CBRFC 2015 Runoff Recap: Fontenelle Reservoir

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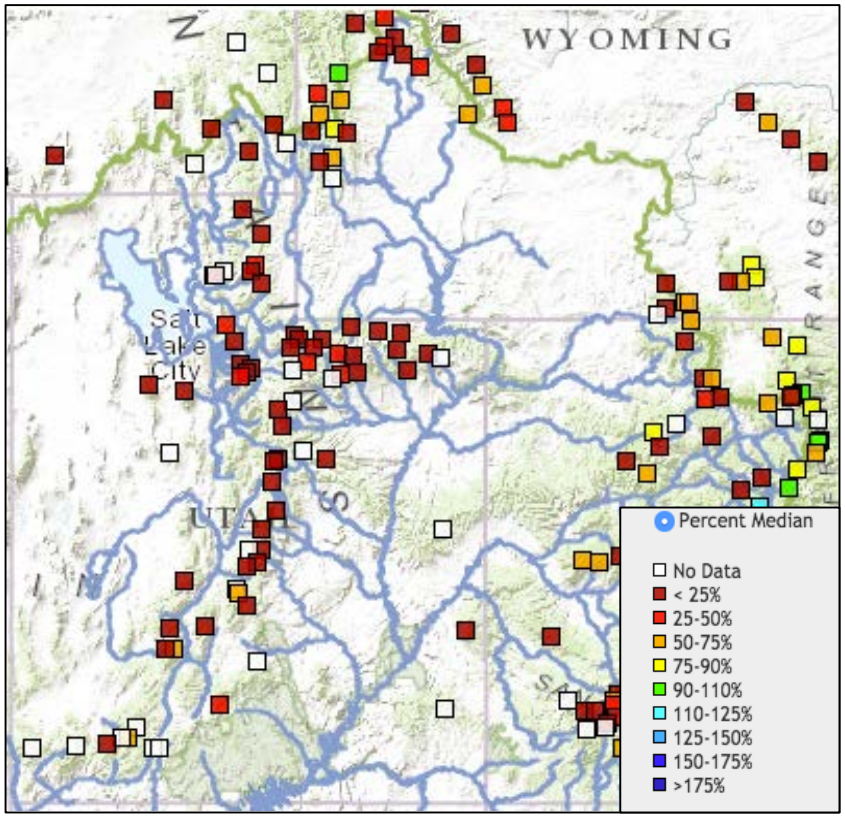
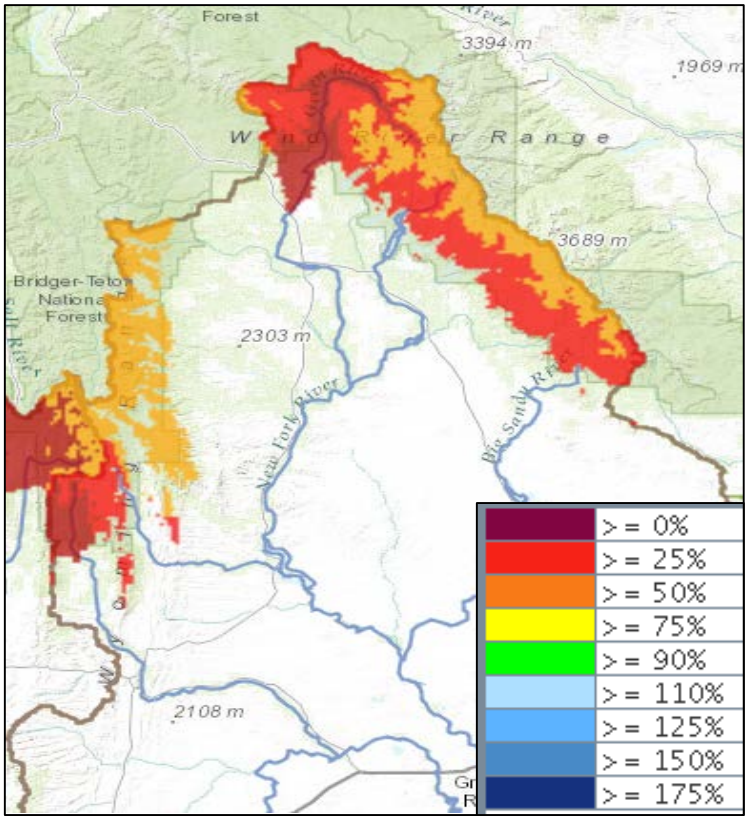
Looking Back – Snapshot on May 1st 2015

- Below average precipitation January- April
- Record warm winter in many areas
- Early snowmelt at low and middle elevations
- Dismal snowpack conditions
- Forecast Inflow for Fontenelle was 495 KAF (68%of average)
- Stage set for sub-par runoff with below average volumes

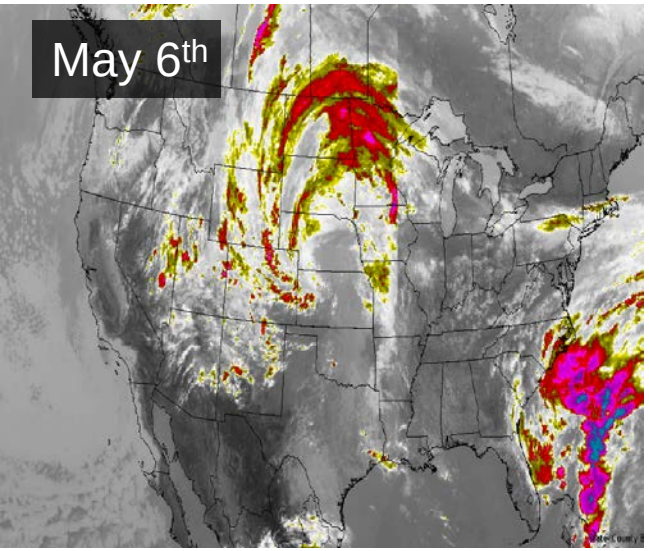
Snow Water Equivalent: May 1

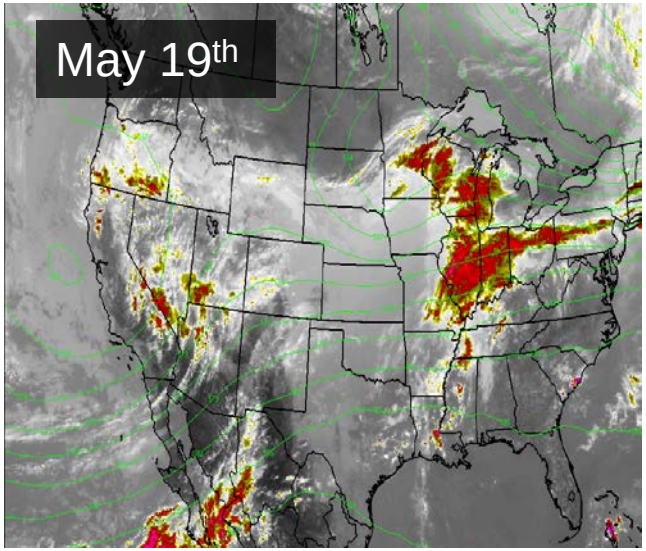


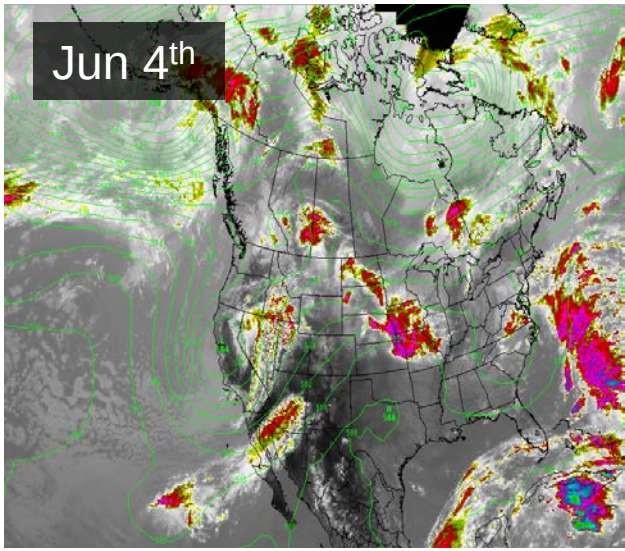
Model Snow: May 1



A change in the weather



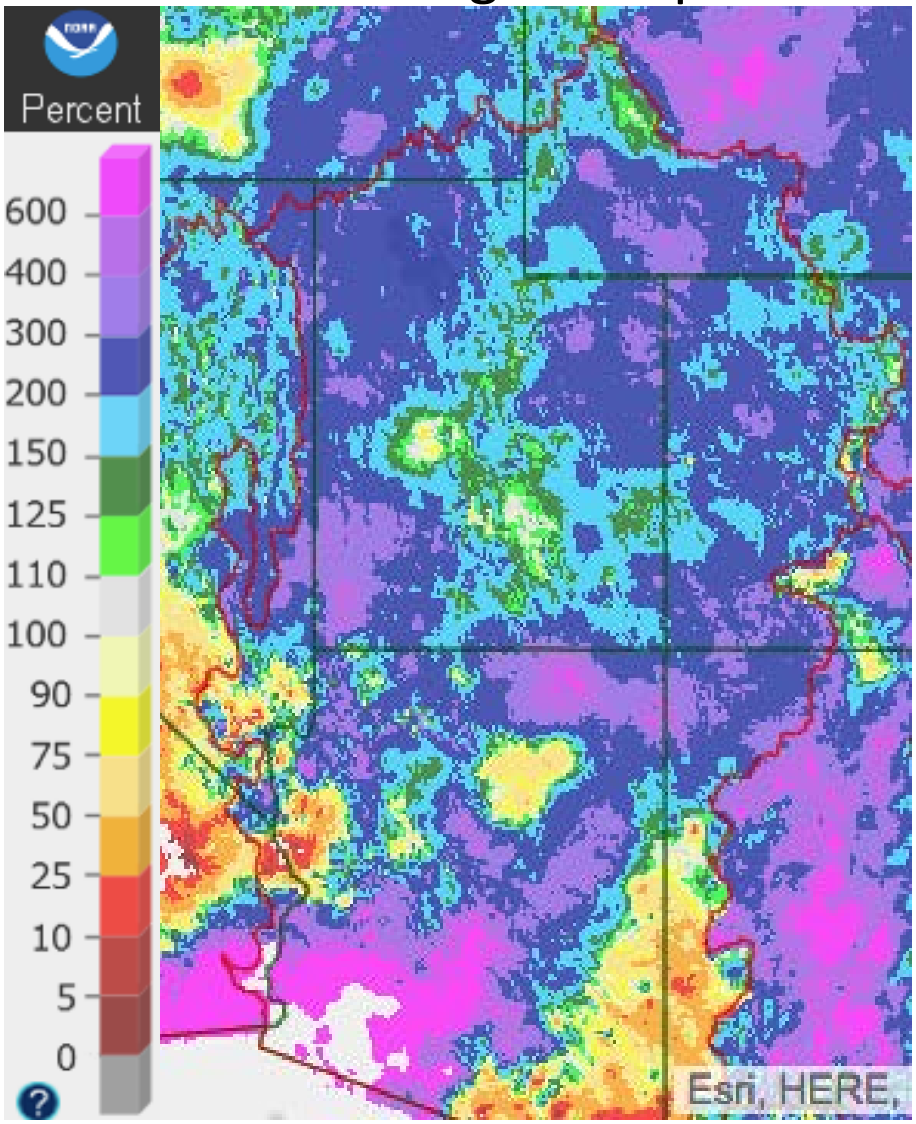




- Pattern started to change in mid April & carried into early June.
- Frequent moist storms systems
- Much below average temperatures May into early June.
- Moisture tropical in nature with significant precipitation.
- Impacted by Hurricane Andres

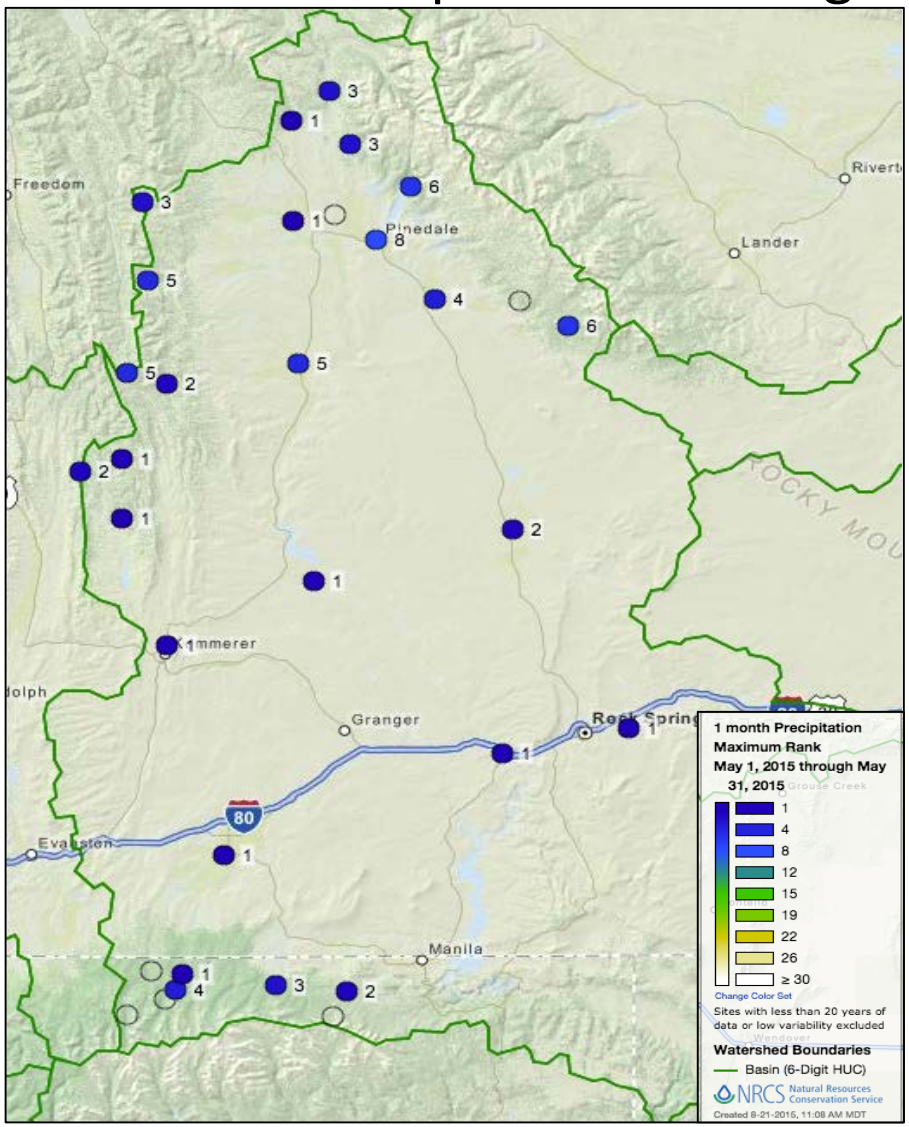
May Precipitation

Percent of Average Precipitation



Above Fontenelle 120-250 % of Average

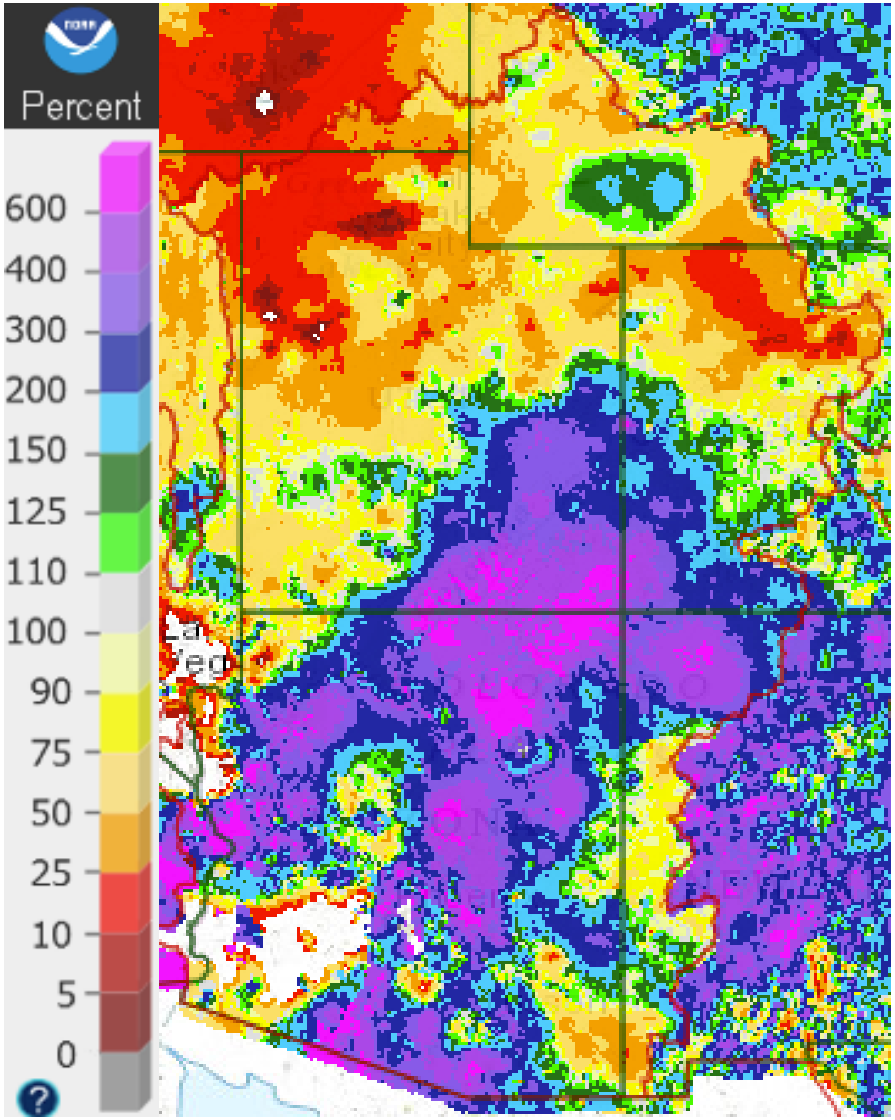
Historical Precipitation Ranking



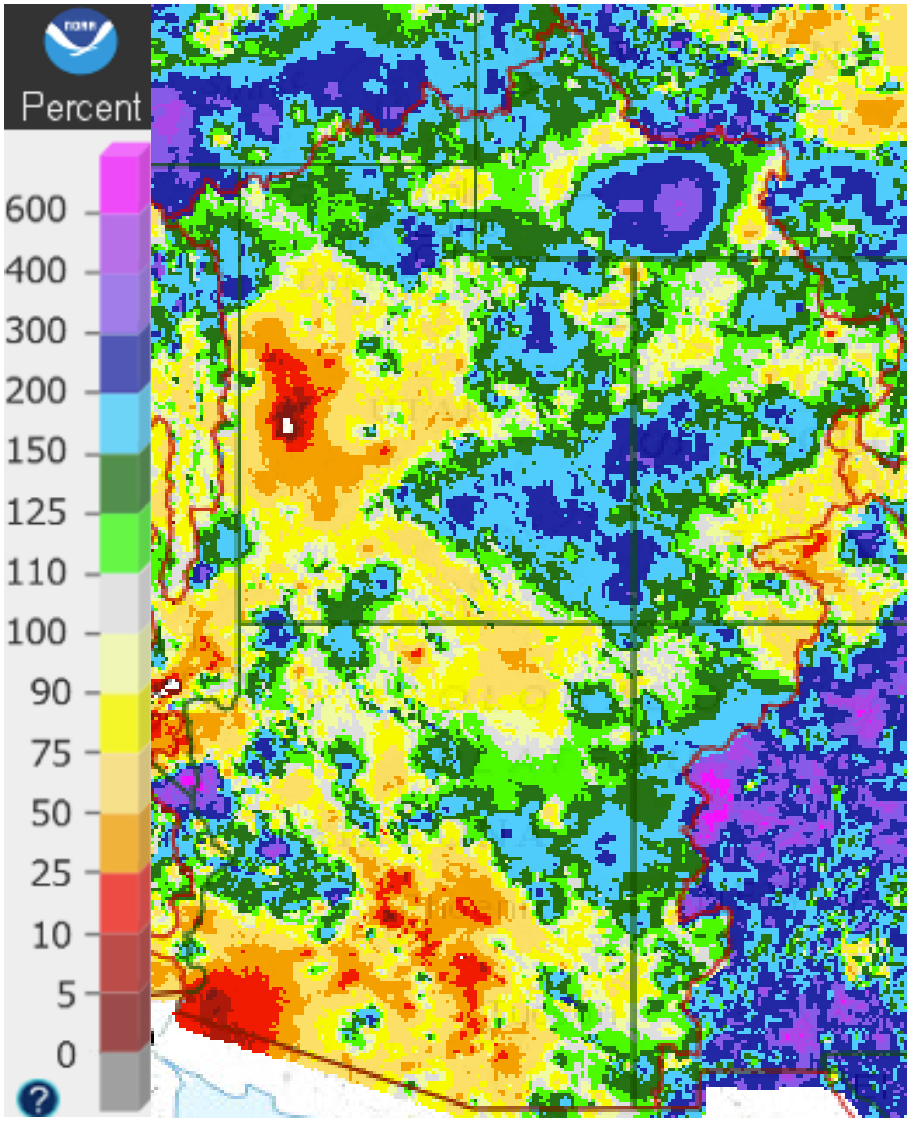
Most sites in top 5 of historical record

Monthly precip distriubiton

June/July Precipitation



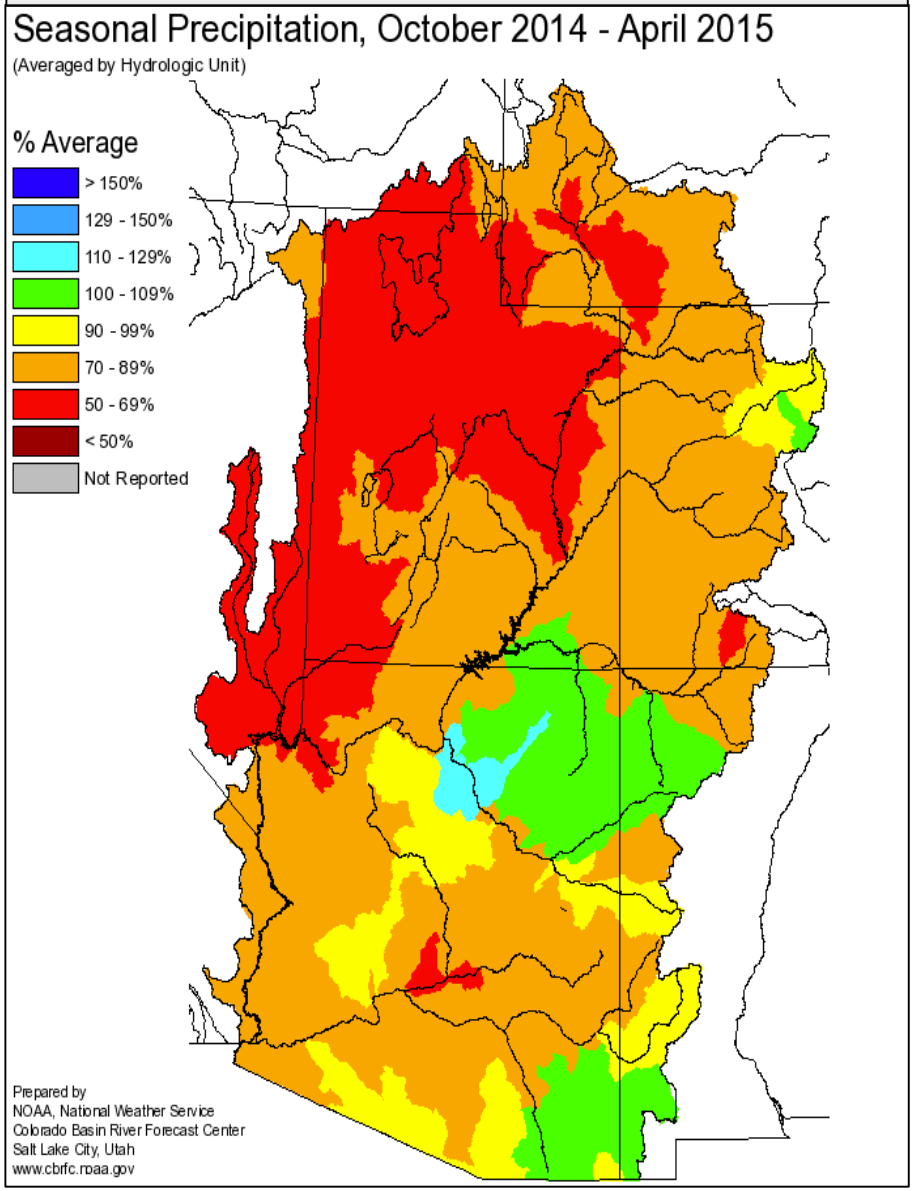
June Precipitation: ~80% average
Highly Variable



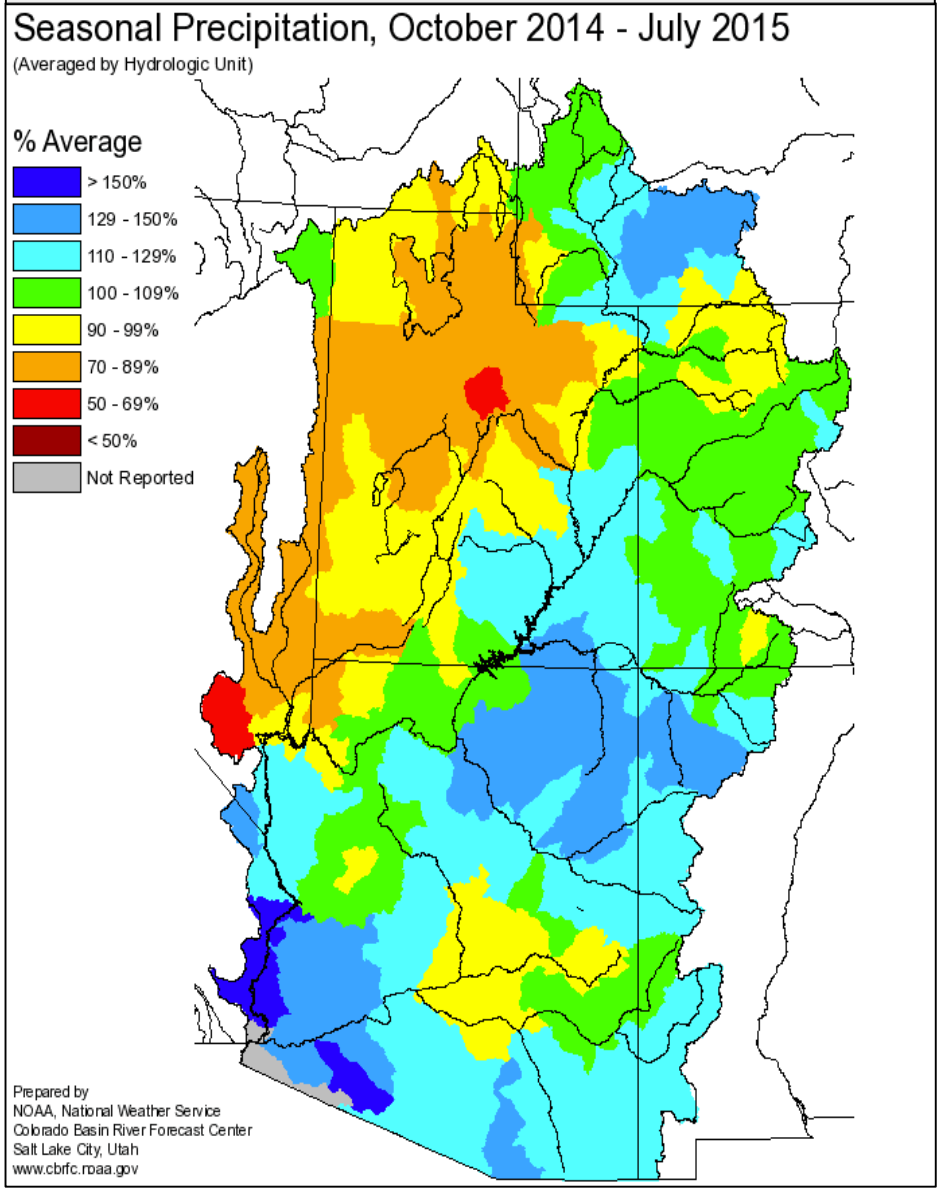
July Precipitation:~110-200 % of average

Seasonal Precipitation

May 1st

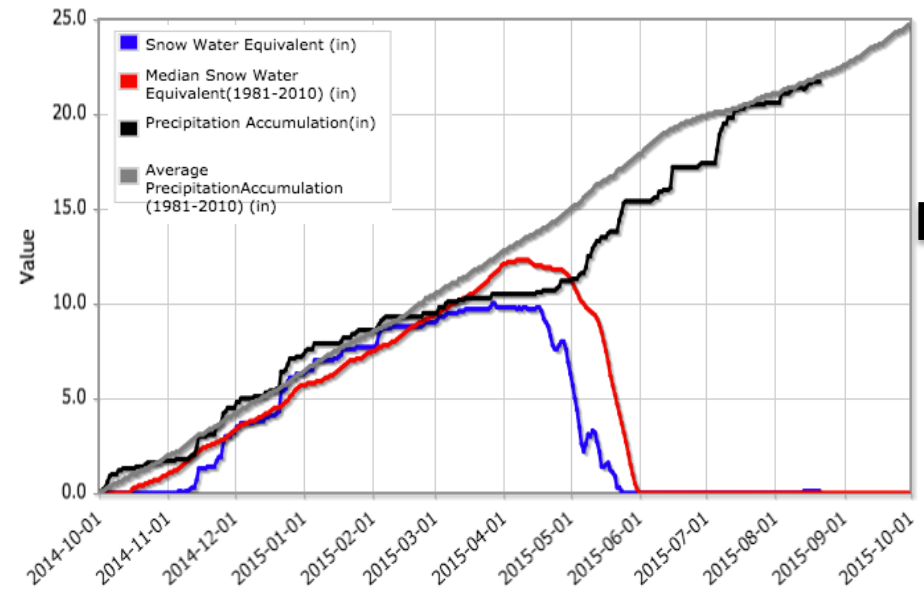


August 1st



Snow vs Rain

Elkhart Park G.s. (468) Wyoming SNOTEL Site - 9400 ft



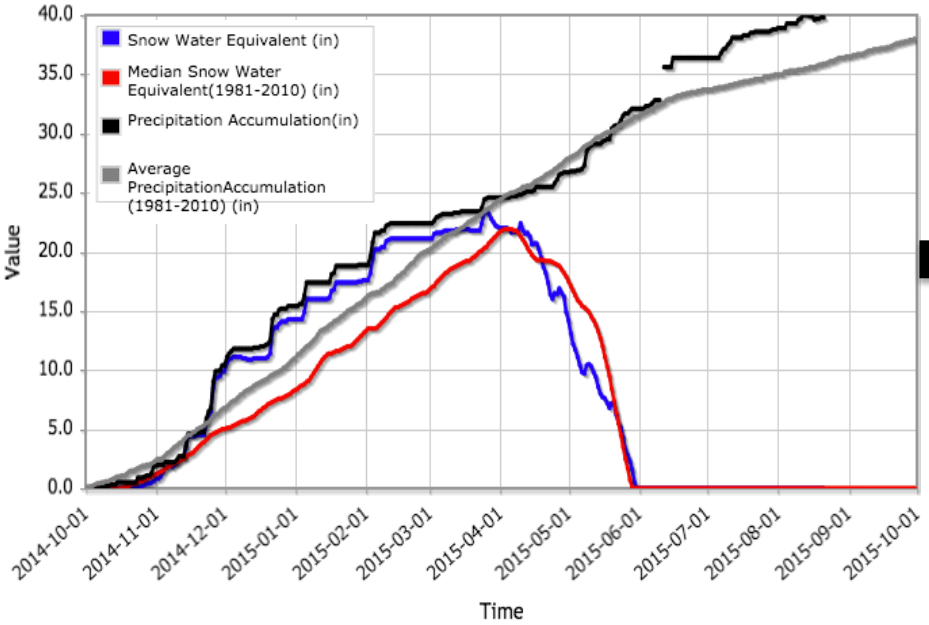
2015

Snow= 46% of Seasonal Precipitation

Normal

Snow= 56 % of Seasonal Precipitation

Triple Peak (831) Wyoming SNOTEL Site - 8500 ft



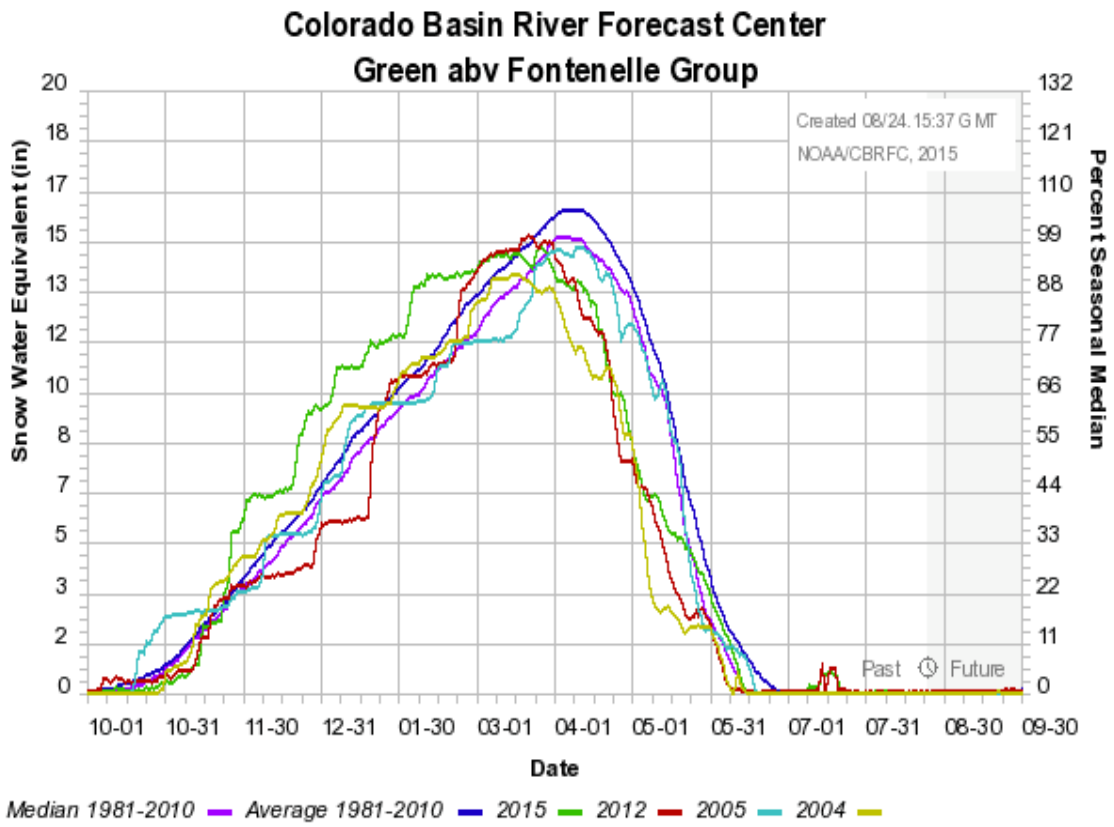
2015

Snow= 59% of Seasonal Precipitation

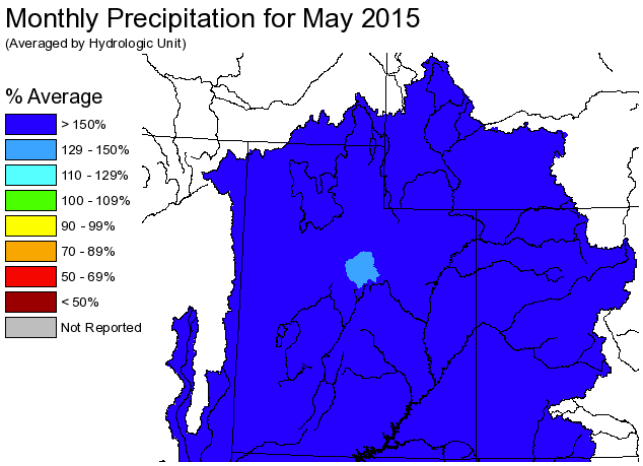
Normal

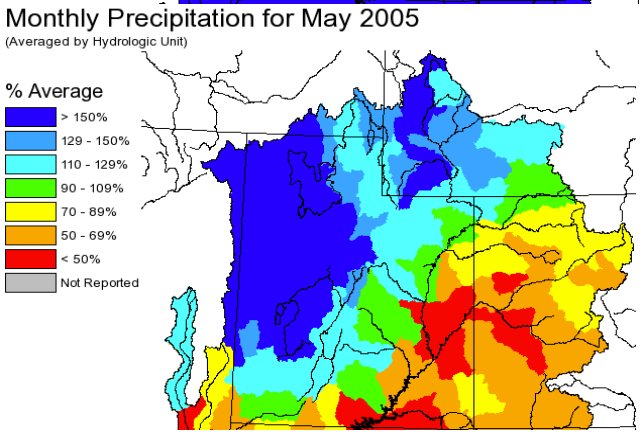
Snow= 62 % of Seasonal Precipitation

Snow vs Rain



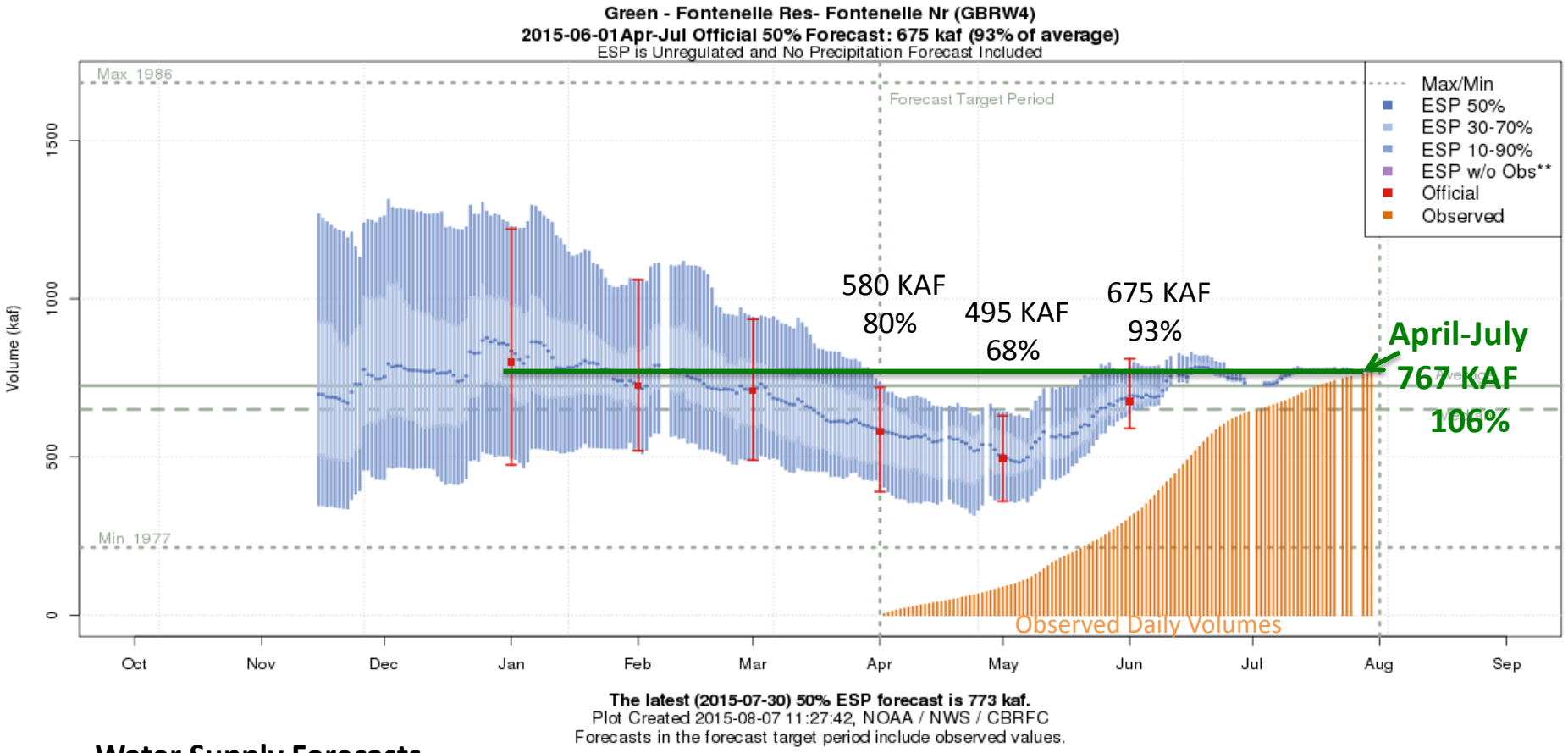
Year	April-July (KAF)
2015	767 (106%)
2012	508 (70%)
2005	846 (116%)
2004	482 (67%)





Similar snow years that didn't have wet springs/summer had lower April-July runoff volumes.

How the cool wet weather impacted the forecasts and observed runoff volumes:



Water Supply Forecasts

- Include 5 days of forecast precipitation then uses climatology (historical average)
- Observed May-July precipitation was above average so forecasts were low

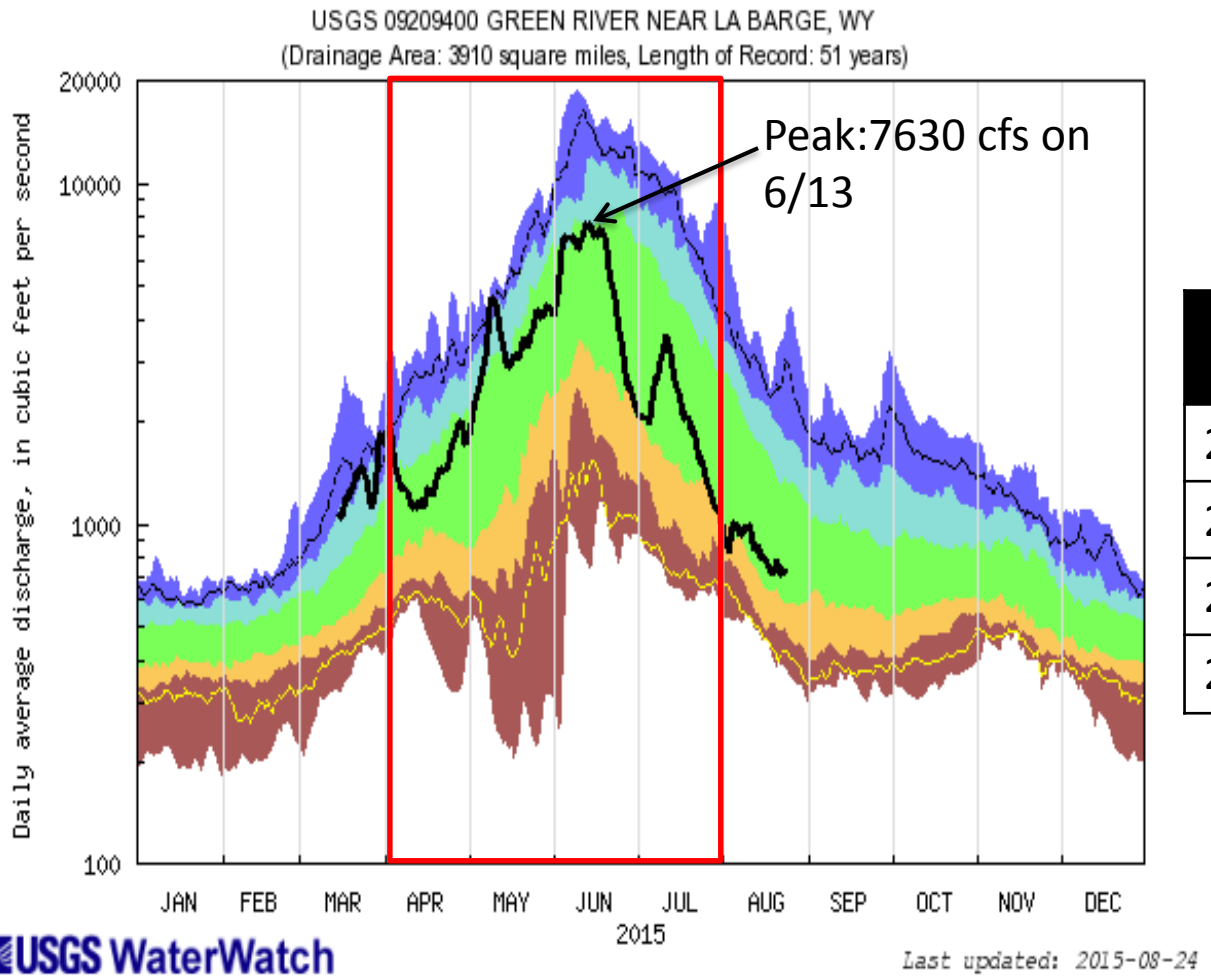
Snow

- High elevation snow held (increased) into early June-impacted runoff timing & volumes

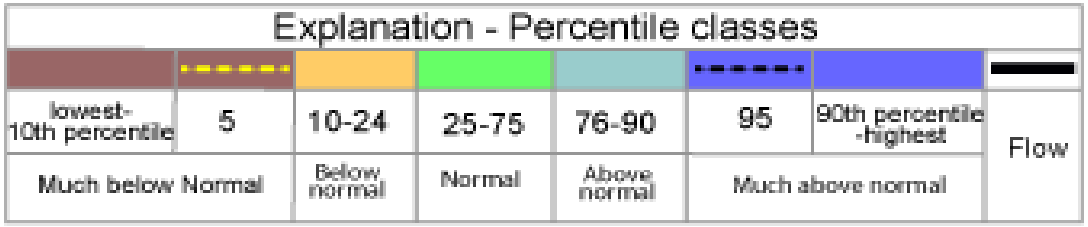
Demand

- Reduced demand (irrigation/diversions)
- Not all are known but “typical” behavior is built into model & forecasts
- Much less depletions to the river system also impact final runoff volumes

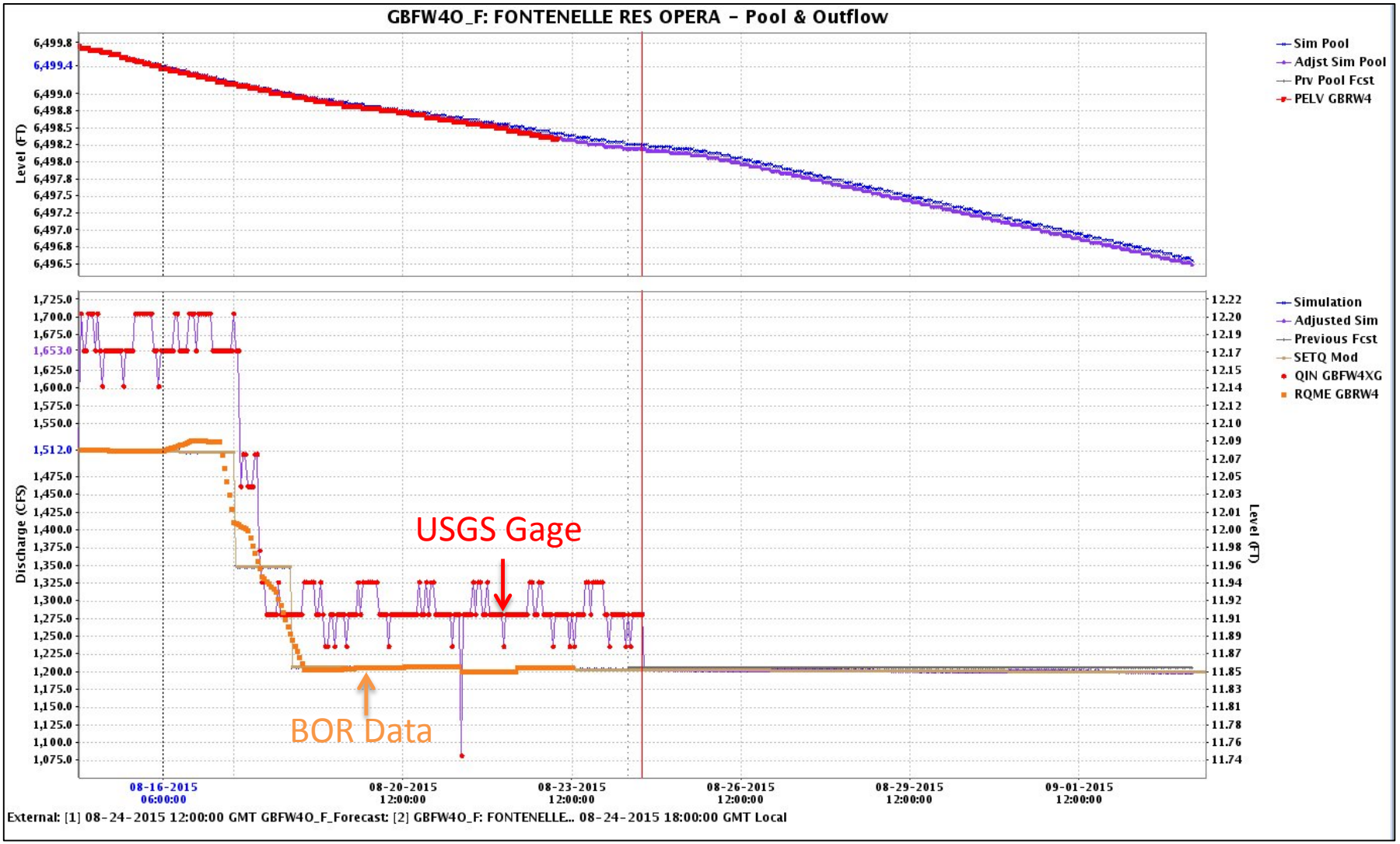
Streamflow: Green River at LaBarge



Year	Peak
2014	11,000 cfs: 6/3
2013	3,800 cfs: 5/19
2012	6,630 cfs: 6/9
2011	13,000 cfs: 7/4

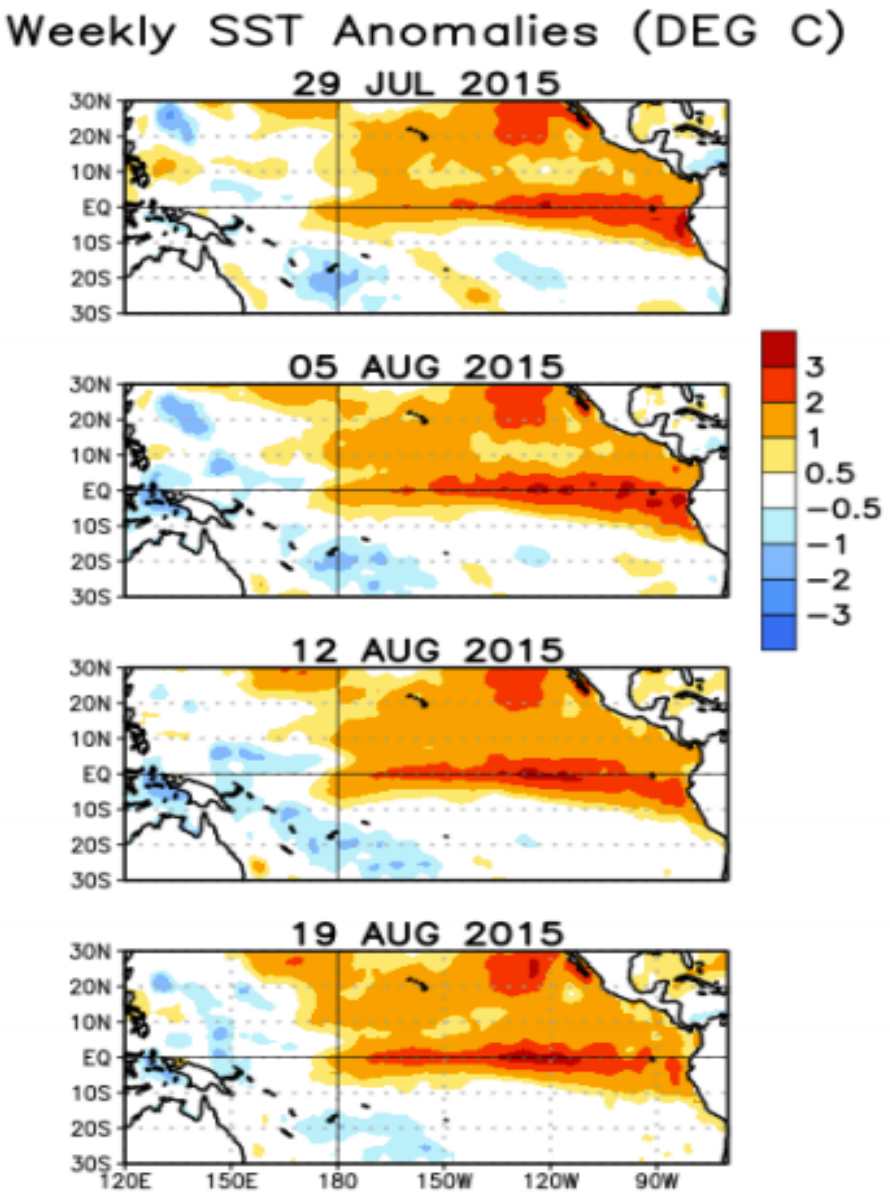


Streamflow Data



- Often differences between USGS and BOR data
- USGS gages shifts/adjustments may be off and need to be updated
- Makes routing flow downstream difficult

Strengthening El Nino



Observed Sea Surface Temperatures

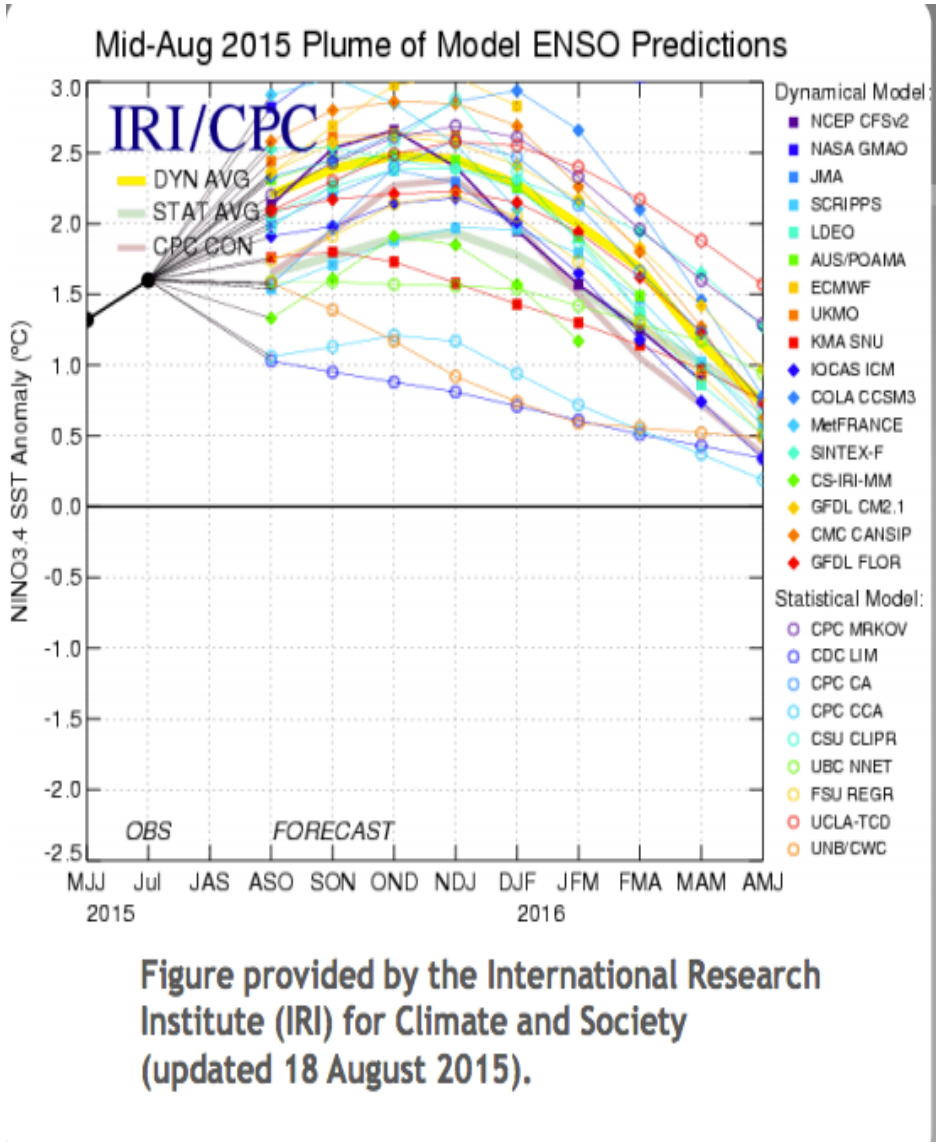
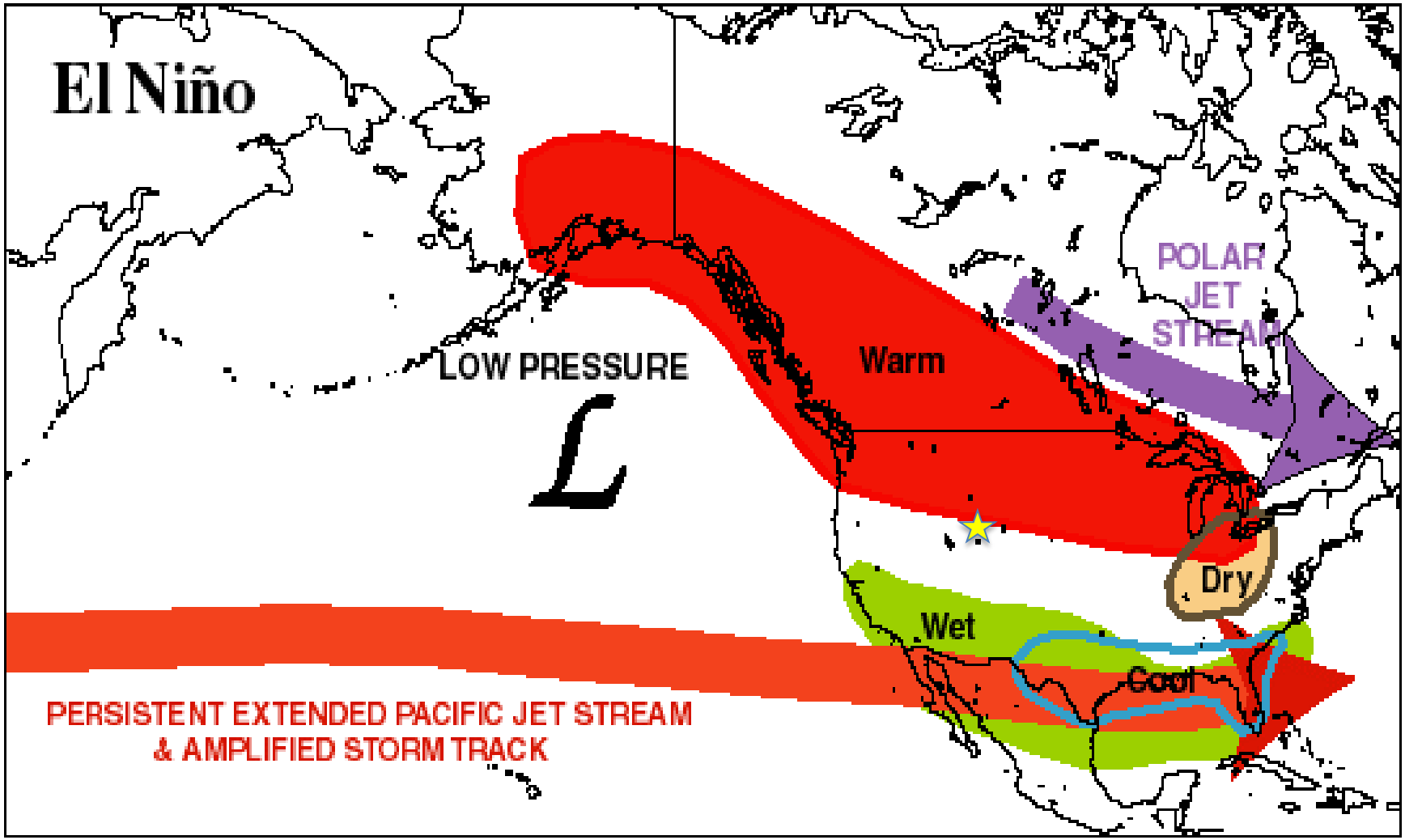


Figure provided by the International Research Institute (IRI) for Climate and Society (updated 18 August 2015).

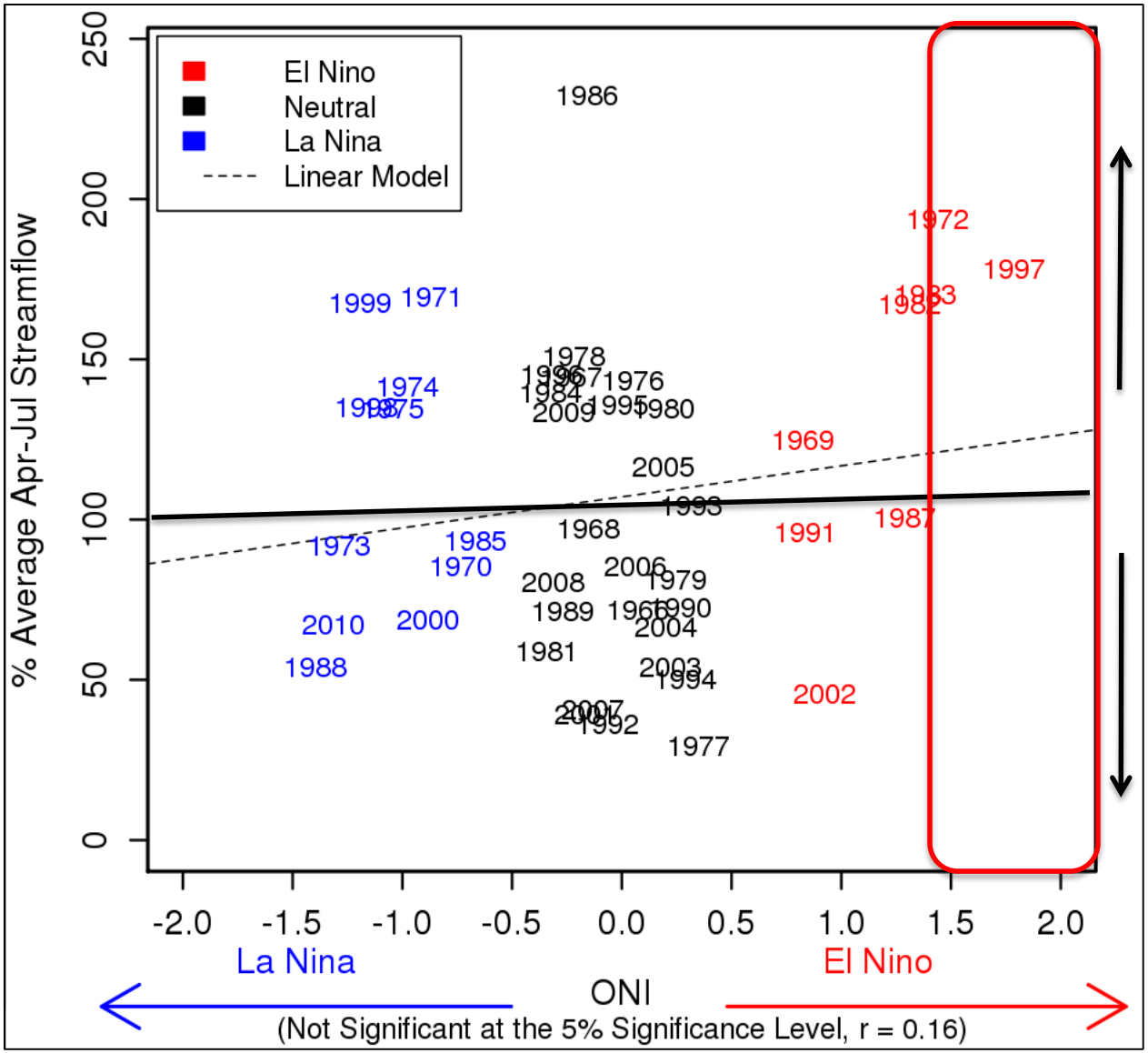
Sea Surface Temperature Forecasts

What does that mean for Upper Green?



Typical Winter El Nino Weather Pattern

What does that mean for Upper Green?

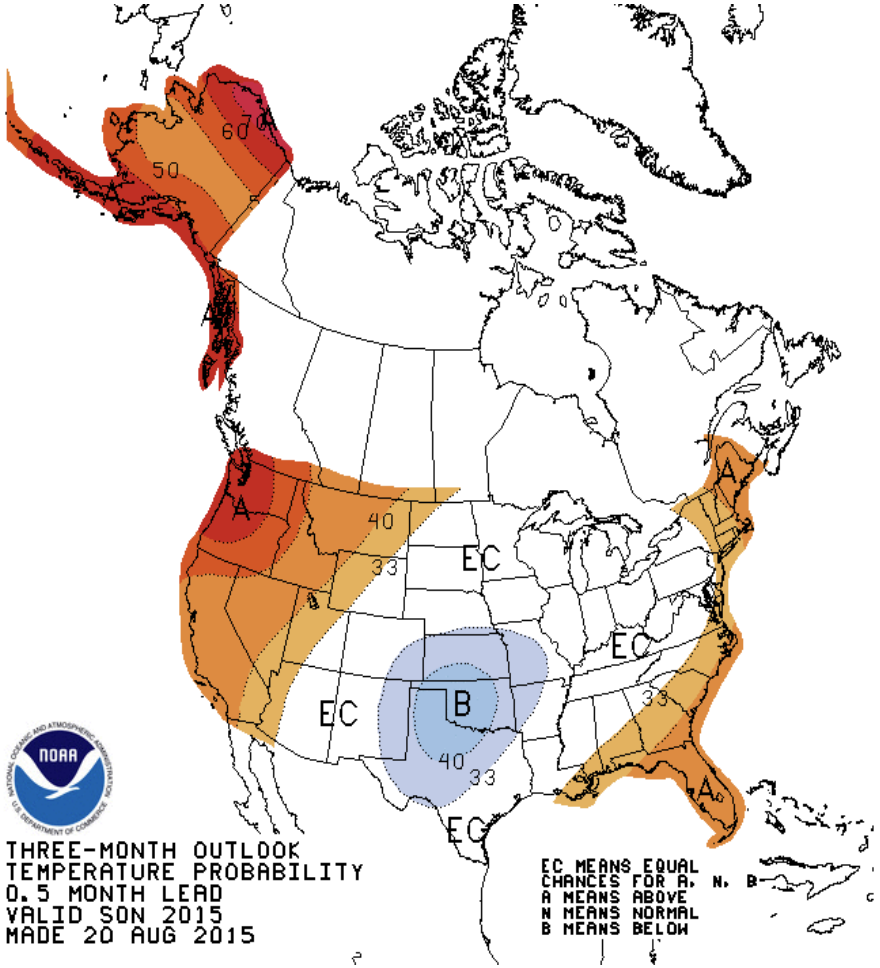


Above average streamflow

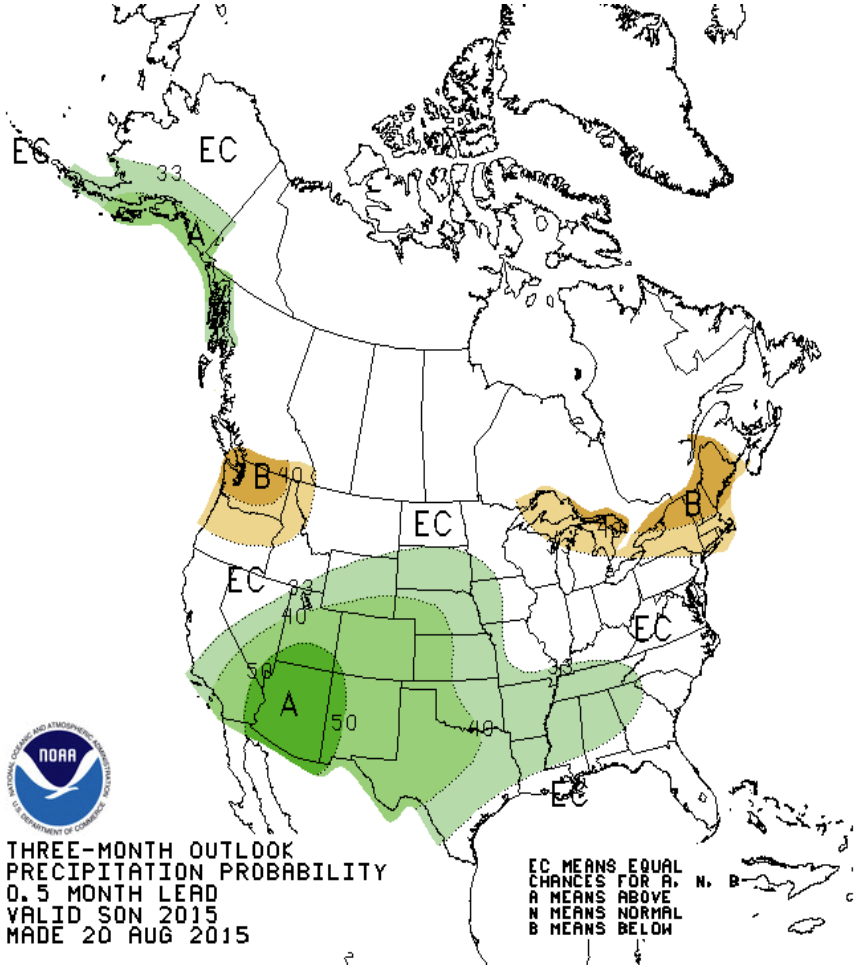
No strong correlation

Below average streamflow

3-Month Climate Outlooks



Temperature



Precipitation

2015 Take-Away:

- Below normal snow conditions and warm winter
- Wet cold spring, especially May
- Much above average precipitation in May and July
- Volume and peak flow forecasts were too low

- Expect early season forecasts (50% exceedance) are expected to miss the mark if future conditions end up extremely wet or dry
- Important to look at the forecast range as well as the 50% forecasts

- Expecting El Nino conditions for fall/winter
- No strong correlation for conditions in Upper Green and El Nino

Questions/Comments/Feedback?

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