Demand Management in the Upper Colorado River Basin

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Colorado River District

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- PROBLEM: Since 2000 Uses > Supply
- OK until now, in 2000 reservoirs full
- NOT OK in future if the hydrology we've seen since the late 80s continues or gets drier!
- SOLUTION: Reduce consumptive uses on a basin-wide scale
- CHALLENGE: Institutions, laws and culture designed for development


Oregon
Idaho
Wyoming
South
Ne
Nevada
Salt Lake City
Flaming Gorge Reservoir
Cheyenne
Green River
Yampa River
San Francisco
Upper Colorado
River Basin
Utah
Denver Metro Area
Colorado
Gunnison River
Colorado River
Colorado Springs
Blue Mesa Reservoir
Pueblo
Lake Powell
Las Vegas
Virgin River
Lake Mead
San Juan River
Colorado River
California
Los Angeles Metro Area
Lower Colorado
River Basin
Albuquerque
Little Colorado River
Burro Creek
Colorado River Aqueduct
Lake Havasu
Arizona
New Mexico
Verde River
Salt River
Gila River
Phoenix
San Francisco River
Imperial Reservoir
San Pedro River
Tucson
Texas
Mexico

COLORADO RIVER BASIN

- Every drop of water is used
- Hydrology variable and declining
- Total storage exceeds 4 times the annual mean discharge
- Historically “Law of the River” used to divide uses among states, create certainty and foster development
- Exports are a major use connecting the river to its adjacent basins

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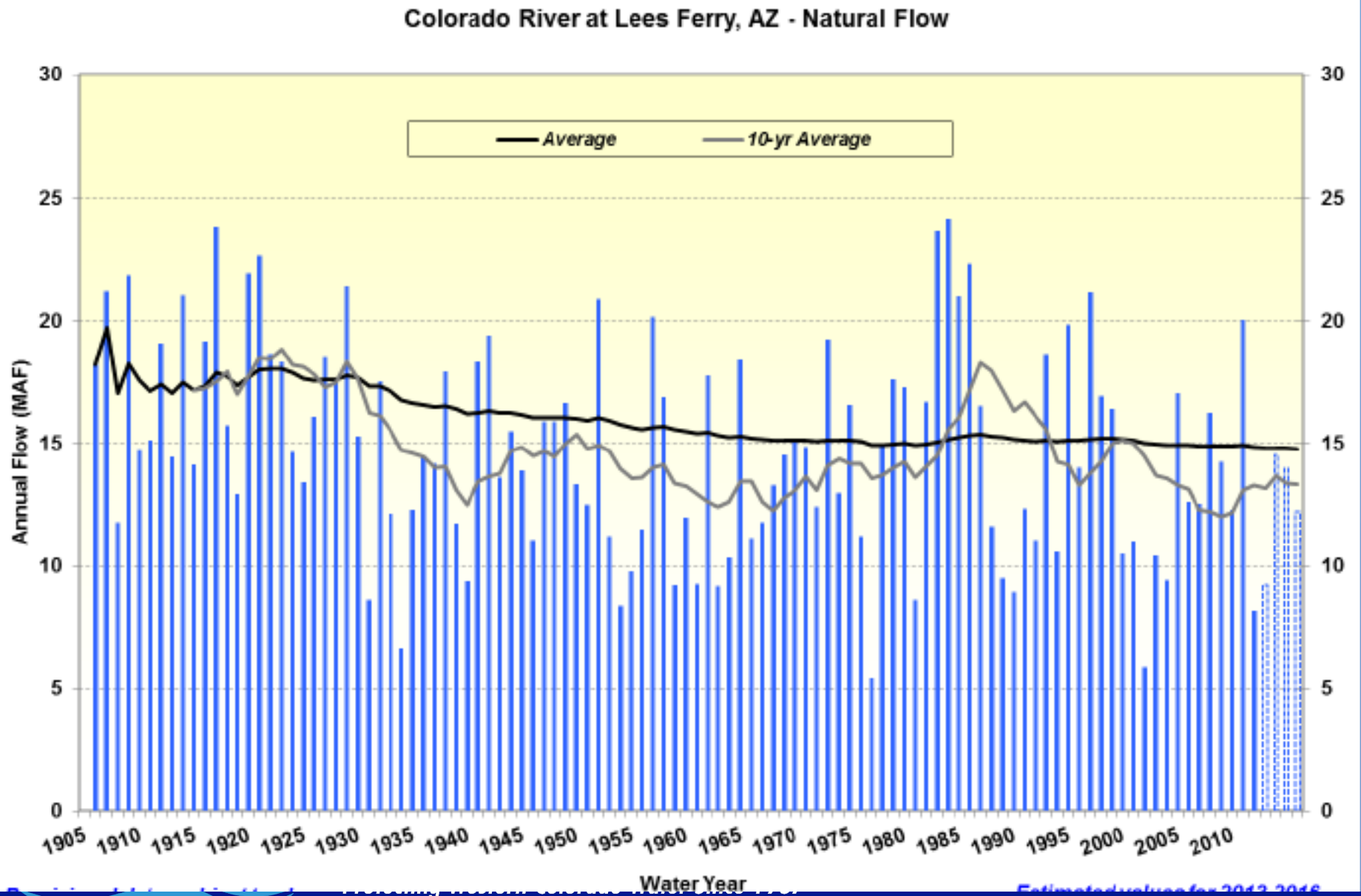
Natural Flow
Colorado River at Lees Ferry Gaging Station, Arizona



Hydrology comparison

average natural flows at Lee Ferry

- 2000-2015 — 12.4 MAF/year
- 2000-2004 — 9.4 MAF/year
- 1906-1999 — 15.1 MAF/year
- 2005-2015 — 13.8 MAF/year
- 1931-2015 — 13.9 MAF/year
- Basin Study [CC] — 13.7 MAF/year

CC = climate change

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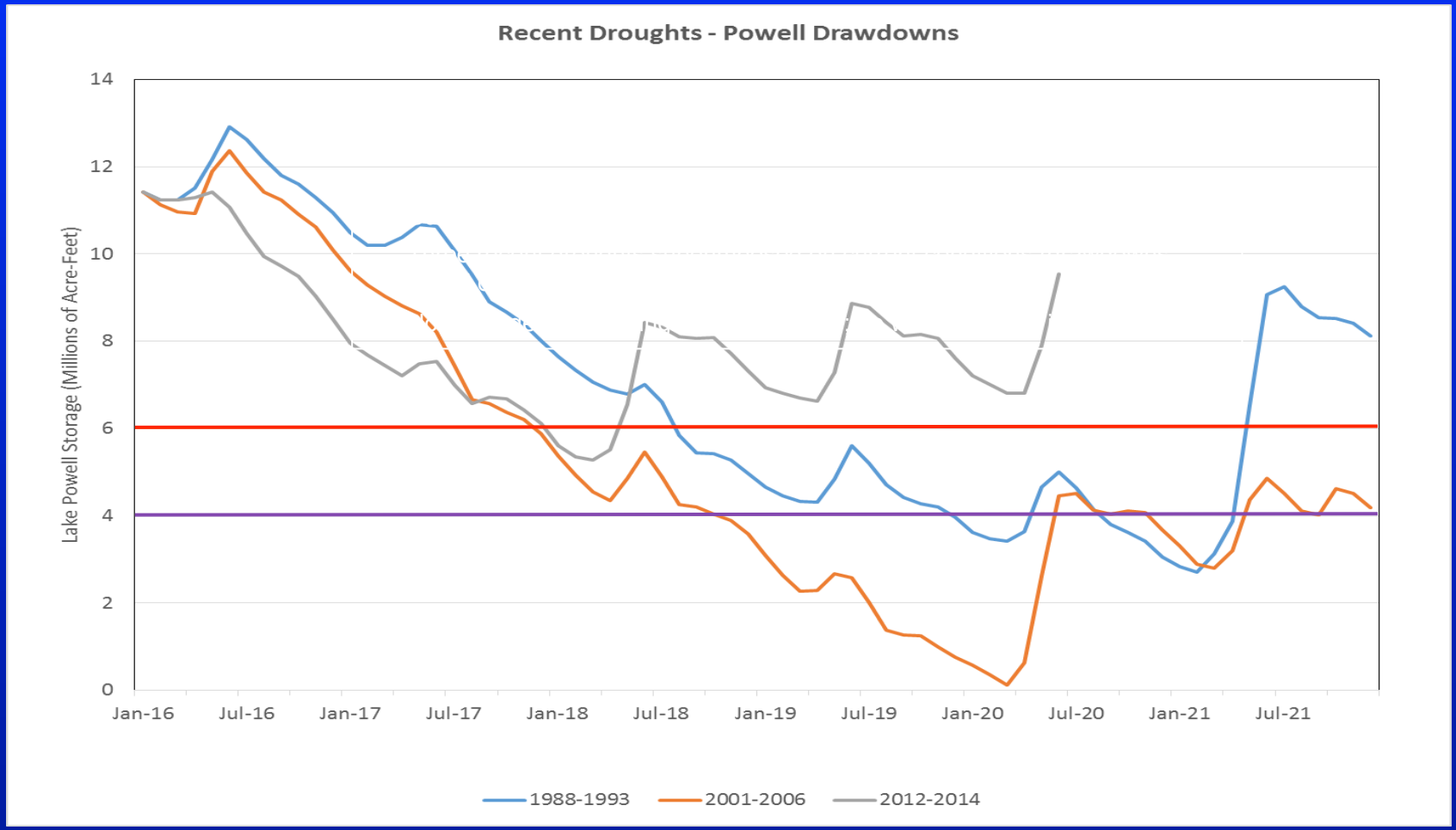
Data from Reclamation's Naturalized Flows database

Contingency Planning

- Challenge from US Dept of Interior:
  - What if the current drought were to continue into the future?
  - Have a plan in place by 2016 (MOA or similar)
- The Goal:
  - Identify actions that can reduce the risk of losing power production or being unable to deliver water
- Possible Solutions:
  - Drought Operation of CRSP reservoirs
  - Demand Management
  - Cloud seeding / other augmentation

What if drought periods of past 25 years repeated?



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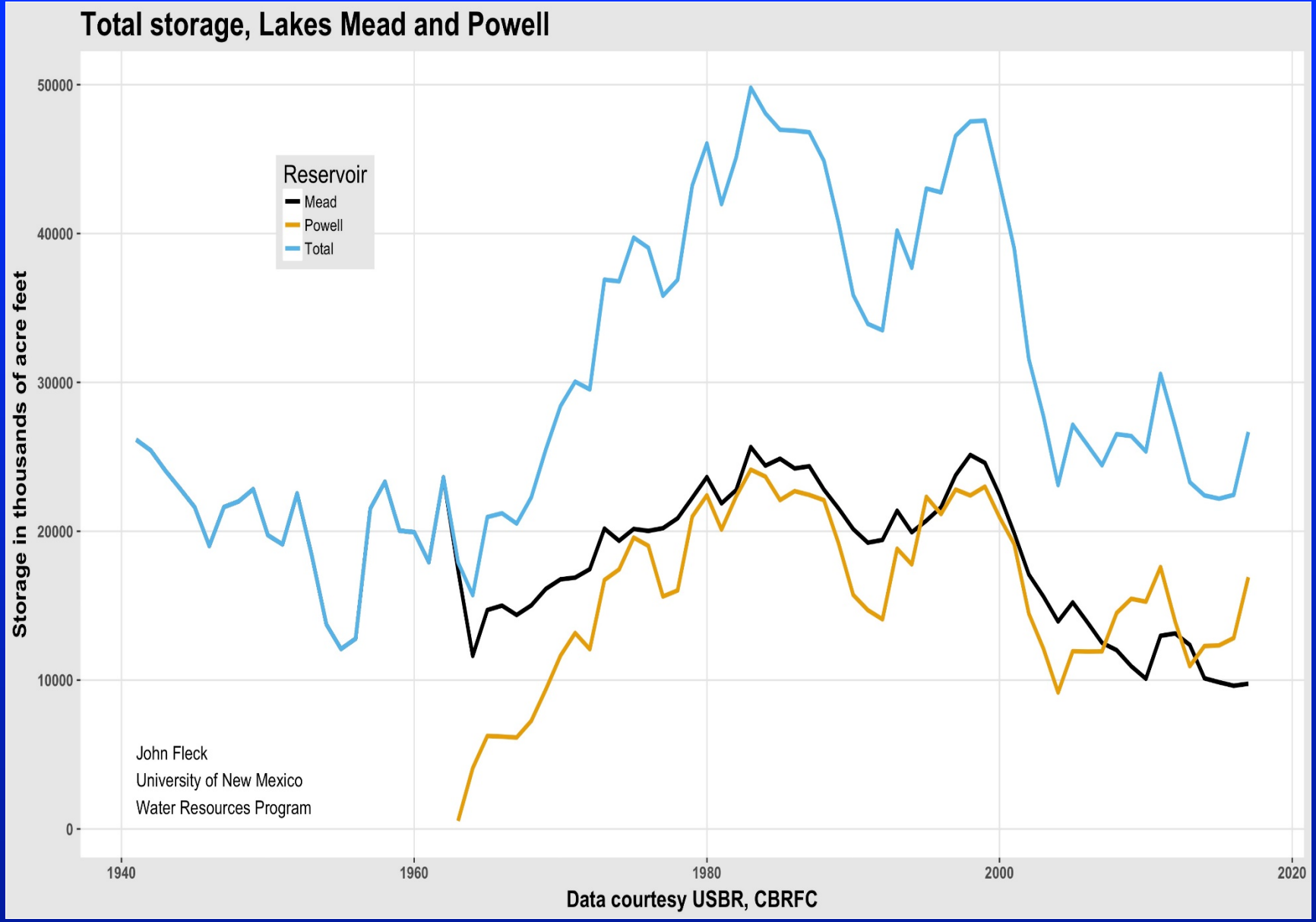

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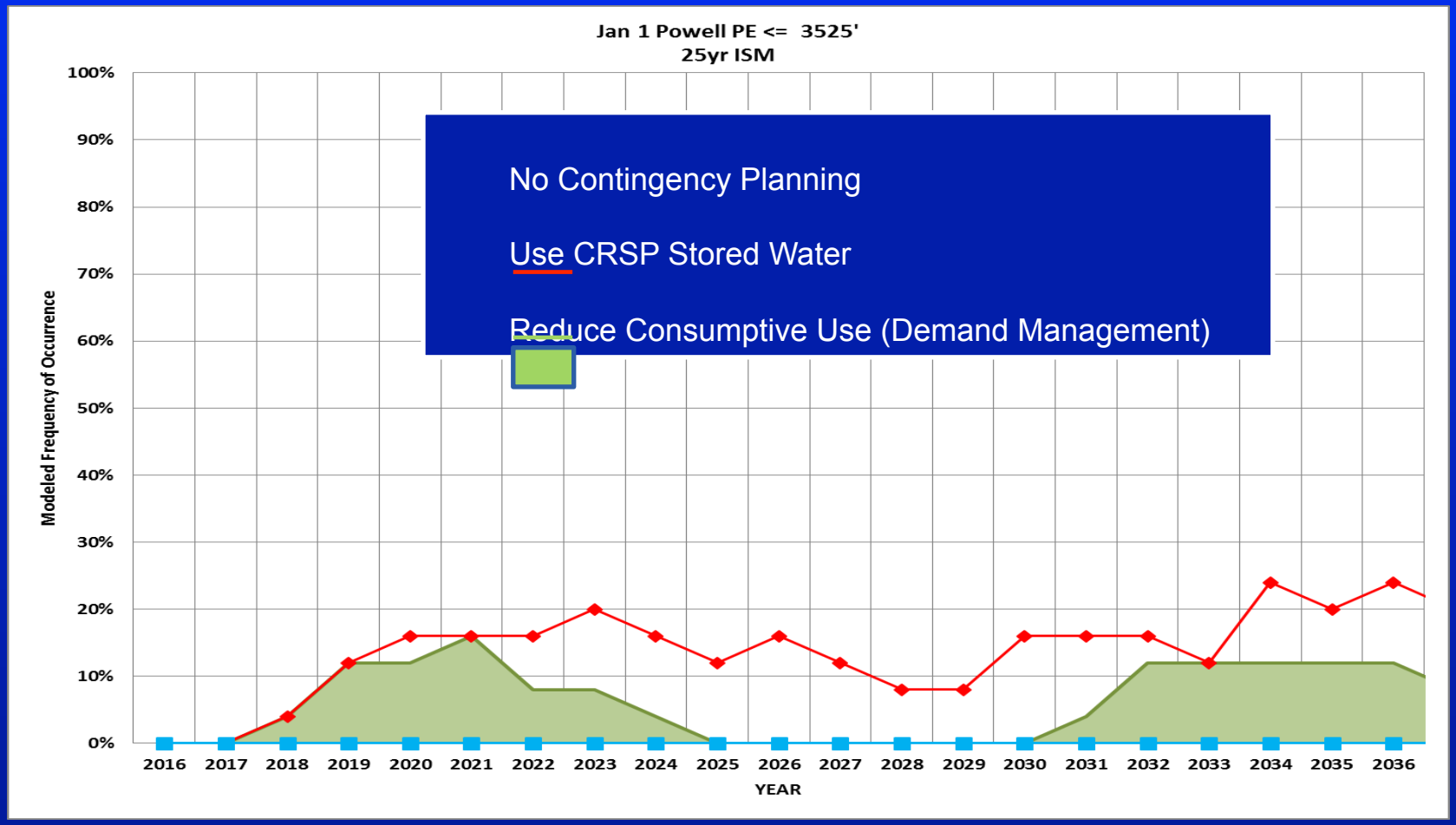
We Can Reduce Risk Further through Demand Management



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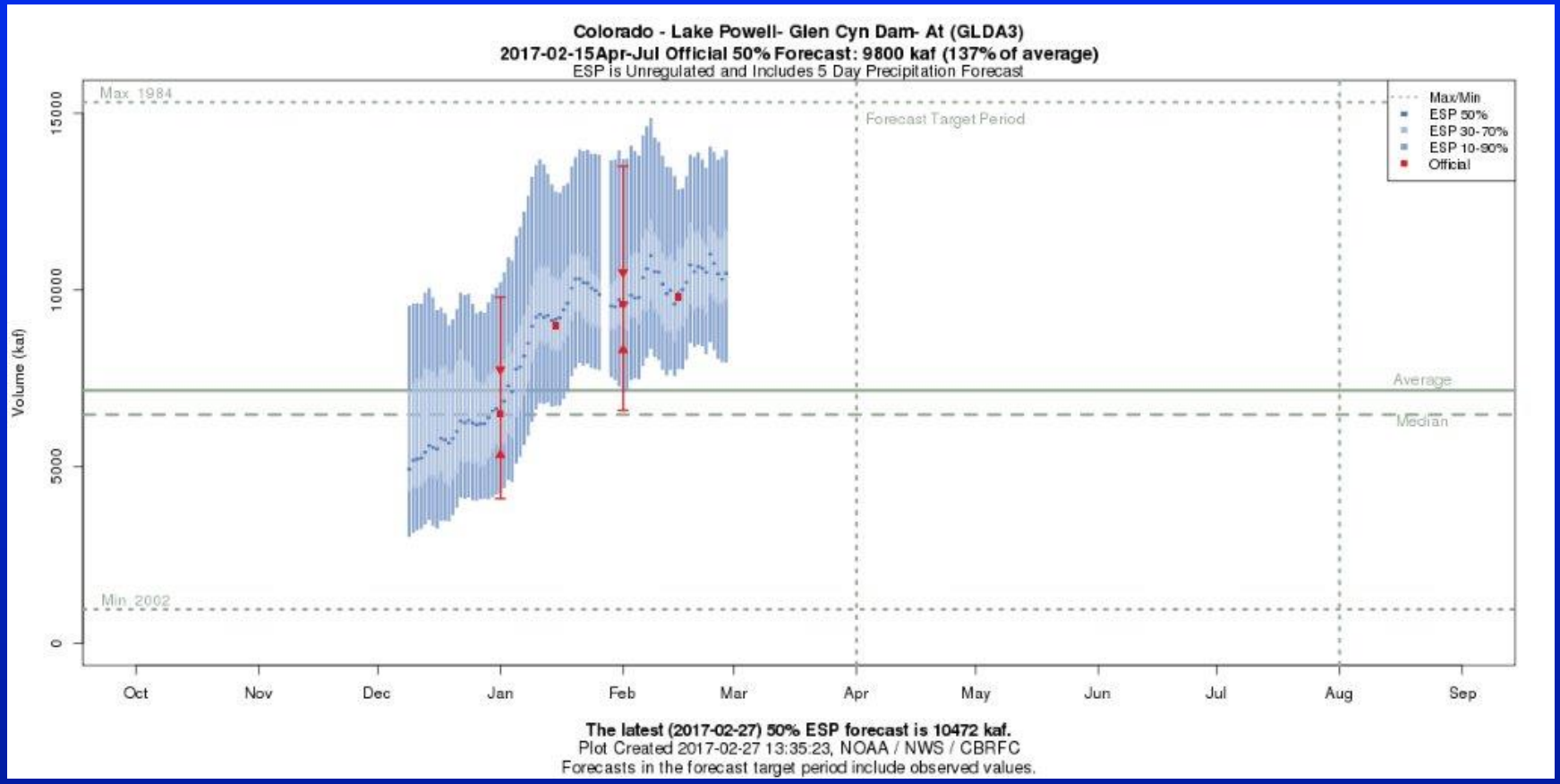
2017 IS A BIG YEAR



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PROGRESS TO DATE

- 2007 Interim Guidelines sets shortages for LB tied to Mead storage levels
- LB developing a “DCP” which will reduce Mead uses by up to 1.2 MAF
- Mexico shares shortages Min 319 & 32X
- UB & DoI have agreed on reservoir drought operations, but still working on the challenges of demand management

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

RECLAMATION

Lake Mead Elevation Since 2000