Successes and Challenges on the Colorado River

March 2, 2017

MSSC Annual Summit

Bill Hasencamp
Metropolitan Water District
of Southern California

Metropolitan Water District

- Regional Water Wholesaler
- 5,200 Sq. Miles - 6 Counties
- ~19 Million People
- 26 Member Agencies
- 38 Member Board of Directors
- ~4 MAF Retail Demand

MWD Service Area

Sources of Water for Southern California

Regi... Achievements in Resource Development

Groundwater Replenishment System

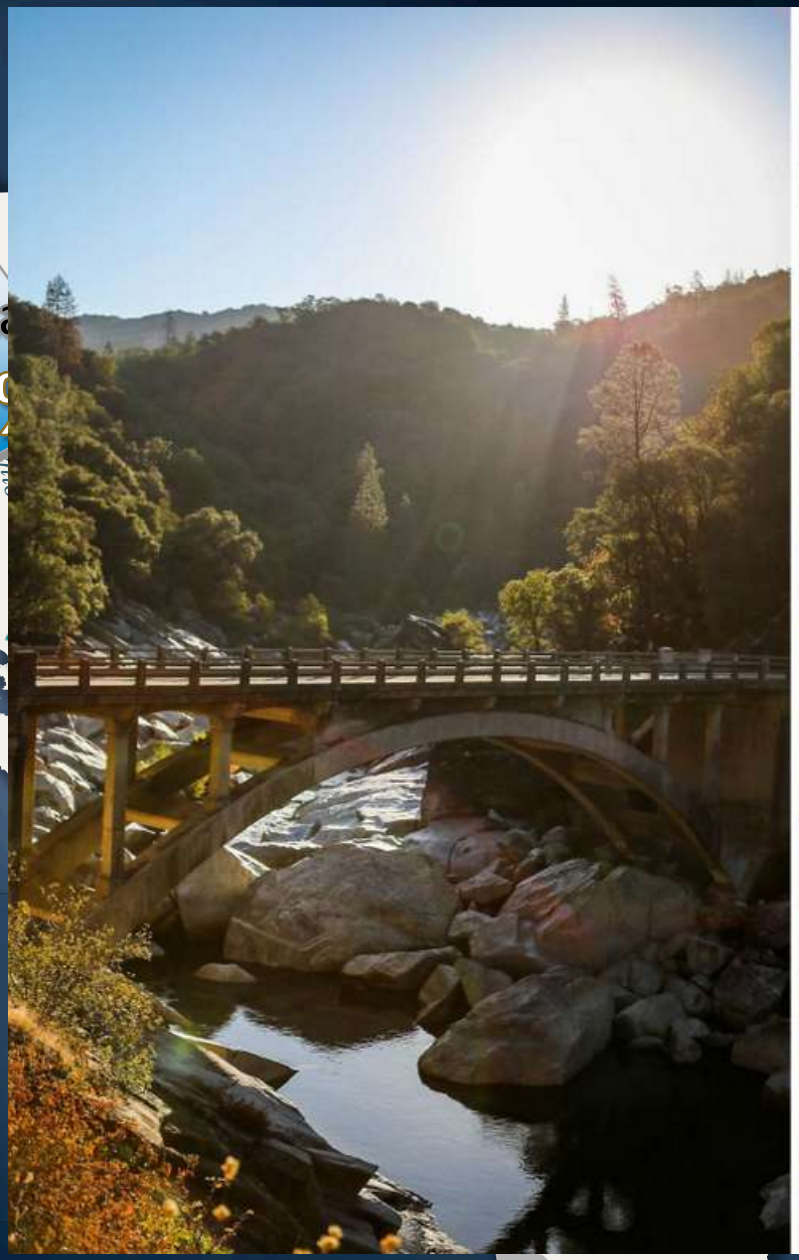
...asin Desalters

Carlsbad Desalination Project

Local Resource	Number of Existing Projects	Est. 2040 Yield (Acre-Feet)
Recycled Water	140	487,000
Groundwater Recovery	33	161,000
Seawater Desalination	1	52,000

Water Year to Date Hydrologic Conditions

Water Year to Date Hydrologic Conditions

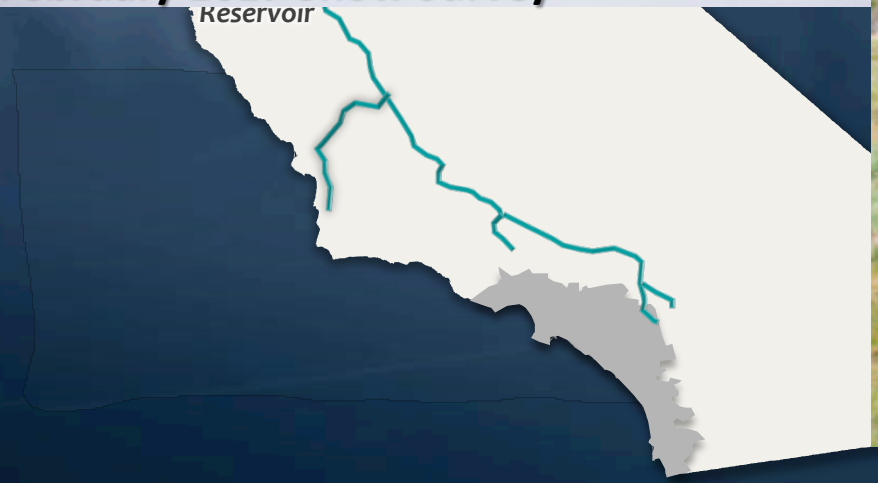


262%

Sep

Water Year to Date Hydrologic Conditions

February 2017 Snow Survey



April 2015 Snow Survey

Lake Oroville Spillway Damage

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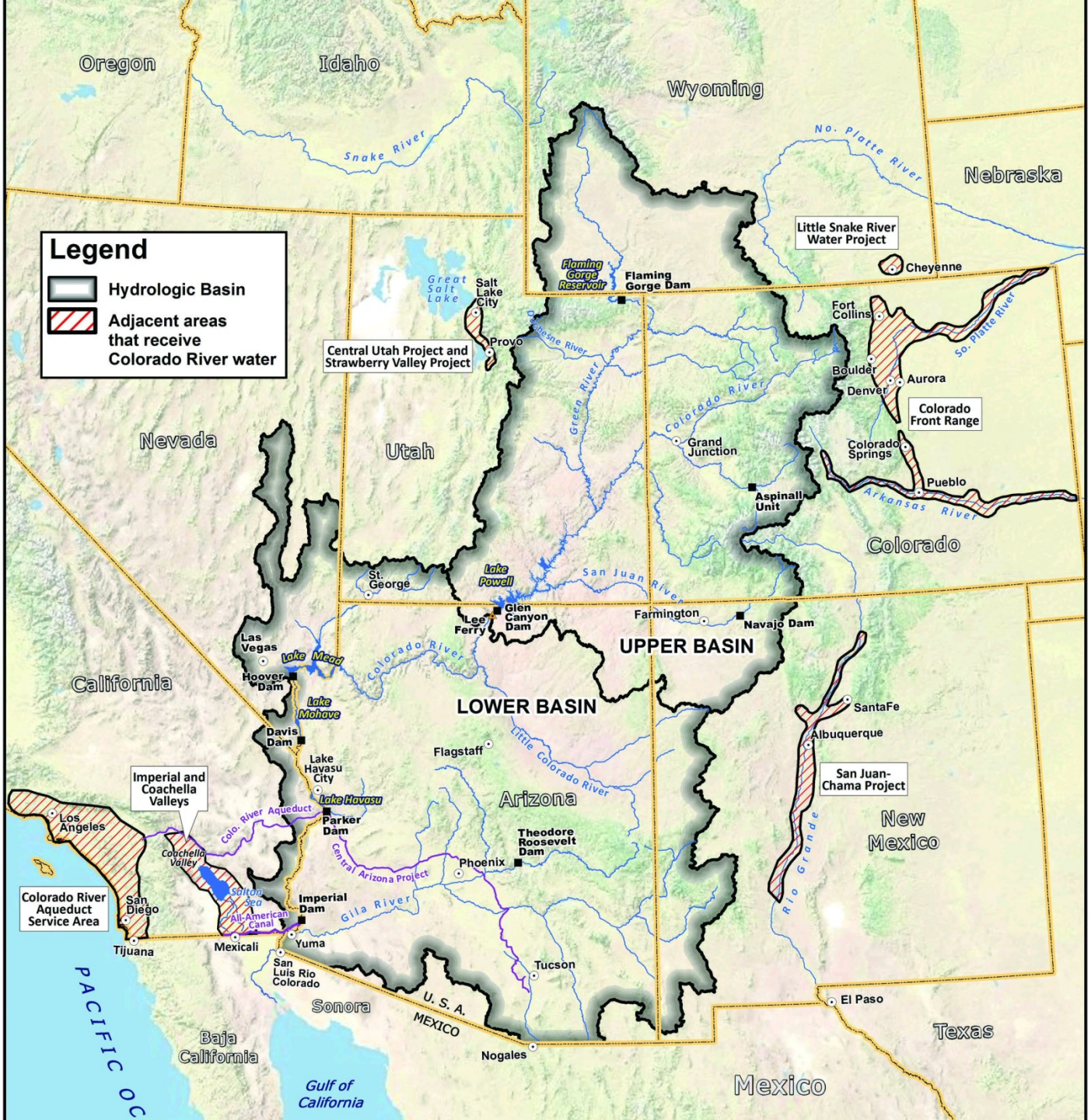
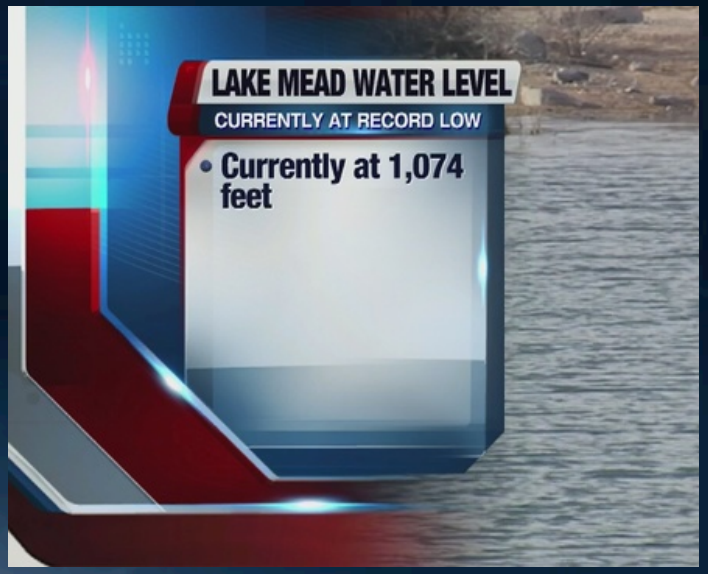

Legend
Hydrologic Basin
Adjacent areas that receive Colorado River water
Oregon
Idaho
Wyoming
Nebraska
Nevada
Utah
Colorado
California
Arizona
New Mexico
Texas
Mexico
Sonora
Baja California
Snake River
No. Platte River
Little Snake River Water Project
Cheyenne
Flaming Gorge Reservoir
Flaming Gorge Dam
Great Salt Lake
Salt Lake City
Provo
Central Utah Project and Strawberry Valley Project
Duchesne River
Green River
Colorado River
Fort Collins
So. Platte River
Boulder
Denver
Aurora
Colorado Front Range
Grand Junction
Colorado Springs
Pueblo
Aspinall Unit
Arkansas River
St. George
Lake Powell
San Juan River
Glen Canyon Dam
Lee Ferry
Farmington
Navajo Dam
UPPER BASIN
LOWER BASIN
Las Vegas
Lake Mead
Hoover Dam
Lake Mohave
Davis Dam
Flagstaff
Little Colorado River
Lake Havasu City
Lake Havasu
Parker Dam
Imperial and Coachella Valleys
Los Angeles
Colo. River Aqueduct
Coachella Valley
Salton Sea
All-American Canal
Imperial Dam
Central Arizona Project
Theodore Roosevelt Dam
Phoenix
Gila River
Colorado River Aqueduct Service Area
San Diego
Tijuana
Mexicali
Yuma
San Luis Rio Colorado
Tucson
U. S. A.
MEXICO
Nogales
El Paso
Rio Grande
SantaFe
Albuquerque
San Juan-Chama Project
PACIFIC OCEAN
Gulf of California


BREAKING NEWS
RECORD LOW WATER LEVELS
LAKE MEAD
ACTION NEWS // ACTION NEWS // ACTION NEWS // ACTION NEWS // ACTION NEWS // ACTION

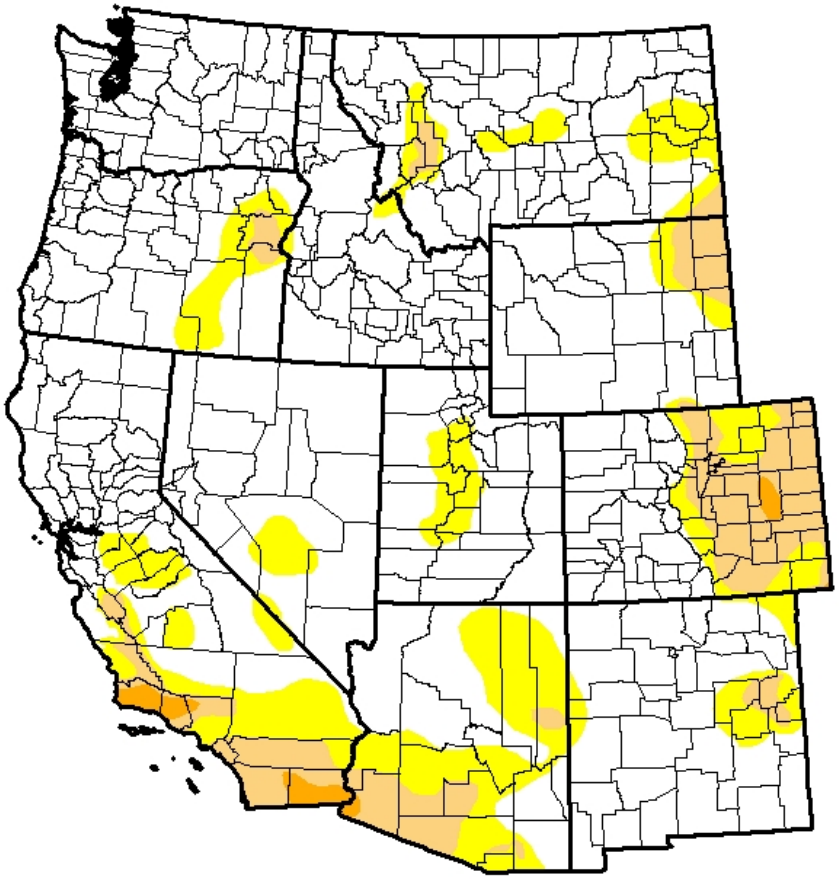

LAKE MEAD WATER LEVEL
CURRENTLY AT RECORD LOW
Currently at 1,074 feet


Largest U.S. Water Reservoir
Record Low

Colorado Basin **not** in Drought Conditions…

U.S. Drought Monitor

West



February 21, 2017

(Released Thursday, Feb. 23, 2017)

Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	77.21	22.79	8.54	0.76	0.00	0.00
Last Week 2/14/2017	73.57	26.43	9.68	1.11	0.10	0.00
3 Months Ago 11/22/2016	43.92	56.08	25.58	9.90	5.73	2.81
Start of Calendar Year 1/3/2017	54.19	45.81	21.51	8.53	5.11	2.44
Start of Water Year 9/27/2016	27.78	72.22	30.95	13.45	5.77	2.81
One Year Ago 2/23/2016	37.06	62.94	36.25	19.70	10.28	5.55

Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:

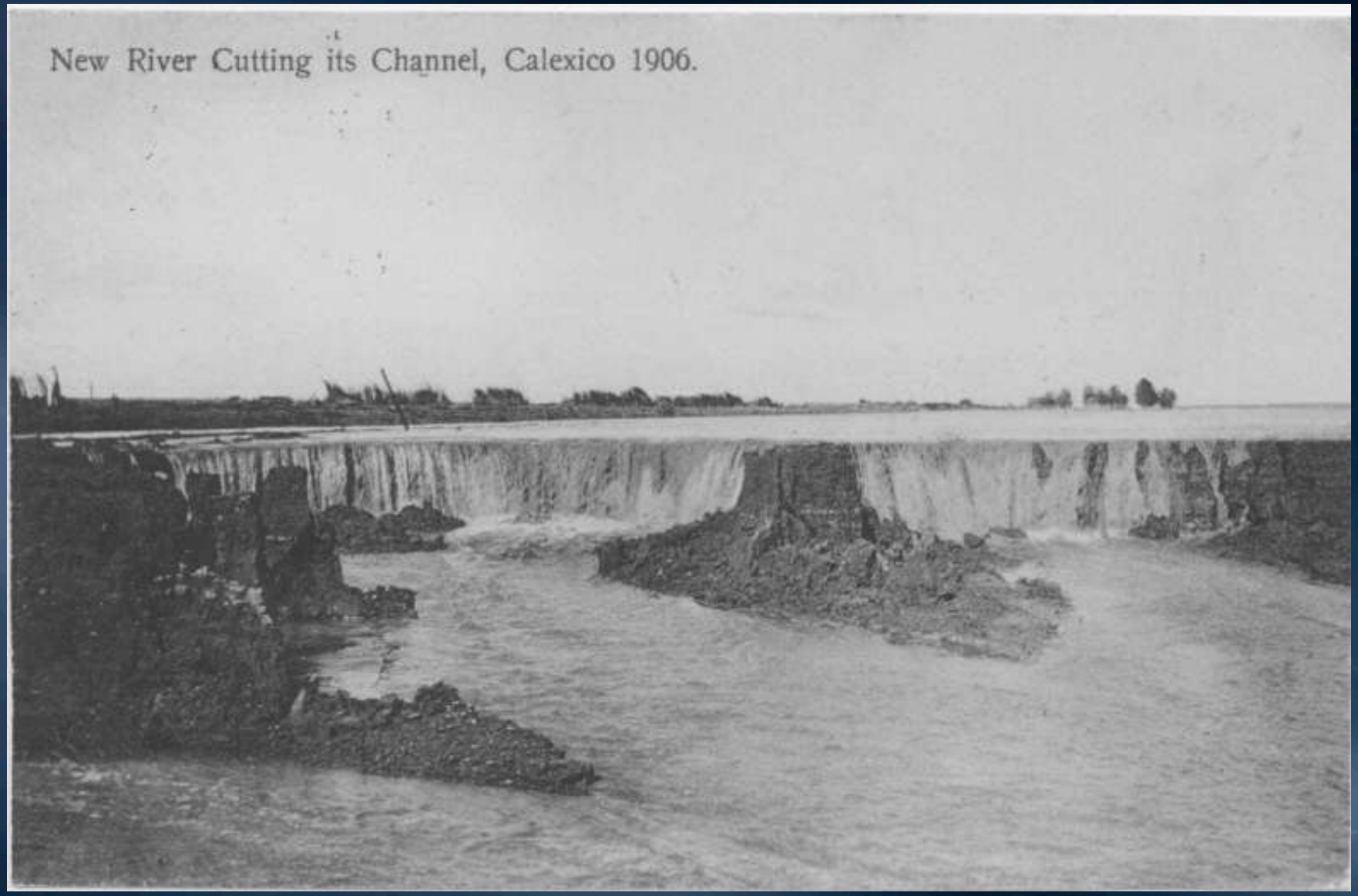
Richard Heim

NCEI/NOAA

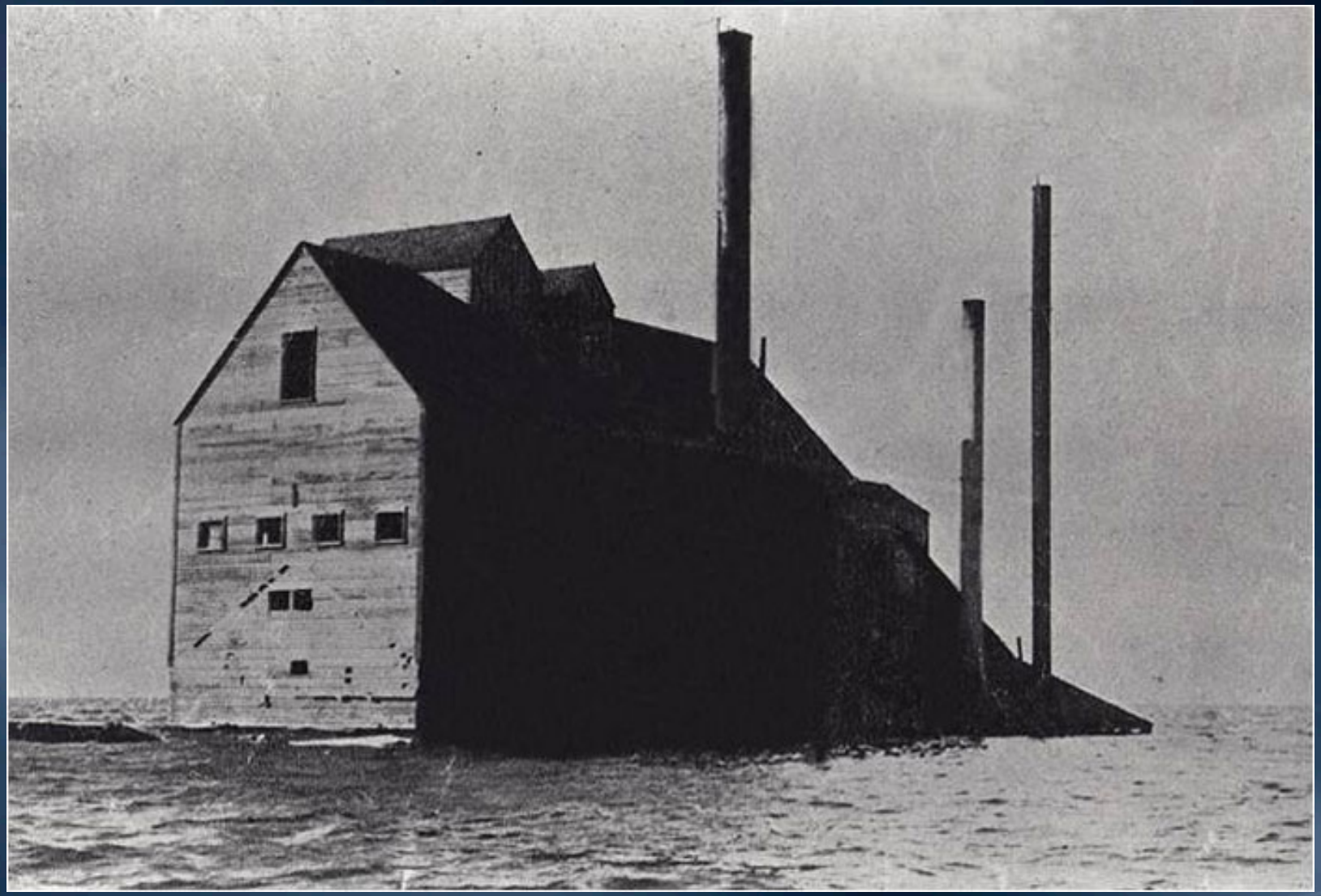
http://droughtmonitor.unl.edu/

Imperial Valley Farmer, ca. 1900

Imperial Valley, 1906



Imperial Valley, 1906



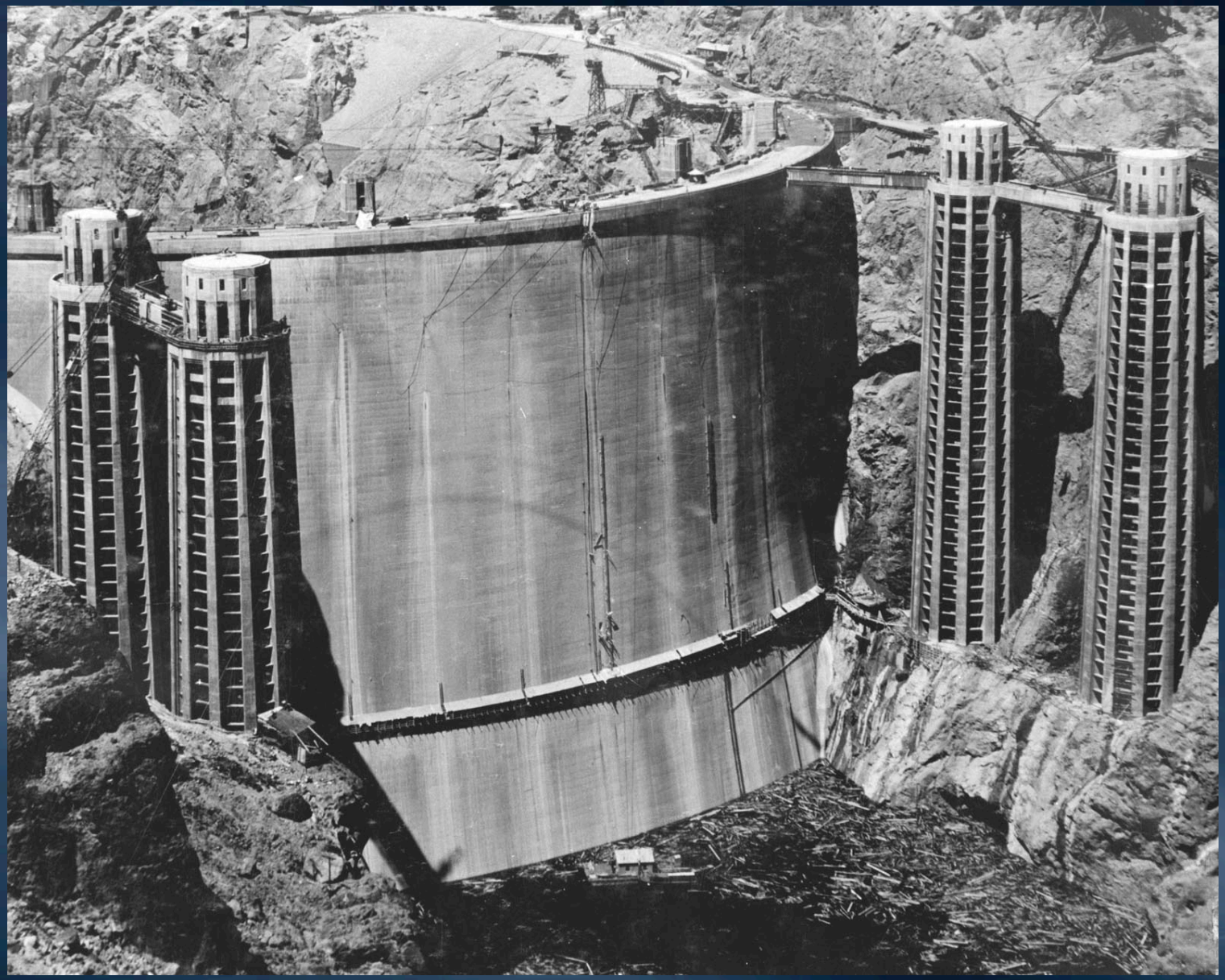
Imperial Valley, 1906

Black Canyon, Colorado River

1922 Compact and 1944 Treaty Allocations

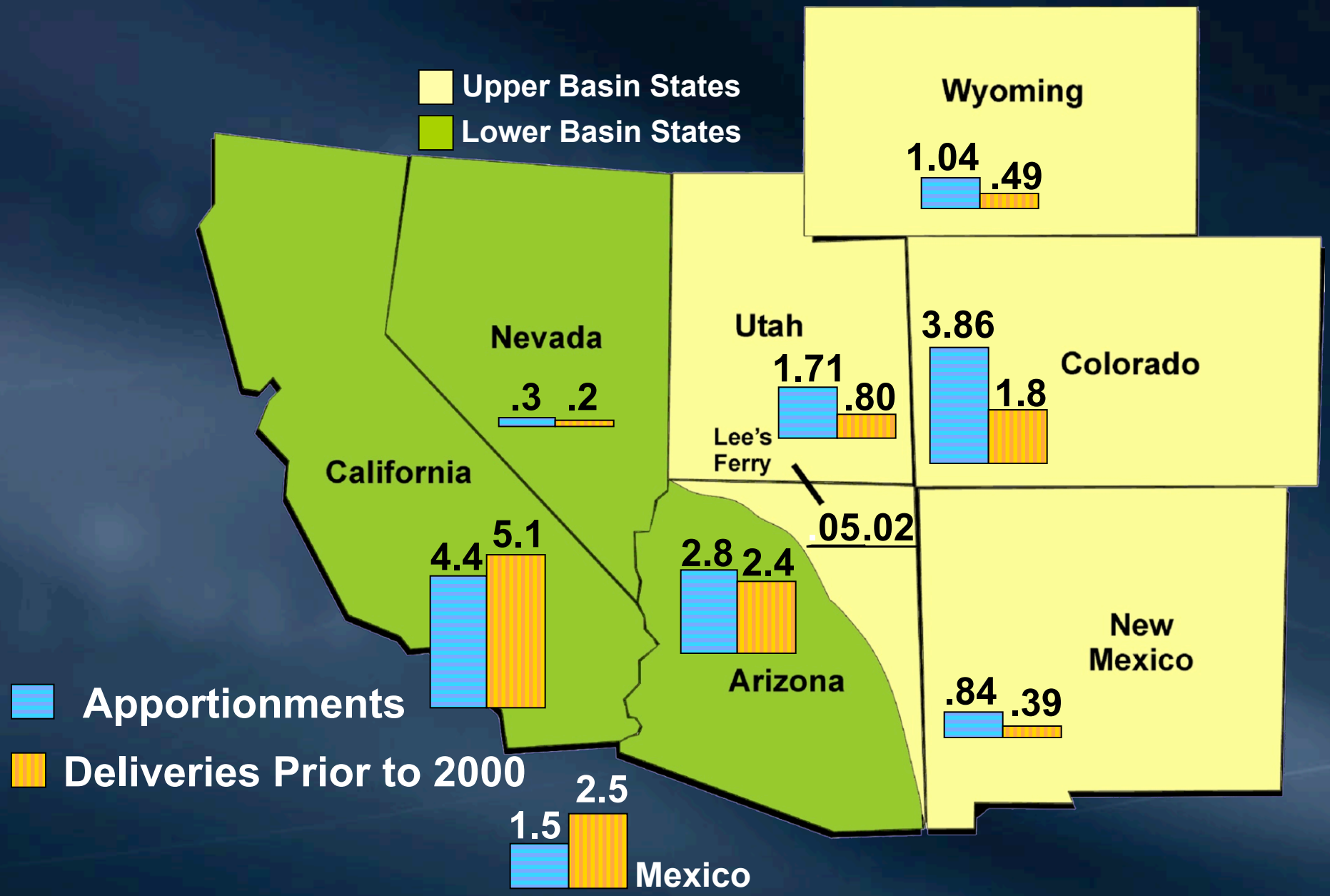
Upper Basin Lower Basin Mexico	7.5 mafy 7.5 mafy + 1.0 mafy 1.5 mafy
Total	17.5 mafy

Hoover Dam Construction, 1928



Hoover Dam Completed

Colorado River Apportionments (Million acre-feet)




California Service Areas
NEVADA
Lake Mead
Hoover Dam
Colorado River
Lake Mohave
Davis Dam
ARIZONA
Los Angeles Aqueduct
California Aqueduct
CALIFORNIA
Lake Havasu
Colorado River Aqueduct
Parker Dam
Coachella Valley W.D.
MWD
Palo Verde I.D.
Coachella Canal
Salton Sea
Senator Wash Reservoir
Imperial Dam
IID
All American Canal
Yuma Project
PACIFIC OCEAN
UNITED STATES
MEXICO

California Priority System (1931)

1. Palo Verde
2. Yuma Project
3. (a) Imperial & Coachella
   (b) Palo Verde

3.85 MAF

4. Metropolitan — 550 TAF

Total Basic Apportionment 4.4 MAF

5. Metropolitan — 662 TAF
6. Imperial, Coachella, Palo Verde — 300 TAF

Quantification Settlement Agreement Quantified Water Budgets

	maf	
PVID Yuma Project		0.42 (Average)
IID		3.10
CVWD		0.33
MWD *		0.55
Total	4.40	

*Amount fluctuates based on PVID/Yuma Project use, unused IID and CVWD water

California 4.4 Plan

Agricultural Conservation Measures with IID

California 4.4 Plan

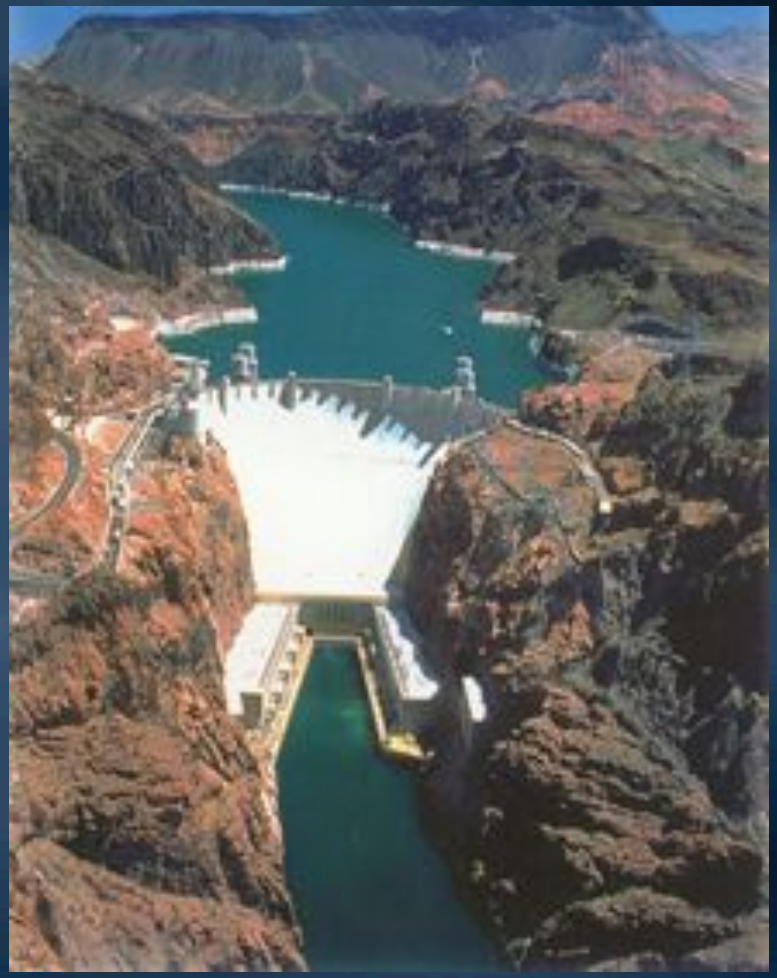
Line the All-American, Coachella Canals

California 4.4 Plan

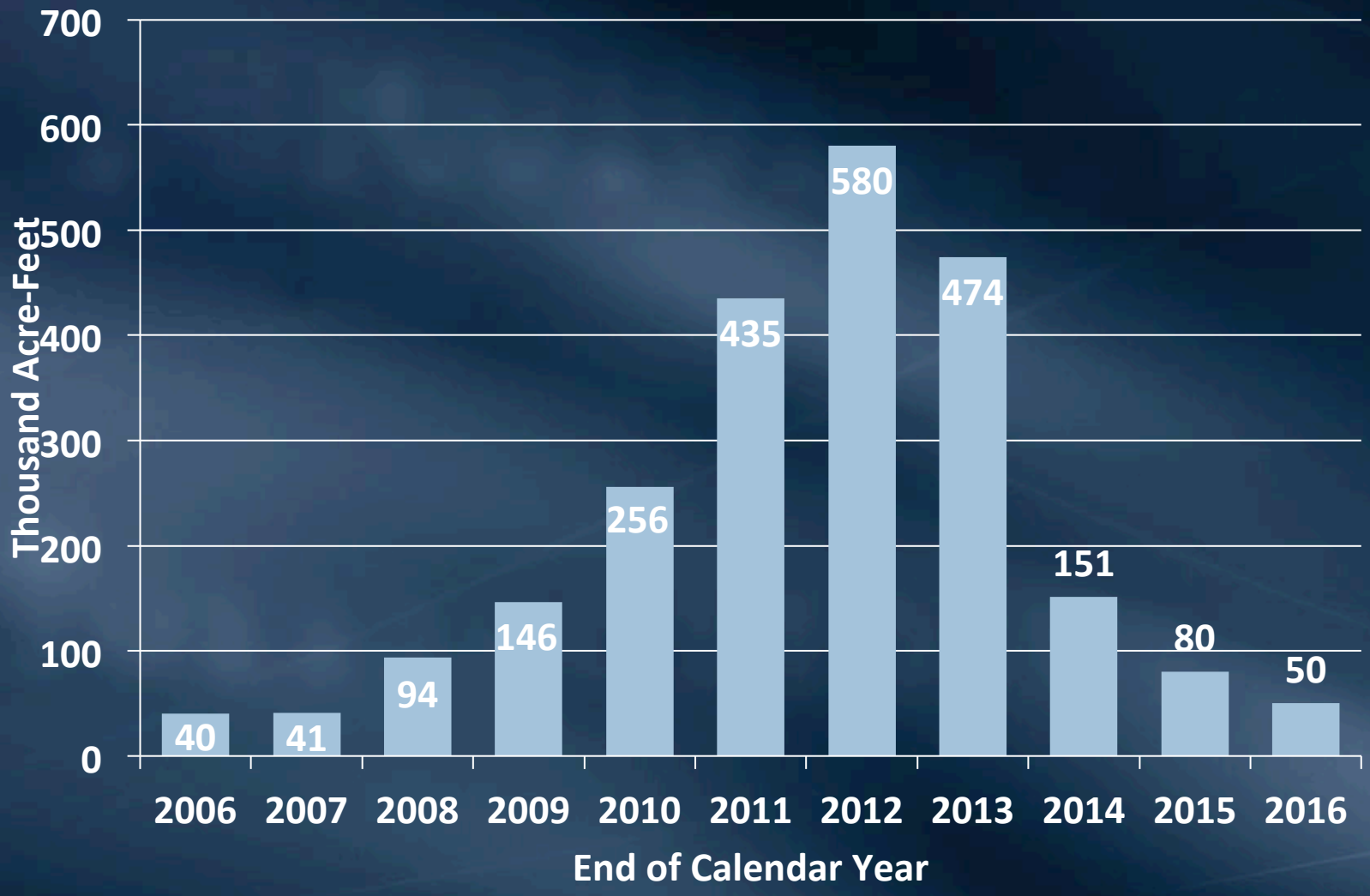
Incentivize PVID Farmers to Not Grow Crops

Water Sharing Agreement with Nevada

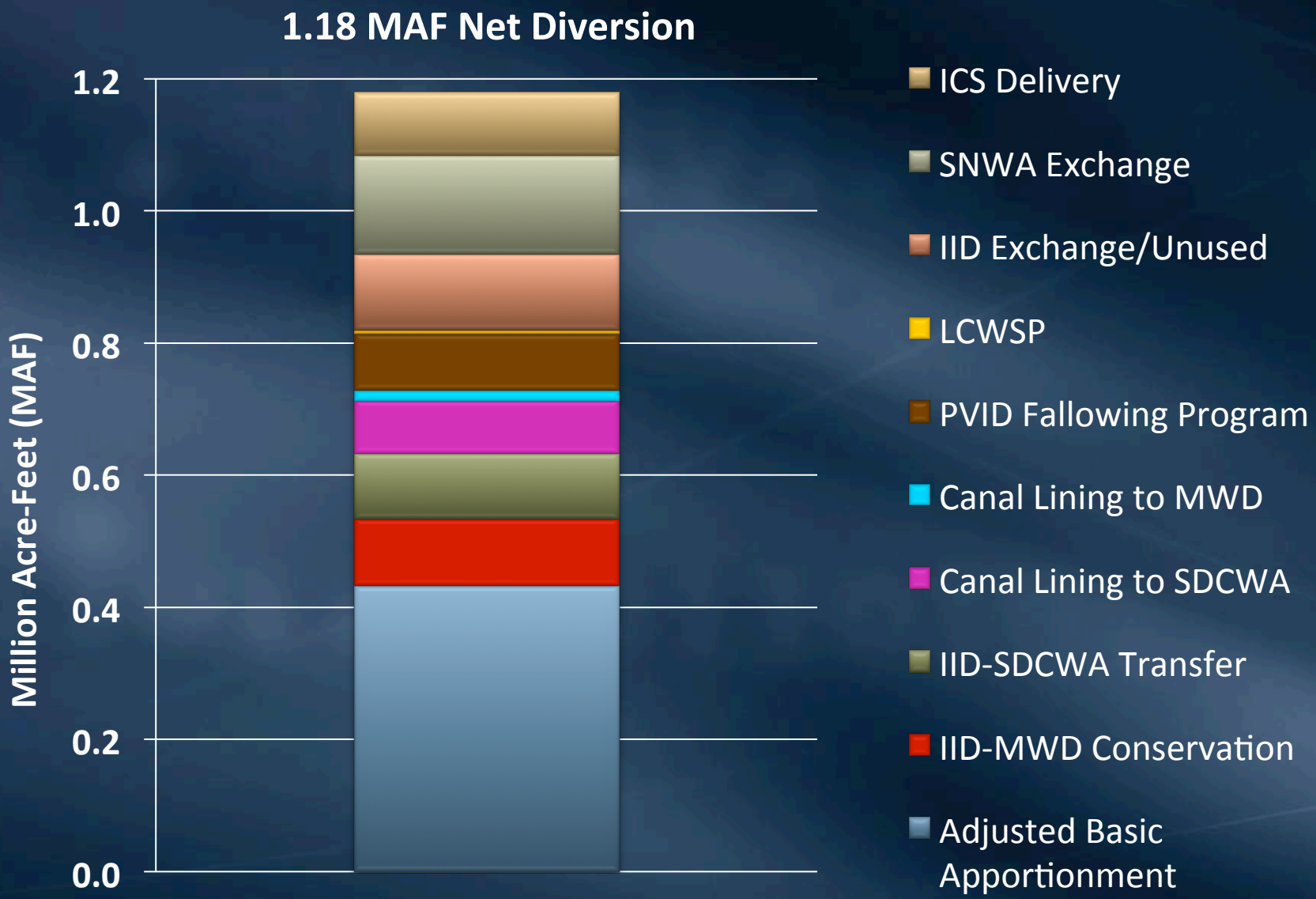
Storage Program in Lake Mead (ICS)



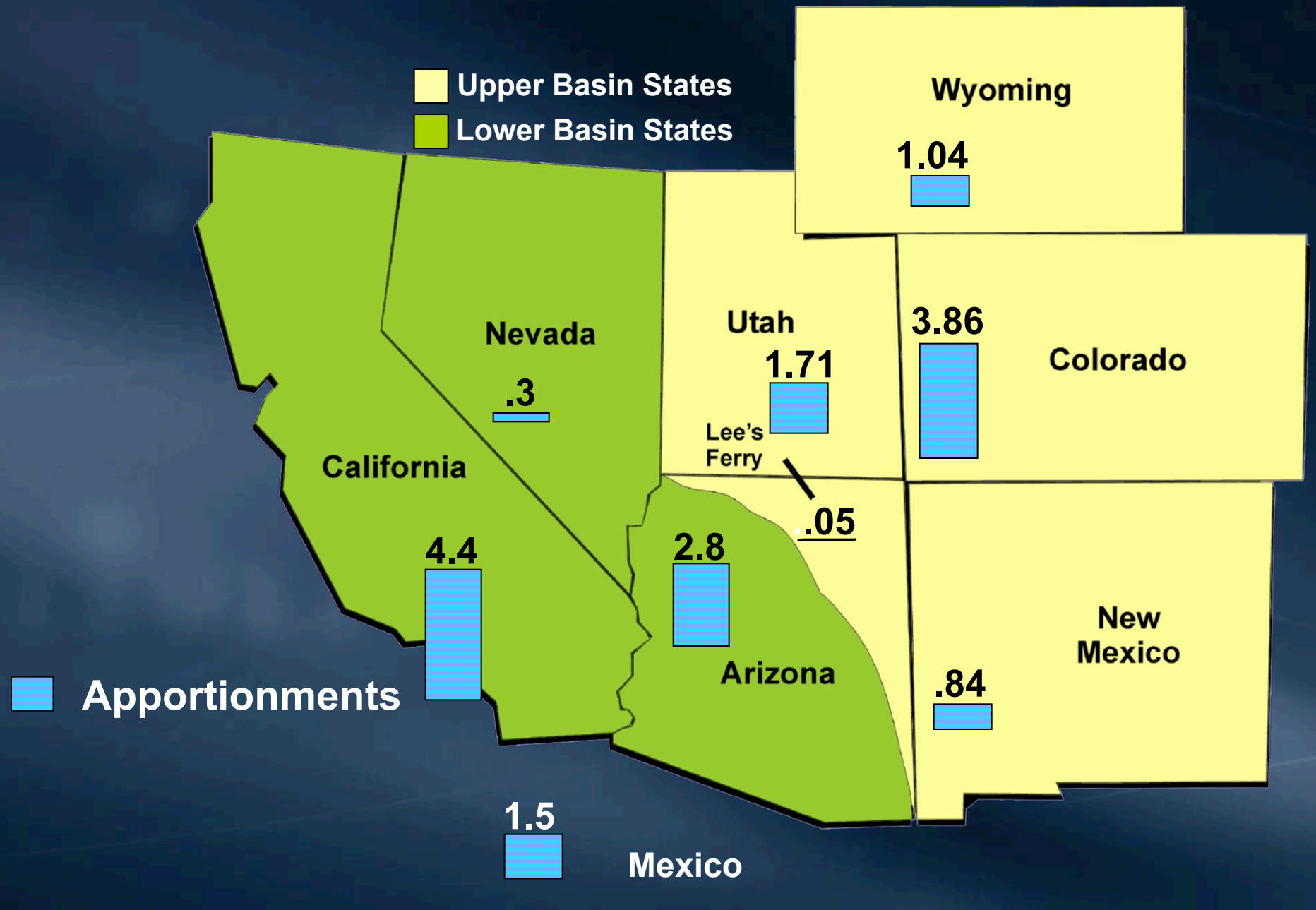
MWD Storage Balance (ICS) in Lake Mead



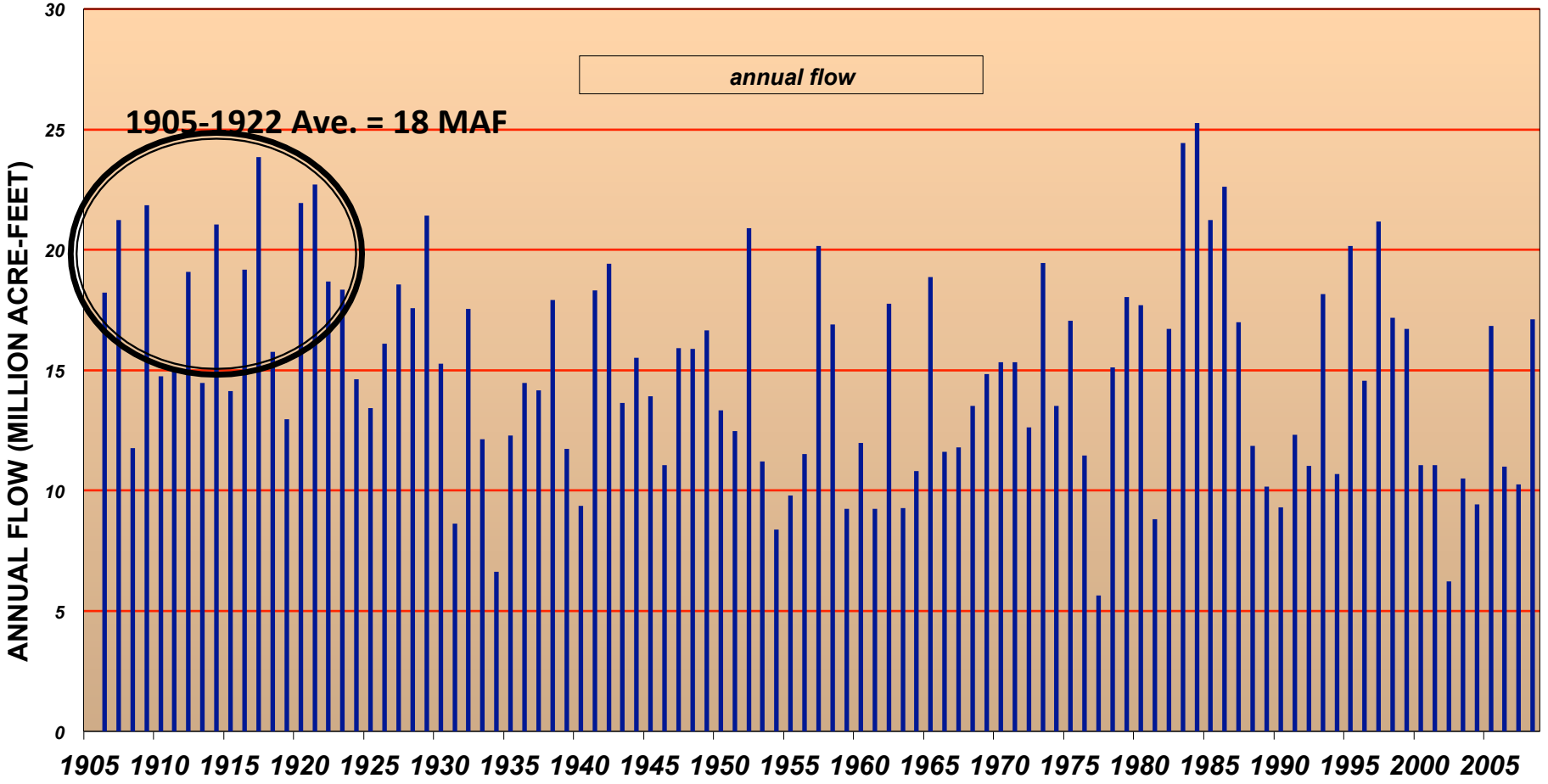
2015 Colorado River Aqueduct Supplies



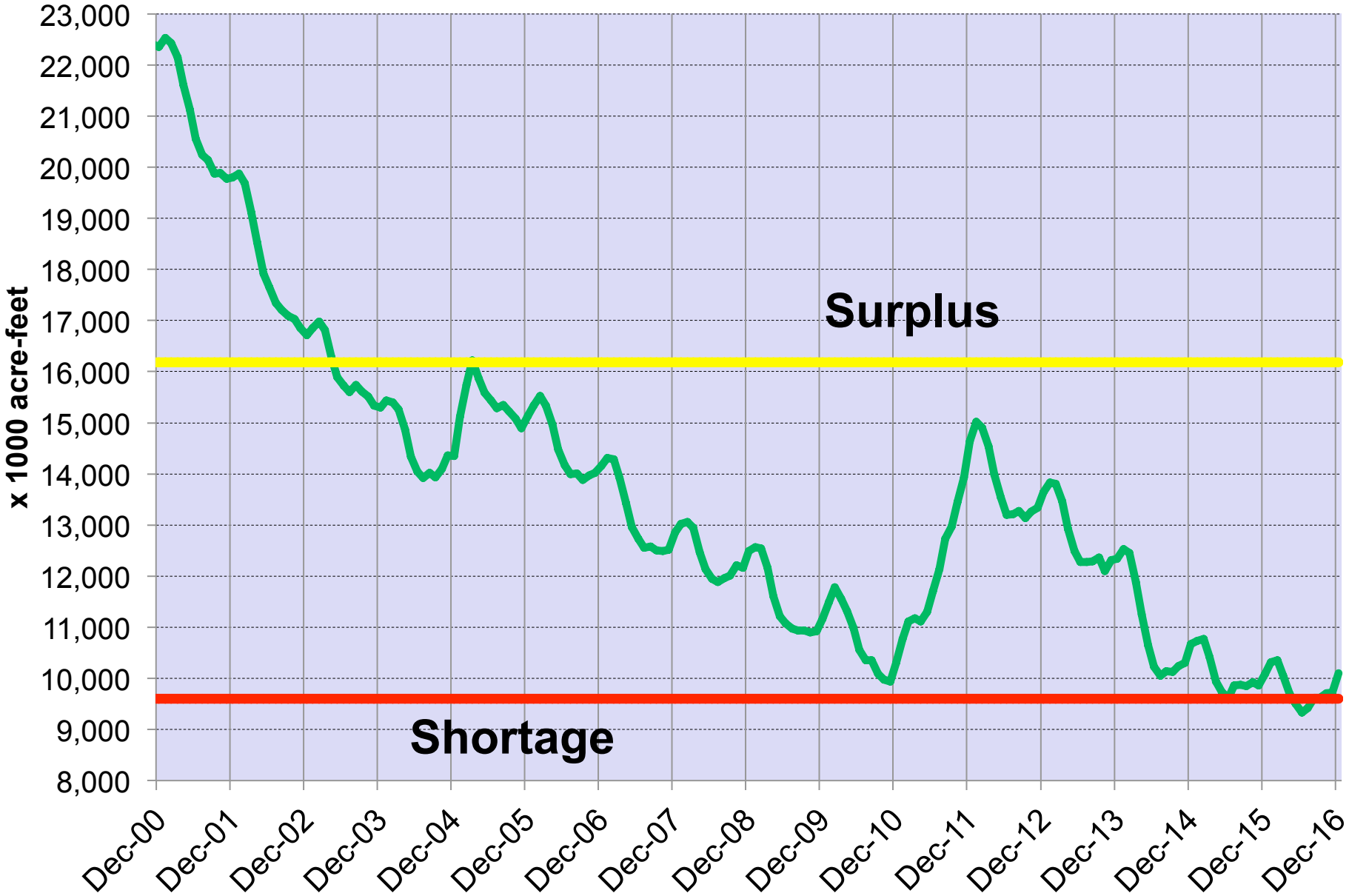
Colorado River Apportionments (Million acre-feet)



COLORADO RIVER NATURAL FLOW (AT LEE'S FERRY)
1906-2008
103 Year Average = 15.0 MAF



Lake Mead Storage
2000 – 2016



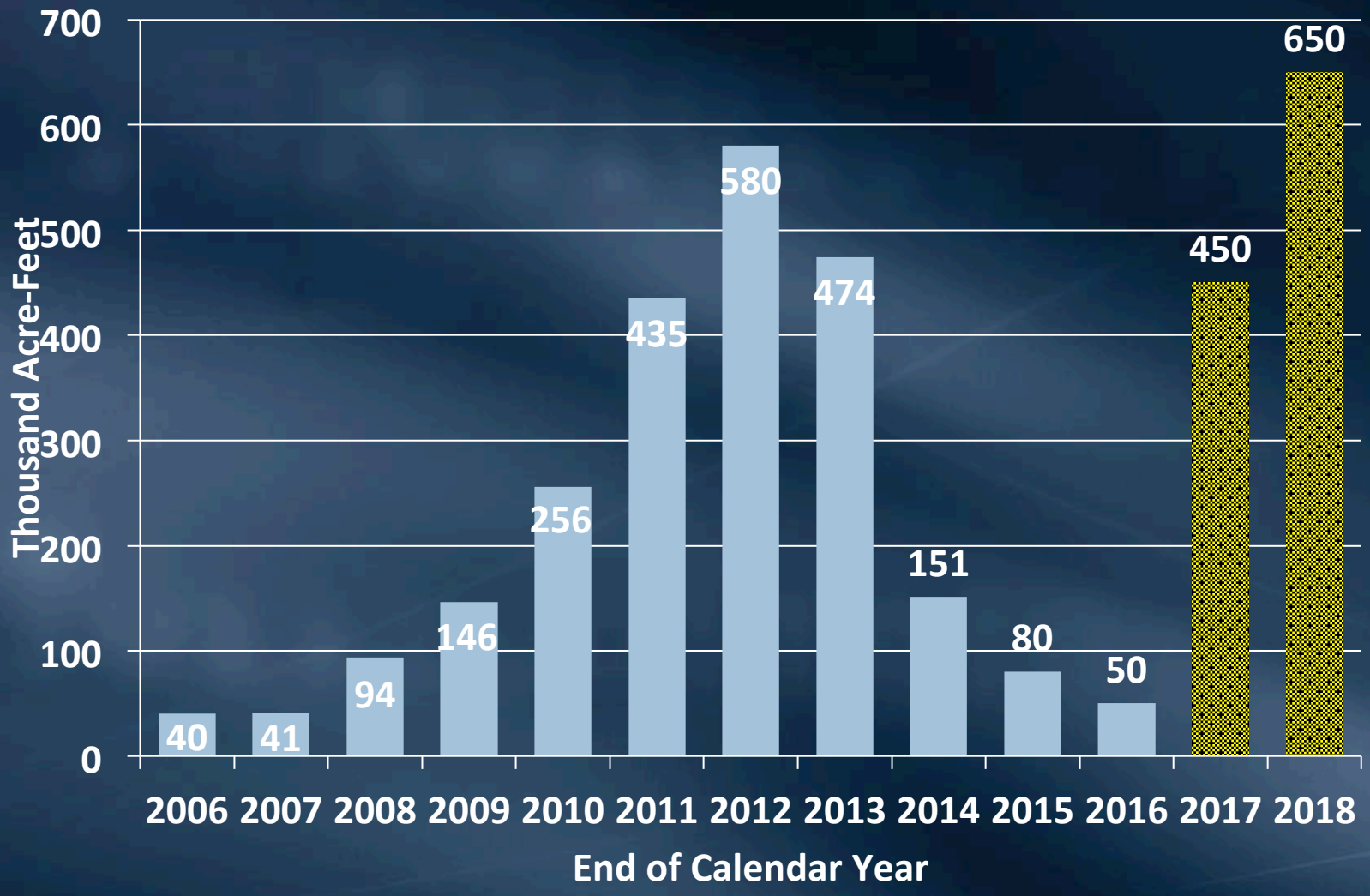
Basin States Developing Drought Contingency Plans

Proposed Drought Contingency Plan: Additional Flexibility Important to MWD

Proposal for CA to reduce diversions at lower Lake Mead levels includes:

- Allowing agencies to store and recover ICS during shortages
- Allowing CA to exchange water with other states during shortages
- Allowing binational exchanges during shortages

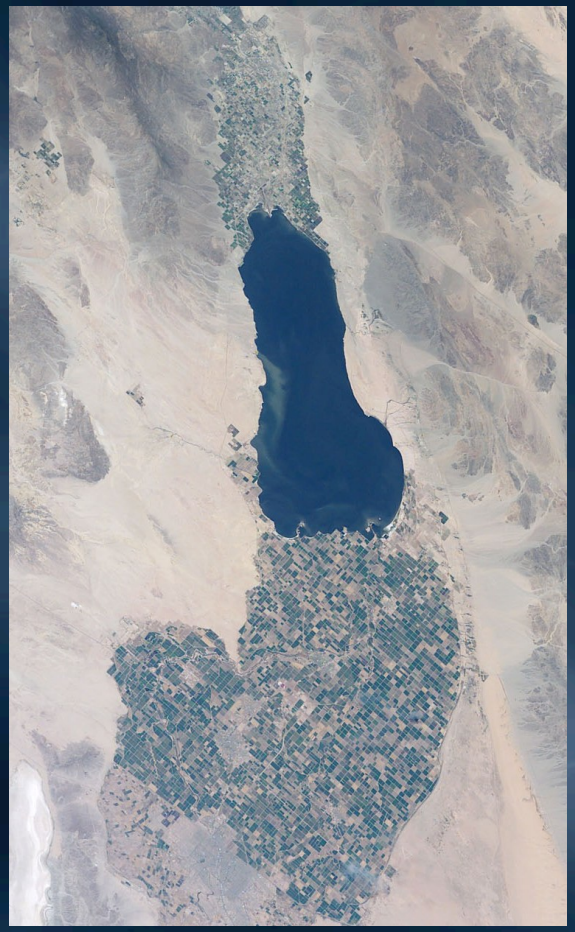
Projected MWD ICS Storage Balance



California Needs: Salton Sea and Bay-Delta Solutions

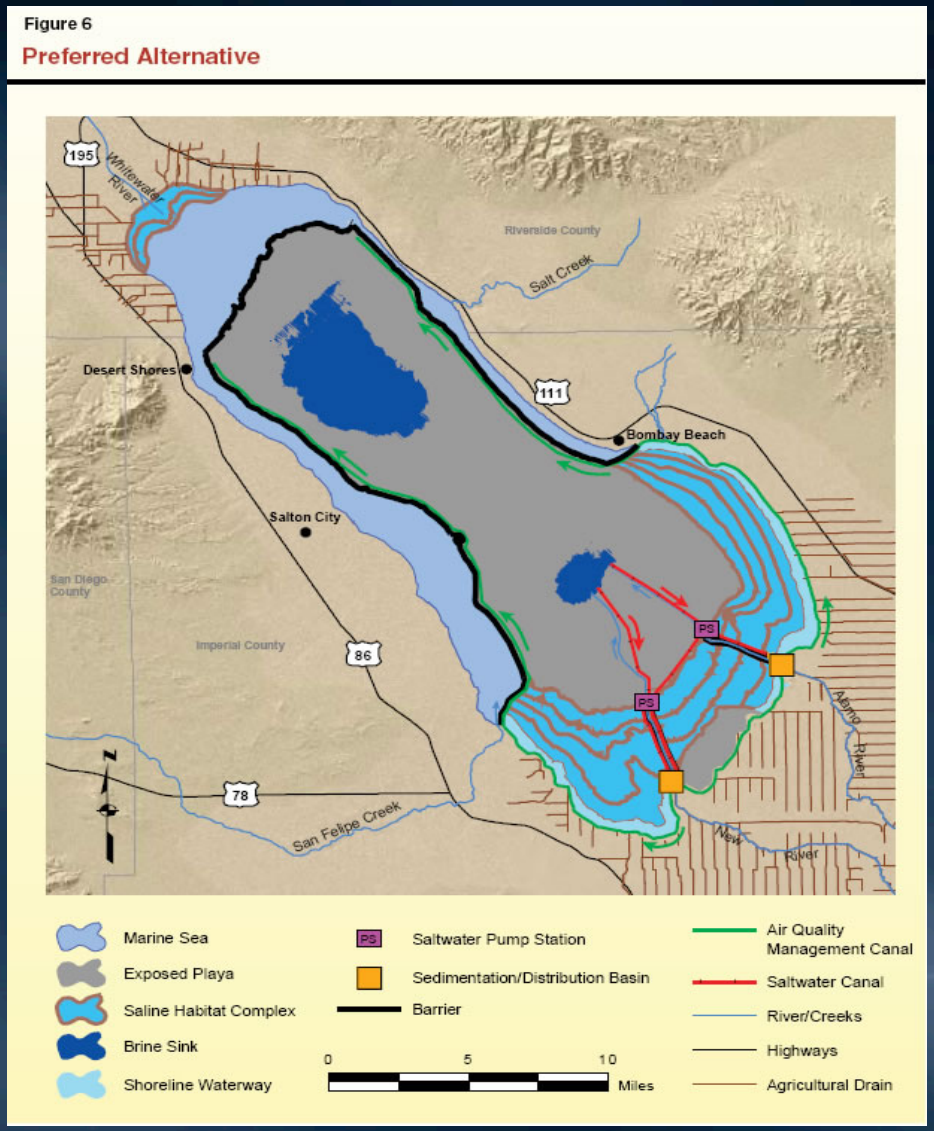
QSA Provided Time to Restore Salton Sea

- Formed in 1905
  - Sustained by ag drainage
- 50% saltier than ocean
  - Salinity increase 1%/yr
  - Frequent fish kills
- Sea protected from IID-SDCWA Transfer impacts for 15 years
  - IID to deliver 800 TAF of "mitigation water" to Salton Sea through 2017
  - Provided time for state to develop long-term solution



15 Year Period Nearing End

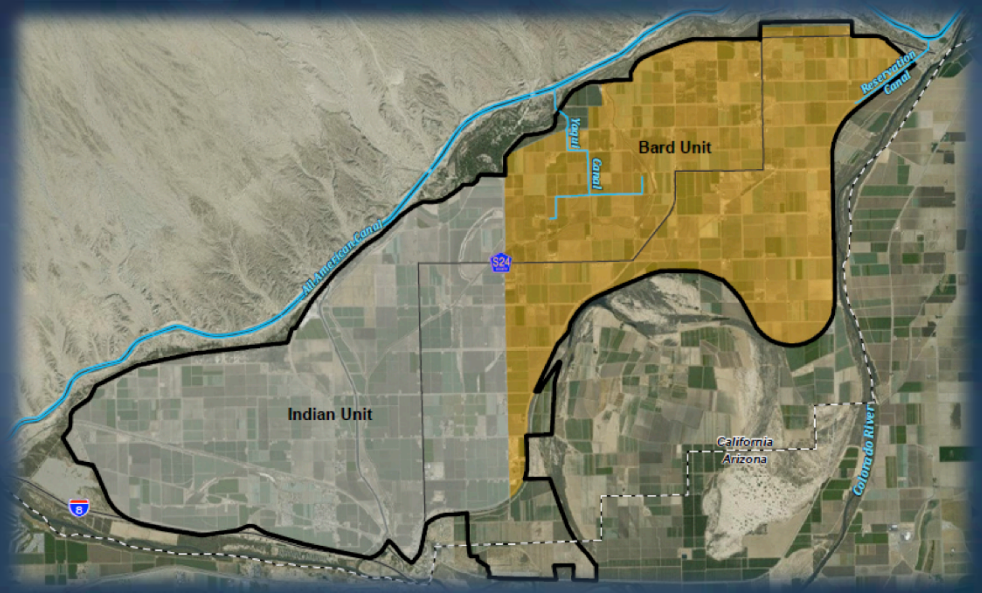
- 2008 state issued Draft EIR
  - Preferred Alternative:
    $9 billion cost
- 2014: IID petitioned SWRCB
- 2015-16: SWRCB Workshops
- 2016: State adds $80 million to state budget for Sea
- Sept 2016: Fed-State MOU
- January 2017: DOI Secretarial Directive

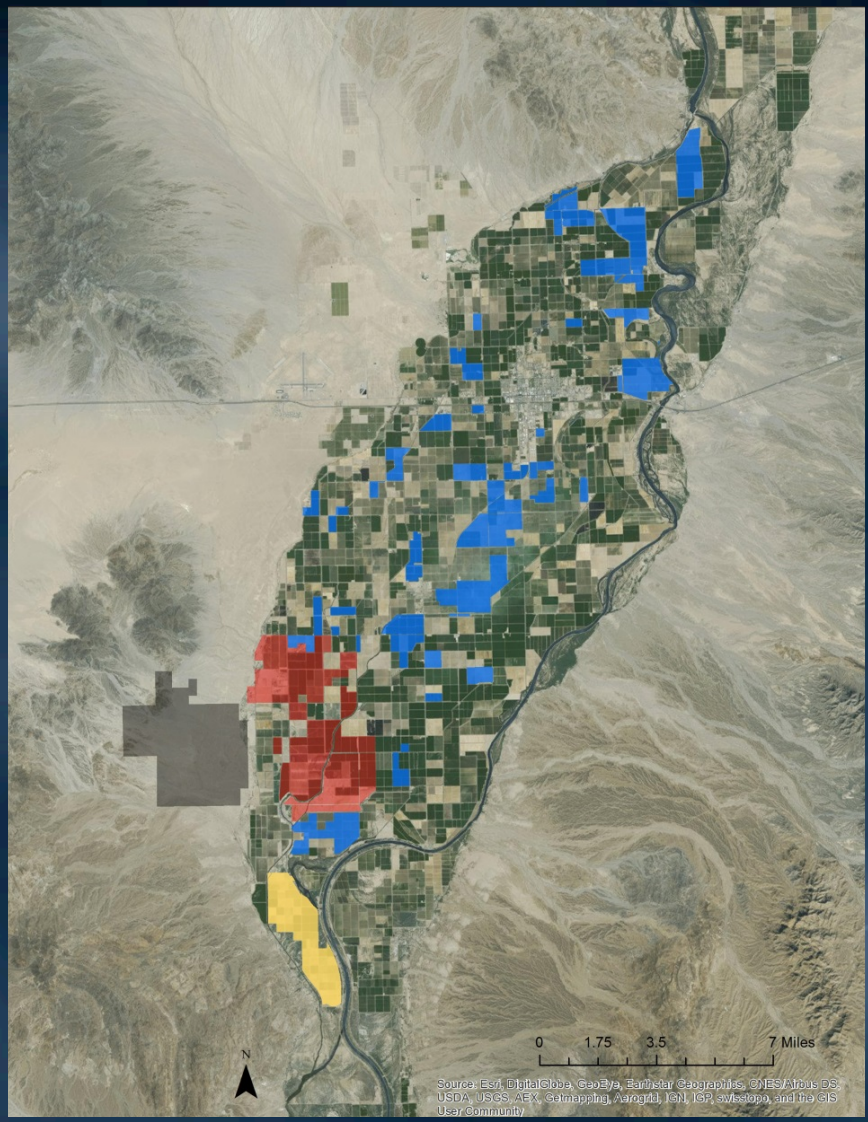


California Water Fix

Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

New Efforts to reduce demand: Bard and PVID





Summary

- The Western US collectively shares water resources and states need to work together to find creative solutions
- Additional long-term demand management programs, like the QSA related agreements, need to be developed
- Providing incentives are the most effective way to achieve success

“The best way to predict your future is to create it.”

- Abraham Lincoln

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