

# RECLAMATION

*Managing Water in the West*



**Navajo Unit Operations  
January 26, 2010  
Coordination Meeting**



U.S. Department of the Interior  
Bureau of Reclamation

# Agenda

- Welcome
- Special Presentation – Colorado River 24-mo Study
- Review of Water Year 2009 Operations
- Water Year 2010 Conditions
- Water Year 2010 Forecasts & Proposed Operations
- Current Reservoir Status
- Recommendations for San Juan River Administration and Operation
- Navajo Dam Maintenance Activities
- Fish & Wildlife Service/San Juan RIP Update
- Reports from other Agencies
- Questions from Audience
- How To Access Information
- Close

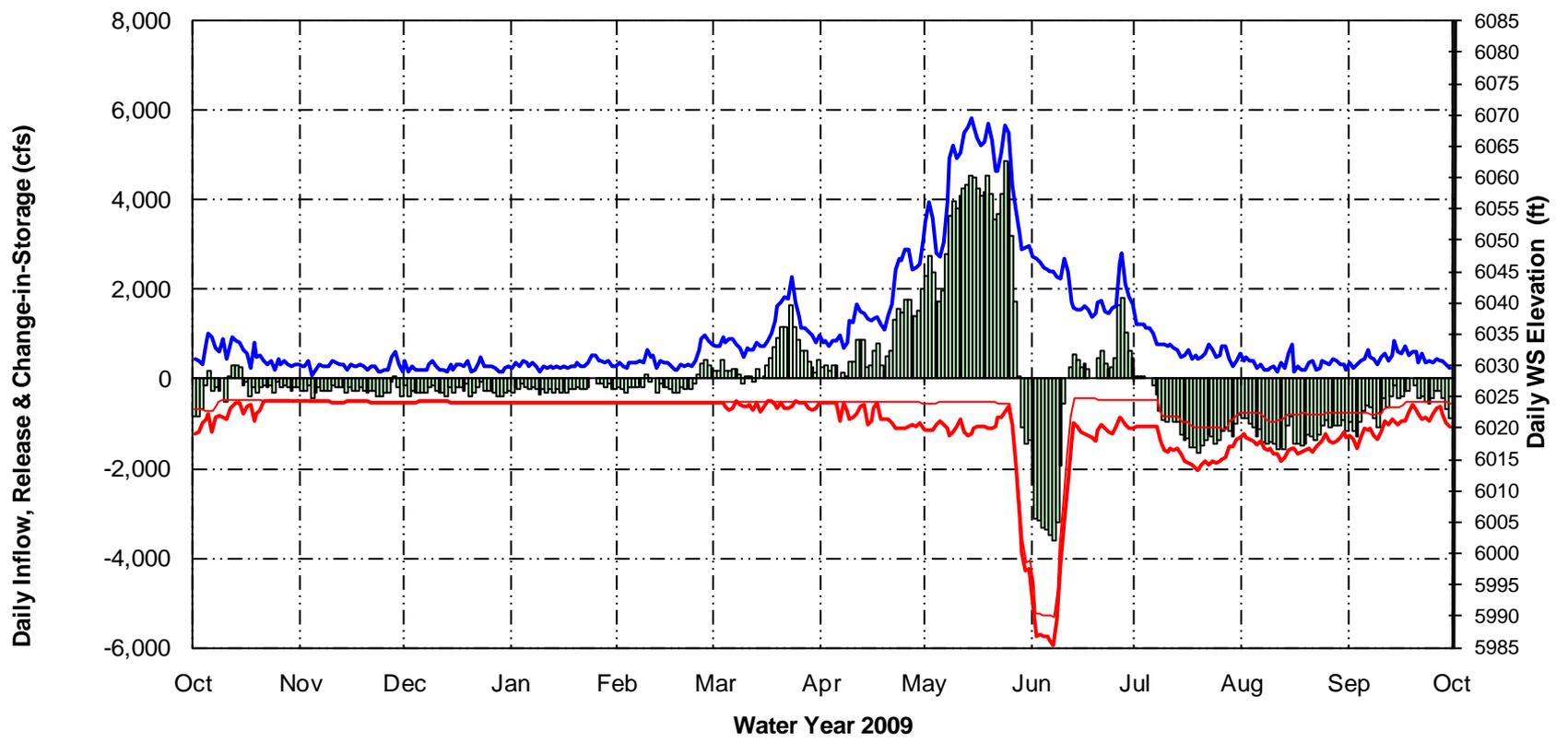
RECLAMATION

An aerial photograph of a large concrete dam with a reservoir behind it. The dam has several spillways. A road curves around the dam. The surrounding landscape is arid with sparse vegetation. The text "Review of 2009 Operations" is overlaid in large white letters with a black outline.

# Review of 2009 Operations

RECLAMATION

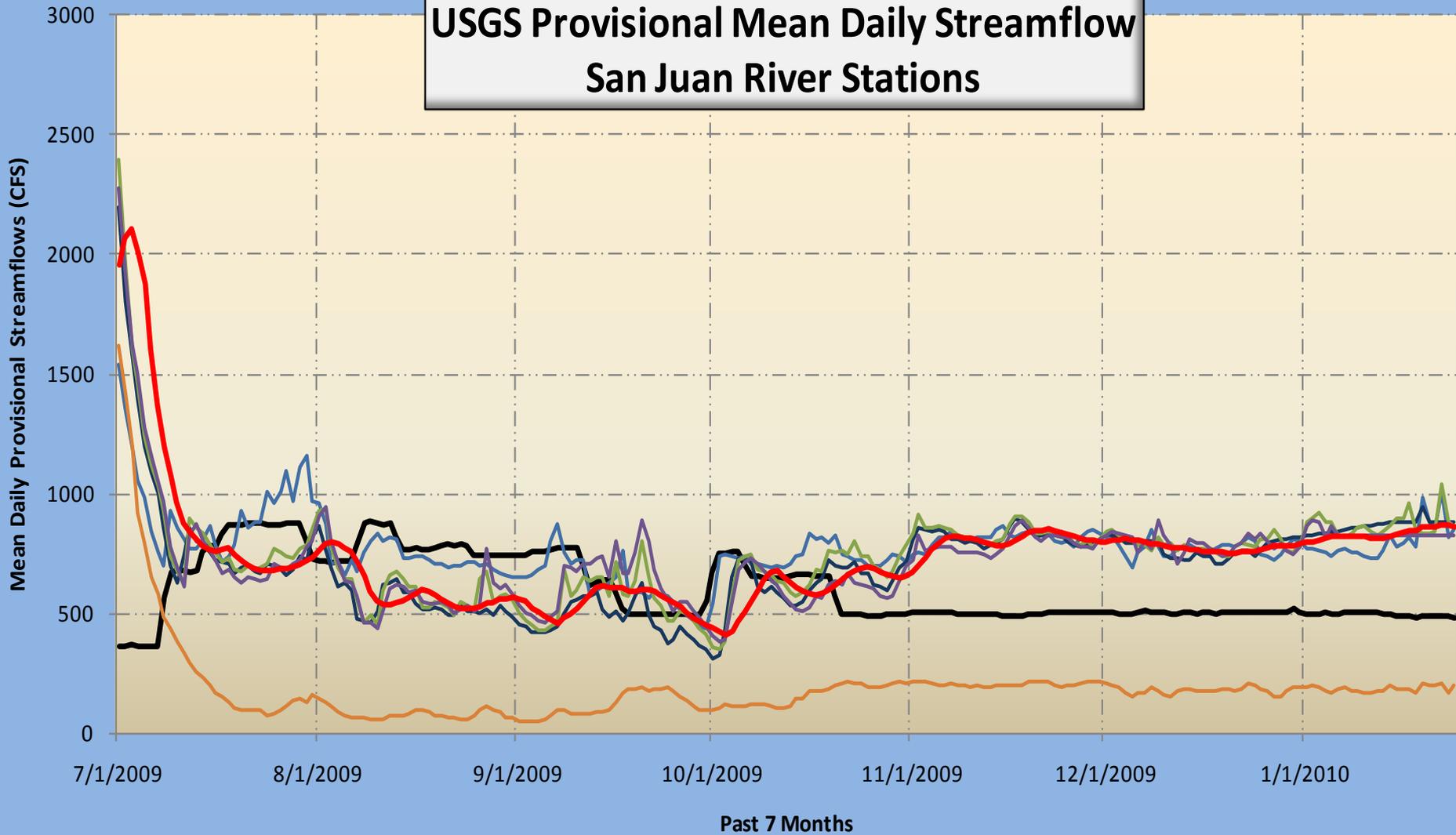
# NAVAJO RESERVOIR OPERATIONS



# Chasing the Target Base Flow

<b>6/12 – 7/8</b>	<b>500 cfs Base</b>
<b>7/8 – 7/14</b>	<b>800 cfs</b>
<b>7/14 – 7/30</b>	<b>1000 cfs</b>
<b>7/30 – 8/7</b>	<b>900 cfs</b>
<b>8/7 – 8/13</b>	<b>1100 cfs</b>
<b>8/13 – 9/11</b>	<b>900 cfs</b>
<b>9/11 – 9/17</b>	<b>650 cfs</b>
<b>9/17 – 9/30</b>	<b>500 cfs</b>
<b>9/30 – 10/20</b>	<b>600 cfs</b>
<b>10/20 - current</b>	<b>500 cfs Base</b>

# USGS Provisional Mean Daily Streamflow San Juan River Stations



— SJ Archuleta — SJ Farmington — SJ Shiprock — SJ Four Corners — SJ Bluff — Animas @ Farmington — 7-Day Moving Mean



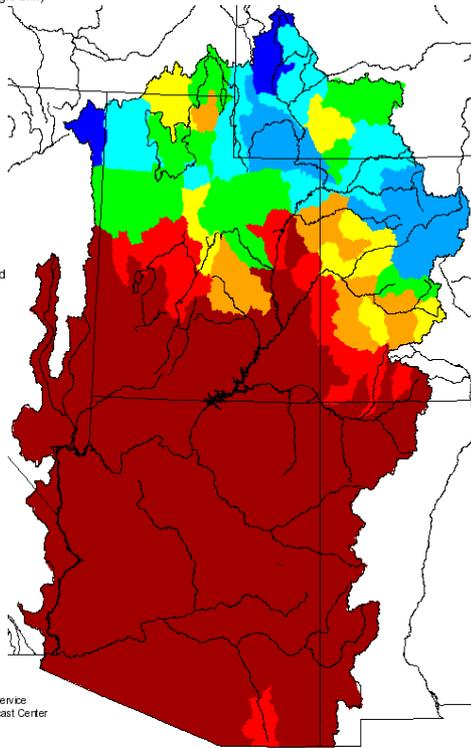
# Water Year 2010 Conditions

### Monthly Precipitation for October 2007

(Averaged by Hydrologic Unit)

#### % Average

- > 150%
- 129 - 150%
- 110 - 129%
- 100 - 109%
- 90 - 99%
- 70 - 89%
- 50 - 69%
- < 50%
- Not Reported



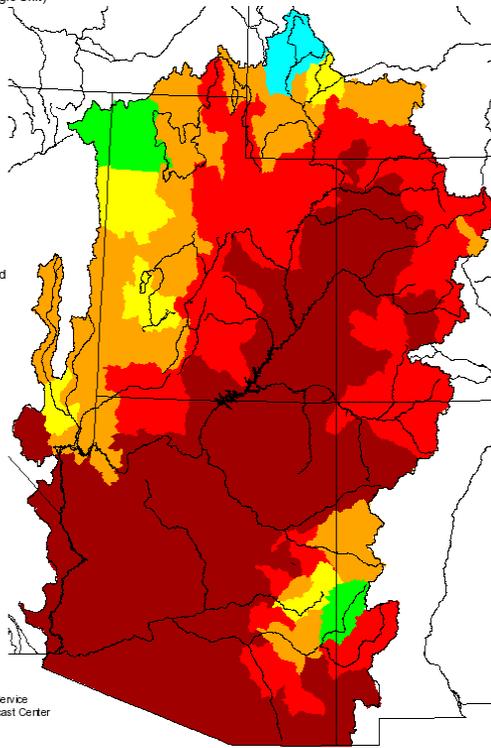
Prepared by  
NOAA, National Weather Service  
Colorado Basin River Forecast Center  
Salt Lake City, Utah  
www.cbafc.noaa.gov

### Monthly Precipitation for October 2008

(Averaged by Hydrologic Unit)

#### % Average

- > 150%
- 129 - 150%
- 110 - 129%
- 100 - 109%
- 90 - 99%
- 70 - 89%
- 50 - 69%
- < 50%
- Not Reported



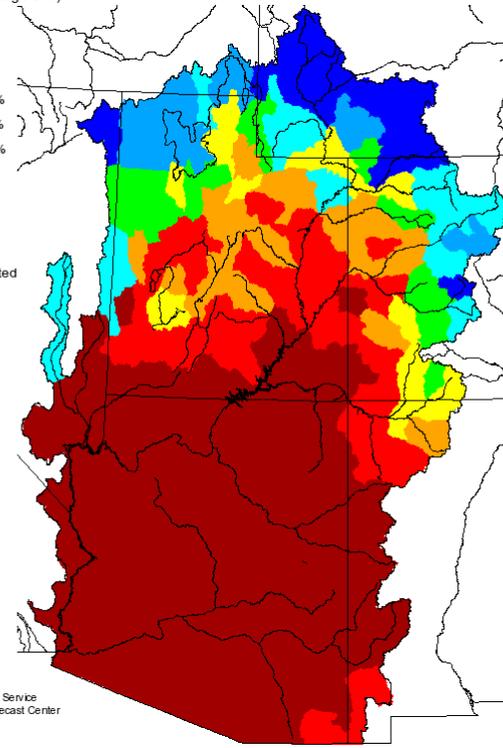
Prepared by  
NOAA, National Weather Service  
Colorado Basin River Forecast Center  
Salt Lake City, Utah  
www.cbafc.noaa.gov

### Monthly Precipitation for October 2009

(Averaged by Hydrologic Unit)

#### % Average

- > 150%
- 129 - 150%
- 110 - 129%
- 100 - 109%
- 90 - 99%
- 70 - 89%
- 50 - 69%
- < 50%
- Not Reported

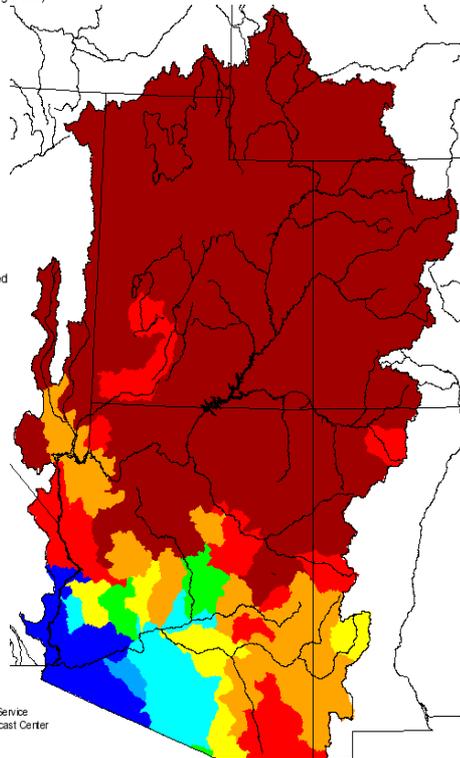
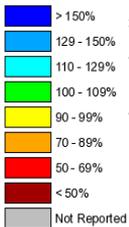


Prepared by  
NOAA, National Weather Service  
Colorado Basin River Forecast Center  
Salt Lake City, Utah  
www.cbafc.noaa.gov

### Monthly Precipitation for November 2007

(Averaged by Hydrologic Unit)

#### % Average

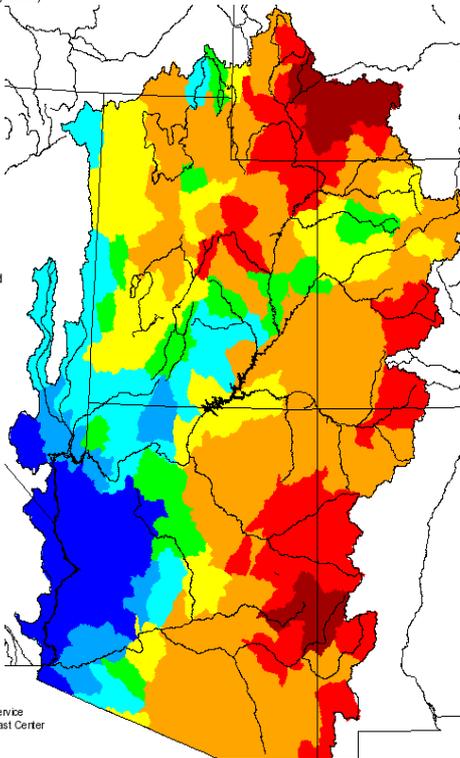
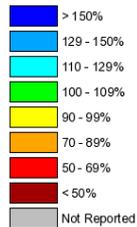


Prepared by  
NOAA, National Weather Service  
Colorado Basin River Forecast Center  
Salt Lake City, Utah  
www.cbafc.noaa.gov

### Monthly Precipitation for November 2008

(Averaged by Hydrologic Unit)

#### % Average

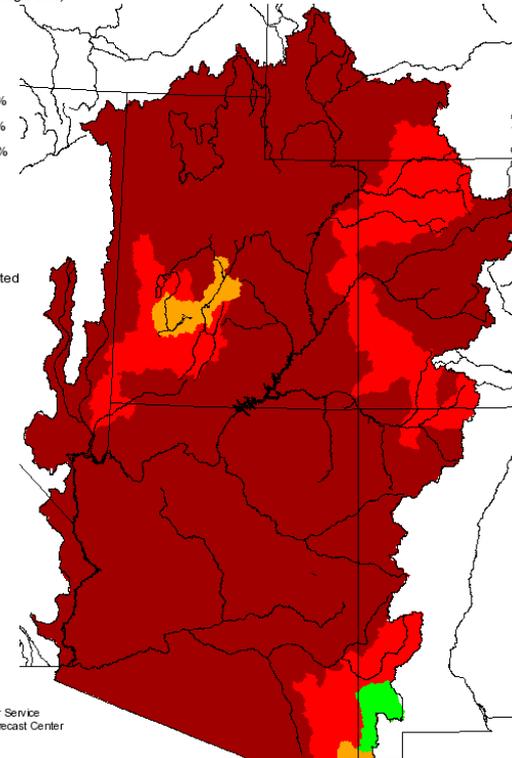
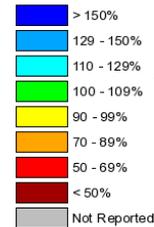


Prepared by  
NOAA, National Weather Service  
Colorado Basin River Forecast Center  
Salt Lake City, Utah  
www.cbafc.noaa.gov

### Monthly Precipitation for November 2009

(Averaged by Hydrologic Unit)

#### % Average

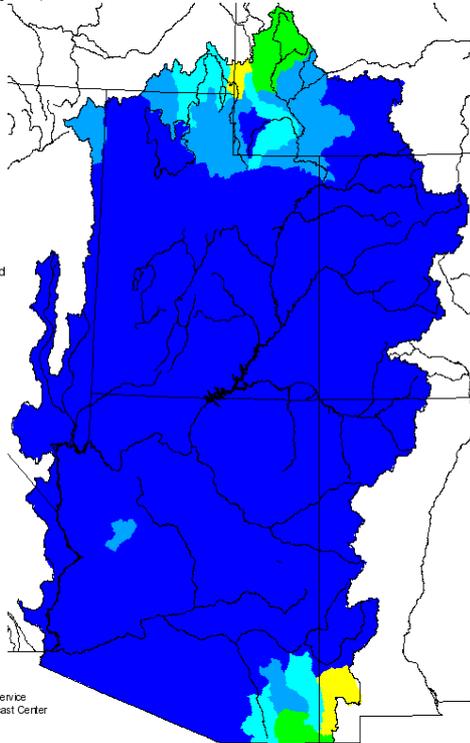
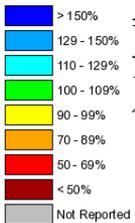


Prepared by  
NOAA, National Weather Service  
Colorado Basin River Forecast Center  
Salt Lake City, Utah  
www.cbafc.noaa.gov

### Monthly Precipitation for December 2007

(Averaged by Hydrologic Unit)

#### % Average

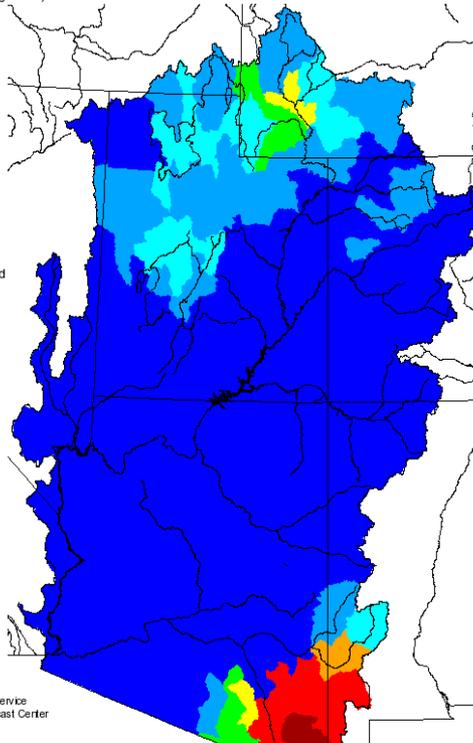
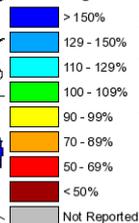


Prepared by  
NOAA, National Weather Service  
Colorado Basin River Forecast Center  
Salt Lake City, Utah  
www.cbtrc.noaa.gov

### Monthly Precipitation for December 2008

(Averaged by Hydrologic Unit)

#### % Average

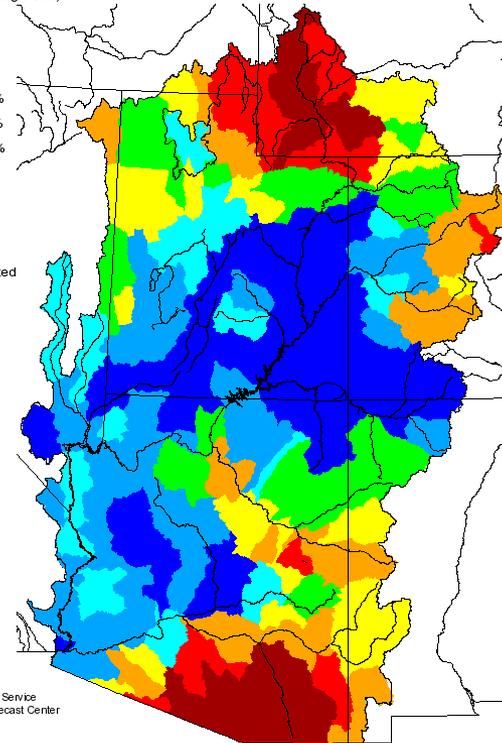
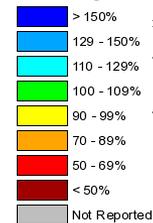


Prepared by  
NOAA, National Weather Service  
Colorado Basin River Forecast Center  
Salt Lake City, Utah  
www.cbtrc.noaa.gov

### Monthly Precipitation for December 2009

(Averaged by Hydrologic Unit)

#### % Average

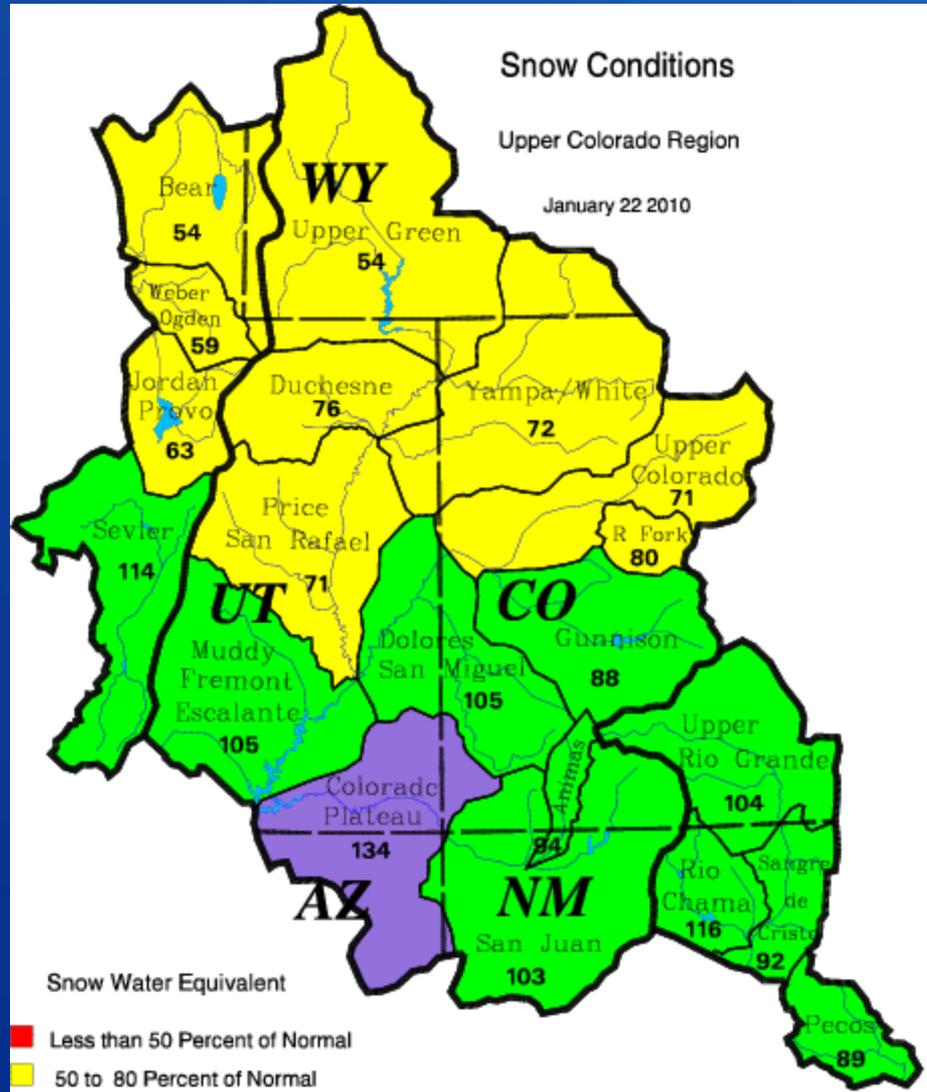


Prepared by  
NOAA, National Weather Service  
Colorado Basin River Forecast Center  
Salt Lake City, Utah  
www.cbtrc.noaa.gov

# Snow Conditions

Upper Colorado Region

January 22 2010



- Snow Water Equivalent
- Less than 50 Percent of Normal
  - 50 to 80 Percent of Normal
  - 80 to 120 Percent of Normal
  - 120 to 150 Percent of Normal
  - Greater than 150 Percent of Normal

Upper Colorado  
**GIS**  
Region

Data Provided by the Natural Resource Conservation Service

# RECLAMATION

# Water Year 2010

## San Juan Basin Snowpack Summary

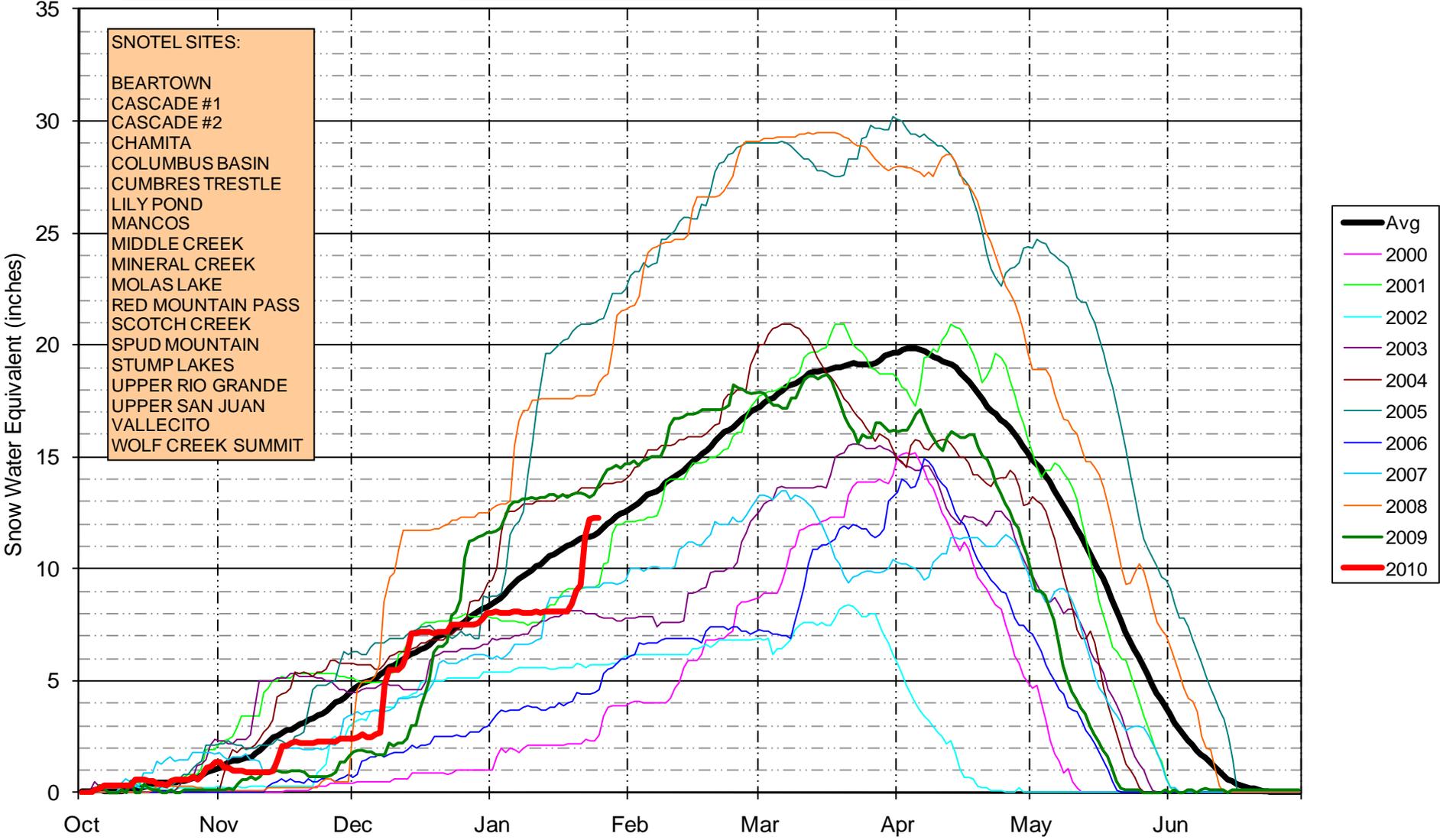
(as of 1/25/2010)

<b>Locations</b>	<b>Average of Applicable SNOTEL Stations (SWE – inches)</b>	<b>% Average</b>
<b>San Juan (Bluff)</b>	12.3	108%
<b>Navajo Reservoir</b>	12.8	109%
<b>Vallecito Reservoir</b>	10.2	84%
<b>Animas @ Durango</b>	11.9	104%

# San Juan Basin Multiple Station Snotel Plot

January 25, 2010

Current Snowpack is (12.3/11.4) = 108% of Average



# Water Year 2010 (as of 1/25/2010)

## Navajo Inflows & San Juan Basin Snowpack

<b>EOM</b>	<b>Inflow (af)</b>	<b>% Average</b>	<b>SJ SWE (in.)</b>	<b>% Average</b>
<b>October</b>	20,511	40%	1.7	94%
<b>November</b>	12,550	38%	2.7	48%
<b>December</b>	9,601	39%	8.5	96%
<b>January (Current)</b>	9,047	58%	12.8	109%

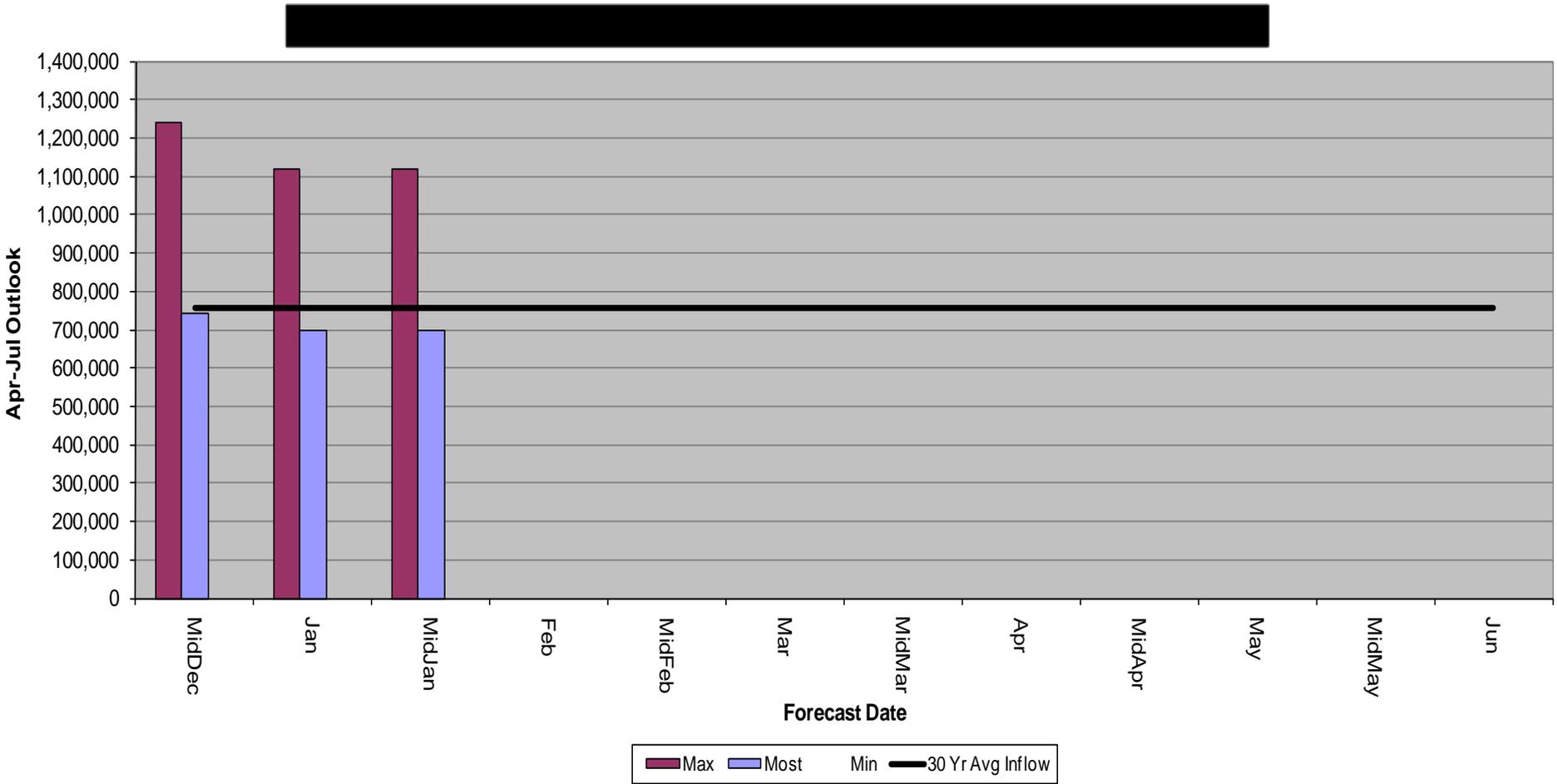
An aerial photograph of a river valley. The river flows from the top center towards the bottom left, curving through the landscape. On the left bank, there are lush green fields and dense trees. On the right bank, the terrain is a mix of brown, eroded soil and sparse green vegetation. The overall scene depicts a natural waterway in a semi-arid region.

# Water Year 2010 Forecasts

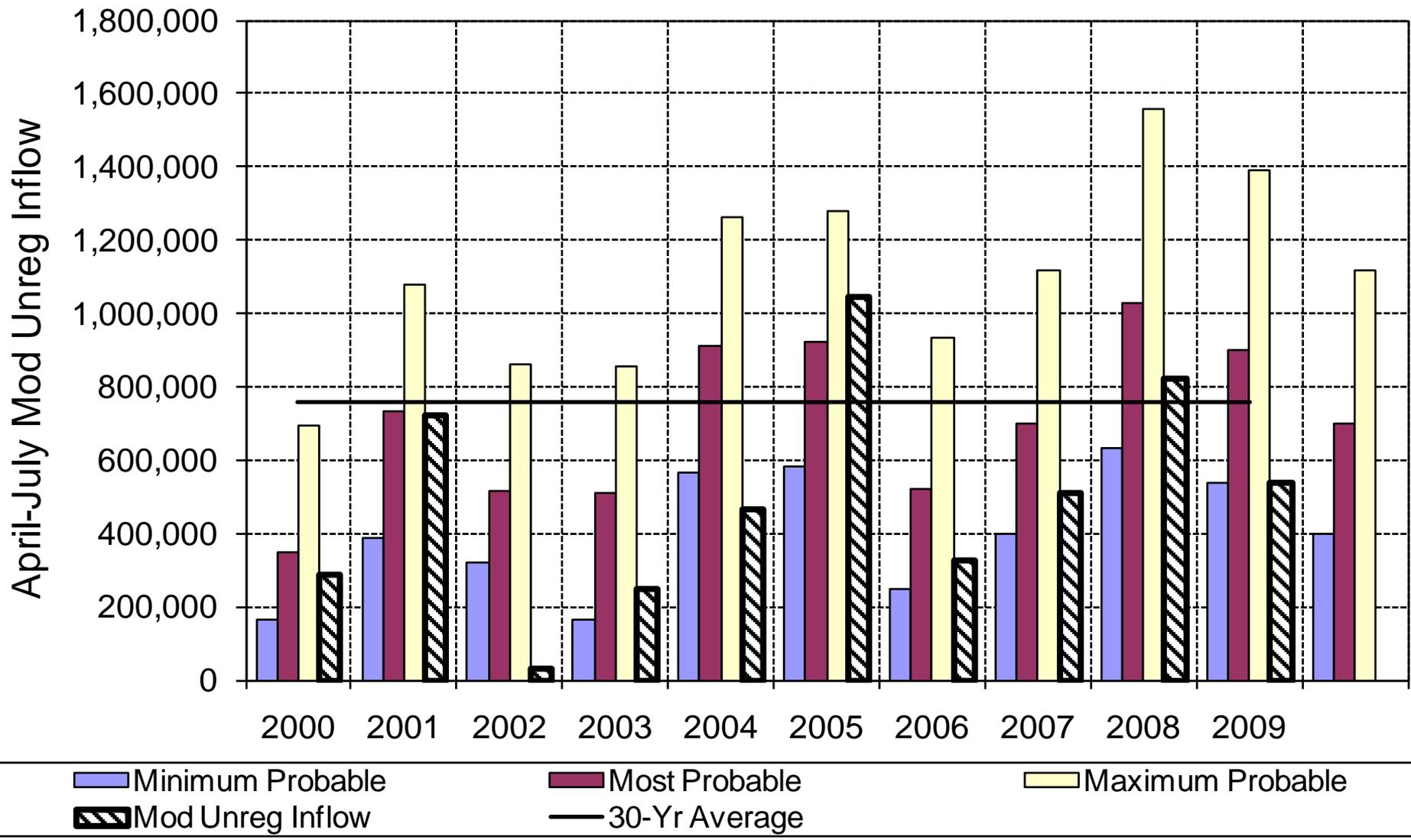
RECLAMATION

Mid-January 2010 Forecast  
 Navajo Reservoir  
 Modified Unregulated  
 April-July Inflow Volume

	Inflow (af)	% of Average	2009 Forecast
Most Probable	700,000	93%	900,000 (117%)
Minimum Probable	400,000	53%	540,000 (70%)
Maximum Probable	1,120,000	148%	1,390,000 (180%)

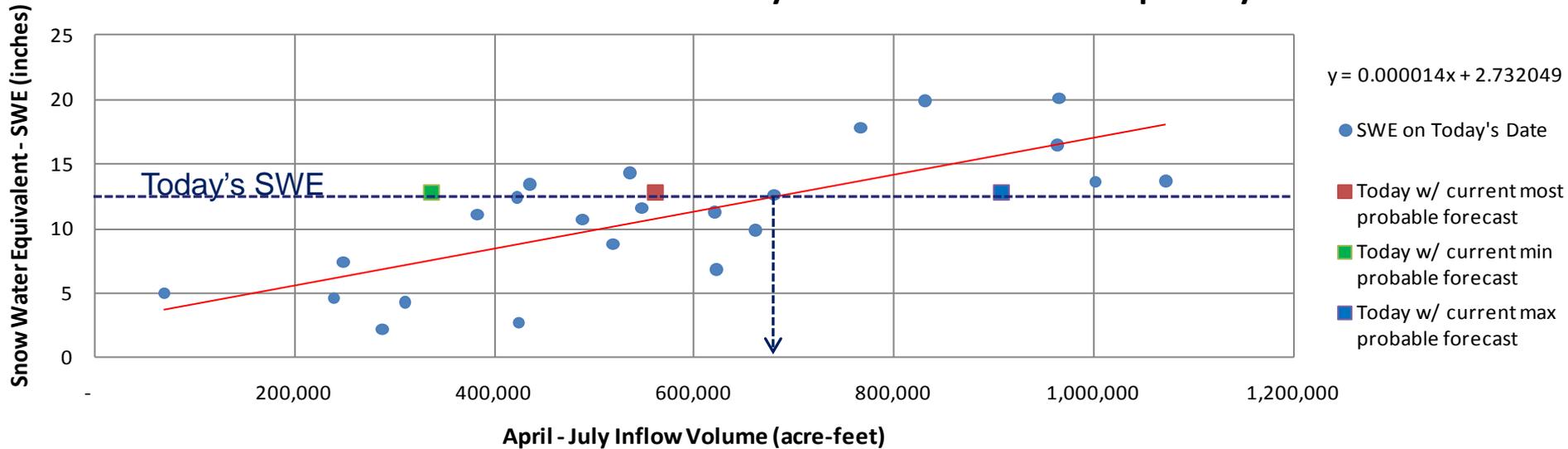


# April-July Mod Unreg Forecast from January vs Actual Mod Unreg Inflow

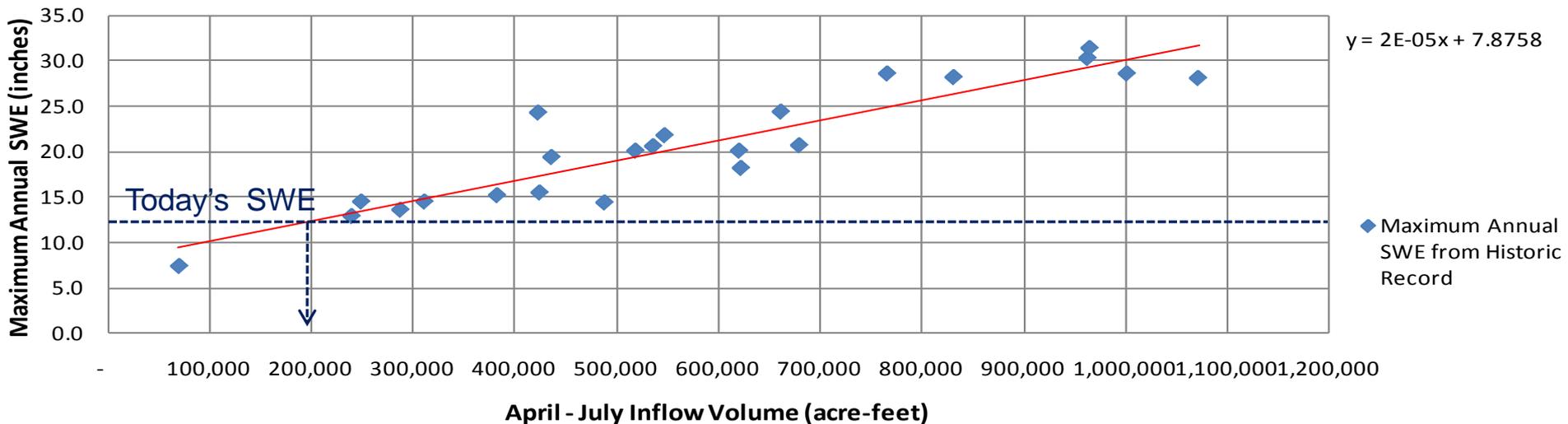


# SNOTEL above Navajo vs. Inflow Forecast

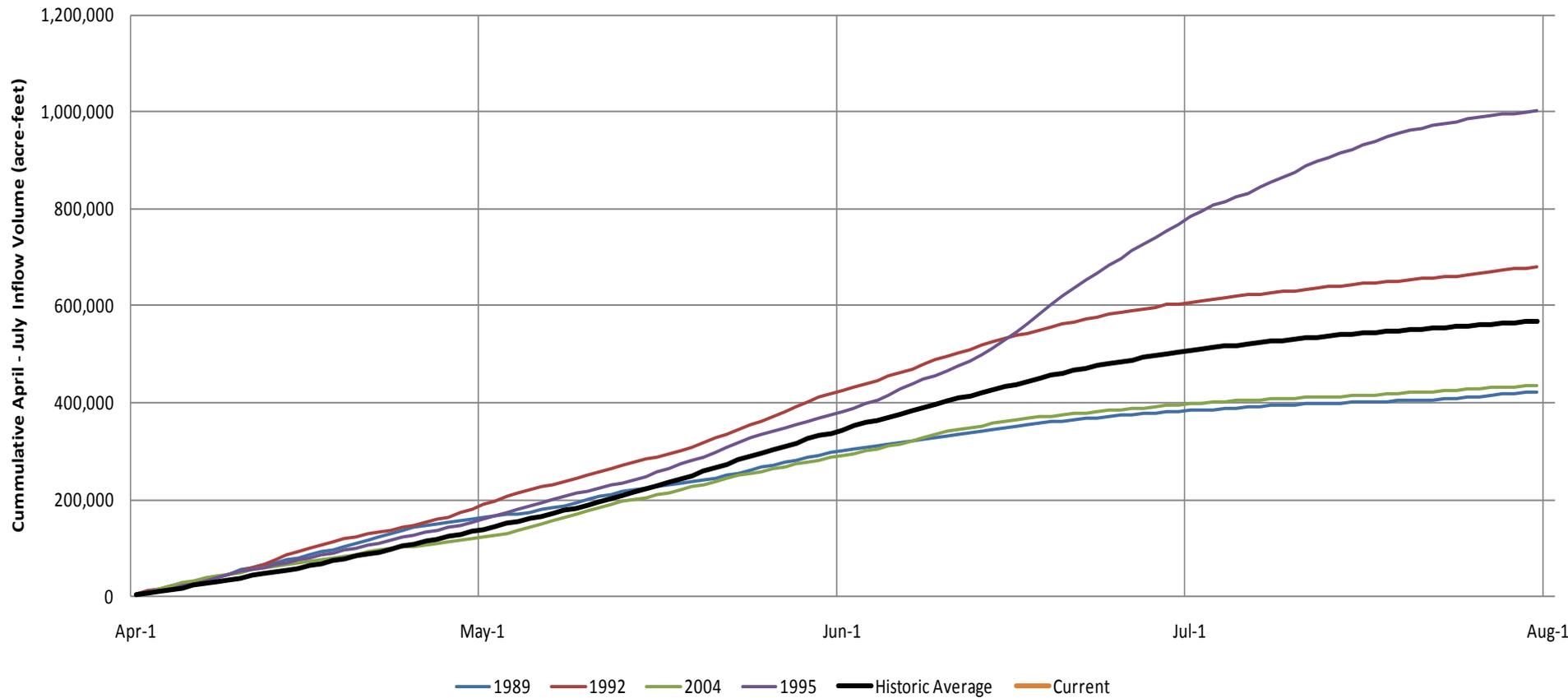
## Correlation of Historical SWE from Today's Date and Observed April-July Inflow



## Historical April-July Inflows compared to Maximum Annual SWE



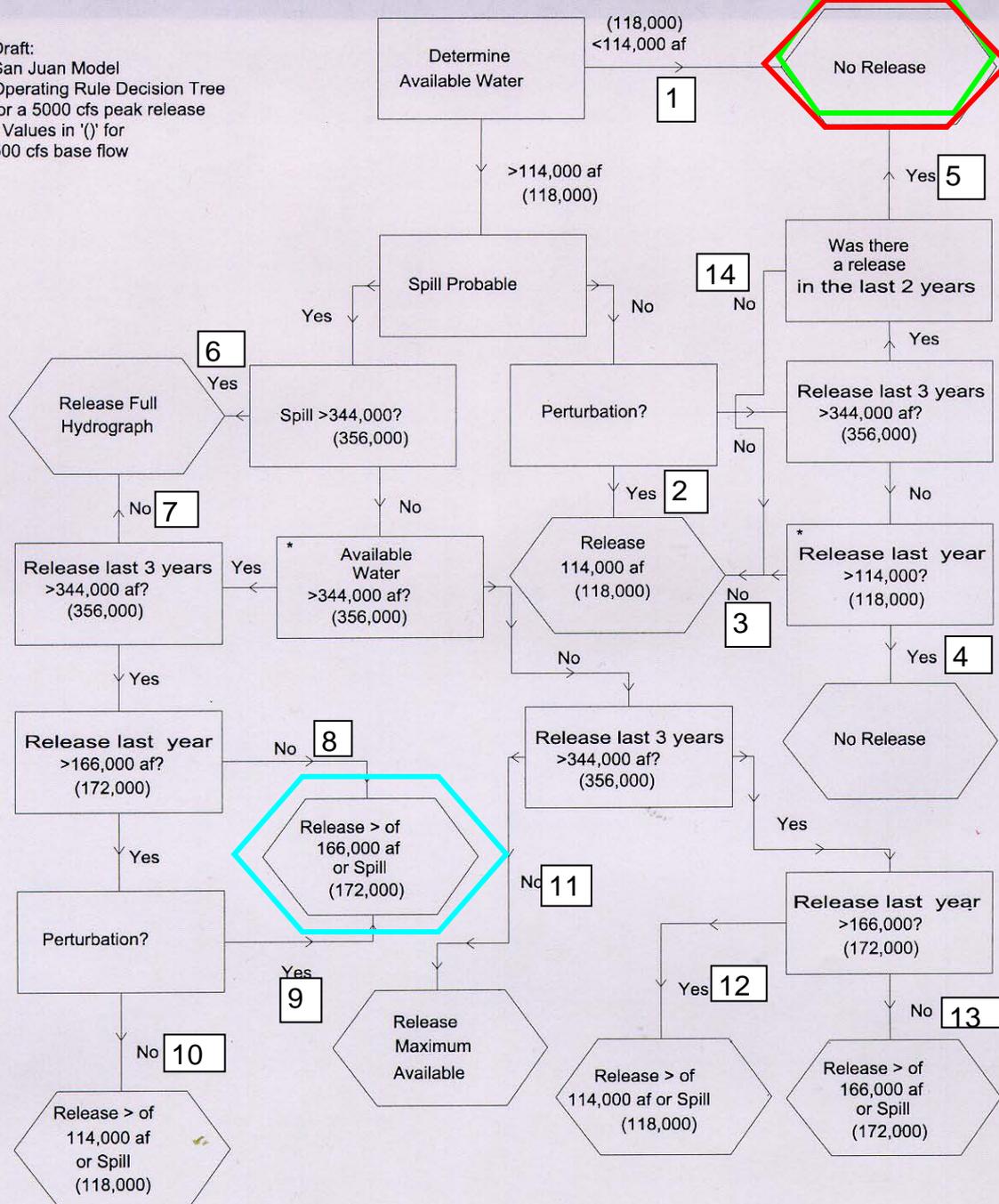
## Cummulative April - July Inflow of Representative SWE Years



# Water Year 2010 Proposed Operations

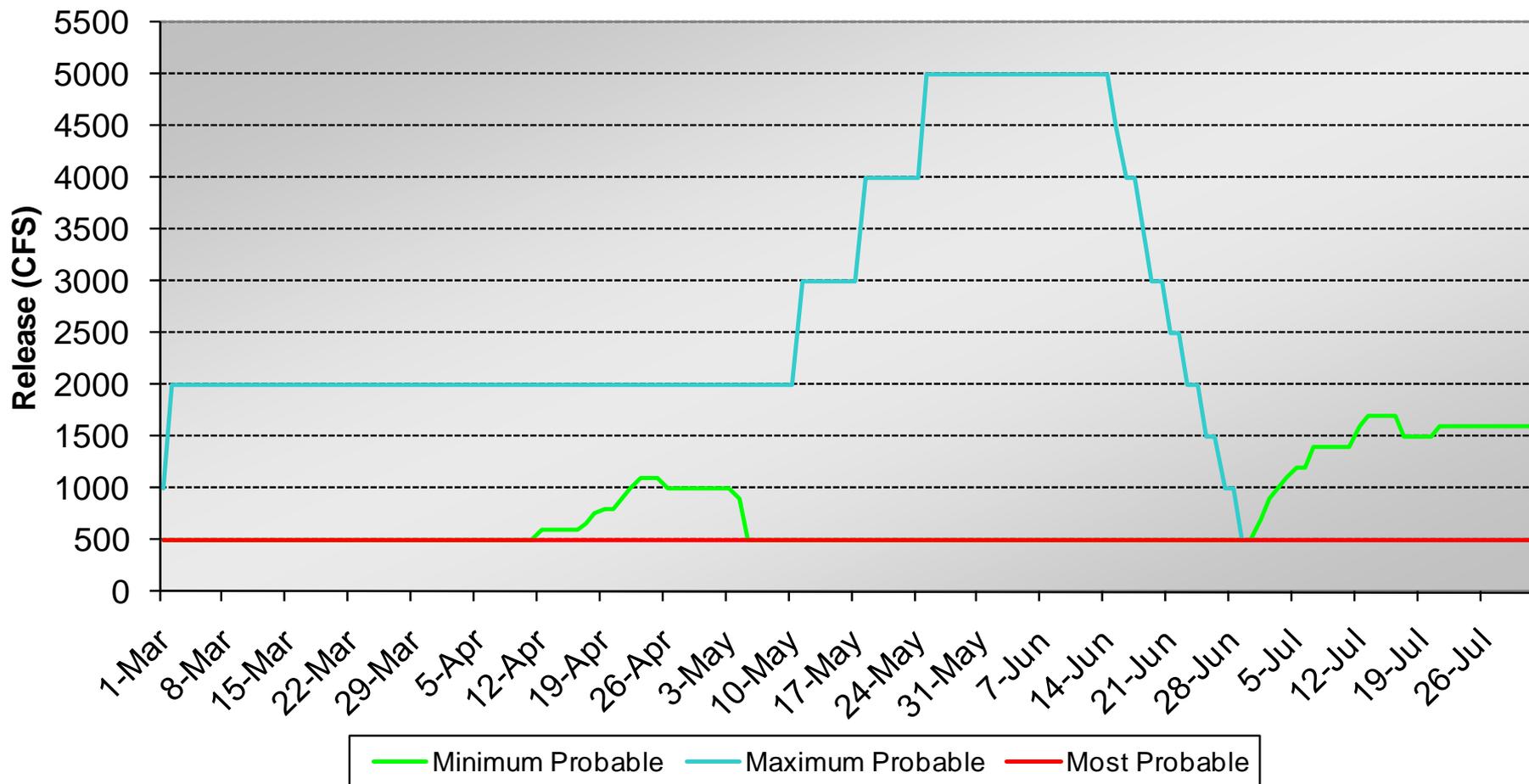
- Navajo Reservoir is at a manageable elevation
- 500 cfs base release
- Under the current Most Probable Forecast, there will be no spring peak release.
- It is only January, and a lot can still change!

Draft:  
 San Juan Model  
 Operating Rule Decision Tree  
 for a 5000 cfs peak release  
 - Values in '()' for  
 500 cfs base flow

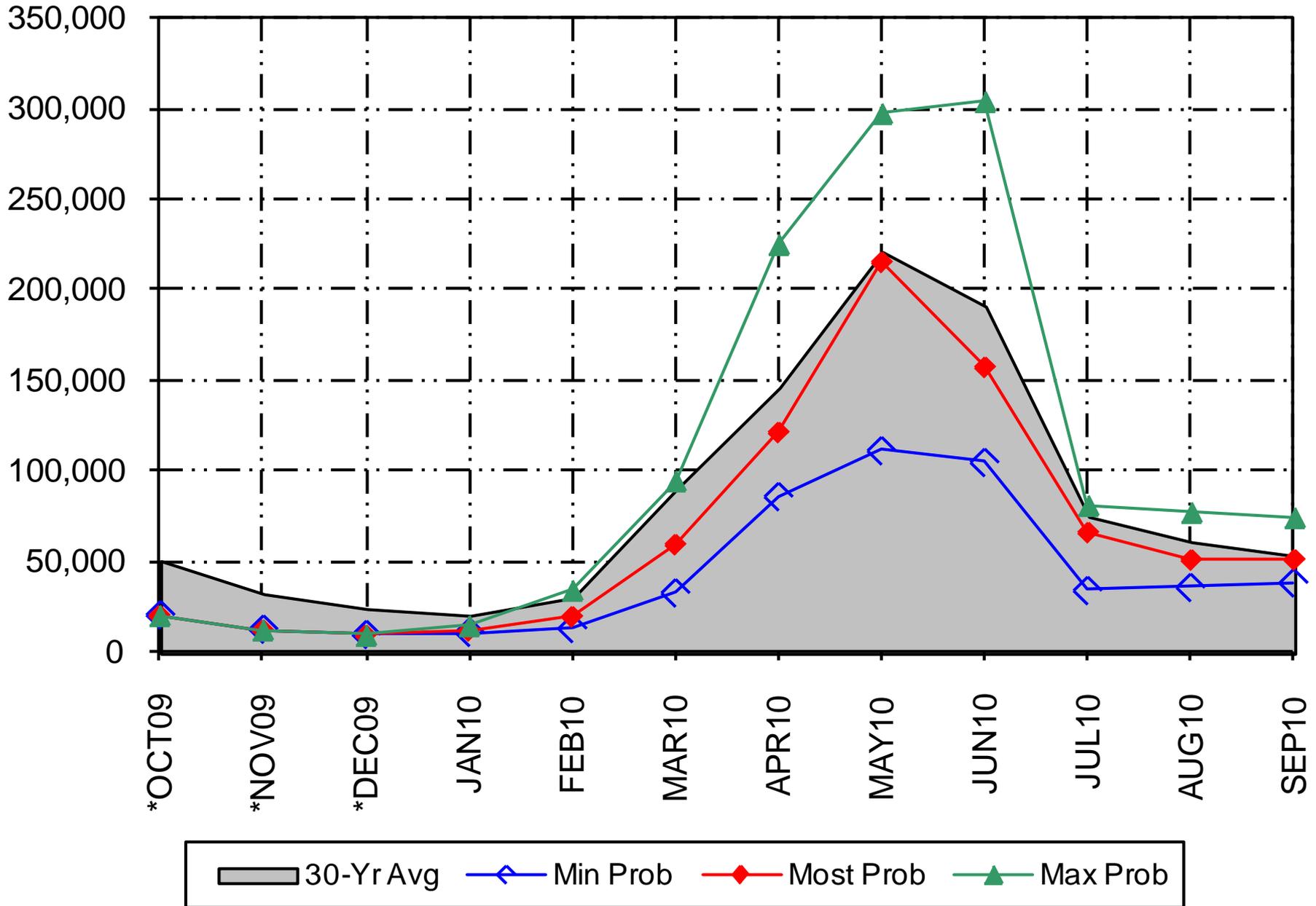


AVAILABLE WATER	PATH
Min Prob: 199,000 af	#5
Most Prob: 533,000 af	#5
Max Prob: 929,000 af	#8

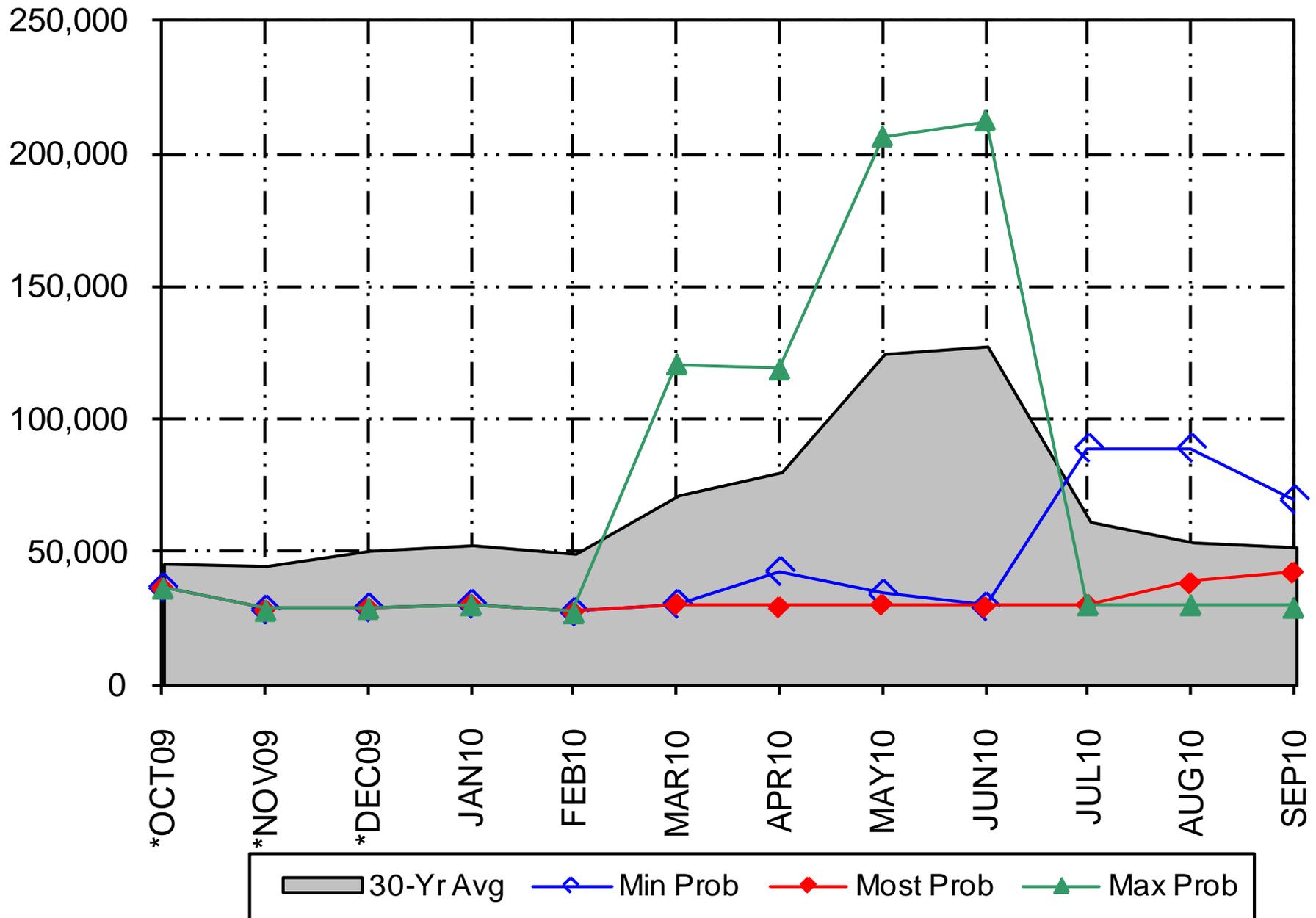
## Spring Peak Hydrographs for WY2010 as of the Mid January Forecast



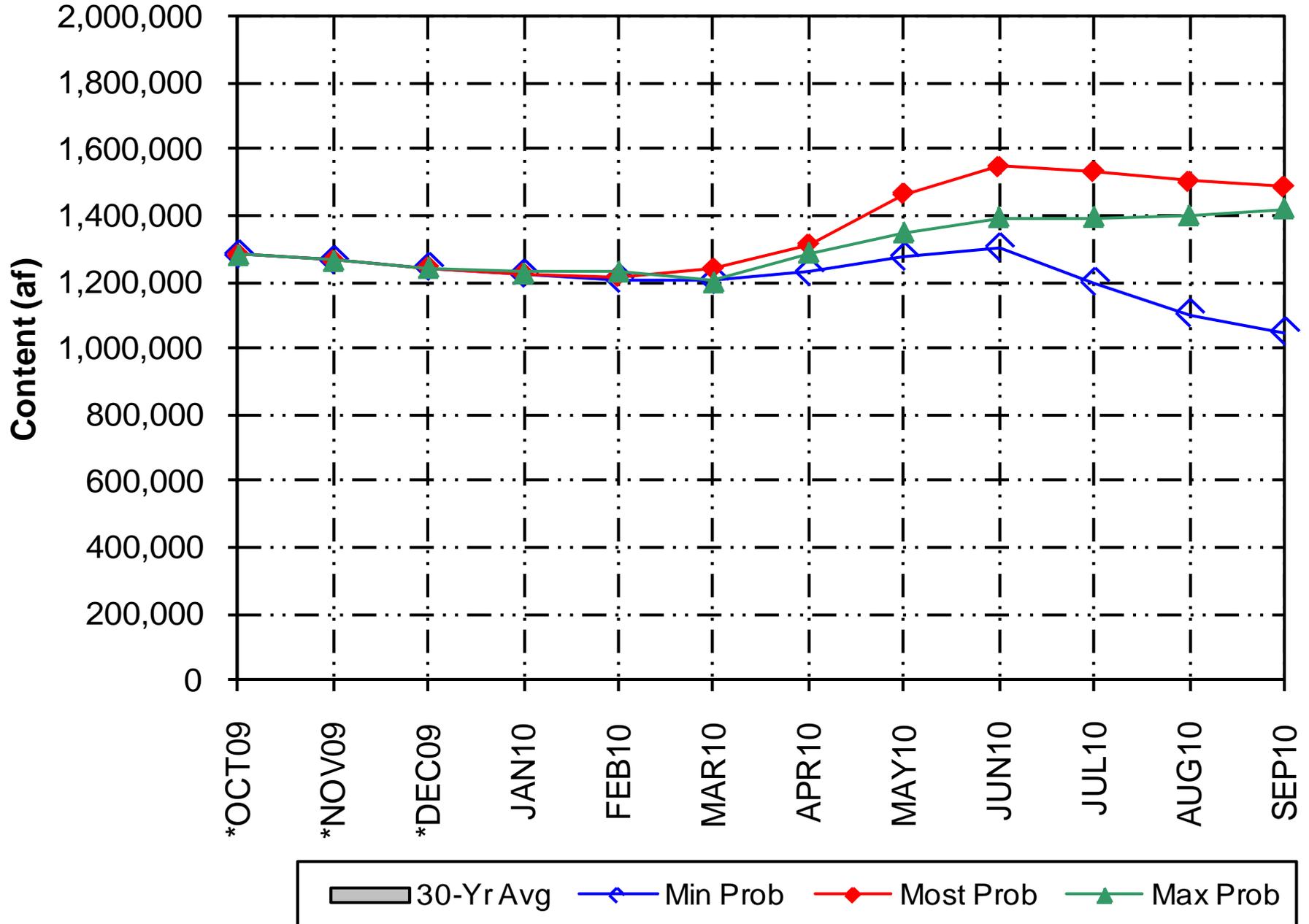
# Inflow (af) as of January 2010 Mid Month Forecast



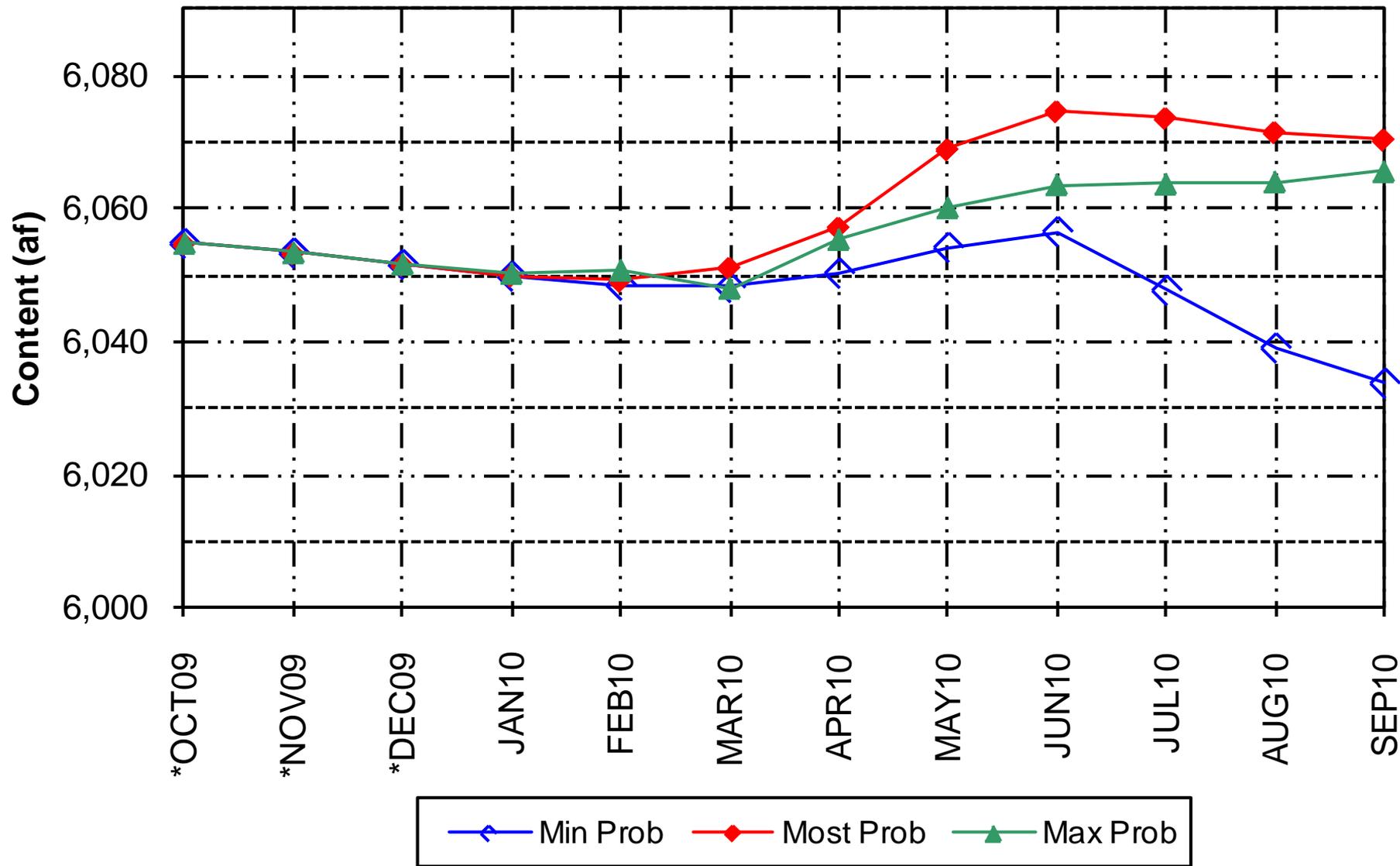
# Release (af) as of January 2010 Mid Month Forecast



# Content (af) as of January 2010 Mid Month Forecast

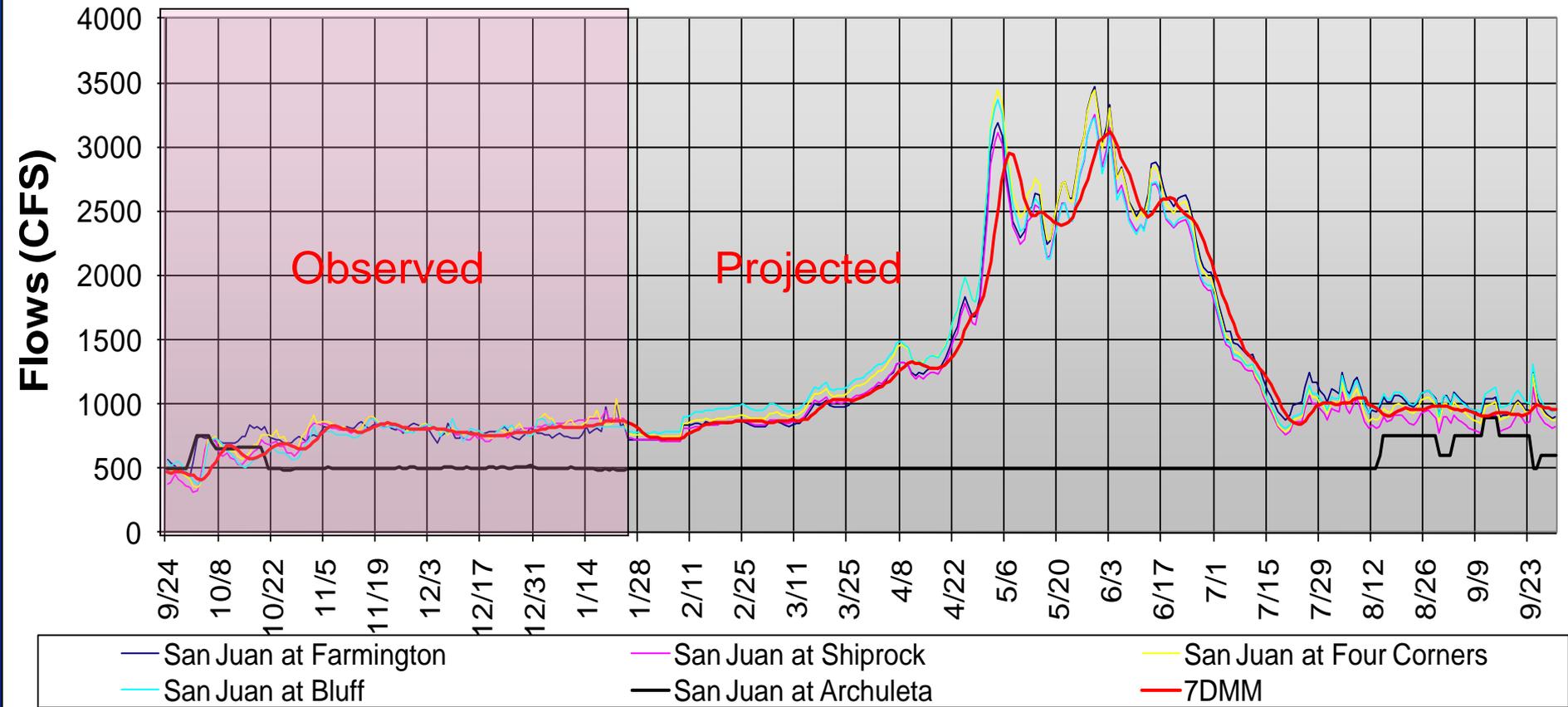


# Elevation as of January 2010 Mid Month Forecast



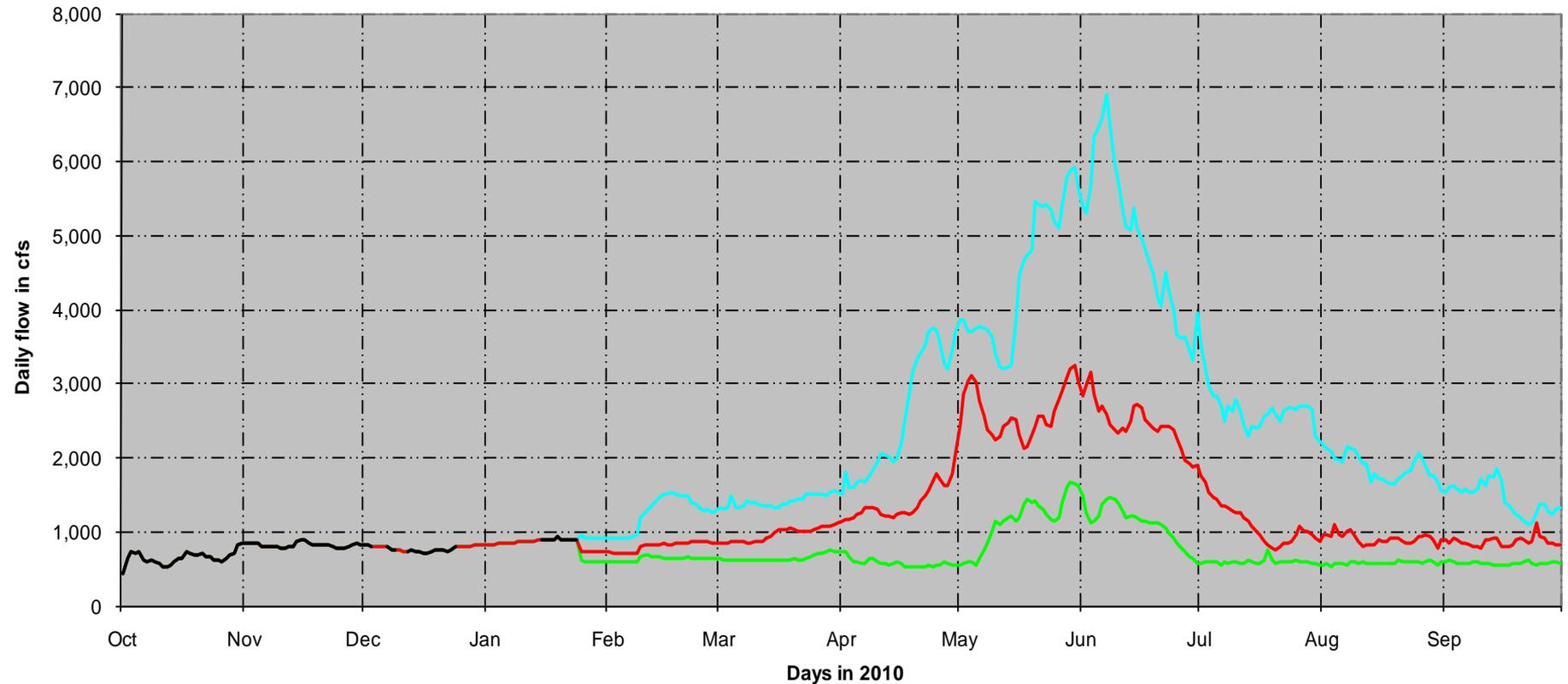
# San Juan River Downstream Flows

San Juan Flows based on Most Probable Navajo Release  
and Animas @ Farmington Flows as of 1/25/2010



# San Juan River at Shiprock

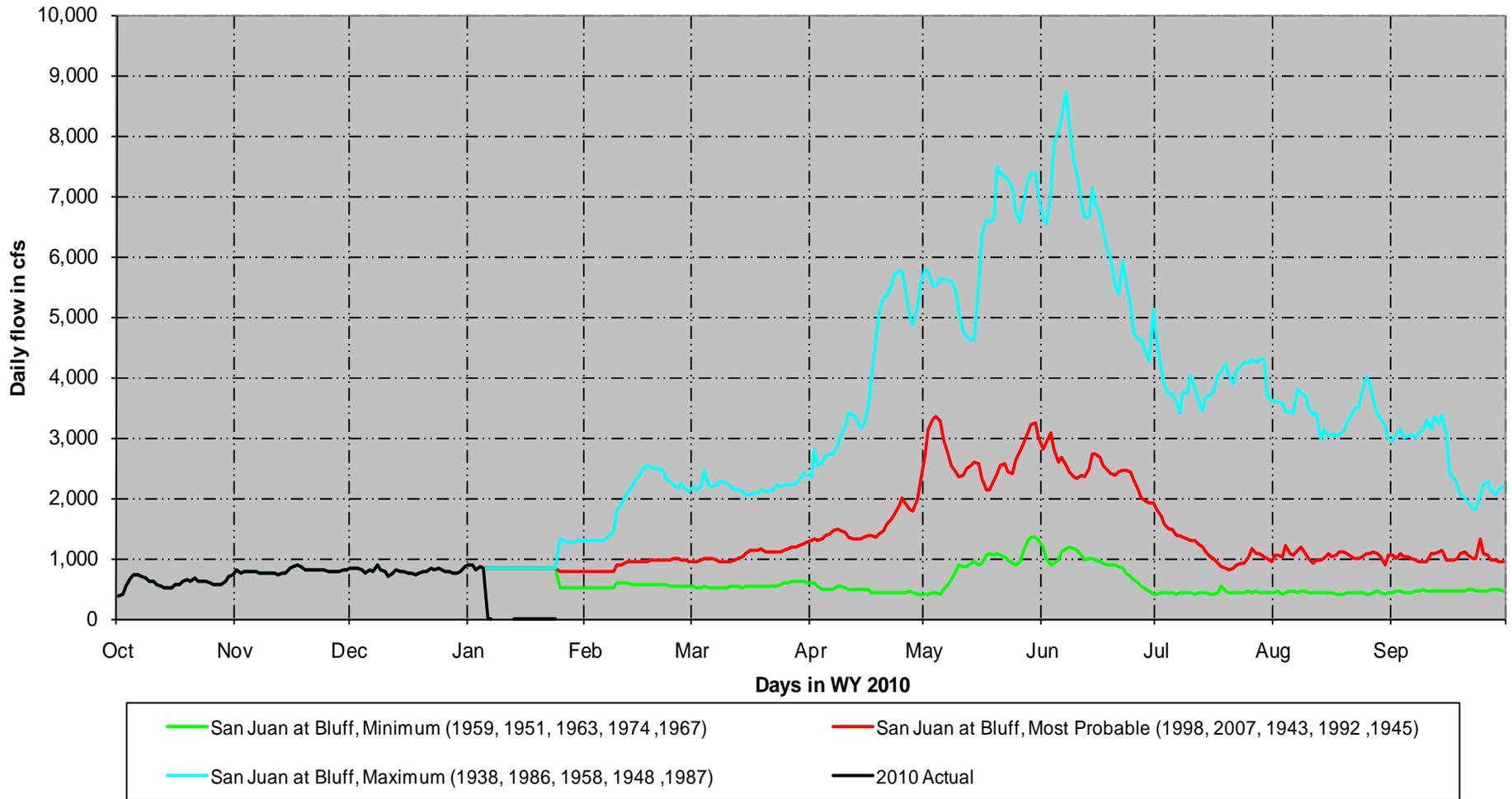
Based on the Jan Mid Month Forecast , Estimate of the San Juan River at Shiprock, Representative Daily Historic Flows

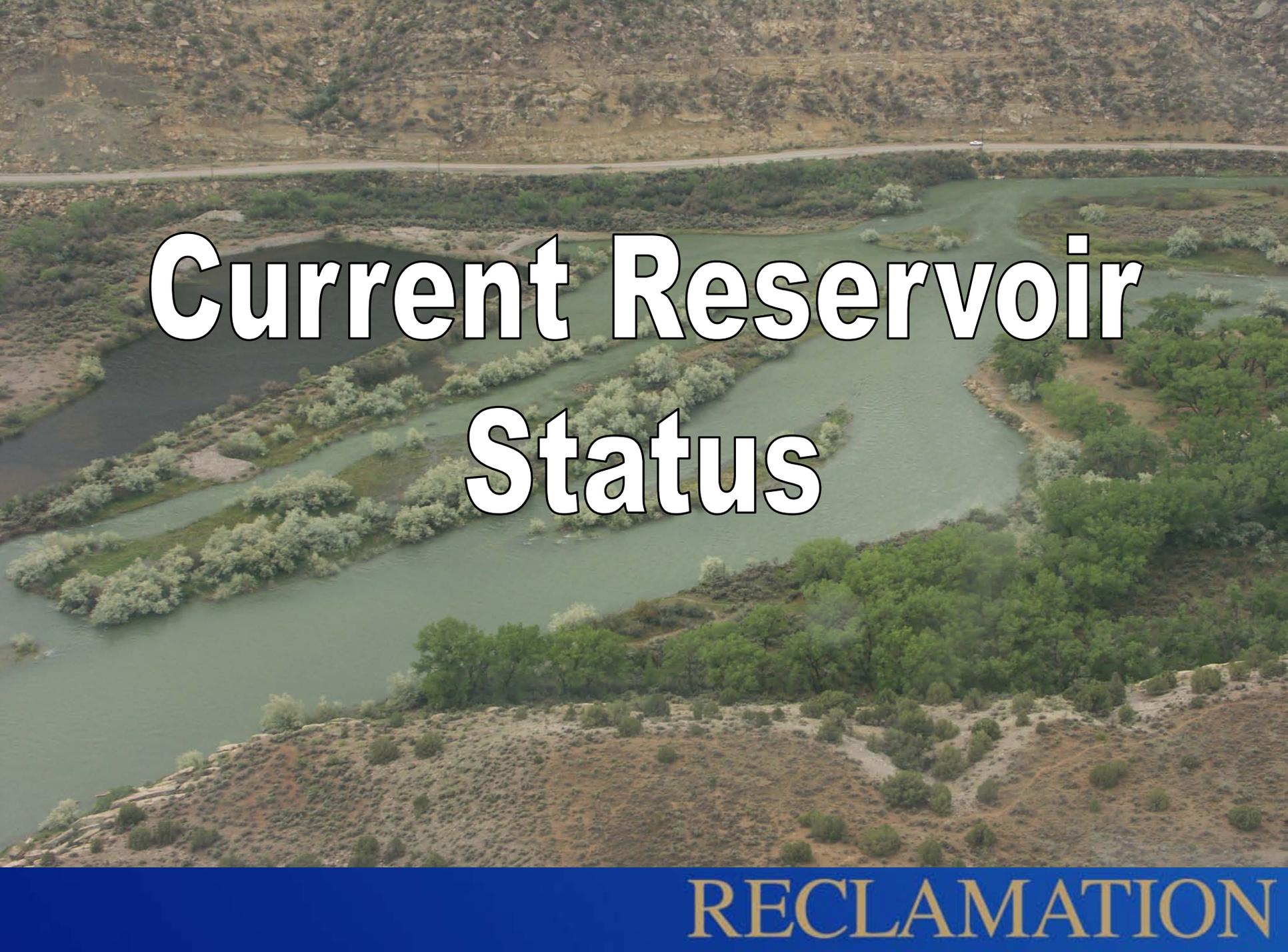


San Juan at Shiprock, Minimum (1959, 1951, 1963, 1974 ,1967)      San Juan at Shiprock, Maximum (1938, 1986, 1958, 1948 ,1987)  
San Juan at Shiprock, Most Probable (1998, 2007, 1943, 1992 ,1945)      2010 Actual

# San Juan River at Bluff

Based on the Jan Mid Month Forecast, Estimate of the San Juan River at Bluff, Representative Daily Historic Flows



An aerial photograph of a reservoir with a winding path of water. The water is a light greenish-brown color. The surrounding landscape is a mix of dry, brownish hills and green vegetation. A road is visible at the top of the image. The text "Current Reservoir Status" is overlaid in the center in a large, white, bold font with a black outline.

# Current Reservoir Status

RECLAMATION

# Navajo Current Conditions

(as of 1/25/10)

Elevation = 6050.34 (94% of Average)

Storage = 1,229,550 af (72% Full)

Inflow = 190 cfs (January Average)

Release = 500 cfs

NIIP = Not currently diverting water

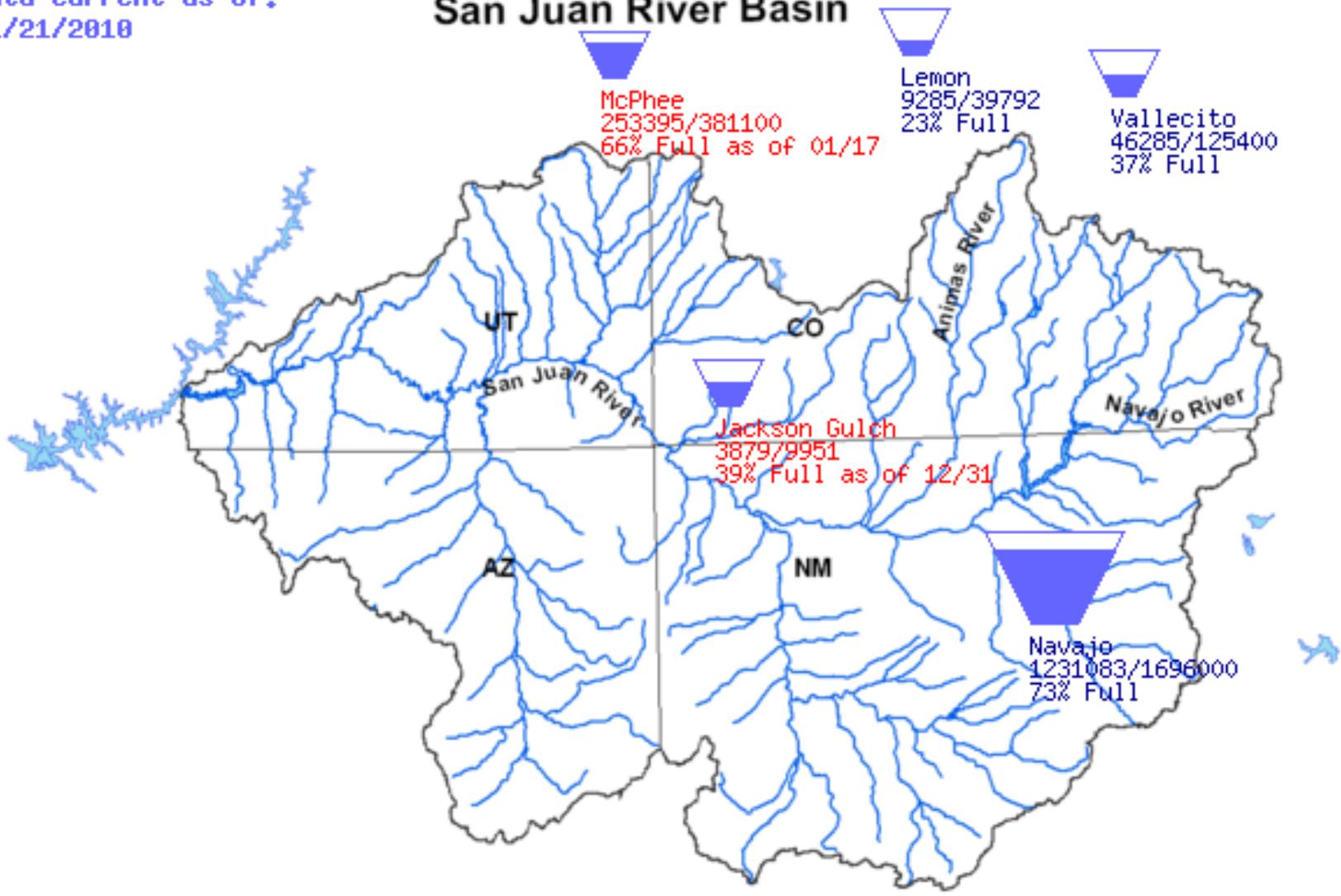
San Juan-Chama Diversion = None

RECLAMATION

# Nearby Reservoirs

Data Current as of:  
01/21/2010

## San Juan River Basin



RECLAMATION

# Nearby Reservoirs

(1/25/2010)

## Vallecito

- Elevation = 7631.0 (37% Full, 73% of average)
- Storage = 46,483 af
- Release = 30 cfs
- Inflow = 67 cfs

## Lemon

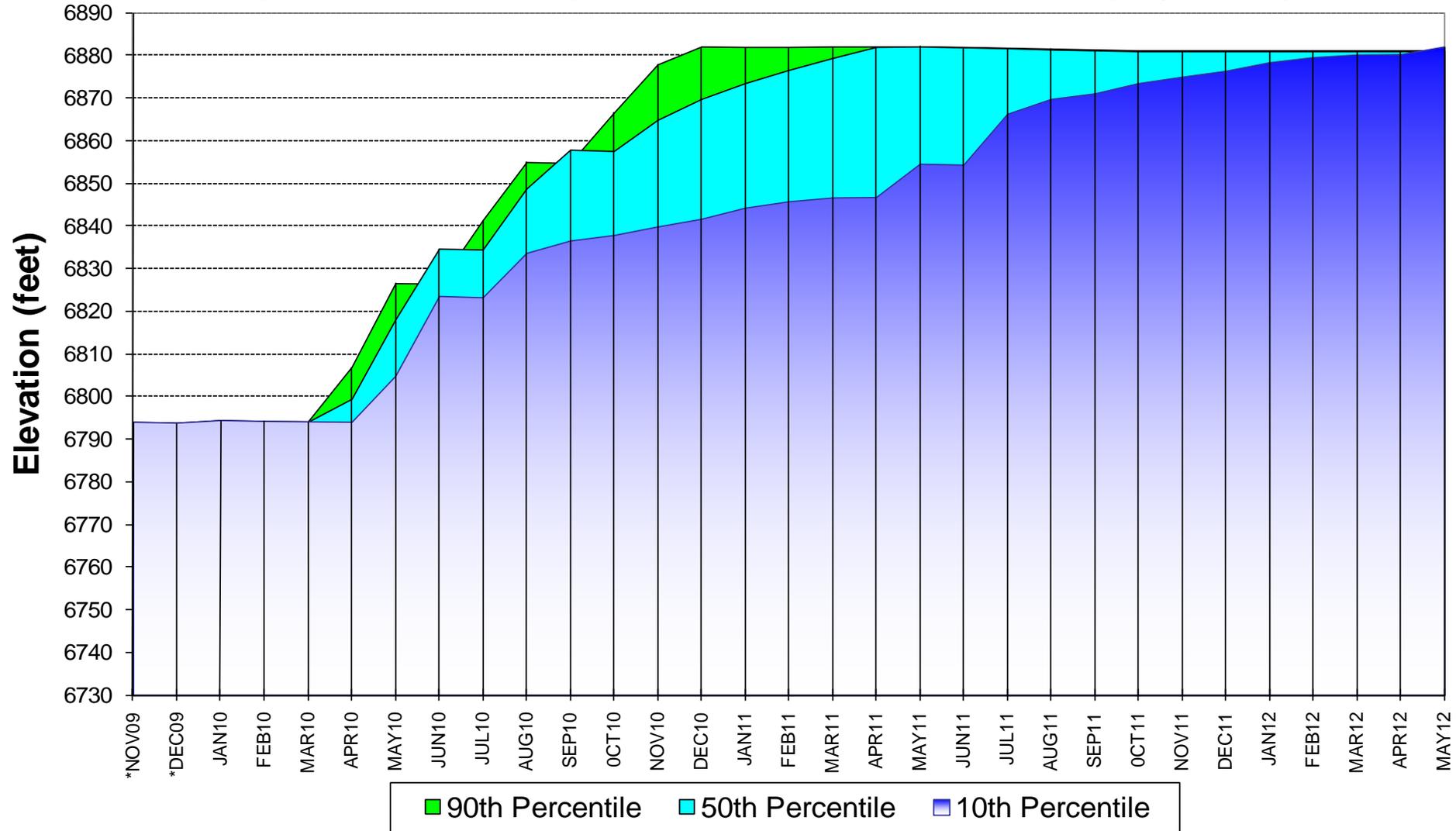
- Elevation = 8078.6 (23% Full, 44% of average)
- Storage = 9,292 af
- Release = 9 cfs
- Inflow = 9 cfs

# Animas-La Plata Project

- No pumping since the end of July
- Continuation of pumping is expected in March
- Reservoir is 21% Full (25,521 af stored)
- Navajo Nation Municipal Pipeline is currently under construction

# Animas-La Plata Project

**Projected First Fill Schedule**  
based on the January 10 Final Forecast  
(see attached assumptions and constraints for basis of projections)



An aerial photograph of the San Juan River. The river flows from the top center towards the bottom right. In the middle of the river, there is a dam with several spillways. The surrounding landscape is a mix of green shrubs and trees on the left and brown, rocky hills on the right. The text is overlaid on the image in a stylized, yellow, bubbly font with a blue outline.

*Recommendations  
for the San Juan River  
Operation and Administration*

RECLAMATION



# Navajo Dam Maintenance Activities

# Future Navajo Dam Maintenance Activities:

Muck-out Stilling Basin

Replace Bolts on Penstocks

Quagga Mussels

Auxiliary Outlet Works Gates

# Public Law 111-11

- Non-Navajo ditch improvements



**Fish & Wildlife Service**  
**San Juan RIP Update**

**RECLAMATION**



*Reports from other Agencies*

RECLAMATION

The background consists of several overlapping, slightly crumpled white papers scattered across a light gray surface. Large, bold, black question marks are printed on the papers, some partially obscured by the folds and other papers. The overall composition is centered around the theme of questions and inquiry.

Questions from  
the Audience

# How You Can Access Information



Bureau of Reclamation  
[www.usbr.gov/uc](http://www.usbr.gov/uc)

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

Colorado Basin River Forecast Center  
[www.cbrfc.noaa.gov](http://www.cbrfc.noaa.gov)

RECLAMATION

# Reclamation Contacts:

**Pat Page**

970-385-6560, [ppage@usbr.gov](mailto:ppage@usbr.gov)

**Ryan Christianson**

970-385-6590, [rchristianson@usbr.gov](mailto:rchristianson@usbr.gov)

**Ruth Swickard**

970-385-6523, [rswickard@usbr.gov](mailto:rswickard@usbr.gov)

RECLAMATION

# Summary

- WY2009 had highly variable conditions again (dry/wet/dry)
- After very dry fall, snowfall in December and January have helped bring snowpack to average.
- Forecasts are very preliminary!
- Most Probable April – July Inflow Forecast is 93% of average
- No spring peak release is currently scheduled based on the most probable forecast
- Downstream river flows are forecasted to be lower
- Likely Minimum (Base) Release = 500 cfs
- Target Baseflow is 500 -1000 cfs in Critical Habitat
  
- Next Operations Meeting: April ?, 2010



Thanks for coming!