

RECLAMATION

Managing Water in the West

CRFS Technical Committee Spring Meeting Lower Colorado Region Operations Update

March 23, 2017



U.S. Department of the Interior
Bureau of Reclamation

Topics

- LC Current Conditions Update
- LC Operations Update

An aerial photograph of the Hoover Dam and Hoover Dam Bypass Bridge. The dam is a large concrete structure in the center, with a reservoir behind it. The bridge is a long, curved concrete structure with multiple piers, crossing the river. The surrounding landscape is rugged and rocky, with some winding roads and power lines visible. The text "Lower Colorado River Basin" and "Current Conditions" is overlaid in white on the image.

Lower Colorado River Basin

Current Conditions

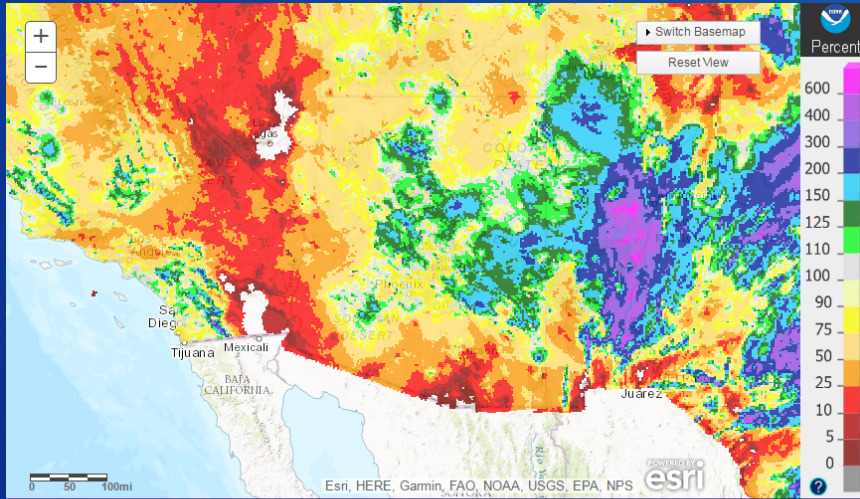
Colorado River Basin Storage

(as of March 21, 2016)

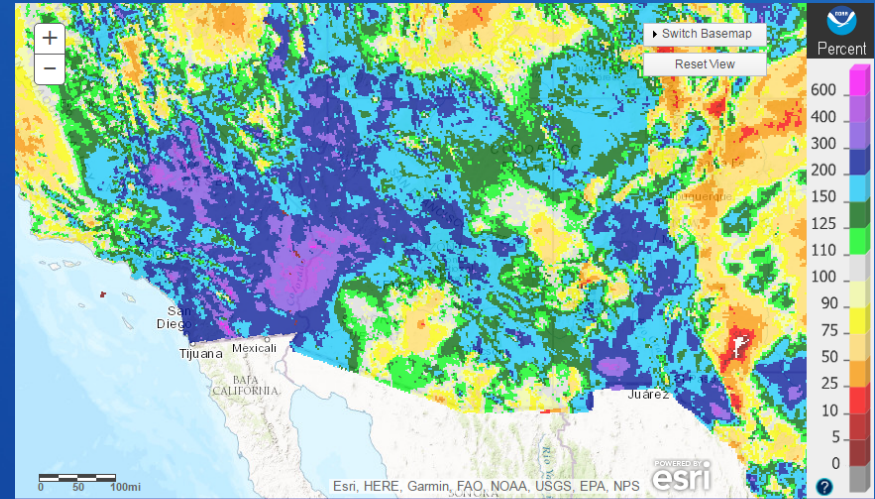
Reservoir	Percent Full	Storage (MAF)	Elevation (Feet)
Lake Powell	46	11.21	3,594.3
Lake Mead	41	10.73	1,088.6
Lake Mohave	96	1.73	644.3
Lake Havasu	94	0.59	448.3
Total System Storage	50	29.70	N/A

*Total system storage was 28.94 maf or 49% this time last year

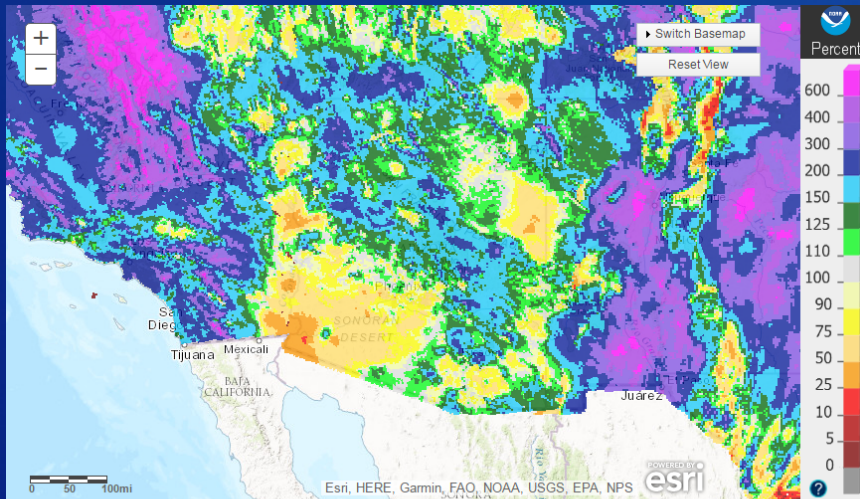
Observed Precipitation



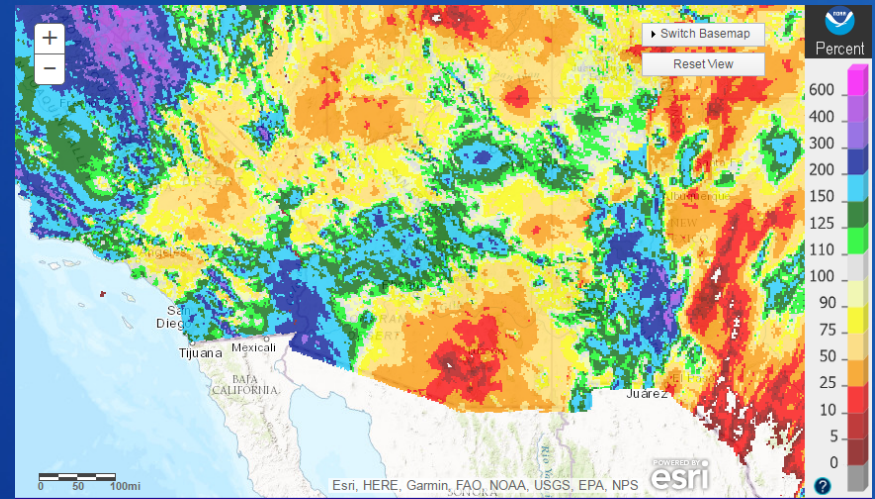
Arizona: November, 2016 Monthly Percent of Normal Precipitation
Valid on: December 01, 2016 12:00 UTC
What is UTC time? Map Help



Arizona: December, 2016 Monthly Percent of Normal Precipitation
Valid on: January 01, 2017 12:00 UTC
What is UTC time? Map Help



Arizona: January, 2017 Monthly Percent of Normal Precipitation
Valid on: February 01, 2017 12:00 UTC
What is UTC time? Map Help



Arizona: February, 2017 Monthly Percent of Normal Precipitation
Valid on: March 01, 2017 12:00 UTC
What is UTC time? Map Help

Lower Basin Side Inflows – WY/CY 2017^{1,2}

Intervening Flow from Glen Canyon to Hoover Dam

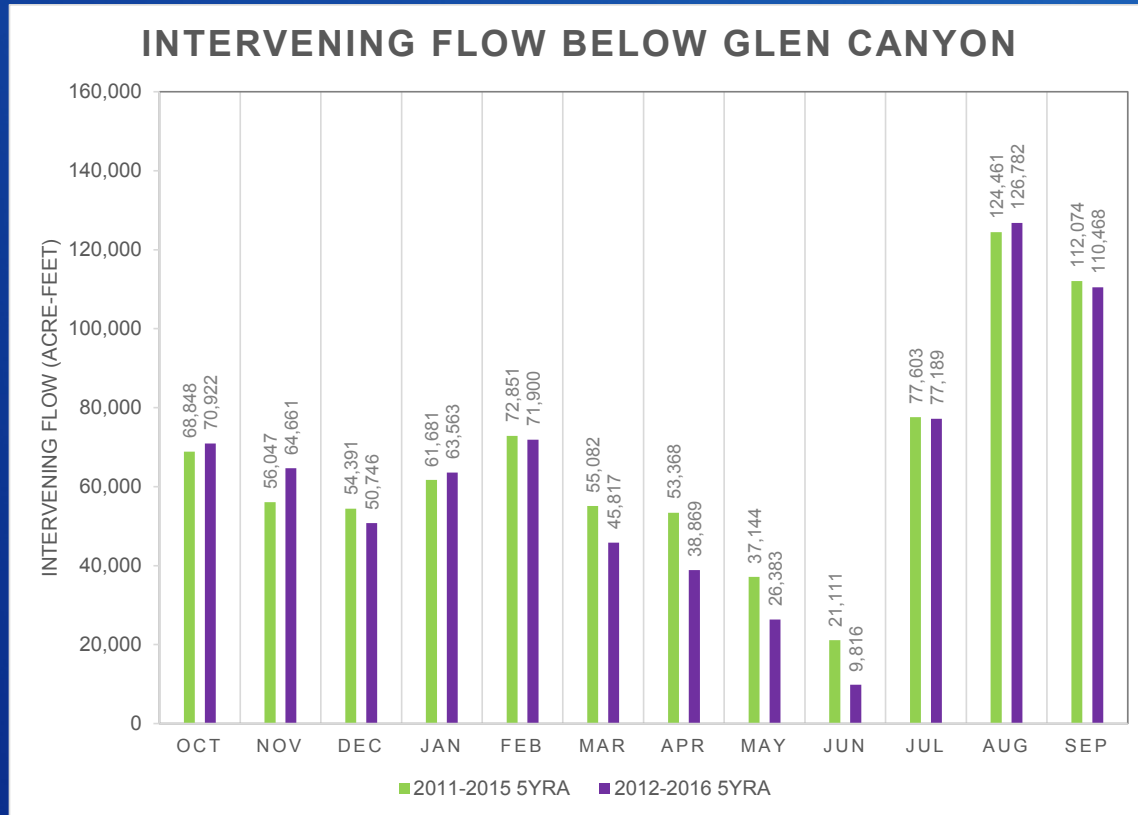
Month in WY/CY 2017		5-Year Average Intervening Flow (KAF)	Observed Intervening Flow (KAF)	Observed Intervening Flow (% of Average)	Difference From 5-Year Average (KAF)
HISTORICAL	October 2016	71	78	110%	7
	November 2016	65	77	120%	13
	December 2016	51	63	124%	12
	January 2017	64	128	202%	65
	February 2017	72	149	207%	77
FUTURE	March 2017	46			
	April 2017	39			
	May 2017	26			
	June 2017	10			
	July 2017	77			
	August 2017	127			
	September 2017	110			
	October 2017	71			
	November 2017	65			
	December 2017	51			
WY 2017 Totals		757	931	123%	174
CY 2017 Totals		757	899	119%	141

¹ Values were computed with the LC's gain-loss model for the most recent 24-month study.

² Percents of average are based on the 5-year mean from 2012-2016.

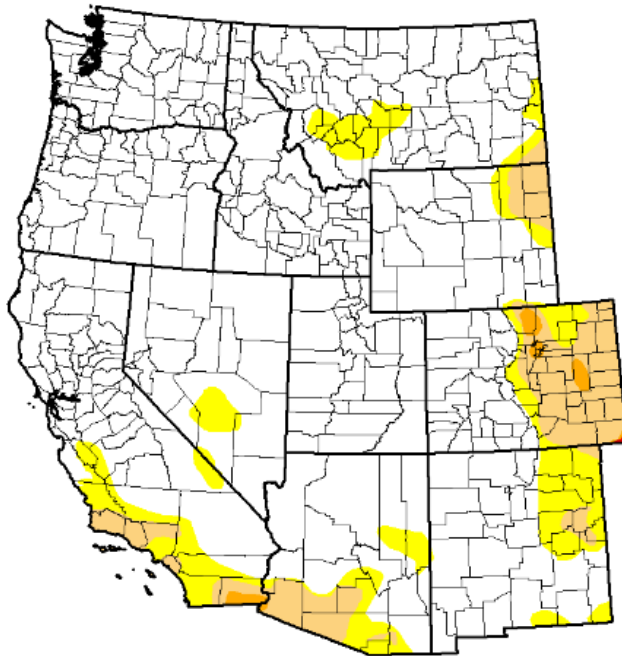
Lower Basin Side Inflows

Intervening Flow from Glen Canyon to Hoover Dam

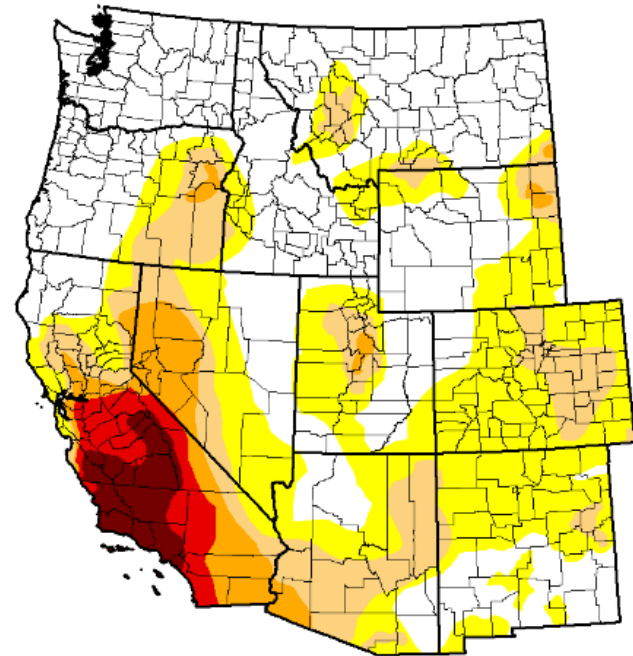


LC REACH	2011-2015	2012-2016	DIFFERENCE
Glen to Hoover (af)	794,662	757,117	-37,544

Drought Monitor



March 14, 2017



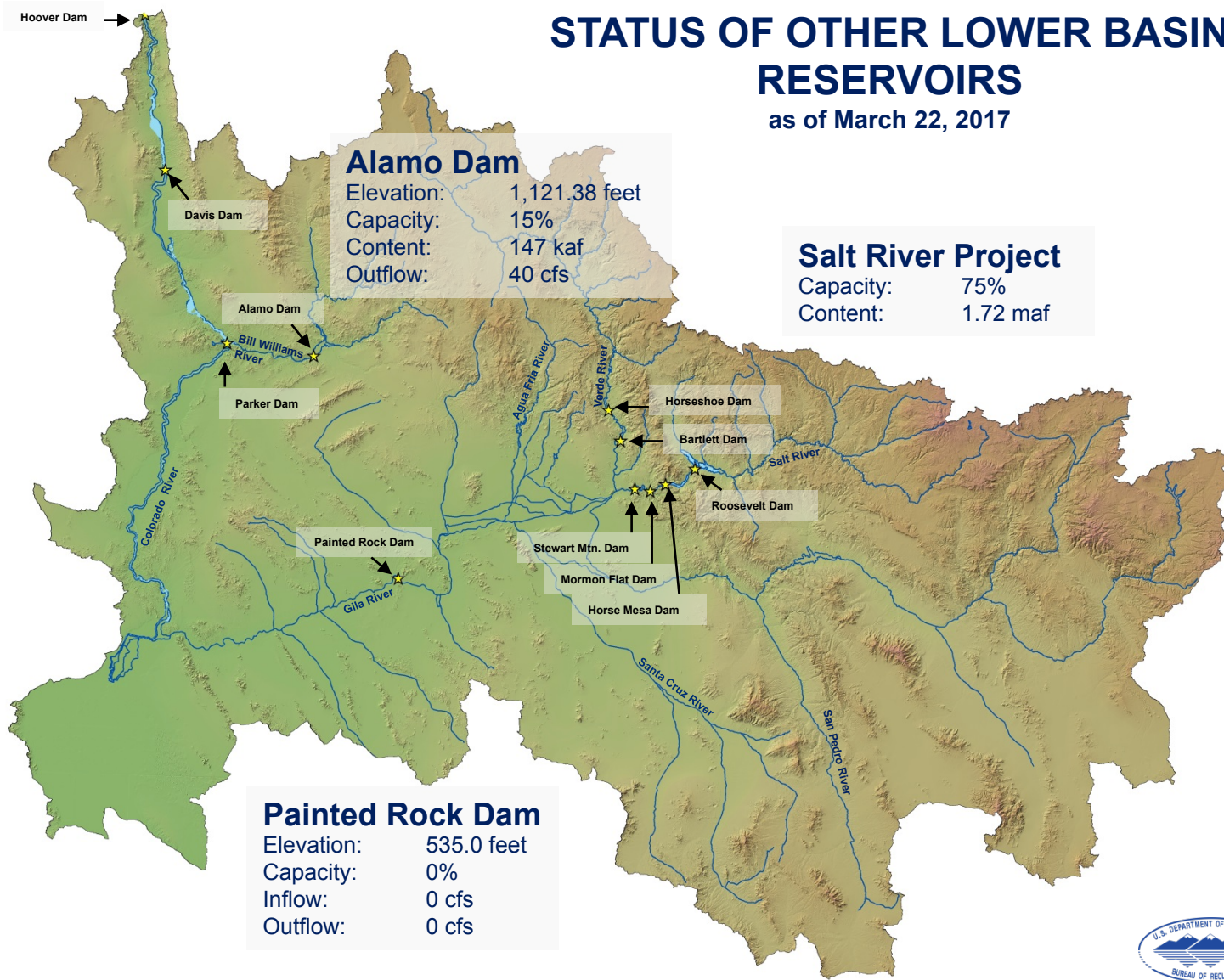
November 1, 2016

Statistics Comparison

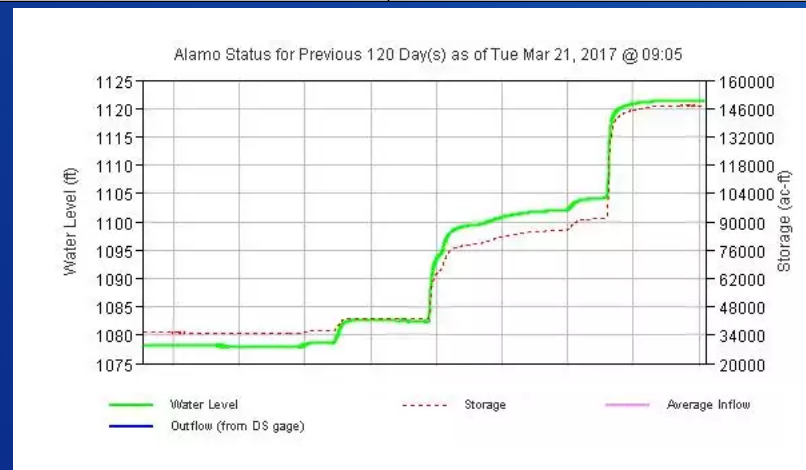
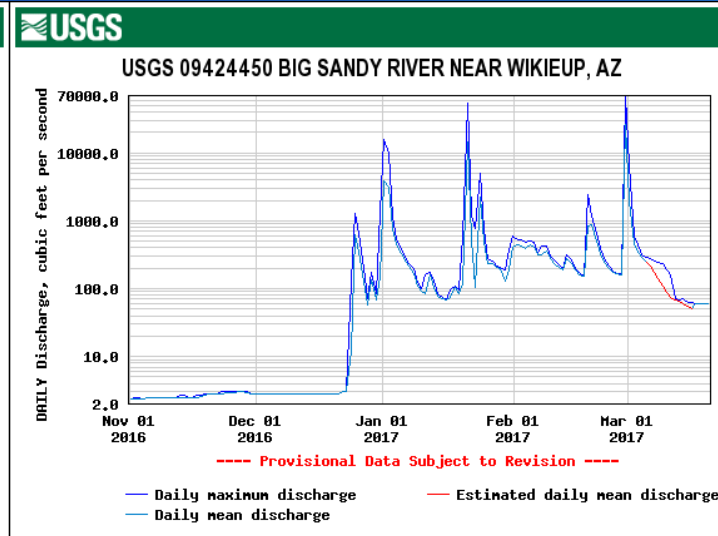
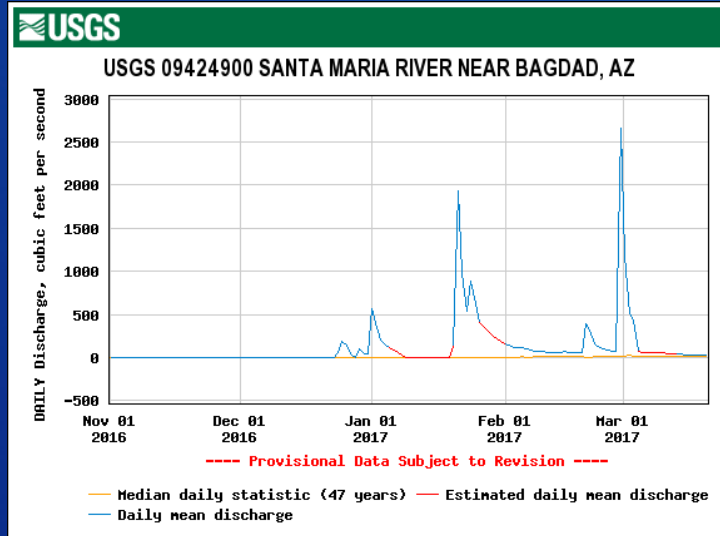
Week	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
2017-03-14	83.68	16.32	7.32	0.55	0.02	0.00
2016-11-01	44.71	55.29	25.26	11.18	5.73	2.81

STATUS OF OTHER LOWER BASIN RESERVOIRS

as of March 22, 2017



Bill Williams River/Alamo Dam



Additional Operational Data

(provisional year-to-date values)

Mexico Excess Flows (af)	Brock Reservoir Stored (af)	Senator Wash Stored (af)
5,698	29,171	12,036
Through 3/21/17	Through 3/15/17	Through 3/16/17



Morelos Dam Pictured Above – April 2014
Alexander Stephens (USBR)



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Lower Colorado River Basin

Operations Update

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Lower Basin Operations Calendar Year 2017

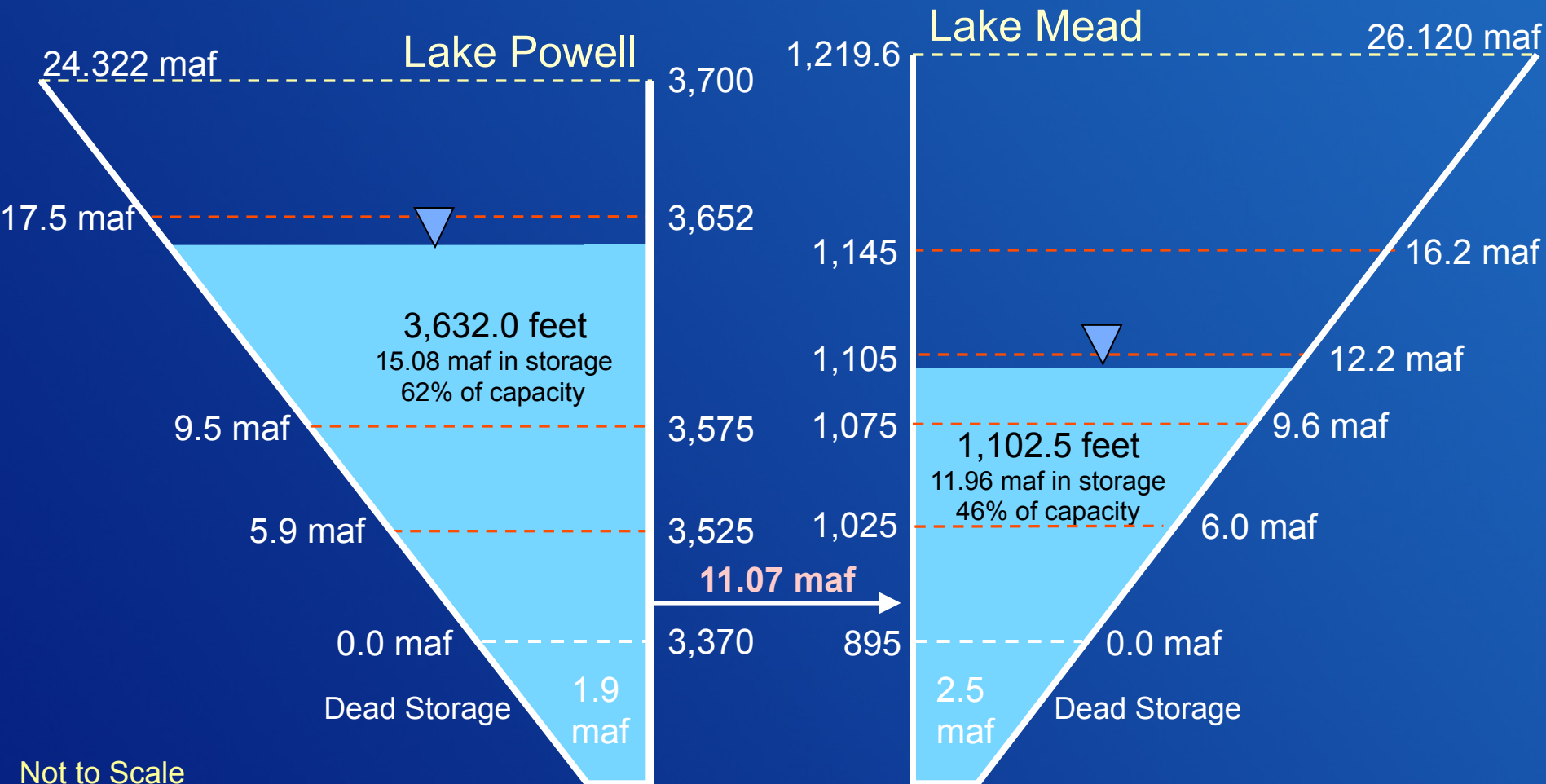
Lake Mead Operating Condition

- Normal/ICS Surplus Condition
 - Lower Basin projected water use of 7.5 maf +/- ICS created or delivered
 - Mexico projected to take delivery of 1.5 maf +/- any water deferred or delivered

End of Water Year 2017 Projections

March 2017 24-Month Study Most Probable Inflow Scenario¹

Projected Unregulated Inflow into Powell¹ = 14.35 maf (132% of average)



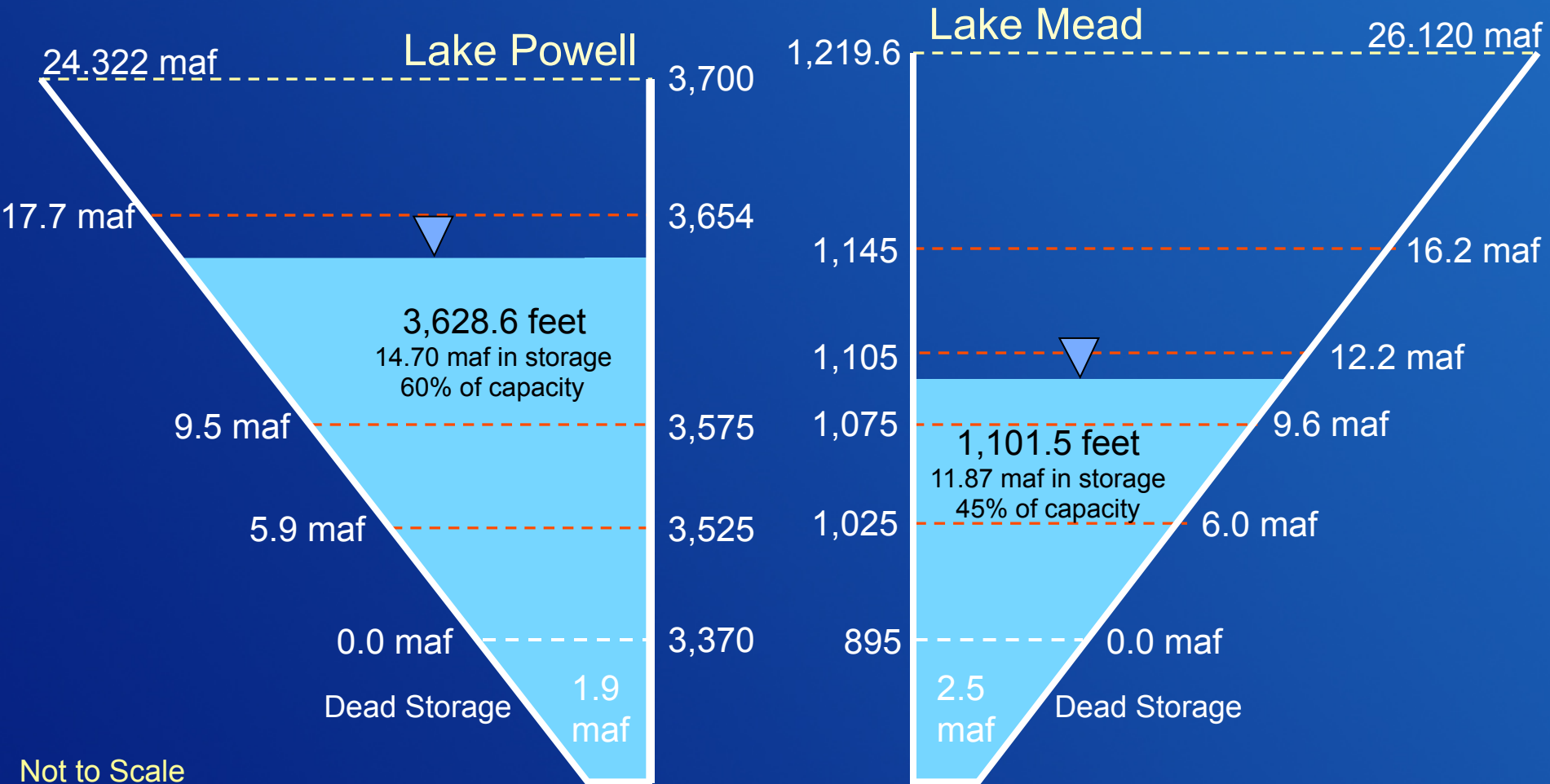
Not to Scale

¹ WY 2017 unregulated inflow into Lake Powell is based on the CBRFC forecast dated 3/2/17.

End of Calendar Year 2017 Projections

March 2017 24-Month Study Most Probable Inflow Scenario¹

Based on a 8.23 maf release pattern from Lake Powell in Water Year 2018



Not to Scale

¹ WY 2017 unregulated inflow into Lake Powell is based on the CBRFC forecast dated 3/2/17.



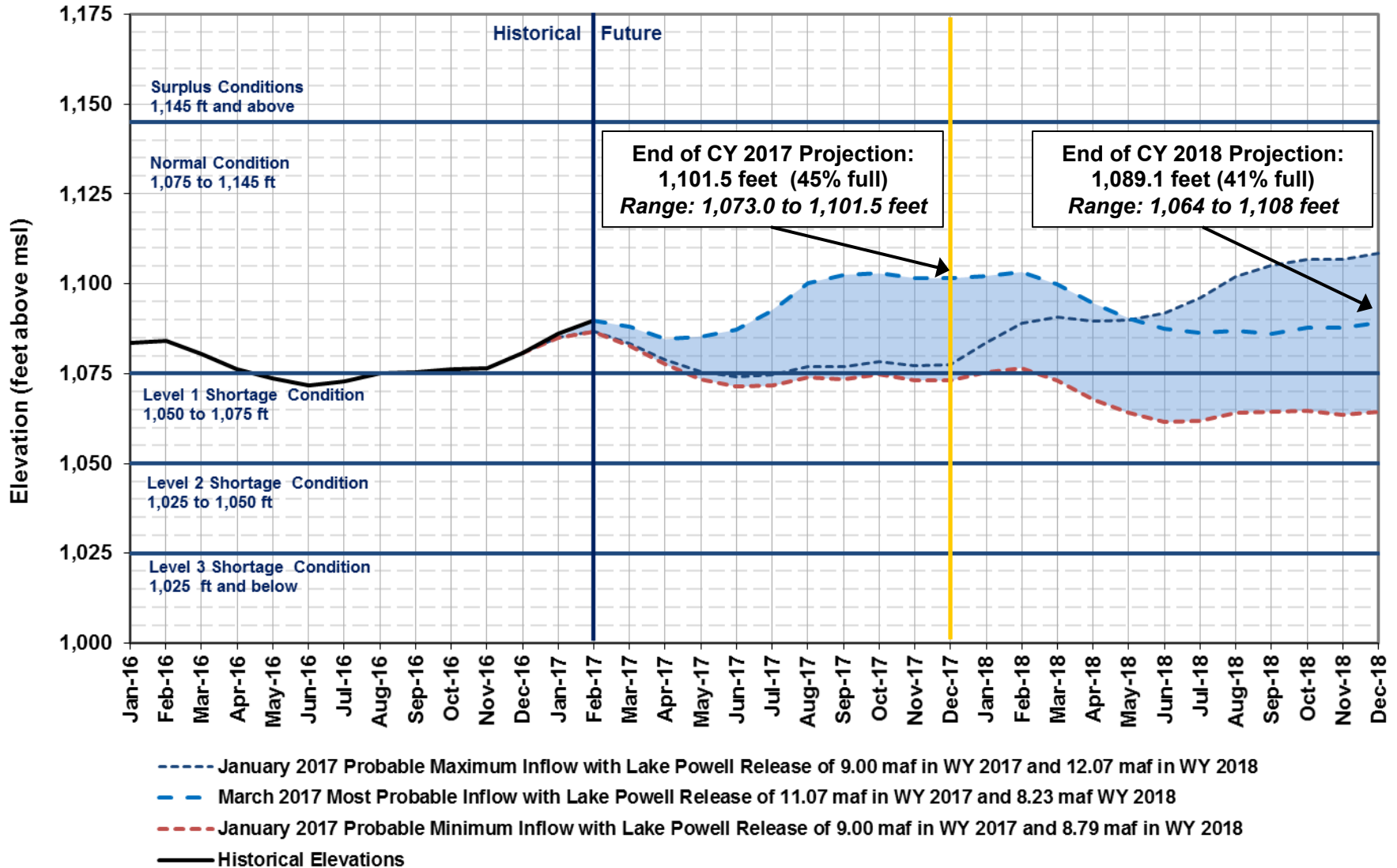
Lower Basin Projected Operations Calendar Year 2018

Lake Mead Projected Operating Condition

- Normal/ICS Surplus Condition
 - Lower Basin projected water use of 7.5 maf +/- ICS created or delivered
 - Mexico projected to take delivery of 1.5 maf +/- any water deferred or delivered

Lake Mead End of Month Elevations

Projections from January and March 2017 24-Month Study Inflow Scenarios



Percent of Traces with Event or System Condition

Results from January 2017 MTOM/CRSS^{1,2,3} (values in percent)

	Event or System Condition	2017	2018	2019	2020	2021
Upper Basin – Lake Powell	Equalization Tier	34	38	37	34	33
	<i>Equalization – annual release > 8.23 maf</i>	34	37	36	33	32
	<i>Equalization – annual release = 8.23 maf</i>	0	1	1	1	1
	Upper Elevation Balancing Tier	66	62	60	55	53
	<i>Upper Elevation Balancing – annual release > 8.23 maf</i>	63	44	37	27	28
	<i>Upper Elevation Balancing – annual release = 8.23 maf</i>	3	17	23	27	25
	<i>Upper Elevation Balancing – annual release < 8.23 maf</i>	0	<1	<1	1	<1
	Mid-Elevation Release Tier	0	0	2	11	12
	<i>Mid-Elevation Release – annual release = 8.23 maf</i>	0	0	0	<1	<1
	<i>Mid-Elevation Release – annual release = 7.48 maf</i>	0	0	2	11	12
Lower Elevation Balancing Tier	0	0	0	<1	2	
Lower Basin – Lake Mead	Shortage Condition – any amount (Mead ≤ 1,075 ft)	0	34	30	29	33
	<i>Shortage – 1st level (Mead ≤ 1,075 and ≥ 1,050)</i>	0	34	30	27	25
	<i>Shortage – 2nd level (Mead < 1,050 and ≥ 1,025)</i>	0	0	<1	1	7
	<i>Shortage – 3rd level (Mead < 1,025)</i>	0	0	0	<1	1
	Surplus Condition – any amount (Mead ≥ 1,145 ft)	0	3	7	15	18
	<i>Surplus – Flood Control</i>	0	0	<1	2	4
	Normal or ICS Surplus Condition	100	63	63	56	49

¹ Reservoir initial conditions based on results from 35 simulations of December 31, 2017 conditions using the Mid-term Probabilistic Operations Model. MTOM uses the January 17, 2017 unregulated inflow forecast from the CBRFC.

² Each of the 35 initial conditions were coupled with 107 hydrologic inflow sequences based on resampling of the observed natural flow record from 1906-2012 for a total of 3,745 traces analyzed.

³ Percentages shown may not be representative of the full range of future possibilities that could occur with different modeling assumptions.

A wide-angle photograph of a desert canyon at sunset. The sky is filled with dramatic, dark clouds illuminated from below by the setting sun, creating a golden glow. The river is a vibrant blue, winding through the reddish-brown rock formations. A large, prominent rock formation sits in the center of a sharp bend in the river. The foreground shows the rugged, layered rock walls of the canyon.

Lower Colorado River Operations

For further information: [http://www.usbr.gov/lc/
region](http://www.usbr.gov/lc/region)

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