

# Voluntary Water Conservation Program for Lake Mead: Current Account Balances, Credits, and Debits

David E. Rosenberg

July 23, 2024

## Description

This is an R Markdown document. Plots Lake Mead water conservation account balances, deposits/withdraws, limits, and other data for the Lake Mead water conservation program.

Within the Colorado River basin, the Lake Mead water conservation program is called Intentionally Created Surplus (ICS) program for Lake Mead. The program is defined in the 2007 Interim Guidelines and 2019 Drought Contingency Plans (Reclamation, 2007; 2019). In the voluntary conservation program, states reduce use from their historical allocations, leave the conserved water in Lake Mead, and withdraw the conserved water at a future date under certain restrictions.

The plots also compare the water account balances to withdraw limits and mandatory conservation targets. The plots support the analysis of the work: “Lake Mead Water Conservation Accounts: Examples, Successes, Challenges, and Potential Improvements post 2026.”

## Figures

Figure 1. A stacked bar chart compares voluntary conservation account balances by state and year. These balances are compared to the overall and individual state max balances allowed by the 2007 Interim Guidelines and 2019 Drought Contingency Plan (DCP).

Figure 2 A stacked bar chart compares annual voluntary water conservation efforts by state. Credits are shown as positive and withdraws as negative. These credits and debits are compared to the maximum allowed amounts.

Additional Figures - see ICS-Plots.r file.

## Data and References

1. USBR. (2019). “Agreement Concerning Colorado River Drought Contingency Management and Operations.” U.S. Bureau of Reclamation, Washington, DC. <https://www.usbr.gov/dcp/finaldocs.html>
2. USBR. (2007). “Record of Decision: Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lakes Powell and Mead.” U.S. Bureau of Reclamation. <https://www.usbr.gov/lc/region/programs/strategies/RecordofDecision.pdf>.
3. USBR (2024). “Boulder Canyon Operations Office - Program and Activities: Water Accounting Reports”. <https://www.usbr.gov/lc/region/g4000/wtracct.html>. These annual reports are aggregated in the Excel file **IntentionallyCreatedSurplus-Summary.xlsx** from USBR annual accounting reports: <https://www.usbr.gov/lc/region/g4000/wtracct.html>. Note most recent data is for 2023.

## Observations

1. The water conservation accounting program for Lake Mead is popular and well used (Figures 1 and 2).
2. As of 2022 Arizona, California, and Nevada have saved and deposited ~3.1 million acre feet (MAF) – above the current 2.7 MAF maximum limit (Figure 1).
3. The states should raise their individual and combined conservation account limits to more transparently represent situation with account balances larger than the limits. At the same time, the limit on conservation account balances must stay below Lake Mead’s physical active storage so conserved water is recoverable.
4. Arizona has yet to conserve water at the annual volumes required for it’s mandatory conservation targets (Figures 3, 4, 5, 6). In contrast, California and Nevada already have a track record of conserving at the mandatory conservation targets.

## Requested Citation

David E. Rosenberg (2024), “Lake Mead Water Conservation Accounts: Examples, Successes, Challenges, and Potential Improvements post-2026–Account Balances, Credits, and Debits.” Utah State University. Logan, Utah. <https://github.com/dzeke/ColoradoRiverCollaborate/tree/main/LakeMeadWaterConservationProgramAnalysis/ICS>.

```
## tidyverse      readxl RColorBrewer      dplyr      expss      reshape2
##      TRUE      TRUE      TRUE      TRUE      TRUE      TRUE
##      pracma    lubridate directlabels    plyr      stringr    ggplot2
##      TRUE      TRUE      TRUE      TRUE      TRUE      TRUE
##      ggpubr
##      TRUE
```

```
## [1] "ICS balance as fraction of Mead storage"
```

```
## [1] "35.6%"
```

```
## [1] "Percent of Upper Colorado River Basin area of entire continental US area"
```

```
## [1] "3.5%"
```

Figure 1. Lake Mead water conservation account balances

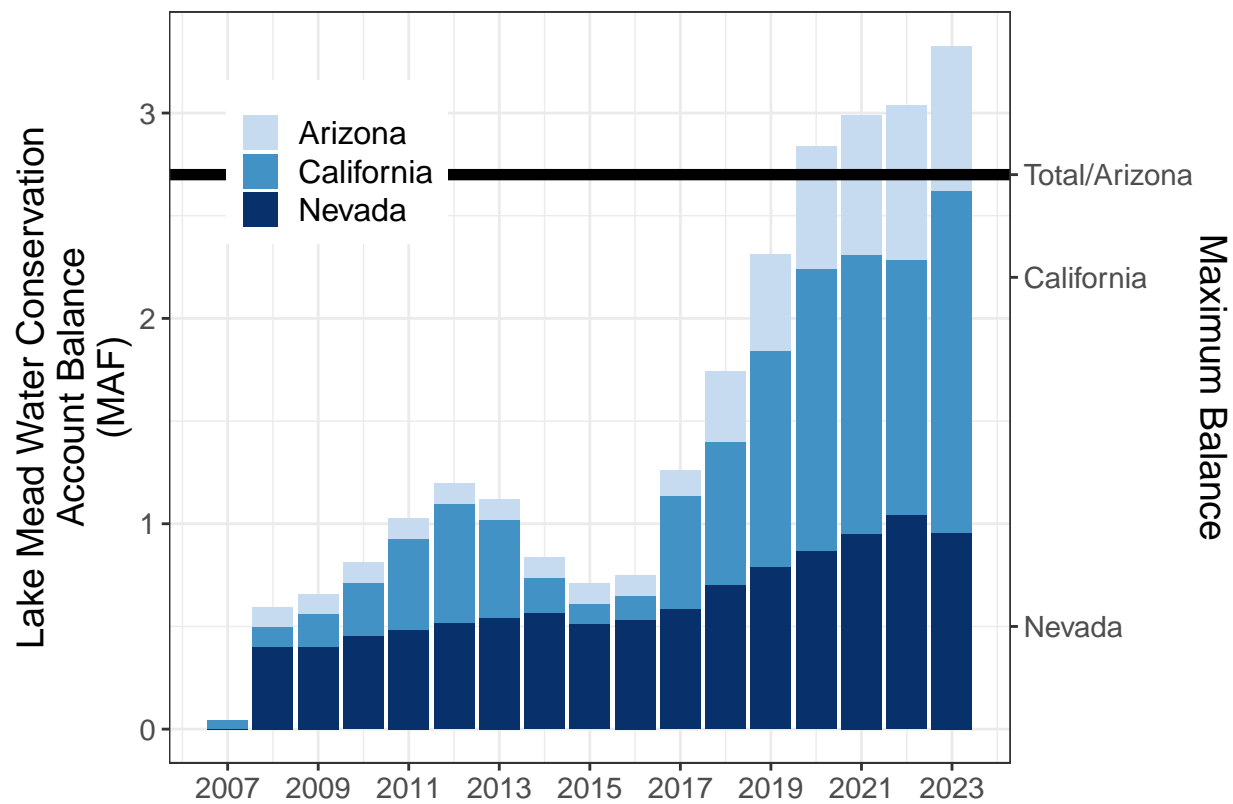


Figure 2. Lake Mead conservation account deposits and withdrawals

