

**Central Valley Project and  
State Water Project  
2016 Drought Contingency Plan**

**Part I: December 2015 – January 2016**

**Final Working Draft 12/10/15**

DRAFT

## Introduction

California has just ended its fourth consecutive year of below-average rainfall and snowpack, and Water Year (WY) 2015 was the eighth of nine years with below-average runoff. This extended drought has produced chronic and significant shortages to municipal and industrial, environmental, agricultural, and wildlife refuge water supplies, and led to historically low groundwater levels. The current dry hydrology has set many new statewide records, including the driest four-year period of statewide precipitation (2012-2015). In calendar year 2013, many communities recorded their lowest-ever levels of annual precipitation; calendar year 2014 saw record-low water allocations for the Central Valley Project (CVP) and State Water Project (SWP) contractors; and January 2015 was the driest January on record for precipitation Statewide.

The cumulative effect of these sustained dry conditions is demonstrated in the reduced snowpack and runoff, reduced natural runoff for streamflow, limited surface water storage in reservoirs, increased groundwater pumping, and significant effects to fish and wildlife populations (including both listed and non-listed winter-run Chinook salmon, smelt, and waterfowl). Typically, the snowpack provides a large portion of California's seasonal water storage. The April 1, 2015 California Department of Water Resources (DWR) snow survey found no snow at the Phillips snow course for the first time in 75 years of early-April measurements.

Since December 2013, state and federal agencies that supply water, regulate water quality, and protect fish and wildlife have worked closely together to cope with persistent drought. The U.S. Bureau of Reclamation (Reclamation), DWR, California Department of Fish and Wildlife (CDFW), State Water Resource Control Board (SWRCB), U.S. Fish and Wildlife Service (USFWS), and National Marine Fisheries Service (NMFS), (collectively, the State and Federal Agencies) have closely coordinated to manage water resources through both forward-thinking and real-time efforts, including through work on drought operations planning and during the weekly Real-time Drought Operations Management Team (RTDOMT) meetings. This cooperative environment has allowed the State and Federal Agencies to collectively provide the necessary information to the SWRCB to support their evaluation of Reclamation and DWR's requests for modifications to operational standards for the Central Valley and State Water Projects.

Each successive year of historic drought conditions has brought new management challenges compounded on those we have faced before. The challenge of managing limited water supplies for multiple uses has never been more difficult. Coordination on drought contingency planning is critical for continuation of our drought response efforts, as this process establishes agreed upon goals for operations at the beginning of the water year, outlines the potential response actions, and documents the planning process that will inform development of additional response efforts should conditions warrant. One of the guiding documents for this planning effort is the *CVP and SWP Drought Contingency Plan for October 15, 2014 through January 15, 2015*, prepared by Reclamation and DWR in response to a SWRCB order with input from USFWS, NMFS and CDFW. This Drought Contingency Plan, provided an overview of current conditions as they related to projected flow and storage conditions using 50 percent, 90 percent, and 99

percent exceedance probabilities for assumed hydrology and addressed projected water operations based on various hydrologic scenarios and potential adjustments to regulatory requirements through January 15, 2015.

On January 15, 2015, DWR and Reclamation provided an updated report to the SWRCB, the *CVP and SWP Drought Contingency Plan for January 15, 2015 through September 30, 2015*, which incorporated additional modeling outputs informed by DWR's January prediction of total annual water year runoff for the major watersheds of the Sacramento and San Joaquin River basins. This subsequent report reflected more realistic plan based upon forecast conditions as opposed to pre-season assumed hydrology. Meanwhile, during December 2014 the State and Federal Agencies prepared a draft *Interagency 2015 Drought Strategy for the CVP and SWP* which established a collective framework for operations, set priorities for drought response, and described anticipated coordination, process, planning, and potential drought response actions for 2015. This *CVP and SWP Drought Contingency Plan for January 15, 2015 through September 30, 2015* built on the framework of the December 2014 draft of the *Interagency 2015 Drought Strategy for the CVP and SWP*.

In consideration of current hydrologic uncertainty, and in anticipation of future SWRCB Orders, this document builds on the foundation of the State and Federal Agencies' planning work over the last few years. DWR and Reclamation, with input from the State and Federal Agencies, have prepared this 2016 Drought Contingency Plan (DCP), Part I based on the structure of the October 2014 and January 2015 Drought Contingency Plans, while learning lessons from the last four years of consecutive drought planning. There is a potential that dry conditions may persist through WY 2016, which will likely require the submittal of a CVP and SWP Drought Contingency Plan to the SWRCB in early January. This 2016 DCP provides a framework of potential CVP and SWP operational actions that may be requested and necessary between December 2015 and November 2016 if California experiences its fifth consecutive year of drought.

Rather than produce two separate plans and a strategy document as was done during previous years, for 2016 the State and Federal Agencies have worked to streamline the planning process by preparing a two part Drought Contingency Plan – Part I focuses on the December 2015 through January 2016 timeframe before modeled hydrology and projected run-off scenarios are available, while Part II will focus on February through November 2016 based on updated hydrologic forecasts issued by DWR in early 2016.

### Purpose

It is difficult to balance the multiple critical uses of available water supplies under these very dry conditions and low reservoir storages. While this 2016 DCP Part I is not a detailed operational plan, it serves many communication and documentation purposes. One of the key purposes of this 2016 Drought Contingency Plan is to communicate State and Federal Agencies' overarching goals for 2016 water management and the potential operations needed to achieve those goals to broader water resources stakeholders and the public. Another key purpose is to compile 2014 and 2015 D-1641 modification requests to provide documentation for future drought planning

efforts. As the State and Federal Agencies plan and respond to this drought, they recognize the need for documentation of operations to inform future prolonged drought response efforts.

This 2016 DCP considers water operations subject to D-1641 for two periods, December 2015 through January 2016 (Part I), and February through November 2016 (Part II). In addition to providing an overview of current conditions relating to salinity, fisheries, and reservoir conditions in the Delta, Part I of the 2016 DCP provides an overview of available water supplies for multiple beneficial uses as they relate to projected flow and storage conditions, identifies potential actions based on 2014 and 2015 rainfall patterns, and establishes a framework for the February through November timeframe. DWR and Reclamation, with input from the State and Federal Agencies, will prepare Part II of the 2016 DCP, which will outline proposed actions based on 50 (normal year)/90/99 percent hydrology scenarios. The 90 percent exceedance hydrology assumes inflows from rainfall and snowmelt at levels that are likely to be exceeded with a 90 percent probability, or in other words, there is a 10 percent or less chance of actual conditions turning out to be this dry or drier from this point forward. The 50 percent probability is the 50/50 assumption - it is just as likely to be drier or wetter. The 50 percent hydrologic scenario represents a normal year hydrology. Part II will also contemplate actions that may be necessary if the hydrology is wet. From this framework, DWR and Reclamation will develop operational plans and provide Temporary Urgency Change Petitions to the SWRCB for consideration of modifying operating standards under D-1641, and corresponding biological reviews to USFWS, NMFS and CDFW for Federal and State Endangered Species Act (ESA) and California Endangered Species Act (CESA) compliance.

## Goals

Economic and environmental challenges for our State continue to mount as California approaches winter after a fourth consecutive drought year. If 2016 precipitation results in another dry year, the State and Federal Agencies will need to make difficult decisions to balance water supply to meet critical needs such as essential health and safety needs for urban water users, cold water and appropriate flows for fish, and adequate water quality in the Delta. Maintaining sufficient carry-over storage for 2017 to meet essential health and safety needs and provide for fish and wildlife needs if 2016 is a dry year is an important consideration for this 2016 DCP. While 2016 is forecasted to be a strong El Nino year, typically characterized by wet conditions, the ability to predict at this time whether 2016 will be wet or dry is limited, highlighting the need to be cautious when planning for the next year's water operations. The following primary goals are intended to achieve a balance between water supply and resource conservation:

- Ensure, as a first priority, the CVP and SWP (together “the Projects”) will meet essential human health and safety needs, by supplying adequate water supplies throughout their service areas for drinking, sanitation, and fire suppression. Beyond providing for these basic needs, the Projects will operate in order to lessen economic losses due to water shortages, to the extent possible, through project water deliveries and facilitating voluntary water transfers and exchanges (as the Projects have done throughout this current drought period).

- Manage the intrusion of salt water into the Sacramento-San Joaquin Delta (Delta) through operations of the Projects. Salt water is driven upstream from the San Francisco Bay into the Delta on a daily basis by tidal actions. In a normal year the Projects manage this intrusion through water releases from upstream storage, to create a hydrologic barrier of fresh water that holds back intruding salt water. The Projects, through discussions with the RTDOMT, will continue to weigh tradeoffs between meeting upstream water delivery obligations, cold water pool management for fish and wildlife, and in-Delta water quality, as well as contemplate other management tools, such as installation of physical barriers to manage salinity intrusion.
- Provide and maintain adequate protections for State and Federal endangered and threatened species and other fish and wildlife resources. The Projects will implement operational criteria over the course of the coming year to provide adequate fish protections, including to preserve cold water pools in upstream reservoirs for temperature management for salmon and steelhead. The Projects will strive to maintain temperature management until late in the water year, which may require tradeoffs with providing habitat, controlling salinity intrusion, and water supply. In light of the continued declining trend of Delta smelt and Longfin smelt, the Projects will continue to manage exports in a manner that minimizes entrainment and associated salvage at the export facilities and minimizes effects to habitat for fish species. The Projects will continue to manage these tradeoffs through discussions with the State and Federal Agencies using the RTDOMT process. Biological analyses of the effects of implementing actions will be prepared with the formal modification requests. Reclamation and DWR will coordinate with the other State and Federal Agencies to ensure compliance with applicable laws, including federal and California ESAs and the California Water Code.
- Seek and consider water management flexibilities to maximize the benefit of limited water supplies. The CVP and SWP operators will work with their contractors and partners to take advantage of opportunities to shift demands, shift timing of diversions, and facilitate water transfers in order to maximize these benefits. The Projects, in discussions with the Federal and State Agencies through the RTDOMT, will consider management flexibilities, and seek approval for actions such as extending the water transfer window in order to maximize benefits of limited supplies for multiple purposes where possible.

## Current Conditions

### Water Quality

Salinity in the western Delta continues to increase due to tidal conditions and reduced inflow from the Sacramento and San Joaquin Rivers. These salinity conditions are likely to control Project operations well into December 2015 regardless of precipitation patterns. Typically, the Projects minimize exports and operate to a higher Net Delta Outflow Index (NDOI) than the nominal D-1641 requirements as a first step in moderating salinity degradation. This course of action is usually adequate until the first significant runoff events of the water year provide sufficient flow to improve Delta salinity conditions. Typically, if the Delta Cross Channel (DCC) gates are open and exports are reduced to minimum health and safety requirements and

conditions continue to trend dry, then the Projects operators will consider augmenting Delta inflow with additional releases from upstream reservoirs, noting that this action is not particularly effective in influencing south Delta water quality when the DCC gates are closed. However, real-time conditions in November 2015 show continued degradation of Delta salinity conditions, and the Projects have been severely limited in their ability to augment inflow with releases from upstream reservoirs in order to conserve minimal upstream storage. In 2015, DWR installed an emergency drought salinity barrier at West False River from June 15 to November 15 to help prevent salinity intrusion into key areas of the Delta and help offset upstream storage releases. Such a barrier could again be necessary if similar conditions persist through 2016.

SWP and CVP Upstream Storage

The lack of precipitation in the last several years has contributed to low reservoir storage levels in the Sacramento River and San Joaquin River watersheds. On November 30, 2015, Shasta Reservoir on the Sacramento River, Oroville Reservoir on the Feather River, and Folsom Reservoir on the American River were at 29, 26, and 14 percent of capacity, respectively (49, 43, and 29 percent of average for end-of-month November, respectively). Trinity Reservoir on the Trinity River (water from the Trinity system is diverted to the Sacramento River system) was at 20 percent of capacity and 30 percent of the November end-of-month average. In particular, the San Joaquin River watershed has experienced severely dry conditions for the past three years. New Melones Reservoir on the Stanislaus River was at 11 percent of capacity and 20 percent of the November end-of-month average. The Trinity, Shasta, Oroville, and New Melones storages have only been lower on one or two occasions for this date in recorded history. The Folsom storage represents a new all-time record low storage for the reservoir on any date.

The Projects requested, and the SWRCB approved, modified D-1641 requirements from February to November 2015 in an effort to make water available for multiple uses throughout the year. The modified requirements allowed the Projects to reduce the quantity of water directed towards Delta outflow and inflows from February through November by over 800 thousand acre-feet and allowed the Projects to continue exporting a minimum 1,500 cubic feet per second (cfs) while D-1641 remained modified. (The Projects often operated at pumping levels lower than this minimum 1,500 cfs export due to salinity concerns.) This modification allowed the Projects to further protect Delta water quality and maintain water in upstream reservoirs for multiple uses throughout the year, including reduced water deliveries to settlement contractors upstream of the Delta, temperature control to protect winter-run salmon, and Delta salinity control. Due to the cumulative effects of consecutive drought years, storage in upstream reservoirs remains at near historic lows while releases of water from storage continue in order to meet these multiple purposes.

<b>Reservoir</b>	<b>End of November Storage (approximately)</b>
Lake Oroville	929 TAF
Lake Shasta	1.33 MAF
Lake Folsom	137 TAF
New Melones	267 TAF
Trinity Lake	478 TAF

## Biology

### Salmonids

DWR and Reclamation are required to protect listed salmonids under the terms of the 2009 NMFS Biological Opinion on joint CVP/SWP operations. (DWR additionally operates under a consistency determination on the Biological Opinion from CDFW.) One specific protective action in the RPA includes ensuring sufficient, suitable cold water temperatures in the Sacramento River for winter-run Chinook spawning.

Reclamation coordinated closely with State and Federal Agencies throughout the 2015 temperature management season to prevent the elevated water temperatures seen in August and September of 2014 and to provide more suitable temperatures for later arriving spring-run and fall-run Chinook salmon. As described in the Reclamation, NMFS and CDFW joint Sacramento River Temperature Management Plan, the objectives in 2015 included stable releases from Keswick Reservoir to minimize the potential for redd dewatering and targeted a daily average water temperature of 57°F at the Clear Creek temperature compliance point (CCR CDEC station), but allowed increases up to 58°F if they resulted in cold water savings at Shasta Reservoir. Daily coordination among the agencies on fish monitoring and operations resulted in relatively successful implementation of the Sacramento River temperature management plan and ensured that metrics the plan were met. However, despite all of the coordination there were three instances where daily average water temperature exceeded 58°F. Although adult winter-run Chinook salmon returns in 2015 surpassed the number of adult returns in 2014, the preliminary estimate of juvenile winter-run emigration at Red Bluff Diversion Dam is considerably lower than for the same period in 2014, which suggests that despite these efforts, Sacramento River winter run Chinook in brood year 2015 have suffered substantial mortality during the egg incubation and emergence periods in the Upper Sacramento River.

### Delta Smelt

DWR and Reclamation are required to protect Delta smelt under the terms of the 2008 Delta Smelt Biological Opinion issued by USFWS, as well as those of a consistency determination from CDFW on the Biological Opinion. The Smelt Working Group (SWG) meets weekly from late November onward to evaluate up-to-date biological and technical issues regarding delta and longfin smelt and develop recommendations for consideration in implementation of the Biological Opinions. Delta smelt field surveys this past WY indicate that relative abundance is at an historical low. The historically low Fall Midwater Trawl (FMWT) index of 9 in 2014 was followed by historically low abundance indices for all field surveys in 2015; the Spring Kodak Trawl index was 13.8 and the 20mm index was 0.3. In the first two months of the 2015 CDFW Summer Tow Net Survey (STN), conducted in June, July, and August, Delta smelt were collected in the Cache Slough-Sacramento Deepwater Ship Channel area and the lower Sacramento River. The resulting abundance index for 2015 is 0.0, the lowest index reported in the history of the STN. The 2015 FMWT, which is conducted in September, October, November, and December, appears to be following the same trend of historical lows. The 2015

FMWT has collected Delta smelt in the lower Sacramento River and in the Sacramento Deep Water Ship Channel; no Delta smelt were found in the central and south Delta in either survey. The resulting 2015 September-October index is 5, the second-lowest in the history of the FMWT.

### Longfin Smelt

DWR operates to the 2009 Longfin Smelt Incidental Take Permit (ITP) issued by CDFW. Entrainment risk for Longfin smelt is highest in drier hydrology when the low salinity zone is farther upstream and adults migrate farther into the Delta to spawn. The 2015 FMWT collected no Longfin Smelt during the months of September or October, resulting in an index of zero, the lowest index in FMWT history. Previous surveys (Bay Study) conducted in the early summer of 2015 detected Longfin Smelt in the Western Delta and the San Francisco Bay with lower densities in Suisun Bay, and in the lower Sacramento River. The CDFW, through the SWG, tracks distribution and salvage to assess risk and make appropriate operational recommendations consistent with the Longfin Smelt ITP. Given the low level of project operations in the south Delta during the drought, no recommendations have been made to restrict operations to protect Longfin Smelt.

## **Part I: Framework December 2015-January 2016 Scenario**

California has the most varied annual precipitation of all states in the country, which creates major challenges to forecasting water project operations. Precipitation in the northern Sierra Nevada has ranged from a high of 88.5 inches in WY1983 to a low of 17.1 inches in WY1924. Although precipitation varies each year, there is no doubt that the existing conditions of the basin consist of low surface storage, depleted groundwater basins, and parched soil moisture will result in runoff less than would be expected for the given amount of precipitation.

Rather than rely on preliminary runoff estimates before the modeled forecasts are available in January, to assess potential rainfall and runoff patterns for the December 2015 and January 2016 time period, DWR reviewed 2014 and 2015 rainfall patterns to evaluate any water operation or biological constraints for this two month timeframe.

### **Repeat of WY 2014 Hydrology Pattern**

DWR considered the implications of a hydrologic scenario that mimicked the rainfall/runoff pattern that occurred in WY 2014 in the context of current storage amounts and the species status of WY 2016. That pattern included a dry December and January. Preliminary conclusions are that the Projects may request modifications to D-1641 and adjustments to the NMFS Biological Opinion based on this hydrologic scenario. *[As of December 1, 2015, at this time this draft was finalized, observed and forecasted real-time hydrologic conditions suggest a pattern most in line with 2014 hydrology – as dry conditions remain. The Projects will formulate operational plans and submit requests to modify D-1641 and adjustments to the NMFS Biological Opinion based on this hydrologic scenario and the potential actions outlined below.]*

### **Potential Actions for December/January Based on this Hydrology**

D-1641: Under this hydrology, the Projects may request for modifications to D-1641 associated with DCC gate operations to manage salinity in the central Delta and meet the Rio Vista flow objective for December. Modifications to D-1641 will require review under 2008/2009 Biological Opinions and CESA permit.

NMFS Biological Opinion: Under this hydrology, the Projects may seek to adjustment RPA Action IV.1.2, DCC gate operations to manage salinity in the central Delta.

USFWS Biological Opinion: Under this hydrology, the Projects anticipate operating within the existing 2008 Biological Opinion.

CESA 2081 Authorizations: Under this hydrology, the SWP anticipates operating pursuant to the Longfin Smelt Incidental Take Permit for December through January. If modifications to D-1641 or the NMFS Biological Opinion are necessary, DWR will work with CDFW to ensure ongoing CESA compliance in light of flexibility provided in the RPAs and range of effects analyzed.

### **Repeat of WY 2015 Hydrology Pattern**

DWR considered the implications of a hydrologic scenario that mimicked the rainfall/runoff pattern that occurred in WY2015 in the context of current storage amounts and the species status of WY 2016. That pattern included an above normal rainfall for December and a return to dry conditions in January. Preliminary conclusions are that the Projects would request modifications to D-1641 and adjustments to the Biological Opinions based on this hydrologic scenario.

### **Potential Actions**

D-1641: Under this hydrology, the Projects plan to operate to an unmodified D-1641 through the December to January time period.

NMFS Biological Opinion: Under this hydrology, the Projects anticipate a “first flush” flow event in December. Real-time monitoring information for salmonids will be considered by the State and Federal Agencies through the RTDOMT. If salmonid triggers pursuant to RPA Action IV.3 (for December) and Action IV.2.3 (for January) occur, the Projects will discuss existing operational flexibility in the 2009 Biological Opinion to determine appropriate export reductions.

USFWS Biological Opinion: Under this hydrology, the above normal precipitation created a “first flush” flow event, which, if it occurred again, would initiate real-time monitoring efforts associated with water quality (boat based turbidity monitoring) and geographic distribution of Delta smelt (early warning surveys) in addition to the last sampling effort of the FMWT survey and an added Spring Kodiak Trawl survey in December. Because of the continuing decline of Delta smelt, protective measures would be implemented as described in the 2008 Biological Opinion if conditions warrant in December. If Action 1 is triggered, Old and Middle River (OMR) flows would be limited to -2000 cfs for 14 days with additional protective measures following under Action 2, which prescribes OMR flows between a range of -1250 to -5000 cfs. USFWS will take into account the factors listed in the RPA descriptions, as well as additional monitoring data, when making determinations under Action 1 and Action 2. The Projects plan to operate in conformance with Action 1 and Action 2 by evaluating additional monitoring data and discussing potential water operations in the RTDOMT.

CESA 2081 Permit – Under this hydrology, an above normal precipitation created a “first flush” flow event, which, if it occurred again, would initiate real-time monitoring of water quality (boat based turbidity monitoring) and geographic distribution of Delta smelt (early warning surveys) in addition to the last sampling effort of the FMWT survey and an added Spring Kodiak Trawl survey in December. The Projects will operate in conformance with USFWS the Incidental Take Permit for Longfin Smelt and would coordinate with CDFW to ensure ongoing compliance with CESA under the consistency determinations.

## **Part II: Framework February – November 2016 Scenario**

Prior to developing water operations and potential needs for D-1641 modifications or Biological Opinion adjustments between February and November, DWR and Reclamation will model runoff forecasts for the 50/90/99 percent hydrologic exceedance scenarios. The most effective time to assess these hydrologic scenarios is in January, immediately following the production of estimates by DWR’s Hydrology and Flood Operations Office of water year runoff for the major watersheds of the Sacramento and San Joaquin River basins. The runoff forecasts are informed by precipitation, snowpack, runoff and other antecedent hydrologic conditions as they exist on January 1. Based on model results, DWR and Reclamation plan to coordinate with representatives from State and Federal Agencies to assess conditions and forecasts to determine their operational approach based on the framework provided below.

Note that this section presents a framework of potential modifications and adjustments that may be requested in order to create water operation flexibilities that allow the Projects operators to quickly adjust to changes in the weather and environment and to maximize the beneficial use of water to the greatest extent possible. These requests will be considered in light of the Goals set out above. Similar to prior modifications and adjustments, implementation of this balance will consider, and will be consistent with, DWR public trust responsibilities.

### **Repeat of WY 2014 Hydrology Pattern**

Under the 2014 runoff hydrology, DWR and Reclamation would seek to operate the Projects under modified D-1641 standards with some adjustments to the Biological Opinions. In 2014, although modified D-1641 standards were in effect, the Projects operated between the modified D-1641 standards and unmodified D-1641 requirements. If 2016 conditions emulate the spring 2014 hydrology, the Projects could seek similar modifications to D-1641 beginning February 1, 2016. Modifications to D-1641 will require review under 2008/2009 Biological Opinions and CESA permit.

The following information highlights the general conditions approved under various Orders issued pursuant to Temporary Urgency Change Petitions filed with the SWRCB in 2014:

#### **February and March**

- a) Monthly average Net Delta Outflow Index (NDOI) was no less than 3,000 cfs.
- b) Maximum export limits were modified.
- c) DCC gates could be open to maintain water quality.

#### **April, May and June**

- a) Monthly average NDOI was no less than 3,000 cfs for April and May.
- b) Maximum export limits were modified.
- c) San Joaquin River flow requirements at Airport Way Bridge no less than 700 cfs during the pulse flow period. Following the pulse flow, the monthly average minimum flow rate no less than 500 cfs.
- d) DCC gates could be opened to maintain water quality for April through May 20.
- e) Western Delta Sacramento River at Emmaton electric conductivity (EC) compliance location was moved to Threemile Slough for the month of June.

July, August, September, October, and November

- a) Monthly average NDOI no less than 3,000 cfs in July.
- b) Maximum export limits were modified.
- c) Sacramento River flow at Rio Vista no less than 2,000 cfs on a monthly average from September to November 15.
- d) The Western Delta Sacramento River at Emmaton EC compliance location was moved to Threemile Slough from July through August 15.
- e) San Joaquin River flow requirements at Airport Way Bridge no less than 800 cfs on a monthly average for October and November.

**Repeat of WY 2015 Hydrology Pattern**

Under a 2015 runoff hydrology, DWR and Reclamation would seek to operate the Projects under modified D-1641 standards with some adjustments to the Biological Opinions. In 2015, although modified D-1641 standards were in effect, the Projects operated between the modified D-1641 standards and unmodified D-1641 requirements. If 2016 conditions emulate the spring 2015 hydrology, the Projects could seek similar modifications to D-1641 beginning February 1, 2016. Modifications to D-1641 will require review under 2008/2009 Biological Opinions and CESA permit.

The following information highlights the general conditions approved under various Orders issued pursuant to Temporary Urgency Change Petitions filed with the SWRCB in 2015:

February and March

- a) Monthly average NDOI no less than 4,000 cfs.
- b) Maximum export limits were modified.
- c) San Joaquin River flow requirements at Airport Way Bridge no less than 500 cfs on a monthly average.
- d) DCC gate could be opened in compliance with the DCC gate triggers matrix described in Appendix G of the April 2014 Drought Operations Plan and Operational Forecast.

April, May, and June

- a) Monthly average NDOI was to be no less than 4,000 cfs.
- b) Maximum export limits were modified.

- c) San Joaquin River flow requirements at Airport Way Bridge no less than 710 cfs at Vernalis during the pulse flow period from March 25 through April 25. Monthly average minimum flow rate at Vernalis between April 26 and May 31 no less than 300 cfs. For June, monthly average flow rate at Vernalis no less than 200 cfs.
- d) DCC gate could be opened between April 1 and May 20 in compliance with the DCC gate triggers matrix described in Appendix G of the April 2014 Drought Operations Plan and Operational Forecast.
- e) Western Delta Sacramento River at Emmaton EC compliance location was moved to Threemile Slough.

July, August, September, October, and November

- a) Minimum NDOI no less than 3,000 cfs in July.
- b) Maximum export limits were modified.
- c) Average monthly minimum Sacramento River at Rio Vista flow no less than 2,500 cfs during September, October and November.
- d) Western Delta, Sacramento River at Emmaton EC compliance location was moved to Threemile Slough July through August 15.
- e) Reclamation implemented a Sacramento River Temperature Management Plan which controlled releases from Keswick Reservoir.

In addition to these modified D-1641 standards, the water transfer period was extended to include October and November. Additionally in 2015, DWR installed an Emergency Drought Barrier at West False River to help manage salinity in the interior Delta.