Colorado River Planning Convergence
New Solutions to Old Problems

Southwestern Water Conservation District

33rd Annual Water Seminar

April 3, 2015

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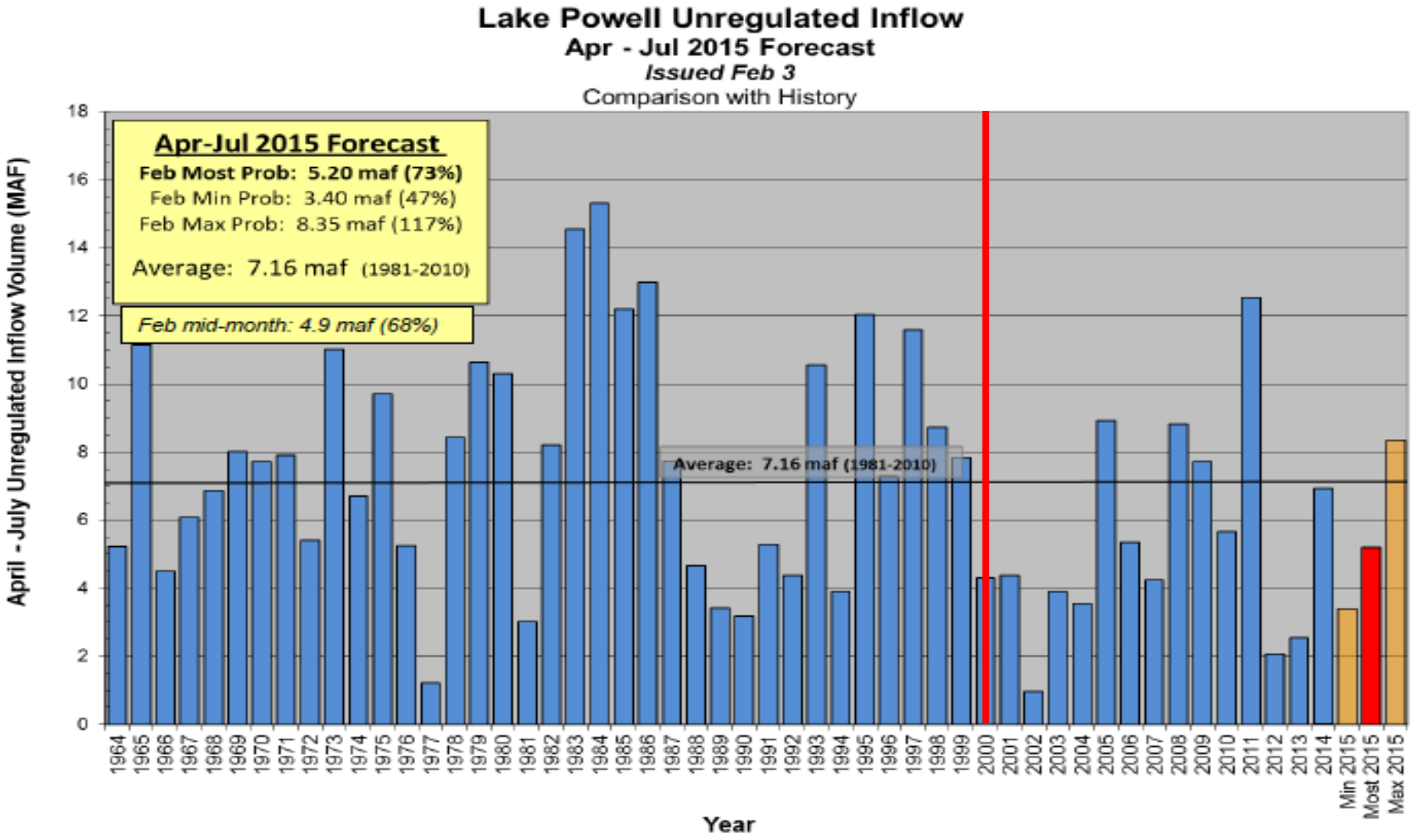
Colorado Water Conservation Board

Drought Contingency Planning

The Basin States and the Bureau of Reclamation are planning for drought response to reduce risks associated with reaching critical reservoir elevations at Lake Powell and Lake Mead. These are low probability events, but with high consequences.

Drought


Lake Powell Unregulated Inflow
Apr - Jul 2015 Forecast
Issued Feb 3
Comparison with History
Apr-Jul 2015 Forecast
Feb Most Prob: 5.20 maf (73%)
Feb Min Prob: 3.40 maf (47%)
Feb Max Prob: 8.35 maf (117%)
Average: 7.16 maf (1981-2010)
Feb mid-month: 4.9 maf (68%)
Average: 7.16 maf (1981-2010)
April - July Unregulated Inflow Volume (MAF)
Year
0
2
4
6
8
10
12
14
16
18
1964 1965 1966 1967 1968 1969 1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 Min 2015 Most 2015 Max 2015

Contingency Planning

- Some projections show that if the current drought continues or worsens, there is a possibility that storage at Lakes Powell and Mead could drop below critical elevations.

- If critical elevations are breached, the system faces threats to drinking water supply, irrigation, power production, environmental resource preservation, and overall sustainability.

- Better to negotiate a drought contingency plan in advance of a crisis.

Contingency Planning

- Colorado River Basin States
  - Arizona, California, Colorado, Nevada, New Mexico, Utah and Wyoming
- Upper Colorado River Commission
- Department of the Interior
  - Bureau of Reclamation, National Park Service, Fish and Wildlife Service, Western Area Power Administration (WAPA)
- Major Water Providers
  - MWD, CAWCD, SNWA, DW (FRWC),CRCD, SWCD
- Others – water rights holders, NGOs, etc.

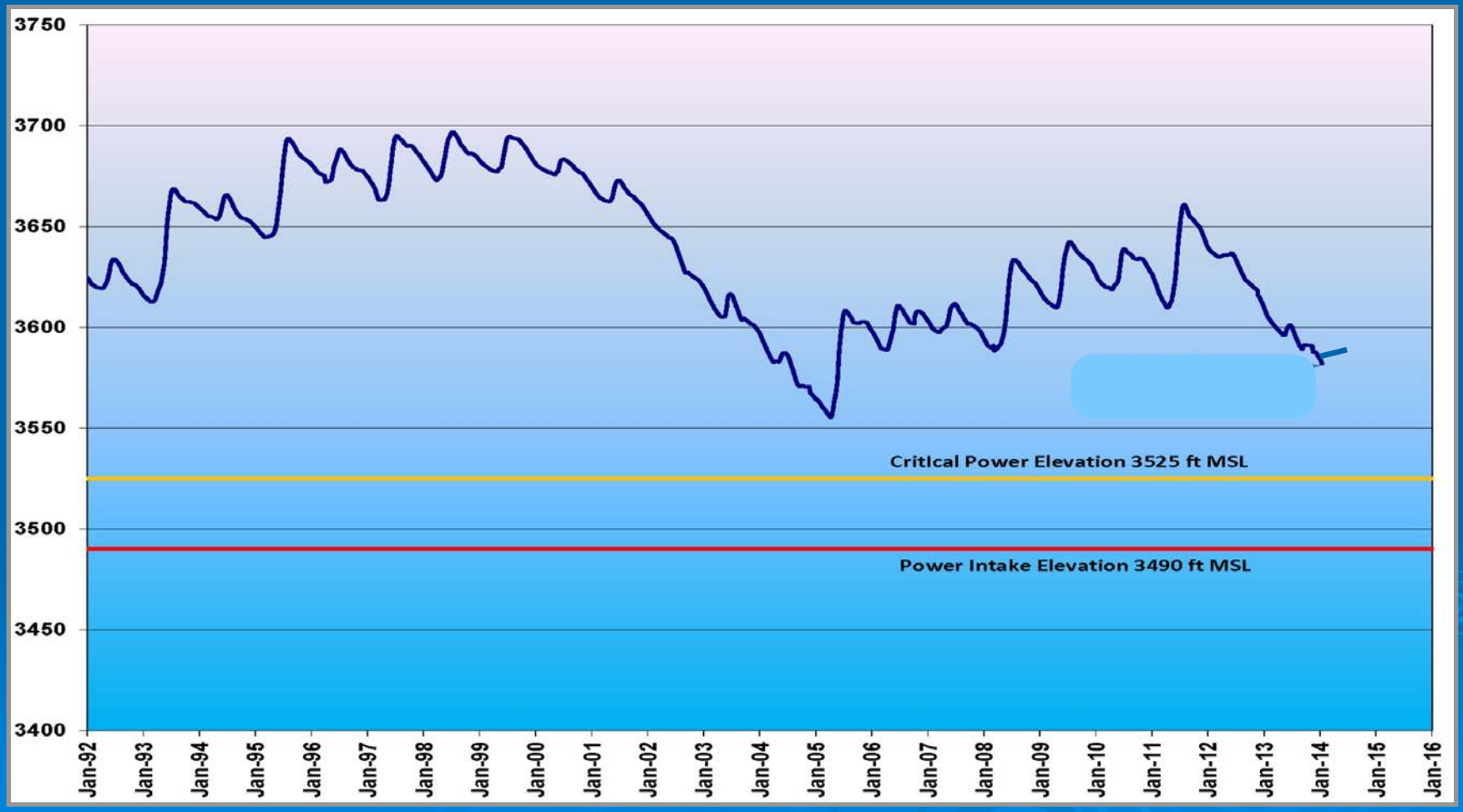
Contingency Planning

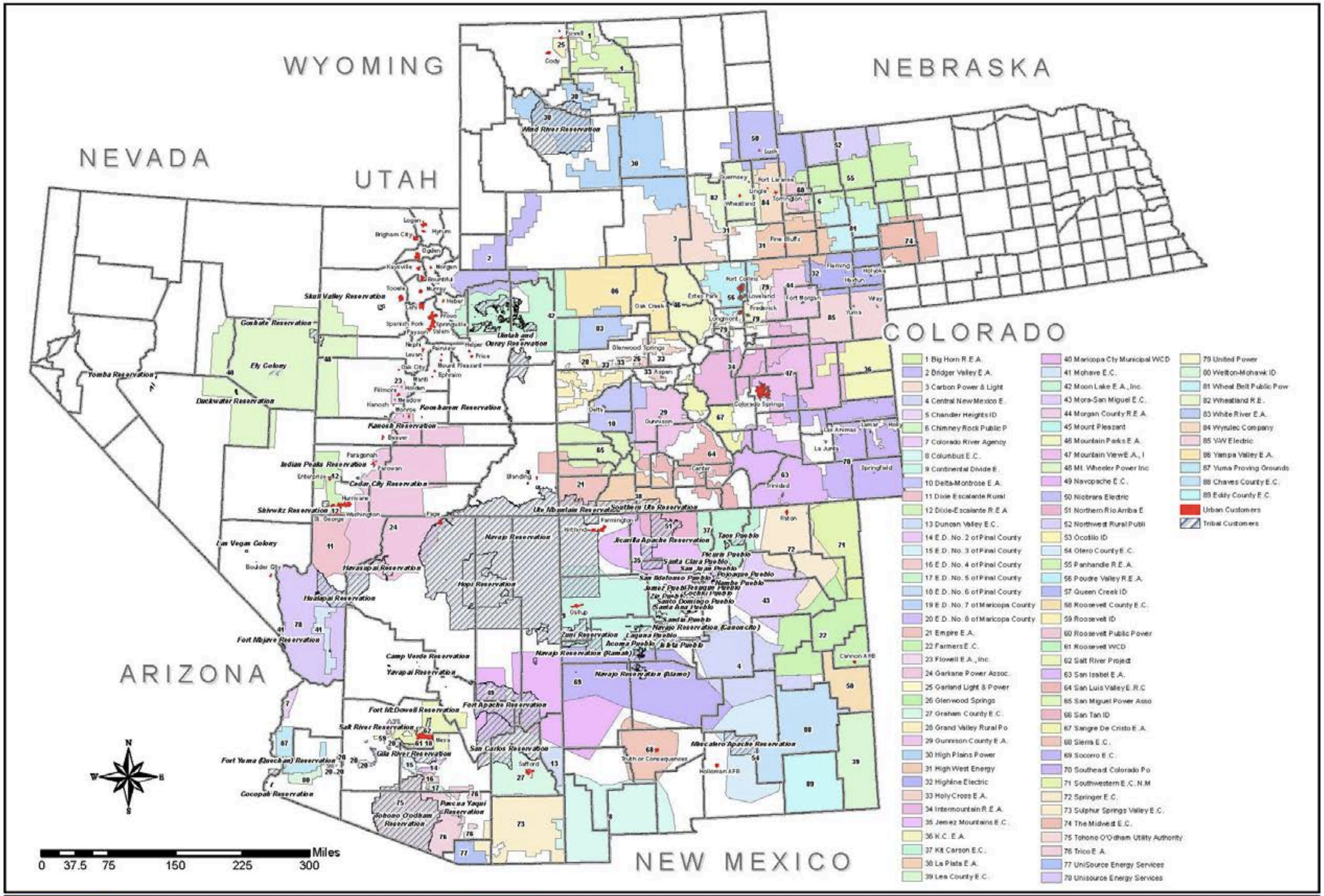
- Goals:
  - To identify methods for providing additional security in the Colorado River System in times of ongoing or extended drought.

AND

  - To avoid unilateral and uncoordinated efforts that could provoke or lead to litigation or conflict.

Critical Powell Elevations





WAPA Service Territory

DISCLAIMER:
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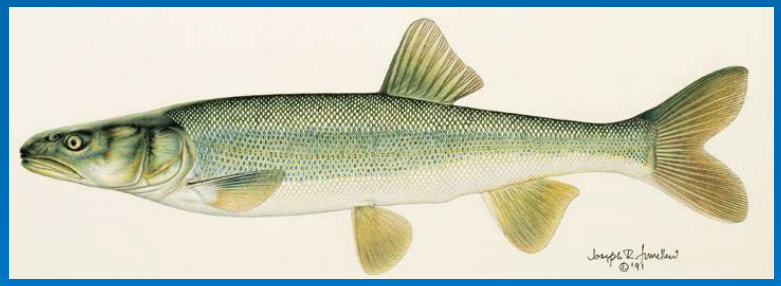
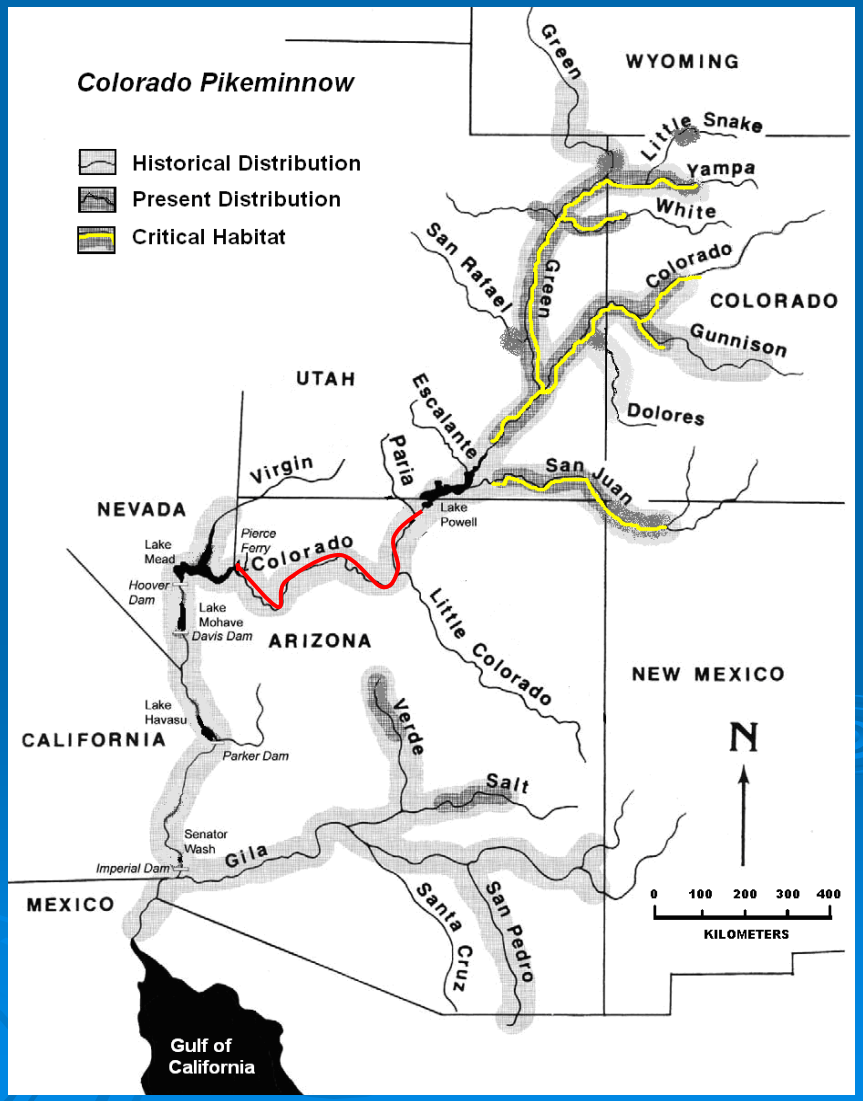
Unites States Deparment of Energy
Western Area Power Administration
Colorado River Storage Project

Environmental Resources – UCRIP/SJRIP/GCAMP





Colorado River Salinity Forum

- CWCB represents Colorado in the Colorado River Basin Salinity Control Program (CRBSCP) in conjunction with the CO Department of Public Health and Environment (CDPHE).
- Cooperative effort of the federal government and the seven Colorado River Basin States.
- Controls salinity through irrigation improvements, vegetation management, and point source control.
- Combined efforts of the Program have resulted in the control of an estimated 772,627 tons of salt per year.
- Funded with power revenues from the Colorado River Basin Fund.

Lake Powell Storage

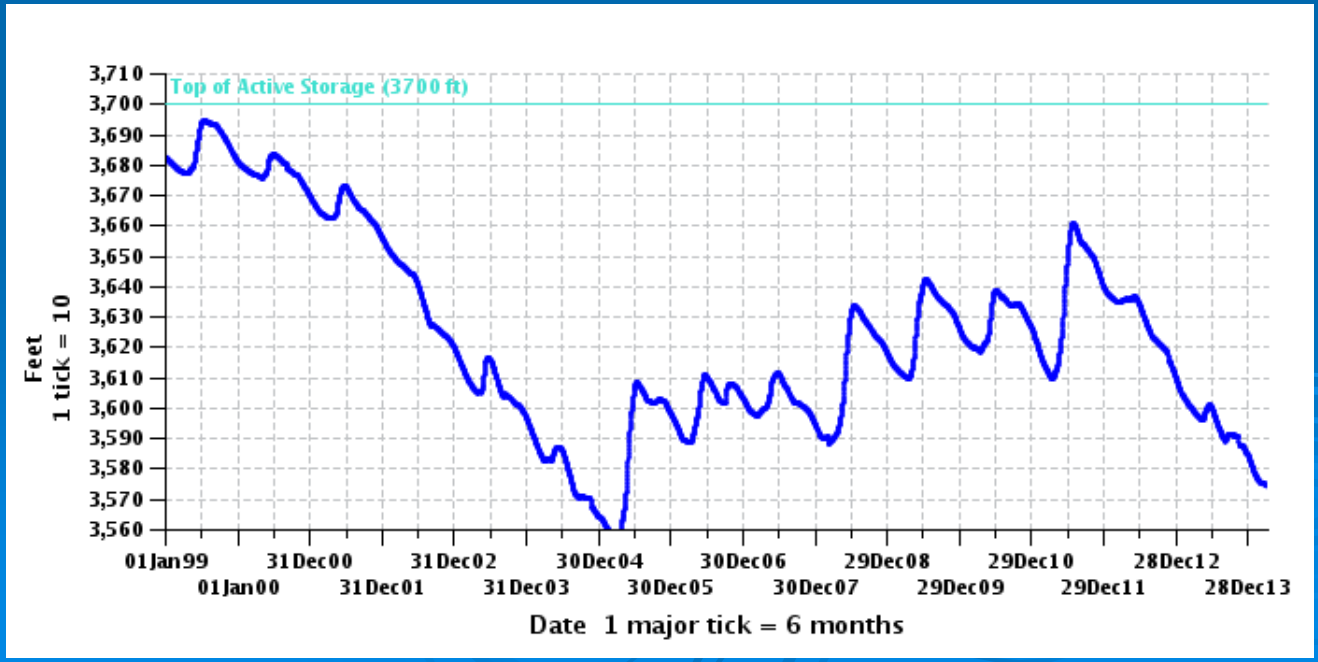
Inflows to Lake Powell

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)

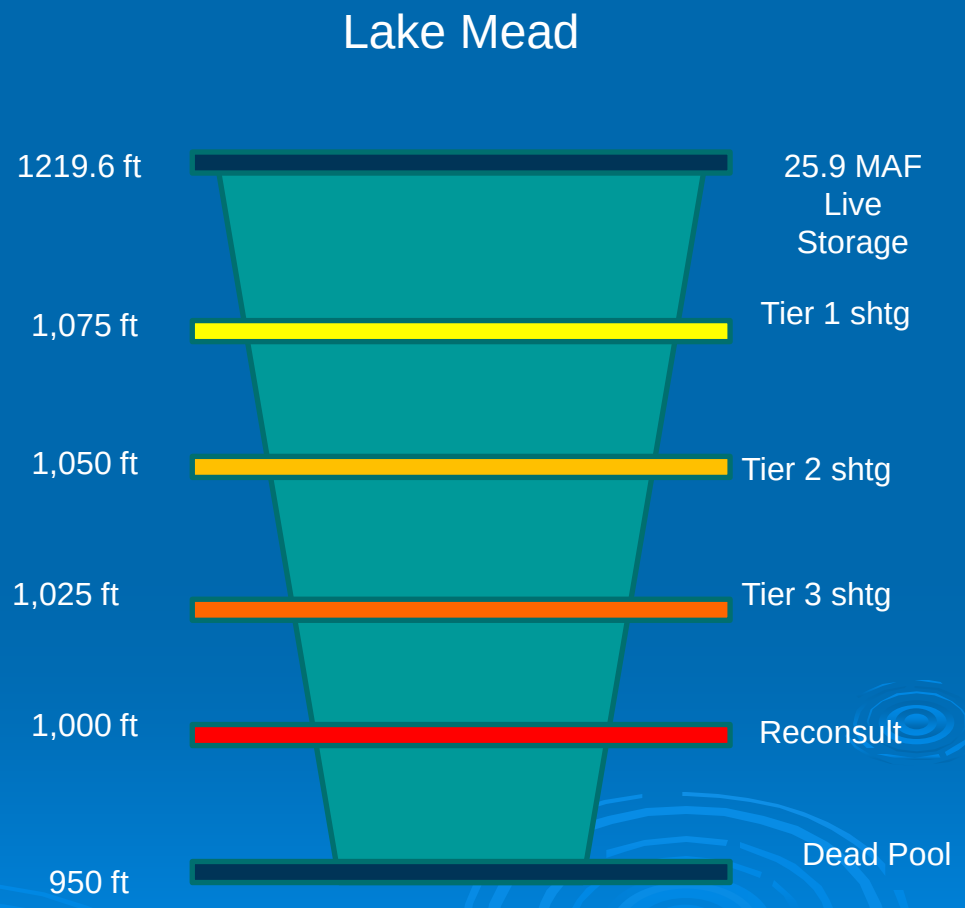
- 2012 – 4.91 maf (45%)
- 2013 – 5.12 maf (47%)
- 2014 – 10.38 maf (96%)



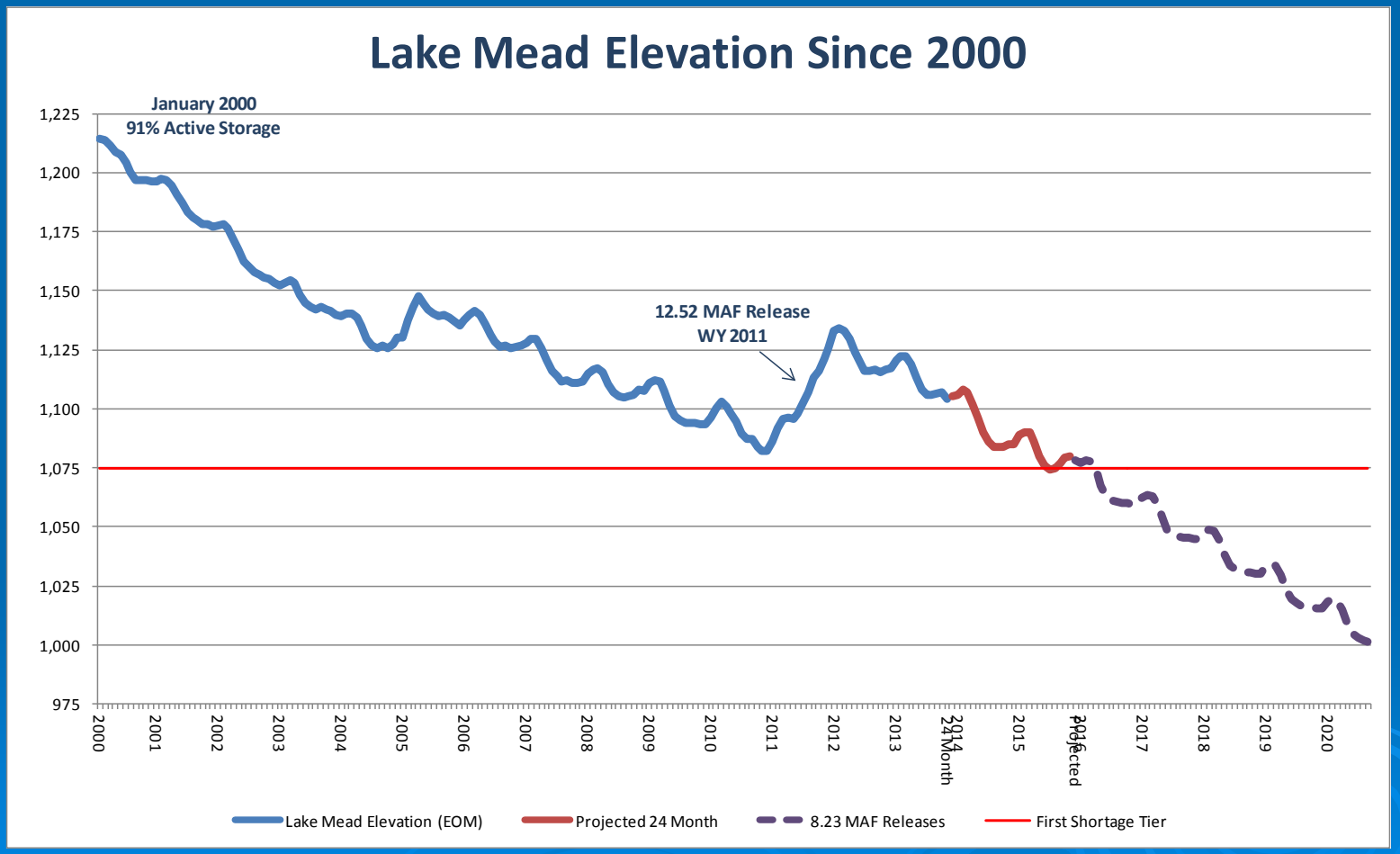
Critical Mead Elevations

- Shortages
  - Tier 1 Shortage (333 KAF) between 1075 & 1050 ft.
  - Tier 2 Shortage (417 KAF) between 1050 & 1025 ft.
  - Tier 3 Shortage (500 KAF) between 1025 & 1000 ft.
  - Below 1000 increased shortages can occur, but consultation required

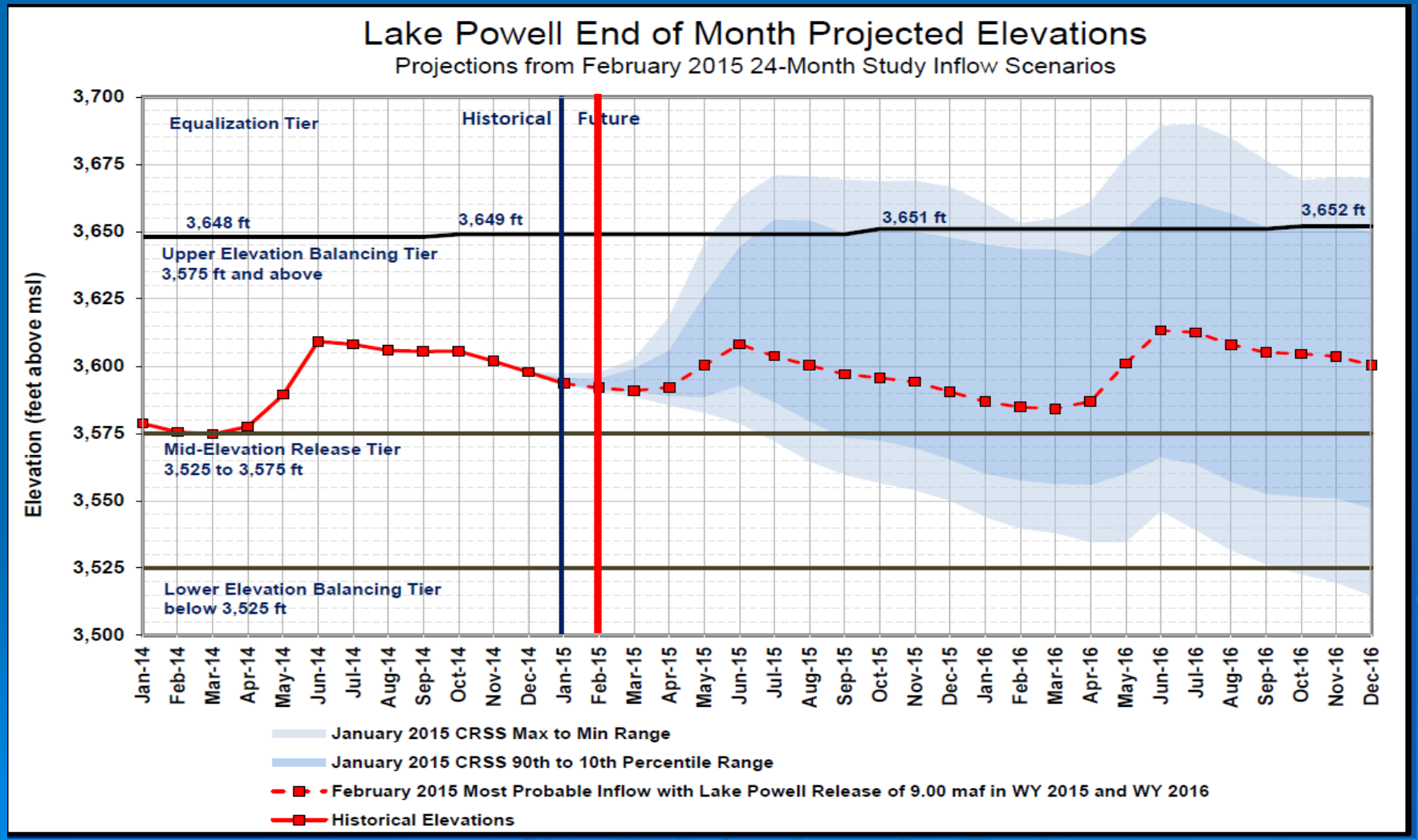
Note: Modeling assumed Mexico would share in shortages so tiers would equal 400, 500 and 600 KAF shortages.



Lake Mead Storage – Assuming Normal Releases



Reservoir Status – Lake Powell



2007 Interim Guidelines

Lake Powell Operational Tiers (subject to April adjustments or mid-year review modifications)		
Lake Powell Elevation (feet)	**Lake Powell Operational Tier**	**Lake Powell Active Storage** (maf)
3,700		**24.32**
	Equalization Tier equalize, avoid spills or release 8.23 maf	
3,636 – 3,666		**15.54 – 19.29**
(see table below)	**Upper Elevation Balancing Tier** release 8.23 maf; if Lake Mead < 1,075 feet, balance contents with a min/max release of 7.0 and 9.0 maf	(2008 – 2026)
3,575		**9.52**
	Mid-Elevation Release Tier release 7.48 maf; if Lake Mead < 1,025 feet, release 8.23 maf	
3,525		**5.93**
	Lower Elevation Balancing Tier balance contents with a min/max release of 7.0 and 9.5 maf	
3,370		**0**

Colorado River Basin Storage (as of March 30, 2015)

Current Storage	Percent Full	MAF	Elevation (Feet)
Powell	45%	10.92	3,591
Mead	40%	10.44	1,085
Total System Storage*	48%	28.85	NA

***Total system storage was 28.22 maf or 47% this time last year**

Upper Basin Contingency Planning

- Goals
  - Reduce or eliminate probability of Lake Powell reaching minimum power pool elevation (est. 3490 ft.) through 2026.
  - Ensure the continued operation of the 2007 Interim Guidelines through 2026.
  - Respect existing framework for administering use of Colorado River water in both the Upper Colorado River Basin and each Upper Division State.
  - Combined with expected actions in Lower Basin, increase the synergistic benefits for Basin as a whole.

Upper Basin Plan - Elements

- Expand existing ***weather modification programs***.
- ***Extend CRSP operations*** (Aspinall, Flaming Gorge, Navajo and Glen Canyon Dam).
- Develop opportunities for ***Upper Basin demand management***.
- Term – Consistent with ***term for 2007 Interim Shortage Guidelines***.

***Currently being implemented through the UCRC

- Resolutions dated December 10, 2014

Weather Modification

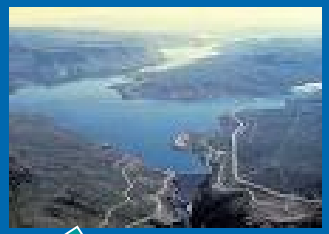
- Expand cloud seeding in key areas to increase opportunities to enhance system supplies.
- Funding from CWCB, Lower Basin entities, and New Mexico.
- Other Upper Division States doing as well.
- Seeking federal acknowledgment that it works, so additional funds can be provided.

Extended Operations

Navajo Reservoir

Flaming Gorge Reservoir

Blue Mesa Reservoir



Lake Powell

- Agree on triggers and 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.

Extended Operations Details

- Challenge
  - Identify flexibilities to release water and subsequently recover storage in a manner that:
    - Works within existing Records of Decisions and Biological Opinions for operating each CRSP reservoir.
    - Protects hydropower facilities.
    - Shares the benefits and burdens across the basin.
    - Helps attain contingency planning goals within appropriate timeframe.

Demand Management

- Evaluate alternatives to facilitate temporary, voluntary, and compensated reductions in consumptive use through willing seller/willing buyer arrangements

- Examples - temporary or rotational fallowing, municipal conservation, interruptible supply agreements, deficit irrigation of crop land, system efficiencies, conservation, etc.

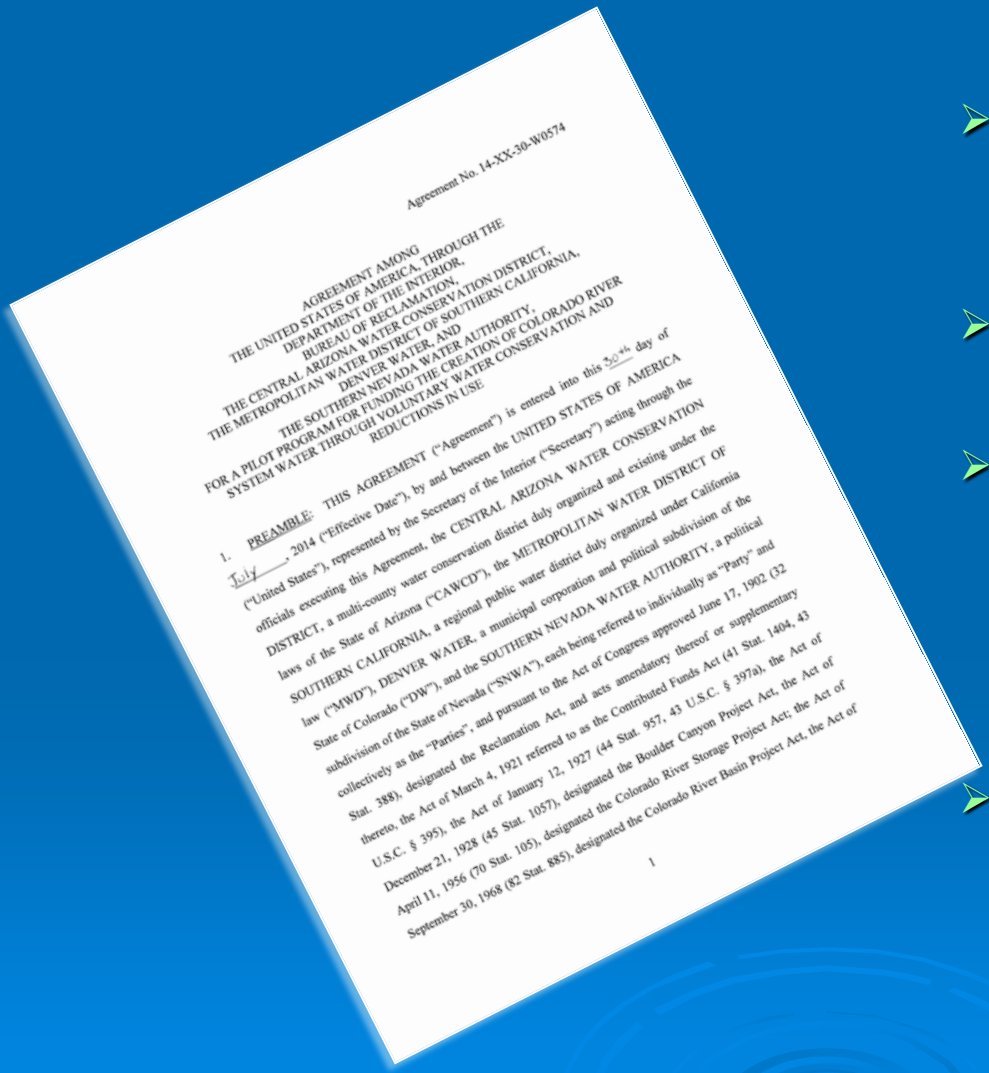
Demand Management

- Challenge - Working within the prior appropriation system, and respecting way of life of water rights holders, to facilitate to voluntarily reductions in consumptive use on willing buyer/willing seller basis.

- Some of the questions - Feasibility, Accounting, Management and Administration, Interest.

- Evaluation Mechanisms - Currently include:
  - System Conservation Pilot Program
  - Water Bank Working Group

July 2014 SC Agreement



Agreement No. 14-XX-30-W0574

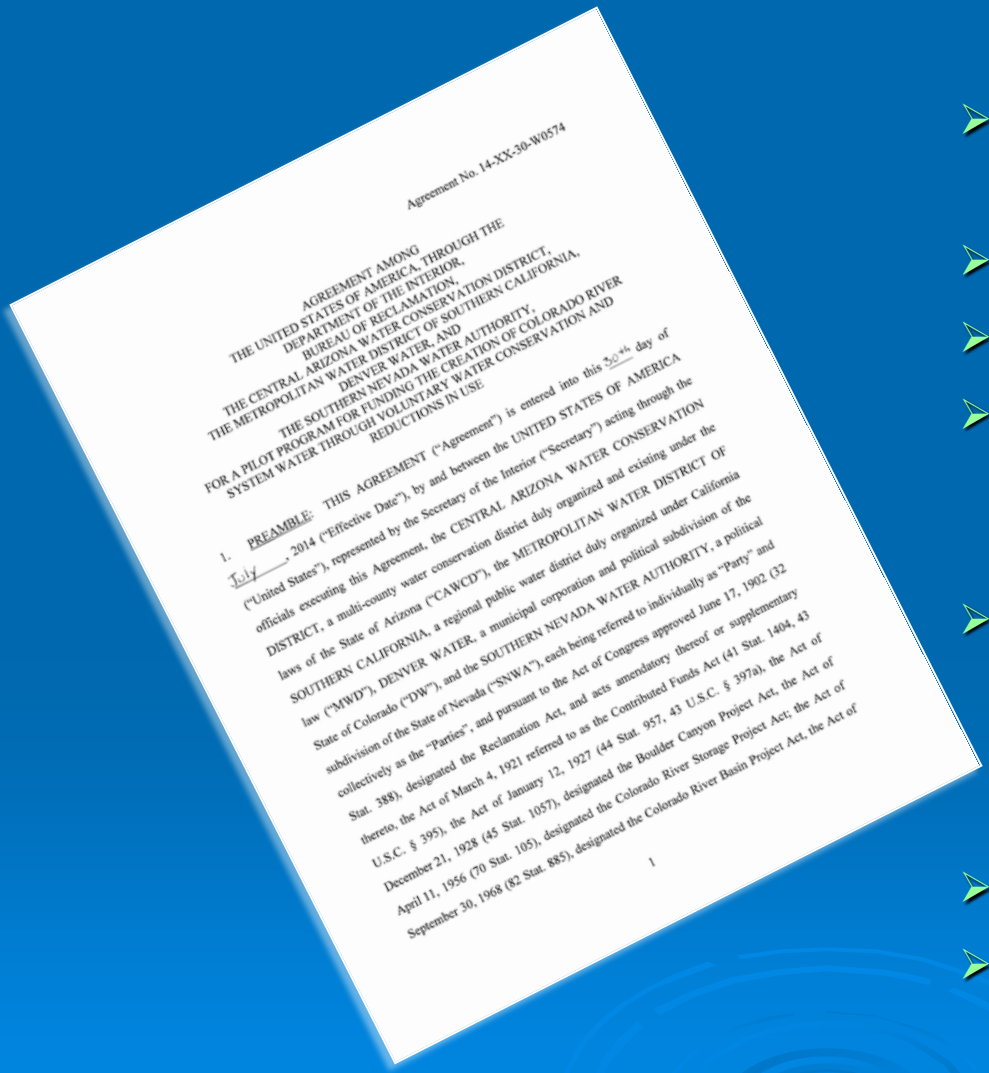
AGREEMENT AMONG
THE UNITED STATES OF AMERICA, THROUGH THE
DEPARTMENT OF THE INTERIOR,
BUREAU OF RECLAMATION,
THE CENTRAL ARIZONA WATER CONSERVATION DISTRICT,
THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA,
DENVER WATER, AND
THE SOUTHERN NEVADA WATER AUTHORITY,
FOR A PILOT PROGRAM FOR FUNDING THE CREATION OF COLORADO RIVER
SYSTEM WATER THROUGH VOLUNTARY WATER CONSERVATION AND
REDUCTIONS IN USE

1. PREAMBLE: THIS AGREEMENT ("Agreement") is entered into this 30th day of July, 2014 ("Effective Date"), by and between the UNITED STATES OF AMERICA ("United States"), represented by the Secretary of the Interior ("Secretary") acting through the officials executing this Agreement, the CENTRAL ARIZONA WATER CONSERVATION DISTRICT, a multi-county water conservation district duly organized and existing under the laws of the State of Arizona ("CAWCD"), the METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA, a regional public water district duly organized under California law ("MWD"), DENVER WATER, a municipal corporation and political subdivision of the State of Colorado ("DW"), and the SOUTHERN NEVADA WATER AUTHORITY, a political subdivision of the State of Nevada ("SNWA"), each being referred to individually as "Party" and collectively as the "Parties", and pursuant to the Act of Congress approved June 17, 1902 (32 Stat. 388), designated the Reclamation Act, and acts amendatory thereof or supplementary thereto, the Act of March 4, 1921 referred to as the Contributed Funds Act (41 Stat. 1404, 43 U.S.C. § 395); the Act of January 12, 1927 (44 Stat. 957, 43 U.S.C. § 397a), the Act of December 21, 1928 (45 Stat. 1057), designated the Boulder Canyon Project Act, the Act of April 11, 1956 (70 Stat. 105), designated the Colorado River Storage Project Act; the Act of September 30, 1968 (82 Stat. 885), designated the Colorado River Basin Project Act, the Act of

1

- Two year pilot funded by BOR, Denver, MWD, CAP, and SNWA
- $11 million ($2.75 million in Upper Basin)
- Evaluate feasibility of mitigating drought impacts through compensated, temporary, and voluntary reductions in consumptive use.
- Benefits of reductions inure to system and NOT to any one entitlement holder

System Conservation Status



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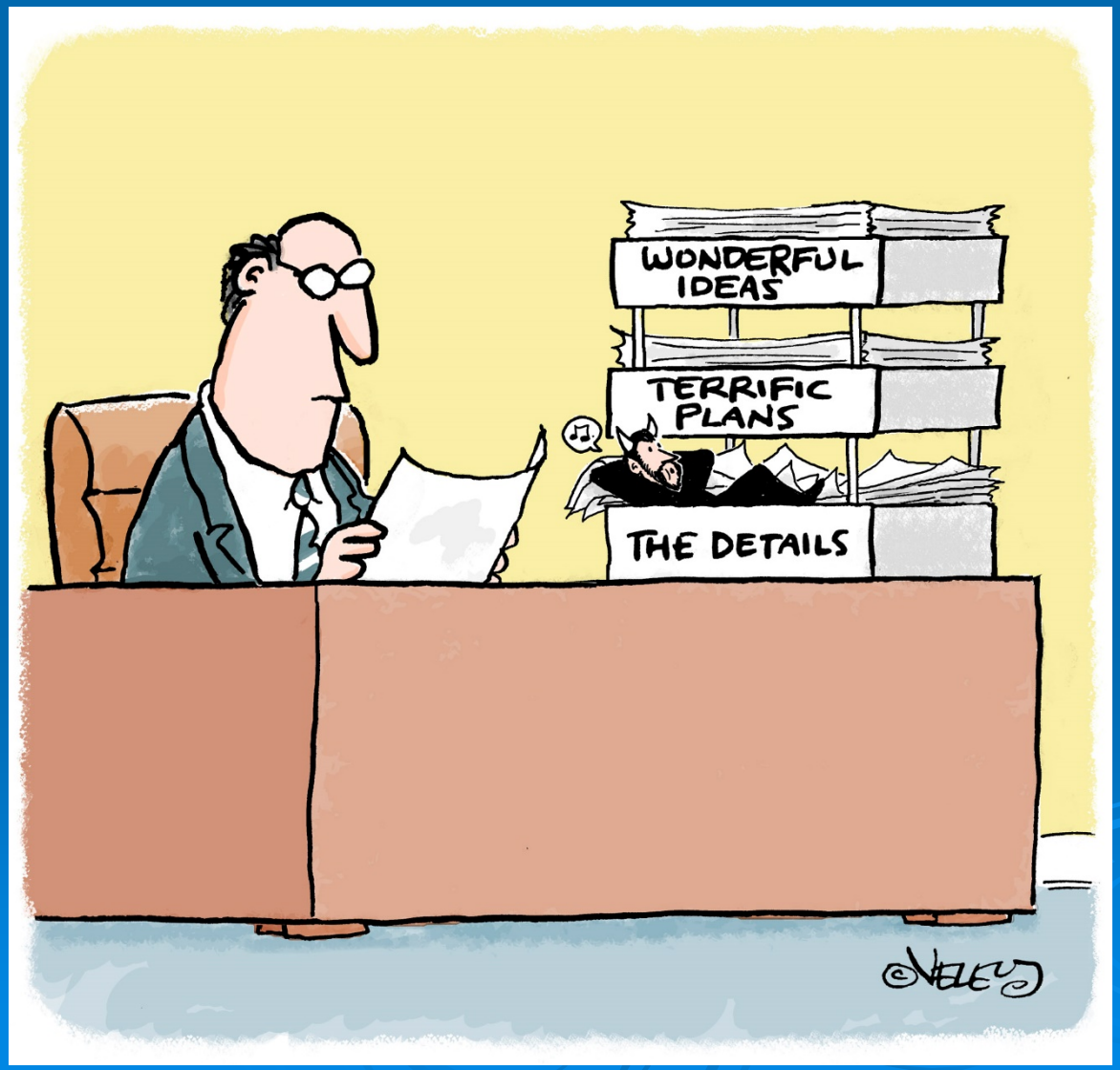
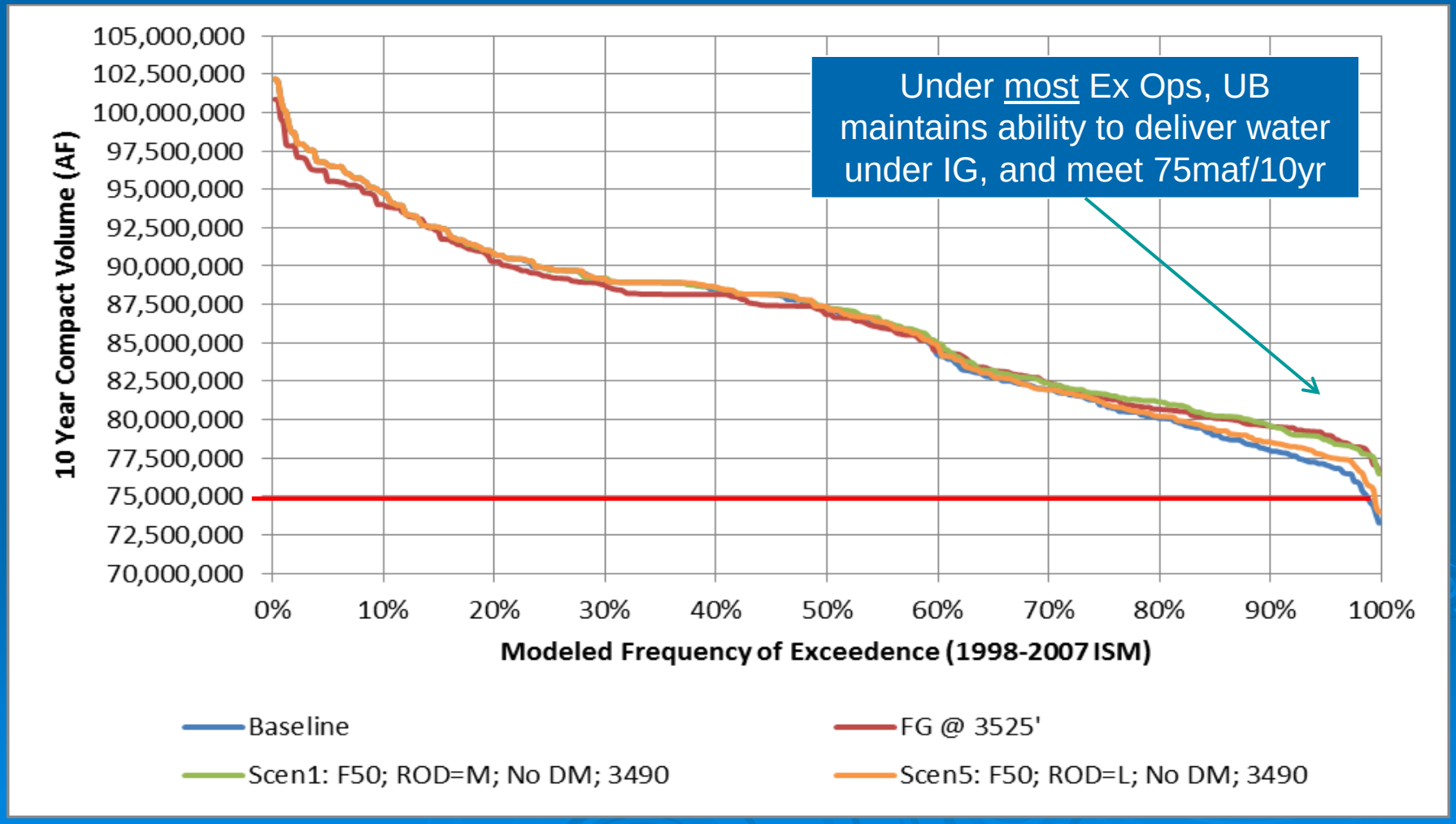
- BOR is administering the program in the lower basin
- Received 14 pre-proposals
- Geographically diverse
- Sector diverse – tribes, municipalities, irrigation districts
- Include efficiency, conveyance loss reduction, fallowing, reuse, and landscape conversions
- Price diverse ($100 - $1000/af)
- Selections made February 2015 for implementation this year

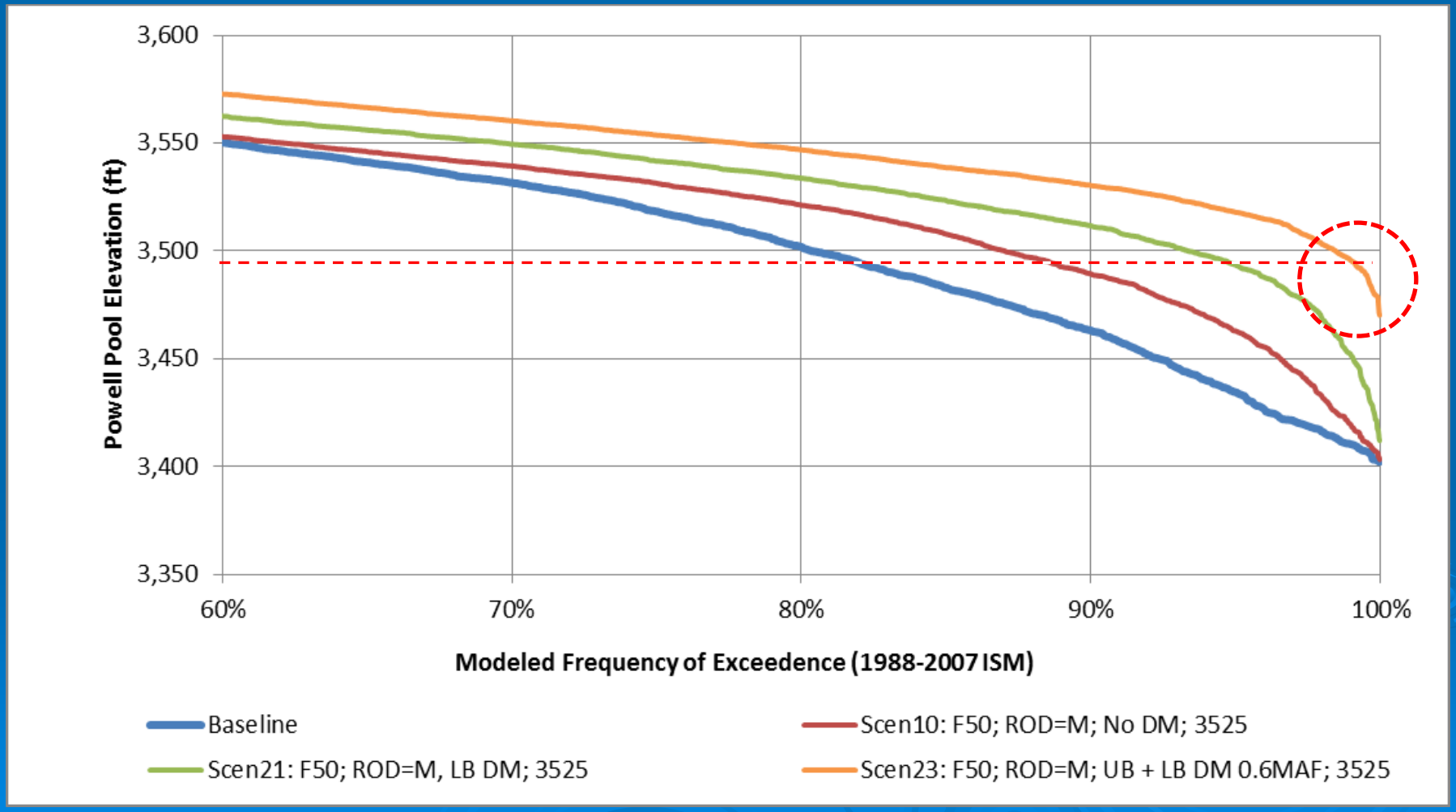
Drought Contingency Plan



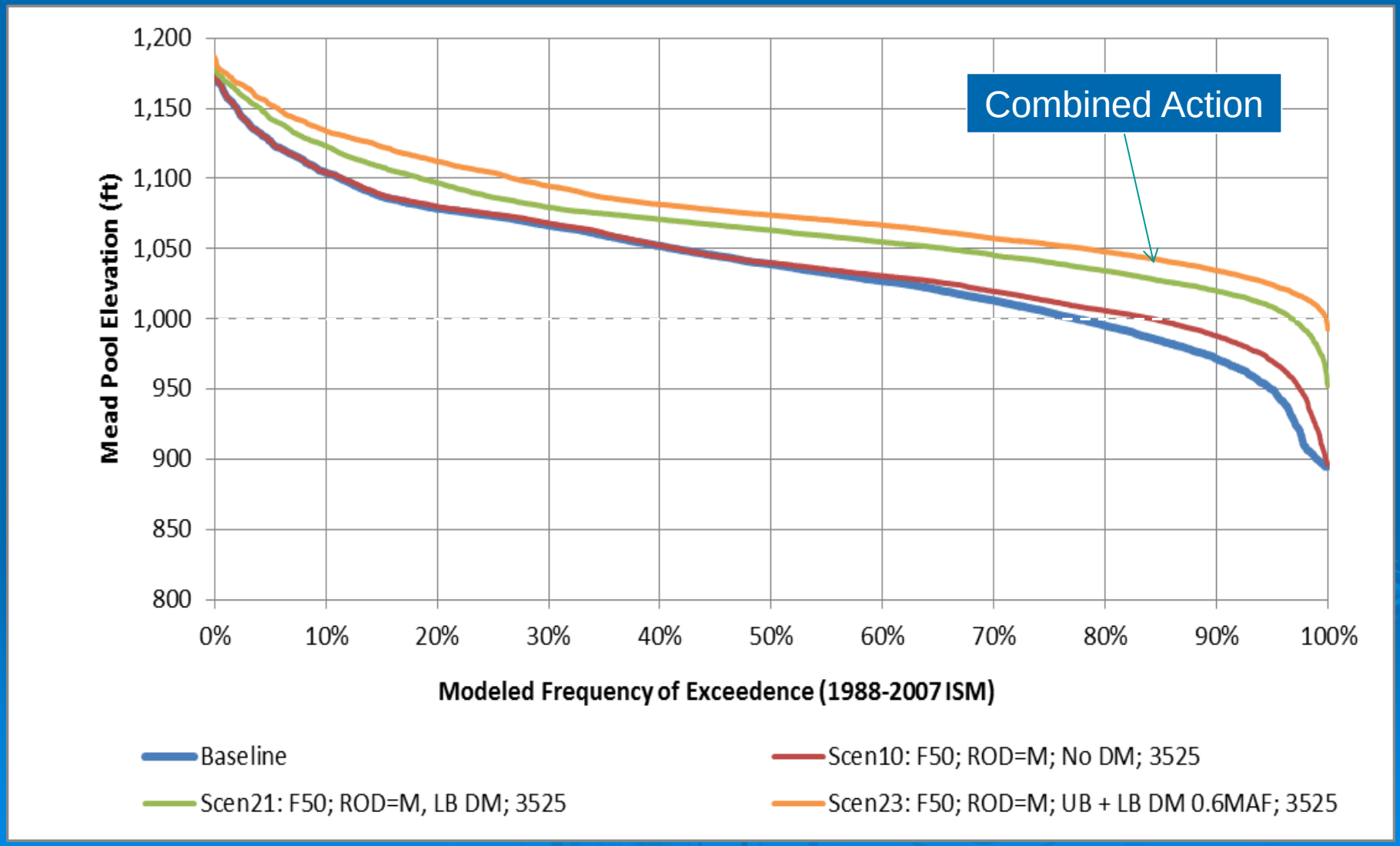
Bending the Curve



Combined efforts bend the curve



Combinations of UB and LB DM, together with Extended Operations, gives the best results



Next Steps

- Establish working criteria for contingency operations at CRSP reservoirs.
- Develop MOA with DOI, Western and Upper Basin States on implementing Extended Operations.
- Establish framework for facilitating System Conservation Agreement pilot program in Upper Basin.
- Continue studies and evaluation of other demand management opportunities in the Upper Basin.
- Confirm compliance with Lower Basin MOU, Contingency Planning, AND Sustainability Planning.
- Work to enter into additional Minute with Mexico.

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