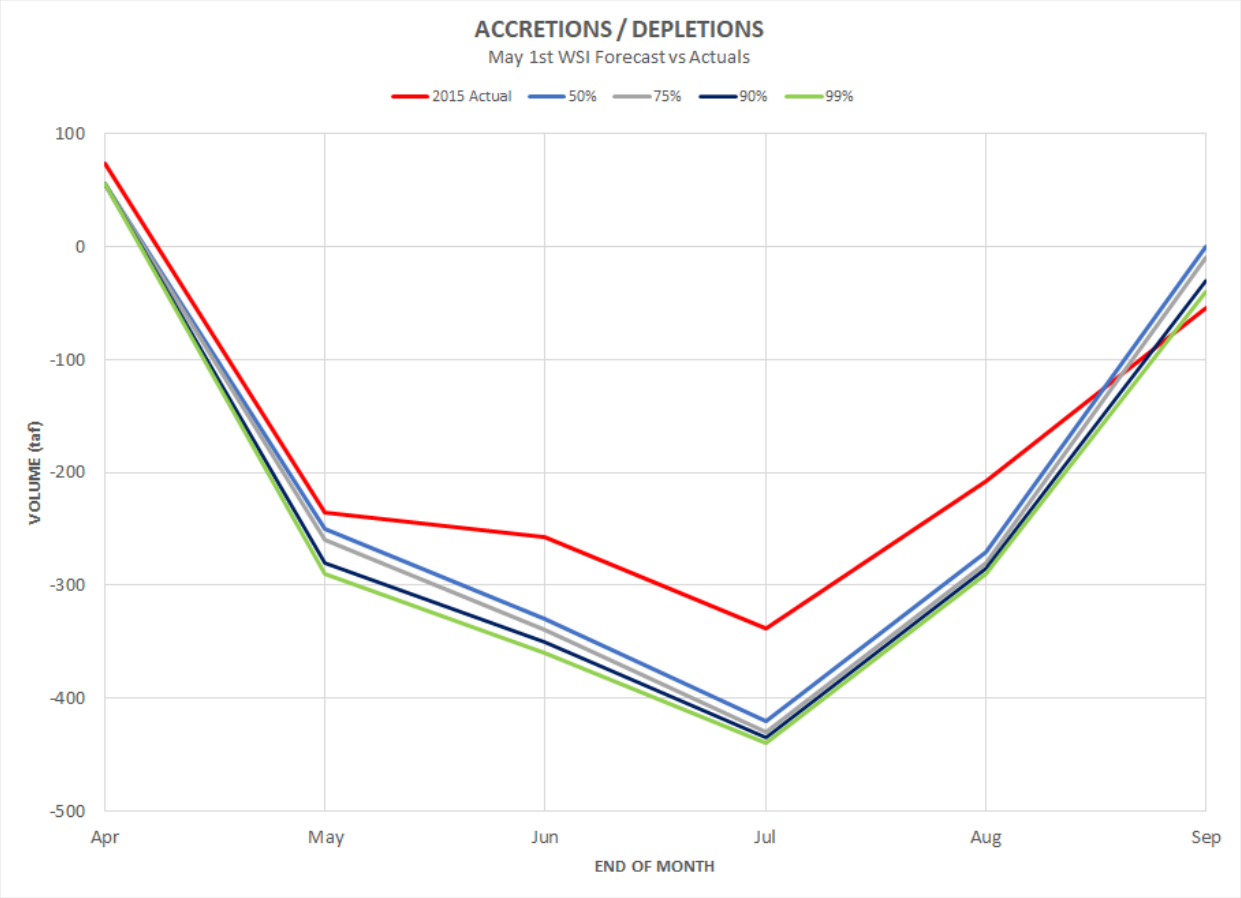

Figure 4. Comparison of 2015 Accretions/Depletions (between May 1 and September 30)

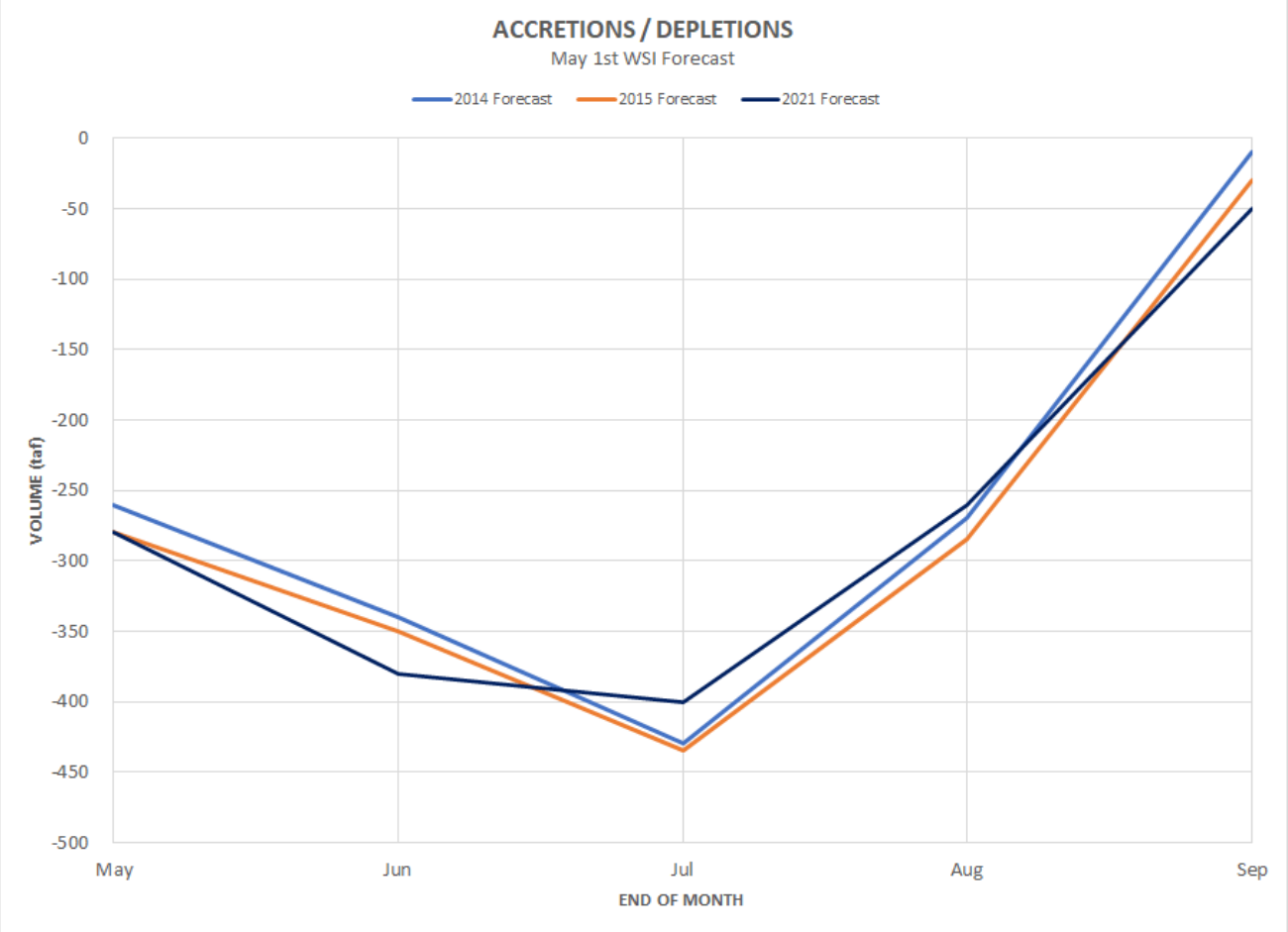

Figure 5. Comparison of May 1 90% Exceedance Accretion/Depletion Forecasts from 2014, 2015 and 2021

Many of the drought actions that affect the accretion/depletions that occurred in 2014 and 2015 are also either being implemented or planned for implementation in 2021. Below is a general list of actions that occurred in 2014 and 2015 that affected the observed accretions and depletions and are also likely to occur in 2021. These actions are described in more detail under the Drought Actions section.

- Reductions in surface water use from Senior Water Right holders through either land fallowing or groundwater substitution for transferring out of basin in the Fall
- Increased releases from smaller systems, such as the Yuba River, for transfers south of the delta
- Curtailment orders from the SWRCB
- Very low project allocations to parties north of the delta
- Urban water conservation measures from various water agencies throughout the Sacramento Basin

Due to similar drought actions being taken in 2021, Reclamation and DWR developed this operational forecast using the average of observed accretions and depletions for water years 2014 and 2015. While volumes of particular actions are not precisely the same in both those years as they are expected to be in 2021, the net resulting depletions between the upstream reservoirs and the Delta are expected to be similar. In addition, the June through September depletion values have been further revised between Keswick Dam and Wilkins Slough to more precisely account for the expected diversions to senior water right holders in this area. Given the extreme hydrology and critical conditions of WY 2021, this approach allows the Projects to craft a more realistic operation that accounts for the significant actions being taken

throughout the basin and recognizes the interconnected nature of these actions to project operations.

For the month of May, the runoff for certain watersheds have continued to decline, indicating the potential to consider a more conservative forecast for the remainder of the year. In addition, the weekly B120 inflow updates for Shasta and Folsom reservoirs have seen slight declines. The table below outlines the April to July unimpaired runoff for 90% and 99% exceedances versus the B120 weekly updates to the 90% exceedance forecast throughout May.

Reservoir	May 1 90%	May 1 99%	May 11 90%	May 18 90%	May 25 90%
Shasta	760 TAF	710 TAF	740 TAF	700 TAF	720 TAF
Oroville	460 TAF	397 TAF	460 TAF	470 TAF	480 TAF
Folsom	380 TAF	321 TAF	350 TAF	340 TAF	350 TAF

Significant reductions to the 90% exceedance inflow may cause challenges with meeting the goals outlined in this plan. As a result, Reclamation and DWR are continuing to work on additional actions to secure water for both water supply and fishery protection. Potential actions being considered are referenced briefly below and will be shared through WOMT as additional information becomes available.

- Increased releases from New Melones Reservoir beyond those forecasted in Attachment 1.
- Increased releases from Lake Oroville beyond those forecasted in Attachment 1.
- Reduction of storage at Whiskeytown Reservoir
- Water purchases for the purposes of meeting the goals outlined in this Plan
- Reoperation of non-CVP/SWP facilities to temporarily increase reservoir storage at CVP/SWP facilities
- Requests for additional voluntary reductions from senior water right holders
- Coordination with the Water Board for consideration of additional curtailments
- Short-term reductions in exports to meet unexpected Delta salinity conditions

C. Contractual Obligations

Under the 90% exceedance hydrologic scenario, the operational forecast assumes fulfilling the contractual obligations between DWR and North Delta Water Agency. For the Feather River Settlement Contractors (FRSC), the full 50% delivery shortage provision was triggered based on the April 1 hydrologic exceedance forecast scenarios and the reduction is included in the attached forecast.

Deliveries to Sacramento River Settlement contractors, San Joaquin River Exchange contractors, and wildlife Refuges are determined by the Shasta Index. For 2021, an index below 3.9 MAF indicates a “Shasta Critical” year, which triggers reduced allocations. The May 50% exceedance hydrology indicates the index will continue to be less than 3.9 MAF. As a result, the Sacramento River Settlement contractors, the San Joaquin River Exchange contractors, and the wildlife refuges are represented as a reduction to their Shasta Critical volumes. Reclamation made an initial determination on February 12 based on the Shasta Index from the February 1 forecast, and this determination has continued through the March, April, and May forecasts.

IV. SWP and CVP Areas of Potential Concern

B. May 1, 2021 90% Exceedance

The 90% exceedance operations forecast incorporates critically dry conditions for WY 2021. Despite beginning WY 2021 with relatively high carryover storage after the dry WY 2020, each Project reservoir exhibits extremely low projected carryover storage at the end of WY 2021. This forecast includes the trade-off between storage management and meeting the Sacramento Valley in-basin uses and includes the quantifiable drought actions described in Section IV. Not all drought actions are able to be quantified to a level of detail that can be directly represented in the operational forecast. These actions are noted as such in their description. Current system-specific operations, the 90% exceedance and expected drought actions forecast areas of potential concern and are further described in detail below.

i. D-1641 SWRCB Bay Delta Standards

Under very dry conditions, SWRCB D-1641 includes flexibilities of Spring X2 water quality and outflow standards in May and June. Spring X2 does not apply in May and June when the best available May estimate of the Sacramento River Index for the water year is less than 8.1 MAF under the 90% exceedance forecast. The Sacramento River Index refers to the sum of the unimpaired runoff in the water year as published in the DWR B120 for the following locations: Sacramento River above Bend Bridge, near Red Bluff; Feather River, total unimpaired inflow to Oroville Reservoir; Yuba River at Smartville; and American River, total unimpaired inflow to Folsom Reservoir. Because the 90% exceedance forecast of the SVI was well below the 8.1 MAF the Spring X2 is not required in May and June.

Due to the extreme dry conditions, on May 17, 2021, a Temporary Urgency Change Petition (TUCP) to modify D-1641 delta water quality and outflow requirements was submitted to the SWRCB due to continuing dry conditions This TUCP is further described in detail below in Drought Actions and is posted on the SWRCB's webpage at: https://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/tucp/index.html.

ii. Trinity River

Spring flows on the Trinity River will be consistent with the annual allocation as prescribed by the Trinity River Main-stem Fishery Restoration Record of Decision. Consistent with fish health criteria, releases to augment flows in the Lower Klamath River will also be considered. The storage forecasted for the end of September is extremely low at just over 600 TAF and does not leave a storage buffer in the event WY 2022 is also dry. In addition, low storages of this level also typically bring temperature management concerns both in this water year and in WY 2022.

iii. Sacramento River

Releases from Shasta and Keswick Reservoirs into the Sacramento River are expected to be controlled by a number of different requirements for WY 2021. Between June and September, necessary releases will be determined by the need to meet senior and riparian water right demands along the Sacramento River, Delta outflow and water quality needs and temperature management between Keswick Dam and the Clear Creek confluence. As outlined in the May 21, 2021 letter from the SWRCB (Attachment 3), in an effort to strike a balance between water supply and fishery protection, Reclamation will be making releases from Shasta Reservoir with the intention to maintain a minimum of 1.25 MAF in storage by the end of September. This minimum Shasta Storage requirement will limit the ability of Shasta to increase

releases to respond to unexpected salinity events and will increase the reliance on releases from Folsom Dam and Oroville Dam. This forecast was developed with the best available information to avoid further exacerbating the already critically low storages in Oroville and Folsom; however real time conditions may deviate from this forecast. Failed drought actions, worsening hydrologic conditions, emergency management and other factors may lead to a change in this approach. Should this happen, the Projects will notify the WOMT agencies, including the SWRCB staff.

The key areas of concern for the upper Sacramento River include temperature management, meeting in-basin demands (including senior water right deliveries and Delta requirements) and carryover reservoir storage. Water temperature management is of significant concern given the storage peaked in March and full use of the Shasta Dam temperature control device is not be possible. Drought actions currently being implemented and/or planned are described in the Drought Actions section and are briefly listed below:

- Shasta warm water power bypass to conserve cold water for temperature management in the summer and fall
- Voluntary diversion reductions by the Sacramento River Settlement Contractors
- Delayed release and delivery of water transfers
- Coordination on the timing of diversions to the Sacramento River Settlement Contractors to limit required release changes
- Temporary Urgency Change Petition to modify Delta requirements
- Emergency drought barrier to minimize Delta salinity intrusion
- Minimum exports to limit releases needed to support Delta needs
- Use of New Melones to meet Delta outflow and salinity requirements to limit upstream releases on the Sacramento River needed to support Delta needs
- Urban water conservation to limit releases needed to support Delta needs
- Potential curtailments from the SWRCB to limit releases needed to support Delta needs
- Reduced allocations to CVP M&I water service contractors
- Continuation of the winter-run reintroduction program on Battle Creek
- Increased intake of winter-run at Livingston-Stone National Fish Hatchery with contingencies to maintain suitable hatchery water temperatures.

Throughout the remainder of WY 2021 and into the beginning of WY 2022, Reclamation will work with DWR, the other WOMT agencies, and water users throughout the basin to identify additional actions that may be taken to support increasing carryover at Shasta, Oroville and Folsom reservoirs. Reclamation will continue to coordinate through the Sacramento River Temperature Task Group, which includes the Agencies and Sacramento River Settlement Contractors.

iv. Clear Creek

Flows on Clear Creek will be consistent with the 2020 Record of Decision implementing the Proposed Action as analyzed in the NMFS 2019 Biological Opinion. A prescribed Spring pulse flow was implemented May 7-16, reaching maximum flow of 840 cfs. In addition, Reclamation is working with NMFS and through the Clear Creek Technical Team (CCTT) to develop a potential additional water-neutral emergency pulse flow to help move observed Spring-run Chinook salmon up stream. This pulse flow would likely be implemented in early to mid-June. Pulse flows and operations will continue to be closely evaluated through the CCTT to minimize effects on water temperature management and/or ability to help meet other system flow needs. Concerns with Clear Creek temperature management are similar to those of the Trinity system. On June 1, a temperature goal 60 deg F at IGO gage (downstream of

Whiskeytown) is required. Clear Creek temperatures will continue to be evaluated and coordinated through the CCTT.

v. Feather River

Minimum Feather River flow and temperature requirements are prescribed in the 1983 Agreement between CDFW and DWR for Management of Fish and Wildlife for Lake Oroville and the 2004 Biological Opinion issued by NMFS. Total releases to the Feather River through the High Flow channel of the Feather River are currently at 1,850 cfs and the flow through the City of Oroville through the low flow channel is 650 cfs. DWR's primary objective is to maintain the lowest possible releases in spring and summer to meet in-basin requirements with the objective of conserving storage for temperature management in the late summer and fall. DWR is targeting a minimum end of September carryover target in Lake Oroville of 850 TAF for Feather River temperature management as this is the storage level at which operational challenges may be encountered for temperature management (further discussed in Section V.H) and power generation. Lake Oroville's Hyatt Powerplant also plays a significant role in supporting the power grid reliability; therefore, maintaining minimal storage for temperature management operations for as long as possible through the summer, will also provide a secondary benefit of helping maintain grid integrity during peak summer power demand for the State of California.

vi. American River

Releases from Folsom Reservoir (and Nimbus Dam) into the American River are expected to be controlled by a number of different requirements for WY 2021. Between June and September, releases are expected to be made primarily to meet minimum instream flow requirements and Delta outflow and water quality needs. Due to Folsom's close proximity to the Delta, the Shasta minimum storage requirement and the inability to reduce the already minimum exports, releases from Folsom are expected to be relied upon throughout the summer to respond to salinity conditions. Flows on the American River will be consistent with the provisions of the 2020 Record of Decision implementing the Proposed Action as analyzed in the NMFS 2019 Biological Opinion. The key areas of concerns for the American River include meeting minimum health and safety deliveries within the American River basin, carryover storage and water temperature management to protect fisheries health.

Folsom Reservoir is a key (and sometimes the sole) water source for many M&I communities within the American River basin, some with senior water rights. For many in the area, this supply is contingent on a minimum storage within Folsom Reservoir. Although the exact storage varies with the demand expected, Reclamation generally assumes a storage less than 110 TAF is not adequate to operate the facilities to meet expected demands. Given the potential for a very dry fall where storage may continue to decrease, Reclamation is targeting a minimum end of September storage of 200 TAF in Folsom Reservoir. This goal, combined with the flexibility to decrease to minimum releases of under 600 cfs by the fall, is expected to protect the water supply to meet minimum public health and safety needs in the event of a dry fall.

Water temperature management is of significant concern given the low storage, which does not allow for use of the highest shutter gates, requiring colder water to be released earlier in the season and therefore not be available later in the late summer/early fall. Due to the significantly dry hydrology, storages in Folsom Lake are well below those levels experienced in both 2014 and 2015 and are only slightly higher than storages experienced in 1977.

Drought actions currently being implemented and/or planned for WY 2021 are described in the Drought Actions section and are briefly listed below:

- Temporary Urgency Change Petition to reduce Delta needs
- Emergency drought barrier to reduce Delta needs
- Minimum exports to limit releases needed to support Delta needs
- Use of New Melones Reservoir to meet Delta outflow and salinity requirements to limit releases needed to support Delta needs
- Urban water conservation to both reduce water deliveries from Folsom Reservoir and limit releases needed to support Delta needs
- Potential curtailments from the SWRCB to both reduce water deliveries from Folsom Reservoir and limit releases needed to support Delta needs
- Reduced allocations to CVP M&I water service contractors
- Temperature shutter de-ganging to help conserve cold water for later in the summer and fall

These potential provisions and actions being considered will help to ensure that urban water users in the greater Sacramento area will continue to have access to surface water and groundwater, and that flows on the lower American River will meet the minimum flow standards for fish.

vii. Stanislaus River

Flows on the Stanislaus River are typically managed in a manner consistent with the provisions of the 2020 Record of Decision implementing the Proposed Action as analyzed in the NMFS 2019 Biological Opinion. Generally, flows in the winter and spring will follow the Stepped Release Plan schedules (from the Proposed Action) as modified through the interagency Stanislaus Watershed Team. Storage in WY 2021 has been at or near average with relatively high storage carried over from previous wet years. Given the critically low storage levels of the other CVP and SWP reservoirs, New Melones will be used throughout the summer of 2021 to support meeting Delta outflow and salinity objectives. This action is expected to reduce the carryover storage into WY 2022 as a trade-off for avoiding catastrophic conditions at Shasta, Oroville, and Folsom reservoirs. Despite this action being planned, carryover remains a concern for New Melones Reservoir. New Melones has a very low refill rate, meaning it only typically fills in very wet years (such as 2017) and can go many years between filling even with non-drought hydrology. For this reason, storage within New Melones can be relied upon for meeting basin requirements for several years after the last filling. Given the expected increased releases for meeting delta requirements, the 90% exceedance forecast shows a carryover storage of approximately just under 900 TAF at the end of September. While this storage is relatively high compared to the other reservoir within the system, it may still present challenges with regard to meeting future requirements should WY 2022 or even WY 2023 also be dry.

V. Drought Actions

DWR and Reclamation, in coordination with partner agencies have undertaken and are undertaking a number of measures to respond to conditions in WY 2021. These actions for WY2021 are described below.

A. Drought and Dry Year Toolkit

The Drought Toolkit is being developed in accordance with Alternative 1 (Preferred Alternative) as described Reclamation's 2020 Record of Decision for the Coordinated Long-Term Operation of the Central Valley Project (CVP) and State Water Project (SWP), dated February 2020, and analyzed in the National Marine Fisheries Service (NMFS) Biological Opinion, dated October 2019. The Drought Toolkit provides a coordination process and identifies potential measures under Shasta Cold Water Pool Management Dry Years, Drought Years, and Successive Dry Years.

The coordination process starts with WOMT convening the Drought Relief Year (DRY) team to assess available actions and to plan for future actions if drought conditions persist. A more complete description of the DRY team is provided in a team Charter finalized in April 2021. The DRY team is responsible for evaluating and reporting on the effectiveness of any implemented action and updating the Drought Toolkit. The DRY team will, at a minimum, convene when Shasta Cold Water Pool Management is in critical condition (i.e., Tier 3 years where there may be a high risk of exceeding 56°F before October 1st) and Tier 4 years. Agencies may determine that there is a need for the DRY team based on real-time conditions and will coordinate the decision through WOMT.

To support an efficient and organized drought response, the Drought Toolkit contains summaries of potential Drought Relief Actions (DRAs). Individual action summaries provide DRY team members with a quick reference based on both the seasonal timing and implementation times for rapid evaluation. DRAs are not meant to be comprehensive for any single water year, but rather are intended to act as a repository of the institutional knowledge gained when an action is implemented. This Drought Toolkit leverages planning and communication channels to implement actions that can be taken year-round to support operational flexibility and ongoing habitat and restoration actions that may bolster the species' resilience, especially during drought and successive dry year conditions.

B. Sacramento River Meet and Confer Actions

Coordination with the Sacramento River Settlement Contractors began in March and resulted in technical support for options on water temperature management, demand reductions, delayed water transfers, and weekly coordination with operators

C. Shasta Reservoir Warm Water Power Bypass

On April 18, 2021 Reclamation adjusted operations to bypass Shasta Dam's powerplant and temperature control device (TCD) due to the low water elevation in Shasta Reservoir. Reclamation released water from the warmer, upper layers of Shasta Reservoir directly through the dam's river outlets into the Sacramento River. The purpose of this warm water release is to maintain Sacramento River flows through the spring while preserving the limited supply of colder water for use later in the summer when most critical for endangered winter-run Chinook salmon. Fishery agencies provided preliminary guidance on the maximum temperatures (60 deg F at Clear Creek - CCR), and Reclamation has been coordinating with the Agencies weekly on the need for potential revisions. Monitoring for unanticipated effects

includes monitoring temperatures and their impacts to hatchery winter-run Chinook salmon at LSNFH and monitoring winter-run Chinook salmon in the Sacramento River (e.g., observations of pre-spawning mortality in adults). When fisheries conditions showed possible adverse effects from the warmer release, Reclamation began to manage the river temperatures to 57 deg F at the SAC gage (Sacramento River upstream from Highway 44 bridge) beginning on May 15 by adjusting the release blend from the bypass with the powerplant and TCD. The bypass was reduced as water temperatures in Shasta Lake increased in order to maintain downstream river temperatures at 57 deg F at SAC. On May 24, the bypass ended and is estimated to have conserved over 300 TAF of cold water (<52 deg F) for use later in the summer and fall.

D. Agricultural Delivery Efficiencies and Reductions

Sacramento River Settlement Contractors (SRSC) scheduled diversions and transfers to other Sacramento Valley Water Users for 2021 are 1,117,000 AF, an amount that is less than the volumes diverted and transferred in 2015. Diversions and transfers are 65% of Settlement Contract totals, an additional 10% reduction from the 75% shortage provisions. Sacramento River Settlement Contractors have made available 170,000 AF of reduced diversions to make water available for transfer to other areas of the State in critical need. SRSC are considering alternatives to rice decomposition water that will provide water additional savings. The SRSC propose to establish, in cooperation with Reclamation, an emergency groundwater pumping program to further reduce offset diversions and address the migratory needs of the Pacific Flyway. Weekly coordination with Reclamation and contractors on diversions maximizes efficiencies to retain as much water in Shasta Lake as possible while meeting demands.

E. Water Transfer Demand Delay Programs

CVP South-of-Delta agricultural water service and repayment contractors coordinate with Reclamation to store water purchased from Sacramento River Settlement Contractors in Shasta Reservoir over the summer in order to assist with management of the coldwater pool.

F. Temporary Urgency Change Petition

DWR and Reclamation submitted a Temporary Urgency Change Petition (TUCP) to SWRCB on May 17, 2021. The TUCP included the following:

1) Reduction of Outflow Requirements (June 1 through June 30, 2021)

Beginning June 1, Reclamation and DWR request modification of D-1641 outflow. The requested change would modify the minimum NDOI described in Figure 3 of D-1641 during the month of June to no less than 3,000 cfs on a 14-day average, to allow for some storage conservation for fishery protection and improving carryover storage while meeting minimum CVP and SWP export levels.

2) Reduction of Outflow Requirements (July 1 through July 31, 2021)

Beginning July 1, Reclamation and DWR request modification of D-1641 outflow. The requested change would modify the minimum NDOI described in Figure 3 of D-1641 in July from a monthly average of 4,000 cfs to a monthly average of 3,000 cfs (Table 3, footnote 8 remains applicable) to allow for some storage conservation for fishery protection and improving carryover storage while meeting minimum CVP and SWP export levels.

3) Exports (June 1 through July 31, 2021)

June 1 through July 31, the maximum combined SWP and CVP exports will be limited to 1,500 cfs when Delta outflow is less than 4,000 cfs. SWP and CVP exports may exceed 1,500 cfs when Delta outflow meets D-1641 or for moving transfer water (beginning July 1, 2021).

The minimum combined export of 1,500 cfs, is consistent with other regulatory requirements. The combined 1,500 cfs export rate represents a sustainable rate and provides the CVP and SWP real-time operational flexibility in the Delta to meet D-1641 salinity and water quality standards, as Delta conditions can rapidly change due to weather and tidal cycles. Absent this flexibility, additional sustained upstream releases would be required to manage the real-time changes in Delta conditions. In addition, the 1,500 cfs rate allows the CVP the ability to maintain a one-unit operation and minimizes the need to start and stop the unit in a 24-hour period (i.e. cycling) which could result in catastrophic damage. This rate also allows the SWP to meet Byron Bethany Irrigation District diversions, who divert from Clifton Court Forebay, and also provides for water supply delivery to the SWP South Bay Public Water Agencies who are not directly connected to San Luis Reservoir and who rely on direct diversions from the Delta to meet their municipal and industrial demands.

4) Modification of the Western Delta Salinity Compliance Point (June 1 through August 15, 2021)

In a critical year, D-1641 requires the Agricultural Western Delta Salinity Standard at Emmaton have a 14-day running average of 2.78 millimhos per centimeter from April 1 to August 15. Reclamation and DWR are petitioning the SWRCB to modify this requirement by moving the compliance location from Emmaton to Threemile Slough on the Sacramento River from June 1 through August 15, 2021.

Reclamation and DWR are awaiting response from the SWRCB on the TUCP request.

Reclamation and DWR may have a need to request modification of the Rio Vista flow requirement contained in D-1641 for September through December 2021 to be no less than 2,500 cfs. It is not yet clear whether such a request will be necessary.

G. Emergency Drought Salinity Barrier

California continues to take actions to mitigate drought conditions, and on May 10, 2021, Governor Gavin Newsom expanded the State of Emergency issued on April 21 to include 39 additional counties. Two critical actions will allow the CVP and SWP to preserve critical reservoir storage resources for later use including cold water resources needed this fall for salmon. First, DWR and Reclamation have submitted a TUCP to the SWRCB to modify D-1641 water rights conditions, and second, DWR is expeditiously moving forward with the installation of an emergency drought salinity barrier at West False River. This drought salinity barrier is a rock-filled channel closure in the Sacramento-San Joaquin River Delta, and it will allow DWR and Reclamation to maintain control of salinity in the Delta with the reduction of freshwater releases from upstream reservoirs including Lake Oroville, Folsom Reservoir and Shasta Lake. Blocking this waterway slows saltwater intrusion into the interior Delta, thus preserving fresh water for beneficial uses later in year.

H. Water Temperature Management

Folsom Shutter De-ganging: Direct operational drought related needs at the Folsom Dam to facilitate real time operations. This work directly contributes to water temperatures and flows in the Lower American River. Temperature control device shutter de-ganging may help preserve Folsom Reservoir's coldwater pool by controlling the elevations in the reservoir where water is released.

Shasta Temperature Management Plan: Reclamation coordinate a draft TMP through the SRTTG and provided a draft to NMFS and the SWRCB on May 4. Reclamation received comments from NMFS and the SWRCB and provided a final TMP on May 28.

Feather River Temperature Management: The main intake structure at Lake Oroville has a number of shutters, that can be added or removed to control the elevation and temperature of water released from Lake Oroville. Typically, once a shutter is removed, it is not re-installed until the following year. Because of low lake elevation this year, there was not enough storage to support the installation of all the shutters, which is typical in a dry year. Therefore, when storage is low and the shutters are exhausted, it is common for DWR to blend warmer water being conveyed through the main Hyatt intakes with colder water from the low-level river valve outlet system (RVOS). Maintaining minimal storage through September will provide for this more efficient temperature blending operation and avoid depleting large volumes of cold water when not needed for downstream temperatures and conserve the colder water for when it is needed in the later summer and fall for fisheries. Current modeling suggests that the forecasted operations is sufficient to maintain temperature compliance on the Feather River. DWR will continue to coordinate with State and federal fishery agencies on water temperature management activities through the summer and fall in the on-going bi-weekly Feather River coordination meetings and will provide updates to WOMT, as necessary.

I. Curtailments

DWR and Reclamation anticipate the SWRCB will pursue curtailment of other water users in the Central Valley and Delta.

J. Water Use Efficiency and Conservation

CVP and SWP water contractors and agencies are taking a number of measures to reduce water use and provide additional flexibility for drought operations. Examples include:

City of Roseville: The City of Roseville has encouraged customers to reduce their water use by 10% and began use of its groundwater wells to help meet customer demands and to offset Roseville's surface water demand from Folsom Lake. Roseville is furthermore expediting two Aquifer Storage and Recovery (ASR) projects to bolster capacity.

City of Sacramento: The City of Sacramento is maintaining it aggressive conservation practices, increasing outreach efforts to its customers and shifting its drinking water productions to divert less water from the American River and more from the Sacramento River and groundwater wells. This will reduce City of Sacramento water diversions on the lower American River by about 30% based on long term practices.

Contra Costa Water District: After the 2014-2015 drought, Contra Costa Water District (CCWD) officially adopted many of the temporary drought restrictions as permanent prohibitions on water use for the purpose of conserving the available water supply and preventing waste and unreasonable use. CCWD partnered with seven other Bay Area agencies to develop the Bay Area Regional Reliability Drought Contingency Plan (BARR-DCP) – funded in part by Reclamation – to approach drought mitigation and response from a regional, integrated perspective. While many of the BARR-DCP drought mitigation measures are in various stages of planning, CCWD continues to invest in a robust water use efficiency program, providing tools and resources to our customers. During this drought emergency, CCWD will ask customers to take additional actions to conserve to reduce our diversion of surface water.

Friant Water Authority: Landowners in the Friant Division will fallow lands as a result of water shortages while working to increase the installation of drip systems and other water saving technologies. The Friant

Water Authority (FWA) recently completed an upgrade of the Supervisory Control and Data Acquisition (SCADA) system to add more efficiency and precision to operation of the Friant-Kern Canal and is working to repair all reaches of the Friant-Kern Canal to maximize the use and flexibility of available water supplies. Additionally, FWA is conducting reverse flow operations in the Friant-Kern Canal to help contractors retrieve supplies banked in Kern County and facilitating a transfer program to allow farmers to pump water into the canal and deliver it to other contractors in need.

Grassland Water District: Surface water transfers are not available for refuge water supply contractors this year. Grassland Water District plans to supplement surface water reductions by operating its newly built water recapture and recirculation facility, and also taking advantage of recycled water from nearby communities. After a brief wetland irrigation period this spring, the District is conserving all of its reduced water supply for use in the fall and winter to support migratory birds.

Kern County Water Agency: KCWA and many of the SWP agricultural contractors are working closely with DWR to facilitate operational exchanges to recover banked groundwater to meet critical deliveries this year. There are also several drought planning efforts that are underway or planned such as investments in groundwater banks, canal lining projects, and investments in efficient irrigation practices. Many growers are also implementing scheduling services and technologies to optimize irrigation, or redeveloping land by removing permanent crops from service or planting crops that require less water. However, even with all this past and current investment, that still hasn't shielded growers from having to fallow land.

Metropolitan Water District: Metropolitan's regional communication effort is emphasizing the critical importance of water conservation to manage supply in this extremely dry year, while preparing for a potential dry water year in 2022. Further, Metropolitan is taking significant new actions to preserve State Water Project supplies by constructing physical improvements in its distribution system, and also funding a cost offset program to shift delivery pathways and locations to its member agencies to allow greater use of Colorado River Aqueduct and regionally stored water supplies. As part of its ongoing commitment to conservation and local supply development, Metropolitan provided more than $43 million in incentives in 2019-2020 to fund recycling, conservation, and groundwater recovery projects and programs, with ac cumulative investment of $1.5 billion in those efforts since 1990.

Sacramento River Settlement Contractors: Scheduled diversions and transfers to other Sacramento Valley Water Users for 2021 are 1,117,000 AF, an amount that is less than the volumes diverted and transferred in 2015. Sacramento River Settlement Contractors have reduced diversions by 170,000 AF to make water available for transfer to other areas of the State in critical need. SRSC are considering alternatives to rice decomposition water that will provide additional water savings. The Sacramento River Settlement Contractors are working to establish, in cooperation with Reclamation, an emergency groundwater pumping program of up to 60,000 AF to further reduce diversions and address the migratory needs of the Pacific Flyway. SRSC diversions and transfers are scheduled to be 64% of Settlement Contract totals, an additional 11% voluntary reduction from the 75% shortage provisions. Weekly coordination with CVO and contractors on diversions maximizes efficiencies to retain as much water in Shasta as possible while meeting demands.

San Joaquin River Exchange Contractors Water Authority: The member agencies of the San Joaquin River Exchange Contractors Water Authority are operating under their contractual shortage provision and are taking voluntary actions to further reduce demands during the critical summer period. Such actions include maximizing the use of groundwater wells owned by the member agencies and incentivizing landowners to use private well resources within the districts. Additionally, Exchange Contractors are making water available for transfer through groundwater substitution or fallowing to other south of Delta agencies who are in critical need of water supplies.

San Luis Water District: By investing in real-time soil and ET monitoring systems plus deficit irrigation,

farmers in San Luis WD have been able to conserve approximately 14% more water than in 2014 and 2015. From water year 2020 to 2021 San Luis WD landowners rescheduled the maximum allowed in San Luis Reservoir to reduce demand in 2021. San Luis WD is developing partners to facilitate time of year swaps where Ag contractors borrow water from M&I contractors in the summer months, and repayment to the M&I contractors in the fall and winter months.

Tehama-Colusa Canal Authority: The seventeen water service/repayment CVP Water Districts/Contractors that make up the Tehama-Colusa Canal Authority (TCCA) , a 150,000 acre service area spanning four counties along the westside of the Sacramento Valley, received an initial allocation of 5%, which was then reduced to zero. It is estimated that approximately 50 thousand acres of annual crops will be fallowed as a result of the drought conditions. Significant acreage throughout the service area planted to permanent crops will rely heavily on groundwater. Also, many of the TCCA districts are purchasing expensive alternative water supplies from senior water right holders via crop idle and groundwater substitution transfers to avoid crop failures and long term or permanent damage to their orchards. The TCCA and the districts are managing all water supplies as tightly as possible under the dire circumstances.

Valley Water: Valley Water is committed to increasing conservation and has over 20 conservation programs to reduce demand on existing water supplies. Valley Water has maintained a call for conservation since 2014, including asking municipalities to implement water waste restrictions. Since then, residents and businesses have reduced their average annual water use by 20% compared to 2013. The Board will evaluate additional conservation measures, including mandatory restrictions, at their June 8, 2021 board meeting.

Public outreach emphasizes being drought-ready and promotes Valley Water's many conservation programs. The multilingual spring water conservation campaign includes digital ads, print advertorials, social media posts, and radio ads. The new summer campaign is utilizing focus groups and market research to encourage water conservation further.

Valley Water has committed to increasing program incentives and funding for the Landscape Rebate Program from $1 to $2 per square foot. Valley Water is working to expand its partnership with, Our City Forest, a local nonprofit organization that helps residents convert their lawns into drought-tolerant landscapes as part of the Lawn Buster Program; a program designed for low-income community members, veterans, people with disabilities, and residents age 60 and over. Additionally, Valley Water doubled the maximum rebate amount for its Water-Efficient-Technologies Rebate Program to $100,000 for implementing water conservation projects in commercial and institutional facilities.

Valley Water newest program, the online Shopping Cart is an incredibly popular tool that allows Santa Clara County homes and businesses to easily order free water-efficient tools like efficient showerheads and faucet aerators. In May, the Fixture Replacement Program was launched, replacing 1.6 gallon per flush toilets and inefficient showerheads/faucet aerators with high-efficiency fixtures.

Water Forum: The American River water purveyors are currently undertaking or considering actions, consistent with the Sacramento Water Forum Agreement, to reduce surface water diversions from the American River by shift diversions from the lower American River to the Sacramento River, and/or by shifting from using surface water to groundwater as a supply source as part of the region's plan for sustainability. In addition, based on a resolution passed by the Regional Water Authority Board (Adopted on May 13, 2021), water purveyors are requesting that customers voluntarily reduce water use by 10% in an effort to conserve water. The Water Forum will continue to provide scientific expertise (e.g., water temperature modeling, fisheries, and hydrology), and consensus-based recommendations to support State and Federal agency decision making and to protect the environmental of the lower American River.

Westlands Water District: This year Westlands Water District is implementing all Best Management

Practices in the District's Water Management Plan, including drip irrigation, relying on conserved/stored water from last year through the peak irrigation season, and participating in programs to acquire water through groundwater substitution, land fallowing, and reservoir releases, from willing sellers. Westlands anticipates its farmers will fallow approximately 210,000 acres this year because of insufficient water supplies. Additionally, annual crops like tomatoes and permanent crops, like almonds, are being abandoned in the field and will not receive additional water or be harvested. Further, Westlands has prohibited all outdoor use of municipal and industrial water, including landscape watering, to protect health and safety and has requested all water users voluntarily reduce all in-door consumption by 25 percent. Westlands has also supported a delay in the delivery of water it purchased from willing sellers within the Sacramento Valley, so that water can remain in Shasta Reservoir to improve the cold-water pool and provide benefits in the late summer and fall to winter-run and fall run salmon.

K. CVP/SWP Operational Exchange at San Luis Reservoir

DWR's Operations Control Office and Reclamation's Central Valley Operations Office are coordinating and assessing whether there is adequate storage in the SWP State share of San Luis Reservoir to support deliveries to Reclamation's senior water rights holders, (Exchange Contractors and Refuge Water Supply) while avoiding a need to release water from Friant Dam. This action reduces the required releases from upstream reservoirs to meet these demands, avoids the significant losses expected between Friant Dam and Mendota Pool and preserves the already low allocation for the Friant Water Users to lessen the reliance on critically sensitive groundwater pumping.

L. New Melones Releases to Support Delta Outflow

Reclamation has made releases from New Melones Reservoir to support Delta outflow that preserves health and safety and assists with balancing critical storage levels in Folsom, Oroville, and Trinity reservoirs while preserving water in Shasta Lake to meet end of September storage objectives.

On May 7, 2021 the Directors of the Resources agencies met and recommended to increase releases from New Melones Reservoir to support Delta outflow requirements under D-1641 for a period of time until the Delta was back in a sustainable condition. As a result, on May 10 and 11, Reclamation increased releases from Goodwin Dam from 500 cfs to 1,500 cfs to meet Delta outflow. At the 1,500 cfs release level, the Delta needs were fully met. On May 13, Delta conditions began to change where salinity at Emmaton was increasing and additional releases from New Melones Reservoir were less effective in meeting Delta requirements. As such, Goodwin Dam releases were decreased over the next week to 600 cfs.

The brief increase in releases from New Melones from May 10 to May 19 helped meet D-1641 outflow requirements and allow for storage conservation in the critically low upstream storage reservoirs (Oroville, Shasta and Folsom reservoirs). Reclamation anticipates similar increased releases from New Melones Reservoir throughout the summer to support Delta water quality and outflow. Depending on salinity conditions, New Melones Reservoir may be more effective in meeting Delta conditions later in the summer when Delta salinity concerns begin to move further south.

M. Water Acquisition Programs

DWR and Reclamation are coordinating with project and non-project water users on the ability to make water available to support Delta outflow and reduce the reliance upon CVP and SWP reservoirs to prevent salinity intrusion and maintain the ability to deliver Health and Safety water supplies.

N. Conservation Hatcheries

Reclamation funds the USFWS to manage the Livingston-Stone National Fish Hatchery for the conservation of winter-run Chinook salmon. Fish agencies met to discuss increased hatchery broodstock and production in anticipation of 2021 conditions. Reclamation is preparing to acquire chillers to ensure cold water for the hatchery.

To address potential fish impacts at the Nimbus Fish Hatchery (a mitigation hatchery) due to drought, CCAO is working with CDFW to assess potential alternatives to help reduce steelhead mortality through the summer given expected warm lower American River temperatures. Additional actions are under discussion.

DWR and Reclamation support the U.C. Davis Fish Conservation and Culture Laboratory and U.S. Fish and Wildlife Service Livingston Stone National Fish Hatchery to maintain a refugial population of Delta Smelt.

O. Pacific Flyway Protection

DWR and Reclamation propose to coordinate with water districts in the Sacramento and Feather River basins to pump groundwater to support a portion of the Pacific Flyway that would otherwise rely on rice decomposition practices.

P. Habitat Restoration

Reclamation and the Fish and Wildlife Service continue to support SDM and the implementation of spawning and rearing habitat on the Sacramento, Clear Creek, American, and Stanislaus basins under the CVPIA.

Q. Directors Meeting

In the event of low egg-to-fry survival, DWR and Reclamation will convene a meeting of the Regional Directors of the Department of Water Resources, National Marine Fisheries Service, Fish and Wildlife Service, and California Department of Fish and Wildlife to identify actions to address the potential for a third year of low survival.

VI. Monitoring and Science Efforts to Inform Operations

A. Delta Smelt Surveys

The Enhanced Delta Smelt Monitoring Program (EDSM) conducts high intensity sampling year-round and provides regional population estimates for Delta Smelt across their range. The robustness of the EDSM design is evident in its detections of Delta Smelt despite extremely low population level in WY2021. This information has helped to inform export operation decisions and development of weekly assessments by the SMT.

The EDSM surveys are conducted in addition to several other key surveys, including the seasonal fish assemblage surveys and the Bay Studies performed by CDFW which provide year-round abundance and distribution data to inform species assessments. As part of the new ITP (Section 7.6.2), CDFW, DWR, and partners will be testing improved methods to measure larval smelt entrainment at the SWP. These new larval entrainment sampling efforts will be in a pilot phase starting in WY 2022.

The Delta Smelt population is at extremely low abundance in WY 2021, which has caused limited observations and is expected to continue for the foreseeable future. As a consequence, as outlined in the Biological Opinions and DWR's ITP, management activities may focus more on abiotic conditions including turbidity, temperature, and hydrology when assessing the likelihood of entrainment. Particle tracking models and real-time abiotic condition monitoring will also be considered and, as appropriate, guide management actions. Reclamation supports the FWS on pursuing supplementation of Delta Smelt to address, in part, allee effects from the previous drought.

B. Longfin Smelt Surveys

Longfin Smelt are sampled by a variety of long-term DFW monitoring programs, including the San Francisco Bay Study, Smelt Larva Survey, and others. While there are limitations to these monitoring efforts with respect to Longfin Smelt, most notably an absence of shallow water sampling and limited sampling downstream of Carquinez Straits, the 2020 Incidental Take Permit mandated the creation and implementation of the Longfin Smelt Science Plan (COA 7.6.3) which includes improvements to the Longfin Smelt monitoring network to fill these key gaps. While Longfin Smelt distribution and abundance data from across their whole range, especially during the summer months, may be incomplete in the short term, coverage in the Delta, confluence, and Suisun Bay are anticipated to be sufficient to detect meaningful drought impacts.

DFW monitoring programs conduct high intensity sampling in the Delta during the winter and spring months to inform the real time operations of the SWP and CVP for the management of Longfin Smelt entrainment and salvage. Additionally, as part of the new ITP (Section 7.6.2), CDFW, DWR, and partners will be testing improved methods to measure larval smelt entrainment at the SWP. These new larval entrainment sampling efforts will be in a pilot phase starting in WY 2022. As with Delta Smelt, particle tracking models and real-time abiotic condition monitoring will also be used to inform and guide management actions for Longfin Smelt.

C. Salmonids Monitoring

An extensive salmonid monitoring program exists throughout the Central Valley and is described in the Biological Assessment (Appendix C) of the LTO and updated annually in coordination with NMFS. Additional monitoring efforts that may evaluate drought effects and improve status and trend fish and ecosystem monitoring while preserving inferences from existing long-term datasets are being discussed and considered through the Sacramento River Science Partnership. Salmonid monitoring efforts include

rotary screw traps, acoustic tagging, trawls, carcass surveys, red surveys, and beach seining. Environmental DNA sampling is being investigated to complement the Sacramento, Mossdale, and Chipps Island trawls observations to improve salmonid detection at Delta entry and Delta exit points.

Other studies on migration paths and mortality will continue in WY 2021 for winter-run and spring-run Chinook salmon, and steelhead, to improve knowledge of population dynamics of these species. Juvenile sampling is being investigated to evaluate the temperature experience of early salmonid life stages in the upper Sacramento River during summer and fall 2021. Several new or updated models, such as the STARS model and DSM2, are available to simulate fish migration rate, routing, and survival in the Delta in response to flow and other variables. These models will be used to inform real-time management decisions to minimize the impact of drought actions on the survival of salmonids migrating through the Delta.

As a potential additional tool, DWR's ITP requires the development of a predictive tool to improve management of winter-run Chinook salmon salvage. One such modeling tool is already in an advanced state of development (housed on SacPAS), and another has been initiated. These models will be piloted by SaMT to provide additional information regarding real-time operations, potentially improving the ability to reduce entrainment throughout the winter and spring months when salmonids are present in the Delta. Monitoring and tools utilized by SaMT improve our understanding of timing and distribution of species in the Delta, as well as inform targeted research to fill data gaps to identify additional risks to salmonids resulting from water operations.

D. Ecosystem Drought Monitoring and Assessment

Monitoring during the previous major drought (2014-2015) demonstrated that there can be major ecological changes in the estuary. For example, the previous drought showed increases in harmful algal blooms, aquatic weeds, and invasive fishes (e.g. centrarchids). These changes are likely to further intensify again under drought conditions, and in the Delta and Suisun Marsh monitoring focuses on measuring these effects to understand the impacts of this potential drought and efficacy of different management actions taken to address these ecological stressors.

DWR is developing a drought monitoring and synthesis plan for the Delta and Suisun Marsh built on existing monitoring and synthesis efforts (see Attachment 2). The analysis and synthesis will be conducted by a team of multi-agency scientists with opportunities for input and participation by stakeholders and experts from academia and industry.

This plan will have three major goals:

- Monitor the status of important environmental drivers in the Delta during the current drought.
- Examine the effects of this drought on critical ecological conditions in the Delta.
- Assess the effects of the TUCP and Drought Barrier on the Delta ecosystem.

The monitoring plan relies upon the extensive existing network, which includes additions made during the 2014 and 2015 years and adds additional efforts where necessary to capture specific actions. The monitoring program is a more coordinated telemetry network for anadromous fishes, and the State's surveys of aquatic vegetation. Reclamation and CDFW are also leading an interagency team to explore whether the seasonal fish assemblage surveys funded by Reclamation and DWR can be improved to better characterize the status and trends of the ecosystem while preserving the utility to make inferences from long-term datasets.

The Delta Ecosystem Monitoring and Synthesis Plan will be conducted in coordination with other effectiveness monitoring outside the Delta conducted through the DRY team.

VII. Next Steps

For WY 2021, DWR and Reclamation will coordinate to determine feasible actions, continue updating the Drought Plan, and provide weekly hydrology and operations updates at the WOMT meetings.

DWR and Reclamation will use the weekly LTO Implementing Agency Coordination meeting (which focuses on planning and reporting as opposed to WOMT's focus on real-time decisions) to identify and oversee a group of agency experts to report on the outcomes and effectiveness of actions taken under this Drought Plan for the purpose of updating and improving the Drought Toolkit.

The report may include:

- Accounting of water supply for water saving actions;
- Physical conditions;
- Biological observations;
- Preliminary attribution of effects, if possible; and
- Recommendations on next steps.

The schedule for the report will be developed by the agency experts with the intention of informing potential actions in WY 2021. The report would include, at minimum, input from stakeholders through forums such as the Collaborative Science and Adaptive Management Plan and, if desired, a SWRCB workshop.

In addition, DWR and Reclamation will continue to collaborate with Agencies to develop the Drought Toolkit which will be completed in August 2021. The Drought Toolkit establishes a Dry Relief Year (DRY) Team comprised of technical experts and/or policy makers from each of the six WOMT agencies. The DRY Team will also update the Drought Toolkit with any additional actions and evaluations of the effectiveness of any implemented actions. This update will be completed annually by February and discussed with the LTO Implementing Agency Coordination group and WOMT.

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Attachment 1- Operations Forecast Results

OPERATIONS FORECAST RESULTS

To Be Added

For the May 2021 Drought Plan

Attachment 2- Drought Monitoring Plan

Attachment 3- May 21, 2021 letter from SWRCB to Reclamation