Addendum to the
State Water Project and Central Valley Project
Drought Contingency Plan

September 30, 2022

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This Drought Contingency Plan (Drought Plan) Addendum has been prepared by the California Department of Water Resources (DWR) and the U.S. Bureau of Reclamation (Reclamation) to provide the latest information about the operations forecast and drought actions being taken.

DWR and Reclamation operate the State Water Project (SWP) and the Central Valley Project (CVP), respectively, to the 2019 U.S. Fish and Wildlife Service (USFWS) Biological Opinion and 2019 National Marine Fisheries Service (NMFS) Biological Opinion (Collectively the 2019 Biological Opinions), and DWR also operates to the 2020 California Department of Fish and Wildlife (CDFW) Incidental Take Permit (ITP). Certain operational requirements have been modified by an interim operations plan for Water Year (WY) 2022 (2022 IOP) that was proposed by the federal and state agencies in ongoing litigation and ordered by the United States District Court for the Eastern District of California on March 14, 2022.[1] This Addendum is submitted by DWR to CDFW in response to Condition 8.21 of the ITP. Concurrently, this Addendum will also be shared with the members of the Water Operations Management Team (WOMT) which includes representatives from DWR, Reclamation, USFWS, NMFS, CDFW, and the State Water Resources Control Board (SWRCB) (collectively referred to as Agencies).

This Addendum includes a recap of WY 2022's hydrologic conditions and drought actions, a summary of current conditions, plus a look ahead to WY 2023 planning and potential drought actions.

DWR and Reclamation are committed to working with the Agencies through further development of drought actions, WOMT coordination, and other forums as necessary.

Recap of Water Year 2022

From beginning to end, WY 2022 included both wet and dry extremes, as shown on Figure 1 below. The Northern Sierra experienced the second wettest October on record with a monthly average rainfall of 453% of historical average. While December 2021 was above average in terms of precipitation and snowfall, the conditions turned extremely dry; January through March were the driest January-through-March period on record, thereby negating much of the storage and soil moisture gains made in the fall. Also, as shown in Figure 2, much of California experienced record warm conditions and below average precipitation throughout WY 2022.

[1] Order Granting Federal Defendants' Motion for Voluntary Remand without Vacatur, U.S. District Court for the Eastern District of California, Case Nos. 1:20-cv-00431-DAD-EPG and 1:20-cv-00426-DAD-EPG (Mar. 14, 2022).

Figure 1

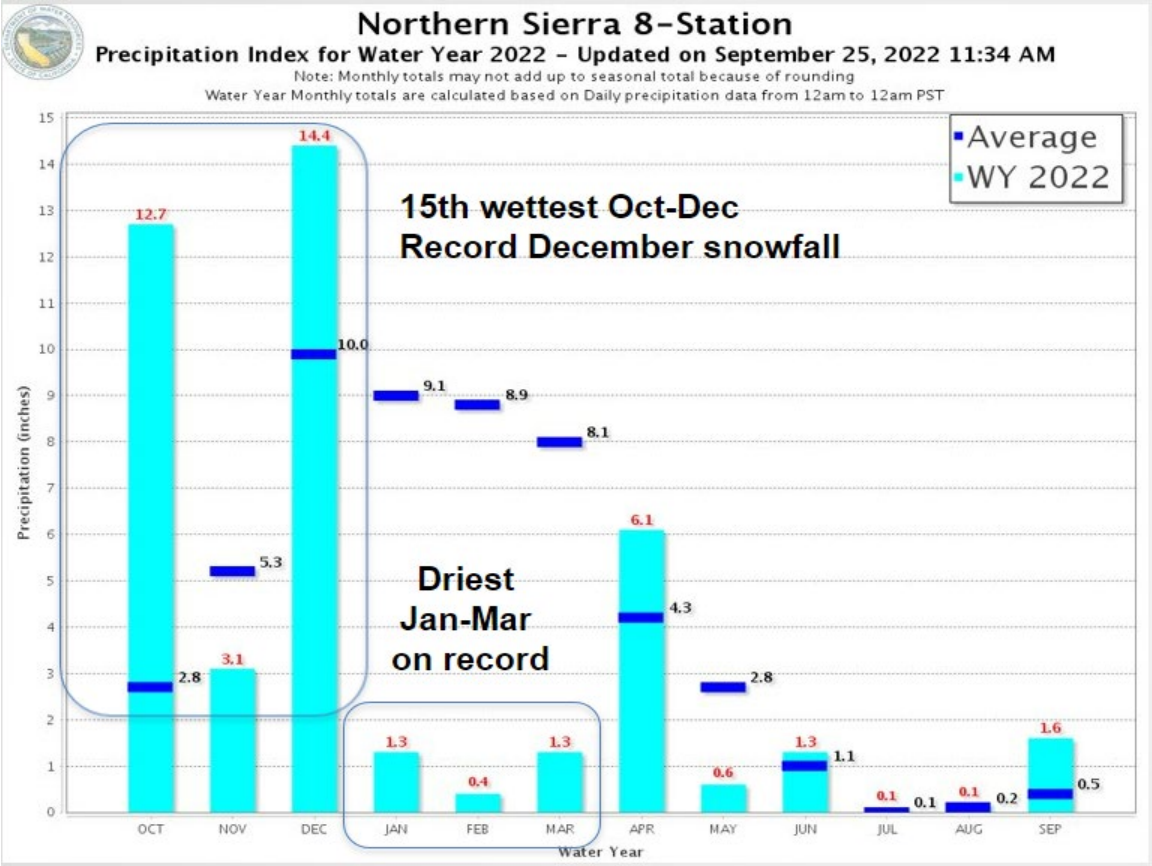
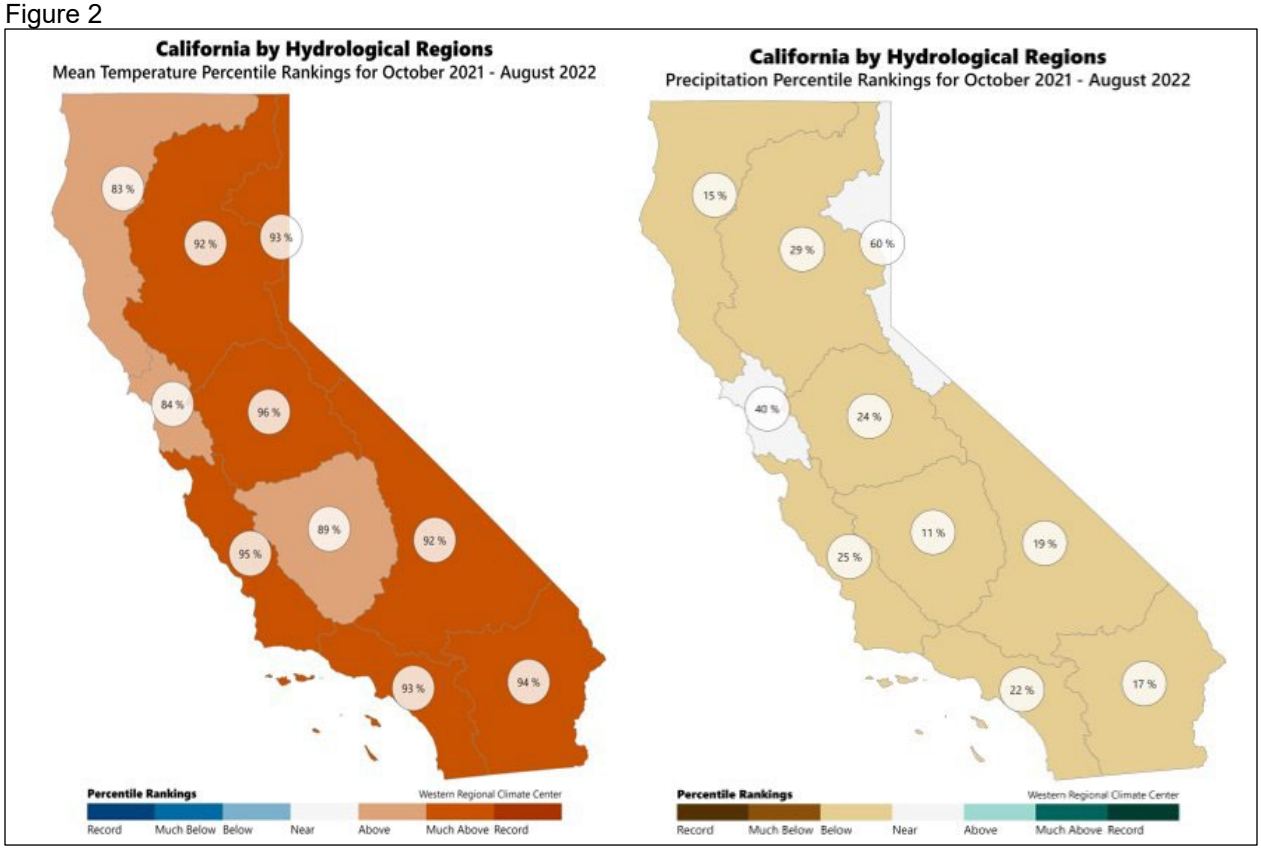


Figure 2



WY 2022 Drought Actions

In response to continuing drought conditions, DWR and Reclamation implemented the following actions in WY 2022:

Temporary Urgency Change Petitions

On December 1, 2021, as an early drought action, a Temporary Urgency Change Petition (TUCP) was submitted to the SWRCB requesting a modification of certain water rights Decision 1641 (D1641) standards during February through April 2022. On January 18, 2022, DWR and Reclamation withdrew this TUCP because of improved storage conditions in Folsom and Oroville. However, the historically dry January through March 2022 conditions mentioned above offset the storage gains realized in October and December 2021, so DWR and Reclamation submitted a new TUCP for modification of other D1641 standards during April through June 2022. Although the historically dry conditions in January through March were setting up conditions for additional D1641 modifications beyond June 2022, the above normal storm events that came in April resulted in improved storage conditions both Oroville and Folsom, and as a result a TUCP for modified standards beyond June 2022 was not necessary.

West False River Drought Barrier

Construction of the rock-filled channel closure across West False River from Jersey Island to Bradford Island began on June 3, 2021, and installation was completed on June 22, 2021. Removal of the barrier was originally planned to begin in October 2021, and full removal was anticipated by November 30, 2021.

However, in response to the continuing drought conditions, DWR received approval from CDFW, U.S. Army Corps of Engineers, and the SWRCB to keep the emergency drought salinity barrier in place through the winter. In January 2022, the barrier was notched by removing rock from a 400-foot section in the center of the barrier to allow boat and fish passage. The notch was backfilled on April 13, 2022. The barrier is planned to be breached in early November 2022 and will be fully removed no later than November 30, 2022.

In addition, DWR is working to get the needed environmental approvals, through standard non-emergency processes, to allow for up to two additional installations of the West False River barrier between 2023 and 2032, if needed.

Feather River Settlement Contractors Delivery Reductions

Because Lake Oroville ended WY 2021 with historically low storage and in anticipation of continuing drought conditions in WY 2022, DWR and the Feather River Settlement Contractors (FRSC) coordinated limited deliveries (which are typically for permanent crops, rice decomposition, and waterfowl habitat) during November through January of WY 2022 to help preserve Oroville storage. In addition, the April 1, 2022 B120 forecast triggered the drought deficiency criteria of the FRSC Agreements, and as such, the contractual deliveries to the FRSC were reduced to 50% for WY 2022.

Reduction to water available for Sacramento River Settlement Contractors and North of Delta Wildlife Refuges

Because of the very low storage at Shasta Reservoir and the two back-to-back years of low egg to fry survival for the endangered Winter run Chinook salmon, Reclamation, DWR, NMFS, FWS, CDFW and the SWRCB worked with the Sacramento River Settlement Contractors to coordinate the development of a Keswick release plan that conserved Shasta storage and prioritized temperature management in the Sacramento River. This release plan was used to determine the available water for diversion by the Sacramento River Settlement Contractors and the wildlife refuges north of the Delta. It was determined that the Sacramento River Settlement Contractors would have approximately 18% of contract totals available for diversion. Under the terms of their contracts, a critical year otherwise normally results in only a 25% reduction in contract total.

Release of water from Friant Dam for Contractual Demands in Mendota Pool

Due to the inability of Reclamation to provide enough water from the Delta in 2022 for the contractual demands of senior water rights contractors in Mendota Pool, Reclamation began making releases from Friant Dam on April 1, 2022 to meet these demands. As a result, the San Joaquin River Restoration Program had to cease San Joaquin River releases on April 11, 2022 due to the unavailability of river capacity for the Restoration Program flows. The Friant Dam releases began decreasing in late June and releases for the Exchange Contractor stopped by July 10th due to an increase in water available in the delta.

SWP and CVP Forecasts, Operations, and Condition Update

SWP and CVP Operations Forecasts

Although the final official Water Supply Index Bulletin 120 forecast for the year was issued on May 1, 2022, the SWP/CVP Operations forecast provided in Attachment 1 provides the latest operations forecast under dry conditions through the end of the calendar year. Storage conservation at Shasta, Trinity, Folsom, New Melones, and Oroville reservoirs continues to be a priority, and both the SWP and the CVP will be reducing releases through the fall, as conditions allow, with the objective of maintaining minimum releases through the fall and winter to conserve storage to meet WY 2023 obligations. Tables 1 and 2 below provide end of WY and end of Calendar Year (CY) storage values based on this forecast.

Table 1

Reservoir	End of WY 2021	Projected End of WY 2022
Central Valley Project		
Trinity	710 TAF	544 TAF
Shasta	1.07 MAF	1.50 MAF
Folsom	229 TAF	340 TAF
New Melones	842 TAF	634 TAF
State Water Project		
Oroville	790 TAF	1.2 MAF

As shown in Table 1, cumulative storage conditions at the end of WY 2022 are better than end of WY 2021, except for Trinity and New Melones reservoirs. This is primarily attributed to the very poor hydrology experienced in the Trinity River and Stanislaus Basins.

Table 2

Reservoir	End of CY 2021	Projected End of CY 2022
Central Valley Project		
Trinity	721 TAF	504 MAF
Shasta	1.3 MAF	1.55 MAF
Folsom	588 TAF	250 TAF
New Melones	941 TAF	617 TAF
State Water Project		
Oroville	1.3 MAF	1.2 MAF

The beginning of WY 2022 (and end of CY 2021) included significant precipitation in October and December which increased storage at most reservoirs from their end of the water year storage. As shown in Table 2, should dry conditions persist through December, actual calendar year-end storages could be lower than they were last year at many reservoirs. The forecast assumptions include existing storage conditions, actual runoff through August, forecasted runoff based on historical dry fall hydrology, projected water supply deliveries, and releases needed to meet existing flow and water quality standards, and fish and wildlife protections. The forecast includes anticipated monthly storage levels, reservoir releases, Delta export rates, and Delta outflow through December 31, 2022. DWR and Reclamation will continue to update the forecasts based on actual runoff conditions which may vary considerably from month to month in the early part of WY 2023.

Specific conditions and operations updates for the primary SWP and CVP reservoir and associated river system, as well as for the San Joaquin-Sacramento Delta, are further described below.

Trinity Reservoir/Trinity River

Trinity Reservoir reached its peak storage for the season of approximately 808 TAF on April 4 and began decreasing shortly afterward with the implementation of the spring pulse flow. As of September 25, storage is about 561 TAF (23% of capacity and 37% of historical average). Unfortunately, Lake Shasta and Trinity Reservoir did not benefit significantly from the storm events in WY 2022 because most of the storms centered on watersheds farther south or west.

The spring pulse flow on the Trinity River, consistent with the annual allocation as prescribed by the Trinity River Main-stem Fishery Restoration Record of Decision, was completed May 16, 2022. Consistent with the 2017 Long-Term Plan to Protect Adult Salmon in the Lower Klamath River Record of Decision, releases to augment flows in the Lower Klamath River occurred from August 26 through September 21. The storage forecasted in the 90% exceedance forecast for

the end of September is extremely low at 544 TAF and does not leave a storage buffer in the event WY 2023 is also dry. In addition, low storage of this level also likely results in temperature management concerns both this water year and in WY 2023. To conserve storage in Trinity Reservoir to the largest degree possible, Reclamation is diverting minimal water from Trinity to the Sacramento River. Imports to the Sacramento River are limited to those necessary to reduce the residence time in Lewiston Reservoir and support temperature management down the Trinity River.

Shasta Reservoir /Sacramento River

Shasta Reservoir reached its peak storage for the season of approximately 1.827 MAF on May 21. Storage has been slowly decreasing and, as of September 25, is now about 1.52 MAF (33% of capacity and 59% of historical average). Projected end-of-September storage is approximately 1.5 MAF; however, storage is likely to continue decreasing under dry fall conditions.

Reclamation is operating Shasta Reservoir and the Sacramento River consistent with a multi-agency approach based on maximum monthly average Keswick releases of 4,500 cfs from May through August. Shasta releases are expected to be reduced to minimum flows (3,250 cfs) in the fall. Due to the very low storage at Shasta Reservoir and the two back-to-back years of low egg to fry survival for the endangered winter-run Chinook Salmon, Reclamation, DWR, NMFS, FWS, CDFW and the SWRCB worked with the Sacramento River Settlement Contractors to develop a Keswick release plan that conserves Shasta storage and prioritizes temperature management in the Sacramento River. The monthly release schedule for the water year is shown below, although April, May and June were all below these levels due to decreased demands and additional runoff from precipitation events.

Operations Information/Month	April	May	June	July	August	September
Shasta Releases (TAF)	183	267	253	257	257	218
Keswick Releases (cfs)	3,500	4,500	4,500	4,500	4,500	4,000
Keswick Releases (TAF)	193	277	268	277	277	238
Spring Creek Power Plant (TAF)	10	10	15	20	20	20
Shasta End-of-Month Storage (TAF)	1,746	1,646	1,523	1,382	1,238	1,135

Reclamation has been working with DWR, NMFS, USFWS, CDFW and the SWRCB regularly regarding uncertainties with this plan and any potential for deviating from the release plan above. As of September 25, releases to the Sacramento River from Keswick Reservoir are at 4,100 cubic feet per second (cfs) and are expected to remain at that level through early to mid-October to minimize dewatering of winter-run Chinook redds. This will result in a higher monthly average for September than shown in the table above. This increase in the monthly average was discussed through the Sacramento River Temperature Task Group and the deviation was agreed upon through the Shasta Planning Group in order to provide a suitable habitat for winter-run Chinook salmon for the longest period possible. Monthly average releases from Keswick were considerably lower than in the above table for the months of May (215 TAF actual) and June (242 TAF actual). The Shasta storage forecasted in the 90% exceedance forecast for the end of September is estimated at 1.50 MAF, which is over 300 TAF higher than what was included in the final temperature management plan and is approximately 400 TAF higher than the end of WY 2021.

The Final Temperature Management Plan for the lower Sacramento River was submitted to the SWRCB on May 2, 2022, and the SWRCB provided a conditional approval on May 6.

Clear Creek

Flows on Clear Creek will be consistent with the 2019 NMFS Biological Opinion. 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. Concerns with Clear Creek temperature management will be similar to those of the Trinity system.

Folsom Reservoir/American River

Folsom Reservoir greatly benefited from both the early season and late season storms and did not reach its peak storage until June 9 at approximately 865 TAF. As of September 25, storage is approximately 357 TAF (37% of capacity and 72% of historical average) and decreasing. Releases from Folsom are at 2,500 cfs and are scheduled to decrease to 2,000 cfs before the end of September. Additional reductions are expected in late September and early October to reach minimum flows (approximately 1,300 cfs) in the fall.

Flows on the American River will be consistent with the provisions of actions included in the 2019 NMFS Biological Opinion. Current storage is 357 TAF (as of September 25) which is 126 TAF higher than the storage at this same time in 2021. Flows in August and September have been higher than minimum flows outlined in the 2017 revised American River Flow Management plan to meet Delta needs and to meet the temperature management plan for the American River. Reclamation's current forecast shows Folsom at approximately 340 TAF at the end of September. This volume minimizes the risk of not meeting public health and safety demands in the event of a dry fall and lowers the risk of early flood releases in an average fall. Reclamation's Temperature Management Plan was finalized in July through discussions with the American River Group and targets 66 degrees Fahrenheit at Fair Oaks throughout the summer.

New Melones Reservoir/Stanislaus River

In the San Joaquin watershed, New Melones Reservoir reached its peak storage for the season of approximately 992 TAF on February 1. As of September 25, storage is approximately 618 TAF, which is 26% of capacity and 46% of historical average. Releases are currently at the minimum flow of 150 cfs.

Flows on the Stanislaus River were consistent with the provisions of the 2019 NMFS Biological Opinion and D-1641 Vernalis base flow and water quality requirements. Stanislaus flows through June were primarily driven by the D-1641 Vernalis base flow requirement (as modified by the 2022 April-June TUCO), which was met through releases from New Melones combined with flows in the San Joaquin River upstream of the Stanislaus River confluence. The key area of concern for the Stanislaus River basin is carryover storage. New Melones has a very low refill rate, meaning it only typically fills in very wet years (such as 2017) and can go many years between filling even with non-drought hydrology. The 90% exceedance forecast shows a carryover storage at just over 600 TAF at the end of September, leaving very little buffer for New Melones should WY 2023 also be dry.

In 2021, Reclamation released a significant volume of water (approximately 148 TAF) from New Melones Reservoir to meet Delta needs and to offset the need for additional releases from Shasta, Oroville and Folsom reservoirs. This operation was implemented in consideration of the extremely low storages at Shasta, Oroville, and Folsom reservoirs and the relatively higher storage at New Melones Reservoir. Due to the lower storage at New Melones Reservoir this year, this operation was not conducted in WY 2022. Reclamation and DWR are coordinating on an appropriate mechanism to recognize this 2021 operation.

Oroville Reservoir/Feather River

Lake Oroville storage is about 1.24 million acre-feet (MAF) (35% of capacity and 64% of historical average). Total releases to the Feather River from Lake Oroville are currently 2,500 cfs. Oroville releases may be modified to meet Delta needs, but releases are planned to be reduced for storage conservation throughout the fall and winter.

Lake Oroville hit its peak storage for WY 2022 on May 8, at 776.95 feet elevation and 1.94 million acre-feet (MAF), about 400 TAF higher than the peak in 2021. This year's higher storage was primarily attributed to the well above average rainfall during the fall of 2021 and in April 2022. As shown in Table 1, the end of September carryover storage is projected to be about 1.22 MAF, which is still below average but is about 450 TAF higher than the end of WY 2021. The increased projected end of water year storage is primarily attributed to the October and December 2021 and April 2022 storms; however, it is below the planning carryover target of 1.6 MAF.

The main intake structure at Lake Oroville has a number of shutters that can be added or removed to control the elevation and temperature of water released from Lake Oroville. Feather

River temperature management can typically be achieved through the removal of shutters from the intake structure when there are higher storages than what has been experienced since 2020. This year, all the shutters were removed for temperature management in August. At the end of August, DWR began blending warmer from the main Hyatt Powerplant intakes with colder water from Oroville Dam's low-level outlet. DWR expects this blending operation to continue through the fall.

Sacramento-San Joaquin Delta

Higher releases from Folsom throughout the summer have resulted in increased exports after meeting the D-1641 Delta requirements. For the CVP, increased exports are currently contributing to meeting demands for public health and safety, refuges, and senior water right holders, including the San Joaquin River Exchange Contractors. The CVP was able to increase deliveries to the Exchange contractors from the Delta in July, thereby decreasing releases to the Exchange Contractors from Friant Dam. Reductions in Friant Dam releases are supporting both the San Joaquin River Restoration Program and water supply to Friant Division contractors. For the SWP, releases from Oroville will be to meet D1641 Delta requirements as well as support exports to meet public health and safety needs.

During the month of September, combined Project exports have been ranging between 2,500 cfs to 4,200 cfs. Above average rainfall in the month of September resulted in slight increases in exports. CVP exports were in the range of 1800 cfs to 2700 cfs to support demands for public health and safety, senior water rights, and wildlife refuges south of the Delta, as well as some transfer water. SWP exports have ranged between 700 cfs to 1,500 cfs and include transfers as well as water to support public health and safety demands.

The Delta Cross Channel (DCC) gates have been open since July 1 to assist with interior Delta water quality. It is expected that DCC gate closures will be needed to meet the D1641 Rio Vista flow standard in October, however, the duration and timing will depend on real time conditions.

Planning for WY 2023

As described above, several drought actions were implemented in WY 2022. Drought planning does not stop with the end of WY 2022. While conditions are slightly better for some Project reservoirs, overall storage conditions remain well below average, and DWR and Reclamation are continuing to plan for a fourth dry year. Although it is uncertain how the hydrology will unfold in WY 2023, the following are current efforts to begin preparing for a dry WY 2023:

- All Project reservoirs are either at or ramping down to their minimum winter flows in order to maximize the potential for building storage this fall and winter.
- DWR continues to collaborate with the FRSC on deliveries for beneficial use during the November through January period with the objective of balancing Oroville storage conservation needs while providing water for critical Pacific Flyway habitat.

- Both DWR and Reclamation have initiated dry year coordination with State and federal water contractors.

If dry conditions continue into WY 2023, the following objectives will guide future drought actions and decisions. These objectives are consistent with those from WY 2021 and WY 2022:

- Provide for minimum health and safety needs;
- Maintain suitable water quality in the Delta, which is a source of municipal drinking water for the majority of residents in the State;
- Protect species by meeting environmental needs;
- Conserve storage to meet future critical needs; and
- Provide water supply from the CVP and SWP.

While there have been several drought actions that have been coordinated and implemented by the SWP and CVP, if hydrologic conditions do not improve in WY 2023, and there is a fourth critically dry year, DWR and Reclamation expect that similar types of drought actions will be evaluated. These actions include, but are not limited to:

- Low allocations prioritizing meeting public health and safety needs;
- Continued coordination with CVP and SWP settlement contractors on WY 2023 deliveries;
- TUCPs for modified Bay-Delta standards; and
- Re-installation of the West False River salinity barrier, or other north Delta salinity barriers.

DWR and Reclamation will continue to coordinate with State and federal agencies through WOMT, the Long-term Operations Agency working groups, and other forums as warranted.

MODELED FORECAST RESULTS

For the 2022 Drought Action Plan

September - 90% HYDROLOGY

END OF MONTH STORAGES (TAF)

RESERVOIRS	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
Shasta	1,500	1,473	1,507	1,566
Folsom	341	310	275	248
Oroville	1,223	1,195	1,161	1,199
New Melones	615	603	610	617

MONTHLY AVERAGE RELEASES (CFS)

RIVERS	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
Sacramento	4,100	3,800	3,250	3,250
American	2,550	1,300	1,300	1,300
Feather	2,150	950	950	950
Stanislaus	240	577	200	200

DELTA SUMMARY (CFS)

	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
Sac River at Freeport	9,200	5,850	7,200	7,950
SJ River at Vernalis	300	1,000	1,250	1,200
Computed Outflow	4,200	3,000	4,950	5,750
Combined Project Pumping	3,150	2,250	3,150	3,250