

# Drier and Hotter: Managing Climate Risks in the Southwest & the Colorado River Basin

AN ENVIRONMENTAL AND ENERGY STUDY INSTITUTE BRIEFING  
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Protecting Western Colorado Water Since 1937



NEVADA

UTAH

WYOMING

COLORADO



CALIFORNIA

ARIZONA

NEW  
MEXICO

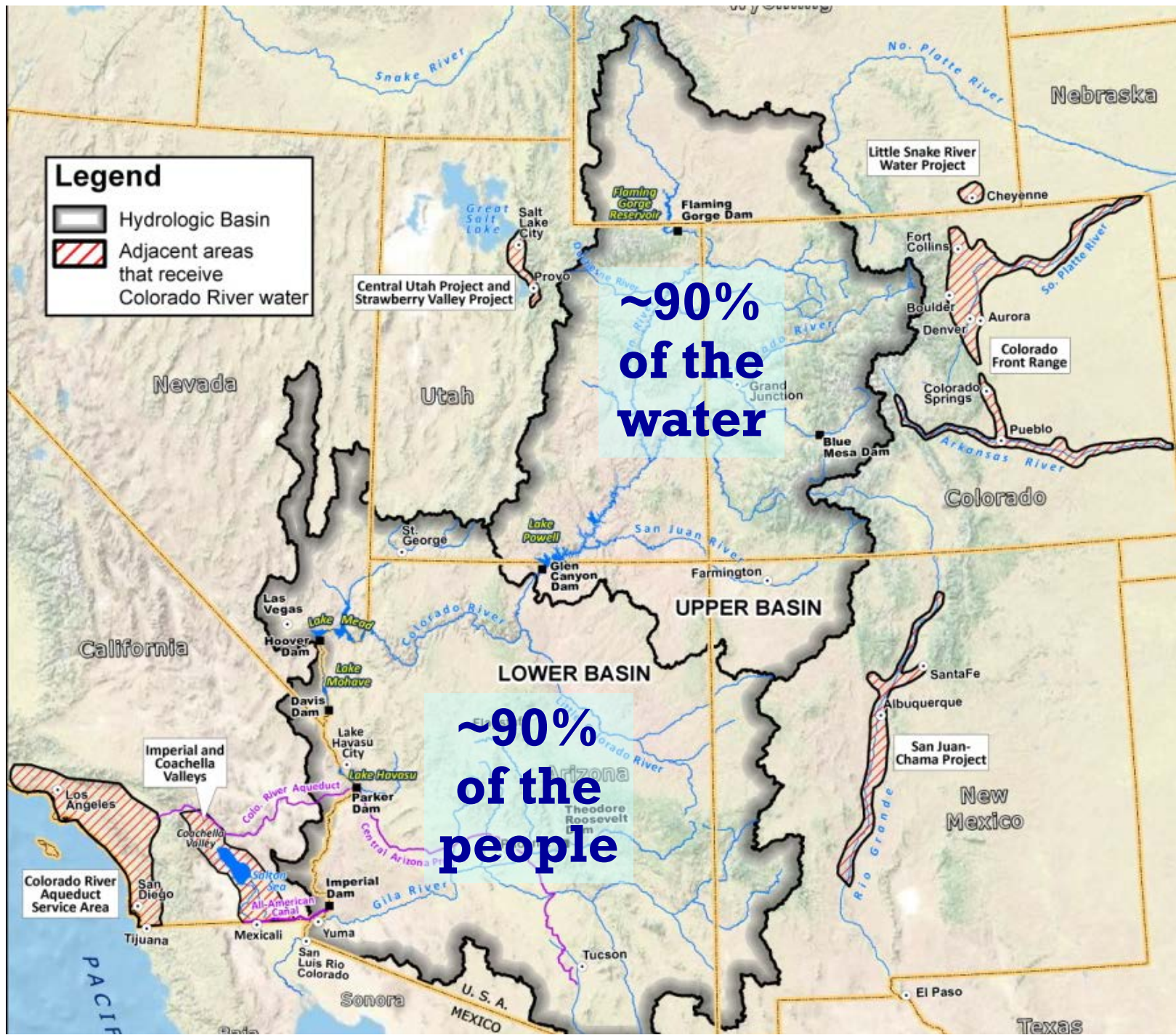


## Legend

-  Hydrologic Basin
-  Adjacent areas that receive Colorado River water

**~90%  
of the  
water**

**~90%  
of the  
people**



# Colorado River Basin *Tomorrow*

- Seven Basin States
- Almost 300,000 square miles
- ~~35~~ **80 million people** (↑ of ~90%)
- ~~5.5~~ **4.6 million irrigated acres** (↓ of ~15%)
- ~~15~~ **13.6 million acre-feet of supply** (↓ of 9-10%)
- 10 autonomous / sovereign Tribes
- 2 countries

# Planning for the Future

- Colorado River Water Supply and Demand Study aka “*Basin Study*”
- Cooperative scenario-based planning study
- Co-sponsored by Bureau of Reclamation and 7-basin states
- Over ~\$4 million; ~3 years; released to public on 12/12/12



# Bottom Line Summary (1 of 3)

From Study Report:

- **Imbalances will grow** in the future if the potential effects of climate change are realized and demands continue to increase.
- A **combination of options**, including conservation and reuse, development of local groundwater supplies, desalination, augmentation, and the transfer of water from ag. to urban uses, **will likely be needed**.

# Bottom Line Summary (2 of 3)

- Foundation and **common platform** developed upon which future discussions will occur **to refine recommendations and implementations to sustain** the environment, people, and economy of this region.
- *Current* basinwide demands (15.3 MAF/yr) outstrip supplies (14.9 MAF/yr)
- *Current* basinwide gap is covered by storage; significant future actions needed

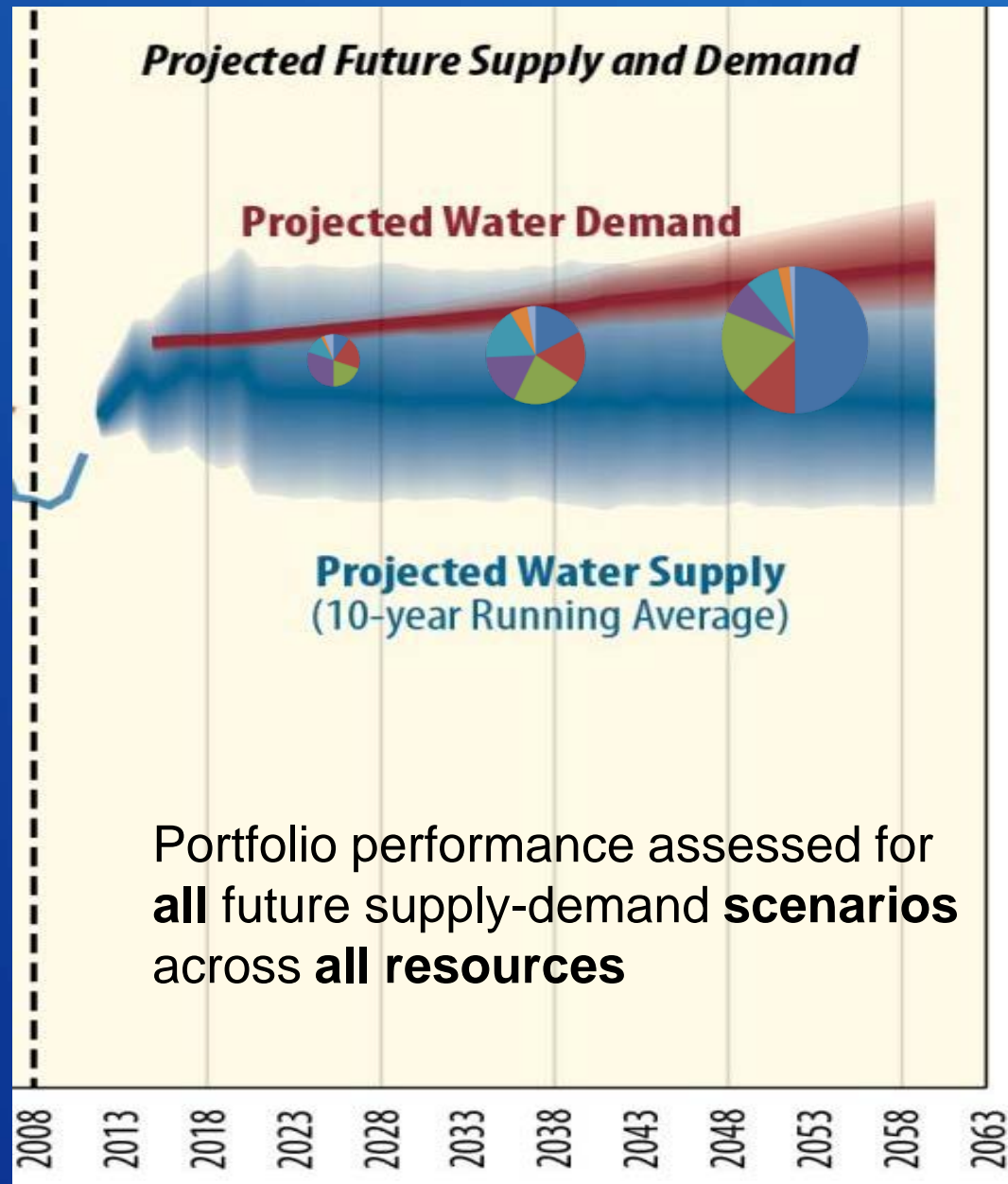
# Bottom Line Summary (3 of 3)

- Supply and demand gap is greatest in Lower Basin, shortages are '*when, not if*'
- Gap in Upper Basin more uncertain; but shortage risk real and *Chance of Curtailment > 0* in future
- For Upper Basin **supply** (hydrology) most significant factor
- For Lower Basin **demand** most significant factor



# Options & Portfolio Development

- solicit and characterize options
- dev. “portfolios” with combinations of options that implement a particular strategy
- strategy dev. through characterization criteria determining how options are combined
- four portfolios were dev. to demonstrate potential ways options could be combined



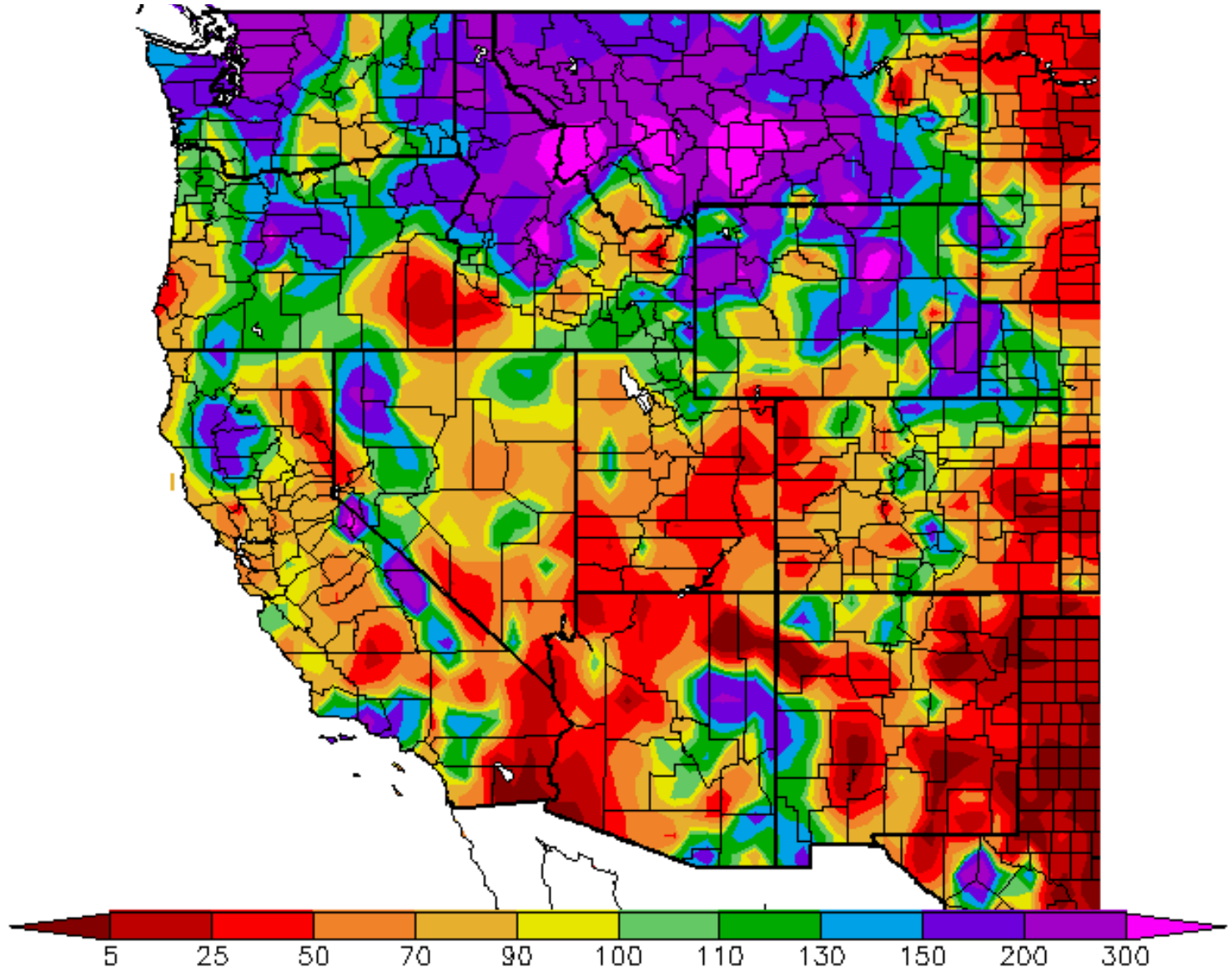
RECLAMATION

# Options / Strategies to Minimize Risk

- **Conservation**
- **Augmentation**
- **Governance**
- **Water development / new supplies?**

# Percent of Average Precipitation

Feb. 22 - Mar. 24, 2014



NOAA Regional Climate Centers, generated using provisional data



# Colorado River Storage Project Units (CRSP)

## Flaming Gorge

3.7MAF active capacity

**78% full**

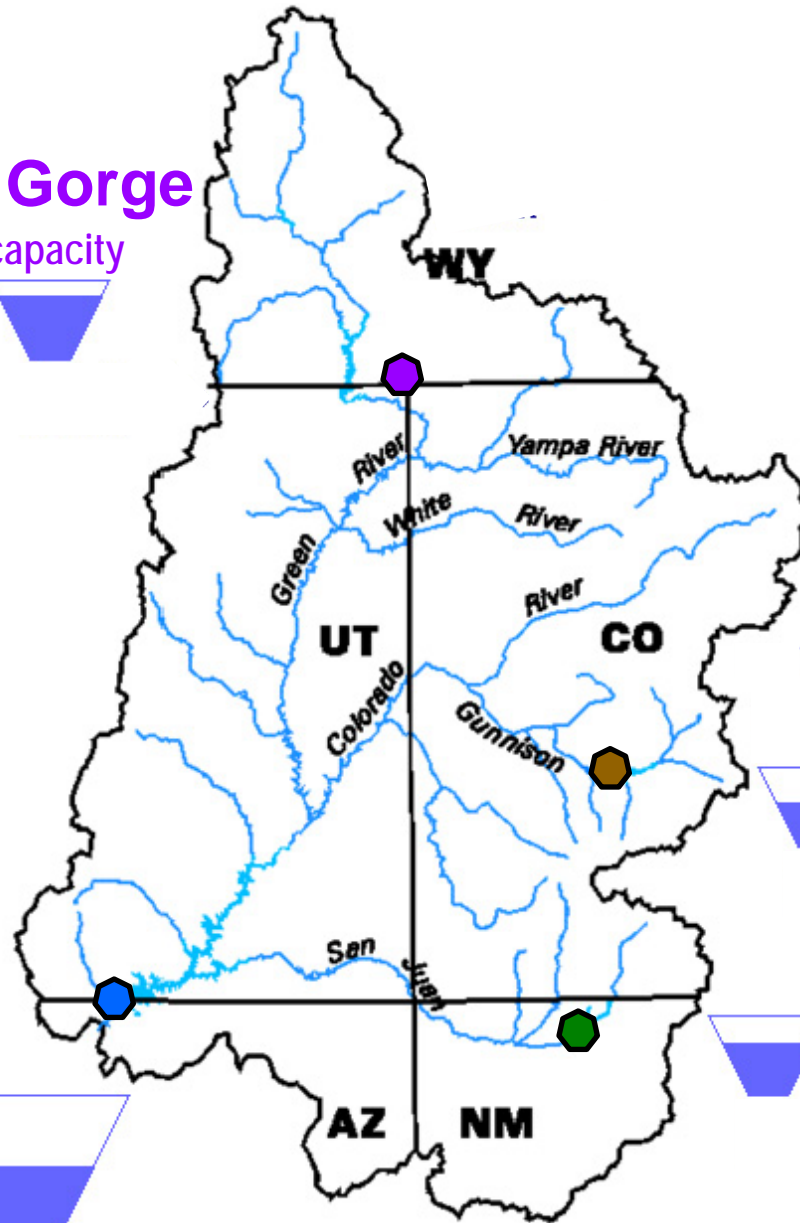


CRSP Acts of 1956 and 1968 authorized construction of facilities for long-term regulation and development of Colorado River water resources

SOURCE: USBR UPPER COLORADO REGION **STORAGE LEVELS AS OF 3/27/14**



**Lake Powell** 26 MAF active capacity **39% full**



**Aspinall Unit:**  
Blue Mesa, Morrow Point & Crystal Res.

## Blue Mesa

0.84MAF active capacity

**49% full**



## Navajo

1.7 MAF active capacity

**59% full**



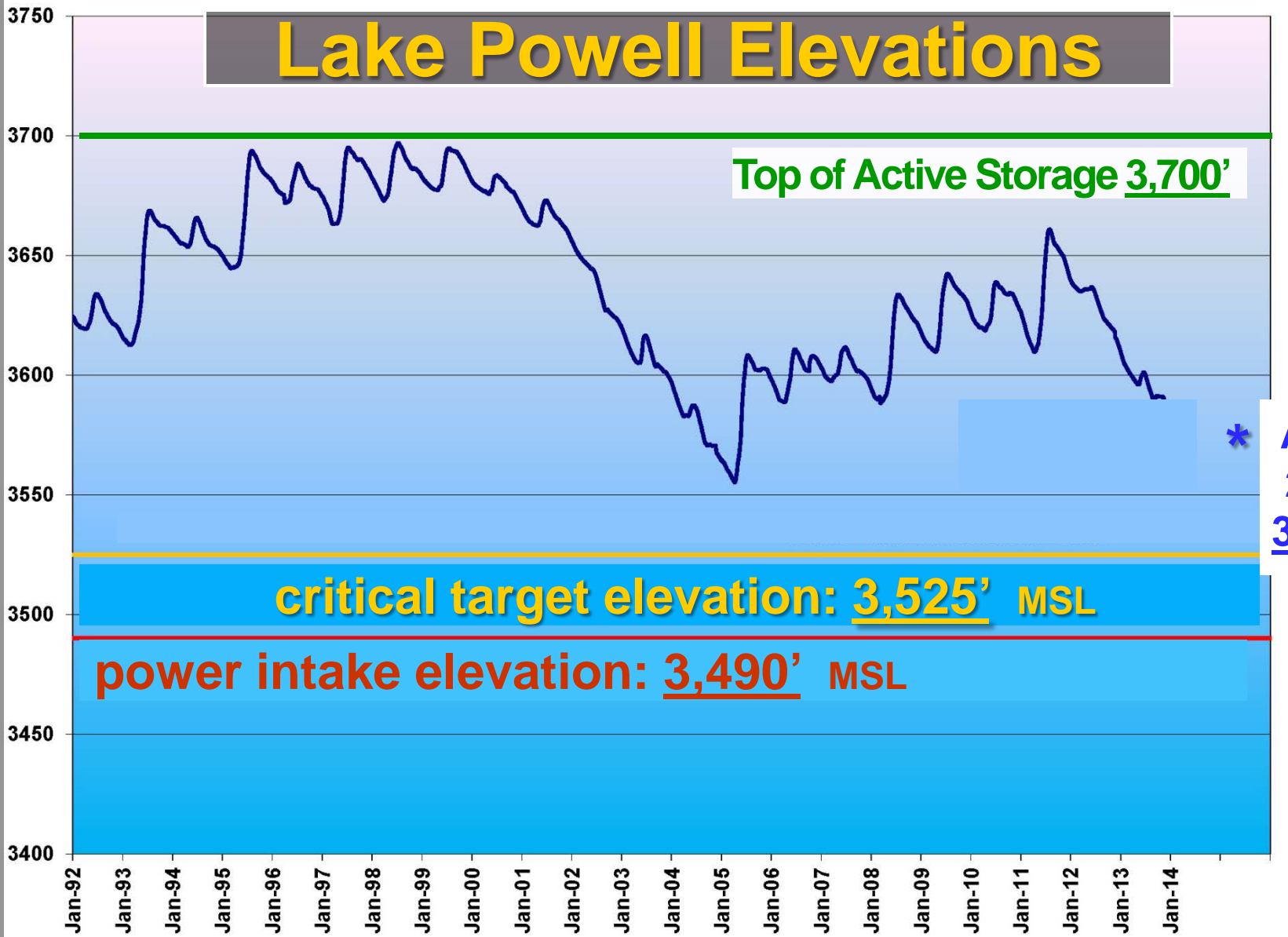
# Lake Powell Elevations

Top of Active Storage 3,700'

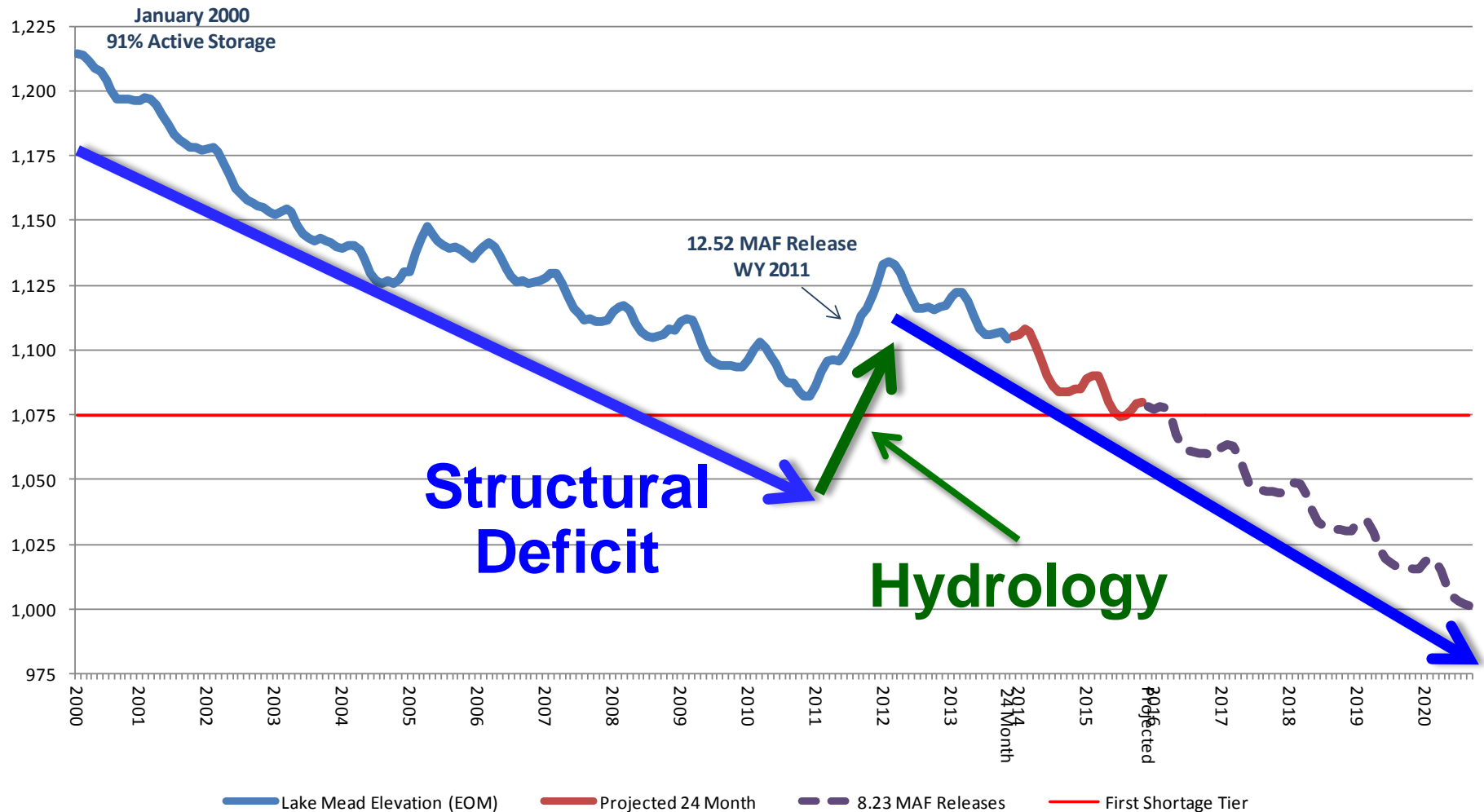
\* April  
2014  
3,574'

critical target elevation: 3,525' MSL

power intake elevation: 3,490' MSL



# Lake Mead Elevation Since 2000





# Water Budget at Lake Mead

- Inflow = 9.0 maf  
(release from Powell + side inflows)
- Outflow = - 9.6 maf  
(AZ, CA, NV, and Mexico delivery  
+ downstream regulation and gains/losses)
- Mead evaporation losses = - 0.6 maf
- Balance = - 1.2 maf

Given basic apportionments in the Lower Basin, the allotment to Mexico, and an 8.23 maf release from Lake Powell, Lake Mead storage declines about 12 feet each year



# Possible Actions

**Status Quo** - hope for change

## Action Alternatives:

1. decrease uses (voluntary demand management approach)
2. improve system efficiencies
3. re-operate to protect critical storage levels

# Uncertain Future:



***“Past performance does not  
guarantee future results”***



# Requests / Recommendations

- Foster greater cooperation - federal agencies are important players/partners
- Fund demand management pilots
- Direct research for water reuse, conservation, desalination & other “new supplies”
- Aid creation of flexibility / extraordinary measures
- Create bi-partisanship (*had to ask*)

# April Fool's





# Colorado River District

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