

Water Supply 2016 Early Outlook Briefing

December 10, 2015

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Colorado Basin River Forecast Center / National Weather Service

* Please mute your phone until ready to ask questions *

Today's Presentation

Initial Hydrologic Conditions

Fall weather review - precipitation, snowpack, soil Moisture

Early 2016 Runoff Outlook

Raw model guidance

Short Term Weather

El Niño and Long Term Outlook

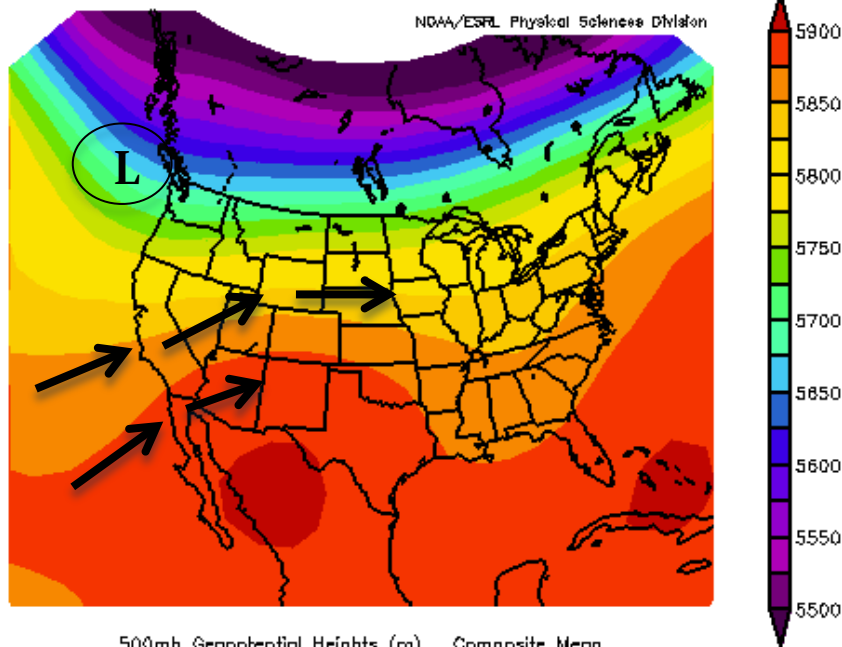
Current state, El Niño outlook, Historical impacts

CBRFC Products Update

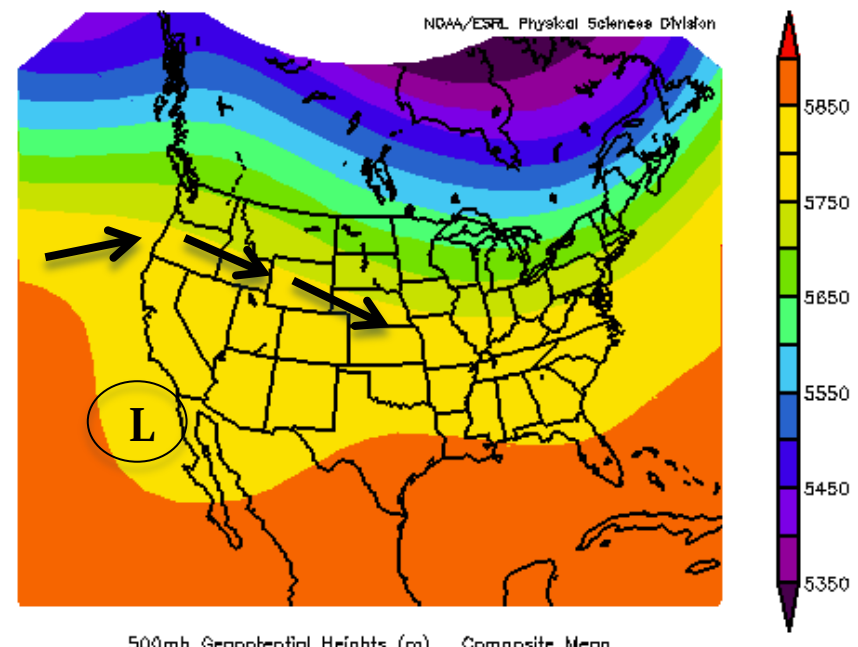
New and modified web page products
2016 water supply briefings

2015 Fall Weather

September 2015



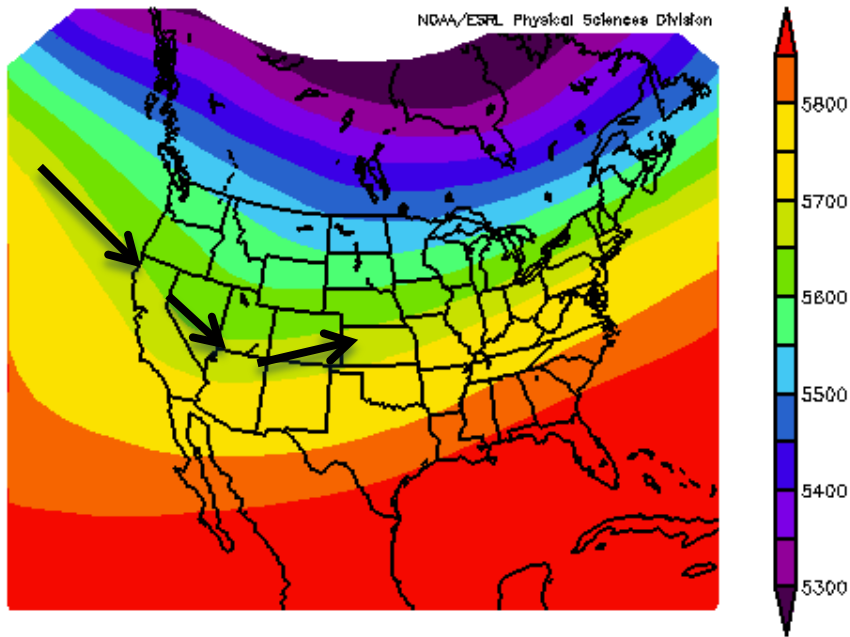
October 2015



Upper Atmosphere Pattern

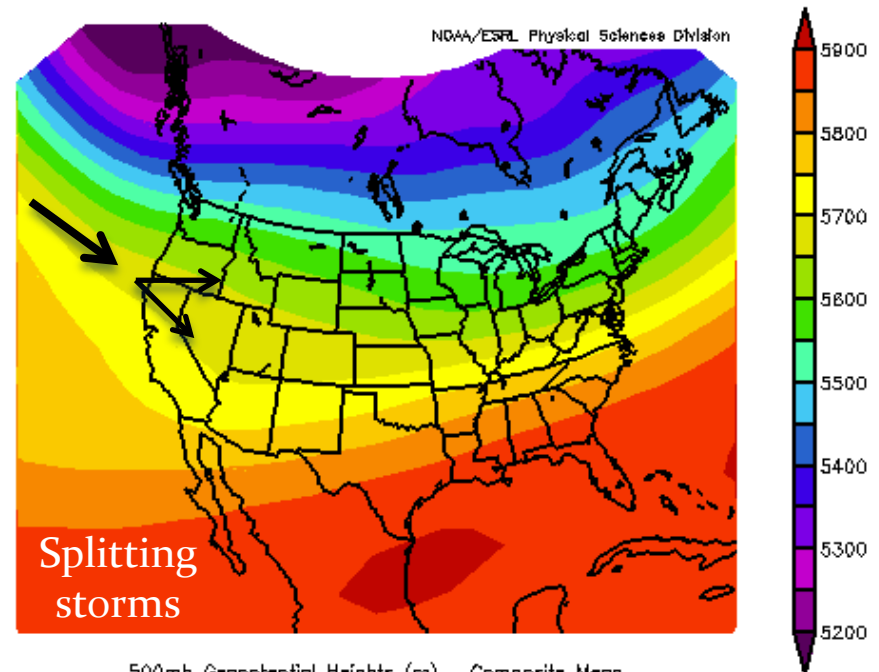
2015 Fall Weather

November 2015



500mb Geopotential Heights (m) Composite Mean
11/1/15 12z to 11/30/15 12z
NCEP/NCAR Reanalysis

November 10-15 2015



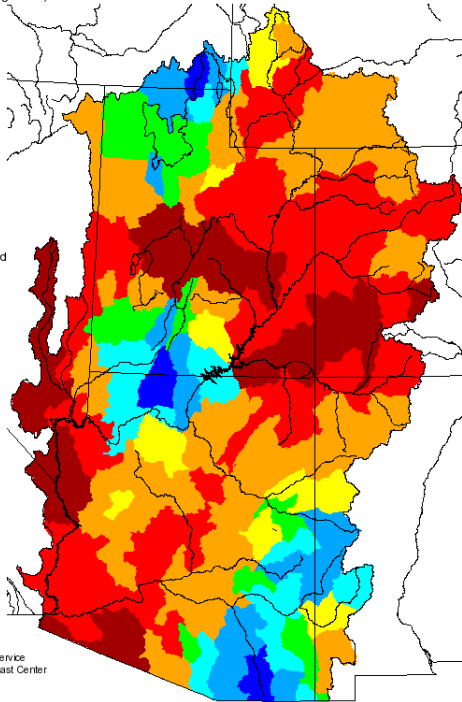
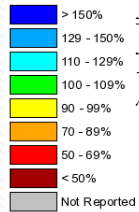
500mb Geopotential Heights (m) Composite Mean
11/10/15 12z to 11/15/15 12z
NCEP/NCAR Reanalysis

Upper Atmosphere Pattern

Fall Precipitation

Monthly Precipitation for September 2015
(Averaged by Hydrologic Unit)

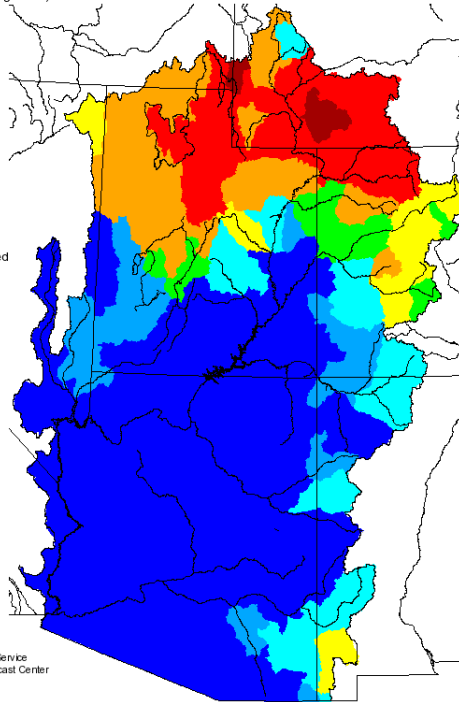
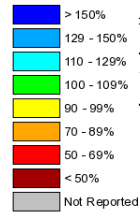
% Average



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

Monthly Precipitation for October 2015
(Averaged by Hydrologic Unit)

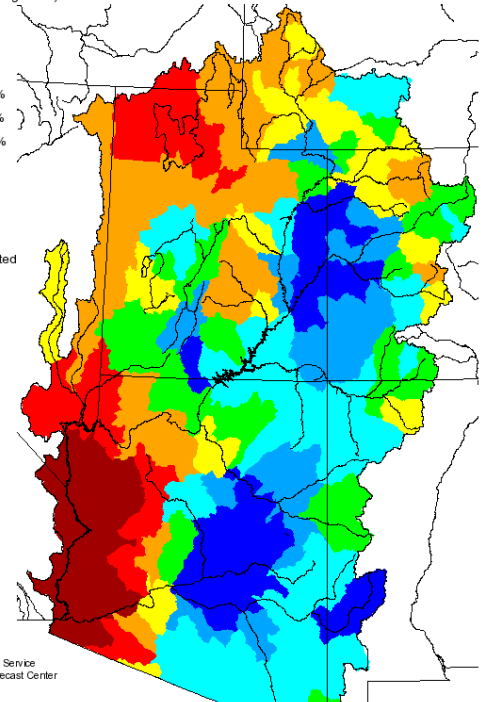
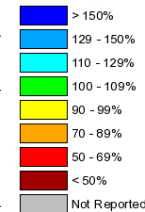
% Average



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Monthly Precipitation for November 2015
(Averaged by Hydrologic Unit)

% Average



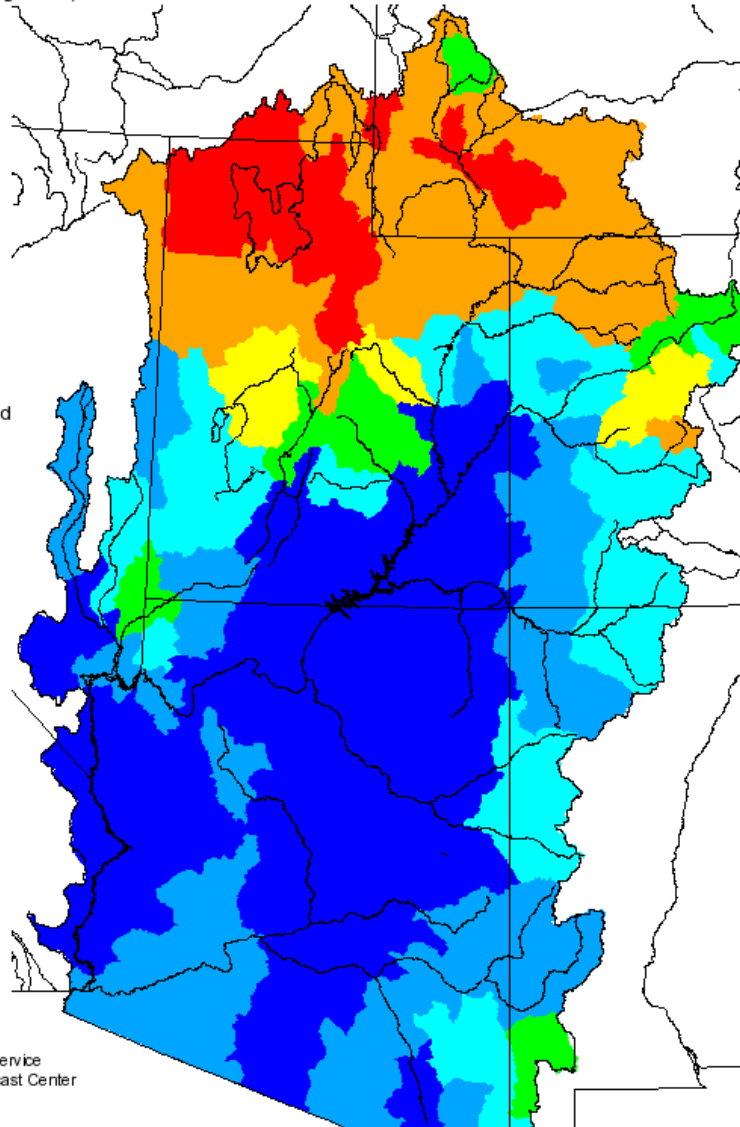
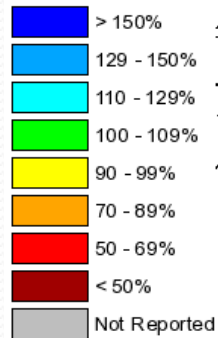
Prepared by
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Colorado Basin River Forecast Center
Salt Lake City, Utah
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Water Year 2016 Precipitation

Seasonal Precipitation, October 2015 - November 2015

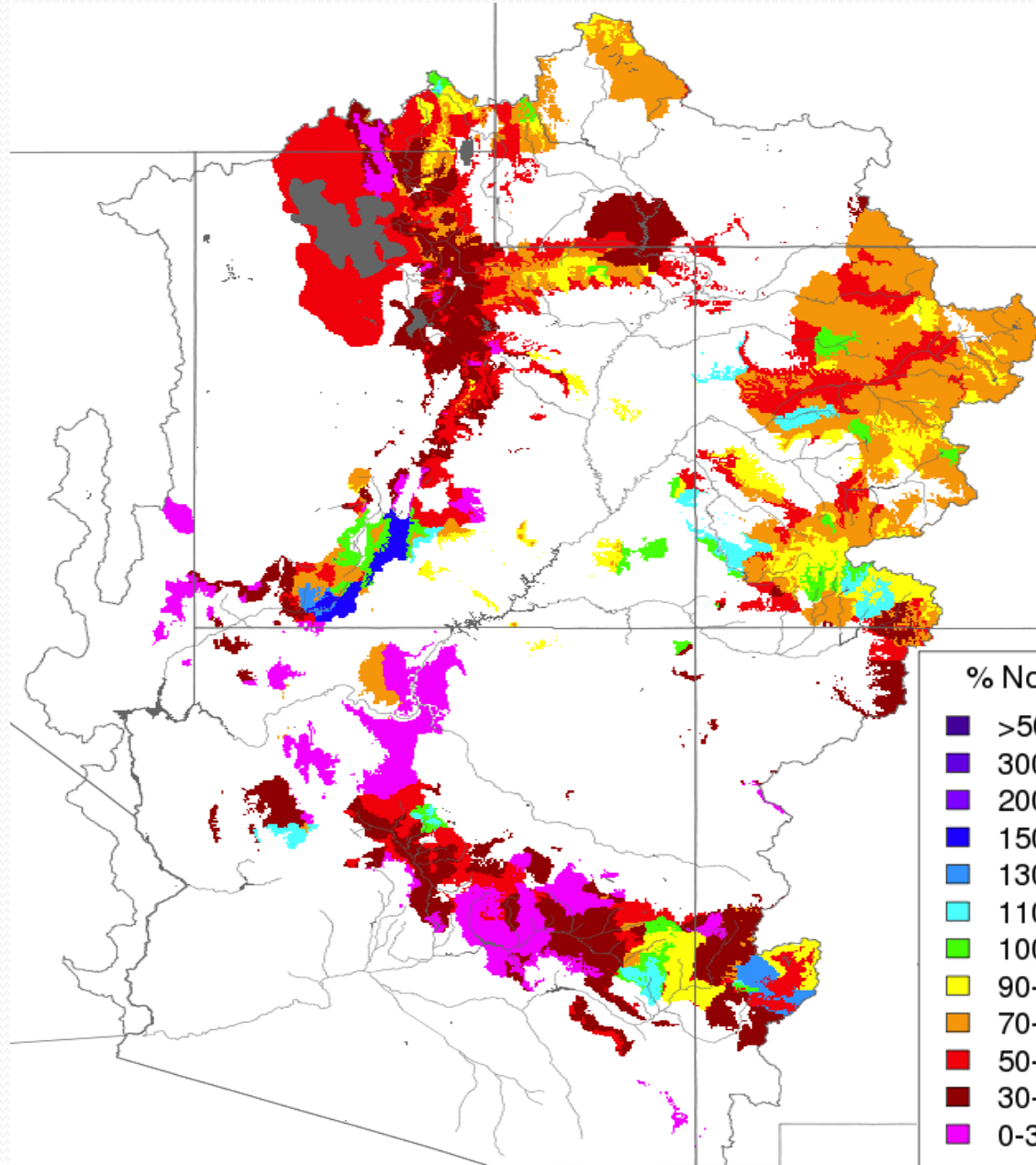
(Averaged by Hydrologic Unit)

% Average

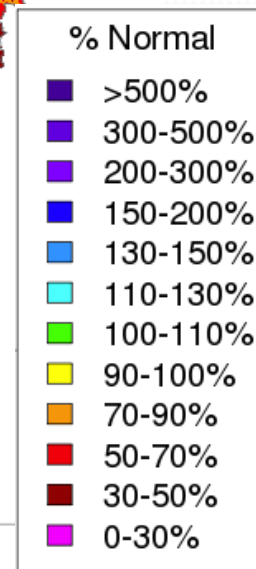


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Soil Moisture



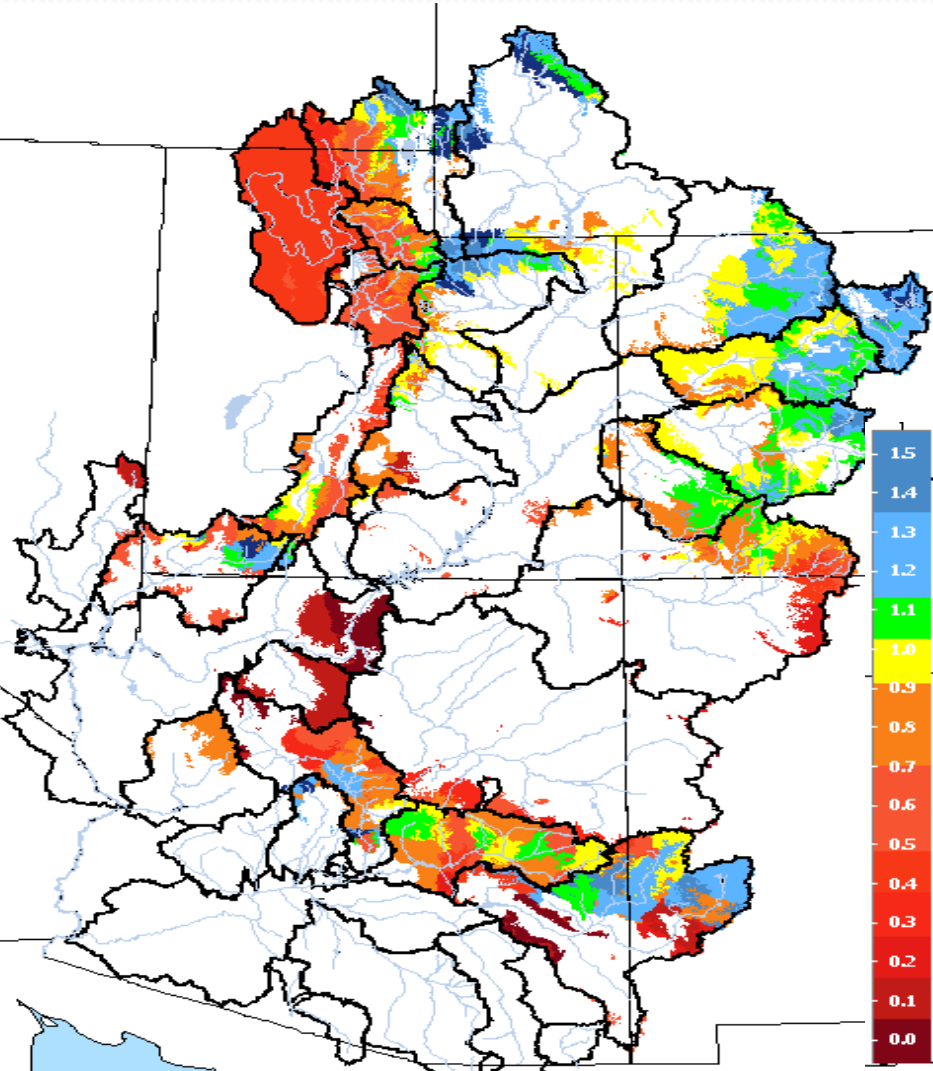
Model Soil Moisture
Lower Zone
(~deeper than 50 mm)



Soil Moisture

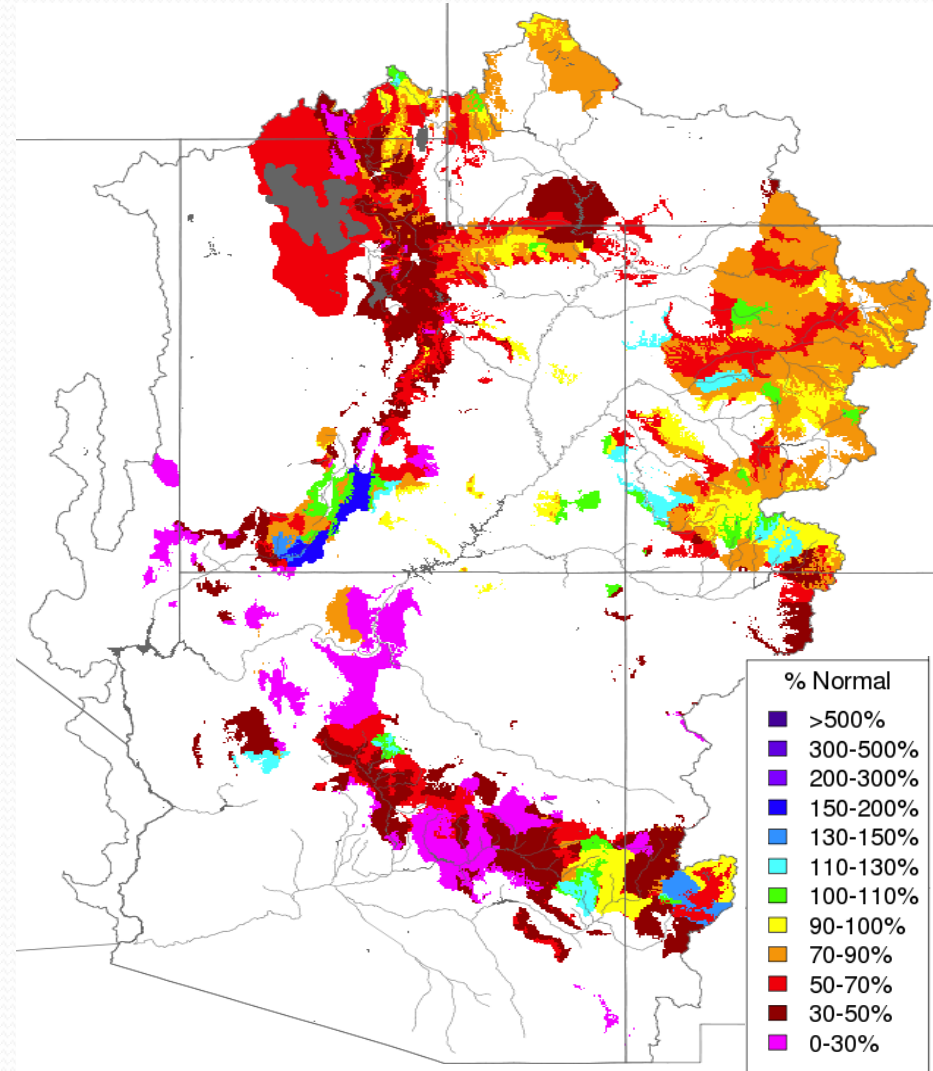
CBRFC Model Soil Moisture

November 15, 2014

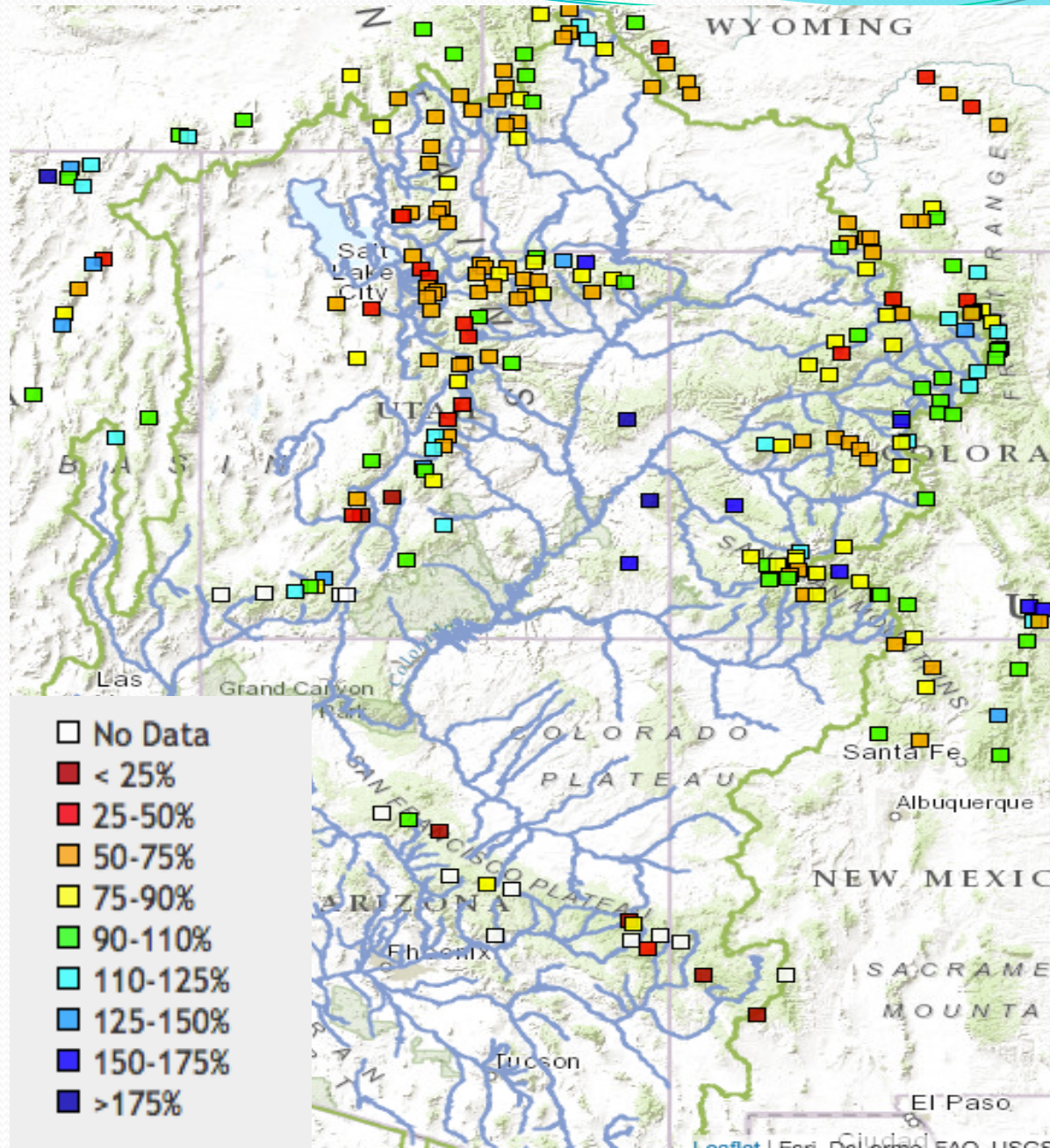


CBRFC Model Soil Moisture

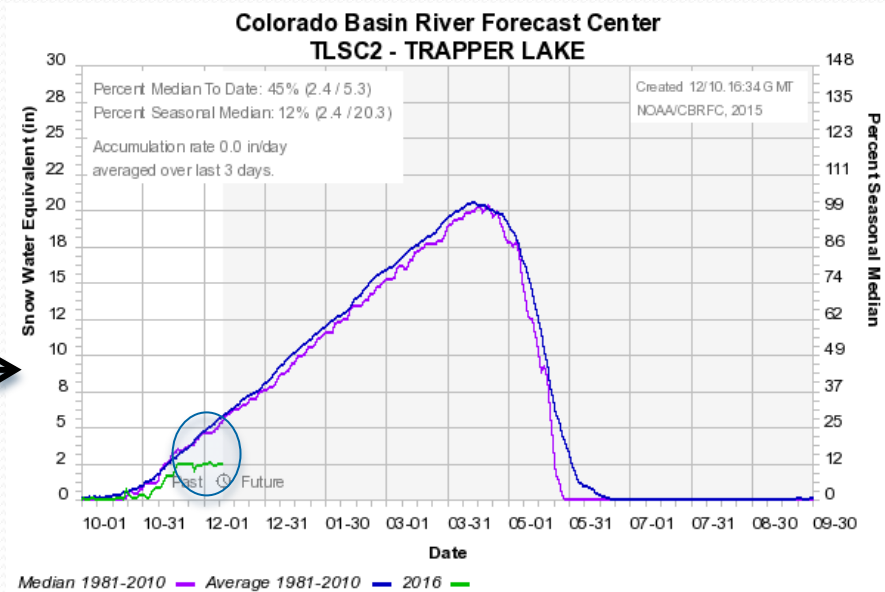
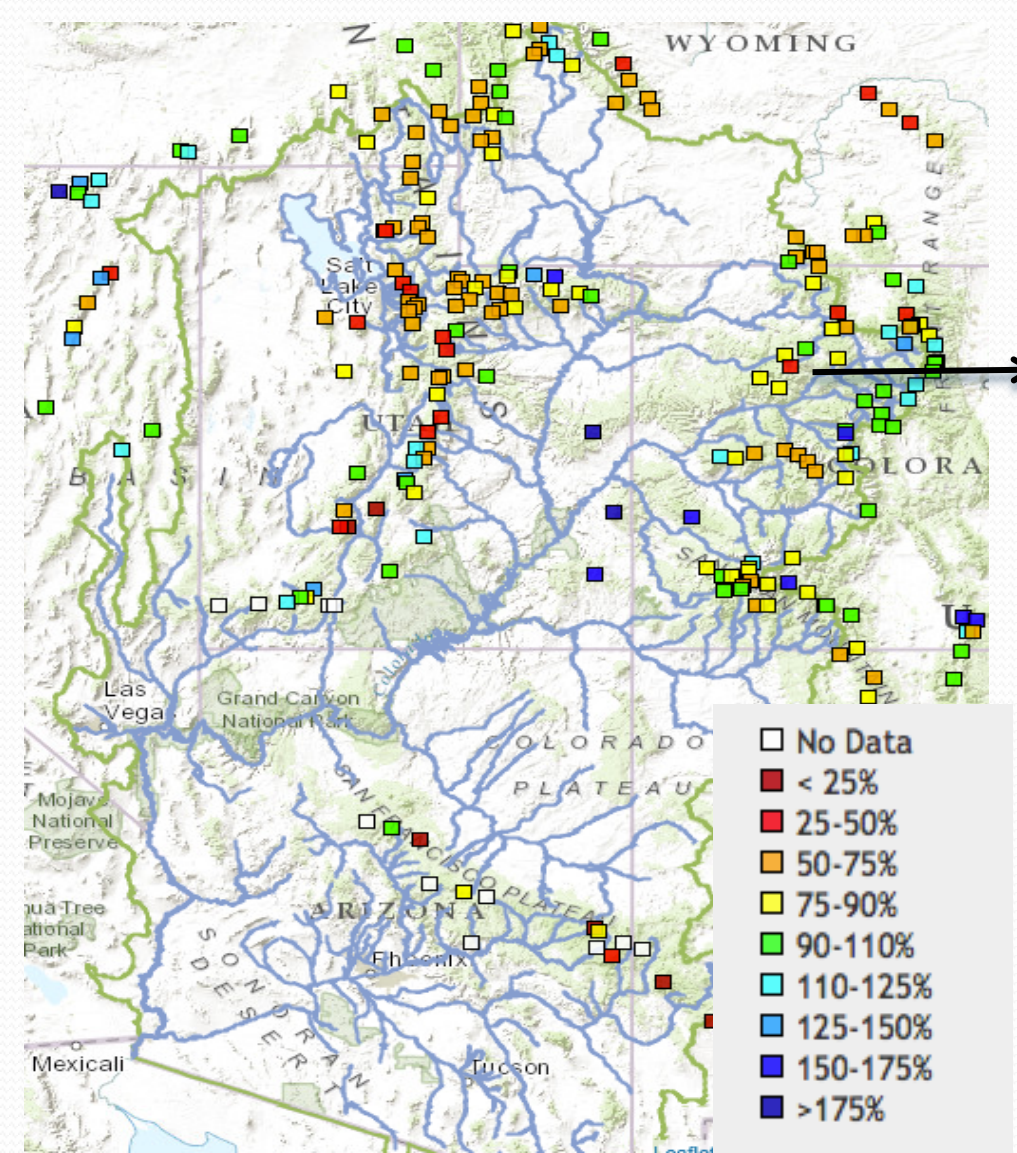
November 15, 2015



Current Snow – SNOTEL



Current Snow – SNOTEL

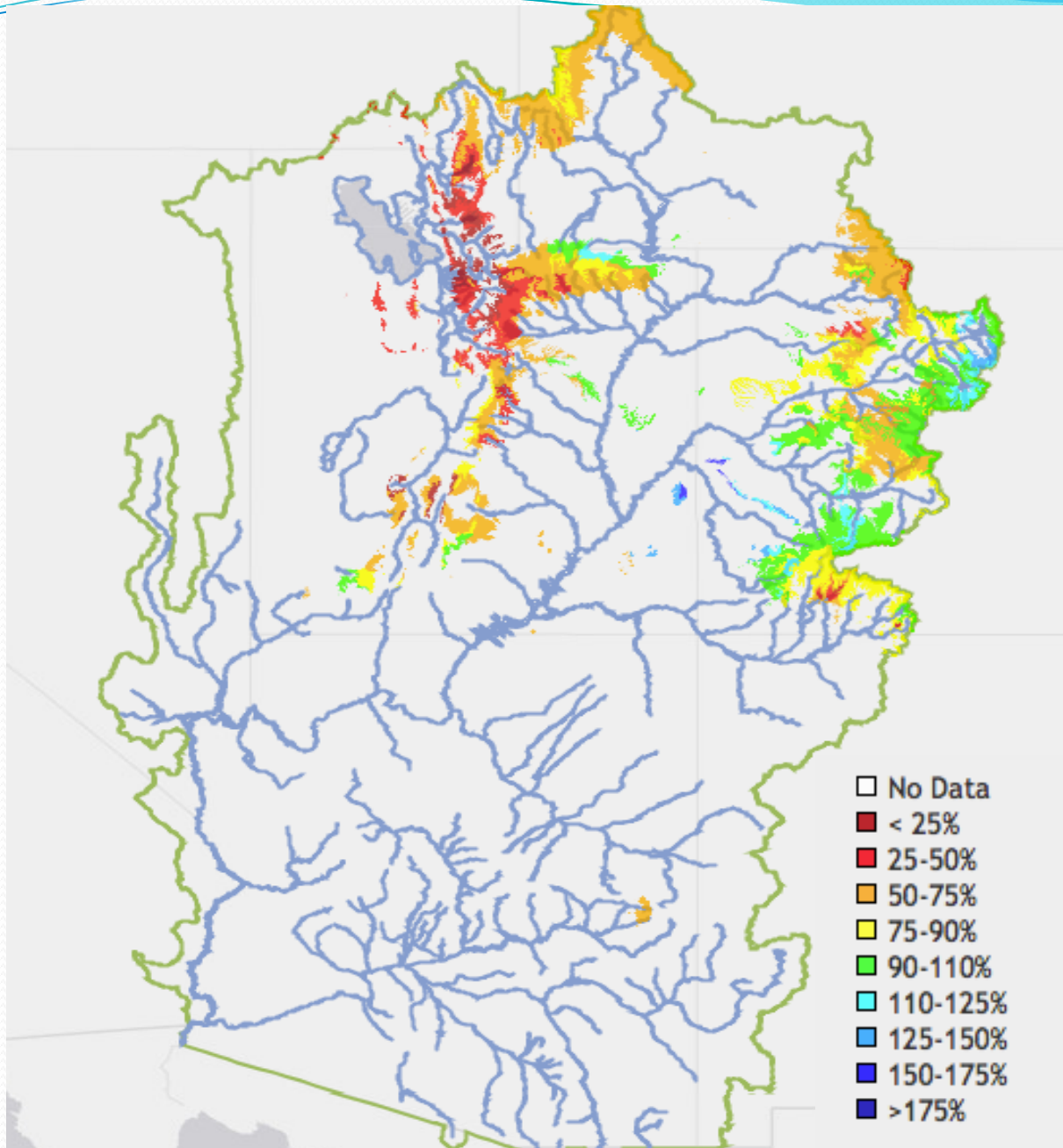


Very early in the season. The percent of average observation will be impacted by just a couple of good storm systems.

Currently SNOTEL is at 45% of median

Today med 5.3 ~ 2.9 inch deficit
April med 20.3 ~ 11.2 inch deficit

Current Snow – Modeled SWE



Raw Model Guidance



COLORADO BASIN RIVER FORECAST CENTER

NATIONAL WEATHER SERVICE / NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

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- SNOW
- WATER SUPPLY**
- RESERVOIRS
- WEATHER
- CLIMATE
- HELP
- ABOUT
- NEWS
- SEARCH

News CBRFC Water Supply Webinar - Early Outlook for 2016 - Dec 10th 11 AM MST [Read More...](#)

Seasonal Water Supply Forecasts Have Ended.

Seasonal water supply forecasts are produced November through July. Check back during this period for seasonal forecasts.

[Contact Us](#) with any questions/comments you may have.

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HOME

CBRFC
National Weather Service
National Oceanic and
Atmospheric Administration
Department of Commerce

RIVERS

Conditions Map
Conditions List
Peak Flow Map
Peak Flow List
Peak Flow Archive
Recreational Forecasts
Text Products
 Internal Text Products
5 Day Flood Outlook
Hydro Data
AHPS

SNOW

Conditions Map
Conditions List
Snow Groups

WATER SUPPLY

Official Forecast Map
 Forecast Map (Local)
Official Forecast List
 Forecast List (Local)
Official Forecast Discussion
Discussion Archive
Official Forecast Publication
Publication Archive
Specific Site Archive
ESP Forecast Map
ESP Forecast List
2015 Verification Map
Historical Verification Map
Documentation
Precipitation
Temperature
Soil Moisture
 Internal Tools
Special Forecast Products

RESERVOIRS

Conditions Map
Conditions List
 Webcat
 DamBreak

WEATHER

Forecast QPF
Observed Summary
Observed Precipitation
Observed Temperature
Observed Freezing Level
National Precip Forecast
 Radar
 Radar Bias
 Satellite

CLIMATE

Forecasts
Hydroclimatology
Climate Change
Data and Indices
El Nino and MJO

HELP

General
Water Supply
Documentation
Sac-SMA Model
Peak Forecasts

ABOUT

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 Schedule 2016
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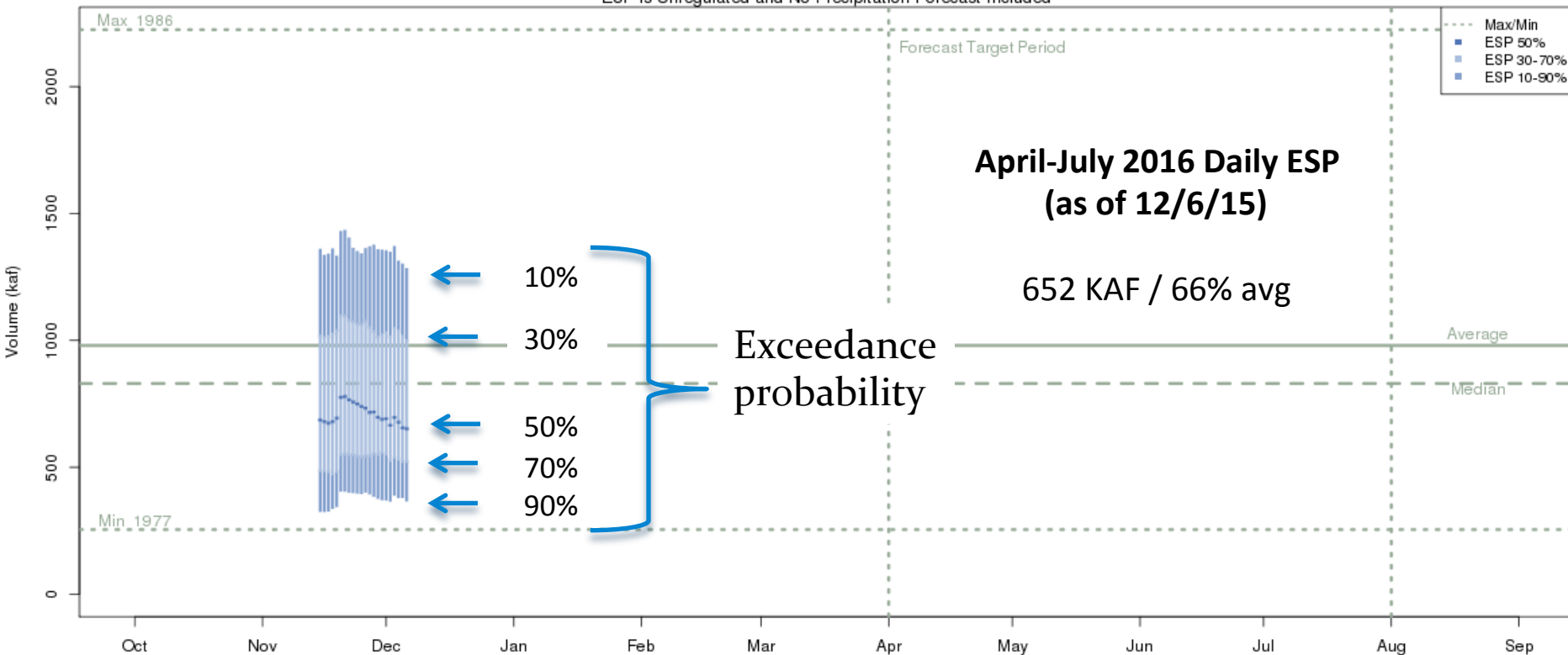
NEWS

CBRFC News
Email Updates

2016 Raw Model Guidance

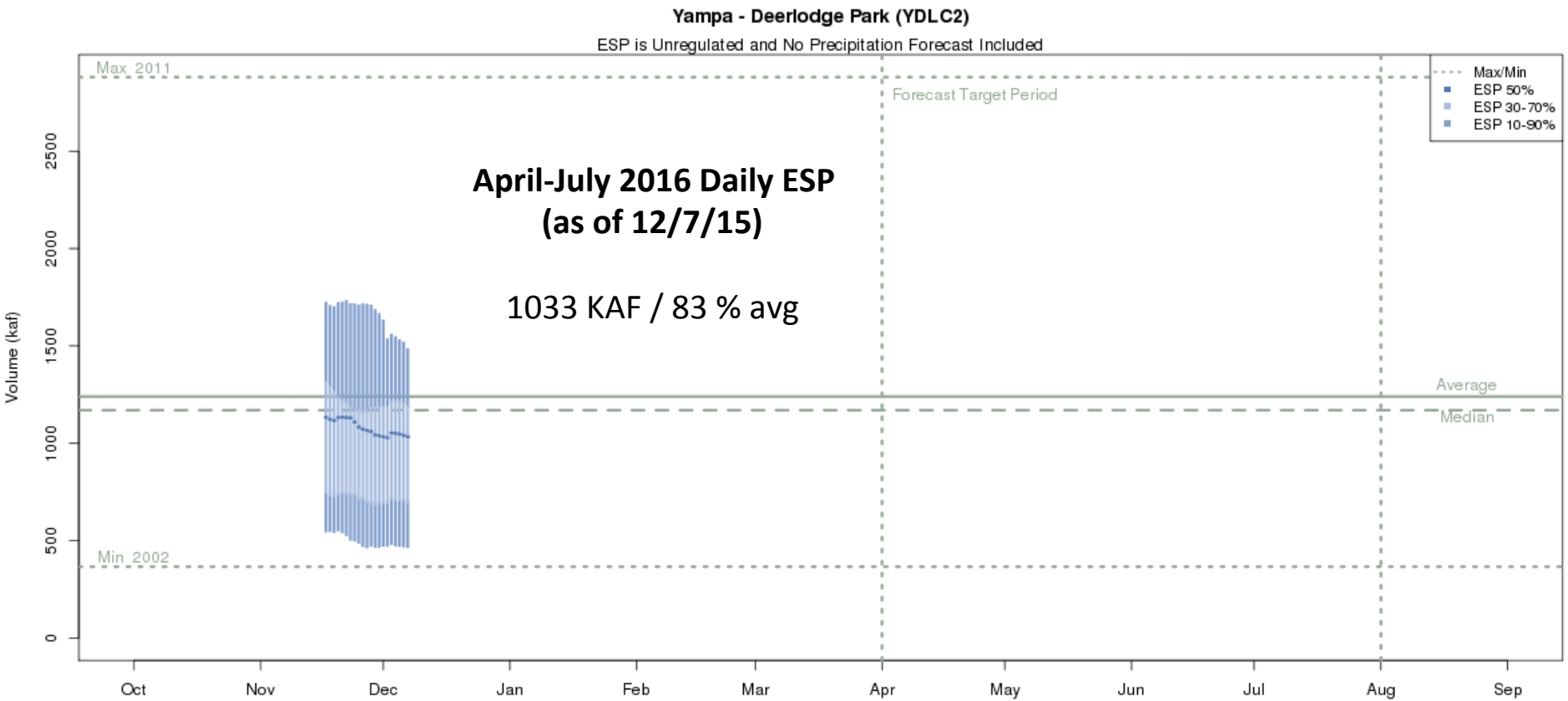
Green - Flaming Gorge Res- Flaming Gorge Dam- At (GRNU1)

ESP is Unregulated and No Precipitation Forecast Included



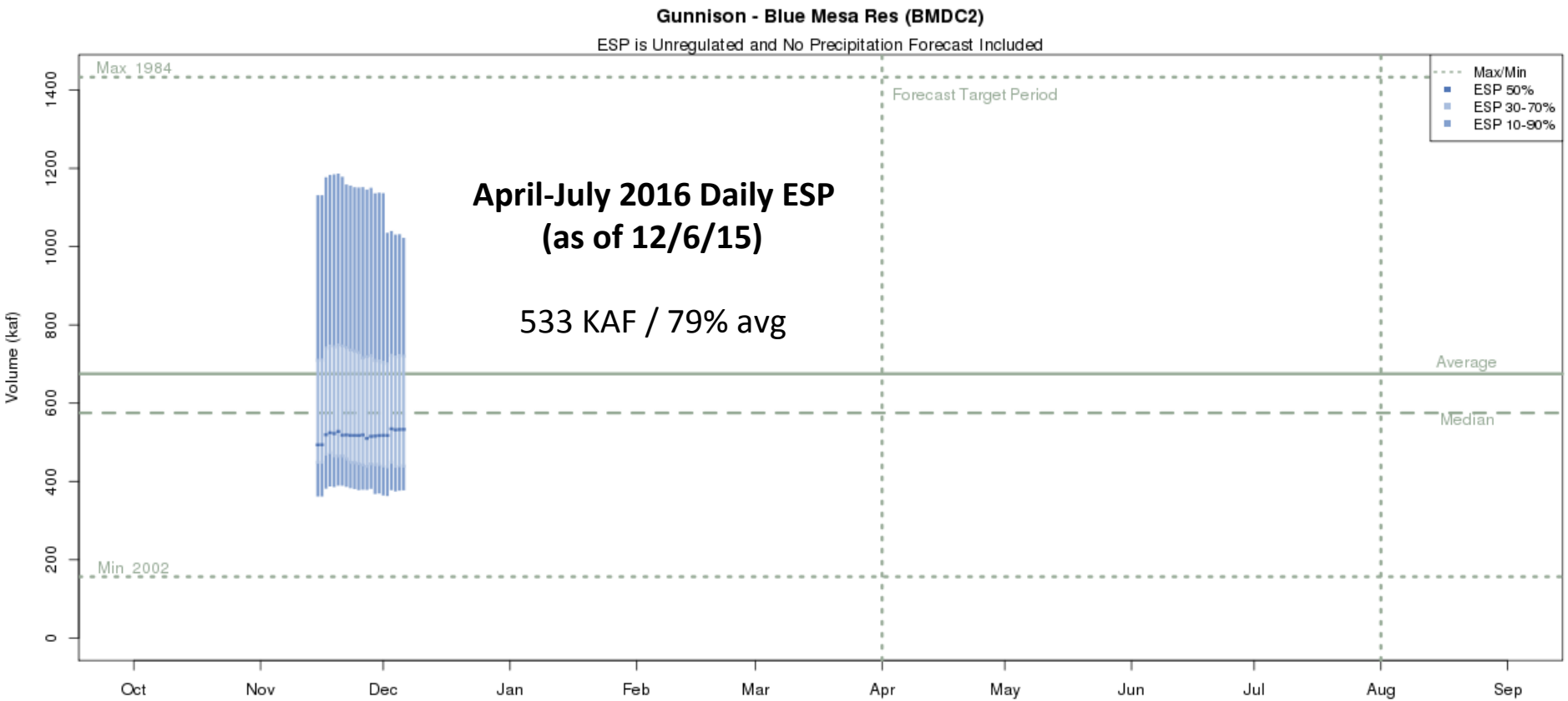
The latest (2015-12-06) 50% ESP forecast is 652 kaf.
Plot Created 2015-12-07 10:02:23, NOAA / NWS / CBRFC
Forecasts in the forecast target period include observed values.

2016 Raw Model Guidance



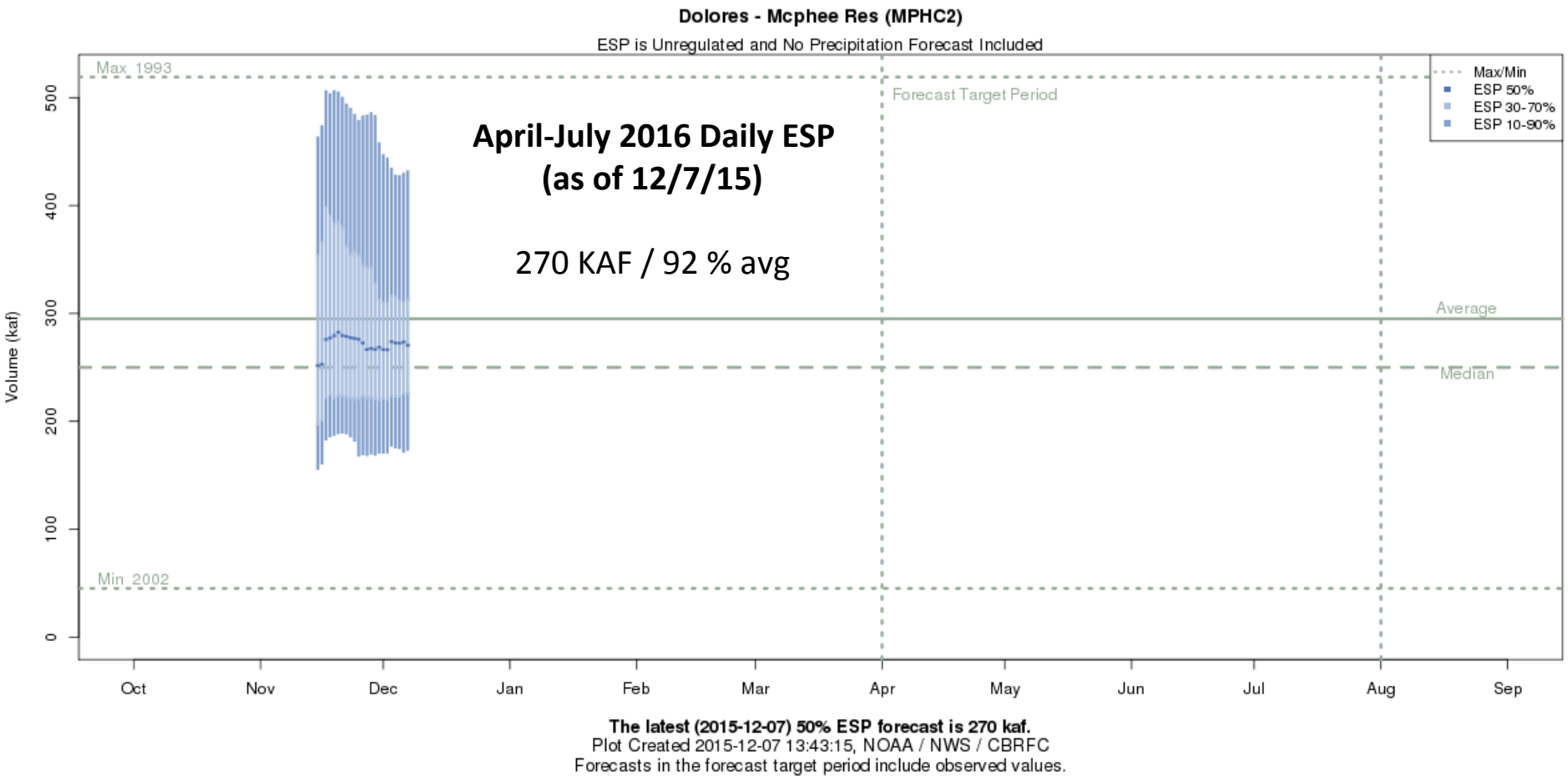
The latest (2015-12-07) 50% ESP forecast is 1033 kaf.
Plot Created 2015-12-07 13:58:07, NOAA / NWS / CBRFC
Forecasts in the forecast target period include observed values.

2016 Raw Model Guidance



The latest (2015-12-06) 50% ESP forecast is 533 kaf.
Plot Created 2015-12-07 10:21:08, NOAA / NWS / CBRFC
Forecasts in the forecast target period include observed values.

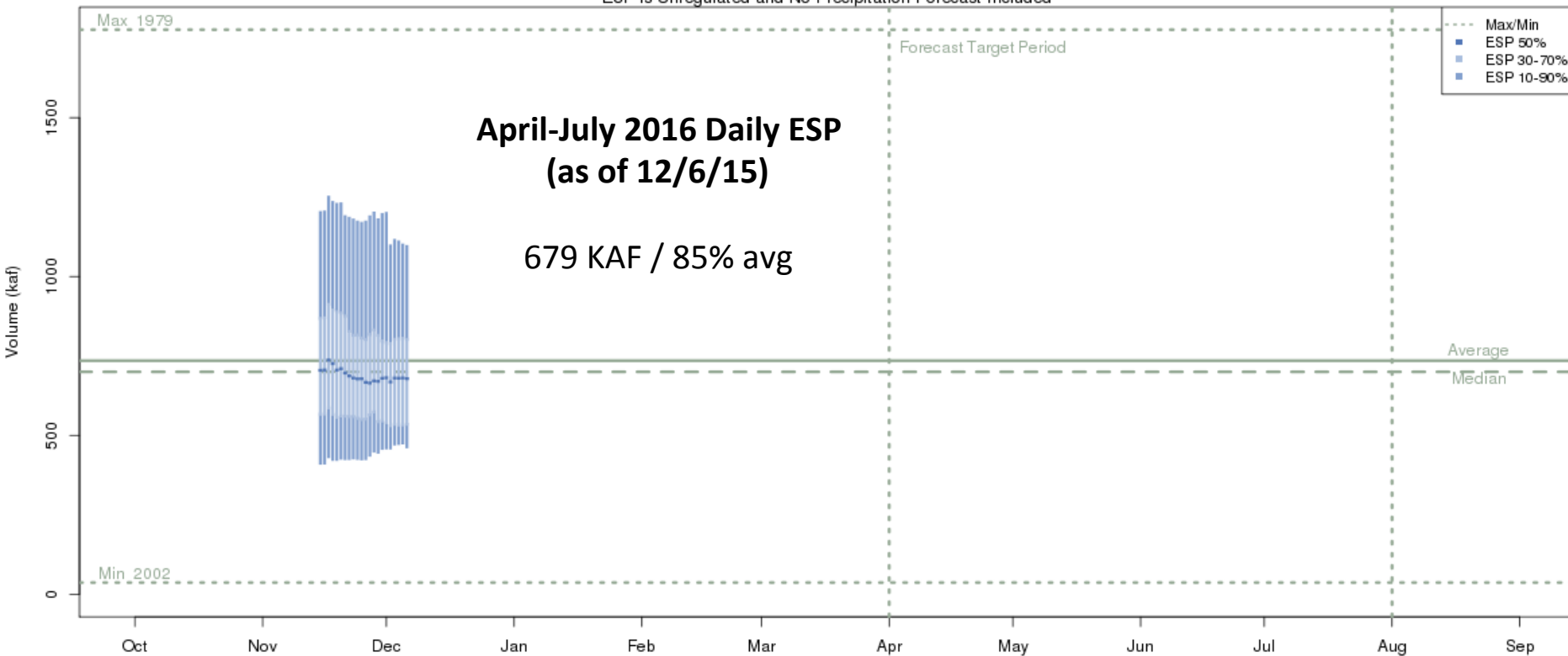
2016 Raw Model Guidance



2016 Raw Model Guidance

San Juan - Navajo Res- Archuleta- Nr (NVRN5)

ESP is Unregulated and No Precipitation Forecast Included

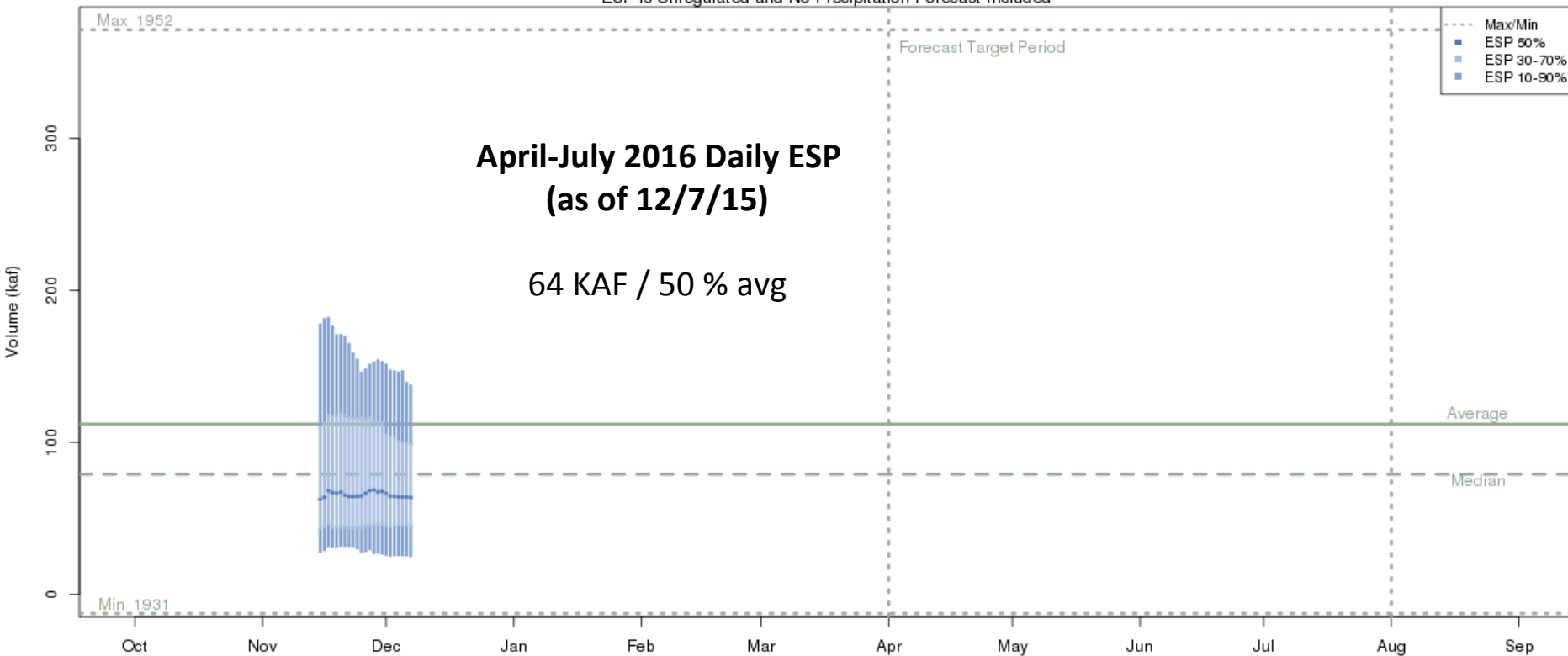


The latest (2015-12-06) 50% ESP forecast is 679 kaf.
Plot Created 2015-12-07 10:23:28, NOAA / NWS / CBRFC
Forecasts in the forecast target period include observed values.

2016 Raw Model Guidance

Strawberry - Starvation Res- Duchesne- Nr (STAU1)

ESP is Unregulated and No Precipitation Forecast Included

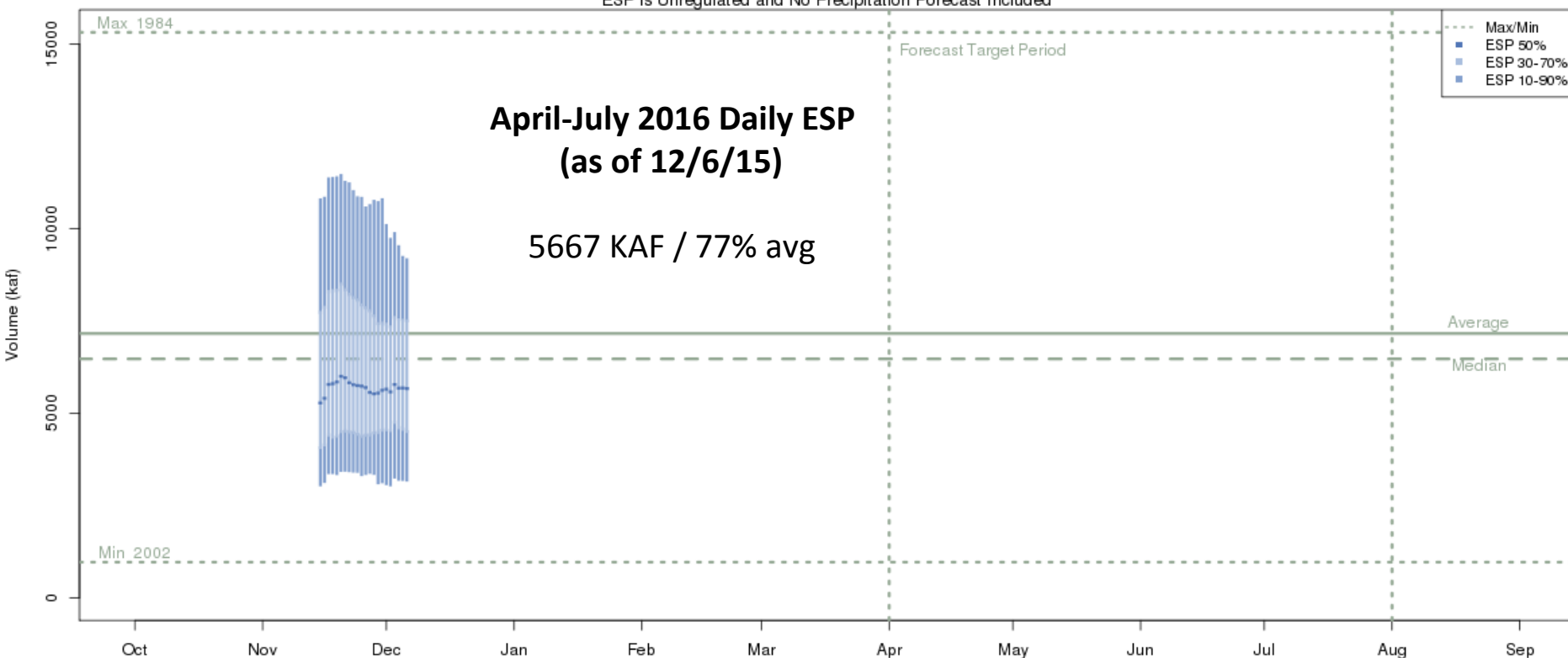


The latest (2015-12-07) 50% ESP forecast is 64 kaf.
Plot Created 2015-12-07 13:51:20, NOAA / NWS / CBRFC
Forecasts in the forecast target period include observed values.

2016 Raw Model Guidance

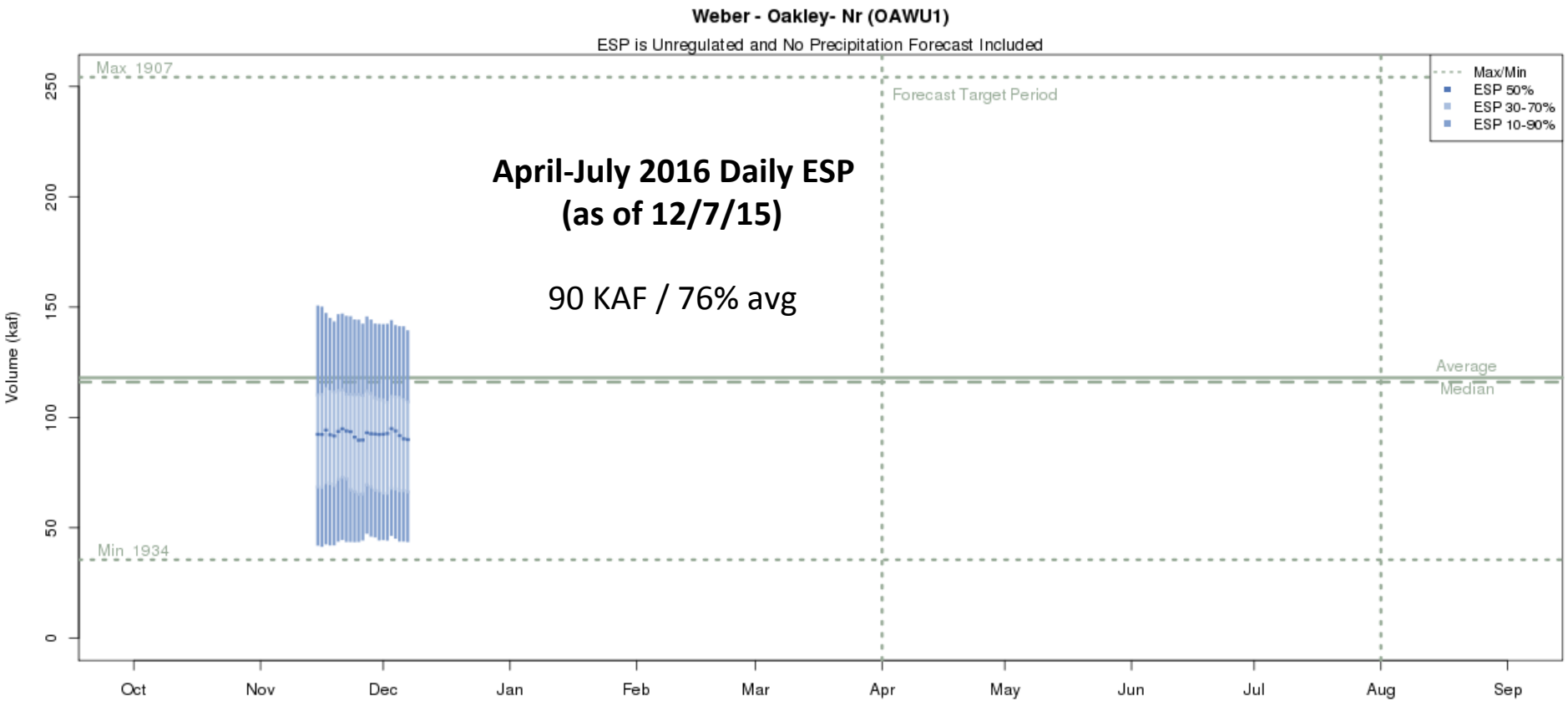
Colorado - Lake Powell- Glen Cyn Dam- At (GLDA3)

ESP is Unregulated and No Precipitation Forecast Included



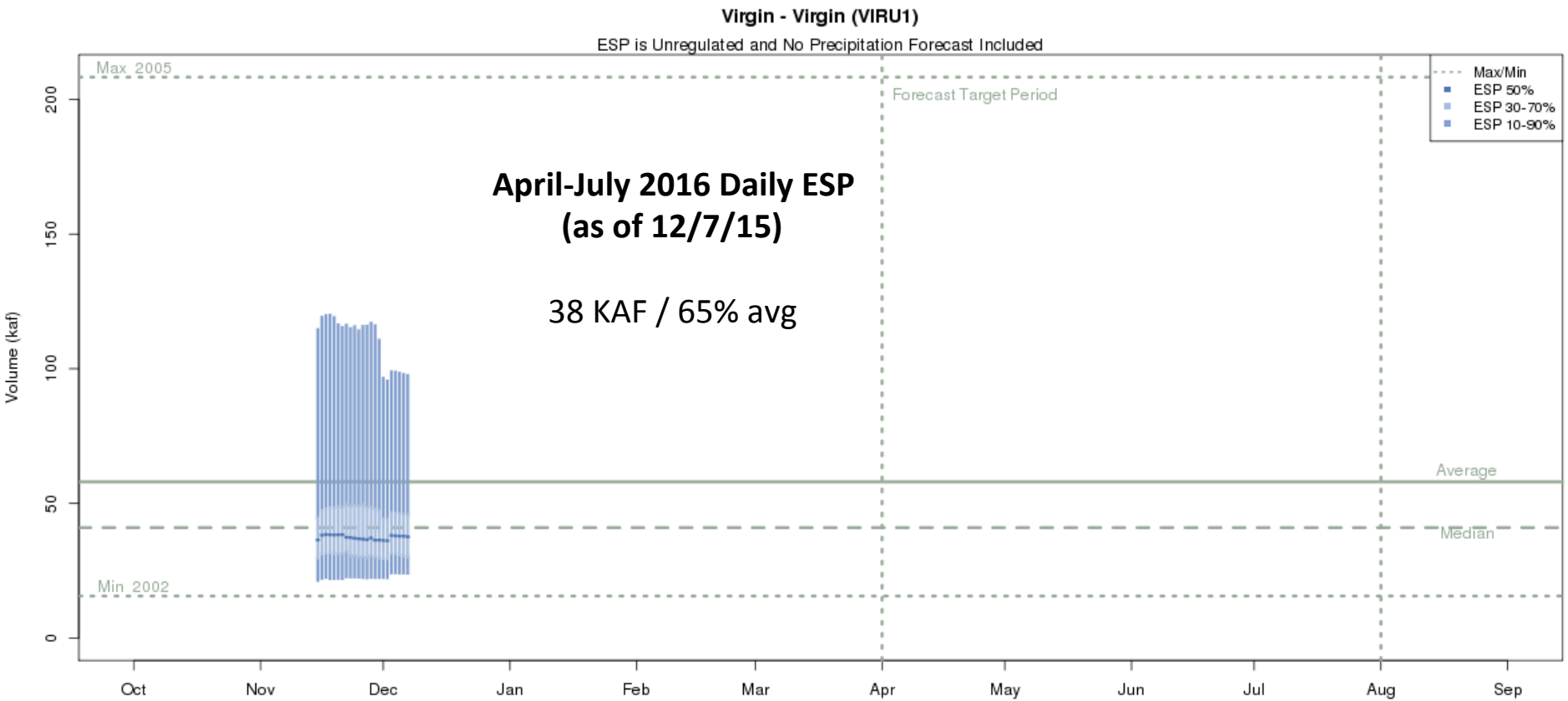
The latest (2015-12-06) 50% ESP forecast is 5667 kaf.
Plot Created 2015-12-07 09:53:27, NOAA / NWS / CBRFC
Forecasts in the forecast target period include observed values.

2016 Raw Model Guidance



The latest (2015-12-07) 50% ESP forecast is 90 kaf.
Plot Created 2015-12-07 13:44:32, NOAA / NWS / CBRFC
Forecasts in the forecast target period include observed values.

2016 Raw Model Guidance

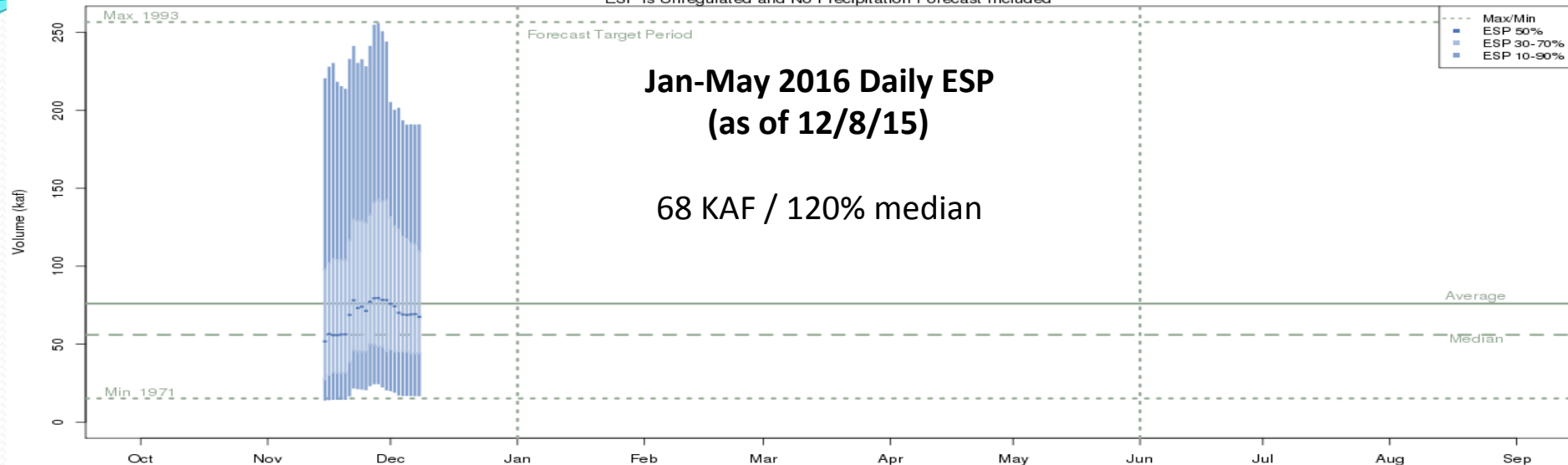


The latest (2015-12-07) 50% ESP forecast is 38 kaf.
Plot Created 2015-12-07 13:54:30, NOAA / NWS / CBRFC
Forecasts in the forecast target period include observed values.

2016 Raw Model Guidance

Gila - Gila- Nr (GILN5)

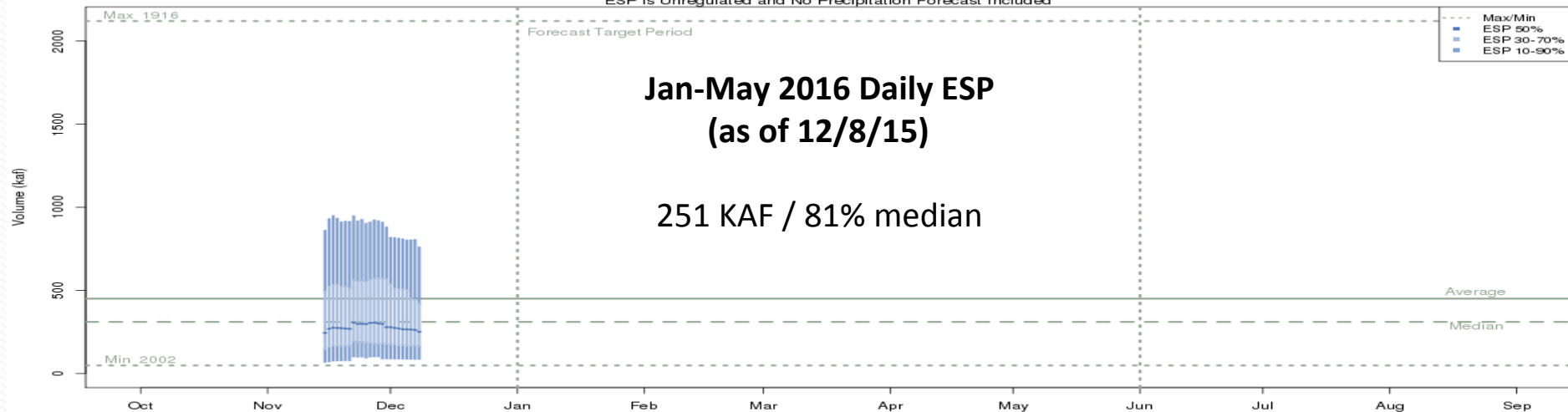
ESP is Unregulated and No Precipitation Forecast Included



The latest (2015-12-08) 50% ESP forecast is 68 kaf.
Plot Created 2015-12-08 15:16:27, NOAA / NWS / CBRFC
Forecasts in the forecast target period include observed values.

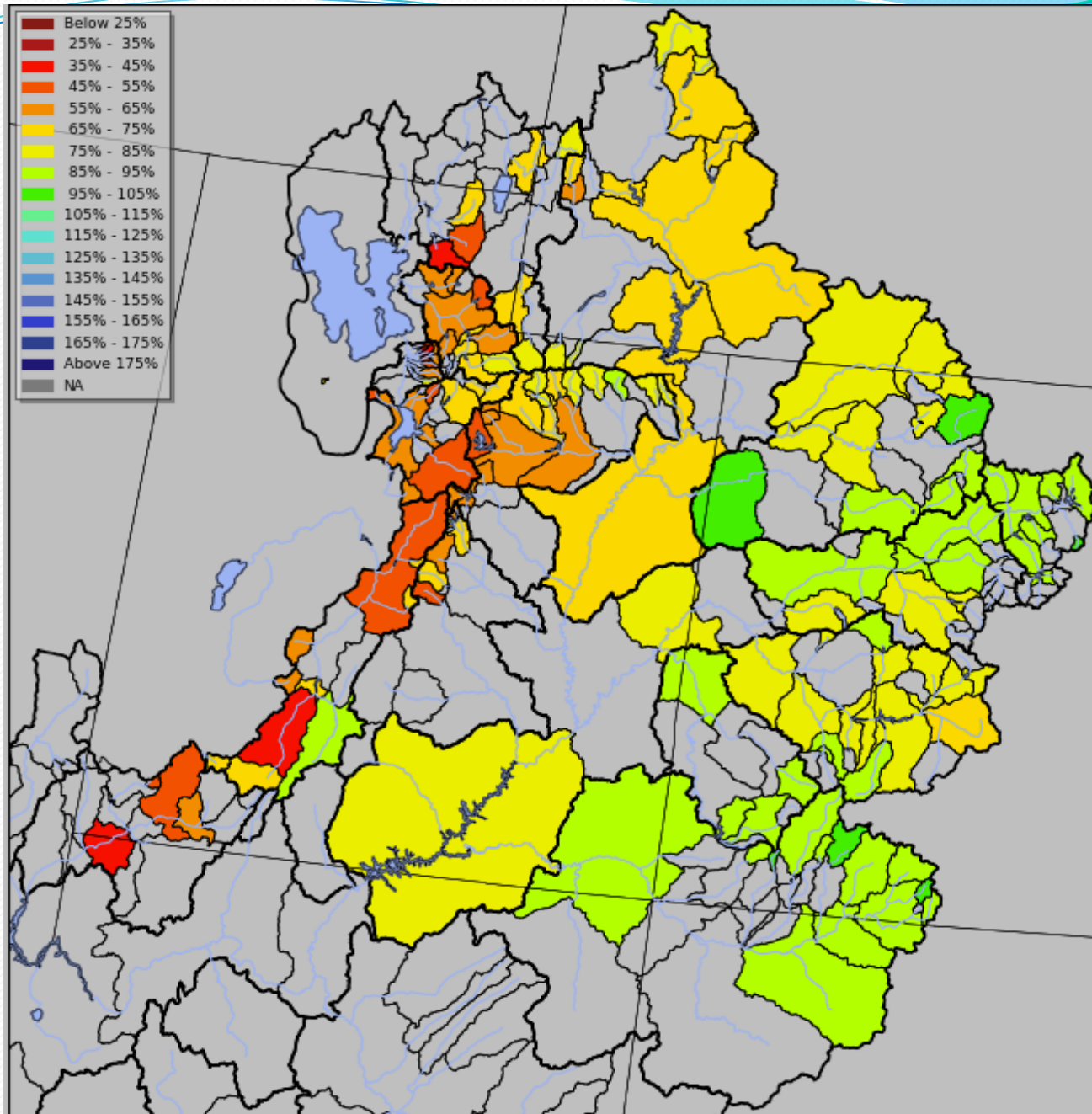
Salt - Roosevelt- Nr (SLRA3)

ESP is Unregulated and No Precipitation Forecast Included

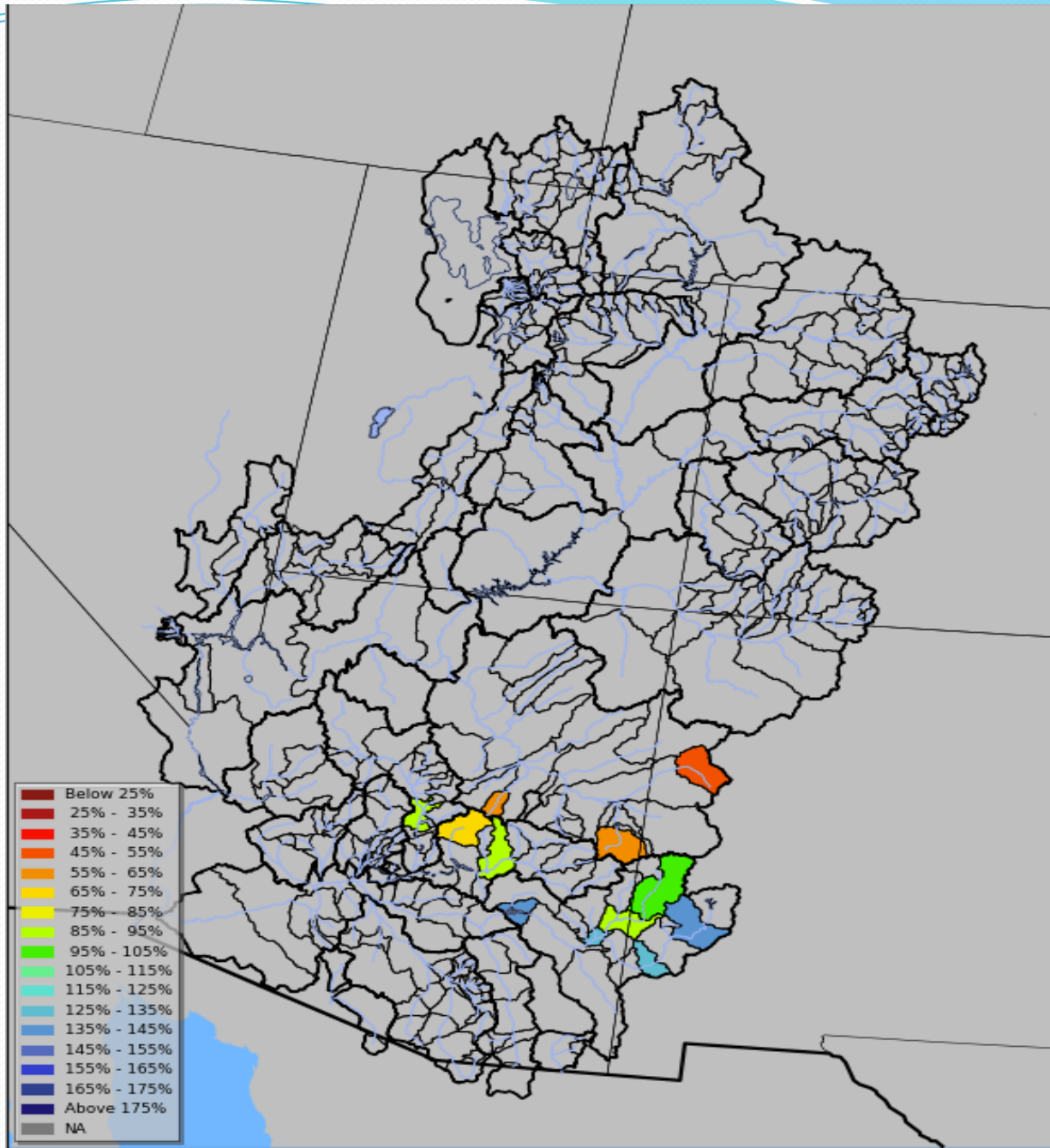


The latest (2015-12-08) 50% ESP forecast is 251 kaf.
Plot Created 2015-12-08 15:31:36, NOAA / NWS / CBRFC
Forecasts in the forecast target period include observed values.

WATER YEAR 2016 Model Guidance (April-July % Average)

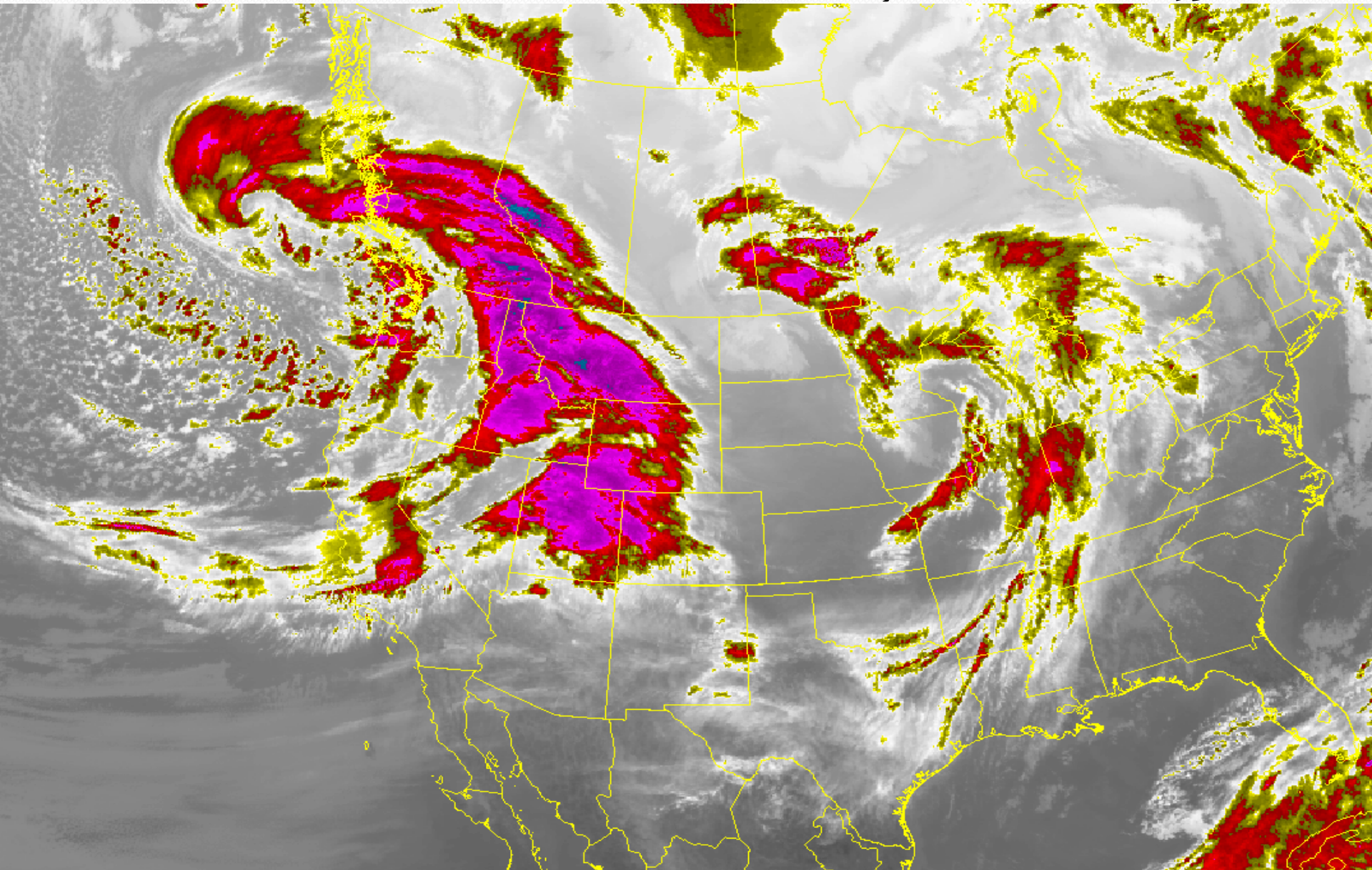


WATER YEAR 2016 Model Guidance (Jan-May % Median)



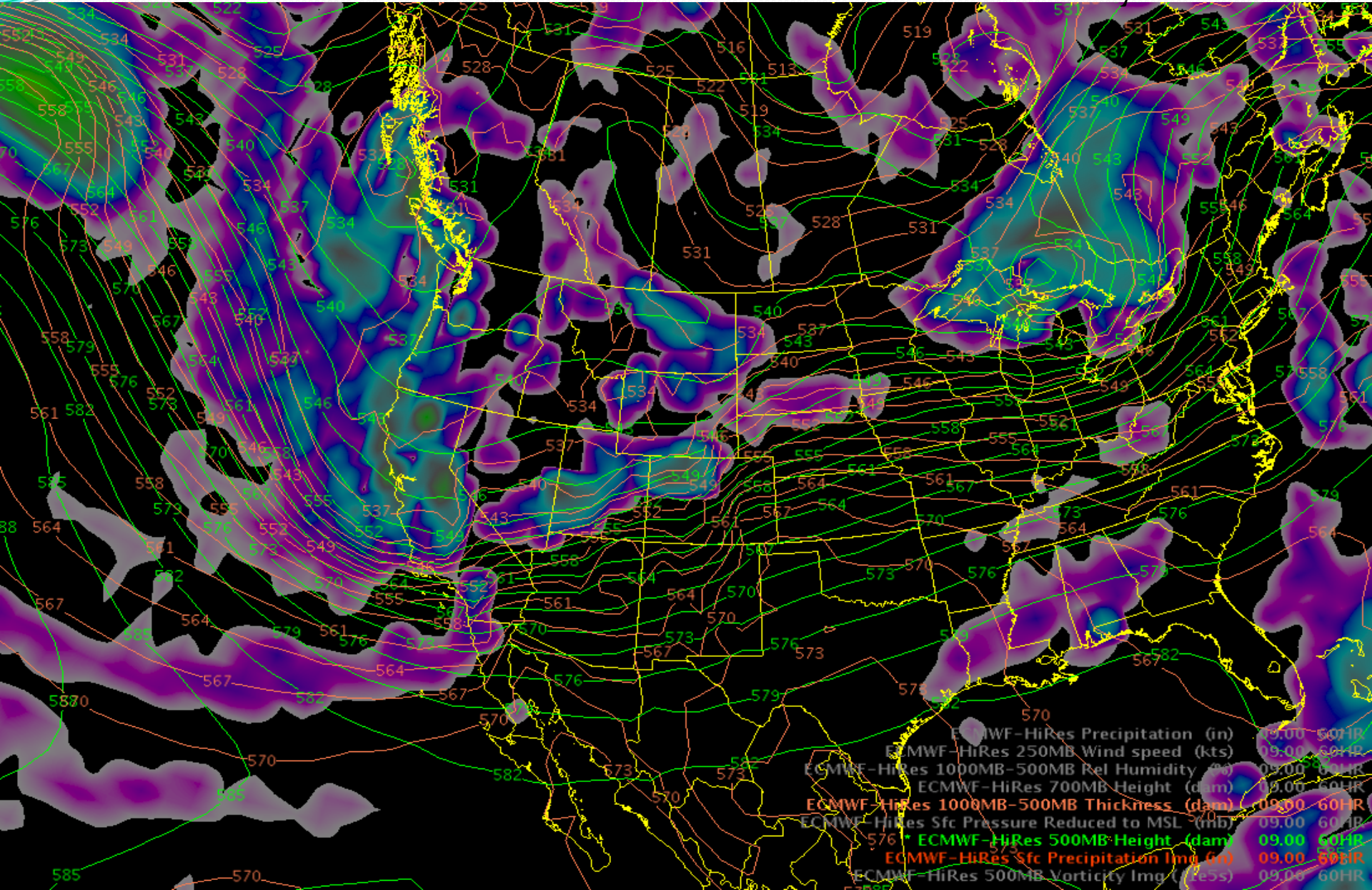
Short Term Forecast

Today, December 10th at 930 am MST



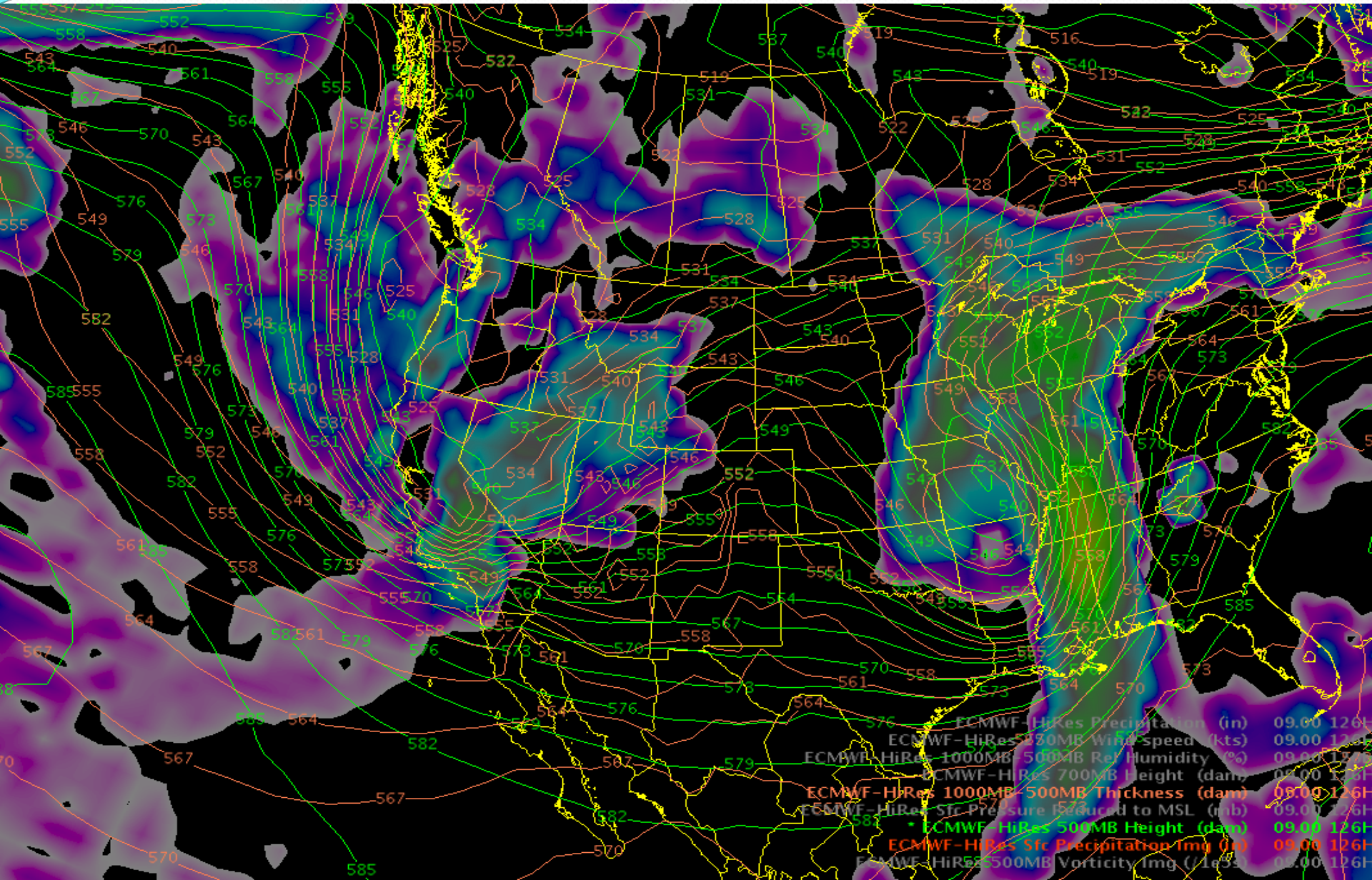
Short Term Forecast

Friday December 11th



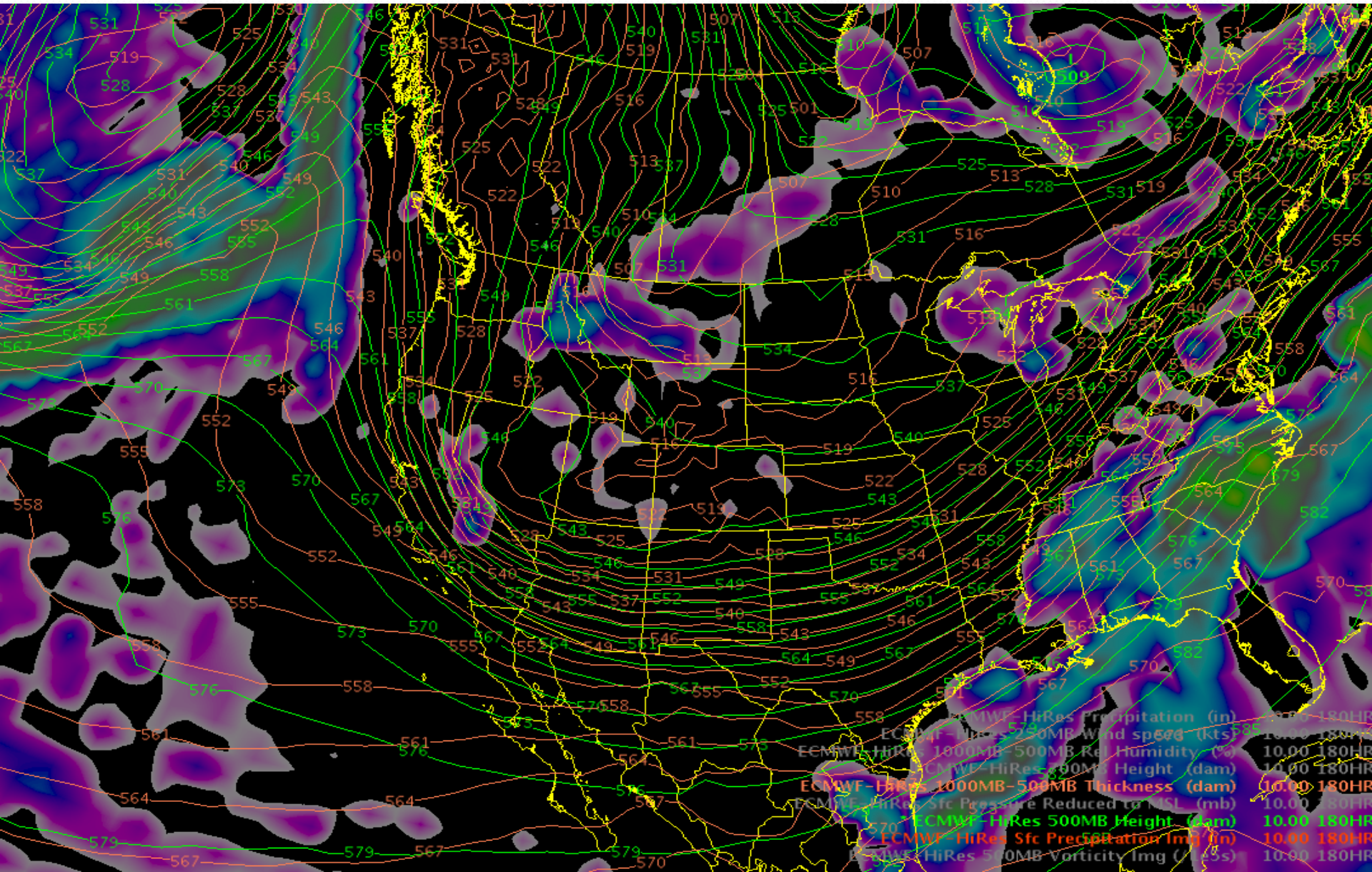
Short Term Forecast

Monday December 14th

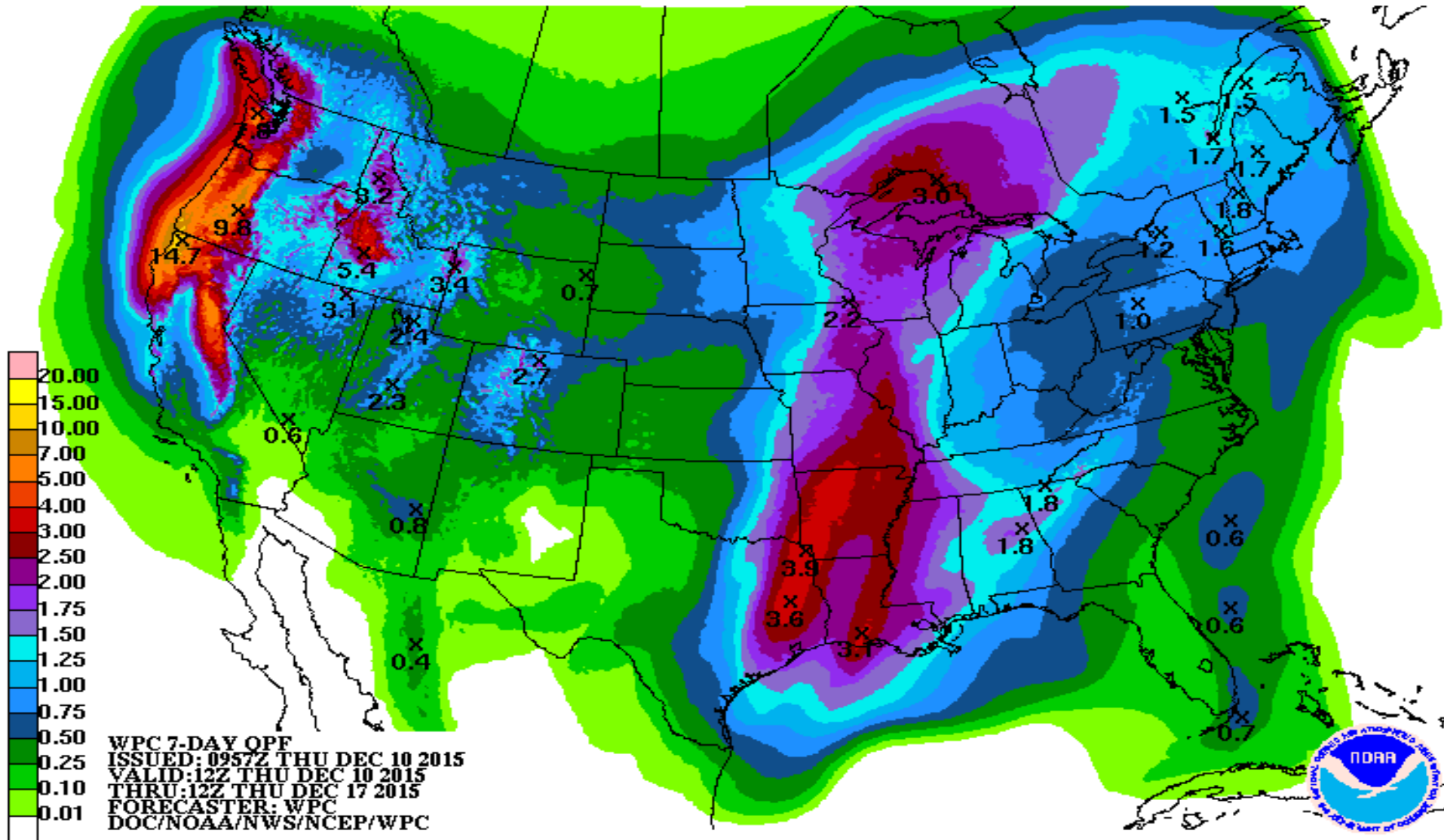


Short Term Forecast

Thursday December 17th

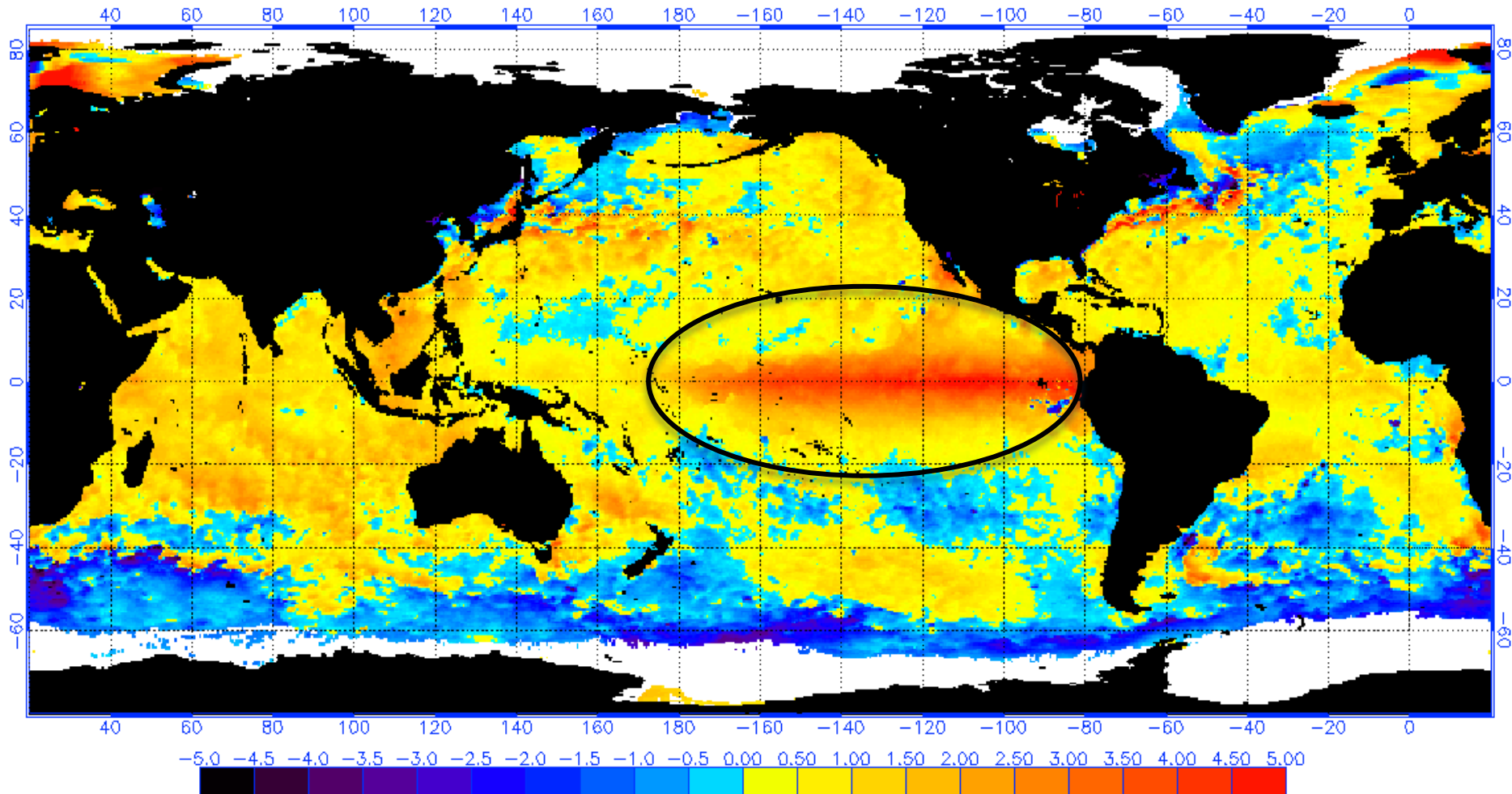


Short Term Forecast – Precipitation Totals Dec 10 – Dec 17



Long Term Outlook: ENSO Event

NOAA/NESDIS 50 KM GLOBAL ANALYSIS: SST Anomaly (degrees C), 12/7/2015
(white regions indicate sea-ice)



Long Term Outlook - ENSO CONDITIONS

CPC/NCEP Summary (as of 11/30/15)

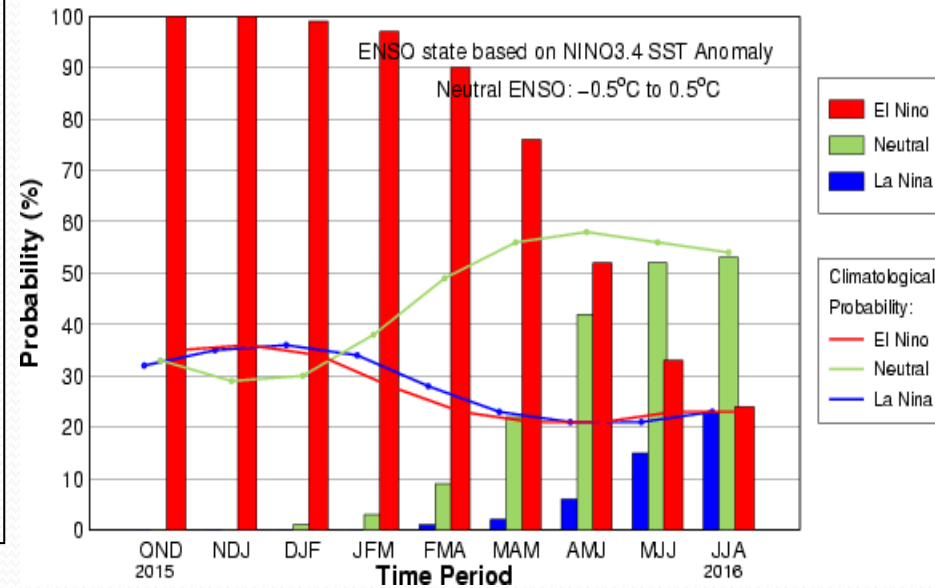
ENSO Alert System Status: El Niño Advisory

El Niño conditions are present.

Positive equatorial sea surface temperature (SST) anomalies continue across most of the Pacific Ocean.

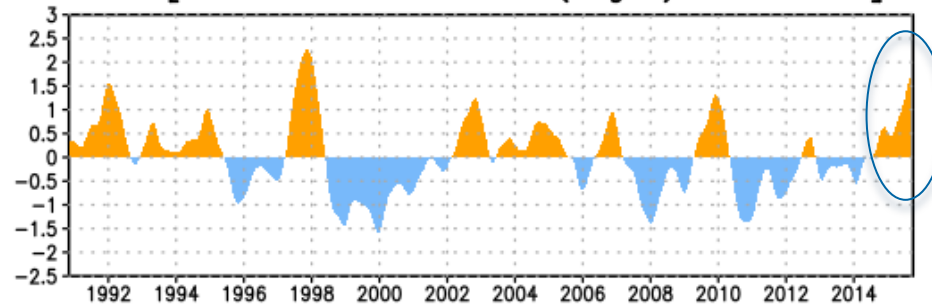
El Niño will likely peak during the Northern Hemisphere winter 2015-16, with a transition to ENSO-neutral anticipated during the late spring or early summer 2016.

Early-Nov CPC/IRI Consensus Probabilistic ENSO Forecast



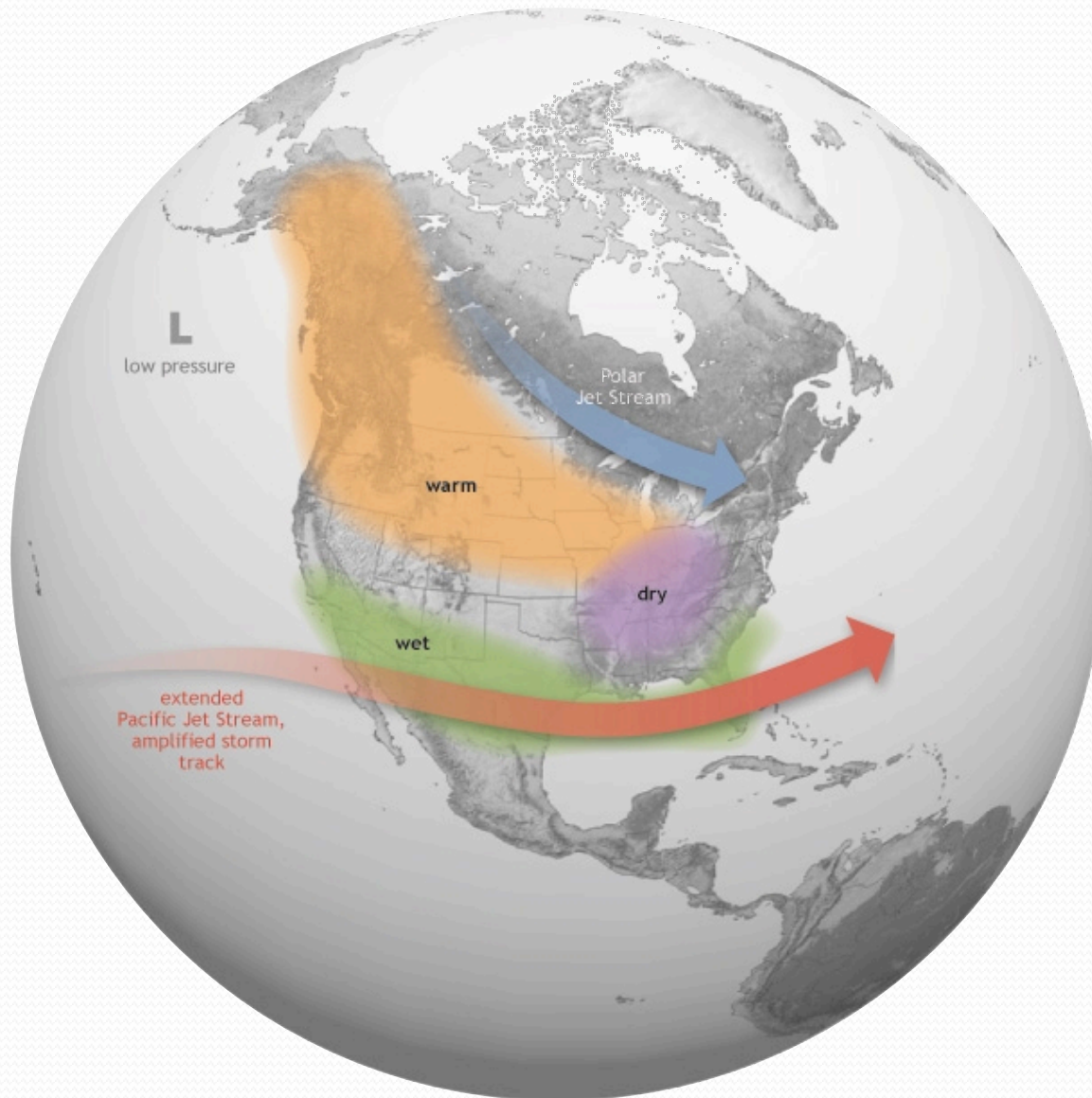
El Niño: characterized by a positive ONI (3 month running mean of sea surface temperature anomalies) greater than or equal to $+0.5^{\circ}\text{C}$.

ONI [3-mrm SST anomalies (deg C) in Nino 3.4]

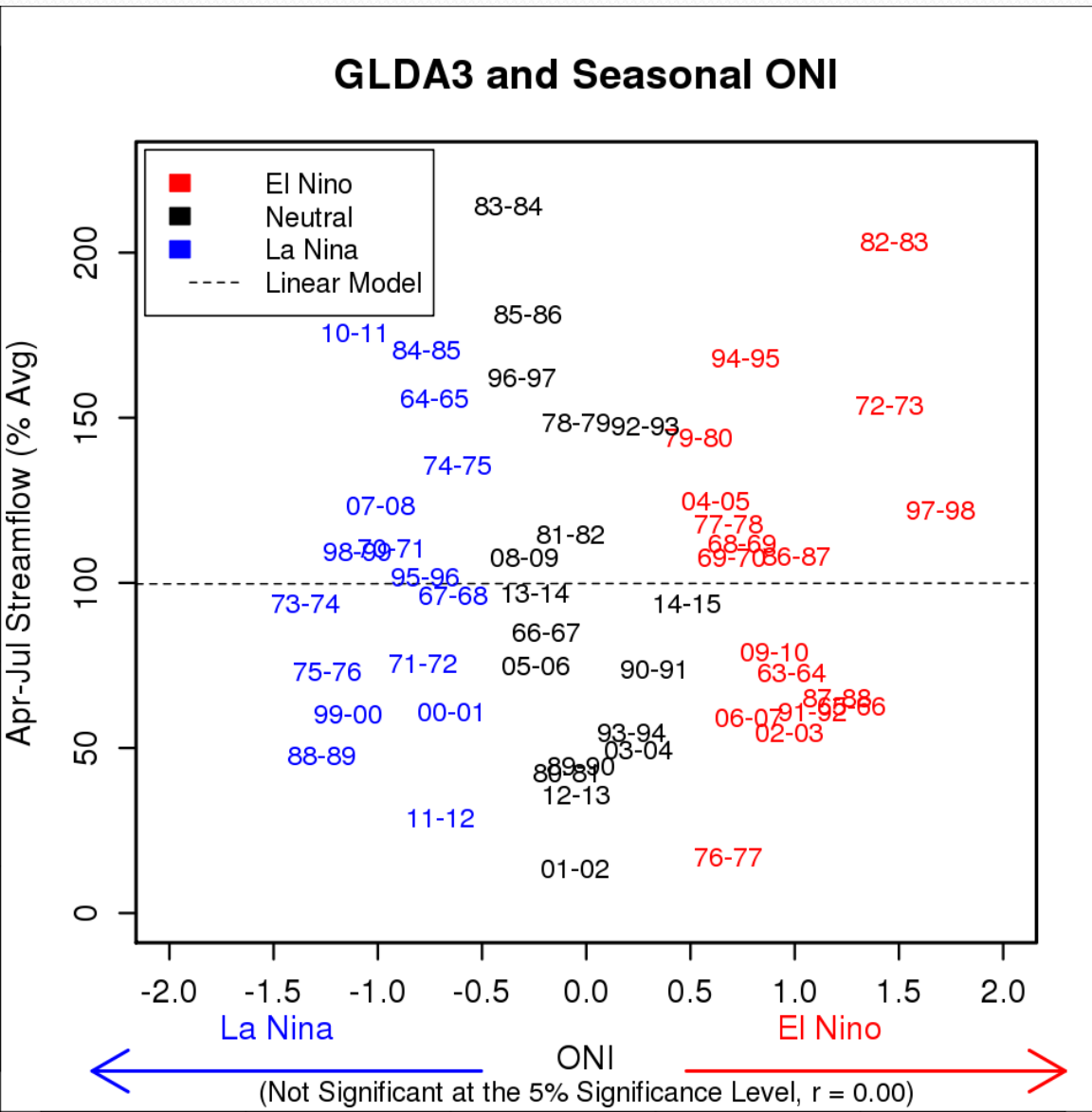


Most recent ONI value (September - November 2015): 2.0°C

Long Term Outlook - ENSO Impacts



Historical ENSO Impacts - Lake Powell

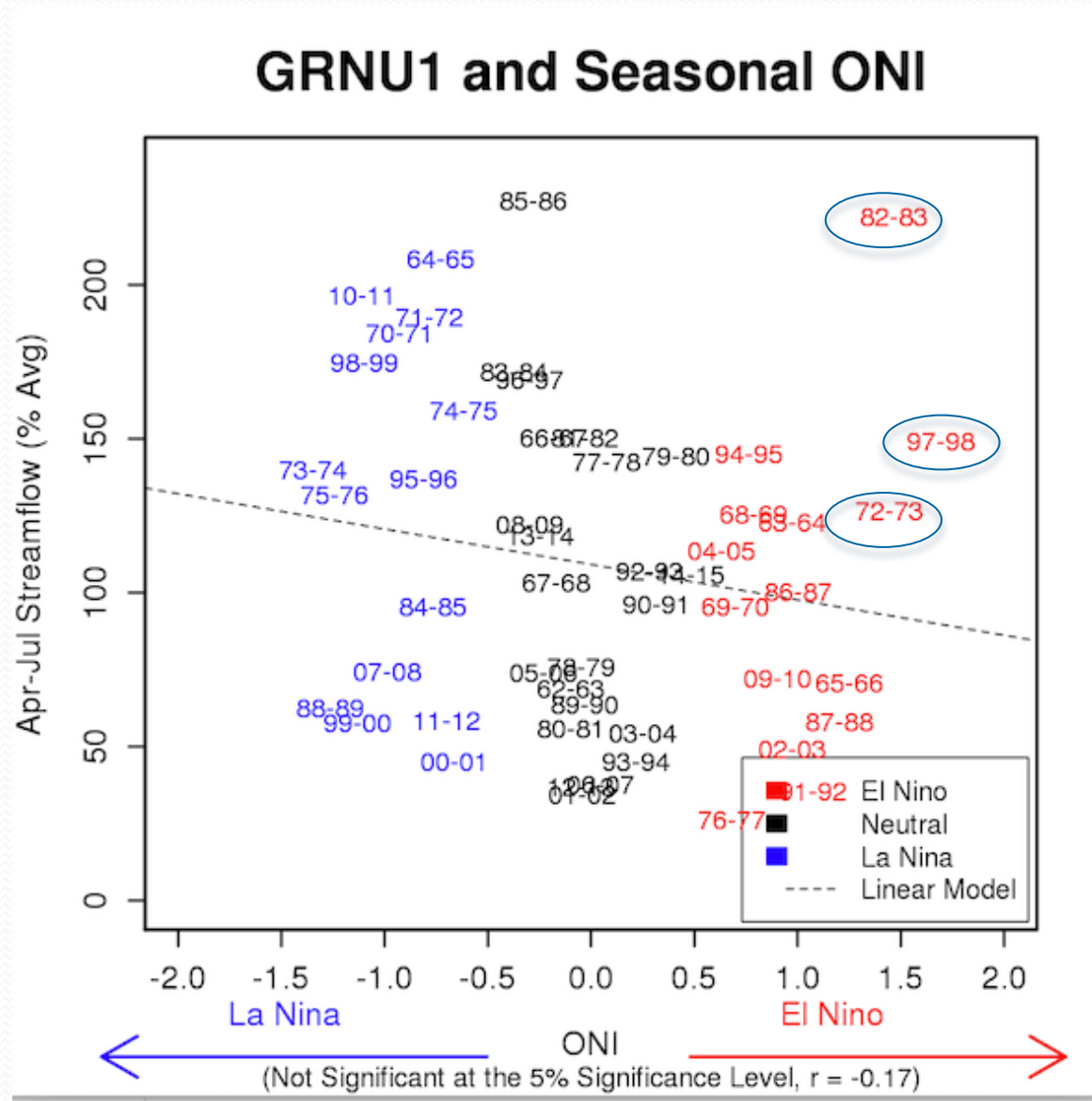


Strong Events:

- 1957-1958* (pre-Powell)
- 1965-1966 (below avg)
- 1972-1973 (above avg)
- 1982-1983 (above avg)
- 1991-1992 (below avg)
- 1997-1998 (near avg)

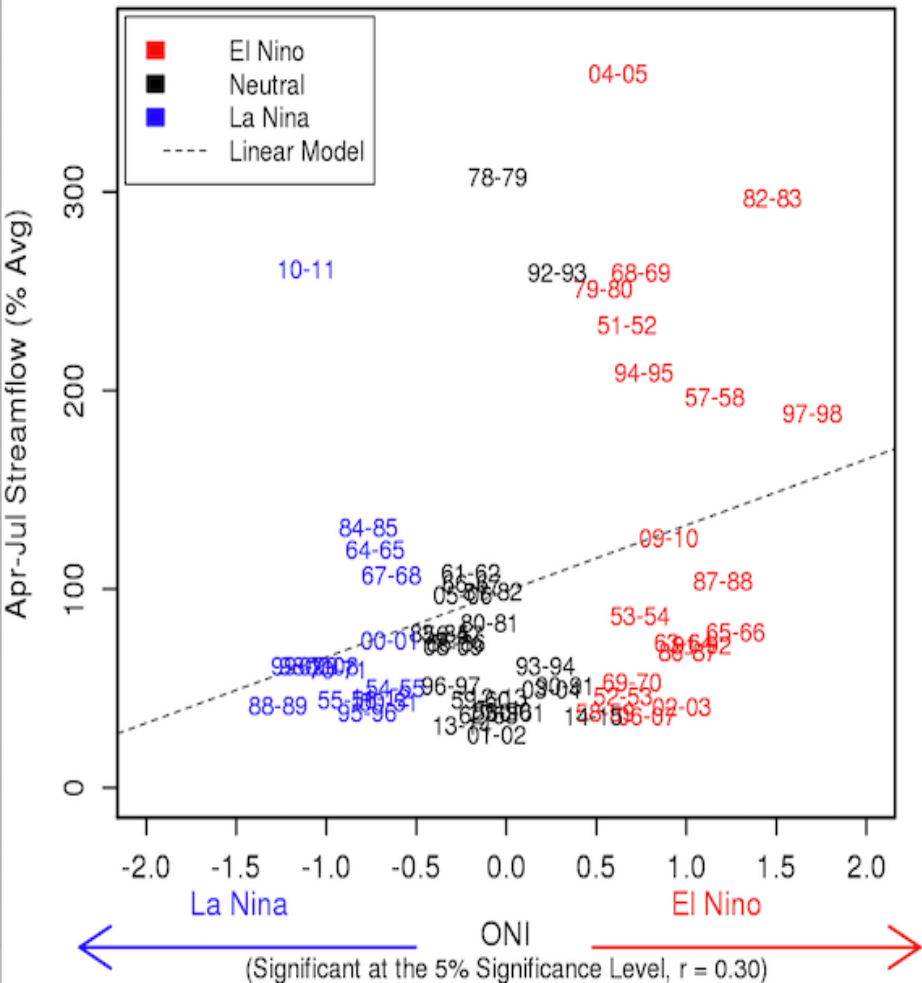
*Based on Reclamation Natural Flow, this was an above average year

Historical ENSO Impacts – Flaming Gorge

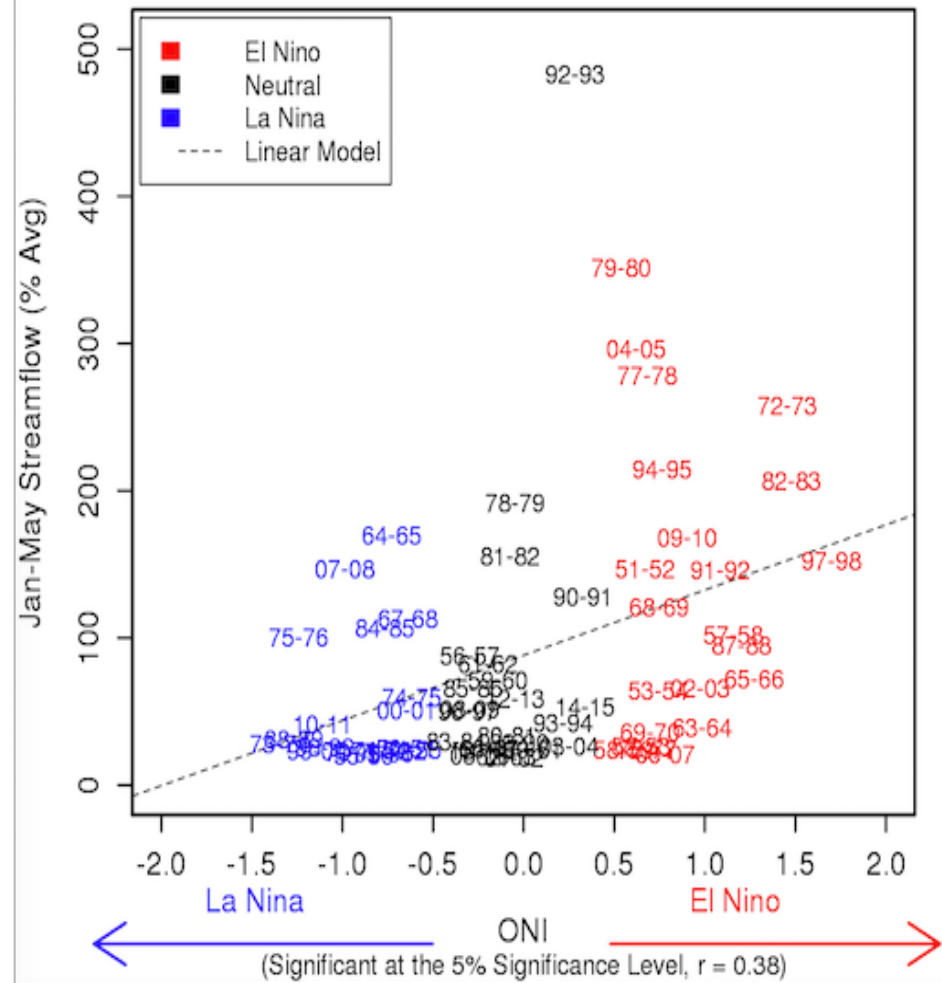


Historical ENSO Impacts – Lower Colorado

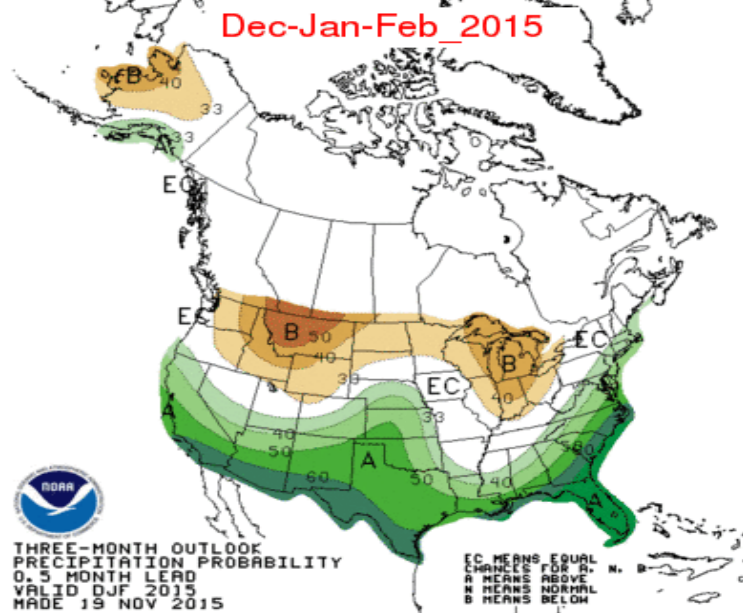
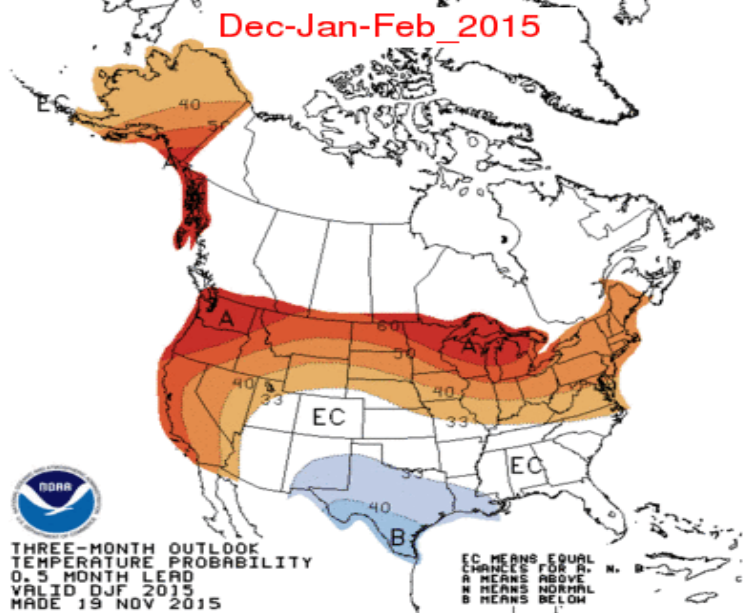
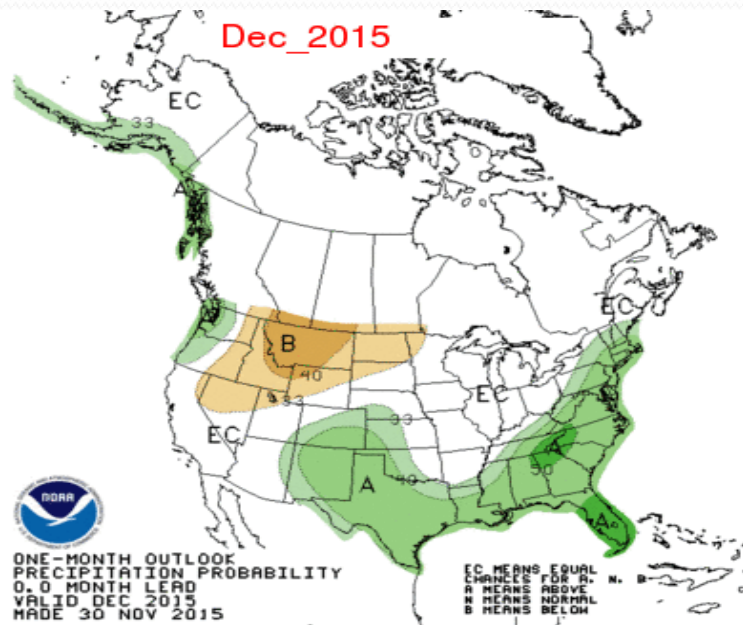
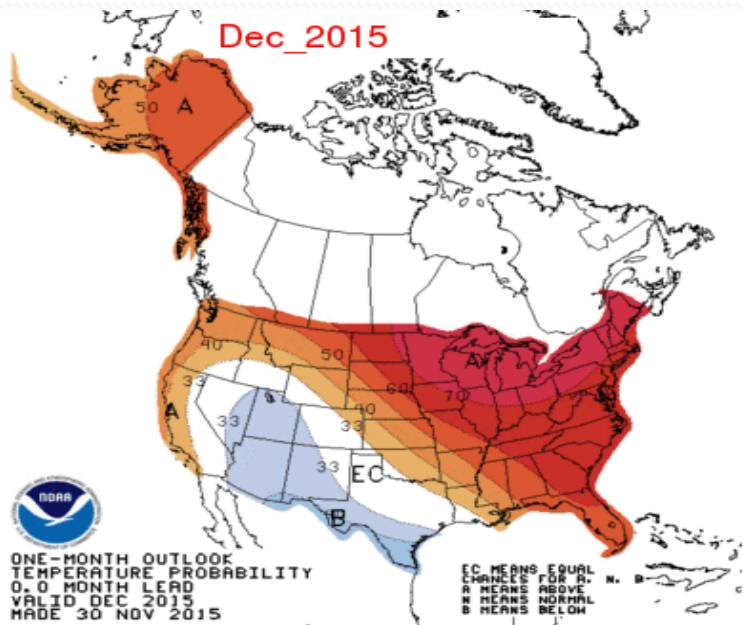
VIRU1 and Seasonal ONI



VDTA3 and Seasonal ONI

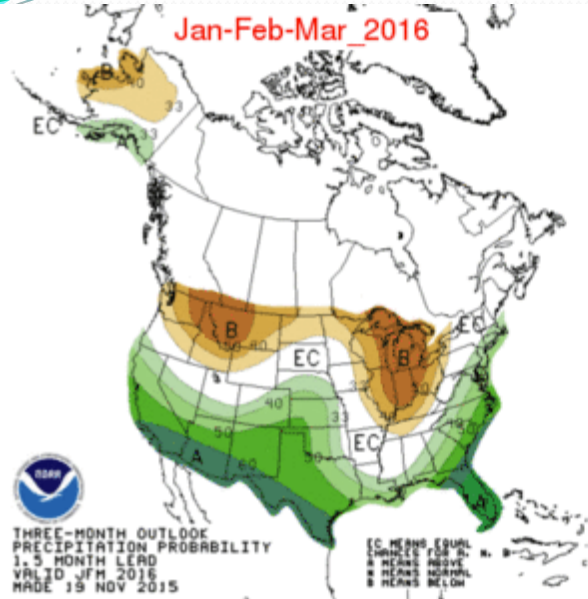


Climate Outlooks

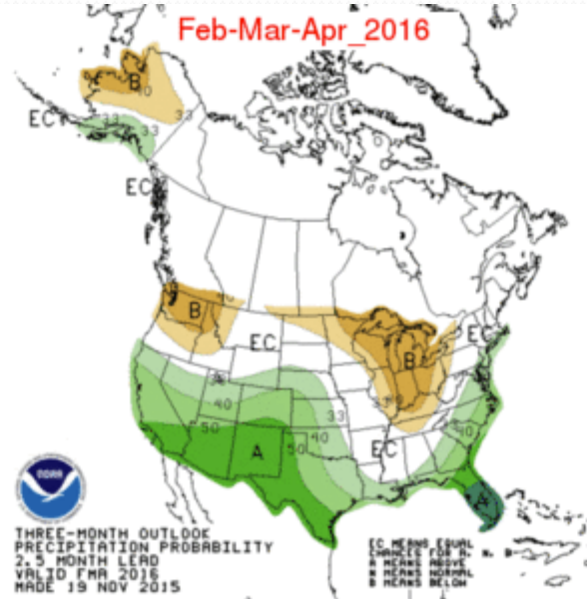


Climate Outlooks

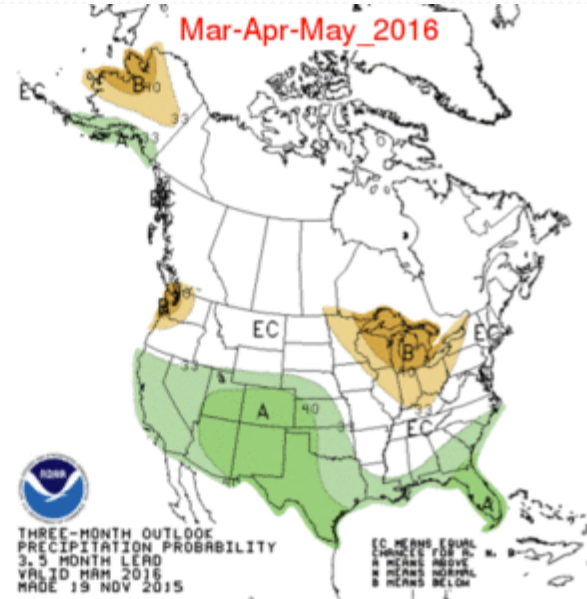
Jan-Feb-Mar 2016



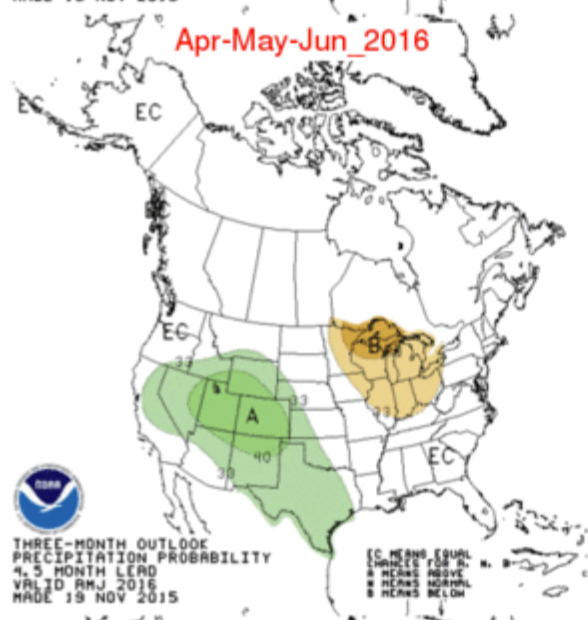
Feb-Mar-Apr 2016



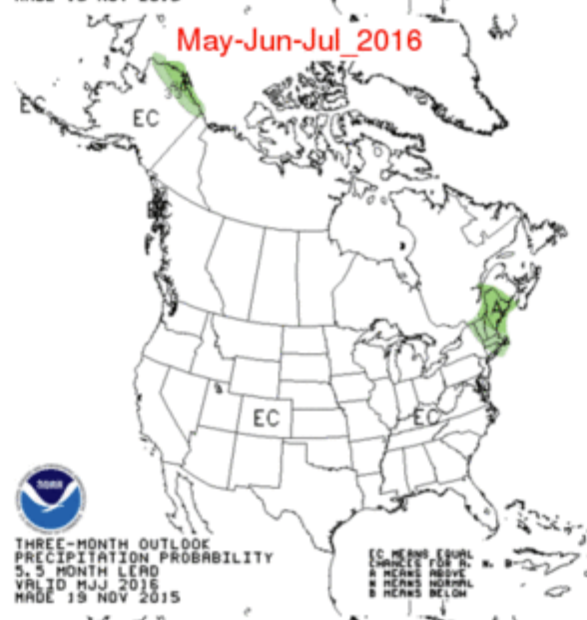
Mar-Apr-May 2016



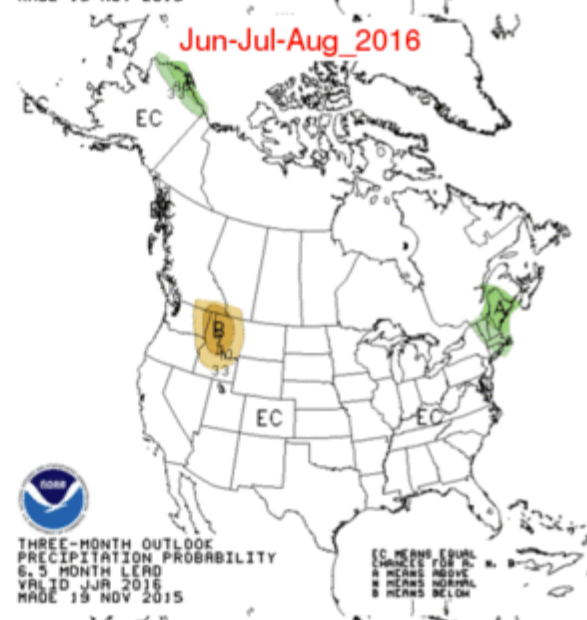
Apr-May-Jun 2016



May-Jun-Jul 2016



Jun-Jul-Aug 2016



Web Page Modifications

Monthly/Seasonal Precipitation Maps

- Lumped areas based on CBRFC model defined sub-areas vs. HUC
- Can be 'trimmed' to display most important areas for runoff contribution
 - more representative of how water supply conditions have been affected
 - these trimmed areas can then be used to compute the monthly %average precipitation
- Added additional increments to %average scale for better resolution of extreme events
- Available as an overlay on front page map

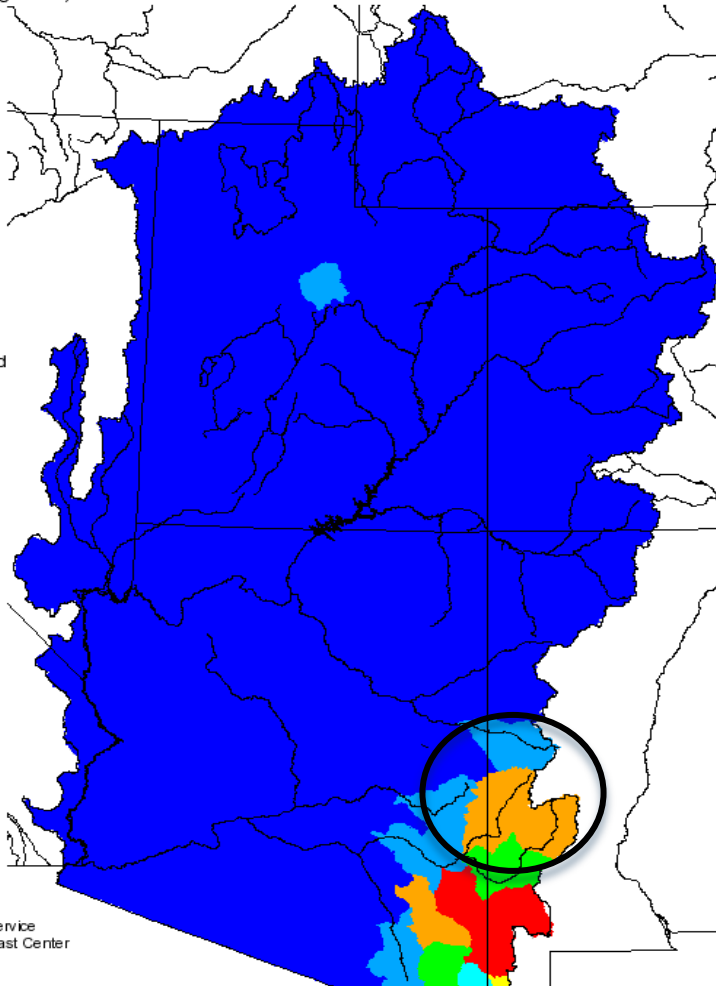
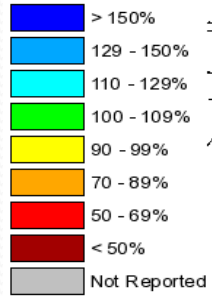
LEGACY

NEW

Monthly Precipitation for May 2015

(Averaged by Hydrologic Unit)

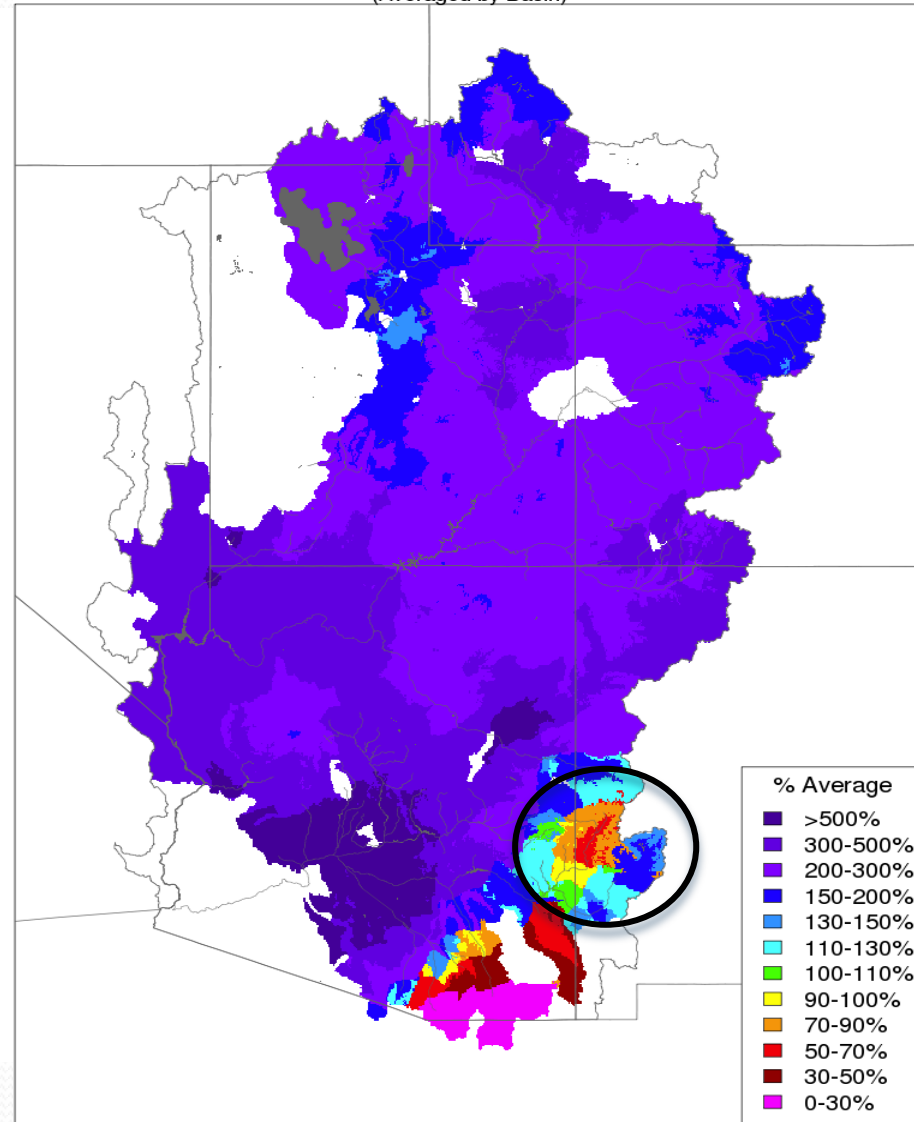
% Average



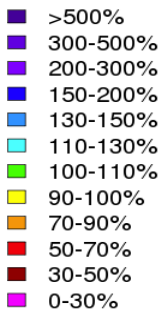
Prepared by
NOAA, National Weather Service
Colorado Basin River Forecast Center
Salt Lake City, Utah
www.cbrfc.noaa.gov

Monthly Precipitation - May 2015

(Averaged by Basin)



% Average

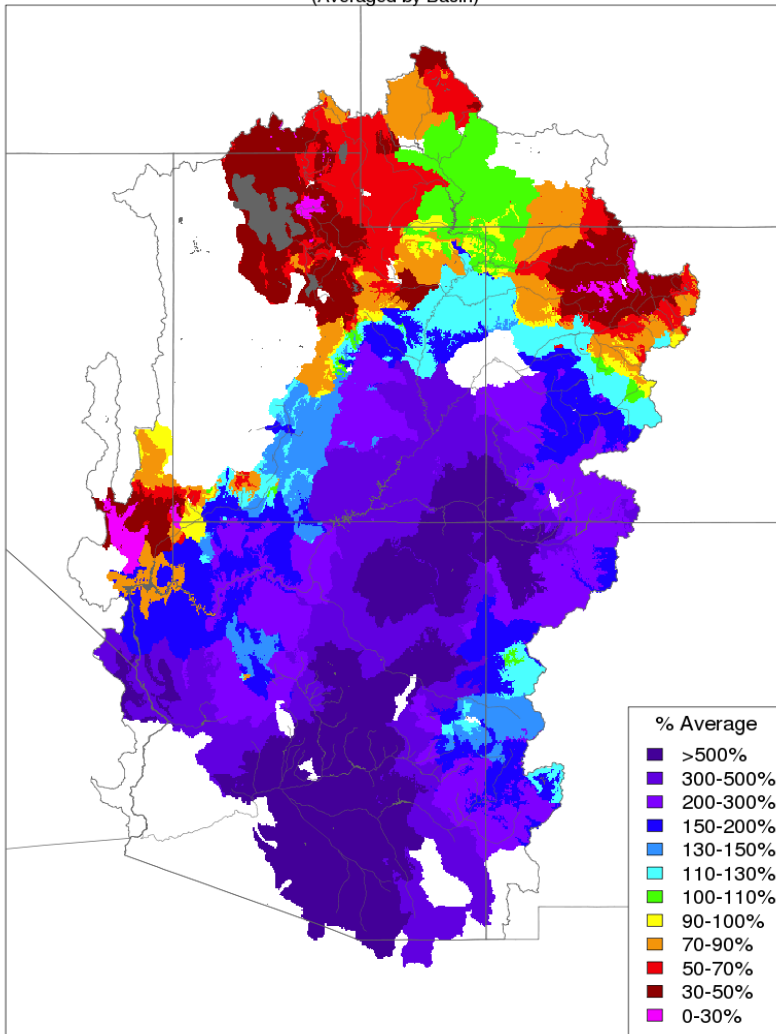


Prepared by NOAA, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbrfc.noaa.gov

Monthly/Seasonal Precipitation Maps

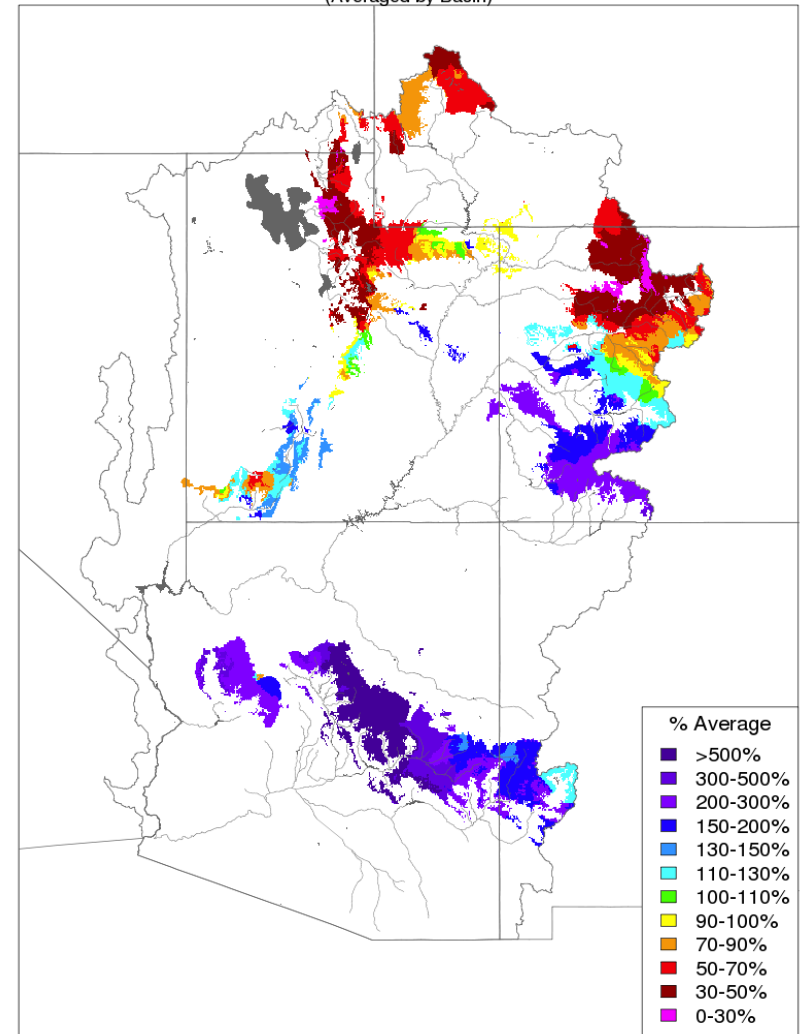
Trimmed to runoff contributing areas

Monthly Precipitation - June 2015
(Averaged by Basin)



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Monthly Precipitation - June 2015
(Averaged by Basin)



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WEB PAGE

New Front Map Overlays

▶ River Conditions

▶ Snow Conditions

▶ Water Supply Forecasts

▶ Peak Flood Probability

▶ Reservoir Conditions

▶ Weather Conditions

▶ Seasonal Weather

▶ Soil Moisture

▶ Map Options

▼ Search Points

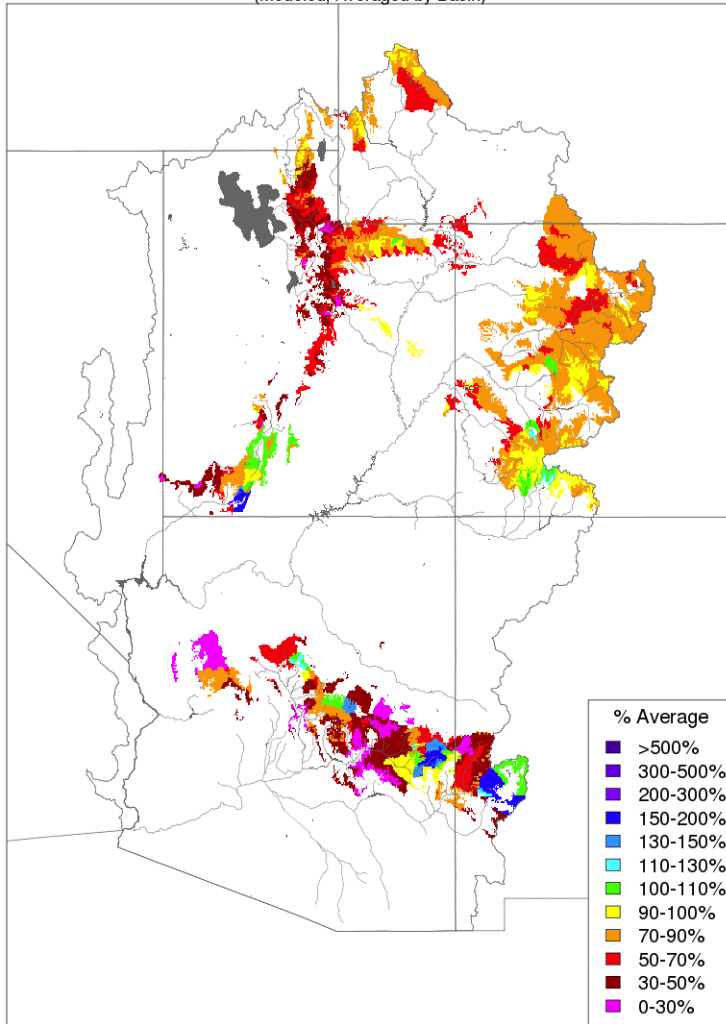
- Seasonal Precipitation (Water Year)
- Monthly Precipitation
- Month To Date
- Full and trimmed versions

- Fall Model Soil Moisture
- Current Model Soil Moisture
- Current Model 'Inches to Saturation'
- Full and trimmed versions

WEB PAGE

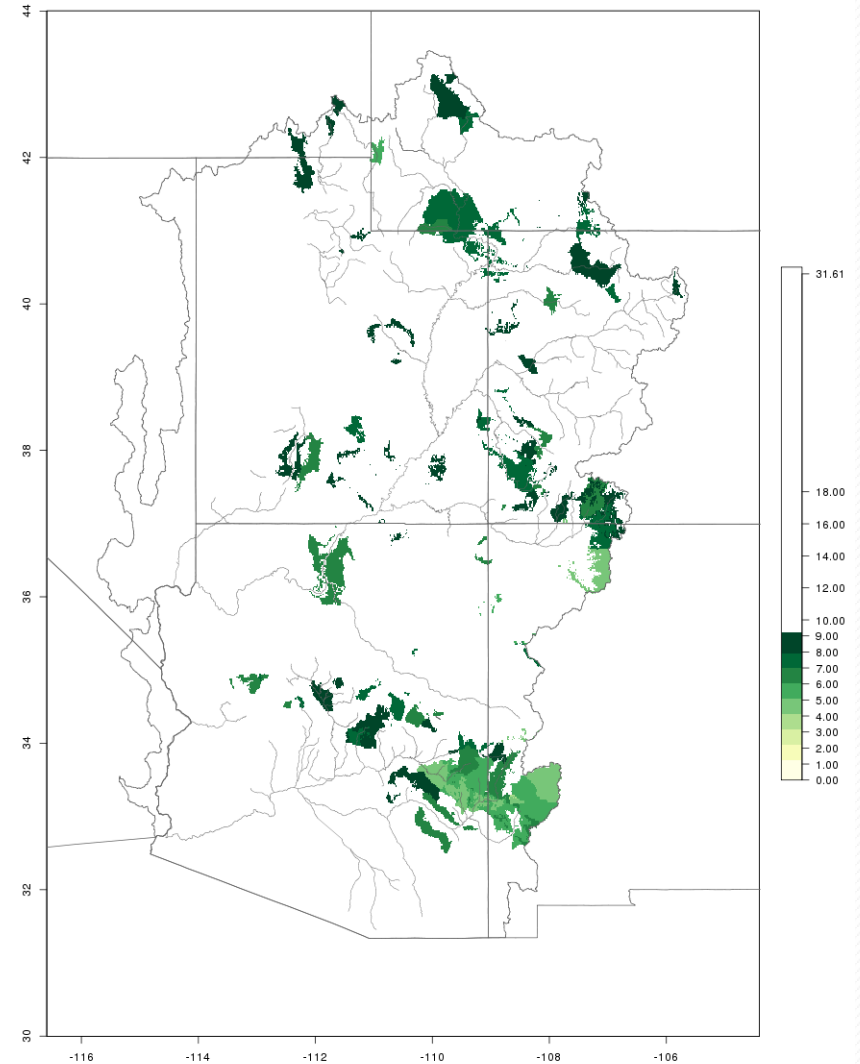
Model Soil Moisture

Soil Moisture - December 02 2015
(Modeled, Averaged by Basin)



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Inches to Saturation



Web Page Modifications

- Upper Colorado Situational Awareness Page
 - One location for snow, precip, soil moisture, etc
 - Runoff forecast information and contribution breakdown from the larger River Basins.
 - The ability to view the “trimmed” basins, those that are most important to the runoff volumes
- Inclusion of the 30 / 70 % exceedance forecasts.

2016 water supply briefings

- Tentative dates for 2016 monthly water supply briefings
 - Thursday Jan 7th@ 1 pm MT
 - Thursday Feb 4th @ 1 pm MT
 - Friday Mar 5th @ 11 am MT
 - Thursday Apr 7th @ 1 pm MT
 - Thursday May 5th @ 1 pm MT
- Additional briefings and a peak flow briefing will be scheduled as needed.
- Date/Times are subject to change. All registration information will soon be posted to the CBRFC web page.

Today's Summary

SNOW- Not off to a strong start in many areas but also not worrisome this early in the game.

SOIL MOISTURE- Will have a negative impact on spring runoff in most areas with a few exceptions.

RUNOFF VOLUMES – Too early for excitement or despair. Great Basin is currently looking the worst while the Upper Colorado Basin is near to below average. The Lower Colorado is quite dependent on winter rain so El Niño offers room for optimism there.

EL NIÑO – It is among the strongest on record and expected to continue into the spring. Historically doesn't mean much for Lake Powell Inflow but a there is a tendency for wetter conditions in the Lower Colorado Basin and drier conditions in the upper Green River Basin. That said both high and low runoff years have occurred during El Niño events throughout our forecast area. The El Niño relationships are not conclusive.

This is where it gets fun – expect conditions to vary over the next few months.