RECLAMATION

Managing Water in the West

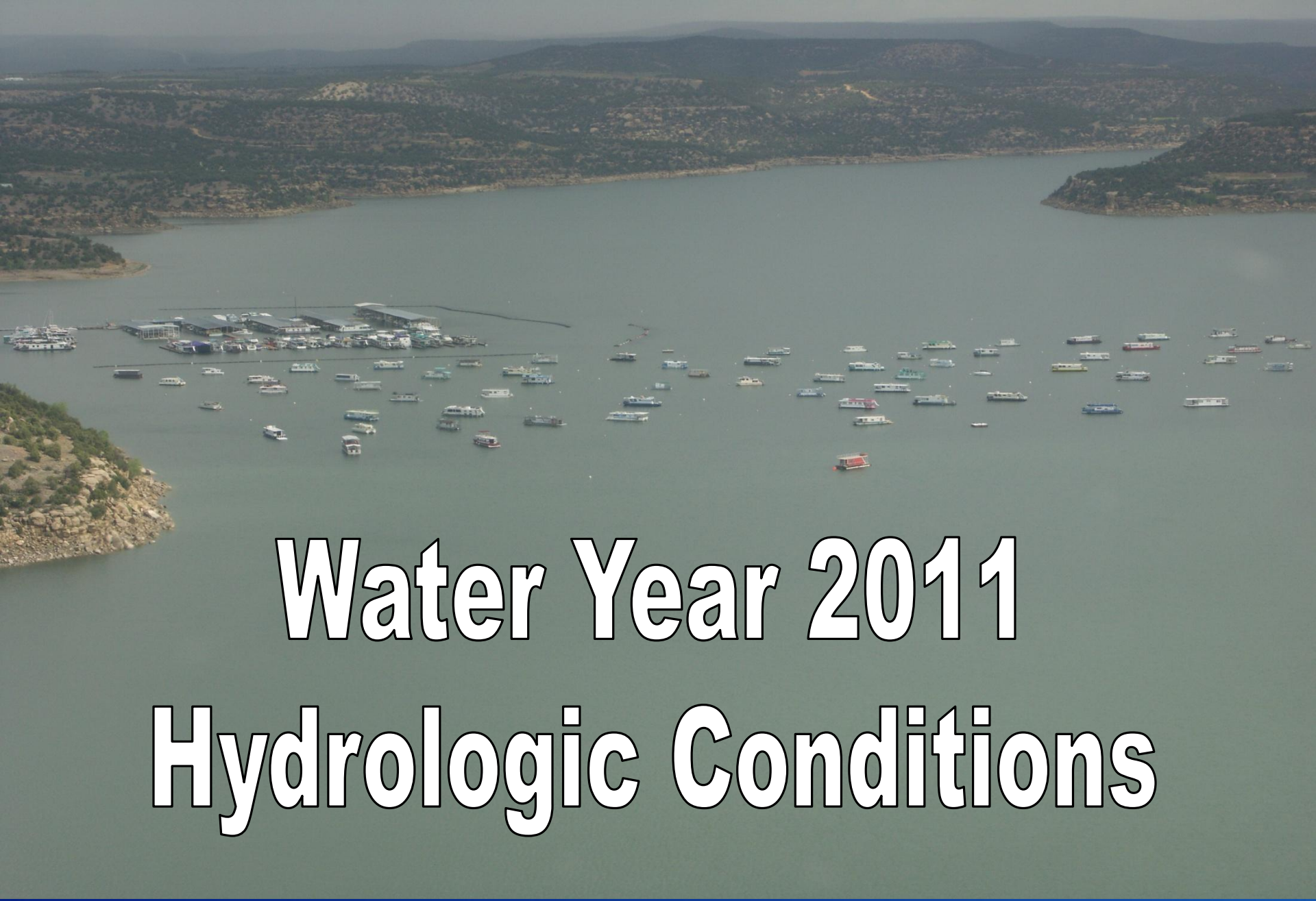
Navajo Unit Operations
August 30, 2011
Coordination Meeting

U.S. Department of the Interior
Bureau of Reclamation

Agenda

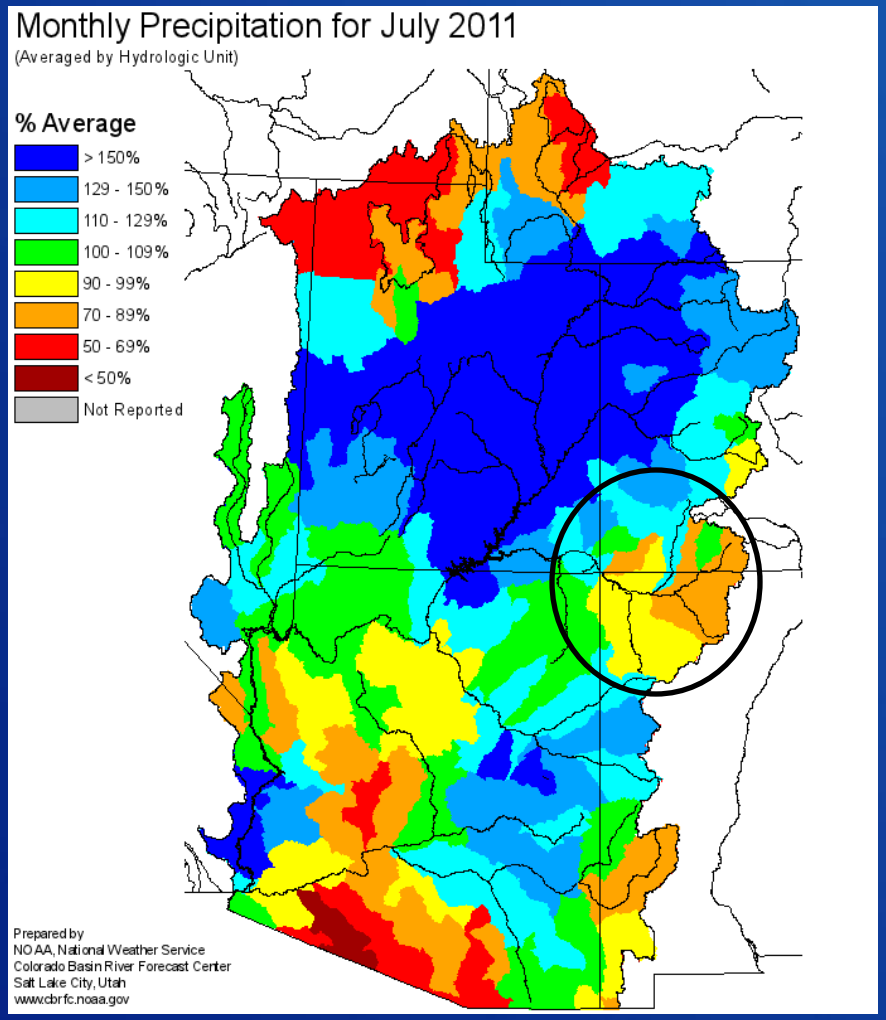
- Welcome
- Water Year 2011 Hydrologic Conditions
- Review of Water Year 2011 Operations
- Current Conditions
- Water Year 2012 Forecasts and Proposed Operations
- Navajo Dam Maintenance Activities
- Fish & Wildlife Service/San Juan RIP Update
- Reports from other Agencies
- Close

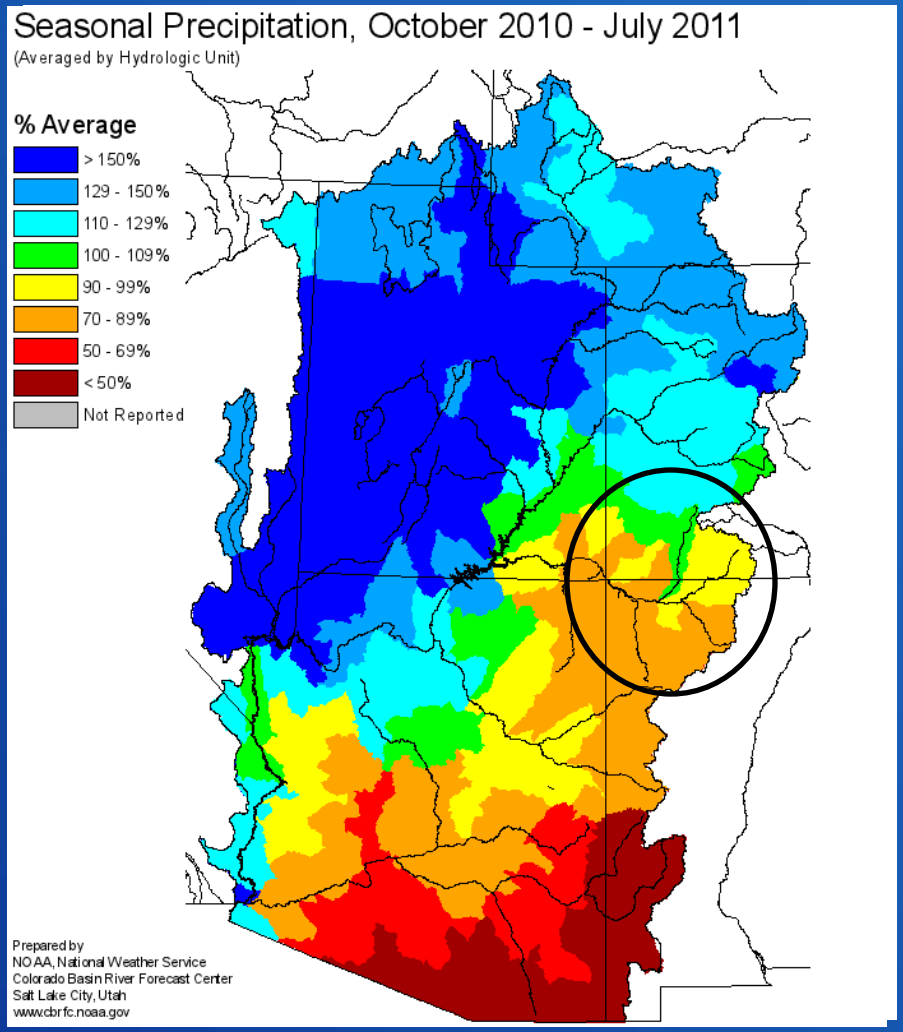
RECLAMATION



Water Year 2011 Hydrologic Conditions

RECLAMATION





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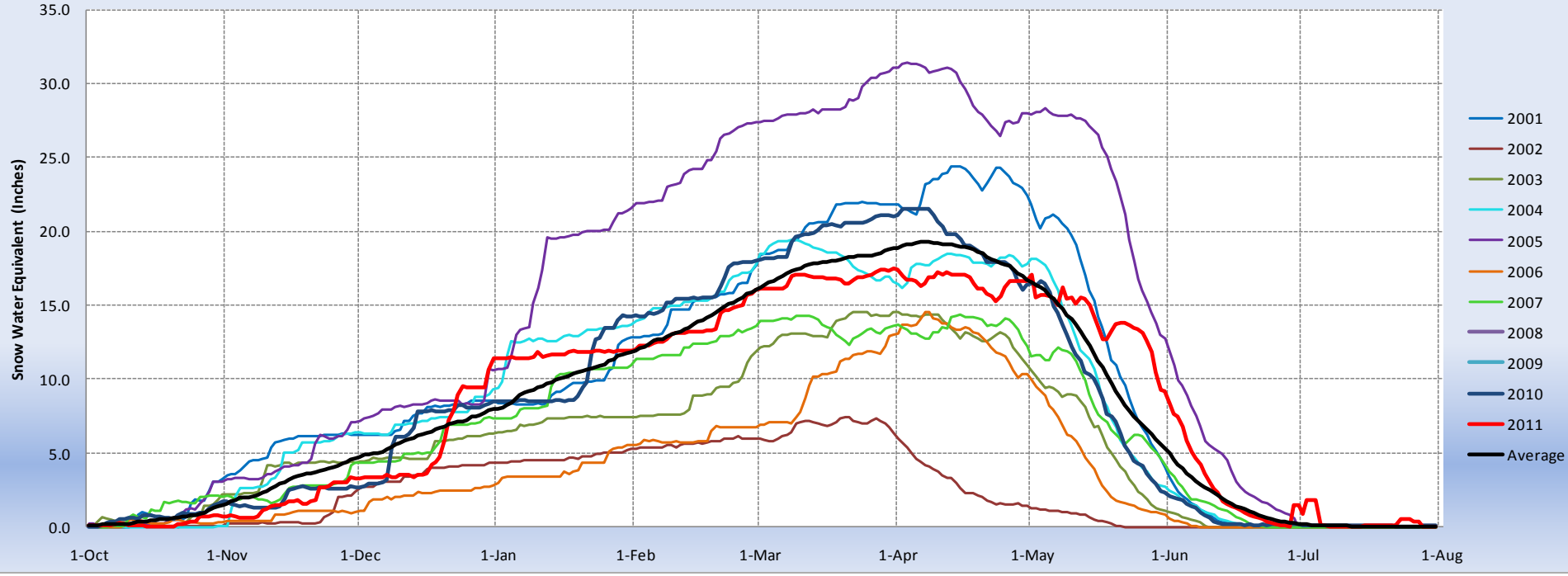
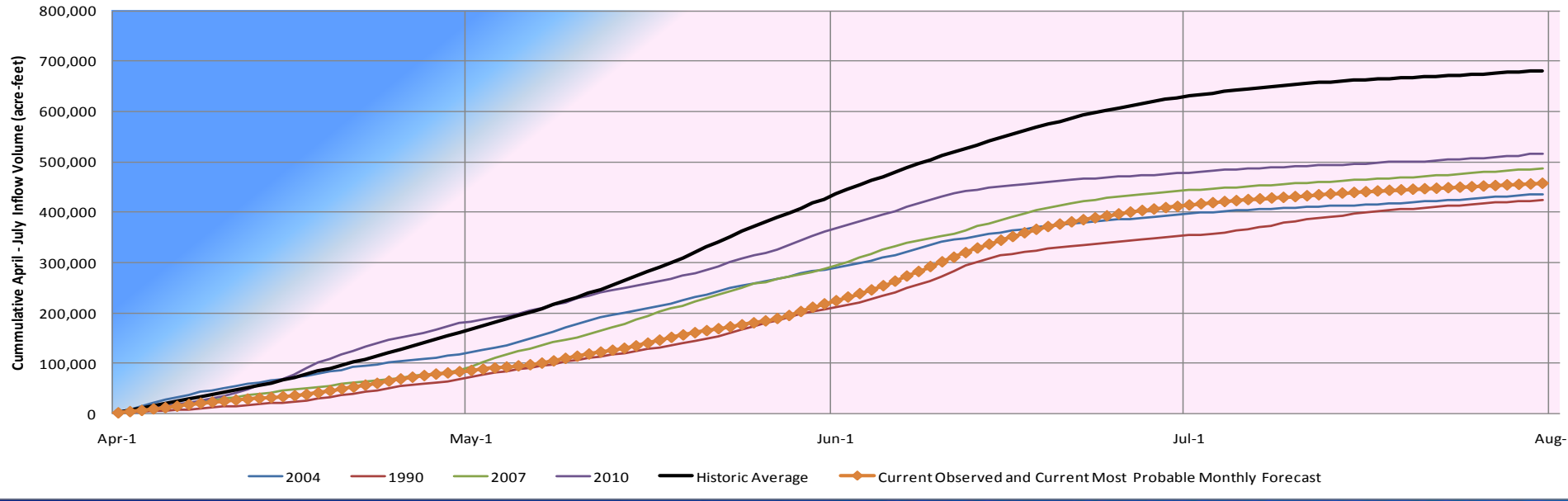
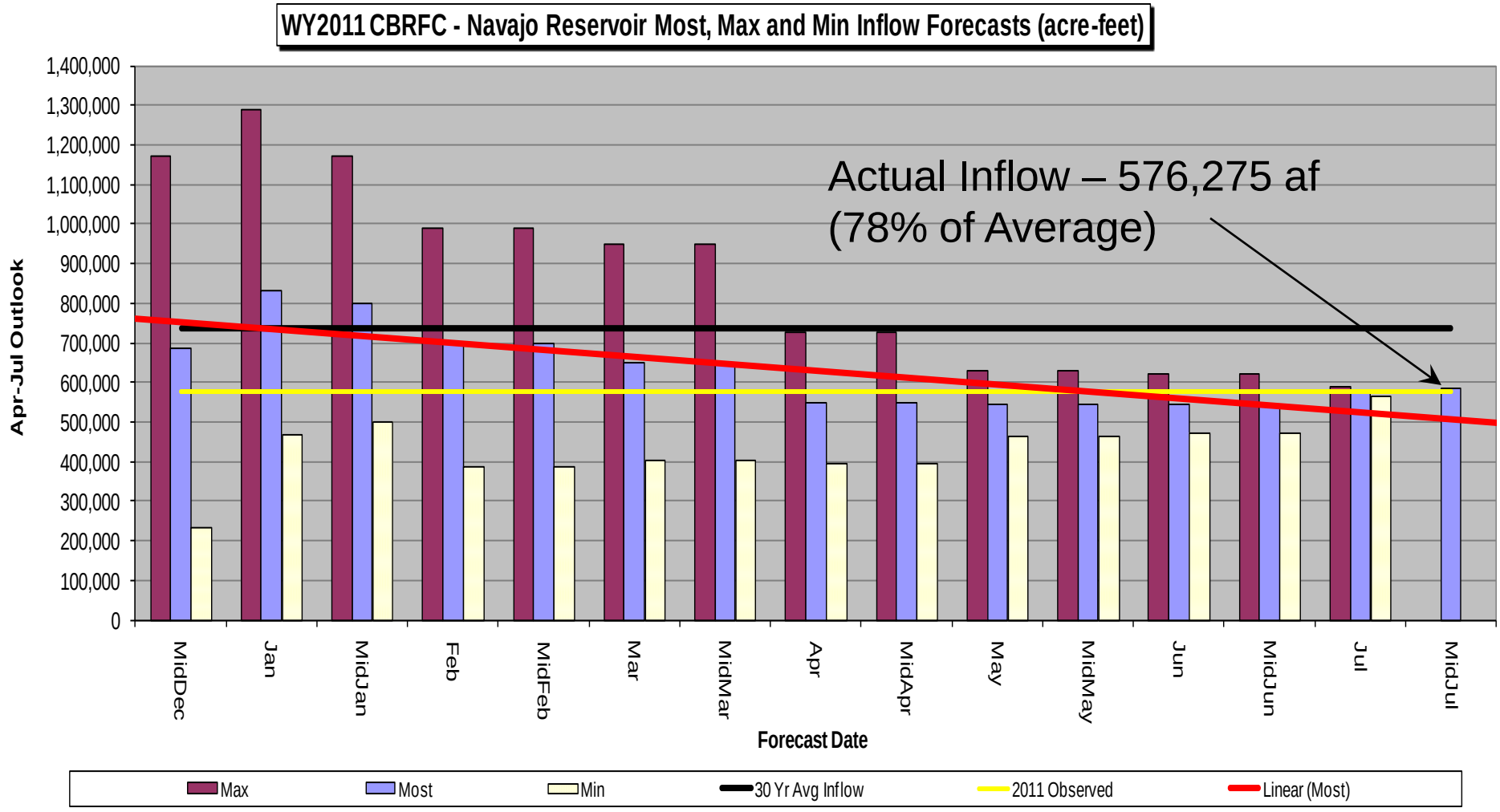
Navajo Reservoir SNOTEL SWE from 2001-2011



Cummulative April - July Observed Inflow of Representative SWE Years





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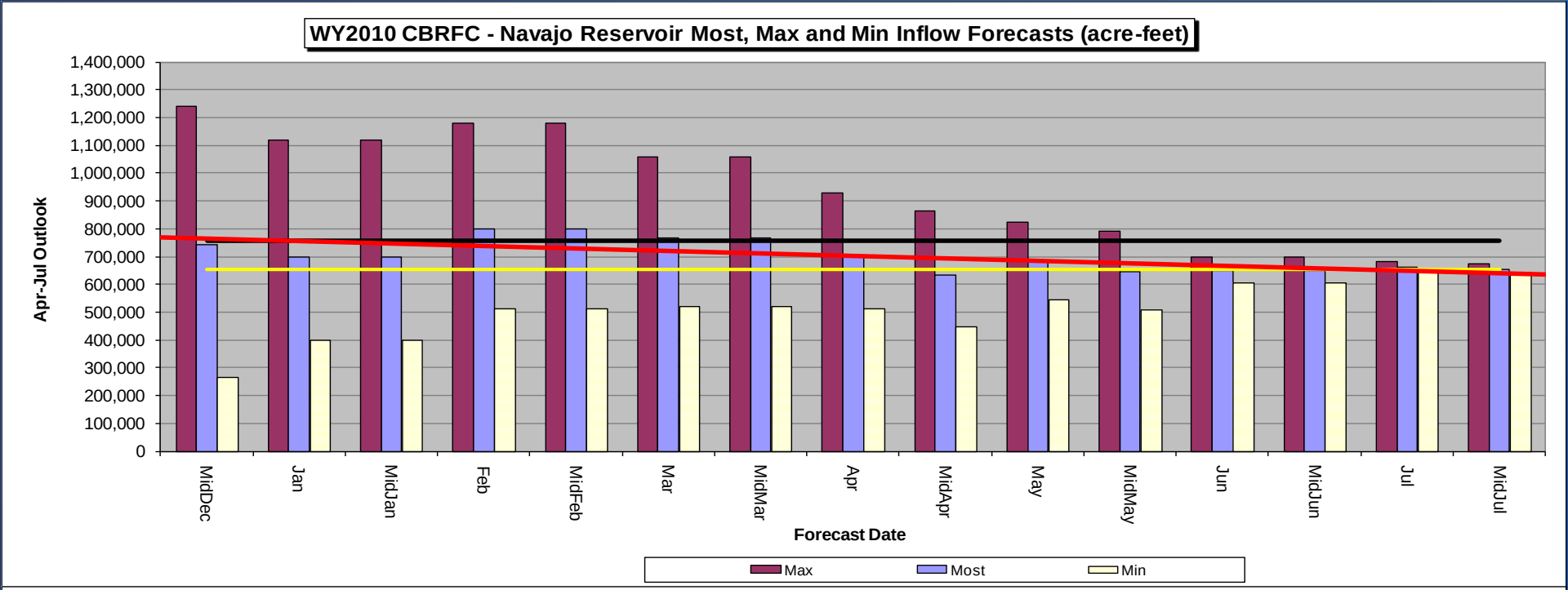
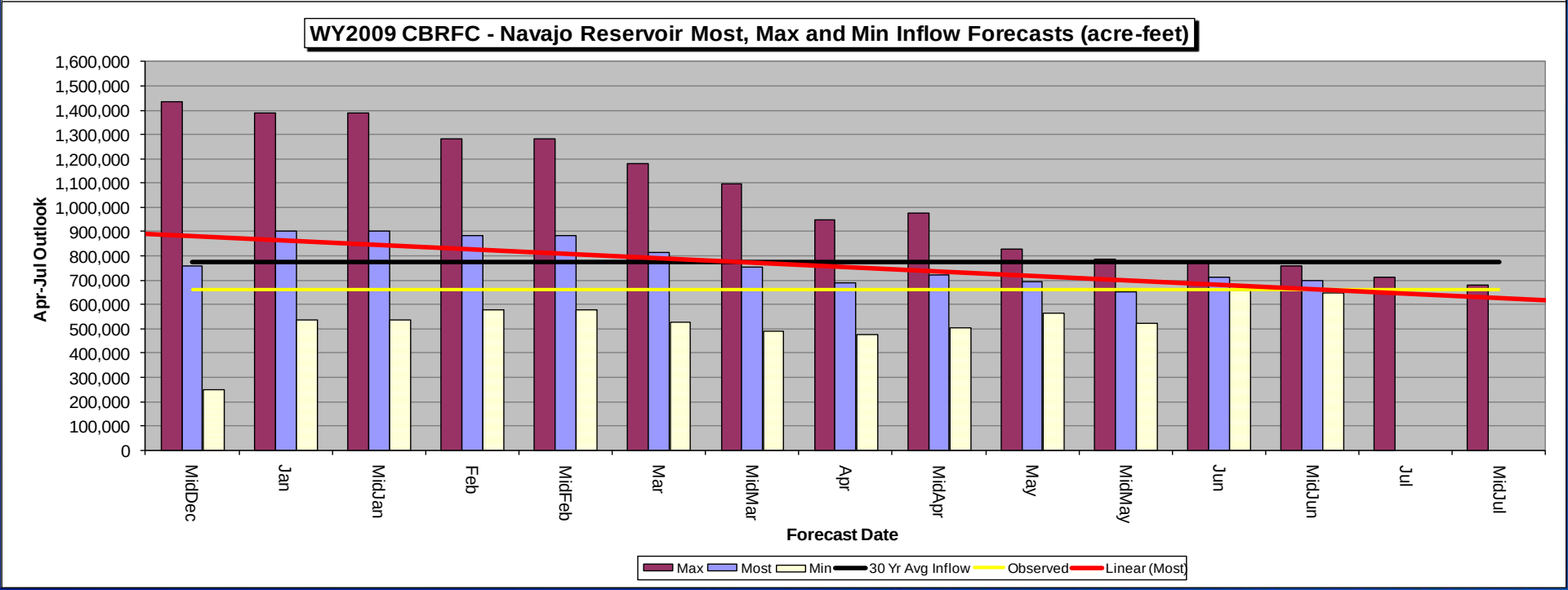
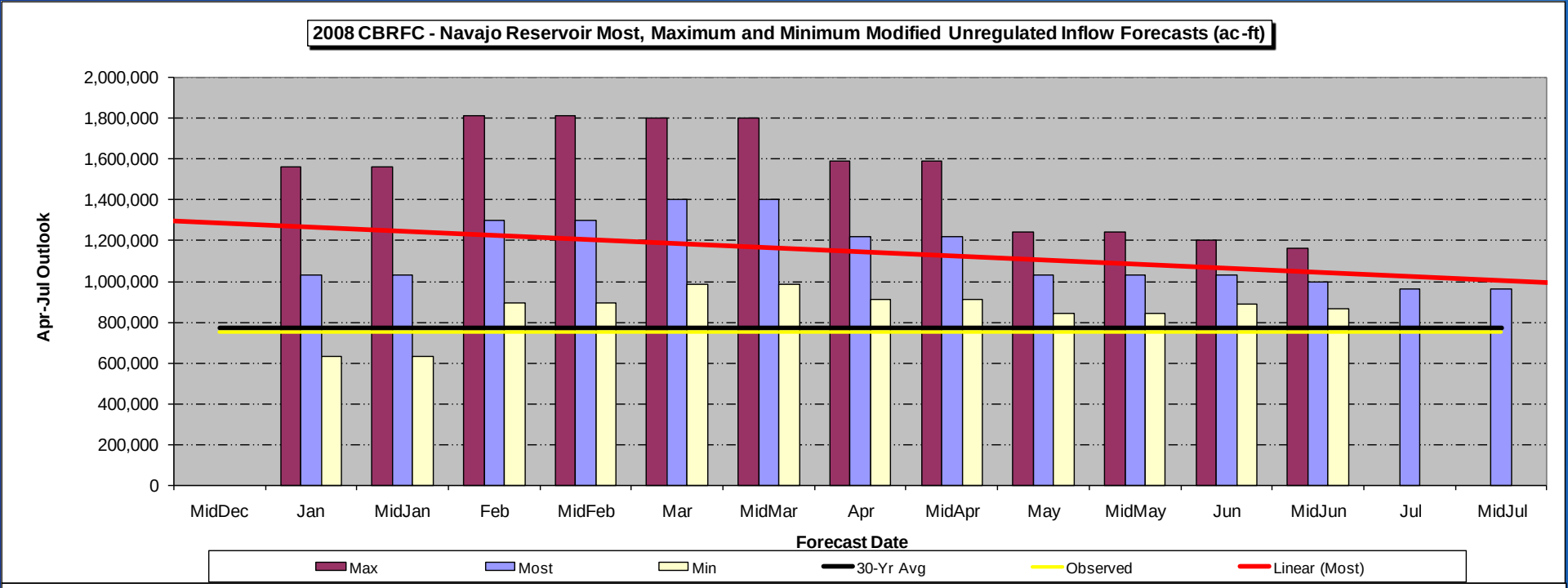
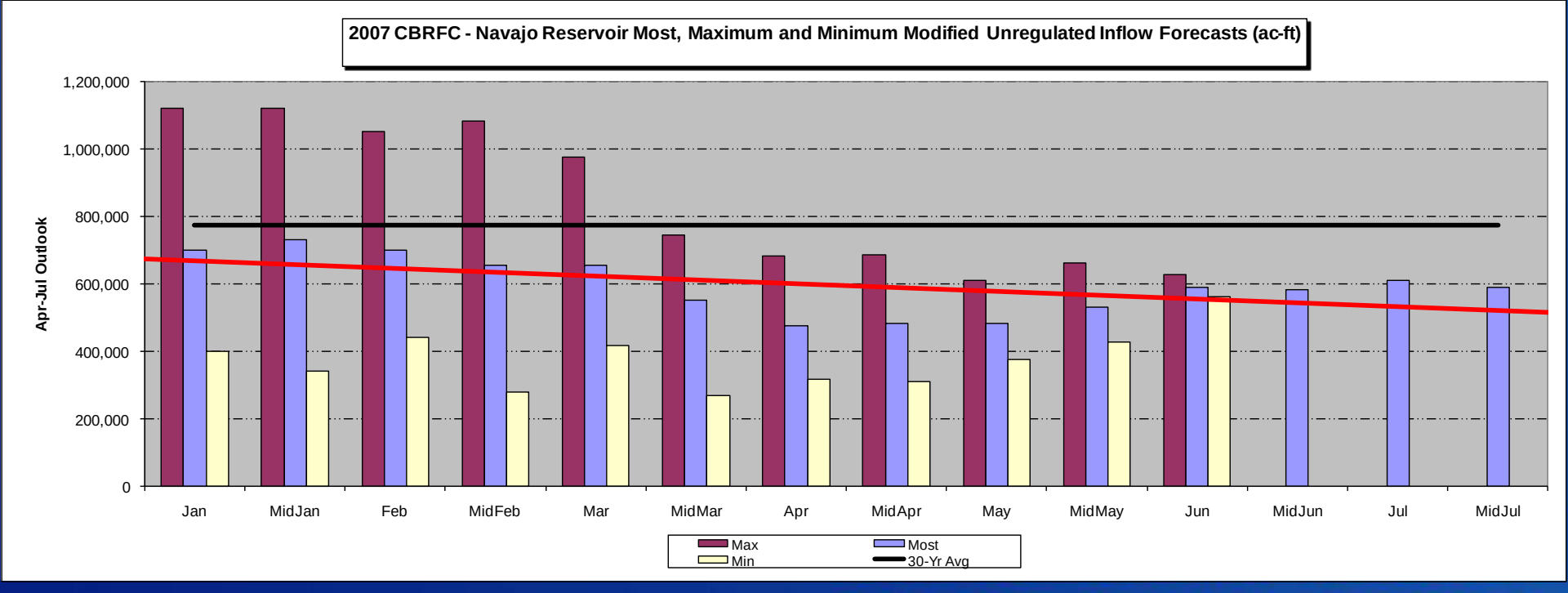
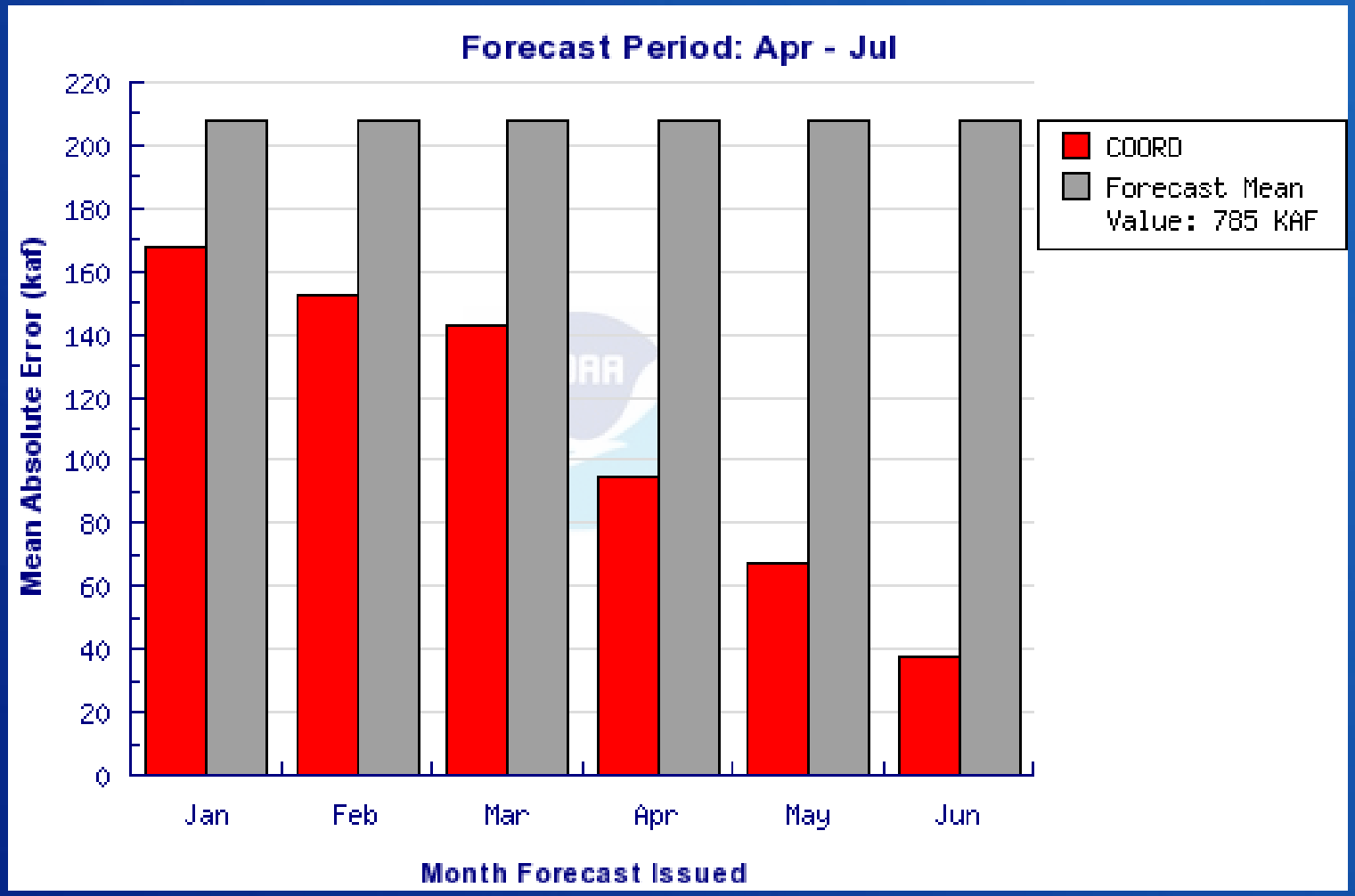

WY2010 CBRFC - Navajo Reservoir Most, Max and Min Inflow Forecasts (acre-feet)
Apr-Jul Outlook
1,400,000
1,300,000
1,200,000
1,100,000
1,000,000
900,000
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
MidDec
Jan
MidJan
Feb
MidFeb
Mar
MidMar
Apr
MidApr
May
MidMay
Jun
MidJun
Jul
MidJul
Forecast Date
Max
Most
Min


WY2009 CBRFC - Navajo Reservoir Most, Max and Min Inflow Forecasts (acre-feet)
Apr-Jul Outlook
1,600,000
1,500,000
1,400,000
1,300,000
1,200,000
1,100,000
1,000,000
900,000
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
MidDec
Jan
MidJan
Feb
MidFeb
Mar
MidMar
Apr
MidApr
May
MidMay
Jun
MidJun
Jul
MidJul
Forecast Date
Max
Most
Min
30 Yr Avg Inflow
Observed
Linear (Most)


2008 CBRFC - Navajo Reservoir Most, Maximum and Minimum Modified Unregulated Inflow Forecasts (ac-ft)
Apr-Jul Outlook
2,000,000
1,800,000
1,600,000
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
MidDec
Jan
MidJan
Feb
MidFeb
Mar
MidMar
Apr
MidApr
May
MidMay
Jun
MidJun
Jul
MidJul
Forecast Date
Max
Most
Min
30-Yr Avg
Observed
Linear (Most)


2007 CBRFC - Navajo Reservoir Most, Maximum and Minimum Modified Unregulated Inflow Forecasts (ac-ft)
Apr-Jul Outlook
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
Jan
MidJan
Feb
MidFeb
Mar
MidMar
Apr
MidApr
May
MidMay
Jun
MidJun
Jul
MidJul
Max
Most
Min
30-Yr Avg

April-July Inflow Volume Coordinated Forecast Error Summary (1991-2011)



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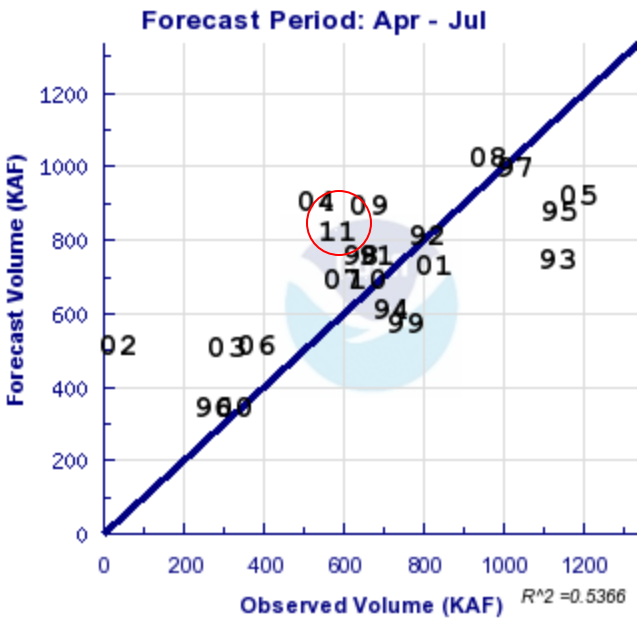
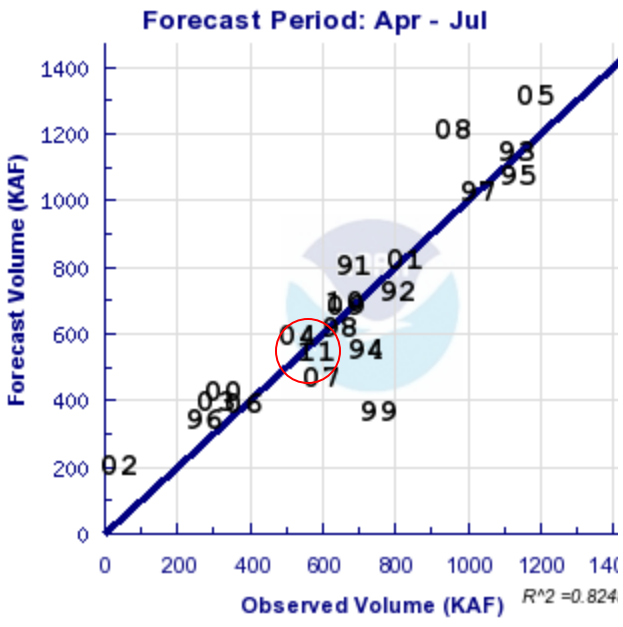
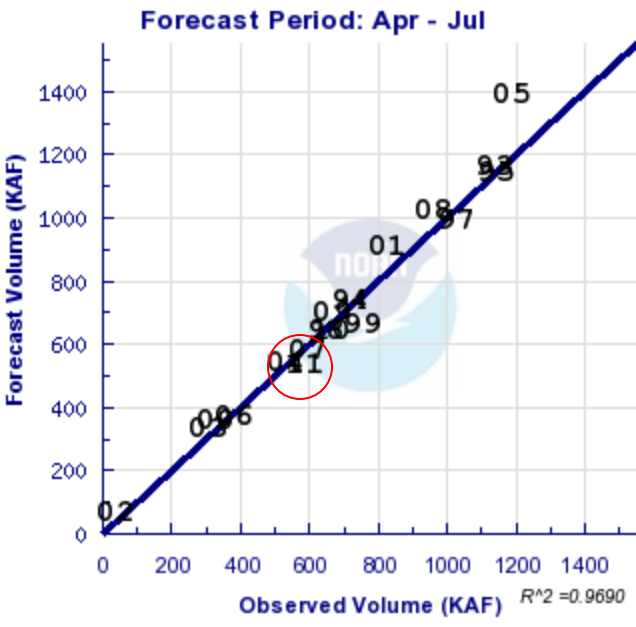
April – July Inflow Volume Coordinated Forecast Verification Scatterplot (1991-2011)



January Coordinated Forecast

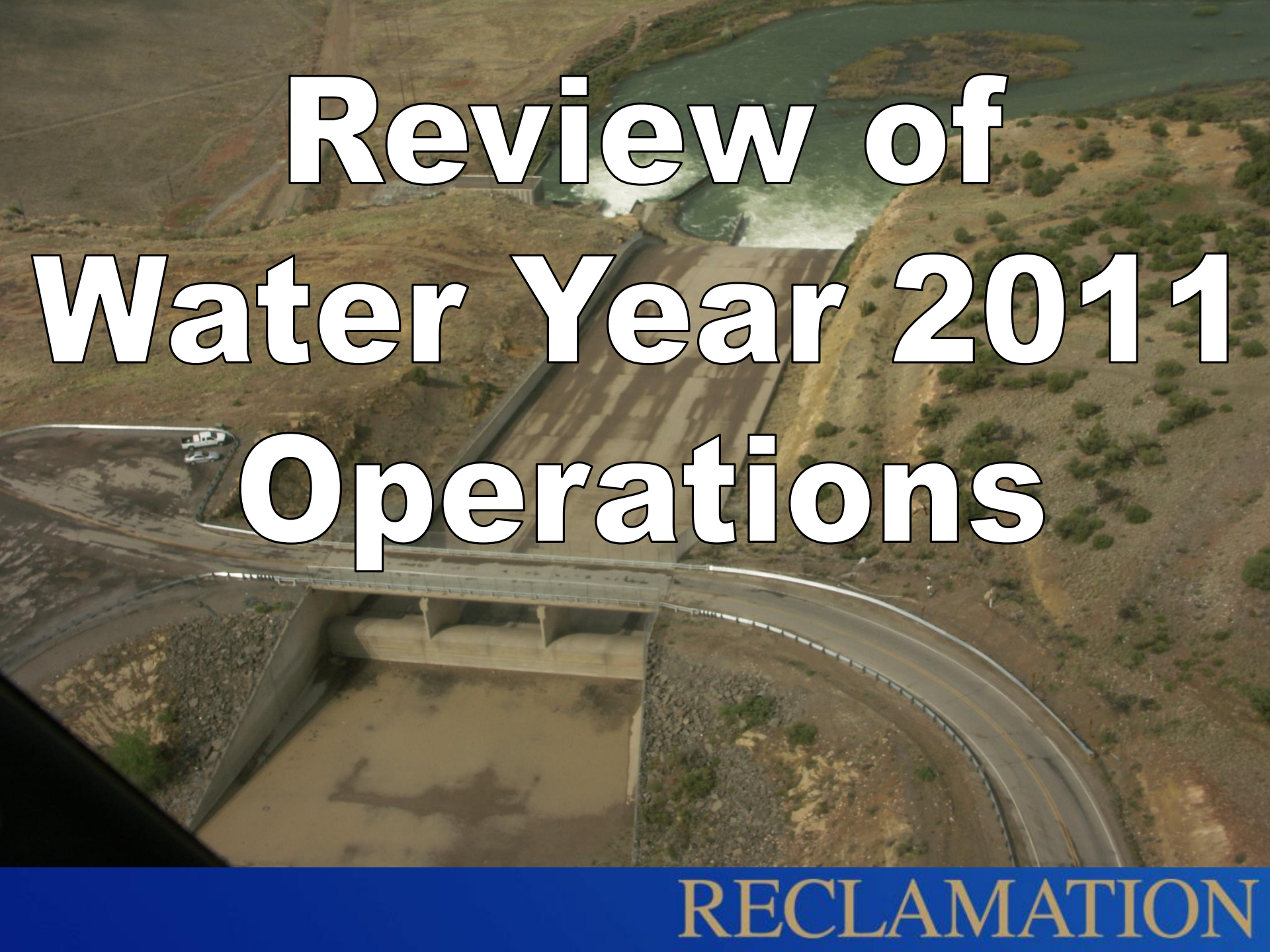


April Coordinated Forecast

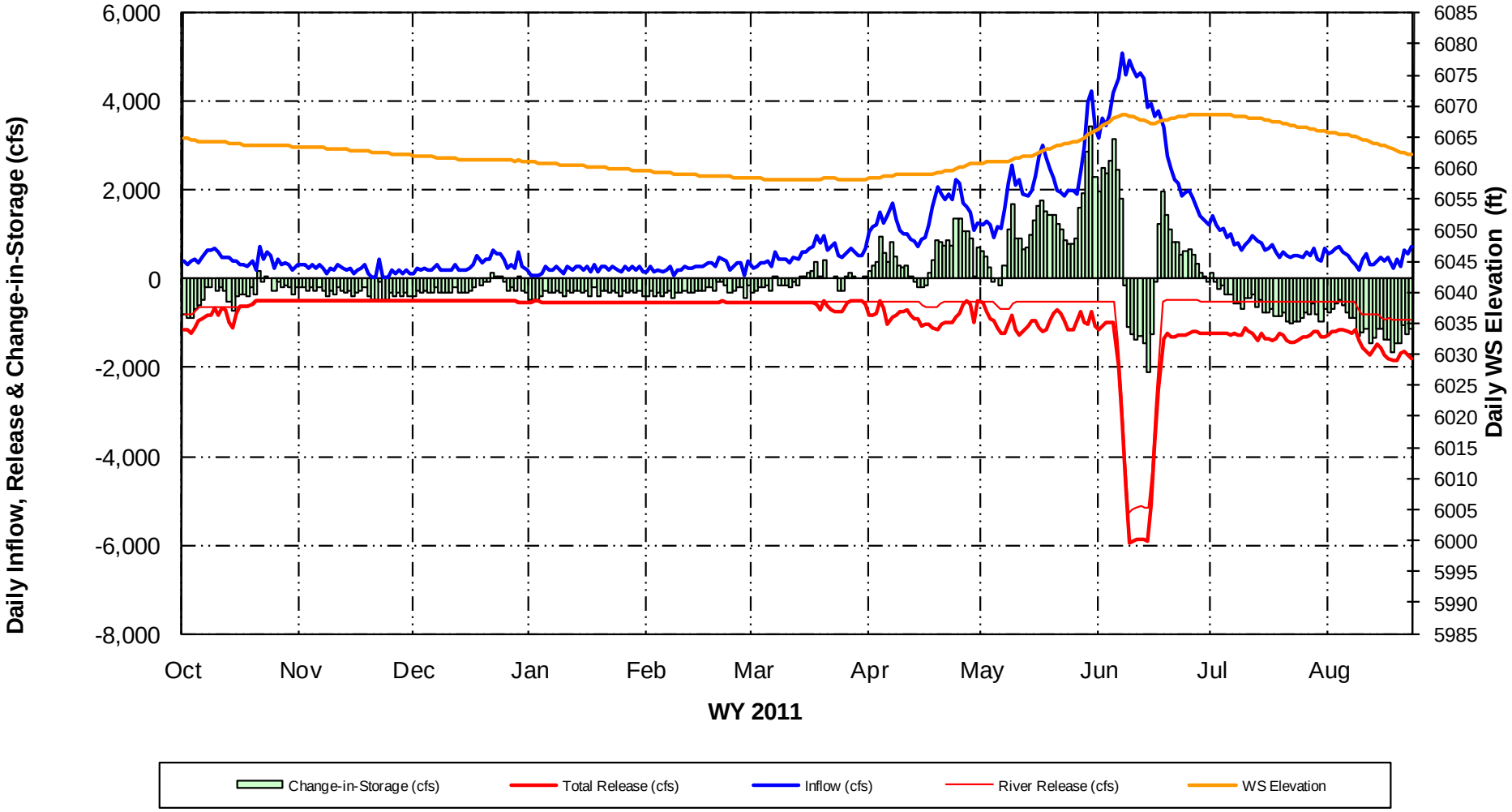


June Coordinated Forecast

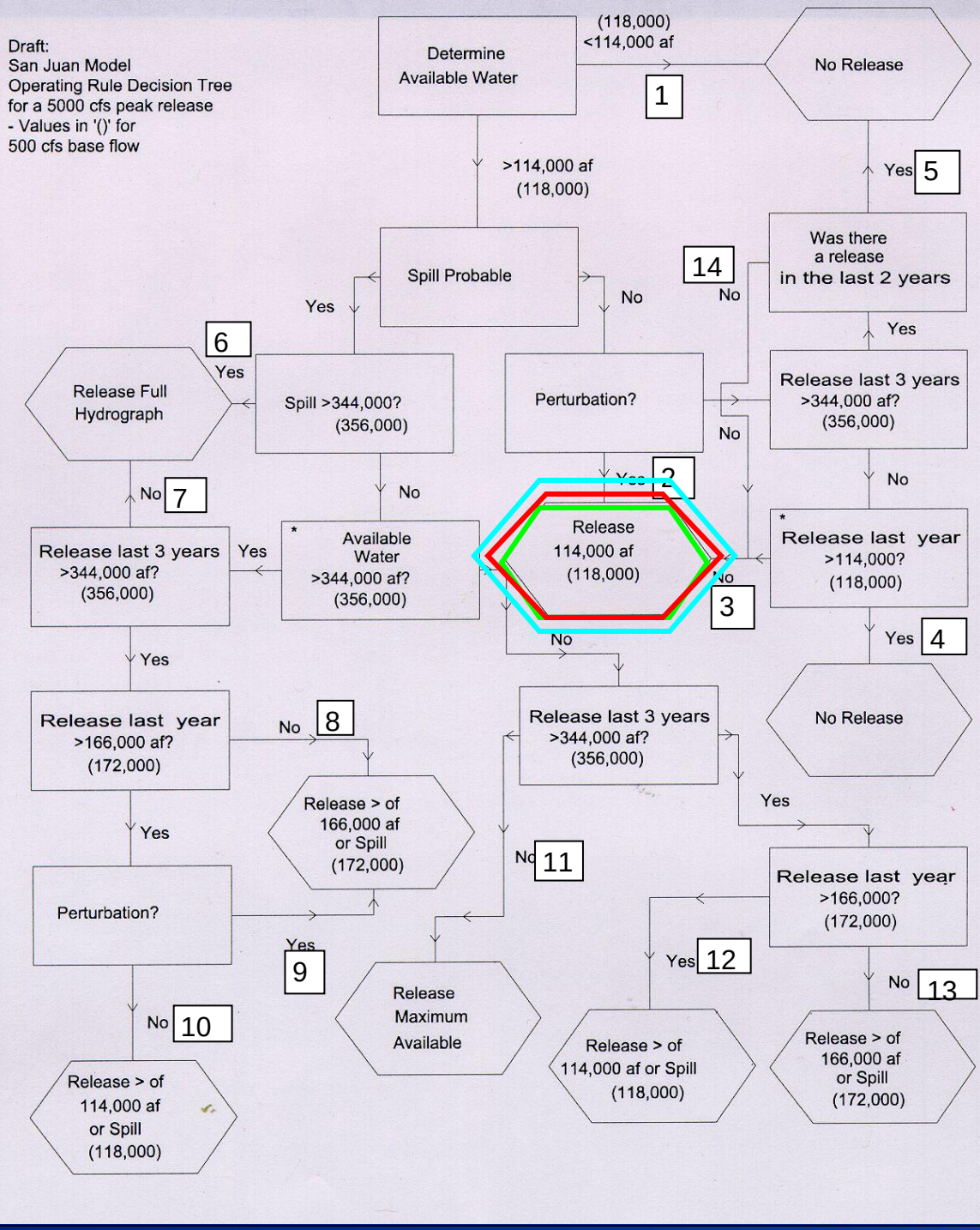
RECLAMATION


Review of
Water Year 2011
Operations
RECLAMATION

NAVAJO RESERVOIR OPERATIONS



RECLAMATION



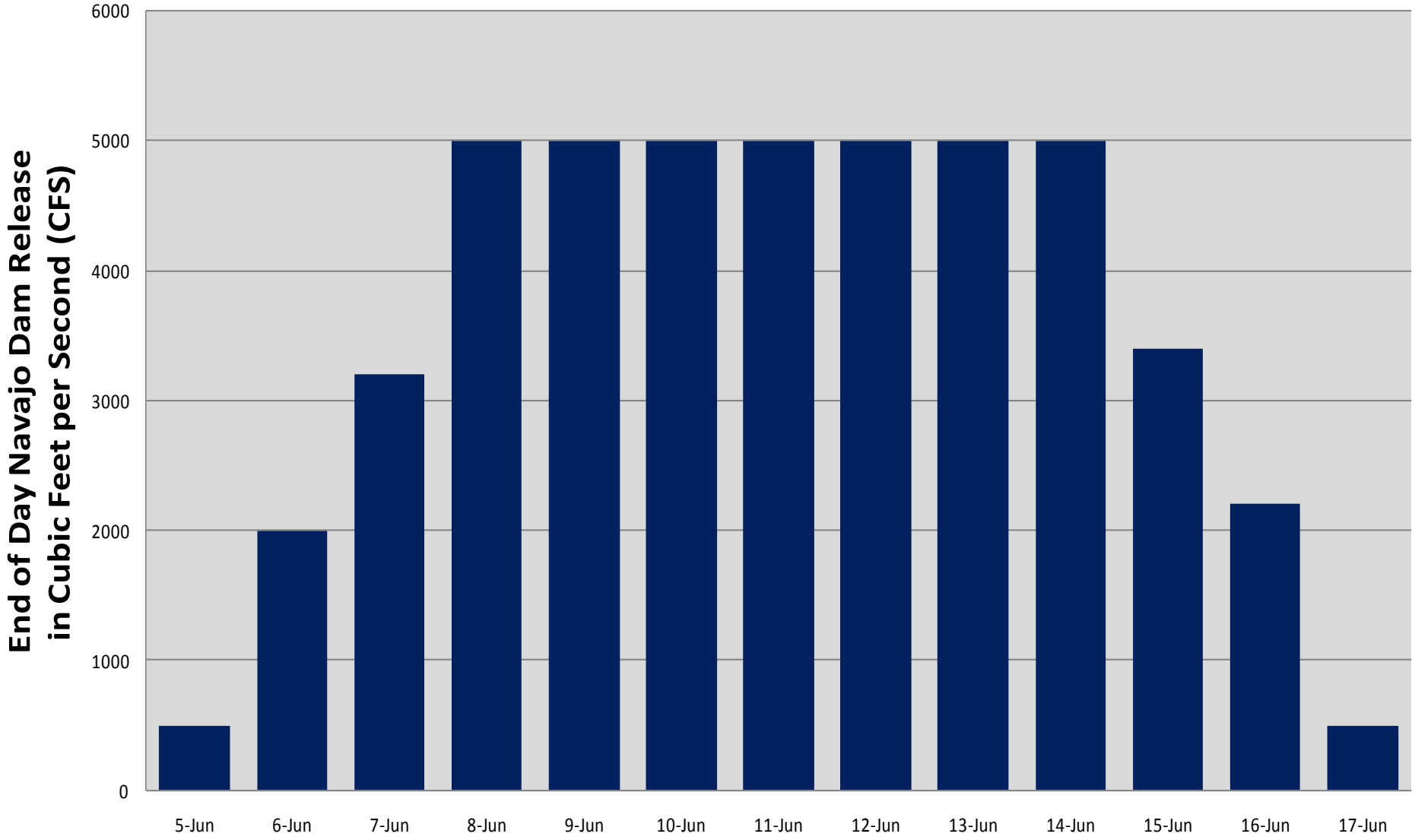
AVAILABLE WATER (April) PATH

Min Prob:	**376,960 af**	**#2**
Most Prob:	**500,429 af**	**#2**
Max Prob:	**643,061 af**	**#2**

MATION

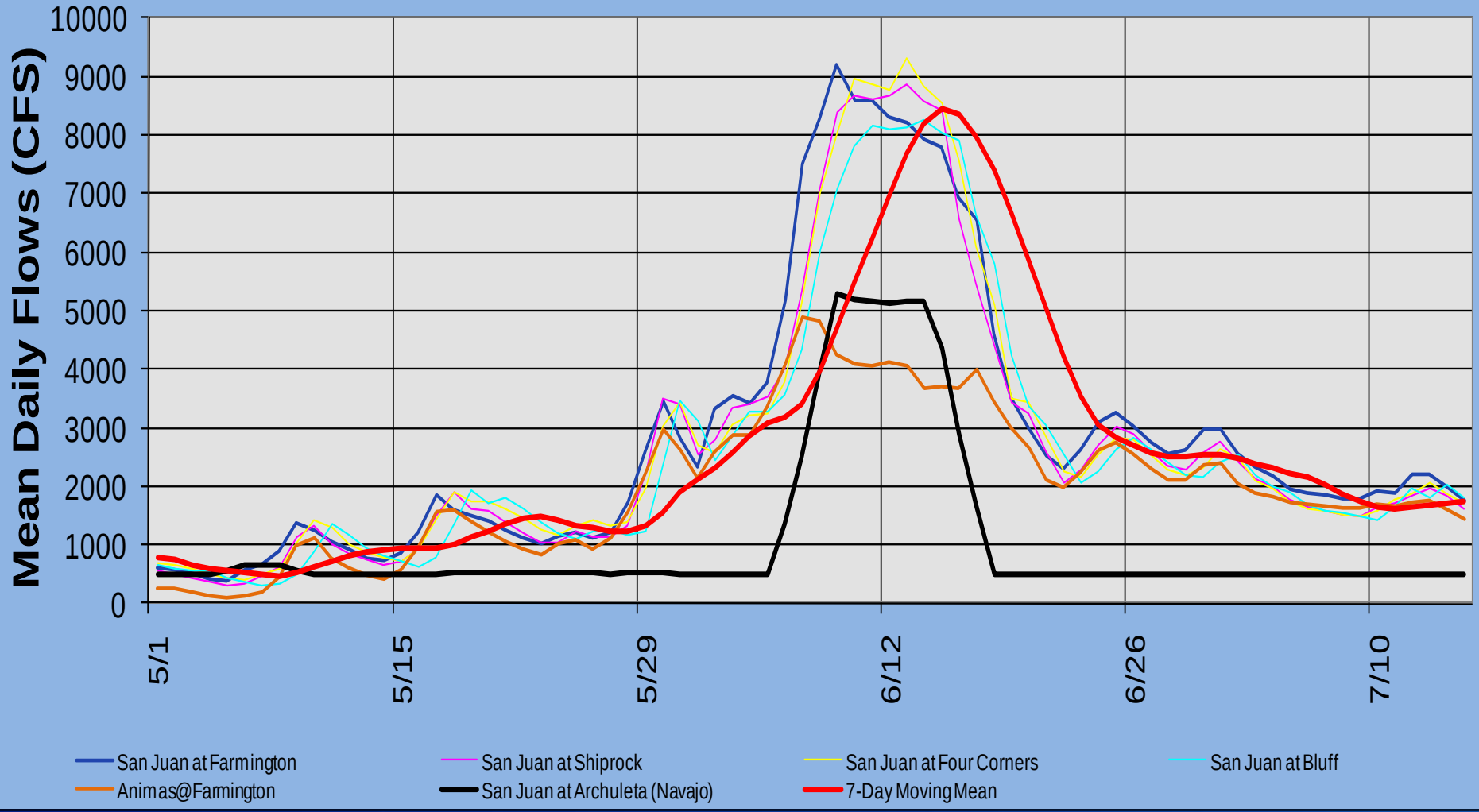
Navajo Reservoir 2011 Spring Peak Release Schedule

(Final)



	5-Jun	6-Jun	7-Jun	8-Jun	9-Jun	10-Jun	11-Jun	12-Jun	13-Jun	14-Jun	15-Jun	16-Jun	17-Jun
Release (CFS)	500	2000	3200	5000	5000	5000	5000	5000	5000	5000	3400	2200	500

USGS Mean Daily Streamflows - San Juan and Animas River Stations



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SJRIP Spring Peak Flow Goals

Critical Habitat Gages	>10,000 cfs for 5-days Req. Frequency – 20%	>8000 cfs for 10-days Req. Frequency – 33%	>5000 cfs for 21-days Req. Frequency – 50%	>2500 cfs for 10-days Req. Frequency – 80%
San Juan River @ 4 Corners	0	7	12	28

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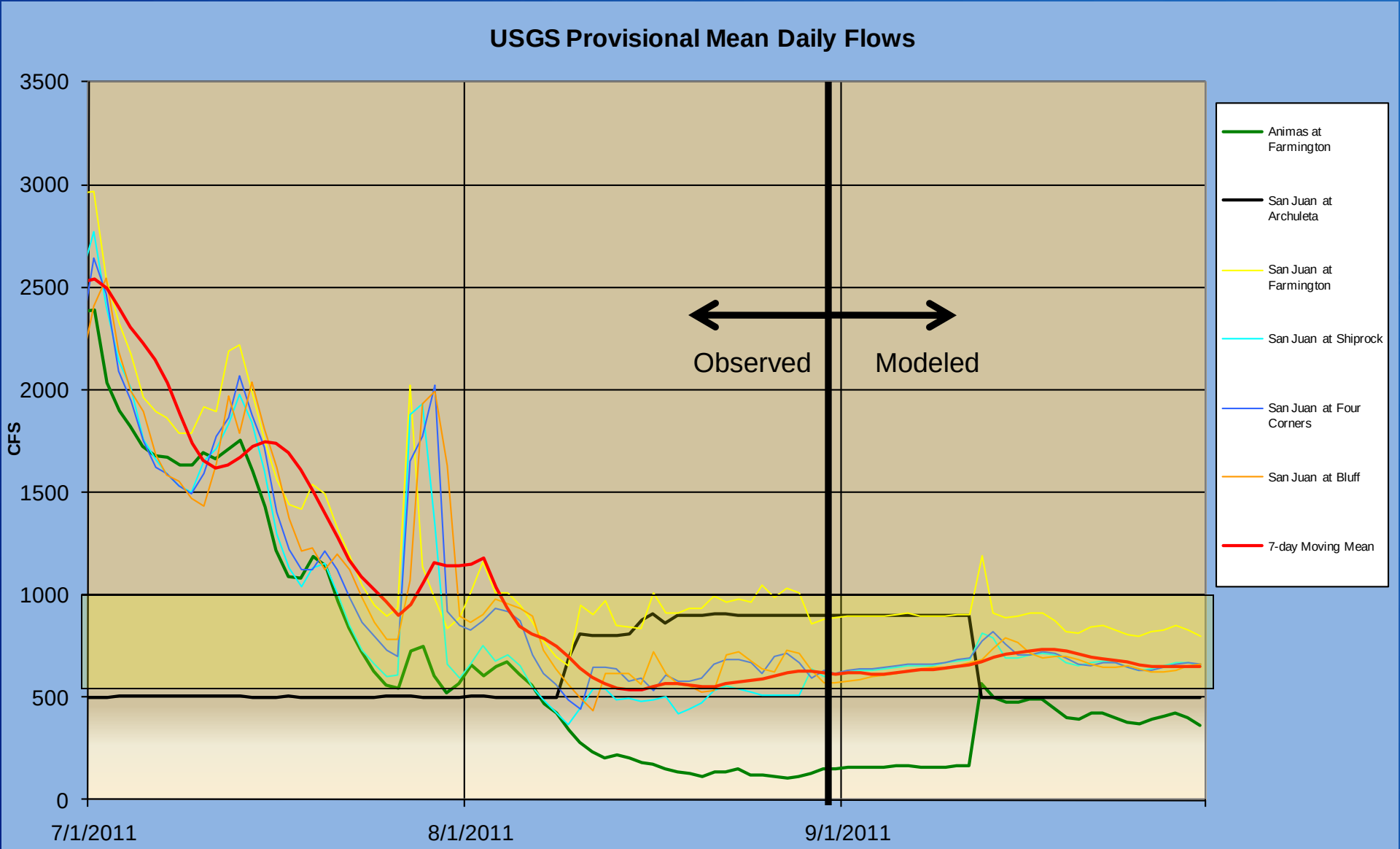
Chasing the Target Baseflow

- Temporary (5-day) increase to 650 cfs was required in April due to late runoff and dry conditions
- Base releases remained at 500 cfs until August 9th
- Late runoff kept the river within Target Base Flow range without additional releases later than usual
- Increased release to 800 cfs on August 9th, up to 900 cfs on August 17th
- Continue to monitor flow in the Critical Habitat and make release adjustments as necessary



75% Exceedance Modeled Downstream Losses

68% Exceedance Observed, Last 10 days

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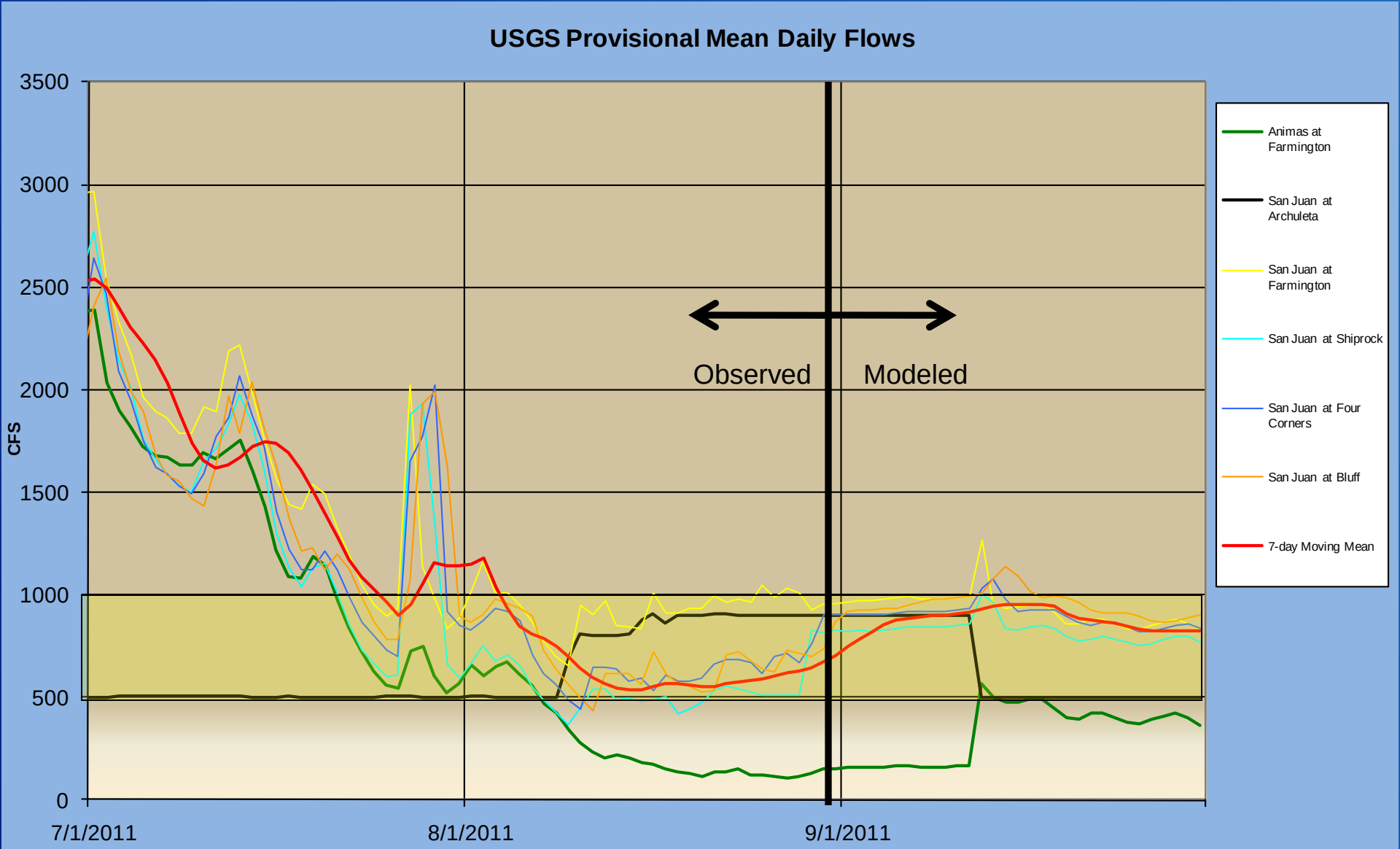

50% Exceedance Modeled Downstream Losses

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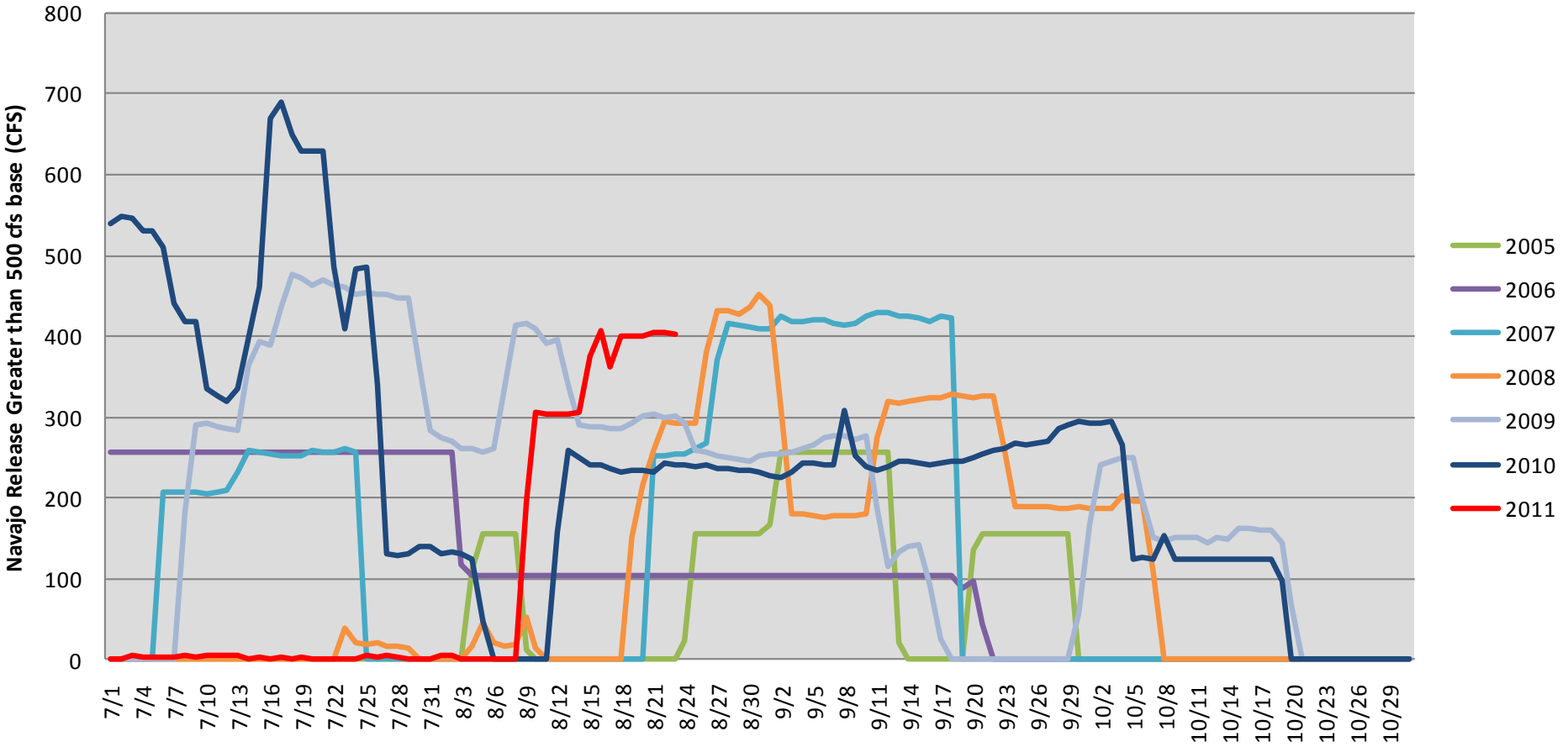
Supplemental Navajo Releases To Meet Downstream Target Base Flows (2005-2011)



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Current Conditions

Navajo Current Conditions

(as of 8/28/11)

Elevation = 6061.1 (97% of Average)

Storage = 1,362,353 af (80% Full)

Inflow = 508 cfs*

Release = 900 cfs

NIIP = 806 cfs*

San Juan-Chama Diversion = 33 cfs*

* Average of the last 7 days

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Nearby Reservoirs

(8/28/11)

Vallecito

- Elevation = 7648.45 (69% Full, 107% of average)
- Storage = 83,278 af
- Release = 595 cfs
- Inflow = 145 cfs*

Lemon

- Elevation = 8098.63 (41% Full, 67% of average)
- Storage = 15,252 af
- Release = 200 cfs
- Inflow = 26 cfs*

* Average of the last 7 days

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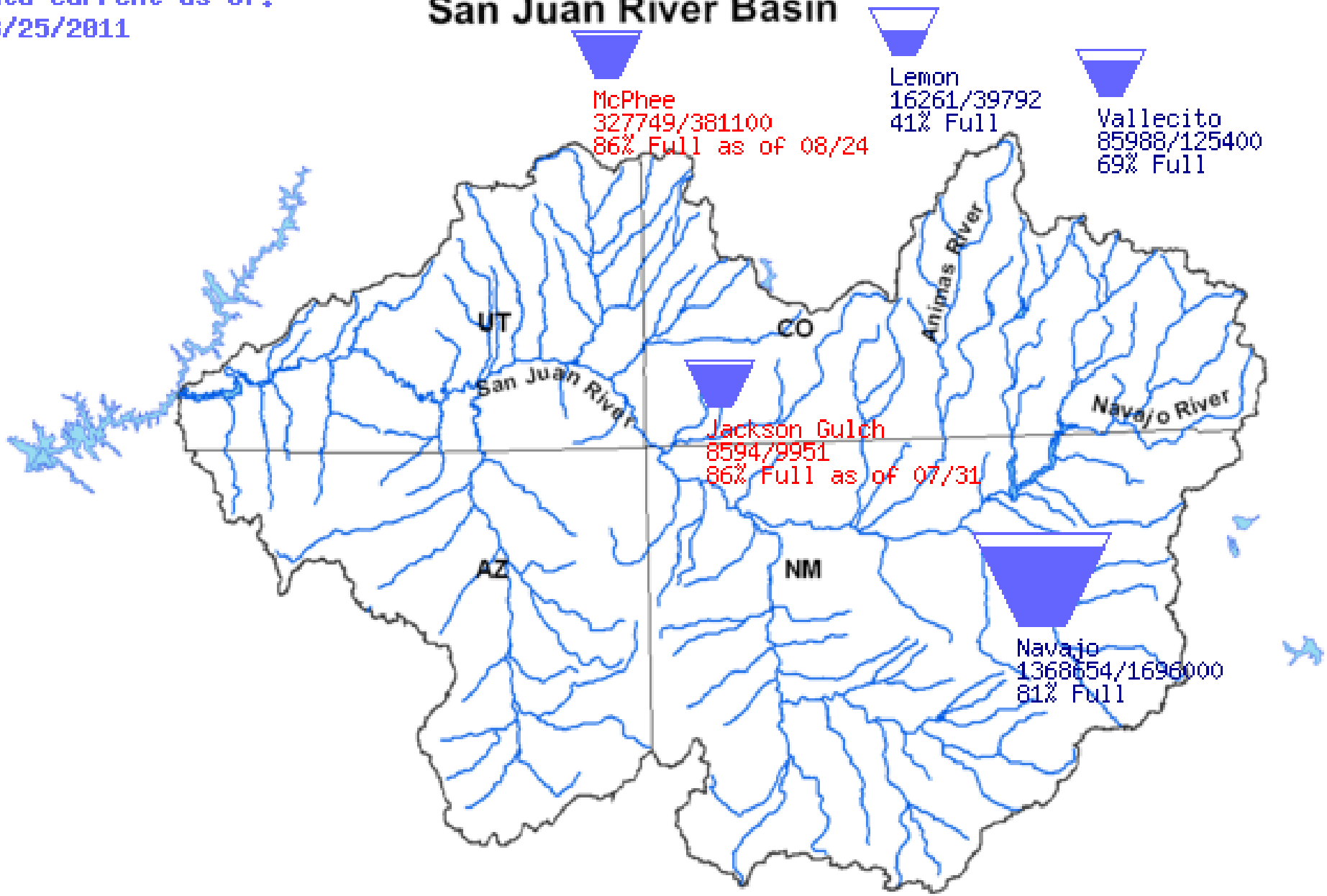
Data Current as of:
08/25/2011

San Juan River Basin



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Animas-La Plata Project

- Reservoir is full – 123,541 af stored
- No further pumping anticipated until transfer to ALP OM&R Association
- Navajo Nation Municipal Pipeline is currently under construction – completion expected in the spring 2012

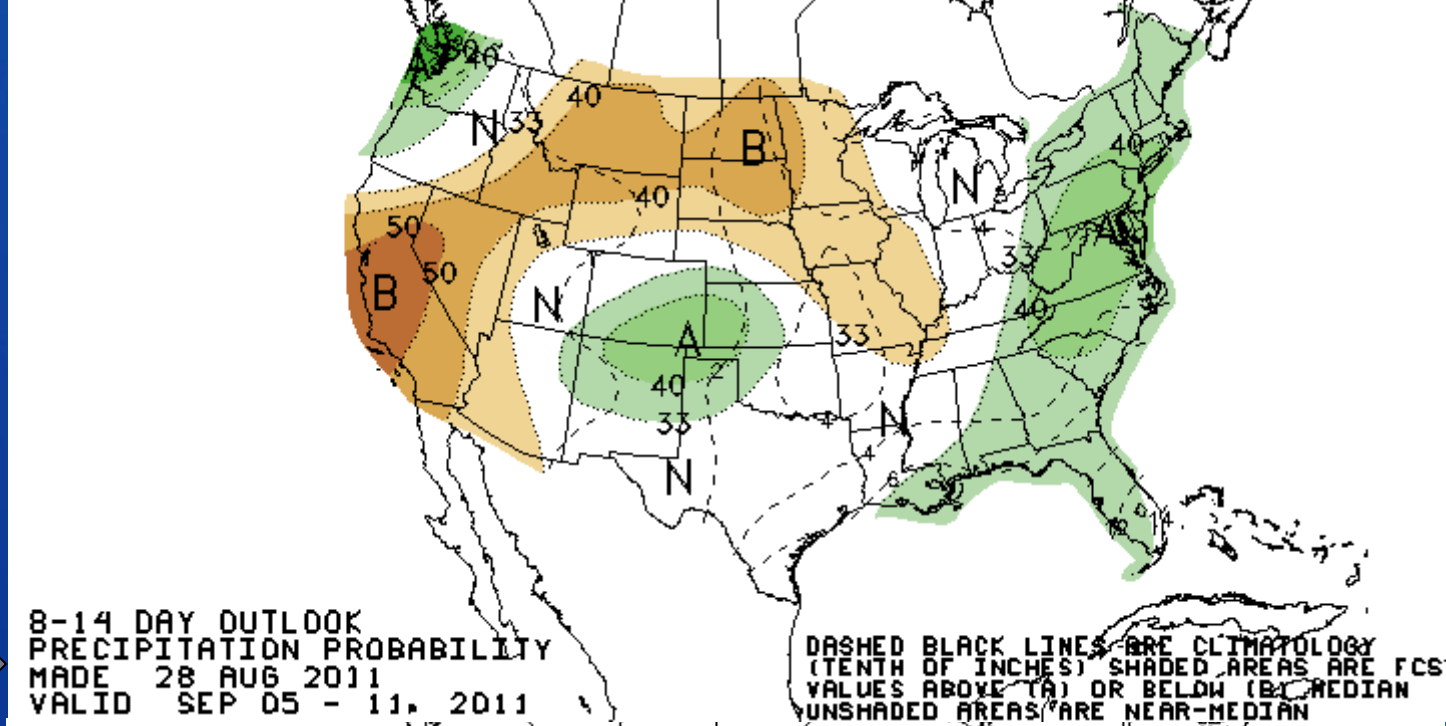
RECLAMATION

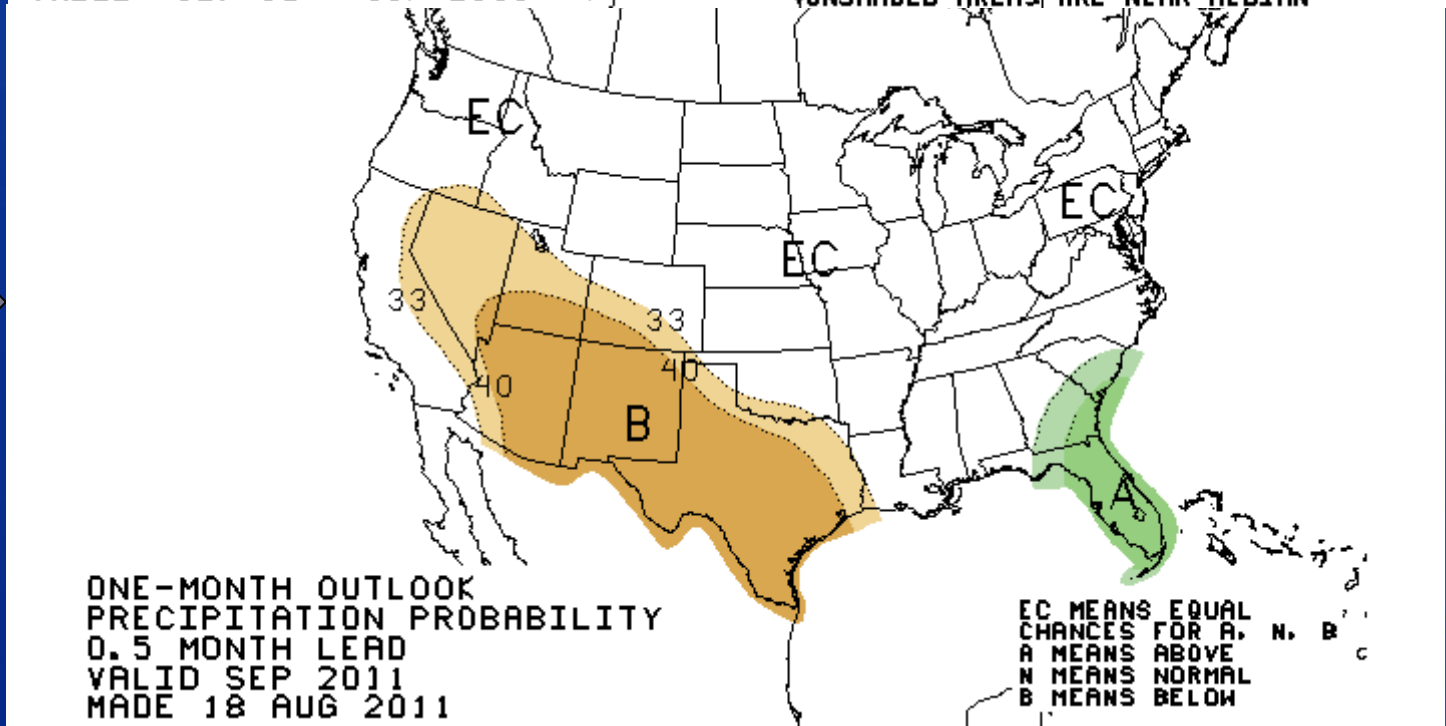
RECLAMATION

Climate Prediction Center Precip. Outlooks

8-14 Day

September Monthly

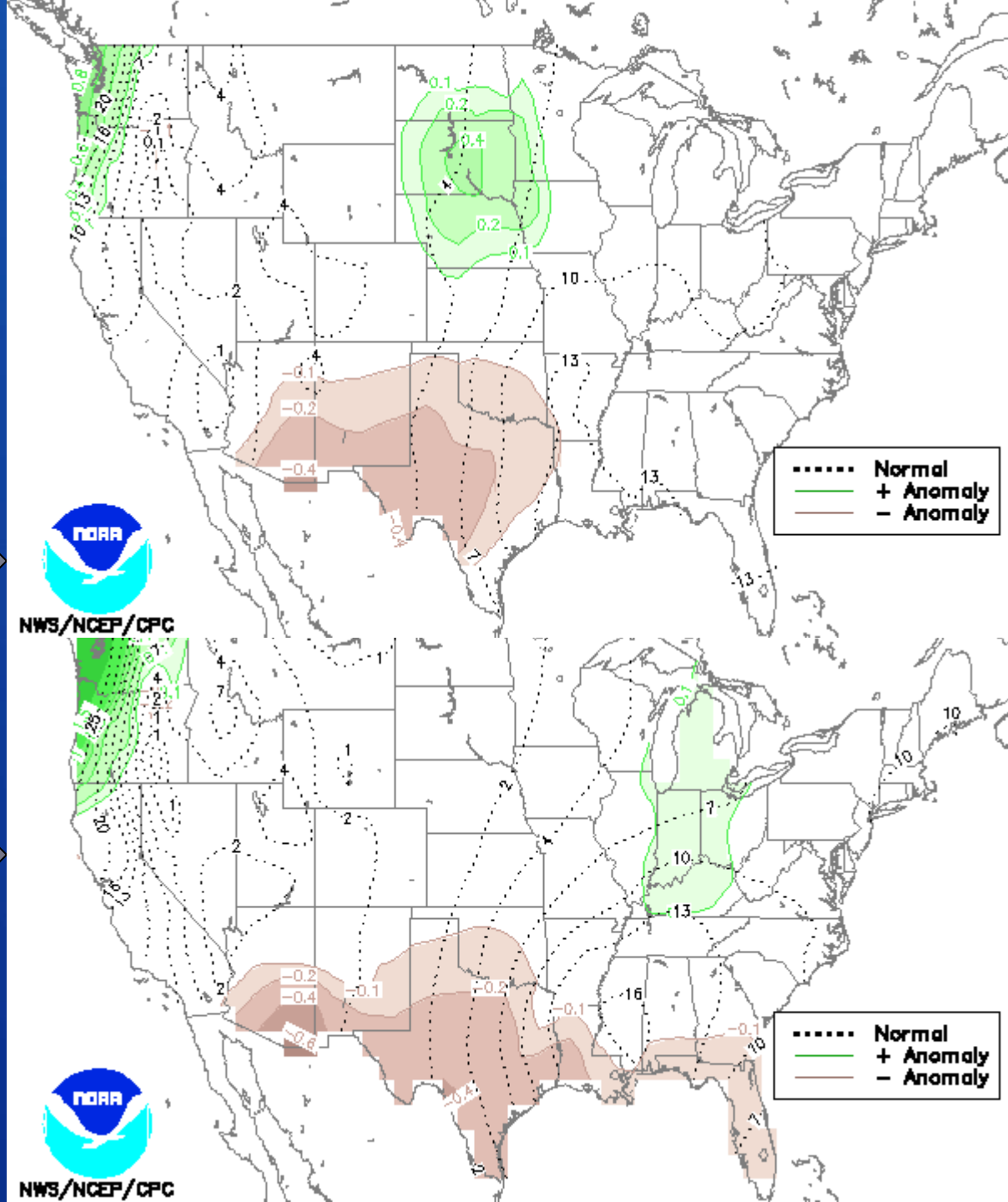




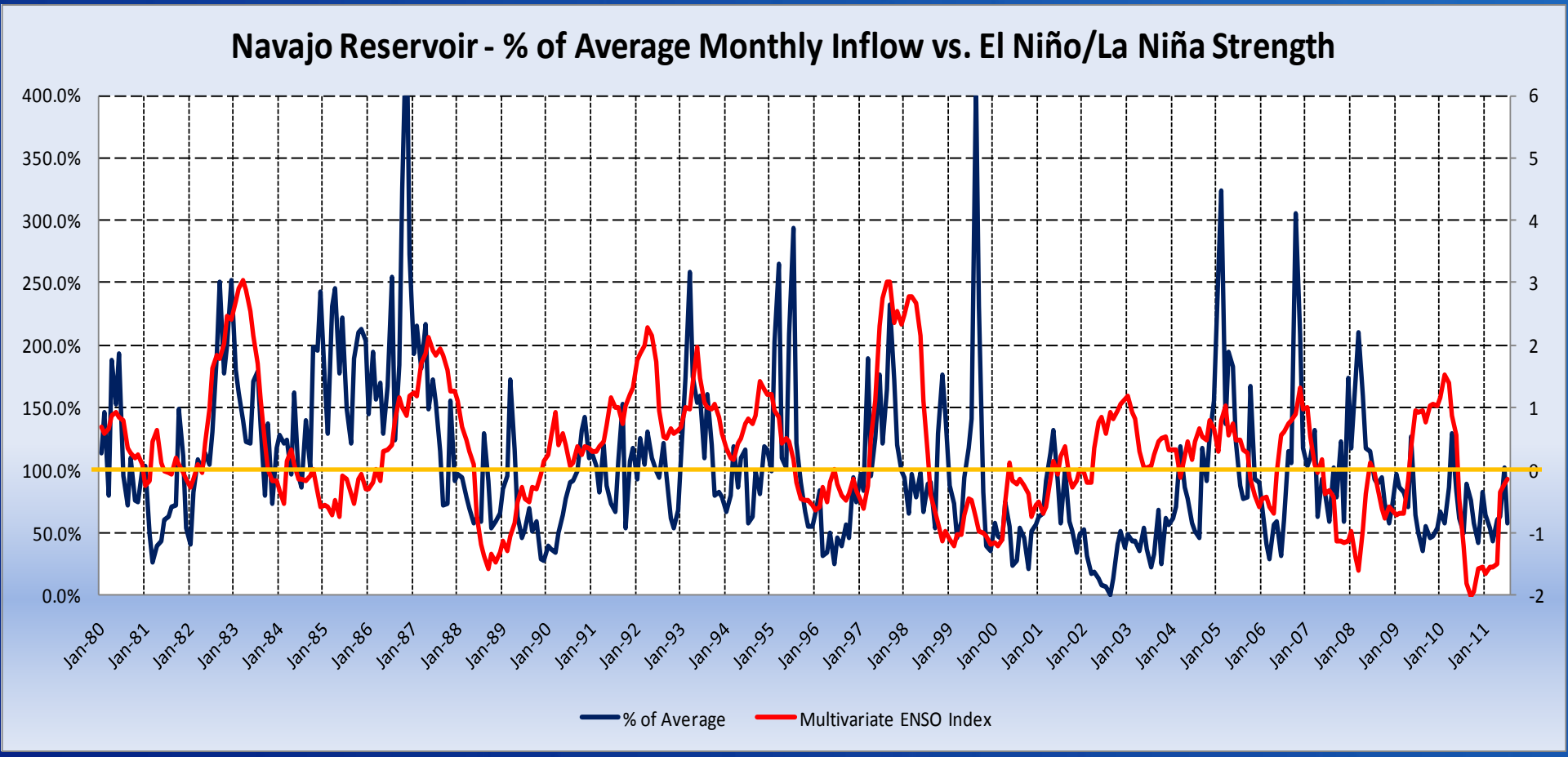
Climate Prediction Center Seasonal Precipitation Outlooks

September-October-November

December-January-February



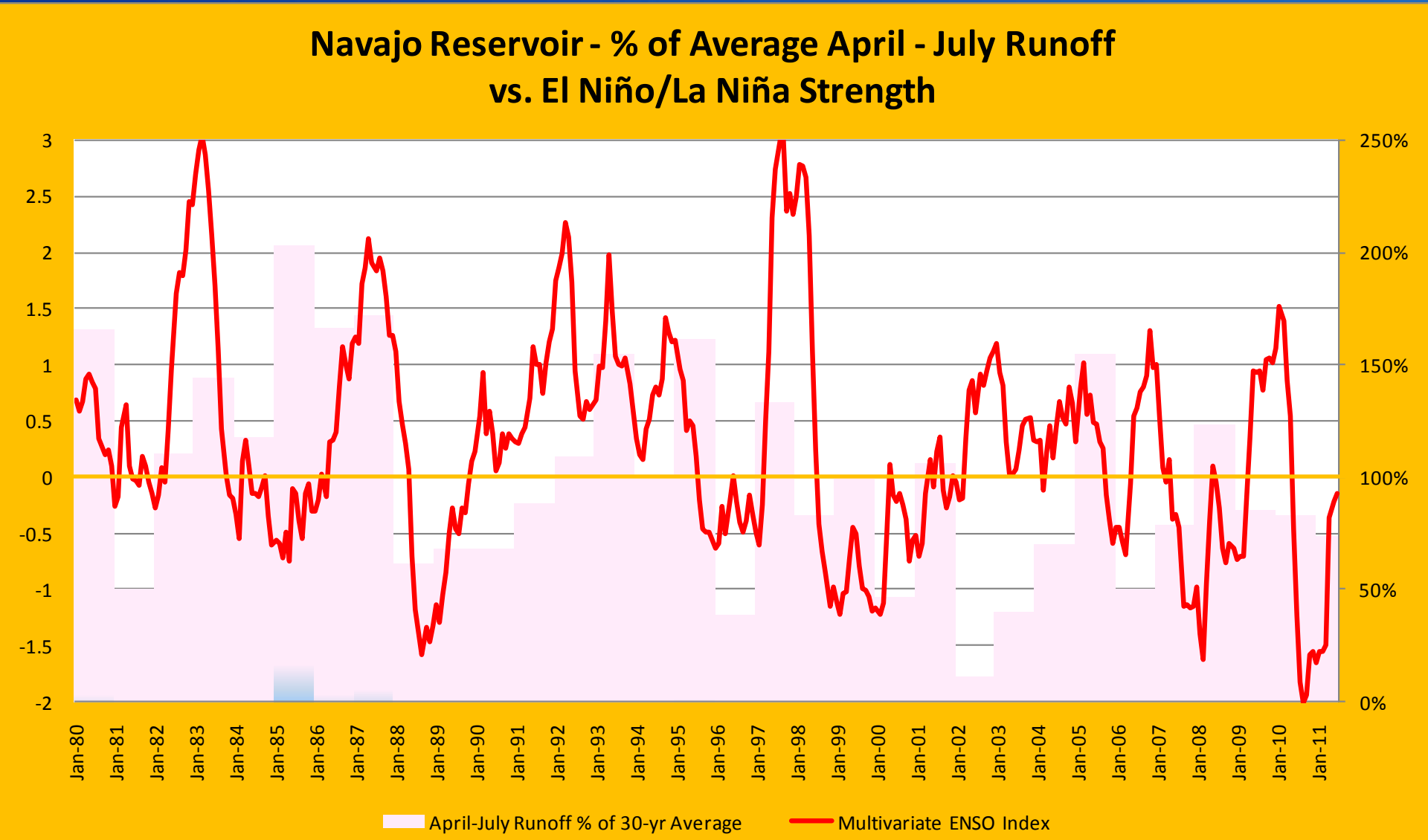
El Niño/La Niña Correlation with inflow



MEI data from (Wolter and Timlin, 1993, 1998)

RECLAMATION

El Niño/La Niña Correlation with inflow



MEI data from (Wolter and Timlin, 1993, 1998)

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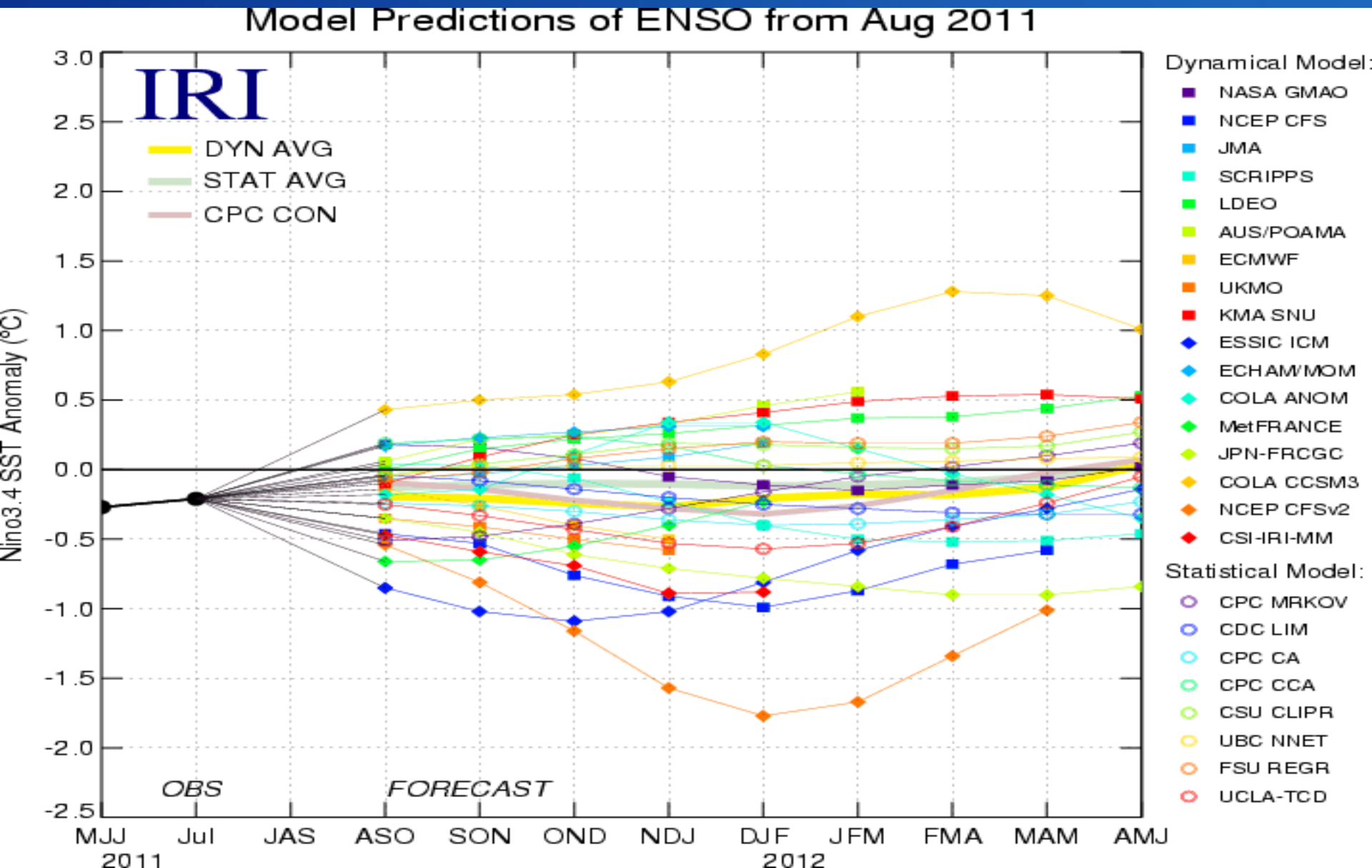
El Niño/La Niña current status and forecast models



Water Year 2012 ESP Forecasts

(Note- Ensemble Streamflow Predictions (ESP) for the outlying water year are very preliminary. Actual inflows can and will likely change.)

Water Year

Most Probable – 1,036,000 af (96% average)

Minimum Probable – 446,000 af (41% average)

Maximum Probable – 1,656,000 af (154% average)

April - July

Most Probable – 747,000 af (101% average)

Minimum Probable – 253,180 af (34% average)

Maximum Probable – 1,251,550 af (170% average)

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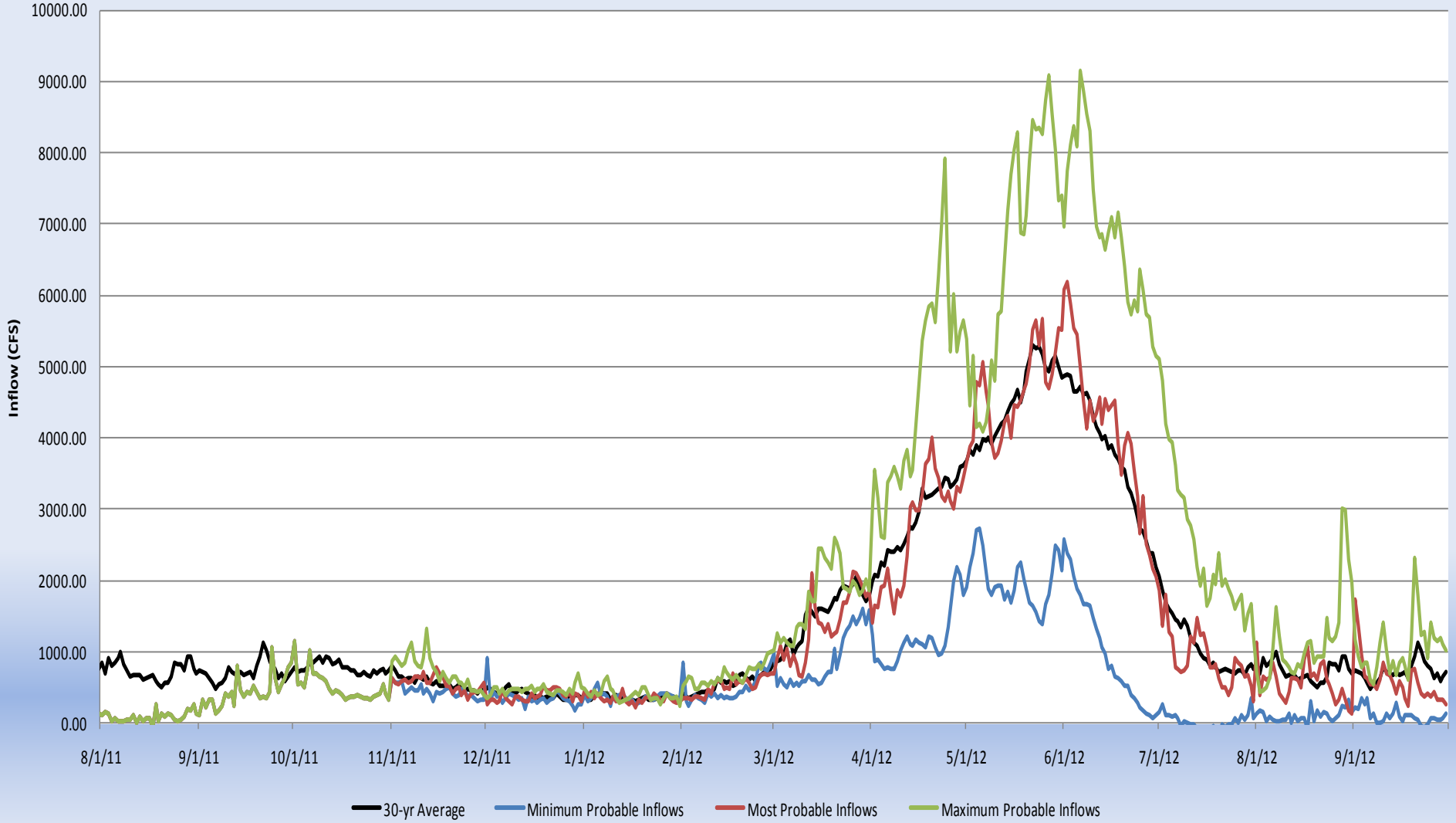
WY 2011 Navajo Disaggregated Daily Modified Unregulated Inflows



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2012 Spring Peak Release
(Based on ESP Forecast)

Most Probable

Water Available = 731,000 af

Peak Release = 356,000 af (Full Hydrograph - 3 weeks @ 5000 cfs with week-long benches)

Minimum Probable

Water Available = 229,000 af, No Spill

Peak Release = No Release (if no perturbation)

Maximum Probable

Water Available = 1,138,000 af

Peak Release = 749,000 af (Full Hydrograph – 3 weeks @ 5000 cfs)
+ bench of 3500 cfs to March 1st

Base release of 500 cfs for remainder of water year

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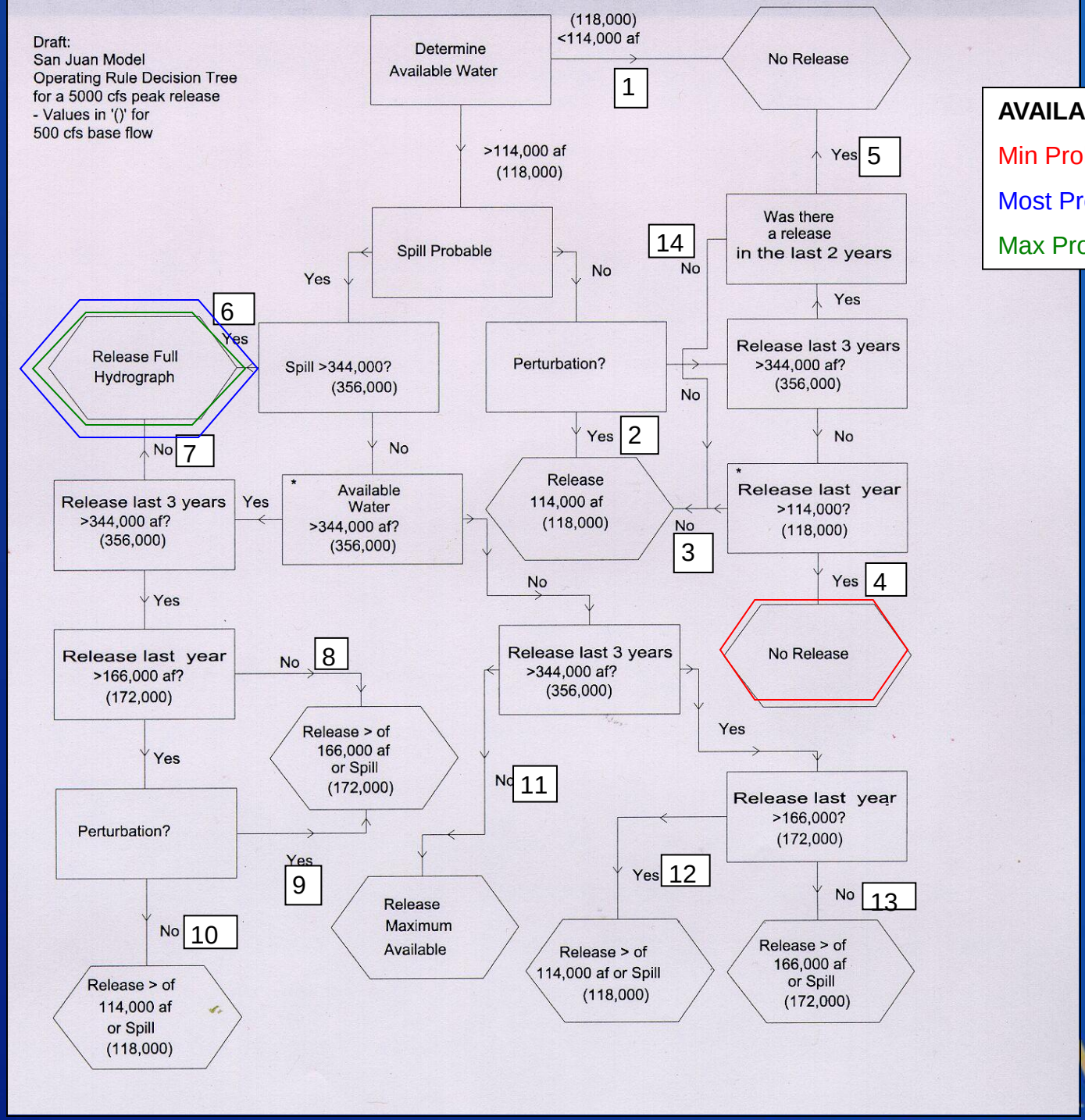
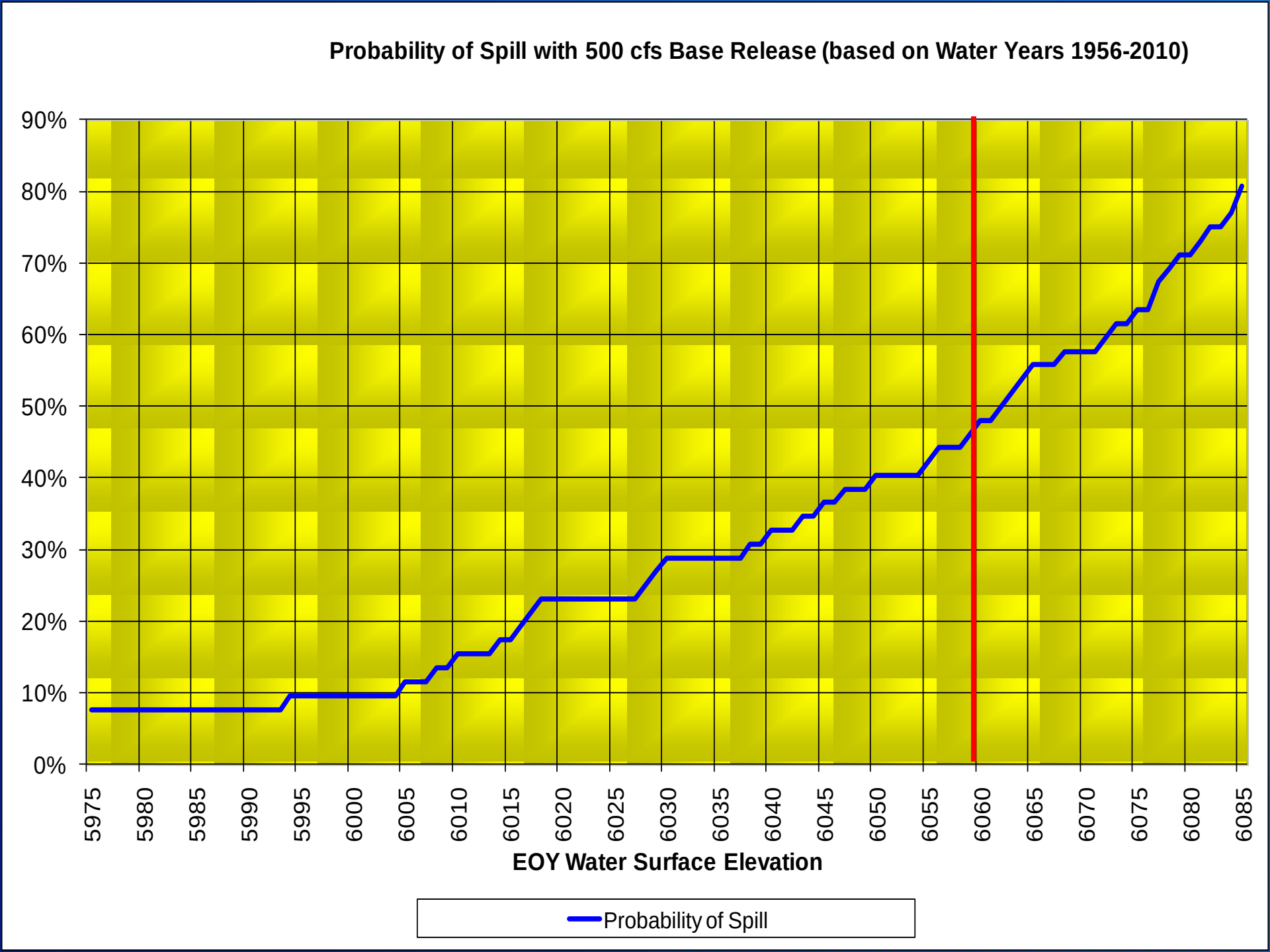
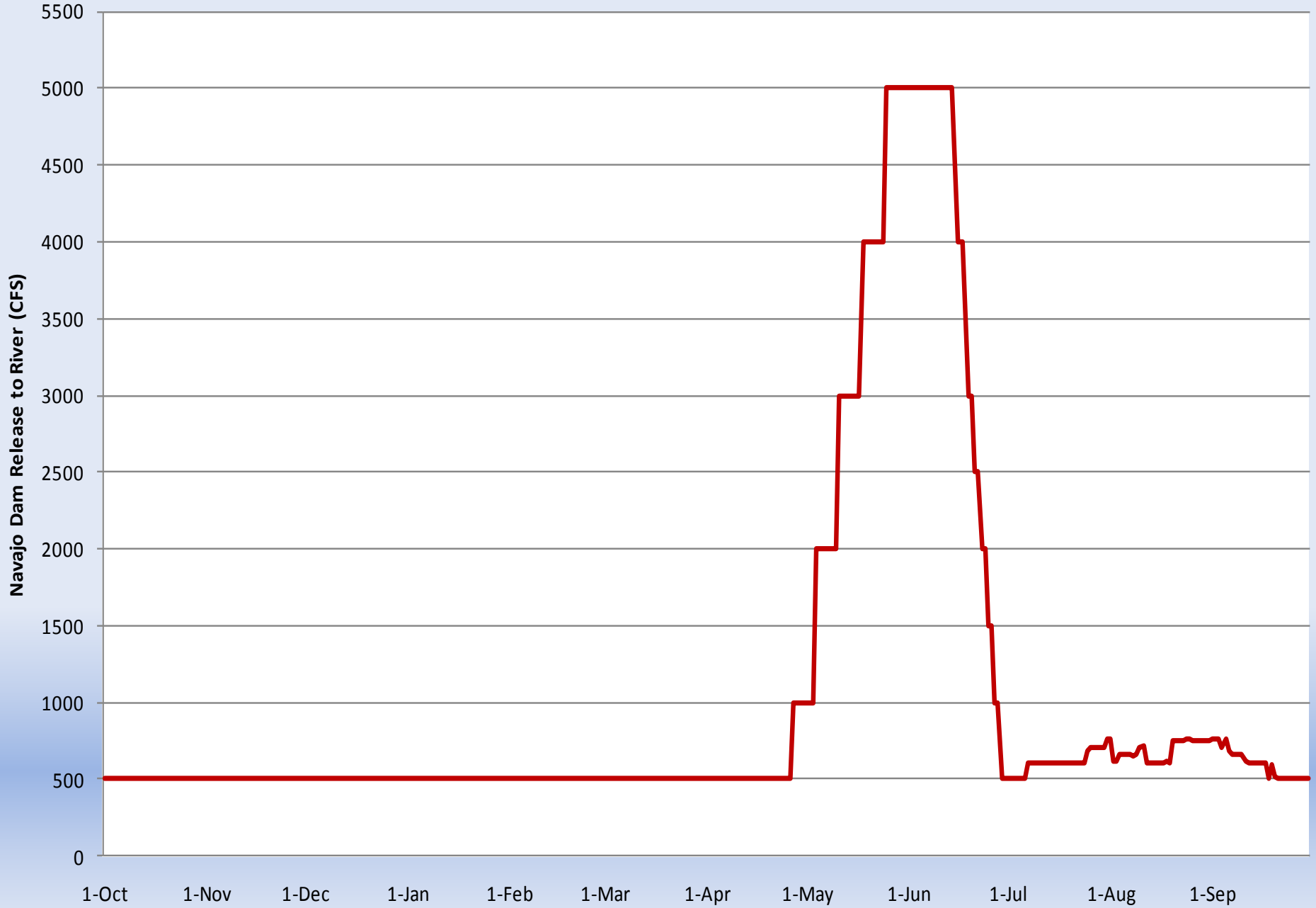


AVAILABLE WATER		PATH
Min Prob:	229,000 af	#4
Most Prob:	731,000 af	#7
Max Prob:	1,138,000 af	#6

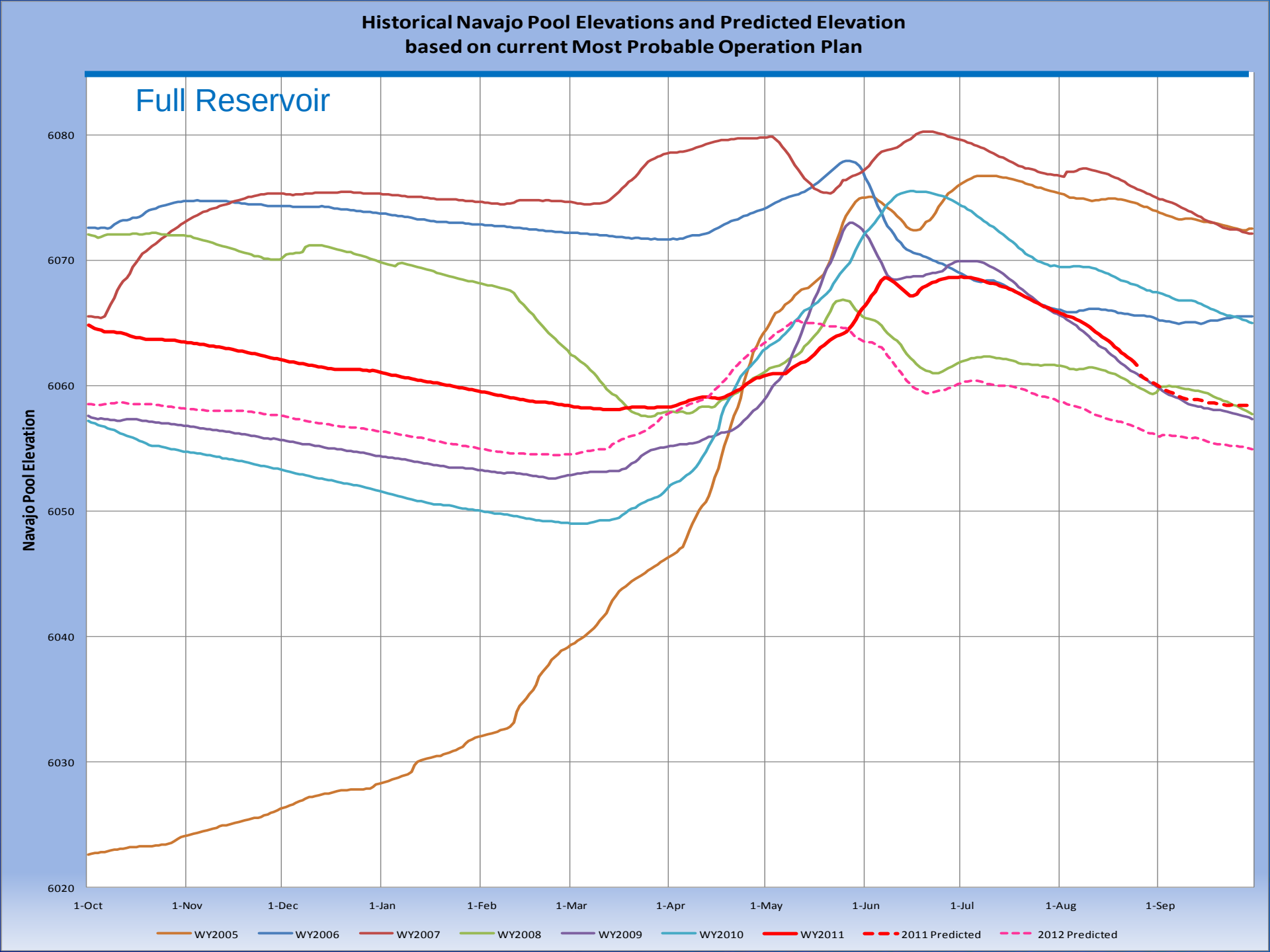
MATION


Probability of Spill with 500 cfs Base Release (based on Water Years 1956-2010)
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
5975
5980
5985
5990
5995
6000
6005
6010
6015
6020
6025
6030
6035
6040
6045
6050
6055
6060
6065
6070
6075
6080
6085
EOY Water Surface Elevation
Probability of Spill

Navajo Reservoir WY2012 Predicted Release



Historical Navajo Pool Elevations and Predicted Elevation based on current Most Probable Operation Plan




Navajo Dam
Maintenance Activities

Ongoing Navajo Dam Maintenance Activities:

6x13 Emergency Gate Bonnet Maintenance

- Started on August 15th
- Scheduled for completion on September 16th
- Flow is diverted through auxiliary gate

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Fish & Wildlife Service
San Juan RIP Update

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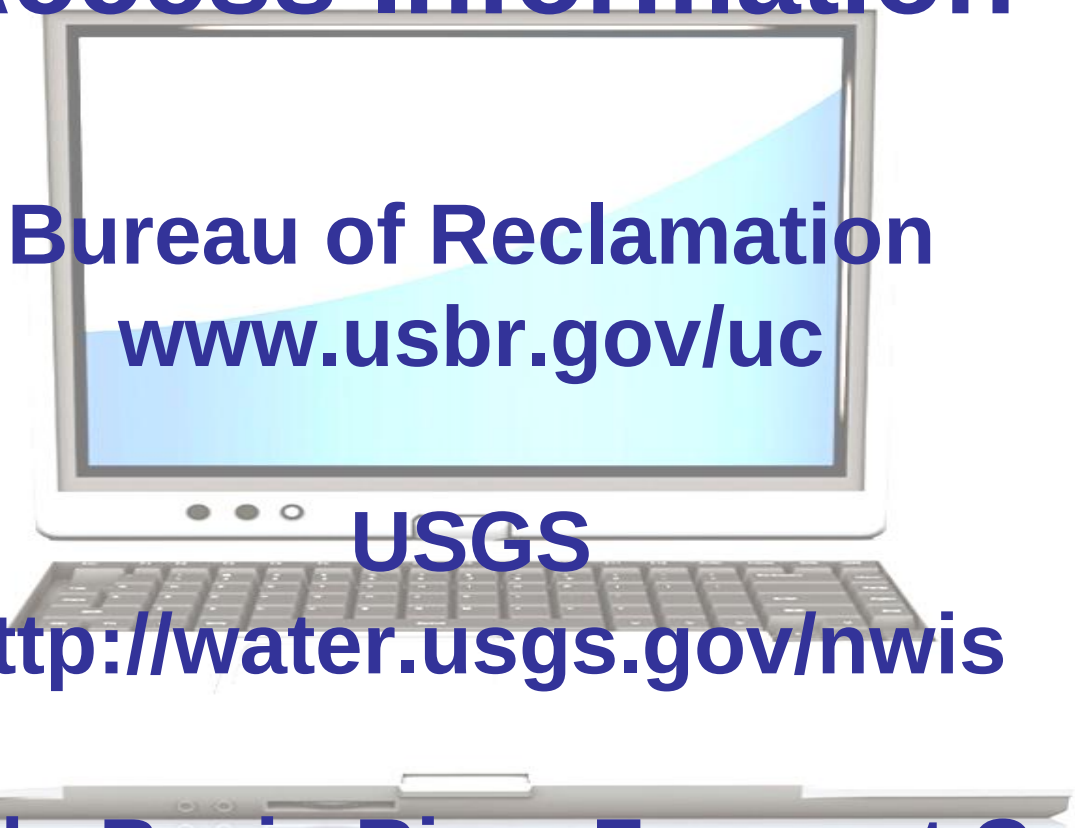
Questions from
the Audience

How You Can Access Information



Bureau of Reclamation
www.usbr.gov/uc

USGS
http://water.usgs.gov/nwis

Colorado Basin River Forecast Center
www.cbrfc.noaa.gov

Reclamation Contacts:

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Ruth Swickard

970-385-6523, rswickard@usbr.gov

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Summary

- WY2011 had near to below average snowpack for most of the year
- WY2011 April – July Inflow was 78% of average (576K af)
- 1-week Spring Peak Release at 5000 cfs (later due to late runoff)
- Only minimum SJRIP goal was met (>2500 for 10 days)
- Minimum Release = 500 cfs, Current Release = 900 cfs
- Release greater than 500 cfs can be expected to meet target base flows
- Expected EOWY Reservoir Elevation = 6060 ft. (98% of average)
- ESP Forecast for WY2011 shows a wide variance centered over average conditions – better idea of WY2012 conditions next meeting
- As of now, full hydrograph will be released next year if forecast holds

- Next Operations Meeting: January 24?, 2010


Thanks For Coming!
RECLAMATION