# Colorado River 101

**Brenda Burman** *Central Arizona Project* 

December 14, 2022





### Colorado River Basin Map

- Supplies water to 40 million people
- Provides water to Salt Lake City, Las Vegas, Phoenix, Los Angeles, San Diego, and the front range
- Includes 30 Tribes
- Irrigates ~5 million acres of farmland
- Includes 60 million acre-feet of storage capacity
- Generates clean hydropower for the Western power grid
- Supports National Parks, wildlife refuges, recreation areas and monuments



### **Tribes**

- 30 Colorado River Basin tribes
- 22 in Arizona







#### **Colorado-Big Thompson Project**

The Colorado–Big Thompson Project is a federal water diversion project in Colorado designed to collect west slope water from the headwaters of the Colorado River and divert it to Colorado's front range and plains.







1962 **O** 

1964 **O** 

1966 **O** 



#### Navajo Dam <

is on the San Juan River in northwestern New Mexico. It was built by the Bureau of Reclamation to provide flood control, irrigation, water supply and storage. The dam was dedicated on Sept. 15, 1962.









#### Flaming Gorge Dam

Dam is located in northern Utah, forming the Flaming Gorge Reservoir that extends into southern Wyoming. The dam went into operation on Sept. 27, 1963 at the press of a switch by President John F. Kennedy and was dedicated by Lady Bird Johnson on Aug. 17, 1964.







#### Glen Canyon Dam

is in northern Arizona and forms Lake Powell. It was named for John Wesley Powell who in 1869 led the first Colorado River expedition of the Grand Canyon. Lady Bird Johnson gave the official dedication speech on Sept. 22, 1966.











#### The San Juan-Chama Project

is an interbasin water transfer project located in New Mexico and Colorado. It takes water from the drainage basin on the San Juan River and supplements water in the Rio Grande watershed. The Bureau of Reclamation announced completion in 1978.







1966 **O** 



1981



#### The Fryingpan-Arkansas Project

is a water diversion project that imports spring runoff and summer rainfall from Colorado's western slope to the Arkansas River Basin on Colorado's east slope. Construction was complete in 1981.





1981 <mark>o</mark>

2008

2022



#### Central Utah Project

is located in central and east central Utah, providing Utah with the opportunity to use a portion of its Colorado River allotment.





### 2008

2022 🔿





#### Navajo-Gallup Water Supply Project

will convey a reliable water supply from the San Juan River to the eastern section of the Navajo Nation, southwestern portion of the Jicarilla Apache Nation and the City of Gallup, N.M.





### 2022 🔆



### Hoover Dam ◀ 1935 Ò

Hoover Dam was authorized as part of the Boulder Canyon Project Act, passed in 1928. Construction began in 1930, the dam was dedicated in 1935, and the hydroelectric generators went online in 1937. In 1947, Congress officially designated it Hoover Dam.







1007

1977

1938 **O** 

#### Parker Dam

backs up Lake Havasu with Metropolitan Water District's pumping plant for the Colorado River Aqueduct located about two miles upstream from the dam. It was dedicated on Nov. 19, 1938.







1002

1977

1935 O

1938 <sup>O</sup>

#### Davis Dam

is between Hoover Dam and Parker Dam and was constructed for regulation of water to be delivered to Mexico as part of the Mexican Treaty of 1944. It was completed in 1951 and creates the Lake Mohave reservoir.









#### Main Outlet Drain Extension

transports drainage water from Arizona's Wellton-Mohawk Irrigation and Drainage District in Arizona to Morelos Dam in Mexico.





### **1977** $\diamond$

1992 O

1993 O

1952 O

◀

#### Yuma Desalting Plant

1977 O

**1992** O

1993 O

2019

was completed in 1992, but has only operated for two pilot projects. It was built to treat saline agricultural return flows from the Wellton-Mohawk Irrigation and Drainage District to be included in water deliveries to Mexico.







#### Central Arizona Project

1992 O

1993 O

2019 O

is the 336-mile system that brings Colorado River water into central and southern Arizona. It took 20 years to complete – from 1973 to 1993. First water deliveries were made in 1985.







#### 242 Wellfield

1993 O

2019 0

is a protective and regulatory pumping unit located within a five-mile wide strip of land along the U.S./Mexico border in southwestern Arizona. The groundwater recovered by the unit is collected and delivered to Mexico by the U.S. as part of treaty obligation.









**Colorado River Flow** 

Colorado River 101

# **Recent Hydrology**

#### Snowpack vs. Runoff (% of average)

	Snowpack	Runoff
2020	105%	56%
2021	86%	37%
2022	90%	63%
2023	?	?



### Colorado River Water Supply Report

#### System Contents: 19.14 MAF

As of December 6, 2022

Last Year System Contents: 22.25 MAF



### Math Counts

Inflows to Lake Mead — Evaporation — Releases to Lower Basin and Mexico

**Yearly Deficit** 

(inflow – evap – releases = **deficit/year**)



#### Lake Powell & Lake Mead Combined Storage

# Law of the River

- 1922 Colorado River Compact
- 1928 Boulder Canyon Project Act
- 1944 Mexican Water Treaty
- 1948 Upper Colorado River Basin Compact
- 1956 Colorado River Storage Project Act
- 1964 AZ v. CA US Supreme Court Decision
- 1968 Colorado River Basin Project Act

**1970** – Coordinated Long-Range Operation of Colorado River Reservoirs

- 1992 Grand Canyon Protection Act
- 2004 Arizona Water Settlements Act
- 2005 Multi-Species Conservation Program
- 2007 Colorado River Interim Guidelines
- 2017 Minute 323 to the Mexican Water Treaty
- 2019 Drought Contingency Plan (DCP)
- **2021** 500+ Plan
- 2022 Drought Response Operations Agreement (DROA)

#### Citations:

<u>CAP - https://www.cap-az.com/about/history-of-cap/law-of-the-river/</u> <u>Reclamation - https://www.usbr.gov/lc/region/pao/lawofrvr.html</u>

### **1922 - Colorado River Compact**

- First agreement to legally connect the Colorado River Basin states
- Designated 7.5 MAF to the Upper and Lower Basins
- Upper Basin must not deplete flow at Lee Ferry below an aggregate of 75 MAF for any period of 10 consecutive years
- Obligation to Mexico shared equally between basins



### 1928 - Boulder Canyon Project Act

- Authorized construction of Hoover Dam
- Apportioned Colorado River water among the Lower Basin states:
  - Arizona 2.8 MAF
  - California 4.4 MAF
  - Nevada 300,000 acre-feet
- Authorized construction of the All-American
  Canal



### 1944 – U.S. Mexico Water Treaty

- Apportioned 1.5 MAF per year of Colorado River water to Mexico and specified that Mexico would share in times or surplus and in reductions due to <u>"extraordinary drought"</u>
- Established the binational International Boundary and Water Commission to implement the Treaty
- Notable Minutes 242, 319, 323



### 1964 – U.S. Supreme Court Decree: Arizona v. California

- After a decade of deliberation, Supreme Court's opinion favored Arizona, upholding its designated 2.8 MAF/year share of mainstream Colorado River water
- Decision effectively established the U.S.
  Secretary of the Interior as the Lower Basin "water master"



### 1968 – Colorado River Basin Project Act

- Authorized the Bureau of Reclamation to fund and construct the Central Arizona Project
- Created a junior priority in the Lower Basin for CAP water
- Directed the U.S. Secretary of the Interior to develop a plan for augmenting the Colorado River supply



### 2007 – Interim Guidelines

- Established a shortage framework for the Lower Basin based on elevations in Lake Mead
- Incentivized storage of water in Lake Mead
  through Intentionally Created Surplus
- Coordinated operations of Lake Powell and Lake Mead



### 2017 – Minute 323

- Expanded collaboration and sharing of shortage risks and surplus opportunities between Mexico and the United States
- Provided for U.S investment in water infrastructure and environmental projects in Mexico
- Established a work group to investigate binational desalination in the Sea of Cortez
- Established the binational water scarcity contingency plan



### 2019 – Drought Contingency Plan

- Supplements 2007 Interim Guidelines
- Required larger and earlier mandatory contributions to Lake Mead
- Required California to make contributions starting at Lake Mead elevation 1045'
- Called for protection of Lake Mead elevation 1020' through future actions (500+ Plan)
- Established a framework for protection of Lake Powell through Upper Basin storage releases and demand management



### Lake Mead Storage & Conservation

#### Lake Mead Elevation by Year



<sup>1</sup>End of calendar year 2022 balances of U.S. ICS and Mexico's Water Reserve, system conservation water, and other voluntary contributions to Lake Mead are based on projections from the October 2022 24-Month Study and are subject to change.

#### 2007 Interim Guidelines, Minute 323, Lower Basin Drought Contingency Plan, and Binational Water Scarcity Contingency Plan Total Volumes (kaf)

	Lake Mead Elevation (feet msl)	Mexico: (Minute	US: (2007 Inte e 323 Delivery R	Combined Vol erim Guidelines eductions + Bin	umes by Country Shortages + DCP Contribu ational Water Scarcity Con	itions) tingency Plan Savings)	Total Combined Volumes	
		AZ Total	NV Total	CA Total	Lower Basin States Total	Mexico Total	Lower Basin States + Mexico	
Tier Zer	0 1,090 - 1,075	192	8	0	200	41	241	
Tier 1	1,075 - 1050	512	21	0	533	80	613	
Tier 2A	1,050 - 1,045	592	25	0	617	104	721	2022 Roductions +
Tier 2B	1,045 - 1,040	640	27	200	867	146	1,013	Contributions
Tier 2C	1,040 - 1,035	640	27	250	917	154	1,071	
Tier 2D	1,035 - 1,030	640	27	300	967	162	1,129	
Tier 2E	1,030 - 1,025	640	27	350	1,017	171	1,188	
Tier 3	<1,025	720	30	350	1,100	275	1,375	

The Secretary of the Interior will take affirmative actions to implement programs designed to create or conserve 100,000 acre-ft per annum or more of Colorado River System water to contribute to conservation of water supplies in Lake Mead and other Colorado River reservoirs in the lower basin. All actions taken by the United States shall be subject to applicable law, including availability of appropriations.

### Lake Powell

**Key Elevations** 



### End of Calendar Year 2022 Projections November 2022 24-Month Study Most Probable Inflow Scenario



# **Recent Timeline**

June	Bureau of Reclamation announcement that an additional 2 to 4 million acre-feet of conservation needed to protect critical levels in the reservoirs.
August	24th Month Study, Tier 2a
September/October	Reclamation outlines steps they are taking to facilitate ongoing efforts to conserve water and protect the Colorado River, and investments from the Bipartisan Infrastructure Law and Inflation Reduction Act (IRA), including funding/RFP process for IRA funds.
November	Federal Register Notice published. Comments and input due by December 20, 2022. Anticipated draft Supplemental EIS available Spring 2023. Anticipated final Supplemental EIS available late Summer 2023.

### What's Next?



Thank you for rescuing me and returning me to my family!

- Bosco