

RECLAMATION

Managing Water in the West

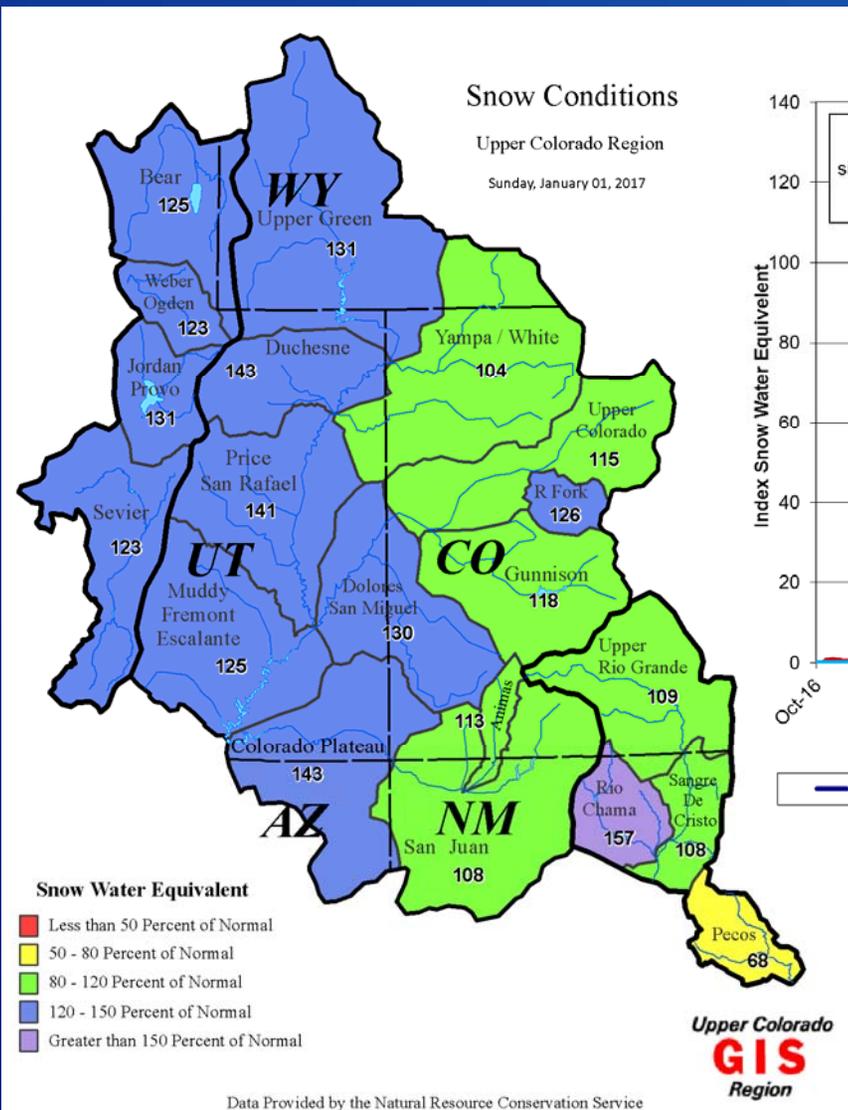
Basin Hydrology, Operations and 2018 Hydrograph

Glen Canyon Technical Work Group
January 26, 2017

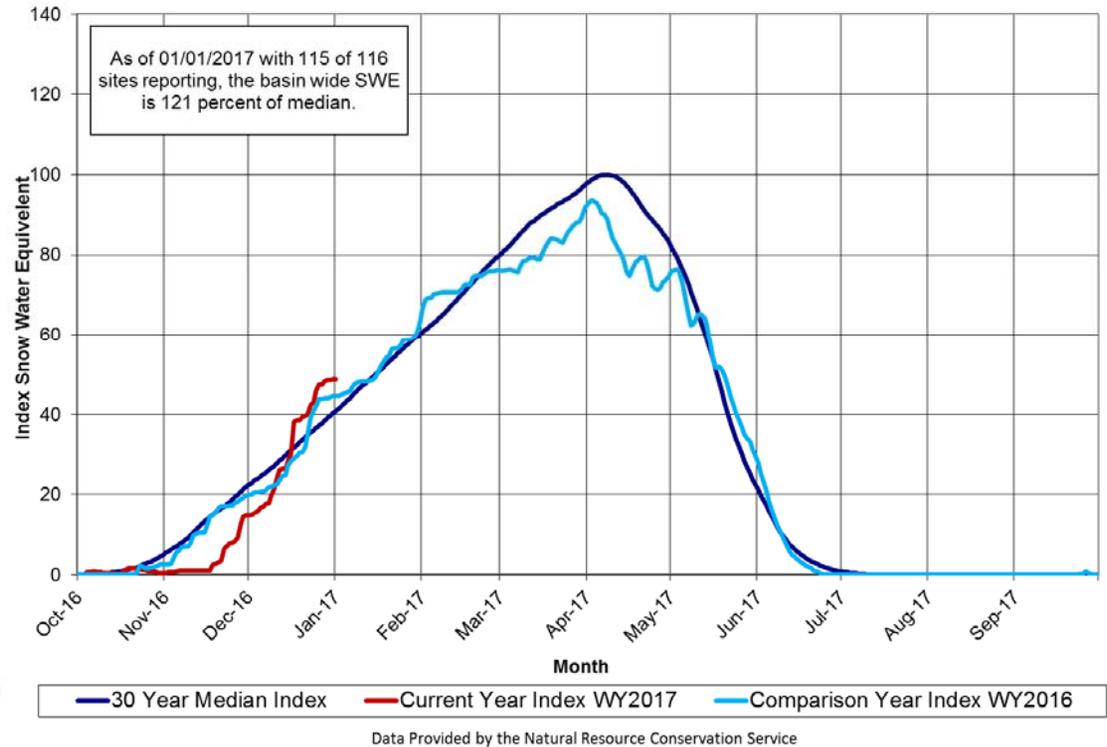


U.S. Department of the Interior
Bureau of Reclamation

Snow Conditions



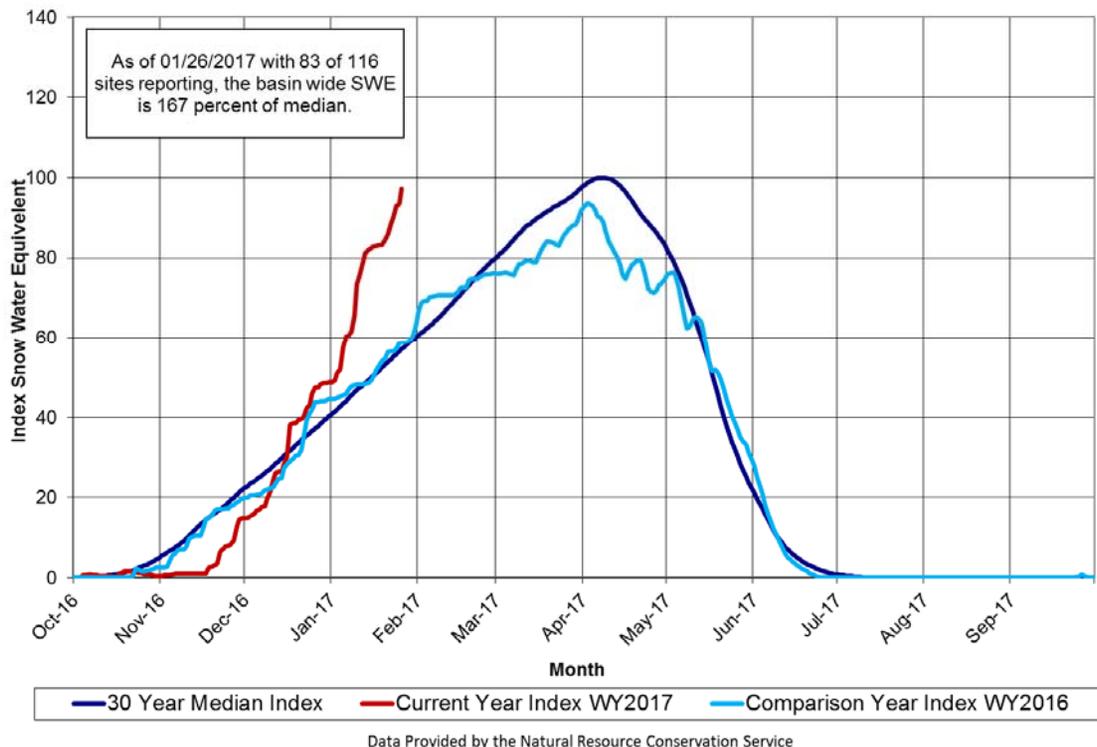
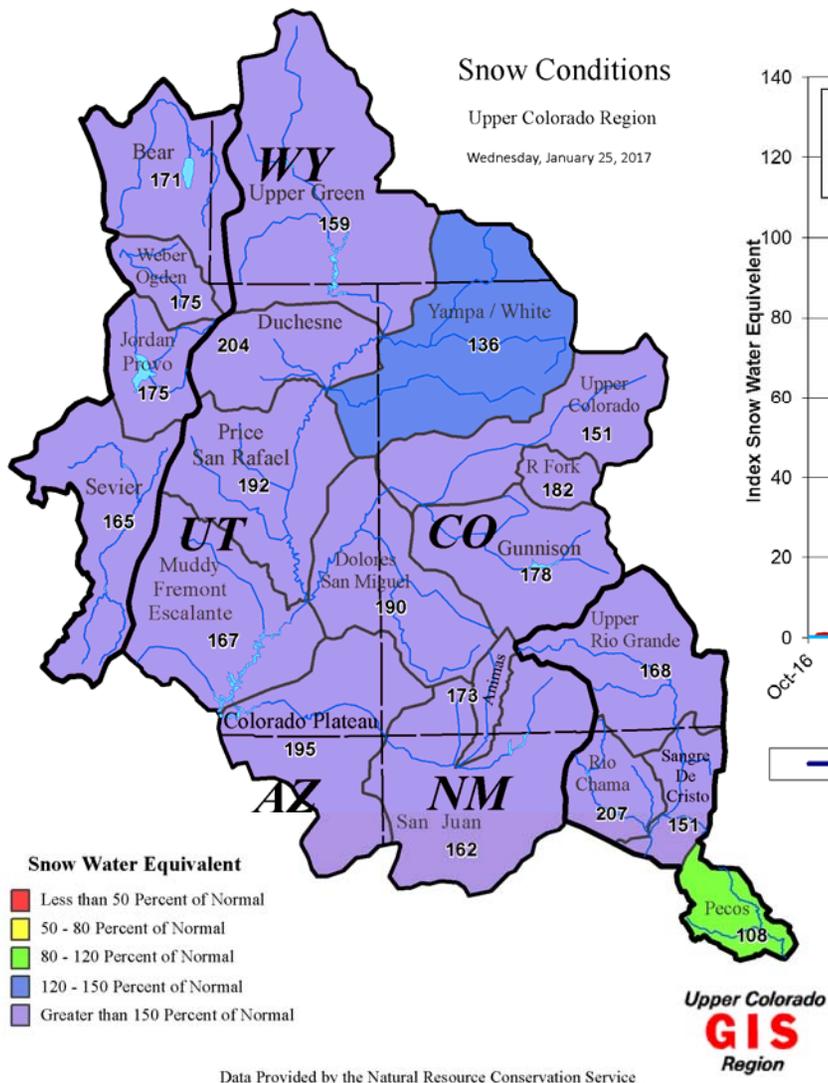
Upper Colorado River Basin Snotel Tracking
Aggregate of 116 Snotel Sites above Lake Powell



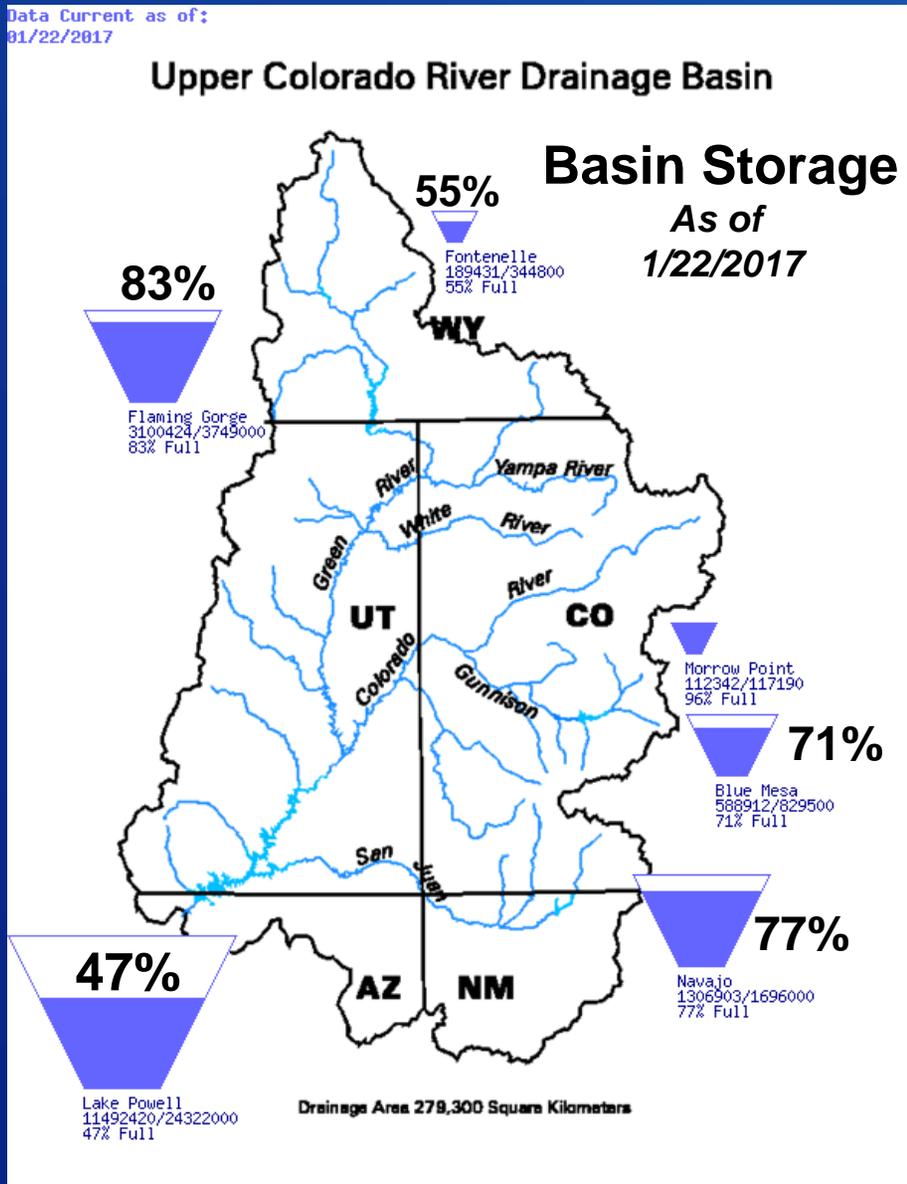
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Snow Conditions

Upper Colorado River Basin Snotel Tracking
Aggregate of 116 Snotel Sites above Lake Powell



Upper Basin Storage



http://www.usbr.gov/uc/water/basin/tc_cr.html

April to July 2017 Forecasted Inflow Issued January 4, 2017

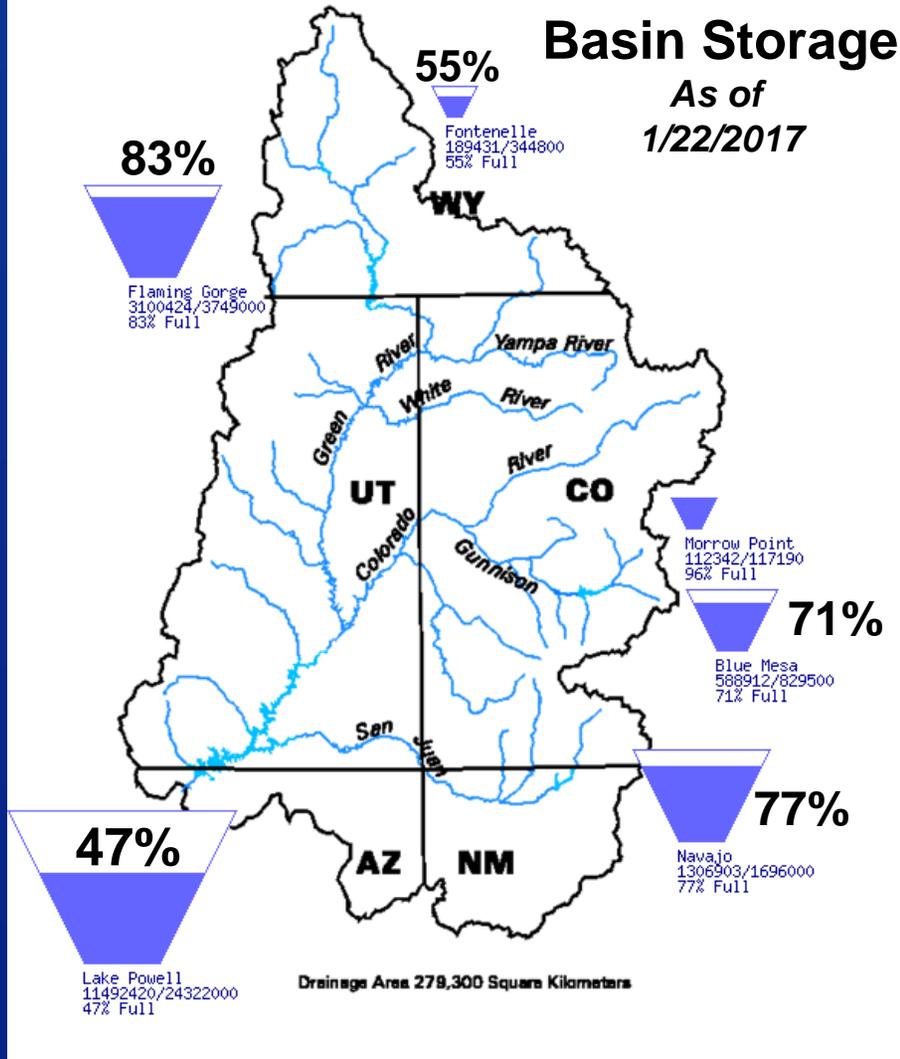
Reservoir	A-J Forecast (KAF)	Percent of Average ¹
Fontenelle	930	128%
Flaming Gorge	1230	126%
Blue Mesa	575	85%
Navajo	580	79%
Powell	6,500	91%

¹ percent of average based on period 1981-2010.

Upper Basin Storage

Data Current as of:
01/22/2017

Upper Colorado River Drainage Basin



http://www.usbr.gov/uc/water/basin/tc_cr.html

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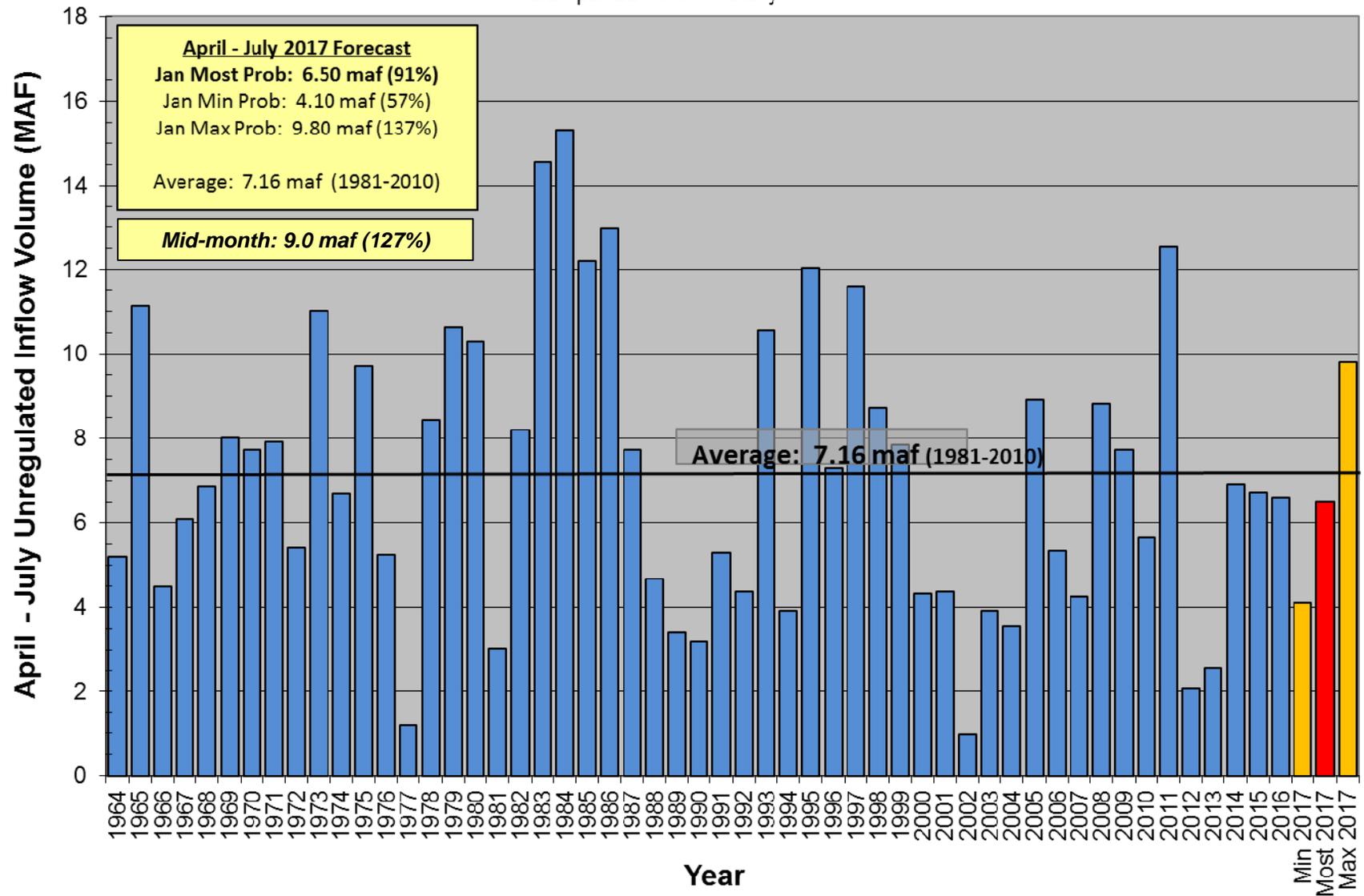
April to July 2017 Forecasted Inflow Issued January 17, 2017

Reservoir	A-J Forecast (KAF)	Percent of Average ¹
Fontenelle	1130	156%
Flaming Gorge	1530	156%
Blue Mesa	915	136%
Navajo	750	102%
Powell	9,000	126%

¹ percent of average based on period 1981-2010.

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**Lake Powell Unregulated Inflow
April - July 2017 Forecast
Issued January 1st
Comparison with History**



Lake Powell 2017 Operating Tier

Upper Elevation Balancing

- Tier was set in August 2016
 - Start with 8.23 maf release
- Use April 24-Month Study projections of end of water year storage to potentially adjust
 1. Stay with 8.23 maf
 2. Balancing: 8.23 - 9.0 maf
 3. Equalization: > 8.23 maf

Lake Powell		
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
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)
3,575	Mid-Elevation Release Tier Release 7.48 maf; if Lake Mead < 1,025 feet, release 8.23 maf	9.5
3,525	Lower Elevation Balancing Tier Balance contents with a min/max release of 7.0 and 9.5 maf	5.9
3,490		4.0
3,370		0

Lake Powell 2017 Operating Tier Scenarios

Based on January 2017 modeling

Inflow Scenario	Operating Tier Release Volume
Minimum Probable	Upper Elevation Balancing 9.0 maf
Most Probable	Upper Elevation Balancing 9.0 maf
Maximum Probable	Upper Elevation Balancing 9.0 maf

LTEMP Monthly Release Volumes

Month	7.00	7.48	8.23	9.00	9.50	10.50	11.00	12.00	13.00	14.00
OCT	480	480	640	640	640	640	640	640	640	640
NOV	500	500	640	640	640	640	640	640	640	640
DEC	600	600	720	720	720	720	720	720	720	720
JAN	660	720	760	860	920	1040	1100	1230	1350	1470
FEB	590	640	680	750	810	920	970	1080	1190	1300
MAR	620	675	710	800	860	970	1030	1150	1260	1370
APR	550	600	640	710	760	870	920	1020	1120	1220
MAY	550	600	630	710	760	860	910	1020	1120	1220
JUN	580	630	660	750	800	910	960	1060	1170	1280
JUL	650	710	750	850	900	1020	1080	1200	1320	1440
AUG	700	760	800	900	970	1090	1160	1280	1410	1540
SEP	520	565	600	670	720	820	870	960	1060	1160

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Glen Canyon Power Plant Planned Unit Outage Schedule for Water Year 2017

Unit Number	Oct 2016	Nov 2016	Dec 2016	Jan 2017	Feb 2017	Mar 2017	Apr 2017	May 2017	Jun 2017	Jul 2017	Aug 2017	Sep 2017	
1													
2													
3													
4													
5													
6													
7													
8													
Units Available	6	6	6	6	5	5	7	7	7	7	7	6	
Capacity (cfs)	21,000	21,000	19,700	19,750	16,200	16,150	23,350	23,350	24,400	23,400	23,400	19,600	
Capacity (kaf/month)	1,310	1,280	1,180	1,270	930	1,090	1,390	1,440	1,390	1,440	1,450	1,200	
Max (kaf) ¹	601	750	898	880	715	720	620	646	750	850	900	670	9.0
Most (kaf) ²	601	750	898	880	715	720	620	646	750	850	900	670	9.0
Min (kaf) ¹	601	750	898	880	715	720	620	646	750	850	900	670	9.0

¹ Projected release, based on Jan 2017 Min and Max Probable Inflow Projections and 24-Month Study model runs

² Projected release, based on Jan 2017 Most Probable Inflow Projections and 24-Month Study model runs

(updated 1-13-2017)

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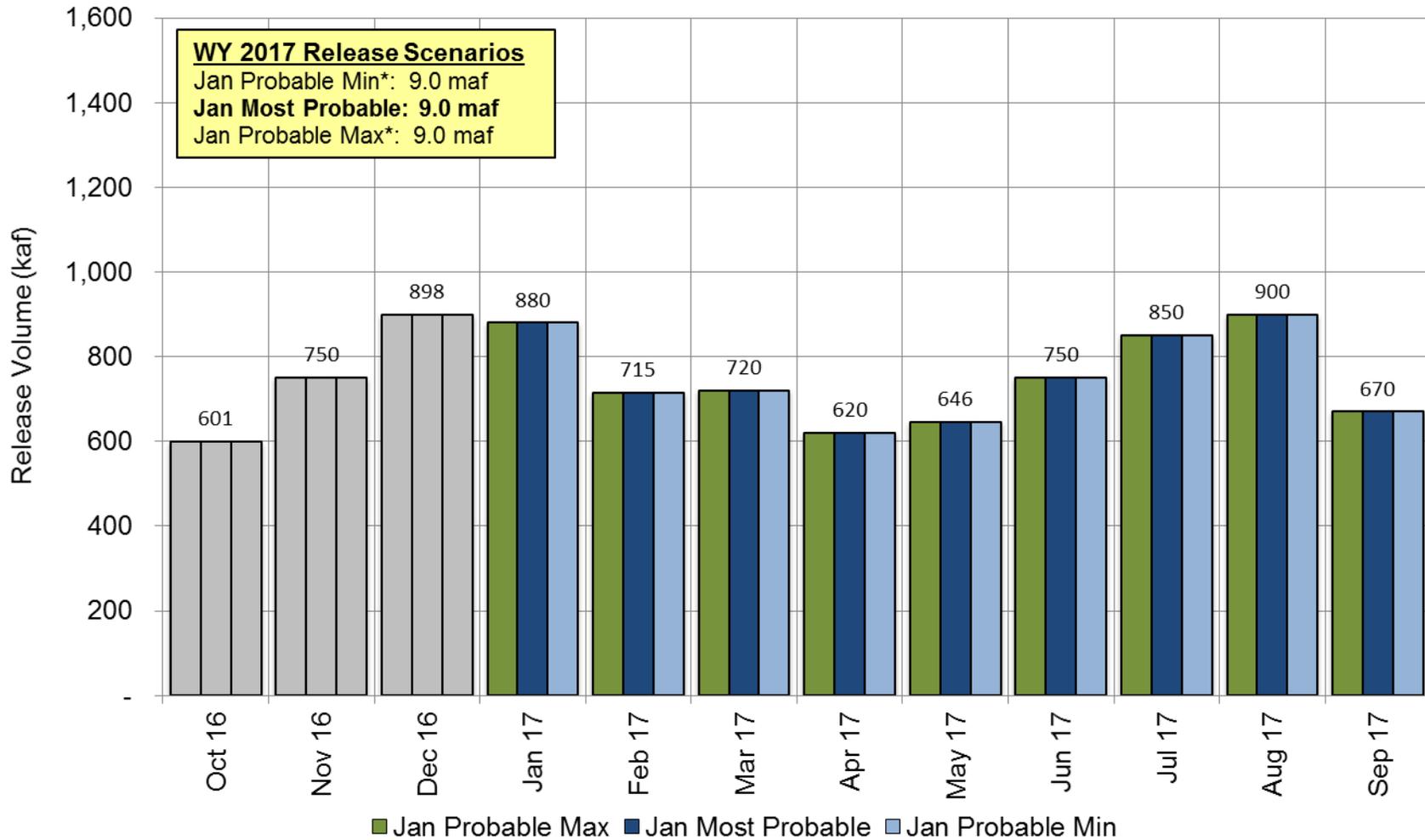
2017 Hydrograph (9.0 MAF)

Month	LTEMP Release, (kaf)	BOR/WAPA Planned Release, (kaf)	Recommended 2017 Hydrograph, (kaf)
OCT	640	601	600
NOV	640	750	600
DEC	720	898	900
JAN	860	880	900
FEB	750	715	700
MAR	800	720	650
APR	710	620	600
MAY	710	646	700
JUN	750	750	800
JUL	850	850	950
AUG	900	900	900
SEP	670	670	700
TOTALS			

Potential Lake Powell Monthly Release Volume Distribution

Release Scenarios for Water Year 2017

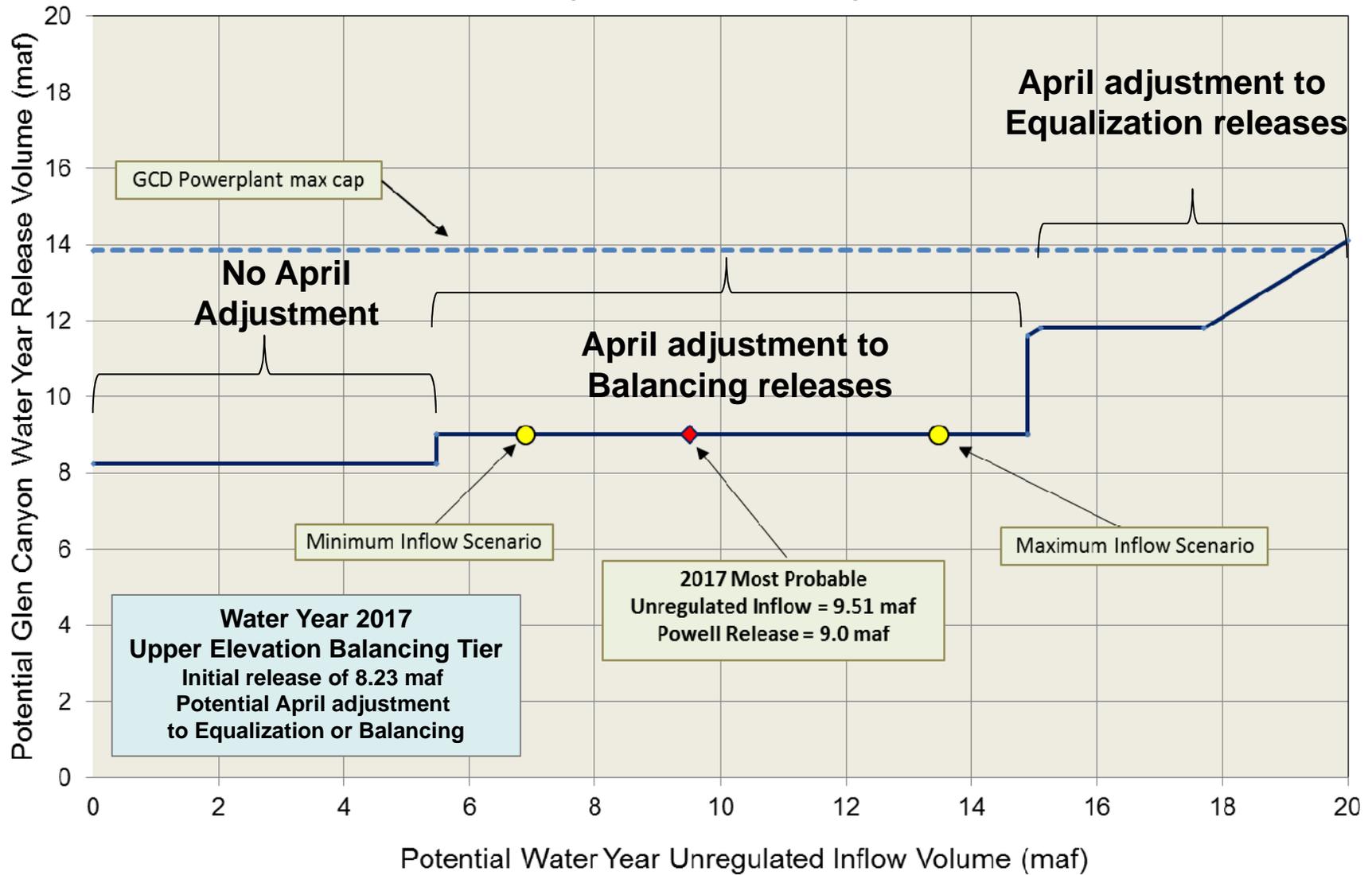
Updated January 2017



* Probable Min and Max annual release volume is based on April Min and Max inflow forecasts

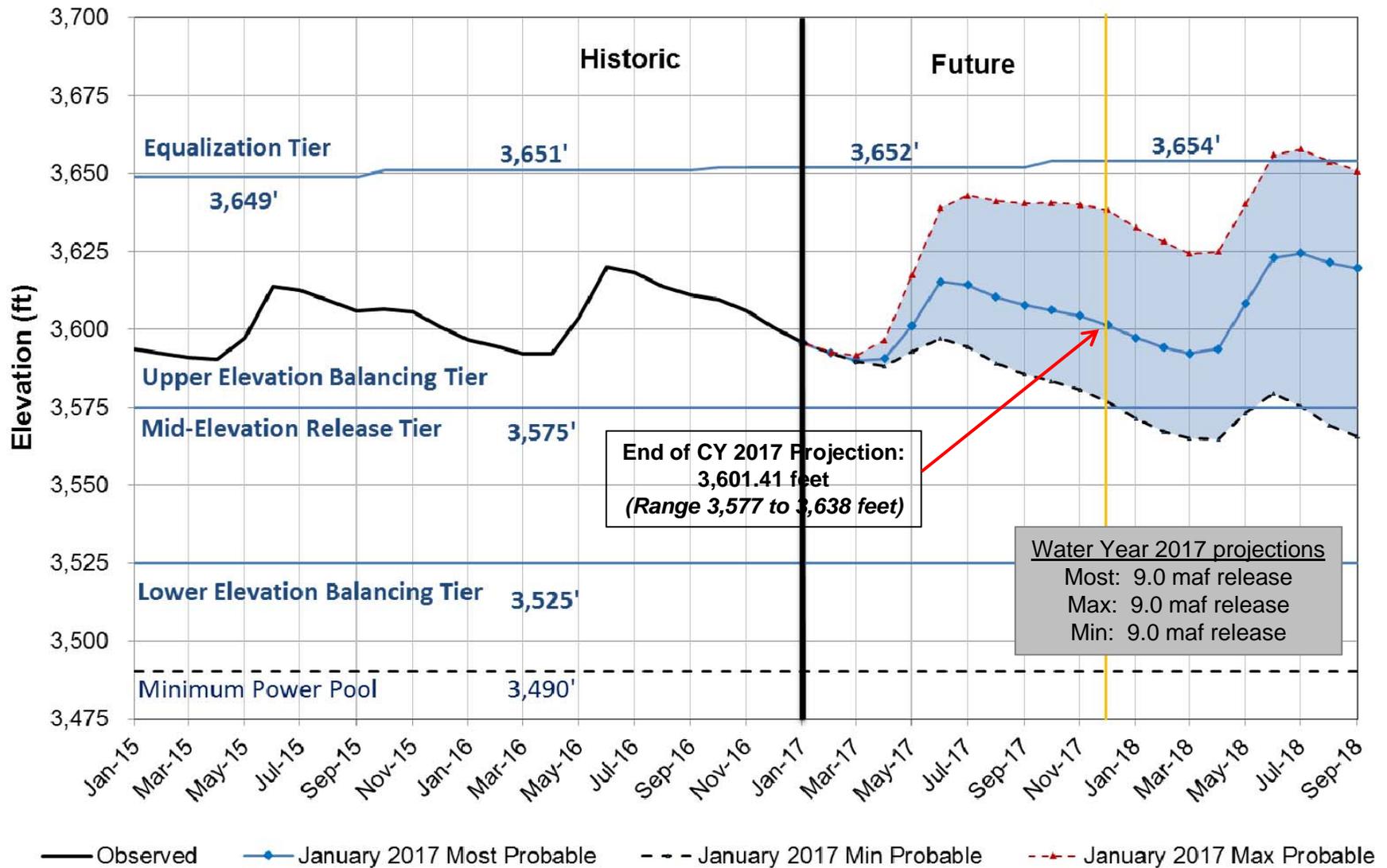
Potential Lake Powell Release Scenarios

Water Year 2017 Release Volume as a Function of Unregulated Inflow Volume
based on January 2017 24-Month Study Conditions



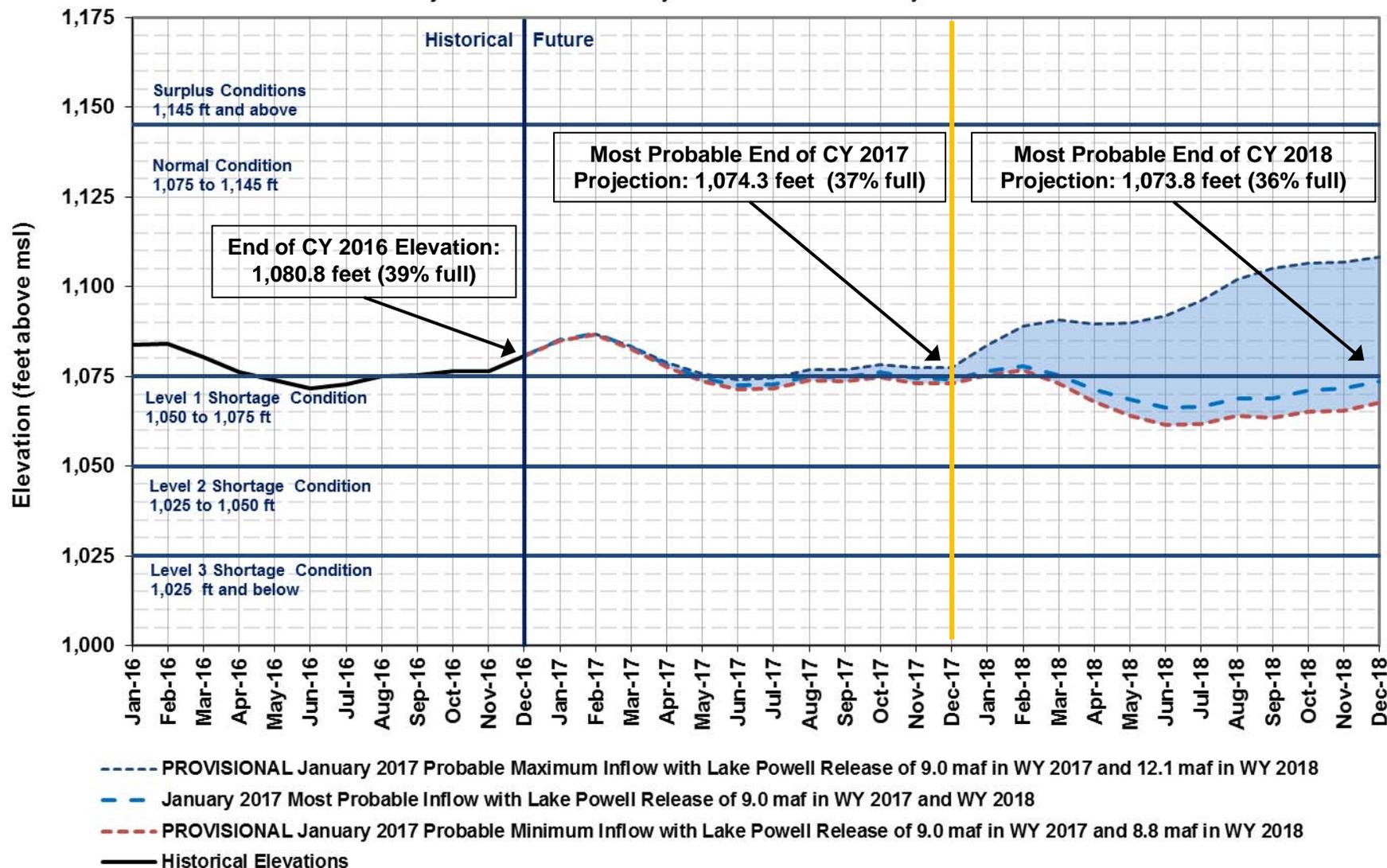
Lake Powell End of Month Elevations

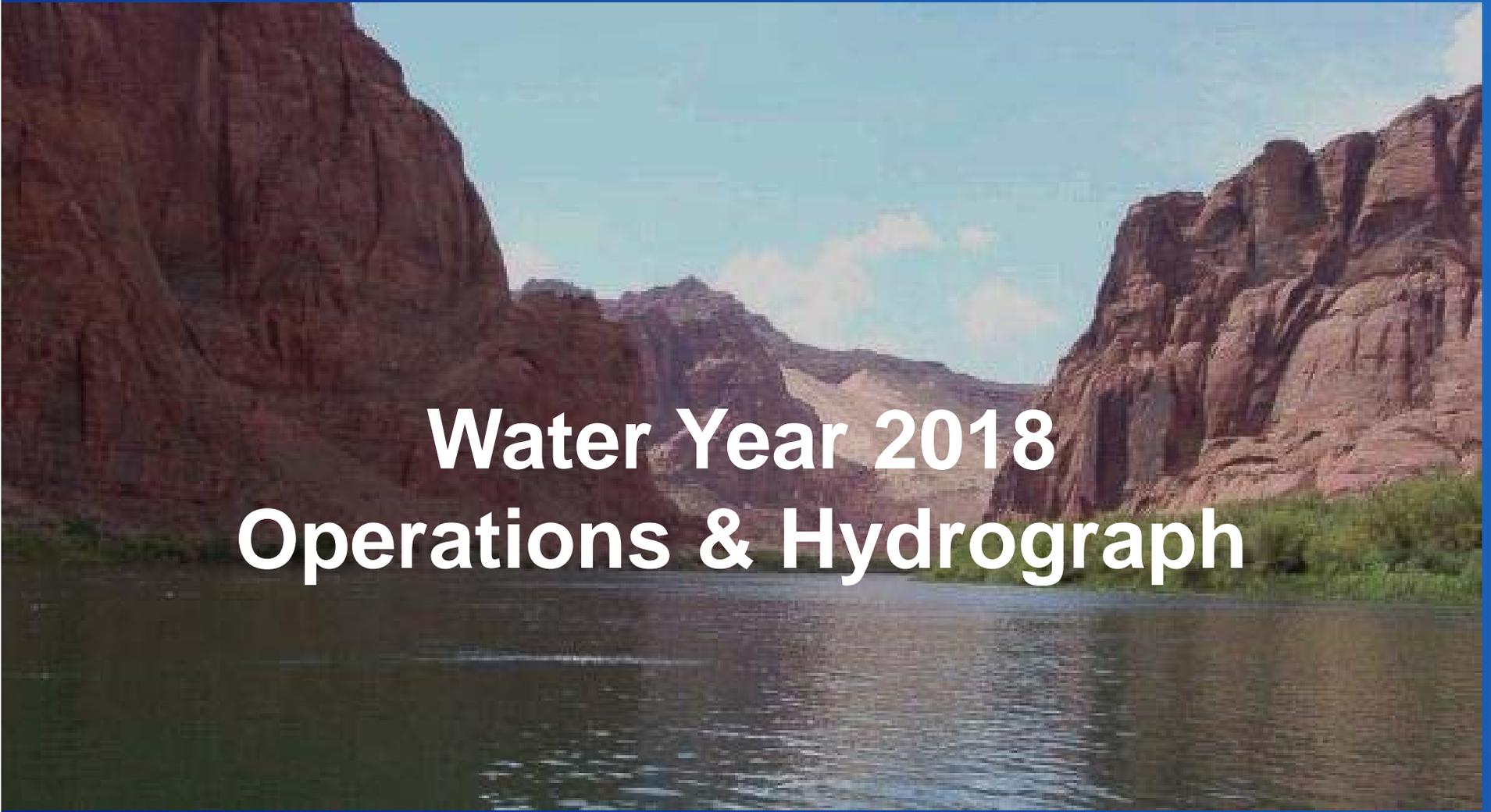
Historic and Projected based on January 2017 Modeling



Lake Mead End of Month Elevations

Projections from January 2017 24-Month Study Inflow Scenarios





Water Year 2018 Operations & Hydrograph

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Glen Canyon Power Plant Planned Unit Outage Schedule for Water Year 2018

Unit Number	Oct 2017	Nov 2017	Dec 2017	Jan 2018	Feb 2018	Mar 2018	Apr 2018	May 2018	Jun 2018	Jul 2018	Aug 2018	Sep 2018	
1		Possible HFE											
2													
3													
4													
5													
6													
7													
8													
Units Available	7	7/5	5	5	5	5	7	7/8	8	8	8	6	
Capacity (cfs)	23,400	16,100	16,000	16,000	16,000	16,000	23,400	27,000	27,000	27,000	27,000	19,800	
Capacity (kaf/month)	1,440	1,220	1,010	980	890	1,000	1,390	1,590	1,660	1,660	1,660	1,240	
Max (kaf) ¹	640	640	720	1,230	1,080	1,150	1,020	1,020	1,100	1,200	1,300	966	12.1
Most (kaf) ²	640	640	720	860	760	800	710	710	750	840	900	670	9.0
Min (kaf) ¹	640	740	720	860	760	710	640	640	750	850	900	680	8.8

¹ Projected release, based on Jan 2017 Min and Max Probable Inflow Projections and 24-Month Study model runs

² Projected release, based on Jan 2017 Most Probable Inflow Projections and 24-Month Study model runs

(updated 1-26-2017)

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LTEMP Monthly Release Volumes 2018

Month	7.00	7.48	8.23	9.00	9.50	10.50	11.00	12.00	13.00	14.00
OCT	480	480	640	640	640	640	640	640	640	640
NOV	500	500	640	640	640	640	640	640	640	640
DEC	600	600	720	720	720	720	720	720	720	720
JAN	660	720	760	860	920	1040	1100	1230	1350	1470
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Questions?

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Resource Management Division
Water Resources Group

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