



The Colorado River Basin

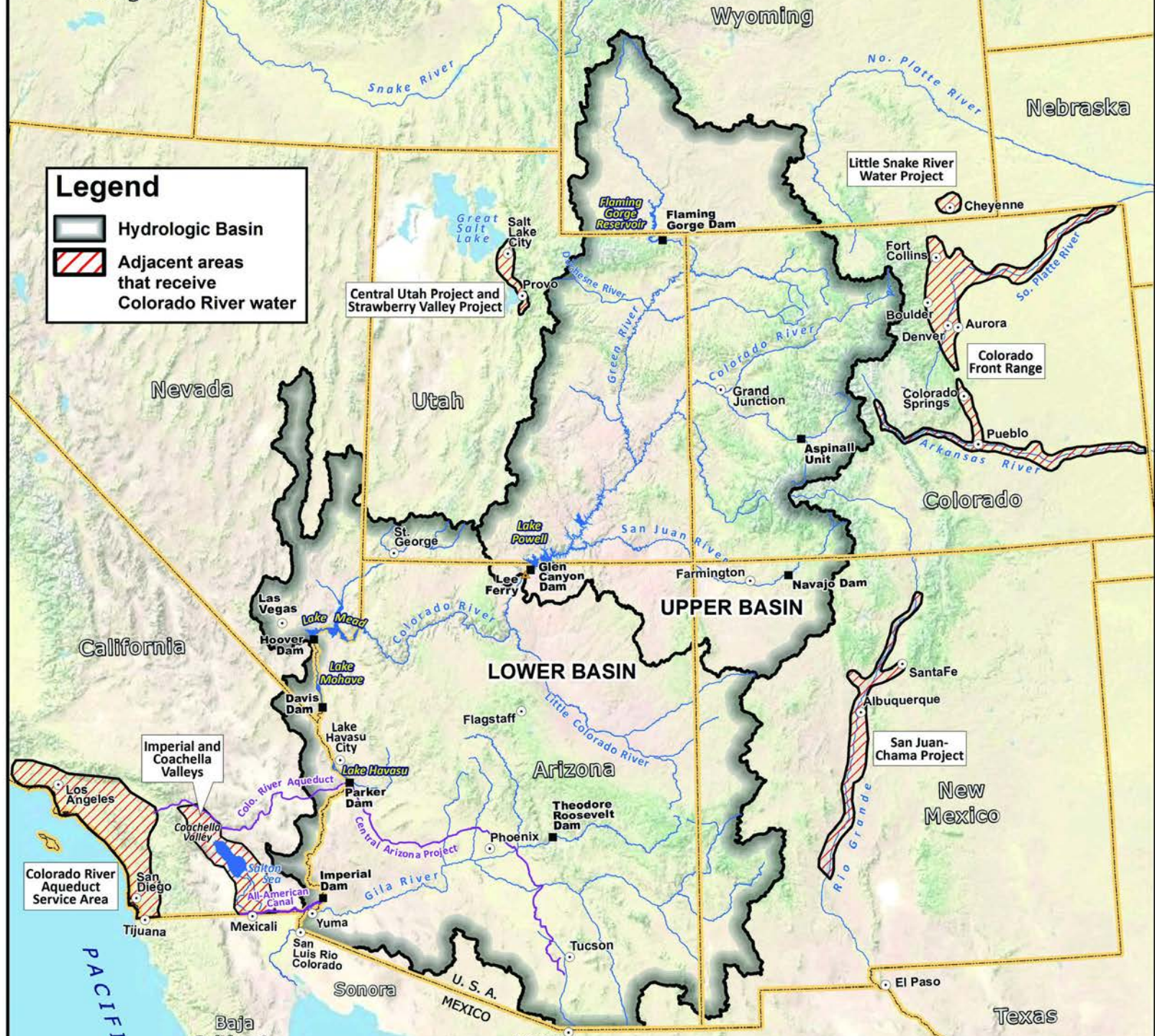
Challenges & Opportunities

Michael Cohen
May 28, 2014

- Geography & water use
- Institutions
- Supply & consumption
- Declining storage & threat of shortage
- Supply/Demand imbalance and options
- Recent Innovations

Legend

-  Hydrologic Basin
-  Adjacent areas that receive Colorado River water



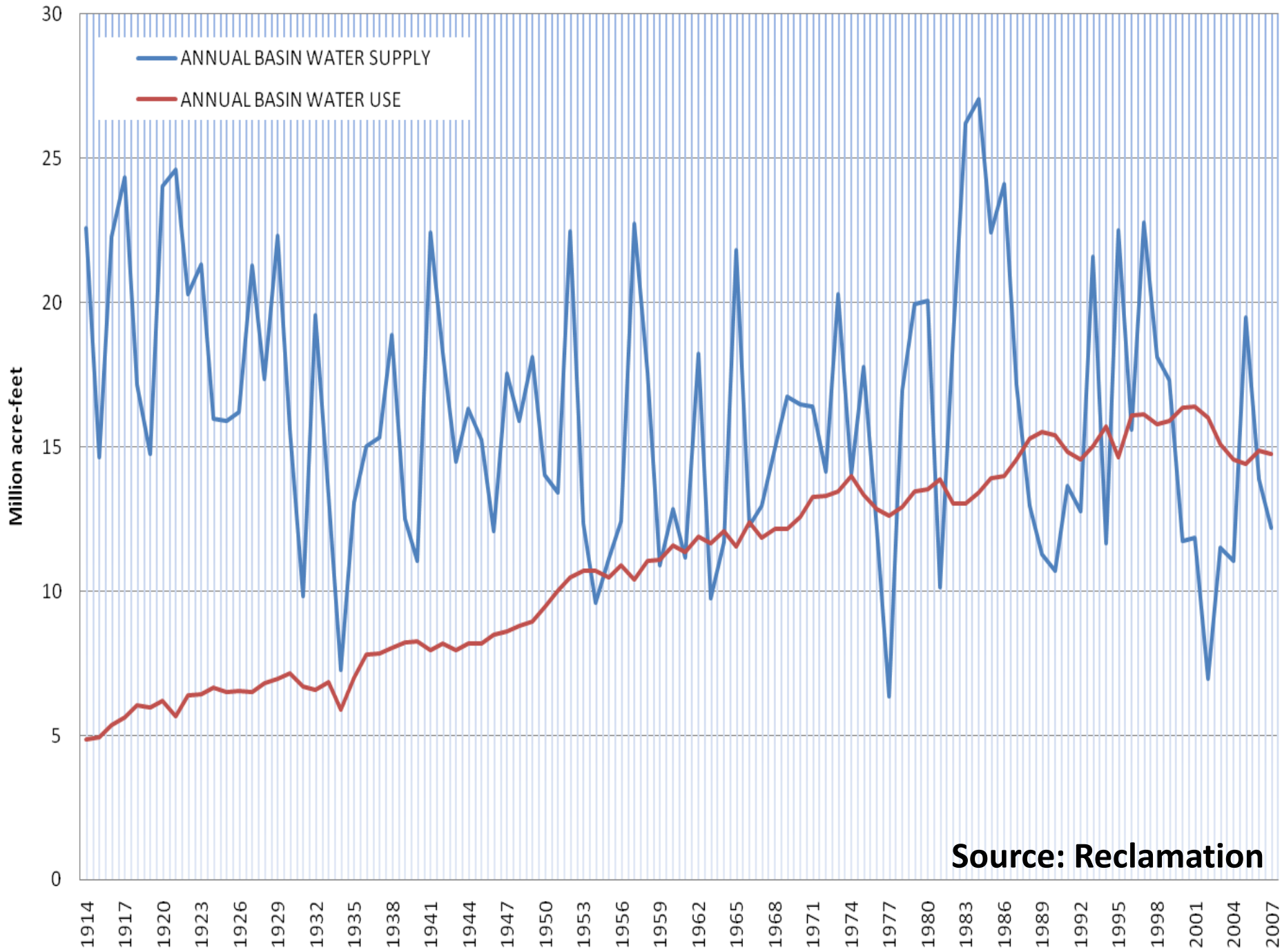


The “Law of the River”

- The Colorado River Compact of 1922
- The Boulder Canyon Project Act of 1928
- California Seven Party Agreement of 1931
- The Mexican Water Treaty of 1944
- Upper Colorado River Basin Compact of 1948
- Colorado River Storage Project of 1956
- Arizona v. California Decision (1963) and Decree (1964)
- The Colorado River Basin Project Act of 1968
- Criteria for Coordinated Long-Range Operation of Reservoirs (1970)
- Minute 242 of the U.S.-Mexico IBWC of 1973
- The Colorado River Basin Salinity Control Act of 1974
- Supplemental Decree of 1979
- Grand Canyon Protection Act of 1992
- Interim Surplus Guidelines of 2001
- California’s QSA of 2003
- Shortage Guidelines/Reservoir Operations (2007)
- IBWC Minutes 316-319 (2010-2012)

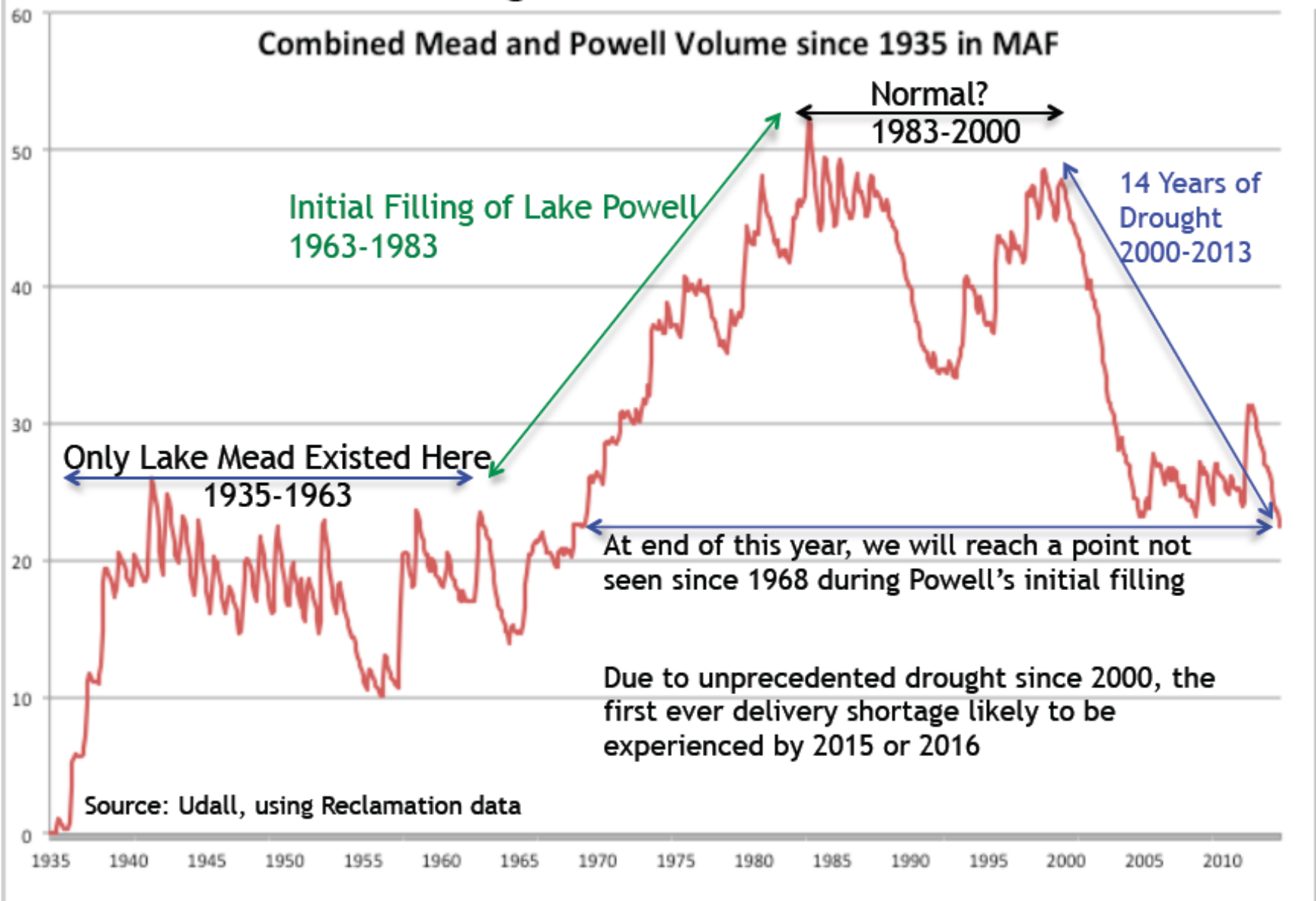
Stakeholders

- Dept of Interior/Bureau of Reclamation
- Upper Basin Commission
- 7 Basin States
- IBWC/CILA
- Water agencies (MWD, IID, SNWA, CAP, etc)
- Tribes
- Power interests
- NGOs
- Recreation interests



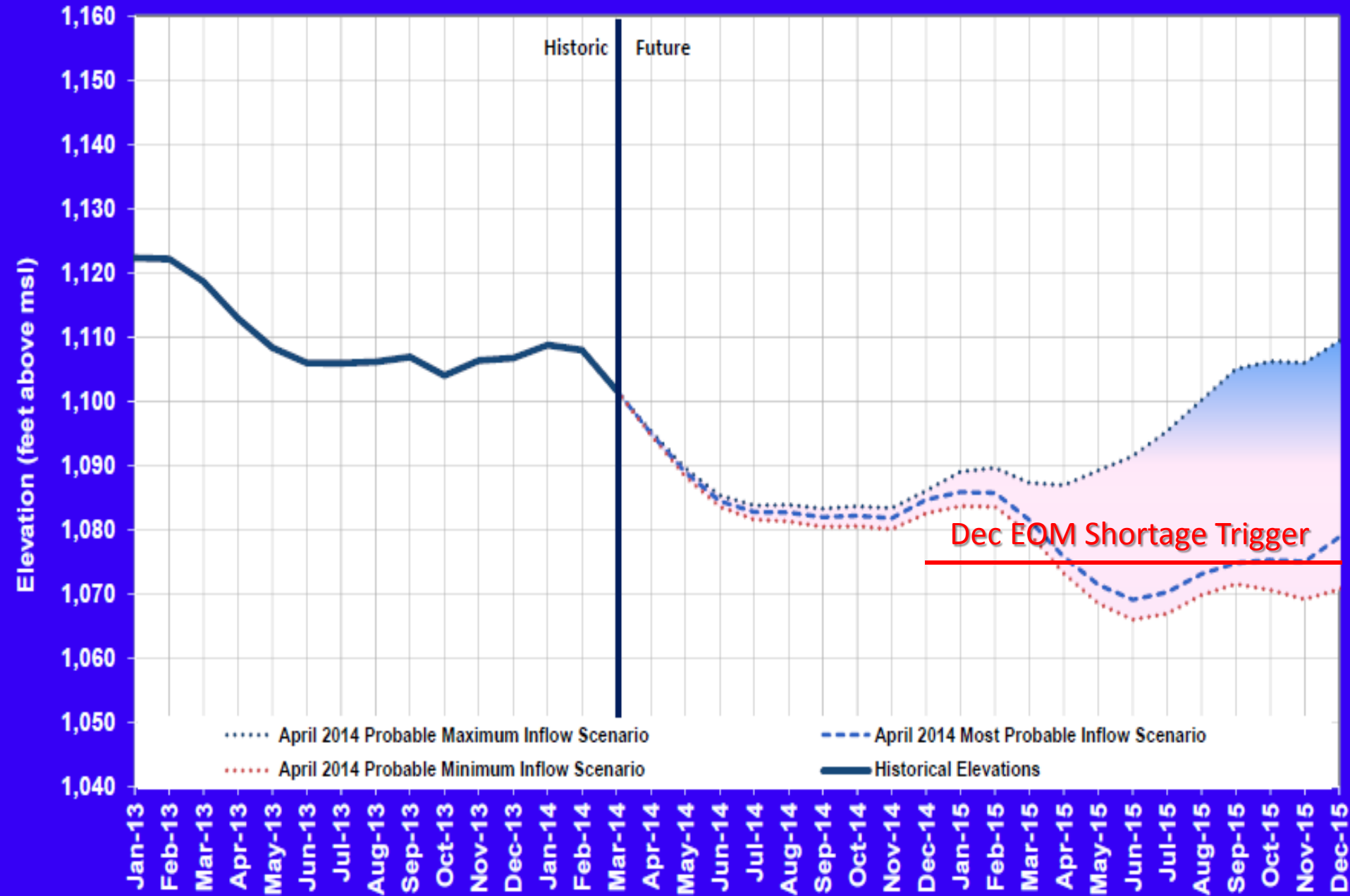
Source: Reclamation

Contents of the Two Largest Reservoirs in the United States



Lake Mead End of Month Elevations

Projections from April 2014 24-Month Study Inflow Scenarios



Structural Deficit

- The Lower Basin uses about 1.2 million acre-feet more each year than it receives from Lake Powell and from side inflows – equivalent to ~12 ft/yr at Mead.
- Absent an equalization release from Lake Powell or other corrective measures, Lake Mead will fall below elevation 1000 within the next 6 to 8 years, even after deliveries are reduced in accordance with the Guidelines

Source: CAP, April 2014

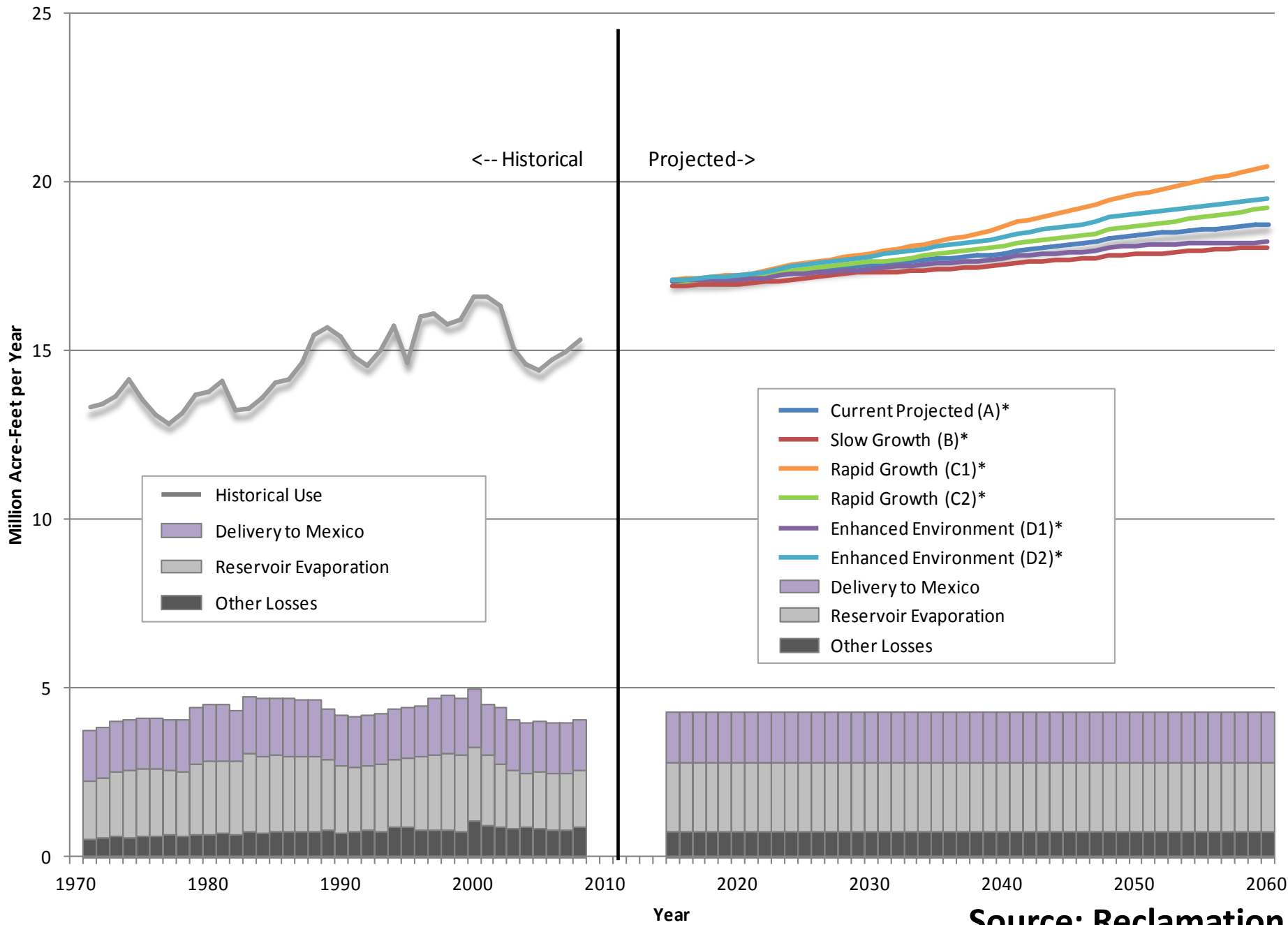
RECLAMATION

Managing Water in the West

Colorado River Basin Water Supply and Demand Study

Executive Summary

www.usbr.gov/lc/region/programs/crbstudy.html



Source: Reclamation

*Quantified demand scenarios have been adjusted to include Mexico's allotment and estimates for future reservoir evaporation and other losses.

Basin Study Common Solutions

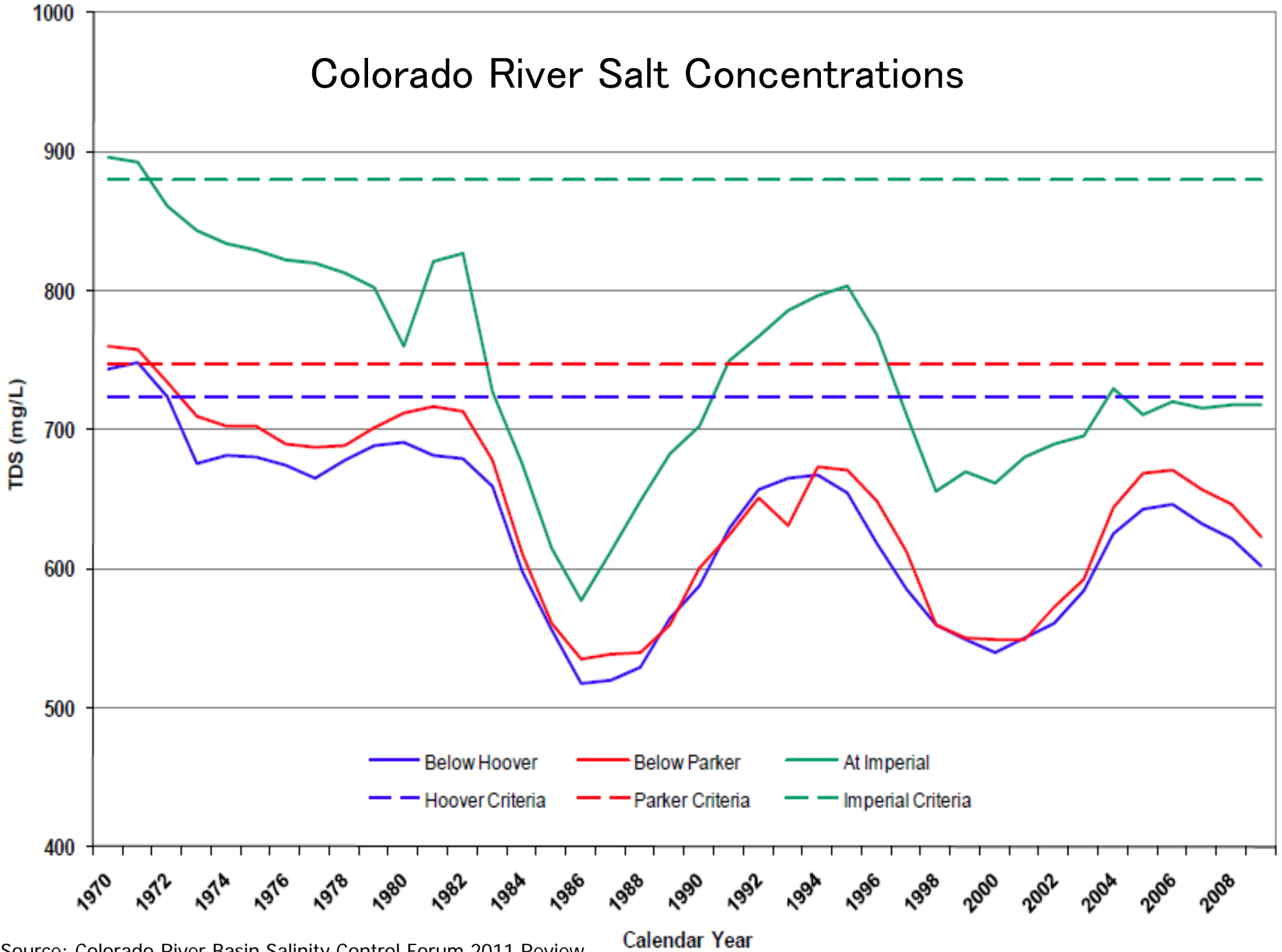
Option Type	Option Category	est. cost (\$/AF)	Years before available	Potential yield by 2060 (AF/yr)	Included in Portfolio
Increase supply	Re-Use of M&I water	1,500-1,800	10-35	932,000	All portfolios
Increase supply	Salton Sea Drain water	1,000	15-25	500,000	All portfolios
Reduce demand	M&I water conservation	500-900	5-40	1,000,000	All portfolios
Reduce demand	Ag water conservation	150-750	10-15	1,000,000	All portfolios
Reduce demand	Power Plants convert to air cooling	2,000	10	160,000	All portfolios

United States Bureau of Reclamation, *Basin Study*, 2012.

Innovations

- Water transfers – 263 KAF
- Canal linings - ~100 KAF
- Intentionally Created Surplus – 1,100 KAF stored
- Mexico's Deferred deliveries – 294 KAF
- Delta pulse flow
- CO R System Conservation Program - \$13 M
- CO R Salinity Control Program

Colorado River Salt Concentrations



Source: Colorado River Basin Salinity Control Forum 2011 Review

CO R Salinity Control Program

- Multiple implementing agencies – NRCS, BLM, Reclamations
- Partners – 7 basin states, USGS, EPA, FWS, water agencies & districts. 30% up-front cost share
- 2008-2009 avg. salinity levels at Imperial Dam (717 mg/l) modeled show over \$376 million/yr in present annual economic damages.
- Impact of \$173 per ton or \$1,733,000 per mg/l of TDS per year
- Has controlled about 1.2 million tons/yr, at \$20/45/160 /ton
- Salinity control programs include lining and piping canals to minimize seepage and leaching; deep re-injection wells, grazing mgmt, etc