



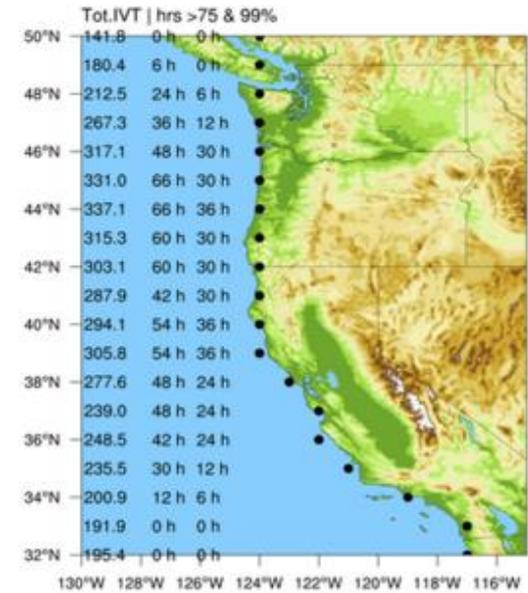
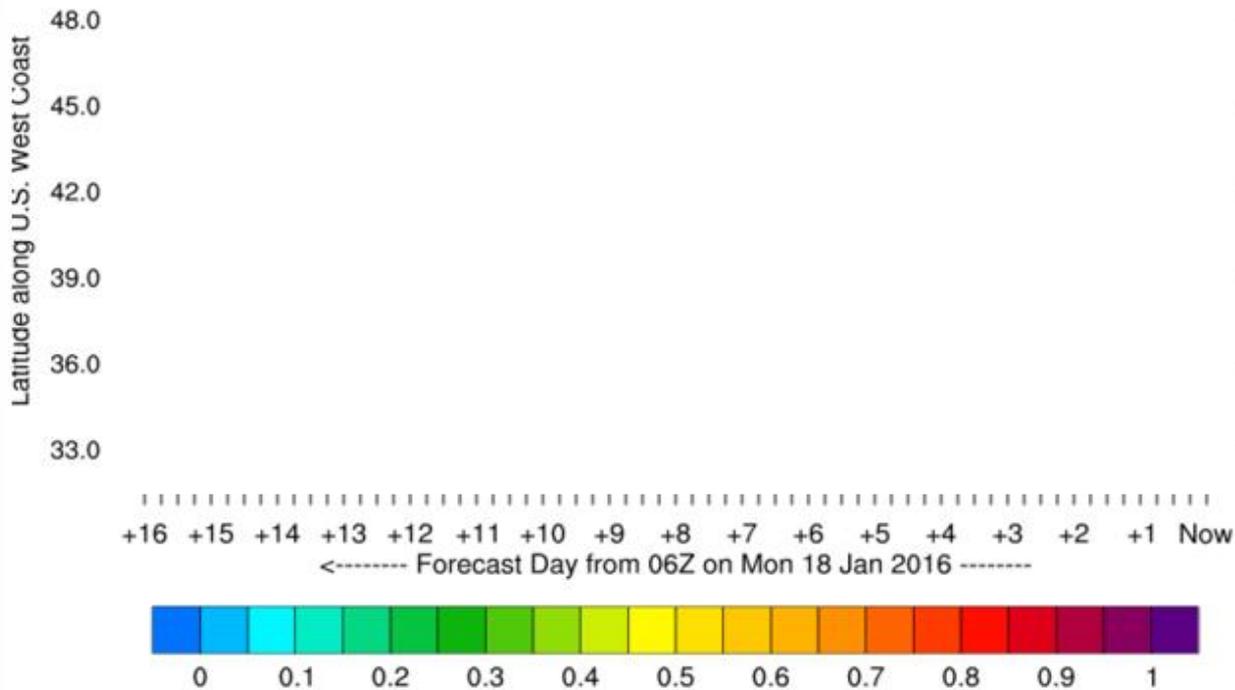
# Northern Nevada 2016 Streamflow Forecast Meeting Jan 19, 2015

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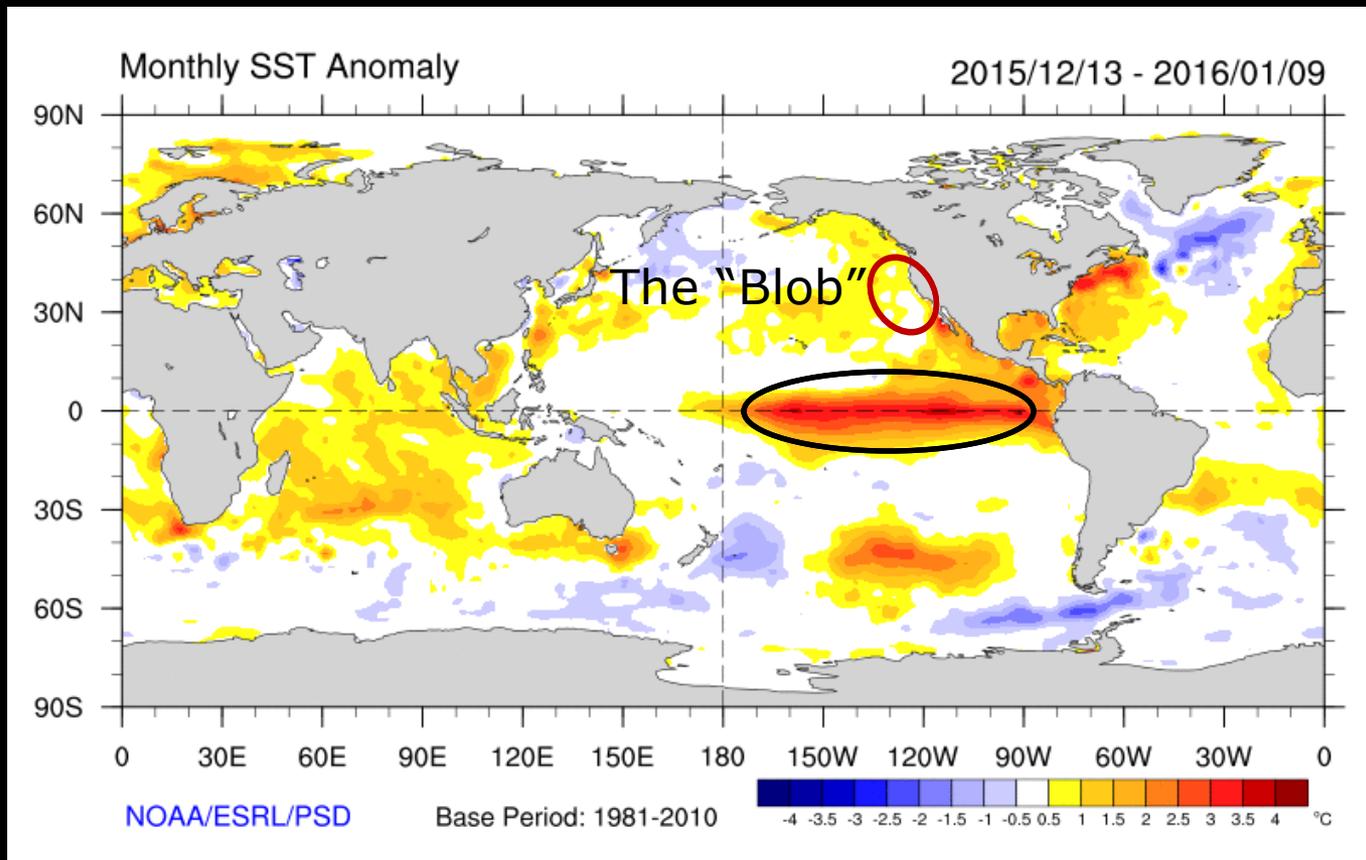
**Reno National Weather Service**  
Forecasting for the Sierra and western Nevada since 1905





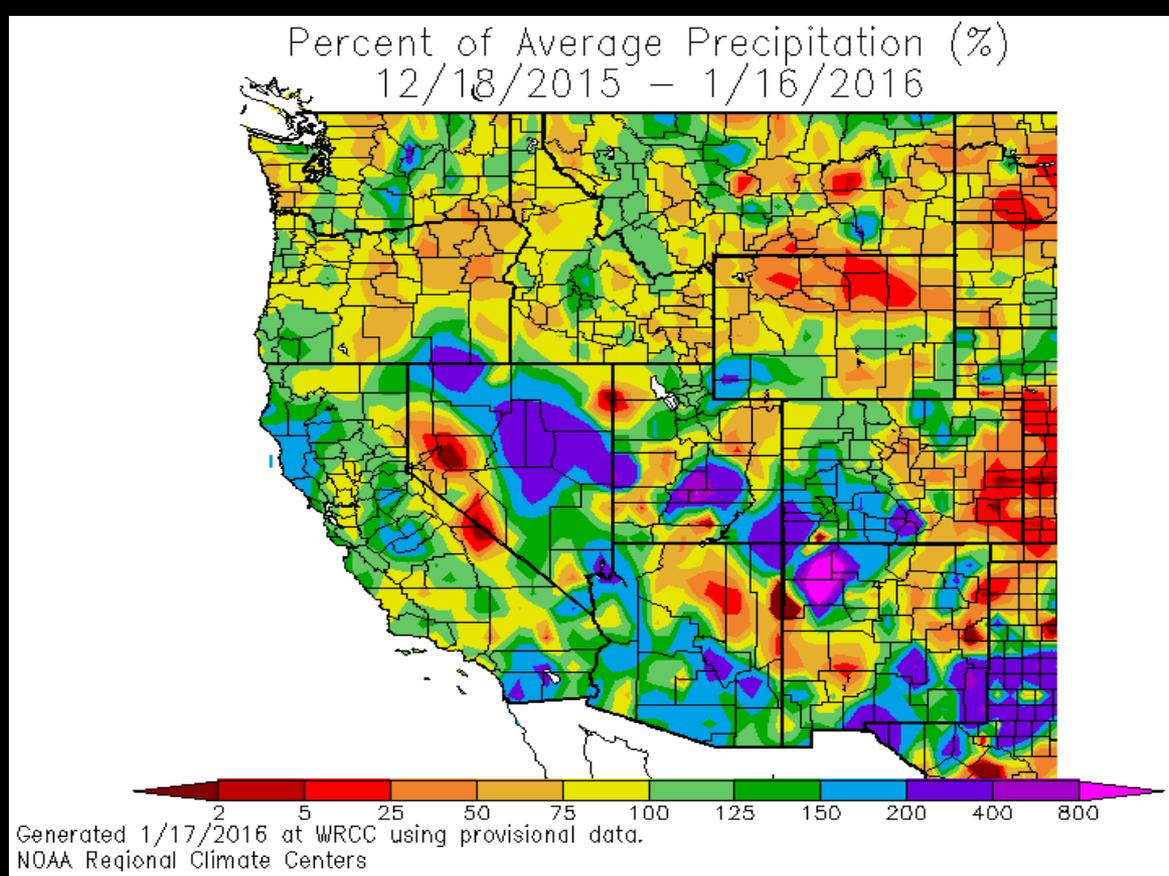
## The Next Two Weeks

- ☑ GFS Ensemble – 21 forecast simulations each with slightly different initial conditions meant to mimic chaos/uncertainty in atmosphere
- ☑ Higher the number = more simulations showing AR landfall.
- ☑ Generally that means higher confidence, but not always.
- ☑ High confidence for the end of this week for CA/NV
- ☑ Moderate confidence the end of next



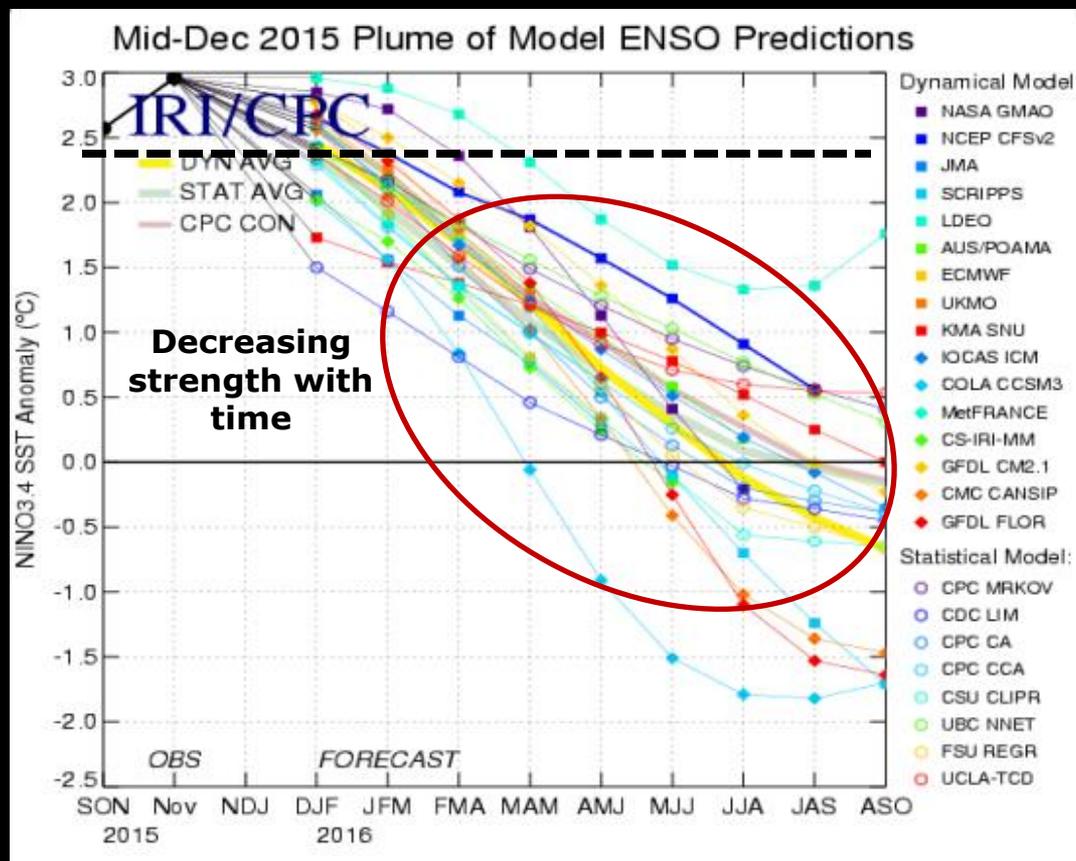
## El Niño Status

- 🌊 Significant increase in Sea Surface Temperature Anomalies over one year ago.
- 🌊 The "Blob" has weakened significantly.
- 🌊 But what has been the effect so far?
- 🌊 A mixed bag



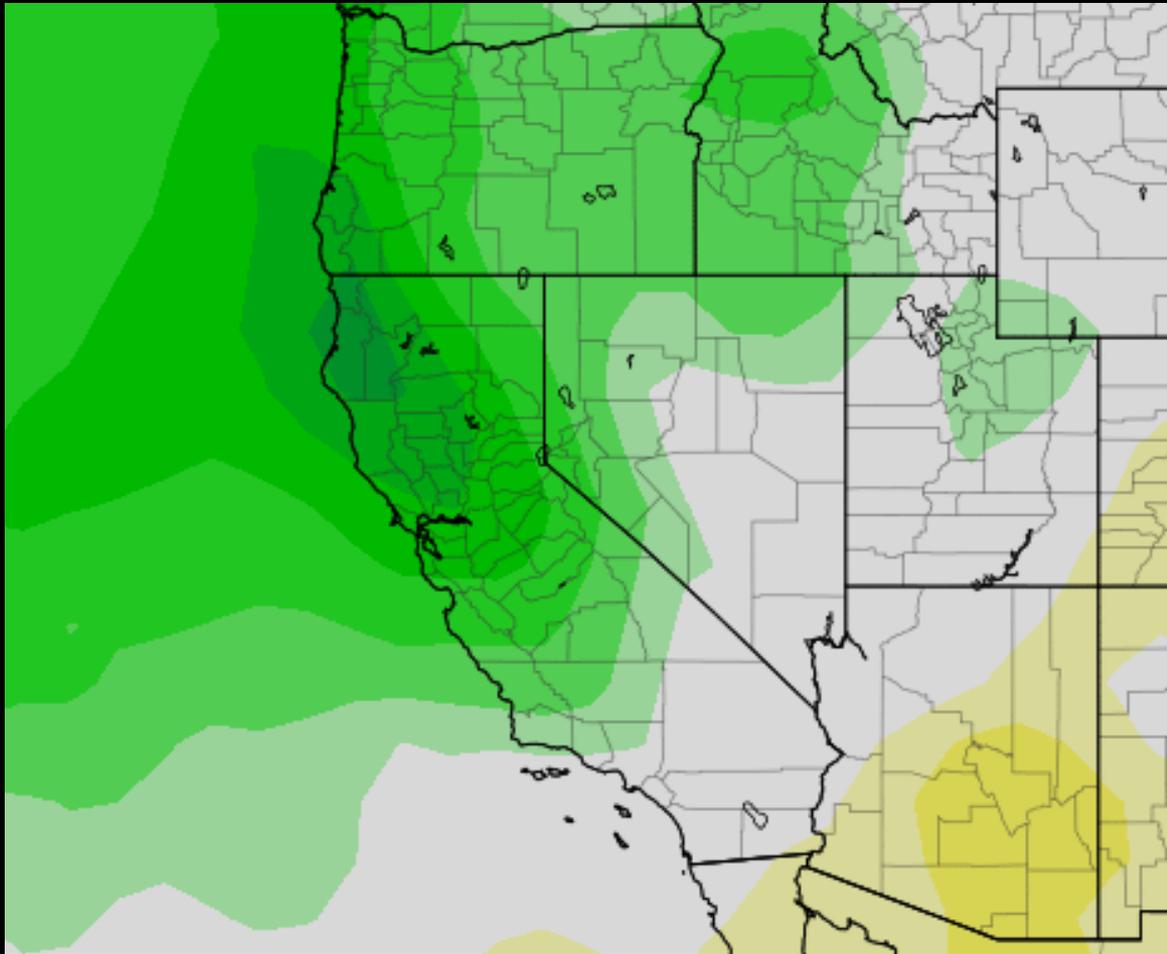
## Precipitation So Far

- Above average over the northern Sierra and much of Nevada.
  - Averages are lower in the Western Nevada Basin and Range and much of the precipitation occurred in Oct/Nov
  - The southern part of the Walker Basin has fared a little worse
- Central Nevada has fared better with respect to average the last 30 days.



## Status of El Niño Moving Forward

-  Deterministic models show a continuation of strong El Niño through spring, then a decrease in intensity.
-  Generally this what happens during a strong warm phase event.
-  The effects of El Niño fade into the Northern Hemisphere Summer.
-  Let's look at Climate Forecast System Forecasts going forward



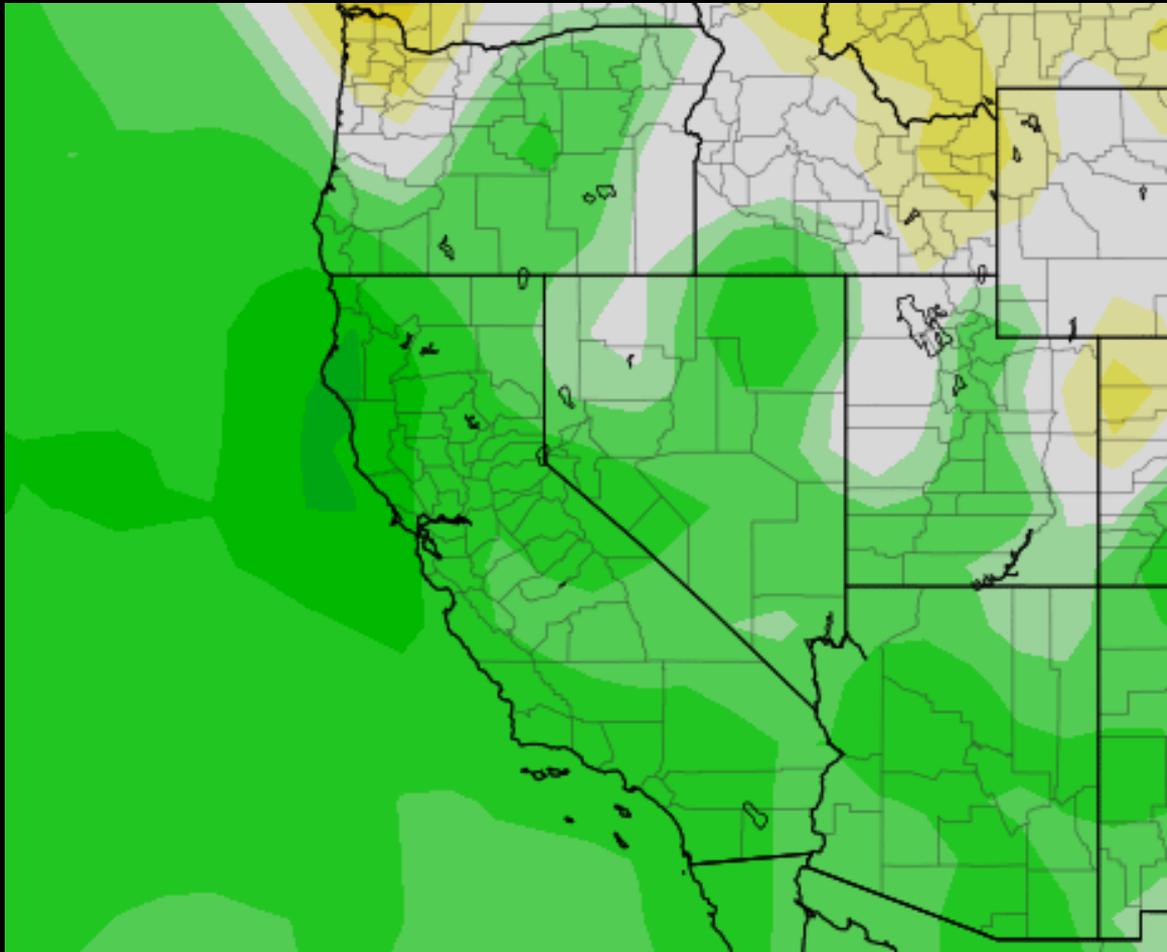
**Greens/blues** –  
favor wetter  
than normal

**Oranges/reds** –  
favor drier than  
normal

**Darker shading**  
– increased  
confidence

## Monthly CFS Simulations – February 2016

☀ Favoring wetter than normal, more storms – temperature fluctuating



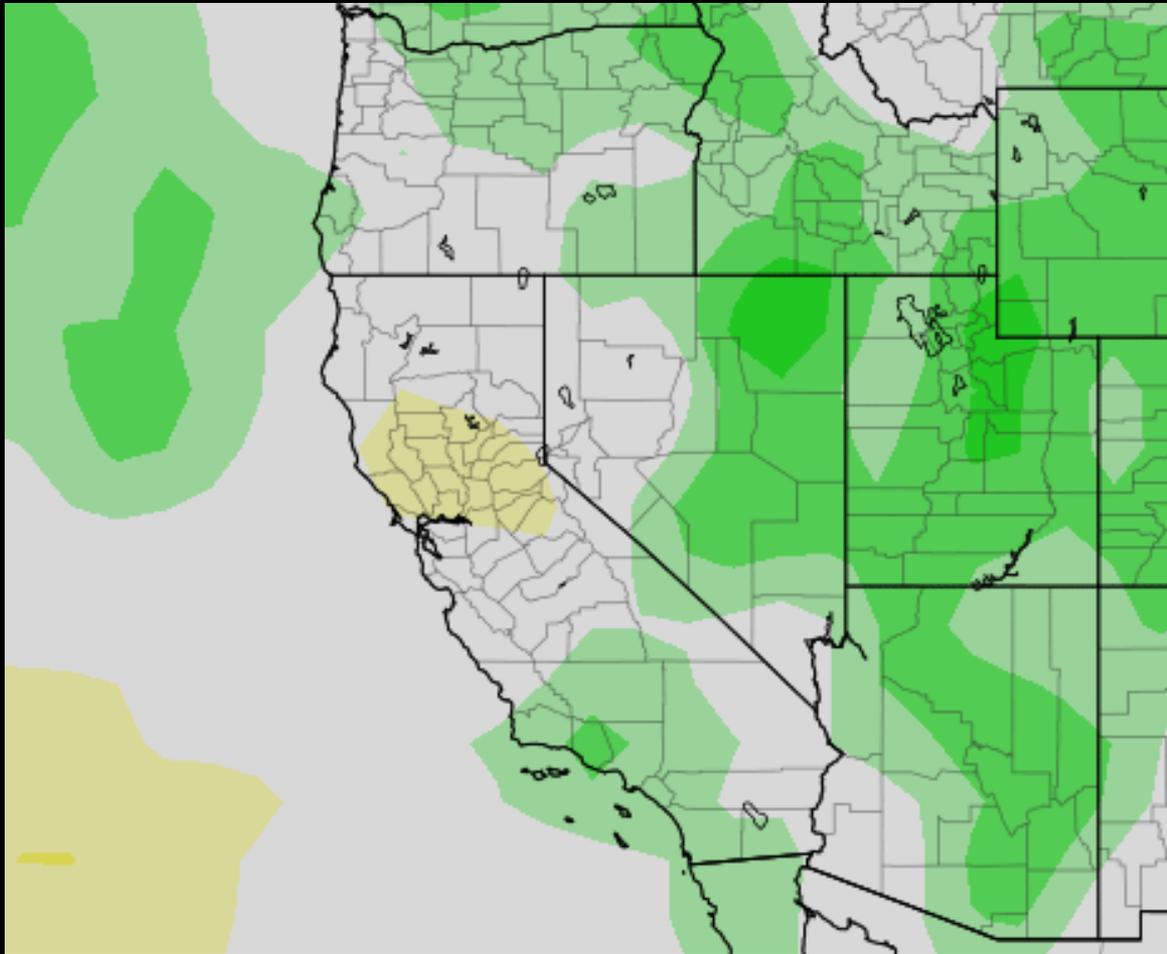
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favor drier than  
normal

**Darker shading**  
– increased  
confidence

## Monthly CFS Simulations – March 2016

- ☑ Favoring wetter than normal, more storms – temperature fluctuating
- ☑ A more classic El Niño look



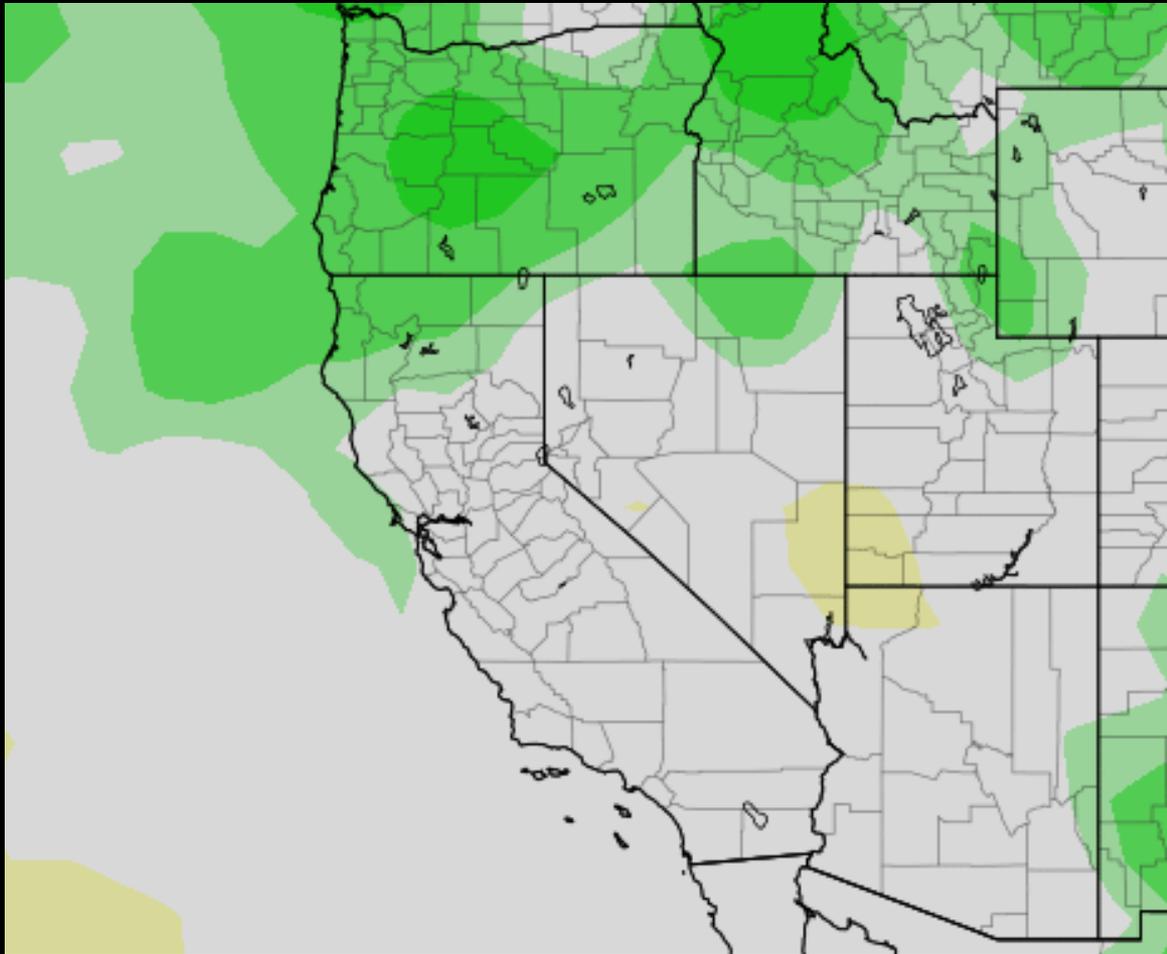
**Greens/blues** –  
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than normal

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favor drier than  
normal

**Darker shading**  
– increased  
confidence

## Monthly CFS Simulations – April 2016

- ☉ More nebulous weather pattern – could be anything storm wise
- ☉ Temperatures favor near normal overall.
- ☉ Snow melt flood risk – totally unknown at this point



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than normal

**Oranges/reds** –  
favor drier than  
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**Darker shading**  
– increased  
confidence

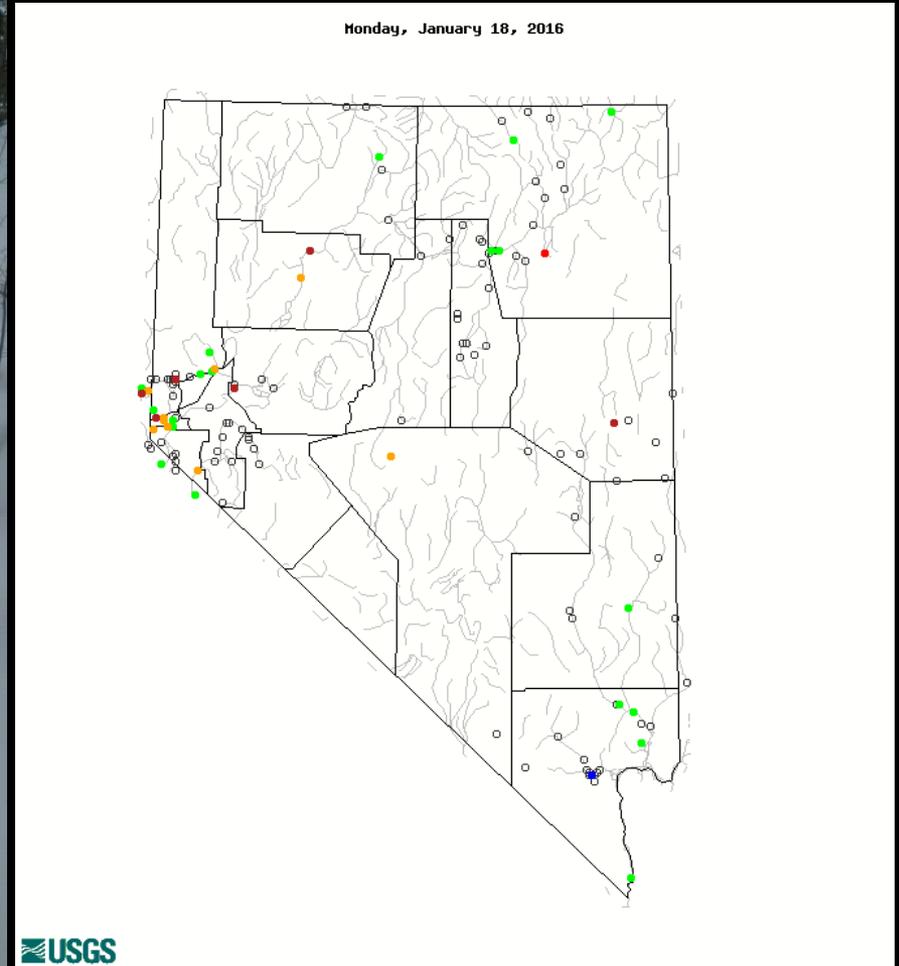
## Monthly CFS Simulations – May 2016

- Continued nebulous weather pattern – could be anything storm wise
- Temperatures favor near normal overall
- Snow melt flood risk – totally unknown at this point

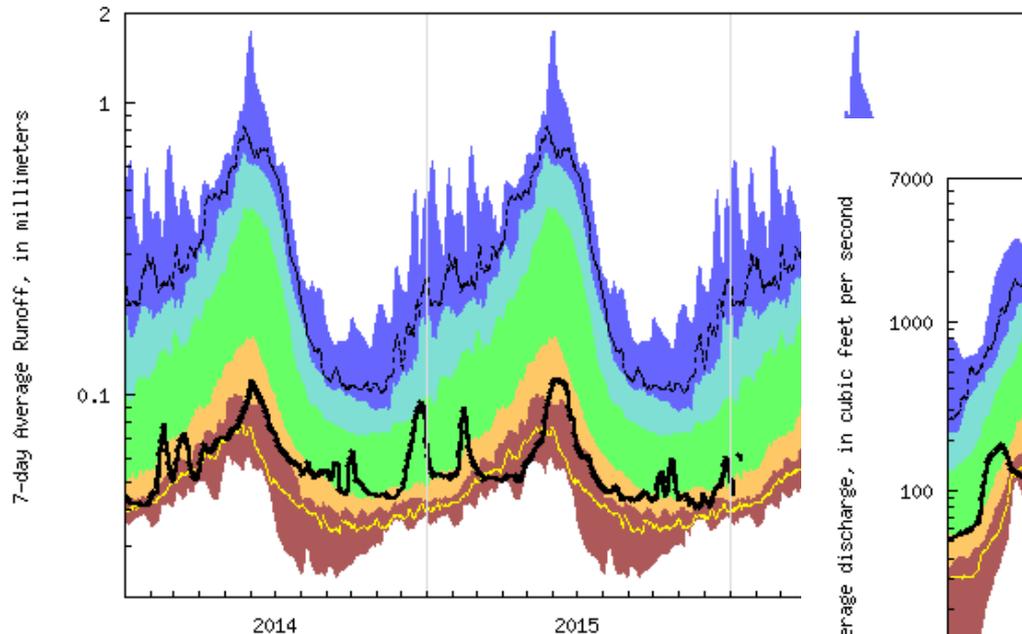
# Key Weather and Climate Takeaways

- Rest of January – High Confidence in at least a moderate AR later this week; lower confidence next week
- Good start to the Water Year, but precipitation variable across the region with respect to average.
- El Niño to remain strong through Spring, then weaken.
- Outlook for Feb/Mar favors **wetter** than average with variable temperatures; varying snow levels as well.
- Beyond March the forecast is more nebulous as El Niño effects begin to wane

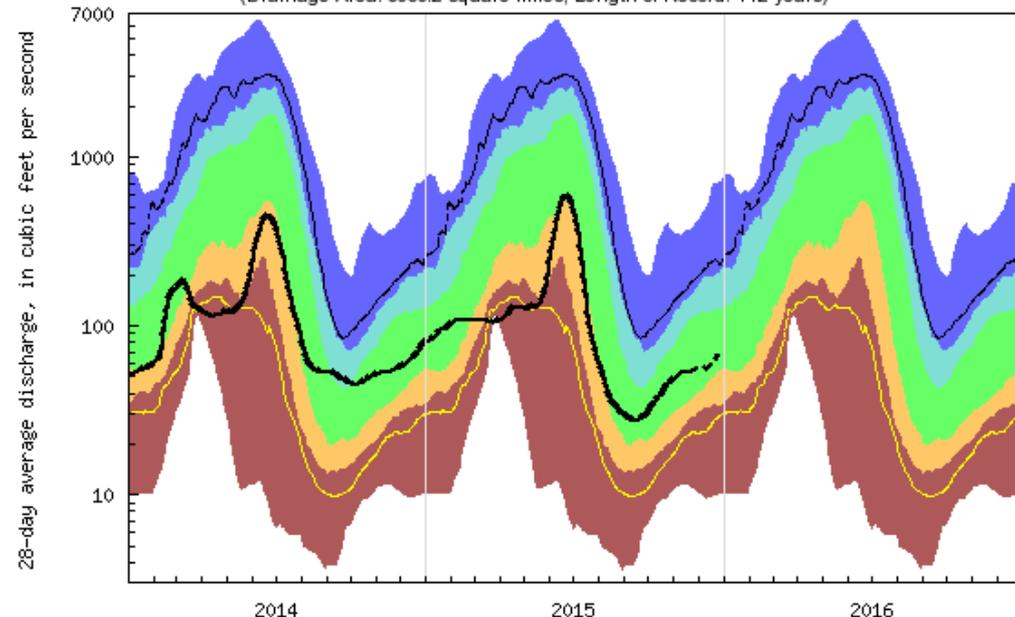
# Streamflow Conditions and Forecasts



Duration hydrograph of 7-day average runoff for Nevada



USGS 10322500 HUMBOLDT R AT PALISADE, NV  
(Drainage Area: 5053.2 square miles, Length of Record: 112 years)

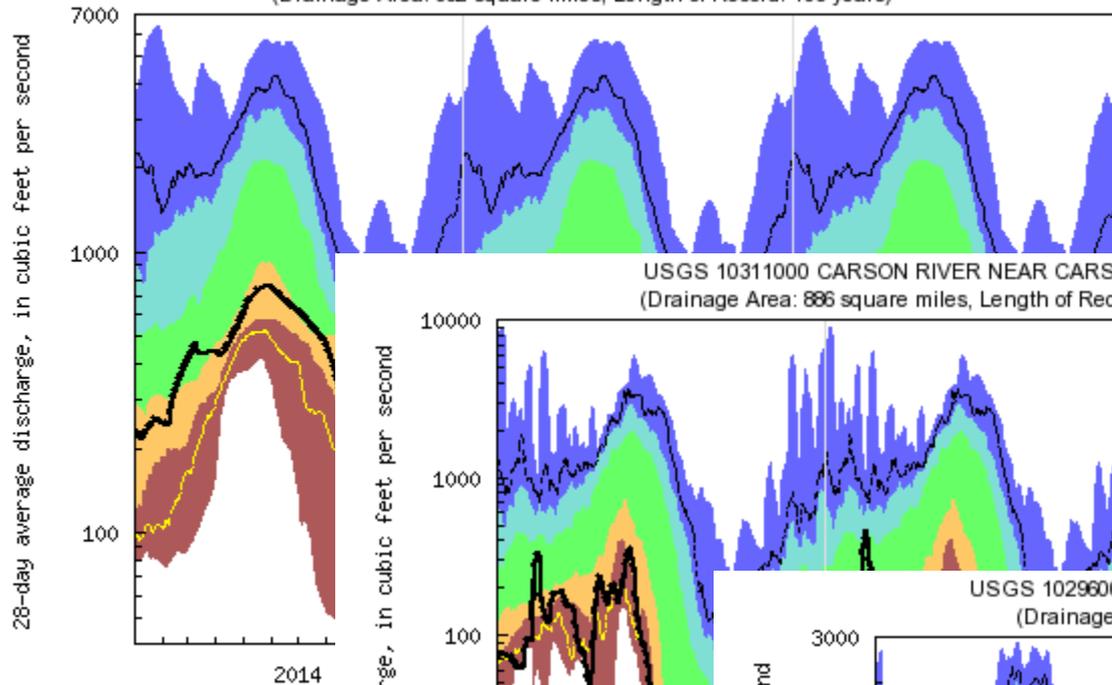


Last updated: 2016-01-19

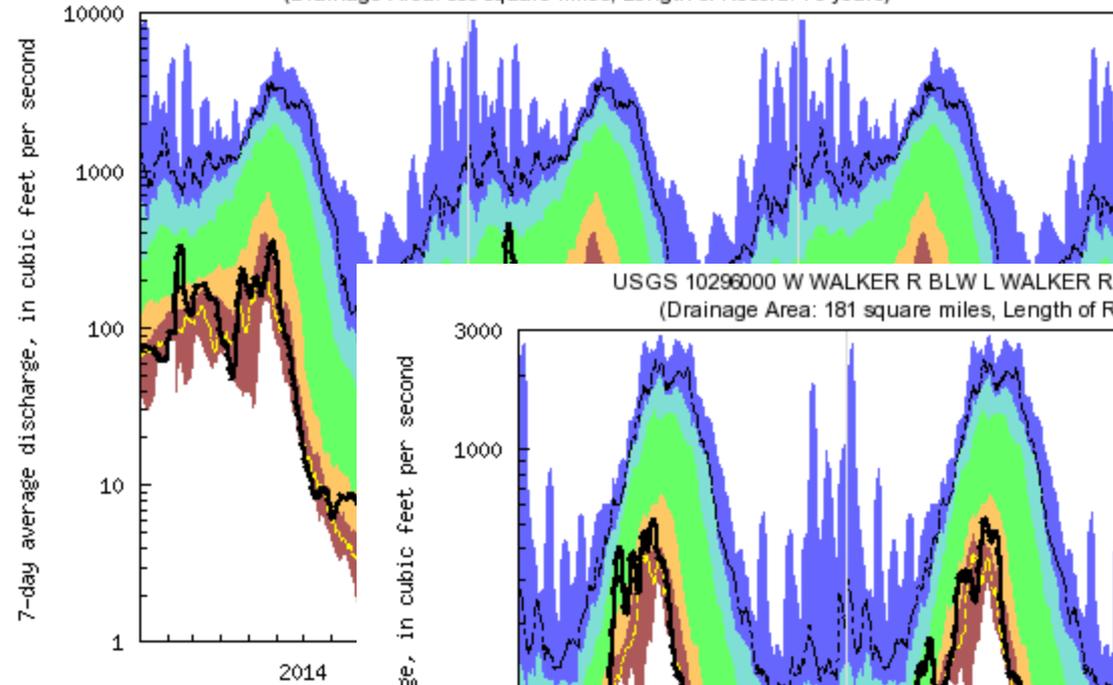
## Current Streamflow conditions

- 7 day running average compared to historic percentiles
- Most local rivers and streams have spent much of the past 4 years in the below to much below normal range, only punctuating the normal range for brief wet events or premature snowmelt.

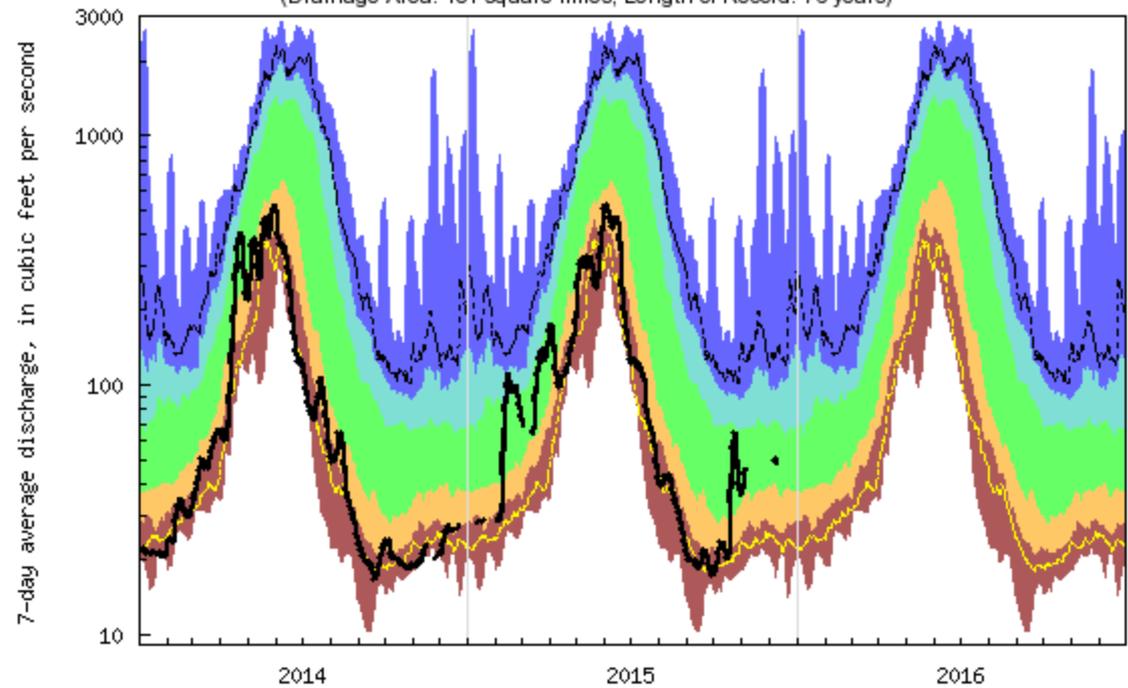
USGS 10346000 TRUCKEE R A FARAD CA  
(Drainage Area: 932 square miles, Length of Record: 105 years)



USGS 10311000 CARSON RIVER NEAR CARSON CITY, NV  
(Drainage Area: 886 square miles, Length of Record: 75 years)



USGS 10296000 W WALKER R BLW L WALKER R NR COLEVILLE, CA  
(Drainage Area: 181 square miles, Length of Record: 76 years)

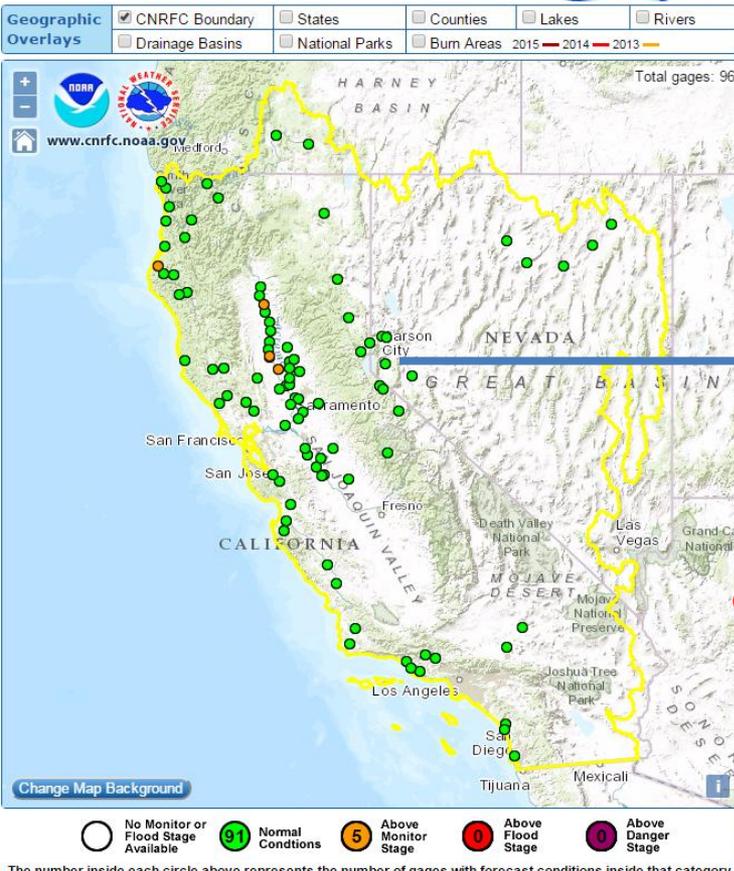
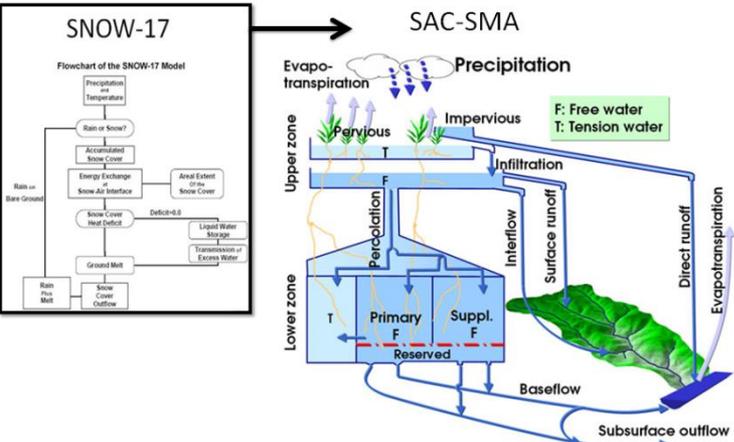


USGS WaterWatch

USGS WaterWatch

USGS WaterWatch

# Short Term River Forecasts



**Rivers/Reservoirs**

Forecasts Show only critical stages (fct pts only)  
 Data updated: Tue Jan 19 2016 08:10 AM PST  
 Ens. fct updated: Mon Jan 18 2016 08:20 AM PST  
 Forecast Points  Other Points  Ensemble

Observed Data  
 Data updated: Tue Jan 19 2016 07:56 AM PST  
 Show only critical stages (applies to fct pts only)  
 Latest Hour  1 Hr Ago  2 Hrs Ago  3 Hrs Ago

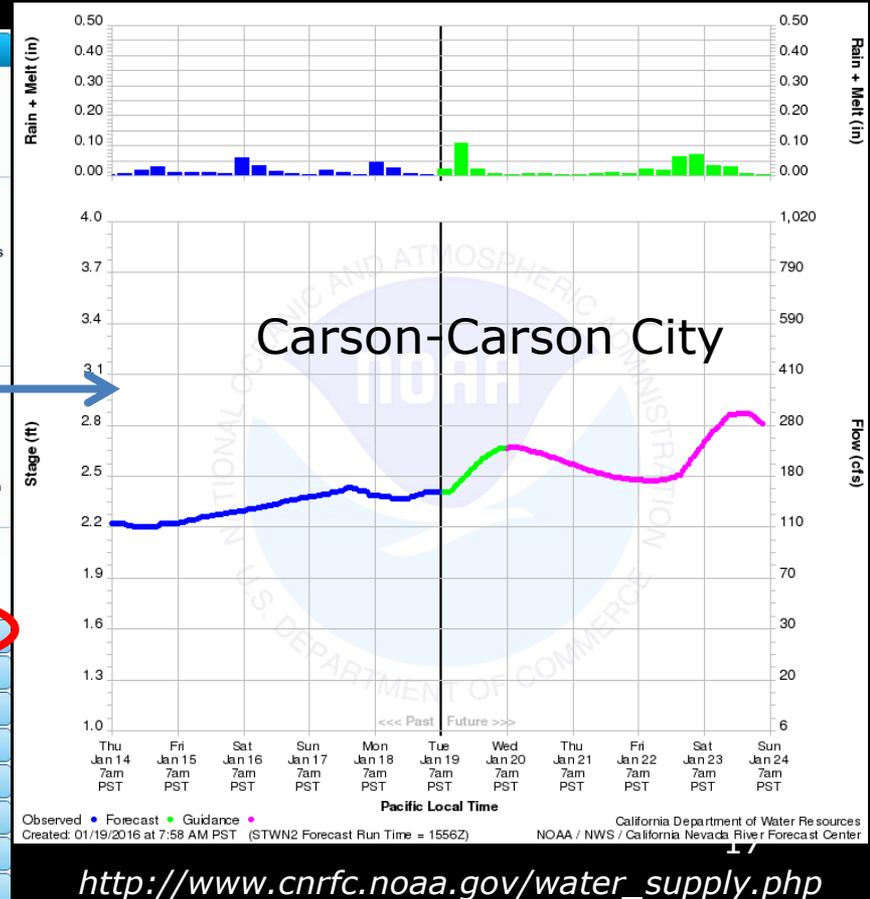
Forecast Points  Other Points  Reservoirs

Forecast + Observed Data  
 Fcst data updated: Tue Jan 19 2016 08:10 AM PST  
 Obs data updated: Tue Jan 19 2016 07:56 AM PST  
 Forecast Points  Show only critical stages   
 Link to  observed  forecast  
 Latest Hour  1 Hr Ago  2 Hrs Ago  3 Hrs Ago

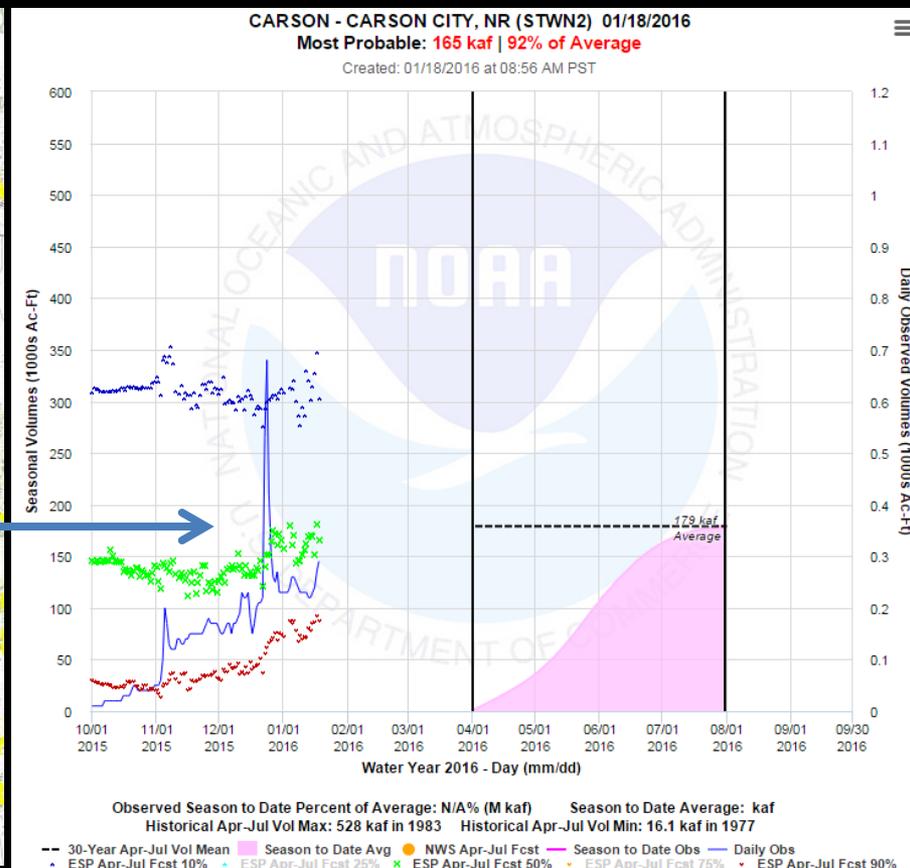
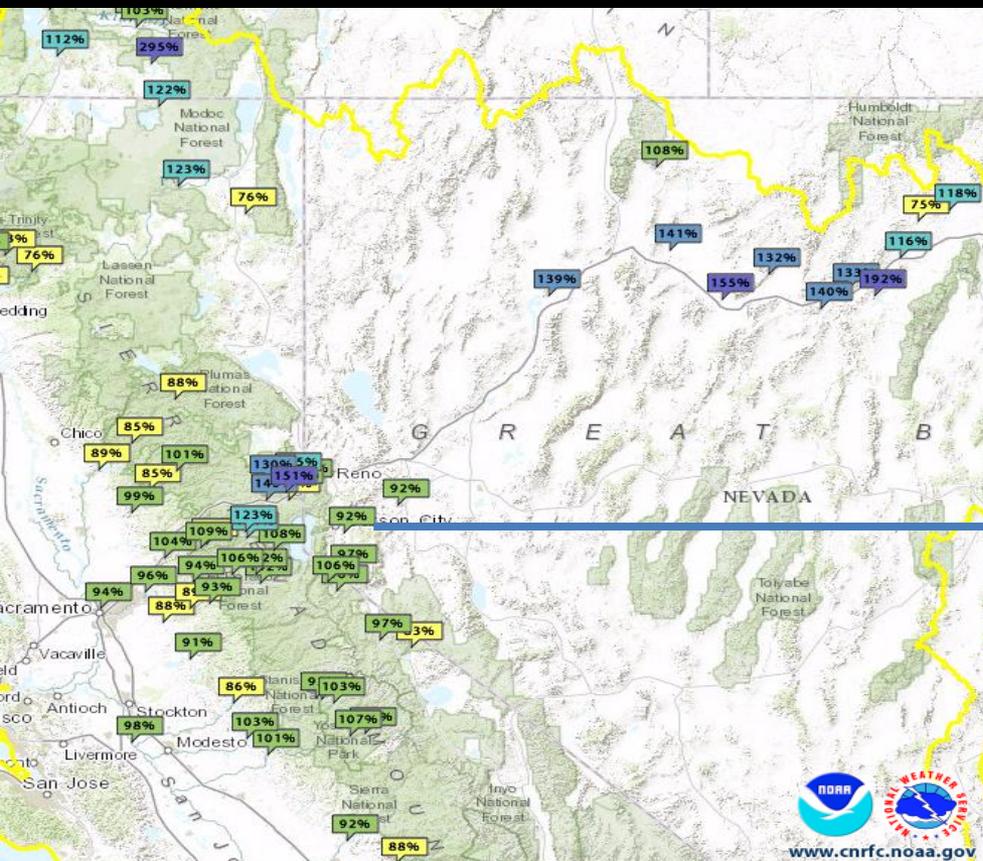
Significant River Flood Outlook  
 Data updated: Mon Jan 18 2016 11:00 AM PST  
 Valid: 01/18/2016 - 01/23/2016  
 Latest Flood Outlook Product (Updated 1/19/16)

**Water Resources**

Snow Data  
 Observed Precipitation (QPE)  
 Forecast Precipitation (QPF)  
 Observed Temperatures  
 Forecast Temperatures  
 Freezing Levels  
 Flash Flood Guidance



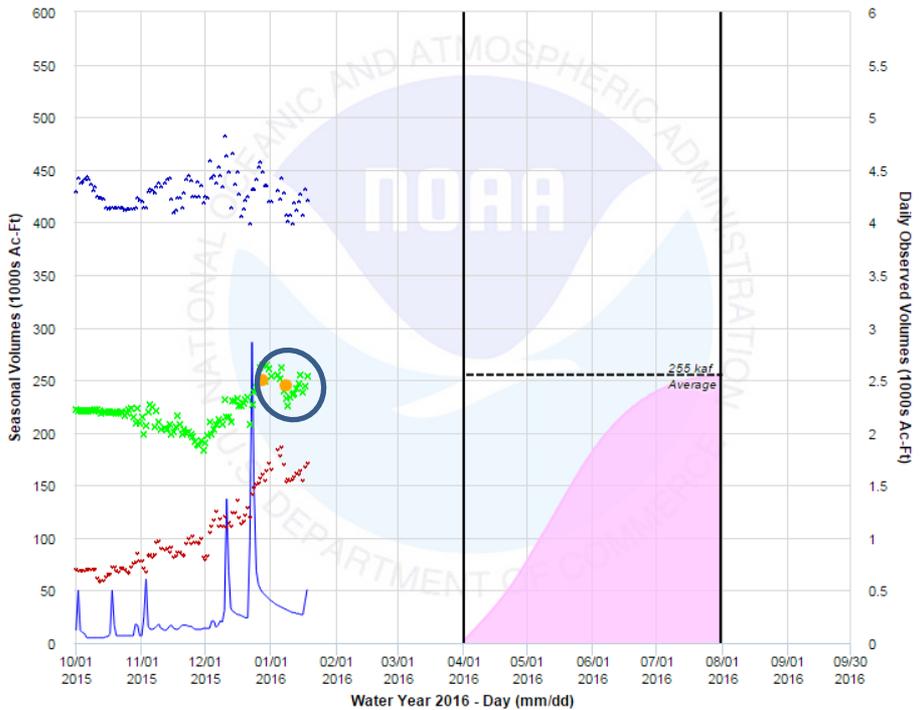
# Long Range Ensemble Forecasts



- Forecasts twice daily.
- Based on current forecasted weather 3-5 days out and historical data
- Start with current conditions and 58 years worth of model data
- Probability distribution derived from multiple runs; 50% chance of exceedance is taken as daily forecast
- Multiple standard and custom plotting options

**TRUCKEE - FARAD (FARC1) 01/18/2016**  
**Most Probable: 254 kaf | 100% of Average**

Created: 01/18/2016 at 08:56 AM PST



Observed Season to Date Percent of Average: N/A% (M kaf)      Season to Date Average: kaf  
 Historical Apr-Jul Vol Max: 713 kaf in 1983      Historical Apr-Jul Vol Min: 49.9 kaf in 1988

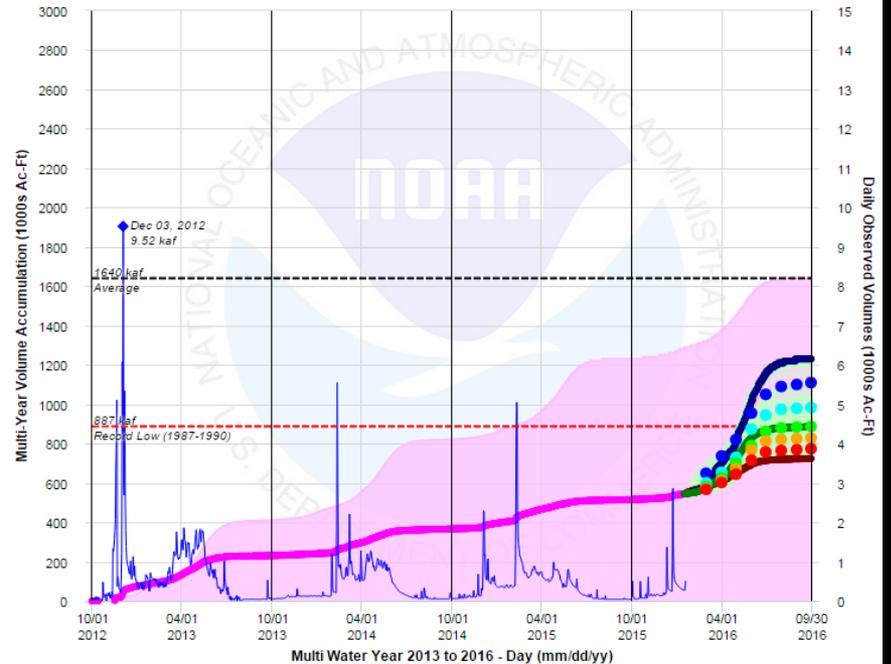
-- 30-Year Apr-Jul Vol Mean      Season to Date Avg      ● NWS Apr-Jul Fcst      --- Season to Date Obs      --- Daily Obs  
 ● ESP Apr-Jul Fcst 10%      ● ESP Apr-Jul Fcst 25%      × ESP Apr-Jul Fcst 50%      ● ESP Apr-Jul Fcst 75%      ● ESP Apr-Jul Fcst 90%

**2016 Multi-Year Accumulated Volume Plot**

CSV Ensemble File Download: Forecast Group | FARC1

**TRUCKEE - FARAD (FARC1) 01/18/2016**  
**Most Probable: 887 kaf | 54% of Average**

Created: 01/18/2016 at 09:00 AM PST



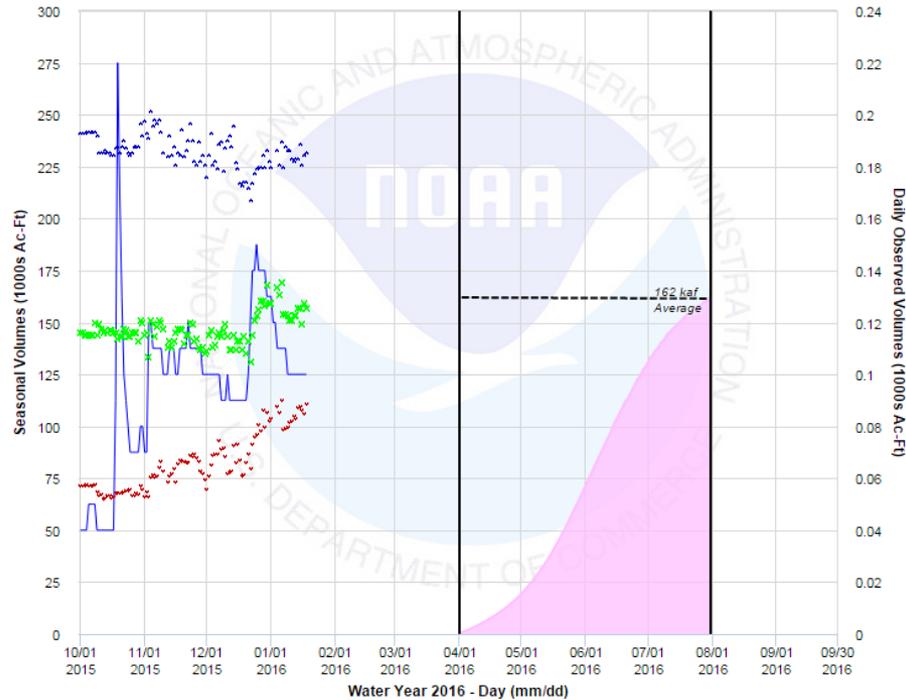
Observed to Date Percent of Average: 42% (544 kaf)      Water Year to Date Average: 1290 kaf

● 90%: 774 kaf      ● 75%: 828 kaf      ● 50%: 887 kaf      ● 25%: 983 kaf      ● 10%: 1110 kaf  
 --- Min Trace (1989: 724 kaf)      --- Median Trace (1955: 887 kaf)      --- Max Traces (1996: 1230 kaf)  
 --- Volume Med      --- Volume Avg      --- Traces (1950-2008)      --- Record High      --- Record Low  
 --- Accum to Date Avg      --- Accum to Date Obs      --- Daily Obs      ◆ Obs Peak

**WEST WALKER - LTL WALKER, BLO, COLEVILLE, NR (WWBC1) 01/18/2016**

**Most Probable: 157 kaf | 97% of Average**

Created: 01/18/2016 at 08:56 AM PST



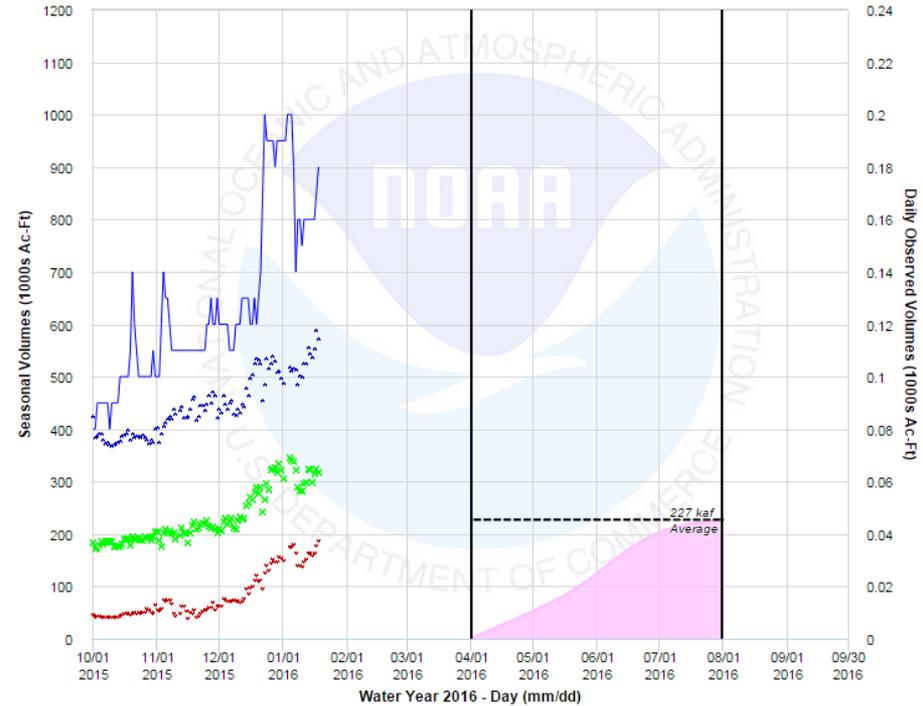
Observed Season to Date Percent of Average: N/A% (M kaf)      Season to Date Average: kaf  
 Historical Apr-Jul Vol Max: 303 kaf in 1969      Historical Apr-Jul Vol Min: 35.1 kaf in 1977

-- 30-Year Apr-Jul Vol Mean    Season to Date Avg    ● NWS Apr-Jul Fcst    Season to Date Obs    — Daily Obs  
 ▲ ESP Apr-Jul Fcst 10%    ◆ ESP Apr-Jul Fcst 25%    × ESP Apr-Jul Fcst 50%    ◆ ESP Apr-Jul Fcst 75%    ● ESP Apr-Jul Fcst 90%

**HUMBOLDT - PALISADE (PALN2) 01/18/2016**

**Most Probable: 318 kaf | 140% of Average**

Created: 01/18/2016 at 08:56 AM PST



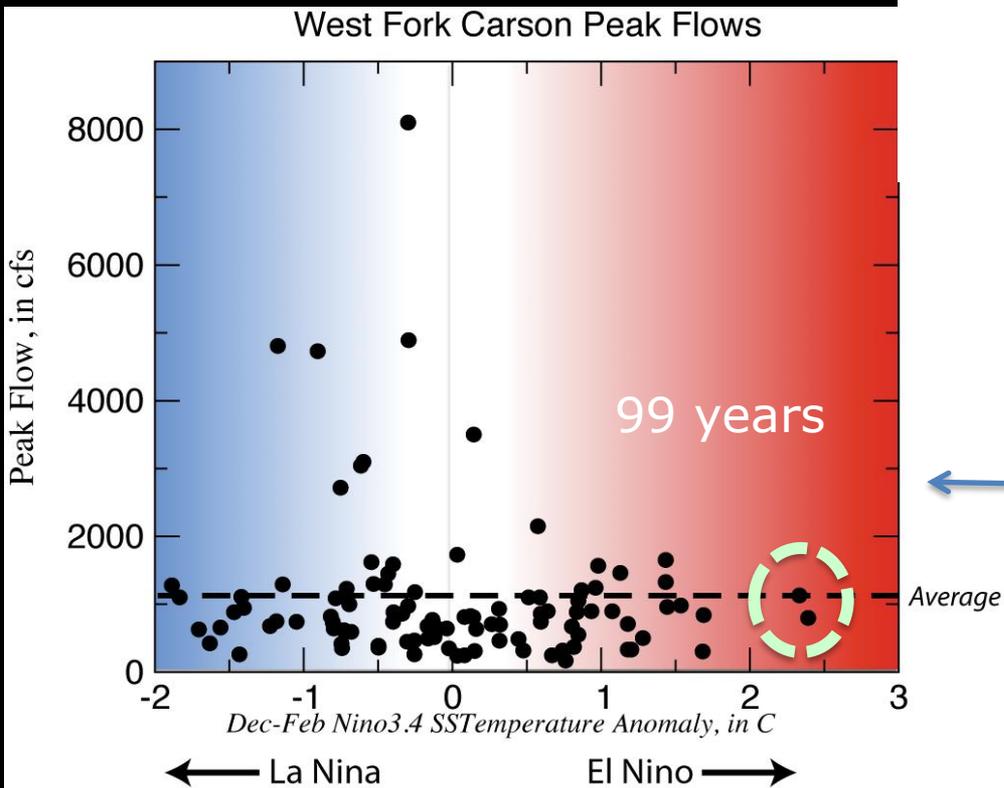
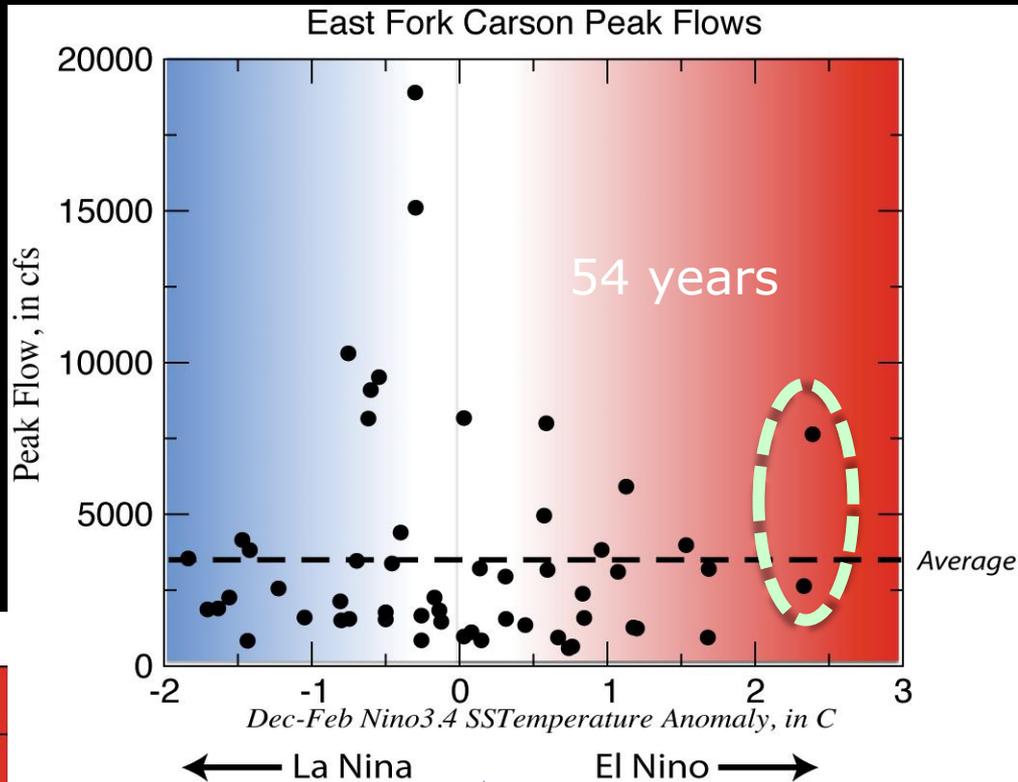
Observed Season to Date Percent of Average: N/A% (M kaf)      Season to Date Average: kaf  
 Historical Apr-Jul Vol Max: 999 kaf in 1984      Historical Apr-Jul Vol Min: 20.0 kaf in 1959

-- 30-Year Apr-Jul Vol Mean    Season to Date Avg    ● NWS Apr-Jul Fcst    Season to Date Obs    — Daily Obs  
 ▲ ESP Apr-Jul Fcst 10%    ◆ ESP Apr-Jul Fcst 25%    × ESP Apr-Jul Fcst 50%    ◆ ESP Apr-Jul Fcst 75%    ● ESP Apr-Jul Fcst 90%

# El Nino and Flood Potential



# Peak Annual Streamflows of Carson River versus El Nino status

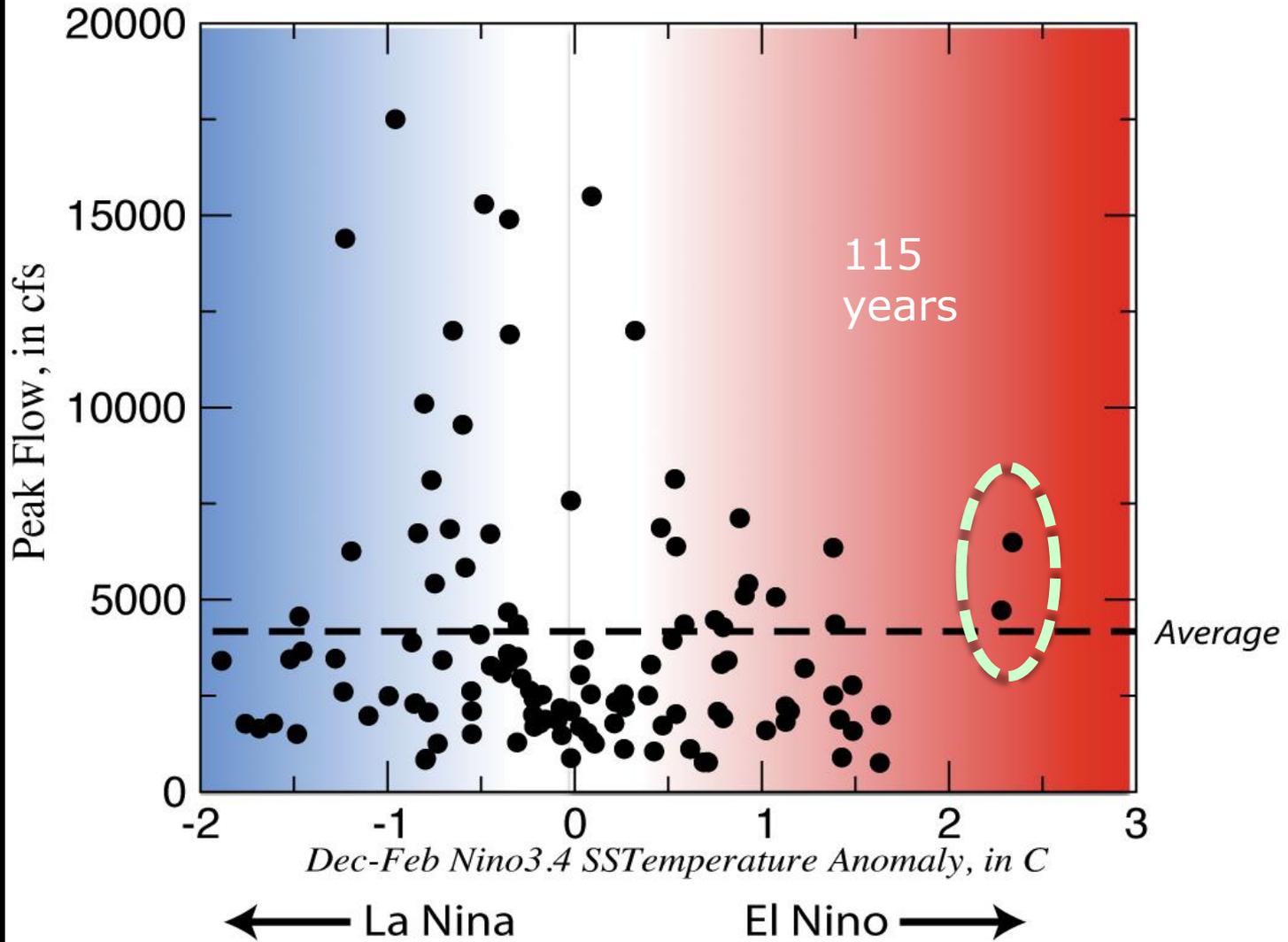


Near Markleeville

At Woodfords

Courtesy of Mike Dettinger USGS

# Truckee River at Farad Peak Flows



Courtesy of Mike  
Dettinger USGS

# Key Streamflow Takeaways

- Some minor rises expected next weekend.
- Observed streamflows still generally low, responding to events but recede quickly.
- Water supply forecasts for 2016 near to above average. Higher in northeastern Nevada.
- Next two months critical to water supply. Need frequent cold storms to continue to build snowpack
- Strong El Nino winters have not favored big floods in western Nevada statistically. Snow melt flooding a possibility, but uncertain at this time.
- Long-term drought improving SLOWLY- need a big winter and runoff to make an appreciable dent.



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Forecasting for the Sierra and western Nevada since 1905



# DO EL NINOS OR "VERY STRONG" EL NINOS YIELD THE LARGEST, MOST DANGEROUS STORMS IN CALIFORNIA/NEVADA?

*Answer: EL NINOS HAVE NOT BEEN STANDOUTS IN THIS REGARD, HISTORICALLY*

Water-Year Counts of 3-day Periods with Any California-Nevada Precipitation Reports greater than 300 or 400 mm, as a function of El Nino status

