Colorado River Board of California

September 27, 2019

**NOTICE OF REGULAR MEETING OF THE COLORADO RIVER BOARD**

**NOTICE IS HEREBY GIVEN** pursuant to the call of the Chairperson, Peter Nelson, by the undersigned Executive Director of the Colorado River Board of California that a regular meeting of the Board Members is to be held as follows:

| | |
|---|---|
| Date: | Wednesday, October 9, 2019 |
| Time: | 10:00 a.m. |
| Place: | Orchid Room<br>Sheraton Ontario Airport Hotel<br>429 North Vineyard Avenue<br>Ontario, CA 91764 |

The Colorado River Board of California welcomes any comments from members of the public pertaining to items included on this agenda and related topics. Oral comments can be provided at the beginning of each Board meeting; while written comments may be sent to Mr. Peter Nelson, Chairperson, Colorado River Board of California, 770 Fairmont Avenue, Suite 100, Glendale, California, 91203-1068.

Requests for additional information may be directed to: Mr. Christopher S. Harris, Executive Director, Colorado River Board of California, 770 Fairmont Avenue, Suite 100, Glendale, CA 91203-1068, or 818-500-1625. A copy of this Notice and Agenda may be found on the Colorado River Board's web page at www.crb.ca.gov.

A copy of the meeting agenda, showing the matters to be considered and transacted, is attached.

Christopher S. Harris
Executive Director

**Regular Meeting**
**COLORADO RIVER BOARD OF CALIFORNIA**
**Wednesday, October 9, 2019**
**10:00 a.m.**

At the discretion of the Board, all items appearing on this agenda, whether or not expressly listed for action, may be deliberated upon and may be subject to action by the Board. Items may not necessarily be taken up in the order shown.

**1. Call to Order**

**2. Opportunity for the Public to Address the Board** (Limited to 5 minutes)
In accordance with California Government Code, Section 54954.3(a)

**3. Administration**
a. Consideration and approval of the Minutes of the meeting held September 11, 2019 (Action)

**4. Water Supply and Operations Reports**
a. Colorado River Basin Report
b. State and Local Reports

**5. Staff Reports regarding Colorado River Basin Programs**
a. Status of Minute No. 323 Implementation
b. Basin States Climate and Hydrology State of the Science draft report
c. General Announcements

**6. Executive Session**
An Executive Session may be held by the Board pursuant to provisions of Article 9 (commencing with Section 11120) of Chapter 1 of Part 1 of Division 3 of Title 2 of the Government Code and Sections 12516 and 12519 of the Water Code to discuss matters concerning interstate claims to the use of Colorado River system waters in judicial proceedings, administrative proceedings, and/or negotiations with representatives from other states or the federal government.

**7. Other Business**

**8. Future Agenda Items/Announcements**

**Next Scheduled Board Meeting**: November 13, 2019
10:00 a.m.
Sheraton Ontario Airport Hotel
Orchid Room
429 North Vineyard Avenue
Ontario, California 91764

Minutes of Meeting
COLORADO RIVER BOARD OF CALIFORNIA
Wednesday, September 11, 2019

A meeting of the Colorado River Board (Board) of California was held on Wednesday, September 11, 2019 at the Sheraton Ontario Airport Hotel, 429 North Vineyard Avenue, Ontario, California 91764.

Board Members and Alternates Present:

Nicole Neeman-Brady (Public Member)
David DeJesus (MWD Alternate)
Dana B. Fisher, Jr. (PVID)
James Hanks (IID)
Jeanine Jones (DWR Designee)
Henry Kuiper (Public Member)
Peter Nelson, Chairman (CVWD)
Glen D. Peterson (MWD)
David R. Pettijohn (LADWP)
Jack Seiler (PVID Alternate)
David Vigil (DFW Alternate)

Board Members and Alternates Absent:

Evelyn Cortez-Davis (LADWP Alternate)
Norma Sierra Galindo (IID Alternate)
Christopher Hayes (DFW Designee)
Jim Madaffer (SDCWA)
John Powell, Jr. (CVWD Alternate)
Mark Watton (SDCWA Alternate)

Others Present:

Steve Abbott
Melissa Baum Haley
Christopher Harris
Bill Hasencamp
Michael Hughes
Ned Hyduke
Lisa Johansen
Rich Juricich
Laura Lamdin
Tom Levy
Lindia Liu
Aaron Mead
Dylan Mohamed
Jessica Neuwerth
Anisa Patey
Angela Rashid
Ivory Reyburn
Kelly Rogers
Shanti Rosset
Tom Ryan
Gary Tavetian
Kimberlyn Velasquez
Margaret Vick
Jerry Zimmerman

## CALL TO ORDER

Chairman Nelson announced the presence of a quorum and called the meeting to order at 10:11 a.m.

## OPPORTUNITY FOR THE PUBLIC TO ADDRESS THE BOARD

Chairman Nelson invited members of the audience to address the Board on items on the agenda or matters related to the Board. Hearing none, Chairman Nelson moved to the next item on the agenda.

## ADMINISTRATION

Chairman Nelson asked for a motion to approve the June 12, 2019, Board meeting minutes. Mr. Fisher moved that the minutes be approved, seconded by Mr. Pettijohn. By roll-call vote, the minutes were unanimously approved.

## COLORADO RIVER BASIN WATER REPORTS

### Colorado River Basin Report

Ms. Rashid reported that as of September 3rd, the water level at Lake Powell was 3,617.75 feet with 13.53 million-acre feet (MAF) of storage, or 56% of capacity. The water level at Lake Mead was 1,083.47 feet with 10.30 MAF of storage, or 39% of capacity. As of June 9th, the total system storage was 32.10 MAF, or 54% of capacity, which is about 3.5 MAF less than the system storage at this same time last year.

Ms. Rashid reported that Water Year-2019 will be ending on September 30th, adding that the forecasted inflow for Lake Powell is 13.2 MAF, or 125% of normal. The Observed April to July 2019 runoff into Lake Powell is projected to be 10.41 MAF, or 94% of normal. The August 2019 observed Lake Powell inflow was 0.47 MAF, or 94% of normal, and the September forecasted Lake Powell inflow is 0.39 MAF, or 94% of normal. To date, the Water Year-2019 precipitation is 114%.

Ms. Rashid reported that precipitation conditions in July and August were below average throughout the Basin, noting that monsoonal activity was below average.

Ms. Rashid reported that as of September 3rd, Upper Basin reservoirs were close to capacity. She also reported on the regulatory storage conditions in the Lower Basin. As of August 29th, Brock and Senator Wash reservoirs captured 86,031 AF and 75,362 AF, respectively. Ms.

Rashid reported excess flows to Mexico were 4,674 AF through September 3rd. As of September 4th, the total bypassed to the Cienega de Santa Clara in Mexico is 62, 914 AF.

Mr. Harris reported that Reclamation will be conducting maintenance operations on the U.S. section of the Main Outlet Drain Extension (MODE) between the Northerly International Boundary (NIB) and the Southerly International Boundary (SIB). The Mexican government will also be conducting maintenance on Mexico's section of the MODE down to the Cienega. For the next 120 days, about 35,000 AF of saline drainage that would normally go to the Cienega will be rerouted to the main river channel below Morelos Dam and discharge into the limithrope, to percolate into the regional aquifer. Mr. Harris explained that on the U.S. side Reclamation will dredge the MODE and replace leaking concrete panels. U.S and Mexican non-governmental organizations (NGOs) are developing a monitoring program to observe the potential impacts on the Cienega. Responding to a question regarding the salinity impact of the project, Mr. Harris stated that the water in the Main Outlet Drain Extension Canal has a salinity of about 4,000 ppm and may increase salinity to the aquifer that is pumped by Mexico.

Ms. Rashid reported that on August 15th, the U.S. Bureau of Reclamation (Reclamation) held a webinar to discuss the results of the 2019 August 24-Month Study projections. The most probable end of Calendar Year-2019 elevation for Lake Powell is projected to be 3,618.56 feet, indicating that the reservoir will be operated in the Upper Elevation Balancing Tier with the most probable release of 8.23 MAF in 2020. The most probable end of Calendar Year-2019 elevation for Lake Mead is projected to be 1,089.40 feet and operations in 2020 will be governed by the normal or ICS surplus conditions and the implementation of the Lower Basin Drought Contingency Plan (LB DCP) and the Minute 323 Binational Water Scarcity Contingency Plan. Ms. Rashid explained that this will result in contributions from Arizona (192,000 AF), Nevada (8,000 AF) and Mexico (41,000 AF). Mr. Harris added that Tier 0 LB DCP contribution threshold is 1,090 feet.

Ms. Rashid reported that Reclamation released the updated 2019 August Colorado River Simulation System (CRSS) future projected Colorado River system conditions over the next 5 years, which was last updated in June. Ms. Rashid explained that since June the probability for a shortage in the Lower Basin decreased slightly by two percentage points in 2021 and 2022 but increased by six percentage points in 2023 and 2024.

Ms. Rashid reported that Reclamation held its third and final consultation meeting for the 2020 Annual Operating Plan (AOP) on September 5th in McCarran Airport in Las Vegas, Nevada and via webinar. Ms. Rashid reported that Lake Powell will be operated in accordance with the Upper Elevation Balancing Tier with a most probable release of 8.23 MAF from Glen Canyon Dam. Lake Mead will be operated in accordance with normal and ICS surplus conditions.

Lastly, Ms. Rashid reported that on August 21st, the Basin States Climate and Hydrology Workgroup released a draft of the State of the Science (SOS) report. Ms. Rashid reminded the Board that the Workgroup was developed after the Basin States Climate and Hydrology symposium held in 2017. She reported that the purpose of the report is the synthesize and assess the current science on Basin climate and hydrology and to identify knowledge gaps and uncertainties. Comments on the draft report are due September 17th and a Workgroup conference call is scheduled for September 26th. Mr. Harris noted that the Six Agency Committee contributed $15,000 for the development of the SOS report. Mr. Harris reported that better coordination between NOAA agencies and Reclamation could help reduce some of the knowledge gaps and uncertainties that exist in Basin climate and hydrology science and knowledge.

**State and Local Report**

Ms. Jones, representing the California Department of Water Resources (CA DWR), reported that the State's precipitation for Water Year-2019 is above average. She reported that the State's annual precipitation has been very variable, noting the State suffered a drought from 2012 to 2016, followed by the wettest year on record in terms of state-wide runoff in 2017 and average precipitation in 2018. Ms. Jones reported a warm wall of water is forming off the Pacific Coast, like what occurred in 2015/2016. Ms. Jones noted that this might lead to ridging and might predispose the State to drier conditions, noting that it is just speculation at this point. She added that the warm water is not good for marine life.

Ms. Jones reported that the State's reservoir storage is above average. She noted that the central coast of California is recovering from past drought conditions slower than other parts of the State. Mr. Harris inquired about the magnitude of warming in the Pacific Ocean. Ms. Jones remarked that long-term records indicate that the temperatures could be as much as ten degrees above average.

Board member Peterson, representing The Metropolitan Water District of Southern California (MWD), reported that as of September 1st, the combined reservoir storage is 91% of capacity. Mr. Peterson stated that MWD has been developing groundwater storage in the Antelope Valley. Mr. Peterson reported that MWD has about 1 MAF of water stored in its storage accounts and water use in MWD's service area was normal.

**STATUS OF COLORADO RIVER BASIN PROGRAMS**

**Minute No. 323 Implementation**

Board Staff Ms. Neuwerth reported that the Minute 323 Environmental Work Group (EWG) met June 27-28 in San Diego, California. Ms. Neuwerth noted that the EWG is responsible for overseeing the use of $18 million and 210,000 acre-feet of water under Minute 323. Several

habitats have been created in the Colorado River Delta, and the EWG plans to fund expansion of several of these sites in the next year. Ms. Neuwerth also reported that no federal water has yet been delivered to any of the habitats, and the EWG is discussing how best to make use of future federal water deliveries to the Delta.

Ms. Neuwerth reported that the Bureau of Reclamation is planning to undertake repairs to the Main Outlet Drain Extension (MODE), which carries saline drainage from the Yuma area to the Gulf of California, where it is discharged into a large wetland, the Cienega de Santa Clara. Ms. Neuwerth noted that the drainage will instead be routed into the old river channel for several months. Ms. Neuwerth reported that monitoring will be conducted to evaluate the effects of the activity.

Mr. Harris reported that the Desalination Work Group for Minute 323 had received a preliminary draft feasibility assessment on the potential to conduct desalination on the Sonoran Coast in the Gulf of California. The draft report identifies five sites where desalination may be feasible. Mr. Harris noted that challenges facing desalination projects in the area include a lack of nearby water users available to take delivery of product water, the lack of available power generation and transmission, and the need to build product water conveyance to Mexican or U.S. water users. Mr. Harris reported that another draft of the report will be prepared for review by the Desalination Work Group. Finally, Mr. Harris noted that future feasibility assessments could evaluate the potential for desalination on the Baja coast of the Gulf of California or on the Pacific Coast.

In response to a question, Mr. Harris noted that the draft feasibility assessment evaluates the possibility of multiple desalination plants producing a total of about 200,000 acre-feet of product water.

**Status of the Glen Canyon Dam Adaptive Management Program**

Ms. Neuwerth reported that the Glen Canyon Dam Adaptive Management Work Group (AMWG) met August 21-22 in Flagstaff, Arizona. Ms. Neuwerth reported that the group recommended approval of the FY-20 Budget and Work Plan, which includes approximately $11 million, most of which goes to support monitoring and research in the Grand Canyon. Ms. Neuwerth also reported that the likelihood of conducting a high-flow experiment (HFE) this fall at Glen Canyon Dam currently appears quite low, due to limited tributary sediment input.

Ms. Neuwerth reported that the AMWG discussed a guidance document provided by Secretary of the Interior's designee to the program, Dr. Tim Petty. Ms. Neuwerth noted that the document describes the administration's priorities for the Glen Canyon Dam Adaptive Management Program, including continued implementation of the Long-Term and Experimental

Management Plan EIS, consideration of spring high flows, and consideration of flows that increase hydropower production.

Ms. Neuwerth reported that the AMWG received an update from the U.S. Fish and Wildlife Service (USFWS), which proposed last year to downlist two native fish found in the area, the razorback sucker and humpback chub, from endangered to threatened. Ms. Neuwerth noted that the downlisting proposals are expected to be accompanied by a rule specifying what protections the species would be afforded. Ms. Neuwerth reported that the downlisting proposal for the humpback chub is expected by the end of the year.

Finally, Ms. Neuwerth noted that the Technical Work Group would meet October 21-22 in Phoenix, Arizona.

**Lower Colorado River Multi-Species Conservation Program**

Ms. Neuwerth reported that the Lower Colorado River Multi-Species Conservation Program (LCR MSCP) Steering Committee met via teleconference on June 26th and approved the *Final Implementation Report, Fiscal Year 2020 Work Plan and Budget, Fiscal Year 2018 Accomplishment Report*, which looks at a three-year period of past, current, and future accomplishments and expenditures.

Ms. Neuwerth also reported that a small group has recently met to discuss changes to the LCR MSCP program coverage. The LCR MSCP provides environmental compliance for changes in flow along the Lower Colorado River, including up to 845,000 acre-feet of change in flow between Hoover and Davis Dams, 860,000 acre-feet of change in flow between Davis and Parker Dams, and 1.574 million acre-feet of change-in-flow between Parker and Imperial Dams. Ms. Neuwerth noted that the group of stakeholders is holding preliminary discussions on the possibility of increasing program coverage so that the entire river from Hoover Dam to Imperial Dam will have coverage for up to 1.574 million acre-feet of change in flow.

**Status of the Salinity Control Program**

Board Staff Rich Juricich reported on the Work Group meeting held on August 26th to 28th in Salt Lake City, Utah. Mr. Juricich reported that the Work Group focused on the 2020 Triennial Review, with discussion on the US Bureau of Land Management contributions of watershed-based treatments accounted for by the Salinity Control Program in terms of tons of salt controlled each year. The Work Group is re-evaluating these contributions in the Triennial Review.

Mr. Juricich reported that the Work Group is also working on the Water Conservation memo, looking at salinity control benefits associated with water conservation. The Fall meeting will include the Advisory Council and the Forum in October in Phoenix, Arizona.

Mr. Juricich reported that the main topic at the Work Group meeting was on the Paradox Valley Unit (PVU). The PVU well has been shut down since early March due to an earthquake. By the end of September, Reclamation is expected to complete the analysis needed to determine whether to continue operating the well or to keep it shut down while exploring other alternatives. Reclamation released the Administrative Draft EIS for the next phase of the PVU project. The four alternatives being considered include 1) no action; 2) a new injection well; 3) evaporations ponds; and 4) zero-liquid discharge technology. The draft EIS will be released for public comment in November/ December. The final EIS is due to be released in May 2020.

**ANNOUNCEMENTS**

Mr. Harris reported briefly on the U.S. House and Senate. Mr. Harris indicated that the House passed 10 of 12 appropriation bills but the Senate has yet to move forward on the bills. Mr. Harris indicated that the House passed its Fiscal Year 2020 Energy and Water Appropriations legislation on June 19th, which contains funding for Reclamation and the Army Corps of Engineers.

Mr. Harris reported on the details of the House Energy and Water bill. Mr. Harris indicated that there would be an additional $400 million for water resource projects, $121 million for rural water projects above budget requests, $510 million for SECURE Water Act, $70 million for the Upper Colorado River Basin Fund, and $5 million for the Lower Colorado River Basin development Fund.

Finally, Mr. Harris noted that the next meeting of the Colorado River Board would be October 9th and would be held in Ontario, California.

**EXECUTIVE SESSION**

Pursuant to provisions of Article 9, commencing with Section 11120, of Chapter 1 of Part 1, Division 3 of Title 2 of the government Section Program 12516 and 12519 of the Water Code to discuss matters concerning interstate negotiations with representatives from other states or the federal government, a motion was made by Mr. Hanks to go into Executive Session, seconded by Mr. Kuiper. By roll-call vote, the motion was unanimously approved. The Board entered Executive Session at 11:05 and adjourned from executive session at 11:58.

**REGULAR SESSION**

The Board resumed the regular session at 11:59 and Chairman Nelson reported that the Board held an Executive Session and that no action was taken by the Board.

**ADJOURNMENT**

With no further items to be brought before the Board, Chairman Nelson adjourned the meeting at 12:01 p.m.

9/30/2019

# LOWER COLORADO WATER SUPPLY REPORT

River Operations

Bureau of Reclamation

Questions: BCOOWaterops@usbr.gov
(702)293-8373
http://www.usbr.gov/lc/region/g4000/weekly.pdf

| CURRENT STORAGE | PERCENT FULL | Content 1000 ac-ft (kaf) | Elev. (Feet above mean sea level) | 7-Day Release (CFS) |
|---|---|---|---|---|
| LAKE POWELL | 55% | 13,291 | 3,615.49 | 11,700 |
| * LAKE MEAD | 39% | 10,259 | 1,082.97 | 11,600 |
| LAKE MOHAVE | 87% | 1,571 | 638.26 | 11,000 |
| LAKE HAVASU | 97% | 598 | 448.94 | 7,000 |
| TOTAL SYSTEM CONTENTS ** | 53% | 31,657 | | |
| As of 9/29/2019 | | | | |
| SYSTEM CONTENT LAST YEAR | 47% | 28,026 | | |

* Percent based on capacity of 26,120 kaf or elevation 1,219.6 feet.

** TOTAL SYSTEM CONTENTS includes Upper & Lower Colorado River Reservoirs, less Lake Mead exclusive flood control space.

| | | | | |
|---|---|---|---|---|
| Salt/Verde System | 69% | 1,577 | | |
| Painted Rock Dam | 0% | 0 | 530.00 | 0 |
| Alamo Dam | 13% | 129 | 1,116.32 | 25 |

Forecasted Water Use for Calendar Year 2019 (as of 9/30/2019) (values in kaf)

| | | |
|---|---|---|
| NEVADA | 257 | |
| SOUTHERN NEVADA WATER SYSTEM | | 227 |
| OTHERS | | 30 |
| CALIFORNIA | 4,034 | |
| METROPOLITAN WATER DISTRICT OF CALIFORNIA | | 554 |
| IRRIGATION DISTRICTS | | 3,467 |
| OTHERS | | 13 |
| ARIZONA | 2,621 | |
| CENTRAL ARIZONA PROJECT | | 1,498 |
| OTHERS | | 1,123 |
| TOTAL LOWER BASIN USE | | 6,912 |
| DELIVERY TO MEXICO - 2019 (Mexico Scheduled Delivery + Preliminary Yearly Excess[1]) | | 1,514 |

OTHER SIGNIFICANT INFORMATION

UNREGULATED INFLOW INTO LAKE POWELL - SEPTEMBER MID-MONTH FORECAST DATED 9/16/2019

| | MILLION ACRE-FEET | % of Normal |
|---|---|---|
| FORECASTED WATER YEAR 2019 | 13.107 | 121% |
| OBSERVED APRIL-JULY 2019 | 10.410 | 145% |
| AUGUST OBSERVED INFLOW | 0.472 | 94% |
| SEPTEMBER INFLOW FORECAST | 0.300 | 74% |

| | Upper Colorado Basin | Salt/Verde Basin |
|---|---|---|
| WATER YEAR 2019 PRECIP TO DATE | 111% (34.9") | 105% (29.6") |
| CURRENT BASIN SNOWPACK | NA% (NA) | NA% (NA) |

[1] Delivery to Mexico forecasted yearly excess calculated using year-to-date observed and projected excess.

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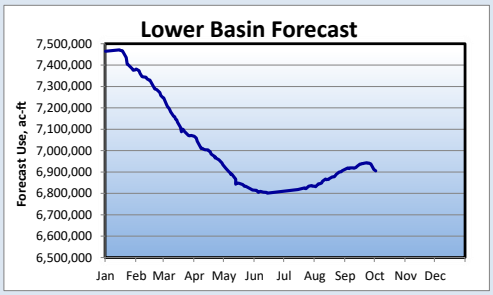
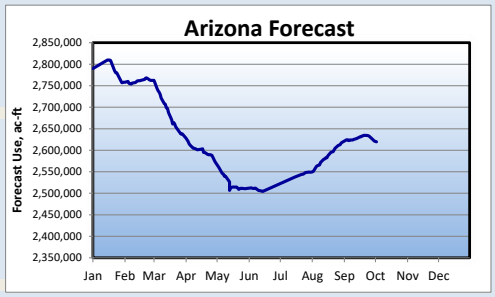
**U.S. BUREAU OF RECLAMATION**
**LOWER COLORADO REGION**
**CY 2019**

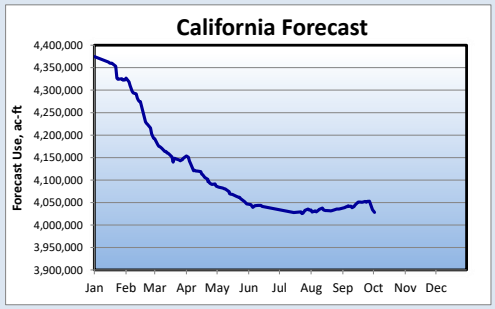
ARIZONA, CALIFORNIA, NEVADA, MEXICO
FORECAST OF END OF YEAR CONSUMPTIVE USE
FORECAST BASED ON USE TO DATE AND APPROVED ANNUAL WATER ORDERS [1]
(ACRE-FEET)

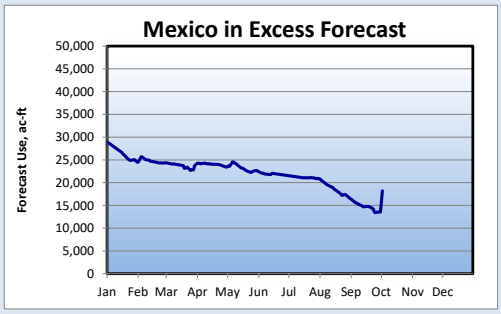
| WATER USE SUMMARY | Use To Date CY2019 | Forecast Use CY2019 | Approved Use [2] CY2019 | Excess to Approval CY2019 |
|---|---|---|---|---|
| ARIZONA | 2,002,414 | 2,619,640 | 2,758,672 | -139,032 |
| CALIFORNIA | 3,268,949 | 4,028,103 | 4,371,121 | -343,018 |
| NEVADA | 193,181 | 257,404 | 300,000 | -42,596 |
| STATES TOTAL [3] | 5,464,544 | 6,905,147 | 7,429,793 | -524,646 |
| MEXICO IN SATISFACTION OF TREATY (Including downward delivery) | 1,246,251 | 1,518,184 | 1,500,000 | **18,184** |
| TO MEXICO AS SCHEDULED | 1,236,147 | 1,500,000 | | |
| MEXICO IN EXCESS OF TREATY [4] | 10,104 | 18,184 | | |
| BYPASS PURSUANT TO MINUTE 242 [5] | 70,984 | 100,401 | | |
| TOTAL LOWER BASIN & MEXICO | 6,781,779 | 8,523,732 | | |

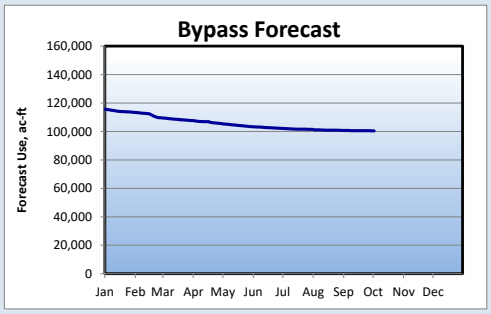
1/ Incorporates 80 daily reporting stations which may be revised after provisional data reports are distributed by the USGS. Use to date estimated for users reporting monthly and annually.
2/ These values reflect adjusted apportionments. See Adjusted Apportionment calculation on each state page.
3/ Includes unmeasured returns based on estimated consumptive use/diversion ratios by user from studies provided by Arizona Department of Water Resources, Colorado River Board of California, and Reclamation.
4/ Mexico excess forecast is based on the 5-year average for the period 2013-2017.
5/ Bypass forecast is based on the average for the period 1990-2017.

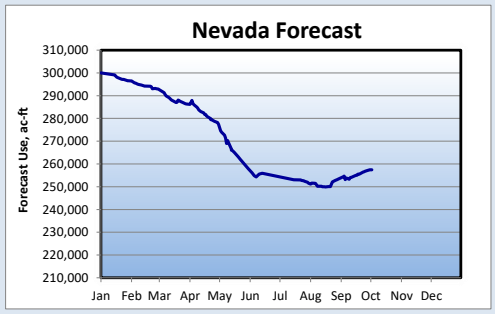


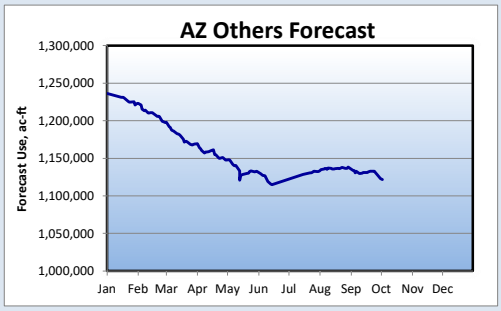



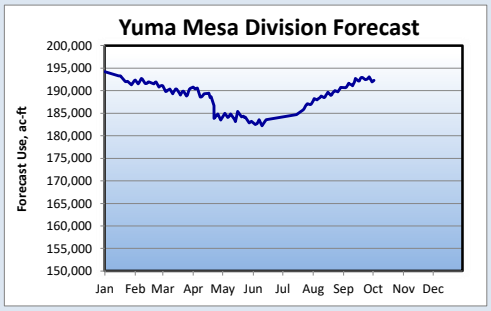



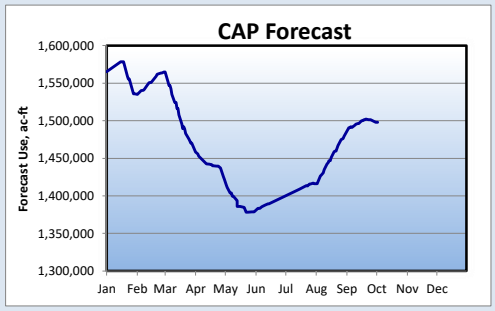



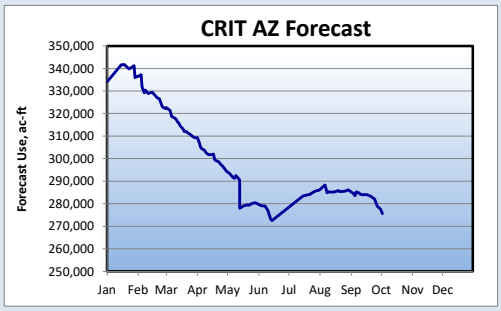



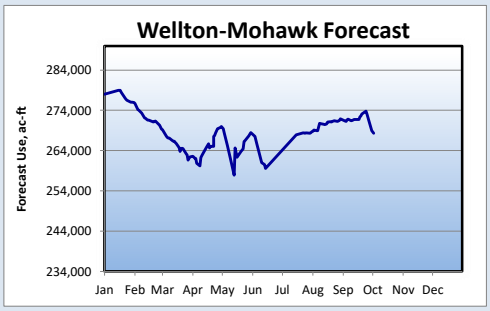



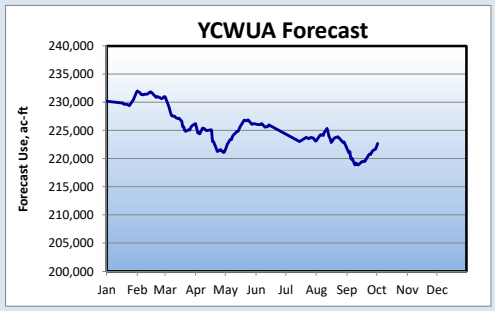




Graph notes: Jan 1 forecast use is scheduled use in accordance with the Annual Operating Plan's state entitlements, available unused entitlements, and over-run paybacks. A downward sloping line indicates use at a lower rate than scheduled, upward sloping is above schedule, and a flat line indicates a use rate equal to schedule. Lower priority users such as CAP, MWD, and Robert B. Griffith may adjust use rates to meet state entitlements as higher priority use deviates from schedule. Abrupt changes in the forecast use line may be due to a diversion schedule change or monthly updating of provisional realtime diversions.

Oct 02, 2019 07:34:54 AM

**U.S. BUREAU OF RECLAMATION**
**LOWER COLORADO REGION**
**CY 2019**

NOTE:
- Diversions and uses that are pending approval are noted in *red italics*.
- Water users with a consumptive use entitlement - **Excess to Estimated Use** column indicates overrun/underrun of entitlement. Dash in this column indicates water user has a diversion entitlement.
- Water user with a diversion entitlement - **Excess to Approved Diversion** column indicates overrun/underrun of entitlement. Dash in this column indicates water user has a consumptive use entitlement.

ARIZONA WATER USERS
FORECAST OF END OF YEAR CONSUMPTIVE USE
FORECAST BASED ON USE TO DATE AND APPROVED ANNUAL WATER ORDERS
Arizona Schedules and Approvals
Historic Use Records (Water Accounting Reports)

| WATER USER | Use To Date CY2019 | Forecast Use CY2019 | Estimated Use CY2019 | Excess to Estimated Use CY2019 | Diversion To Date CY2019 | Forecast Diversion CY2019 | Approved Diversion CY2019 | Excess to Approved Diversion CY2019 |
|---|---|---|---|---|---|---|---|---|
| ARIZONA PUMPERS | 12,048 | 14,444 | 14,444 | --- | 18,563 | 22,255 | 22,255 | 0 |
| LAKE MEAD NRA, AZ - Diversions from Lake Mead | 60 | 79 | 111 | --- | 60 | 79 | 111 | -32 |
| LAKE MEAD NRA, AZ - Diversions from Lake Mohave | 140 | 181 | 185 | --- | 140 | 181 | 185 | -4 |
| DAVIS DAM PROJECT | 2 | 2 | 2 | --- | 17 | 20 | 20 | 0 |
| BULLHEAD CITY | 5,333 | 7,134 | 7,683 | --- | 8,378 | 11,375 | 12,720 | -1,345 |
| MOHAVE WATER CONSERVATION DISTRICT | 527 | 632 | 632 | --- | 787 | 944 | 944 | 0 |
| BROOKE WATER LLC | 263 | 315 | 315 | --- | 396 | 475 | 475 | 0 |
| MOHAVE VALLEY IDD | 16,154 | 20,531 | 21,464 | --- | 29,914 | 38,017 | 39,746 | -1,729 |
| FORT MOJAVE INDIAN RESERVATION, AZ | 27,360 | 31,628 | 44,550 | --- | 50,667 | 58,570 | 82,500 | -23,930 |
| GOLDEN SHORES WATER CONSERVATION DISTRICT | 224 | 268 | 268 | --- | 335 | 402 | 402 | 0 |
| HAVASU NATIONAL WILDLIFE REFUGE | 2,393 | 2,783 | 3,563 | --- | 19,951 | 24,516 | 41,820 | -17,304 |
| LAKE HAVASU CITY | 5,989 | 8,133 | 8,928 | --- | 9,659 | 13,117 | 14,400 | -1,283 |
| CENTRAL ARIZONA PROJECT | 1,083,923 | 1,497,988 | | --- | 1,083,923 | 1,497,988 | | |
| TOWN OF PARKER | 300 | 391 | 430 | --- | 648 | 856 | 933 | -77 |
| COLORADO RIVER INDIAN RESERVATION, AZ | 241,179 | 275,633 | 316,645 | --- | 467,265 | 571,921 | 612,125 | -40,204 |
| EHRENBURG IMPROVEMENT ASSOCIATION | 195 | 234 | 234 | --- | 274 | 328 | 328 | 0 |
| CIBOLA VALLEY [1] | 13,063 | 15,661 | 15,661 | --- | 18,259 | 21,891 | 21,891 | 0 |
| CIBOLA NATIONAL WILDLIFE REFUGE | 10,160 | 11,734 | 14,016 | -2,282 | 16,387 | 18,924 | 22,605 | -3,681 |
| IMPERIAL NATIONAL WILDLIFE REFUGE | 1,691 | 2,617 | 3,799 | -1,182 | 2,730 | 4,223 | 6,128 | -1,905 |
| BLM PERMITEES (PARKER DAM to IMPERIAL DAM) | 912 | 1,093 | 1,093 | | 1,401 | 1,680 | 1,680 | |
| CHA CHA, LLC | 780 | 1,041 | 1,365 | --- | 1,200 | 1,602 | 2,100 | -498 |
| BEATTIE FARMS | 515 | 654 | 724 | --- | 791 | 1,004 | 1,110 | -106 |
| YUMA PROVING GROUND | 311 | 385 | 479 | --- | 311 | 385 | 479 | -94 |
| GILA MONSTER FARMS | 3,625 | 4,700 | 5,254 | --- | 6,286 | 8,150 | 9,156 | -1,006 |
| WELLTON-MOHAWK IDD | 217,414 | 268,291 | 278,000 | -9,709 | 303,571 | 385,666 | 412,965 | -27,299 |
| BLM PERMITEES (BELOW IMPERIAL DAM) | 81 | 97 | 97 | 0 | 123 | 148 | 148 | 0 |
| CITY OF YUMA | 10,138 | 13,919 | 15,962 | -2,043 | 17,513 | 24,063 | 26,700 | -2,637 |
| MARINE CORPS AIR STATION YUMA | 1,016 | 1,292 | 1,359 | --- | 1,016 | 1,292 | 1,359 | -67 |
| UNION PACIFIC RAILROAD | 18 | 24 | 24 | --- | 36 | 48 | 48 | 0 |
| UNIVERSITY OF ARIZONA | 700 | 897 | 928 | --- | 700 | 897 | 928 | -31 |
| YUMA UNION HIGH SCHOOL DISTRICT | 97 | 126 | 151 | --- | 132 | 171 | 200 | -29 |
| DESERT LAWN MEMORIAL | 14 | 17 | 17 | --- | 19 | 23 | 23 | 0 |
| NORTH GILA VALLEY IRRRIGATION DISTRICT | 8,335 | 10,596 | 12,141 | --- | 31,695 | 41,840 | 44,200 | -2,360 |
| YUMA IRRIGATION DISTRICT | 29,785 | 38,213 | 39,007 | --- | 52,163 | 67,840 | 71,900 | -4,060 |
| YUMA MESA IDD | 117,861 | 143,487 | 143,060 | --- | 183,523 | 227,351 | 239,724 | -12,373 |
| UNIT "B" IRRIGATION DISTRICT | 15,831 | 19,417 | 21,483 | --- | 21,757 | 26,683 | 29,400 | -2,717 |
| FORT YUMA INDIAN RESERVATION | 1,049 | 1,258 | 1,258 | --- | 1,616 | 1,937 | 1,937 | 0 |
| YUMA COUNTY WATER USERS' ASSOCIATION | 172,193 | 222,706 | 230,166 | --- | 246,535 | 334,470 | 360,400 | -25,930 |
| COCOPAH INDIAN RESERVATION | 659 | 948 | 1,691 | --- | 776 | 1,220 | 2,580 | -1,360 |
| RECLAMATION-YUMA AREA OFFICE | 76 | 91 | 91 | --- | 76 | 91 | 91 | 0 |
| RETURN FROM SOUTH GILA WELLS | | | | | | | | |
| TOTAL ARIZONA | 2,002,414 | 2,619,640 | 2,758,672 | | 2,599,593 | 3,412,643 | 3,638,108 | |
| CAP | 1,083,923 | 1,497,988 | | | | 1,497,988 | | |
| ALL OTHERS | 918,491 | 1,121,652 | 1,207,280 | | | 1,914,655 | 2,086,716 | |
| YUMA MESA DIVISION, GILA PROJECT | 155,981 | 192,296 | 171,610 | 20,686 | | 337,031 | | |

**ARIZONA ADJUSTED APPORTIONMENT CALCULATION**

| | |
|---|---|
| Arizona Basic Apportionment | 2,800,000 |
| System Conservation Water - Pilot System Conservation Program [2] | -41,328 |
| Total State Adjusted Apportionment | 2,758,672 |
| Excess to Total State Adjusted Apportionment | -139,032 |
| Estimated Allowable Use for CAP | **1,637,447** |

[1] Includes the following water users within the Cibola Valley: Cibola Valley IDD, Arizona Game and Fish Commission, GSC Farms, Red River Land Co., Western Water, and the Hopi Tribe.
[2] System Conservation Water to be conserved by Bullhead City, Fort McDowell Yavapai Nation, and the Colorado River Indian Tribes pursuant to System Conservation Implementation Agreements executed under the Pilot System Conservation Program. This water will remain in Lake Mead to benefit system storage.

NOTES: Click on Arizona Schedules and Approvals above for incoming diversion schedules and approvals.

Oct 02, 2019 07:34:54 AM

**U.S. BUREAU OF RECLAMATION**
**LOWER COLORADO REGION**
**CY 2019**

NOTE:
- Diversions and uses that are pending approval are noted in *red italics*.
- Water users with a consumptive use entitlement - **Excess to Estimated Use** column indicates overrun/underrun of entitlement. Dash in this column indicates water user has a diversion entitlement.
- Water user with a diversion entitlement - **Excess to Approved Diversion** column indicates overrun/underrun of entitlement. Dash in this column indicates water user has a consumptive use entitlement.

CALIFORNIA WATER USERS
FORECAST OF END OF YEAR CONSUMPTIVE USE
FORECAST BASED ON USE TO DATE AND APPROVED ANNUAL WATER ORDERS
California Schedules and Approvals
Historic Use Records (Water Accounting Reports)

| WATER USER | Use To Date CY2019 | Forecast Use CY2019 | Estimated Use CY2019 | Excess to Estimated Use CY2019 | Diversion To Date CY2019 | Forecast Diversion CY2019 | Approved Diversion CY2019 | Excess to Approved Diversion CY2019 |
|---|---|---|---|---|---|---|---|---|
| CALIFORNIA PUMPERS | 1,521 | 1,824 | 1,824 | --- | 2,752 | 3,300 | 3,300 | 0 |
| FORT MOJAVE INDIAN RESERVATION, CA | 4,812 | 5,891 | 8,996 | --- | 8,941 | 10,945 | 16,720 | -5,775 |
| CITY OF NEEDLES (includes LCWSP use) | 860 | 1,201 | 1,605 | -404 | 1,503 | 1,983 | 2,261 | -278 |
| METROPOLITAN WATER DISTRICT | 447,339 | 547,931 | 840,734 | --- | 449,451 | 550,823 | 843,474 | --- |
| COLORADO RIVER INDIAN RESERVATION, CA | 2,125 | 2,548 | 2,548 | --- | 3,520 | 4,220 | 4,220 | 0 |
| PALO VERDE IRRIGATION DISTRICT | 348,167 | 385,867 | 422,468 | --- | 684,325 | 826,712 | 856,000 | -29,288 |
| YUMA PROJECT RESERVATION DIVISION | 30,115 | 40,456 | 47,045 | --- | 61,455 | 83,791 | 98,928 | -15,137 |
| YUMA PROJECT RESERVATION DIVISION - INDIAN UNIT | --- | --- | --- | --- | 32,641 | 43,329 | 46,128 | -2,799 |
| YUMA PROJECT RESERVATION DIVISION - BARD UNIT | --- | --- | --- | --- | 28,814 | 40,462 | 52,800 | -12,338 |
| YUMA ISLAND PUMPERS | 2,230 | 2,673 | 2,673 | --- | 4,031 | 4,833 | 4,833 | 0 |
| FORT YUMA INDIAN RESERVATION - RANCH 5 | 436 | 523 | 523 | --- | 788 | 945 | 945 | 0 |
| IMPERIAL IRRIGATION DISTRICT | 2,147,545 | 2,672,407 | 2,652,800 | **19,607** | 2,126,882 | 2,680,448 | 2,755,109 | --- |
| SALTON SEA SALINITY MANAGEMENT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | --- |
| COACHELLA VALLEY WATER DISTRICT | 282,909 | 365,714 | 388,837 | -23,123 | 285,914 | 373,511 | 404,914 | --- |
| OTHER LCWSP CONTRACTORS | 691 | 829 | 829 | --- | 1,081 | 1,296 | 1,296 | 0 |
| CITY OF WINTERHAVEN | 56 | 67 | 67 | --- | 83 | 99 | 99 | 0 |
| CHEMEHUEVI INDIAN RESERVATION | 143 | 172 | 172 | --- | 9,459 | 11,340 | 11,340 | 0 |

**CALIFORNIA ADJUSTED APPORTIONMENT CALCULATION**

| | |
|---|---|
| California Basic Apportionment | 4,400,000 |
| System Conservation Water - Pilot System Conservation Program [1] | -3,879 |
| Creation of Additional Conserved Water (IID) [2] | -25,000 |
| Creation of Extraordinary Conservation ICS (MWD) [3] | - |
| Total State Adjusted Apportionment | 4,371,121 |
| Excess to Total State Adjusted Apportionment | -343,018 |

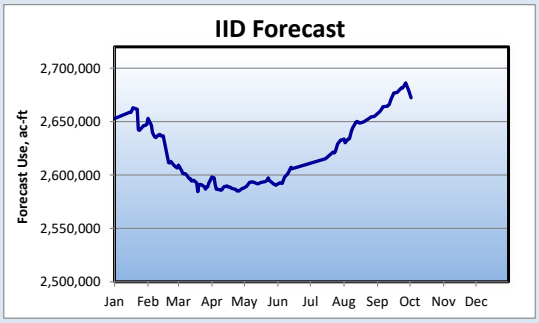
**Estimated Allowable Use for MWD** **910,556**

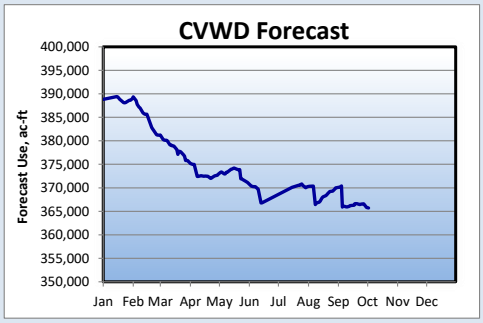
NOTES: Click on California Schedules and Approvals above for incoming diversion schedules and approvals.

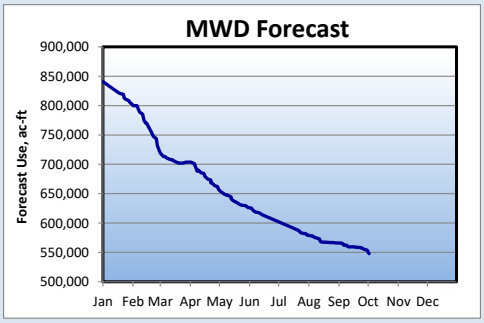
[1] System Consevation Water to be conserved by the City of Needles, the Coachella Valley Water District, and Bard Water District pursuant to System Conservation Implementation Agreements executed under the Pilot System Conservation Program. This water will remain in Lake Mead to benefit system storage.

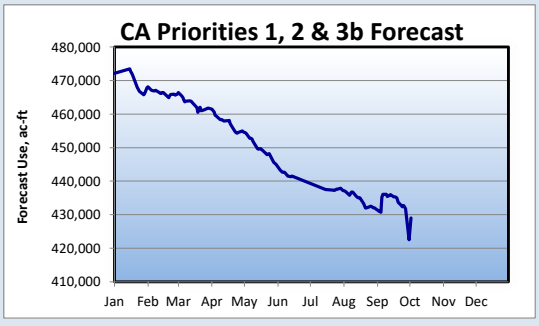
[2] IID's CY 2019 water order incorporates an "Estimate of Additonal Conserved Water" for purposes including, but not limited to, storage in The Metropolitan Water District of Southern California's system (with the written consent of MWD) or in Lake Mead as Intentionally Created Suprlus (ICS). As of the date of this forecast, approval of IID's CY 2019 ICS Plan of Creation (Plan) is pending. Use by IID of Additional Conserved Water to create ICS for storage in Lake Mead is conditional upon Reclamation's approval of IID's CY 2019 Plan.

[3] MWD's CY 2019 water order incorporates the creation of up to 299,300 AF of Extraordinary Conservation Intentionally Created Suprlus (ICS). As of the date of this forecast, approval of MWD's CY 2019 ICS Plan of Creation (Plan) is pending; therefore the estimate of the amount of water available to MWD does not incorporate ICS creation by MWD. Upon approval of MWD's CY 2019 ICS Plan, Reclamation will revise MWD's water order approval accordingly.

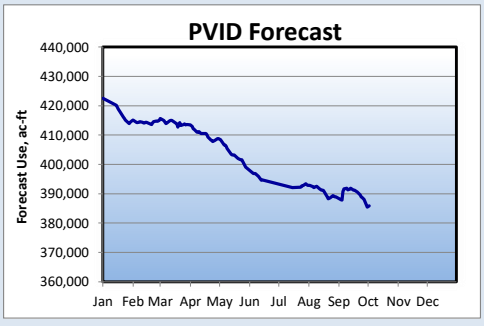






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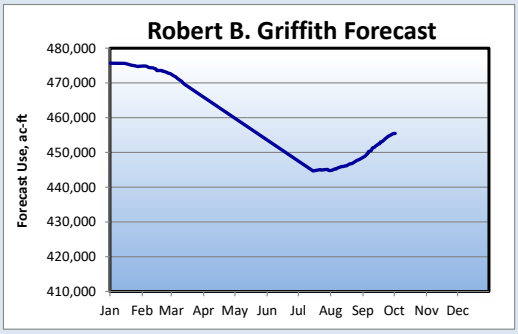
**U.S. BUREAU OF RECLAMATION**
**LOWER COLORADO REGION**
**CY 2019**

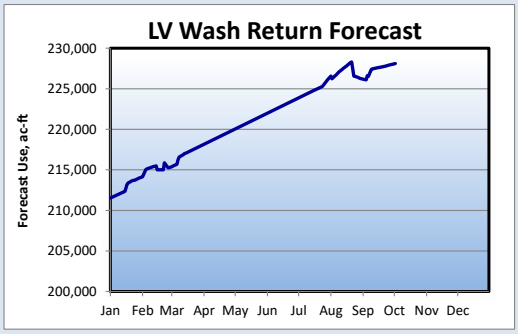
NOTE:
● Diversions and uses that are pending approval are noted in *red italics*.
● Water users with a consumptive use entitlement - **Excess to Estimated Use** column indicates overrun/underrun of entitlement. Dash in this column indicates water user has a diversion entitlement.
● Water user with a diversion entitlement - **Excess to Approved Diversion** column indicates overrun/underrun of entitlement. Dash in this column indicates water user has a consumptive use entitlement.

NEVADA WATER USERS
FORECAST OF END OF YEAR CONSUMPTIVE USE
FORECAST BASED ON USE TO DATE AND APPROVED ANNUAL WATER ORDERS
Nevada Schedules and Approvals
Historic Use Records (Water Accounting Reports)

| WATER USER | Use To Date CY2019 | Forecast Use CY2019 | Estimated Use CY2019 | Excess to Estimated Use CY2019 | Diversion To Date CY2019 | Forecast Diversion CY2019 | Approved Diversion CY2019 | Excess to Approved Diversion CY2019 |
|---|---|---|---|---|---|---|---|---|
| ROBERT B. GRIFFITH WATER PROJECT (SNWS) | 346,050 | 455,475 | 475,686 | -20,211 | 346,050 | 455,475 | 475,686 | -20,211 |
| LAKE MEAD NRA, NV - Diversions from Lake Mead | 479 | 784 | 1,500 | --- | 479 | 784 | 1,500 | -716 |
| LAKE MEAD NRA, NV - Diversions from Lake Mohave | 193 | 318 | 500 | --- | 193 | 318 | 500 | -182 |
| BASIC MANAGEMENT INC. | 4,463 | 6,400 | 8,208 | --- | 4,463 | 6,400 | 8,208 | -1,808 |
| CITY OF HENDERSON (BMI DELIVERY) | 11,557 | 15,518 | 15,878 | --- | 11,557 | 15,518 | 15,878 | -360 |
| NEVADA DEPARTMENT OF WILDLIFE | 7 | 10 | 12 | -2 | 531 | 749 | 1,000 | --- |
| PACIFIC COAST BUILDING PRODUCTS INC. | 704 | 923 | 928 | --- | 704 | 923 | 928 | -5 |
| BOULDER CANYON PROJECT | 144 | 173 | 173 | --- | 250 | 300 | 300 | 0 |
| BIG BEND WATER DISTRICT | 1,871 | 2,967 | 4,619 | --- | 4,072 | 6,306 | 10,000 | -3,694 |
| FORT MOJAVE INDIAN TRIBE | 2,481 | 2,944 | 4,020 | --- | 3,703 | 4,393 | 6,000 | -1,607 |
| LAS VEGAS WASH RETURN FLOWS | -174,768 | -228,108 | -211,524 | --- | | | | |
| TOTAL NEVADA | 193,181 | 257,404 | 300,000 | -20,213 | 372,002 | 491,166 | 520,000 | -28,583 |
| SOUTHERN NEVADA WATER SYSTEM (SNWS) | 171,282 | 227,367 | | | | 455,475 | | |
| ALL OTHERS | 21,899 | 30,037 | | | | 35,691 | | |
| NEVADA USES ABOVE HOOVER | 188,829 | 251,493 | | | | 480,467 | | |
| NEVADA USES BELOW HOOVER | 4,352 | 5,911 | | | | 10,699 | | |

| | |
|---|---|
| **Tributary Conservation & Imported Intentionally Created Surplus** | |
| Total Requested Tributary Conservation Intentionally Created Surplus | 42,000 |
| Total Requested Imported Conservation Intentionally Created Surplus | 0 |
| 5% System Assessment for Creation of Intentionally Created Surplus | -2,100 |
| Total Intentionally Created Surplus Left in Lake Mead | 39,900 |
| **NEVADA ADJUSTED APPORTIONMENT CALCULATION** | |
| Nevada Basic Apportionment | 300,000 |
| Creation of Protection Volume [2] | 0 |
| Total State Adjusted Apportionment | 300,000 |
| Excess to Total State Adjusted Apportionment | -42,596 |



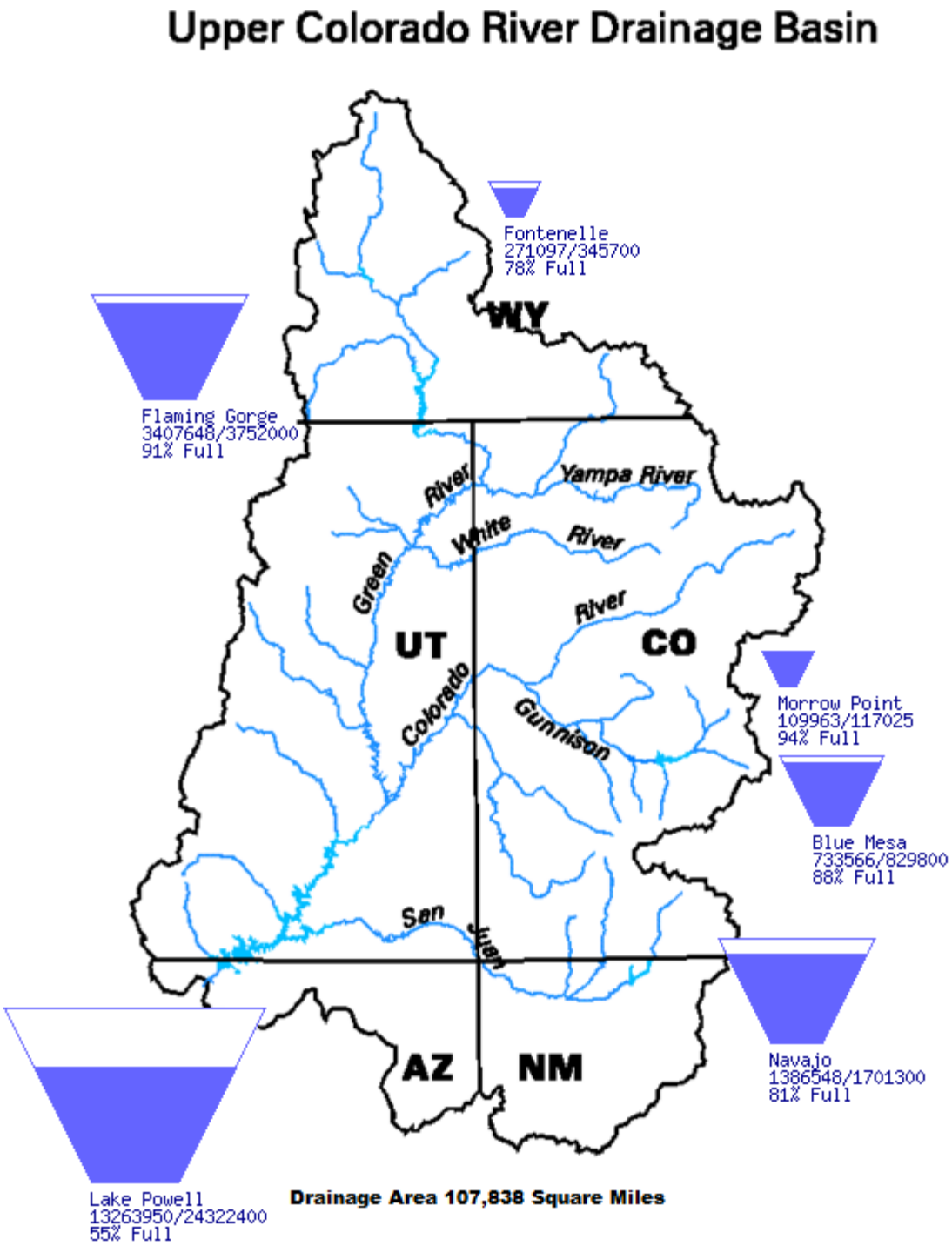




NOTES: Click on Nevada Schedules and Approvals above for incoming diversion schedules and approvals.

# Upper Colorado Region Water Resources Group

**River Basin Tea-Cup Diagrams**

Data Current as of:
10/01/2019



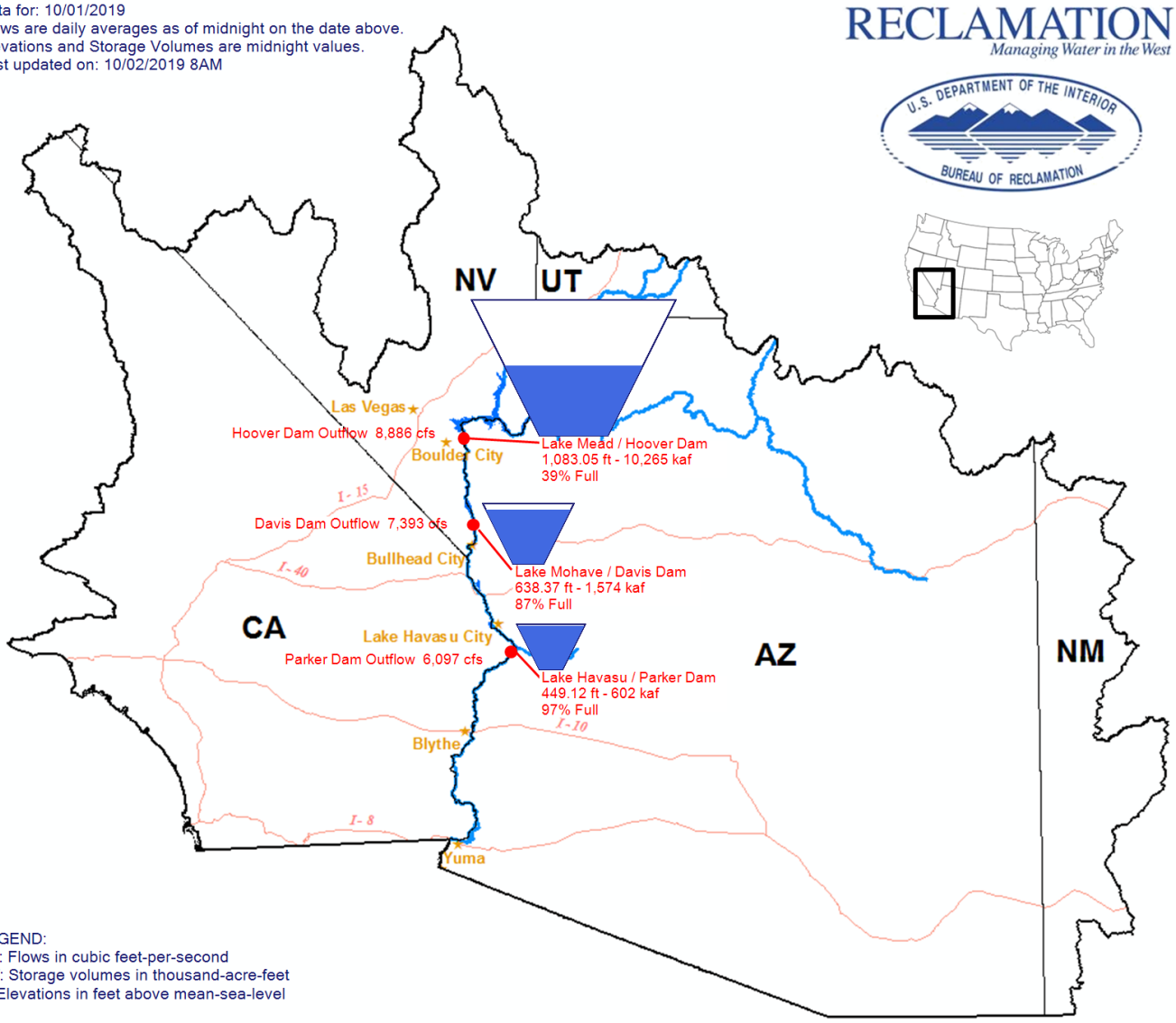
# Lower Colorado River Teacup Diagram

Data for: 10/01/2019
Flows are daily averages as of midnight on the date above.
Elevations and Storage Volumes are midnight values.
Last updated on: 10/02/2019 8AM

RECLAMATION
Managing Water in the West

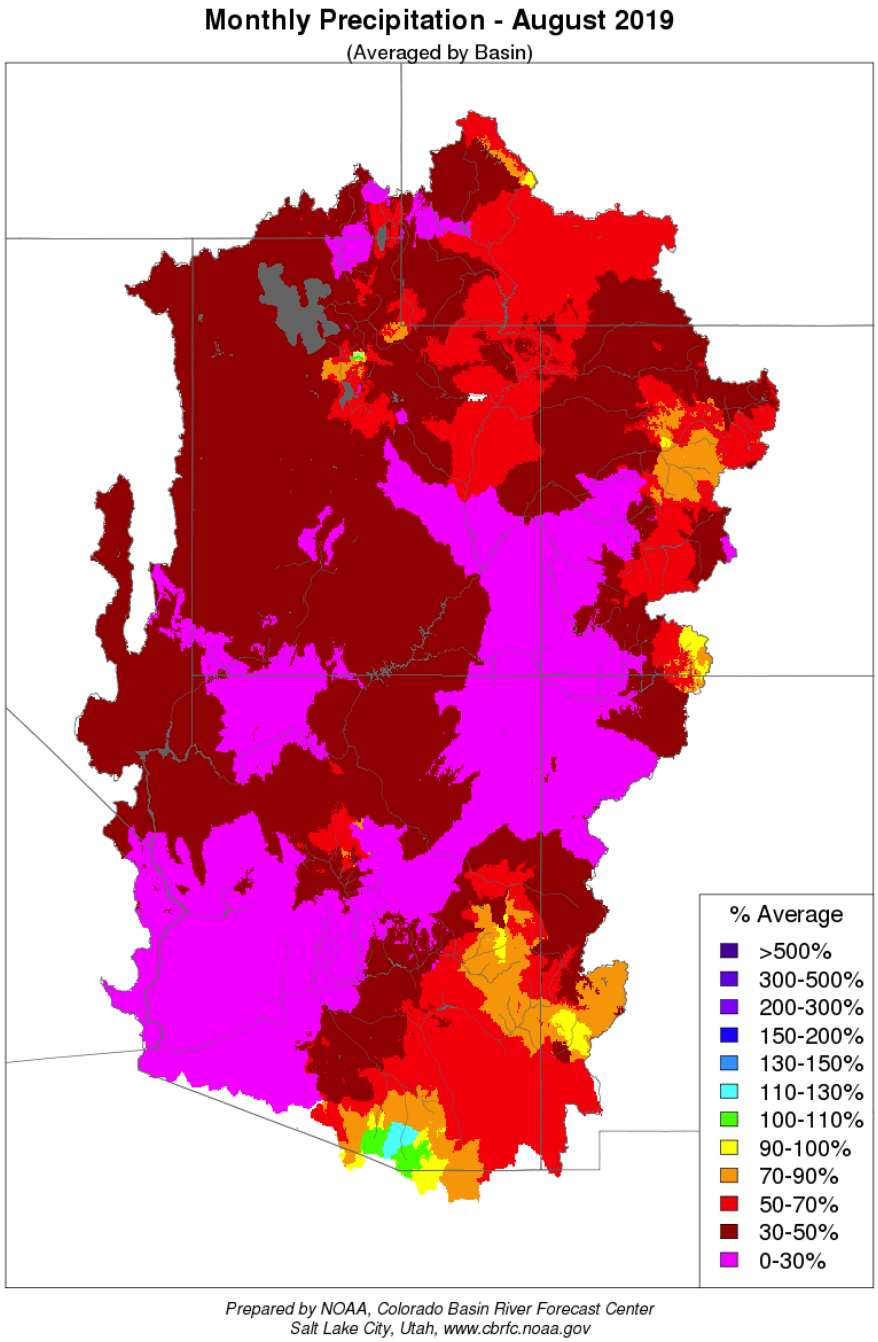
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION





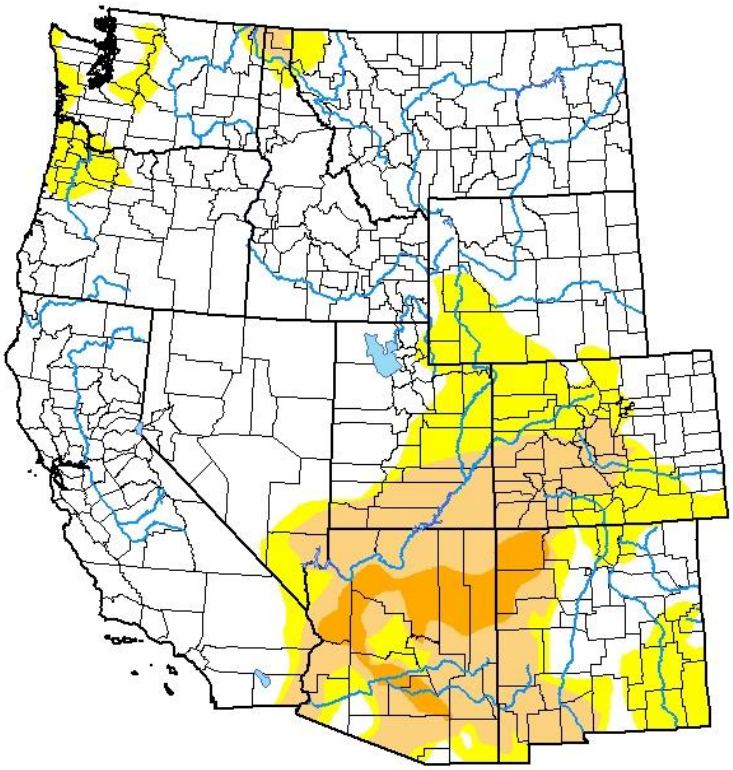

LEGEND:
cfs: Flows in cubic feet-per-second
kaf: Storage volumes in thousand-acre-feet
ft: Elevations in feet above mean-sea-level

NOAA National Weather Service Monthly Precipitation Map August 2019



USDA United States Drought Monitor Map

# U.S. Drought Monitor
# West



## October 1, 2019
***(Released Thursday, Oct. 3, 2019)***
**Valid 8 a.m. EDT**

*Drought Conditions (Percent Area)*

| | None | D0-D4 | D1-D4 | D2-D4 | D3-D4 | D4 |
|---|---|---|---|---|---|---|
| **Current** | 68.40 | 31.60 | 16.32 | 3.16 | 0.00 | 0.00 |
| **Last Week** *09-24-2019* | 66.35 | 33.65 | 15.07 | 3.18 | 0.00 | 0.00 |
| **3 Months Ago** *07-02-2019* | 86.89 | 13.11 | 5.53 | 1.24 | 0.00 | 0.00 |
| **Start of Calendar Year** *01-01-2019* | 28.03 | 71.97 | 53.25 | 27.22 | 8.35 | 2.88 |
| **Start of Water Year** *10-01-2019* | 68.40 | 31.60 | 16.32 | 3.16 | 0.00 | 0.00 |
| **One Year Ago** *10-02-2018* | 14.15 | 85.85 | 59.29 | 38.88 | 17.58 | 4.36 |

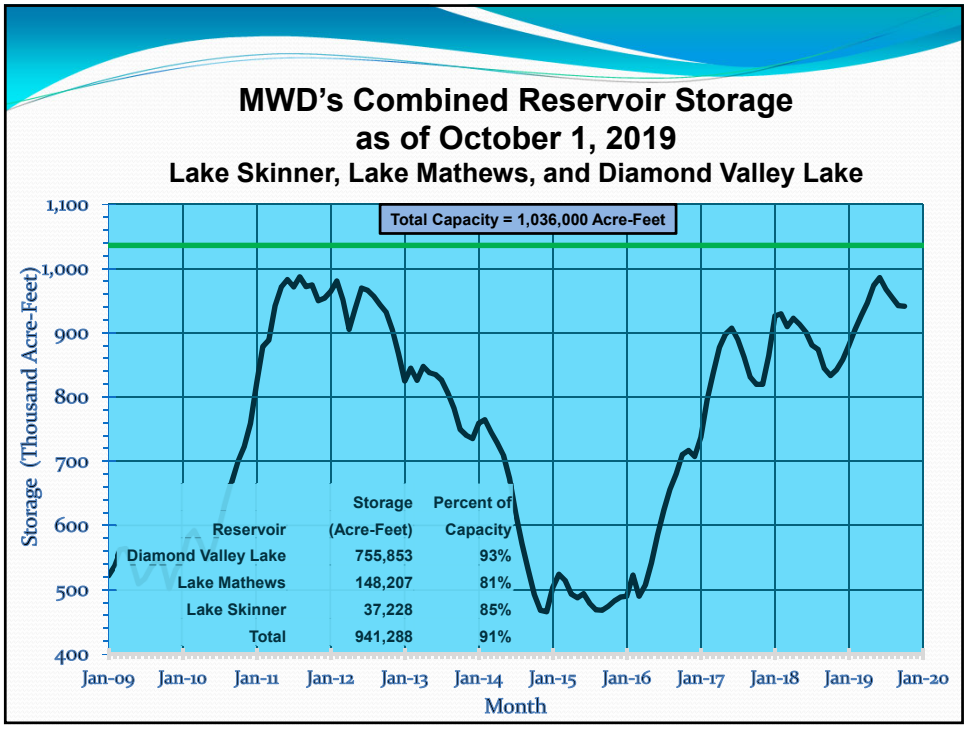
*Intensity:*

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

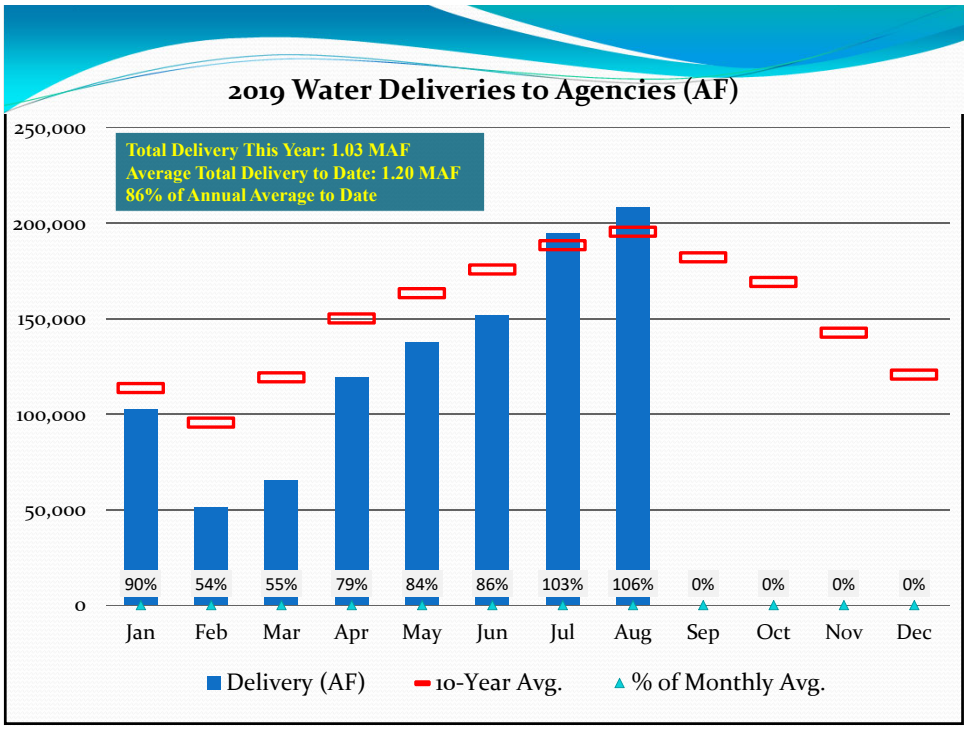
*The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.*

*Author:*
Brian Fuchs
National Drought Mitigation Center

**droughtmonitor.unl.edu**

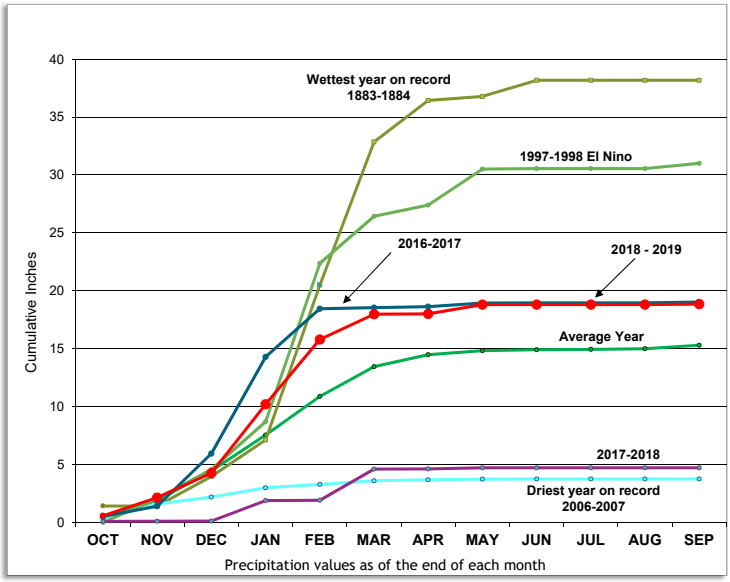

MWD's Combined Reservoir Storage
as of October 1, 2019
Lake Skinner, Lake Mathews, and Diamond Valley Lake
Total Capacity = 1,036,000 Acre-Feet
Storage (Thousand Acre-Feet)
1,100
1,000
900
800
700
600
500
400
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Month
Reservoir | Storage (Acre-Feet) | Percent of Capacity
Diamond Valley Lake | 755,853 | 93%
Lake Mathews | 148,207 | 81%
Lake Skinner | 37,228 | 85%
Total | 941,288 | 91%

1


2019 Water Deliveries to Agencies (AF)
Total Delivery This Year: 1.03 MAF
Average Total Delivery to Date: 1.20 MAF
86% of Annual Average to Date
250,000
200,000
150,000
100,000
50,000
0
90%
54%
55%
79%
84%
86%
103%
106%
0%
0%
0%
0%
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Delivery (AF)
10-Year Avg.
% of Monthly Avg.

2

## Los Angeles Civic Center Precipitation




1

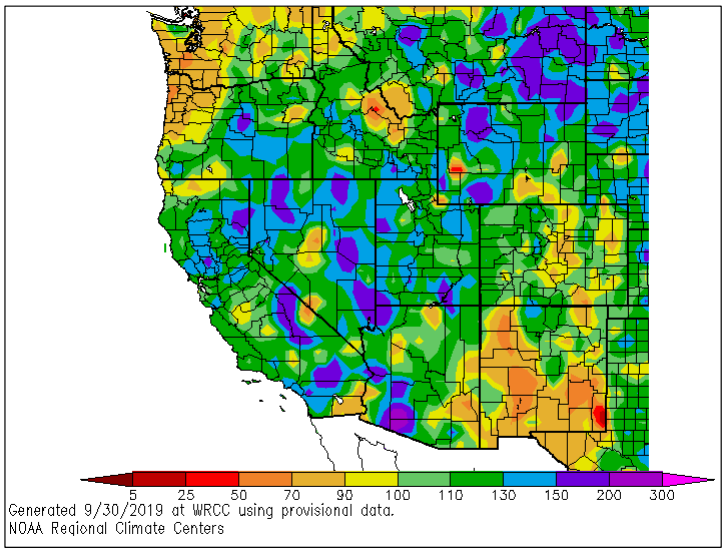
## Precipitation at Six Major Stations in Southern California

### From October 1, 2018 to September 30, 2019

| Station | Precipitation in inches | | Average to Date | Percent of Average |
|---|---|---|---|---|
| | Sep | Oct 1 to Sep 30 | | |
| San Luis Obispo | 0.00 | 17.50 | 22.44 | 78% |
| Santa Barbara | 0.00 | 20.31 | 17.78 | 114% |
| Los Angeles | 0.03 | 18.85 | 15.31 | 123% |
| San Diego | 0.11 | 8.60 | 10.15 | 85% |
| Blythe | 0.00 | 2.27 | 3.81 | 60% |
| Imperial | 0.44 | 2.13 | 2.83 | 75% |

2

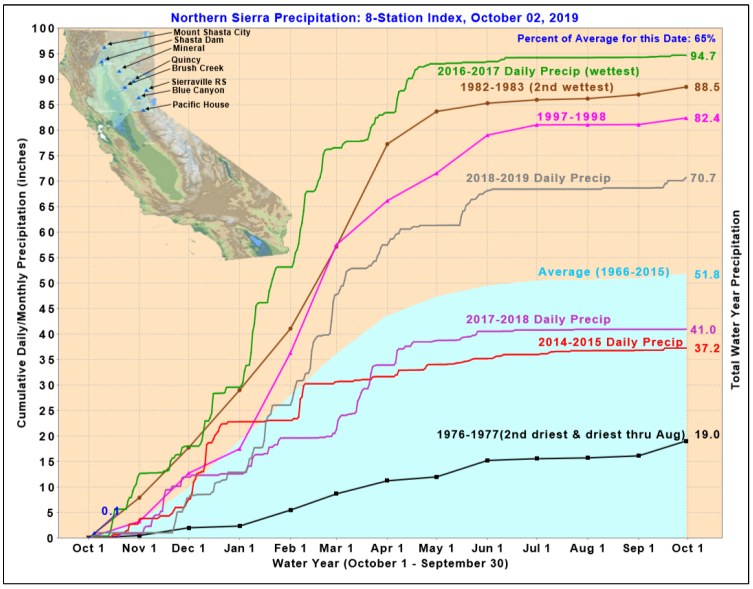
## Percent of Average Precipitation (%)
## October 1, 2018 - September 30, 2019




Western Regional Climate Center
http://www.wrcc.dri.edu/cgi-bin/anomimage.pl?wrcOctPpct.gif

3

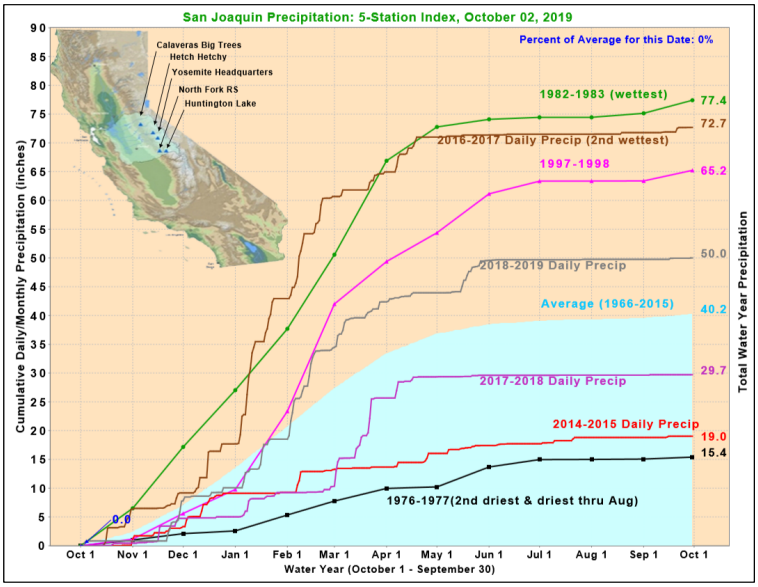
## Northern Sierra Precipitation: 8 Station Index




California Data Exchange Center
http://cdec.water.ca.gov/cgi-progs/products/PLOT_ESI.pdf

4

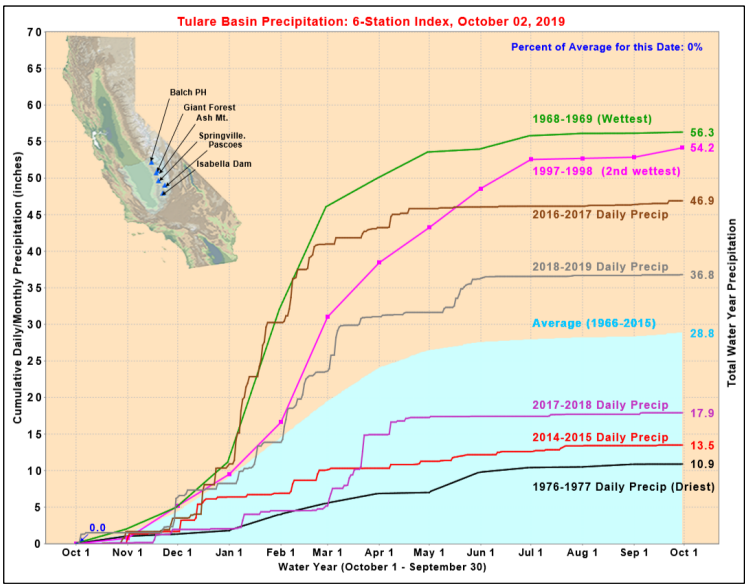
## San Joaquin Precipitation: 5 Station Index




California Data Exchange Center
http://cdec.water.ca.gov/cgi-progs/products/PLOT_FSI.pdf

5

## Tulare Basin Precipitation: 6 Station Index




California Data Exchange Center
http://cdec.water.ca.gov/cgi-progs/products/PLOT_TSI.pdf

6

## Comparison of SWP Water Storage

| Reservoir | Capacity | 2018 Storage (acre-feet) As of Oct 1 | 2018 Storage (acre-feet) % of Cap. | 2019 Storage (acre-feet) As of Oct 1 | 2019 Storage (acre-feet) % of Cap. |
|---|---|---|---|---|---|
| Frenchman | 55,475 | 42,658 | 77% | 44,595 | 80% |
| Lake Davis | 84,371 | 67,257 | 80% | 67,650 | 80% |
| Antelope | 22,564 | 16,904 | 75% | 18,729 | 83% |
| Oroville | 3,553,405 | 1,354,856 | 38% | 2,215,749 | 62% |
| TOTAL North | 3,715,815 | 1,481,675 | 40% | 2,346,723 | 63% |
| Del Valle | 39,914 | 33,672 | 84% | 34,092 | 85% |
| San Luis | 2,027,835 | 1,120,438 | 55% | 1,260,178 | 62% |
| Pyramid | 169,901 | 163,829 | 96% | 166,719 | 98% |
| Castaic | 319,247 | 278,868 | 87% | 289,530 | 91% |
| Silverwood | 74,970 | 72,686 | 97% | 72,494 | 97% |
| Perris | 126,841 | 59,049 | 47% | 97,135 | 77% |
| TOTAL South | 2,758,708 | 1,728,542 | 63% | 1,920,148 | 70% |
| TOTAL SWP | 6,474,523 | 3,210,217 | 50% | 4,266,871 | 66% |

As of June 19, 2019, the Table A allocations for SWP contractors is 75%.

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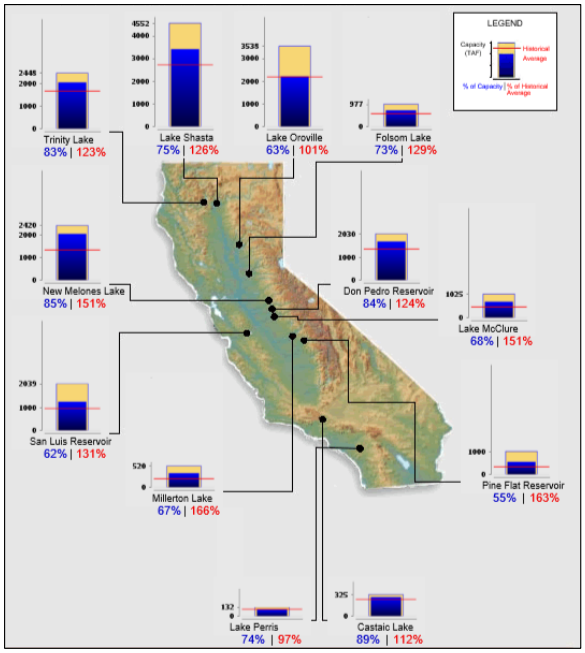
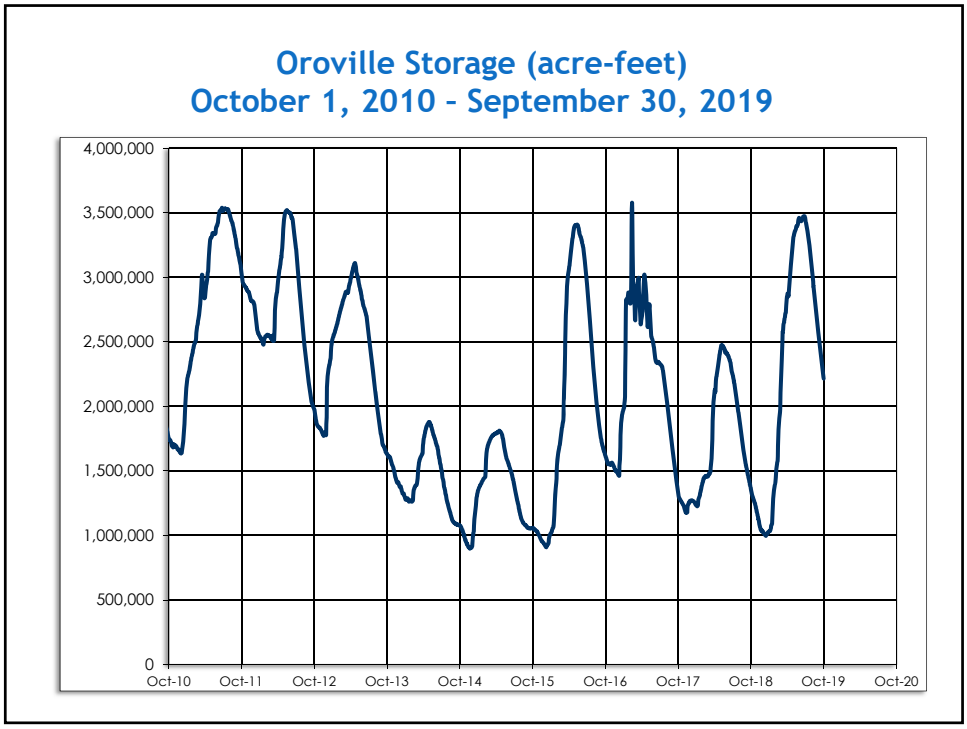
## Reservoir Current Conditions as of October 2, 2019




California Data Exchange Center
https://cdec.water.ca.gov/reportapp/javareports?name=rescond.pdf

8


Oroville Storage (acre-feet)
October 1, 2010 – September 30, 2019
4,000,000
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
Oct-10
Oct-11
Oct-12
Oct-13
Oct-14
Oct-15
Oct-16
Oct-17
Oct-18
Oct-19
Oct-20

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IN THE UNITED STATES DISTRICT COURT
FOR DISTRICT OF ARIZONA
PRESCOTT DIVISION

| | |
|---|---|
| **SAVE THE COLORADO**; **LIVING RIVERS**; and **CENTER FOR BIOLOGICAL DIVERSITY**,<br><br>Plaintiffs,<br><br>vs.<br><br>**UNITED STATES DEPARTMENT OF THE INTERIOR**; and **DAVID BERNHARDT**, Secretary of the Interior,<br><br>Defendants | Case No. _____<br><br>**COMPLAINT FOR VACATUR, DECLARATORY AND INJUNCTIVE RELIEF** |

## INTRODUCTION

1. In an era defined by widespread climate disruption and increasing water scarcity, the future of the Colorado River and its ability to provide for abundant wildlife, remarkable scenery, and shared water resources, depends upon the sound, scientifically driven management of the River and its various impoundments, including Lake Powell and the Glen Canyon Dam.

2. This action is about climate change, protection of the Colorado River and Grand Canyon National Park, and a dam that is near the end of its useful life. By this action, plaintiffs challenge the United States Department of the Interior's illegal and willful omission of Colorado River climate change impact projections from the required environmental impacts analysis for that Department's operational plans for its Glen Canyon Dam. The result of that incomplete environmental analysis process is a deeply flawed document which will guide the Glen Canyon Dam's operations, down to hourly release patterns, for the next 20 years. However, it does so without specifically considering ways to significantly change those Dam operations in order to respond to the Department's single-greatest operational challenge, climate change. This glaring omission violates federal law in multiple ways.

3. The Department's environmental analysis conceals the risks that climate change poses to the 40 million people dependent on the Colorado River. This behavior has cost the public valuable time within which critical response strategies must be developed to help sustain the world's 10th largest economy and to avoid violations of the 1992 Grand Canyon Protection Act.

4. Plaintiffs Save The Colorado, Living Rivers, and Center for Biological Diversity challenge Defendant U.S. Department of the Interior's ("Department") Record of Decision (ROD), dated December 2016 for the Glen Canyon Dam Long-Term Experimental Management Plan ("LTEMP"). The ROD and its underlying Final Environmental Impact Statement ("Plan FEIS"), which contains the LTEMP, violates the Administrative Procedure Act (APA) as well as National Environmental Policy Act (NEPA) and its implementing regulations. The Plan FEIS significantly undervalued projections of climate change impacts which forecast real detrimental effects to the Colorado River's supported ecosystems and its many domestic and industrial water users. In fact, the Plan FEIS's purpose and need statement fails to even mention climate change. This omission resulted in the consideration of an inadequate range of alternatives, none of which primarily focused on the Dam's operations in times of increased water scarcity or drought which the facility and its surrounding environment will almost certainly face in the coming years due to climate change.

5. Despite the repeated suggestions of Plaintiffs and multiple other environmental groups throughout the NEPA process, the Department chose not to fully consider several alternatives, such as Run-of-the-River, Decommissioning the Dam, and Fill Lake Mead First, which would better serve the Colorado River and its millions of users in face of climate change impacts. For more than a decade, concerns regarding climate change impacts on declining surface water flows have occupied water management discussions and have been a major subject of scientific inquiry within the Colorado River basin. During this time, multiple comments have been submitted to the

Department documenting the need to heed the warnings from science and for the Department to examine, discuss, and plan in order to avoid exacerbating the risks associated with impending water shortages across the Colorado River basin.

6. The operations selected and approved by the Department in the 2016 ROD are similar to the flow regimes with which the Dam has operated since the Department's 1996 ROD. In the years since 1996, however, the effects of climate change have weighed heavily on the Colorado River Basin. Current projections forecast these impacts causing drastic reductions to the quantity of water available to users of the Colorado River. Furthermore, the Dam's operations since its construction in the early 1960s have caused a variety of harmful effects to the surrounding environment which reach all the way through the Grand Canyon. The Department's ROD allows the Glen Canyon Dam to operate in ways which both continue to damage the Colorado River and its supported ecosystems and, because it neglects to account for pressing climate change impacts, are likely to cause even greater future harm.

7. Recent research regarding the differences between "hot droughts"—those essentially created by climate change circumstances—and historic droughts underscores the necessity of responsible water management adaptation in the face of climate change. A string of studies all suggests the same trend: rising temperatures in the Colorado River Basin will increase the severity of droughts beyond the predictions currently employed within the Plan FEIS.

8. The Plan FEIS' alternatives analysis did not contain a proper analytical methodology regarding projected climate change impacts. Indicative of the Plan FEIS's many shortcomings, the Department drastically undervalued the findings of a flawed but nevertheless relevant study on the Colorado River's current and future water supply and demand imbalances authored by its own sub-agency, the Bureau of Reclamation ("Bureau"): *The Colorado River Basin Supply and Demand Study* ("2012 Study"). The purpose of the Study was "to define current and future imbalances in water supply and demand in the Basin and the adjacent areas of the Basin States that receive Colorado River water over the next 50 years (through 2060), and to develop and analyze adaptation and mitigation strategies to resolve those imbalances." The 2012 Study concludes that its findings are a serious "call to action" regarding water management on the River.

9. The ROD, and its underlying FEIS, unfortunately, did not heed that "call to action" and do not account for gravity of the 2012 Study's conclusions regarding climate change impacts. Consequently, the Plan FEIS did not provide holistic information concerning the efficacy of the alternatives it did consider in potential climate change circumstances and therefore hindered both the Plaintiffs' and public's ability to adequately understand the actual, likely impacts of climate change on the current and future operations of the Glen Canyon Dam.

10. The Department did not adequately address the environmental consequences of the proposed alternatives in the Plan FEIS. In violation of CEQ regulations, the agency failed to explain the relationship between the alternatives and

possible conflicts with the objectives of Federal and state law, land use policies, plans, and controls. 40 C.F.R § 1502.16(c).

11. Even if the Plan FEIS were legally adequate when defendants finalized it in 2016, which it is not, due to its failure to adequately incorporate climate change concerns throughout the Plan FEIS and the robust conclusions of recently published scientific research, most of which employed data available at the time of the FEIS publication, the Department must now produce a supplemental environmental impact statement (SEIS) to comply with federal NEPA regulations.

12. Plaintiffs informed the Department of these scientific studies in a letter on June 21, 2019. The Department did not acknowledge or respond to this letter nor the scientific studies it references. Accordingly, the Department "unlawfully withheld" an agency action required by law. 5 U.S.C. § 706(1). In the alternative, if, despite the plethora of science referenced within the letter, the Department affirmatively refused to complete an SEIS any such decision was "arbitrary and capricious" and a violation of both NEPA and the APA. 5 U.S.C. § 706(2)(A).

13. In order to prevent the Department from continuing to implement the Glen Canyon Dam Plan FEIS, which would exacerbate environmental harm and is created in violation to NEPA, Plaintiffs seek from this Court declaratory relief, an order setting aside the Department's 2016 ROD and its underlying Plan FEIS, and injunctive relief if necessary.

## PARTIES

14. Plaintiff **SAVE THE COLORADO** is a grassroots, non-profit 501(c)(3) environmental organization dedicated to the protection and restoration of the Colorado River and its tributaries. Save The Colorado's mission is to promote conservation of the Colorado River and its tributaries through science, public education, advocacy, and litigation by supporting alternatives to new dams and diversions that enhance the river's adaptation to climate change, support river restoration and aquatic species conservation, and remove outdated and unneeded dams from the Colorado River. Save the Colorado has approximately 20,000 members, supporters, and followers throughout the Colorado River Basin, including within the state of Arizona.

15. Save the Colorado has an organizational interest in the scientifically sound management of the Glen Canyon Dam. The organization's mission to promote the protection and restoration of the Colorado River depends on the responsible, scientifically sound, and legally sufficient management of the Dam by the Department and its associated Agencies.

16. Members of Save the Colorado regularly visit and recreate within the Glen Canyon area above and below the Dam. The organization's membership is deeply invested in the ecological health of the Glen Canyon area individually and as a part of the larger Grand Canyon ecosystem. Members participate in recreational activities such as kayaking, birdwatching, hiking, and fishing. The plan of operations and flow regimes employed by the Department's ROD and its underlying Plan FEIS limit and hinder opportunities to partake in these recreational activities. These harms include devastating

impacts to members of Save the Colorado uses of the Glen Canyon area both upstream and downstream of the Dam in the Grand Canyon.

17. At certain elevations, projected to be maintained in the coming years within the ROD, Lake Powell submerges portions of Glen Canyon upstream of the Dam. This drowns certain spaces and renders them inaccessible to kayakers, rafters, and hikers alike. One such natural space is the famous Cataract Canyon: when Lake Powell is at higher elevations which the ROD's climate change projections maintain, some rapids in Cataract Canyon are flooded by the reservoir. These are of course, inaccessible to recreational kayakers. In addition to these rapids, many side canyons are flooded by the waters of Lake Powell and therefore are no longer potential, accessible hiking locations for members of Save the Colorado. Below the Dam in the Grand Canyon, members are unable to experience the natural flow of the River. This is largely due to the fact that the Dam blocks the natural flow of sand and sediment from traveling downstream. This hinders the formation of beaches along the River's shore and therefore limits the recreational use of the river. Additionally, current operations at the Dam output water that is colder than is natural for the area. In the past, the River's water naturally ran both warm and muddy. These changed conditions cause invasive species of fish, such as bass, to thrive and hinder the survival of native and endangered fish. The flow regime currently in place at the Dam as dictated by the ROD and its underlying FEIS, therefore prohibits members of Save the Colorado from fishing for native species.

18. Additionally, some members of Save the Colorado have professional interests in the ecologically sound maintenance of the Glen Canyon and Grand Canyon

areas that are dependent on operations at the Dam. Many individuals depend on the ecological health of the natural environment for data to participate in water policy research. Furthermore, members are invested in the survival of species within the Grand Canyon ecosystem for scientific research purposes.

19. Save the Colorado and its members are concerned by the relative lack and the inadequacy of existing climate change analysis within the ROD and its underlying FEIS. Furthermore, the Department failed to consider alternatives which would address the impacts of climate change on the Dam's operations. As alleged throughout the complaint, these include but are not limited to Fill Mead First, Run-of-the-River, and Decommissioning the Dam. Climate change effects will inevitably impact the survival of species and their habitats throughout Glen Canyon and the larger Grand Canyon ecosystem. If climate change is not adequately taken into consideration, these species and habitats' survival in the coming years may be imperiled.

20. The implementation of these alternatives which would address the realities of climate change -- including but not limited to Fill Mead First, Run-of-the-River, and Decommissioning the Dam -- which would return the River to a more natural state would redress at least in part many of these injuries. These alternatives were explicitly rejected by the Department and its associated Agencies throughout the NEPA process and were not included in the ROD and its underlying FEIS. Natural flow levels would return many portions of the River to its state prior to the Dam's existence. Rapids and side canyons currently submerged by Lake Powell would return to their former state and would again be accessible to recreationalists. Furthermore, professional interests in the presence of

native species and their habitats would remain intact and protected through the implementation of these natural-flow alternatives.

21. Members of Save the Colorado will continue to suffer these aesthetic, recreational, scientific, and other injuries if the Department's ROD is not vacated and the Dam continues to be operated by the flow regime authorized by the ROD.

22. The injuries of Save the Colorado and its members can be redressed by a formal ruling from this Court which declares the Department's ROD, and its underlying Plan FEIS, arbitrary and capricious in violation of both the APA and NEPA, vacates the Department's ROD and its underlying Plan FEIS, and any necessary injunctive relief.

23. Plaintiff **LIVING RIVERS** is a watershed advocacy organization dedicated to the protection of the Colorado River and the many rivers of the American West. Living Rivers is headquartered in Moab, Utah and is a non-profit 501(c)(3) environmental group that emphasizes achieving ecological river restoration while balancing human needs. The organization endeavors to restore the delta of the Colorado River and its many submerged canyons. Living Rivers works to repeal antiquated laws which harm the Colorado River, reduce human water consumption and energy use to decrease harmful ecological impacts on the river, and recruit support from members of the public in their mission to revive the Colorado River.

24. Living Rivers' many supporters and members live and throughout the Colorado River Basin, including within the state of Arizona. The organization's members have suffered aesthetic, recreational, scientific, and other harms as a result of the Department's ROD and its underlying Plan FEIS. Members of Living Rivers will

continue to suffer these and other harms if the Department's ROD is not vacated due to the various NEPA and APA violations addressed within this complaint.

25. Living Rivers members use the Colorado River and its tributaries, above and below Glen Canyon Dam for a variety of recreational, scientific and commercial activities including rafting, hiking, camping, fishing, birdwatching, and observing other wildlife. Some members have participated in Glen Canyon environmental studies along with representatives of defendants. All or most of these member activities have been adversely impacted by the combined impacts of the ongoing operations of the Glen Canyon Dan approved by the ROD and climate change. Those adverse impacts were significantly exacerbated by the defendants refusal in the Plan FEIS and ROD to fully assess the impacts of climate change on future dam operations and their failure to consider and adopt reasonable alternatives for future dam operations that would more realistically address the likely impacts of climate change on the Colorado River. Ecosystem.

26. Below the Glen Canyon Dam some of the adverse impacts from the ongoing dam operations approved by the ROD include colder water that creates safety hazards for rafters, ecological impacts that prevent mayfly hatches that should be occurring, that eliminate driftwood and other carbon sources for native insect species and that reduce the size of beaches. These adverse ecological impacts in turn adversely impact the ability of Living River's members to use the Colorado River ecosystem for activities such as rafting, camping, fishing, scientific observation and research, and observing native wildlife.

27. Above Glen Canyon Dam some of the adverse impacts from the ongoing dam operations approved by the ROD include reservoir levels that make it extremely difficult to camp along the lake by requiring campers to clear weeds and create stairs and pathways to established campsites, flood side canyons and prevent ecological recovery of Colorado River tributaries. These adverse ecological impacts in turn adversely impact the ability of Living River's members to use Lake Powell, the Colorado River and its tributaries for activities such as camping, rafting, fishing, wildlife observation and scientific observation and studies.

28. The injuries of Living Rivers and its many members can be redressed by a formal ruling from this Court which declares the Department's ROD, and its underlying Plan FEIS, arbitrary and capricious in violation of both the APA and NEPA, vacates the Department's ROD and its underlying Plan FEIS, and enters appropriate injunctive relief. For example, below the dam the defendants could have fully considered and then chosen a number of reasonable alternatives that would lowered water temperatures and allowed for more natural river flows. Above the dam, for example, such alternatives would have addressed the injuries to Living River's members by restoring riparian corridors and allowing tributary recovery in side canyons, greatly benefiting native ecosystems and wildlife and making it more able to adapt and respond to the likely impacts of future climate change.

29. Plaintiff **CENTER FOR BIOLOGICAL DIVERSITY** ("Center") is a non-profit 501(c)(3), public interest, conservation organization with more than 1.6 million members and online activists dedicated to the protection of endangered species

and wild places and to the fulfillment of the continuing educational goals of our membership and the general public in the process. The Center is headquartered in Tucson, Arizona.

30. The Center has many members throughout the Upper and Lower Colorado River Basins. Center Board Members, staff and general members have been involved in Colorado River conservation issues for almost three decades. Because the Department has failed to incorporate climate change into the formulation of the Glen Canyon Dam operational plan, no objectively quantifiable habitat protection can be undertaken because the Department will not know how much water there is to be released and when the water can and/or should be released. These actions directly undermine the health and the future of Lower Colorado River habitat, and adversely affect habitat throughout the Lower Colorado River Basin to the detriment of the Center's and its members' concrete interests in Lower Colorado River wildlife habitat and myriad species that depend on it. Should the Department proceed with the flawed operational plan, the Center and its members will suffer scientific, recreational, aesthetic, informational and other injuries as a direct result of the Department's failure to incorporate climate change into its operational plans for the Dam. Members of CBD will continue to suffer these and other harms if the Department's ROD is not vacated due to the various NEPA and APA violations addressed within this complaint.

31. The injuries of CBD and its many members can be redressed by a formal ruling of this Court which declares the Department's ROD, and its underlying Plan FEIS, arbitrary and capricious in violation of both the APA and NEPA, vacates the

Department's ROD and its underlying Plan FEIS, and forces the Department to create a plan of operation for Glen Canyon Dam incorporating and reflecting the reality of climate change.

32. Defendant **U.S. DEPARTMENT OF THE INTERIOR** is an agency of the United States and is charged with the management and conservation of many federal lands and natural resources in accordance and compliance with NEPA and its implementing regulations. The Department of the Interior encompasses the Bureau of Reclamation and the National Parks Service ("the Agencies"), the two lead agencies which created the Final Environmental Impact Statement for the Glen Canyon Dam Long-Term Experimental Management Plan ("Plan FEIS").

33. Defendant **DAVID BERNHARDT** is the current Secretary of the Interior. Sally Jewell, former Secretary of the Interior, signed the Record of Decision for the Glen Canyon Dam Long-Term Experimental Management Plan and Final Environmental Impact Statement ("Plan FEIS") challenged in this case. The ROD and its underlying Plan FEIS was a final agency action of the Department of the Interior. Defendant Bernhardt is sued only in his official capacity. Defendants U.S. Department of the Interior and Bernhardt are collectively referred to as the "Department."

## JURISDICTION AND VENUE

34. This Court has jurisdiction over this action pursuant to 5 U.S.C. §§ 701-706 (APA); 28 U.S.C. § 1331 (federal question). Other relief sought in this complaint is authorized by 28 U.S.C. § 2412 (costs and fees). Plaintiffs have challenged final agency actions as defined by the Administrative Procedure Act ("APA"), 5 U.S.C. § 704.

Plaintiffs have exhausted all administrative remedies and are seeking judicial review of a final administrative action of the Department as defined by 5 U.S.C. § 704.

35. Venue is properly vested in this Court pursuant to 28 U.S.C. § 1391(e) because the Glen Canyon Dam, whose operation is the subject of the ROD and Plan FEIS, is located in Page, Arizona. All of the Plaintiff organizations have members who reside in Arizona and Plaintiff Center for Biological Diversity's offices are headquartered in Tucson, Arizona.

36. This case is properly before the Prescott Division of this District pursuant to Civil Local Rules 5.1 and 77.1(a) because the Glen Canyon Dam is located in Page, Arizona within Coconino County.

## STATUTORY FRAMEWORK

### National Environmental Policy Act (42 U.S.C. §§ 4321-4370(h))

37. The primary purposes of the National Environmental Policy Act ("NEPA"), 42. U.S.C. §§ 4321-4370(h), are to ensure fully informed decision-making and to provide for public participation in environmental analysis and decision-making. 40 C.F.R. § 1500.1(b), (c). The Council on Environmental Quality ("CEQ") promulgates regulations implementing NEPA. CEQ's regulations are binding on all federal agencies. 40 C.F.R. §§ 1500-1518.4. Agency actions taken pursuant to NEPA are reviewable by this Court under the APA. 5 U.S.C. §§ 702, 704, 706.

38. NEPA requires an Environmental Impact Statement ("EIS") for all "major federal actions significantly affecting the quality of the human environment." 42 U.S.C. § 4332(2)(C). "[E]nvironmental information [must be made] available to public officials

and citizens before decisions are made and before actions are taken." 40 C.F.R. § 1500.1(b).

39. One of NEPA's fundamental goals is to "promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man." 42 U.S.C. § 4321. The scope of NEPA review is quite broad, including the disclosure and consideration of all reasonable alternatives, 40 C.F.R. § 1502.14(a), and direct, indirect and cumulative effects on "ecological . . . aesthetic, historic, cultural, economic, social, or health" interests. 40 C.F.R. § 1508.8. The NEPA documentation must provide the decision-maker and the public with adequate information, evidence, and analyses to fully assess the potential impacts of the proposed actions. 40 C.F.R. § 1502.1.

40. The requirement to evaluate all reasonable alternatives is not simply procedural; the CEQ has stated that the alternatives analysis is "the heart" of the NEPA analysis. 40 C.F.R. § 1502.14; *see also* 42 U.S.C. § 4332(2)(E); 40 C.F.R. § 1507.2(d). The federal agency must "[r]igorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated"; "[d]evote substantial treatment to each alternative considered in detail including the proposed action"; and "[i]nclude reasonable alternatives not within the jurisdiction of the lead agency." 40 C.F.R. § 1502.14(a)-(c).

41. To satisfy NEPA's "hard look" requirement, a federal agency must present the environmental impacts of the proposed action and the alternatives in comparative

form, thus sharply defining the issues and providing a clear basis for choice among the options by the decision maker and the public. 40 C.F.R. § 1502.14. Because the purpose and need statement required by 40 C.F.R § 1502.13 defines the scope of reasonable alternatives, an agency may not narrowly construe the purpose and need so as to define away competing reasonable alternatives and foreclose consideration of a reasonable range of alternatives.

42. When comparing alternative proposals, CEQ regulations dictate that agencies must analyze the environmental consequences of a given alternative in comparison to other alternatives within an EIS, including the proposed action. 40 C.F.R § 1502.16. An agency's alternatives comparisons must include an explanation of possible conflicts between the proposed action of an EIS and the objectives of Federal, regional, State, and local land use plans, policies and controls for a project's area. 40 C.F.R § 1502.16(c).

43. An adequate analysis of the environmental impacts of a project also must include a consideration of the direct, indirect, and cumulative impacts of the project resulting from all past, present and reasonably foreseeable future actions. 40 C.F.R. §§ 1508.7, 1508.8, 1508.25(c). Indirect effects include reasonable effects caused by the federal action which are removed either in time or in geographic distance. These may include changes in the pattern of land use or "growth inducing effects" as well as other related effects to ecosystems and their respective natural processes. 40 C.F.R § 1508.86(b).

44. NEPA obligates the agency to make available to the public high-quality information, including accurate scientific analyses, expert agency comments and public comments, before decisions are made and actions are taken. 40 C.F.R. § 1500.1(b). The agency's discussion and analysis must be based on professional and scientific integrity. 40 C.F.R. § 1502.24. NEPA also specifically requires a federal agency to discuss any adverse effects on species listed under the ESA, 40 C.F.R. § 1508.27(b)(9), to address how the alternatives will achieve the requirements of other environmental laws and policies, 40 C.F.R. § 1502.2(d), and to include with the draft and final EIS any materials prepared to substantiate the analysis therein. 40 C.F.R. § 1502.18.

45. When an environmental impact statement is warranted, NEPA requires that federal agencies document their decision in a formal document called a Record of Decision (ROD). 40 C.F.R. § 1505.2. Within this document, the agency must explicitly state the outcome of their decision. 40 C.F.R. § 1505.2(a). A ROD is a "concise public record of the decision" which must identify all the alternatives considered by the agency when reaching their decision as well as the environmentally preferred alternative. Agencies are required to state their preferences for the alternatives based on any relevant factors, including the balancing of national policy. Furthermore, the agency must state how these considerations impacted their final decision. 40 C.F.R. § 1505.2(b). RODs must additionally state whether "all practicable means to avoid or minimize environmental harm from the alternative selected have been adopted, and if not, why they were not." 40 C.F.R. § 1505.2(c).

46. Agencies are required to create a supplemental environmental impact statement (SEIS) in two situations: when "the agency makes substantial changes to the proposed action that are relevant to environmental concerns" or "when there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts." 40 C.F.R § 1502.9(c)(1)(i-ii). Additionally, agencies have the option to create an SEIS when they "determine that he purposes of the Act will be furthered by doing so." 40 C.F.R § 1502.9(c)(2).

47. NEPA requires agencies to discuss the possible conflicts between a proposed action and "the objectives of Federal, regional, State, and local (and in the case of a reservation, Indian tribe) land use plans, policies and controls for the area concerned." 40 C.F.R. § 1502.16(c).

**Administrative Procedure Act (5 U.S.C. §§ 701-706)**

48. The Administrative Procedure Act ("APA"), 5 U.S.C. §§ 701–706, authorizes courts to review final agency actions and hold unlawful and set aside final agency actions, findings, and conclusions that are arbitrary and capricious, an abuse of discretion, or otherwise not in accordance with law. 5 U.S.C. § 706(2)(A). The APA provides a cause of action to challenge any final agency action where there is no other adequate remedy in a court. 5 U.S.C. § 704.

49. The APA also provides for judicial review when an agency "failed to act in an official capacity or under color of legal authority," 5 U.S.C. § 702, and requires that

the reviewing court "compel agency action unlawfully withheld or unreasonably delayed." 5 U.S.C. § 706(1).

50. NEPA does not contain specific judicial review provisions, and the Department of the Interior's actions governed by that statute, such as the ROD and FEIS, are therefore subject to judicial review under the APA.

## LAW OF THE RIVER

51. A number of federal statutes, often referred to as a part of the "Law of the River," direct how the Department must operate the Glen Canyon Dam. It is self-evident, when the purposes of and obligations imposed by these statues is examined, that climate change impacts will greatly affect the Department's ability to comply with its obligations under these laws.

### Grand Canyon Protection Act (Pub. L. No. 102-575)

52. The Grand Canyon Protection Act of 1992 (GCPA) mandated the creation of the first Environmental Impact Statement (EIS) for the operation of the Glen Canyon Dam in accordance with NEPA.

53. The GCPA mandates that the Glen Canyon Dam be operated "in such a manner as to protect, mitigate adverse impacts to, and improve the values for which Grand Canyon National Park and Glen Canyon National Recreational Area were established including, but not limited to natural and cultural resources and visitor use." Grand Canyon Protection Act, Pub. L. No. 102-575, § 1802(a), 106 Stat. 4669 (1992).

54. The GCPA further states that the Secretary of the Interior must "establish and implement long-term monitoring programs." *Id.* § 1805.

55. The GCPA requires that the Secretary of Energy and the Secretary of the Interior in conjunction with a variety of stakeholder groups "identify economically and technically feasible methods of replacing any power generation that is lost through adoption of long-term operational criteria for the Glen Canyon Dam" as required by Sec. 1804 of the GCPA. *Id.* § 1809.

**Glen Canyon National Area Designation (16 U.S.C. § 460dd, Pub. L. No. 92-593)**

56. The Glen Canyon National Recreational Area Designation (GCNRA) specified that the Glen Canyon National Recreation Area be created "to provide for public outdoor recreation use and the enjoyment of Lake Powell and the lands adjacent thereto…and to preserve scenic, scientific, and historic features contributing Establishment, to public enjoyment of the area[.]" 16 U.S.C. § 460dd.

57. The GCNRA mentions hydropower production solely to mandate that Glen Canyon Dam and its reservoir be administered in compliance with the purposes of the Colorado River Storage Project Act "for river regulation, irrigation, flood control, and generation of hydroelectric power." 16 U.S.C. §460dd–3.

**Colorado River Storage Project Act (43 U.S.C. § 620, Pub. L. No. 485)**

58. The Colorado River Storage Project Act (CRSPA) authorized the Secretary of the Interior to construct, operate, and maintain dams on the Colorado River in order to regulate the flow of the Colorado River for the water allotment needs of Upper Basin

states, in accordance with the Colorado River Compact, land reclamation, and flood control. The generation of hydropower is permitted merely "as an incident of the foregoing purposes[.]" 43 U.S.C. § 620.

**Colorado River Compact (C.R.S.A. § 36-61-101, 43 U.S.C.A. § 617l)**

59. The purpose of the Colorado River Compact (CRC), created in 1922, is to apportion the waters of the Colorado River amongst the Upper Basin (parts of Arizona, Colorado, New Mexico, Wyoming, and Utah diverting above Lee's Ferry) and the Lower Basin (Lower Arizona, California, Nevada, New Mexico, and Utah diverting below Lee's Ferry). C.R.S.A. § 36-61-101, Art. II(f),(g).

60. Both the Upper and Lower Basin are each entitled to 7,500,000 acre-feet of water annually. C.R.S.A. § 36-61-101, Art. III(a). The statute requires the Upper Basin states to never let the flow of the river at Lee Ferry fall below fixed 75,000,000 acre-feet allocation for any period of ten consecutive years. C.R.S.A. § 36-61-101, Art. III(d).

61. If the Lower Basin states are not receiving their allotted quantity, they can call upon the Upper Basin states to enact a compact driven curtailment on Upper Basin water users to increase the quantity of water flow directed to the Lower Basin states. This is called a "Compact Call." C.R.S.A. § 36-61-101, Art. III(d).

62. The CRC dictates that agriculture and domestic uses are the Compact's "dominant purposes." C.R.S.A. § 36-61-101, Art. IV(b).

63. Hydropower production may occur so long as it is "subservient to the use and consumption of such water for agricultural and domestic purposes" and does not "interfere with or prevent use" of these dominant purposes. C.R.S.A. § 36-61-101, Art. IV(b).

**Colorado River Basin Project Act (43 U.S.C. §§ 1501-1556, Pub. L. No. 90-537)**

64. The Colorado River Basin Project Act (CRBPA) allows for the purposes of additional development of water resources in the Colorado River Basin.

65. The act is primarily concerned with "regulating the flow of the Colorado River; controlling floods, improving navigation; providing for the storage and delivery of waters of the Colorado River for reclamation of lands, including supplemental water supplies, and for municipal, industrial, and other beneficial purposes; improving water quality; providing for basic public outdoor recreation facilities; improving conditions for fish and wildlife." 43 U.S.C. §1501(a).

66. Hydropower production and sale is only permitted "as an incident of [these] foregoing purposes." 43 U.S.C. §1501(a).

**Upper Colorado River Basin Compact (Colo. Rev. Stat. Ann. 37-62-101)**

67. The purposes of The Upper Colorado River Basin Compact included to "provide for the equitable division and apportionment of the use of the waters of the Colorado River System," and to establish the obligations and responsibilities of the

Upper Basin states to meet the water deliver requirements of the Colorado River Compact. C.R.S.A. 37-62-101 Art. I(a).

68. The Compact allows for water to be used for the generation of electrical power, but states that such generation "shall be subservient to the use and consumption of such water for agricultural and domestic purposes and shall not interfere with or prevent use for such dominant purposes." C.R.S.A. 37-62-101 Art. XV(a).

69. The statute defines domestic use as the following: "includ[ing] the use of water for household, stock, municipal, mining, milling, industrial and other like purposes, but shall exclude the generation of electrical power." C.R.S.A. 37-62-101 Art. II(m).

## FACTS GIVING RISE TO THE PLAINTIFFS' CAUSES OF ACTION

### General Facts

70. The Colorado River is one of our nation's largest rivers and supplies water to residents of seven states in the American Southwest. The river begins in the Rocky Mountains in Colorado and flows 1,450 miles until reaching Mexico. Its basin covers an immense 246,000 square miles. The Colorado River is an important waterway that supports a wide range of ecologically significant species and communities, has a long cultural history, and is a critical source of water for millions of people and numerous water-dependent industries. Due to its great importance, this river is oftentimes referred to as "The Lifeline of the American Southwest."

71. The Colorado River was, until the construction of the Dam, free-flowing through Glen Canyon, renowned for its massive sandstone cliffs and vistas. Glen Canyon

is the location of many ancient sacred sites to the Hopi, Paiute, Ute, and Navajo tribes, including the Rainbow Bridge, one of the world's largest natural bridges. The Colorado River and its tributaries support the habitats of a variety of endangered and endemic fish species such as the humpback chub, the razorback sucker, the pikeminnow, and the bonytail chub.

72. In 1963, the construction of the Glen Canyon Dam was completed. The Dam's reservoir, Lake Powell, is located on the northward side of the facility. As a result of the Dam's construction, Glen Canyon as it once was is no longer visible. The area's many side canyons are now submerged beneath the waters of Lake Powell. The Dam staunches the flow of water to habitats and species downstream, drowns natural spaces and its respective species upstream, and creates artificial water levels and flow throughout the Colorado River Basin. If the Colorado River runs freely once again, without the Dam impeding the natural flow of water, Glen Canyon will reemerge as it once was, an ecologically sound habitat and natural space.

73. Glen Canyon's ecosystems, wildlife, and outdoor recreation opportunities have suffered as a result of the Dam's construction. In addition to the submergence of natural habitats and ancient sacred sites, the alteration of the waterway's natural flow to artificial levels has caused damaging effects downstream reaching all the way through Grand Canyon National Park, a World Heritage Site. The Dam's construction resulted in both ecosystem changes and physical alternations to the Colorado River. The Glen Canyon Dam creates a barrier which impedes the movement of aquatic organisms, lowers

the mean water temperature of river, reduces both the peak flow of water quantity and the transfer of sediment from the river's upper basin to its lower basin, modifies the composition of riparian vegetation including an increase of non-native vegetation, and restricts the distribution of native fish downstream.

74. Climate change and its respective environmental impacts, such as water scarcity due to "hot" climate change-related droughts, described below, have contributed to drastic declines in the water levels of Lake Powell in recent years. Lake Powell is now surrounded by a "bathtub ring" indicating the water body's former high-water mark. The Lake currently sits more than 80 feet below this mark.

75. The rising temperatures associated with climate change lead to "hot droughts." These droughts are different than historic droughts which were primarily the result of declining precipitation levels. Rising global temperatures transform what would have been "modest droughts" historically "into severe ones."[1] Recent research by Bradley Udall and Jonathan Overpeck indicates that the precipitation levels needed to offset rising temperatures in the Colorado River Basin are highly unlikely to occur. In addition, Reclamation's projections in the Plan FEIS do not account for greater risks and greater flow reductions due to these near-certain temperature increases. The authors further highlight the fact that policy and decision makers cannot rely on the Reclamation's data as it treats median outcomes "as a proxy for risk despite the fact that the median obscures

[1] Bradley Udall & Jonathan Overpeck, *The twenty-first century Colorado River hot drought and implications for the future*, 53 WATER RESOURCES RES. 2402, 2408 (2017).

the wide range of results and lumps…near certain temperature increases and very uncertain changes."[2] Although published after the Plan FEIS, this research utilized Reclamation's own data which was available at the time of the FEIS' creation and when the Department produced the ROD for the Plan FEIS.

76. Utilizing stream flow data and data collected from tree rings within the Colorado River Basin, additional research has confirmed these "hot drought" predictions. Again, the data utilized in this study was available to both the Agencies and the Department at the time of the publications of the Plan FEIS and ROD, respectively. This study indicates the severity of water scarcity levels the Colorado River Basin is likely to experience in the coming decades: "We conclude with 80% probability that the current drought will continue long enough into the future to deplete all existing water storages for the Colorado River system. This prediction, however, would be considered an underestimation, since climate change models predict an increase in droughts throughout the southwest United States."[3]

77. The general conclusions of these two recent studies have been confirmed in subsequent analysis by experts.[4] This research, all of which relies primarily on data that

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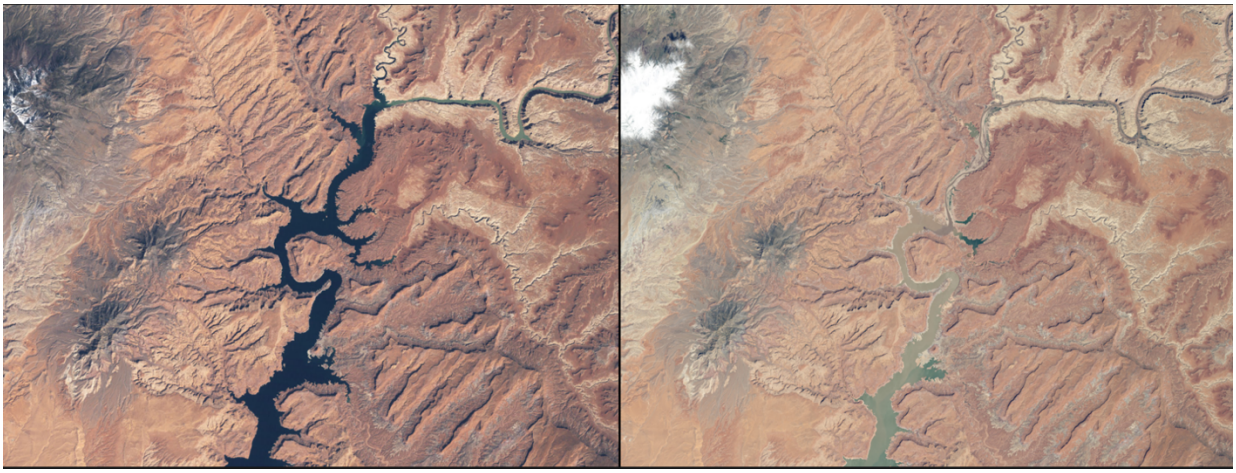
[2] *Id. at* 2414.
[3] George Rhee & Jimmy Salazar, *How Long Does a 15-Year Drought Last? On the Correlation of Rare Events*, 32 J. OF CLIMATE 1345 (2018).
[4] *See* Gregory J. McCabe et al., *Evidence that Recent Warming is Reducing Upper Colorado River Flows*, 21 EARTH INTERACTIONS 1 (2017); Bibi S. Naz et al., *Effects of climate change on streamflow extremes and implications for reservoir inflow in the United States*, 556 J. OF HYDROLOGY 360 (2018); Mu Xiao et al, *On the Causes of Declining Colorado River Streamflows*, 54 WATER RESOURCES RES. 6739 (2018).

was available to the Agencies and the Department at the time of the Plan FEIS development and subsequent publication, works to emphasize the dire necessity of adapting management of the Glen Canyon Dam, and the Colorado River waterway more broadly, in accordance with the most scientifically accurate climate change predictions. As alleged throughout this complaint, the Plan FEIS fails to accomplish this task. These predictions are so conclusive and disparate from the Reclamation's climate change modeling used within the Plan FEIS, that they warrant the production of a supplemental environmental impact statement (SEIS) pursuant to CEQ regulations. 40 C.F.R. § 1502.9(c)(iii).

78. If Lake Powell drops below 3,490 feet, the Glen Canyon Dam will be unable to produce hydroelectric power. Although this level may have seemed unlikely when the dam was originally constructed, it is now a real possibility. In 2013, after another year of extremely low surface water runoff within the Colorado River basin, water agencies began to recognize that the Interim Guidelines they agreed to in partnership with Reclamation in 2007 were out of step with a Colorado River hydrology already suffering the effects of climate change. During various forums, anxiety heightened due to Reclamation modeling showing a likelihood that water volumes in Lake Powell Reservoir might become insufficient to generate hydropower. Despite these concern and additional scientific studies warning of long-term water shortages, The Department's Plan FEIS, devoted little attention to climate change and the associated modeling of low flow scenarios being discussed during these forums.

79. Climate change projections forecast a wide range of inflow variations to Lake Powell. These may reach as low as 7 million acre feet (maf) annually, which is roughly 1.5 maf lower than lowest mean annual inflow according to historic data.

80. The image below shows the declining water levels of Lake Powell in the last two decades (photo by NASA). On the left is the reservoir in 1999 at roughly full capacity. On the right is the reservoir in 2014 at roughly 40% capacity.



81. Climate change impacts will hinder the operations of the Glen Canyon Dam, the ability of the Colorado River to meet water delivery demands, and place stress on water-dependent species and their respective habitats. The Colorado River is responsible for a large amount of water to domestic households, agricultural purposes, and industrial uses in the American Southwest. When comparing future median water supply projections to median water demand projections, the Bureau, in a 2012 Study, found that the long-term imbalances are projected to be 3.2 million acre feet (maf) by 2060.

82. The first EIS for the operation of the Glen Canyon Dam was published in 1995. The Department's ROD for the 1995 EIS was released in 1996 and required, as stipulated by the Grand Canyon Protection Act, that the Secretary of the Interior monitor the impacts of the operations of the Glen Canyon Dam to determine whether the Dam was meeting the resource protection objectives of the 1995 FEIS and its accompanying 1996 ROD. The 1995 FEIS included a system for "adaptive management" of the Glen Canyon Dam in compliance with the GCPA. After publication of the 1995 FEIS, the Glen Canyon Dam Adaptive Management Program (GCDAMP) was developed as a federal advisory committee which would undertake the research required to monitor the Dam's long-term operations. GCDAMP collected data and evaluated information on the Dam's operations in recent decades. Their findings informed the alternatives included in the 2016 Plan FEIS.

83. On December 10th, 2009, then Secretary of the Interior Ken Salazar declared the need for a Long-Term Experimental and Management Plan (LTEMP) for the Glen Canyon Dam which would incorporate management changes to operations at the Dam. The Plan FEIS was completed by two joint lead agencies, the Bureau of Reclamation and the National Parks Service ("the Agencies"), in October of 2016. The proposed federal action considered in the document is the long-term management plan of operations for the Glen Canyon Dam over the duration of the next 20 years.

84. In 2012, the Bureau of Reclamation published the *Colorado River Basin Water Supply and Demand Study* ("2012 Study"). Although the 2012 Study is also flawed

and suffers from an unduly limited scope of drought scenarios, it does correctly stress the necessity of managing the Colorado River system in accordance with future projections of increased demand and decreased water quantity due to environmental impacts including those of climate change. It concludes with the statement that "[T]he Study is ultimately a call to action" thereby stressing the importance of diligent water management within the Colorado River Basin.

85. In 2016, the Department released the ROD for the FEIS of the Glen Canyon LTEMP (Plan FEIS). Then-Secretary Sally Jewell signed and approved the ROD on December 15th, 2016.

86. The Plan FEIS includes a discussion of the specific details regarding the operation of the Glen Canyon Dam including release patterns in as small as hourly increments, non-flow actions, and experimental actions that may dictate future dam operations.

87. The Plan FEIS offered a vital opportunity to correct the 2012 Study's limitations, acknowledge its warnings and implement changes to the management of the Glen Canyon Dam that would address future imbalances between supply and demand on the Colorado River as well as climate change impacts. However, due to the complete absence of climate change-focused alternatives and the improper climate change projection analysis of the included alternatives, the Plan FEIS did not heed the 2012 Study's "call to action."

88. The Plan FEIS identified the project's purpose and need as creating a framework to "adaptively manage" the dam according to federal statutes including the GCPA which requires the minimization of adverse impacts to downstream resources.

89. The Department narrowly construes the purpose and need statement through the inclusion of "obligations of hydropower production" defined as meeting current or increased levels of hydroelectricity to the "greatest extent possible."

90. Significantly, the purpose and need statement fails to even mention adapting the dam's management in accordance with future climate change projections. Moreover, the Agencies fails to mention the future imbalances of supply and demand on the Colorado River, examined at length by one of the FEIS's lead agencies through the 2012 Study, in the purpose and need statement. Additionally, neither of these topics is included as a listed objective for the project.

91. The FEIS included seven alternatives to meet the stated purpose and need of the project. Despite drastic changes in the environment since the 1996 ROD, and even more drastic changes caused by predicted future climate change, none of the seven alternatives considered, were designed to, or in fact would change the Dam's operations in order to adapt to climate change. Instead the seven alternatives, including the no-action alternative, focused on hydropower and either increased hydropower production or minimally decreased hydropower production, thereby keeping power levels roughly consistent with current production levels as mandated by the project's flawed purpose

and need statement and outlined objectives. The FEIS identified Alternative D as both the project's preferred and environmentally preferred alternative.

92. Alternative A was identified as the No Action Alternative in which dam operations would continue as specified by the 1996 ROD. Alternative B would increase the production of hydropower. Alternatives C and D feature condition-dependent flow and non-flow actions triggered by resource conditions. Alternative E would produce hydropower electricity as dictated by monthly demand. Alternative F would create a more natural flow pattern through creating peak flows according to timing of pre-dam peak water levels. Lastly, Alternative G would output a steady flow from month-to-month to maintain and increase sandbar size.

93. The selected alternative will marginally decrease hydropower production at the Dam. Alternative D will result in a 0.17% total price increase for hydropower from the No Action Alternative, the dam's current operations, over the 20-year Plan FEIS period. Furthermore, Alternative D will result in an increase in Greenhouse Gas emissions.

94. The 2016 Plan FEIS allows for periods of experimental flow rates. Recently, the dam underwent a "bug flow experiment." The data from this first study, the second of which is expected to run from May to August of 2019, demonstrated that steady, consistent river flow increased the amount of native fish and bugs downstream from the Glen Canyon Dam.

95. Plaintiffs Save the Colorado, Center for Biological Diversity, and Living Rivers submitted comments to the Department throughout the various phases of the NEPA process including the publication of the EIS. Throughout the commenting process, Plaintiffs demonstrated their collective concern that the Department failed to adequately include climate change as a factor in the analysis of the future operations of the Glen Canyon Dam.

96. On May 9th, 2016 Plaintiffs Living Rivers, Center for Biological Diversity, and Save the Colorado submitted an extensive comment letter on the draft environmental impact statement (DEIS) detailing their concern that the Glen Canyon Dam's operations in conjunction with climate change would increase the likelihood of a "compact call" on the Colorado River and that the project's purpose and need statement did not meet standard required of the project's "comprehensive intent."

97. Plaintiff Save the Colorado submitted an additional comment letter on May 9th, 2016 on the DEIS which stressed the importance of adequate climate change impact analysis. In particular, the letter stressed Plaintiff's concerns that the future likelihood of a "compact call" due to these effects was not adequately included in the DEIS' alternatives analysis.

98. A few months later, Plaintiff Save the Colorado submitted a comment letter regarding the Plan FEIS on November 14th, 2016. This letter again underscored Plaintiff's concerns that climate change was not adequately addressed within the Plan FEIS. Save the Colorado additionally stated their concern that the Agencies did not

include a full range of reasonable alternatives within the Plan FEIS and should have considered an alternative which decommissions the Dam.

99. On June 21st, 2019 Gary Wockner on behalf Plaintiff Save the Colorado sent the Department and the Agencies a letter asserting the need for the an SEIS due to recently published, highly relevant science. Attached to the letter via an enclosed CD were six separate studies each of which asserted that water scarcity will continue to increase within the Colorado River. Of course, this will greatly affect operations at the Glen Canyon Dam – the very focus of the ROD and its underlying Plan FEIS. Plaintiffs have received neither an acknowledgement nor a response to this letter from the Department and its associated Agencies.

**Purpose and Need Statement**

100. The Department defined the purpose and need of the project as the following:

> The purpose of the proposed action is to provide a comprehensive framework for adaptively managing Glen Canyon Dam over the next 20 years consistent with the GCPA and other provisions of applicable federal law.
>
> The proposed action will help determine specific dam operations and actions that could be implemented to improve conditions and continue to meet the GCPA's requirements and to minimize—consistent with law—adverse impacts on the downstream natural, recreational, and cultural resources in the two park units, including resources of importance to American Indian Tribes.
>
> The need for the proposed action stems from the need to use scientific information developed since the 1996 ROD to better inform DOI decisions on dam operations and other management and experimental actions so that the Secretary may continue to meet statutory responsibilities for protecting downstream resources for future generations, conserving species listed under the Endangered Species Act (ESA), avoiding or mitigating impacts on *National Register of Historic Places*

(NRHP)-eligible properties, and protecting the interests of American Indian Tribes, while meeting obligations for water delivery and the generation of hydroelectric power.

101. In light of the climate change projections, detailed throughout the Plan FEIS and extensively highlighted within the Bureau of Reclamation's 2012 Study, the project's purpose and need statement should have included measures to "adaptively mana[ge]" the Dam under climate change conditions, such as times of water scarcity or drought, in order to be a truly comprehensive framework for the facility's management. While climate change forecasts are mentioned in Plan FEIS, they are not truly part of its analysis methodology due to the document's reliance on historic hydrologic data rather a full range of climate change impact projections as detailed in the Climate Change Analysis section below. Without measures that correlate to and manage the Dam in light of these forecasted impacts, the Secretary of the Interior cannot fulfill his statutorily prescribed duty "to protect downstream resources for future generations."

102. Rather than including the Department's legal obligation to adapt to climate change impacts in order to protect the River's resources and environment, the "obligations" outlined in the project's purpose and need statement erroneously include hydroelectric power production. The Plan FEIS states that it "considers operations that can maintain or increase hydropower production while protecting and improving downstream resources." The Plan FEIS explicitly states that the maintenance or increase of electric energy generation is an objective of the Plan which was taken into account during the formulation and development of its alternatives.

103. The Department fundamentally misunderstood federal statutory requirements as obligating future dam operations to produce hydroelectric power at current or increased levels. The governing authorities of the Glen Canyon Dam do not specify a level of hydropower production required of the facility. Furthermore, the GCPA (which is often referenced by the Plan FEIS and ROD) includes a section contemplating the replacement of power lost due to a decrease of hydropower production at the Glen Canyon Dam. Many of the statutory authorities list that hydropower is required only as a "incident" to other primary purposes, such as domestic water use.

104. Therefore, the project's purpose and need statement is fundamentally and illegally flawed in two ways: First, it failed to include climate change adaptations within the purpose and need statement and the objectives for the project, despite a plethora of evidence suggesting the gravity of forecasted scenarios on water scarcity and increased imbalances between water supply and demand on the Colorado River, and the clear relevance of that evidence to the Department's legal obligations under the Law of the River. Second, it impermissibly narrowed the purpose and need statement to include "obligations for hydropower production" at current or elevated levels when the law of the River does not impose such a responsibility on the facility.

**Range of Alternatives**

105. Pursuant to NEPA regulations, a project's purpose and need statement defines the scope of the range of alternatives included within an environmental impact statement (EIS). The Plan FEIS' narrow statement of purpose and need led the

Department to fail to disclose and analyze an inadequate range of alternatives. Consequently, the Plan FEIS did not provide the public with adequate means to understand all reasonable and possible future operations at the Glen Canyon Dam.

106. Plaintiffs find the absence of an alternative that primarily focuses on the adaptive management of operations at the Glen Canyon Dam in light of forecasted climate change effects particularly troubling. None of the seven alternatives included in the Plan FEIS manage dam operations in line with the lowest projections of water quantity nor include measures to protect of downstream resources in regard to other relevant climate change effect projections.

107. Decreased surface water runoff associated with the dryer climate regime taking root across the Colorado River watershed will result in less water available for storage in the basin's reservoirs. Scientific studies of future Colorado River hydrology warn that there is an increasingly likelihood that both Lake Powell and Lake Mead could be operating at extremely low reservoir levels in the future, possibly with neither capable of generating hydropower. Such forecasts raise questions as to the necessity of operating both to these major reservoirs as represented by the Fill Lake Mead First and Decommission Glen Canyon Dam alternatives. These alternatives point out that Lake Mead alone may be sufficient to accommodate the forecasted water storage needs presently spread across both reservoirs, yet the Plan FEIS fails to properly address these alternatives. The Plan FEIS demonstrates Reclamation's ongoing resistance to adequately disclose and objectively evaluate the full range of possible climate change runoff reduction scenarios projected for the Colorado River basin. The LTEMP FEIS fails to

present a range of alternative management strategies so that the range of responses can be considered. Such behavior has left the public ill-informed and allowed water managers to be ill-prepared for the water scarcity and ecological dangers that they will be inevitably facing.

108. The Department cited their narrow purpose and need statement as a primary reason to reject Plaintiff's suggested alternatives, each of which would better serve the Secretary's "statutory responsibilities to protec[t] downstream resources for future generations." According to the Department, Plaintiff's suggested alternatives Fill Mead First and Decommissioning the Dam were excluded from the Plan FEIS because they would "not meet the purpose, need, or objectives of the proposed action." Similarly, the alternative Run-of-the-River was dismissed for the same reason. *Id.* The exclusion of these alternatives narrowed the Plan FEIS' range of the alternatives to encompass fewer than the full range of reasonable experimental and management actions at the Glen Canyon Dam.

109. The project's seven alternatives maintain Dam operations at a status quo. Each minimally, if at all, results in the adjustment of hydroelectric production levels at the Dam. These alternatives do not represent the range necessary for the Department to select Dam operations which would result in a comprehensive framework to adaptively manage the Glen Canyon Dam in response to climate change over the course of the next two decades as stipulated by the project's statement of purpose and need.

**Climate Change Analysis**

110. Due to droughts caused or exacerbated by climate change, the water quantity of the Colorado River has greatly decreased since the dam's construction in the 1963. This decrease in flow is expected to continue as climate change effects worsen in the coming years. These concerns were addressed by Plaintiffs Save the Colorado, Center for Biological Diversity, and Living Rivers in comments regarding both the Draft Environmental Impact Statement (DEIS) and Plan FEIS.

111. The ROD and its underlying Plan FEIS discuss climate change impacts on the Colorado River at multiple points. In particular, the Plan FEIS states that climate change may result in more frequent and severe droughts, caused by decreased mean annual flow and increased variability of the Colorado River's waters. Furthermore, the Plan FEIS reiterates the findings of the Bureau of Reclamation's 2012 Study which found that the Colorado River is likely to experience decreased inflow to a reservoir, Lake Powell, and increasing water losses through evaporation and evapotranspiration processes. The Agencies state that these effects will likely be exacerbated by a steadily increasing population size in the Southwest which will place a greater demand on the Colorado River for water delivery. In addition to water quantity and allocation concerns, the Plan FEIS asserts that climate change will affect the quality of water within and released from Lake Powell due to increased temperature which may cause algal blooms within the reservoir. Under these future projected conditions, the Southwest may expect both extended droughts and decreased elevations at the Lake Powell reservoir.

112. Water scarcity caused by climate change will impact both the Dam's operations and the ability to meet water allocation responsibilities pursuant to the Law of the River, including the Colorado River Compact.

113. Lake Powell's elevation is influenced by release patterns from the Dam, which lowers the reservoir's level, and inflow patterns to the reservoir which serve to add water and therefore raises the reservoir's elevation. Lake Powell receives inflow primarily from the mainstream of the Colorado River and its two large tributaries, the San Juan and Green Rivers. Inflow hydrology is "one of the most important factors driving short-term and long-term processes in Lake Powell." The Plan FEIS states that climate change will impact Lake Powell's inflow quantities and seasonal patterns.

114. In order to assess the efficacy of the alternatives in climate change scenarios, the Agencies relied on historic hydrological data to model inflow levels, giving greater weight to historically drier years to "represent their expected increased frequency and occurrence under climate-change scenarios." The historically derived data was taken from the years 1906 to 2010 and was used by the Agencies to create 21 hydrology traces to represent what they call a "full range of dry to wet" conditions.

115. These historic traces used to model climate change did not represent the "full range of expected inflow variation" nor did they "include the driest traces expected under climate change." Roughly a third of the distribution of inflow variation was not incorporated into the historic data. The Plan FEIS states that the use of historic data led to the underestimation of drier years in climate change modeling. Thus, the Agencies both

knowingly and willfully excluded the most severe projections for Lake Powell's inflow when assessing climate change projections in the Plan FEIS alternatives analysis.

116. When discussing runoff estimates, the Plan FEIS states that although conventional norms dictate the usage of historical trends to calculate runoff in future conditions, these are merely limited assumptions: "[I]t is possible that future flows may include periods of wet or dry conditions that are outside the range of sequences observed in the historical record, particularly considering the effects of climate change and the potential for increased hydrologic variability." This again underscores the limitations of utilizing historic data to model future climate change scenarios. Furthermore, it demonstrates that the Agencies were aware of these limitations and nevertheless chose to employ them in their Plan FEIS analysis.

117. According to the Bureau's 2012 Study, climate change will bring about water scarcity the likes of which the Colorado River Basin has yet to see. The 2012 Study created four scenarios to assess the future water supply and demand needs of the river. Three of these scenarios utilized historic data from the region to create projections of future water quantities. A fourth, the "Downscaled GCM Projected Scenario," incorporated 112 climate change projections from the Intergovernmental Panel on Climate Change. Of the four scenarios, The Downscaled GCM Projected Scenario displayed the greatest likelihood of "deficit spells" lasting 5 or more years. The 2012 Study therefore underscored the fact that climate change impacts may create water deficits which cannot be modeled when relying solely on historic data from the region.

118. The Agencies were well aware of the 2012 Study and its findings. One of the leading agencies during the Plan FEIS' NEPA process was The Bureau of Reclamation, the same federal agency that published the 2012 Study.

119. In contrast to the findings of 2012 Study, the Agencies chose to rely solely on historic data when modeling the outcomes of the seven alternatives in regards to climate change conditions. Accordingly, the climate change analysis of the Plan FEIS is scientifically and legally insufficient. The Department relied on data that did not encapsulate the true possibilities the Colorado River may face in regards to water scarcity. The Plan FEIS asserts that pursuant to their methodology, climate change projections were given neither a "full-fledged analysis" nor an "adaptive approach."

120. Despite these clear insufficiencies, the Department stated that the alternatives analysis was adequate in regard to climate change impacts when responding to Plaintiff Save the Colorado's comments.

121. Furthermore, although there is a clear need prominently stated throughout the Plan FEIS, the Agencies did not produce an alternative with a primary focus on dam operations and the protection of downstream resources in light of projected climate change impacts. All alternatives were stated to perform uniformly relative to one another in water variability and availability projections according to the hydrologic trace data.

122. The Agencies used limited historic trace data to model water elevations at Lake Powell in regard to each alternative. The Agencies further used this faulty methodology to assess whether Lake Powell would drop below the minimum amount of

water necessary, deemed the "minimal power pool," to produce hydroelectricity at the Glen Canyon Dam under any of the project's alternatives. *Id.* Without utilizing data which incorporated the full range of climate change projections, the Plan FEIS could not have adequately demonstrated that the alternatives would deliver water consistent with the Law of the River in the coming years. This is listed as "overlying goal" of the project at large.

123. If climate change projections were adequately incorporated into the Plan FEIS' analysis, through the inclusion of the full range of water scarcity and inflow projections, the Agencies would have concluded that hydropower production at the Dam may be impaired in the coming years. Moreover, the Plan FEIS states that one of its objectives is to "[m]aintain or increase Glen Canyon Dam electric energy generation...*to the greatest extent practicable, consistent with improvement and long-term sustainability of downstream resources*" Emphasis added. Accordingly, the Agencies must analyze alternatives which center on the true possibilities of climate change impacts to the Colorado River, including water scarcity due to reduced and variable inflow to the reservoir, as these are a practicable future condition for the Dam. An absence of such alternatives insures neither the improvement nor the long-term sustainability of downstream resources, the protection of which is required by the GCPA. The Department therefore must consider alternatives which decommission the Glen Canyon Dam.

124. The Agencies rejected Plaintiff's suggested alternatives Run-of-the-River, Fill Lake Mead First, and Decommissioning the Dam on the grounds that they would not

meet the project's statement of purpose and need and would not allow for the water allocation required by the Law of the River, including the Colorado River Compact.

125. Instead of considering the very real possibilities of water scarcity due to climate change impacts in their analysis methodology or through the inclusion of an alternative that focuses on such impacts, the Department created a broadly worded directive, entitled Operational Flexibility, for the Dam's operations under the selected alternative. This section covers operations for "unanticipated events" which include the ability to "respond to low reservoir conditions as a result of drought in the Colorado River Basin.". As stated throughout the Plan FEIS and the Bureau's 2012 Study, water scarcity and drought circumstances at Lake Powell are anything but "unanticipated."

**Failure to Explain Conflicts between Authorities and Proposed Alternatives**

126. In addition to rejecting Plaintiff's suggested alternatives on the grounds that they did not satisfy the Agencies' stated purpose and need for the Plan FEIS, the Department simply stated that these alternatives "would not comply with other federal requirements and regulations, including the GCPA." The agency offered no further explanation as to why the suggested alternatives did not comply with federal authorities.

127. The Plan FEIS used this underdeveloped rationale when rejecting the Decommissioning the Dam Alternative, Fill Lake Mead First Alternative, Full-Powerplant Capacity Operations Alternative, and the Run-of-the-River Alternative.

128. Furthermore, the Department did not explain how the alternatives analyzed within the Plan FEIS would meet the various federal statutory requirements referenced

throughout the document, including the water allotment obligations of the Colorado River Compact.

129. The preferred alternative, Alternative D, would result in a decrease of hydropower production in terms of average daily generation (1.1 percent decrease in MWh) and firm capacity (6.7 percent decrease in MW) from current dam operations.

130. Through selecting Alternative D, the Department illustrated that the agencies had the capability to explore more alternatives that would decrease hydropower production at the Glen Canyon Dam. In other words, the agencies were not limited to alternatives that would increase or maintain hydropower production.

## CLAIMS FOR RELIEF

### Violations of NEPA and the APA by the Department

131. Plaintiffs reallege and incorporate all preceding paragraphs into each of the claims set forth below.

CLAIM ONE

132. Pursuant to CEQ regulations, an agency must analyze the environmental consequences of proposed actions on the affected environment, including cumulative and indirect impacts. 40 C.F.R. §§1502.15, 1502.16, 1502.7, 1502.8.

133. The Plan FEIS did not include an analysis of the ways in which climate change will impact the efficacy of the considered alternatives nor how various resources

will be impacted if conditions such as extreme drought arise. Consequently, the Plan FEIS does not adequately analyze climate change impacts on the affected environment. Therefore, the Department failed to take the requisite hard look at the impacts of the proposed action.

134. The Department's failure to include adequate analysis of the proposed alternatives is arbitrary, capricious, and not in accordance with NEPA, in violation of 5 U.S.C. § 706(2)(A).

CLAIM TWO

135. Agencies are required to define the purpose and need of a proposed action within an EIS. This statement may not be impermissibly narrow so as to exclude reasonable alternatives from analysis. 40 C.F.R § 1502.13.

136. Despite research and evidence suggesting a clear need to include climate change as an integral part of the adaptive management framework for the Glen Canyon Dam over the course of the next 20 years, neither climate change nor its accompanying effects such as increased water scarcity and drought were included within the project's purpose and need statement.

137. The statement of purpose and need within the Plan FEIS includes management consistent with applicable federal laws in addition to the meeting "obligations" for hydropower production.

138. The federal laws directing the management of the Glen Canyon Dam include the Grand Canyon Protection Act of 1992, The Glen Canyon National Recreational Area Designation, Colorado River Compact, Colorado River Storage Project Act, Colorado River Basin Project Act, and the Upper Colorado River Basin Compact. A specific level of hydroelectric power production is not required by any of these statutes. In contrast the obligations these laws expressly impose on the Department clearly will be impacted by climate change.

139. Therefore, the Department unreasonably narrowed the scope of the purpose and need of the project by including a non-existent obligation of hydropower production. And excluding the much more relevant purpose and need of adapting management to the impacts of climate change.

140. The Department's overly narrow statement of purpose and need is arbitrary, capricious, not in accordance with NEPA, and in violation of 5 U.S.C. § 706(2)(A).

CLAIM THREE

141. Agencies are required under NEPA "to identify and assess the reasonable alternatives to proposed actions that will avoid or minimize adverse effects of these actions upon the quality of the human environment." 40 C.F.R § 1500.2(e). In order to be considered reasonable, an alternative must fulfill the project's statement of purpose and need.

142. The Department failed to include an alternative which would focus on the dam's operations and the protection of downstream resources under climate change impact projections which include increased water scarcity and drought.

143. The Department improperly construed the purpose and need of the project to include the generation of hydroelectric power at current or elevated levels. In accordance with the project's purpose and need statement, all of the alternatives analyzed in the Plan FEIS including the no-action alternative contained hydropower production. Furthermore, the Plan FEIS states that it would consider dam operations that would maintain or increase hydropower production.

144. Due to the project's narrow statement of purpose and need, the Department did not consider Plaintiff's alternatives including Run-of-the-River, Decommissioning the Dam, and Fill Lake Mead First.

145. The Department's failure to consider a reasonable range of alternatives, due to constriction by an impermissibly narrow statement of purpose and need, is arbitrary, capricious, not in accordance with NEPA, and in violation of 5 U.S.C. § 706(2)(A).

CLAIM FOUR

146. Federal regulations require Agencies to produce an SEIS when there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts." CFR §1502.9(c)(1)(i-ii).

147. Recent research demonstrating the severity of "hot droughts" in the Colorado River Basin provides new projections of water scarcity on the Colorado River.

The Glen Canyon Dam requires water to produce hydroelectricity. Projections indicate that water levels in Lake Powell may drop below those required by the Dam.

148. In order to comply with NEPA, the Department and the Agencies must produce an SEIS to address research regarding these pressing climate change impacts on the both the Colorado River broadly and operations at the Glen Canyon Dam.

149. The Department and the Agencies "unlawfully withheld or unreasonably delayed" a required agency action through failing to produce an SEIS in light of recently published scientific research. 5 U.S.C. § 706(1).

150. In the alternative, if the Department and agencies affirmatively and finally decided not to prepare an SEIS, that final agency action was arbitrary, capricious, not in accordance with NEPA and in violation of 5 U.S.C. § 706(2)(A).

CLAIM FIVE

151. CEQ regulations require that agencies explain the possible conflicts that may exist between a proposed action and the objectives of Federal, regional, State land use plans, policies and controls for the project area. 40 C.F.R. § 1502.16 (c).

152. The Department cited to various initiatives and guidelines, such as the Colorado River Compact, as reasoning for the rejection of alternatives including Fill Lake Mead First within the Plan FEIS. However, the Department failed to explain the relationship between these rejected alternatives and such guidelines as required by CEQ regulations. Furthermore, the Department did not explain the relationship between considered alternatives and the various objectives, policies, and controls for Glen Canyon Dam and the project area. This failure allowed the Department to not acknowledge, much

less explain and plan for, the impacts of climate change on the Department's and other governmental bodies' obligations under these objectives, policies and controls.

153. The failure to explain possible conflicts between the proposed action and guiding policies and controls is evident throughout the entirety of the Plan FEIS and was adequately not addressed in response to comments.

154. The Department's failure to explain the relationships between guidance documents and alternatives is arbitrary, capricious, not in accordance with NEPA, and in violation of 5 U.S.C. § 706(2)(A).

**PRAYER FOR RELIEF**

WHEREFORE, Plaintiffs respectfully request that the Court:

A. Declare that the Department of the Interior's approval of the Plan FEIS violates NEPA and/or is arbitrary, capricious, an abuse of discretion, and/or not in accordance with the law under APA, 5 U.S.C. § 706(2)(A);

B. Adjudge and declare that in order to comply with NEPA, the Department must produce an SEIS due to significant new information regarding climate change impacts on the Colorado River, 5 U.S.C. § 706(1); or declare that any affirmative, final decision by the Department not to prepare an SEIS was arbitrary, capricious, an abuse of discretion, or not in accordance with NEPA in violation of 5 U.S.C. §706(2)(A);

C. Vacate and set aside 2016 Plan FEIS and ROD for the Glen Canyon Dam Long-Temp Experimental Management Plan as illegal agency actions under the APA;

D. Adjudge and declare that the Department has violated NEPA by failing to analyze the environmental consequences of the proposed action on the affected environment, including the cumulative and indirect impacts caused by climate change;

E. Adjudge and declare that the Department improperly drafted the project's purpose and need statement to exclude climate change adaption, in violation of NEPA;

F. Adjudge and declare that the Department has violated NEPA by failing to consider a reasonable range of alternatives for the project's proposed action, including numerous reasonable alternatives that would adapt the Dam's operations to climate change impacts;

G. Adjudge and declare that the Department has violated NEPA by failing to explain the relationship between relevant land use policies, controls, and guidance documents in regard to the examined alternatives and rejected alternatives and climate change impacts;

H. Enter any other appropriate preliminary or permanent injunctive relief;

I. Grant such further relief as the Court deems just and proper.

Dated this 1st day of October 2019.

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