

DCP-DM SUBCOMMITTEE MEETING

Southwest Roundtable

Drought Contingency Plan and Demand Management Sub-Committee Meeting

November 6, 2018

TODAY'S MEETING AGENDA

- Introductions
- Purpose of Today's Meeting
- PowerPoint Presentation
 - Historical documents and figures
 - Drought Contingency Plan documents and agreements
 - Conservation Districts and CWCB perspectives
- Discussion of Draft Documents
 - "Connecting it All" Flowchart
 - Discussion, comments, and questions
 - Public comment period
- Action Items and Set Next Meeting Date

TODAY'S PRESENTATION AGENDA

- Colorado River Compact of 1922
- Interim Agreement of 2007
- Summary of Past Hydrology
- Division of Water Resources Administration
- Risk Assessment Phase III Scope
- Lower Basin Drought Contingency Plans
- Drought Contingency Plans and Agreements
- Drought Contingency Legislation
- Conservation Districts and CWCB Perspectives

COLORADO RIVER COMPACT 1922

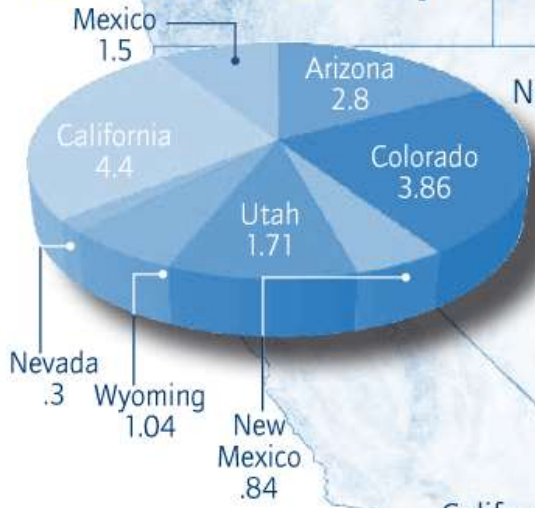
- Apportionment – Article III (a)
 - The exclusive beneficial use of 7.5 MAF per year of water from the Colorado River System is apportioned to the Upper and Lower Basin respectively which includes all water needed for the supply of any future water rights (Note: Lower Basin gets additional 1 MAF under Article III (b))
- Non-Depletion Clause – Article III (d)
 - Upper Basin states will not cause the flow at Lee Ferry to be depleted below an aggregate of 75,000,000 acre-feet for any period of ten consecutive years
 - Known as the 75/10 Rule
 - This is not a delivery obligation!
- Operational Provision – Article III (e)
 - Upper Basin states cannot keep water, and the Lower Basin states cannot call for delivery of water that cannot be reasonably applied to domestic and agricultural use
- Article IV
 - In the event curtailment of use shall become necessary to not deplete the flow at Lee Ferry below that required by Article III of the Colorado River Compact, the extent of **curtailment by each state shall be determined in such amounts and at such times as determined by the UCRC**
 - The UCRC does NOT have authority to determine how to administer water within an individual state
 - We have never been in curtailment, and under historical hydrologic conditions, we will not face a curtailment in foreseeable future. Historical record, however, is not necessarily indicative of the future

TREATY WITH MEXICO, 1944

- Guarantees Mexico an annual quantity of 1.5 MAF
- If a system surplus exists, amount can increase to 1.7 MAF
- In “extraordinary drought” allotment can be reduced in proportion to reduction of uses with the U.S.
 - The Treaty does not define extraordinary drought
 - Any definition would apply to Lower Rio Grand too (Part of the same treaty)
- Establishes the International Boundary and Water Commission to implement the Treaty
- Minutes to the treaty further define but DO NOT alter terms

COLORADO RIVER BASIN AND ITS APPORTIONMENT

Total: 16.5 million acre-feet/year



SOURCE: U.S. BUREAU OF RECLAMATION



2007 INTERIM GUIDELINES

- In place for an interim period from 2007 through 2026
- Guidelines provide for coordinated operations of Lake Powell and Lake Mead to minimize Lower Basin shortages and Upper Basin curtailments
- Encourage efficient use and management of Colorado River water through the Internationally Created Surplus (ICS) mechanism
- Establish guidelines for determining shortages in the Lower Basin
- Creates option to bank water in the Lower Basin = ICS
 - Options: (1) Extraordinary conservation; (2) System efficiency improvements; (3) Tributary conservation; (4) Importation of non-System water
- Specifics coordinated operating criteria for Lake Powell and Lake Mead
 - To avoid Upper Basin curtailment and reduce impact of Lower Basin shortages under low water supplies

Lake Powell
current elevation
3,593 feet
(10/9/18)

Lake Powell & Lake Mead Operational Diagrams

Equalize

8.23 or balance
if Mead low

7.48 or 8.23 if
Mead low

Balance

| Lake Powell Elevation (feet) | Lake Powell Operational Tiers | Lake Powell Storage (maf) | Lake Mead Elevation (feet) | Lake Mead | Lake Mead Storage (maf) |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|----------------------------|------------------------------------------------------------------|-------------------------|
| 3,700 | Equalization Tier Equalize, Avoid Spills or Release 8.23 maf | 24.3 | 1,220 | Flood Control or 70R Surplus | 25.9 |
| 3,636 - 3,666 (2008-2026) | | | 15.5 - 19.3 (2008-2026) | | 1,200 |
| 3,595 | Upper Elevation Balancing Tier¹ Release 8.23 maf; if Lake Mead < 1,075 feet, balance contents with a min/max release of 7.0 and 9.0 maf | 11.3 | 1,145 | Normal Operations | 15.9 |
| 3,575 | | | 9.5 | | 1,125 |
| 3,560 | Mid-Elevation Release Tier Release 7.48 maf; if Lake Mead < 1,025 feet, release 8.23 maf | 8.3 | 1,100 | | 11.5 |
| 3,525 | | | 5.9 | 1,075 | 9.4 |
| 3,490 | Lower Elevation Balancing Tier Balance contents with a min/max release of 7.0 and 9.5 maf | 4.0 | 1,050 | Shortage 333 kaf² | 7.5 |
| 3,370 | | | 0 | | 1,025 |
| | | | 1,000 | Shortage 500 kaf² and Consultation³ | 4.3 |
| | | | 895 | | 0 |

¹ Subject to April adjustments that may result in balancing releases or releases according to the Equalization Tier.

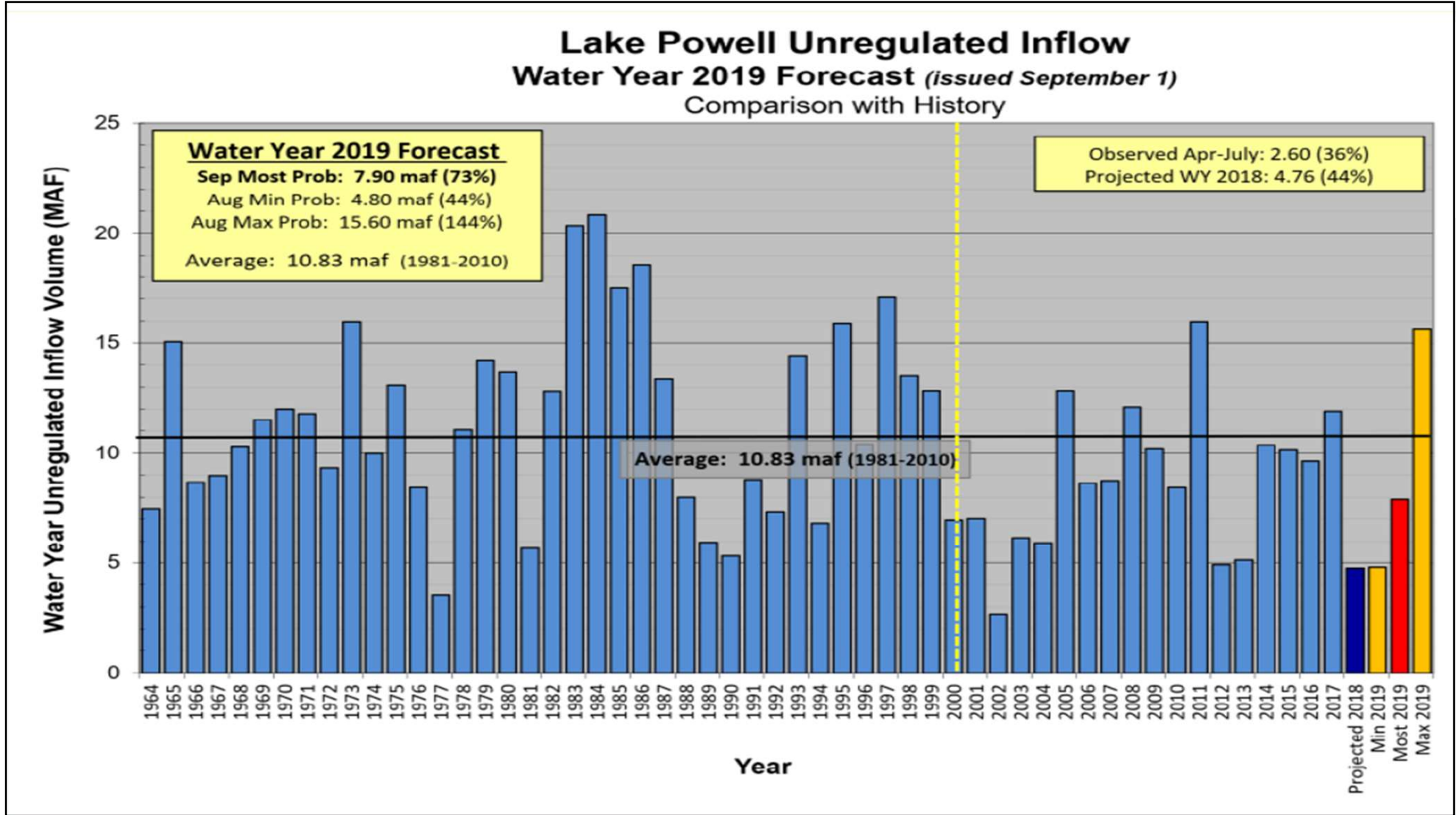
² These are amounts of shortage (i.e., reduced deliveries in the United States).

³ If Lake Mead falls below elevation 1,025 ft msl, the Department will initiate efforts to develop additional guidelines for shortages at lower Lake Mead elevations.

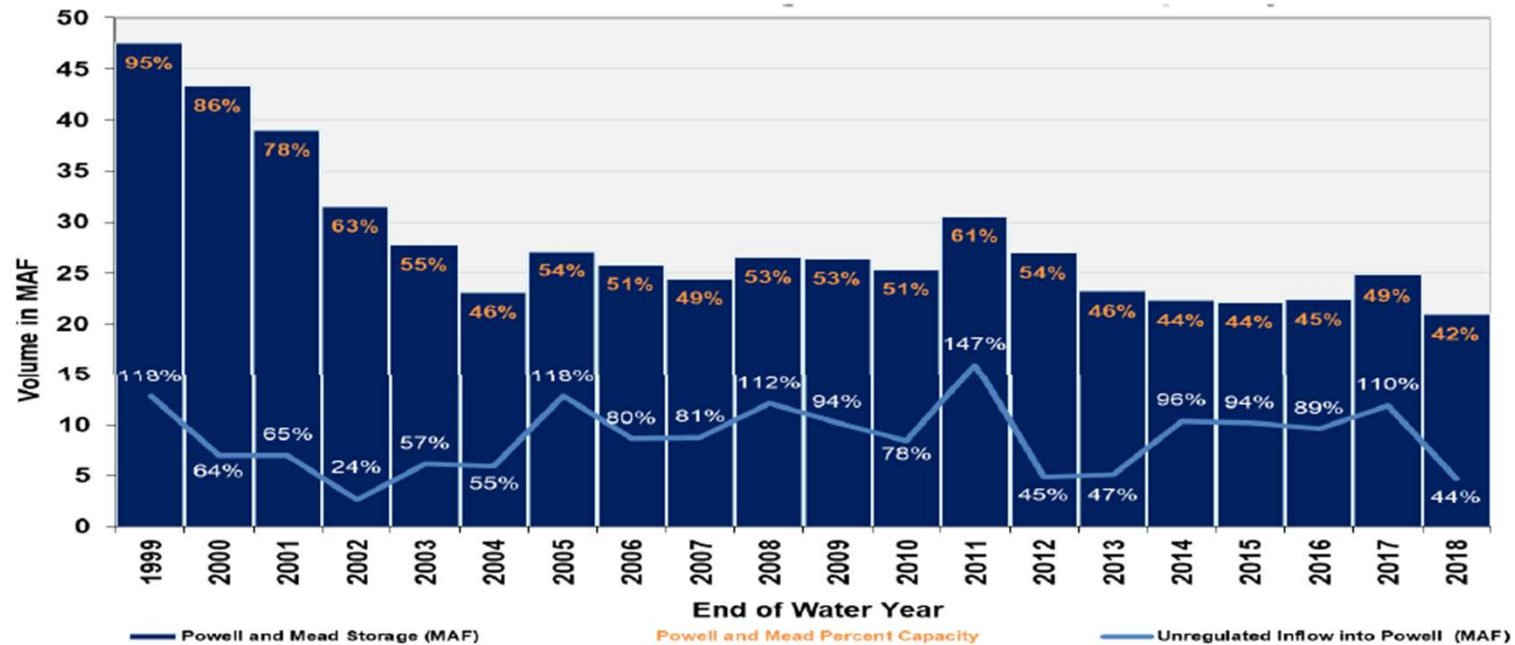
RECLAMATION

SUMMARY OF PAST HYDROLOGY

- Water Year 2018 – On track to be third driest year on record (since 1964)
- Lake Powell inflows were less than 5 million acre-feet 7 out of last 18 years
- Above-average Lake Powell inflows have occurred only 5 years since 2000
- 4 of the lowest years on record have occurred during the 19 year drought, with 2012 and 2013 being the driest consecutive two year period in recorded history
- Current predictions are for increasing demand and decreasing supply



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



¹Values for Water Year 2018 are projected. Unregulated inflow is based on the latest CBRFC forecast dated September 17, 2018. Storage and percent capacity are based on the September 2018 24-Month Study.

²Percentages on the light blue line 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.

LEE FERRY HISTORIC FLOW LAST 10 YEARS

| Year | Historic Flow (1,000 AF) | Progressive 10-Year (1,000 AF) |
|------|-----------------------------|-----------------------------------|
| 2008 | 9,180 | 89,004 |
| 2009 | 8,406 | 85,870 |
| 2010 | 8,436 | 84,777 |
| 2011 | 13,227 | 89,643 |
| 2012 | 9,534 | 90,829 |
| 2013 | 8,289 | 90,746 |
| 2014 | 7,590 | 89,988 |
| 2015 | 9,157 | 90,750 |
| 2016 | 9,138 | 91,380 |
| 2017 | 9,175 | 92,133 |

DIVISION OF WATER RESOURCES ADMINISTRATION

- Division Engineer Authority
 - 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..."
- Considerations
 - Beneficial use (enable authority)
 - Source of water
 - Destination of water
 - No Injury
 - Junior and senior diversions in the "Reach"; exchange in the Reach; out-of-priority diversions – replacement supply in the Reach; and Losses

FEDERAL PROJECT DATES IN OUR AREA

| Sub-Basin | Project | Adjuration Date | Appropriation Date |
|---------------|-----------------|-----------------|--------------------|
| Pine River | Vallecito | 03/07/1966 | 11/13/1935 |
| Florida River | Lemon | 03/21/1966 | 06/10/1936 |
| Mancos River | Jackson | 03/22/1963 | 10/31/1936 |
| Animas River | Animas-La Plata | 03/21/1966 | 09/02/1938 |
| Dolores River | Dolores | 03/22/1963 | 09/10/1940 |

RISK STUDY: QUESTIONS ADDRESSED IN PHASES 1 & 2

- What are the magnitude and duration of Lake Powell shortages below elevation 3525'?
- How much of the above shortages can be met by contributions from Drought Operations of CRSP reservoirs?
 - Answer: up to about 2 MAF
- How much consumptive use reduction ("demand management") would be needed by Upper Basin states – after use of stored CRSP water – in order to maintain Lake Powell pool elevations?
 - Answer: in extended droughts well over 1 MAF
- What are possible implications to Compact deliveries?
 - Answer: storage in Lake Powell is key – if storage available no Compact problems
- What is the range of volumes that Colorado might need to conserve?
 - Answer: up to 1 MAF – too much for a single year – must use a water bank to build up a reserve
- Can we use CRSS & StateMod together to answer detailed questions?
 - Answer: Yes

We must understand the "Big River" issues in order to address issues within Colorado. CRSS handles the "Big River" and StateMod is used to look at detailed management and impacts within Colorado

RISK STUDY PHASE 3

- Critical Assumptions
 - We'll take action at 3525' to protect minimum power pool (3490')
 - Elevation of 3525' is 2 MAF above minimum power pool
 - Lower Basin will successfully implement its DCP!
 - Future hydrology will be similar to 1988-2018
 - Natural flow at Lee Ferry of about 13.2 MAF since 2000 its been 12.4 MAF
- Points to Consider
 - Phase 3 is in progress; work will provide more details on demand management alternatives and impacts
 - DCPs have not yet been approved within individual states
 - 2007 Interim Guidelines expires in 2026 – new agreements must be negotiated and will impact DCPs
 - Federal legislation will be required

RISK STUDY PHASE 3 SCOPE OF WORK SUMMARY

- Task 1 Develop Baseline Information
 - Baseline simulations and future conditions
- Task 2 Refinements to Linked StateMod Model for Compact Administration Modeling
 - Quantify water rights by date (pre & post compact), evaluate and devise mechanism administration between in-basin and TMD water rights, and evaluation of pre-compact depletions
- Task 3 Evaluation Impacts of Increasing Levels of Post-Compact Water Right Curtailment
 - Model hypothetical administrative protocols to be modeled for varied levels of curtailment and other protocols to help inform potential future demand management activities
- Task 4 Evaluate 100,000 AF/YR and 200,000 AF/YR contributions from 4 Upper Basin states to a 1 MAF non-equalized demand management account to compare the reduction in risk of Lake Powell dropping below elevation 3525' achieved under each annual rate of contribution to the account.
- Task 5 Outreach and Deliverables

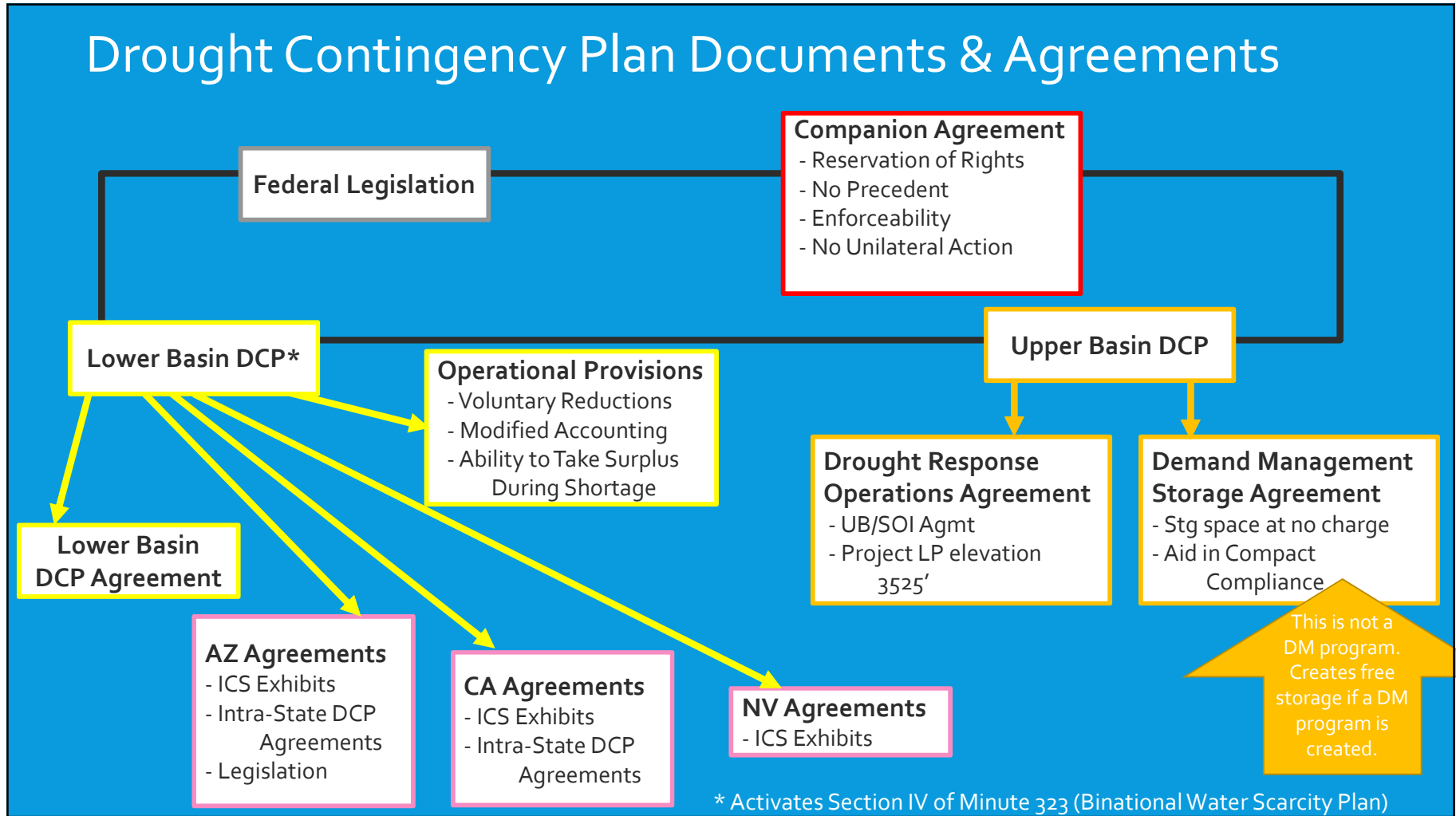
TAKE AWAY SUMMARY

- Likelihood of Lake Powell dropping below critical elevations is small, but impact to upper basin 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 upper basin could generate that volume of water in a short period of time through a reactive demand management program
- A proactive demand management 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 ban, its location(s), and operating constraints are important considerations
- StateMod is the best tool for modeling in-state demand management 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 demand management requirements
- The two models 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

DROUGHT CONTINGENCY PLANNING IN UPPER AND LOWER BASINS

- What is it?
 - Interstate planning for drought response to reduce risks associated with reaching critical reservoir elevation at Lake Powell and Lake Mead
- Actions would be in addition to the 2007 Interim Guidelines
- Actions designed to reduce the increased risks since adoption of the 2007 Interim Guidelines
- Actions designed to reduce risks during development of post-2026 operations plan which begins no later than December 31, 2020
- 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

Drought Contingency Plan Documents & Agreements



COMPANION AGREEMENT

- Signatories
 - Secretary of the Interior and Bureau of Reclamation Commissioner, Upper Basin, and Lower Basin parties
- Elements
 - Attaches and incorporates UB DCP and LB DCP documents
 - Provides mutual understanding of DCP documents as tools to be used in an effort to protect each Basin and benefit the system
 - Establishes mutual willingness to obtain federal legislation to implement the DCPs
 - Sets forth provisions to resolve claims and controversies, reserve rights and legal positions, and implement a consultation process
 - Serves as mechanism to enforce the terms of the DCPs

This agreement is the bridge between the UB and LB DCPS

FEDERAL LEGISLATION

- Purpose
 - To authorize and direct the Secretary to execute the Upper Basin and Lower Basin 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

LOWER BASIN DROUGHT CONTINGENCY PLAN AND AGREEMENTS

- Lower Basin DCP Agreement
 - Sets terms for Secretary and Lower Basin agreement on Lower Basin DCP Operations
 - Includes Secretary commitment to work to create 100,000 acre feet of water per year
 - Term is until the end of 2026. Lower Basin DCP Operations
- Lower Basin DCP Operations
 - Serves as guidance, in combination with the 2007 Interim Guidelines, to control LB operations thru 2026
 - Requires each Lower Division State to contribute specific volumes of DCP water at certain Lake Mead elevations
 - Recognizes that the DCP contributions may be created by converting banked storage (ICS) to DCP ICS, but restricts when DCP ICS can be delivered in the future (above elevation 1090, except for temp. borrowing)
 - Provides greater flexibilities

Overall, requires Lower Basin conservation and provides for additional flexibilities to accomplish these goals

UPPER BASIN DROUGHT CONTINGENCY PLAN AND AGREEMENTS

2014 UPPER COLORADO RIVER COMMISSION RESOLUTION

- Development of an Upper Basin Drought Contingency Plan to ensure ongoing compliance with 1922 Colorado River Compact, including:
 - A Plan to operate certain Upper Basin reservoirs to reduce risk of Lake Powell dropping to critical elevations
 - Investigation of feasibility of temporary, voluntary, compensated demand management programs in the Upper Basin
 - Expansion of weather modification programs

GOALS

- Reduce risk of Lake Powell reaching critically low elevations (3,490 feet & 3,525 feet)
- Reduce the risk of involuntary curtailment in the Upper Basin to maintain compliance with 1922 Colorado River Compact

AGREEMENTS

- Drought Response Operations
- Demand Management Storage

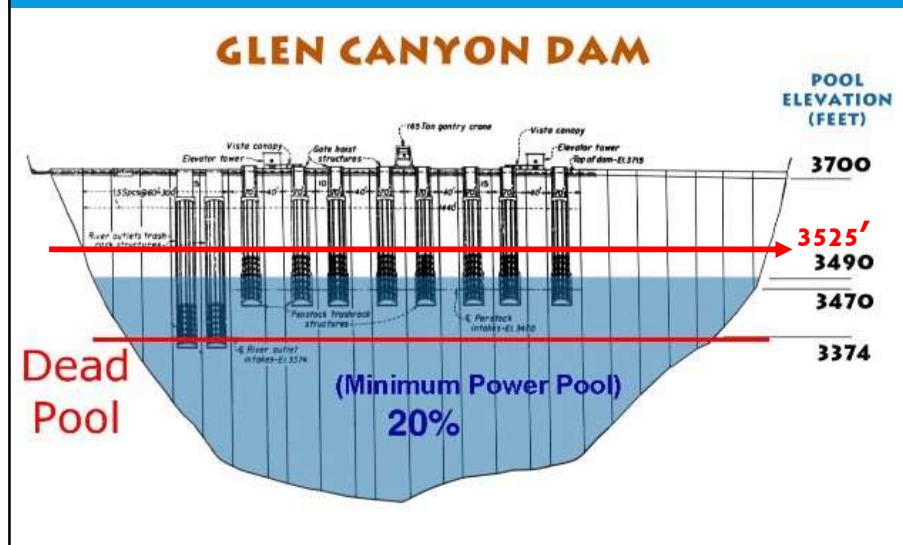
Upper Basin Drought Contingency Plan Drought Response Operations Agreement (UB DCP – DROA)

- Agree on process for developing operational plans to implement based on specific triggers to help maintain minimum power pool elevation at Lake Powell
- By conserving water (temporarily) in Lake Powell or moving water available (and subsequently recovering the storage) from upper CRSP facilities



UB DCP – DROA

WHY PROTECT MINIMUM POWER POOL?



- Loss of power generation impacts:
 - Clean power supply
 - Funding for:
 - Repayment of CRSP projects
 - Operating and maintenance of CRSP projects
 - Complying with EPA, NEPA, Grand Canyon protection obligations
 - Salinity Mitigation
 - Upper Basin projects funded by current Basin Fund MOA
- Threat to maintaining compact compliance
 - Directly implicates ability to utilize existing water supplies

UB DCP – DROA continued...

- Signatories
 - Secretary of the Interior and Upper Division States through the Upper Colorado River Commission
- Target Elevation
 - 3525' to help assure enough water can remain in Lake Powell to protect minimum power pool and infrastructure (somewhere between 3490' and 3525')
- Principles and Process Document
 - Sets forth minimum principles to guide any plan development process
 - Establishes process for developing a plan to move water (and subsequently recover storage) from CRSP Initial Units to protect elevation 3525' at Lake Powell based on real time conditions

DEMAND MANAGEMENT STORAGE AGREEMENT

- Purpose
 - Secure ability to use unfilled storage space in CRSP Initial Units to promote continued compliance with compact obligations in times of extended drought
 - Provide foundation on which the Upper Basin may explore and potentially develop a demand management program in the future
- Need
 - For any demand management to be effective, multi-year storage is required. Water must be conserved and stored overall several years to provide a meaningful benefit
 - There is little incentive to investigate the many outstanding issues related to demand management without securing some assurances to mitigate risks and justify expending time and resources
- Authorization (federal approval)
 - Secure Secretary's authority to allow, over the long-term, storage at CRSP Initial Units of water conserved as part of an Upper Basin Demand Management Program
 - Ensure such storage will be at no charge
 - Authorization does not sunset
- Agreement (interstate agreement)
 - Sets forth minimum parameters under which the Upper Division States could access the authorized storage space between now and 2026

SOUTHWESTERN WATER CONSERVATION DISTRICT AND COLORADO RIVER DISTRICT INTRA-STATE REQUEST TO CWCB

- Account Lake Initial CRSP Units (Lake Powell)
 - Upper Division States, No Charge
- Not Subject to Equalization (Coordinated Op's)
- Voluntary, Compensated, Temporary
 - Public Presentations, UCRC Resolution
 - Would have otherwise depleted flows
- Must Not Injure Other Water Rights
- Avoid Disproportionate Impacts
 - Contributions Both Sides of the Continental Divide
 - Proportionate Post-Compact Depletions (approx. 50-50)
- Consistent Water Plan – Conceptual Framework
- Any Other Use (Mandatory, Anticipatory)
 - Stakeholder Outreach – Consensus Approach

CWCB PERSPECTIVE

DCP TIMELINE

Interstate Drought Contingency Plan

- September 18 – 7-States and Reclamation agreed the concepts in draft documents address the scope of the DCP
- October – Outreach performed. DCP documents brought to the Board; Public Webinar was held on October 9
- October – November - If possible, LB obtain approvals for committing to obligations in LB DCP, Commission confirms path forward, DOI conducts internal review
- November - December – If possible, Parties demonstrate path forward at CRWUA. Federal legislation coordination as appropriate
- January 2019 – If possible, AZ legislature provides approval to execute documents. Federal legislation secured and Parties execute documents

Intrastate Demand Management Evaluation

- October – 2019 – Continue demand management outreach (IBCC, roundtables, etc.).

NEXT STEPS

- CWCB Board Meeting
 - November 14 -15, 2018 in Golden, Colorado
- Next Sub-Committee Meeting Date(s)
 - December meeting date