Colorado River Drought Management Planning and Status

Southwestern Water Conservation District Annual Water Seminar

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The views expressed in this presentation are solely those of the presenters. Accordingly, this presentation does not reflect the official position of the State of Colorado or Dept. of Law.

Overview of Drought Planning

- Interstate Planning
  - Context for Drought Contingency Planning (DCP)
  - Status of DCPs
- Intra-State Planning
  - Current Forums
  - State Outreach Approach
    - Focus: Demand Management Considerations
    - Law of the River as Context
    - Issues
- Next Steps

Interstate Contingency Planning – General

- What is it?
  - Planning for drought response to reduce risks associated with reaching critical reservoir elevations at Lake Powell or Lake Mead.

Interstate Contingency Planning – General

- Why are we doing it?
  - If critical elevations are breached, the system faces threats to ability to control own destiny – drinking water supply, irrigation, power production, environmental resource preservation, and overall sustainability.

- Low probability but High Risk.
  - Sensible to plan for the worst case scenarios to avoid potential controversy, conflict, and uncertainty.
  - Preparation for but not predicting need for implementation.

Current Issue: Drought

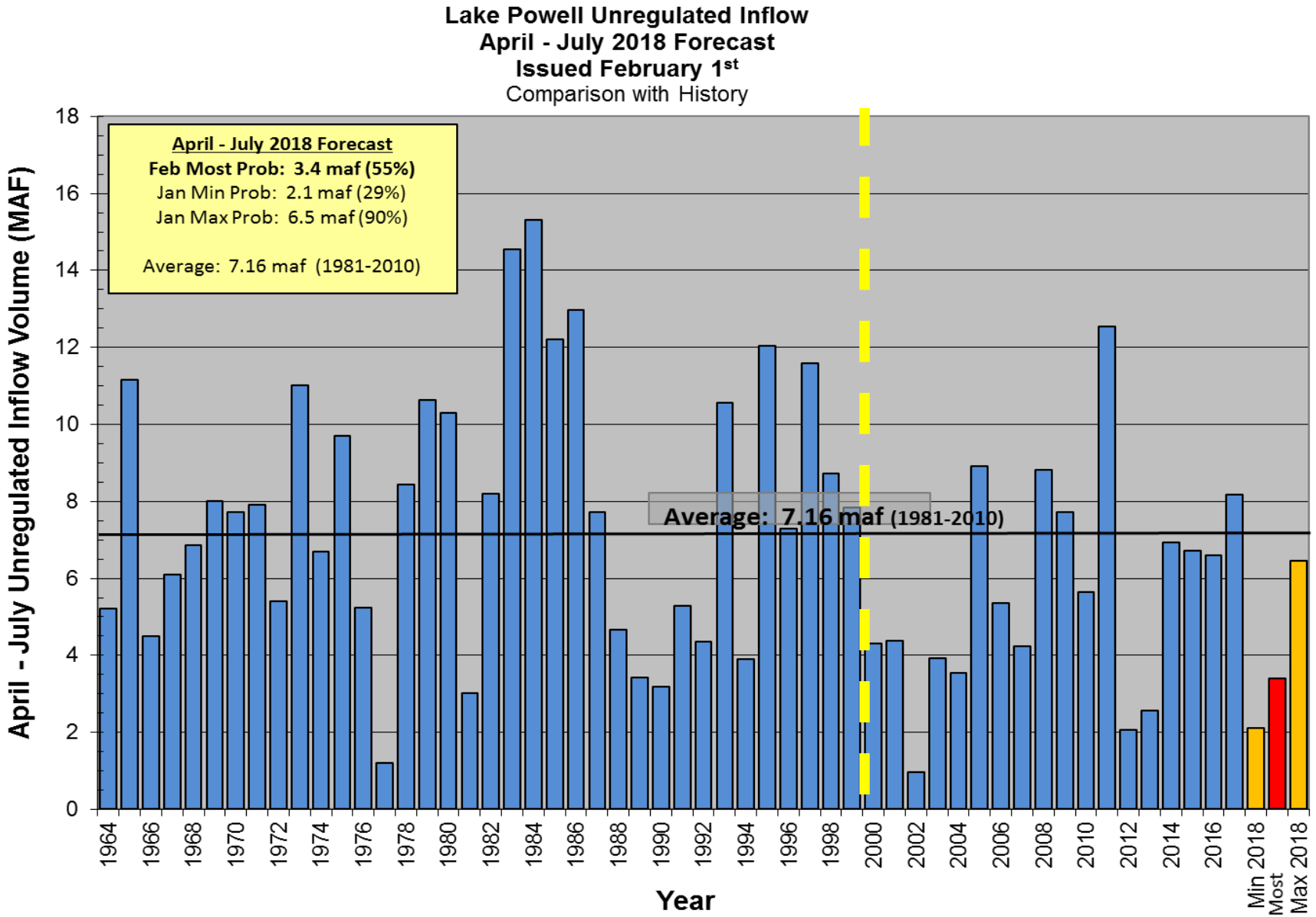
- Basin Hydrology--How Bad Is It?

- Water Year 2017— good hydrology
  Water Year 2018 – not gonna say it, but . . .

- Context in Basin

  - ✓ 6 of last 17 years of inflows into Lake Powell were less than 5 million acre-feet. (May be 7 of last 18).
  - ✓ Above-average inflows into Lake Powell have occurred only 5 years since 2000.
  - ✓ 3 of the 4 lowest years on record have occurred during the 17-year drought, with 2012 and 2013 being the driest consecutive two-year period in recorded history.(May be 4 of the 5 lowest years)
  - ✓ Current realistic predictions are for increasing demand

Drought cont'd



Lake Powell Storage

Inflows to Lake Powell

Percentage of 30-year average (1971-2000): 12.04 maf

2000 – 7.32 maf (62%)
- 2001 – 6.96 maf (59%)
- 2002 – 3.06 maf (25%)
- 2003 – 6.36 maf (51%)
- 2004 – 6.13maf (49%)
- 2005 – 12.62 maf (105%)
- 2006 – 8.77 maf (71%)
- 2007 – 8.23 maf (68%)
- 2008 – 12.36 maf (102%)
- 2009 – 10.36 maf (92%)
- 2010 – 8.74 maf (73%)
- 2011 – 16.79 maf (142%)

1981-2010: 10.83 maf)

- 2012 – 4.91 maf (45%)
- 2013 – 5.12 maf (47%)
- 2014 – 10.38 maf (96%)
- 2015 – 10.17 maf (94%)
- 2016 – 9.62 maf (89%)
- 2017 – 12.23 maf (113%)

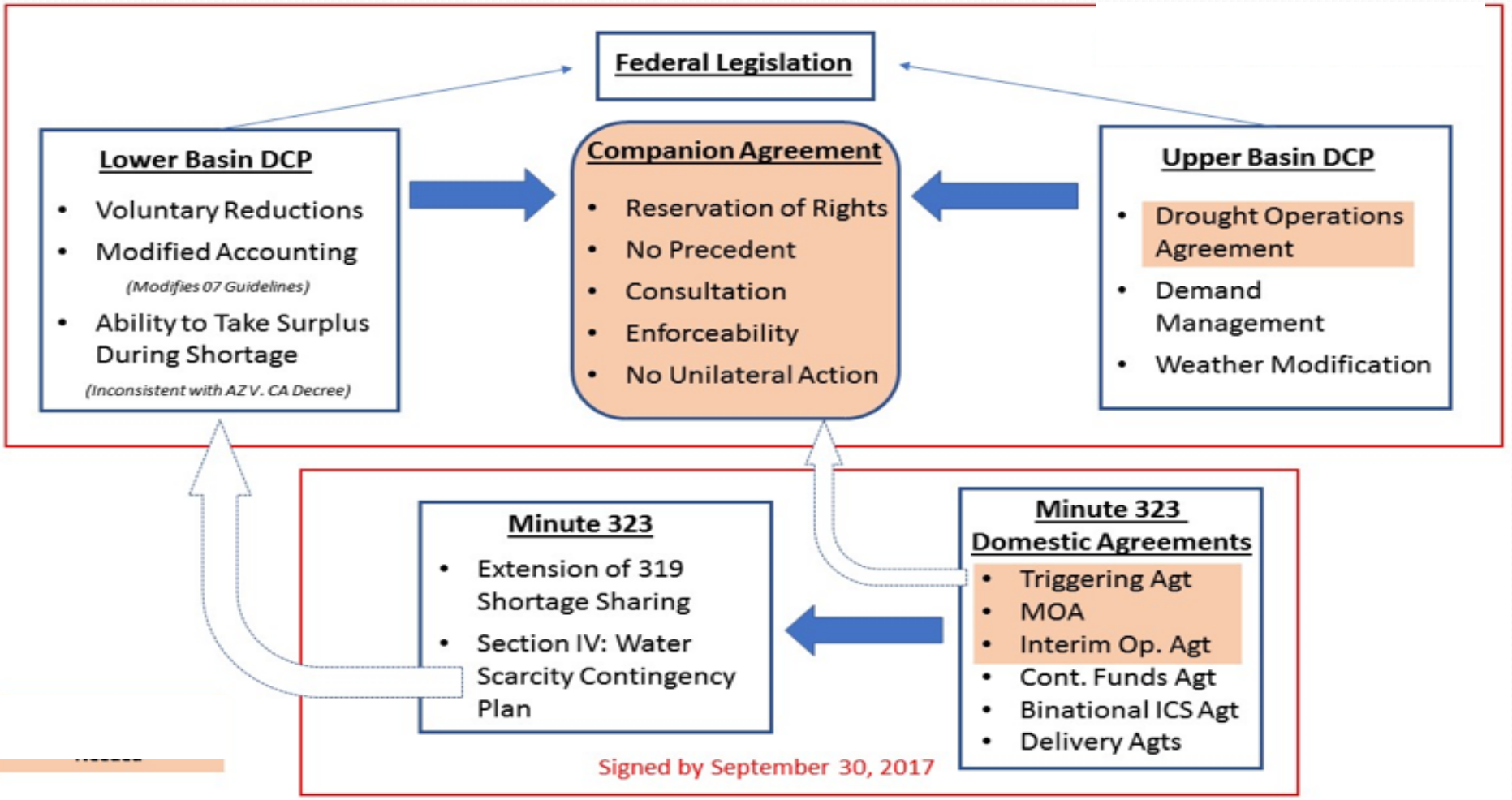
Interstate Contingency Planning – General

- **Goals**
  - Identify methods for providing *additional security* in the Colorado River System in times of ongoing or extended drought.

AND

  - Avoid *unilateral* and *uncoordinated* efforts that could provoke or lead to litigation or conflict.

Drought Contingency Relationships



Minute 323

- Signed in Santa Fe, October 2017, along with domestic agreements necessary to implement the Minute.
- Key Results
  - ✓ Helps cement drought planning in the Lower Basin (Mexico participating).
  - ✓ Continues problem solving consistent with Treaty.
  - ✓ Does not compromise state authorities or rely on use of state water to accomplish.
- For Minute Water Scarcity provisions to be effective, Lower Basin must effectuate a Drought Contingency Plan.

Lower Basin DC Planning

- Contingency Planning
  - Implement voluntary reductions in water use beyond those required by the 2007 Interim Guidelines
    - Includes a commitment by the U.S. to work to create or conserve Colorado River system water.
  - Incentivize ICS creation/storage
- Sustainability planning
  - Recognizing need for longer-term mechanisms for addressing "Structural Deficit" in the Lower Basin. But DCP is not solving this deficit.

Contemplated Proposed Lower Basin Reductions

Lake Mead Elevation (ft)	2007 Interim Guidelines Shortages (kaf)		Voluntary Reductions (kaf)			Combined Reductions (kaf) (2007 Interim Guidelines Shortages + Voluntary Reductions)			
	AZ	NV	AZ	NV	CA	AZ		CA	TOTAL
1,090	0	0	192	8	0			0	200
1,085	0	0	192	8				0	200
1,080	0	0	192	8			8	0	200
1,075	320	13	192				21	0	533
1,070	320	13				512	21	0	533
1,065	320	13			0	512	21	0	533
1,060	320				0	512	21	0	533
1,055				8	0	512	21	0	533
1,050			192	8	0	592	25	0	617
1,045			240	10	200	640	27	200	867
1,040	40	17	240	10	250	640	27	250	917
1,035	400	17	240	10	300	640	27	300	967
1,030	400	17	240	10	350	640	27	350	1,017
< 1,025	480	20	240	10	350	720	30	350	1,100

Upper Basin Contingency Planning

- Goals
  - Reduce or eliminate probability of Lake Powell reaching *minimum power pool* elevation through 2026.
  - Ensure the *continued operation of the 2007 Interim Guidelines* through 2026.
  - Combined with expected actions in Lower Basin, increase the *synergistic benefits* for Basin as a whole.

Minimum Power Pool

- Elevation ~3,490 feet at Lake Powell.
- Below minimum power:
  - Lose large power supply.
  - Lose funds for:
    - Repaying for construction of projects.
    - Operating and maintaining Glen Canyon, Aspinall, Flaming Gorge, Navajo, etc. reservoirs.
    - Implementing compliance with Endangered Species Act, NEPA, and Grand Canyon protection legislation.
  - Increase risk to meeting Compact obligations.

Operational Impacts

- More frequent releases of 8.23 MAF or lower each year.
- Minimum elevation for power generation is *approximately* 3,490 feet.
- Below 3,490 feet, releases would be made through bypass tubes only.
- As elevation decreases, cannot release full capacity of bypass tubes (15,000 cfs.)
  - 3500' – 10.86 MAF annually
  - 3490' – 10.60 MAF annually
  - 3450' – 9.09 MAF annually
  - 3440' – 8.28 MAF annually
  - 3430' – 7.41 MAF annually
  - 3420' – 6.37 MAF annually
  - 3400' - 3.47 MAF annually
  - **3370' = 0 MAF, dead pool**

Upper Basin DCP-Plan Elements

- *Develop Drought Response Ops for CRSP Facilities*
- Explore feasibility and opportunities for *Upper Basin demand management*
- *Weather Modification* and *Phreatophyte Management*
- *Term* – Consistent with *term for 2007 Interim Shortage Guidelines*

CRSP Reservoir Operations

Navajo Reservoir

Flaming Gorge Reservoir

Blue Mesa Reservoir

Lake Powell

- Agree on operations to implement under emergency conditions to maintain minimum power pool elevation at Lake Powell.
- By conserving water (temporarily) in Lake Powell or moving water available from upper CRSP facilities

Demand Management

- Goal – evaluate alternatives to facilitate temporary, voluntary, compensatedd reductions in consumptive use through willing participant arrangements.
- Challenges – Working within the prior appropriation system and respecting way of life of water rights holders, to facilitate voluntary reductions in consumptive use on willing participant basis.
- Lots of questions exist – Feasibility, accounting, implementation, management and administration. Need to be investigated before determining if viable.
- Evaluation mechanisms – Currently include:
  - System Conservation Pilot Program (UCRC)
  - UCRC next steps workgroup
  - Others (intra-state or academic).

System Conservation Pilot Program

- Facilitating temporary, voluntary, compensated conservation to provide water to the Colorado River System.

System Conservation Pilot Program

- Purposes of Program:
  - ✓ Educate on role of system conservation.
  - ✓ Explore interest in participating in voluntary conservation projects.
  - ✓ Evaluate whether and to what extent there could be a potential benefit to the Colorado River System.
  - ✓ Identify obstacles, considerations, and potential solutions to implementing on a broad scale.

- UCRC, states, and Funders understand that the goal of the pilot program is NOT to ensure that wet water gets to Lake Powell. Rather, *investigate options and feasibilities* as possible.

System Conservation Pilot Program

Year	Colorado	New Mexico	Utah	Wyoming	Total
2015	5	0	0	5	10
2016	8[A)]	2	1[B)]	9[C)]	20
2017	2	3	6	4	15
Total	**15**	**5**	**7**	**18**	**45**

A) 11 projects were selected but only 8 were implemented.
B) 2 projects were selected but only 1 was implemented.
C) 10 projects were selected but only 9 were implemented.

- 2018 Projects
  - ✓SCPP is continuing for one more year.
  - ✓Currently in process of negotiating contracts with prospective participants.

Weather Modification

- Snowpack modification through cloud seeding to augment system.
- Established programs in many western states.

DCP v. 2007 Guidelines Discussions

- DCP
  - Emergency responses in place to protect against a crash of the system in UB, LB or both
  - Immediate/through 2026 if needed
- Guidelines
  - Long-standing operational criteria for system as a whole
  - Expire in 2026, renegotiation begins no later than 2020

* Preparing for re-negotiations, and negotiating on DCP.

* NOT likely to negotiate both at the same time.

* Need to get DCP done to focus fully on re-negotiations for longer-term period

Intra-State Activities

Focus – Compact Compliance/Curtailment Avoidance

Current Forums

- Compact Compliance Study
- Colorado Water Bank Work Group
- System Conservation Projects
- Risk Studies
- Shepherding White Paper and Workshops
- Colorado Water Plan
- Others

** IMPORTANT FOR THE STATE TO CONSIDER INPUT AND INTERACTIONS BETWEEN ALL OF THESE**

CWCB Outreach Approach

- Identifying and Evaluating Possible *Options for Avoiding Compact Curtailment*
  - *Consistent with direction from Colorado Water Plan*

- Focus on *Demand Management Considerations* to inform progress both inter/intra-state.
  - *Keeping in-line with interstate planning considerations*

- Outreach to water user / stakeholder community to listen to and have approaches informed by experienced and interested constituencies.
  - *Promoting well-informed positions that consider all aspects*

CWCB Outreach Approach Cont'd.

- Speak at forums, boards, seminars, roundtables locally and statewide to:
  - Provide context and updates on Colorado River Basin activities
  - Identify/discuss interest in and reasoning for exploring demand management
  - Obtain input and feedback on various demand management considerations

- Conduct workshops and technical outreach
  - Identify specific legal, technical and policy questions associated with demand management
  - Explore flexibilities and obstacles within the state

- Develop demand management position informed by water users/stakeholders considerations and concerns
  - Consider and integrate to extent appropriate input and feedback from outreach
  - Revisit with outreach groups to identify possible positions, and discuss refinements, etc.

Takeaway – Not developing any position regarding whether and how to develop a demand management program in Colorado in a vacuum. Preserve options and opportunities while we seek engagement and input to consider positions going forward.

What is Demand Management?

Way it is being explored:

- Temporary
- Voluntary
- Compensated
- Reduction in diversions to conserve water that is otherwise consumptively used

Important Link: To help avoid potential need for involuntary curtailment of Colorado River uses. Specifically geared to ensure compact compliance.

Goals of Demand Management

- Provide secondary compact compliance mechanism (Following use of CRSP facilities)
- Voluntarily boost storage at Lake Powell
- Support Upper Basin's use of compact entitlements
- Comply with the CR Compact
- Avoid imposed curtailment of post-Compact water rights

Context - 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: LB gets additional 1 MAF under Art. III (b)).

- Non-Depletion Clause - Art 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.

THIS IS NOT A DELIVERY OBLIGATION

Context - Upper Colorado River Compact 1948

Article III(a) – apportions "in perpetuity" the Upper Basin's share of the consumptive use of water under the Colorado River Compact to individual states. Arizona gets 50,000 AF annually. The other states may use the following percentages:

State	Percentage	% of 7.5 MAF (fully supply)
Colorado	51.75	3,855,375
New Mexico	11.25	838,125
Utah	23	1,713,500
Wyoming	14	1,043,000

Context - Upper Colorado River Compact cont'd

- Article IV – in the event curtailment of use shall become necessary to not deplete the flow at Lee Ferry below that required by Art. 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.

- UCRC does NOT have authority to determine how curtailment will be implemented within an individual state.

- We never have been in curtailment, and under historical hydrologic conditions, we will not face a curtailment in foreseeable future.

Context - Reactive v. Proactive

- Reactive – waiting until crisis occurs
  - Curtailment
    - High level of uncertainty
    - Decreased streamflow (returns and storage recovery)
    - Inefficient allocation of natural and economic resources
    - Litigation
    - Economic ramifications
  - Increase risk of federalization of the Upper Basin

- Proactive – control our own destiny-planning ahead to mitigate impacts
  - Reduce risk of uncertainty with curtailment (Risk will never be zero)
  - Explore and develop position for employing mechanisms that manage risk level within Colorado and the Upper Basin

- An ounce of prevention is worth a pound of cure
Benjamin Franklin

Demand Management Considerations

- **Interstate**
  - Coordination with Upper Colorado River Commission
    - Storage sites
    - UCRC Rules and Findings (if needed)
  - Administration and Accounting within UB
  - Consistency with Law of the River, as well as Reclamation Laws and with ESA/NEPA compliance (if needed),
  - Interaction with Interim Guidelines or similar framework
  - Funding
  - Sideboards or guideposts to consider
  - Many others

Demand Management Considerations cont'd

- **Intra-state**
  - Consistency with prior appropriation and state water laws
  - Preservation of water rights
  - Economic / Environmental considerations
  - Monitoring and verification of water conservation
  - Administration and Accounting
  - Sideboards/limitations to consider
  - Water court involvement
  - Parity?
  - Many others

Demand Management Considerations cont'd

- Do NOT want to do any program in a vacuum.
- Before we decide or lead with anything, we want to hear from you.
  - Want to hear what you think and have to say.
  - Want to consider observations, concerns, and ideas of people directly affected and implicated by program
- CWCB, AGs staff are available to discuss, listen, learn.
- Iterative process - Armed with information, will revisit with interested parties to evaluate options and possibilities.

Next Steps

- Continue interstate DCP negotiations
  - Keeping options / opportunities open in process
- Outreach to be informed on program considerations
- Distill feedback and develop options for CO positions going forward
- Loop back to report and gain additional feedback

Questions/Discussion?

Thank you

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