

RECLAMATION

Managing Water in the West

CRFS Technical Committee Fall Meeting Lower Colorado Region Operations Update

November 16, 2017



U.S. Department of the Interior
Bureau of Reclamation

Overview

- Current Conditions
- 2017 Operations Summary
- 2018 Projections



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An aerial photograph of the Hoover Dam and the Hoover Dam Bypass Bridge. The dam is a large concrete structure with a curved face, situated in a deep canyon. The bridge is a long, multi-span concrete arch bridge that crosses the river below the dam. 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 on the image in white.

Lower Colorado River Basin

Current Conditions

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Colorado River Basin Storage

(as of November 14, 2017)

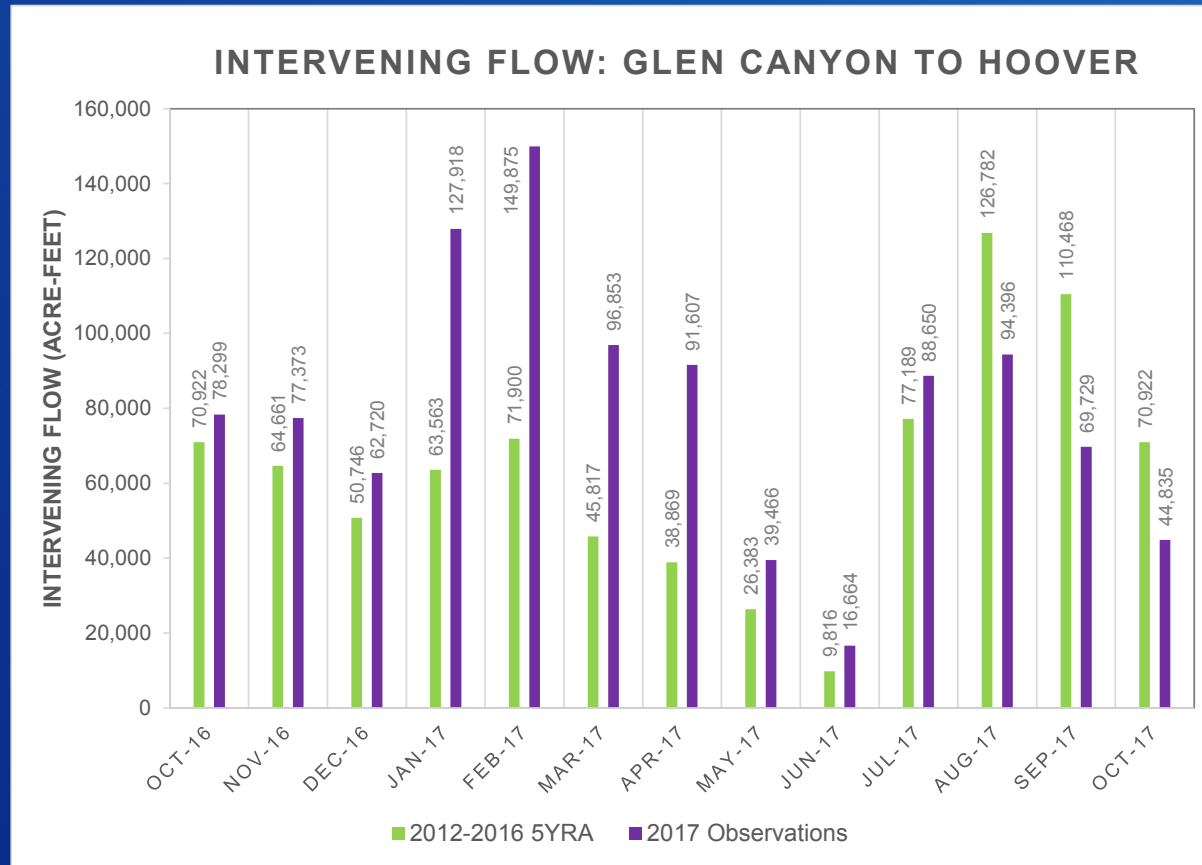
Reservoir	Percent Full	Storage (MAF)	Elevation (Feet)
Lake Powell	59	14.43	3,626.2
Lake Mead	39	10.13	1,081.5
Lake Mohave	86	1.56	637.9
Lake Havasu	92	0.57	447.3
Total System Storage	54	32.49	N/A

***Total system storage was 50% or 29.75 maf this time last year**

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Lower Basin Intervening Flows

Intervening Flow from Glen Canyon to Hoover Dam



LC REACH	2012-2016	WY 2017	DIFFERENCE
Glen to Hoover (af)	757,117	993,511	236,433

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

Intervening Flow from Glen Canyon to Hoover Dam

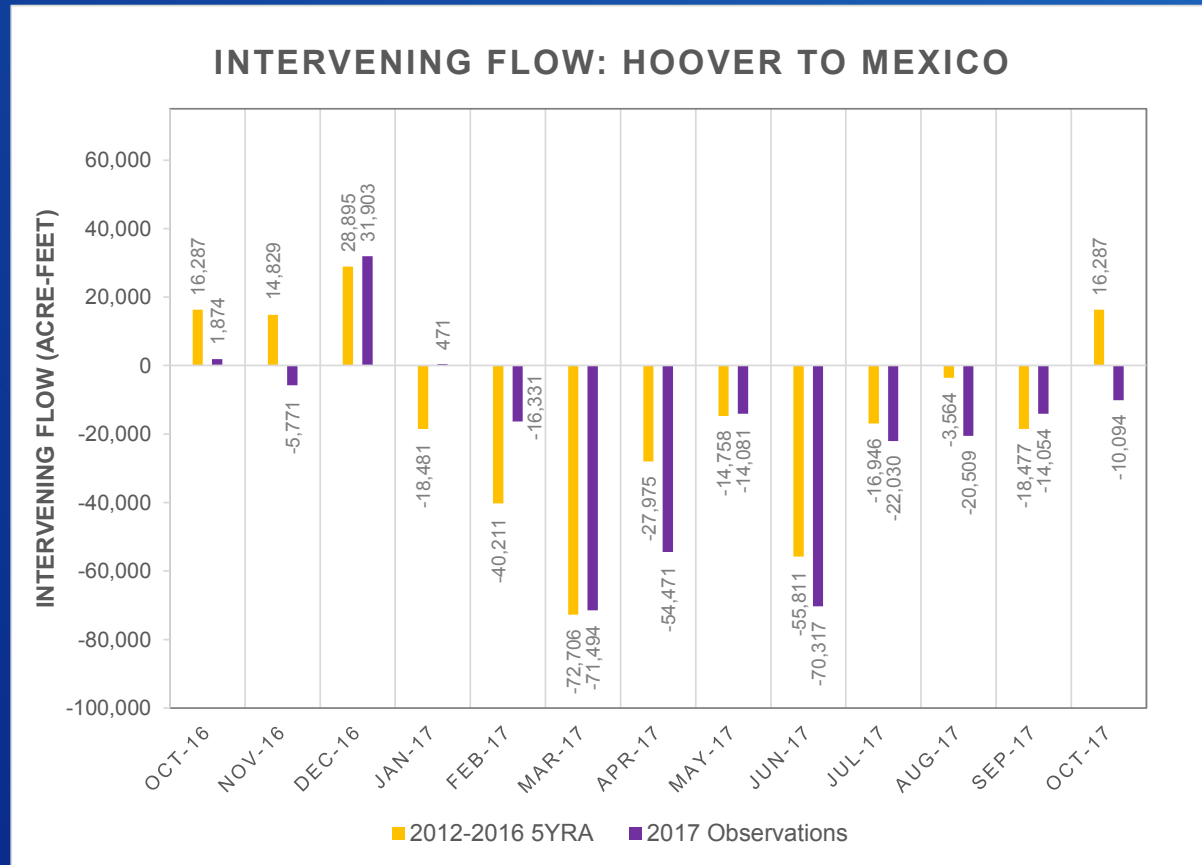
Month in WY/CY 2017		5-Year Average Intervening Flow (KAF)	Observed Intervening Flow (KAF)	Observed Intervening Flow (% of Average)	Difference From 5-Year Average (KAF)
HISTORICAL	October 2016	71	78	110%	7
	November 2016	65	77	120%	13
	December 2016	51	63	124%	12
	January 2017	64	128	201%	64
	February 2017	72	150	208%	78
	March 2017	46	97	211%	51
	April 2017	39	92	236%	53
	May 2017	26	39	150%	13
	June 2017	10	17	170%	7
	July 2017	77	89	115%	11
	August 2017	127	94	74%	-32
	September 2017	110	70	63%	-41
	October 2017	71	45	63%	-26
FUTURE	November 2017	65			
	December 2017	51			
WY 2017 Totals		757	994	131%	236
CY 2017 Totals		757	935	124%	178

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.

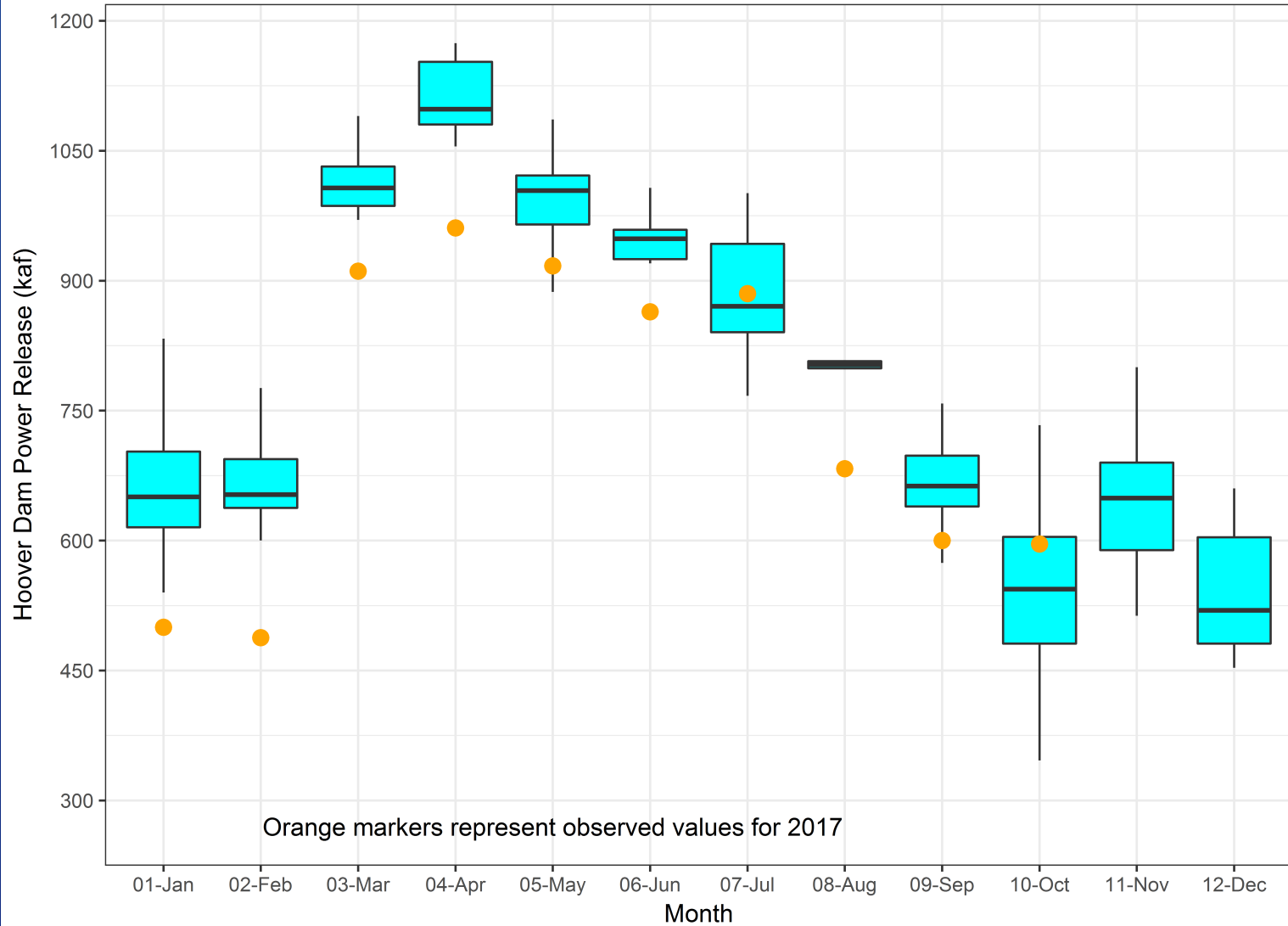
Lower Basin Intervening Flows

Intervening Flow from Hoover Dam to Mexico

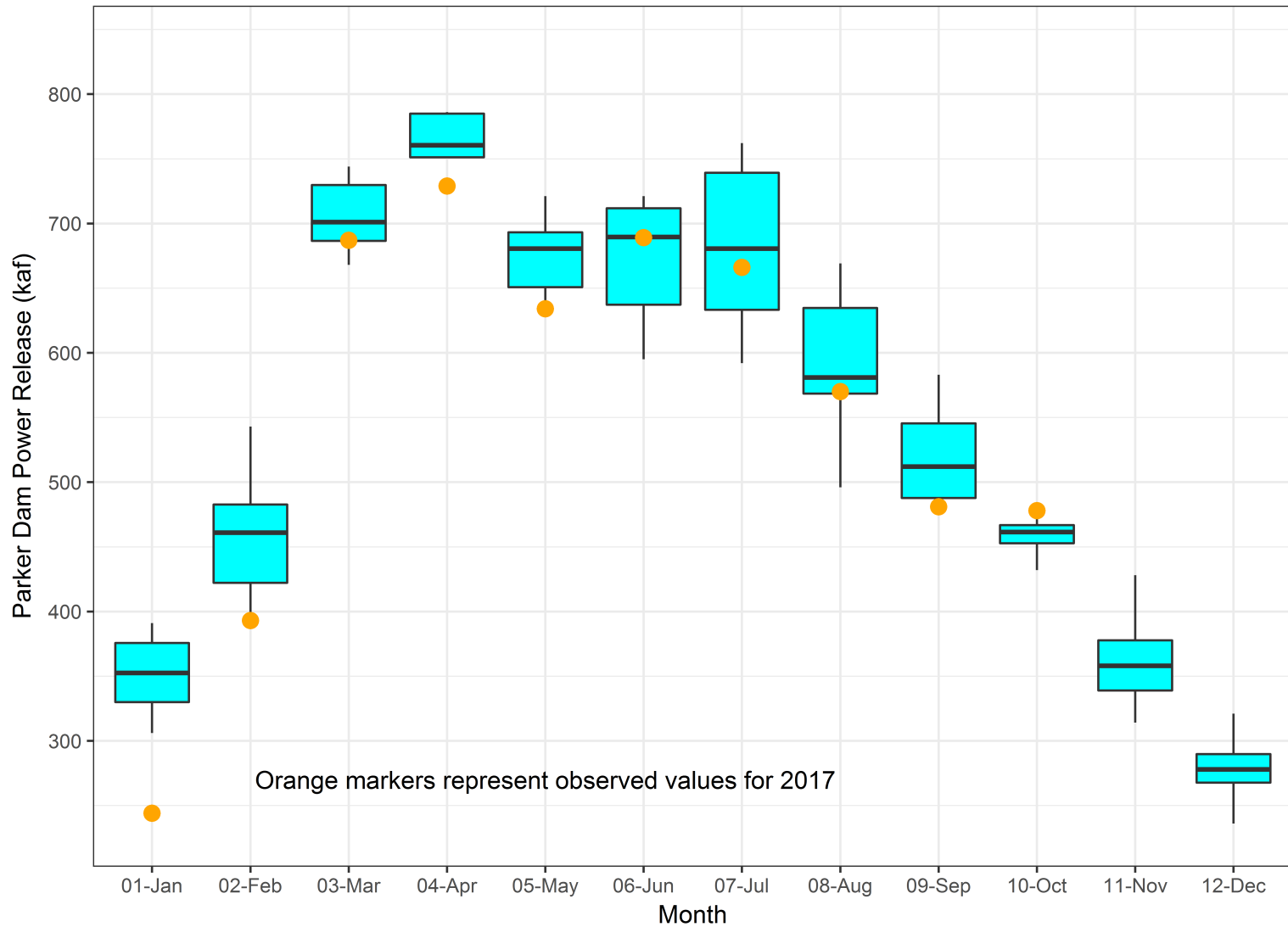


LC REACH	2012-2016	WY 2017	DIFFERENCE
Hoover to Mexico (af)	-208,920	-254,812	-45,892

HOOVER DAM RELEASES: 2007 - 2016

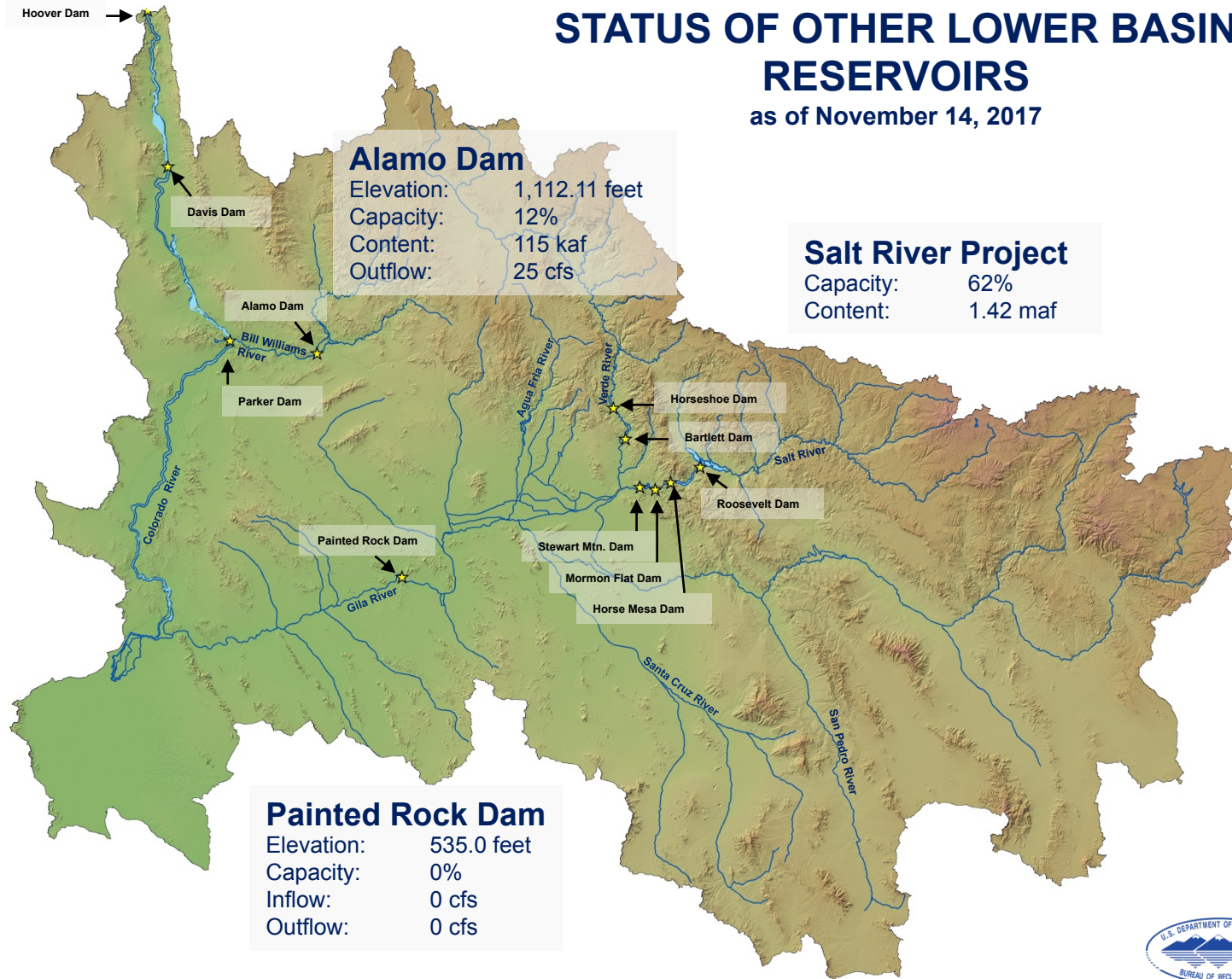


PARKER DAM RELEASES: 2007 - 2016



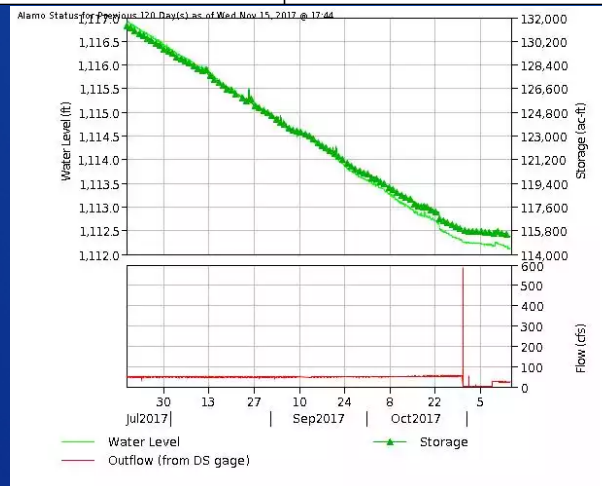
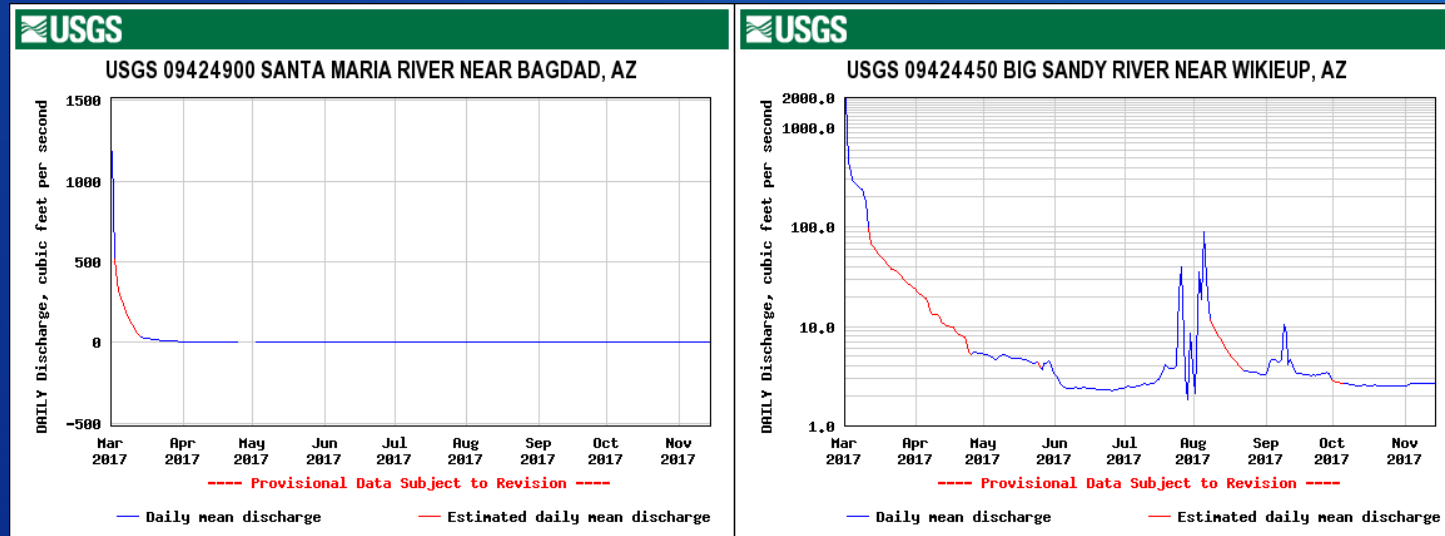
STATUS OF OTHER LOWER BASIN RESERVOIRS

as of November 14, 2017



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Bill Williams River/Alamo Dam



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Additional Operational Data

(provisional year-to-date values)

Mexico Excess Flows (af)	Brock Reservoir Stored (af)	Senator Wash Stored (af)
16,132	84,923	95,472
Through 11/14/17	Through 11/8/17	Through 11/9/17



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

Lake Powell & Lake Mead Operational Table

Operational Tiers for Water Year/Calendar Year 2018¹

Lake Powell			Lake Mead		
Elevation (feet)	Operation According to the Interim Guidelines	Live Storage (maf) ¹	Elevation (feet)	Operation According to the Interim Guidelines	Live Storage (maf) ¹
3,700	Equalization Tier Equalize, avoid spills or release 8.23 maf	24.3	1,220	Flood Control Surplus or Quantified Surplus Condition Deliver > 7.5 maf	25.9
3,636 - 3,666 (2008-2026)	Upper Elevation Balancing Tier³ Release 8.23 maf; if Lake Mead < 1,075 feet, balance contents with a min/max release of 7.0 and 9.0 maf	15.5 - 19.3 (2008-2026)	1,200 (approx.) ²	Domestic Surplus or ICS Surplus Condition Deliver > 7.5 maf	22.9 (approx.) ²
3,575	Jan 1, 2018 Projection 3,627.34 ft	9.5	1,145	Normal or ICS Surplus Condition Deliver ≥ 7.5 maf 1,083.46 ft	15.9
			1,105		11.9
			1,075		9.4
	Mid-Elevation Release Tier Release 7.48 maf; if Lake Mead < 1,025 feet, release 8.23 maf		1,050	Shortage Condition Deliver 7.167 ⁴ maf	7.5
3,525		5.9	1,025	Shortage Condition Deliver 7.083 ⁵ maf	5.8
	Lower Elevation Balancing Tier Balance contents with a min/max release of 7.0 and 9.5 maf	4.0	1,000	Shortage Condition Deliver 7.0 ⁶ maf Further measures may be undertaken ⁷	4.3
3,490					
3,370		0	895		0

Diagram not to scale

¹ Acronym for million acre-feet

² This elevation is shown as approximate as it is determined each year by considering several factors including Lake Powell and Lake Mead storage, projected Upper Basin and Lower Basin demands, and an assumed inflow.

³ Subject to April adjustments which may result in a release according to the Equalization Tier

⁴ Of which 2.48 maf is apportioned to Arizona, 4.4 maf to California, and 0.287 maf to Nevada

⁵ Of which 2.40 maf is apportioned to Arizona, 4.4 maf to California, and 0.283 maf to Nevada

⁶ Of which 2.32 maf is apportioned to Arizona, 4.4 maf to California, and 0.280 maf to Nevada

⁷ Whenever Lake Mead is below elevation 1,025 feet, the Secretary shall consider whether hydrologic conditions together with anticipated deliveries to the Lower Division States and Mexico is likely to cause the elevation at Lake Mead to fall below 1,000 feet. Such consideration, in consultation with the Basin States, may result in the undertaking of further measures, consistent with applicable Federal law.

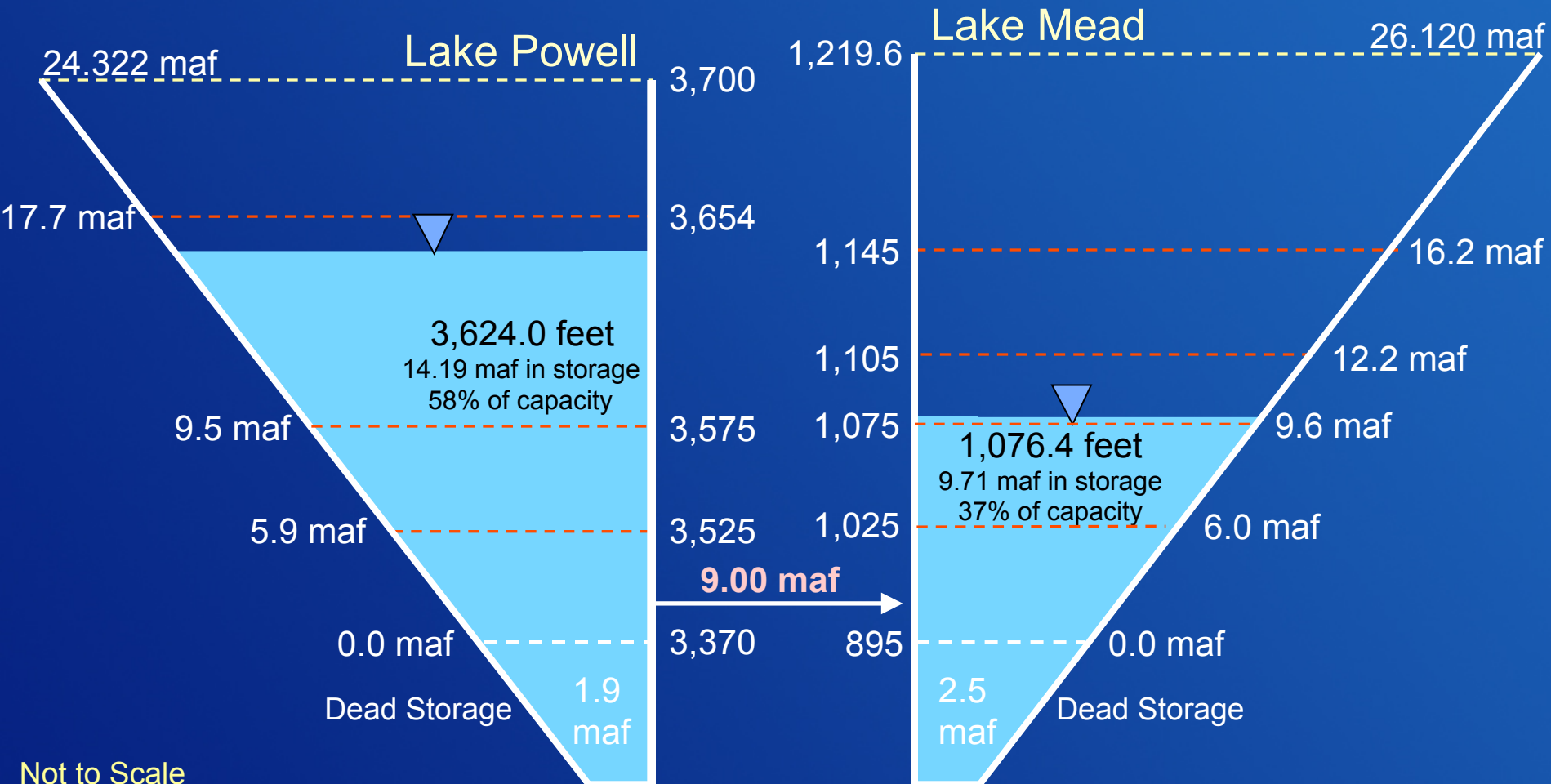
¹ Lake Powell and Lake Mead operational tier determinations were based on August 2017 24-Month Study projections and will be documented in the 2018 AOP.

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End of Water Year 2018 Projections

November 2017 24-Month Study Most Probable Inflow Scenario¹

Projected Unregulated Inflow into Powell¹ = 8.90 maf (82% of average)



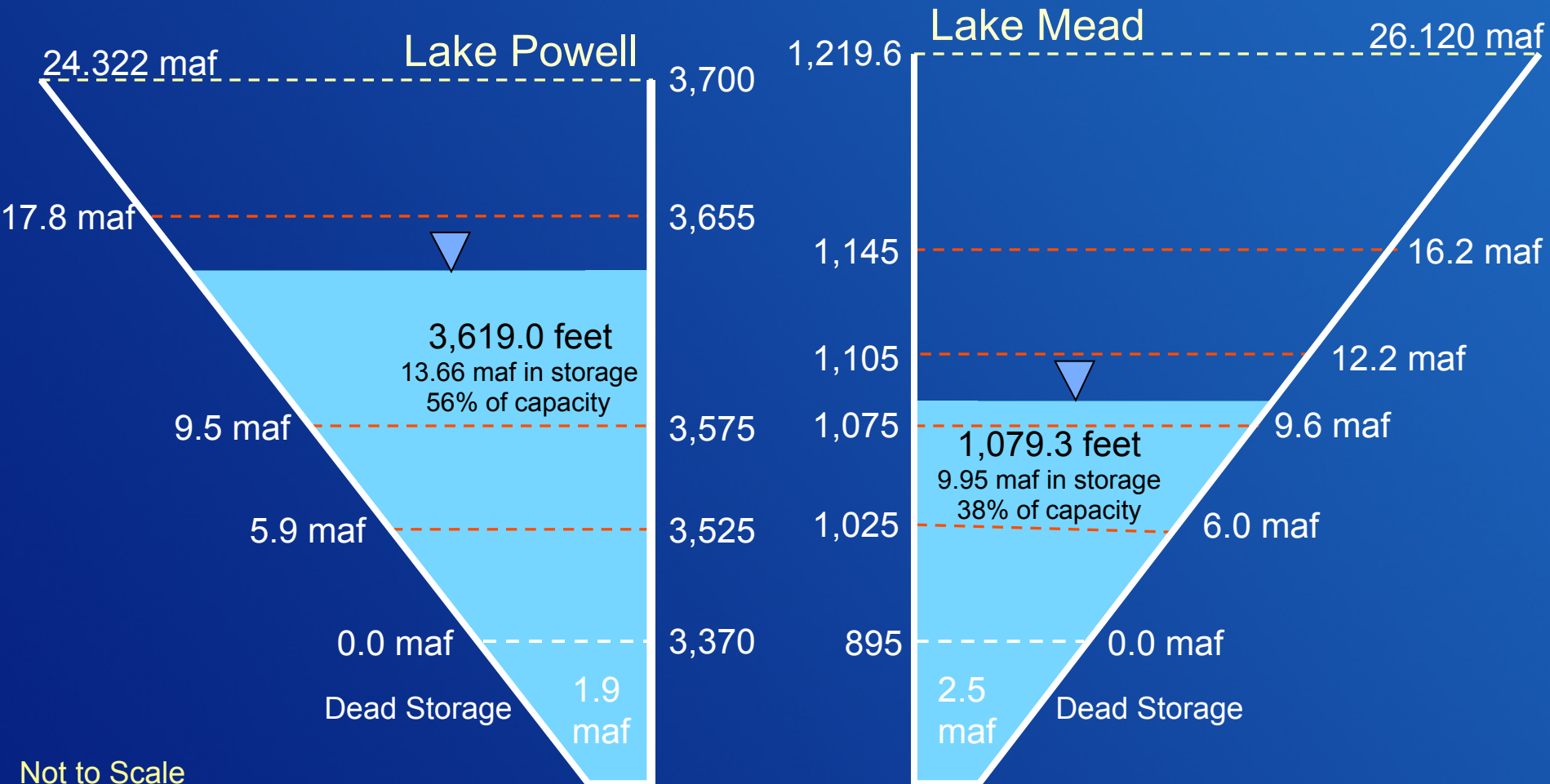
¹ WY 2018 unregulated inflow into Lake Powell is based on the CBRFC forecast dated 11/1/17.

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End of Calendar Year 2018 Projections

November 2017 24-Month Study Most Probable Inflow Scenario¹

Based on an 9.00 maf release from Lake Powell in Water Year 2019



Not to Scale

¹ WY 2018 unregulated inflow into Lake Powell is based on the CBRFC forecast dated 11/1/17.

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Projected Lake Mead Operational Tiers

Based on August and October 2017 24-Month Study Inflow Scenarios

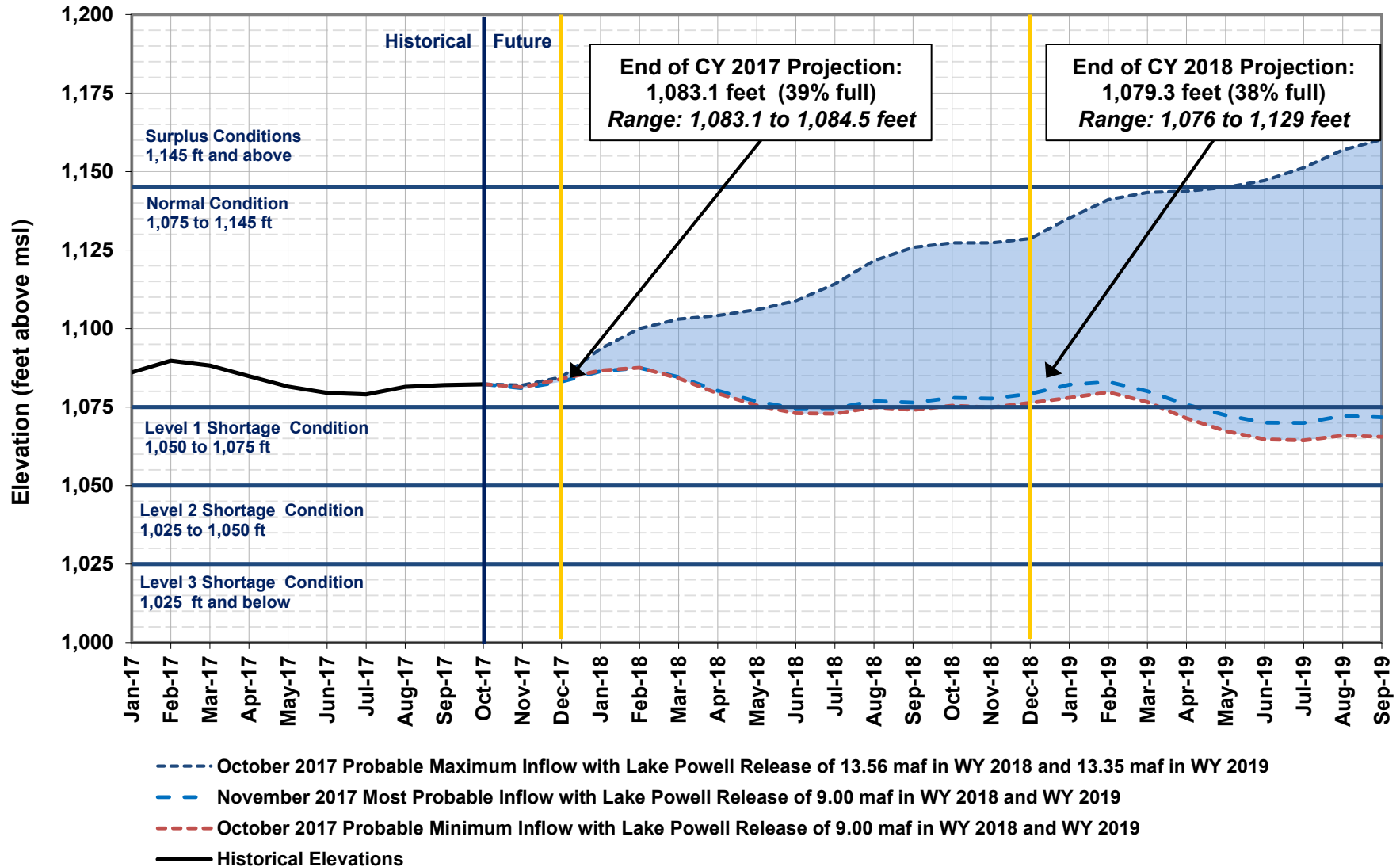
Inflow Scenario	CY 2018 Jan 1, 2018 - August Projection	CY 2019 Jan 1, 2019 - Projection
Maximum Probable	Normal - ICS Surplus Condition Elevation 1,083.46 ft	Normal - ICS Surplus Condition Elevation 1,128.72 ft ¹
Most Probable		Normal - ICS Surplus Condition Elevation 1,079.25 ft ²
Minimum Probable		Normal - ICS Surplus Condition Elevation 1,076.31 ft ¹

¹Based on the October 2017 24-Month Study

²Based on the November 2017 24-Month Study

Lake Mead End of Month Elevations

Projections from October and November 2017 24-Month Study Inflow Scenarios



Percent of Traces with Event or System Condition

Results from August 2017 CRSS^{1,2,3,4} (values in percent)

	Event or System Condition	2018	2019	2020	2021	2022
Upper Basin – Lake Powell	Equalization Tier	20	29	27	29	31
	<i>Equalization – annual release > 8.23 maf</i>	20	29	27	28	30
	<i>Equalization – annual release = 8.23 maf</i>	0	0	0	1	1
	Upper Elevation Balancing Tier	80	68	55	52	52
	<i>Upper Elevation Balancing – annual release > 8.23 maf</i>	75	52	41	35	37
	<i>Upper Elevation Balancing – annual release = 8.23 maf</i>	5	15	15	17	14
	<i>Upper Elevation Balancing – annual release < 8.23 maf</i>	0	1	0	0	1
	Mid-Elevation Release Tier	0	3	17	15	12
	<i>Mid-Elevation Release – annual release = 8.23 maf</i>	0	0	0	0	2
	<i>Mid-Elevation Release – annual release = 7.48 maf</i>	0	3	17	15	10
	Lower Elevation Balancing Tier	0	0	0	4	5
Lower Basin – Lake Mead	Shortage Condition – any amount (Mead ≤ 1,075 ft)	0	15	42	45	52
	<i>Shortage – 1st level (Mead ≤ 1,075 and ≥ 1,050)</i>	0	15	40	35	33
	<i>Shortage – 2nd level (Mead < 1,050 and ≥ 1,025)</i>	0	0	2	10	15
	<i>Shortage – 3rd level (Mead < 1,025)</i>	0	0	0	1	5
	Surplus Condition – any amount (Mead ≥ 1,145 ft)	0	0	7	12	17
	<i>Surplus – Flood Control</i>	0	0	1	2	3
	Normal or ICS Surplus Condition	100	85	51	43	31

¹ Reservoir initial conditions based on results from the August 2017 most-probable 24-Month Study.

² Percentages computed from 110 hydrologic inflow sequences based on resampling of the observed natural flow record from 1906-2015 for a total of 110 traces analyzed.

³ Percentages shown may not sum to 100% due to rounding to the nearest percent.

⁴ Percentages shown may not be representative of the full range of future possibilities that could occur with different modeling assumptions.



Lower Colorado River Operations

For further information: <http://www.usbr.gov/lc/region>

Email at: bcoowaterops@usbr.gov

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