

Planning Efforts for Drought in the Colorado River Basin

A summary of Colorado Drought Contingency Plans and Colorado Investigations in Planning Efforts

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1 Document Purpose

The purpose of the sub-committee and the Roundtable is to provide educational materials regarding the Colorado River Drought Contingency Planning documents and agreements to the entities the Roundtable members represent. The sub-committee's charge is to organize, review, and assemble information for the Roundtable to disseminate to their constituents.

1.1 Definitions/Acronyms/Engaged Parties

2007 Interim Guidelines – Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead

LB – Lower Basin States: Arizona, California, and Nevada

CRD – Colorado River Water Conservation District

Compact – Colorado River Compact of 1922

CRSP – Colorado Reservoir Storage Project

CRSS – Colorado River Simulation System

CWCB – Colorado Water Conservation Board

CWP – Colorado Water Plan

CU – Consumptive Use

DCP – Drought Contingency Plan

DCP ICS – Water stored under ICS that is used in the Drought Contingency Plan

DM – Demand Management Program

DOI – Department of Interior

DWR – Division of Water Resources

FRWC – Front Range Water Council

ICS – Intentionally Created Surplus

Initial Units – Initial storage units of the CRSP (Aspinall, Flaming Gorge, Navajo, Glen Canyon)

Roundtable – Southwest Basin Roundtable

StateMod – Colorado's Surface Water Model

SWCD – Southwestern Water Conservation District

UB – Upper Basin States: Colorado, New Mexico, Utah, and Wyoming

UCRC – Upper Colorado River Commission

V,T,C – voluntary, temporary, compensated

2 Colorado River Drought Contingency Planning Synopsis

Historic drought conditions in the Colorado River Basin have resulted in fluctuating water levels and low storage in many Colorado River reservoirs. These impacts are seen severely at Lake Powell and Lake Mead. Since 2014, the Upper Basin (UB) states of Colorado, New Mexico, Utah, and Wyoming have worked on a Drought Contingency Plan (DCP) for the UB.

The resolution in 2014 for the development of an UB DCP identified three (3) key components to ensure ongoing compliance with the Compact.

1. The need for a plan to operate certain UB reservoirs to reduce risk of Lake Powell dropping to critical elevations;
2. Investigation of feasibility of temporary, voluntary, compensated demand management programs in the UB; and,
3. The expansion of weather modification programs.

Simultaneously, the Lower Basin (LB) states of Arizona, California, and Nevada have worked on their own DCP. Partied to these DCPs is the Department of Interior while the Republic of Mexico will participate in the LB DCP when implemented.

The UB DCP objectives are to (1) protect critical elevations at Lake Powell and help ensure continued compliance with the 1922 Colorado River Compact, and (2) establish the foundation for the storage of water in the UB as part of a Demand Management Program (DM) that may be developed in the future. Weather modification programs are ongoing and not explicitly identified in the DCP documents.

The LB DCP objectives are to (1) require Arizona, California and Nevada to contribute additional water to Lake Mead storage at predetermined elevations, and (2) create new flexibility to incentivize additional voluntary conservation of water to be stored in Lake Mead.

2.1 Interstate and Federal Agreements

These agreements are an interstate planning effort for drought responses to reduce risks associated with reaching critical reservoir elevations at Lake Powell and Lake Mead. These actions would be in addition to the 2007 Interim Guidelines. The 2007 Interim Guidelines are in place until 2026 with negotiations for post-2026 actions beginning no later than December 31, 2020. These actions will be designed to reduce the increased risks since adoption of the guidelines. To date, modeling studies of the DCPs indicate that, when implemented, the risk of reaching critical elevations in Lakes Powell and Mead through 2026 is significantly reduced.

CWCB provided a statement of support at their November 15, 2018 board meeting for the “*collective efforts of the seven Colorado River Basin States and Federal Government to plan and prepare for drought contingencies in the Colorado River Basin*”.

Below the draft agreements and documents are described. To read the draft documents in their entirety please visit the CWCB or Roundtable’s website. For specific questions regarding the draft documents please direct them to Celene Hawkins, the Roundtable’s CWCB representative.

2.1.1 Federal Legislation

Purpose: To authorize and direct the Secretary to execute the UB and LB DCP agreements and implement the DCP operations.

Need: To avoid claims or controversies that any element of the DCPs conflicts with or is otherwise not authorized by existing law.

Status: On March 19, 2019, representatives of the seven basin states sent a letter to Congress attaching the final draft interstate DCP agreements and requesting federal legislation for the UB and LB DCPs. Federal legislation has been drafted that authorizes the Secretary to execute the UB and LB DCP agreements and implementation.

2.1.2 Companion Agreement

Purpose: This agreement attaches and incorporates the UB DCP and LB DCP documents.

Need: To provide mutual understanding of DCP documents, willingness to obtain federal legislation implement the DCPs, sets forth provisions to resolve claims and controversies, reserve rights and legal positions, and implement a consultation process, and finally serve as mechanism to enforce the terms of the DCP.

Opportunities and Concerns: This agreement is the bridge between the UB and LB DCPs. Along with the federal legislation, this agreement holds both the UB and LB accountable when implementing their DCPs. This agreement is part of the overall package of the Colorado River DCPS, whereas all documents must be signed for implementation.

2.2 Lower Basin Drought Contingency Plan Documents

The LB DCP documents include LB DCP Agreement, Operational Provisions, Arizona agreements, California agreements, and Nevada agreements. The LB DCP agreement sets the terms for the Secretary and LB agreement on LB DCP Operations and includes the Secretary's commitment to work to create 100,000 AF of water per year until the end of 2026. The Operational Provisions serves as a guidance, in combination with the 2007 Interim Guidelines, to control the LB operations through 2026. These provisions require each LB state to contribute specific volumes of DCP water at certain Lake Mead elevations. It also recognizes that DCP contributions may be created by converting banked stored water (i.e. ICS) to DCP ICS but restricts when DCP ICS can be delivered in the future.

Purpose: These documents and exhibits require LB conservation and provides for additional flexibilities to accomplish the goals of the LB DCP. While using projections from the 24-Month Study for most probable inflows, *Section III. Operation Provisions (B) of Exhibit 1 – LB DCP Operations* describes DCP contributions from each state as they correspond specific elevation targets. These documents also activate Minute No. 323, a treaty between Mexico and the United States, requiring Mexico to participate in shortage sharing as well.

Opportunities and Concerns: By supporting the LB DCPs, this allows the UB to request federal legislation for a storage “bucket” in Lake Powell for future compliance use in Compact compliance; this may be interpreted as a tradeoff for provisions granted, such as using tools to address shortages now and provide long term-flexibility management of the river, in the LB

DCPs. Overall, these documents will lead to more water left in Lake Mead which allows more water to remain in Lake Powell that would otherwise be released to meet equalization requirements described in the 2007 Interim Guidelines. The 2007 Interim Guidelines require only Arizona and Nevada to take shortages, while the LB DCP requires California in addition to these states to take shortages and provide DCP contributions.

2.3 Upper Basin Drought Contingency Plan Documents

The UB DCP documents include the UB Drought Contingency Response Operations Agreement and Demand Management Storage Agreement. The goals of these documents are to reduce risk of Lake Powell reaching critically low elevations and reduce the risk of involuntary curtailment in the UB to maintain compliance with the Compact.

2.3.1 Upper Basin Drought Contingency Response Operations Agreement

This agreement will describe the process for developing operational plans to implement specific triggers to help maintain minimum power pool elevation at Lake Powell. This will be done by conserving water (temporarily) in Lake Powell or by moving water available (and subsequently recovering the storage) from upper CRSP facilities. A target elevation of 3525' was set to help assure enough water can remain in Lake Powell to protect minimum power pool and infrastructure.

Opportunities and Concerns: A common concern is Lake Powell dropping below power generation elevations and having this directly impact the ability to utilize existing water supplies. The loss of this clean power supply, loss of funding generated by the power production, and threats to maintaining compact compliance are big concerns with wide reaching impacts. The funding generated provides monies for: repayment of CRSP projects; operating and maintaining CRSP projects; complying with Endangered Species Act, NEPA, and Grand Canyon protection obligations; salinity mitigation program; and the UB projects funded by current Basin Fund MOA.

2.3.2 Demand Management (DM) Storage Agreement

This agreement is to explore the feasibility of a temporary, voluntary, and compensated reduction in diversions to conserve water that is otherwise consumptively used. This agreement will evaluate alternatives to facilitate intentional reductions in consumptive use through participant arrangements. Each state is responsible for investigating their own DM program and if found feasible implementation of the program. To implement a DM program for the entire UB, all UB states need to reach a consensus on program implementation.

Purpose: The purpose of a DM program is to help avoid the potential need for involuntary curtailment of Colorado River uses; specifically geared to ensure compact compliance. This would be considered a last resort to attempt to avoid an involuntary Compact curtailment. The UB was allocated a 500,000 acre-foot "bucket" in Lake Powell for storing demand management water for use under the UB DCP.

Opportunities and Concerns: Many challenges exist while questions remain unanswered when developing a DM program. These challenges exist on both a inter and intra-state level. Within Colorado, concerns exist surrounding working within the prior appropriation system and

respecting the way of life of water rights holders, to facilitate voluntary reductions in consumptive use from willing participants. A DM program may provide opportunities that works for a wide range of parties starting with the individual water right holders to the entire UB. Concerns were specifically raised to CWCB about proportionate contributions from the east and west slopes water users of the Colorado River. While CWCB does prioritize avoiding disproportionate impacts, no quantification of percent or volume allotments by from one sub-basin to another.

3 Colorado Specific Efforts in Response to DCP and Drought Conditions

Within Colorado, efforts to investigate the impacts of the persistent drought conditions, Compact curtailment, and DCP implementation are already underway. For example, a state level, the CWCB has adopted a policy statement as it relates to the DCP and proposed a work plan to investigate a DM program. At a local level, West Slope districts and Roundtables have investigated risk associated with Colorado River system and impacts from drought conditions and Compact curtailment.

3.1 Colorado Water Conservation Board Policy and Work Plan

The CWCB provided a policy statement at their November 15, 2018 board meeting regarding DM. The policy is to *“develop the state’s position and approach on whether and how to develop any Upper Basin Demand Management Program that could potentially be implemented within Colorado consistent with state law to avoid or mitigate the risk of involuntary compact curtailment and to enhance certainty and security in the Colorado water supply.”*

The policy statement also included eight strategies to help inform the state’s DM position. These strategies are summarized below:

1. Comply with applicable state law including that no action related to DM cause material injury to other water rights holders.
2. Convene a process to identify and evaluate the issues the state must address as part of any potential DM program to be considered in Colorado and the UB. This also includes considering input and consideration of water rights holders and stakeholders potentially impacted by the application of DM during the public review process.
3. Engage in activities that further the goals of the CWP specific to Chapter 9.1 and Principle 4 of the Conceptual Framework in Chapter 8.
4. The proposed DM program will operate within and be subject to the terms and conditions of the DM Storage Agreement. Specifically identified any water conserved and stored under a DM (1) will be stored at the Initial Units without charge; (2) will be solely for the purpose of helping assure compliance with the Compact; (3) shall not be released from Lake Powell except at the request of the UCRC for the exclusive purpose of helping assure Compact compliance; and (4) will be subject to evaporation assessments and volumetric limitations.
5. Investigate voluntary, temporary, and compensated reductions in CU. CWCB may join the UCRC and other UB states in any evaluation of importing of waters from

outside the natural Colorado River watershed to augment the river system for compact compliance purposes.

6. Prioritize avoidance of disproportionate negative economic or environmental impacts to any single sub-basin or region within Colorado while protecting the legal rights of water rights holders. The CWCB Board will work with water rights holders and stakeholders to assess the feasibility of and promote mechanisms for obtaining roughly proportionate contributions of water consumptively used from the Colorado River System to a DM program over a given timeframe from participants on each side of the Continental Divide.
7. CWCB will work with Colorado's Commissioner to the UCRC to cooperate with other UB states and the DOI to investigate and potentially develop a regional DM program and to ensure water conserved within Colorado under DM is not diverted and consumptively used by any other state.

At March 2019 CWCB Board meeting, a 2019 Work Plan was approved to develop a framework for investigating Colorado's interests and positions regarding whether and how any Colorado River DM program could or should operate within Colorado. This position will be based on evaluation and consideration of policy, legal, and technical aspects with water user/stakeholder input and technical expertise. The Work Plan proposes five (5) specific tasks including workgroups focusing on specific areas in need of investigation and outreach workshops.

3.2 Division of Water Resources Compact Administration

The Division of Water Resources (DWR) is charged with implementing Compact curtailment administration under their statutory authority. The State Engineer's authority is:

- 37-92-502(2)(a) "...and he [or she] shall also order the total or partial discontinuance of any diversion in his [or her] division to the extent that the water being diverted is required by persons entitled to use water under water rights having senior priorities..."
- 37-87-102(4) "The owners (of water rights)... may conduct the waters... into and along any of the natural streams of the state... and my take the same out again at any point desired if no material injury results to the prior or subsequent rights of others to other waters in said natural streams..."

The Division Engineers under the direction of the State Engineer will need to consider and identify beneficial use(s), source of water, destination of water, and no injury other water users when administering the Compact.

Opportunities and Concerns: The opportunity exists to provide extensive input into the development process of the rules and regulations for Compact compliance administration. Time and again concerns are raised about how the water rights priority system will be implemented (i.e. adjudication vs appropriation date). Considerable concerns surround the administration of water rights in the manner that no injury occurs to other water rights holders. CWCB supports the development of a process for allowing groups and individuals to provide

comments during the rule making process for implementing Compact administration. The State Engineer has not issued any criteria for how a curtailment would be administered at this time.

3.2.1 CWCB Position

The CWCB makes a clear distinction between a DM program that is voluntary, temporary, and compensated and mandatory curtailment for Compact compliance. Currently there is no exploration or expectation of an anticipatory (i.e. involuntary) DM program. The CWCB provided a policy statement at their November 15, 2018 board meeting regarding DM. CWCB understands that during the development process of a DM program numerous technical, legal, economic and policy questions will need to be resolved. Current hydrologic trends could hasten the time for formal action necessary to comply with the Compact.

In the event that the quantify of water conserved after CRSP reservoir releases and under DM is insufficient to ensure Colorado's compliance with the Compact, it is the policy of CWCB to *"encourage and collaborate with Division of Water Resources to engage in timely and extensive public outreach regarding the development of any alternative measures or rules for compact compliance administration...Such process would be with the goal, but not the requirement, of achieving general consensus within the state, without constraining the Division of Water Resources' lawful administration of water rights in order to meet Colorado's compact obligations."*

3.3 Colorado River Risk Study

The SWCD, CRD, and the four west slope Roundtables have embarked on a Colorado River Risk Study. This project is a multi-phase process. The impetus for doing a Risk Study are hydrologic drought conditions persistent since 2000 and the full or even over development of the Colorado River supplies. Colorado's Water Plan describes Colorado Conceptual Framework for development of water supplies from the Colorado River System for use on the Eastern Slope, with Principal 4 specifically addressing a collaborative program that protects against involuntary curtailment. In anticipation of such program, these entities embarked on this modeling effort to better understand the "Big River" issues while addressing issues with in Colorado.

- Phase I laid the groundwork for evaluating a number of different state-wide or sub-basin scenarios dealing with questions of curtailment, demand management, water banking, and risk sensitivity to model variables such as demands and hydrology.
- Phase II included two tasks. Task 1 addressed the questions that were raised during the Phase I process specific to the modeling performed using CRSS. Task 2 focused on the use of StateMod to address in-state questions related to DM, resulting yields of conserved water, water banking, and the potential to couple StateMod with CRSS.
- Phase 3 of the study (funded only by SWCD and CRD) is currently on going and builds on the outcomes from the first two phase. Using the two models, Phase 3 will conduct a number of model runs relating to: (1) baseline simulations and futures conditions; (2) Compact administration modeling; (3) evaluation impacts of increasing levels of post-compact water right curtailment; and (4) evaluation of 100,000 AF/year and 200,000 AF/year contributions from the UB states to a 1 MAF non-equalized demand

management account to compare the reduction in risk of Lake Powell dropping below elevation 3525’.

Model Results: The first two phases of the study yielded notable quantitative and qualitative results. Phase 3 of the study is currently underway with preliminary results expected the summer of 2019. In general, the following bullets are key take-aways from the study.

- The likelihood of Lake Powell dropping below critical elevations is small, but impact to UB water users could be catastrophic.
- The deficit volumes at Lake Powell, even after proposed Drought Operations of CRSP reservoirs, could be in the order of millions of acre-feet if critical drought periods repeat.
- It is unlikely that the UB could generate that volume of water in a short period of time through a reactive demand management program.
- A proactive DM program (V,C,T) combined with a water banking program intended to support Lake Powell elevations could significantly reduce the risks. The size of the bank, its location(s), and operating constraints are important considerations.
- StateMod is the best tool for modeling in-state DM activities, non-federal reservoir operations, and yield estimation from participating water rights/users.
- CRSS is necessary for understanding Lake Powell operations and other “big river” issues that are the key drivers to DM requirements.
- The two models (CRSS and StateMod) can be combined effectively to simulate complex demand management questions within Colorado as well as the impacts of those actions on Lake Powell and impacts of basin-wide operations on Colorado water use.

3.4 Weather Modification Program

Colorado has been participating in a weather modification research and programs since the 1950s with the first permits issued for weather modification facilities in 1972. Since Colorado is a headwaters state with eight major river basins, downstream states are reliant on the snow pack and stream flow generated in Colorado. This program is seen as an opportunity to augment flows in the Colorado River basin.

Weather modification is primarily conducted by the process of cloud seeding. Cloud seeding is the process of burning silver iodide through an ice nucleus generator that is carried up into the clouds to stipulate the precipitation process. Based on a 2014 Study by the State of Wyoming, seeding in two Wyoming mountain ranges increased snowfall by 5 to 15 percent which in turn raised stream flows by 0.4 to 3.7 percent.

In southwestern Colorado, many local water entities fund an Eastern San Juan Program, a Western San Juan Program, and an Upper San Miguel Program (including west Dolores and Telluride).