

Colorado Basin Outlook

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**NOAA/NWS Arizona La Nina Briefing
December 6, 2013**



Outline

- River Forecast Center overview
- Arizona's water supply
- 2013 runoff review
 - Colorado River
 - Salt/Verde Rivers
- 2014 Look Ahead
 - Antecedent conditions
 - Climate and Weather impacts on Streamflow



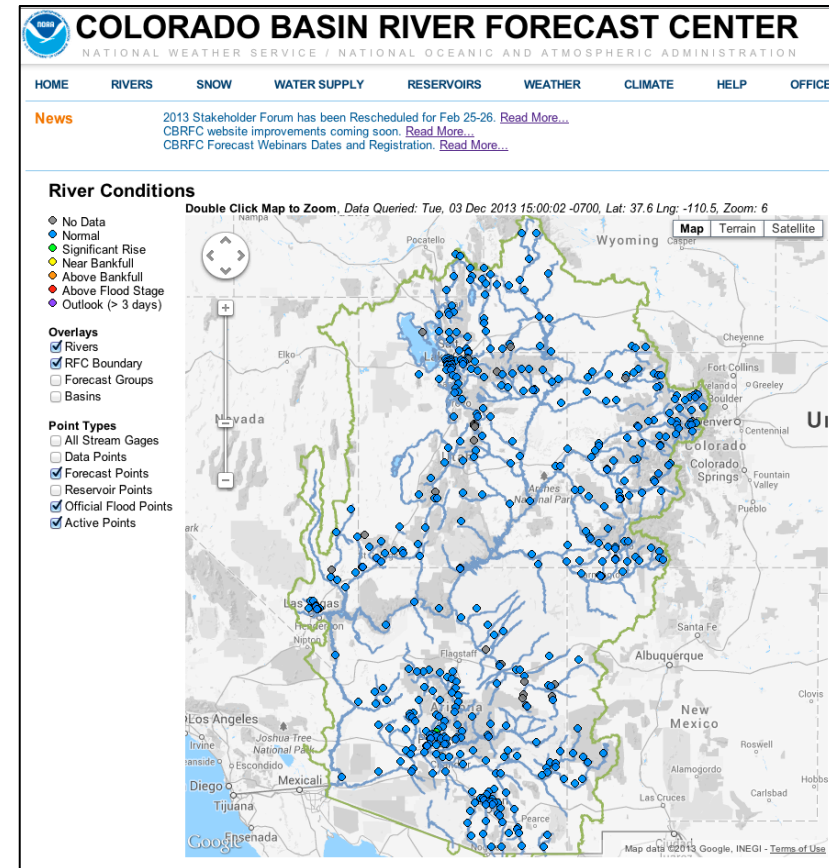
Colorado Basin River Forecast Center



The Colorado Basin River Forecast Center (CBRFC) generates streamflow forecasts across the Colorado and Utah. The latest forecasts, data, and more are available online:

- Daily streamflow forecasts
- Long lead peak flow forecasts
- Water supply forecasts
- Webinar briefings
- Email updates
- And More....

www.cbrfc.noaa.gov

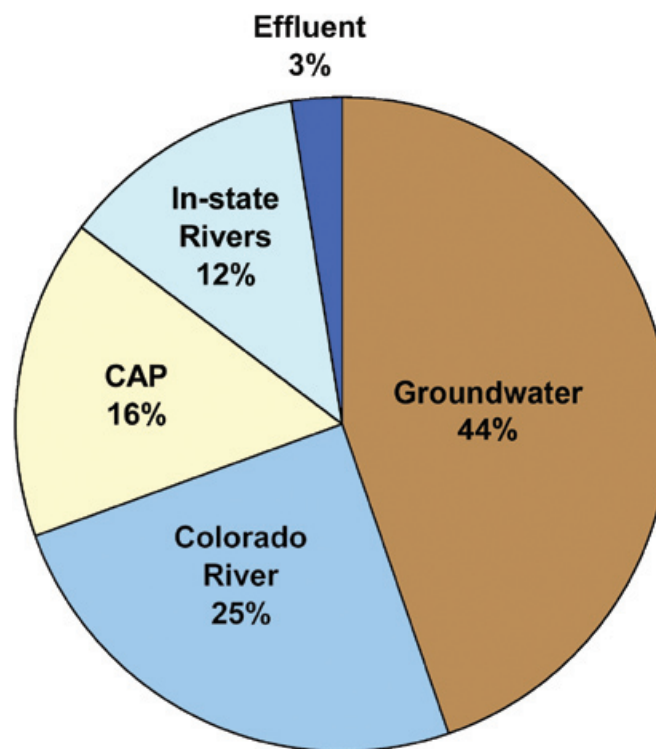


Arizona Water Supply

Arizona's surface water surface water supply:

- 2.8 MAF/year from Colorado R
- ~0.8 MAF/year from Salt Verde
- ~0.25 MAF/year from other rivers

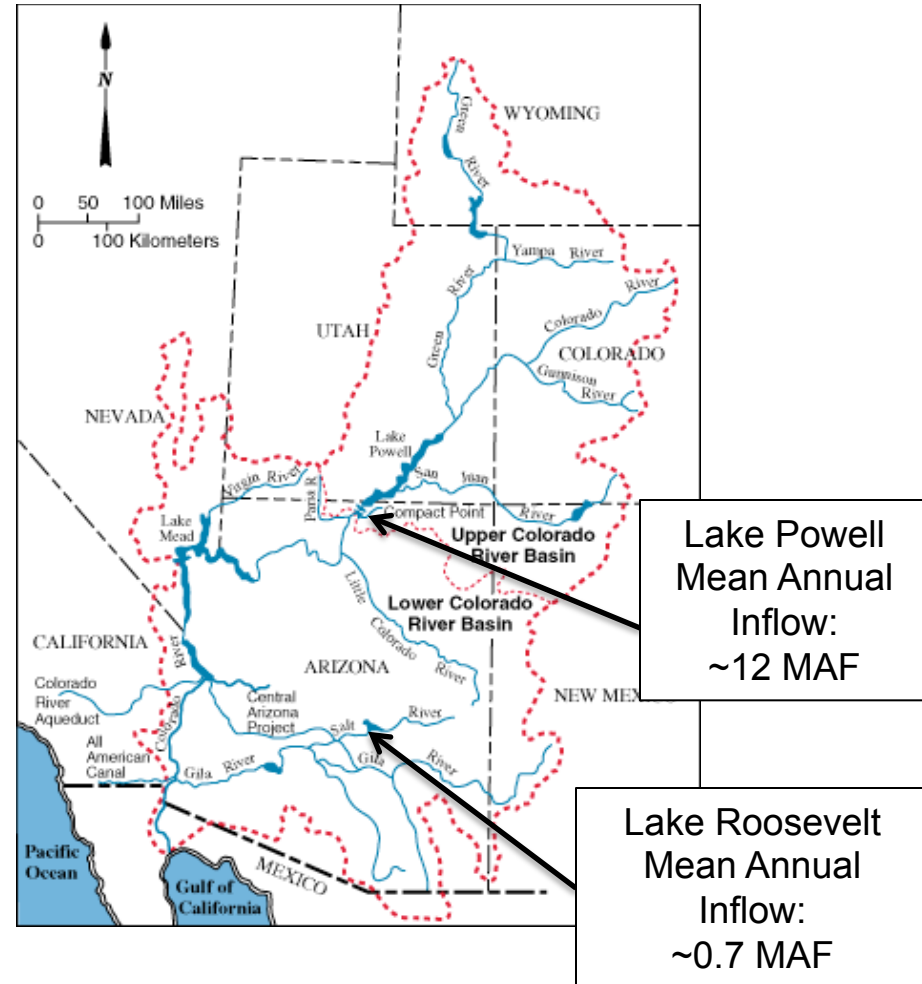
Water Supply



Colorado River Basin

Key Characteristics:

- Mostly semi-arid with average annual precipitation ranging from 3" to 75"
- Runoff dominated by snowmelt from mountains: 85% of runoff comes from elevations above 9000 feet
- Reservoir storage capacity (~60 MAF) is ~4 times mean annual flow (~15 MAF)
- Average annual water demand approximately equal to supply

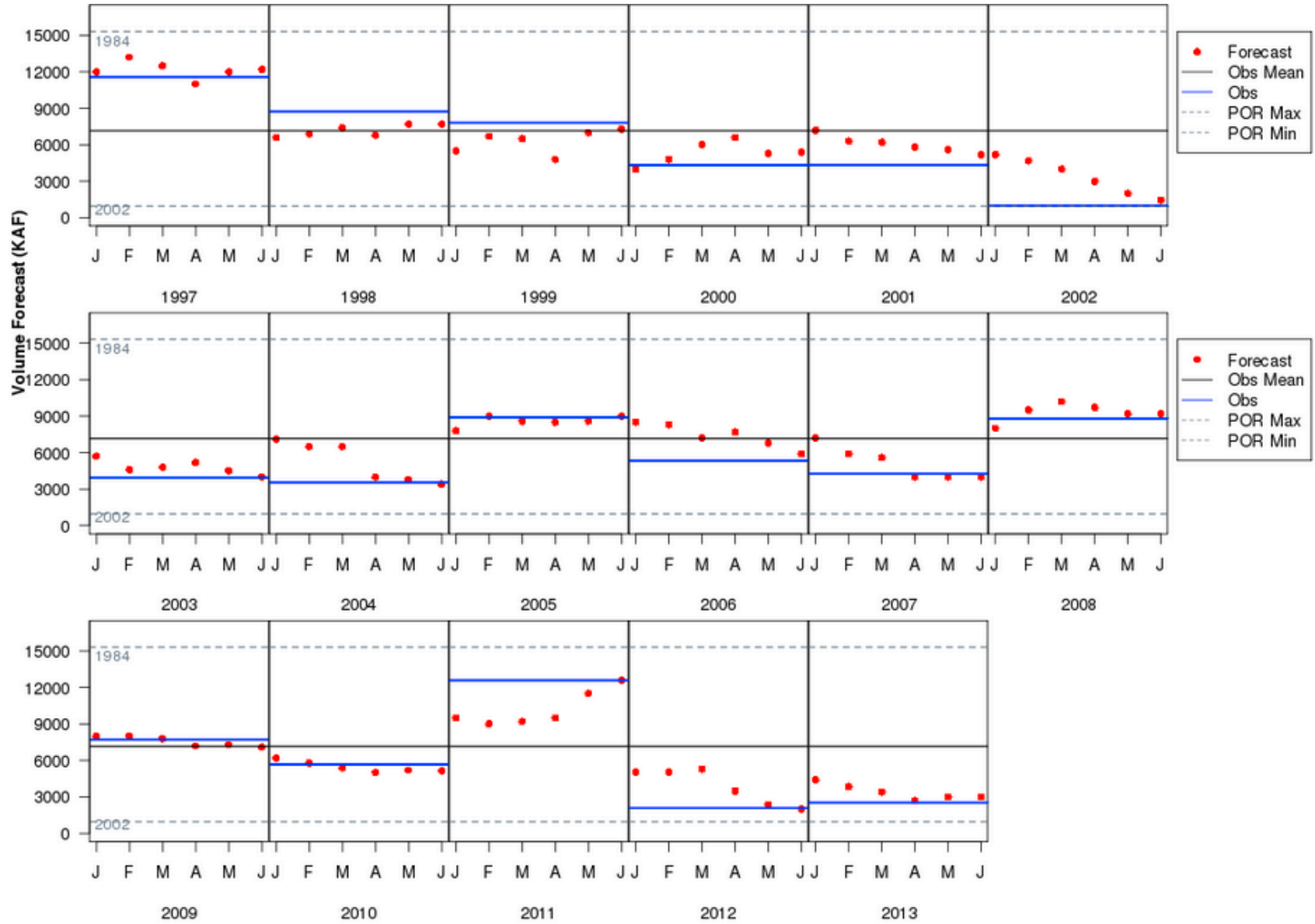




Recent History

- **Upper Colorado** - 2012 and 2013 were the two driest consecutive years on record and two of the four driest individual years on record for Lake Powell inflow
- **Salt/Verde** – Roosevelt inflow was 2011 (9th driest), 2012 (21st driest), and 2013 (34th driest) were all much below historical average and median
- Summer 2013 was very wet – providing good antecedent conditions for winter season

Lake Powell Inflow



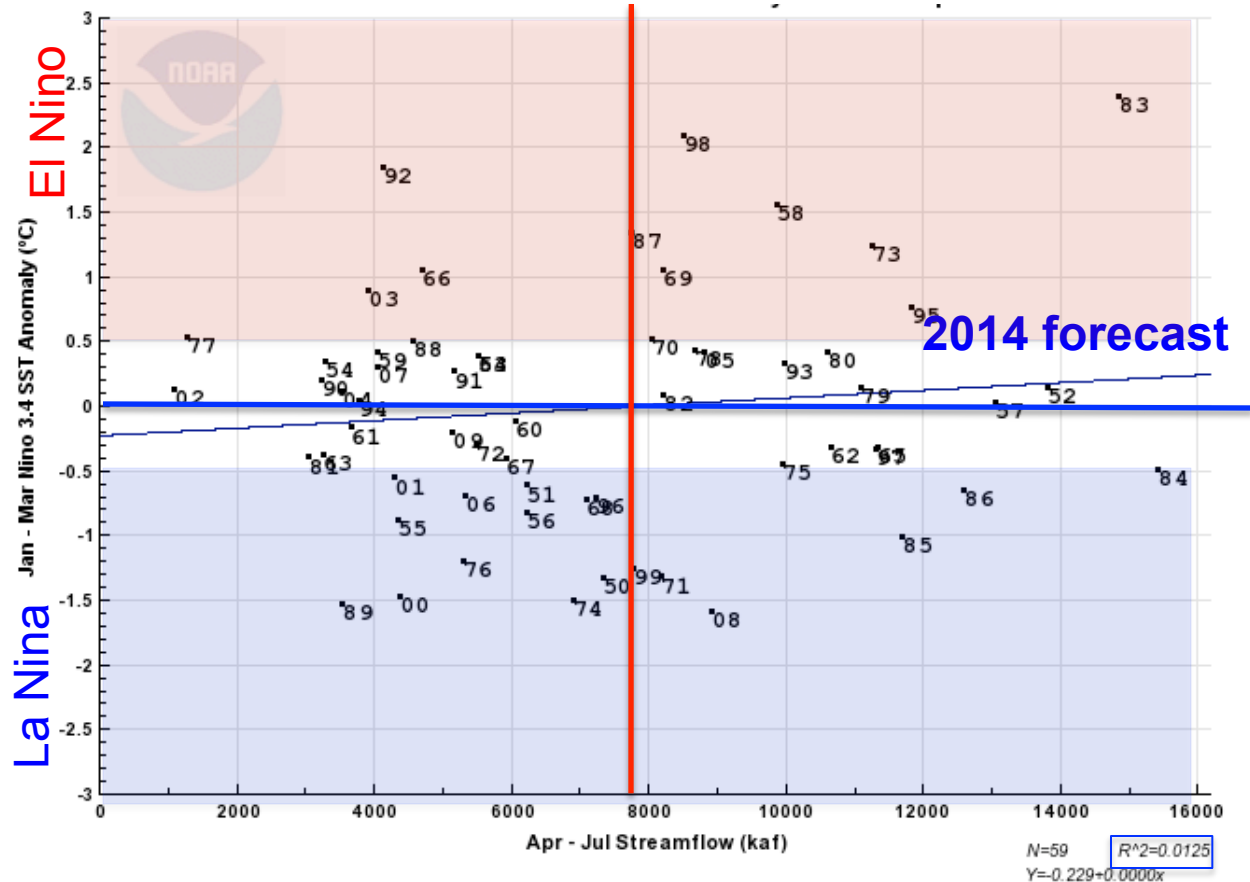
La Nina and CO River Streamflow

Very low correlations in most of upper basin (right: Lake Powell)

La Nina correlated with low streamflow in lower basin at around 0.2 – 0.3

Weaker correlations for San Juan Basin with low streamflow and Upper Green with high streamflow

Lake Powell Inflow vs El Nino / La Nina





El Nino/La Nina and Arizona Rivers



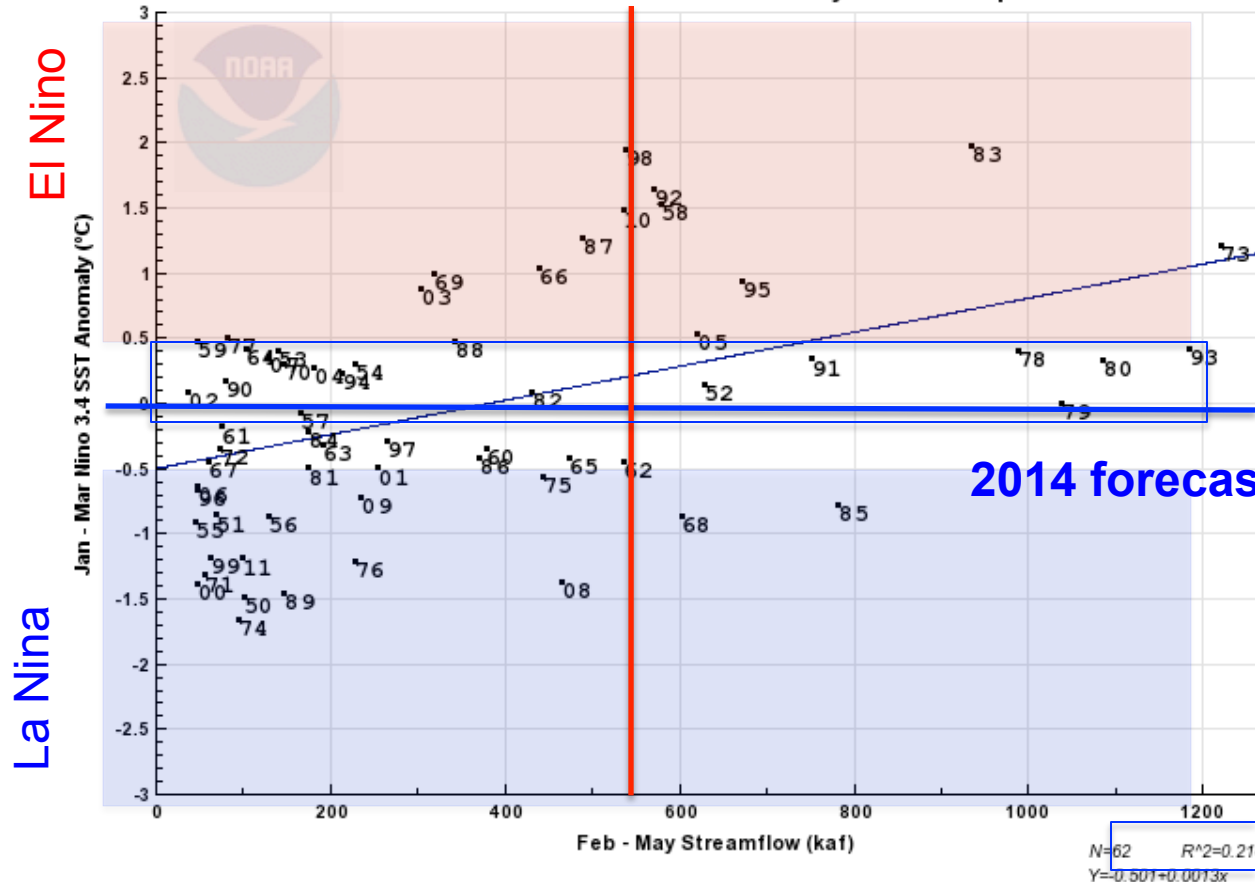
Salt River shown

Significant correlations (0.15-0.3) for low streamflow during La Nina years

Relationship especially strong with strong La Nina years (like 2011)

Lake Roosevelt Inflow vs El Nino / La Nina

SLRA3 Streamflow-Climate Variability Relationship

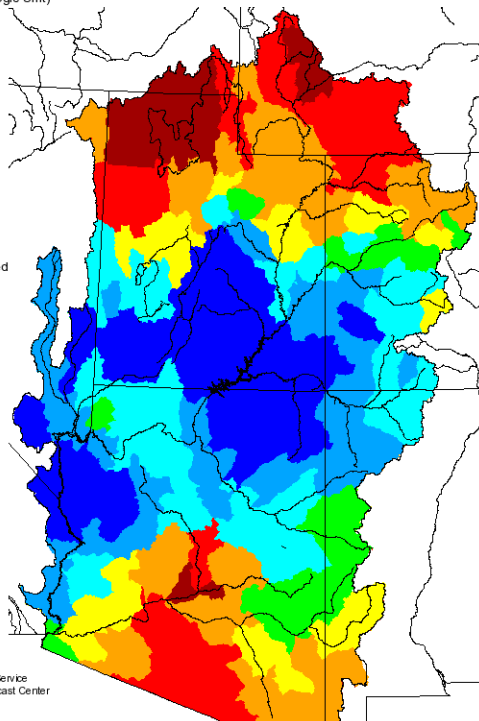
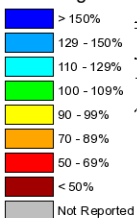


Summer/Fall Precipitation

Monthly Precipitation for August 2013

(Averaged by Hydrologic Unit)

% Average

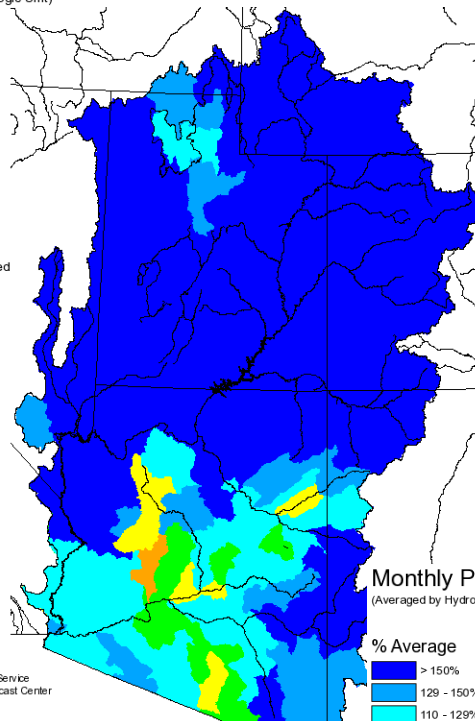
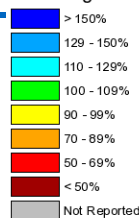


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NOAA, National Weather Service
Colorado Basin River Forecast Center
Salt Lake City, Utah
www.cbrec.noaa.gov

Monthly Precipitation for September 2013

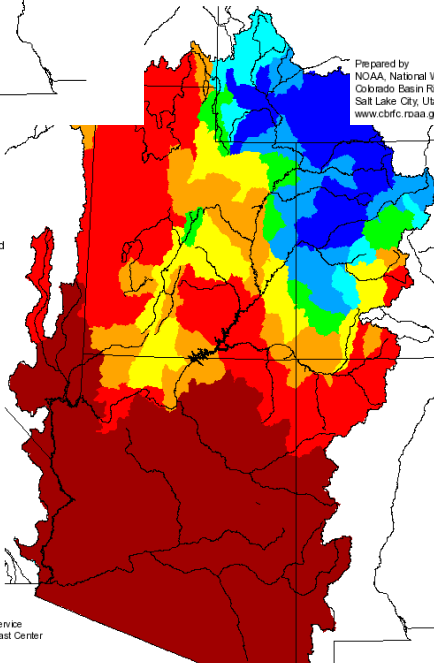
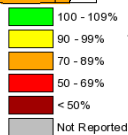
(Averaged by Hydrologic Unit)

% Average



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October 2013

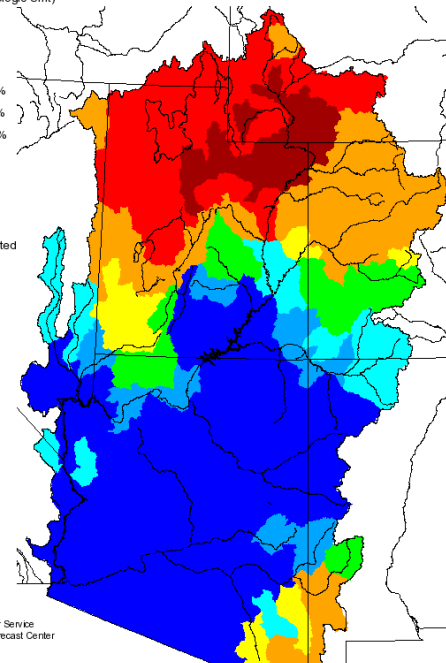
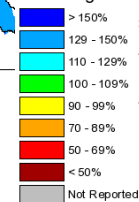


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Monthly Precipitation for November 2013

(Averaged by Hydrologic Unit)

% Average

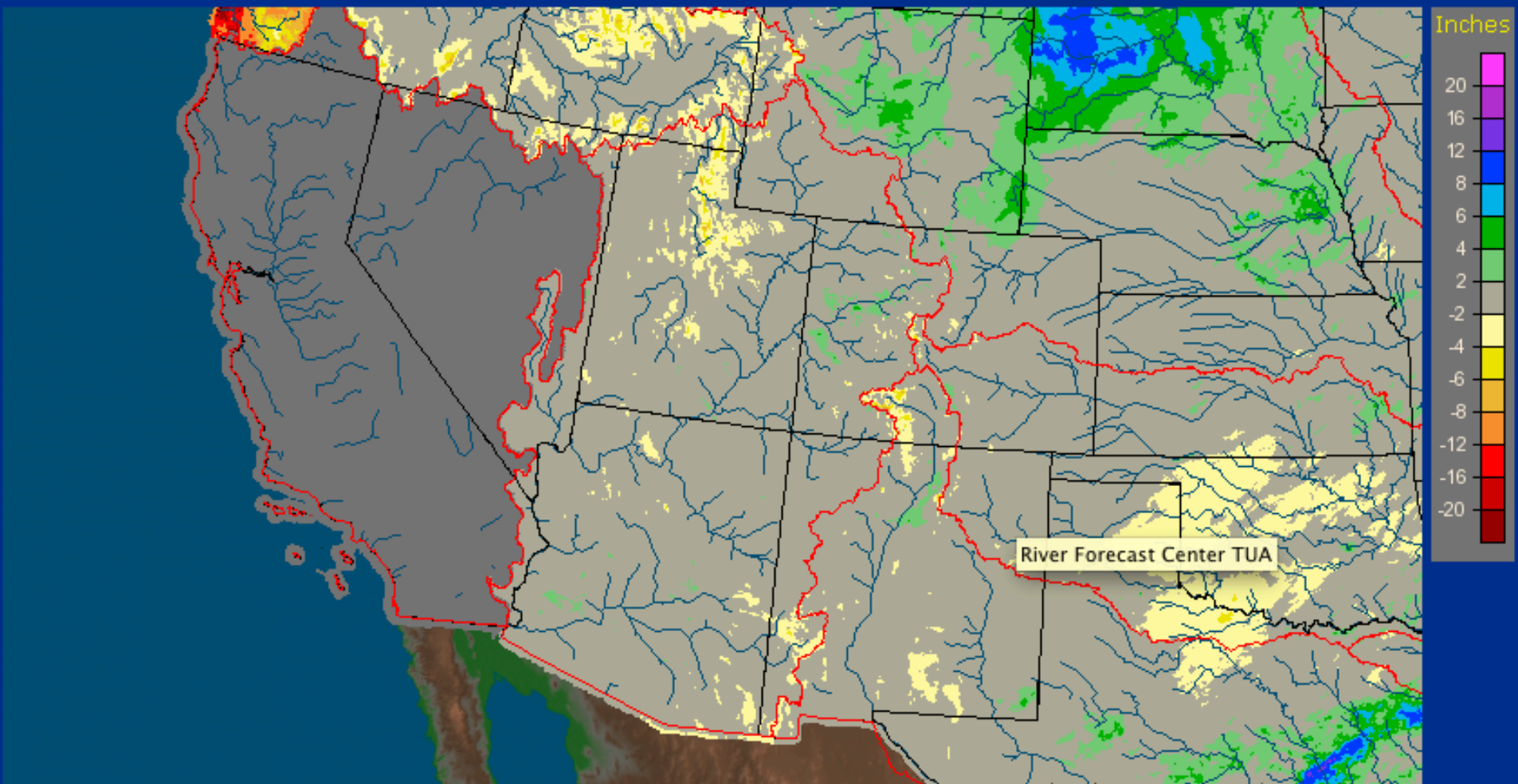


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Water Year Departure from Normal

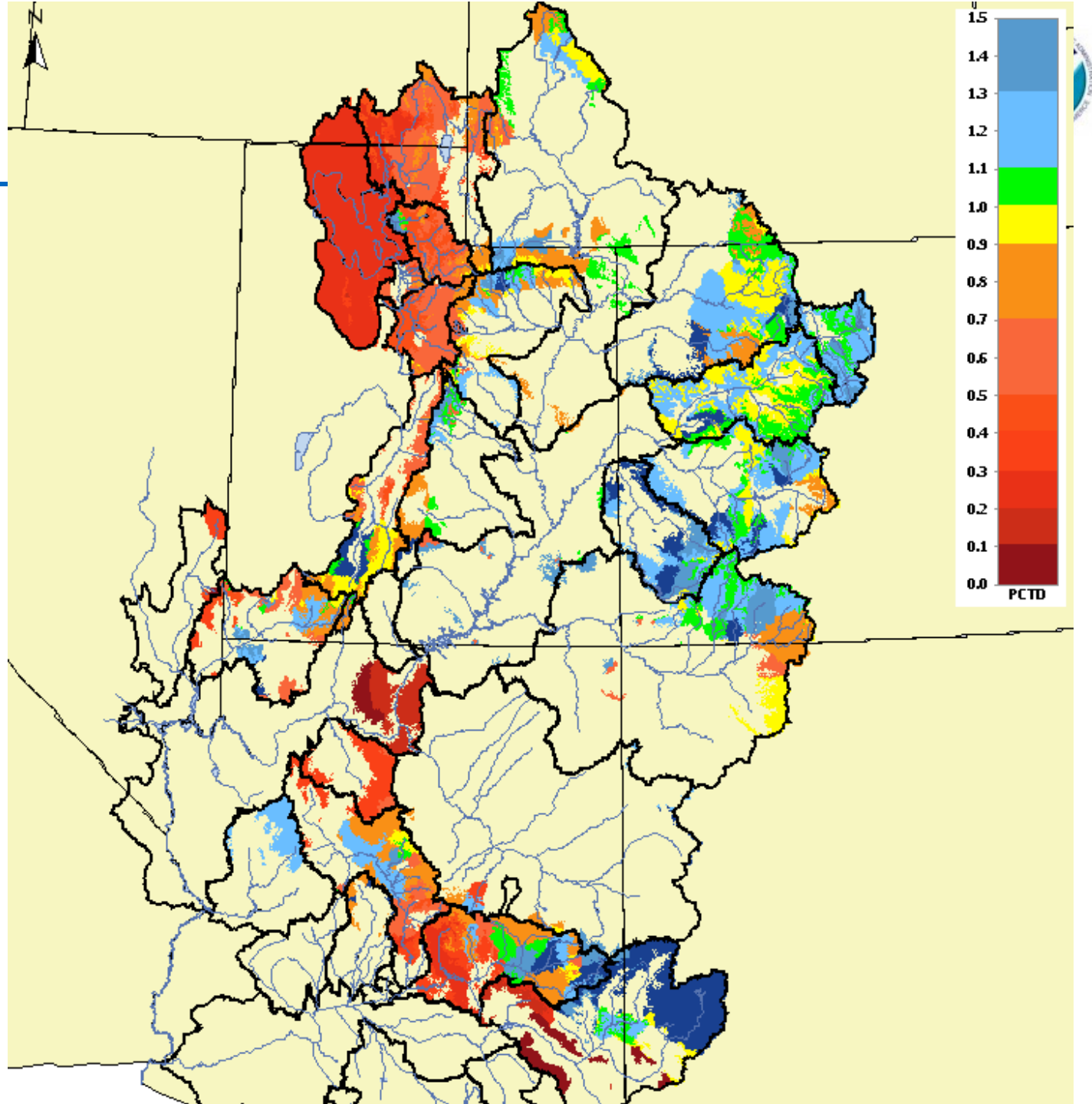
Colorado Basin RFC Salt Lake City, UT: Current Water-Year (Oct 1) Departure from Normal Precipitation
Valid at 12/6/2013 1200 UTC - Created 12/6/13 15:51 UTC



Topo Pcpn Amount Counties Rivers States Highway/City RFC Boundary



CBRFC Model Soil Moisture 11/1/2013



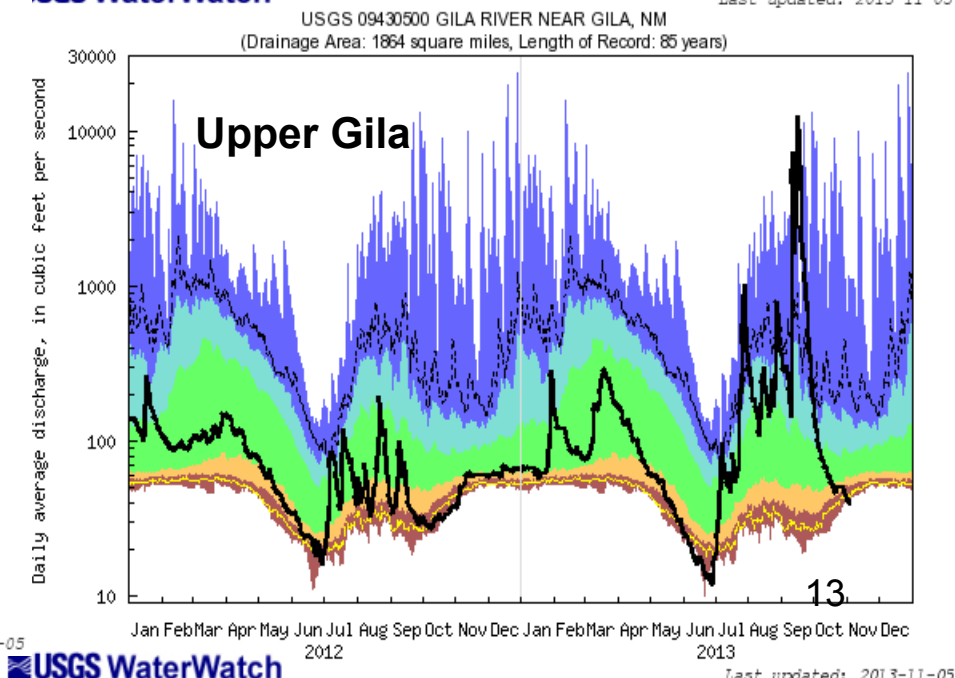
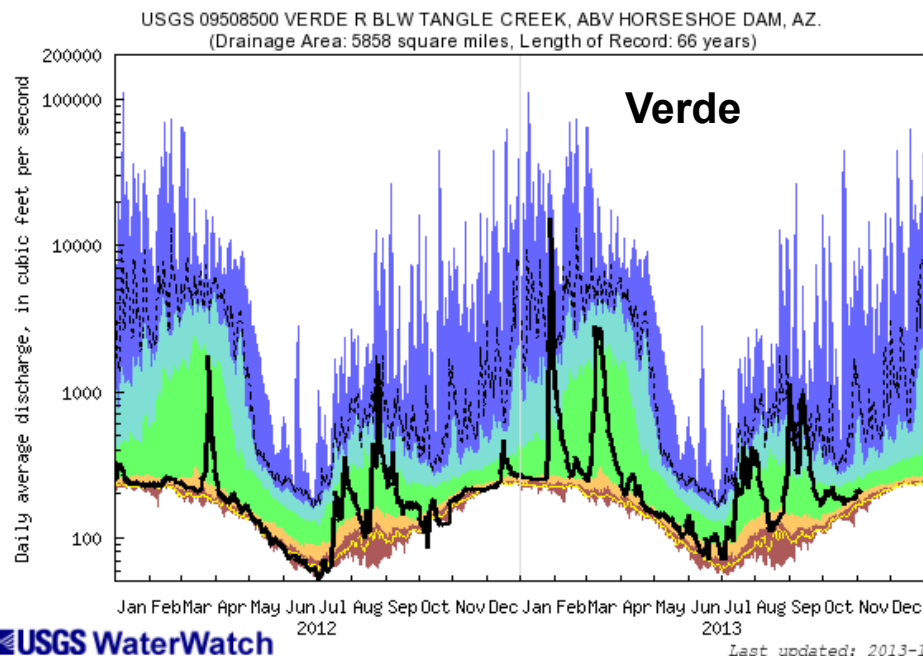
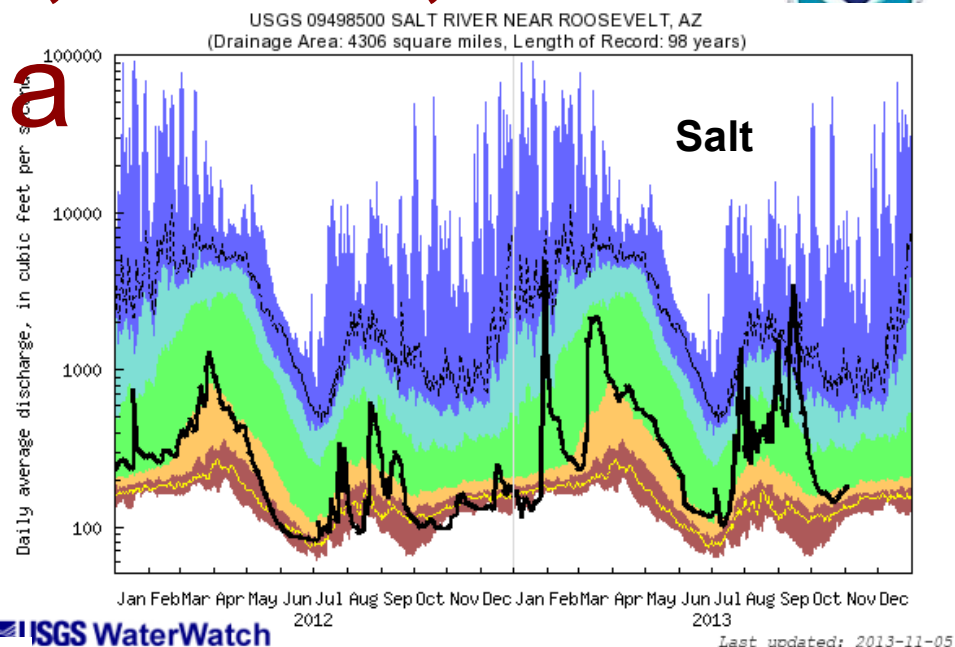


Base Flow: Salt, Verde, and Gila

Dry conditions throughout AZ

Being so dry from last year definitely factored into this year's forecast

Conditions improved this summer for next year's WS

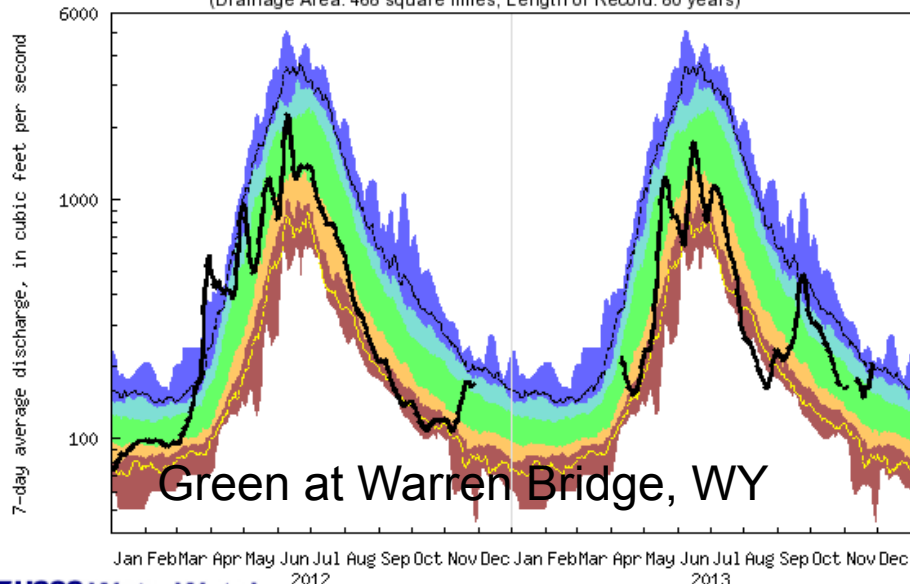




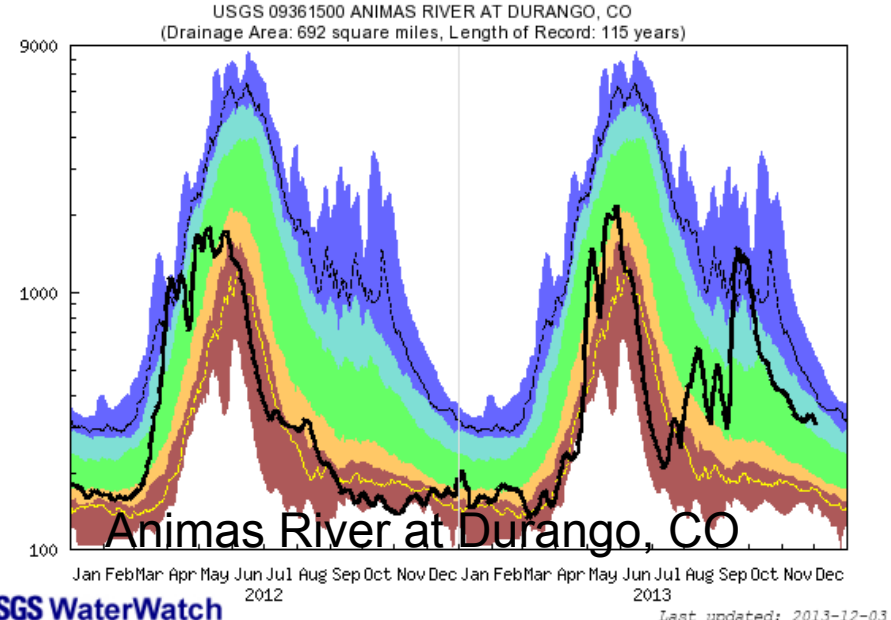
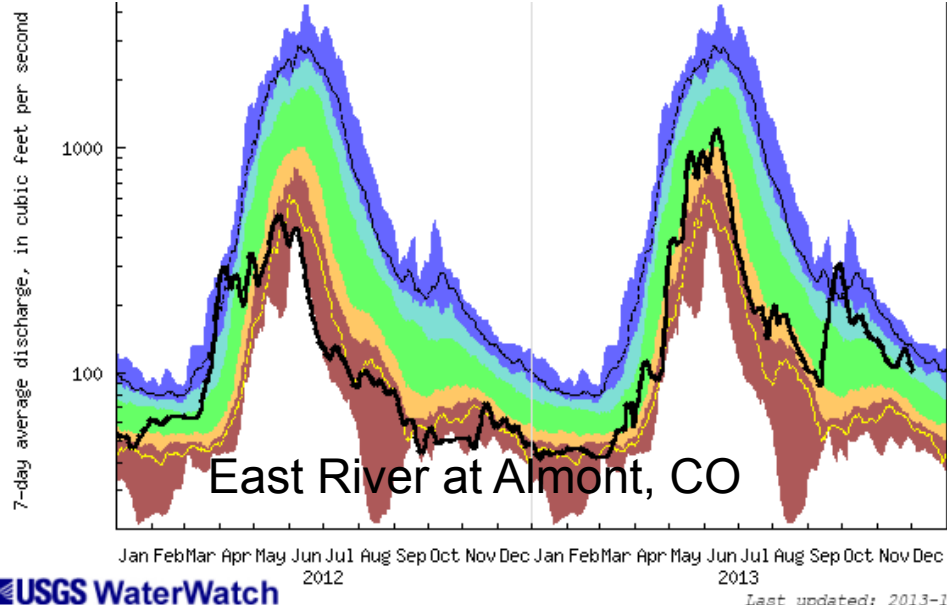
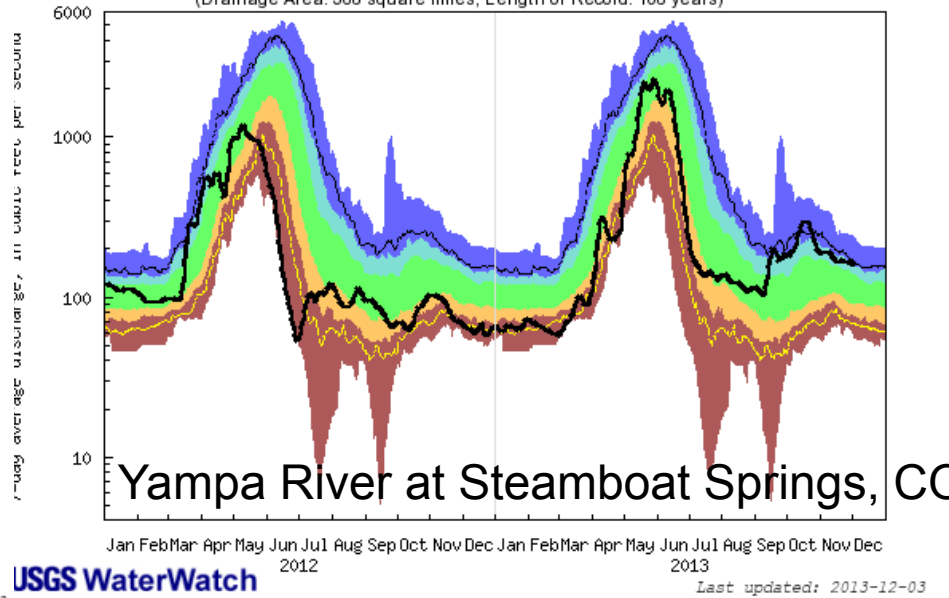
Base flows: Upper Colorado



USGS 09188500 GREEN RIVER AT WARREN BRIDGE, NEAR DANIEL, WY
(Drainage Area: 468 square miles, Length of Record: 80 years)



USGS 09239500 YAMPA RIVER AT STEAMBOAT SPRINGS, CO
(Drainage Area: 568 square miles, Length of Record: 108 years)



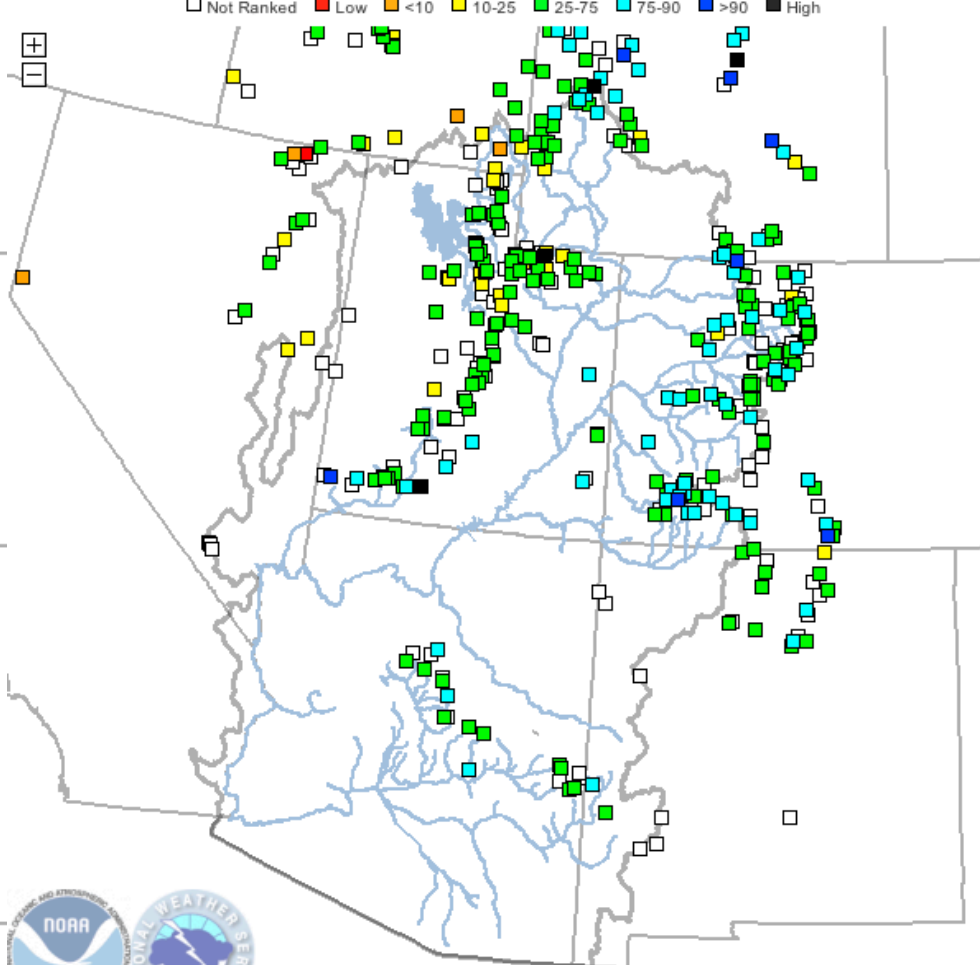
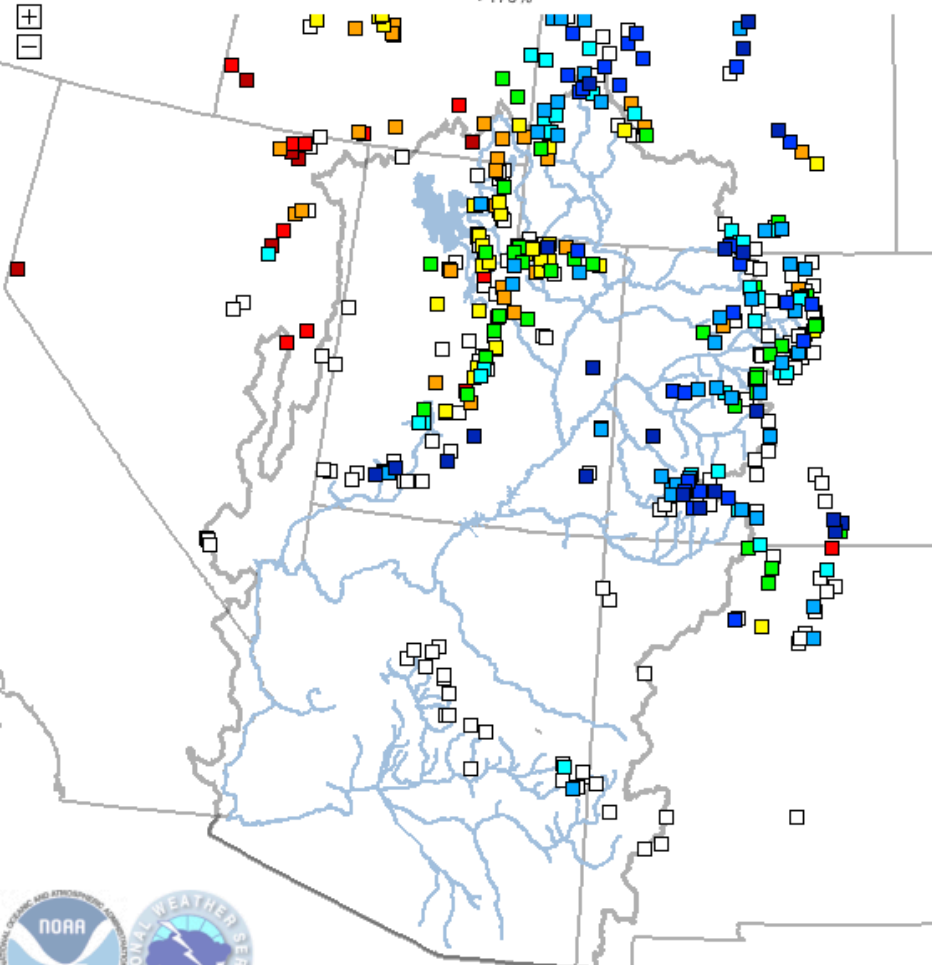


Snow so far (Dec 5)



Snow Point Classification: ○ Percentiles ○ Percent Average ● Percent Median
 ○ NA ● <25% ● 25-50% ● 50-75% ● 75-90% ● 90-110% ● 110-125% ● 125-150% ● 150-175%
 >175%

Snow Point Classification: ● Percentiles ○ Percent Average ○ Percent Median
 □ Not Ranked ● Low ● <10 ● 10-25 ● 25-75 ● 75-90 ● >90 ● High



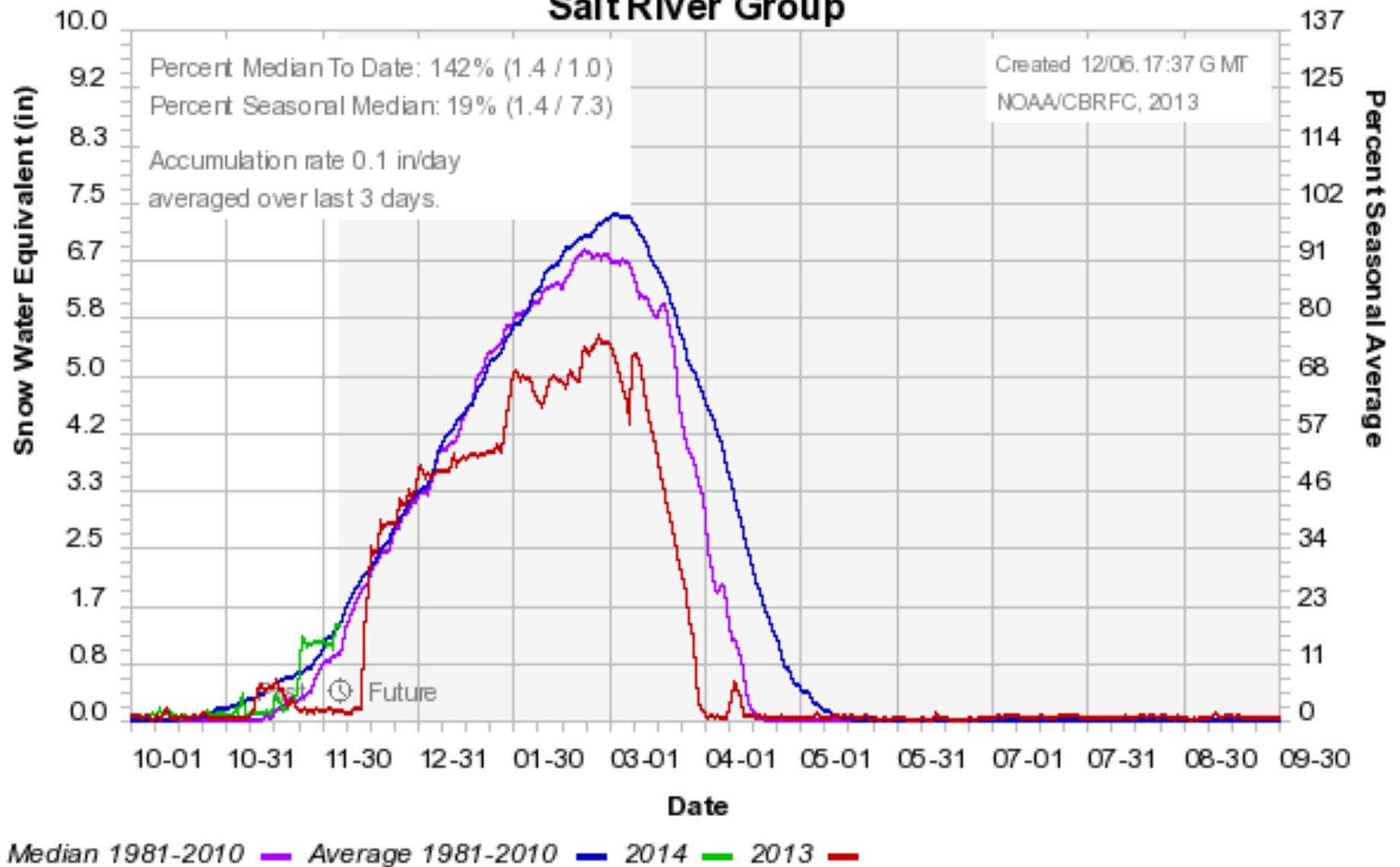
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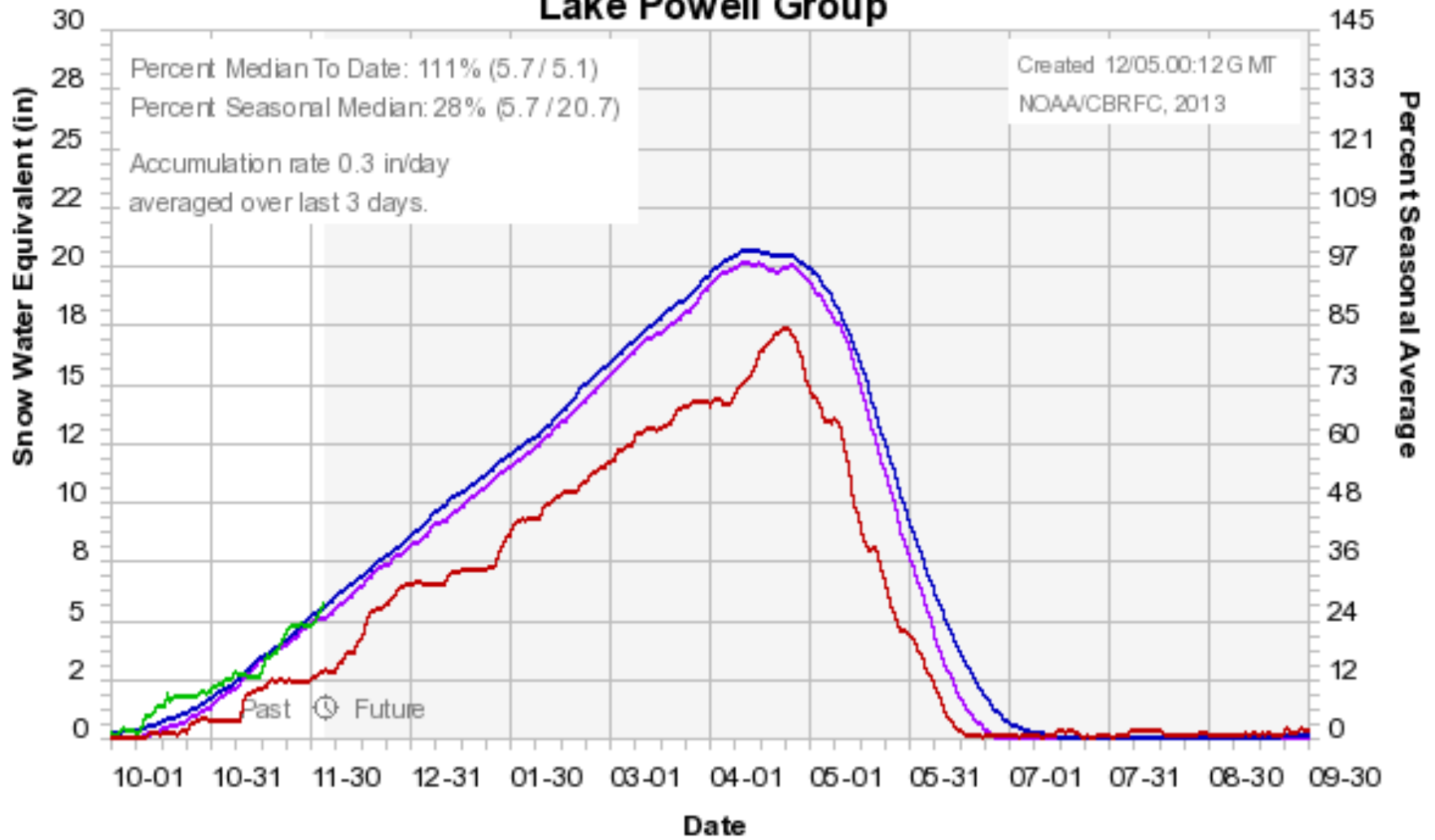
Created: December 5, 2013, 10:30

Colorado Basin River Forecast Center

Salt River Group



Colorado Basin River Forecast Center Lake Powell Group



Median 1981-2010 Average 1981-2010 2014 2013 2012



Early WY14 River Outlook...

Excellent antecedent conditions

- Aug/Sept precipitation
- Soil moisture (less so in UT)
- Streamflow

Climate predictions

- Dry for AZ, NM
- No help for upper basin

Weather

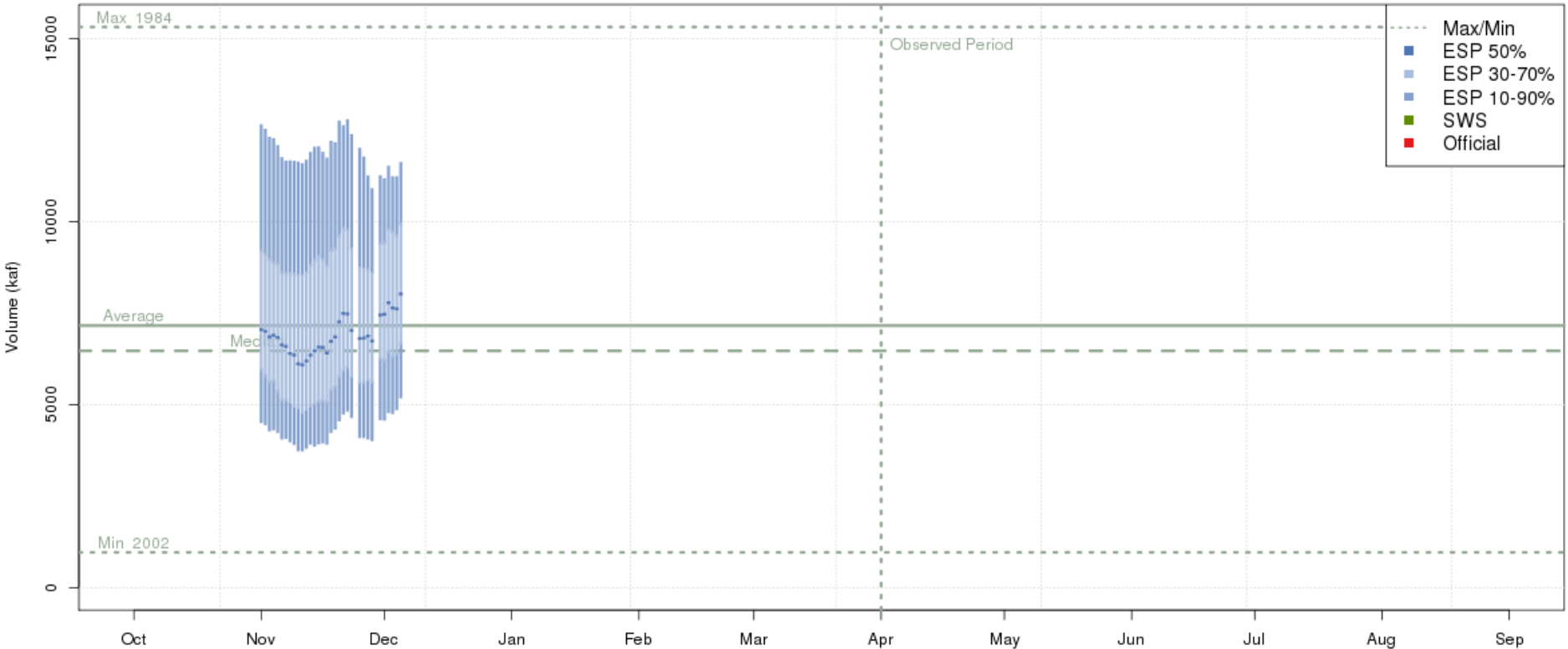
- Active period



Early WY14 River Outlook: Lake Powell



2014 Runoff Forecast Apr-Jul (Includes 5 Day Precip Forecast)
Colorado - Lake Powell- Glen Cyn Dam- At (GLDA3)



Plot Created 2013-12-05 16:42:34, Lastest ESP Run from 2013-12-05, CBRFC / NWS / NOAA
Maximum of 15316.1 in 1984, Minimum of 964 in 2002, Average/Median for 1981-2010.
ESP forecasts in the Observed Period include observed values.

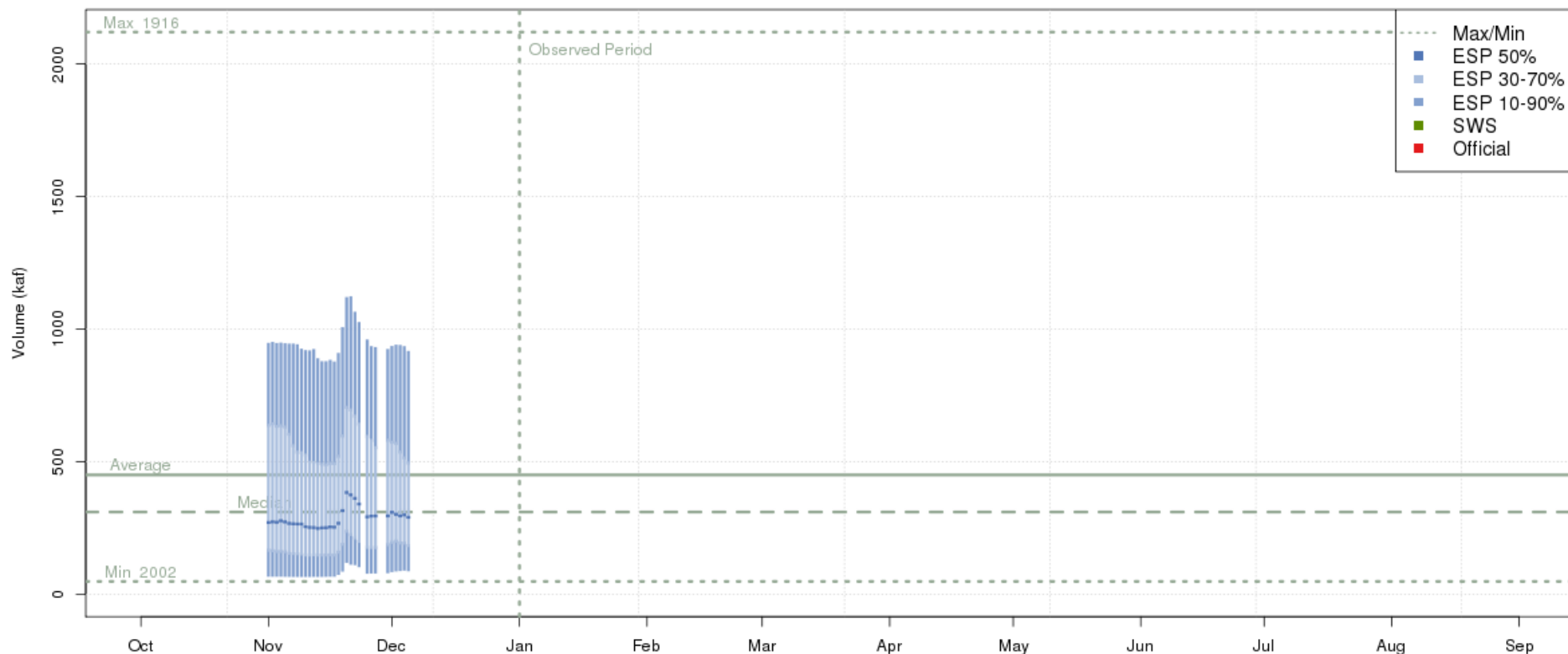
Bottom line: Off to a promising start but long ways to go



Early WY14 River Outlook: Lake Roosevelt



2014 Runoff Forecast Jan-May (Includes 5 Day Precip Forecast)
Salt - Roosevelt- Nr (SLRA3)



Plot Created 2013-12-05 16:57:08, Latest ESP Run from 2013-12-05, CBRFC / NWS / NOAA
Maximum of 2120.2 in 1916, Minimum of 48.2 in 2002, Average/Median for 1981-2010.
ESP forecasts in the Observed Period include observed values.

Bottom line: Off to a promising start but long ways to go



Summary

- Poor runoff last 2-3 years
- Great antecedent conditions
- ENSO neutral -> “anything goes”
- Snow season off to a good start but still very early and lots can happen.



Feedback, Questions, Concerns always welcome....



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