Utah's Interstate Water Compacts: What Happens if the Drought Continues?

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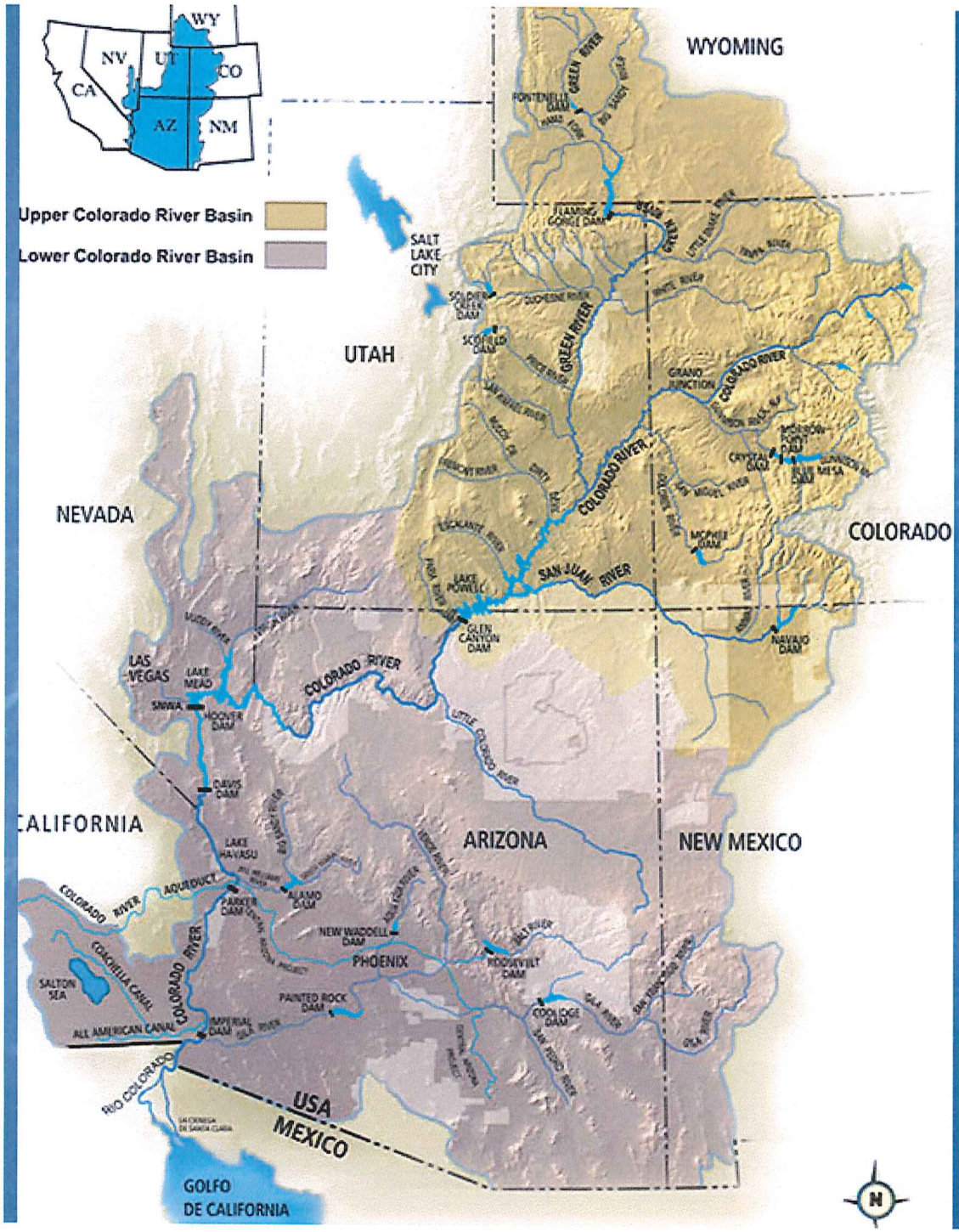


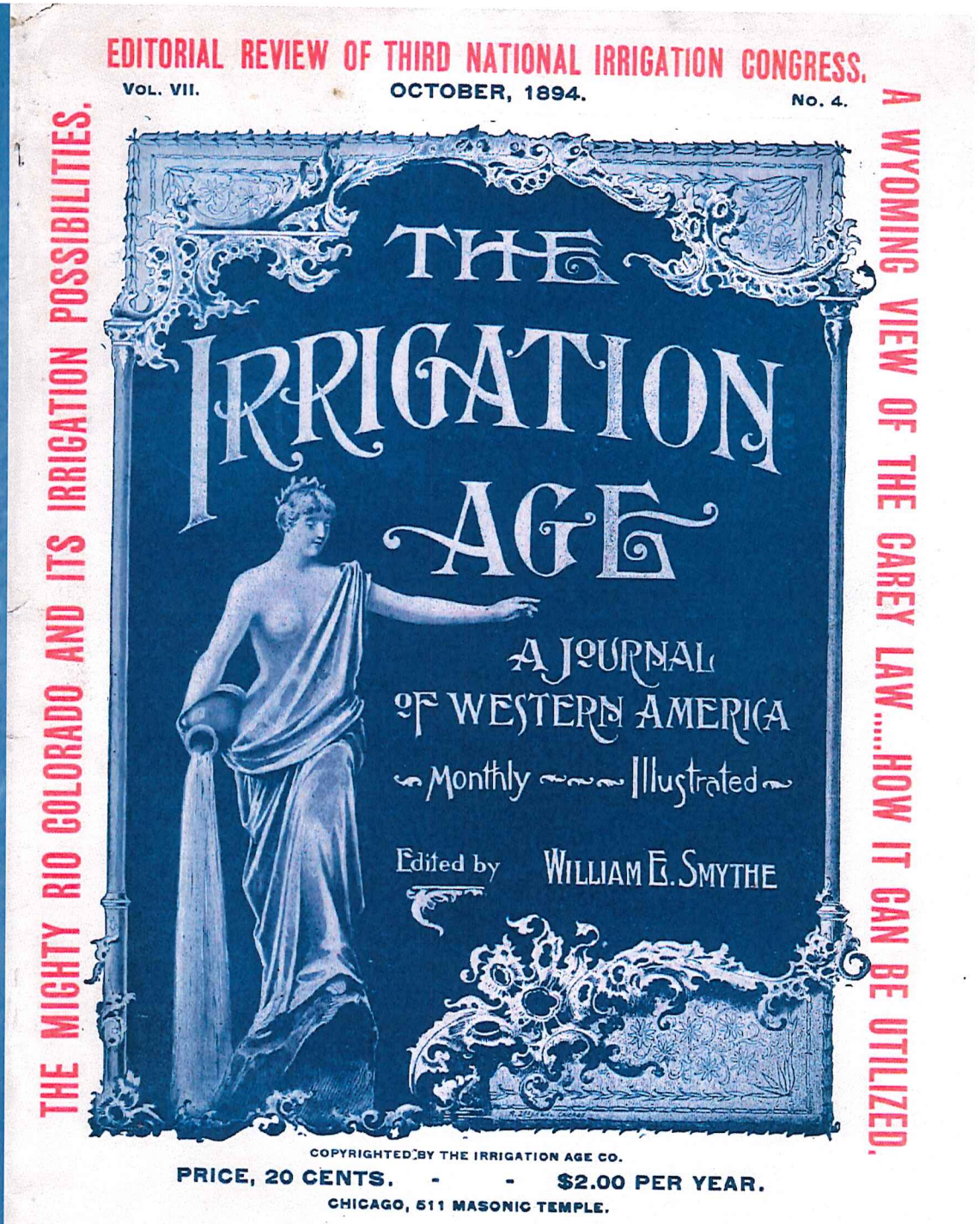
Colorado River Basin

Colorado River Basics

- The Colorado River:
  - Drains roughly 250,000 square miles
  - Provides water to more than 35 million people
  - Irrigates more than 4 M acres of farmland
  - Generates hydropower
  - Facilitates varied recreation
  - Provides habitat for endangered species
  - Has a fascinating history

Colorado River Basics

- The Mighty Rio Colorado and its Irrigation Possibilities
- October, 1894 (120 years ago)

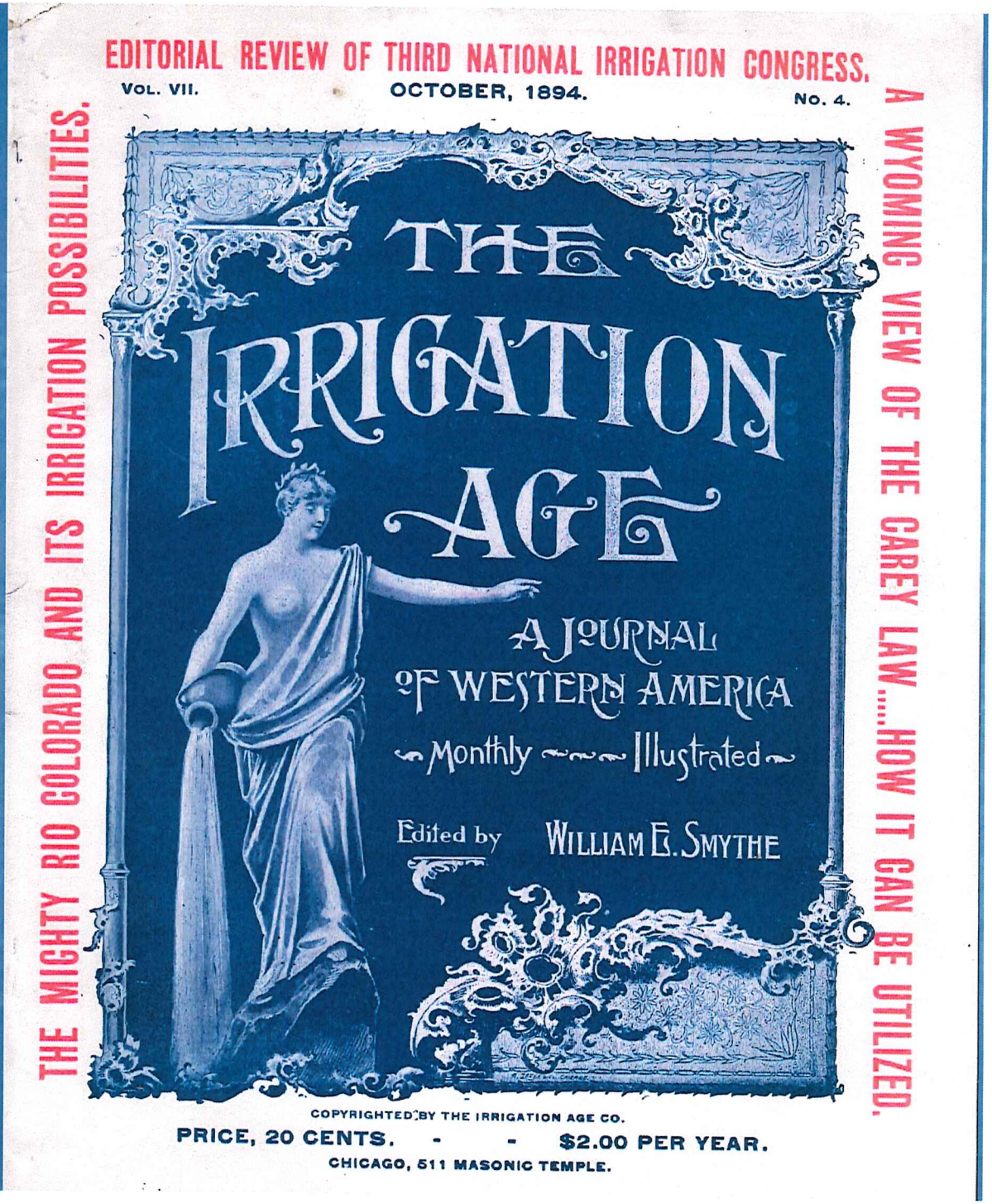


Colorado River Basics

- 1907 Irrigation Congress Motto
  - Store the Floods; Save the Forests; Reclaim the Land

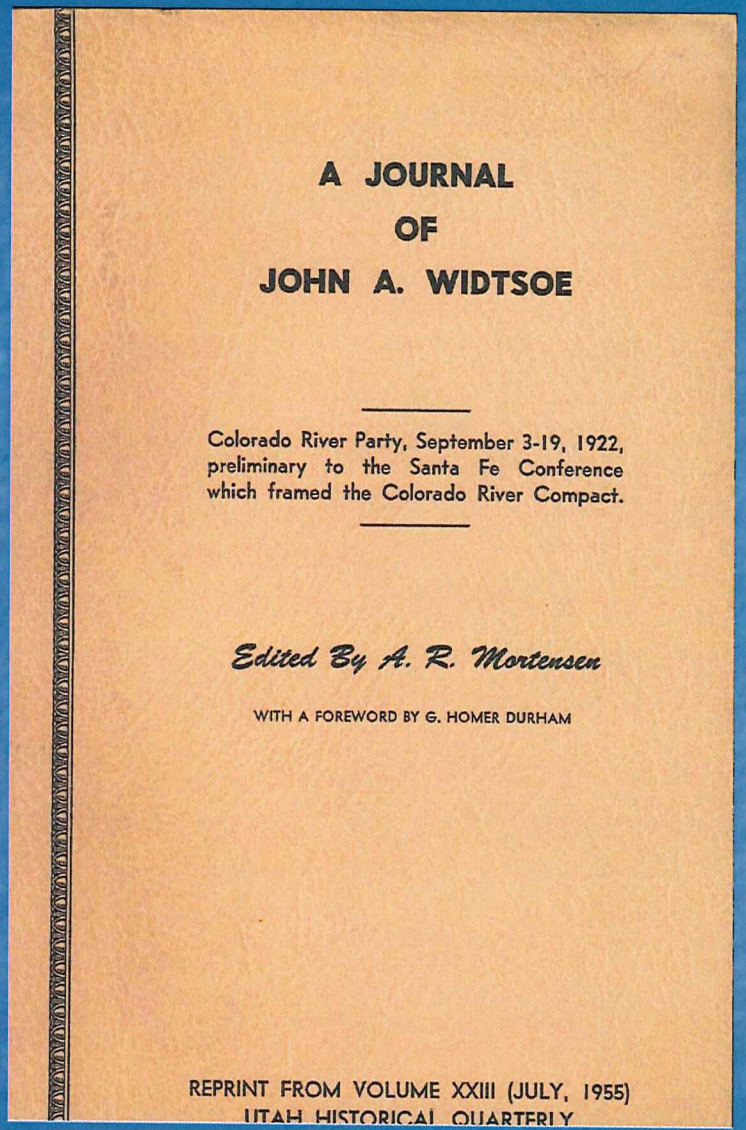
Colorado River Basics

- Future President of United States?
- Herbert Hoover
- High ranking member of Mormon Church Leadership?
- Apostle John A. Widtsoe



Colorado River Compact

- But, in recent years the river has rarely flowed consistently at that volume



A JOURNAL
OF
JOHN A. WIDTSOE

Colorado River Party, September 3-19, 1922, preliminary to the Santa Fe Conference which framed the Colorado River Compact.

Edited By A. R. Mortensen

WITH A FOREWORD BY G. HOMER DURHAM

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UTAH HISTORICAL QUARTERLY

Colorado River Compacts

- Utah is party to 2 Colorado River Compacts
  - 1922 Colorado River Compact
  - 1948 Upper Colorado River Basin Compact
  - River Management is based on the Law of the River, which includes these two compacts
  - Upper Division States = CO, NM, UT, WY
  - Lower Division States = AZ, CA, NV

Colorado River Compacts

- Negotiators finalized the 1922 Compact during a wet cycle on the River
- They divided 7.5 MAF annually to each basin (Lee Ferry is the dividing point) + 1 MAF to the LB when available
- They also recognized a delivery of water to Mexico would later be negotiated

Colorado River Compacts

- 2000-2013--12.2 MAF average flow Lee Ferry
- 1988-2007--13.1 MAF average flow
- Combined 34 yrs.--12.7 MAF average flow
- Includes 21 yrs of <11.8 MAF @ Lee Ferry

  aka VERY DRY PERIOD (like the mid 1100's from peleo-hydrology)

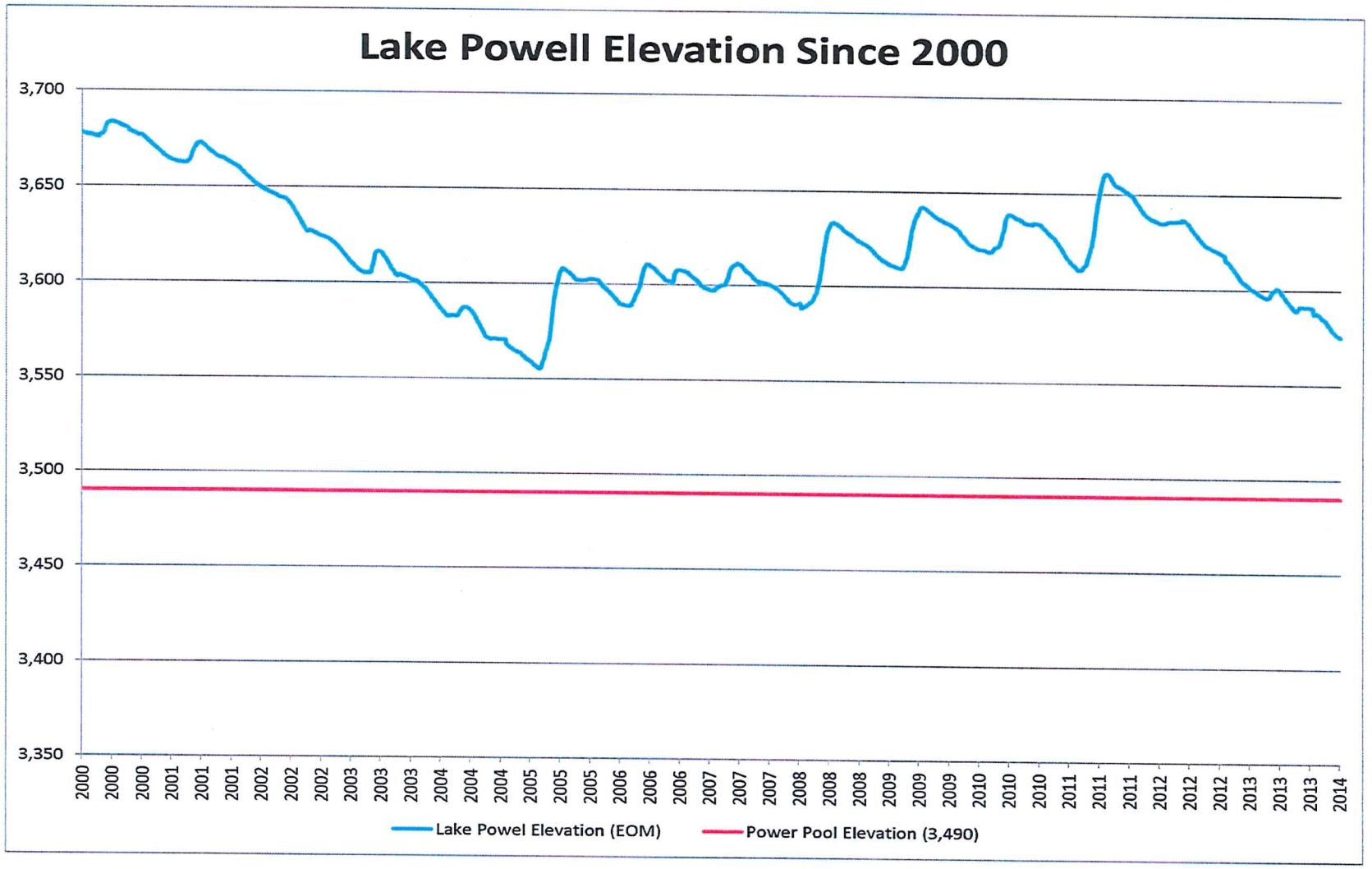
Stress Test Scenarios

- What happens if the dry hydrology continues, or worsens?
- Supply: extend recent observed drought into future
- Demand: utilize different demand sets
- Operational Considerations: Implement different demand management and operational strategies in BOTH Upper and Lower Basins

System Operation

- Two large reservoirs regulate the Colorado River System—Lake Powell and Lake Mead
- Lake Powell (and other UB CRSP reservoirs) are the UB insurance policy
- The 1922 Compact requires the UB not to cause the river's flow at Lee Ferry to be depleted below 75 MAF every 10 years
- Lake Powell has served this purpose well
- But, the Lake's level has dropped recently

System Operation



System Operation

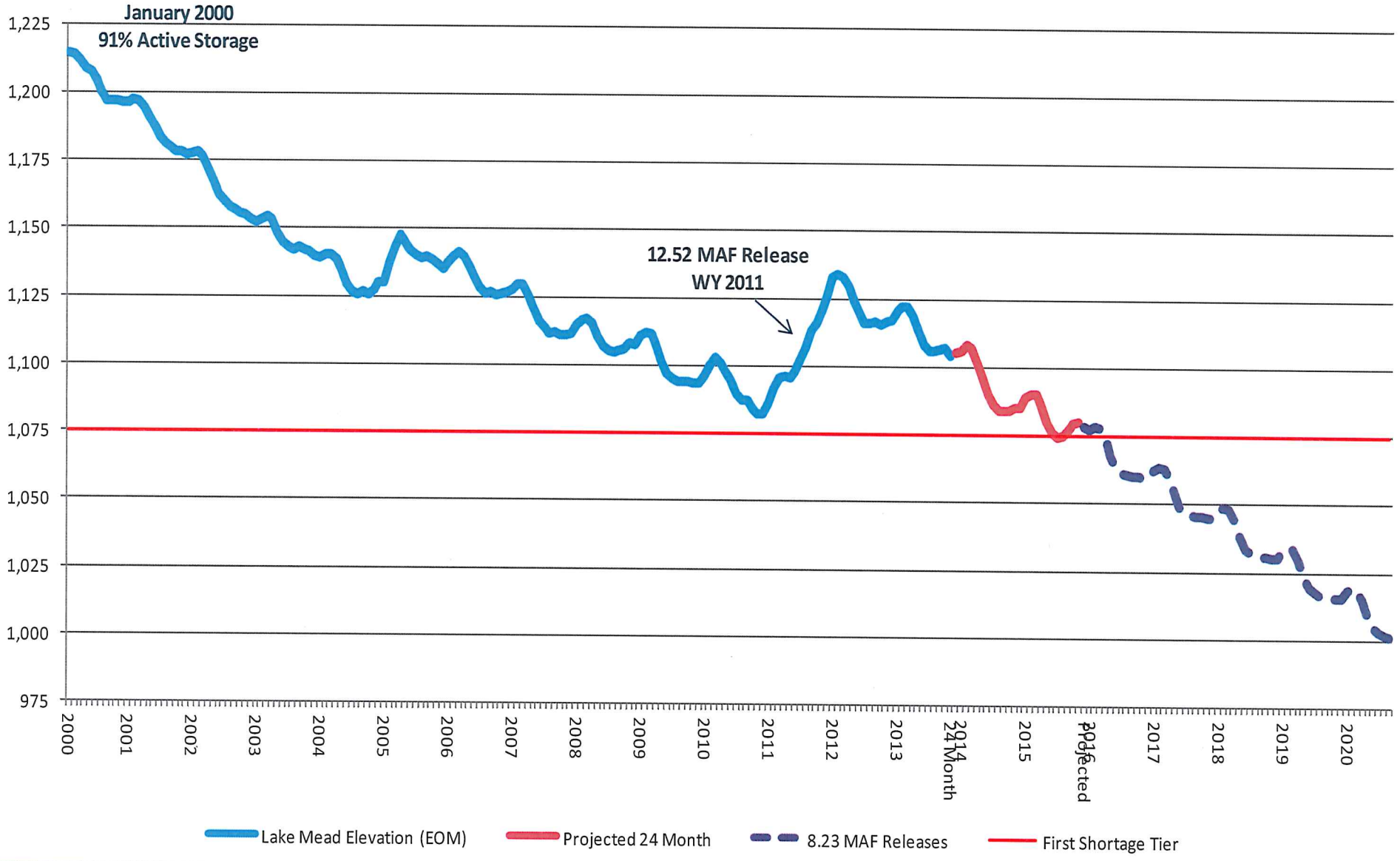
- UB releases are tied to elevations in Lakes Powell and Mead by the 2007 Shortage Sharing Guidelines
- And, unfortunately, there is a structural deficit in the LB which pulls down the elevation of Lake Mead, thus indirectly reducing the amount of water in Lake Powell

"Normal" Lake Mead Water Budget

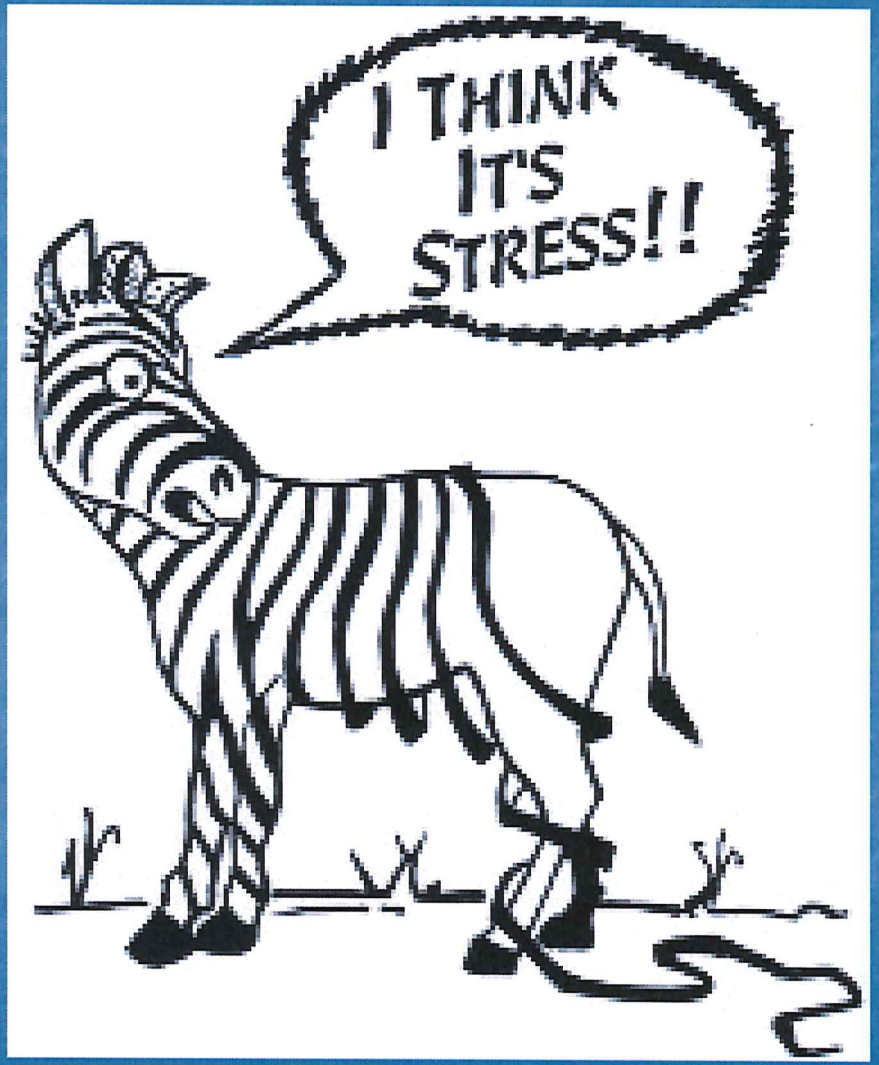
- Inflow = 9.0 MAF
  (release from Powell + intervening inflows)
- Outflow = -9.6 MAF
  (AZ, CA, NV, and Mexico delivery + downstream regulation and gains/losses)
- Mead evaporation losses = -0.6 MAF
- "Structural Deficit" = -1.2 MAF

Given base LB apportionments, the allotment to Mexico, and 8.23 MAF Lake Powell releases, Lake Mead storage declines about 12 feet each year.

Lake Mead Elevation Since 2000



Stress Test



Collision Course

- LB has depended on equalization releases from Lake Powell to sustain level of Lake Mead—LB recognizes this must change
- UB wants to maximize storage in Lake Powell to protect existing and planned uses
- Failure to Act harms both basins:
  - Could lead to a 1922 Compact violation;
  - Jeopardizes power production and funding for programs;
  - Affects our ability to meet Mexican Treaty obligations;
  - Directly impacts Las Vegas' water source.

Collision Course

- What IF the drought continues or worsens?
- Correction requires significantly reducing or eliminating the LB structural deficit;
- Encourages the UB to consider all options for wise management of the River, including working with interests in the entire Basin;
- Provides an incentive for all Basin states to pursue the benefits that accrue to both UB and LB from working jointly to approach drought.
- What can we do?

Possible Actions

- Status Quo – Hope for wet years
- Action Alternatives (remember, all the easy stuff is done—what remains will take cooperation and sacrifice throughout the Colorado River Basin)
- These are the choices:
  - Increase Supply
  - Reduce Demand

Increase Supply

- Continue, or expand, weather modification efforts
  - The Science is clear that this technique works, but unsettled concerning the measurement of the impact
  - Even assuming the lowest estimates of effectiveness, past studies show cloud seeding is an effective and relatively low-cost way of increasing water supply
  - Continue phreatophyte control

Increase Supply

- Employ the full range of reservoir operations available under the CRSP Act
  - CRSP was intended to promote flexibility in approach to meet UB storage needs
  - Congress authorized the reservoirs, among other things, to provide long-term storage and comprehensive water development

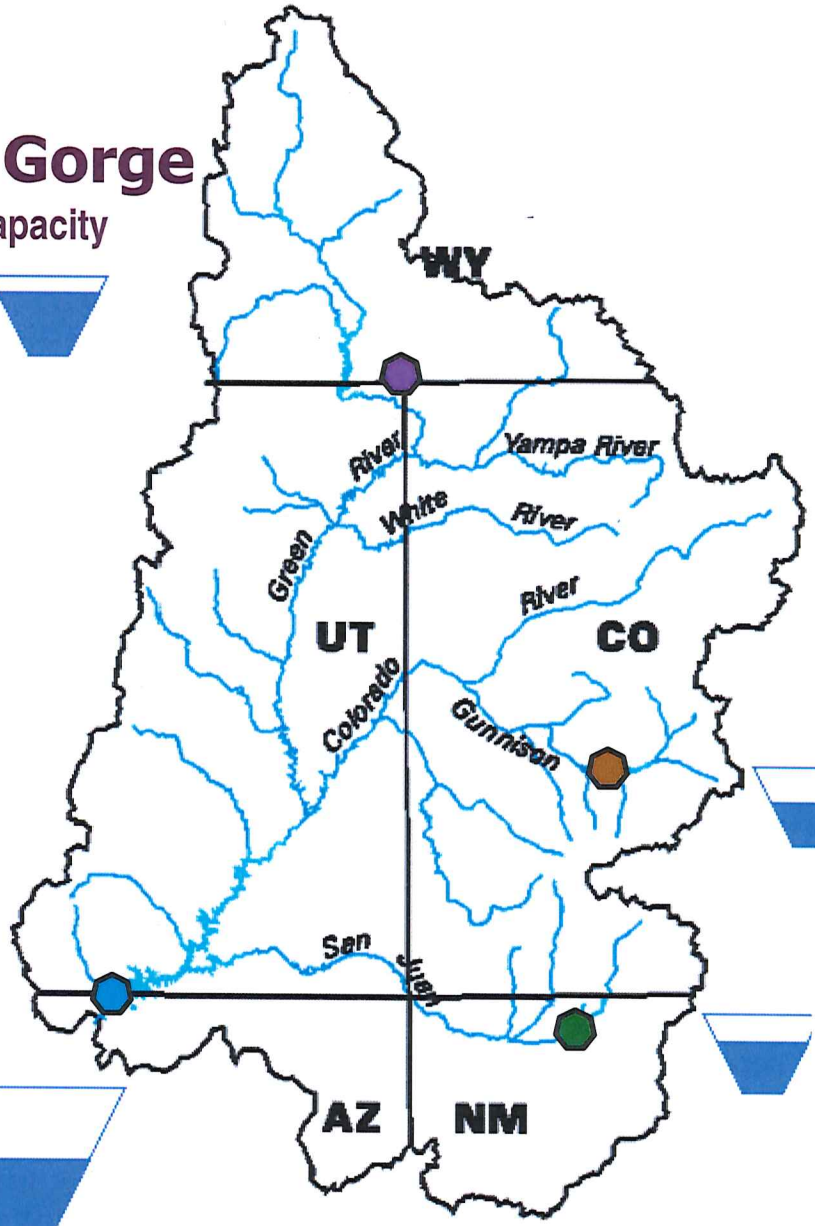
Colorado River Storage Project Units (CRSP)

Flaming Gorge

3.7MAF active capacity

75% full

CRSP Acts of 1956 and 1968 authorized construction of facilities for long-term regulation and development of Colorado River water resources



Aspinall Unit:

Blue Mesa, Morrow Point & Crystal Res.

Blue Mesa

0.84MAF active capacity

45% full

Navajo

1.7 MAF active capacity

57% full

Lake Powell

26 MAF active capacity **43% full**

SOURCE: USBR UPPER COLORADO REGION STORAGE LEVELS AS OF 12/09/13

Increase Supply

- Thanks to the foresight of state and federal water officials, we have a wonderful storage system in place
- We have been used to limited reservoir fluctuations—we must now consider a full range of reservoir operations
- There will be tradeoffs as we go to a full range of reservoir operations
- Many technical and legal questions remain

Increase Supply

- Tradeoffs—Lower reservoir levels mean:
  - Smaller likelihood of curtailment (+)
  - Less power-head (at smaller reservoirs) (-)
  - Decreased flat-water recreation (-)
  - Education efforts are necessary
- There are others, of course, but these are the most obvious tradeoffs today

Increase Supply

- Technical Questions
  - Quantifying the effects of cloud-seeding
  - Quantifying environmental consequences
- Legal Questions
  - How to protect flows released from upstream reservoirs to Lake Powell
  - Can full operations occur within existing environmental compliance?

Increase Supply

- What about inter-basin importation?
  - High costs
  - Environmental Consequences
  - Technical and legal questions

Decrease Demand

- We need to look at system-wide solutions
- One way to reduce demand is to be smarter about our water use
- Conservation programs, including "Slow the Flow" in Utah can help reduce demand
- We desire to avoid a mandatory curtailment under the UB Compact

Decrease Demand

- Mandatory curtailment, if and when necessary, will be a painful, expensive, and litigious fight
  - Curtailment applies if 75 MAF over 10 years non-depletion requirement isn't met
  - Curtailment, if and when it is necessary, is a legally and technically complex procedure
  - But, one that Utah will handle if needed

Decrease Demand

- As an alternative, to prevent curtailment, some people are discussing water banking
- We need to define the term "banking"
  - "Macro-banking" = CRSP reservoirs, such as Lake Powell, are the UB's "water banks" or "insurance policy"
  - "Micro-banking" = allowing individual water users to "bank" unused water to keep the level of Lake Powell as high as possible

Decrease Demand

- Technical & Legal questions related to "micro-banking:"
  - What type of water right could be used?
  - Who pays the water user?
  - How can the water be protected from the place where it is banked to Lake Powell?
  - Is banking consistent with the Law of the River?
  - Verification of decreased water use (deposits)

Uncertain Future:

"Past performance does not guarantee future results" and past reservoir operations do not represent the full range of reservoir operations contemplated under federal and state authorizations.

Take Away Summary

- Results are preliminary
- Based upon contingency planning, not a prediction of future
- All planning honors "Law of the River"
- Not easy, will require further modeling, evaluation, education, and cooperation
- Therefore, continued efforts toward BASIN-WIDE contingency planning are essential

Take Away Summary

- Strong history within the basin of working
  - 2001 Interim Surplus Guidelines
  - 2007 Interim Shortage-sharing Guidelines
  - Minute 319
- Collaborative, consensus solutions are better than those imposed by administrative, legislative or judicial fiat—we have used this type of approach to survive the last 15-20 of dry, challenging hydrology on the River

Bear River Basin

Bear River Basics

- The Bear River:
  - Drains 6,900 square miles
  - Crosses 5 state lines
  - Meanders about 500 miles
  - Is the largest tributary to the Great Salt Lake
  - Generates power at five hydro-plants
  - Provides habitat to waterfowl and aquatic life

Bear River Compact

- Idaho, Utah, and Wyoming are parties
- Became effective in 1958
- Divided the Bear River into three divisions
- Apportioned flows between UT and WY in the Upper Division
- Provided for regulation by priority for ID and UT water rights in the Lower Division

Bear River Compact

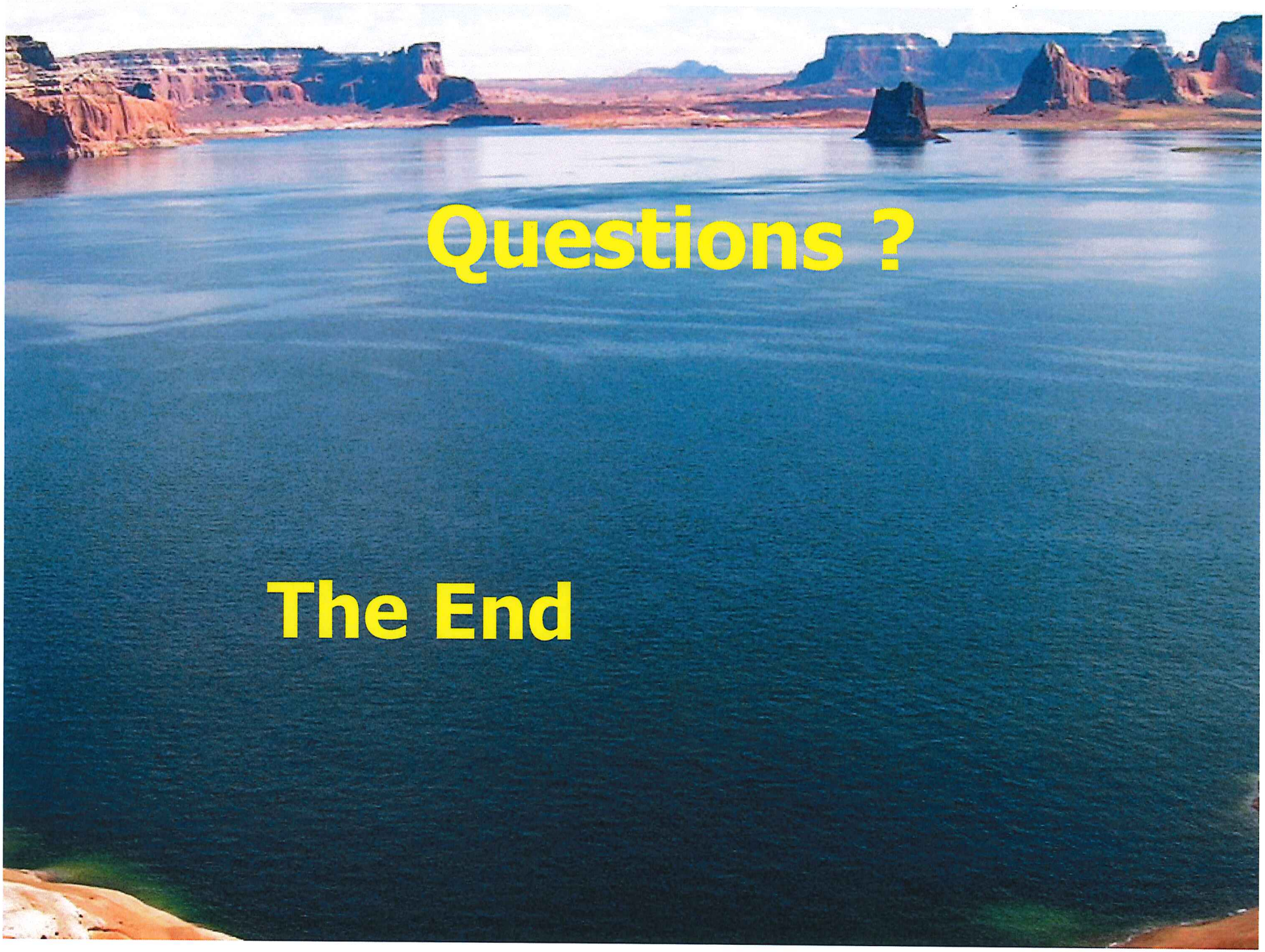
- Defined pre-Compact storage for the states in reservoirs above Bear Lake
- Amended in 1978 to:
  - Deal with additional storage
  - Allocate water to all 3 states that had not been applied to beneficial use by Jan. 1, 1976

Bear River Shortages

- Bear River Compact deals with shortage differently than Colorado River Compacts
- Bear River Upper Division
  - In times of shortages, water is allocated by percentage
- Bear River Lower Division
  - Because of agreements between water users and interest around Bear Lake water is allocated based on elevation in Bear Lake

Bear River Shortages

- Bear River Lower Division, cont.
  - If there is a call on the river, water is allocated by priority in ID and UT
- As of the past decade the states have worked together avoid conflicts and make things work generally on the river


Questions ?
The End