Intentionally Created Surplus for Lake Mead: Current Accounts and Next Steps

David E. Rosenberg

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Description

This is an R Markdown document. Six plots show the current status of the Intentionally Created Surplus (ICS) program for Lake Mead. This program is defined by the 2007 Interim Guidelines and ammended by the 2019 Lower Basin Drought Contingency Plan. The ICS program allows states to voluntarily conserve water, store the water in Lake Mead, get credit, and withdraw the conserved water at a future date under certain restrictions. The DCP mandates certain volumes of conservation (DCP contributions) that increase as Lake Mead level drops. DCP contributions are permanent. When making a DCP contribution, states and users lose future access to their contributions.

1. A stacked bar chart compares ICS 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 Contigency Plan (DCP).
2. A stacked bar chart compares annual deposits to and withdraws from ICS accounts by state and year. These deposits and withdrawals are compared to the maximum allowed amounts.
3. A bar plot shows the ratio of ICS account balance to the required DCP contribution at two different Lake Mead water levels. This ratio is the number of years water in the ICS account can be used to make the state's contribution required by the DCP before the ICS account is depleted. This ratio assumes there is no new ICS contributions during that time. The ratios (number of years) fall as Lake Mead level drops and DCP contribution increase.
4. A bar plot shows the ratio of the ICS withdrawal limit to the DCP contribution at two different Lake Mead water levels. If ICS withdrawal limits are enforced, this ratio represents the fraction of the DCP contribution the state could make from it's ICS account each year. This ratio assumes there is sufficient water in the ICS account.
5. A bar plot shows the ratio of the ICS deposit limit to the required DCP contribution at two different Lake Mead water levels. If deposit limits are enforced, this ratio shows how well a state can keep up year-to-year with its required DCP contributions by continuing to conserve, add that water to it's ICS account, then transfer and use the ICS water to meet it's required DCP contribution. Conserving, adding to one's ICS account, and transfering to make a DCP contribution is preferred to a direct DCP contribution. This approach is preferred because water conserved **this** year and credited to the ICS account can be used to meet **next** year's DCP contribution. Should Lake Mead level rise during the year, the state retains access to its ICS water whereas a direct DCP contribution is lost.
6. **The most important plot** A bar plot shows conservation capacity at two different Lake Mead water levels. Conservation capacity is the ratio of the largest ICS deposit on record to the DCP contribution. Conservation capacity shows whether a state has historically conserved at the level required by the DCP. States below 100% have never before conserved at the level required by the DCP. They do not yet have a track record for water conservation.

Data from USBR annual accounting reports: https://www.usbr.gov/lc/region/g4000/wtracct.html. Note most recent data is for 2019.

Findings (Recommendations in bold)

1. The Intetionally Created Surplus program for Lake Mead is popular and well used (Figures 1 and 2).
2. As of 2019, Arizona, California, and Nevada have saved and deposited ~2.3 million acre feet (MAF) of the 2.7 MAF maximum limit (Figure 1). **The states should raise their individual and combined maximum limit immediately to allow states to conserve and store more water in Lake Mead.**
3. Arizona has overcommitted on its DCP contributions (Figures 3, 4, 5, 6) and has yet to show that it can conserve the annual volumes required for it's DCP contributions year to year (Figure 6). In contrast, California and Nevada already have a track record in their ICS accounts of conserving the annual water volumes specified in the DCP aggreement.
4. Arizon's overcommittment presents both a problem and opportunity for California and Nevada. The problem is that Arizona can not ramp up its conservation efforts fast enough and the total DCP contributions will not be made. Lake Mead level will fall further and faster than anticipated. **The opportunity is that California and/or Nevada could transfer some of their ICS balances to Arizona's ICS account and charge Arizona heftily for the ICS amounts transferred.** A transfer would buy Arizona more time to ramp up its conservation efforts to the level required for its DCP contributions.
5. When Lake Mead falls below 1,090 feet, California and Nevada are well positioned to convert and use their ICS balance to make their DCP contributions for several years (Figure 3). During this time, both states can continue to deposit water in their ICS accounts to make future DCP contributions and contributions (Figures 4, 5, and 6).
6. At a Lake Mead Level of 1,045 feet, Arizona's ICS balance of 474,000 acre-feet will only cover 74% of its 640,000 acre-feet DCP contribution (Figure 3).
7. Additionally, Arizona's ICS withdrawal and deposit limits prevent the state from using ICS to keep pace with its DCP contributions (Figures 4 and 5).
8. If Lake Mead level stays below 1,090 feet for multiple years, Arizona will quickly exhaust its ICS account balance (Figure 3 and be forced to make direct DCP contributions each and every year.
9. Both the Interim Guidelines (2007) and the DCP (2019) allow states to make ICS and DCP contributions on behalf of another state. **Once the DCP triggers and Arizona exhausts it's ICS account balance (in less than 1 year)(Figure 3), Arizona could buy and convert ICS water from California or Nevada to meet it's required DCP contribution amounts.**
10. The 2019 DCP does not specify what happens to ICS water once a state uses its' ICS water for a DCP contribution (called DCP ICS in the 2019 DCP) or makes a direct DCP contribution. Physically, the water stays in Lake Mead, same as when a state contributed to its ICS account. Administratively, the water should pass to a new entity that manages the water for system-wide benefits.
11. **I recommend to transfer DCP ICS water and direct DCP contributions to a new, separate, system account that is no longer accessible by states or users.** This system water should be managed by a Lower Basin commission whose members are the Lower Basin states, representatives of environmental groups, First Nations, and other under-represented or disadvantaged groups that have historically been excluded from Colorado River decision making. Once Lake Mead rises to a certain level, this system water could be used for purposes that benefit the entire Lower Colorado River system. Example system purposes that benefit the entire Lower Colorado River system could include occasional pulse floods to the Colorado River delta, deliveries to bolster the Salton Sea level, or deliveries to under-represented or disadvantaged groups. The amount of water in the system account will depend on the ICS account balances that states and users convert and use to make their DCP contributions plus the volumes states and users directly contribute to meet their DCP contributions. The Lake Mead level that triggers and allows system releaseses from Lake Mead should be lower than the lake level that states and users are allowed to withdraw from their ICS accounts. Like ICS accounts, there should be a cap (limit) on the annual withdrawal amount from the system account.

Requested Citation

David E. Rosenberg (2021), "Intentionally Created Surplus for Lake Mead: Current Accounts and Next Steps." Utah State University. Logan, Utah. https://github.com/dzeke/ColoradoRiverFutures/tree/master/ICS

```
## [1] "ICS balance as fraction of Mead storage"
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## [1] "23.3%"
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## [1] "Percent of Upper Colorado River Basin of entire continential US"
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## [1] "3.5%"
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Figure 1. Account balances

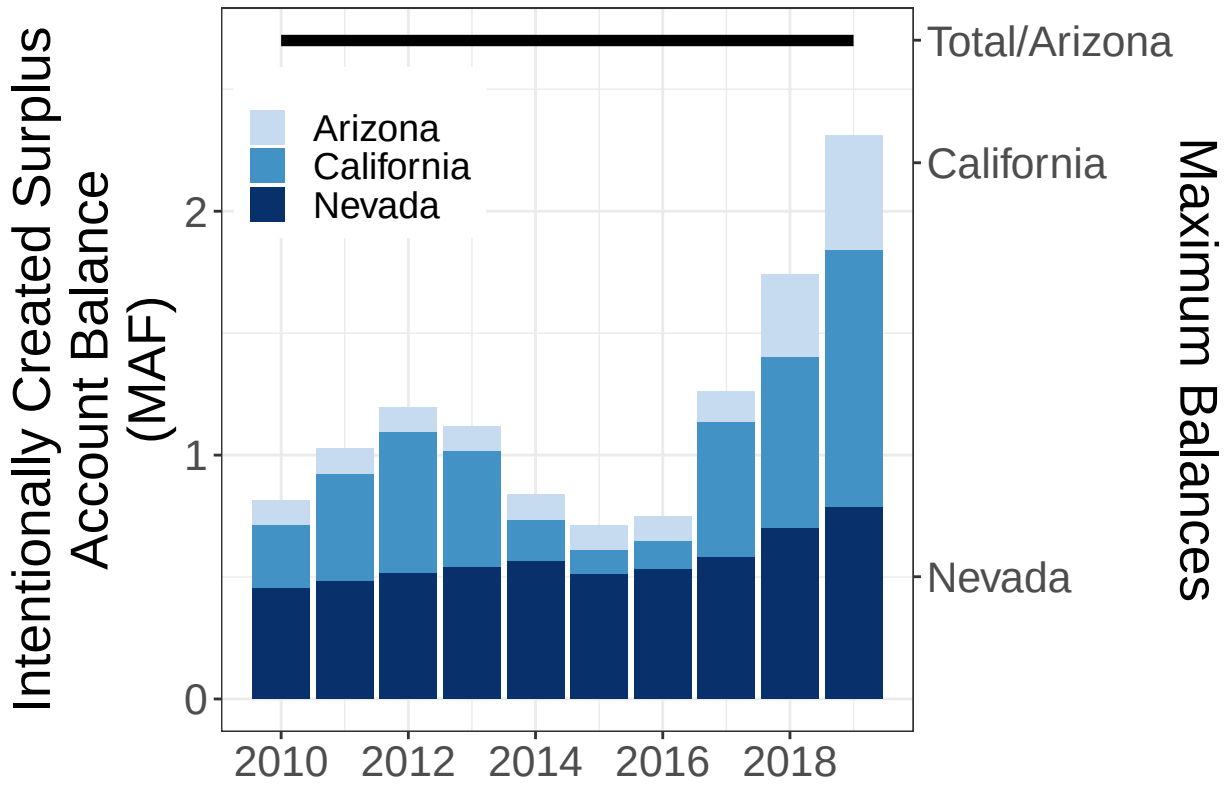

Figure 2. Deposits and Withdrawals

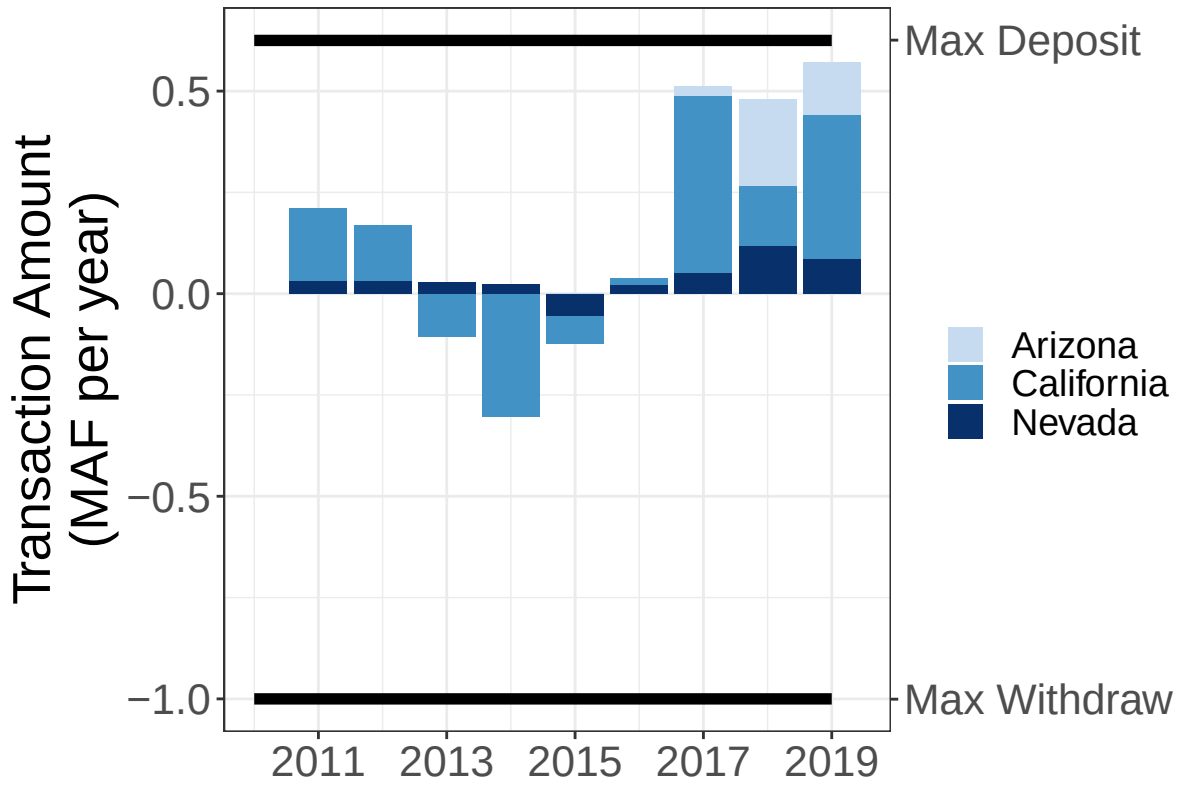

Figure 3. Years 2019 ICS balance can fund an ongoing DCP contributions. Dashed red line indicates 2 years.

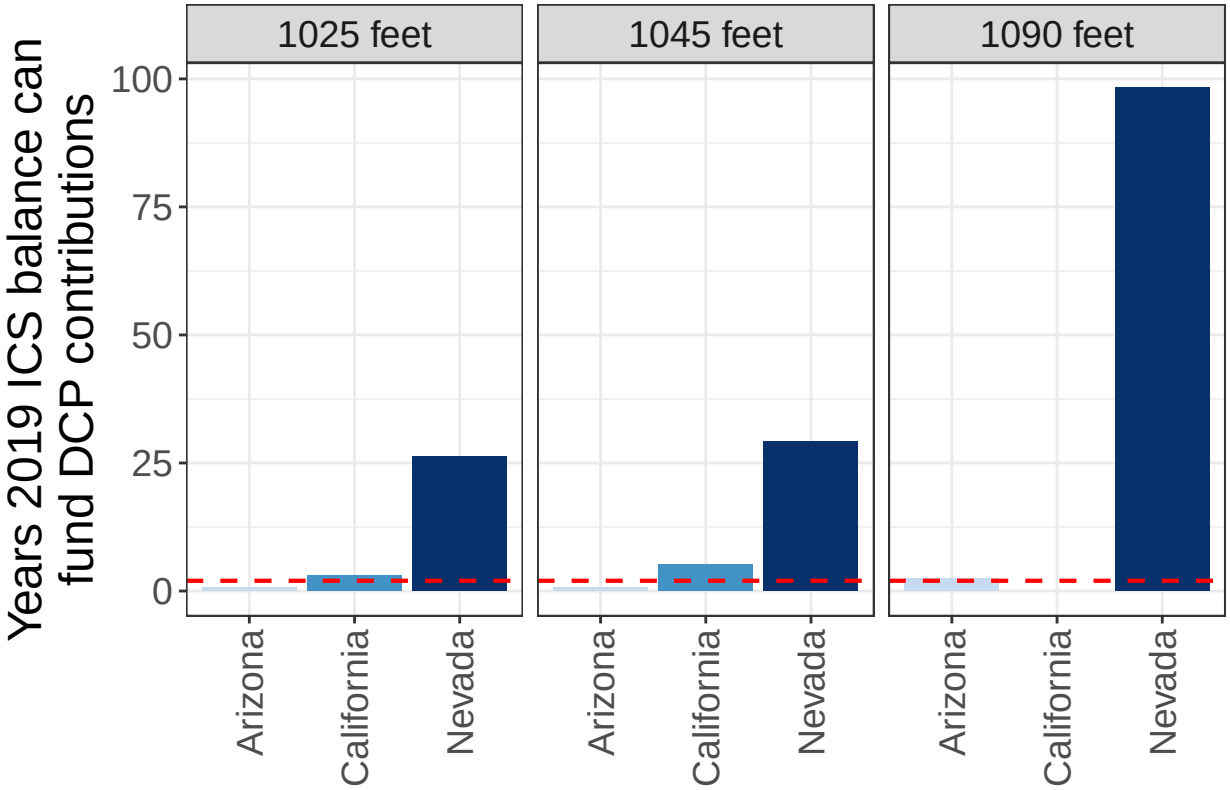

Figure 4. Ratio of ICS max withdrawal limit to DCP contribution.

States less than 100% (red dashed) will need to implement conservation immediately and make direct DCP contributions.

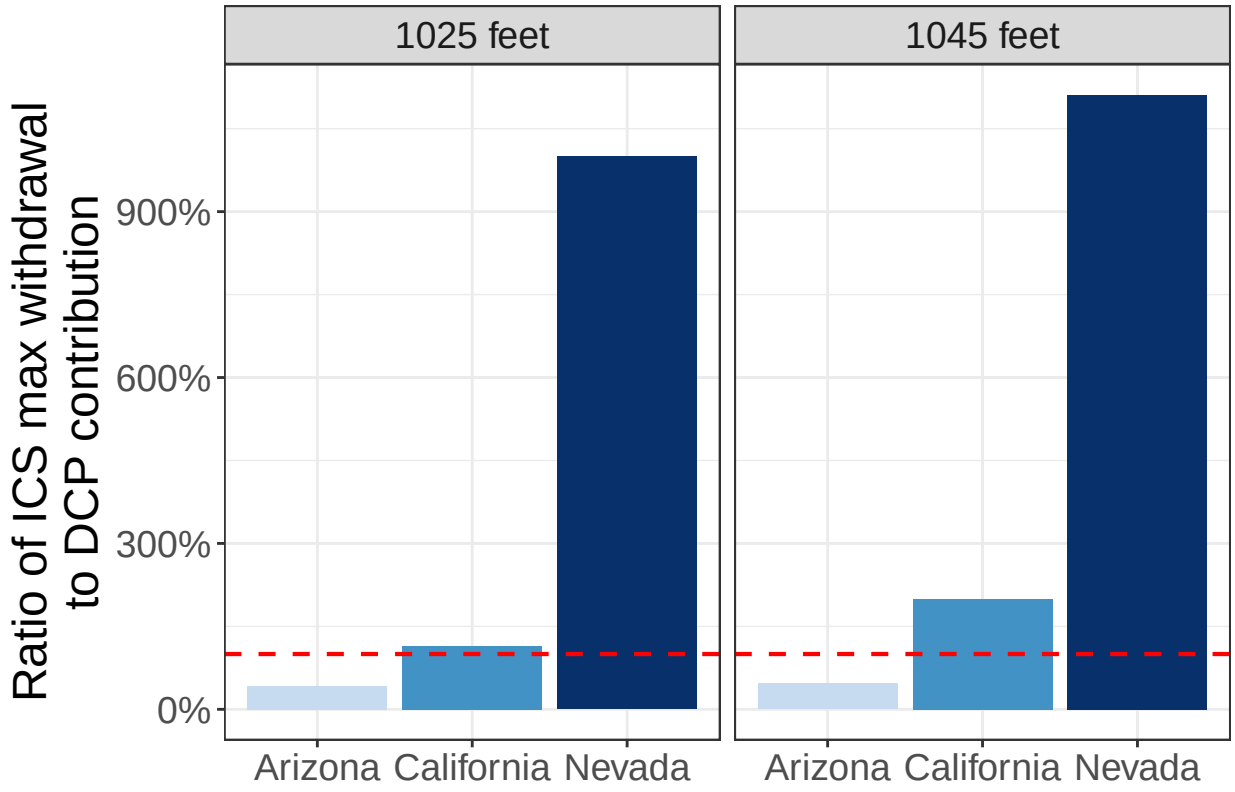

Figure 5. Ratio of ICS max deposit to DCP contribution

States less than 100% (dashed red line) will likely require help from other users to make their ongoing DCP contributions.

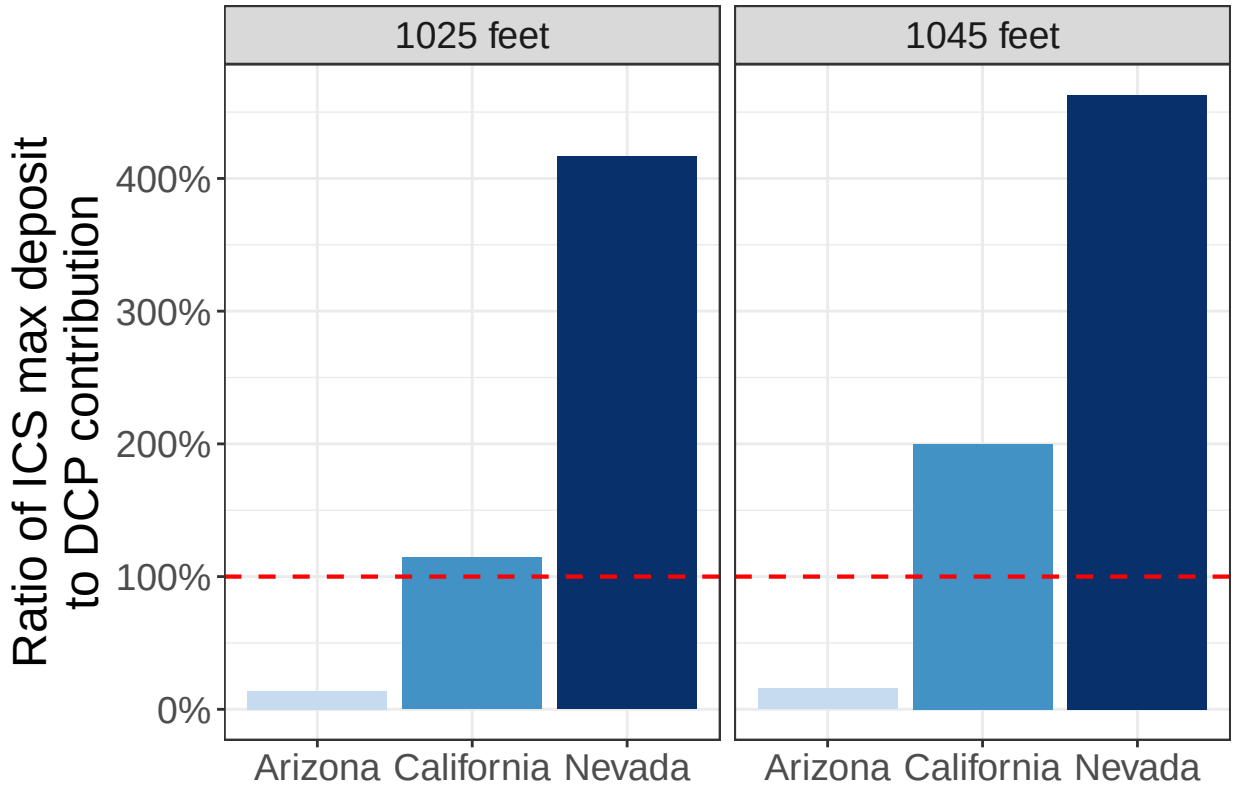

Figure 6. Ratio of largest ICS deposit to DCP contribution

States less than 100% (dashed red line) have yet to conserve at the annual level required by the DCP.