MONTHLY REPORT TO THE
COLORADO RIVER BOARD OF CALIFORNIA

September 14, 2022

COLORADO RIVER BASIN WATER SUPPLY CONDITIONS REPORT

As of September 6th, the surface water elevation of Lake Powell was 3,531.05 feet with nearly 5.9 million-acre feet (MAF) of storage, or 25% of capacity. The surface water elevation of Lake Mead was 1,044.23 feet with 7.3 MAF of storage, or 28% of capacity. As of September 5th, the total System storage was 19.84 MAF, or 34% of capacity, which is about 3.69 MAF less than the total System storage at this same time last year.

As of August 2nd, storage in the Upper Basin reservoirs, excluding Lake Powell, included the following volumes: 96% of capacity at Fontenelle Reservoir in Wyoming; 76% of capacity at Flaming Gorge Reservoir in Wyoming and Utah; 95% of capacity at Morrow Point and 44% of capacity at Blue Mesa Reservoir in Colorado; and 56% of capacity at Navajo Reservoir in New Mexico.

As of September1st, the August observed inflow into Lake Powell was 0.37 MAF (98% of normal) and the September forecasted inflow is 0.24 MAF (69% of normal). The preliminary forecasted unregulated inflow into Lake Powell for Water Year (WY) 2022 is 6.08 MAF (63% of normal). The observed April through July 2022 unregulated inflow into Lake Powell is 3.75 MAF (59% of normal). To date, WY-2022 precipitation is 100% of normal.

Lower Basin Side Inflow – WY/CY 2022

The Bureau of Reclamation recently released updated observed intervening side inflow data from Glen Canyon to Hoover Dam for Water and Calendar Year 2022. Above average summer monsoonal activity has resulted in a significant increase in intervening side inflows. For July and August 2022, the observed intervening flow was 125% and 283% of average, respectively. The 2022 Water and Calendar year forecasted totals are 89% and 91% of average. Table 1 shows the WY/CY 2022 observed and projected intervening flow from Glen Canyon to Hoover Dam.

Lower Basin Side Inflows – WY/CY 2022[1,2,3]

Intervening Flow from Glen Canyon to Hoover Dam

	Month in WY/CY 2022	5-Year Average Intervening Flow (kaf)	Observed Intervening Flow (kaf)	Observed Intervening Flow (% of Average)	Difference From 5-Year Average (kaf)
Observed	October 2021	69	80	116%	11
	November 2021	68	42	62%	-26
	December 2021	69	64	94%	-4
	January 2022	87	60	69%	-27
	February 2022	88	58	65%	-31
	March 2022	107	41	39%	-65
	April 2022	72	30	43%	-41
	May 2022	43	8	18%	-35
	June 2022	22	16	72%	-6
	July 2022	56	70	125%	14
	August 2022	66	186	283%	120
Projected	September 2022	62			
	October 2022	69			
	November 2022	68			
	December 2022	69			
	WY 2022 Totals	810	718	89%	-92
	CY 2022 Totals	810	738	91%	-72

[1] Values were computed with the LC's gain-loss model for the most recent 24-month study.

[2] Percents of average are based on the 5-year mean from 2017-2021.

[3] Lake Mead's evaporation in the intervening flow mass balance incorporates evaporation coefficients developed by the USGS between 2010-2019. The study report can be found online at: https://pubs.usgs.gov/of/2021/1022/ofr20211022.pdf

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Table 1 Lower Basin Side Inflows WY/CY 2022

COLORADO RIVER BASIN PROGRAM UPDATES

Colorado River Basin Salinity Control Program Implementation

Colorado River Basin Salinity Control Forum Work Group Meeting

The Colorado River Salinity Control Work Group meeting is scheduled for September 19-21 in Santa Fe, New Mexico. The Work Group will hear about the effect of drought on hydropower generation at Hoover, Davis, and Parker dams; program benefits; a proposal for covering habitat replacement requirements associated with new salinity control projects; new studies, investigations, and research; and program funding.

Paradox Valley Unit

As mentioned at the Board's June 15 meeting, Reclamation has restarted injection of brine at the Paradox Valley Unit (PVU) as part of a six-month test injection plan. PVU has not operated since March 2019 in response to a significant seismic event. When fully operational, the PVU removed about 100,000 tons of salt per year that would have otherwise entered the Colorado River. Under the test injection plan, PVU is injecting brine at a rate of 115 gallons per minute, equivalent to

approximately 5,500 tons of salt control per month (about 66% of the most recent injection capacity). Three months into the test there have been no significant operational issues or seismic events. Figure 1 shows the salt load and flow for the Dolores River during 2022. There is an evident downward trend in the observed salt load since the injection resumed in June.

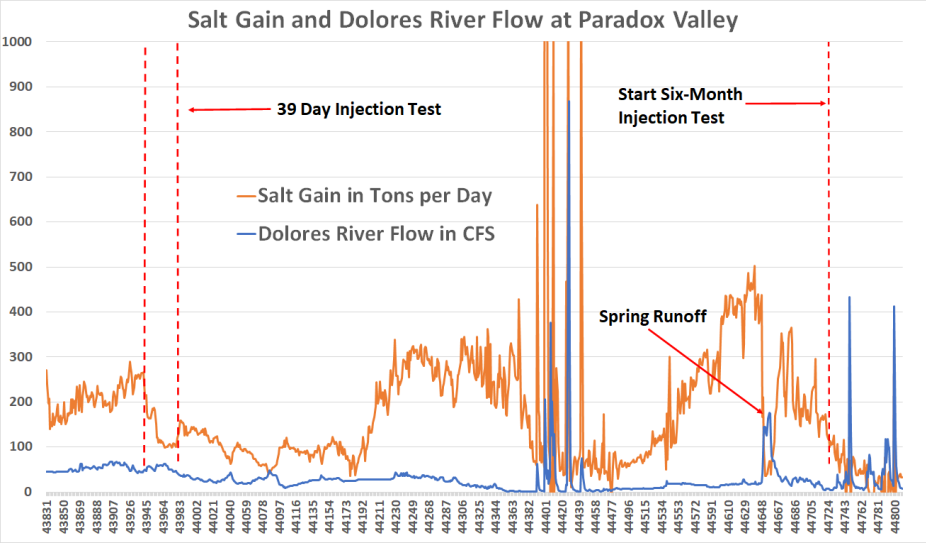

Figure 1 Salt Gain and Dolores River Flow

Glen Canyon Dam Adaptive Management Program

The Adaptive Management Work Group (AMWG) of the Glen Canyon Dam Adaptive Management Program (GCDAMP) met via webinar August 17-18.

The AMWG received a report that there have been 232 catches of non-native fish in 2022, 90% of these have been near Lees Ferry and 10% downstream. Signs of reproduction are evident for smallmouth bass, bluegill sunfish, and green sunfish. The National Park Service (NPS) reported that plans are underway to potentially chemically treat the slough in September to prevent smallmouth bass from establishing populations. Tribal consultation and monitoring of the area are under way.

The AMWG received a report from Reclamation on Glen Canyon Dam Fish Escapement Options. This report is the culmination of an effort by Reclamation to explore long-term exclusion options to prevent passage of non-native fish through Glen Canyon Dam. Options have been grouped into three categories: in-reservoir barrier options that prevent fist from approaching or entering the dam through exclusion; at-dam options which prevent fish from passing through the dam through exclusion or by reducing survival, and downstream removal that involves collecting and

removing fish that have passed into the lower river. Specific options explored include installation of an in-reservoir barrier net, in-reservoir multi-stimulus barriers (e.g., bubble, light, sound) and deeper water withdrawal. The effort has not identified a clear alternative. The next step is for the report to go through a review process within Reclamation, after which it will be finalized and shared.

The AMWG received a report from the Grand Canyon Monitoring and Research Center (GCMRC) regarding potential operational alternatives at Glen Canyon Dam that may prevent smallmouth bass establishment. The goal of utilizing operational alternatives to regulate temperature and/or flows below the dam is to prevent establishment during a transition period to more long-term solutions (e.g., infrastructure to minimize fish passage and/or change to much deeper withdrawal depths). Four alternatives were selected that could help prevent warmwater invasive fish establishment while minimizing potential adverse effects to other resources. The alternative identified as the most likely to be effective mixes water releases from the penstocks and bypass tubes to maintain a daily average water temperature below 16°C at the Little Colorado River confluence. Below 16°C smallmouth bass and many other nonnatives are unable to spawn.

The Secretary's Designee to the AMWG proposed five actions that are under consideration: (1) evaluation of high-flow experiments under low-elevations/low-flows, (2) evaluation of downstream resource impacts under low-elevations/low-flows, (3) completion of a nonnative fish strategic plan, (4) initiation the NEPA compliance process for operational flexibilities to address nonnative fish, (5) initiating planning to evaluate fish exclusion projects. The proposed actions are preliminary; however, many of the efforts have been initiated.

A macroinvertebrate flow experiment ("Bug Flows") was initiated on May 1, and is scheduled to conclude on August 31, 2022. Opportunities for the Planning and Implementation Team (P&I Team) to recommend termination of the experiment were included in the authorization to conduct Bug Flows in 2022 in recognition of uncertainty in WY-2022 hydrology, annual and monthly operations, and resource conditions. Two of the specified conditions for the P&I Team to consider termination of the bug flow experiment occurred during the experiment: (1) detection of juvenile smallmouth bass in Lees Ferry and (2) a decrease in annual or monthly release volumes from May through August. The P&I Team considered whether or not to recommend early termination of 2022 Bug Flows and provided a non-consensus "Technical Analysis and Comments" document for the Leadership Team's review. The Leadership Team met on August 10, to consider whether or not to recommend early termination of 2022 Bug Flows and did not reach consensus regarding a recommendation. The Acting Secretary's Designee to the GCDAMP issued a decision on August 12, to continue Bug Flows through its scheduled completion date. The decision memo stated that "the technical and scientific analysis provided

by GCMRC indicates that there is no meaningful risk from continuation of the bug flows to benefitting entrainment and establishment of SMB downstream of the dam."

The P&I Team will also begin considering whether or not to implement a high flow experiment (HFE) this fall. The program is currently in the fall accounting period to determine if there has been sufficient loading of sediment to trigger a potential fall HFE in accordance with the Long-term Experimental and Management Plan (LTEMP).

Finally, the Technical Work Group (TWG) will meet virtually October 12 – 13. The AMWG will hold its Annual Reporting Meeting January 24-25. The feasibility of holding this meeting in person is being evaluated.

GENERAL ANNOUNCEMENTS AND UPDATES

August 24-Month Study

Reclamation held a briefing on results of the August 24 Month-Study on August 16. Pursuant to the 2007 Interim Guidelines, the August 2022 24-Month Study projections for January 1, 2023, system storage and reservoir water surface elevations are utilized in determining the operational tiers for the coordinated operations of Lakes Powell and Mead during 2023. The August 2022 24-Month Study also sets operational targets for Lake Mead operations pursuant to the Lower Basin Drought Contingency Plan (DCP) Agreement and Minute No. 323.

The Study projects Lake Powell's January 1, 2023, elevation to be 3,505.66 feet based on an 8.23 maf Lake Powell Release. Lake Powell's operations in WY-2023 will be governed by the Lower Elevation Balancing Tier with an initial projected water year release volume of 7.00 maf. In April 2023, Reclamation will evaluate hydrologic conditions to determine if balancing releases may be appropriate under the conditions established in the 2007 Interim Guidelines. Because the 2022 operations were designed to protect critical elevations at Lake Powell, Reclamation will implement Lower Elevation Balancing Tier operations in a manner that continues to protect these critical elevations, or preserves the benefits of the 2022 operations to protect Lake Powell, in water year 2023. Specifically, Reclamation modeled operations in WY-2023 as follows in the August 24-Month Study:

- The Glen Canyon Dam annual release has initially been set to 7.00 maf;
- Balancing releases will be limited (with a minimum of 7.00 maf) to protect Lake Powell from declining below elevation 3,525 feet at the end of December 2023;

- Balancing releases will take into account operational neutrality of the 0.480 maf that was retained in Lake Powell under the May 2022 action. Any Lake Powell balancing release volume will be calculated as if the 0.480 maf had been delivered to Lake Mead in WY-2022; and
- The modeling approach for WY-2023 will apply to 2024.

The August 2022 24-Month Study projects the January 1, 2023, Lake Mead elevation, determined as if the 0.480 MAF had been delivered to Lake Mead in water year 2022, to be 1,047.61 feet. Consistent with Section 2.D.1 of the Interim Guidelines, a Shortage Condition consistent with Section 2.D.1.b will govern the operation of Lake Mead for calendar year 2023. In addition, Section III.B of Exhibit 1 to the Lower Basin DCP Agreement will govern the operation of Lake Mead for CY- 2023. Arizona and Nevada will implement 617 KAF in water savings in CY-2023 under the 2007 Interim Guidelines and Lower Basin Drought Contingency Plan. California is not required to implement water savings actions under the Guidelines or DCP in 2023. Mexico will implement 104 kaf of water savings under Minute 323 Delivery Reductions and the Binational Water Scarcity Contingency Plan. The 24-Month Study also reflects agreements in place under the 500+ Plan Memorandum of Understanding between entities in the states of Arizona, Nevada, and California signed on December 15, 2021.

Figures 2 and 3 show the projected elevations for Lakes Powell and Mead through July of 2024 from the August 24-Month Study.

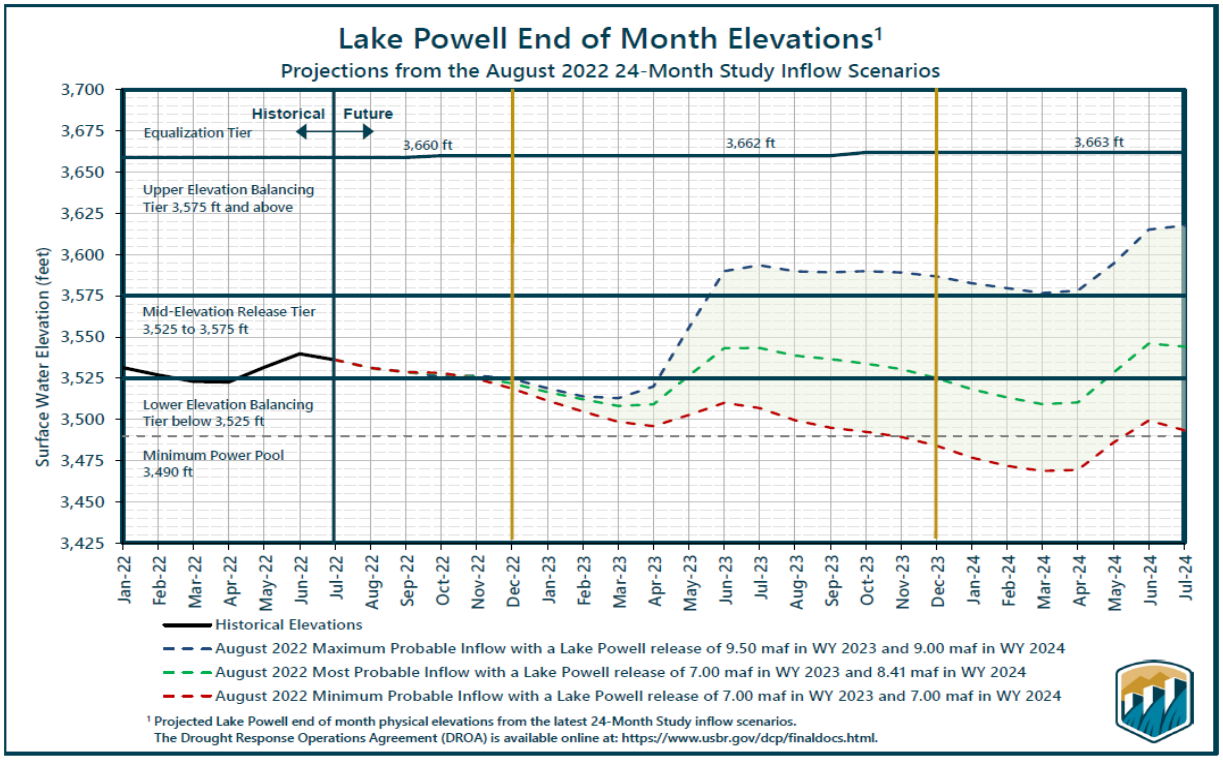

Figure 2. Lake Powell End of Month Elevations from August 2022 24-Month Study

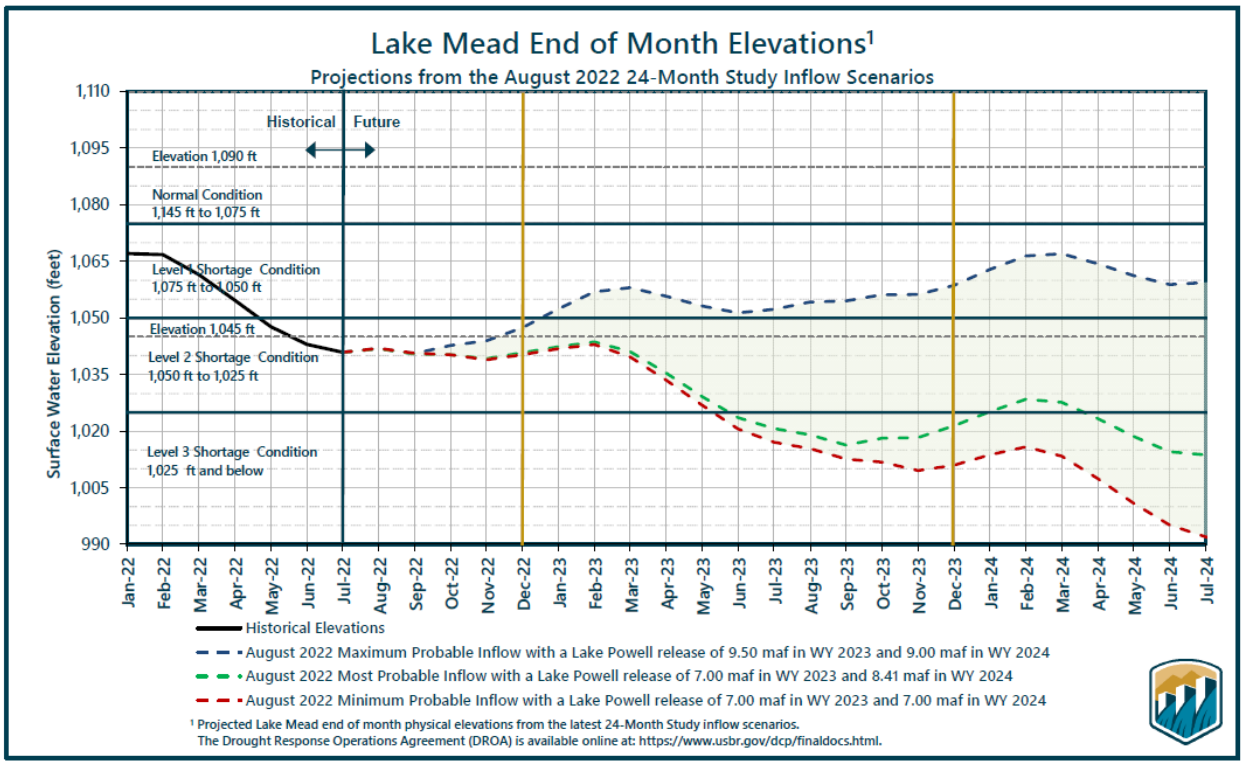

Figure 3. Lake Mead End of Month Elevations from August 2022 24-Month Study

2023 Annual Operating Plan, Third Consultation Meeting

The third consultation meeting for the development of the 2023 Annual Operation Plan (AOP) for the Colorado River System was held on September 7th via webinar to provide an update of the draft 2023 AOP and accept additional comments from stakeholders. The 1968 Colorado River Basin Project Act (P.L. 90-537) requires that the Secretary of the Department of the Interior prepare a report documenting the actual operations for the previous water year and the projected operations for the upcoming water year. Based on the operating criteria established within the 2007 Interim Guidelines, the August 24-Month Study Report projections for January 1st elevations in the following year sets the operational tiers for the coordinated operations of Lakes Powell and Mead.

Based on the August 2022 24-Month Study Report Study, which incorporates the Lake Powell annual operating decision in water year 2022, including operational neutrality in Lake Powell and Lake Mead operations, the projected operational tier for Lake Powell in WY-2023 is the Lower Elevation Balancing Tier, with a most probable release of 7.0 MAF from Glen Canyon Dam.
It was determined that the most probable operational tier for Lake Mead in 2023 is the Level 2a Shortage Condition.

The draft 2023 AOP currently projects a delivery to Mexico, pursuant to the 1944 Water Treaty, of 1.43 MAF. This volume may be further adjusted for water savings as required under Section IV of IBWC Minute No. 323. Delivery amount may also be adjusted based upon Mexico's utilization of its Water Reserve and obligations under Minute No. 323.

The draft 2023 AOP can be accessed and viewed online at the websites maintained by Reclamation's Upper and Lower Colorado Basin Regions. The link for the most recent draft of the 2023 AOP is:

https://www.usbr.gov/uc/water/rsvrs/ops/aop/AOP23_draft.pdf

The fourth AOP consultation meeting is scheduled for October 12, 2022, at 12:00 p.m., Pacific Time.

5 Year Operation Study Released by Reclamation

Reclamation published results of the August 2022 Colorado River Mid-term Modeling System (CRMMS) 2 & 5-year probabilistic projections on August 31, 2022. For the 5-Year Probabilistic Projections, CRMMS is run in Ensemble Mode to provide more information about risk and

uncertainty for operations within a one- to five-year planning horizon. CRMMS Ensemble Mode uses an ensemble of 30 unregulated streamflow forecasts developed by the National Weather Service Colorado Basin River Forecasting Center (CBRFC) using Ensemble Streamflow Prediction (ESP) forecasts for 1991-2020. Tables 2 and 3 show projected operating levels for Lakes Powell and Mead based on the 5-year probabilistic projections. In Table 2 the Equalization Tier for Lake Powell in 2023 is 3662 feet.

Event or System Condition	2023	2024	2025	2026	2027[5]
Equalization Tier (Powell ≥ Equalization [EQ] Elevation)	0	0	3	13	13
Equalization – annual release > 8.23 maf	*0*	*0*	*3*	*13*	*13*
Equalization – annual release = 8.23 maf	*0*	*0*	*0*	*0*	*0*
Upper Elevation Balancing Tier (Powell < EQ Elevation and ≥ 3,575 ft)	0	13	27	23	33
Upper Elevation Balancing – annual release > 8.23 maf	*0*	*10*	*27*	*23*	*33*
Upper Elevation Balancing – annual release = 8.23 maf	*0*	*0*	*0*	*0*	*0*
Upper Elevation Balancing – annual release < 8.23 maf	*0*	*3*	*0*	*0*	*0*
Mid-Elevation Release Tier (Powell < 3,575 and ≥ 3,525 ft)	0	37	37	33	27
Mid-Elevation Release – annual release = 8.23 maf	*0*	*0*	*7*	*7*	*3*
Mid-Elevation Release – annual release = 7.48 maf	*0*	*37*	*30*	*27*	*23*
Lower Elevation Balancing Tier (Powell < 3,525 ft)	100	50	33	30	27
Lower Elevation Balancing – annual release > 8.23 maf	*23*	*20*	*13*	*13*	*17*
Lower Elevation Balancing – annual release < 8.23 maf	*77*	*30*	*20*	*17*	*10*

Table 2. Lake Powell Percent of Traces with System Condition

Event or System Condition	2023	2024	2025	2026	2027[5]
Surplus Condition – any amount (Mead ≥ 1,145 ft)	0	0	0	0	0
Surplus – Flood Control	0	0	0	0	0
Normal or ICS Surplus Condition (Mead < 1,145 and > 1,075 ft)	0	7	0	7	13
Recovery of DCP ICS / Mexico's Water Savings (Mead >/≥ 1,110 ft)	0	0	0	0	0
DCP Contribution / Mexico's Water Savings (Mead ≤ 1,090 and > 1,075 ft)	0	7	0	3	3
Shortage Condition – any amount (Mead ≤ 1,075 ft)	100	93	100	93	87
Shortage / Reduction – 1st level (Mead ≤ 1,075 and ≥ 1,050)	*0*	*17*	*30*	*13*	*10*
DCP Contribution / Mexico's Water Savings (Mead ≤ 1,075 and > 1,050 ft)	0	17	30	13	10
Shortage / Reduction – 2nd level (Mead < 1,050 and ≥ 1,025)	*100*	*57*	*30*	*33*	*33*
DCP Contribution / Mexico's Water Savings (Mead ≤ 1,050 and > 1,045 ft)	100	0	0	13	3
DCP Contribution / Mexico's Water Savings (Mead ≤ 1,045 and > 1,040 ft)	0	10	0	7	3
DCP Contribution / Mexico's Water Savings (Mead ≤ 1,040 and > 1,035 ft)	0	7	7	3	10
DCP Contribution / Mexico's Water Savings (Mead ≤ 1,035 and > 1,030 ft)	0	13	7	7	7
DCP Contribution / Mexico's Water Savings (Mead ≤ 1,030 and ≥/> 1,025 ft)	0	27	17	3	10
Shortage / Reduction – 3rd level (Mead < 1,025)	*0*	*20*	*40*	*47*	*43*
DCP Contribution / Mexico's Water Savings (Mead </≤ 1,025 ft)	0	20	40	47	43

Table 3. Lake Mead Percent Traces with System Condition

Federal Register Notice for Public Input on Federal Meteorological Services

Board staff have identified an opportunity to promote additional federal research and funding for improvements to weather forecasting, including seasonal to sub-seasonal forecasting. On August 18, the Office of Science and Technology Policy and the National Oceanic and Atmospheric Administration, on behalf of the Interagency Council for Advancing Meteorological Services, published a notice in the federal register requesting input from all interested parties to identify opportunities for, and inform the advancement of federal meteorological services across the meteorological enterprise in both the short- (2-3 years) and long-term (next decade). This information will be used to inform the development of a new decadal strategic plan for federal coordination of meteorological science and services using an earth system approach. Interested persons and organizations are invited to submit comments on or before 5:00 p.m. EST, October 3, 2022.

Washington, D.C. Report

FY-2023 Appropriations

The federal government is set to run out of money on September 30th and must pass a continuing resolution (CR) or face a government shutdown. It is unlikely that Congress could pass 12 appropriations bills in both chambers by then. The House is scheduled to vote next week on a CR that will keep the government operating until December 16, 2022. The Senate is expected to also support such a short-term funding bill.

President Joe Biden requested $47.1 billion in emergency funds as part of his administration's CR proposal, parts of which may face opposition from Republicans who want a mostly "clean" stopgap without additional spending. Included in the President's request are:

- An extension for the CalFed Bay-Delta Program,
- Extensions for the Emergency Drought Relief Act and WaterSMART,
- $25 million for an Army Corps-investigation account for drought resilience, and
- $25 million for an Army Corps-operations account for drought resilience.

Water Recycling Projects Selected

Last week, Reclamation announced $310 million in infrastructure bill funding for water recycling projects in the western states, mainly in California. The selected projects will advance drought resilience and are expected to increase annual capacity by about 213,000 acre-feet of water, enough water to support more than 850,000 people a year.

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