Colorado River Basin: System Status Update and Outlook for 2018 and 2019

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Topics

• Overview of the Colorado River Basin

• Colorado River Drought

• Projected Conditions

• Drought Response Activities

• Summary
Overview of the Colorado River System

- 16.5 million acre-feet (maf) allocated annually
  - 7.5 maf each to Upper and Lower Basins and 1.5 maf to Mexico
  - 13 to 14.5 maf of basin-wide consumptive use annually
- 16 maf average annual “natural flow” (based on historical record)
  - 14.8 maf in the Upper Basin and 1.3 maf in the Lower Basin
- Inflows are highly variable year to year
- 60 maf of storage (nearly 4-times the annual inflow)
- The System is operated on a type hydrologic budget
Natural Flow
Colorado River at Lees Ferry Gaging Station, Arizona
Water Year 1906 to 2018

Provisional data, subject to change

Estimated values for 2016-2018
Water Budget at Lake Mead

Given current water demands in the Lower Basin and Mexico, and a minimum objective release from Lake Powell (8.23 maf), Lake Mead storage declines by about 1.2 maf annually (equivalent to about 12 feet in elevation).

Inflow 9.0 maf
(Powell release + side inflows above Mead)

Outflow -9.6 maf
(Lower Division State apportionments and Mexico Treaty allocation, plus balance of downstream regulation, gains, and losses)

Mead evaporation loss -0.6 maf

Balance -1.2 maf
In July 2016, Lake Mead was at its lowest elevation of 1,071.61 feet since it was first filled in the 1930s.

During the 1950s drought, Mead reached a low of 1,083.23 feet in April 1956.

Prior to 1999, Lake Mead was last at elevation 1,082.52 feet in June 1937.
Lake Mead near Hoover Dam in 2000

Lake Mead near Hoover Dam in 2016
Lake Mead – Key Elevations\(^1,\)\(^2\)

**Flood Control or Surplus Conditions**
- 1,229 ft
- 27.6 maf

**Normal or ICS Surplus Conditions**
- 1,145 ft
- 17.1 maf

**Level 1 Shortage Conditions**
- 1,086 ft*\(^3\)
- 10.5 maf*\(^4\)
- 10.5 maf* 40% of Live Capacity
- U.S. Lower Basin Shortage = 333 kaf
- Mexico Reduction = 50 kaf

**Level 2 Shortage Conditions**
- 1,050 ft
- 9.6 maf
- U.S. Lower Basin Shortage = 417 kaf
- Mexico Reduction = 70 kaf

**Level 3 Shortage Conditions**
- 1,025 ft
- 7.7 maf
- U.S. Lower Basin Shortage = 500 kaf
- Mexico Reduction = 125 kaf

**Dead Pool Storage**
- 895 ft
- 2.5 maf

**Not to scale**

2. Mexico reductions based on Minute 323 (in place 2017-2026).
3. *As of January 23, 2018*
State of the System (Water Years 1999-2017)\(^1\)

Unregulated Inflow into Lake Powell
Powell-Mead Storage and Percent Capacity

[Graph showing water year data from 1999 to 2017 with bars for unregulated inflow into Lake Powell and lines for storage and percent capacity.]

\(^1\) Percentages at the top of the light blue bars represent percent of average unregulated inflow into Lake Powell for a given water year. The percent of average is based on the period of record from 1981-2010.
Upper Colorado River Basin
Water Year 2018 Snowpack and Forecasted Inflow

Water Year 2018
Forecasted Inflow into Lake Powell

6.7 maf (62% of average)

As of January 22, 2018
Snowpack is 66% of median

Upper Colorado River Basin Snotel Tracking
Aggregate of 117 Snotel Sites in the Upper Colorado River Basin

30 Year Median Index
Current Year Index WY2018
Comparison Year Index WY2017

Data Provided by the Natural Resource Conservation Service
Most Probable End of CY 2018 Projection: 1,079.5 feet (38% full)
Min/Max Range: 1,076 to 1,083 feet

Most Probable End of CY 2019 Projection: 1,074.7 feet (37% full)
Min/Max Range: 1,062 to 1,108 feet

End of CY 2017 Elevation: 1,082.5 feet (39% full)
Drought Response Activities

• Through 2017, storage and conservation programs have resulted in nearly 20 feet of additional elevation in Lake Mead
  - U.S. Intentionally Created Surplus
  - Mexican deferred delivery
  - Lower Basin Drought MOU voluntary protection volumes
  - Pilot System Conservation Program
  - Other system conservation agreements

• Additional Lower Basin drought response discussions are on-going
  - Goal is to reduce the risk of reaching critically low Lake Mead elevations through voluntary actions
Percentages computed from 110 hydrologic inflow sequences based on resampling of the observed natural flow record from 1906-2015.

Percentages shown may not be representative of the full range of future possibilities that could occur with different modeling assumptions.
Summary

• The Colorado River Basin continues to experience an unprecedented drought

• Even with above average inflow and a slight improvement in system conditions in 2017, there is a chance for Lower Basin shortage as early as 2019

• Cooperation and collaboration will be key in finding sustainable solutions and addressing current and future challenges
For more information:

https://www.usbr.gov/lc/riverops.html