

**Central Valley Project and State Water Project  
Drought Contingency Plan  
January 15, 2015 – September 30, 2015**

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This Drought Contingency Plan (DCP) is prepared by the U.S. Bureau of Reclamation (Reclamation) and California Department of Water Resources (DWR), by working with U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), and California Department of Fish and Wildlife (CDFW) (collectively “the Agencies”). This DCP is submitted to the State Water Resources Control Board (SWRCB) on January 15, 2015, as required by the SWRCB’s final Temporary Urgency Change Order dated October 7, 2014. This DCP will be updated as necessary based on changing circumstances, which could include additional proposed modifications to SWRCB permit requirements. Most importantly, the DCP, as described below, is based upon hydrologic conditions as of January 1, 2015, thus we anticipate changes in drought response actions as the year’s hydrology unfolds.

The Agencies prepared an “Interagency 2015 Drought Strategy for the Central Valley Project and State Water Project” (2015 Drought Strategy) which was released as a working draft on December 12, 2014. A copy of the 2015 Drought Strategy is included with this DCP for ease of reference (See Reference 1). The 2015 Drought Strategy describes the anticipated coordination, process, planning and potential drought response actions for 2015. Not all of those actions are described specifically in this DCP, which is focused on articulating anticipated proposed modifications to SWRCB permit requirements. Other actions described in the 2015 Drought Strategy, as well as additional actions that may be proposed by stakeholders, will continue to be considered and analyzed by the Agencies for possible implementation in 2015.

## **I. Introduction and Purposes of the DCP**

The State’s December 30, 2014, snow survey found a Sierra Nevada snowpack that is less than half of normal in terms of the amount and water content for this time of year. Furthermore, although November and December 2014 storms brought much needed precipitation, after three dry years, the State’s overall water storage levels remain far below average. Adequate storage is needed throughout the year and especially in dry times of the year in order for the Central Valley Project (CVP) and State Water Project (SWP) to supply human needs, continue repelling saltwater in the Delta, and provide for cold water needs of Chinook salmon. On January 17, 2014, California’s Governor issued a drought State of Emergency proclamation. Nearly one year later, drought conditions and the Governor’s proclamation remain in place. Over the last year and a half, Reclamation and DWR have worked closely with the fish and wildlife agencies to develop operational and contingency plans, as well as real-time coordinated operations and monitoring, in order to responsibly manage our State’s limited water supplies.

## A. Purpose of the DCP

Since December 2013, State and federal agencies that supply water, protect fish and wildlife, and regulate water quality, have worked together to balance water supply, biological protections, and water quality during this drought. Following the Governor's emergency drought proclamation, on January 29, 2014, Reclamation and DWR sought a temporary modification to their water rights permits and licenses to respond to the drought conditions. On January 31, 2014, the Executive Director of the SWRCB issued an Order that granted temporary modification to Water Rights Decision 1641 (D-1641).

According to the petition and subsequent acknowledgement in the Order, Reclamation and DWR convened a Real Time Drought Operations Management Team (RTDOMT) comprised of representatives from Reclamation, DWR, State and federal fish and wildlife agencies, and the SWRCB to discuss more flexible operations of the Projects while protecting beneficial uses. Together, these agencies worked through existing statutory and regulatory obligations so that water operations could adjust quickly to changes in the weather and environment to support and improve water supply deliveries when possible while protecting water quality and fish and wildlife as required under state and federal laws and permits. The RTDOMT agencies recognize the importance of their efforts to minimize potential impacts from drought to provide food security, economic stability, and species protection in California.

It is difficult under these very dry conditions, and low reservoir storages, to balance the multiple critical uses of the limited water supplies. The purpose of this DCP is to provide an overview of current conditions in the CVP and SWP operated reservoirs and the Delta related to salinity and threatened fisheries, as well as an overview of available supplies for multiple beneficial uses as they relate to projected flow and storage conditions using 50%, 90%, and 99% exceedence probabilities for assumed hydrology. This DCP addresses projected water operations based on various hydrologic scenarios and potential adjustments to regulatory requirements through September 30, 2015.

The primary goals of this DCP are to:

1. Operate the CVP and SWP during this extreme drought to provide for, at a minimum, essential human health and safety needs throughout the CVP and SWP service areas, and preferably to minimize water supply shortages that harm the State's economy.
2. Control saltwater intrusion in the Sacramento-San Joaquin Delta by providing enough fresh water flow out of the Delta throughout dry months to repel saltwater that pushes inland on ocean-driven tides from San Francisco Bay.
3. Preserve enough cold water deep in Shasta Lake and other reservoirs to maintain cool river temperatures for various runs of Chinook salmon.
4. Maintain protections for State and federally endangered and threatened species and other fish and wildlife resources that are suffering from unavoidable impacts due to a drought of this magnitude and necessary drought-related actions.

## **B. Critical Operational Considerations**

The operational forecasts developed for this DCP are designed to make the most efficient use of the limited water resources in 2015 for multiple beneficial uses while managing the potential risks of continued drought conditions into next year. There are three main objectives of this DCP. First, to continue operation of the Delta pumping facilities, taking advantage of opportunities to export natural or abandoned flow while maintaining Delta water quality and providing adequate protections for listed fish. Second, to conserve reservoir storage for use later in the water year. Third, to manage reservoir releases from June through September to concurrently benefit in-stream temperature objectives, meet Sacramento Valley in-basin needs and other water supplies, and preserve carry-over storage. This DCP includes considerations on how the Projects propose to generally operate under different hydrologic conditions, but the actual operation is still uncertain at this time because of changing hydrology. The hydrologic scenarios used in this DCP are discussed in the Projected Hydrology and Runoff section later in the document.

A key consideration is that even if the overall hydrology significantly improves this year, the water supply system, particularly in regions south of the Delta, is in a severely depleted state. The ability to deliver water south of the Delta is important to support health and safety, municipal and industrial, and refuge needs as well as to help communities and the State economy to recover from the severe dry conditions from the past several years.

The following are the Projects' critical operational considerations and objectives under on-going drought conditions.

### **i. Health and Safety**

During this continuing drought, operations of the CVP and SWP must provide for, at a minimum, essential human health and safety needs throughout the CVP and SWP service areas, and retain the capability to provide for such minimum needs throughout water year (WY) 2015 and WY2016 if drought conditions continue. For clarity, Reclamation and DWR's consideration of these essential human health and safety needs includes adequate water supplies and water quality for drinking water, sanitation, and fire suppression, but does not extend to other urban water demands such as outdoor landscape irrigation. While most Californian communities may have reserve water supplies, some communities will require continued delivery of limited amounts of water through the CVP and SWP systems to meet these basic needs.

At DWR's request, the 29 public water agencies that contract for water from the SWP quantified their needs to meet demands for drinking, hygiene, and sanitation (collectively 55 gallons per capita per day (gpcd)), plus fire protection. Most SWP contractors have alternative sources of water, including groundwater and local reservoirs. The combined initial estimated need that DWR received from its contractors this past October was approximately 330 thousand acre-feet

(TAF) for calendar year 2015. Those needs are expected to fluctuate based on changes in availability from other sources.

Reclamation currently uses its draft Municipal and Industrial (M&I) Water Shortage Policy (Draft Policy) to determine the amount of water to be provided to its M&I contractors in those years where human health and safety needs govern CVP allocations to these contractors. Under these conditions, M&I contractors are required to update population estimates and non-CVP water source information to determine how much water will be needed from the CVP to meet their overall human health and safety demand for that year. The vast majority of CVP contractors throughout the entire service area that receive M&I water from the CVP have other available supplies to help meet their demand. Based upon application of the Draft Policy approximately 180 TAF of CVP water was allocated in WY2014 to help meet their health and safety needs with consideration of other available supplies. For WY2015, Reclamation intends to again apply the Draft Policy to determine the amount of CVP water available to meet health and safety needs. For planning purposes the 180 TAF is a reasonable estimate of minimum CVP M&I needs for WY2015 if dry conditions continue, however it is anticipated these needs may fluctuate based on changes in availability from other sources.

## **ii. Economic Impacts**

Throughout the continuing drought, CVP and SWP systems will be operated to lessen critical economic losses to agriculture, municipal, and industrial uses due to water shortages through project water deliveries and by facilitating voluntary water transfers and exchanges to the extent possible, while balancing the needs of upstream storage, fishery and wildlife resource protection, and operational flexibility. A key to minimizing water supply shortages for economic purposes will be to take advantage of opportunities to export natural or abandoned flow in the winter and spring while maintaining Delta water quality and minimizing adverse effects to listed fish. Release of stored water in summer and fall will be managed to concurrently benefit in-stream temperature and wildlife objectives, meet Sacramento Valley in-basin needs, convey water south-of-Delta to meet water supply needs, and preserve system reservoir carry-over storage to meet objectives in WY2016.

## **iii. Fishery and Wildlife Protection**

The CVP and SWP operations outlined in this DCP will continue to maintain protections for endangered species and other fish and wildlife resources that are suffering from unavoidable impacts due to drought and drought-related operations. The 2015 Drought Strategy calls out some elements that could be modified in order to balance all needs, while providing protections required by law. Any changes in operations that are ultimately proposed by Reclamation and DWR either through a Temporary Urgency Change Petition (TUCP) or under the Endangered Species Act (ESA) will be submitted by Reclamation and DWR for concurrent review under applicable laws, including the Federal ESA (FESA), California ESA (CESA), and the California Water Code.

A goal of this DCP for operations this spring through fall is to identify a balanced approach to meeting river temperatures, instream flows, and Delta protective actions. A primary consideration involves the need to conserve enough cold water in Project reservoirs early in the year to maintain cool water temperatures in the Sacramento River and tributaries to support the various runs of Chinook salmon and steelhead. If conditions remain dry, these same water supplies may be needed to provide for other critical operational considerations throughout 2015. The timing, flow rate, and rate of any flow changes for instream fishery needs will also vary with storage and hydrologic conditions.

#### **iv. Refuge Water Supplies**

One of the requirements of the Central Valley Project Improvement Act (CVPIA) passed by Congress in 1992 included providing water for state, federal and private managed wetlands in order to maintain and improve wetland habitat areas. This DCP includes plans to provide water in order to keep conveyance channels charged; support seasonal, riparian, permanent and semi-permanent wetlands; and to provide critical ESA habitat for protected species, such as the Giant Garter Snake and Tri-Colored Blackbird, for both north and south of the Delta refuges. Deliveries for summer, fall, and winter water will be consistent with the schedules submitted by the refuges and adjusted as allocations are modified.

Refuge water supply contracts also allow for reallocation of Level 2 supplies between and among refuges to improve supply flexibility, coordination, and management between Reclamation and wetland managers, and to lessen impacts to other water users.

For south of Delta refuges, when total demand from direct diversions from the Delta are not feasible, water from San Luis Reservoir can be made available to meet refuge needs. The CVPIA and refuge water supply contracts allow for flexibility to transfer water from refuges both within basin as well as north of the Delta to south of the Delta. Water transfers from north of Delta refuges to south of Delta refuges would occur to support priority habitat needs of south of Delta refuges given available capacity to facilitate the transfer. This water could be directly diverted or stored in San Luis Reservoir and used when most needed by south of the Delta refuges.

Level 2 represents a baseline of water supply needed to manage refuge wetlands. To maximize the quality and extent of habitat with a limited water supply, system operators will strive to deliver refuge water in accordance with refuge manager schedules and in conjunction with any Incremental Level 4 water supplies. System operators will work with refuge managers to deliver summer water and to transfer, reallocate, or exchange refuge water supplies to meet management and biological needs. Absent summer water deliveries to south of Delta refuges, critical habitat for Giant Garter Snake remains dry or extremely restricted because of water quality constraints and wetlands cannot produce essential forage needed for fall and winter migratory birds.

CVPIA refuge managers will be involved regularly throughout the water supply reevaluation and adjustment process. Refuge deliveries are included in CVP operational scenarios and forecasts, and calculations regarding anticipated reservoir levels into the late fall and early winter. The Agencies will continue to work together with water districts and non-governmental organizations to identify opportunities for delivery flexibility to accommodate management of water quality and the needs of salmonids and smelt at different life stages while minimizing impacts to Project and refuge operations.

#### **v. Operational Flexibility**

An underlying objective of this DCP is to maximize regulatory flexibility of Project operations while still remaining within existing law and regulations. Maximizing such flexibility allows Project operators to adjust quickly to changes in the weather and environment and to maximize the beneficial use of water to the greatest extent possible within the law. This goal of improving water supply includes facilitating water transfers for municipal and industrial, refuge, and agriculture to ensure the most critical supply needs are met throughout the service areas of the CVP and SWP and ensuring flow standards are as flexible as possible in order to capture multiple storm events under the otherwise dry conditions. This flexibility allows for Reclamation and DWR to improve upstream reservoir storage and deliver maximum available water supplies.

## **II. Initial Status of Conditions**

### **A. Water Quality**

Overall water quality in the Delta is much improved since the October 15, 2014 Drought Contingency Plan was submitted due to the above average precipitation in northern California during December. Salinity conditions are likely to remain manageable through January regardless of precipitation patterns. Conditions will continue to be monitored and Delta pumping may be reduced if necessary to increase Delta outflow to levels sufficient to manage salinity intrusion. If 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 Project operators will carefully consider augmentation of Delta inflow with additional releases from upstream reservoirs. However, increasing inflows is not particularly effective in influencing south Delta water quality when the DCC gates are not opened.

The Projects do not anticipate opening the DCC gates in January, however, Reclamation and DWR would request opening the DCC gates before proposing any modifications to D-1641 Table 1 salinity objectives for M&I beneficial uses and Table 2 objectives for beneficial uses in the export area. This is because exceedences of these existing water quality objectives would elevate risk to public health as a result of disinfection byproducts related to the treatment of degraded water quality constituents potentially increasing beyond permissible contaminant levels.

## B. SWP and CVP Upstream Reservoir Storage

In the Sacramento River watershed, storage in upstream reservoirs still remains well below average for this time of year. Lake Oroville as of January 14, 2015 storage was about 1.40 million acre-feet (MAF) (39% of capacity and 62% of historical average). Lake Shasta as of January 14, 2015 storage was about 1.93 MAF (42% of capacity and 66% of historical average), and Lake Folsom as of January 14, 2015 storage was approximately 444 TAF (45% of capacity and 91% of historical average).

In the San Joaquin watershed, storage in New Melones Reservoir was 552 TAF, which is just 23% of capacity and 39% of historical average and about half the storage at that time last year.

## C. Biology

### i. Salmonids

DWR and Reclamation operate to the 2009 NMFS Biological Opinion. DWR also operates under a consistency determination from CDFW on the Biological Opinion. As of January 14, 2015, the preliminary estimate of natural juvenile winter-run Chinook salmon emigration past the Red Bluff Diversion Dam is 402,529 based on USFWS rotary screw trap monitoring. To put this in perspective, this is less than half of the juveniles that resulted from broodyear 2011 when only approximately 824 adult winter-run returned to spawn. In addition, in anticipation of considerable water temperature impacts to incubating winter-run eggs and alevin, the Livingston Stone National Fish Hatchery (LSNFH) increased its winter-run broodstock collection to 388 adults, over triple the typical limit of 120. There are currently approximately 650,000 juvenile hatchery winter-run rearing at LSNFH and awaiting release in January or February.

As of January 13, 2015, the Delta Operations for Salmon and Sturgeon (DOSS) Team estimated the following distribution of winter-run and spring-run Chinook salmon:

Location	Yet to Enter Delta (Upstream of Knights Landing)	In the Delta	Exited the Delta (Past Chipps Island)
<i>Young-of-year (YOY) winter-run Chinook salmon</i>	< 5% (last week: same)	> 95% (last week: same)	< 5% (last week: same)
<i>YOY spring-run Chinook salmon</i>	50% - 75% (last week: ~50% )	25% - 50% (last week: ~50%)	< 5% (last week: same)
<i>Yearling spring-run Chinook salmon*</i>	< 5% (last week: same)	80% - 90% (last week: same)	< 15% (last week: same)

\* No yearling spring-run Chinook salmon have been caught in 2014 monitoring. In general, very few yearling spring-run Chinook salmon are observed because of their relatively large size and strong swimming (and associated gear avoidance) abilities.

As of January 13, 2015, the WY2015 total for combined wild winter-run loss is 70, and the combined wild steelhead loss is 17.

## ii. Delta Smelt

DWR and Reclamation operate to the 2008 USFWS Delta Smelt Biological Opinion. DWR also operates under a consistency determination from CDFW on the Biological Opinion. The Smelt Working Group (SWG) began meeting in late November to discuss current-year conditions. The 2014 Fall Midwater Trawl was completed in December; the computed index was 9, a new historic low. A special Spring Kodiak Trawl survey was completed in the third week of December 2014 to more precisely identify distribution of adult Delta Smelt. It revealed that most of the fish are likely in the Sacramento River portions of the estuary, especially the confluence region. In addition, two Delta Smelt were observed at Survey Station 815 (Prisoners Point) on the lower San Joaquin River. Early warning Delta Smelt monitoring at Jersey Point and Prisoners Point in the lower San Joaquin River began on December 1, 2014 and was conducted daily (to the extent conditions permitted) through January 5, 2015. Early warning Delta Smelt monitoring revealed an increase in Delta Smelt density at both locations in the latter half of December, indicating that storms in December had stimulated movement of Delta Smelt into the fresher water portions of the estuary. The special December Spring Kodiak Trawl was conducted during the series of storms that occurred, and likely partially reflects a post-storm distribution of fish. As of January 13, 2015 an expanded total of 56 adult Delta Smelt have been observed in salvage.

## iii. Longfin Smelt

DWR operates to the 2009 Longfin Smelt Incidental Take Permit (ITP) issued by CDFW. In WY2014 juvenile Longfin Smelt were only observed at the salvage facilities between February and April. Salvage data from WY1994 through WY2014 indicate that salvage of adult Longfin Smelt is rare, and typically occurs between the months of December and February. Additionally, the majority of Longfin Smelt salvage typically occurs after February when juvenile fish rearing in the south and central Delta have grown large enough to be effectively screened by the fish collection facilities. As of January 13, 2015 no Longfin Smelt have been salvaged in WY2015 and none were detected in the central or south Delta during the December Fall Midwater Trawl or supplemental Spring Kodiak Trawl. Late December 2014 catches by the Chipps Island trawl suggested that spawning movement into the western Delta is currently ongoing, which was further confirmed through the “Early Warning Sampling” at Prisoner’s Point catching 2 ripe Longfin Smelt adults on January 4, 2015. The first Smelt Larvae Survey of January 2015 detected one larvae on the Lower San Joaquin River and two larvae in the Cache Slough complex (with 18 of 32 stations results processed). The CDFW through the SWG tracks distribution and salvage to assess risk and make appropriate operational recommendations consistent with the Longfin Smelt ITP.

## iv. Refuge Water Supply

The CVPIA Refuge Water Supply Program supports 19 managed wetland areas. These areas are strategically located across the Central Valley to provide the core critical wetland habitat for migratory birds and wetland dependent wildlife, including threatened and endangered species such as the Giant Garter Snake and Tri-Colored Blackbird. The amount of flooded acreage in

most refuges is currently near average. This increase in flooded acres was due to the recent rain events and storm water flows associated with the December rainstorms. However, the dry January is leading to rapidly decreasing flooded acreages. January is within the peak season where as many as 5,000,000 waterfowl might be in the Central Valley. The decision to forgo summer irrigations during WY2014 has resulted in decreased forage availability and its expected food resources will be depleted in the near future. Monitoring is ongoing to track body condition and bird distribution.

Wetland habitats in the Central Valley are critical to different life stages of resident and migratory birds and resident wildlife, including threatened and endangered. Fall and winter wetlands are critical for waterfowl and other migratory birds. Summer wetlands are critical for Giant Garter Snake, Tri-Colored Blackbirds, breeding waterfowl, etc. Summer conditions continue to decline with the ongoing drought as evidenced by the continued decline of breeding waterfowl and tri-colored blackbirds in the Central Valley. While fall and winter conditions ended up well above expectation given private wetland acreages and flooded agriculture in the Sacramento Valley, not all regions of the Central Valley fared as well. Wetland conditions on private land mirrored the refuges as described above, whereas further south there is less habitat available, resulting in less habitat value and bird production.

### **III. Projected Hydrology and Runoff**

The DWR's Hydrology and Flood Operations Office within the Division of Flood Management produces estimates of water year runoff for the major watersheds of the Sacramento and San Joaquin River basins beginning in January and updates these as part of the Department's Bulletin 120 update process from February through May of each year. The runoff forecasts utilized for this DCP are informed by precipitation, snowpack, runoff and other antecedent hydrologic conditions as they existed on January 1, 2015. These forecasts combine runoff associated with antecedent conditions with anticipated runoff resulting from precipitation predicted to occur for the remainder of the year under the 50%, 90%, and 99% hydrologic exceedence scenarios. For example the 90% exceedence hydrology assumes inflows from rainfall and snowmelt at levels that are likely to be exceeded with a 90% probability, or in other words, there is a 10% or less chance of actual conditions turning out to be this dry or drier from this point forward. The 50% probability is the 50/50 assumption - it is just as likely to be drier or wetter.

Operations forecasts utilize the hydrologic forecasts as inputs to simulate Project operations under various regulatory constraints and produce forecasted reservoir storages, releases, flows, and deliveries under the same set of hydrologic exceedences. These operations forecasts give general guidance for annual water delivery, storage management, and power planning purposes for each exceedence assumption. Actual hydrologic events act in time steps shorter than a month and are often unpredictable more than a few days to a week out. Day-to-day operations are also influenced by operating criteria such as those found in U.S. Army Corps of Engineers flood control manuals, D-1641, and the Biological Opinions. Output from forecast models as provided in this DCP represent system responses to the overlay of very specific operating

criteria on a generic set of hydrologic scenarios. These operations forecast updates are generally completed by the third week of the month.

## **IV. Operations Forecasts - Projected Supplies, Releases and Storage**

The operational forecasts are based on a model using the January 1, 2015 50%, 90% and 99% hydrology. The base assumptions utilize existing storage conditions, actual precipitation and runoff occurred to date, forecasted precipitation based on the hydrology, projected water supply deliveries, and meeting existing water quality standards and fish and wildlife protections. The 99% hydrology scenario assumes the installation of emergency drought barriers will be necessary.

Under all the hydrologic scenarios, the model assumes fulfilling the contractual obligations between DWR and North Delta Water Agency. For the Feather River Settlement Contractors, no shortage provision is assumed under the 50% and 90% hydrology scenario, while the contractual 50% shortage provision is assumed to be triggered under the 99% hydrology. A final determination of the delivery to the Feather River Settlement contractors would be made based on the April forecasts. Deliveries to Sacramento River contractors and San Joaquin River Exchange contractors are not explicitly identified in these forecasts. Reclamation will be evaluating available supplies to these contractors based on February forecast projections.

The storage and flows under the January 1, 2015 50%, 90%, and 99% hydrologic scenarios are included in Attachment 1. The January 1, 2015 50%, 90%, and 99% exceedance scenarios were selected to show the likely ranges of hydrology for potential future conditions.

## **V. Projected D-1641 TUCP Requests**

### **A. Summary Table**

The Summary Table, included in Attachment 2, outlines the D-1641 Bay-Delta Standards with likely 2015 TUCP Requests by month for the 50%, 90%, and 99% hydrologic scenarios.

### **Near-Term Considerations**

The January 1, 2015 50%, 90%, and 99% exceedance forecasts are included in Attachment 1. Each of these forecasts project monthly storage levels, reservoir releases, Delta pumping rates, and Delta outflow through the end of September 30, 2015. Much is still unknown about the hydrology for this year, and the hydrology will not follow these exact forecasts. For example, despite above normal rainfall in December in the Sacramento Basin, the hydrology has been dry since December 21, 2014. The following near-term actions are proposed as dry forecasts remain. The hydrology will likely continue to fluctuate between the scenarios making requests for modifications difficult to predict. Therefore, DWR and Reclamation will be seeking initial

modifications based on the current dry trend and the significant unknowns on the year's hydrology.

## **B. Near-Term Actions**

Near-Term (1a): The minimum monthly Net Delta Outflow Index (NDOI) described in Figure 3 of D-1641 during the months of February and March could be requested to be modified to be no less than 4,000 cubic feet per second (cfs).

Near-Term (1b): The maximum Export Limits included in Table 3 of D-1641 could be requested to be modified as follows:

During February and March when footnote 10 of D-1641 is not being met, or the DCC gates are open during a period inconsistent with footnote 23 of D-1641, the combined maximum SWP and CVP export rate for SWP and CVP contractors at the Harvey O. Banks and C.W. "Bill" Jones pumping plants will be no greater than 1,500 cfs on a 3-day running average. When precipitation and runoff events occur that allow the DCC to be closed and footnote 10 of D-1641 is being met [3-day average Delta Outflow of 7,100 cfs or electrical conductivity of 2.64 milliohms per centimeter on a daily or 14-day running average at the confluence of the Sacramento and the San Joaquin rivers (Collinsville station C2) if applicable<sup>1</sup>], but any additional Delta Outflow requirements contained in Table 4 of D-1641 are not being met, then exports of natural and abandoned flows are permitted up to D-1641 Export Limits contained in Table 3 and, in compliance with applicable laws and regulations including ESA and CESA.

Near-Term (2): The DCC Gate Closure requirements included in Table 3 could be requested to be modified as follows:

The DCC gates may be opened during February and March as necessary to preserve limited storage in upstream reservoirs and reduce intrusion of high salinity water into the Delta while reducing impacts on migrating Chinook salmon. Any requests for opening DCC gates will utilize the DCC Matrix and shall be determined through the Real-Time Drought Operations Management Team Process.

Near-Term (3): Table 3 San Joaquin River flow requirements at Airport Way Bridge, Vernalis, for February and March could be requested to be modified as follows:

Base flow period averages shall be no less than 500 cfs.

## **C. Detailed Description of Anticipated D-1641 Modification Requests**

Differences in snowpack distribution, variation among basin and sub-basin hydrologic circumstances, disparity among month to month hydrologic conditions, and other meteorological uncertainties can also effect real-time reservoir and Delta operations and the available water supply at any given time. The 50%, 90% and 99% probability exceedence levels presented

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<sup>1</sup> The Standard does not apply in May and June if the best available estimate of the Sacramento River Index for the water year is less than 8.1 MAF at the 90% exceedence level.

here, as used in this document, are very general and are not the only drivers of what modifications may be needed in the future. The purpose of this document is to set forth generally foreseeable modifications in a 50%, 90% and 99% exceedence scenario.

Consequently, it may be necessary to request modifications earlier than the timeframes outlined in this document, or before the broader hydrology has reached the next described exceedence level, or as additional modifications in response to unforeseen future conditions present themselves.

It is anticipated that all D-1641 Delta requirements would be met if hydrologic conditions in the Sacramento Basins are at the 50% exceedence level or wetter; conditions in the San Joaquin River Basin will likely require wetter conditions before D-1641 requirements related to the San Joaquin River can reliably be met. However, because of the uncertainty of actual hydrologic conditions for the remainder of the winter/early spring period, the Projects will, at a minimum, request the D-1641 modifications identified under the 50% Probability section prior to the end of January 2015. This will help meet the primary goals of the DCP in the event that hydrologic conditions remain drier than normal.

Additional TUCP requests identified under the 90% Probability and 99% Probability sections would likely follow in subsequent months if those respective scenarios play out over the course of water year 2015.

### **January 1, 2015 50% Probability**

If conditions which produced above average conditions for the Sacramento River basin through the end of December 2014 were to continue through the remainder of the water year, Reclamation and DWR forecast that all D-1641 requirements related to that basin could be met without major adverse impacts to other beneficial uses.

However, because conditions in the San Joaquin River basin have been much drier and storages are severely depleted on that system, modifications to the Vernalis flow standard are likely to be requested even under median hydrologic conditions as follows:

50% (1): Table 3 San Joaquin River flow requirements at Airport Way Bridge, Vernalis, for April through June could be requested to be modified as follows:

Base flow period averages shall be no less than 710 cfs. The 31-day pulse flow period shall consist of an overall pulse flow volume equivalent to 31-days at a flow rate to be determined based on subsequent forecasts and operations of the other San Joaquin River tributaries. The start date and flow schedule for the overall pulse flow volume of water shall be determined through consultation with CDFW, NMFS and USFWS (fisheries agencies).

### **January 1, 2015 90% Probability**

In addition to near-term provisions, some or all of the following additional provisions would likely be requested in March if a 90% scenario were to play out in either the Sacramento or San Joaquin River basins

90% (1a): The minimum NDOI described in Figure 3 of D-1641 during the months of April, May, and June could be requested to be no less than 7,100 cfs (or electrical conductivity of 2.64 millimhos per centimeter on a daily or 14-day running average at the confluence of the Sacramento and the San Joaquin rivers (Collinsville station C2)).

90% (1b): The maximum Export Limits during March in conjunction with revised NDOI requirement:

When precipitation and runoff events occur that allow footnote 10 of D-1641 to be met [3-day average Delta Outflow of 7,100 cfs or electrical conductivity of 2.64 millimhos per centimeter on a daily or 14-day running average at the confluence of the Sacramento and the San Joaquin rivers (Collinsville station C2)], but any additional Delta Outflow requirements contained in Table 4 of D-1641 are not being met, then exports of natural and abandoned flows are permitted up to D-1641 Export Limits contained in Table 3 and in compliance with applicable laws and regulations including ESA and CESA.

90% (2): Table 3 San Joaquin River flow requirements at Airport Way Bridge, Vernalis, for April through June could be requested to be modified as follows:

Base flow period averages shall be no less than 500 cfs. The 31-day pulse flow period shall consist of an overall pulse flow volume equivalent to 31-days at a flow rate to be determined based on subsequent forecasts and operations of the other San Joaquin River tributaries. The start date and flow schedule for the overall pulse flow volume of water shall be determined through consultation with CDFW, NMFS and USFWS (fisheries agencies).

90% (3): Table 2 Western Delta Sacramento River could be requested to be modified follows:  
Move the compliance location from Emmaton on the Sacramento River to Threemile Slough on the Sacramento River.

90% (4): The Table 3 Sacramento River at Rio Vista flow requirements from September 30, 2015 could be requested to be modified as follows:

Flows shall be no less than 2,500 cfs on a monthly average. The 7-day running average shall not be less than 2,000 cfs.

### **January 1, 2015 99% Probability**

In addition to near-term provisions, some or all of the following additional provisions would likely be requested in March if a 99% scenario were to play out in either the Sacramento or San Joaquin River basins:

99% (1a): The minimum monthly NDOI described in Figure 3 of D-1641 during the months of April, May, and June could be requested to be no less than 4,000 cfs.

99% (1b): The maximum Export Limits included in Table 3 of D-1641 could be requested to be modified as follows:

During April, May, and June when footnote 10 of D-1641 is not being met, or the DCC gates are open during a period inconsistent with footnote 23 of D-1641, the combined maximum SWP and CVP export rate for SWP and CVP contractors at the Harvey O. Banks and C.W. "Bill" Jones pumping plants will be no greater than 1,500 cfs on a 3-day running average. When precipitation and runoff events occur that allow the DCC to be closed and footnote 10 of D-1641 is being met [3-day average Delta Outflow of 7,100 cfs or electrical conductivity of 2.64 millimhos per centimeter on a daily or 14-day running average at the confluence of the Sacramento and the San Joaquin rivers (Collinsville station C2) if applicable], but any additional Delta Outflow requirements contained in Table 4 of D-1641 are not being met, then exports of natural and abandoned flows are permitted up to D-1641 Export Limits contained in Table 3 and, in compliance with applicable laws and regulations including ESA and CESA.

99% (2): The DCC Gate Closure requirements included in Table 3 could be requested to be modified as follows:

The DCC gates may be opened during April, May, and June as necessary to preserve limited storage in upstream reservoirs and reduce intrusion of high salinity water into the Delta while reducing impacts on migrating Chinook salmon. Requirements for closure of the DCC gates from February 15 through May 20 shall be determined through the Real-Time Drought Operations Management Process.

99% (3): Table 3 San Joaquin River flow requirements at Airport Way Bridge, Vernalis, for April through June could be requested to be modified as follows:

Both the base flow and pulse flow period averages will be determined based on subsequent forecasts and operations of the other San Joaquin River tributaries. The start date and flow schedule for any pulse flow volume of water shall be determined through consultation with the CDFW, NMFS and USFWS (fisheries agencies).

### **Emergency Drought Barriers**

In addition to any TUCP provisions requested in the 99% scenario, at any time when the installation of Emergency Drought Barriers (EDB) is deemed to be necessary for human health and safety needs, the following modification provisions would likely be requested:

EDB (1): Table 2 Western Delta Sacramento River requirement at Emmaton would be requested to be suspended.

EDB (2): The minimum NDOI described in Figure 3 of D-1641 during the months of June, July, August, and September would be requested to be suspended.

EDB (3): The Table 3 Sacramento River at Rio Vista flow requirements for September would be requested to be suspended.

Installation of the EDB does not preclude DWR from fulfilling its North Delta Water Agency contractual obligations.

## **VI. Further Aspects of Potential Operations**

### **A. Instream Flows**

#### **i. Trinity River**

Spring flows on the Trinity River will be consistent with annual allocations as provided through the Trinity River Main-stem Fishery Restoration Record of Decision. Flows for the remainder of the year will make consistent with SWRCB order WR 90-5. Consistent with fish health criteria, releases to augment flows in the Lower Klamath River may be considered.

#### **ii. Sacramento River**

Flow releases at Keswick will be maintained at the minimum of 3,250 cfs this winter and spring as much as practicable to help conserve storage in Shasta Lake. Procedures consistent with the NMFS Biological Opinion will be applied through this period, and Reclamation will again work closely with the Sacramento River Settlement Contractors in scheduling their river diversions in a manner to help minimize the release of water prior to the start of the temperature management season. Likely starting in late May, flow releases will increase at Keswick to facilitate temperature management along the upper reach of the Sacramento River, and these increased flows will then be used to meet other Project purposes in the system.

#### **iii. Clear Creek**

Flows on Clear Creek will be consistent with the NMFS Biological Opinion and RPA actions. The timing of any prescribed pulse flows will be closely evaluated through technical teams to minimize effects on temperature management and/or ability to help meet other system flow needs.

#### **iv. Feather River**

Flows on the Feather River will be consistent with flow requirements on the Low Flow Channel and High Flow Channel on the Feather River and all temperature requirements at the Feather River Fish Hatchery and Robinson's Riffle for all periods as designated in the current FERC license which includes consultation by NMFS and USFWS, and the 1983 agreement between DWR and CDFW.

#### **v. American River**

Flows on the American River will be consistent with the provisions of the NMFS Biological Opinion and RPA actions. Flows in the winter and spring will generally follow the outline of the “American River Flow Management Standard”, with flows in the summer and into the fall intertwined with the temperature plan for Folsom Lake and the American River. Starting in June, flow releases will increase at Nimbus to facilitate temperature management along the American River, and these increased flows will then be used to meet other Project purposes in the system.

#### **vi. Stanislaus River**

Flows on the Stanislaus River will be consistent with the provisions of the NMFS Biological Opinion and RPA actions. Generally flows in the winter and spring will follow the “Appendix 2e” schedules (from the NMFS Opinion) as modified through the interagency Stanislaus Operations Group. Given the severely depleted storage at New Melones Lake, minimum flows will be maintained as much as possible. The requested modifications to objectives on the lower San Joaquin River at Vernalis are intended to conserve water in New Melones Lake to help balance the competing needs of the Stanislaus River and conditions on the lower San Joaquin River.

### **B. Additional Fishery Actions**

The Agencies have described in detail other potential operations to maintain adequate protections for State and federally listed endangered and threatened species and other fish and wildlife resources in the event of continued dry hydrology in the 2015 Drought Strategy. These specific measures relate to potential flexibility in implementing Old and Middle River (OMR) flows, temperature management on the Sacramento River, LSNFH hatchery operations, DCC gate operations, and emergency drought barriers. (The 2015 Drought Strategy is included as Reference 1).

#### **i. Initial Temperature Management Conditions – Sacramento River**

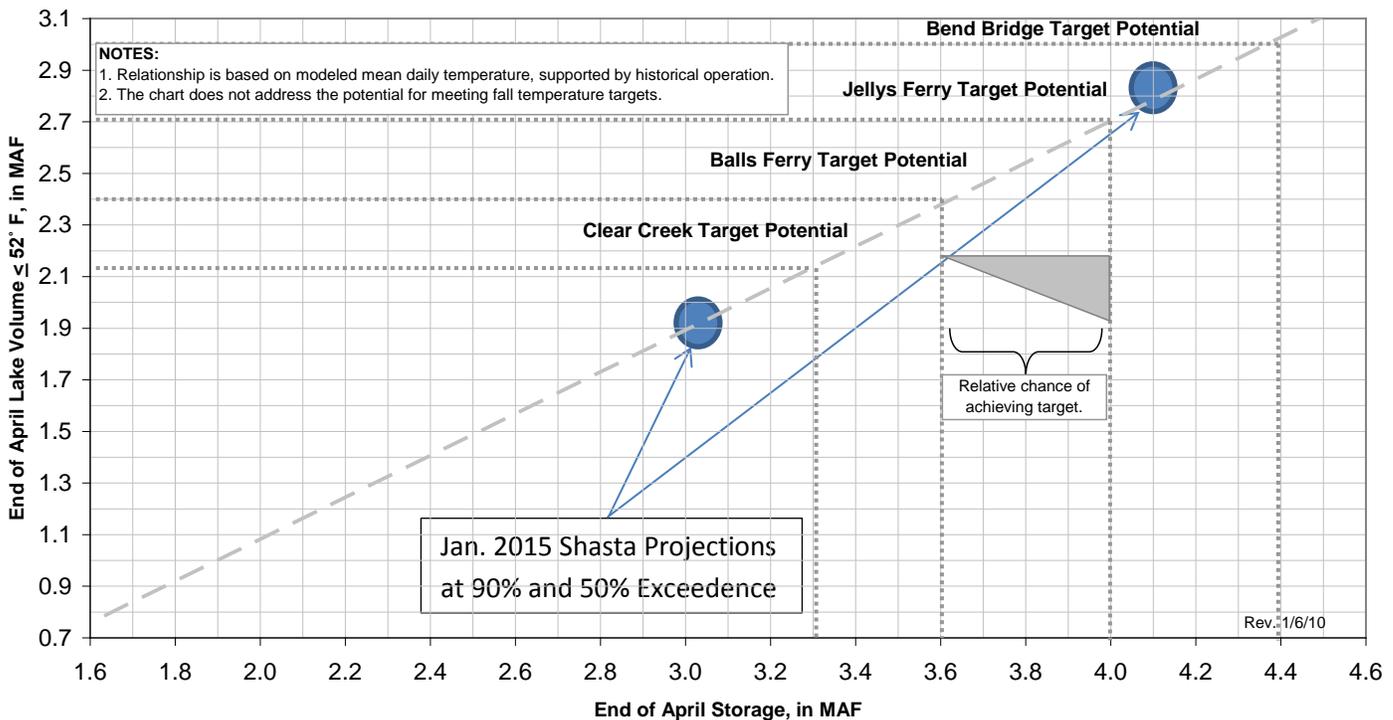
The current suite of runoff projections based on the January 1 forecasts (unadjusted based on observed conditions in January) suggests a significant range of possible temperature management outcomes for the Sacramento River. The range is more pronounced than some of the other aspects of this DCP given that the seasonal inflow to Shasta Lake is the prime driver of temperature performance on the Sacramento River, and the range of the potential inflow to Shasta Lake is sizable this early in the water year. Specifically, the January through April inflow projections currently range from 1.45 MAF in the 99% exceedence forecast, 2.00 MAF in the 90%, 3.05 MAF in the 50% exceedence forecast.

Another important consideration this year is that diversions from the Trinity River basin to the Sacramento River will be more limited than in past years given the relatively low storage projections at Trinity Lake and anticipated Trinity River operations this season.

Based on forecasted projections, the upper Sacramento River water temperature compliance locations could range from a location upstream of the Clear Creek confluence in a 90% exceedence scenario, to the Jelly's Ferry location in a 50% exceedence scenario.

Under the 99% hydrology temperature compliance will likely utilize the procedures outlined in the NMFS Winter-run Contingency Plan (Appendix-D of the April 2014 CVP and SWP Drought Operations Plan).

**Lake Shasta End of April Storage  
Potential for Meeting Compliance Point Target of 56° F (Apr-Sep)**



**Shasta Lake Projections**  
(based on exceedence forecasts including January)

Exceedence Forecast	April 30 Storage Projection (TAF)	April 30 Elevation Projection (ft)
90%	3,030	1,009
50%	4,140	1,053

For the 90% exceedence scenario, the maximum Shasta Lake elevation is projected to be only 1009 feet. This lake level would limit the flexibility of the Shasta Temperature Control Device (TCD) to only the Middle, Lower and Side gates to manage the coldwater pool. This is similar to

conditions of Water Year 2014. The Upper gates require a lake elevation of about 1,035 feet to be functional in managing water temperatures.

By contrast, in the 50% exceedence scenario, the operation of the Shasta TCD would utilize all the gate levels, and combined with the increase in available cold water, Reclamation could potentially attain the Jelly's Ferry compliance location this year.

#### **ii. Hatchery Winter-run**

In order to protect juvenile hatchery winter-run from exposure to the hydrodynamic effects from exports, Livingston Stone National Fish Hatchery managers will coordinate with DOSS to time the hatchery release of winter-run chinook with adequate hydrologic conditions, and track their movement down the Sacramento River into and through the Delta utilizing the acoustically-tagged winter-run released at approximately the same time. Real-time acoustic receivers will be deployed along the Sacramento River and Delta at various locations. DOSS will review the real-time acoustic tag data to determine the likely timing and distribution of the hatchery winter-run in the Sacramento River and into the Delta, and advise NMFS and Water Operations Management Team of potential risk of hatchery winter-run to the influences of the hydrodynamic effects of increased exports during sporadic storm events.

#### **iii. Delta Cross Channel Gates**

Based on current and projected water quality in the Delta, and at least 3 weeks prior to any need to open the DCC gates, Reclamation and DWR will determine whether adjustments in the timing of the opening of the DCC gates should occur in order to address the prospects of elevated salinities in the Delta (Action IV.1.2). The DCC gate triggers matrix will be used to determine risk to species and DCC gate operation in the event the DCC gates are opened to address water quality or supply concerns. The triggers outlined in this matrix provide direction for when the gates may remain open and a method that balances water supply and fishery objectives in the Delta.

#### **iv. Emergency Drought Barriers**

If winter forecasts show there will not be enough water in upstream reservoirs to repel the saltwater and meet health and safety and other critical needs, then installation of Emergency Drought Barriers will be considered to lessen water quality impacts. Excessive salinity increases in the Delta could render the water undrinkable by the 25 million Californians and unusable by the farms reliant upon this source. Temporary rock (rip-rap) Emergency Drought Barriers may be installed at up to three locations in the Delta during drought conditions in 2015 or in a subsequent year if necessary to manage salinity in the Delta when there is not enough water in upstream reservoirs to release to rivers to repel the saltwater. An interagency group is evaluating barrier installation – at this time, the following timeline is considered: The temporary rock barriers may be installed on or about May 7 in West False River and no sooner than May 22 at the Sutter Slough and Steamboat Slough. Construction would require approximately 30-60 days. Barrier removal would commence on or about October 1 and would require approximately 30-60 days for Sutter and Steamboat Sloughs and approximately 45-60 days for

West False River. The Agencies continue to work together to ensure compliance with appropriate State and federal laws.

In the event barriers are installed, barrier-associated biological and physical monitoring will be initiated in a timely fashion, in some cases in advance of barrier installation. Additionally, as described in Section V B, modifications to D-1641 standards would need to be requested.

## **VII. Real Time Monitoring Efforts to Inform Operations**

### **A. Delta Smelt Early Warning Surveys**

The current drought has highlighted the need to improve the array of information that is collected to support management decisions pertaining to the effect of winter/spring exports on the Delta Smelt population. Reclamation and USFWS coordinated for several months to develop early warning surveys to provide information on Delta Smelt distribution that will inform water operations in WY2015. The overall intent for early warning surveys is to inform USFWS and others whether, during weather events and freshets, substantial numbers of Delta Smelt are moving, or being moved, into areas potentially subject to entrainment. This information has helped to inform export operational decisions and allowed for flexibility in maximizing export opportunities early this year. The early warning surveys were initiated in December 2014 and will continue through April 2015. Reclamation, USFWS, CDFW and DWR are collaborating to leverage available funds from all agencies and integrate Delta Smelt and salmonid trawl efforts to improve efficiency.

Now that the storm systems in December have abated, per the study design weekly sampling is now occurring and will continue until weather or other circumstances indicate a need to return to daily sampling.

### **B. Salmonids Near-term Drought Monitoring**

In WY2015, various salmonid monitoring efforts will continue, as long as drought conditions continue. Additional trawling and beach seining in the northern Delta, more frequent sampling at rotary screw traps further upstream in the Sacramento River Basin, and implementation of a DCC gate operations trigger matrix would accompany any modifications in operations of the DCC gates from those specified in the NMFS Biological Opinion or D-1641. Temperature and dissolved oxygen probes are planned to be deployed within redds of fall-run and winter-run salmon to monitor and allow for management of water quantity (minimizing the effects of dewatering) and water quality. An additional Kodiak trawl was conducted in December to monitor distributions of Delta Smelt and salmonids, and the early warning trawling planned for Jersey Point and Prisoner's Point will monitor salmonid species as well. This early warning trawling will provide information from additional locations in the Delta about the presence of salmonids, which will help to inform management decisions about OMR reverse flows. An increase in sampling duration at the salvage facilities was considered as part of the monitoring plan to minimize inaccuracies in expanded salvage counts and loss calculations. However,

after several discussions, DOSS advised NMFS not to increase the sampling duration because the disadvantages would outweigh the potential benefits.

Other studies on migration paths and mortality will continue in 2015 for winter-run and spring-run salmon, as well as steelhead and sturgeon, to improve scientific knowledge about the population dynamics of these species. An enhanced Particle Tracking Model that includes simulation of fish migration behavior will be tested in a pilot project to verify accuracy and the ability of the model to inform real-time management decisions. Using recent data, the upstream temperature model will also be recalibrated to improve its ability to forecast temperature conditions in the Sacramento River. A feasibility study on the use of passive integrated transponders to monitor the movement and fate of salmonids will also be conducted in 2015 to determine if this technology could be usefully deployed in California to improve knowledge of salmonid populations.

This monitoring in 2015 and beyond was developed to improve our understanding of timing and distribution of species in the Delta, as well as inform targeted research and fill data gaps that further detail risks resulting from water operations.

**DROUGHT CONTINGENCY PLAN**  
(January 15, 2015 - September 30, 2015)

**January 1 - 50% HYDROLOGIC EXCEEDENCE**

**END OF MONTH STORAGES (TAF)**

RESERVOIRS	2015								
	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
Trinity	917	1019	1172	1287	1199	1080	958	867	783
Shasta	2188	2843	3498	3835	3898	3611	3195	2856	2733
Folsom	491	486	587	646	878	935	825	694	642
Oroville	1463	1933	2431	2742	2900	2910	2374	1883	1523
New Melones	583	635	684	675	655	597	502	397	322

**MONTHLY AVERAGE RELEASES (CFS)**

RESERVOIRS	2015								
	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
Trinity	300	300	300	550	4200	2100	1100	450	450
Sacramento	3250	3250	3250	5000	7000	10700	11050	9500	6200
American	900	5000	4700	4550	2100	2300	3400	3700	2250
Feather	950	950	800	1800	1050	1050	8600	8050	6950
Stanislaus	200	200	200	650	750	500	350	350	250

**DELTA SUMMARY (CFS)**

	2015								
	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
Rio Vista Flows	11150	27100	22300	13950	8200	6250	10600	10100	8850
Sac River at Freeport	13250	31750	26350	17250	11450	11700	19800	18950	16600
SJ River at Vernalis	1450	3150	3000	2650	3100	1400	1100	1050	950
Computed Outflow	13000	31900	27150	17950	11400	7500	6500	5450	4450
Combined Project Pumping	3550	5100	3300	1550	1600	2400	10500	11250	11200

**January 1 - 90% HYDROLOGIC EXCEEDENCE**

**END OF MONTH STORAGES (TAF)**

RESERVOIRS	2015								
	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
Trinity	888	926	1007	1075	967	862	761	658	599
Shasta	2036	2389	2751	2889	2815	2566	2261	1994	1875
Folsom	465	537	640	642	646	488	316	229	210
Oroville	1403	1641	1926	2067	2037	1874	1682	1523	1485
New Melones	543	544	537	492	411	333	255	180	123

**MONTHLY AVERAGE RELEASES (CFS)**

RESERVOIRS	2015								
	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
Trinity	300	300	300	550	2900	800	450	450	450
Sacramento	3250	3250	3250	4500	6400	8750	8500	7750	4900
American	900	1700	1900	3150	2500	4000	3800	2550	1350
Feather	950	950	800	1050	1300	1950	1400	1300	1200
Stanislaus	200	200	300	550	500	550	400	350	250

**DELTA SUMMARY (CFS)**

	2015								
	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
Rio Vista Flows	9450	12200	9800	7400	5800	5300	2650	2600	2600
Sac River at Freeport	11300	14550	12000	9700	8600	10450	8550	8350	7800
SJ River at Vernalis	1050	1400	1600	1450	1450	1050	900	750	750
Computed Outflow	9650	12750	12250	9250	7100	7100	4250	4350	4200
Combined Project Pumping	3550	4350	1800	1150	1150	1200	1250	1400	2300

Footnote: These forecast numbers include adjustments to January inflows based upon observed conditions through mid-January.

## DROUGHT CONTINGENCY PLAN

(January 15, 2015 - September 30, 2015)

### January 1 - 99% HYDROLOGIC EXCEEDENCE

#### END OF MONTH STORAGES (TAF)

RESERVOIRS	2015								
	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
Trinity	860	894	920	929	843	769	704	637	576
Shasta	1966	2173	2393	2424	2242	1843	1397	1070	936
Folsom	440	499	523	520	484	347	251	217	182
Oroville	1374	1516	1704	1762	1681	1468	1250	1027	1023
New Melones	543	544	537	491	409	331	254	178	122

#### MONTHLY AVERAGE RELEASES (CFS)

RESERVOIRS	2015								
	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
Trinity	300	300	300	600	1500	800	450	450	450
Sacramento	3250	3250	3250	4500	7000	10000	9850	7800	4900
American	900	800	1950	2000	1750	3050	2200	1200	1100
Feather	950	950	800	1650	1700	2700	2400	3100	950
Stanislaus	200	200	300	550	550	550	400	350	250

#### DELTA SUMMARY (CFS)

	2015								
	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
Rio Vista Flows	7800	7550	7050	6100	5750	5850	2900	2600	2000
Sac River at Freeport	9350	9200	8800	8200	8550	11200	8950	8400	6950
SJ River at Vernalis	1050	850	850	1750	1550	300	250	350	350
Computed Outflow	7050	7100	8050	7800	7100	7100	4200	4300	4050
Combined Project Pumping	3550	3350	1300	900	850	900	900	900	900

Footnote: These forecast numbers include adjustments to January inflows based upon observed conditions through mid-January.

# D-1641 Bay-Delta Standards

With Likely 2015 TUCP Requests

CRITERIA	Feb 2015	Mar 2015	Apr 2015	May 2015	Jun 2015	Jul 2015	Aug 2015	Sep 2015
<b>Jan 1 - 50% Hydrology</b>								
• Outflow Spring X2 Minimum Outflow - mon.	Near-Term TUCP							
• River Flows @ Rio Vista - min. mon. avg. @ Vernalis: Base -min. mon. avg. Pulse objective	Near-Term TUCP		710 cfs	T.B.D.	710 cfs	710 cfs	710 cfs	
• Delta Cross Channel Gates	N-T TUCP							
• Salinity EC - Emmaton								

<b>Jan 1 - 90% Hydrology</b>								
• Outflow Spring X2 Minimum Outflow - mon.	Near-Term TUCP		7100 cfs	7100 cfs	7100 cfs			
• River Flows @ Rio Vista - min. mon. avg. @ Vernalis: Base -min. mon. avg. Pulse objective	Near-Term TUCP		500 cfs	T.B.D.	500 cfs			2500 cfs
• Delta Cross Channel Gates	N-T TUCP							
• Salinity EC - Emmaton			Requirement Moved to Three Mile Slough					

<b>Jan 1 - 99% Hydrology</b>								
• Outflow Spring X2 Minimum Outflow - mon.	Near-Term TUCP		4000 cfs	4000 cfs	Suspended			
						Suspended		
• River Flows @ Rio Vista - min. mon. avg. @ Vernalis: Base -min. mon. avg. Pulse objective	Near-Term TUCP		T.B.D.	T.B.D.	T.B.D.			Suspended
• Delta Cross Channel Gates	N-T TUCP		Conditional DCC Opening					
• Emergency Drought Barriers				Construction	Operational			
• Salinity EC - Emmaton			Suspended					

**Interagency 2015 Drought Strategy**  
**For the Central Valley Project and State Water Project**  
**December 11, 2014**  
**Working Draft**

**Overview**

This Interagency 2015 Drought Strategy (2015 Drought Strategy) has been prepared by the Bureau of Reclamation (Reclamation), California Department of Water Resources (DWR), U.S. Fish and Wildlife Service (FWS), National Marine Fisheries Service (NMFS) and California Department of Fish and Wildlife (CDFW). This 2015 Drought Strategy is comprised of three components which are outlined in this document: (1) a preliminary framework for the Drought Contingency Plan for Operations of the CVP and SWP (DCP), (2) the DCP Biological Monitoring Plan, and (3) Other Drought-Related Measures. The DCP, when finalized by the above agencies, will be submitted to the State Water Resources Control Board (SWRCB) on January 15, 2015, as required by the SWRCB's final Temporary Urgency Change Order dated October 7, 2014. The purpose of issuing this Drought Strategy is to inform stakeholders and the public of 2015 drought response actions being taken by the state and federal government relating to project water operations and related matters.

**Introduction and Goals**

As California approaches the winter after a third consecutive dry year, economic and environmental challenges for our State are mounting. Since December 2013, state and federal agencies that supply water, regulate water quality, and protect fish and wildlife have worked together to cope with persistent drought. Together, these agencies worked through existing statutory and regulatory obligations so that water operations could adjust quickly to changes in the weather and environment to support and improve water supply deliveries when possible while protecting water quality and fish and wildlife as required under state and federal laws and permits. The agencies recognize the importance of their efforts to minimize potential impacts from drought to food security, provide economic stability, and provide for species protection in California.

On January 17, 2014, the Governor issued a drought State of Emergency proclamation. On January 29, Reclamation and DWR sought a temporary modification to their water rights permits and licenses to allow appropriate modification of CVP and SWP operations to respond to the drought conditions. On January 31, 2014, the Executive Director of the State Water Resources Control Board (SWRCB) issued an Order that granted temporary modification to Water Rights Decision 1641 (D-1641). The modification allowed the Projects to reduce Delta outflow and thus

conserve upstream storage for later use. It also allowed the Projects to pump to meet critical supply needs when Delta outflow was lower than would typically allow such pumping

Consistent with the petition and subsequent acknowledgement in the Order, Reclamation and DWR convened a Real Time Drought Operations Management Team (RTDOMT) comprised of representatives from Reclamation, DWR, fisheries agencies, and the SWRCB to discuss more flexible operations of the Projects while protecting beneficial uses. Together, through subsequent petitions vetted through the RTDOMT and submitted to the SWRCB, Reclamation and DWR received modifications to the Order and adjustments to water operations under drought provisions of the smelt and salmon biological opinions. The RTDOMT developed a Drought Operations Plan (DOP) for April to November 2014 to address water operations which incorporated regulatory adjustments to balance water supply and biological benefits.

The modified Order, DOP, and subsequent biological reviews created flexibility for water operations which conserved water in upstream reservoirs for future beneficial uses. Some of the major modifications included shifting the Agricultural Western Delta Salinity Standard (EC) compliance from Emmaton upstream to Threemile Slough, adjusting Delta Outflow requirements, adapting OMR regulatory flows, and varying flow standards at Vernalis. These modifications allowed the projects to conserve a significant amount of water while operating under the Order and DOP.

As we approach 2015, Reclamation, DWR, FWS, NMFS and CDFW have prepared this 2015 Drought Strategy to be in a better position to address 2015 challenges and to inform stakeholders about the agencies' anticipated drought response efforts. The Strategy will help the five agencies to maximize operational flexibility of the CVP and the SWP to support water supplies while minimizing the adverse effects of the drought on water quality and imperiled species. This Strategy is currently intended to address drought responses through November 2015 through development and implementation of the individual key Strategy components and incorporates lessons learned from last year. The agencies recognize that effectively addressing a fourth year of drought will require extraordinary cooperation and action by water managers at the state, federal and local level to implement innovative water management measures. The agencies will support those efforts as appropriate to meet water needs in 2015.

The goals of this 2015 Drought Strategy are to operate the CVP and SWP and take other related actions consistent with the following core principles:

1. **Operate the CVP and SWP during the continuing drought to meet essential human health and safety needs and lessen critical economic losses throughout the CVP and SWP service areas from January 15 through November 15, 2015.** As a first priority, the Projects must assure that adequate water supplies are available for drinking water, sanitation, and fire suppression for communities within their service areas. Beyond

providing for these basic needs, this 2015 Drought Strategy provides for operation of the CVP and SWP systems to lessen critical economic losses due to water shortages through project water deliveries and by facilitating voluntary water transfers and exchanges to the extent possible, while balancing the other purposes of the Strategy described below.

2. **Control of salt water intrusion in the Sacramento-San Joaquin Delta (Delta).** Salt water pushes inland from San Francisco Bay, driven in large part by tidal rise and fall of the ocean, and reaching inland to the point where fresh water inflows to the Delta present a barrier that keeps the salinity from proceeding further. The fresh water inflows to the Delta are primarily determined by managed releases from upstream reservoirs. If there is not enough water in upstream reservoirs to release to rivers to repel the saltwater, the salinity intrusion impairs water quality in the channels from which water supplies are drawn, not just for the SWP and CVP but also for Delta farmers and water districts in nearby Contra Costa, Alameda and San Joaquin counties. Maintenance of sufficient reservoir storage is critical to control Delta salinity in the upcoming (2015) spring through the fall months; therefore, this 2015 Drought Strategy balances the often conflicting needs of protecting upstream storage, providing critically needed water deliveries from the Delta in the spring and summer, and maintaining salinity control in the Delta for diversions and deliveries later in the year and possibly into 2016. If winter forecasts show there will not be enough water in upstream reservoirs to repel the saltwater and to meet health and safety and other critical needs, then installation of Emergency Drought Barriers will be considered to lessen water quality impacts.
3. **Preserve cold water pools in upstream reservoirs for temperature management to maintain cool water temperatures for salmon and steelhead.** These same water supplies also serve other beneficial uses including water deliveries and Delta salinity management in water year (WY) 2015 and in WY 2016 if dry conditions continue.
4. **Maintain adequate protections for state and federally endangered and threatened species and other fish and wildlife resources.** Operational criteria will be implemented this year in a manner that provides adequate fishery protections. This 2015 Drought Strategy identifies the criteria that have been or could be modified in order to balance all needs while continuing to provide the protections required by law. The key components that will be used to implement the strategy will be reviewed under applicable laws, including the federal Endangered Species Act (ESA), California ESA and the California Water Code.
5. **Provide an overview of biological monitoring that may be implemented to assist in development of forecasted operations as well as guide daily operations to increase the agencies' ability to support and improve water deliveries while also meeting**

**water quality and species requirements.** The goal of the monitoring is to provide data that can be assessed so that biological needs and water supply objectives are considered in real time (*i.e.*, on a weekly or daily basis). Monitoring provides important information to decision makers when considering the potential effects of real-time operations. Monitoring allows for decisions to be made using relevant information such as species presence and risk level.

6. **Highlight other drought-related measures that the federal and state agencies will pursue in 2015.** These actions, if implemented, may be helpful under certain conditions in alleviating some impacts to water supply caused by the drought. These measures may also have additional utility beyond the drought.

### **Key Components**

Key components associated with the 2015 Drought Strategy for the CVP and SWP include the following:

- Drought Contingency Plan for Operations
- Biological Monitoring Plan
- Other 2015 Drought-Related Measures

#### **1. Drought Contingency Plan (DCP) for Operations of the CVP and SWP**

Reclamation and DWR are working collaboratively with the FWS, NMFS, CDFW and the SWRCB to prepare a 2015 DCP for operations of the CVP/SWP (also “Projects”) in the event that water supplies remain very low. The 2015 Interagency Drought Strategy will be used by DWR and Reclamation to inform the Drought Contingency Plan to be completed per the SWRCB final Temporary Urgency Change Order dated October 7, 2014. The SWRCB’s October 7, 2014, Order required the agencies to develop a two-phased DCP. Phase 1 was submitted to the SWRCB on October 15 (*see Enclosure I*) and addresses operation of the CVP and SWP from *October 15, 2014, through January 15, 2015*. Phase 2 is due to the SWRCB by January 15, 2015, and will include forecasted conditions related to the operation of the CVP and SWP from *January 15, 2015, through September 30, 2015*. The DCPs will be modified as needed in the future based on evolving circumstances, including additional direction from the SWRCB as well as current hydrologic and biological conditions. The agencies will use the outline below to develop the Phase 2 DCP ordered by the SWRCB. However, it may be difficult to include some of the actions outlined below in the monthly hydrology forecasts requested by the SWRCB.

Phase 2 of the 2015 DCP will address a range of potential hydrologic/runoff conditions through forecasted operation of the CVP and SWP to (not in order of priority):

- Meet essential human health and safety needs and, where possible, lessen critical economic losses
- Manage salinity intrusion in the Sacramento-San Joaquin Delta
- Manage cold water in Project reservoirs for various cold water species
- Maintain protections for listed species and other fish and wildlife resources to the extent possible given the severity of the drought
- Provide SWP and CVP contractual deliveries based on forecasts and available water supplies. The SWP initial water supply allocation is made December 1. The CVP initial allocation is released in February. Updated forecasting occurs monthly thereafter.

### **Anticipated Collaboration Process**

Reclamation and DWR have recommenced the RTDOMT meetings that were established in 2014 (see Introduction). Reclamation, DWR, CDFW, FWS, NMFS, and the SWRCB will meet at least once a week in order to review real-time water operation and biological information to assess potential drought response actions. The RTDOMT provides state and federal water operators, fish agencies, and the SWRCB with a reliable communication schedule and established points of contact to timely respond to emerging issues.

Biological information will be collected through standard survey programs and via additional monitoring, including Early Warning Surveys (*see section 2 and Enclosure II for the DCP Biological Monitoring Plan*). The available physical and biological data will be evaluated on an ongoing basis by the RTDOMT agencies to ensure efficient water operations management through potentially dynamic weather and flow events. As circumstances permit, the Projects may request adjustments in OMR flow management through the RTDOMT process. In considering such requests, the RTDOMT will convene and evaluate real-time and forecasted hydrology, data from various monitoring and sampling locations, and any recommendations from the Delta Operations for Salmonids and Sturgeon (DOSS) or Smelt Working Group (SWG). If temporary adjustments to the Biological Opinions or D-1641 are requested by the Projects, they will submit a written request to the appropriate agencies for consultation or approval.

The RTDOMT will also monitor water transfers and address operational issues associated with making transfers in light of drought operations.

### *Summary of anticipated contents of the Phase 2 of the DCP:*

- I. *Introduction and Purposes of the Plan*
- II. *2015 Water Conditions and Forecasted Operations of the CVP and SWP for January 15-November 15, 2015*
- III. *Critical CVP/SWP Operational Considerations*

- A. Essential Human Health and Safety
- B. Storage Conditions going into 2016 will be assessed in early January 2015 and included in the January 15 report to the SWRCB.
- C. Maintaining Salinity Control through Emergency Drought Barriers
  - i. Excessive salinity increases in the Delta could render the water undrinkable by 25 million Californians and unusable by farms reliant upon this source. Temporary rock (rip-rap) barriers may be installed at up to three locations in the Delta during drought conditions in 2015 or in a subsequent year if necessary to manage salinity in the Delta when there is not enough water in upstream reservoirs to release to rivers to repel the saltwater.
  - ii. An interagency group is considering installing barriers – at this time, the following timeline is considered: The temporary rock barriers may be installed on or about May 7 in West False River and no sooner than May 22 at the Sutter Slough and Steamboat Slough. Construction would require approximately 30-60 days. Barrier removal would commence on or about October 1 and would require approximately 30-60 days for Sutter and Steamboat Sloughs and approximately 45-60 days for West False River.
- D. Coldwater management and other fishery needs: The end-of-September 2014 storage of approximately 1.163 million acre-feet in Shasta Reservoir is very low and may not be adequate to maintain winter-run Chinook salmon egg incubation and fry production throughout the 2015 broodyear (through September 2015) in the Sacramento River without a marked increase in inflow into Shasta Lake. The April 8, 2014, *Central Valley Project and State Water Project Drought Operations Plan and Operational Forecast April 8, 2014 through November 15, 2014* (DOP) included a winter-run contingency plan (Attachment D), which provided for an enhanced monitoring program, various infrastructure improvements and decision points based on various considerations in order to minimize the negative effects of the drought and operations in 2014. A similar winter-run contingency plan will be needed for 2015.
- E. CVP and SWP Water Supplies for WY 2015: Reclamation and DWR will follow their normal processes for making allocations of supplies for 2015. Water contractors will be involved regularly in discussions regarding 2015 CVP/SWP operations and contract allocations.
- F. Refuge Water Supply: Central Valley Project Improvement Act (CVPIA) refuge water supplies will follow their normal process in making allocations. CVPIA refuge managers will be involved regularly in discussions regarding 2015 CVP/SWP operations and contract allocations.
- G. Operational Flexibility to support potential exchanges and transfers: The agencies will support efforts to implement extraordinary one-year transfers or multi-year exchange agreements between water users.

H. Water re-use and conservation: The agencies intend to pursue water re-use and promote conservation efforts where appropriate to make the most use of limited supplies.

IV. *Overview of 2015 Forecasts and Operations*

A. Overview

B. Process: The five agencies will continue coordinating with the SWRCB through the existing RTDOMT.

C. CVP and SWP Forecasts

V. *Proposed Upstream Tributary Operations (Temperatures and flows) – January 15- November 15, 2015- this section is under development; following is the current outline for the plan*

A. Upper Sacramento River, Trinity River, and Clear Creek Flows and Temperature Management Planning – NMFS Reasonable and Prudent Alternative (RPA) Action 1.2.3.C

i. Trinity Operations

ii. Clear Creek Operations

iii. Shasta Operations/Keswick Release Schedule

iv. These operations will be developed further and refinements will be incorporated based on operation from last year.

B. Folsom/American River Operations

C. New Melones/Stanislaus River Operations

D. Oroville/Feather River Operations

VI. *Proposed Delta Operations – Winter*

A. 2009 Biological Opinion and Conference Opinion on the Long-term Operations of the Central Valley Project and the State Water Project (NMFS BiOp) Provisions

i. Delta Cross Channel (DCC) Operation–Based on current and projected water quality in the Delta, and at least 3 weeks prior to any need to open the DCC gates, Reclamation and DWR will determine whether adjustments in the timing of the opening of the DCC gates should occur in order to address the prospects of elevated salinities in the Delta (Action IV.1.2). The DCC gate triggers matrix (as described in Appendix G of the DOP) will be used to determine operation the DCC gates. The triggers outlined in this matrix provide direction and a method that balances water quality and fishery objectives in the Delta. There is a reasonable potential that water quality will be adversely affected by a continuation of the drought into early water year (WY) 2015; therefore the January 15 DCP is expected to propose modifications to water quality criteria to achieve the aforementioned balance.

- ii. The interagency group continues to discuss short-term flexibilities to allow OMR exceedances of the 14-day running average during sporadic storm events under an exceptionally dry hydrology: Upon the onset of RPA Action IV.2.3 for OMR flow management, OMR shall be no more negative than -5,000 cfs as a 14-day running average, and no more negative than -6,250 cfs as a 5-day running average, except as needed to capture sporadic storms (increase exports). This exception would be evaluated based on listed species distribution and risk in the South and Central Delta, and if conditions remain very dry (according to subsections below).
1. While Action IV.2.3 is in effect, and drought conditions remain, the Projects may request an adjustment to its implementation by requesting that the use of the OMR Index criteria (as approved by USFWS, NMFS, and CDFW) to be no more negative than -6,000 cfs for limited periods in order to capture additional natural or abandoned flow in the Delta because of infrequent storm events. Through this operational flexibility, the Projects are expected to be able to increase exports over what they would otherwise be able to do, while providing protections for the listed species. During any potential adjustment to Action IV.2.3, the action triggers provided in RPA Action IV.2.3 (*e.g.*, combined older juvenile Chinook salmon loss density) will continue to be in effect. Additional flexibility, use of the OMR Index to be no more negative than -6,500 cfs for short periods, may be requested by the Projects to capture the peak of storm events. Once the operational flexibility has been exercised, operations will conform OMR flows consistent with RPA Action IV.2.3.
  2. On occasion, there may be multiple rainfall events that occur one right after the other that make implementation of subsection 3, below, difficult, especially in consideration of the Projects exporting as much natural and abandoned flow as possible. In these situations, Reclamation and DWR may request additional flexibility in OMR flow management through the RTDOMT. In considering the request, the RTDOMT will convene and evaluate real-time and forecasted hydrology, data from various monitoring locations (*e.g.*, Knights Landing RSTs, Sacramento trawl and beach seines, Jersey Point and Prisoners Point trawls, and the Federal and state fish facilities), and any advice from the DOSS, in making a decision whether to grant the additional flexibility, and for what duration.
  3. A similar flexibility was granted and implemented during a few storms in water year 2014. However, increases in combined exports lagged behind (a couple-day lag time) the peak of the increased natural flow in the Delta. If flexibility is requested and subsequently granted, increased exports during sporadic storm events in water year 2015 will

be implemented during the ascending limb of the hydrograph, followed by a subsequent reduction in exports during the descending limb of the storm events. The key to this operation is to capture the spike in water availability prior to a coincident spike in listed fish presence in the central and south Delta. This request will be accompanied by augmented real-time monitoring at Prisoners Point and Jersey Point in order to evaluate the timing, location and magnitude of listed anadromous salmonid species in the Delta.

4. Hatchery winter-run and their exposure to the hydrodynamic effects from exports: Livingston Stone National Fish Hatchery (LSNFH) managers will coordinate with DOSS to time the hatchery release of winter-run chinook to good hydrologic conditions, and track their movement down the Sacramento River into and through the Delta utilizing the acoustically-tagged winter-run released at approximately the same time. Real-time acoustic receivers will be deployed along the Sacramento River and Delta at various locations. DOSS will review the real-time acoustic tag data to determine the likely timing and distribution of the hatchery winter-run in the Sacramento River and into the Delta, and advise NMFS and Water Operations Management Team (WOMT) of potential risk of hatchery winter-run to the influences of the hydrodynamic effects of increased exports during the sporadic storm events. Beginning in March 2015, enhanced Particle Tracking Model (PTM) modeling will also be utilized to inform real time OMR limits and in consideration of any requests for flexibility in OMR flow management.

- iii. Fish migration non-physical barriers (*e.g.*, Georgiana Slough, Delta Cross Channel)
- iv. Preferential export shift to Jones Pumping Plant: One option to help reduce increased impacts on migrating fisheries due to these adjustments in operations may be to shift facility operations so that minimal export pumping will occur at the SWP's Banks Pumping Plant and the majority will occur at the CVP's Jones Pumping Plant. This export shift typically increases survival of salmonids through these facilities since fewer fish will enter the SWP where losses are higher due to substantial pre-screen mortality associated with Clifton Court Forebay. Combined exports would remain the same. The amount of shifted pumping from Banks to Jones would be made available to the SWP.

B. 2008 Biological Opinion for Delta Smelt (FWS BiOp) Provisions

- i. December-January OMR management. OMR management for Delta Smelt is best divided into two time periods to distinguish the early months (December

and first half of January) when a “first flush” migration can occur from later months when the fish are less likely to strongly respond to freshets.

- ii. December 1 through January 15. Delta Smelt may migrate into fresher water in response to physical environmental stimuli, including turbid freshets passing through the Delta, during December and early January. These freshets usually originate in the Sacramento River drainage. As such, Delta Smelt residing in or near the Low Salinity Zone usually move into the Sacramento River side of the Delta in response to early freshets. The current understanding is that they do not enter the San Joaquin River side of the Delta unless the freshet originated in the San Joaquin drainage or there is high negative OMR flow during the freshet that carries a strong plume of turbid Sacramento River water into the Central and South Delta. During December and January, but not other months, there is a significant potential for large numbers of Delta Smelt to be drawn into the Central and South Delta and become entrained at the pumps if high negative OMR flow is maintained while turbid freshets are passing through the Delta. Moreover, fish drawn into the Central and South Delta during such events are likely to remain in those areas and may spawn, potentially creating a management challenge that can persist for an extended period. Hence, there is considerable value in planning early freshet operations that optimize water exports while avoiding potentially lingering Delta Smelt entrainment concerns.
- iii. January 15 through March. The proposed approach for Delta Smelt in the early winter is focused on avoiding drawing Delta Smelt into areas where adult Delta Smelt and their progeny would be at risk of entrainment. If successful, that approach should minimize the need to take actions for Delta Smelt later in the winter that are more restrictive than those needed to protect salmon. In the event storms are infrequent, the RTDOMT expects to implement short-term flexibilities when they occur to allow OMR exceedances in situations where such exceedances may allow for increased water exports while avoiding excessive take of Delta Smelt. Any such request will be accompanied by augmented real-time monitoring at Prisoners Point and Jersey Point in order to evaluate in real-time any changes in the distribution or density of Delta Smelt in the Central Delta. In accordance with the approach employed in last year’s drought operations, such a request will also be accompanied by an analysis of effects of the proposed operations on Delta Smelt distribution and entrainment risk. The analyses will address monthly and real-time Delta Smelt distributional information and trends,

physical environmental conditions, and, if appropriate, hydrodynamic model output.

Management decision-making during both period (1) and period (2) of the winter will be aided by review of information obtained through “early warning” trawl sampling for Delta smelt that began on December 1. Early-warning drought monitoring will include a survey of the Spring Kodiak Trawl program in December, where the program formerly began in January, and a “real-time” component that samples as frequently as on alternate days in the Central Delta. The “real-time” component has a high potential to quickly answer whether Delta smelt are in danger of moving so far into the Central and South Delta that strong entrainment concerns will eventuate. The information from the “early warning” sampling will be very carefully evaluated along with other sources of information bearing on operations management.

The combination of turbidity modeling and augmented biological monitoring is expected to allow more focused management of OMR flow. Where in the past agencies were forced to rely on a combination of monthly biological monitoring and real-time turbidity and flow monitoring, it may now be possible to incorporate real-time monitoring in all three of these areas into management decision-making. As such, FWS expects to be able to more narrowly focus reductions in exports during early storm events than would have been possible in the past, while still maintaining adequate entrainment protection for Delta smelt that may be in the lower Sacramento and San Joaquin rivers.

#### C. D-1641 Provisions

- i. Triggers for DCC gate operation to balance water quality and fish
- ii. Modify D-1641 Export to Inflow (E/I) ratio’s averaging period for sporadic storm events (similar to last year)
- iii. Triggers for modified X2 criteria to balance upstream storage and fish protection
- iv. Modify Vernalis-based flows if drought persists

#### D. Consistency with CESA for SWP

- i. CDFW will work in coordination with FWS and NMFS through the RTDOMT to review requests by DWR for operational adjustments to implement the actions described above pursuant to the California Endangered Species Act (CESA) and the existing consistency determinations on the BiOps

for the SWP, to ensure ongoing CESA compliance in light of flexibility provided in the RPAs and the range of effects analyzed.

- ii. Compliance with Longfin Smelt Incidental Take Permit (ITP) – CDFW will work through the RTDOMT and in consultation with the Smelt Working Group (SWG) to monitor the risk to Longfin Smelt and review proposed changes in operations to ensure compliance with the Longfin Smelt ITP for the SWP. The proposed approach for Longfin Smelt in the early winter is focused on avoiding drawing Longfin Smelt into areas where adult Longfin Smelt and their progeny would be at risk of entrainment. If successful, that approach should minimize the need to take actions for Longfin Smelt during the winter that are more restrictive than those needed to protect salmon. The RTDOMT will continue to consider short-term flexibilities to allow OMR exceedances in situations where such exceedances may allow for increased water exports while avoiding excessive take of Longfin Smelt. Any such request will be accompanied by analysis of the effects of the proposed operations on to Longfin Smelt based on the distribution and entrainment risk of Longfin Smelt in the Central and South Delta. The analyses will address monthly and real-time Longfin Smelt distributional information and trends, physical environmental conditions, and, if appropriate, hydrodynamic model output.

## VII. *Proposed Delta Operations – Spring*

### A. NMFS BiOp Provisions

- i. Short-term flexibilities to allow OMR exceedances of the 14-day running average during sporadic storm events under an exceptionally dry hydrology: Upon the onset of RPA Action IV.2.3 for OMR flow management, OMR shall be no more negative than -5,000 cfs as a 14-day running average, and no more negative than -6,250 cfs as a 5-day running average, except as needed to capture sporadic storms (increase exports). This exception would be evaluated based on listed species distribution and risk in the South and Central Delta, and if conditions remain very dry (according to subsections below).
  - 1. While Action IV.2.3 is in effect, and drought conditions remain, the Projects may request an adjustment to its implementation by requesting that the use of the OMR Index criteria (as approved by USFWS, NMFS, and CDFW) to be no more negative than -6,000 cfs for limited periods in order to capture additional natural or abandoned flow in the Delta because of infrequent storm events. Through this operational flexibility, the Projects are expected to be

able to increase exports over what they would otherwise be able to do, while providing protections for the listed species. During any potential adjustment to Action IV.2.3, the action triggers provided in RPA Action IV.2.3 (e.g., combined older juvenile Chinook salmon loss density) will continue to be in effect. Additional flexibility, use of the OMR Index to be no more negative than -6,500 cfs for short periods, may be requested by the Projects to capture the peak of storm events. Once the operational flexibility has been exercised, operations will conform OMR flows consistent with RPA Action IV.2.3. Through this operational flexibility, the Projects are expected to be able to increase exports over what they would otherwise be able to do, while providing protections for the listed species. During any potential adjustment to Action IV.2.3, the action triggers provided in RPA Action IV.2.3 (e.g., combined older juvenile Chinook salmon loss density) will continue to be in effect. Additional flexibility may be requested by the Projects to address changing hydrologic and species distribution conditions throughout the water year.

2. On occasion, there may be multiple rainfall events that occur one right after the other that make implementation of subsection B, below, difficult, especially in consideration of the desire for the Projects to export as much natural and abandoned flow as possible. In those situations, Reclamation and DWR may request additional flexibility in OMR flow management through the RTDOMT. In considering the request, the RTDOMT will convene and evaluate real-time and forecasted hydrology, data from various monitoring locations (e.g., Knights Landing RSTs, Sacramento trawl and beach seines, Jersey Point and Prisoners Point trawls, and the Federal and state fish facilities), and any advice from the DOSS, in making a decision whether to grant the additional flexibility, and for what duration.
3. A similar flexibility was granted and implemented during a few storms in water year 2014. However, increases in combined exports lagged behind (a couple-day lag time) the peak of the increased natural flow in the Delta. If flexibility is requested and subsequently granted, increased exports during sporadic storm events in water year 2015 will be implemented during the ascending limb of the hydrograph, followed by a subsequent

reduction in exports during the descending limb of the storm events. The key to this operation is to capture the spike in water availability prior to a coincident spike in listed fish presence in the central and south Delta. This request will be accompanied by augmented real-time monitoring at Prisoners Point and Jersey Point in order to evaluate the timing, location and magnitude of listed anadromous salmonid species in the Delta.

- ii. Flexibility with San Joaquin I/E ratio. Currently, the agencies are discussing several concepts for providing additional flexibility in the April-May period, in the event that conditions remain very dry. These operations will be discussed further and evaluated as part of the phased operations plan as hydrology is updated. These concepts include the following:
  - a. Consider different functional forms of the relationship between Vernalis flow and exports in the implementation of the San Joaquin I/E ratio, such that if there is a dry year classification, the ratio is less than 2:1 (closer to 1:1).
  - b. If critically dry, consider added flexibility in the 1:1 ratio on the shoulders of Vernalis pulse flows to capture sporadic storm events (similar to last year).
  - c. Clarify the treatment of potential transfers during this period.
  - d. Declare San Joaquin River water year classification (dry or critically dry year classification) as early as possible (see Reclamation's February 7, 2014, letter to NMFS for example).
- iii. The spring head of Old River barrier (HORB) will be installed and operational by April 1 if hydrological conditions are compatible. The HORB is installed in the spring and is intended to prevent downstream-migrating salmonids in the San Joaquin River from entering Old River. Flow conditions will be assessed to determine actual date of installation.
- iv. Preferential export shift to Jones Pumping Plant: An element to reduce potentially greater exports during April and May 2015 than would occur under an unmodified RPA Action IV.2.1 could be a facility shift in exports so that minimal pumping will occur at the SWP's Banks Pumping Plant and the majority will occur at the CVP's Jones Pumping Plant. This export shift will increase survival of salmonids through these facilities, since fewer fish will enter the SWP, where loss is higher due to substantial pre-screen mortality associated with Clifton Court Forebay. Combined exports would remain the

same. The amount of shifted pumping from Banks to Jones would be made available to the SWP.

B. FWS BiOp Provisions

- i. The proposed approach for Delta Smelt in the early winter is focused on avoiding drawing Delta Smelt into areas where adult Delta Smelt and their progeny would be at risk of entrainment. If successful, that approach should minimize the need to take actions for Delta Smelt in the spring that are more restrictive than those needed to protect salmon. In the event storms are infrequent, the RTDOMT expects to implement short-term flexibilities when they occur to allow OMR exceedances in situations where such exceedances may allow for increased water exports while avoiding excessive take of Delta Smelt. Any such request will be accompanied by augmented real-time monitoring at Prisoners Point and Jersey Point in order to evaluate in real-time any changes in the distribution or density of Delta Smelt in the Central Delta. In accordance with the approach employed in last year's drought operations, such a request will also be accompanied by an analysis of effects of the proposed operations on Delta Smelt distribution and entrainment risk. The analyses will address monthly and real-time Delta Smelt distributional information and trends, physical environmental conditions, and, if appropriate, hydrodynamic model output.

C. D-1641 Provisions

- i. Implement D-1641 E/I ratio's averaging period for sporadic storm events (similar to last year).
- ii. Triggers for modified X2 criteria to balance upstream storage and fish protection.
- iii. Triggers for moving Western Delta Ag compliance point (i.e.:Emmaton to Three-Mile Slough).
- iv. Modify San Joaquin-based flows at Vernalis if drought persists.

D. Consistency with CESA for SWP

- i. CDFW will work in coordination with FWS and NMFS through the RTDOMT to ensure that requests by DWR for operational adjustments to implement the actions described above pursuant to the CESA and the existing consistency determinations on the BiOps for the SWP, to ensure ongoing CESA compliance in light of flexibility in the RPAs and the range of effects analyzed.
- ii. Compliance with Longfin Smelt ITP – CDFW will work through the RTDOMT and in consultation with the SWP to monitor the risk to Longfin

Smelt and review proposed changes in operations to ensure compliance with the Longfin Smelt ITP for the SWP. The proposed approach for Longfin Smelt in the spring is focused on minimizing entrainment of Longfin Smelt juveniles. If successful, that approach should minimize the need to take actions for Longfin Smelt during the spring that are more restrictive than those needed to protect salmon. The RTDOMT will continue to consider short-term flexibilities to allow OMR exceedances in situations where such exceedances may allow for increased water exports while avoiding excessive take of Longfin Smelt. Any such request will be accompanied by analysis of the effects of the proposed operations on Longfin Smelt based on the distribution and entrainment risk of Longfin Smelt in the Central and South Delta. The analyses will address monthly and real-time Longfin Smelt distributional information and trends, physical environmental conditions, and, if appropriate, hydrodynamic model output.

- E. Maintaining Salinity Control through Possible Emergency Drought Barriers: Reclamation and DWR's planning assumptions for 2015 include the possibility of installing temporary rock barriers across three Delta waterways to mitigate water quality impacts when there is not enough water in upstream reservoirs to meet other beneficial uses and repel the saltwater. The three barriers would be constructed at Sutter Slough, Steamboat Slough and West False River. Releases from Shasta, Folsom, Oroville and other reservoirs to provide sufficient Delta outflow to repel saltwater and protect Delta water quality could be reduced with the temporary barriers in place. If the barriers are determined to be necessary, DWR would complete installation within 30-60 days, delaying construction as long as possible to minimize effects on fish. In the event barriers are installed, barrier-associated biological and physical monitoring will be initiated in a timely fashion, in some cases in advance of barrier installation. Additionally, adjustments to D-1641 will need to occur.
- F. Allow transfers outside the July through September window provided for in the Biological Opinions if conditions permit.

*VIII. Proposed Delta Operations – Summer and Fall*

- A. Maintaining Salinity Control through Possible Emergency Drought Barriers: Use of the temporary rock barriers, if applicable, would continue throughout the summer. If temporary rock barriers are constructed, removal would commence on or near October 1. For Sutter Slough and Steamboat Slough, removal must start no later than October 15, and complete barrier removal must occur by November 1. For a barrier at West False, complete removal must occur by November 15.
- B. NMFS BiOp Provisions

C. FWS BiOp Provisions

- i. Fall X2 Action (if Sacramento Valley classification is above normal or wet). This RPA component is not expected to be triggered in WY 2015; however, during the year, Reclamation will work with DWR, NMFS, FWS, CDFW and others to refine the Fall Outflow AMP based on findings to date, including, if appropriate, proposing new experimental management strategies based on those findings.

D. D-1641 Provisions

- i. Rio Vista Flow
- ii. Net Delta Outflow
- iii. October San Joaquin base flow at Vernalis

E. CDFW Consistency Determination and CESA ITP Provisions

F. Fall head of Old River barrier

- i. Fall HORB installation. The fall HORB barrier is similar in design to the spring barrier, but smaller in size. The fall barrier is intended to benefit migrating adult salmon in the San Joaquin River by improving flow and dissolved oxygen conditions in the river downstream of the barrier. The fall HORB is typically installed upon request by CDFW.

G. Allow transfers outside the July through September window provided for in the Biological Opinions if conditions permit.

- IX. *Measures to Minimize Effects of Drought Operations to Species*- Agencies are exploring potential measures to minimize effects of drought operations to species. Current ideas include less negative OMRs following peak storm events, enhanced protection of hatchery winter run Chinook release through real-time operations informed by monitoring, providing for additional flows in the San Joaquin River, shifting exports to Jones Pumping Plant (CVP), and construction of non-physical barriers at Georgiana Slough and/or the DCC.

**2. DCP Biological Monitoring Plan**

Reclamation, DWR, FWS, CDFW and NMFS have been working on a DCP Biological Monitoring Plan focused on smelt and salmonids for 2015 and beyond (*See Enclosure II*). The goals of this initiative is to provide additional data on the location and movement of Delta Smelt and salmonids that will increase the agencies' ability to manage water operations in a manner that protects the imperiled fish while supporting and improving water deliveries.

### **Delta Smelt Early Warning Surveys**

Reclamation and FWS have been coordinating for several months to develop early warning surveys to provide information on Delta smelt distribution that will inform water operations in WY2015. The current drought has highlighted the need to improve the array of information that is collected to support management decisions pertaining to the effect of winter/spring exports on the Delta Smelt population. The overall intent for early warning surveys is to inform FWS and others whether, during weather events and freshets, substantial numbers of Delta Smelt are moving, or being moved, into areas potentially subject to entrainment. This information will allow exports to continue as long as Delta smelt are not in the area of influence of the pumps and result in additional exports. The early warning surveys were initiated in December 2014 and will continue through April 2015. FWS is also conducting additional Kodiak trawling at Jersey Point and Prisoner's Point. A Delta Smelt mark and recapture element may also be implemented in this monitoring program. A FWS proposal dated September 26, 2014, identifies resource needs totaling \$830,000. Reclamation, FWS, CDFW and DWR are collaborating to leverage available funds from all agencies and integrate Delta smelt and salmonid trawl efforts to improve efficiency.

### **Salmonids Near-term Drought Monitoring**

Reclamation, NMFS, FWS, CDFW and DWR have been coordinating on long-term and near-term drought monitoring efforts. In WY 2014, various salmonid monitoring efforts (e.g., installation of temperature and dissolved oxygen probes adjacent to winter-run redds, implementation of a DCC gate operations trigger matrix, and increased beach seining and trawling efforts to determine the timing and magnitude of salmonid emigration into the Delta) were implemented in order to determine the effect of the drought and operations on the salmonids and to be able to make optimal real-time management decisions regarding operations and protection of the listed anadromous fish species.

Similar activities are planned for 2015, as long as drought conditions continue. Additional trawling and beach seining in the northern Delta, as well as more frequent sampling at rotary screw traps further upstream in the Sacramento River Basin, would accompany any modifications in operations of the DCC gates from those specified in the NMFS BiOp or D-1641. Temperature and dissolved oxygen probes are planned to be deployed within redds of fall-run and winter-run salmon, to monitor and allow for management of water conditions. An additional Kodiak trawl is planned for December to monitor distributions of Delta Smelt and salmonids, and the early warning trawling planned for Jersey Point and Prisoner's Point will monitor salmonid species as well. This early warning trawling will provide information from additional locations in the Delta about the presence of salmonids, which will help to inform management decisions about OMR reverse flows. Sampling frequency at salvage facilities at the export pumps may also be increased to provide more accurate information about entrainment impacts.

Other studies on migration paths and mortality will continue in 2015 for winter-run and spring-run salmon, as well as steelhead and sturgeon, to improve scientific knowledge about the population dynamics of these species. An enhanced particle tracking model that includes simulation of fish migration behavior will be tested in a pilot project to verify accuracy and the ability of the model to inform real-time management decisions. Using recent data, the upstream temperature model will also be recalibrated to improve its ability to predict temperature conditions in the Sacramento River. A feasibility study on the use of passive integrated transponders to monitor the movement and fate of salmonids will also be conducted in 2015 to determine if this technology could be usefully deployed in California to improve knowledge of salmonid populations.

In conclusion, the interagency group will conduct this monitoring in 2015 and beyond in order to improve our understanding of timing and distribution of species in the Delta, as well as inform targeted research and data gaps associated with risks associated with water operations.

### 3. **Other 2015 Drought-Related Measures**

Other drought-related measures have been discussed in the past as administrative actions. These actions are being taken as part of the Interagency 2015 Drought Strategy. The actions, taken as a whole, will increase the agencies' ability to operate the CVP and SWP in a manner that protects water quality and imperiled fish species while supporting and improving water supplies. The first category is a list of items first identified in late 2013 that will be continued in WY 2015.

#### ➤ ***Status of August 2013 Items:***

- ***Incidental take to provide operational flexibility.*** Investigate a regression analysis based on measured turbidity in the Sacramento River and modeled OMR flows over an 18-year period to evaluate a new cumulative salvage index calculation. The current incidental take statement (ITS) in the 2008 FWS Biological Opinion calculates the incidental take limit (ITL) based on the cumulative salvage index (CSI) from three years, 2006-2008. Metropolitan Water District of Southern California and Reclamation staff have developed a new calculation utilizing 18 years of data to calculate the CSI. The new calculation was reviewed by environmental groups in October 2014 and was part of the RPA Annual Science Review on November 6 and 7, 2014.
  - ***Status:*** Adjustments and new analysis were performed based on comments from environmental groups and the public meeting of the Long-term Operations Annual Science Review. Reclamation submitted the proposal to FWS on November 21, 2014, requesting that FWS consider using this

new CSI calculation. If FWS concludes the proposal has merit, this new calculation could be utilized in calculating the ITL for 2015.

- ***Old and Middle River (OMR) Index.*** Reclamation and DWR developed the OMR Index Demonstration Project to test whether using an index rather than actual United States Geological Survey (USGS) gauge data to determine OMR flow enables compliance with the BiOps and the Longfin Smelt ITP.
  - *Status:* This project has been implemented since spring 2014. NMFS granted an initial trial period of one year, subject to modifications based on real-time information. An additional trial period of one year (WY 2015) will be requested. Operations will revert to the RPA should any unanticipated adverse effects occur to listed species. Results of the demonstration project will be presented to the independent review panel during the 2015 annual review expected in November 2015. Reclamation, FWS, NMFS, DWR and CDFW support this action.
- ***New and refined turbidity models.*** For predicting Delta Smelt salvage, develop a model to predict turbidity conditions that lead to entrainment events and determine the conditions likely to create a “turbidity bridge” for the Delta Smelt’s movement between the Central Delta and the export pumps. Further steps are intended to determine under what circumstances export operations can be managed to reduce turbidity intrusion, thereby increasing total seasonal water deliveries while maintaining adequate protection for Delta Smelt.
  - *Status:* The Metropolitan Water District of Southern California funded the agencies’ development of a model based on data from the period 2011-present that has been used to provide turbidity projections for the water projects. The current drought did not provide an opportunity or need to use the model in WY2014. Model results will be shared with the Delta Conditions Team in WY 2015. In addition, discussions are underway to develop tools to evaluate when “first flush” conditions are amenable to management intervention to protect seasonal water exports and Delta smelt. To provide better data for the model as well as to improve the ability to track smelt movement, additional monitoring sampling efforts are being planned in Suisun Marsh and the Central Delta.
- ***Temporary barrier(s).*** Installation of HORB to minimize movement of salmonids from the San Joaquin River into the South Delta.
  - *Status:* The spring HORB was installed every year from 2000-2004 and has been installed in six of the subsequent ten years (including in 2014). In two of those years, the bioacoustic fish fence served as the barrier. It

was not installed in the other four years. The Collaborative Science and Adaptive Management Process, through the Salmon Scoping Team, is currently developing an analysis of the HORB to identify data gaps concerning export effects on hydrodynamics and, if possible, recommend how such processes could be managed to minimize entrainment of salmonids with consequent reductions to predation and salvage. These analyses will supply information to better inform decisions regarding barrier placement and thereby potentially reducing constraints on water pumping.

- **Water transfers.** Water transfers in spring 2014 were considered on a case-by-case basis. It is anticipated that the need for additional water transfers in early WY 2015 could occur if dry conditions persist. For WY 2015, the agencies will continue to identify ways to streamline the water transfer approval process as much as practical.
  - *Status:* Due to continued dry conditions, unusually high river depletions in the Sacramento Valley, water quality conditions in the Delta and minimum exports through the summer 2014, some transfer water was diverted at the federal export facilities between July and September. As a result, Reclamation conducted environmental analysis to extend the period to convey transfer water across the Delta through November 15, 2014. This modification to the established transfer window in both the NMFS and FWS BiOps allowed the conveyance of approximately 75 to 90 TAF of additional transfer water (excluding carriage water) that has been retained in Shasta and Folsom reservoirs for export from the South Delta at the Jones Pumping Plant during WY 2015. Both NMFS and FWS concurred that this modification to the DOP would not result in additional adverse effects to salmon or Delta smelt or to any critical habitat beyond those analyzed in the biological opinions. CDFW also concurred that there would be no effect to existing CESA coverage for the SWP.
- **Delta smelt life cycle model.** Life cycle models allow more detailed and comprehensive evaluation of the effects of environmental and demographic variables on Delta smelt, as well as projecting the population-level consequences of potential management actions. Development of accurate life cycle models for Delta Smelt will allow the agencies to better tailor CVP/SWP water operations to protect the Smelt while supporting and improving water supplies.
  - *Status:* FWS is currently developing a Delta Smelt Life Cycle Model. An initial manuscript is expected to be submitted for peer review shortly, and a technical workshop was held on the model on October 27, 2014. Other

efforts are under development in the Collaborative Science and Adaptive Management Process. They include refinement and further evaluation of the Maunder & Deriso Delta Smelt model, the development of new model-based tools to predict Delta Smelt entrainment vulnerability, proportional entrainment of Delta Smelt depending on water operations and other factors, and population viability consequences of entrainment. These efforts are expected to reinforce each other, potentially providing important new information that can be considered in management decision-making, potentially during the current extended drought.

- ***Technology advances for smelt monitoring.*** The “early warning” monitoring described above addresses a specific informational need for managing water operations during the current drought; however, other informational needs related to Delta Smelt monitoring need to be addressed on a longer-term basis. The “standard” monitoring programs for Delta Smelt are in some cases many decades old, based on original efforts for species other than smelt, and based on sampling methods known to have significant shortcomings. Improving the assessment of smelt abundance and distribution, when coupled with life cycle and other model advancements, is expected to enable improved analysis and management of water operations that maximize exports while providing adequate protection for Delta Smelt. Improvements potentially include use of new sampling gears, random sampling protocols, increased survey efforts, and improved spatial coverage.
  - *Status:* Efforts currently underway at the five agencies and the Interagency Ecological Program include ongoing monitoring methods studies, drought-specific fish monitoring and early-warning monitoring for Delta Smelt.

FWS has initiated an investigation of monitoring gear efficiencies and Delta Smelt distribution with the expressed intent to better understand gear efficiency, distribution and effective monitoring approaches. Application of new information is highly likely to improve the monitoring programs upon which management decisions depend by introducing improved equipment, better sampling protocols and/or improved allocation of survey effort. Improved monitoring would potentially allow for more precisely targeted protective actions when necessary and better evaluation of the population-level impacts of water operations.

- ***Improve hatchery operational coordination with North of Delta diverters.*** Develop and implement a process for better future coordination of hatchery releases to improve survivability. In some instances, hatchery fish releases could

be better timed to coincide with adequate natural flows or other operational releases so as to result in greater fish survival.

- *Status:* In 2014, NMFS, CDFW and FWS developed criteria based on various operational, biological and environmental conditions that, when met, would likely result in extremely poor to non-existent in-river survival for out-migrating Chinook salmon. Based on these criteria, a large proportion of Chinook salmon produced at Central Valley hatcheries were trucked downstream and released at Rio Vista or San Pablo Bay. These criteria will be applied again in 2015 if similar conditions occur. Reclamation has initiated discussions with FWS' flow managers and hatchery managers to develop a *Hatchery and Operations Coordination Plan*. The plan will establish better coordination of hatchery fish releases to coincide with adequate natural flows or other operational releases. Better coordination would reduce the need for specific release of stored water as a separate effort for the hatcheries, as well as further harmonize water operations to support natural spawning of salmon runs. NMFS and FWS will continue to coordinate regarding the status of various NMFS RPA actions (e.g., the DCC gate operations) as they pertain to the consideration and determination of river release or trucking of hatchery fish. Reclamation and FWS will continue work on a coordination plan for implementation in WY 2015.
- ***Adjustment to water quality or flow objectives.*** Identify opportunities to collaborate to review and propose temporary modifications to state water quality or flow objectives in order to balance beneficial uses and avoid disproportionate drought impacts through continued operation. Reclamation will effectively coordinate with DWR, the SWP and CVP contractors, the state and federal fishery agencies, and the SWRCB. The goal is to balance risks and reduce disproportionately high water supply impacts or shift a significant fishery concern or water supply impact to another part of the system.
  - *Status:* In January 2014, Reclamation and DWR, in coordination with FWS, NMFS and CDFW, identified the need to file a TUC Petition to the Water Board. The proposal requested modification of the D-1641 outflow standards (outflow at 7,100 cfs starting February 1) which allowed for movement of the X2 salinity position further upstream into the central part of the Delta. This provided more flexibility in water operations and conserved storage in upstream reservoirs to conserve cold water pools for use later in the year to benefit fishery resources. The petition also requested flexibility in the operations at the DCC gates, providing additional opportunities to manage water quality (mainly salinity) in the

central part of the Delta. For 2015, Reclamation and DWR will continue to assess hydrological and operational conditions and coordinate with the appropriate agencies and stakeholders to effectively manage water quality in the Delta. Coordination will primarily occur at regular meetings of the RTDOMT, WOMT, and DOSS group and SWG. Additional meetings and briefings will occur as needed.

- ***Other drought related measures 2014-2015:*** In addition to the list above of drought operations and augmented science and monitoring plans, the agencies are undertaking the following additional inter-agency measures that will continue to be implemented in 2015:
  - ***Fisheries management and fish hatchery actions:*** CDFW, FWS and NMFS will meet on a weekly basis to coordinate on critical fisheries management and fish actions. These include, but are not limited to:
    - 1) Coordination on hatchery production and release strategies, including decisions on in-river releases versus trucking.
    - 2) Decisions on emergency angling restrictions if conditions remain dry
    - 3) Emergency monitoring strategies related to adverse in-river conditions, including permitting needs
    - 4) Winter-run Chinook contingency planning
    - 5) Fish rescues

The criteria (based on various operational, biological and environmental conditions) that NMFS, CDFW and FWS developed in 2014 to determine release location of hatchery Chinook salmon will be used again in 2015 if similar conditions occur. Reclamation, FWS' flow managers, and hatchery managers will develop and implement a *Hatchery and Operations Coordination Plan* in 2015 to establish better coordination of hatchery fish releases to coincide with adequate natural flows or other operational releases. Better coordination would reduce the need for specific release of stored water as a separate effort for the hatcheries as well as further harmonize water operations to support natural spawning of salmon runs. NMFS and FWS will continue to coordinate regarding the status of various NMFS RPA actions (e.g., the DCC gate operations) as it pertains to the consideration and determination of river release or trucking.

- ***Projects to reduce drought related effects on salmonids:***
  - 1) Preferential pumping at CVP. The amount of shifted pumping from Banks to Jones would be made available to the SWP.
  - 2) Water purchases (e.g., implementation of the San Joaquin River action from last year)

- 3) Predation related studies/pilot program, including Stanislaus River and lower San Joaquin River.
  - 4) Upstream priority restoration projects (from the Golden Gate Salmon Association, NCWA and CDFW lists).
  - 5) Non-physical barriers at DCC and Georgiana Slough.
- ***Voluntary Drought Initiative*** - NMFS and CDFW will continue to implement the Voluntary Drought Initiative in 2015. This initiative was started in 2014 to encourage minimum flow releases in priority salmonid watersheds where there is no ESA Section 7 nexus.
  - ***Accelerate two pilot projects to advance the use of forecast-based reservoir operations-*** In order to revise the storage and release strategies to improve available water supplies, DWR and Reclamation will accelerate components of the forecast-based reservoir reoperations evaluation. The purpose of these evaluations is to examine if shifting to forecast-based operations will enable the more efficient use of existing storage capacity within the system while still managing flood risks appropriately. DWR and BOR will work with NOAA (NWS, OAR, and NESDIS), USGS, and others as appropriate, in order to test the ability to shift to more precise real-time reservoir operations that can optimize benefits for water supply and flood risk management while also meeting real-time requirements for fish migrations as described above. This will be further developed in consultation with relevant agencies. One specific example includes the DWR System Reoperation Study.
    - ***Seasonal prediction for water resources*** – Using forecasts to better inform reservoir operations on the seasonal timescale requires forecasts with some amount of skill over climatology. In addition to skill, forecasts should be focused on watersheds important for water resources (e.g. the watersheds above the major reservoirs) and focus on, at a minimum, accumulated rainy season precipitation. During the rainy season, a frequently updating forecast for the precipitation expected for the remainder of the season is required. In partnership with DWR, USBR, and other operating agencies, NOAA should move toward developing such a forecast capability. This includes continuing to invest in research and development through NOAA/OAR as well as scoping operational implementation through NOAA/NWS and NOAA/NESDIS.
    - ***DWR System Reoperation Study-*** System reoperation is necessary to improve existing facilities in order to meet system needs more efficiently

and reliably and to better integrate the state's flood control and water supply management. In 2008, DWR was authorized by legislation to conduct a System Reoperation Study in order to analyze how changes influence the system, including the impacts of climate change, and in what ways the system can be optimized to meet water management goals. The study, which considered many reoperation concepts and strategies through a vetting process with experts, is moving four potential reoperation strategies forward for further evaluation including reoperations of Shasta reservoir, Oroville reservoir, New Exchequer Dam (Lake McClure), and further integration of SWP and CVP operations. The current phase of the study provides an evaluation of these potential strategies for benefits and ranking based on their performance in meeting state water management goals and objectives – including drought response efforts. The last phase of the study will focus on a reconnaissance-level assessment of the remaining strategies, including evaluating costs, quantifying economic benefits and developing conceptual designs.

- ***Continue and expand water conservation initiatives at the federal, state and local levels*** - While the 2015 Drought Strategy is focused on operations of the SWP and CVP, it is developed within the context that increased water conservation efforts is a critical aspect of drought response. Making conservation a “California way of life” is the first goal of the Governor’s 2014 California Water Action Plan (Plan) – a strategy setting state priorities and investments for the next five years. The Plan recognizes that with technological advances and a growing population, more can and should be done to increase conservation efforts within the state. Recent legislation, such as SBx7-7 (2007), has set standards requiring a 20-percent reduction in urban per capita water use by 2020, promoting expanded development of sustainable water supplies at the regional level, and requiring agricultural water management plans and efficient water management practices for agricultural water suppliers. The Plan prioritizes building and expanding on conservation efforts and ensuring water security at the local level through conserving and using water more efficiently, protecting habitat for local species, recycling water for reuse, capturing and treating storm water for reuse, and removing salts and other contaminants from brackish water and saltwater.

### **Next Steps**

Following the release of the 2015 Interagency Drought Strategy, the agencies will continue public outreach in early 2015 to inform the planning of drought operations and implementation of the Drought Contingency Plan.