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

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

ORDER CONDITIONALLY APPROVING A PETITION FOR TEMPORARYURGENCY CHANGES IN 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

On January 23, 2015, 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., to temporarily change their water right permits and license for the State Water Project (SWP) and Central Valley Project (CVP) (collectively Projects). In response to the ongoing drought emergency, the Petitioners sought changes to permit and license conditions imposed pursuant to State Water Resources Control Board (State Water Board) Water Right Decision 1641(D-1641) that require the Petitioners to meet flow-dependent and operational water quality objectives designed to protect fish and wildlife and agricultural beneficial uses in the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta). On February 3, 2015, the Executive Director issued an order approving in part the TUCP, subject to conditions. The Executive Director modified the February 3, 2015 Order on March 5, 2015, and on April 6, 2015. On May 21, 2015, the Petitioners submitted a request to the State Water Board to modify and renew the TUCP Order pursuant to Water Code section 1441, which allows for temporary change orders to be renewed for up to 180 additional days. The May 21, 2015 request replaces a request made on March 24, 2015, for changes during the July 1 through November 30 period on which the Executive Director had not yet taken action. This Order acts upon the May 21, 2015 request.

The February and March Orders approved changes to Delta outflow requirements, export limits, a requirement to close the Delta Cross Channel (DCC) Gates, and San Joaquin River flow requirements for the months of February and March. The April 6, 2015 Order extended the changes to Delta outflow and export requirements through June, and extended the change to the DCC Gate closure requirement through May 20, 2015. In addition, the Order changed the volume of the San Joaquin River at Vernalis spring pulse flow requirement (the timing of the requirement was also changed separately), changed the minimum San Joaquin River flow requirement at Vernalis

[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.

following the pulse flow period through June 30, and moved the compliance point for the Western Delta agricultural electrical conductivity (EC) (a measure of salinity) requirement from Emmaton on the Sacramento River to Threemile Slough on the Sacramento River during the April through June period. The April 6 Order did not act on requested changes after June 30 because it was anticipated that the Petitioners would submit a request for additional changes starting in mid-June if conditions continued to be historically dry. Further, DWR and Reclamation needed to submit a request to renew the TUCP Order for changes sought after August 3 since that date is 180 days after the February 3 Order. Unless renewed, a TUCP order remains in effect for 180 days.

In addition to the previous TUCP Orders, on May 4, 2015, the State Water Board issued a water quality certification to install an emergency drought barrier at West False River to help preserve water quality in the Delta. The temporary rock barrier will prevent tide-driven saltwater from pushing too deeply into the Delta and allow water managers to retain some water in upstream reservoirs for release later in the year.

The May 21, 2015 request seeks the following changes to D-1641 requirements:

1. For July, to reduce the minimum Delta outflow from a monthly average of 4,000 cubic feet per second (cfs), with a seven-day running average of no less than 3,000 cfs, to a monthly average of 3,000 cfs, with a seven-day running average of no less than 2,000 cfs;
2. To reduce the minimum Sacramento River flow requirements at Rio Vista from a monthly average of 3,000 cfs in September and October, and 3,500 cfs in November, to a monthly average of 2,500 cfs for all three months, with a seven-day running average of no less than 2,000 cfs; and
3. To extend through August 15 the change of the compliance point for the Western Delta agricultural salinity requirement from Emmaton on the Sacramento River to Threemile Slough on the Sacramento River.

This Order approves, subject to conditions, the changes described above and continues export constraints when the above requirements are not being met. In addition, in response to comments received related to this matter and updated information, this Order continues and modifies consultation, monitoring, modeling, reporting, and planning requirements included in the April 6 Order. Specifically, this Order imposes additional consultation, monitoring, modeling, reporting and planning requirements to: improve temperature management on the Sacramento and Stanislaus Rivers; ensure municipal water supply reliability from Folsom Reservoir and critical grid reliability; provide CVP refuge managers information to plan for water allocations this summer and fall; and better understand the effects of reduced Delta outflows with the temporary drought barrier at False River in place.

The April 6 Order required Reclamation to prepare and implement a Temperature Management Plan for the Sacramento River for the protection of winter-run Chinook salmon and other salmonids, so that the mortality of nearly all the brood year of juvenile winter-run Chinook salmon, which occurred in 2014, would not reoccur in 2015. Reclamation submitted a draft Temperature Management Plan for review and approval by the Executive Director in mid-April, and an updated plan on May 4, 2015. The Executive Director provisionally approved the Temperature Management Plan on May 14, 2015. Since that time, Reclamation has revised the plan based on updated temperature profile measurements taken at Shasta Lake and associated temperature modeling information. Reclamation submitted the revised plan for the Executive Director's review and approval on June 26. The additional monitoring, modeling, and reporting requirements imposed by this Order should serve to inform and improve real-time operations in accordance with the revised plan and to improve

planning in the future. This order does not approve the revised plan, however, which will be evaluated separately.

The April 6 Order also required Reclamation to develop and implement a plan approved by the Executive Director for operations of New Melones Reservoir that reasonably protects fish and wildlife on the Stanislaus River. Prolonged drought conditions in the San Joaquin River Basin and in the Stanislaus River sub-basin have led to very low reservoir storage levels in New Melones Reservoir which are expected to lead to very high temperatures on the Stanislaus River that will be harmful to steelhead this summer and fall-run Chinook salmon this fall. As a result, the April 6 Order required Reclamation to develop a plan to address these issues. Reclamation submitted a plan on May 15, 2015, that called for use of the low-level outlet on New Melones Reservoir to help control temperatures starting in July. Currently, however, storage levels are higher than originally projected, and it is not expected that the low-level outlet can be used until late August. Additionally, Stanislaus River temperature modeling indicates that high temperatures could be reduced for part of the late summer with releases of cold water from the low level outlet, but with a resulting higher release temperature in the fall. All of these issues create a significant concern regarding operation of New Melones this year and going into next year if drought conditions continue. Accordingly, this Order requires Reclamation to reevaluate the Stanislaus River plan given the changed conditions to determine if improvements can be made to operations to better protect fish and wildlife.

This Order also addresses concerns with potential low storage levels in Folsom Reservoir on the American River that may result from modifications in operations related to the TUCP and water supply concerns for power generation. Specifically, the Order requires that upon the request of the Executive Director, Reclamation and DWR propose adjusted operations to ensure that critical water supplies are available for municipal and industrial use, including to cities served by Folsom Reservoir, and to provide cooling water needed to maintain local grid reliability.

To address concerns that CVP refuge managers have identified with uncertainty about the timing and quantify of their water supplies this summer and fall, this Order requires Reclamation to coordinate with those refuges and provided needed information for the refuges to make planning decisions. Lastly, to ensure that needed monitoring is being conducted to understand and evaluate the effects of reduced Delta outflows in combination with a drought barrier that was installed at False River, this Order requires DWR and Reclamation to perform necessary monitoring.

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 determining whether the impacts of a change on fish and wildlife would be unreasonable, and whether the change 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 modifications approved by this Order apply to requirements to meet water quality objectives designed to protect fish and wildlife beneficial uses, with the exception of the change to the requirement to meet the salinity objective at Emmaton, which is designed to protect agricultural beneficial uses. As described in section 5.3 of this Order, 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. In addition, as described in more detail in section 5.4, as conditioned

by this Order, the potential impacts of the changes on fish and wildlife are not unreasonable, taking into consideration the need to conserve Project storage for municipal, agricultural and other water supply users, as well as for temperature control and other fisheries purposes below Project reservoirs, and salinity control in the Delta.

The changes approved in this order will reduce flows in the Bay-Delta in favor of improved water supplies and reservoir storage levels. The resulting impacts of the proposed changes on fish and wildlife in the Bay-Delta must be weighed against the impacts to all beneficial uses of water if the changes are not approved. California is in the midst of a significant, multi-year drought driven by the lack of rain and snowfall around the state. The historically low snowpack will result in very low inflows the remainder of the year that typically maintain stream flows over the summer and provide inflows to reservoirs. The drought is having devastating effects on communities, farmers, farm workers, the fishing industry, and the environment, and has caused substantial human suffering.

The potential water supply and storage savings from the changes approved by this Order (and the previous 2015 Orders described above) total almost 700 thousand acre-feet (TAF) of water. Conserving upstream storage is particularly important because water released from storage can serve multiple purposes, thereby maximizing the beneficial use of scarce water supplies. Specifically, water released from storage for temperature control to benefit salmon also can be used for agricultural or municipal purposes downstream or south of the Delta, or for salinity control in the Delta.

This Order achieves a reasonable balance of competing demands for the limited water supplies available during the ongoing drought, while taking into consideration: (1) the impacts of reduced Delta outflows on estuarine species and migrating salmonids in the Bay-Delta, (2) the need to conserve water in upstream storage for multiple, critical purposes later in the year, including temperature control on Project rivers, agricultural use, wildlife refuges, municipal and industrial use, and salinity control in the Delta, and (3) the need to export water for a variety of uses south of the Delta, including agricultural use, municipal and industrial use, and wildlife refuges.

2.0 BACKGROUND

2.1 Bay-Delta Plan, D-1641

The Water Quality Control Plan for the Bay-Delta Estuary (Bay-Delta Plan) specifies water quality objectives for the protection of beneficial uses of water in the Bay-Delta, including fish and wildlife, agricultural, and municipal and industrial uses. 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 the beneficial uses of water in the Bay-Delta. During that process, the State Water Board considered and balanced the various beneficial uses of water under various hydrologic conditions and acknowledged that there would be tradeoffs, especially during dry conditions.

In D-1641, based on various agreements that were reached by the Projects, the State Water Board amended the water right permits and license for the SWP and CVP to require the Projects to meet certain objectives in the Bay-Delta Plan[2]. Specifically, D-1641 places responsibility on DWR and Reclamation for measures to ensure that specified water quality objectives included in Tables 1, 2, and 3 of D-1641 are met, in addition to other requirements. The flow and water quality requirements

[2] D-1641 originally implemented the 1995 Bay-Delta Plan. In 2006, the State Water Board amended the Bay-Delta Plan to make minor modifications to the Program of Implementation.

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 (Chipps Island and Port Chicago Maximum Daily Average EC).

The objectives are intended to protect fish and wildlife living in or migrating through the Bay-Delta, and also to keep the Delta and water exported from the Delta from getting too salty for municipal and agricultural uses. Analyses completed to support the flow and salinity objectives in the Bay-Delta Plan and D-1641 were developed based on historic hydrologic conditions that included hydrologic conditions similar to the drought conditions experienced to date. However, the analyses did not include the additional constraints on Project operations that now exist under the U. S. Fish and Wildlife Service (USFWS) Biological Opinion on the Coordinated Long-Term Operations of the CVP and SWP (USFWS Biological Opinion) and National Marine Fisheries Service (NMFS) Biological Opinion and Conference Opinion for the Long-term Operation of the CVP and SWP (NMFS Biological Opinion). The analyses also did no account for the increased SWP demands that have been realized since the 1995 Bay-Delta Plan and D-1641 were adopted, or the large scale shifts from annual to permanent crops that have occurred since the 1995 By-Delta Plan and D-1641 were adopted that have increased the impacts of the drought on water users.

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.

Listed in Table 3 of the Bay-Delta Plan and D-1641, the Delta outflow objectives 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 July during critical water years is 4,000 cfs on a monthly average. Footnote 8 to Table 3 also specifies that for the May through January period for flow requirements less than 5,000 cfs, the 7-day running average shall not be less than 1,000 cfs below the requirement.

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 SWP and CVP pumping facilities to protect fish and wildlife uses. 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 USFWS, NMFS, and the California Department of Fish and Wildlife (CDFW) (hereafter collectively referred to as the fisheries agencies).

Sacramento River Flow at Rio Vista Requirements
The Sacramento River flow requirement is listed in Table 2 of the Bay-Delta Plan and D-1641 and includes one compliance location at Rio Vista. This monthly flow requirement in critical water years is 3,000 cfs during September and October and 3,500 cfs in November and December. Additionally, pursuant to footnote 11, the 7-day average is required to be no less than 1,000 cfs below the monthly objectives.

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, Water Supply Effects and Economic Effects

Hydrology
California is experiencing its fourth consecutive year of below-average rainfall and very low snowpack. Water Year 2015 is also the eighth of nine years with below average runoff, which has resulted in chronic and significant shortages to municipal and industrial, agricultural, and refuge supplies and historically low groundwater levels. As of June 23, 2015, 71 percent of the state is experiencing an Extreme Drought and 47 percent is experiencing an Exceptional Drought, as recorded by the National Drought Mitigation Center, U.S. Drought Monitor.

Of particular concern this year is the state's critically low snowpack which typically provides much of California's seasonal water storage. This year that snow pack was at historically low levels throughout the state. As of the end of May all of the snow stations were at zero percent of average. Typically snowmelt throughout the summer provides for inflows to streams and reservoirs during the dry summer months. This historically low snowpack will result in very low inflows until significant precipitation events occur.

In the Sacramento River watershed, Water Year 2012 was classified as below normal, Water Year 2013 as dry and Water Years 2014 and 2015 as critically dry. As of June 29, 2015, the Northern Sierra 8-Station Precipitation Index was at 36 inches, 74 percent of average. The lack of precipitation the last several years has contributed to low reservoir storage levels in the Sacramento watershed. Storage in Shasta Reservoir peaked at 2,722,000 acre-feet on April 16, 2015, which was 60 percent of capacity (69 percent of normal for April). It has since been drawn down to 49 percent of capacity (all storage levels as of end of June). Storage in Oroville Reservoir peaked at 1,812,640 acre-feet on April 17, 2015, which was 51 percent of capacity (63 percent of normal for April). It has since been drawn down to 40 percent of capacity. Folsom Reservoir peaked at 577,381 acre-feet on April 28, 2015, which was 59 percent of capacity (79 percent of normal for April). It has since been drawn down to 46 percent of capacity. Trinity Lake (water from the Trinity system is transferred to the Sacramento River system) peaked at 1,202,000 acre-feet on April 18, 2015, which was 49 percent of capacity (60 percent of normal for April). It has since been drawn down to 38 percent of capacity. These reservoir levels are of particular concern considering the expected lack of inflows throughout the summer and into fall.

The San Joaquin River watershed in particular has experienced severely dry conditions for the past four years. Water Year 2012 was classified as dry and Water Years 2013, 2014 and 2015 as

critically dry. As of June 29, 2015, the San Joaquin Valley 5-Station Precipitation Index is at 17.7 inches, 45 percent of average for this time of year. The lack of precipitation in the last few years has contributed to historically low reservoir storage levels throughout the watershed. Storage in New Don Pedro Reservoir peaked at 894,000 acre-feet on March 29, 2015, which was 44 percent of capacity (60 percent of normal for March). It has since been drawn down to 37 percent of capacity. Storage in New Melones Reservoir peaked at 607,235 acre-feet on March 3, 2015, which was 25 percent of capacity (40 percent of normal for March). It has since been drawn down to 17 percent of capacity. Storage in Millerton Reservoir peaked at 204,760 acre-feet on March 30, 2015, which was 39 percent of capacity (56 percent of normal for March). It has since been drawn down to 33 percent of capacity. Due to severe reductions in reservoir discharges New Exchequer Reservoir on the Merced River is still filling from upper watershed accretions, but is currently only at 13 percent of capacity (18 percent of normal for June).

Complications of Low-Reservoir Storage Levels

To complicate the storage issue in 2015, some of the reservoirs have physical characteristics which limit the release of water for water supply purposes and the release of cold water for fish and wildlife beneficial uses. In 2014, Reclamation lost control of their ability to release cold water Shasta Dam for fish and wildlife beneficial uses on the Sacramento River. The effects of limited cold water storage and loss of temperature control out of Shasta from mid-August through the fall of 2014 led to mortality to nearly all of the brood year 2014 endangered winter-run Chinook salmon and significant adverse effects on other salmonids. With the current and projected low storage levels in Shasta Reservoir this year, there has been great concern that there would be a repeat of these conditions this year that would have significant effects on the viability of the winter-run Chinook salmon population in the future.

There has also been great concern that low storage levels in New Melones Reservoir and associated elevated temperature conditions on the Stanislaus River this year will lead to very high or complete mortality of steelhead and fall-run Chinook salmon on the river this year, which is cause for significant concerns for the viability of those populations. Similar concerns exist for steelhead and fall-run Chinook salmon on the American River because storage levels are very low in Folsom Reservoir and river temperatures are expected to be very warm. In addition, there are significant concerns that diminishing storage levels will also make water in Folsom Reservoir inaccessible to municipalities that rely on that water.

To address some of these issues this year, the April 6 TUCP Order required Reclamation to develop and implement plans to protect fisheries from elevated temperatures on the Stanislaus and Sacramento Rivers. Reclamation submitted a draft plan for the Sacramento River in mid-April with updated information in early May. With that plan, Reclamation indicated that it believed that temperatures of 56 degrees Fahrenheit could be maintained throughout the temperature control season at the Clear Creek compliance location and also submitted modeling indicating that temperatures could be achieved. Based on that information, the Executive Director provisionally approved the draft plan. In late May however, Reclamation indicated that it could not maintain temperatures at 56 degrees at the Clear Creek compliance location throughout the temperature control season due to significant reductions in cold water supplies indicated in reservoir temperature profile readings beginning in late April and continuing through May. Based on this new information, the Executive Director suspended his provisional approval of the draft plan and directed that Reclamation work with the fisheries agencies and State Water Board staff to develop a revised plan.

Reclamation submitted a revised plan on June 25, 2015, that does not achieve a temperature of 56 degrees, but that should provide for stable slightly higher temperatures throughout the temperature

control season. Specifically, to maintain cold water supplies throughout the temperature control season, the plan calls for real-time operations that target 57 degrees at the Clear Creek compliance location without exceeding 58 degrees with minimized flows. The revised proposed plan is expected to be more protective over the long term than targeting 56 degrees with higher flows now and running out of cold water before the temperature control season is complete. However, there are still concerns with maintaining temperature control throughout the egg incubation period with the revised plan due to the very low cold water storage levels, expected heat waves, inaccuracies of the temperature control model that was used to help develop the revised plan and other issues that will need to be managed very closely. There are also concerns with meeting flow and salinity requirements in the Delta with these lower flows from Shasta Reservoir because Shasta Reservoir typically provides much of the flow needed to meet these requirements. To compensate for these changes, the revised plan is predicated on higher releases from Oroville and Folsom Reservoirs, reduced exports from the Delta, effective operation of the False River drought barrier, and approval of the changes included in the TUCP. Without the storage savings from the TUCP, it would be very difficult for Reclamation and DWR to meet minimal demands on the system, including salinity control, temperatures, and water supplies. The Executive Director is expected to act on the revised plan shortly.

Reclamation submitted an operations plan for the Stanislaus River on May 15, 2015, that identified projected storage conditions and expected operations. The proposed operations included use of the low level outlet on New Melones Reservoir beginning in July when reservoir levels reached approximately 300 TAF to provide access to cold water that is not accessible from the upper level outlet under the current low storage conditions. However, current storage levels in New Melones Reservoir are higher than expected and are not projected to reach 300 TAF until late August. This creates concerns for temperature management on the Stanislaus River in July and most of August if the low level outlet is not used until late August. As a result of these conditions, the Executive Director sent Reclamation a letter on June 26, 2015, directing Reclamation to evaluate options for improving temperature management and provide additional information.

Water Supply Allocations

With respect to water supplies, in 2014, DWR delivered 5 percent of its long-term contractor delivery requests and 100 percent to its Feather River senior settlement contractors. In 2014, Reclamation delivered no water to its (non-settlement) agricultural contractors and 50 percent to municipal and industrial contractors. Reclamation also delivered 75 percent to its settlement contractors and 65 percent to the exchange contractors on the San Joaquin River. For 2014, wildlife refuges received 65 to 75 percent of their Level 2 refuge deliveries depending on the location.

On March 2, 2015, DWR announced allocations of 839,566 acre-feet for deliveries to its contractors, about 20 percent of the 4.2 million acre-feet annual long-term SWP contractor requests. On February 27, 2015, Reclamation announced that the initial 2015 water supply allocation for its agricultural and municipal contractors is 0 and 25 percent, respectively. On March 27, 2015, Reclamation confirmed these allocations along with allocations of 75 percent to settlement and exchange contractors and refuges. Since that time, Reclamation has indicated that exchange contractor and CVP refuge allocations will likely be lower and the timing will be uncertain due to inadequate supplies to meet all CVP Project demands while also meeting minimal protections for fish and wildlife, particularly Sacramento River temperature control. The uncertainty regarding the amount and timing of supplies is a significant concern to water users south of the Delta who have planned on those supplies directly or for water exchanges, as well as refuge managers who are concerned about inadequate food supplies and disease outbreaks for birds on the Pacific Flyway due to inadequate water supplies this summer and fall.

Economic Effects of Water Supply Reductions

On July 15, 2014, the University of California Davis Center for Watershed Sciences released a report estimating the effects of the drought in 2014 on Central Valley farm production and providing data about effects of the drought in coastal and southern farm areas. The report also forecasted the drought's economic fallout through 2016. Key findings of the drought's effects in 2014 include:

- The total statewide economic cost of the drought in 2014 was $2.2 billion.
- Direct costs to agriculture totaled $1.5 billion of which $1 billion were due to revenue losses and $0.5 billion were due to additional pumping costs. This net revenue loss was about three percent of the state's total agricultural value.
- 17,100 seasonal and part-time jobs related to agriculture were lost representing 3.8 percent of farm unemployment.
- Approximately 428,000 acres, or five percent, or irrigated cropland went out of production in the Central Valley, Central Coast and Southern California.
- The Central Valley was hardest hit, particularly the Tulare Basin, with estimated losses of $800 million in crop revenue and $447 million in additional well-pumping costs.
- Statewide dairy and livestock losses from reduced pasture and higher hay and silage costs represented $203 million in revenue losses.

On June 8, 2015, the University of California, Davis updated these estimates on its California Water Blog (http://californiawaterblog.com/). They reported that California's agricultural industry gained a monthly average of more than 4,000 jobs in 2014, up one percent from 2013. Even though the drought has caused some growers to fallow hundreds of thousands of acres of land, other agricultural sectors have continued to grow. The growth in labor is largely from farmers shifting to more profitable permanent crops that usually take more farm workers to produce, such as tree fruits and nuts, and vine crops and vegetables. The job losses and other impacts from the large scale fallowing however, still has devastating local and regional effects on individual farmers, farm workers and many communities.

On May 31, 2015, the University of California, Davis released a paper for the California Department of Food and Agriculture entitled "Preliminary Analysis: 2015 Drought Economic Impact Study" (https://watershed.ucdavis.edu/files/biblio/2015Drought_PrelimAnalysis.pdf). Major findings from the paper include:

- The total statewide economic cost of the drought in 2015 will be $2.7 billion.
- Direct costs to agriculture will total $1.8 billion of which $0.9 billion will be due to revenue losses, $0.6 billion will be due to additional pumping costs and the rest will be due to livestock and dairy revenue loss.
- 18,600 seasonal and part-time jobs related to agriculture will be lost.
- Approximately 564,000 acres of irrigated cropland will go out of production in the Central Valley, Central Coast and Southern California.

2.3 Governor's Executive Orders

On January 17, 2014, Governor Brown proclaimed a State of Emergency due to severe drought conditions and directed the State Water Board, among other things, to consider modifying requirements for reservoir releases or diversion limitations that were established to implement a water quality control plan. Such modifications, which could be accomplished through actions on requests such as the TUCP, would enable water to be conserved in upstream reservoirs that may be

needed later in the year to protect cold water pools for salmon and steelhead, to maintain water supplies, and to improve water quality. To carry out this directive, Governor Brown also suspended the California Environmental Quality Act (CEQA), the CEQA regulations, and Water Code 13247 (requiring state agencies, including the State Water Board, to comply with water quality control plans unless otherwise directed or authorized by statute).

The directive applicable to the State Water Board's action on the TUCP and suspensions of law remain in effect. On April 25, 2014, the Governor issued a Proclamation of a Continued State of Emergency providing that the provisions of the January 17, 2014 Proclamation remain in full force and effect and also adding new provisions. On December 22, 2014, Governor Brown issued Executive Order B-28-14, which extended the waiver of CEQA and Water Code section 13247 contained in the January 17, 2014 and April 25, 2014 Proclamations through May 31, 2016. On April 1, 2015, Governor Brown acknowledged the continuing magnitude of the drought and issued Executive Order B-29-15, which requires the orders and provisions of the prior proclamations and executive orders to remain in full force and effect unless otherwise modified. The provisions of the January 2014 Proclamation that apply to this action are still in effect.

2.4 2014 TUCPs and Drought Contingency Plan

Last year, DWR and Reclamation filed a TUCP seeking changes to the water right permits for the SWP and the water right license and permits for the CVP that were similar to the changes sought this year. The Executive Director conditionally approved the 2014 TUCP on January 31, 2014. As the result of changed circumstances and subsequent requests from DWR and Reclamation, and in response to objections to the TUCP Order, the Executive Director modified the TUCP Order on February 7, 2014, February 28, 2014, March 18, 2014, April 9, 2014, April 11, 2014, April 18, 2014, May 2, 2014, and October 7, 2014, to extend and change the conditions of the TUCP Order. In the May 2, 2014 TUCP Order, the Executive Director renewed the TUCP Order, which subsequently expired on January 27, 2015.

On September 24, 2014, the State Water Board adopted Order WR 2014-0029, which addressed objections to and denied petitions for reconsideration of the Executive Director's January 31, 2014 TUCP Order and subsequent modifications thereto. While the State Water Board denied the petitions for reconsideration in Order WR 2014-0029, it did make some modifications to the TUCP Order in response to issues raised by some of the petitioners and other commenters in order to improve planning and coordination if dry conditions were to continue. Specifically, the Order required the preparation of a Water Year 2015 Drought Contingency Plan (DCP). The Order required the DCP to identify planned minimum monthly flow and storage conditions that consider Delta salinity control, fishery protection, and supplies for municipal water users related to projected flow and storage conditions. The Order required a final DCP by January 15, 2015, with updates as needed. DWR and Reclamation submitted the final DCP on January 15, 2015. The January 15, 2015 DCP identified likely 2015 TUCP requests by the Petitioners by month for the 50 percent, 90 percent, and 99 percent exceedance hydrologic scenarios. Each of these forecasts projected monthly storage levels, reservoir releases, Delta pumping rates, and Delta outflow through the end of September 30, 2015. The changes requested pursuant to the January 23, 2015 and May 21, 2015 TUCP are largely consistent with the January 15, 2015 DCP, with the exception of the request to modify Delta outflow in July.

2.5 Previous 2015 Orders

February 3, 2015 Order
On February 3, 2015, the Executive Director issued an order that took action on the January 23, 2015 TUCP. The February 3, 2015 Order approved the following temporary changes to D-1641 requirements during February and March:

1. The minimum daily average net Delta outflow requirement of 7,100 cfs or equivalent salinity specified in footnote 10 of D-1641, plus the requirement to meet higher flows of 11,400 cfs or equivalent salinity at Chipps Island for a certain number of days specified in Table 4 of D-1641, was reduced to a minimum Delta outflow requirement of 4,000 cfs;
2. When D-1641 requirements were not being met, the maximum rate of export from the Delta was limited to: (a) 1,500 cfs when Delta outflow was between 4,000 cfs and 7,100 cfs or the DCC Gates were open, or (b) up to the D-1641 limits when the DCC Gates were closed and Delta outflow was above 7,100 cfs but the additional requirements included in Table 4 were not being met except that those diversions were limited to natural and abandoned flows;
3. The requirement to close the DCC Gates was changed to allow the gates to be open under certain circumstances; and
4. The minimum San Joaquin River flow requirement at Vernalis was reduced from 710 or 1,140 cfs, depending on hydrology, to 500 cfs.

The February 3 Order did not approve a requested intermediate export level of 3,500 cfs when Delta outflow was at least 5,500 cfs.

March 5, 2015 Order
Subsequent to the issuance of the February 3 Order, the State Water Board received written comments, objections, and petitions for reconsideration. The State Water Board also held a public workshop on February 18, 2015, to receive oral comments on the January 23 Petition and the February 3 Order. These comments along with updated hydrologic, biologic, and water supply information informed the March 5, 2015 update to the February 3 Order. The March 5, 2015, Order modified the February 3 Order by specifying that:

1. Petitioners should use the conserved water pursuant to the TUCP in accordance with their 2015 DCP and Temperature Management Plan for the Sacramento River;
2. Water transfers were exempted from the export provisions; and
3. The intermediate export rate of 3,500 cfs was approved when Delta outflow was between 5,500 cfs and 7,100 cfs, the DCC gates were closed, and DWR or Reclamation determined that additional water was necessary to meet minimum public health and safety needs after notifying the Executive Director.

April 6, 2015 Order
On March 24, 2015, DWR and Reclamation requested approval of additional changes to D-1641 flow and water quality requirements through November of this year. The Executive Director issued an Order based on that request on April 6, 2015, that approved changes through June. The April 6 Order extended the changes to Delta outflow and export requirements described above through June, and extended the change to DCC Gate requirements through May 20. In addition, the April 6 Order made the following changes:

1. Separately, the Executive Director had approved a shift in the time period for the San Joaquin River at Vernalis pulse flow requirement from April 15 through May 15, to March 25 through April 25. The April 6 Order reduced the required volume of the pulse flow during this time period from 3,110 cfs, depending on hydrology, to 710 cfs. In addition, the April 6 Order required Reclamation to comply with the pulse flow requirement contained in the NMFS Biological Opinion;
2. The minimum San Joaquin River flow requirement at Vernalis was changed following the pulse flow period described above and until May 31 from 710 cfs or 1,140 cfs, depending on hydrology, to 300 cfs. In June, the requirement was reduced to 200 cfs; and
3. The compliance point for the Western Delta agricultural salinity requirement at Emmaton on the Sacramento River was moved to Threemile Slough on the Sacramento River from April through June.

In addition to the workshop on February 18 discussed above, the State Water Board also held workshops on May 20 and June 24, 2015, to discuss the TUCP and related matters. The State Water Board has also received numerous comments, objections and petitions for reconsideration related to this matter. The information from the workshops and comments were considered in development of this Order.

2.6 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 July 1 through November 30:

- For July, reduce the minimum Delta outflow from a monthly average of 4,000 cfs, with a seven-day running average of no less than 3,000 cfs, to a monthly average of 3,000 cfs, with a seven-day running average of no less than 2,000 cfs;
- Reduce the minimum Sacramento River flow requirements at Rio Vista from a monthly average of 3,000 cfs in September and October, and 3,500 cfs in November, to a monthly average of no less than 2,500 cfs for all three months, with a seven-day running average of no less than 2,000 cfs; and
- Extend through August 15 the change to the compliance point for the Western Delta agricultural salinity requirement from Emmaton on the Sacramento River to Threemile Slough on the Sacramento River.

2.7 Status of Fish Species and Biological Reviews

The extreme drought conditions that have been occurring for the last four years are having significant impacts on fish and wildlife. The TUCP changes will also have some effects on fish and wildlife, however it is difficult to separate these effects from the effects of the drought itself in many cases. As an attachment to the TUCP, the Petitioners submitted a Biological Review that was prepared for purposes of consultation with the fisheries agencies pursuant to the federal Endangered Species Act (ESA) and the California Endangered Species Act (CESA). The Biological Review evaluates the effects on fish species listed as threatened or endangered under the ESA and CESA, which can be indicators of conditions for aquatic species in general in the Delta watershed. Following is a summary of the potential effects of the TUCP changes, including information from the Biological Review that accompanied the TUCP.

<u>Delta Smelt</u>

Recent population indices for Delta smelt, which is listed as threatened under both the ESA and CESA, are at record low numbers. This is of particular concern given that most Delta smelt do not survive to spawn more than one season and are thus for the most part an annual species.

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 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 (Jassby et al. 1995). 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 Sacramento and San Joaquin rivers (Feyrer et al. 2007), 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).

While there are likely to be few adult Delta smelt that live through the summer, monitoring and historical data suggests the majority of those fish are and will continue to be located outside of the South Delta during the summer and fall. The fifth Spring Kodiak Trawl (SKT)[3] survey conducted the week of May 4, 2015, identified 4 adults in the Sacramento Deep Water Ship Channel (SDWSC), and one in Cache Slough. The fourth SKT survey, conducted during the week of April 6, 2015, identified one adult, which was a record low for that survey (Smelt Working Group (SWG);[4] May 13 notes). According to the SWG, it appears fish density has become so low that the SKT has reached or gone below its minimum effective detection ability (SWG; April 13 Notes). Additionally, in the final week (March 30) of supplemental USFWS sampling in the lower San Joaquin River, catch of adult Delta smelt declined precipitously to zero in the final month of sampling.

Delta Smelt spawning is likely to have peaked in March or April, with larvae detected in the Sacramento River system in early March, and larvae detected in the lower San Joaquin River in late March during the Smelt Larval Survey. A juvenile survey, conducted in late March and early April detected juvenile Delta Smelt in the San Joaquin River at Jersey Point, but the subsequent two surveys reflected presence only in SDWSC. As water temperatures rise, larvae will start to recruit to juvenile size and may begin to disperse further throughout the system. Juvenile Delta Smelt during the summer period typically reside in the LSZ around X2, with a substantial portion of the population remaining in the North Delta. The CDFW Summer Townet Survey (TNS) samples the distribution of Delta Smelt throughout the summer and early fall period, and in the summer of 2014 consistently detected Delta Smelt in both of these areas. It is thought that Delta Smelt in the Cache Slough Complex use deep water areas of Cache Slough and the Sacramento Deep Water Ship Channel as thermal refuges during high summer temperatures. Delta Smelt continue to feed and grow throughout summer months and begin to move upstream

[3] The SKT has sampled annually since its inception in 2002, and replaced the fall midwater trawl in order to more effectively track the movements of mature adult Delta smelt. The SKT samples 40 stations each month from January to May. These 40 stations range from San Pablo Bay upstream to Stockton on the San Joaquin River, Walnut Grove on the Sacramento River, and the SDWSC.

[4] The SWG consists of experts in Delta smelt biology from the USFWS, Reclamation, U.S. Environmental Protection Agency, DWR, NMFS, and CDFW. The SWG evaluates up-to-date biological and technical issues regarding Delta and longfin smelt and develops recommendations for consideration by the USFWS in its implementation of the USFWS Biological Opinion.

in early winter during periods of increased outflow and high turbidities, which typically do not commence until December.

The proposed TUCP changes will have effects on physical habitat and water quality which may affect Delta smelt. The changes will add to the already unfavorable conditions related to the dry conditions. The Biological Review finds that reductions in inflows and outflows associated with the changes to Delta outflow, Western Delta agricultural salinity and Sacramento River flows may reduce the general quality of habitat conditions throughout the Delta. Further, survival of Delta smelt that are currently in the interior and North Delta may be reduced through increased exposure to degraded habitat and predators and increased travel time for migrating fish. In the lower San Joaquin River, the upstream relocation of X2 may result in a greater proportion of the available habitat encompassing areas of high semi-aquatic vegetation and associated low turbidities. This could result in lower prey availability and higher predation rates on juvenile Delta smelt. Further constraining Delta Smelt closer to the upstream spawning areas in the lower Sacramento River, San Joaquin River, and the Cache Slough Complex/SDWSC will increase Delta smelt exposure to less favorable conditions. Conditions in these regions are generally warmer in the summer than locations further west due to prolonged heat waves and less marine influence. Juvenile Delta smelt may be able to reside in thermal refugia to reduce these effects, but it is not clear how long that cool water refugia will be available this summer. In addition, due to the more upstream location of X2, it is also likely that summer Delta smelt distributions will not be in areas for optimal growth and survival further west in Suisun Bay. Reduced inflows and outflows may also affect Delta smelt's ability to move downstream to cooler habitats with more food resources. These effects could pose additional risks to the persistence of local populations.

Because Delta smelt are not currently expected to be distributed in the central and south Delta and turbidity and exports are expected to be low when operating under the TUCP changes, the Biological Review finds that entrainment and salvage effects associated with the changes are unlikely.

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 second lowest Fall Midwater Trawl (FMWT) survey index in 2014. Similar low indices are also expected this fall. Based upon the most recent 20mm survey data, the majority of juvenile longfin smelt appear to be distributed in the lower Sacramento River near the confluence and in Montezuma Slough, with lower densities near Franks Tract in the South Delta. Given the limited distribution of larvae and juveniles in the Central and South Delta, and the very low levels of projected 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 minimal 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 (approximately 3.5 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 spawning and recruitment, though this effect is hard to quantify given the already poor environmental conditions due to the drought.

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. Since most of these species are not afforded the protections of ESA and CESA, many have undergone population declines over the history of water development in the Bay-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.

Winter-Run Chinook Salmon

The endangered winter-run Chinook salmon is of particular concern during drought years. Prior to the spawning period for winter-run Chinook salmon in the summer, adults 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. After spawning, the fertilized eggs require cold water to ensure their proper development (temperatures above 56 degrees Fahrenheit being less than optimal). It is particularly important to provide appropriate temperature conditions during the egg development period, typically late May through early fall, because immobile eggs are not able to seek thermal refugia as fry and parr are able to do. Adults returning to the river in 2015 are predominantly members of the cohort from BY 2012 (assuming a 3-year cohort cycle). Based on cohort replacement rate (CRR)[5] estimates, BY 2012 had the fifth lowest CRR since 1992, making this year's run of particular concern.

As discussed above, temperature control was lost several weeks before the end of the egg incubation life stage last year resulting in almost total mortality to the 2014 winter-run brood year. Temperature management will be difficult again this year. This is of particular concern given winter-run Chinook's endangered status and extremely limited distribution, which reduces this population's ability to withstand environmental perturbations, especially during a prolonged drought when each of the existing brood years has been already negatively affected by drought conditions.

As discussed above, the proposed changes should improve conditions for winter-run Chinook salmon this summer and early fall, by conserving cold-water in Shasta Reservoir for use through the spawning and egg incubation period. Nonetheless, the concern for winter-run Chinook continues this year due to the higher target temperatures (57 to 58 degrees), uncertainty concerning the temperature model, limited amount of cold water available and higher air temperatures.

Spring-Run Chinook Salmon

The 2014 spawning run of spring-run Chinook salmon returning to the upper Sacramento River system also experienced significant impacts due to drought conditions as well as elevated temperatures on the Sacramento River and other tributaries. Similar to winter-run, spring-run eggs in

[5] An evaluation of one spawning generation compared to the next is known as the CRR. It is a parameter used to describe the number of future spawners produced by each spawner. This spawner-to-spawner ratio is defined by the number of naturally spawning adults in the previous generation. The ratio describes the rate at which each subsequent generation, or cohort, replaces the previous one, and can be described as a natural cohort replacement rate.

the Sacramento River experienced significant and potentially complete mortality due to high water temperatures downstream of Keswick Dam starting in early September 2014 when water temperatures exceeded 56 degrees Fahrenheit. Extremely few juvenile spring-run Chinook salmon were observed this year migrating downstream of the Sacramento River during high winter flows, when spring-run originating from the upper Sacramento River, Clear Creek, and other northern tributaries are typically observed, indicating that the population was significantly impacted. Similar concerns for spring-run exist this year as for winter-run. While spring-run have greater distribution and inhabit locations in addition to the Sacramento River, conditions on those streams are also expected to be poor due to the drought. The conservation of storage expected as a result of the changes in the TUCP are expected to also benefit spring-run this year.

Fall-Run Chinook Salmon

Impacts to other anadromous species not addressed in the Biological Review, including commercially important fall-run Chinook salmon are also expected as a result of the drought. If these impacts are severe enough they could result in significant impacts to the commercial and recreation fishing industry.

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 55 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 likely to improve conditions for fall-run Chinook by conserving water in Project reservoirs that may be needed for temperature control in the fall. Despite this improvement, however, projected end of September storage conditions in Shasta, Folsom and New Melones Reservoirs may be insufficient to avoid significant impacts to fall-run Chinook salmon spawning and incubating during the end of 2015 because of a lack of cold water pool availability.

Steelhead

Steelhead have also likely been affected by the drought, but given the difficulty in sampling for these fish it is problematic to determine exactly how the species have 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 though, 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.

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 SWP and CVP 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.

2.8 Emergency Drought Barrier

On April 17, 2015 DWR applied for water quality certification to install an emergency drought barrier at West False River to help preserve water quality in the Delta. The temporary rock barrier will prevent tide-driven saltwater from pushing too deeply into the Delta and allow water managers to retain some water in upstream reservoirs for release later in the year. The State Water Board issued a water quality certification for the West False River barrier on May 4, 2015, and DWR completed closure of the barrier in late May and full construction in mid-June. Although the State Water Board approved the emergency drought barrier separately, installation of the barrier, together with the changes approved by this Order, will affect water quality and flows in the Delta. Accordingly, this Order addresses the need for additional monitoring in light of the barrier.

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

Ordinarily, the State Water Board must comply with any applicable requirements of CEQA prior to issuance of a temporary urgency change order pursuant to Water Code section 1435. (See Cal. Code Regs., tit. 23, § 805.) The Governor's April 1, 2015 Executive Order B-29-15 extended the waiver of CEQA and Water Code section 13247 contained in the prior proclamations and executive orders through May 31, 2016. 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 temporary urgency change petition. (Resolution 2012-0029, ¶¶ 2.2, 4.4.1)[6]

The State Water Board issued a notice of the original TUCP this year (submitted on January 23, 2015) on January 27, 2015. In addition to the Board providing public notice of the TUCP, the Petitioners published the notice in 19 newspapers from January 31 to February 5, 2015, in accordance with Water Code section 1438, subdivision (b)(1). Workshops were held on February 18 and May 20, 2015, which were also publically noticed, and provided a forum for individuals and entities to comment on the TUCP, and other drought related issues. On June 8, 2015, the State Water Board issued a notice for the May 21, 2015 request to modify and renew the TUCP. Similar to the January 23 TUCP, and in accordance with Water Code section 1438, subdivision (b)(1), the Petitioners published the notice in newspapers from June 20 to Jun 28, 2015. The State Water Board also posted the request on its website, and notified persons on its email distribution lists of the request. The State Water Board also held another workshop on June 24, 2015, to discuss drought

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

related Project operations this year, particularly proposed operations to control temperatures on the Sacramento River this summer.

Since the original notice of the first TUCP in January, the State Water Board has received numerous comments, objections and petitions for reconsideration. This Order does not provide written responses to all of the comments and objections due to the urgent nature of the request and the limited time to respond to the large number of comments and objections received. To the extent that issues have not been addressed, written responses will be provided at a later date. Although complete written responses are not being provided at this time, the comments, objections, and issues raised in the petitions for reconsideration were considered in reaching this decision.

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 change orders expire automatically 180 days after issuance, unless they are revoked or an earlier expiration date is specified. (*Id.*, § 1440.) The State Water Board may renew temporary urgency change orders for a period not to exceed 180 days. (*Id.*, § 1441.)

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, Sacramento River flow at Rio Vista, and Western Delta agricultural salinity requirements at Emmaton on the Sacramento River. 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; and (3) in the public interest.

Following is a summary of the changes conditionally approved in this Order:

- For the remainder of July, a reduction of the minimum Delta outflow requirement from a monthly average of 4,000 cfs, with a seven-day running average of no less than 3,000 cfs, to a monthly average of 3,000 cfs, with a seven-day running average of no less than 2,000 cfs;
- A reduction of the minimum Sacramento River flow requirements at Rio Vista from a monthly average of 3,000 cfs in September and October, and 3,500 cfs in November, to a monthly average of 2,500 cfs for all three months, with a seven-day running average of no less than 2,000 cfs; and
- Through August 15, the movement of the compliance point for the Western Delta agricultural salinity requirement from Emmaton on the Sacramento River to Threemile Slough on the Sacramento River.

This Order continues the requirement for the Petitioners 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 not unreasonably affect fish, wildlife, and other instream uses of water. During the effective period of this Order, Petitioners propose to continue to consult with members of an ad hoc team, referred to as the RTDOMT, that was established in 2014 to fulfill this requirement.

This Order also continues the condition from the February 3, March 5, and April 6 Orders that required DWR and Reclamation 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.

This Order continues and augments the requirement for DWR and Reclamation to develop monthly water balance estimates indicating actual and proposed operations through the end of the water year. To better understand the effects of the TUCP, this Order adds a requirement that DWR and Reclamation also identify any Coordinated Operations Agreement[7] imbalances. In addition, this Order continues the requirement for DWR and Reclamation to conduct necessary modeling and monitoring to inform real-time operational decisions and adds a specific requirement that necessary monitoring be conducted to understand the effects of reduced outflows with the emergency drought barrier at False River installed.

This Order continues the requirement that Reclamation implement a Temperature Management Plan on the Sacramento River as approved by the Executive Director. In addition, this Order imposes additional temperature monitoring, modeling, reporting and planning requirements to improve real-time temperature management on the Sacramento River.

This Order also continues and modifies the requirement for Reclamation to develop and implement a plan approved by the Executive Director for operations of New Melones Reservoir that reasonably protects fish and wildlife on the Stanislaus River. This Order also requires Reclamation to evaluate and document the effectiveness of this year's operations to protect fishery resources.

[7] The Coordinated Operations Agreement (COA) is an agreement between the United States of America and the State of California that determines the respective sharing of water costs between the Projects to meet D-1641 objectives in the Delta. The agreement was enacted in 1986 for coordinated operations of the Projects. The principal tools the Projects rely on to meet D-1641 objectives in the Delta include increasing releases from upstream Project reservoirs, reduction in Project exports, and opening of the Delta Cross Channel Gates (DCC).

Upon the request of the Executive Director, this Order requires Reclamation and DWR to propose adjusted operations to ensure that critical water supplies are available for municipal and industrial use, including to cities served by Folsom Lake, and to provide cooling water needed to maintain grid reliability. This Order also requires Reclamation to consult with CVP refuge contractors and provide necessary information for their planning decisions.

This Order continues to reserve the Executive Director's authority to require modifications to the Order to protect fish and wildlife or other uses of water based on additional information.

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 fourth year of drought. Reservoir levels are very low and will likely recede quickly due to historically low snowmelt and resulting significantly reduced inflows to reservoirs and streams. These reduced storage levels and reduced inflows create an urgent need to conserve, protect, and provide flexibility in making existing water resources available for various uses.

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 over 330 TAF of water supply and storage benefits (see table below). Combined with the previous orders conditionally approving the TUCP this year, the water supply and storage benefits total almost 700 TAF this year. 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 to protect temperatures on the Sacramento River. In order to maintain this water in storage, reservoir releases must be reduced. As discussed above, reduced reservoir releases from Shasta Reservoir increase the burden on other Project facilities to meet Delta salinity and outflow requirements. The changes in this Order will reduce those effects. The Executive Director will also continue to monitor the situation to determine whether DWR and Reclamation should be required to propose adjusted operations to ensure that critical water supplies are available for municipal and industrial use, including to cities served by Folsom Lake, and to provide cooling water needed to maintain grid reliability.

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 and south of Delta 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 water supplies for contractors, salinity control and fisheries purposes.

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

Reductions in Flows and Water Supply/Storage Savings Under the TUCP Order July Through November*

Assumed D-1641 Requirements (cfs)	Jul	Aug	Sep	Oct	Nov
Rio Vista Flows	N/A	N/A	3,000	3,000	3,500
Delta Outflows	4,000	3,000	3,000	3,000	3,500
Salinity Compliance Location	Emmaton	Emmaton	N/A	N/A	N/A
TUCP Requirements (cfs)	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**
Rio Vista Flows	N/A	N/A	2,500	2,500	2,500
Delta Outflows	3,000	3,000	3,000	3,000	3,500
Salinity Compliance Location	Threemile Sl.	Threemile Sl.	N/A	N/A	N/A
Theoretical Savings (TAF)	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**
Rio Vista Flows	N/A	N/A	29.8	30.7	29.8
Delta Outflows	61.5	0	0	0	0
Salinity Location & Barrier	73.5	64.7	47.1	-2.3	0
Total	135.0	64.7	76.8	28.5	29.8
Total of Theoretical Saving July through November (TAF) =					334.8

*Notes: Assumes the same savings for salinity compliance as last year, though the savings this year will likely be higher than last year if conditions remain dry.

Together, operations to meet unchanged Delta outflow, Sacramento River flow at Rio Vista, and Emmaton salinity could have a variety of effects depending how operations would be prioritized. It could significantly deplete storage, reduce deliveries north of the Delta and reduce opportunities to export water, making those supplies unavailable for the remainder of the season, for water supply contractors, prior water right holders, fisheries protection, control of Delta salinity and refuge supplies. Reductions in supplies to water users upstream of the Delta would reduce the ability of those water users to provide much needed transfers during the drought, which would adversely affect south of Delta export users and potentially 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 and length 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 several years, and to help address the associated severe economic impacts in some communities, 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 flow and salinity requirements, and adequate flows are expected to remain in the system to meet the demands of other lawful users of water. Moreover, 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 Sacramento River at Emmaton agricultural salinity requirement to prevent injury to other lawful users of water.

The Petitioners also 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 in various locations in the Delta similar to what occurred last year. However, records of historic salinity measurements indicate that these increases would be less than what would occur without the Projects because the Projects ensure that salinity does not intrude upstream into the Delta by supplementing natural inflow with storage releases in very dry conditions like this year when salinity would otherwise intrude far upstream into the Delta. 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

The USFWS submitted a concurrence letters on June 26, 2015, and NMFS and DFW submitted concurrence letters on July 2, 2015, indicating that the changes proposed in the TUCP are in compliance with ESA and CESA requirements. The concurrence letters also address issues related to, but outside of the scope of this approval, including the Sacramento River temperature management plan, extension of the transfer window and the False River drought barrier. In their concurrence letter, USFWS concurred with Reclamation's determinations that the proposed changes to D-1641 for July through November 2015 are consistent with the range of effects previously analyzed in the 2008 Biological Opinion. USFWS acknowledges the conclusions in the Biological Review that the ongoing drought continues to affect Delta smelt and that there are uncertainties in these conclusions. USFWS states that the continued declining trend in Delta smelt abundance raises concern regarding impacts of drought-related stressors on the population, and that Delta smelt entrainment risk will be subject to reevaluation and adjustment to changing conditions. Furthermore, abundance trends and risk evaluation will be based on a review of Delta smelt distribution and catch data, ongoing Interagency Ecological Program monitoring and fish salvage operations, as well as gauge data. In their concurrence letter, NMFS concurred that operations under the proposed changes requested by the TUCP are within the limits of the Incidental Take Statement of the 2009 Biological Opinion. NMFS finds that the potential effects of the proposed changes under the TUCP were considered under the 2009 Biological Opinion. However, NMFS acknowledges that quantifying the specific effects of any particular action, or the full suite of actions, is difficult as a result of combined uncertainties relating to migration timing of listed species, quantitative relationships, and specific timing, magnitude, and duration of any particular action. Based on the concurrence

determinations by USFWS and NMFS, and based on CDFW's review of the changes and associated Biological Review, CDFW also concurs that the existing CDFW consistency determinations remain in effect and no further CESA authorization from CDFW is necessary.

In addition to the fisheries agencies, the Central Valley Regional Water Quality Control Board (Central Valley Board) submitted an email in accordance with California Code of Regulations Title 23, section 794 requiring water right petitioners to consult with the appropriate Regional Water Quality Control Board regarding potential effects of the proposed changes. The Central Valley Board submitted comments recommending that the Projects participate in the Central Valley Board's Regional Monitoring Program (RMP) to help to better understand trends in water quality and related issues. This Order does not specifically address the longer term efforts of the RMP, but does require various activities to better understand the effects of the changes on water quality and 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 irrigated agriculture, municipal and industrial use, use by wildlife refuges, stored water needed for downstream temperature control and salinity control in the Delta, and other fish and wildlife uses. Further, the effects that have occurred to the species over several years must be considered. Information previously submitted by the fisheries agencies summarized how insufficiencies in the quality and quantity of Delta flows have contributed to the decline of the Delta ecosystem. Several processes to ameliorate the effects of these insufficiencies at the state, federal and local levels include development of Biological Opinions, Recovery Plans, Delta Outflow criteria, comprehensive review and update of the Bay-Delta Plan, and drought contingency planning, as well as many other efforts.

As discussed above, historically low snowpack will result in very low inflows the remainder of the year that typically maintain stream flows over the summer and provide inflows to reservoirs. These dry conditions are expected to adversely affect habitat conditions for various species. While maintaining the D-1641 flow and water quality requirements would provide some short-term benefits to these species, the overriding effects of the drought would persist. Further, meeting those requirements would reduce the storage available in Project reservoirs later in the year for cold-water flows for fish, deliveries to agriculture, municipalities, wildlife refuges and other users, for salinity control and minimal reserves 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 very likely that Reclamation would not be able to maintain temperature control in accordance with the revised temperature management plan without significantly impacting water supplies for Sacramento River settlement contractors, exporters, and the municipal and agricultural users and fishery resources dependent on other Project reservoirs, including Folsom and Oroville.

As discussed above, 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. As mentioned previously, groundwater supplies after four years of drought 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.

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 address the significant concerns with temperature management for winter-run and other Sacramento River salmonids this year, this Order requires Reclamation to operate in compliance with a revised Temperature Management Plan approved by the Executive Director and to update that plan as necessary. This Order also requires Reclamation to conduct additional consultation, modeling, monitoring, reporting and planning to improve temperature management on the Sacramento River.
2. To address the concerns described above with operations of New Melones, this Order requires Reclamation to perform additional consultation and temperature modeling to update its plan required by the April 6 TUCP Order to protect fish and wildlife from elevated temperatures and related impacts due to low storage conditions. The Order requires Reclamation to implement the approved plan and any changes directed by the Executive Director necessary to reasonably protect fish and wildlife. To improve planning in the future, the Order also requires Reclamation to submit a report that evaluates and documents the effectiveness of this year's Stanislaus River operations in protecting fishery resources.
3. This Order requires DWR and Reclamation to conduct necessary modeling and monitoring and to prepare other necessary technical information to inform operational decisions. Specifically, this Order requires DWR and Reclamation 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.
4. This Order further requires Reclamation to consult with and provide information to CVP refuge contractors to improve planning for refuge supplies.

In summary, the changes that may result in reductions in flows approved in this Order balance the various uses of stored water into the summer and fall by improving water supplies for water allocations, wildlife refuges, and salinity control, and at the same time meeting temperature control requirements. Additionally, the reductions to Delta outflows, Rio Vista flows, and change in Western Delta salinity requirements will allow the Projects to conserve upstream storage for use later in the year for fish and wildlife and other uses. Based on the above, the potential for impairment to fish, wildlife, or other instream beneficial uses from the approved temporary changes is not unreasonable considering the water supply benefits of the changes, and the impacts to agricultural, municipal and wildlife refuge supplies and fish and wildlife that could occur if the temporary changes are not approved.

5.5 The Proposed Change is in the Public Interest

The temporary modifications authorized in this Order will make the best use of limited water supplies and are accordingly in the public interest. As discussed above, hydrologic and water supply conditions in the Bay-Delta watershed continue to be highly impacted by the drought and are inadequate to meet all of the demands 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 municipal and agricultural supply, wildlife refuge supplies, temperature control on the Sacramento River and salinity control in the Delta. The changes approved in this

Order will also allow for exports for critical purposes. 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 in part, 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. This Order shall be effective until December 30, 2015.

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 Decision 1641 for DWR and Reclamation to meet specified water quality objectives are amended as follows:

    a. During July, the minimum Delta outflow level specified in Table 3 of Decision 1641 as measured by the Net Delta Outflow Index (NDOI) described in Figure 3 of Decision 1641 shall be no less than 3,000 cubic-feet per second (cfs) on a monthly average. The 7-day running average shall be no less than 1,000 cfs below the monthly average.

    b. During September, October and November the minimum Sacramento River at Rio Vista flow rate specified in Table 3 of Decision 1641 shall be no less than 2,500 cfs on a monthly average. The 7-day running average shall be no less than 2,000 cfs.

    c. Through August 15, 2015, the Western Delta, Sacramento River at Emmaton electrical conductivity (EC) compliance location specified in Table 2 of Decision 1641 is moved to Threemile Slough on the Sacramento River.

    d. Through November 30, 2015, the maximum Export Limits specified in Table 3 of Decision 1641 are modified as follows:

        i. When Decision 1641 Delta outflow, Rio Vista flow, and Emmaton EC requirements in Tables 2 and 3 of Decision 1641 are not being met, the combined maximum exports at the SWP Banks Pumping Plant and the CVP Jones Pumping Plant shall be no greater than 1,500 cfs.
        ii. During the effective period of this Order, if precipitation events occur that enable DWR and Reclamation to fully comply with the above referenced requirements, then Decision 1641 requirements 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.iii.
        iii. These export limitations do not apply to water transfers. Based on additional information or changed circumstances, the export limits

imposed pursuant to this Order may be modified through the consultation process described in condition 2, below.

2. DWR and Reclamation shall consult on a regular basis with designated representatives from the State Water Board, the National Marine Fisheries Service (NMFS), the U.S. Fish and Wildlife Service, and the Department of Fish and Wildlife (DFW) (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. The Executive Director will designate a representative who will be authorized to make real-time operational decisions, including how often DWR and Reclamation need to consult with representatives of the State Water Board and fisheries agencies. If the State Water Board approves any additional temporary urgency changes pursuant to the temporary urgency change petition that is the subject of this Order, or otherwise modifies this Order, the State Water Board will provide notice and an opportunity for interested persons to comment or object. Based on public comments or objections, further changes may be made to this Order. Information concerning changes to this Order will be posted on the State Water Board's website within 24 hours.

3. DWR and Reclamation shall calculate and maintain a record of the amount of water conserved in storage or exported through the changes authorized by this Order, as well as a record of where that water was conserved, and shall submit such records on a monthly basis to the State Water Board and fisheries agencies within 20 working days after the first day of the following month. The water conserved as a result of this approval shall be used in accordance with the Petitioners' current CVP and SWP operations plan associated with the June 25, 2015 revised Temperature Management Plan for the Sacramento River with any updates that are agreed to through the consultation process described in condition 2 above.

4. DWR and Reclamation shall develop monthly water balance estimates indicating actual and proposed operations through the end of the water year, including:

    a. Upstream: Inflows to and storage levels in the major reservoirs (Shasta, Folsom, Oroville, Trinity, Whiskeytown, New Melones). River releases from the aforementioned reservoirs. Flows in the San Joaquin River above the junction with the Stanislaus River. 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;

    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;

e. South of Delta water transfers, including the transferors, transferees and the quantities transferred; and

f. Any Coordinated Operations Agreement imbalances.

The water balance 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.

5. DWR and Reclamation shall conduct necessary modeling and monitoring and prepare other necessary technical information to inform operational decisions. Specifically, DWR and Reclamation shall conduct necessary monitoring to understand the effects of operations associated with the temporary drought barrier at False River, including reductions in Delta outflows. DWR and Reclamation shall consult with the fisheries agencies and State Water Board staff through the consultation process described in Condition 2 above to identify needed modeling and monitoring. Required modeling and monitoring shall be determined by the Executive Director or his representative, taking into consideration input from the relevant agencies, including DWR, Reclamation, and the fishery agencies. DWR and Reclamation shall timely make available technical information to inform these operational decisions, including planned operations, temperature models, modeling and monitoring information, water quality modeling and monitoring 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. DWR and Reclamation shall report to the Board monthly at its Board meetings on their drought operations and the information discussed above.

6. Pursuant to the requirements of this Order and State Water Board Order WR 90-5, Reclamation, in consultation with the fisheries agencies, shall take the following actions:

   a. Reclamation shall implement the Sacramento River Temperature Management Plan with any changes required by the Executive Director. Key elements of the Plan from the Shasta Temperature Management Plan-Key Concepts include:

      i Base Keswick releases of 7,250 cfs in June and July.
      ii Base Keswick releases of 7,250 cfs in August, 6,500 cfs in September, and 5,000 cfs in October, subject to change in accordance with the real-time monitoring and decision making process described below based on the performance of the plan in June and July.
      iii Actual operations will be decided using a real-time monitoring and decision making process that includes representatives from the relevant federal and State agencies. This decision making process may yield adjustments to base operations depending on real-time conditions on the ground.
      iv Reclamation will convene the real-time monitoring and decision making group at least weekly, and more frequently if necessary to inform decisions about temperature operations.

v Decisions regarding real-time adjustment to base operations will be made using the principles identified in the Shasta Temperature Management Plan-Key Components.

b. Reclamation shall immediately update the Sacramento River Temperature Management Plan as conditions change or upon the request of the fisheries agencies or Executive Director or his designee. The plan shall provide reasonable protection for winter-run Chinook salmon during the 2015 spawning and rearing period and consider other fisheries needs, including spring-and fall-run Chinook salmon. Reclamation shall conduct all necessary modeling, monitoring and reporting to inform temperature operations. Specifically, Reclamation shall submit to the fisheries agencies and State Water Board staff:

i. Updated reservoir temperature profile measurements no less than weekly for Shasta and every two weeks for Trinity and Whiskeytown reservoirs in digital format, unless otherwise approved;
ii. Immediately upon any change in conditions or upon the request of the fisheries agencies or State Water Board staff, updated annotated temperature modeling including the following information:
    1. Identification of the model run date;
    2. Input and output files;
    3. Keswick flow release level (if static), or time series, as appropriate;
    4. The meteorological assumptions used for the run;
    5. Titles or notes that explain the temperature target of the run, and at what location; and
    6. Other notes that describe if the run was done to target a specific temperature based on the other run assumptions or if the meteorological conditions were simply imposed on another run.

iii. With the exception of weekends and holidays, daily updates of average daily river temperature conditions, including the Shasta temperature control device weighted average, Spring Creek Power House weighted average, and Sacramento River miles 302, 298 and 293 temperatures; 10-day forecasted Redding high and low air temperatures; and
iv. Actual and forecasted CVP and SWP monthly operations immediately upon any significant change in conditions, including input assumptions for major system inflows and outflows, including accretion and depletion assumptions.

c. For the remainder of the drought, Reclamation shall meet no less than weekly with the Sacramento River Temperature Task Group (SRTTG) to discuss operations and options for reducing or avoiding redd dewatering, stranding and temperature impacts to winter-run Chinook salmon. Reclamation shall immediately notify the SRTTG of any significant changes to environmental or operational conditions that may affect temperatures and shall convene a meeting with the SRTTG to discuss unless the SRTTG members indicate a meeting is not needed. Reclamation shall provide notes from the meetings to the SRTTG within 5 days following the meeting for review and approval and shall post the approved notes and handouts from the meetings on its website immediately upon approval.

Reclamation shall confer on recommendations from the SRTTG during the consultation process and other applicable CVP and SWP operational decision-making meetings. Reclamation shall immediately make available technical information requested by the Executive Director or his designee through the consultation process. Reclamation shall report monthly to the State Water Board during its Board meeting on actions that have been or will be taken to reduce impacts to winter-run Chinook salmon, through the remainder of the drought.

d. Reclamation shall meet with State Water Board and fisheries agency staff before August 7, 2015, to develop a plan for providing information and tools needed to independently run the Sacramento River Temperature model.

e. In consultation with the fisheries agencies and State Water Board staff, perform a review and evaluation of the water year 2015 temperature control season to evaluate the effectiveness of temperature control operations this year, as well as necessary actions to improve temperature control operations in the future, beginning in the next water year. Reclamation shall perform any necessary analyses to identify the source of any significant discrepancies between projected and observed temperatures. All analyses associated with this evaluation shall be submitted with the evaluation. The evaluation shall be submitted to the State Water Board and SRTTG by January 15, 2016.

7. In consultation with the fisheries agencies, Oakdale and South San Joaquin Irrigation Districts and State Water Board staff, Reclamation shall revise its May 15, 2015 plan to reasonably protect fish and wildlife on the Stanislaus River using current hydrologic and storage information and revised temperature modeling. The assumptions for the temperature modeling shall be developed in consultation with the organizations identified above and shall be prepared as soon as practical. The plan shall identify how operations on the Stanislaus River will be managed this summer and fall to minimize impacts to fish and wildlife, including optimizing use of the low level outlet on New Melones Reservoir for temperature control and other operational measures. The plan shall be submitted to the Executive Director for approval and to the fisheries agencies by July 10, 2015, and shall be updated as necessary based on changed circumstances. Reclamation shall implement the approved plan and any changes directed by the Executive Director necessary to reasonably protect fish and wildlife.

8. In consultation with the fisheries agencies, Reclamation shall prepare and submit to the State Water Board a report that evaluates and documents the effectiveness of this year's Stanislaus River operations in protecting fishery resources. Specifically, that report shall evaluate the effectiveness of New Melones blending operations between the upper and lower outlets and any other measures taken to improve temperatures, any concerns with operating the lower outlet, actual temperature conditions in the river downstream of Goodwin Dam, and observed fisheries conditions resulting from the operations. The report shall be submitted to the Executive Director and fisheries agencies by January 15, 2016.

9. Upon request of the Executive Director, Reclamation and DWR will propose adjusted operations to ensure that critical water supplies are available for municipal and industrial use, including to cities served by Folsom Lake, and to provide cooling water needed to maintain grid reliability.

10. Reclamation shall promptly consult with CVP refuge contractors regarding forecasted operations and shall provide all requested information concerning forecasting, operational assumptions, and the proposed timing and quantity of refuge water deliveries. Reclamation shall maintain regular consultation with refuge contractors in the fall and winter months to share information regarding current hydrological and biological conditions, and shall work with refuge contractors to adaptively manage the delivery of refuge water supplies as needed.

11. While DWR and Reclamation are operating under the changes approved by condition 1.c. of this Order, they shall bypass natural and abandoned flows to prevent injury to other lawful users of water.

12. This Order may be further modified by the Executive Director or the State Water Board based on additional public input or changed circumstances.

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.

STATE WATER RESOURCES CONTROL BOARD

ORIGINAL SIGNED BY

Thomas Howard
Executive Director
Dated: July 3, 2015

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. Must be provided in intervals of not less than two weeks duration. (Percentage of Calendar Year shown in parenthesis)*			*No. of days each Calendar Year ≤ 150 mg/l Cl^-*
-or-				*W*		*240 (66%)*
San Joaquin River at Antioch Water Works Intake	*D-12 (near) (RSAN007)*			*AN*		*190 (52%)*
				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 Con-Ductivity (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 ***-and-*** *San Joaquin River at Brandt Bridge site[5]* ***-and-*** *Old River near Middle River [5]* ***-and-*** *Old River at Tracy Road Bridge [5]*	*C-10 (RSAN112)* *C-6 (RSAN073)* *C-8 (ROLD69)* *P-12 (ROLD59)*	*Electrical Conductivity (EC)*	*Maximum 30-day running average of mean daily EC (mmhos/cm)*	*All*	*Apr-Aug* *Sep-Mar*	*0.7* *1.0*
EXPORT AREA						
West Canal at mouth of Clifton Court Forebay ***-and-*** *Delta- Mendota Canal at Tracy Pumping Plant*	*C-9 (CHWST0)* *DMC-1 (CHDMC004)*	*Electrical Conductivity (EC)*	*Maximum monthly average of mean daily EC (mmhos/cm)*	*All*	*Oct-Sep*	*1.0*

[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* **-and-** *Montezuma Slough near Beldon Landing*	*C-2 (RSAC081)* *S-64 (SLMZU25)* *S-49 (SLMZU11)*	*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*
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 (RKI1[])	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	*Nove-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*
				BN,D		*1,420 or 2,280*
				C		*710 or 1,140*
				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*	*[22]*
					Feb-May 20	*----*
					May 21-Jun 15	*[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:

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

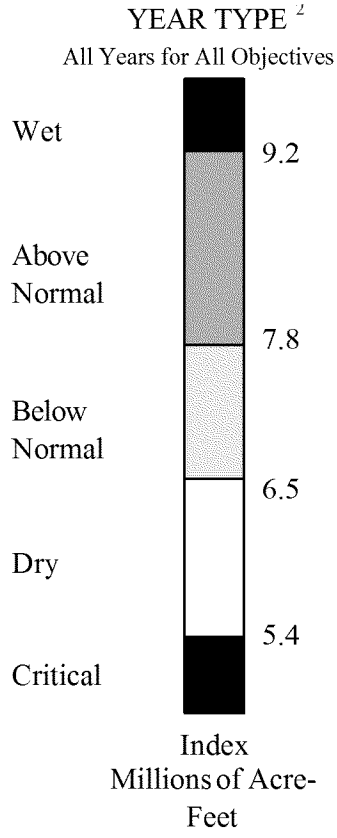
Where: X = Current year's April – July Sacramento Valley unimpaired runoff

Y = Current October – March Sacramento Valley unimpaired runoff

Z = Previous year's index[1]

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.

Classification	Index Millions of Acre-Feet (MAF)
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:

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

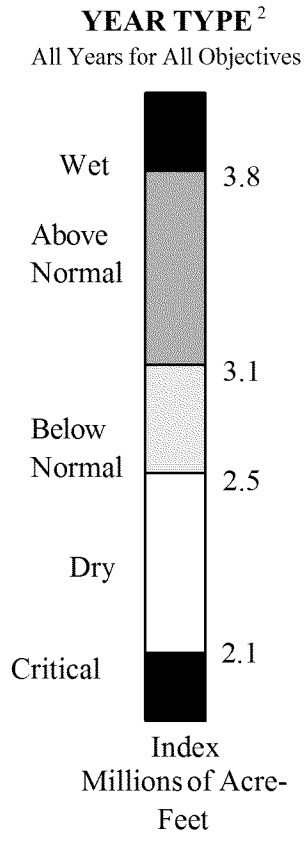
Where: X = Current year's April – July San Joaquin Valley unimpaired runoff

Y = Current October – March San Joaquin Valley unimpaired runoff

Z = Previous year's index[1]

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 classifications 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.

Classification	Index Millions of Acre-Feet (MAF)
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):

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

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

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.

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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 Electrica l 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 Chipps 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 Chipps 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.