

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

**In the Matter of Specified License and Permits¹ of
the Department of Water Resources and U.S. Bureau of Reclamation for the State
Water Project and Central Valley Project**

**ORDER CONDITIONALLY APPROVING A PETITION FOR TEMPORARY URGENCY
CHANGES TO LICENSE AND PERMIT TERMS AND CONDITIONS
REQUIRING COMPLIANCE WITH DELTA WATER QUALITY OBJECTIVES IN
RESPONSE TO DROUGHT CONDITIONS**

BY THE EXECUTIVE DIRECTOR

1.0 INTRODUCTION

The Sacramento/San Joaquin Delta (Delta) watershed is currently experiencing extreme dry hydrologic conditions, with 2021 the driest year on record to date since 1977 following dry conditions in 2020. Snow water content for 2020-2021 was somewhat better than snow water content in other extreme drought periods of 2014-2015 and 1976-1977; however, in 2021 an unprecedented loss of snowmelt into dry soils and due to sublimation resulted in a nearly 700 thousand acre-feet (TAF) deficit in expected inflows to the Sacramento River watershed (at the 90 percent hydrologic forecast) and associated Project reservoirs between April and May of 2021. The abrupt change in expected inflows to reservoirs contributed to insufficient water supply to meet the obligations of the federal Central Valley Project (CVP) and State Water Project (SWP), including requirements of State Water Resources Control Board (State Water Board) Decision 1641 (D-1641) to achieve water quality and flow objectives included in the

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

Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta Plan).

On April 21, 2021, Governor Newsom proclaimed a State of Emergency in Mendocino and Sonoma Counties due to drought conditions in the Russian River watershed and directed state agencies to take immediate action to bolster drought resilience and prepare for impacts on communities, businesses, and ecosystems. On May 10, 2021, Governor Newsom extended the state of emergency to include 41 counties in the Klamath River, Delta, and Tulare Lake Watersheds due to warm temperatures and extremely dry soils resulting in a historic and unanticipated depletion of runoff from the Sierra-Cascade snowpack.

Directive 4 of the Governor's May 10, 2021, Emergency Proclamation states that "to ensure adequate, minimal water supplies for purposes of health, safety, and the environment, the [State] Water Board shall consider modifying requirements for reservoir releases or diversion limitations – including where existing requirements were established to implement a water quality control plan – to conserve water upstream later in the year in order to protect cold water pools for salmon and steelhead, improve water quality, protect carry over storage, or ensure minimum health and safety water supplies."

On May 17, 2021, the Department of Water Resources (DWR) and the United States Bureau of Reclamation (Reclamation) (hereinafter the Petitioners) jointly filed a Temporary Urgency Change Petition (TUCP) pursuant to Water Code section 1435 et seq. requesting that, consistent with Directive 4 of the Emergency Proclamation, the State Water Board temporarily change their water right permits and license for the SWP and CVP (collectively Projects). In response to the 2021 drought emergency, the Petitioners are seeking changes to permit and license conditions imposed pursuant to D-1641 that require the Petitioners to meet flow-dependent water quality objectives designed to protect fish and wildlife and agricultural beneficial uses in the Delta in order to preserve water in storage in Project reservoirs to meet other Project obligations and improve reservoir storage conditions going into next year.

This Order approves, subject to conditions, the changes described below 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.

The modifications approved by this Order apply to requirements to meet a Delta outflow objective designed to protect fish and wildlife beneficial uses of water and a salinity objective designed to protect agricultural beneficial uses of water in the western Delta at the Emmaton compliance point. The Petitioners also proposed modified export limits as a companion to these changes. The Order includes the Petitioners' proposed export limits, as well as additional export limits. Unless renewed, changes approved as part of a TUCP request may remain in effect for up to 180 days. In this case, the changes to the Delta outflow requirements will be effective until July 31, 2021, and the remaining changes will be effective until August 15, 2021. The terms and conditions of approval of the TUCP will remain in effect until compliance is completed.

Directive 4 of the Emergency Proclamation requires that modifications to reservoir releases or diversion limitations be monitored and evaluated in order to inform future actions. Consistent with this requirement, this Order requires consultations on real time operations with the State Water Board and fisheries agencies, reporting on hydrologic conditions, operation outlooks, and real-time operations; accounting of water volumes conserved in storage, water deliveries, and water transfers; evaluation of providing conserved water in a subsequent year to improve conditions for protection of beneficial uses; reporting on infrastructure specifications and health and safety limitations of pumping facilities; analysis of ecological impacts of the temporary urgency change actions in combination with other associated drought actions, including a special study for harmful algal blooms and invasive aquatic weeds; development of an operational strategy for next year to address improvements and hydrologic and operational forecasting; and provisions for continuing authority to modify the Order based on comments or objections, or new information.

The Petitioners are required to evaluate the possibility for dedicating a portion of the volume of water conserved by the changes approved in this Order to provide pulse flows or other improvements above and beyond D-1641 requirements in the next water year² to the extent feasible based on hydrologic conditions. It is widely recognized that the Delta ecosystem is in a state of crisis. The population abundance of several native estuarine species has continued to decline, strongly suggesting that the current water quality objectives are inadequate to protect fish and wildlife beneficial uses. Additional instream flow can help aquatic species recover after experiencing drought conditions.

The Petitioners are also required to develop an operational strategy for water year 2022, in the event that dry or critically dry hydrologic conditions occur next year. Proper planning for possible future dry or critically dry years can help to alleviate the need for

² A water year starts on October 1 and extends to September 30 of the following calendar year. For example, water year 2021 is October 1, 2020, through September 30, 2021.

expedited emergency actions, exceedances of water quality objectives, and the need for relaxations of requirements to meet water quality objectives. The plan should provide clear, transparent goals, optional actions to meet the goals, and thresholds or triggers to implement the actions, for example through a structured decision-making approach.

Approval of the final Sacramento River Temperature Management Plan (TMP) pursuant to State Water Board Order 90-5 is not subject to this Order, but this Order requires Reclamation to implement the plan as approved by the State Water Board's Executive Director.

This Order is consistent with the legal requirements governing approval of a TUCP. In order to approve a TUCP, the State Water Board or its Executive Director, acting under delegated authority, must find (1) that there is an urgent need for the proposed changes, (2) that the changes will not injure any legal user of water, (3) that the changes will not result in unreasonable effects to fish and wildlife, and (4) that the changes are in the public interest. In addition, the State Water Board must protect public trust resources to the extent feasible and in the public interest.

Section 5.2 of this Order explains the urgent need for the proposed changes. As described in section 5.3, as conditioned by this Order, the modifications to the Emmaton salinity compliance point as well as the other requirements will not injure any lawful user of water. As described in more detail in sections 5.4 and 5.5, as conditioned by this Order, the potential impacts of the changes on fish and wildlife are not unreasonable, and the impacts to public trust resources are in the public interest. In determining whether the impacts of a change on fish and wildlife would be unreasonable, and whether the impacts to public trust resources would be in the public interest, the impacts of the change must be weighed against the benefits of the change to all beneficial uses, including fish and wildlife. The changes approved in this Order will reduce freshwater flows into the Delta in order to provide a benefit to upstream storage. Conserving upstream storage is particularly important because water released from storage can provide cold water river flows for salmon and steelhead, improve water quality, and ensure minimum health and safety water supplies. In this case, the impacts to fish and wildlife and public trust resources in the Delta are not unreasonable, or contrary to the public interest, taking into consideration the need to conserve water upstream for use later in the year for multiple beneficial uses. For the foregoing reasons, and as explained in Section 5.6, the changes will be in the public interest.

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2.0 BACKGROUND

2.1 Bay-Delta Plan and D-1641

The Bay-Delta Plan establishes water quality objectives for the reasonable protection of beneficial uses of water in the watershed, including fish and wildlife, agricultural, and municipal and industrial uses. The water quality objectives included in the Bay-Delta Plan were developed through a rigorous and extensive public process to determine the flow-dependent water quality requirements that are needed to reasonably protect beneficial uses. During that process, the State Water Board considered and balanced the various beneficial uses of water under various hydrologic conditions.

The Bay-Delta Plan includes various flow dependent water quality objectives, including salinity, river flows, and Delta outflows, as well as operational constraints on the Projects. The Bay-Delta Plan objectives were adopted to protect fish and wildlife populations living in or migrating through the watershed and to prevent water in the Delta from becoming too salty to be diverted or exported from the Delta for municipal and agricultural uses. Water Year Type indexes are used in the Bay-Delta Plan to coarsely adjust to California's variable hydrology by indexing the numeric value and time period of each flow and water quality objective to water year type (wet, above normal, below normal, dry, and critical). Higher flows and lower salinity levels are required in wet years and less stringent requirements for flows and salinity apply during drier years. Some of the water quality objectives also include additional relaxations in extreme dry conditions, such as this year.

As the result of agreements that were reached regarding implementation of the 1995 Bay-Delta Plan, the State Water Board implements many of the flow and water quality objectives in the Bay-Delta Plan through amended conditions in the water right permits and license held by the Petitioners that require the Projects to operate to meet flow and salinity objectives and other requirements. Specifically, D-1641 places responsibility on the Petitioners to achieve the water quality objectives specified in Tables 1, 2, and 3 of the 1995/2006 Bay-Delta Plan as well as satisfying other requirements. The flow and water quality requirements established by the State Water Board in D-1641 are summarized in the tables and figures contained in Attachment 1 to this Order: Table 1 (Municipal and Industrial Beneficial Uses), Table 2 (Agricultural Beneficial Uses), and Table 3 (Fish and Wildlife Beneficial Uses). Included in Attachment 1 are footnotes to Table 3 that refer to definitions and other requirements contained in Figure 1 (Sacramento Valley Water Year Hydrologic Classification), Figure 2 (San Joaquin Valley Water Year Hydrologic Classification), Figure 3 (Formulas for NDOI and Percent Inflow Diverted), and Table 4 (Chippis Island and Port Chicago Maximum Daily Average EC).

Since adoption of D-1641, native and migratory fish populations have declined substantially. Several of these species of fish are listed as threatened or endangered under the California Endangered Species Act (CESA), the federal Endangered Species Act (ESA), or both, including Delta smelt, longfin smelt, green sturgeon, Central Valley steelhead, winter-run Chinook and spring-run Chinook salmon. Abundance of longfin and Delta smelt are at such low levels they are difficult to detect in the estuary, survival

of juvenile salmonids and returns of spawning adults are chronically low, and risks of extirpation for multiple fish species are high.

The State Water Board is currently in the process of revising the Bay-Delta Plan and implementing those revisions in order to provide for the reasonable protection of fish and wildlife, including evaluating the responsibilities for meeting Bay-Delta Plan objectives.³ Currently, the Petitioners hold primary responsibility for meeting Bay-Delta Plan flows and salinity requirements as part of D-1641. During times of limited supplies like this year, meeting those requirements can require significant contributions of previously stored water releases, both due to limited natural flows and due to other water users diverting water when it is not available under their water rights. These circumstances deplete reservoir storage, and in years like this year when reservoir storage is at critically low levels, create significant concerns for temperature management, health and safety water supplies, and salinity management in the Delta if dry conditions persist. The Petitioners have submitted the TUCP to reduce impacts to reservoir storage attributable to storage releases needed to meet outflow and salinity requirements this summer. The State Water Board is also taking efforts to notify water users when water is not available at their priority of right in order to help to conserve critical reservoir storage supplies. The State Water Board may also pursue emergency regulations in the future to address these issues.

2.1.1 Delta Outflow Requirements

The Delta outflow objectives are intended to protect estuarine and migratory aquatic species and their habitat. Delta outflows affect migration patterns of both resident and anadromous species and the availability of suitable habitat for those species. The populations of several estuarine-dependent species of fish and shrimp vary positively with flow, as do other measures of the health of the estuarine ecosystem. Freshwater flow also is an important factor in cuing upstream migration of adult salmonids through the Delta, and in the downstream migration and survival of juvenile salmonids. Freshwater inflows also have chemical and biological consequences through the effects of inflows on loading of nutrients and organic matter, pollutant concentrations, and residence time.

The Delta outflow objectives listed in Table 3 of D-1641 include year-round requirements that vary by month and water year type. With some flexibility provided through a limited set of compliance alternatives, the basic outflow objectives require calculated minimum net flow from the Delta to Suisun and San Francisco Bays (the Net Delta Outflow Index or NDOI). Pursuant to D-1641, the Delta outflow requirement for June is 4,000 cfs on a 14-day running average (Table 3 Footnote 10) and for July,

³ In 2018, the State Water Board amended the Bay-Delta Plan to revise flow objectives for fish and wildlife beneficial uses on the lower San Joaquin River and salinity objectives in the Southern Delta for agricultural beneficial uses. The Board has not yet implemented the 2018 Bay-Delta Plan through a water right or water quality action amending or otherwise conditioning the Projects' permits; therefore, D-1641 and the 1995 flow and water quality objectives remain in regulatory effect.

during critical water years, is 4,000 cfs on a monthly average. Table 3, Footnote 8 also specifies that when the May through January flow requirements are less than 5,000 cfs, the 7-day running average shall not be less than 1,000 cfs below the requirement.

2.1.2 Export Limits

The export limits objective listed in Table 3 of the Bay-Delta Plan and D-1641 includes requirements to limit the quantity of inflow that is diverted from the south Delta by the Projects' pumping facilities, in order to protect fish and wildlife uses. For the February through June time period (with the exception of April 15 to May 15 when exports are limited to 1,500 cfs) exports are limited to either 35 or 45 percent of Delta inflows and for the July through January time period exports are limited to 65 percent of Delta inflow on either a 3-day or 14-day running average, unless the Executive Director allows for a variation upon concurrence of United States Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), and the California Department of Fish and Wildlife (CDFW) (hereafter collectively referred to as the fisheries agencies).

2.1.3 Western Delta Agricultural Salinity Requirements

The western Delta salinity requirements are listed in Table 2 of the Bay-Delta Plan and D-1641 and include two compliance locations, including one on the Sacramento River at Emmaton for which a requested change was made. The salinity requirement is intended to provide protection of agricultural uses in the western Delta from salinity intrusion. For the April 1 to August 15 period in critically dry years the maximum 14-day running average of mean daily EC is 2.78 millimhos per centimeter (mmhos/cm).

2.2 Drought Conditions and Water Supply Effects

2.2.1 Hydrology

As described in the Introduction, California and the Central Valley are experiencing extremely dry conditions for the second consecutive year. Precipitation conditions in the Sacramento Valley are an indicator of water supply for the Projects because most of the Project reservoirs that capture northern California water supply are in the Sacramento Valley, including Shasta, Oroville, and Folsom Reservoirs. One major reservoir, New Melones, is in the San Joaquin Valley. As of May 18, 2021, the Northern Sierra 8-Station Precipitation Index was at 23 inches, 47 percent of average and the third lowest on record since water year 1921, the first year of precipitation records available on California Data Exchange Center (CDEC).⁴ Water years 2020 and 2021 are the second driest two-year period on record, drier than 2014 and 2015 and behind 1976 and 1977. Precipitation conditions degraded in 2021 after poor conditions in 2020, unlike 2015 which recorded a small improvement in precipitation after 2014. Figure 1 shows the level of precipitation for the Northern Sierra as of May 19, 2021.

⁴ California Data Exchange Center (CDEC) precipitation records.
<https://cdec.water.ca.gov/reportapp/javareports?name=8STATIONHIST>;
<https://cdec.water.ca.gov/precipapp/get8SIPrecipIndex.action>

Figure 1. Northern Sierra Precipitation: 8-Station Index as of May 19, 2021. Source: https://cdec.water.ca.gov/reportapp/javareports?name=PLOT_ESI.pdf, accessed May 19, 2021

Precipitation conditions are also extremely low in the San Joaquin Valley. As of May 19, 2021, the San Joaquin 5-Station Precipitation Index is at 18.2 inches, 48 percent of average for this time of year. Water year 2021 in the San Joaquin Valley is the third driest on record but very similar to water year 2015. Water years 1924 and 1977 are the driest and second driest at just below and just above 15 inches of precipitation, respectively. Water year 2015 is the fourth driest at 19 inches of precipitation.

Of greater concern is the lack of snowmelt runoff in the watersheds feeding into the major Sacramento Valley reservoirs. The amount of Northern Sierra snowpack in late March peaked at 70 percent of historic average, indicating that sufficient reservoir inflow was expected to be available to meet the Projects' obligations to meet water quality and flow requirements and senior contract demands while providing for temperature management. However, expected water supply conditions significantly changed during the month of April 2021 when very little precipitation occurred, and the snowpack did not produce the expected runoff. A conservative forecast of expected Sacramento River

inflow to reservoirs (90% exceedance) was 685 TAF higher in April than May.⁵ Low runoff efficiency may be due to depletions such as snowmelt directly absorbing into soils with dry antecedent conditions from water year 2020, or because of sublimation directly into the dry atmosphere. As of May 19, 2021, snowpack in the Northern Sierra region was 5 percent of historic average, while the Central Sierra and Southern Sierra regions were 2 percent. Figure 2 shows California Snow Water Content as of May 19, 2021. The significant loss of expected inflow to Sacramento Valley reservoirs and associated reductions in Project supplies has resulted in the need to rapidly reevaluate and modify Project allocations for different purposes, including water deliveries and water supplies to meet water quality and flow objectives.

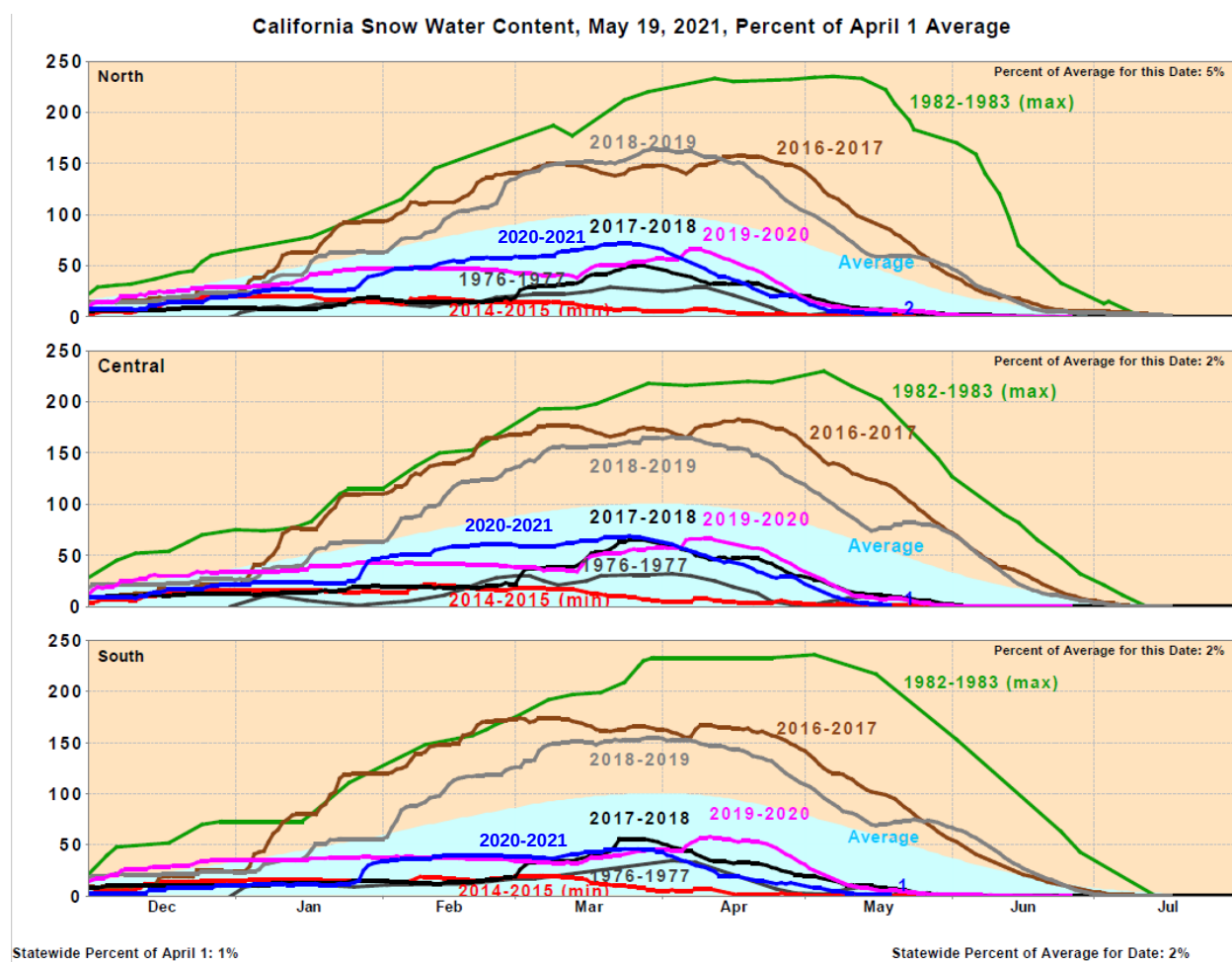


Figure 2. Daily Regional Snowpack Plots from Snow Sensors in California

Source: https://cdec.water.ca.gov/reportapp/javareports?name=PLOT_SWC.pdf, accessed May 19, 2021.

⁵ California Data Exchange Center (CDEC) forecast records.
<https://cdec.water.ca.gov/cgi-progs/products/210401SRWSI.pdf>;
<https://cdec.water.ca.gov/cgi-progs/products/SRWSI.pdf>

2.2.2 Reservoir Storage Levels

Water storage levels in many Project reservoirs are significantly lower than historic average conditions. Typically, snowmelt throughout the spring and summer provides inflows to streams and reservoirs for use during the dry summer and fall months. As discussed above, extremely low precipitation, lower than average snowpack volume, and lack of snowmelt runoff in the Northern Sierra has resulted in very low inflows to the reservoirs with a significant reduction in expected runoff of 685 TAF occurring from April to May. Figure 3 shows the storage levels of major reservoirs in California as of May 16, 2021. The storage levels of most reservoirs in the Central Valley are significantly below historical average, with storage conditions in Shasta, Oroville, and Folsom lower than they were at this time in 2014 and 2015. Folsom Reservoir, which provides municipal water supply for cities in the Sacramento area, is particularly low at approximately 363,000 acre-feet (May 28, 2021), less than 50 percent of historical average, 40 percent of total capacity, and close to 200,000 thousand acre-feet lower volume than end of April 2014 (547,000) and end of April 2015 (576,000 acre-feet). Reservoir storage in Shasta, Oroville, and Folsom Reservoirs is also particularly important for providing cold water to protect fish habitat for threatened and endangered and commercially, recreationally, and culturally important salmon runs.

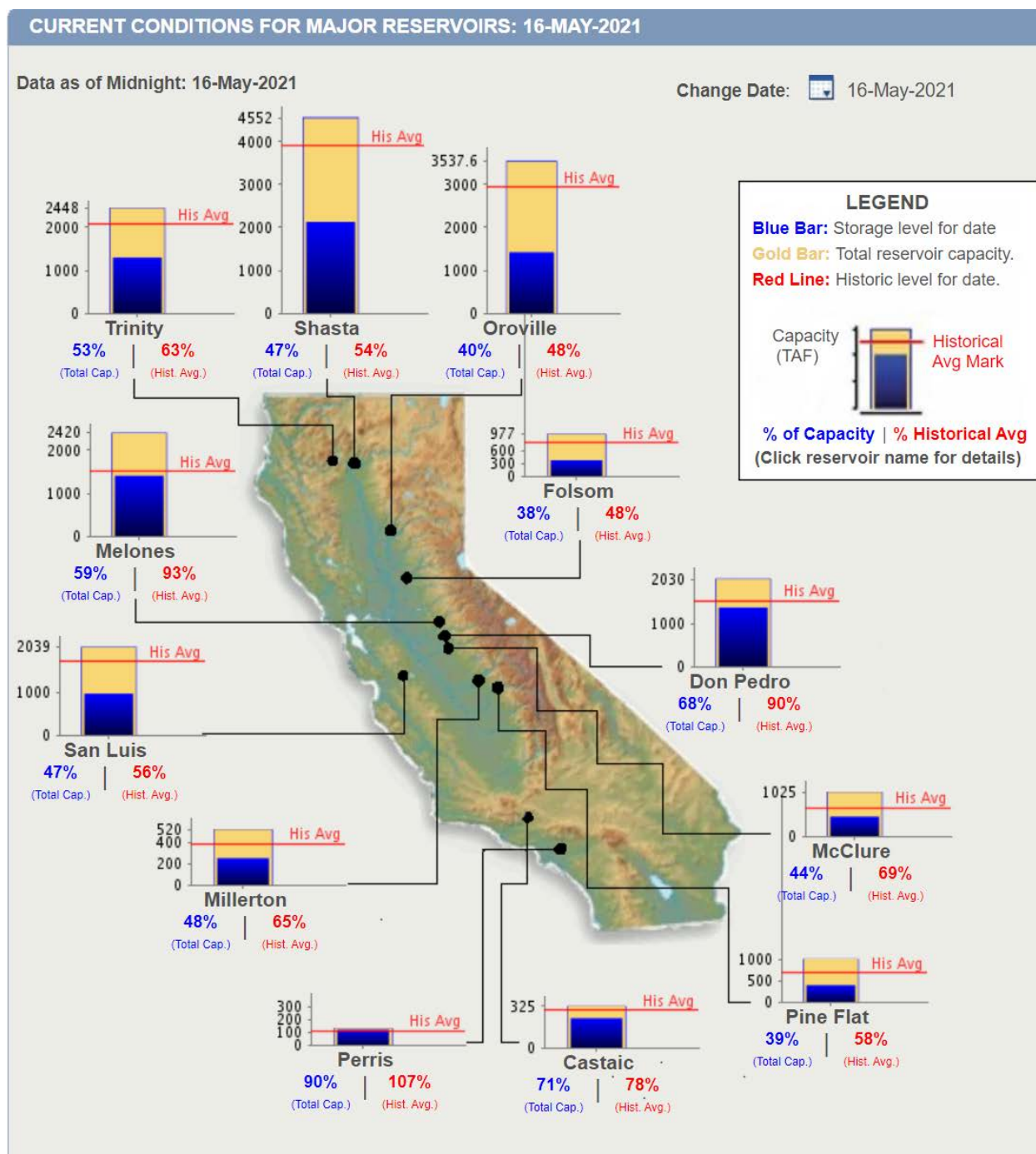


Figure 3. Major Reservoir Conditions in California as of May 16, 2021

Source: <https://cdec.water.ca.gov/reportapp/javareports?name=rescond.pdf>, accessed May 16, 2021

Storage levels in Shasta Reservoir affect Reclamation's ability to control temperatures in the Sacramento River. Pursuant to State Water Board Order 90-5, Reclamation is required to provide for temperature management on the Sacramento River for the protection of fish species, including endangered winter-run Chinook salmon. Order 90-5

requires Reclamation to submit a plan for maintaining temperatures on the Sacramento River. Reclamation submitted a Draft Sacramento River TMP⁶ on May 5, 2021, reflecting the April hydrologic conditions. Even under those conditions, reservoir storage conditions in Shasta Reservoir were projected to be very low, presenting significant concerns for temperature management. With the significant reductions in inflows identified later in May, these concerns intensified for Shasta Reservoir, as well as Folsom and Oroville, and the Petitioners worked to identify actions to address the shortages in expected reservoir inflow. Amongst the actions that the Petitioners identified to address the shortfall were the reductions in required outflows and salinity levels that are part of the TUCP that is the subject of this Order. The final TMP submitted by Reclamation on May 27, 2021, reflects the actions proposed to be taken to address the shortfalls in supplies and make modest improvements to storage conditions, including projected savings from the subject TUCP.

2.2.3 Water Supply Allocations

Project water allocations are determined based on the specific provisions of each contract. More junior contracts, including SWP Table A and CVP service contracts, can be subject to significant reductions under their contracts down to zero in years such as this year. SWP long-term Table A agricultural and Municipal and Industrial (M&I) contractors are generally allocated the same percentages since most SWP Table A contractors have significant reservoir storage of their own that can be relied upon in drier years. CVP agricultural and M&I contractors can receive different allocations since CVP M&I service contractors may not have their own reservoir storage facilities that can be relied upon. More senior Project settlement type contractors that also have their own water rights and water right claims have specific shortage provisions that generally result in much higher allocations to those users in drier conditions than junior contractors.

In December 2020, DWR announced a 10 percent allocation to the 29 long-term SWP Table A contractors.⁷ As dry conditions continued for a second consecutive year, DWR announced, on March 23, 2021, a reduction to its initial SWP allocation from 10 percent to 5 percent of the long-term SWP contractors' requested supplies for Water Year 2021. According to DWR, of this amount, only a relatively small amount of supplies for North and South Bay M&I users is not already in storage in San Luis Reservoir.

DWR also operates Lake Oroville to deliver water to Feather River Contractors pursuant to settlement agreements, post-1914 appropriated water rights, and riparian and pre-1914 water right claims. The December announcement did not identify an initial SWP delivery to Feather River contractors, however DWR announced it will reduce

⁶ State Water Board, Sacramento River Temperature and Order 90-5 Compliance. https://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/sacramento_river/docs/2021/20210504_Letter_to_SWRCB_from_White,_Kristin_RE_DRAFT_Sacramento_River_Temperature_Management_PlanSigned.pdf.

⁷ Department of Water Resources news releases. <https://water.ca.gov/News/News-Releases/2020/Dec-20/DWR-Releases-Initial-State-Water-Project-Allocation>.

allocations to Feather River contractors to the lowest amount allowed in the contracts, which is approximately 50 percent of the maximum contract amount minus a volume that is not subject to reduction.⁸ Total volume of expected deliveries to long-term SWP contractors in 2021 is 210,266 acre-feet.⁹ Total volume of SWP deliveries to Feather River contractors is expected to be approximately 586,000 acre-feet.

On February 23, 2021, Reclamation announced the initial 2021 water supply allocation for CVP contractors.¹⁰ Agricultural water service contractors north-of-Delta and south-of-the Delta were allocated 5 percent of their contract supply. M&I water service contractors north-of-Delta (including American River and In-Delta Contractors) and south-of-the Delta and were allocated 55 percent of their historic use or public health and safety needs, whichever is greater. Sacramento River Settlement Contractors and San Joaquin River Exchange Contractors were allocated 75 percent of their contract supply, per contract terms that limit shortages in dry years. Eastside water service contractors (Central San Joaquin Water Conservation District and Stockton East Water District) were allocated 100 percent of their contract total. Wildlife refuges (Level 2) north- and south-of-Delta were allocated 75 percent of their contract supply. Friant Class 1 allocations were identified at 20 percent and Class 2 at 0 percent.

On May 5, 2021, Reclamation reduced allocations to the agricultural water service contractors both north- and south-of-Delta to 0 percent of their contract supply. On May 26, 2021, Reclamation reduced north-of-Delta and south-of-Delta M&I water service contractors to 25 percent of historic use or health and safety levels. As of May 2021, total CVP allocations are 3.7 million acre-feet including: 328,885 acre-feet to North-of-Delta M&I, In-Delta M&I, and north-of-Delta wildlife refuges; 237,784 acre-feet to south-of-Delta M&I and wildlife refuges; 1,586,785 acre-feet to Sacramento River settlement contractors (however, these contractors have identified that they plan to divert 10 percent less than their contract amount – 65 percent vs. the 75 percent provided under the contract); 656,717 acres-feet to San Joaquin River exchange contractors; 155,000 acre-feet to New Melones East Side; 600,000 acre-feet to East-Side Water Rights, and 208,000 acre-feet to Friant.¹¹

⁸ May 18, 2021 State Water Board Meeting, Project Operations Update, Drought Response, discussion beginning at approximately 5:23:30. (Available at: <https://youtu.be/aIEfAhmRXWo>)

⁹ Department of Water Resources Notice to State Water Project Contractors. https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/State-Water-Project/Management/SWP-Water-Contractors/Files/NTC_21-06_032321.pdf, accessed May 18, 2021

¹⁰ U.S. Bureau of Reclamation news releases. <https://www.usbr.gov/newsroom/newsroomold/newsrelease/detail.cfm?RecordID=73745>

¹¹ Reclamation (2021) Summary of Water Supply Allocations https://www.usbr.gov/mp/cvo/vungvari/water_allocations_historical.pdf

2.3 Drought Contingency Plan for CDFW ITP

DWR, in coordination with Reclamation, is required to develop and implement a Drought Contingency Plan (DCP) when a dry or critical water year is followed by dry conditions the next year, pursuant to the 2020 CDFW and Wildlife Incidental Take Permit for Operation of the SWP (CDFW ITP) Condition 8.21.¹² Water year 2020 was an exceptionally dry year, and dry conditions continued through the month of January 2021. DWR submitted the initial DCP to CDFW in February, with subsequent updates in March, April, and May. The DCP will continue to be updated for the remainder of the water year. The purpose of the DCP is to outline the areas of potential concern given the observed dry hydrology in 2021.

The February 2021 DCP did not propose any specific drought actions for the water year, citing anticipated winter storms.¹³ The March 2021 DCP update on the hydrological conditions identified continued dry conditions for the water year and identified drought actions that the Petitioners were considering and evaluating to improve temperature management and reservoir carryover storage.¹⁴ As hydrological conditions continued to worsen in April, the April 2021 DCP update identified drought actions that the Petitioners had implemented, including, but not limited to, noticing reduced allocations to contractors and warm water power bypasses at reservoirs. DWR also included an Interagency Ecological Program Drought Ecosystem Monitoring and Synthesis Plan to evaluate the environmental impacts of drought and drought actions. The May 2021 DCP update outlines additional actions the Petitioners are taking to address the shortfalls in supplies, including this TUCP.

2.4 Substance of the Temporary, Urgency Change Petition

The Petitioners request the following temporary changes to requirements that were imposed pursuant to D-1641 for the period June 1 through August 15:

- For June 1 – June 30, reduce the required minimum 14-day running average Delta outflow from 4,000 cfs to 3,000 cfs.
- For July 1 – July 31, reduce the required minimum monthly average Delta outflow from 4,000 cfs to 3,000 cfs, with a seven-day running average of no less than 2,000 cfs;
- For June 1 through July 31, limit the combined maximum export rate to no greater than 1,500 cfs when Delta outflow is below 4,000 cfs, and allow the 1,500

¹² Available from the Department of Water Resources website at <https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/State-Water-Project/Files/ITP-for-Long-Term-SWP-Operations.pdf>.

¹³ Available from the Department of Water Resources website at <https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/State-Water-Project/Files/ITP/Final-SWP-and-CVP-DCP-212021ay11.pdf>.

¹⁴ Available from the Department of Water Resources website at <https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/State-Water-Project/Files/ITP/CVP-and-SWP-Drought-PlanFinal32221ay11.pdf>.

cfs limit to be exceeded when the Petitioners are meeting Delta outflow requirements pursuant to D-1641 or for moving transfer water; and

- From June 1 through August 15, move the compliance point for the Western Delta agricultural salinity requirement from Emmaton on the Sacramento River to Threemile Slough on the Sacramento River.

2.5 Status of Fish Species and Biological Reviews

Extremely dry hydrologic conditions in 2020 and 2021, in combination with frequent droughts, long term flow and habitat degradation, and other chronic stressors have contributed to persistently low abundance of native and migratory fish populations. The TUCP changes are also expected to have some effects on fish and wildlife; however potential negative effects to fish populations resulting from TUCP changes may be minimized by the fact that most of the changes would occur after many native fish species have migrated out of the Delta to the Bay and ocean. Native fish that remain in the Delta during the effective period of this TUCP from June through August 15 are likely to experience negative effects associated with reductions in Delta outflow. TUCP actions are also expected to result in some benefits for fish species on tributaries by conserving reservoir storage and cold water resources for use later in the year, maintaining salinity control in the Delta, and minimizing negative effects associated with entrainment and salvage by limiting export pumping.

As an attachment to the TUCP, the Petitioners submitted a Biological Review evaluating the effects of the changes on fish species listed as threatened or endangered under the ESA and CESA).¹⁵ Listed species can be indicators of conditions for aquatic species in general in the Delta watershed. Some additional information about other native species was provided in the Biological Review. As required by Water Code section 1437, the State Water Board consulted with CDFW regarding potential effects to fish and wildlife resources that may result from the TUCP actions. The CDFW consultation focused on species listed as endangered or threatened under CESA and known to occur in portions of the San Francisco Bay and Delta.¹⁶ USFWS and NMFS also submitted a joint letter to Reclamation indicating that as a result of the dry hydrology and reduction in forecasted runoff, the TUCP action is necessary to conserve water in upstream reservoirs to reduce temperature impacts to winter-run and spring-run Chinook salmon and to maintain some system flexibility for managing fish protections should next year also be dry. The letter also indicates that the TUCP is consistent with the Drought and Dry Year Action planning process in Reclamation's Proposed Action included in their

¹⁵ State Water Board, State Water Project and Central Valley Project Temporary Urgency Change Petition.
https://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/tucp/docs/2021/20210517_dwr_usbr_tucp.pdf.

¹⁶ CDFW May 24, 2021 Letter to State Water Board regarding 2021 Temporary Urgency Change Petition Regarding Delta Water Quality; available at
https://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/tucp/docs/2021/20210524_tucp_letter.pdf

2019 Biological Assessment and confirmed in the Biological Opinions issued by USFWS and NMFS on October 21, 2019.

Native aquatic species have not fully recovered from the recent severe droughts and the population effects of chronic stressors. Native fish populations of particular concern include Delta smelt; longfin smelt; winter-run, spring-run, and fall-run Chinook salmon; Central Valley steelhead; and green sturgeon, as well as other native aquatic species. For example, catch of Delta smelt, one of the most impacted fish populations, has dropped precipitously from 418 fish in water year 2013 to 8 fish in water year 2021 to date.¹⁷ Similar trends are observed in longfin smelt. In 2014 and 2015, only 5 percent of in-river winter-run Chinook salmon juveniles emigrated past Red Bluff, with similar survival estimated for fall-run Chinook salmon juveniles and current population estimates remain well below pre-2014 estimates for fall-run Chinook salmon.

Following is a summary of the potential effects of the TUCP changes, including information from the Biological Review that accompanied the TUCP and the CDFW consultation (May 24, 2021). The potential impacts of the TUCP are considered in the context of the existing fish population status and the stressors that cumulatively prevent recovery in non-drought years.

2.5.1 Delta Smelt

Delta smelt are listed as threatened under both the ESA and CESA, relative abundance has been persistently low since prior to the last drought, and the population is at high risk of extinction. Delta smelt have a strong positive relationship with a specific location in the low salinity zone (LSZ), referred to as X2, where the average daily salinity at the bottom of the water column measures 2 practical salinity units (psu). By local convention, X2 is described in terms of distance in kilometers from the 2 psu isohaline to the Golden Gate Bridge. Ecologically, X2 serves as an indicator of habitat suitability for many San Francisco Estuary organisms and is associated with variance in abundance of diverse components of the ecosystem.¹⁸ The LSZ expands and moves downstream when river flows into the estuary are high. Similarly, it contracts and moves upstream when river flows are low. At all times of year, the location of X2 influences both the area and quality of habitat available for Delta smelt to successfully complete their life cycle. In general, Delta smelt habitat quality and surface area are greater when X2 is located in Suisun Bay. Both habitat quality and quantity diminish the more frequently and further the LSZ moves upstream, toward the confluence of the

¹⁷ USFWS, Lodi Fish and Wildlife Office, Delta Juvenile Fish Monitoring Program.
https://www.fws.gov/lofi/juvenile_fish_monitoring_program/.

¹⁸ Jassby, A. D., W. J. Kimmerer, S. G. Monismith, C. Armor, J. E. Cloern, T. M. Powell, J. R. Schubel, and T. J. Vendliniski. 1995. Isohaline position as a habitat indicator for estuarine populations. *Ecological Applications* 5:272–289.

Sacramento and San Joaquin rivers,¹⁹ thus further constraining the habitat for juvenile Delta smelt closer to the upstream spawning areas in the lower Sacramento River, San Joaquin River, and the Cache Slough Complex/Sacramento Deep Water Ship Channel (SDWSC). The proposed TUCP is expected to shift X2 upstream by up to an additional 2 km further than would have occurred without a change in Delta outflow in June and July.

Delta smelt distributions are correlated with water temperatures in addition to the LSZ. Delta smelt are sensitive to temperatures approaching 25° Celsius (C) and above.²⁰ Historic water temperature data (1975-2012) show that Suisun Bay and San Pablo Bay maintain cooler temperatures (average 19-21°C) than the western Delta (average 21-23°C). Delta smelt tend to occupy habitat close to their thermal maximum and may not be able to transition to and occupy the cooler, higher salinity habitat in Suisun Bay and San Pablo Bay.²¹ In general, the lower the Delta outflow, the more eastward position for the LSZ, and the higher exposure to warmer water temperatures. Turbidity is also an important driver for Delta smelt summer distribution.²² Turbidity is hypothesized to increase survival of Delta smelt and reduce predation risk. Studies have shown that turbidity is higher in Suisun Bay and Marsh relative to upstream locations because dynamic variables, such as wind, interact with static variables, such as bathymetric complexity and increased erodible sediment, found in the Suisun Region. A more eastward position of the LSZ will expose Delta smelt to less turbid waters and increase vulnerability to predation.

The majority of the Delta smelt population is expected to be centered around the low salinity zone, near X2, between June and August. Due to limited ability to detect Delta smelt in monitoring surveys, habitat and historical data are used to estimate the location of Delta smelt in the estuary for this summer. Delta smelt spawning is likely to have peaked in March or April based on historic timing. As water temperatures rise, larvae will start to recruit to juvenile size and may begin to disperse further throughout the

¹⁹ Feyrer, F. M. L. Nobriga, and T. R. Sommer. 2007. Multi-decadal trends for three declining fish species: habitat patterns and mechanisms in the San Francisco Estuary, California, USA. *Canadian Journal of Fisheries and Aquatic Sciences* 64:723–734.

²⁰ Swanson, C., T. Reid, P. S. Young, and J. J. Cech Jr. 2000. Comparative environmental tolerances of threatened delta smelt (*Hypomesus transpacificus*) and introduced wakasagi (*H. nipponensis*) in an altered California estuary. *Oecologia* 123:384–390.

²¹ CDFW May 24, 2021 Letter to State Water Board regarding 2021 Temporary Urgency Change Petition Regarding Delta Water Quality; available at https://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/tucp/docs/2021/20210524_tucp_letter.pdf

²² Interagency Ecological Program, Management, Analysis and Synthesis Team (IEP MAST). 2015. An updated conceptual model of Delta smelt biology: our evolving understanding of estuarine fish. Technical Report 90, January 2015, prepared for the San Francisco Bay/Delta Estuary.

system. Juvenile surveys report presence in the SDWSC and the lower Sacramento River regions.²³ A smaller portion of the population is expected to be located in the freshwater North Delta, the Cache Slough Complex, and the SDWSC between June and August. These locations may serve as cold water refugia during high summer temperatures provided that lethal temperature thresholds are not reached.

The magnitude of potential impacts of the TUCP on Delta smelt are uncertain; however, they are considered in the context of the current population status of Delta smelt. The fall midwater trawl abundance index was zero in 2020 for the third year in a row, suggesting a very low adult stock available to produce the next generation of Delta smelt. The reduction in Delta outflow proposed in the TUCP may shift the LSZ and X2 up to 2km eastward and may expose a significant portion of the juvenile Delta smelt to warmer water temperatures, reduced bathymetric complexity, and decreased turbidity. A smaller portion of the population may be able to reside in thermal refugia in North Delta freshwater habitats or more saline habitat in Suisun Bay to reduce these effects, but it is not clear how long that cool water refugia will be available this summer. The effects of reduced Delta outflow are expected to negatively impact survival of juvenile Delta smelt June through August. Delta smelt are not expected to be distributed in the central and south Delta and salvage effects associated with the TUCP are not expected. Reductions in Delta outflow combined with export restrictions are expected to preserve upstream storage and cold water resources which will be important for ecosystem protection later in the year, particularly salinity control in the Delta, and in the event that 2022 is another dry year.

2.5.2 Longfin Smelt

Longfin smelt, which is listed as threatened under CESA and is a candidate for listing as threatened or endangered under ESA, experienced its fourth lowest Fall Midwater Trawl survey index in 2020.²⁴ Similar low indices are expected this fall. Based upon the most recent 20mm survey data,²⁵ juvenile longfin smelt appear to be distributed in Suisun Marsh, west of the Delta near the confluence, Montezuma Slough, the lower Sacramento River, the lower San Joaquin River, and the SDWSC. Longfin smelt tend to migrate seaward with most having dispersed into marine environments during summer. Some individuals will rear in San Pablo Bay and Suisun Bay through fall.

The TUCP changes in June and July are expected to shift the LSZ upstream by up to 2 km and may further reduce food availability for longfin smelt rearing in Suisun Bay. The abundance of an important prey species, *P. forbesi*, in the LSZ is subsidized by

²³ The fourth 20mm Survey sampled 1 larval Delta smelt on May 6, 2021, in the SDWSC. The EDSM surveys have sampled a total of 8 Delta smelt, 7 in the SDWSC (1 on 4/12, 1 on 4/13, 2 on 4/27 and 3 on 5/4) and 1 in the Lower Sacramento River on 5/6.

²⁴ California Department of Fish and Wildlife, Fall Midwater Trawl. <https://wildlife.ca.gov/Conservation/Delta/Fall-Midwater-Trawl>.

²⁵ California Department of Fish and Wildlife, 20mm survey. <https://www.dfg.ca.gov/delta/projects.asp?ProjectID=20mm>.

freshwater inflows from marsh areas into the Delta. This subsidy is important to offset the loss of local zooplankton production caused by feeding from the overbite clam. As inflows are reduced, this subsidized food source and food availability for longfin smelt is expected to decrease to some degree.

Given the limited distribution of larvae and juveniles in the central and south Delta and the relatively low levels of planned exports, the Biological Review finds that the proposed changes are not expected to substantially raise the entrainment risk of the longfin smelt population. While larvae in southern areas will be at risk of entrainment during operations due to their proximity to the export facilities, the minimum export levels should result in a low level of risk. In addition, only a small portion of the population is thought to be in the south Delta (less than 1.0 percent of the total larval catch). However, potential exists for longfin smelt to migrate into the south Delta toward the end of the period of these changes.

The Biological Review indicates that the proposed changes are not expected to result in a substantial degradation of rearing habitat for longfin smelt over conditions that would be experienced in a dry year. The Biological Review finds that reduction in outflow due to the proposed changes may have some negative impact on longfin smelt spawning and recruitment, though this effect is hard to quantify given the already poor environmental conditions due to the drought.

The potential impacts to longfin smelt abundance resulting from the TUCP are uncertain; however, they should be considered in the context of the longfin smelt population leading into the present drought cycle. Longfin smelt abundance has not recovered from the effects of prior droughts and chronic stressors that prevent population recovery. The TUCP changes in June may result in negative effects to longfin smelt abundance based on the observed relationship between January through June outflow and abundance. Reductions in outflow will shift low salinity habitat upstream which will reduce the quality and quantity of habitat and limit access to food subsidies from marsh areas. The reduction in Delta outflow on longfin smelt may have a negative effect, of uncertain magnitude, to a vulnerable population that is at high risk of extinction. However, the potential negative effects of reducing outflow occur in only one month during the period from January through June, which is the time period of strongest relationship between outflow and longfin smelt abundance. Exports are also limited by the TUCP, which will minimize entrainment risk of longfin smelt. Reductions in Delta outflow combined with export restrictions are expected to preserve upstream storage, which will be important for ecosystem protection, including salinity control in the Delta later in the year and in the event that 2022 is another dry year.

2.5.3 Estuarine Habitat and Species

The Biological Review focused on species listed under ESA and CESA, but the proposed action is also likely to have adverse effects on other beneficial uses protected under D-1641. In particular, the Delta outflow objectives in Tables 3 and 4 of D-1641 are designed to protect the estuarine ecosystem in order to provide habitat for several species of pelagic fish and crustaceans whose populations show strong positive relationships to Delta outflow. Many of these species have undergone population

declines over the history of water development in the Delta. As discussed above for Delta smelt, decreasing Delta outflow constrains habitat by moving X2 and the LSZ inland from the shallow, more favorable habitats of Suisun Bay to the deeper, channelized, and less hospitable habitats of the lower Sacramento and San Joaquin Rivers and their confluence. This reduction in habitat quantity and quality will also likely result in lower survival and recruitment of several other estuarine dependent species than would have occurred without a reduction in outflow. Similar to the longfin smelt review, reductions in Delta outflow combined with export restrictions are expected to preserve upstream storage, which will be important for ecosystem protection, including salinity control in the Delta later in the year and in the event that 2022 is another dry year.

2.5.4 Winter-Run Chinook Salmon

Winter-run Chinook salmon was listed as endangered under CESA in 1989 and listed as endangered under the ESA in 1994. The federal listing includes both natural and artificially propagated stocks. Juvenile survival and adult escapement continued to decline after ESA listing. Adult escapement has been persistently low since 2006.²⁶

The endangered winter-run Chinook salmon is of particular concern during drought years. Prior to the summer spawning period for winter-run Chinook salmon, adults migrate through the Delta and hold in the upper Sacramento River below Keswick Dam until they are ready to initiate spawning, with the majority of spawning typically occurring between June and July upstream of Clear Creek. Conditions in the Delta would likely be suboptimal (20–21°C) and in the range of potential mortality (>21–24°C) during the month of June, presenting a potential fish passage barrier to late migrating winter-run Chinook salmon adults. After spawning, the fertilized eggs require cold water to ensure their proper development (temperatures above 53.5° Fahrenheit being less than optimal). It is important to provide appropriate temperature conditions during the egg development period, typically late May through early fall, because immobile eggs are not able to relocate and seek thermal refugia as fry and parr are able to do.

Juvenile winter-run Chinook salmon have experienced two consecutive years of poor outmigrant survival due to complications of thiamine deficiency and poor instream survival on the Sacramento River and through the Delta. Chinook salmon in the Central Valley typically express a three-year cohort cycle. Poor survival for a third consecutive year can have population level negative effects and push the population towards extirpation of naturally produced fish. High temperatures early in the season and an ultimate loss of temperature control several weeks before the end of the egg incubation life stage resulted in almost total mortality to the 2014 and 2015 winter-run brood year.

Temperature management will be difficult again this year. This is of particular concern given winter-run Chinook salmon's endangered status and extremely limited distribution,

²⁶ CDFW. 2020. Fisheries Branch Anadromous Assessment. California Central Valley Sacramento and San Joaquin River Systems Chinook Salmon Escapement: Hatcheries and Natural Areas. GrandTab. Compiled 5/22/2020 by Jason Azat.

which reduces this population's ability to withstand environmental perturbations, especially considering the rapid sequence of prolonged drought conditions. The proposed TUCP changes combined with commitments to Shasta reservoir storage in the 2021 TMP, pursuant to 90-5, should improve conditions for winter-run Chinook salmon this summer and early fall, by storing water in Shasta Reservoir that would have been used to meet Delta outflow. This additional cold water will be available for use during the spawning and egg incubation period. In addition, the water conserved in storage will help to improve carryover storage conditions next year in the event of extended dry conditions. In the event of wetter conditions, this Order requires the Petitioners to evaluate providing pulse flows above D-1641 requirements that could benefit salmon runs on the Sacramento River and improve Delta conditions for various fish species.

2.5.5 Spring-Run Chinook Salmon

Central Valley spring-run Chinook salmon were listed as threatened under the ESA in 1999. The listing was reaffirmed in 2005 and expanded to include the Feather River hatchery stock. Spring-run Chinook salmon were listed as threatened in 1999 under CESA. Escapement of Central Valley spring-run Chinook salmon has remained persistently low since 2012.²⁷

Spring-run Chinook salmon adults returning to the upper Sacramento River system in 2014 and 2015 also experienced significant impacts due to drought conditions. Concerns for spring-run this year are similar to those for winter-run. While spring-run have greater distribution, conditions on those streams are also expected to be poor due to the drought. On May 18, 2021, the interagency Salmon Monitoring Team estimated that 55-70 percent of the brood year 2020 young-of-year spring-run Chinook salmon have exited the Delta. By June 1, it is expected that most juveniles will have migrated west of the Delta, minimizing the negative impact of reducing Delta outflow. Young-of-year spring-run Chinook salmon remaining in the Delta in June and adult spring-run Chinook salmon in the Delta from June through July may experience negative impacts associated with reduced Delta outflow; however, the conservation of storage expected as a result of the changes in the TUCP is expected to benefit spring-run later this year by protecting cold water that can be used for temperature control this year and providing options for improving habitat conditions in 2022 as discussed above for winter-run Chinook salmon.

2.5.6 Fall-Run Chinook Salmon

Impacts to other anadromous species, including fall-run Chinook salmon, are also expected as a result of the drought. These impacts could result in significant impacts to the commercial and recreation fishing industry and concerns related to increased risks of extirpation and possibly extinction if poor conditions persist. Fall-run Chinook salmon are a primary prey base for Southern Resident Killer whales. Accordingly, reductions in

²⁷ *Ibid.*

fall-run Chinook salmon may also negatively impact food availability and survival of Southern Resident Killer whales.

Adult fall-run Chinook salmon typically migrate into natal rivers from September to December, with peak migration typically occurring in November. Spawning may occur as early as November when temperatures in the rivers are lower than 55 degrees Fahrenheit. Egg incubation also may occur in November but can vary depending on water temperatures and timing of spawning. Optimal water temperatures for egg incubation range from 41 to 53.5 degrees Fahrenheit. Eggs that incubate at temperatures higher than 60 degrees Fahrenheit and lower than 38 degrees Fahrenheit suffer high mortality rates. The proposed changes are expected to improve conditions for fall-run Chinook salmon to some degree by conserving water in Project reservoirs that may be needed for temperature control in the fall to protect adult fall-run Chinook salmon prior to and during spawning.

2.5.7 Steelhead

Steelhead have also likely been affected by long-term stressors and recent drought cycles, but given the difficulty in sampling for these fish it is not possible to determine exactly how the species has been affected. Adult steelhead abundance is not estimated in the mainstem of the Sacramento River or any waterways of the Central Valley. The drought conditions are causing increased stress to steelhead populations (with or without water project operations) from low flows causing reduced rearing and migratory habitat, increased water temperatures affecting survival, and likely higher than normal predation of juvenile steelhead. The changes proposed in the TUCP will conserve Project storage, which will mitigate these effects to some extent. Regardless of the changes, steelhead survival will likely be low in all tributaries and migratory pathways and is likely to result in a smaller returning year class of steelhead emigrating this year.

2.5.8 Green Sturgeon

Information on green sturgeon is extremely limited. Adult green sturgeon may be present in the Delta from March to September, with the principal occurrence in upstream spawning areas in the Sacramento River occurring from mid-April to mid-June. Juvenile green sturgeon are routinely collected at the Projects salvage facilities throughout the year. Salvage records indicate that sub-adult green sturgeon may be present in the Delta during any month of the year in low numbers but are most commonly salvaged in July and August. The proposed changes are expected to provide similar benefits for green sturgeon as described above for salmon and steelhead related to improved storage and cold water resources.

2.6 Emergency Drought Barrier

On May 14, 2021 DWR applied for water quality certification to install an emergency drought barrier at West False River to help preserve water quality in the Delta.²⁸ The

²⁸ State Water Board, Water Quality Certification Program Public Notices.
https://www.waterboards.ca.gov/waterrights/water_issues/programs/water_quality_cert/docs/emergency_drought_barriers/edb_2021_public_notice.pdf

temporary rock barrier will reduce the intrusion of high-salinity water into the central and south Delta, help protect water supplies used by people who live in the Delta and in Contra Costa, Alameda, and Santa Clara counties, and allow water managers to retain more water in upstream reservoirs for release later in the year. The State Water Board evaluated the temporary rock barrier's potential impacts to water quality and beneficial uses of water and issued a water quality certification on May 28, 2021. Although the emergency drought barrier certification action is a separate process from the changes approved by this Order, together both actions will affect water quality and flows in the Delta and are related to one another. The changes approved in this Order have taken into consideration the combined impacts of both actions.

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

Ordinarily, the State Water Board must comply with any applicable requirements of CEQA prior to issuance of a temporary urgency change order pursuant to Water Code section 1435. (See Cal. Code Regs., tit. 23, § 805.) Directive 11 of the Governor's May 10, 2021 Drought Proclamation and Executive Order waives CEQA and the regulations adopted to implement CEQA for the purposes of carrying out Directives 3, 4, 5, 6, 8 and 9. In addition, the Drought Proclamation suspends Water Code section 13247 as applied to actions taken pursuant to Directive 4. Absent suspension of section 13247, the State Water Board could not approve a change petition that modifies permits and licenses in a way that does not provide for full attainment of water quality objectives as required by the Bay-Delta Plan, even during a drought emergency.

4.0 PROCEDURAL REQUIREMENTS CONCERNING THE TEMPORARY URGENCY CHANGE PETITION

The State Water Board may issue a temporary urgency change order in advance of public notice. (Wat. Code, § 1438, subd. (a).) Public notice must be provided as soon as practicable, unless the change will be in effect less than 10 days. (*Id.*, § 1438, subds. (a), (b) & (c).) Any interested person may file an objection to a temporary urgency change. (*Id.*, subd. (d).) The State Water Board must promptly consider and may hold a hearing on any objection. (*Id.*, subd. (e).) State Water Board Resolution 2012-0029 delegated to the Board Members individually and to the Executive Director the authority to hold a hearing, if necessary, and act on a TUCP. (Resolution 2012-0029, ¶¶ 2.2, 4.4.1.)²⁹

The Petitioners filed the TUCP on May 17, 2021, and the State Water Board issued notice of the TUCP the following day, May 18, 2021.³⁰ The State Water Board also posted the request on its website and notified persons on its email distribution lists of the request. Due to the urgent nature of the request, the State Water Board is issuing the Order at this time and has incorporated changes to the Order in response to comments received to date. However, the State Water Board is accepting comments on

²⁹ The Deputy Director for Water Rights may act on a temporary urgency change petition if there are no objections to the petition.

or objections to the TUCP until noon on Friday, June 4, 2021, and will give prompt consideration to any such comments or objections, which may form the basis for future modifications of this Order.

5.0 REQUIRED FINDING OF FACT

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

1. The permittee or licensee has an urgent need to make the proposed change;
2. The proposed change may be made without injury to any other lawful user of water;
3. The proposed change may be made without unreasonable effect upon fish, wildlife, or other instream beneficial uses; and
4. The proposed change is in the public interest. (Wat. Code, § 1435, subd. (b)(1-4).)

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

5.1 Summary of the Ordering Conditions that Support the Required Findings of Fact

As summarized and described in the introduction, this Order conditionally approves changes to Delta outflows and Western Delta agricultural salinity requirements on the Sacramento River at Emmaton. This Order also includes other conditions intended to ensure that the changes can be made (1) without injury to other legal users of water; (2) without unreasonable effects on fish, wildlife, or other instream beneficial uses; (3) consistent with the public trust doctrine; and (4) in the public interest. Following is a summary of the changes to D-1641 requirements conditionally approved in this Order:

- Change the minimum NDOI requirement in June and July from 4,000 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;

- From June 1 through August 15, 2021, change the Western Delta agricultural salinity requirement compliance location on the Sacramento River at Emmaton to Threemile Slough on the Sacramento River.

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. The State Water Board Executive Director may also direct lower exports as appropriate. 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 are required to be limited to natural and abandoned flow. The Petitioners are required to consult on a regular basis with designated representatives of the State Water Board and the fisheries agencies to coordinate real-time operations based on current conditions and fisheries information to ensure that the proposed changes pursuant to this Order will meet health and safety requirements and not unreasonably affect fish, wildlife, and other instream uses of water.

This Order requires the Petitioners to calculate and maintain a record of the amount of water conserved through the changes authorized by this Order, as well as to describe where that water is being conserved and to provide those records to the State Water Board and fisheries agencies monthly.

This Order also requires the Petitioners to submit updated monthly operations outlooks to the State Water Board and fisheries agencies and to post the outlooks on DWR's website. Information that is required to be included in the outlooks include, but are not limited to, inflows to and storage levels of Projects' reservoirs; Delta hydrology; water delivery volumes; and south-of-Delta water transfer volumes, transferees and transferors.

This Order requires the Petitioners to evaluate the possibility for dedicating a portion of the volume of water conserved by the changes approved in this Order to provide pulse flows or other improvements above and beyond D-1641 requirements in the next water year, to the extent feasible based on hydrologic conditions.

This Order requires the Petitioners to conduct monitoring, analyses, and modeling necessary to inform real-time operational decisions, assess drought emergency actions authorized by this order, and understand the effects of changes authorized by this Order in combination with other associated actions such as Sacramento River temperature management pursuant to State Water Board Order 90-5 and the emergency drought salinity barrier at False River. In addition, this Order requires completion of a special study that evaluates the effects of changes authorized by this Order in combination with other associated drought actions on harmful algal blooms and invasive aquatic weeds.

This Order requires that Reclamation implement the Sacramento River TMP as approved by the Executive Director, consistent with State Water Board Order 90-5.

This Order requires the Petitioners to prepare a report summarizing the constraints that exist on minimum export pumping levels including, but not limited to, infrastructure and safety thresholds for pump operations, minimum deliveries for health and safety, and an evaluation of opportunities to reduce exports.

This Order requires the Petitioners, in consultation with State Water Board and fisheries agencies, to develop an operational strategy for water year 2022, in the event that dry or critically dry hydrologic conditions occur next year.

This Order continues to reserve the Executive Director's or the State Water Board's authority to require modifications to the Order based on public or agency comments or objections or changed circumstances.

5.2 Urgent Need for the Proposed Changes

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

As discussed in section 2.2, California is in its second year of drought in a very dry sequence of years over the last two decades. The majority of reservoir levels are at critically low storage levels and will likely recede quickly due to reservoir releases for salinity control and minimum deliveries and lack of additional inflow this year. These conditions create significant concerns for health and safety water supplies, salinity control in the Delta, environmental water supplies, and water supplies for other uses. If dry conditions persist into next water year, these concerns will intensify significantly. These conditions create an urgent need to conserve water supplies.

Relevant to the issue of urgency, as well as the findings regarding unreasonable impacts on fish and wildlife and the public interest, are the water supply benefits that are expected as a result of the changes. The changes approved in this Order are expected to result in 60 - 120 TAF of water supply and storage benefits (see table below). The changes will improve the Projects' ability to meet various obligations this summer and fall. Specifically, on the Sacramento River, adequate storage must be maintained into the fall and into next year to control temperatures on the Sacramento River for salmon protection, as well as to provide supplies for salinity control, minimal environmental protections, and water supplies. Minimum storage levels in Folsom Reservoir are needed to meet minimum health and safety needs for communities in the Sacramento area and to provide some level of environmental protection. Likewise, minimum storage levels in Oroville Reservoir are needed for critical hydropower production, environmental protection, and water supplies. The water conservation resulting from modifications to D-1641 flow and water quality objectives in this Order are expected to improve reservoir storage conditions for these purposes. There will be impacts to fish and wildlife from the reduced flows and other changes. However, these effects will be offset to some extent by increasing cold water pool resources throughout the year and supplies for fisheries and other purposes. The increased storage will be realized in a

combination of Shasta, Oroville, and Folsom reservoirs, where it will mitigate to some extent the low storage conditions caused by the drought, and where it can be used for various purposes later, including salinity control, fisheries purposes, and water supplies.

The changes approved in this Order could result in the following reductions in flows and increases in water supplies and storage:

Table 1. Reductions in Flows and Water Supply/Storage Savings Under the TUCP Order June Through August*

D-1641 Requirements	June	July	August 1-15
Delta Outflows (cfs)	4,000	4,000	3,000
Salinity Compliance Location	Emmaton	Emmaton	Emmaton
TUCP Requirements (cfs)	June	July	August
Delta Outflows	3,000	3,000	3,000
Salinity Compliance Location	Threemile Sl.	Threemile Sl.	Threemile Sl.
Maximum Savings (TAF)	June	July	August
Delta Outflows	59.4	61.4	0*
Expected Savings (TAF)	June	July	August
Delta Outflows*	50.5	30.7	0*
Total Expected Savings	50.5	30.7	0*

*Notes: Expected savings of Delta outflow are based on computed outflow reported in Appendix 3 of the TUCP. This includes June outflow of 3,150 cfs, July outflow of 3,500 cfs, and August outflow of 3,000 cfs. Appendix 3 does not identify water saving from changes to salinity requirements in August; however, it is not clear that this is actually the case.

Together, operations to meet unchanged Delta outflow and Emmaton salinity requirements could have a variety of effects depending how operations would be prioritized. It could significantly deplete storage or reduce deliveries, thus making those supplies unavailable for the remainder of the season for fisheries protection, control of Delta salinity, and water supplies. Reductions in supplies to water users upstream of the Delta would reduce the ability of those water users to provide critical water transfers during the drought, which would adversely affect south of Delta export users and potentially wildlife refuges. Reductions in surface water supplies would also place additional strain on already significantly depleted groundwater basins. As such, there is an urgent need for these changes.

In summary, in light of the severe magnitude of the drought, there is an urgent need for the proposed changes to address or help to minimize the significant impacts to water supplies that have occurred over the last two years, and to help address and avoid associated economic impacts, as well as impacts to fish, wildlife, and beneficial uses, especially given that foregone opportunities to conserve storage for later use cannot be regained.

5.3 No Injury to Any Other Lawful User of Water

The proposed changes will not injure any other lawful user of water. As used in Water Code section 1435, the term “injury” means invasion of a legally protected interest. (*State Water Resources Control Board Cases* (2006) 136 Cal.App.4th 674, 738-743.) Riparian and appropriative water right holders with rights to divert water below Project reservoirs only are entitled to divert natural and abandoned flows, and in the case of riparians only natural flows; they are not entitled to divert water previously stored or imported by the Projects that is released for use downstream, including stored water that is released for purposes of meeting water quality objectives. (See *id.* at pp. 738, 743, 771.) Similarly, water right holders only are entitled to the natural flows necessary to provide adequate water quality for their purposes of use; they are not entitled to have water released from upstream storage in order to provide better water quality than would exist under natural conditions, and they are not entitled to better water quality than necessary to allow them to use the water to which they are entitled. (See *Wright v. Best* (1942) 19 Cal.2d 368, 378-379; see also *Deetz v. Carter* (1965) 232 Cal.App.2d 851, 856.) Accordingly, legal users of water will not be injured to the extent that the Projects release less previously stored water as a result of the changes.

To the extent that the Projects divert natural or abandoned flows during the effective period of this Order, other lawful users will not be injured by the proposed changes because the Projects will continue to meet modified Delta outflow and Sacramento River salinity requirements, and adequate flows are expected to remain in the system to meet the demands of other lawful users of water. The Petitioners conducted salinity modeling for the changes that indicates that the change in the salinity compliance location from Emmaton to Threemile Slough may result in increases in salinity at various locations from Rio Vista on the lower Sacramento River to Chipps Island in the Delta from June 1 to August 15. However, the Projects are expected to continue to maintain significant releases of previously stored water to control salinity levels providing for improved conditions over conditions that would occur absent the Projects’ operations.

In addition, approval of the proposed changes does not affect the Petitioners’ obligation to curtail their diversions of natural and abandoned flows to the extent necessary to protect senior water right holders, or to meet any independent contractual obligations that the Petitioners may have. Further, this Order requires that the Petitioners bypass natural and abandoned flows when they are not meeting the Delta outflow or Sacramento River at Emmaton agricultural salinity requirement to prevent injury to other lawful users of water. Therefore, based on the information provided, and as conditioned herein, the proposed changes will not injure other users of water due to changes in water quality.

5.4 No Unreasonable effect upon Fish and Wildlife, or Other Instream Beneficial Uses

In determining whether the impacts of the proposed changes on fish and wildlife are reasonable, the short-term impacts to fish and wildlife must be weighed against the long-term impacts to all beneficial uses of water if the changes are not approved, including impacts to stored water needed for temperature control on the tributaries and salinity control in the Delta, health and safety water supplies, other fish and wildlife uses, and other water supply uses. Further, the effects that have occurred to the species over several years must be considered. Information previously submitted by the fisheries agencies in the 2014-2015 drought and Bay-Delta Plan updates maintains that insufficiencies in the quality and quantity of tributary and Delta flows have contributed to the decline of the Delta ecosystem including the abundance and distribution of species potentially impacted by the TUCP. Several processes to ameliorate the effects of these insufficiencies at the state, federal, and local levels include recent adoption of recovery plans, comprehensive review and update of the Bay-Delta Plan, drought contingency planning, as well as many other efforts.

As discussed above, historically low precipitation in 2021, low April snowpack, and higher than expected depletions will result in very low reservoir inflows the remainder of the year. The Projects are likely to release previously stored water to meet water quality and flow objectives which will deplete reservoir storage when it is already low in most reservoirs and lower than it was during the 2014-2015 drought in several reservoirs. These dry conditions are expected to adversely affect habitat conditions for various species and increase the difficulty of maintaining salinity control in the Delta.

While maintaining the D-1641 flow and water quality requirements would provide some short-term benefits to native and migratory fish species, the overriding effects of the drought and chronic stressors on these populations would persist. Further, releasing water from reservoirs to meet those requirements would reduce the storage available in Project reservoirs later in the year for cold water flows for fish; salinity control in the Delta; deliveries to agriculture, municipalities, wildlife refuges, and other users; and minimal water storage going into the next water year. As discussed above, of particular concern this year is ensuring that adequate water remains in storage in Shasta Reservoir to provide for temperature control on the Sacramento River throughout the temperature control season. Without these changes, it is more likely that Reclamation would not be able to maintain temperature control in accordance with a TMP while meeting water deliveries to settlement contractors, exchange contractors, municipal users, and wildlife refuges. Similarly, the TUCP changes are needed to support the ability to preserve stored water for supporting fishery resources dependent on other Project reservoirs, including Folsom and Oroville.

The potential negative impacts to fish and wildlife associated with the short-term reduction in Delta outflow are not unreasonable in the context of reduced Project allocations to contract minimums, and the need to conserve water in upstream reservoirs for use later in the year to support multiple beneficial uses, including fish and wildlife. In addition to temperature control, conserved stored water is also needed to

maintain salinity control in the Delta in order to protect water quality exported from the Delta and to support fish and wildlife in the approaching year, especially if drought conditions continue. Avoiding loss of salinity control is critically important for maintaining reasonable protection of agricultural, M&I, and fish and wildlife beneficial uses.

Increased water supplies available to users upstream of the Delta are also likely to benefit users south of the Delta who engage in transfers, which are expected to occur later this year. Transfer supplies are critically important sources of supply to south-of-Delta users during dry conditions when there are low to no contract allocations. These transfers help to ensure that permanent crops and other economically important agricultural uses are sustained. Transfers also reduce the reliance on groundwater to some extent. Groundwater supplies after multiple drought episodes in the last two decades are significantly depleted. Prolonged overdraft of groundwater basins may result in a permanent reduction in the capacity of those storage basins, subsidence, and associated significant infrastructure effects. All of these effects present significant concerns that must be balanced with protections for fish and wildlife.

The TUCP is part of a coordinated effort between petitioners, CDFW, NMFS, and USFWS to address drought conditions. On May 18, 2021, the Directors of DWR, Reclamation, and CDFW, the Regional Administrator for NMFS, and the Deputy Assistant Director of USFWS made a joint presentation during the State Water Board's public meeting, and emphasized that coordination among the State Water Board, DWR, Reclamation, CDFW, NMFS, and USFWS with respect to joint SWP/CVP operations in the face of current extreme dry conditions has been and will continue to be critical.³¹ As described by DWR's Director, the TUCP is part of a comprehensive action that helps implement a drought framework that is intended to meet five goals:

- Conserve storage in Shasta, Oroville, and Folsom to provide cold water for fisheries;
- Protect storage in Folsom to meet Sacramento Region needs until storage increases in fall/winter;
- Maintain water quality in the Delta for in-Delta uses and minimize project deliveries while facilitating transfers;
- Provide conditions to lessen drought impacts to fish and wildlife;
- Initiate contingency planning for water year 2022.

According to CDFW's Director, the five Directors of the relevant state and federal agencies on wildlife management and water supply have been working together to address the current crisis, including to develop end-of-September storage targets, and preserve cold water pool, both for the fishery and as a human health and safety water

³¹ May 18, 2021 State Water Board Meeting, Project Operations Update, Drought Response, discussion beginning at approximately 5:23:30. (Available at: <https://youtu.be/aIEfAhmRXWo>)

supply next year. Similarly, the Regional Administrator for NOAA, Western Region, emphasized that temperature management is critical, particularly for winter-run Chinook salmon, and that a critical objective for the agencies is to reduce temperature-dependent mortality as well as make improvement across the whole life history of the fish.

On May 24, 2021, CDFW issued an assessment of potential effects to fish and wildlife resources as a result of the TUCP. CDFW concluded that habitat conditions for Delta smelt in Cache Slough and the SDWSC are unlikely to be affected by the TUCP. In addition, the TUCP would likely maintain or potentially reduce entrainment risk to young of the year Delta smelt by restricting combined Project exports to no more than 1,500 cfs. No change in effects was anticipated as a result of export restrictions in July because historical data indicate that entrainment risk is minimal during this period. In addition, export restrictions have the benefit of preserving upstream storage. For longfin smelt, CDFW acknowledged summer distribution and survival had not been examined in detail. However, the changes by the TUCP in June could exacerbate the negative effects of a critically dry year on longfin smelt abundance in the fall. CDFW acknowledged that the degree to which outflow and salinity elements of the TUCP would affect winter-run and spring-run Chinook salmon as compared to baseline conditions during a critically dry year is uncertain. However, reducing reservoir releases will have the benefit of preserving storage throughout the remainder of the year and subsequent water year, which could benefit winter-run and spring-run Chinook salmon. In addition to the above letter, DFW is expected to issue an amendment to the ITP to cover the changes requested in the TUCP in the near future pursuant to a request from DWR.

On May 30, 2021, the USFWS and NMFS sent a letter to Reclamation, confirming that the USFWS and NMFS have reviewed the relevant portions of the Biological Review prepared by Reclamation and DWR in support of the TUCP. The letter memorializes that the USFWS and NMFS provided technical assistance in the preparation of the Biological Review, including providing comments that were incorporated into the document. Based on their targeted review, the letter states that the USFWS and NMFS have no significant concerns with the analyses contained in the Biological Review. In addition, the letter confirms that the TUCP as requested is consistent with the Drought and Dry Year Action planning process outlined in Reclamation's Proposed Action included in Reclamation's 2019 Biological Assessment and confirmed in the 2019 Biological Opinions issued by the USFWS and NMFS for the coordinated operation of the Projects. The USFWS and NMFS also expressed their understanding that the TUCP is necessary in light of the dry hydrology and reduction in forecasted runoff, and the need to conserve water in upstream reservoirs to reduce temperature impacts to winter-run and spring-run Chinook salmon, and to maintain some system flexibility with Delta conditions for managing fish protections in case next year is also dry.

To ensure that the changes approved in this Order that may reduce flows will not have unreasonable impacts on fish and wildlife, this Order includes several provisions including:

1. To ensure that the water conserved as a result of the changes is used to address the significant concerns with temperature management for winter-run Chinook salmon and other Sacramento River salmonids this year, this Order requires Reclamation to operate in compliance with a Sacramento River TMP as approved by the Executive Director in accordance with Order WR 90-5.
2. Exports are limited to a maximum of 1,500 cfs when D-1641 requirements are not being met, excluding transfers, to improve reservoir storage in the event that the following water year is also dry.
3. To mitigate for any impacts to fish and other beneficial uses, this Order requires the Petitioners to evaluate the possibility for providing pulse flows or other flow enhancements in a subsequent year with improved hydrology.
4. To address concerns about water management in the event dry conditions continue, this Order requires the Petitioners to develop an operational strategy for 2022 that includes improvements in hydrologic and operations forecasting (e.g., estimate of depletions) and describes how Project obligations will be met in the event of limited supplies and extreme dry conditions.
5. This Order requires the Petitioners to conduct necessary modeling, monitoring, analysis, and reporting and to prepare other necessary technical information to inform operational decisions and post drought assessment. Specifically, this Order requires the Petitioners to conduct necessary monitoring to understand the effects of operations associated with the temporary drought barrier at False River, including reductions in Delta outflows. This information along with fisheries information provided by the fisheries agencies will enable the Executive Director and the Board to monitor the effects of this Order and make changes as necessary to avoid any unreasonable impacts to fish and wildlife or other instream beneficial uses.
6. To address concerns about potential TUCP effects on HABs and aquatic weeds, this order requires the Petitioners to fund and complete monitoring and analyses to evaluate and document the effects of the TUCP and associated actions, including the drought barriers, on the prevalence and extent of HABs and expansion of invasive aquatic weeds and identify possible mitigation.

In summary, the potential for impairment to fish, wildlife, or other instream beneficial uses from the approved temporary changes, with the conditions summarized above, is not unreasonable considering the improvements in reservoir storage for temperature management, salinity control, and other purposes and the impacts to fish and wildlife, health and safety water supplies, and other purposes that could occur if the temporary changes are not approved.

5.5 Impacts to Public Trust Resources

Prior to approval of a TUCP, the Board must find that the proposed change may be made without unreasonable effect upon fish, wildlife, or other instream beneficial uses. In addition, the State Water Board has an independent obligation to consider the effect of the approval of changes in this Order on public trust resources and to protect those resources to the extent feasible and in the public interest. (*National Audubon Society v. Superior Court* (1983) 33 Cal. 3d 419, 446-447.) Public trust uses include navigation, commerce, fishing, recreation, and the preservation of fish and wildlife habitat.

5.5.1 Cyanobacteria

Cyanobacteria are present in most freshwater and marine aquatic environments. When conditions are favorable with abundant light, elevated water temperature, elevated levels of nutrients, and lack of water turbulence and velocity, cyanobacteria can quickly multiply into a bloom. Not every bloom is toxic; however, harmful algal blooms are a concern as some species of cyanobacteria produce toxins that have the potential to impact drinking water, recreation, and fish and wildlife.

Cyanobacterial blooms in the Delta have been associated with high irradiance, warm water temperatures, timing of flows, vertical stratification, and high nutrient concentrations.³² Salinity gradients within the Delta do not appear to have control over the geographic distribution of cyanobacteria.³³ Cyanobacterial blooms often originate in the central Delta in Old River and the San Joaquin River; however, the overall coverage and biomass of *Microcystis*, the most common cyanobacteria in the Delta associated with toxins, is low. Cyanobacterial blooms are typically restricted to July and August in most years due to higher turbidity, low temperatures, and higher flows during the rest of the year.

Naturally, cyanobacterial bloom frequency and duration tend to increase with drought conditions due to elevated water temperatures and increased residence times from reduced flows. The requested actions of the TUCP may contribute to increased blooms or the acceleration of blooms into the month of June through additional reductions in Delta outflow; however, the extent to which the requested TUCP actions will increase cyanobacterial blooms above the general drought conditions is unknown. This Order includes a condition requiring the Petitioners to complete monitoring and analyses to evaluate the effects of the requested TUCP action and any associated actions (e.g., the drought salinity barrier) on the prevalence and extent of harmful algal blooms and invasive aquatic weeds in the Delta. In addition, the Petitioners are required to identify possible mitigation. To the extent that the changes would impact public trust uses due to an increase in harmful algal blooms, the conditions of this Order would protect those uses to the extent feasible and in the public interest. In light of the extremely dry conditions and benefits of the changes to carryover storage for temperature control and other purposes, it would not be in the public interest to deny the TUCP, notwithstanding the potential increase in harmful algal blooms.

³² Dahm, C.N., A.E. Parker, A.E. Adelson, M.A. Christman, and B.A. Bergamaschi. 2016. Nutrient Dynamics of the Delta: Effects on Primary Producers. San Francisco Estuary and Watershed Science. 14(4).

³³ Berg, M. and M. Sutula. 2015. Factors affecting the growth of cyanobacteria with special emphasis on the Sacramento-San Joaquin Delta. Southern Coastal Water Research Project Technical Report 869. August 2015. Available at: https://www.waterboards.ca.gov/centralvalley/water_issues/delta_water_quality/delta_nutrient_research_plan/science_work_groups/2015_08_cyano_wp_final.pdf

5.5.2 Recreation

The temporary reductions in Delta outflow and relaxation of western Delta salinity requirements in D-1641 approved by this Order are not expected to impact water contact recreation that depends on water surface elevation to support activities. Water surface elevation in the Delta is determined by the rise and fall of the tides, which results in upstream and downstream movement of large volumes of water and produces flows and velocities that are generally much greater than the volume of water associated with net Delta outflow. Temporary changes to D-1641 Delta outflow and the western salinity requirements approved in this Order may impact water contact and non-water contact recreation to the extent that they promote conditions that increase the occurrence and severity of HABs and submersed aquatic vegetation (SAV) or other aquatic weeds. Temporary changes in Delta outflow may also impact recreational fishing by modifying survival of fish species that depend on different types of habitat. For example, reductions in Delta outflow may negatively impact juvenile fall-run Chinook salmon survival, which could result in fewer adults and a shorter recreational fishing season when the cohort returns in three years. Reductions in Delta outflow may result in habitat conditions that promote survival of introduced recreational fish such as largemouth bass. While this may be a positive impact for recreational fishing of largemouth bass, it is also a negative impact to native fish species consumed by largemouth bass and other predators that use similar habitat. There may be short-term impacts to contact and non-contact recreation and recreational fishing associated with this Order. However, these impacts are not contrary to the public interest in the context of the need to conserve water in reservoirs for use later in the year to control temperature in the upper watershed for salmon and to maintain salinity control in the Delta.

5.5.3 Water Quality and Availability of Habitat

As described in sections 2.5 and 5.4, reductions in Delta outflow and relaxation of the western Delta salinity requirements requested by the TUCP are expected to allow salinity to intrude further upstream which degrades habitat for native and migratory fish populations and reduces water quality for agricultural uses. Fish and wildlife habitat would be protected to the extent feasible and in the public interest by the conditions of this Order. The near-term potential negative impacts to fish and wildlife are not considered contrary to the public interest in the context of extremely dry conditions, the need to maintain salinity control in the Delta, and the ability to use water conserved in storage later in the year to support multiple beneficial uses such as temperature control for salmon, salinity control in the Delta, and water supply for municipal, industrial, and agricultural uses.

5.6 The Proposed Change is in the Public Interest

The temporary modifications authorized in this Order will make the best use of limited water supplies, within the context of the TUCP process, and are accordingly in the public interest. As discussed above, hydrologic and water supply conditions in the Delta watershed continue to be highly impacted by the drought and are inadequate to meet all of the needs for water in the basin this year and heading into next year if conditions continue to be dry. To respond to these conditions, the changes in the

Order are warranted to reduce to some extent the significant fisheries and water supply related impacts expected if conditions remain dry. The changes approved in this Order will help conserve stored water so that it can be released for multiple purposes the rest of this year, including temperature control on the Sacramento River, salinity control in the Delta, and minimal health and safety supplies. The changes approved in this Order balance the various uses of water now and in the future while preserving water right priorities and protecting the public interest. This Order also requires planning, modeling, consulting, monitoring, and reporting and reserves authority to modify the Order to ensure that it remains in the public interest.

6.0 CONCLUSIONS

The State Water Board has adequate information in its files to make the evaluation required by Water Code section 1435 concerning the modification and renewal of the TUCP Order discussed above.

I conclude that, based on the available evidence:

1. The Petitioners have an urgent need to make the proposed changes;
2. The petitioned changes; as conditioned by this Order, will not operate to the injury of any other lawful user of water;
3. The petitioned changes, as conditioned by this Order, will not have an unreasonable effect upon fish, wildlife, or other instream beneficial uses; and
4. The petitioned changes, as conditioned by this Order, are in the public interest.

ORDER

NOW, THEREFORE, IT IS ORDERED that the petition for temporary urgency change in permit and license conditions under Permits 16478, 16479, 16481, 16482 and 16483 (Applications 5630, 14443, 14445A, 17512 and 17514A, respectively) of the Department of Water Resources (DWR) for the State Water Project (SWP) and License 1986 and Permits 11315, 11316, 11885, 11886, 11887, 11967, 11968, 11969, 11970, 11971, 11972, 11973, 12364, 12721, 12722, 12723, 12725, 12726, 12727, 12860, 15735, 16597, 20245, and 16600 (Applications 23, 234, 1465, 5638, 13370, 13371, 5628, 15374, 15375, 15376, 16767, 16768, 17374, 17376, 5626, 9363, 9364, 9366, 9367, 9368, 15764, 22316, 14858A, 14858B, and 19304, respectively) of the United States Bureau of Reclamation (Reclamation) for the Central Valley Project (CVP); is approved, subject to the following terms and conditions. Except as otherwise provided below, all other terms and conditions of the subject license and permits, including those added by the State Water Resources Control Board (State Water Board) in Revised Decision 1641 (Decision 1641) shall remain in effect. The requested changes approved in this Order shall be effective through August 15, 2021. Other conditions of this Order shall be effective until fully satisfied.

1. Except as otherwise provided in condition 2, below, during the time periods specified below, or until such time as this Order is amended or rescinded, the requirements of D-1641 for DWR and Reclamation (Petitioners) to meet specified water quality objectives are amended as follows:
 - a. From June 1 through June 30, 2021, the minimum Delta outflow level specified in Table 3 of D-1641 as measured by the Net Delta Outflow Index (NDOI) described in Figure 3 of D-1641 shall be no less than 3,000 cubic-feet per second (cfs) on a 14-day running average. The 7-day running average shall be no less than 1,000 cfs below 3,000 cfs.
 - b. From July 1 through July 31, 2021, the minimum Delta outflow level specified in Table 3 of D-1641 as measured by the NDOI described in Figure 3 of D-1641 shall be no less than 3,000 cfs on a monthly average. The 7-day running average shall be no less than 1,000 cfs below 3,000 cfs.
 - c. From June 1 through August 15, 2021, the Western Delta, Sacramento River at Emmaton electrical conductivity (EC) compliance location specified in Table 2 of D-1641 is moved to Threemile Slough on the Sacramento River.
 - d. From June 1 through August 15, 2021, the maximum Export Limits specified in Table 3 of D-1641 are modified as follows:
 - i. The combined maximum exports at the 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 or an alternate averaging period as approved by the Executive Director.

- ii. During the effective period of the changes approved in this Order, at least 5 working days prior to conducting water transfers, the Petitioners shall provide detailed accounting for the transfers to the State Water Board identifying: the volume of water being transferred, when, and between which parties; how water is being made available for transfer; and information to support that the transfers will not cause injury to other legal users of water or unreasonable impacts to fish, wildlife, or other instream beneficial uses, including through reductions in carryover storage in Project reservoirs or stream depletions due to groundwater substitution transfers.
 - iii. The Executive Director reserves authority to modify the requirements of this Order, including the export limits, to ensure that the changes approved in this Order are in the public interest and meet the intent of this Order to improve reservoir storage conditions for the protection of health and safety water supplies and the environment. In order to inform the Executive Director's determinations, the Petitioners shall provide an accounting of the total quantities of SWP and CVP water planned to be exported from the Delta, the purposes for which that water will be exported, and an explanation of why it is in the public interest to export that water when D-1641 requirements are not being met. The information shall be provided 5 days in advance of export operations and shall cover operations from June 10 until August 15, 2021.
 - iv. During the effective period of this Order, in the low probability circumstance that precipitation events occur that enable the Petitioners to fully comply with the D-1641 Delta outflow and Sacramento River at Emmaton salinity requirements, then the applicable D-1641 exports limits shall be operative, except that any SWP and CVP exports greater than 1,500 cfs shall be limited to natural or abandoned flow, or transfers as specified in condition 1.d.ii.
2. While the Petitioners are operating under the changes approved by condition 1.a,b, and c of this Order, they shall bypass natural and abandoned flows to prevent injury to other lawful users of water.
3. The Petitioners shall consult on a regular basis with designated representatives from the State Water Board, the Department of Fish and Wildlife (CDFW), National Marine Fisheries Service (NMFS), and U.S. Fish and Wildlife Service (USFWS) (collectively fisheries agencies) concerning current conditions and potential changes to SWP and CVP operations to meet health and safety requirements and

to reasonably protect all beneficial uses of water.

4. The Petitioners shall calculate and maintain a record of the amount of water conserved in storage and identify the reservoir(s) where storage is conserved. These records shall be submitted on a monthly basis to the State Water Board and fisheries agencies within 20 working days after the first day of the following month. Documentation shall include, but is not limited to, the volume of water needed to meet D-1641 flow and salinity requirements and the volume of water conserved as a result of the changes approved by this Order.
5. Through the remainder of the water year, the Petitioners shall submit updated monthly operations outlooks identifying:
 - a. Upstream: Inflows to and storage levels in the major reservoirs (Shasta, Folsom, Oroville, Trinity, Whiskeytown, San Luis, and New Melones). River releases from the aforementioned reservoirs. Transfers from the Trinity system, including Carr Power Plant and Spring Creek Tunnel flows.
 - b. Delta inflows, channel depletions, exports, and outflows.
 - c. SWP: deliveries to Feather River Service Area contractors, north-of-Delta Table A contractors, south-of-Delta Table A contractors. Information regarding SWP deliveries shall include the monthly and total volume, volumes delivered to specific water users, and the basis of water right or contractual agreement under which the deliveries are made.
 - d. CVP: deliveries to Settlement contractors, American River municipal and industrial (M&I) contractors, Sacramento River agricultural water service contractors, Sacramento River M&I water service contractors, Contra Costa Water District, north-of-Delta refuges, exchange contractors, south-of-Delta agricultural water service contractors, south-of-Delta M&I water service contractors, south-of-Delta refuges, East side water right holders, New Melones East side, and Friant Unit; Information regarding CVP deliveries shall include the monthly and total volume, volumes delivered to specific water users, and the basis of water right or contractual agreement under which the deliveries are made
 - e. South-of-Delta water transfers, including the transferors, transferees, and the quantities transferred; and
 - f. The outlooks shall be posted on DWR's website and updated as necessary based on changed conditions. Monthly updates shall be posted and provided to the State Water Board and fisheries agencies within 20 working days after the first day of the following month.
6. In the event of improved hydrologic conditions next year, the Petitioners shall evaluate the possibility for dedicating a portion of the volume of water conserved by the changes approved in this Order to provide pulse flows or other improvements in flows above and beyond D-1641 requirements next water year to provide improved conditions for beneficial uses of water to the extent feasible based on hydrologic conditions. The Petitioners shall submit a report to the Executive Director on their findings by March 15, 2022.

7. The Petitioners shall conduct modeling, monitoring, analysis, and reporting and prepare other technical information necessary to inform operational decisions and assess drought emergency actions authorized by this Order and any subsequent temporary urgency change orders in combination with other drought actions. Specifically, the Petitioners shall conduct monitoring and analyses, including implementation of the Interagency Ecological Program annual workplan and ongoing monitoring in the upper watershed, needed to understand the effects of changes authorized by the TUCP Order in combination with other associated actions such as Sacramento River temperature management pursuant to State Water Board Order 90-5, installation of the temporary drought barrier at False River, and changes to the estuarine salt field and aquatic habitat.
 - a. The Petitioners shall consult with the fisheries agencies and State Water Board staff through the consultation process described in Condition 3 above to identify needed modeling, monitoring, analyses, and reporting. Required modeling, monitoring, analyses, and reporting shall be determined by the Executive Director or other designated representative, taking into consideration input from the relevant agencies, including DWR, Reclamation, and the fisheries agencies including recommendations for modeling and analyses made by CDFW in their consultation letter on the TUCP (May 24, 2021).
 - b. The Petitioners shall make available technical information in a timeframe that is useful to support State Water Board decisions. Technical information and analyses may include, but are not limited to, planned operations (forecasts), examination of minimum export rates, temperature models, modeling and monitoring information, water quality modeling, monitoring, and assessment information, information about potential impacts of operational changes on other water users and fish and wildlife, and any other relevant information requested by the fisheries agencies or State Water Board staff.
 - c. The Petitioners shall report to the Board at least monthly at its Board meetings on their drought operations, including information discussed in the terms of this order.
8. In coordination with the State Water Board, Central Valley Water Board, and the Interagency Ecological Program, the Petitioners shall complete a special study that identifies the effects of this TUCP Order, any future TUCPs, and any associated actions including drought barriers on the prevalence and extent of harmful algal blooms and expansion of invasive aquatic weeds in the Sacramento-San Joaquin Delta. A report on the findings of the special study shall be submitted by December 15, 2021.
9. Pursuant to the requirements of this Order and State Water Board Order WR 90-5, Reclamation, in consultation with the fisheries agencies, shall implement the Sacramento River Temperature Management Plan as approved by the Executive Director.
10. By August 30, 2021, the Petitioners shall prepare a report summarizing the

constraints that exist on minimum export pumping levels including the following:

- a. Infrastructure specifications and safety thresholds for operation of Delta export pumps at each Project. Identification of any safety thresholds that may exist for individual and combined operations;
- b. Minimum deliveries for health and safety purposes and their effect on determining pumping rates;
- c. Evaluation of opportunities to use system infrastructure to reduce exports, including joint points of diversion, use of the California Aqueduct Intertie, operations at San Luis Reservoir, and other potential actions.

11. In consultation with the State Water Board and fisheries agencies, the Petitioners shall develop an operational strategy for water year 2022 in the event that dry or critically dry hydrologic conditions, including conditions similar to this year, occur next water year. The strategy shall include information regarding improvements in hydrologic and operational forecasting to account for extreme dry hydrologic conditions and information regarding how various Project obligations will be met in the event of limited supplies. The strategy shall be submitted to the Executive Director no later than December 31, 2021, and updated as necessary based on changed circumstances or as requested by the Executive Director.
12. This Order may be further modified by the Executive Director or the State Water Board based on public and agency comments or objections, or changed circumstances. Information concerning changes to this Order will be posted on the State Water Board's website within 24 hours.
13. This Order does not authorize any act that results in the taking of a candidate, threatened, or endangered species, or any act that is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code sections 2050 to 2097) or the federal Endangered Species Act (16 U.S.C.A. sections 1531 to 1544). If a "take" will result from any act authorized under this Order, the Petitioners shall obtain authorization for an incidental take permit prior to construction or operation of the project. Petitioners shall be responsible for meeting all requirements of the applicable Endangered Species Act for the temporary urgency changes authorized under this Order.
14. Petitioners shall immediately notify the Executive Director of the State Water Board if any significant change in conditions occurs that warrants reconsideration of this Order.

June 1, 2021

Dated



Eileen Sobeck,
Executive Director

TABLE 1
WATER QUALITY OBJECTIVES FOR
MUNICIPAL AND INDUSTRIAL BENEFICIAL USES

COMPLIANCE LOCATION	INTERAGENCY STATION NUMBER (RKI [1])	PARAMETER	DESCRIPTION (UNIT)	WATER YEAR TYPE [2]	TIME PERIOD	VALUE
Contra Costa Canal at Pumping Plant #1	C-5 (CHCCC06)	Chloride (Cl ⁻)	Maximum mean daily 150 mg/l Cl ⁻ for at least the number of days shown during the Calendar Year.	W		No. of days each Calendar Year ≤ 150 mg/l Cl ⁻ 240 (66%)
-or-				AN		190 (52%)
San Joaquin River at Antioch Water Works Intake	D-12 (near) (RSAN007)		Must be provided in intervals of not less than two weeks duration. (Percentage of Calendar Year shown in parenthesis)	BN		175 (48%)
				D		165 (45%)
				C		155 (42%)
Contra Costa Canal at Pumping Plant #1	C-5 (CHCCC06)	Chloride (Cl ⁻)	Maximum mean daily (mg/l)	All	Oct-Sep	250
-and-						
West Canal at mouth of Clifton Court Forebay	C-9 (CHWST0)					
-and-						
Delta-Mendota Canal at Tracy Pumping Plant	DMC-1 (CHDMC004)					
-and-						
Barker Slough at North Bay Aqueduct Intake	---- (SLSAR3)					
-and-						
Cache Slough at City of Vallejo Intake [3]	C-19 (SLCCH16)					

[1] River Kilometer Index station number.

[2] The Sacramento Valley 40-30-30 water year hydrologic classification index (see Figure 1) applies for determinations of water year type.

[3] The Cache Slough objective to be effective only when water is being diverted from this location.

TABLE 2
WATER QUALITY OBJECTIVES FOR AGRICULTURAL BENEFICIAL USES

COMPLIANCE LOCATION	INTERAGENCY STATION NUMBER (RKI [1])	PARAMETER	DESCRIPTION (UNIT) [2]	WATER YEAR TYPE [3]	TIME PERIOD	VALUE
WESTERN DELTA						
Sacramento River at Emmaton	D-22 (RSAC092)	Electrical Conductivity (EC)	Maximum 14-day running average of mean daily EC (mmhos/cm)		0.45 EC April 1 to date shown	EC from date shown to Aug 15 [4]
				W	Aug 15	----
				AN	Jul 1	0.63
				BN	Jun 20	1.14
				D	Jun 15	1.67
				C	----	2.78
San Joaquin River at Jersey Point	D-15 (RSAN018)	Electrical Conductivity (EC)	Maximum 14-day running average of mean daily EC (mmhos/cm)		0.45 EC April 1 to date shown	EC from date shown to Aug 15 [4]
				W	Aug 15	----
				AN	Aug 15	----
				BN	Jun 20	0.74
				D	Jun 15	1.35
				C	----	2.20
INTERIOR DELTA						
South Fork Mokelumne River at Terminous	C-13 (RSMKL08)	Electrical Conductivity (EC)	Maximum 14-day running average of mean daily EC (mmhos/cm)		0.45 EC April 1 to date shown	EC from date shown to Aug 15 [4]
				W	Aug 15	----
				AN	Aug 15	----
				BN	Aug 15	----
				D	Aug 15	----
				C	----	0.54
San Joaquin River at San Andreas Landing	C-4 (RSAN032)	Electrical Conductivity (EC)	Maximum 14-day running average of mean daily EC (mmhos/cm)		0.45 EC April 1 to date shown	EC from date shown to Aug 15 [4]
				W	Aug 15	----
				AN	Aug 15	----
				BN	Aug 15	----
				D	Jun 25	0.58
				C	----	0.87
SOUTHERN DELTA						
San Joaquin River at Airport Way Bridge, Vernalis	C-10 (RSAN112)	Electrical Conductivity (EC)	Maximum 30-day running average of mean daily EC (mmhos/cm)	All	Apr-Aug	0.7
-and- San Joaquin River at Brandt Bridge site[5]	C-6 (RSAN073)				Sep-Mar	1.0
-and- Old River near Middle River [5]	C-8 (ROLD69)					
-and- Old River at Tracy Road Bridge [5]	P-12 (ROLD59)					
EXPORT AREA						
West Canal at mouth of Clifton Court Forebay	C-9 (CHWST0)	Electrical Conductivity (EC)	Maximum monthly average of mean daily EC (mmhos/cm)	All	Oct-Sep	1.0
-and- Delta-Mendota Canal at Tracy Pumping Plant	DMC-1 (CHDMC004)					

[1] River Kilometer Index station number.

[2] Determination of compliance with an objective expressed as a running average begins on the last day of the averaging period. The averaging period commences with the first day of the time period for the applicable objective. If the objective is not met on the last day of the averaging period, all days in the averaging period are considered out of compliance.

[3] The Sacramento Valley 40-30-30 water year hydrologic classification index (see Figure 1) applies for determinations of water year type.

[4] When no date is shown, EC limit continues from April 1.

[5] The 0.7 EC objective becomes effective on April 1, 2005. The DWR and the USBR shall meet 1.0 EC at these stations year round until April 1, 2005. The 0.7 EC objective is replaced by the 1.0 EC objective from April through August after April 1, 2005 if permanent barriers are constructed, or equivalent measures are implemented, in the southern Delta and an operations plan that reasonably protects southern Delta agriculture is prepared by the DWR and the USBR and approved by the Executive Director of the SWRCB. The SWRCB will review the salinity objectives for the southern Delta in the next review of the Bay-Delta objectives following construction of the barriers.

TABLE 3
WATER QUALITY OBJECTIVES FOR FISH AND WILDLIFE BENEFICIAL USES

COMPLIANCE LOCATION	INTERAGENCY STATION NUMBER (RKI [1])	PARAMETER	DESCRIPTION (UNIT) [2]	WATER YEAR TYPE [3]	TIME PERIOD	VALUE
SAN JOAQUIN RIVER SALINITY						
San Joaquin River at and between Jersey Point and Prisoners Point [4]	D-15 (RSAN018) -and- D-29 (RSAN038)	Electrical Conductivity (EC)	Maximum 14-day running average of mean daily EC(mmhos/cm)	W,AN,BN,D	Apr-May	0.44 [5]
EASTERN SUISUN MARSH SALINITY						
Sacramento River at Collinsville -and- Montezuma Slough at National Steel	C-2 (RSAC081) S-64 (SLMZU25)	Electrical Conductivity (EC)	Maximum monthly average of both daily high tide EC values (mmhos/cm), or demonstrate that equivalent or better protection will be provided at the location	All	Oct Nov-Dec Jan Feb-Mar Apr-May	19.0 15.5 12.5 8.0 11.0
Montezuma Slough near Beldon Landing	S-49 (SLMZU11)					
WESTERN SUISUN MARSH SALINITY						
Chadbourne Slough at Sunrise Duck Club -and- Suisun Slough, 300 feet south of Volanti Slough	S-21 (SLCBN1) S-42 (SLSUS12)	Electrical Conductivity (EC)	Maximum monthly average of both daily high tide EC values (mmhos/cm), or demonstrate that equivalent or better protection will be provided at the location	All but deficiency period [6] Deficiency Period [6]	Oct Nov Dec Jan Feb-Mar Apr-May Oct Nov Dec-Mar Apr May	19.0 16.5 15.5 12.5 8.0 11.0 19.0 16.5 15.6 14.0 12.5

TABLE 3 (continued)
WATER QUALITY OBJECTIVES FOR FISH AND WILDLIFE BENEFICIAL USES

COMPLIANCE LOCATION	INTERAGENCY STATION NUMBER(RK11[1])	PARAMETER	DESCRIPTION (UNIT) [2]	WATER YEAR TYPE [3]	TIME PERIOD	VALUE
DELTA OUTFLOW						
		Net Delta Outflow Index (NDOI) [7]	Minimum monthly average [8] NDOI (cfs)	All	Jan	4,500 [9]
				All	Feb-Jun	[10]
				W,AN	Jul	8,000
				BN		6,500
				D		5,000
				C		4,000
				W,AN,BN	Aug	4,000
				D		3,500
				C		3,000
				All	Sep	3,000
				W,AN,BN,D	Oct	4,000
				C		3,000
				W,AN,BN,D	Nov-Dec	4,500
				C		3,500
RIVER FLOWS						
Sacramento River at Rio Vista	D-24 (RSAC101)	Flow rate	Minimum monthly average [11] flow rate (cfs)	All	Sep	3,000
				W,AN,BN,D	Oct	4,000
				C		3,000
				W,AN,BN,D	Nov-Dec	4,500
				C		3,500
San Joaquin River at Airport Way Bridge, Vernalis	C-10 (RSAN112)	Flow rate	Minimum monthly average [12] flow rate (cfs) [13]	W,AN	Feb-Apr 14 and May 16-Jun	2,130 or 3,420 1,420 or 2,280 710 or 1,140
				BN,D		
				C		
				W	Apr 15- May 15 [14]	7,330 or 8,620
				AN		5,730 or 7,020
				BN		4,620 or 5,480
				D		4,020 or 4,880
				C		3,110 or 3,540
				All	Oct	1,000 [15]
EXPORT LIMITS						
		Combined export rate [16]	Maximum 3-day running average (cfs)	All	Apr 15- May 15 [17]	[18]
				All	Feb-Jun	35% Delta inflow [21]
			Maximum percent of Delta inflow diverted [19] [20]	All	Jul-Jan	65% Delta inflow
DELTA CROSS CHANNEL GATES CLOSURE						
Delta Cross Channel at Walnut Grove	—	Closure of gates	Closed gates	All	Nov-Jan Feb-May 20 May 21- Jun 15	[22] ---- [23]

Table 3 Footnotes

- [1] River Kilometer Index station number.
- [2] Determination of compliance with an objective expressed as a running average begins on the last day of the averaging period. The averaging period commences with the first day of the time period of the applicable objective. If the objective is not met on the last day of the averaging period, all days in the averaging period are considered out of compliance.
- [3] The Sacramento Valley 40-30-30 Water Year Hydrologic Classification Index (see Figure 1) applies unless otherwise specified.
- [4] Compliance will be determined at Jersey Point (station D15) and Prisoners Point (station D29).
- [5] This standard does not apply in May when the best available May estimate of the Sacramento River Index for the water year is less than 8.1 MAF at the 90% exceedence level. [Note: The Sacramento River Index refers to the sum of the unimpaired runoff in the water year as published in the DWR Bulletin 120 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.]
- [6] A deficiency period is: (1) the second consecutive dry water year following a critical year; (2) a dry water year following a year in which the Sacramento River Index (described in footnote 5) was less than 11.35 MAF; or (3) a critical water year following a dry or critical water year. The determination of a deficiency period is made using the prior year's final Water Year Type determination and a forecast of the current year's Water Year Type; and remains in effect until a subsequent water year is other than a Dry or Critical water year as announced on May 31 by DWR and USBR as the final water year determination.
- [7] Net Delta Outflow Index (NDOI) is defined in Figure 3.
- [8] For the May-January objectives, if the value is less than or equal to 5,000 cfs, the 7-day running average shall not be less than 1,000 cfs below the value; if the value is greater than 5,000 cfs, the 7-day running average shall not be less than 80% of the value.
- [9] The objective is increased to 6,000 cfs if the best available estimate of the Eight River Index for December is greater than 800 TAF. [Note: The Eight River Index refers to the sum of the unimpaired runoff as published in the DWR Bulletin 120 for the following locations: Sacramento River flow at Bend Bridge, near Red Bluff; Feather River, total inflow to Oroville Reservoir; Yuba River flow at Smartville; American River, total inflow to Folsom Reservoir; Stanislaus River, total inflow to New Melones Reservoir; Tuolumne River, total inflow to Don Pedro Reservoir; Merced River, total inflow to Exchequer Reservoir; and San Joaquin River, total inflow to Millerton Lake.]
- [10] The minimum daily net Delta outflow shall be 7,100 cfs for this period, calculated as a 3-day running average. This requirement is also met if either the daily average or 14-day running average EC at the confluence of the Sacramento and the San Joaquin rivers is less than or equal to 2.64 mmhos/cm (Collinsville station C2). If the best available estimate of the Eight River Index (described in footnote 9) for January is more than 900 TAF, the daily average or 14-day running average EC at station C2 shall be less than or equal to 2.64 mmhos/cm for at least one day between February 1 and February 14; however, if the best available estimate of the Eight River Index for January is between 650 TAF and 900 TAF, the Executive Director of the SWRCB is delegated authority to decide whether this requirement applies. If the best available estimate of the Eight River Index for February is less than 500 TAF, the standard may be further relaxed in March upon the request of the DWR and the USBR, subject to the approval of the Executive Director of the SWRCB. The standard does not apply in May and June if the best available May estimate of the Sacramento River Index (described in footnote 5) for the water year is less than 8.1 MAF at the 90% exceedence level.

Under this circumstance, a minimum 14-day running average flow of 4,000 cfs is required in May and June. Additional Delta outflow objectives are contained in Table 4.

- [11] The 7-day running average shall not be less than 1,000 cfs below the monthly objective.
- [12] Partial months are averaged for that period. For example, the flow rate for April 1-14 would be averaged over 14 days. The 7-day running average shall not be less than 20% below the flow rate objective, with the exception of the April 15-May 15 pulse flow period when this restriction does not apply.
- [13] The water year classification for the San Joaquin River flow objectives will be established using the best available estimate of the 60-20-20 San Joaquin Valley Water Year Hydrologic Classification (see Figure 2) at the 75% exceedence level. The higher flow objective applies when the 2-ppt isohaline (measured as 2.64 mmhos/cm surface salinity) is required to be at or west of Chipps Island.
- [14] This time period may be varied based on real-time monitoring. One pulse, or two separate pulses of combined duration equal to the single pulse, should be scheduled to coincide with fish migration in San Joaquin River tributaries and the Delta. The USBR will schedule the time period of the pulse or pulses in consultation with the USFWS, the NMFS, and the DFG. Consultation with the CALFED Operations Group established under the Framework Agreement will satisfy the consultation requirement. The schedule is subject to the approval of the Executive Director of the SWRCB.
- [15] Plus up to an additional 28 TAF pulse/attraction flow during all water year types. The amount of additional water will be limited to that amount necessary to provide a monthly average flow of 2,000 cfs. The additional 28 TAF is not required in a critical year following a critical year. The pulse flow will be scheduled by the DWR and the USBR in consultation with the USFWS, the NMFS and the DFG. Consultation with the CALFED Operations Group established under the Framework Agreement will satisfy the consultation requirement.
- [16] Combined export rate for this objective is defined as the Clifton Court Forebay inflow rate (minus actual Byron-Bethany Irrigation District diversions from Clifton Court Forebay) and the export rate of the Tracy pumping plant.
- [17] This time period may be varied based on real-time monitoring and will coincide with the San Joaquin River pulse flow described in footnote 18. The DWR and the USBR, in consultation with the USFWS, the NMFS and the DFG, will determine the time period for this 31-day export limit. Consultation with the CALFED Operations Group established under the Framework Agreement will satisfy the consultation requirement.
- [18] Maximum export rate is 1,500 cfs or 100% of 3-day running average of San Joaquin River flow at Vernalis, whichever is greater. Variations to this maximum export rate may be authorized if agreed to by the USFWS, the NMFS and the DFG. This flexibility is intended to result in no net water supply cost annually within the limits of the water quality and operational requirements of this plan. Variations may result from recommendations of agencies for protection of fish resources, including actions taken pursuant to the State and federal Endangered Species Act. Any variations will be effective immediately upon notice to the Executive Director of the SWRCB. If the Executive Director of the SWRCB does not object to the variations within 10 days, the variations will remain in effect. The Executive Director of the SWRCB is also authorized to grant short-term exemptions to export limits for the purpose of facilitating a study of the feasibility of recirculating export water into the San Joaquin River to meet flow objectives.
- [19] Percent of Delta inflow diverted is defined in Figure 3. For the calculation of maximum percent Delta inflow diverted, the export rate is a 3-day running average and the Delta inflow is a 14-day running average, except when the CVP or the SWP is making storage withdrawals for export, in which case both the export rate and the Delta inflow are 3-day running averages.

- [20] The percent Delta inflow diverted values can be varied either up or down. Variations are authorized subject to the process described in footnote 18.
- [21] If the best available estimate of the Eight River Index (described in footnote 9) for January is less than or equal to 1.0 MAF, the export limit for February is 45% of Delta inflow. If the best available estimate of the Eight River Index for January is greater than 1.5 MAF, the February export limit is 35% of Delta inflow. If the best available estimate of the Eight River Index for January is between 1.0 MAF and 1.5 MAF, the DWR and the USBR will set the export limit for February within the range of 35% to 45%, after consultation with the USFWS, the NMFS and the DFG. Consultation with the CALFED Operations Group established under the Framework Agreement will satisfy the consultation requirement.
- [22] For the November-January period, close Delta Cross Channel gates for a total of up to 45 days. The USBR will determine the timing and duration of the gate closure after consultation with the USFWS, the NMFS and the DFG. Consultation with the CALFED Operations Group established under the Framework Agreement will satisfy the consultation requirement.
- [23] For the May 21-June 15 period, close Delta Cross Channel gates for a total of 14 days. The USBR will determine the timing and duration of the gate closure after consultation with the USFWS, the NMFS and the DFG. Consultation with the CALFED Operations Group established under the Framework Agreement will satisfy the consultation requirement.

Figure 1
Sacramento Valley
Water Year Hydrologic Classification

Year classification shall be determined by computation of the following equation:

$$\text{INDEX} = 0.4 * X + 0.3 * Y + 0.3 * Z$$

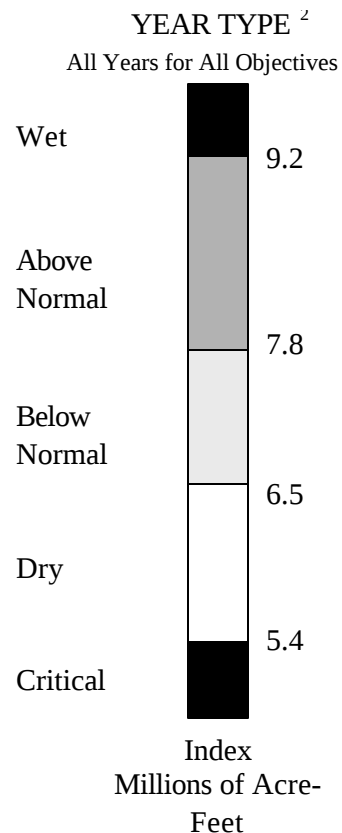
Where: X = Current year's April – July
Sacramento Valley unimpaired runoff

Y = Current October – March
Sacramento Valley unimpaired runoff

Z = Previous year's index¹

The Sacramento Valley unimpaired runoff for the current water year (October 1 of the preceding calendar year through September 30 of the current calendar year), as published in California Department of Water Resources Bulletin 120, is a forecast of the sum of the following locations: Sacramento River above Bend Bridge, near Red Bluff; Feather River, total inflow to Oroville Reservoir; Yuba River at Smartville; American River, total inflow to Folsom Reservoir. Preliminary determinations of year classification shall be made in February, March, and April with final determination in May. These preliminary determinations shall be based on hydrologic conditions to date plus forecasts of future runoff assuming normal precipitation for the remainder of the water year.

<u>Classification</u>	<u>Index</u> <u>Millions of Acre-Feet (MAF)</u>
Wet	Equal to or greater than 9.2
Above Normal	Greater than 7.8 and less than 9.2
Below Normal	Equal to or less than 7.8 and greater than 6.5
Dry	Equal to or less than 6.5 and greater than 5.4
Critical	Equal to or less than 5.4



¹ A cap of 10.0 MAF is put on the previous year's index (Z) to account for required flood control reservoir releases during wet years.

² The year type for the preceding water year will remain in effect until the initial forecast of unimpaired runoff for the current water year is available.

Figure 2
San Joaquin Valley
Water Year Hydrologic Classification

Year classification shall be determined by computation of the following equation:

$$\text{INDEX} = 0.6 * X + 0.2 * Y + 0.2 * Z$$

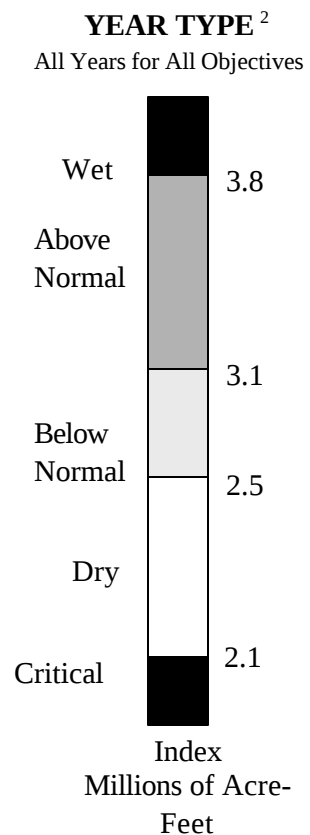
Where: X = Current year's April – July
San Joaquin Valley unimpaired runoff

Y = Current October – March
San Joaquin Valley unimpaired runoff

Z = Previous year's index¹

The San Joaquin Valley unimpaired runoff for the current water year (October 1 of the preceding calendar year through September 30 of the current calendar year), as published in California Department of Water Resources Bulletin 120, is a forecast of the sum of the following locations: Stanislaus River, total flow to New Melones Reservoir; Tuolumne River, total inflow to Don Pedro Reservoir; Merced River, total flow to Exchequer Reservoir; San Joaquin River, total inflow to Millerton Lake. Preliminary determinations of year classification shall be made in February, March, and April with final determination in May. These preliminary determinations shall be based on hydrologic conditions to date plus forecasts of future runoff assuming normal precipitation for the remainder of the water year.

<u>Classification</u>	<u>Index Millions of Acre-Feet (MAF)</u>
Wet.....	Equal to or greater than 3.8
Above Normal.....	Greater than 3.1 and less than 3.8
Below Normal.....	Equal to or less than 3.1 and greater than 2.5
Dry.....	Equal to or less than 2.5 and greater than 2.1
Critical.....	Equal to or less than 2.1



¹ A cap of 4.5 MAF is put on the previous year's index (Z) to account for required flood control reservoir releases during wet years.

² The year type for the preceding water year will remain in effect until the initial forecast of unimpaired runoff for the current water year is available.

Figure 3
NDOI and PERCENT INFLOW DIVERTED ¹

The NDOI and the percent inflow diverted, as described in this footnote, shall be computed daily by the DWR and the USBR using the following formulas (all flows are in cfs):

$$NDOI = DELTA\ INFLOW - NET\ DELTA\ CONSUMPTIVE\ USE - DELTA\ EXPORTS$$

$$PERCENT\ INFLOW\ DIVERTED = (CCF + TPP) / DELTA\ INFLOW$$

where $DELTA\ INFLOW = SAC + SRTP + YOLO + EAST + MISC + SJR$

- SAC* = Sacramento River at Freeport mean daily flow for the previous day; the 25-hour tidal cycle measurements from 12:00 midnight to 1:00 a.m. may be used instead.
- SRTP* = Sacramento Regional Treatment Plant average daily discharge for the previous week.
- YOLO* = Yolo Bypass mean daily flow for the previous day, which is equal to the flows from the Sacramento Weir, Fremont Weir, Cache Creek at Rumsey, and the South Fork of Putah Creek.
- EAST* = Eastside Streams mean daily flow for the previous day from the Mokelumne River at Woodbridge, Cosumnes River at Michigan Bar, and Calaveras River at Bellota.
- MISC* = Combined mean daily flow for the previous day of Bear Creek, Dry Creek, Stockton Diverting Canal, French Camp Slough, Marsh Creek, and Morrison Creek.
- SJR* = San Joaquin River flow at Vernalis, mean daily flow for the previous day.

where $NET\ DELTA\ CONSUMPTIVE\ USE = GDEPL - PREC$

- GDEPL* = Delta gross channel depletion for the previous day based on water year type using the DWR's latest Delta land use study.²
- PREC* = Real-time Delta precipitation runoff for the previous day estimated from stations within the Delta.

and where $DELTA\ EXPORTS^3 = CCF + TPP + CCC + NBA$

- CCF* = Clifton Court Forebay inflow for the current day.⁴
- TPP* = Tracy Pumping Plant pumping for the current day.
- CCC* = Contra Costa Canal pumping for the current day.
- NBA* = North Bay Aqueduct pumping for the current day.

-
- 1 Not all of the Delta tributary streams are gaged and telemetered. When appropriate, other methods of estimating stream flows, such as correlations with precipitation or runoff from nearby streams, may be used instead.
 - 2 The DWR is currently developing new channel depletion estimates. If these new estimates are not available, DAYFLOW channel depletion estimates shall be used.
 - 3 The term "Delta Exports" is used only to calculate the NDOI. It is not intended to distinguish among the listed diversions with respect to eligibility for protection under the area of origin provisions of the California Water Code.
 - 4 Actual Byron-Bethany Irrigation District withdrawals from Clifton Court Forebay shall be subtracted from Clifton Court Forebay inflow. (Byron-Bethany Irrigation District water use is incorporated into the GDEPL term.)

Table 4. Number of Days When Maximum Daily Average Electrical Conductivity of 2.64 mmhos/cm Must Be Maintained at Specified Location

Number of Days When Maximum Daily Average Electrical Conductivity of 2.64 mmhos/cm Must Be Maintained at Specified Location ^[a]																	
PMI ^[b] (TAF)	Chipps Island (Chipps Island Station D10)					PMI ^[b] (TAF)	Port Chicago (Port Chicago Station C14) ^[d]					PMI ^[b] (TAF)	Port Chicago (Port Chicago Station C14) ^[d]				
	FEB	MAR	APR	MAY	JUN		FEB	MAR	APR	MAY	JUN		FEB	MAR	APR	MAY	JUN
≤ 500	0	0	0	0	0	0	0	0	0	0	0	5250	27	29	25	26	6
750	0	0	0	0	0	250	1	0	0	0	0	5500	27	29	26	28	9
1000	28 ^[c]	12	2	0	0	500	4	1	0	0	0	5750	27	29	27	28	13
1250	28	31	6	0	0	750	8	2	0	0	0	6000	27	29	27	29	16
1500	28	31	13	0	0	1000	12	4	0	0	0	6250	27	30	27	29	19
1750	28	31	20	0	0	1250	15	6	1	0	0	6500	27	30	28	30	22
2000	28	31	25	1	0	1500	18	9	1	0	0	6750	27	30	28	30	24
2250	28	31	27	3	0	1750	20	12	2	0	0	7000	27	30	28	30	26
2500	28	31	29	11	1	2000	21	15	4	0	0	7250	27	30	28	30	27
2750	28	31	29	20	2	2250	22	17	5	1	0	7500	27	30	29	30	28
3000	28	31	30	27	4	2500	23	19	8	1	0	7750	27	30	29	31	28
3250	28	31	30	29	8	2750	24	21	10	2	0	8000	27	30	29	31	29
3500	28	31	30	30	13	3000	25	23	12	4	0	8250	28	30	29	31	29
3750	28	31	30	31	18	3250	25	24	14	6	0	8500	28	30	29	31	29
4000	28	31	30	31	23	3500	25	25	16	9	0	8750	28	30	29	31	30
4250	28	31	30	31	25	3750	26	26	18	12	0	9000	28	30	29	31	30
4500	28	31	30	31	27	4000	26	27	20	15	0	9250	28	30	29	31	30
4750	28	31	30	31	28	4250	26	27	21	18	1	9500	28	31	29	31	30
5000	28	31	30	31	29	4500	26	28	23	21	2	9750	28	31	29	31	30
5250	28	31	30	31	29	4750	27	28	24	23	3	10000	28	31	30	31	30
≤ 5500	28	31	30	31	30	5000	27	28	25	25	4	>10000	28	31	30	31	30

[a] The requirement for number of days the maximum daily average EC (EC) of 2.64 mmhos per centimeter (mmhos/cm) must be maintained at Chippis Island and Port Chicago can also be met with maximum 14-day running average EC of 2.64 mmhos/cm, or 3-day running average NDOIs of 11,400 cfs and 29,200 cfs, respectively. If salinity/flow objectives are met for a greater number of days than the requirements for any month, the excess days shall be applied to meeting the requirements for the following month. The number of days for values of the PMI between those specified in this table shall be determined by linear interpolation.

[b] PMI is the best available estimate of the previous month's Eight River Index. (Refer to Footnote 10 for Table 3 for a description of the Eight River Index.)

[c] When the PMI is between 800 TAF and 1000 TAF, the number of days the maximum daily average EC of 2.64 mmhos/cm (or maximum 14-day running average EC of 2.64 mmhos/cm, or 3-day running average NDOI of 11,400 cfs) must be maintained at Chippis Island in February is determined by linear interpolation between 0 and 28 days.

[d] This standard applies only in months when the average EC at Port Chicago during the 14 days immediately prior to the first day of the month is less than or equal to 2.64 mmhos/cm.