Eastern Great Basin
May 2016
Water Supply Briefing

10 am May 6, 2016

Stacie Bender – Hydrologist

(with contributions from Brent Bernard,
Paul Miller, and Greg Smith!)

Colorado Basin River Forecast Center
National Weather Service
NOAA

Conference Phone #: 877-929-0660 Passcode #: 1706374

* Please mute your phone until you have a question-Thank You! *

Eastern Great Basin Water Supply Briefing

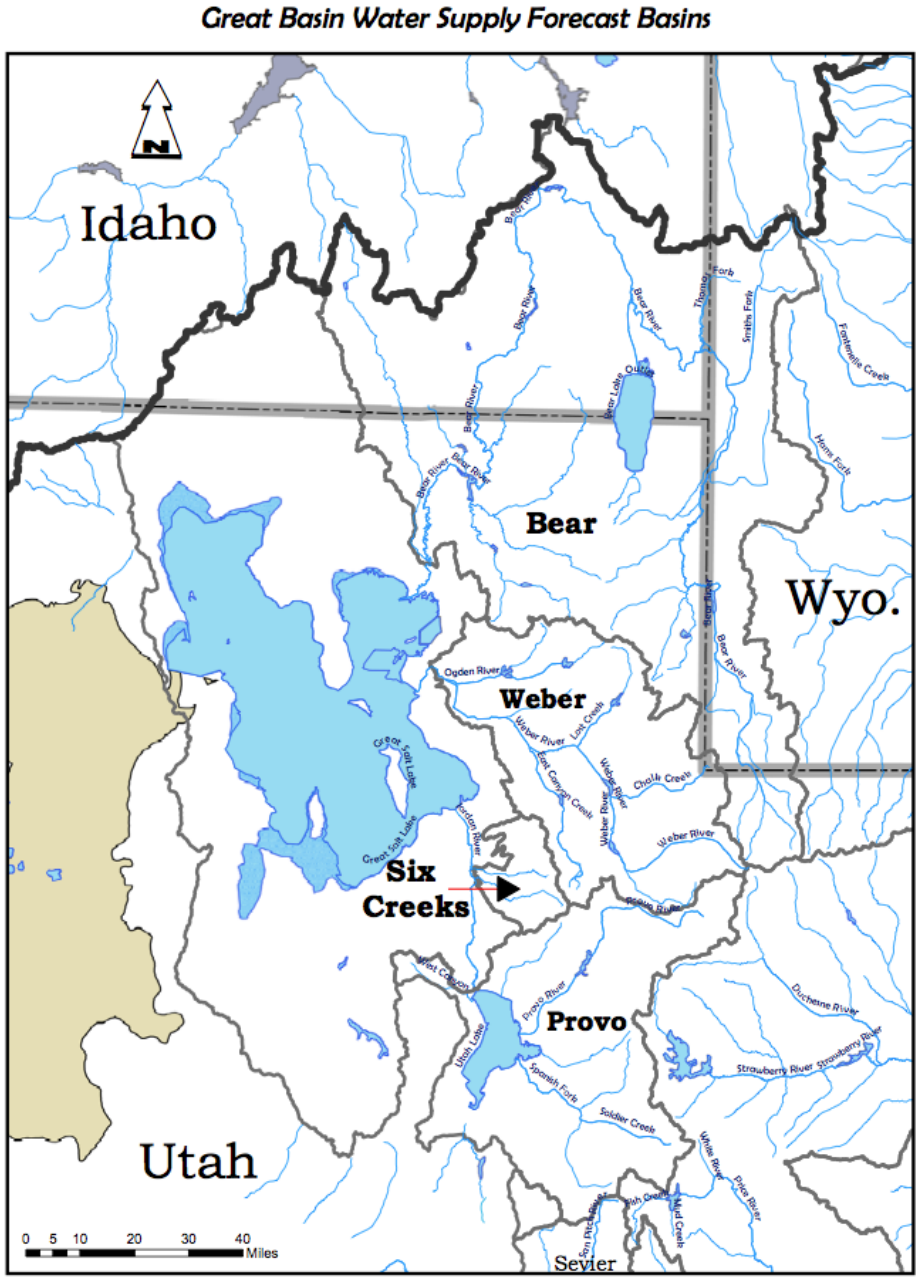
Primary focus is on the Bear, Weber, Six-Creeks, Provo/UT Lake river basins.

→ We can add the Sevier River Basin if there is interest!

We have a separate Colorado River Basin water supply briefing.

→ Archived recordings of all water supply briefings are available at: http://www.cbrfc.noaa.gov/present/present2016.cgi

Feedback on these briefings is welcome and appreciated!



Primary Questions to Answer (and the answers!)

- **How did the eastern Great Basin water supply forecasts issued for <u>May 1</u> change from the forecasts that were issued a month ago on <u>April 1</u>?**
  - No drastic changes in Great Basin April-July volume forecasts from the forecasts issued on April 1
  - Overall, forecasts dropped about 7 %.
  - A few areas benefitted from precipitation and active weather in the second half of April and had slight increases in the April-July forecasts.

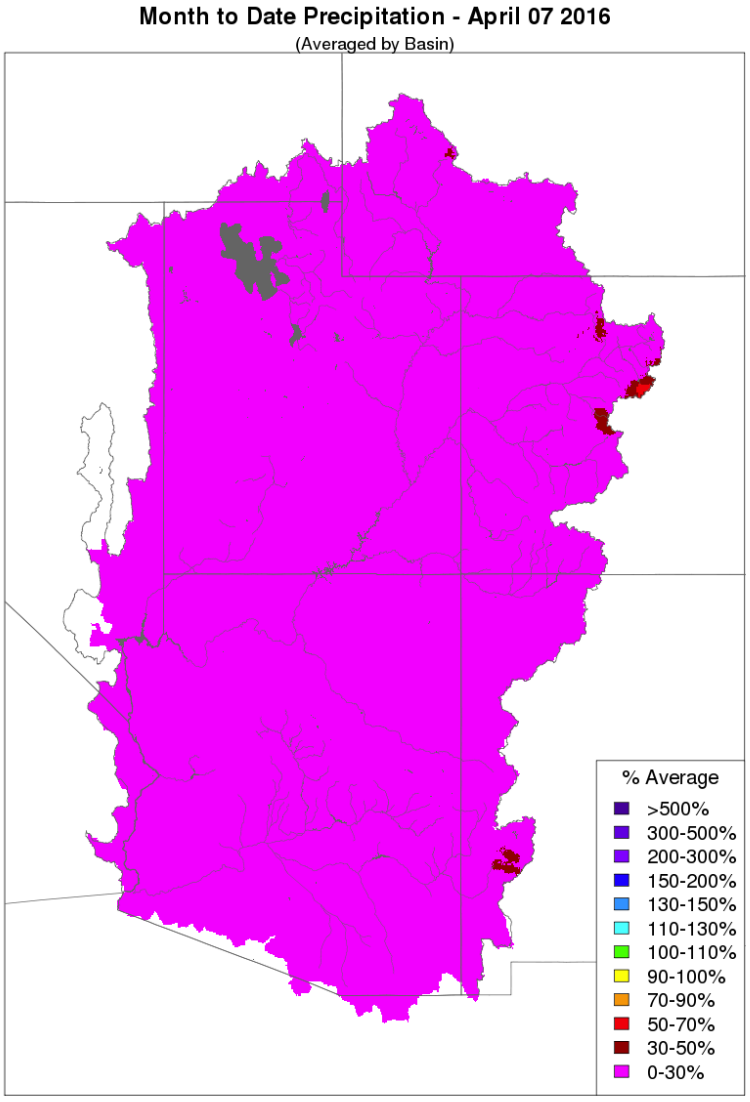
- **Why?**
  - First half of April was warm and dry, but we got a few inches of precip in the 2nd half!
  - Weber, Six Creeks, and Provo areas ended up with near average precip for April 2016, but the Bear was drier.
  - Still, April 2016 precip wasn't enough to overcome the early start to runoff in March.

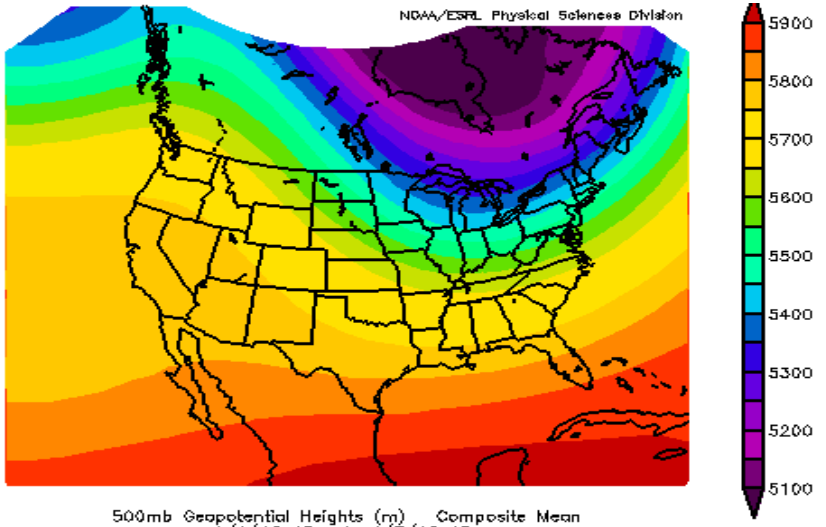
- **What's coming up in the next week, weather-wise?**
  - slow-moving storm for this upcoming weekend. Showers may continue into next week.

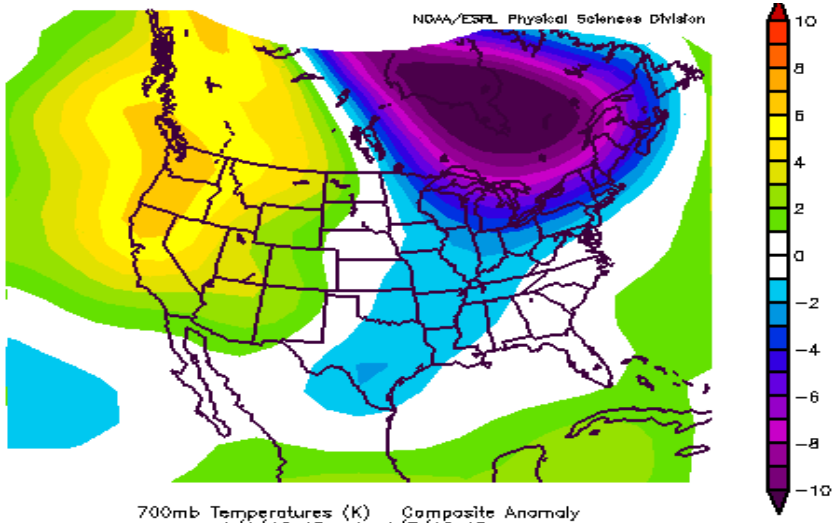
- **What's the long-range outlook for May-June-July, through the end of the runoff period?**
  - latest outlooks show better chances of (a) warm temps and (b) above average precip (but any outcome is still possible!)

April 2016 Weather Review: Precipitation

First part of April: Dry. Warm. Storms stayed mostly north of the EGB.



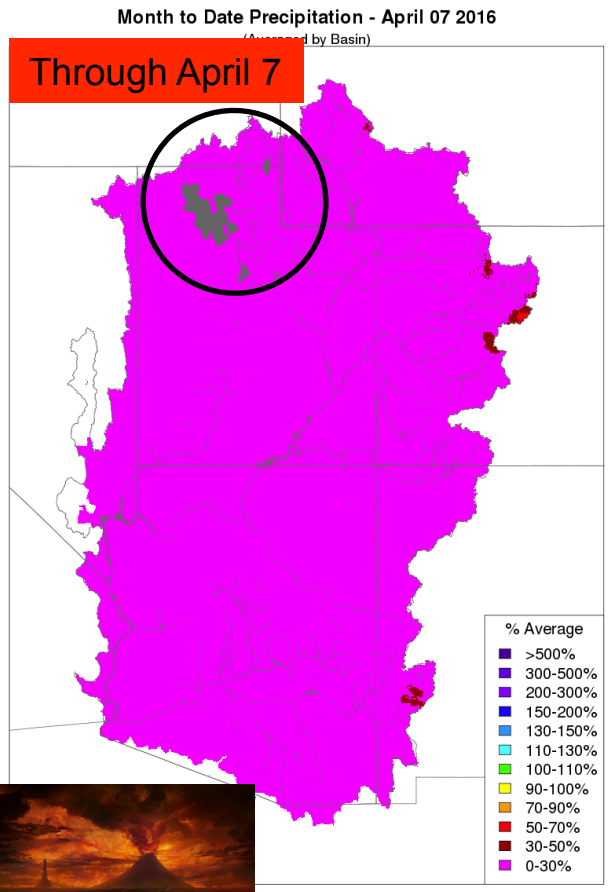


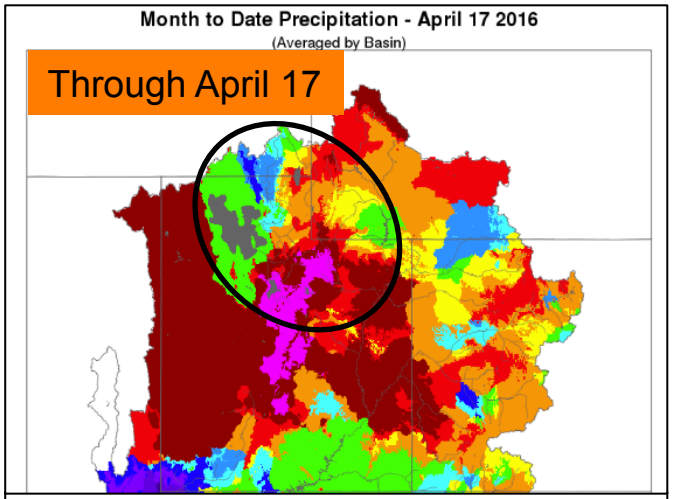


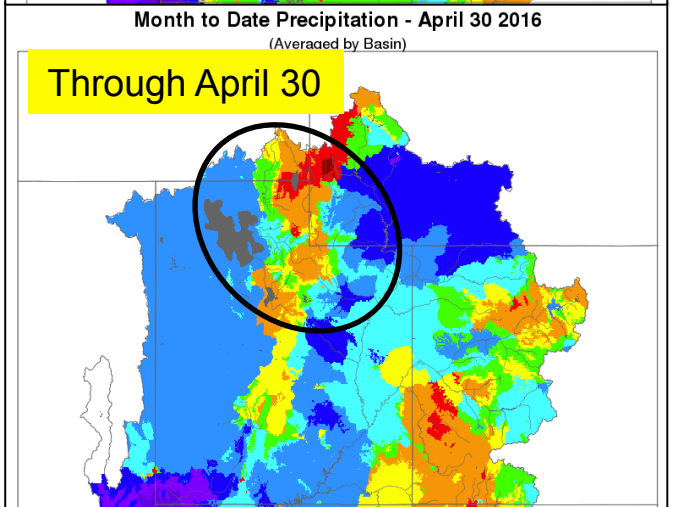
April 2016 Weather Review: Precipitation

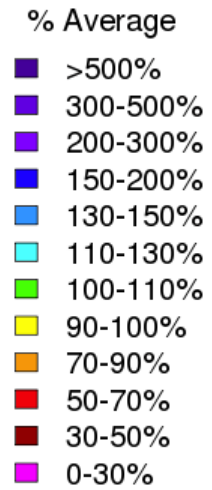
By mid-April:

- Pattern change!
- “Tax Day Storm” on April 14-16, 2016 brings 1-3” of water to portions of the EGB
- Storm on April 23-29, 2016 brings 3-5” of water to portions of the EGB.
- By the end of April, the precipitation picture is much less dismal than at the beginning of the month.









April 2016 Precip (% of normal):

Bear :	85%
Weber:	100%
Six Creeks:	105%
Provo/ Utah Lake:	95%

April 2016 Weather Review: Temperatures

Above average temperatures to start the month

+

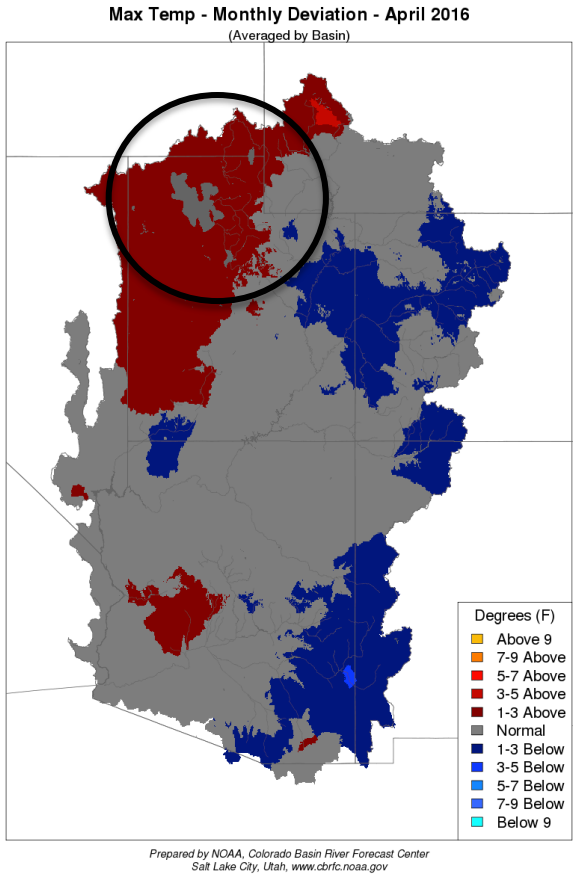
below average temperatures at mid and near the end of the month

=

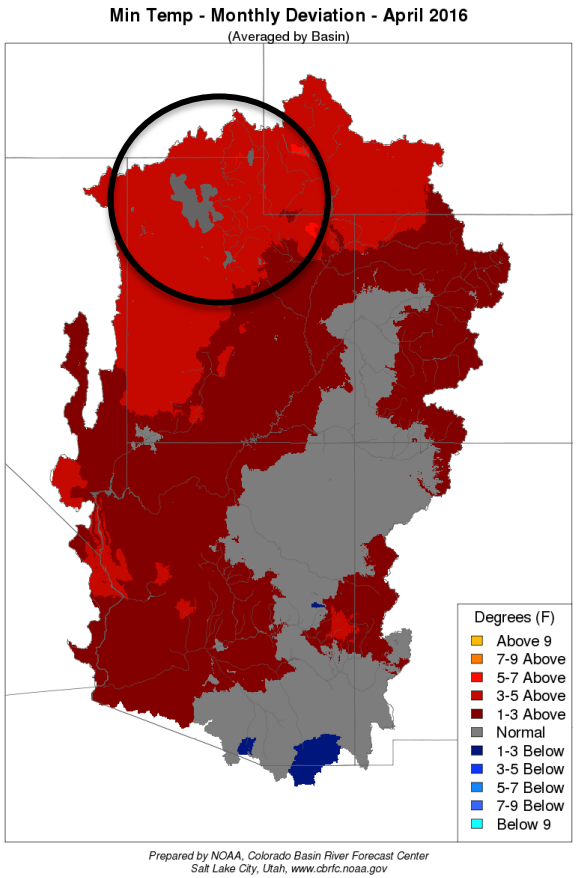
For April 2016 as a whole:

+1 to 3 F above average daily maxes, +3 to +5 F daily mins

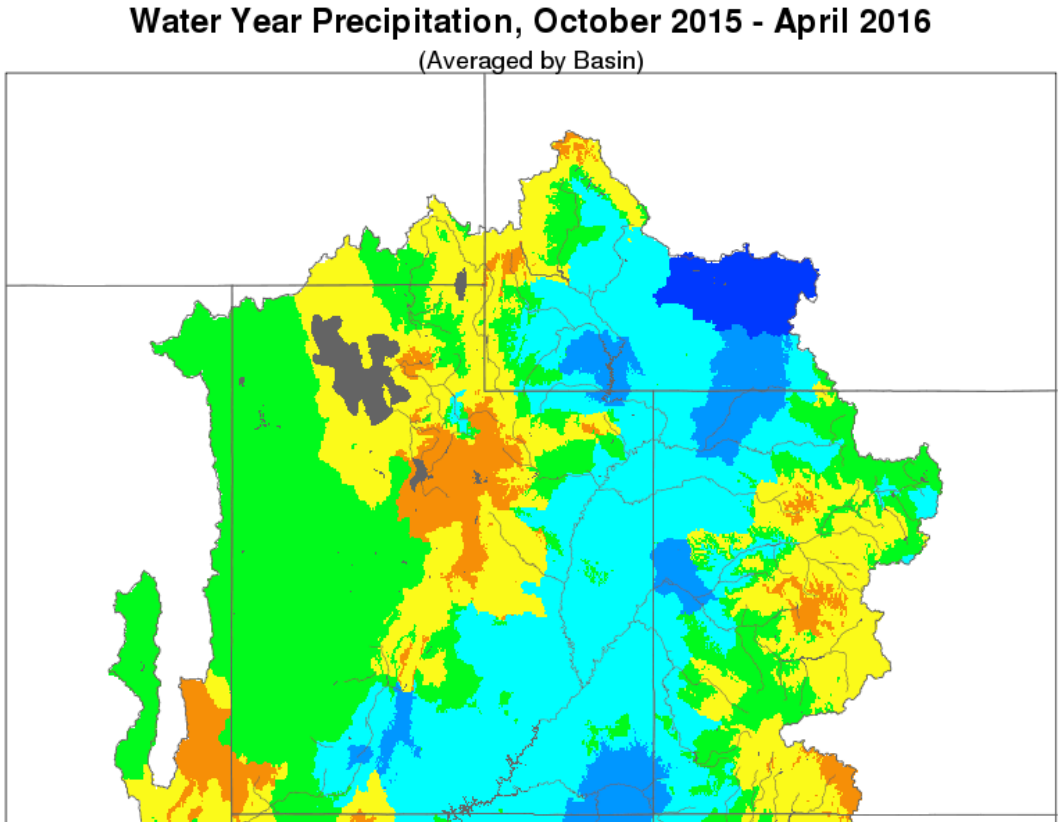
Daily air temperature maxes



Daily air temperature mins



Water-Year (Oct-April) 2016: Precipitation



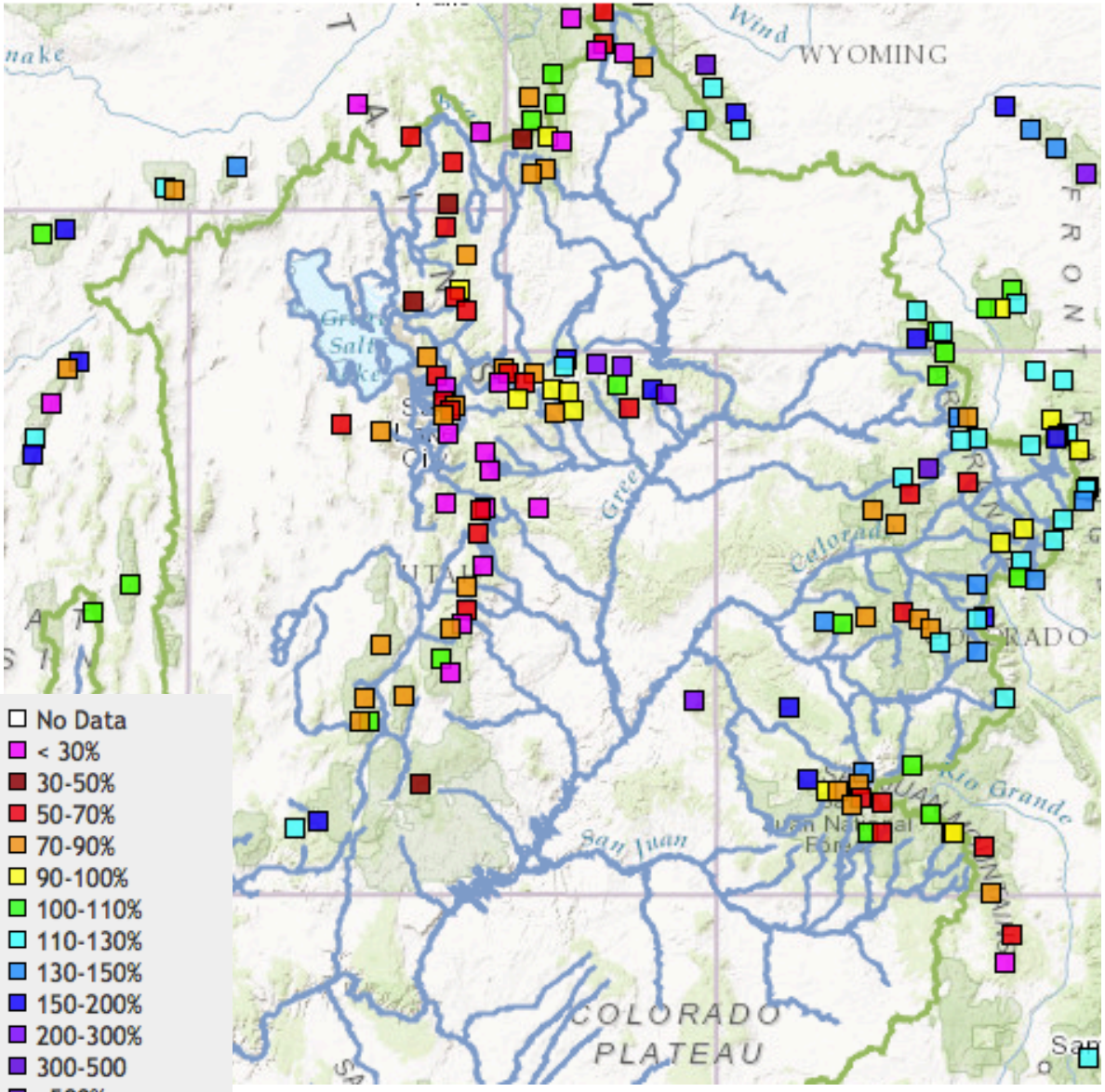
% Average

- >500%
- 300-500%
- 200-300%
- 150-200%
- 130-150%
- 110-130%
- 100-110%
- 90-100%
- 70-90%
- 50-70%
- 30-50%
- 0-30%

Bear :	100%
Weber:	95%
Six Creeks:	90%
Provo/UT Lake:	85%

Observed Snow: USDA/NRCS SNOTEL Network

Snow (% median) for May 5, 2016



Nutshell:

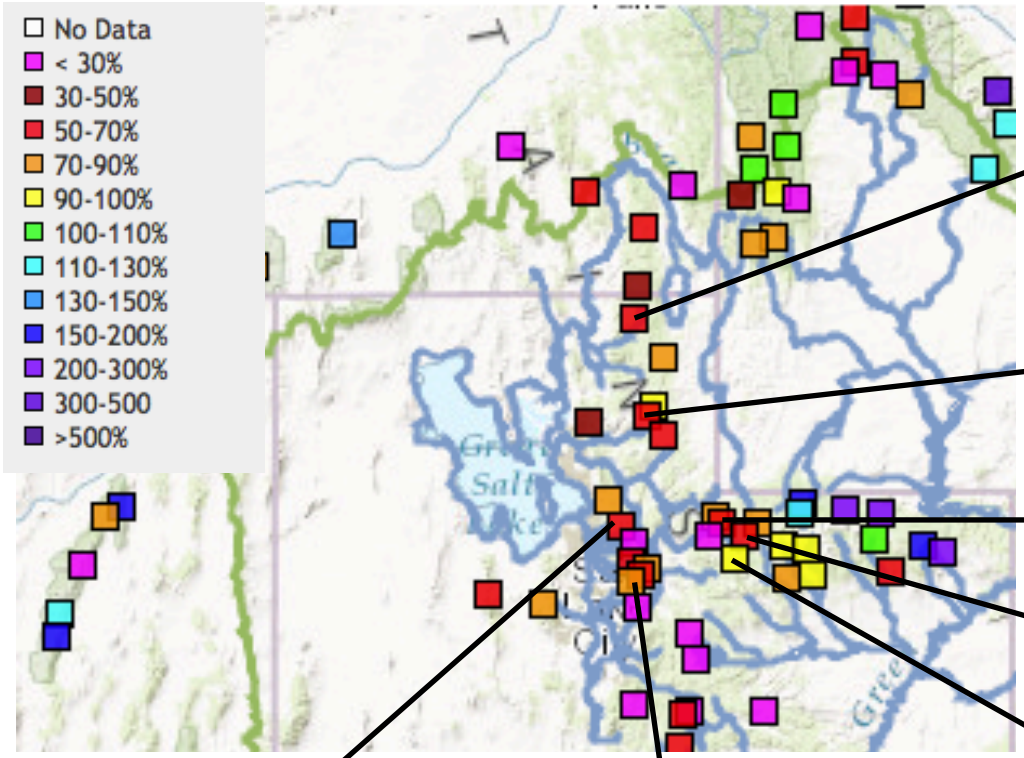
Great Basin in a little worse shape than areas to the East (eastern Uintas, Colorado Rockies)

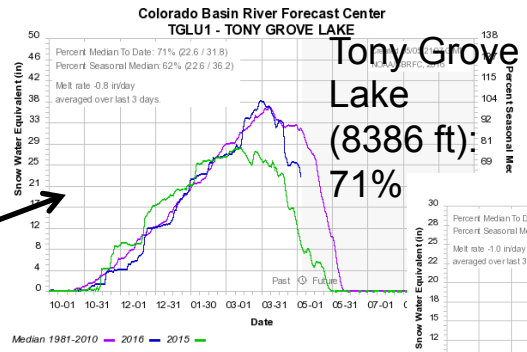
NOTE: Be cautious of percent of median values this time of year.

Low normal values (as snowpack dwindles) can result in large changes and swings in the percent of median value!

Observed Snow: USDA/NRCS SNOTEL Network

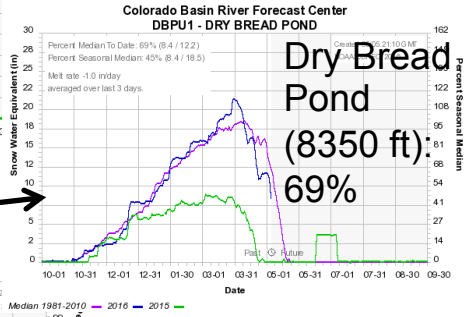
Snow (% median) for May 5, 2016



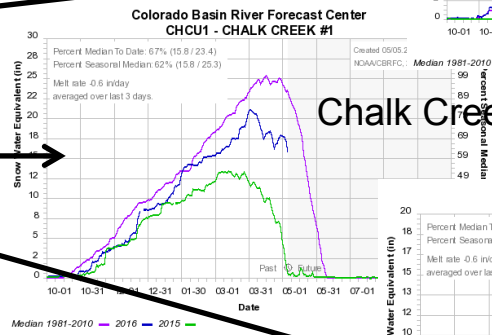


Tony Grove Lake (8386 ft): 71%

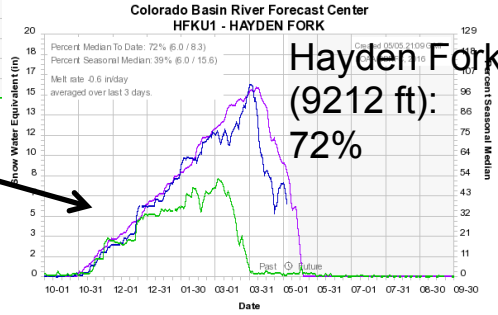
Median
2015
2016



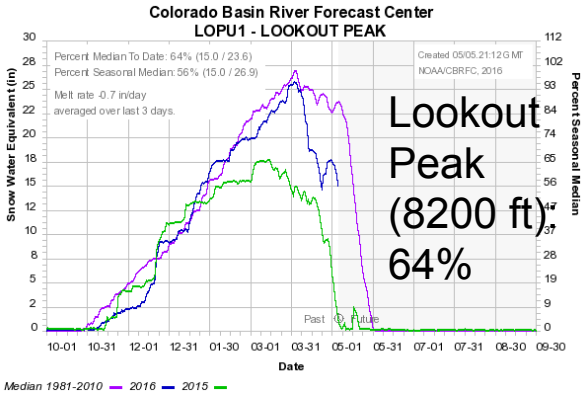
Dry Bread Pond (8350 ft): 69%



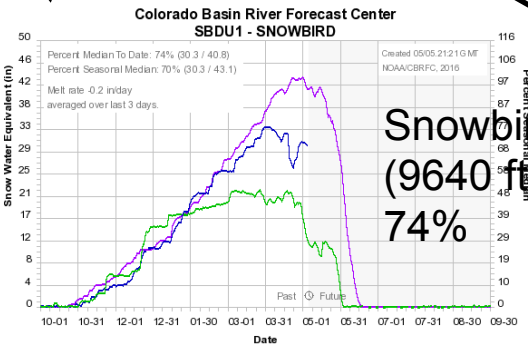
Chalk Creek #1 (8993 ft): 67%



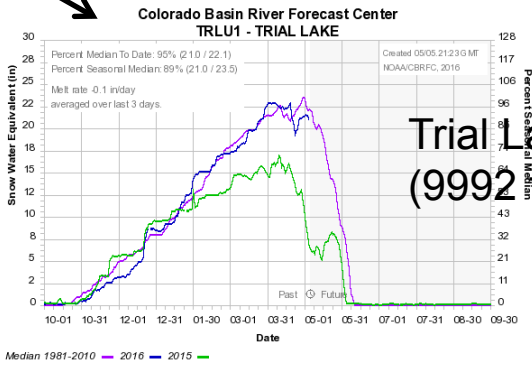
Hayden Fork (9212 ft): 72%



Lookout Peak (8200 ft): 64%



Snowbird (9640 ft): 74%

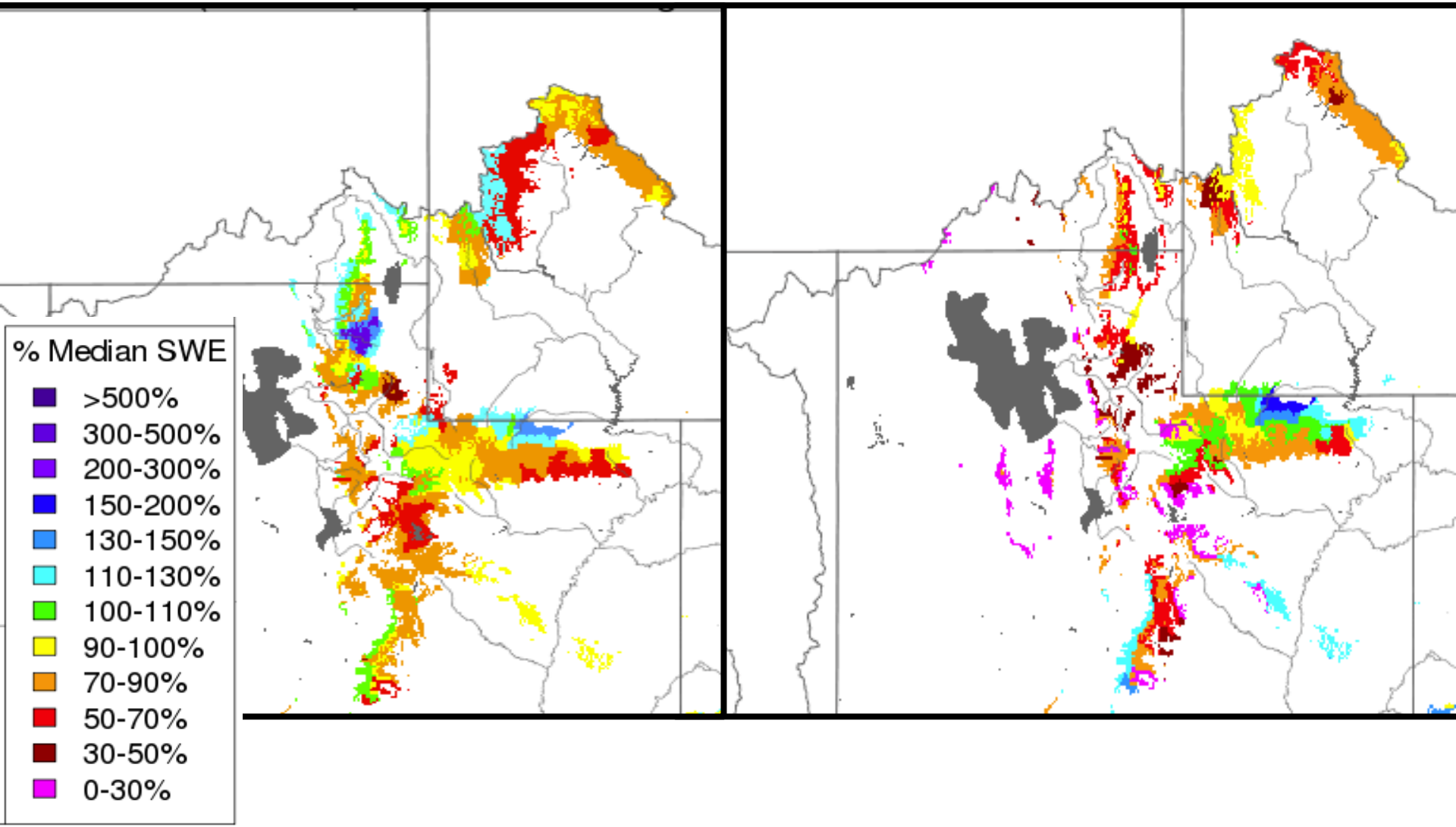


Trial Lake (9992 ft): 95%

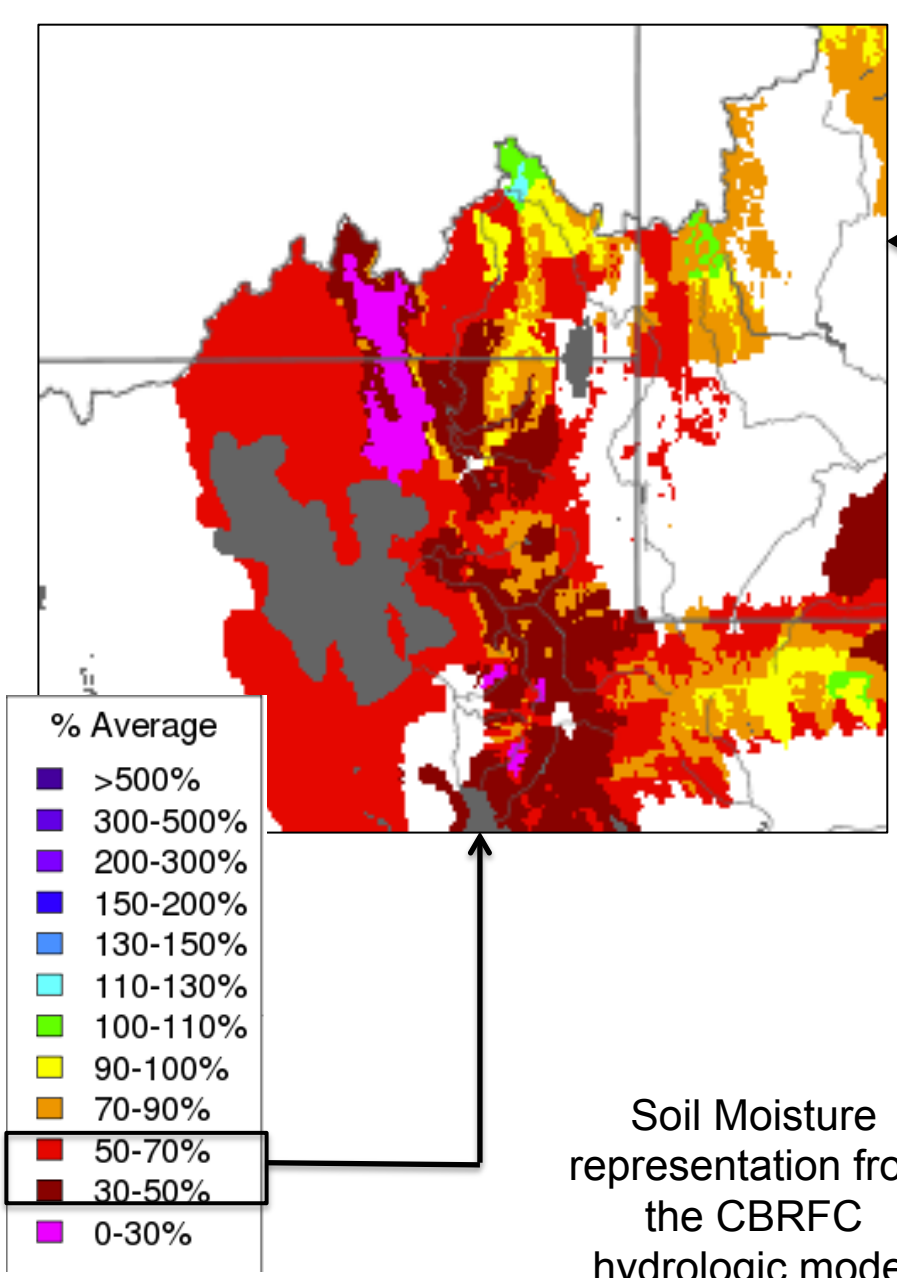
Simulated Snow: CBRFC Hydrologic Model

April 6th 2016
Significant Runoff Areas

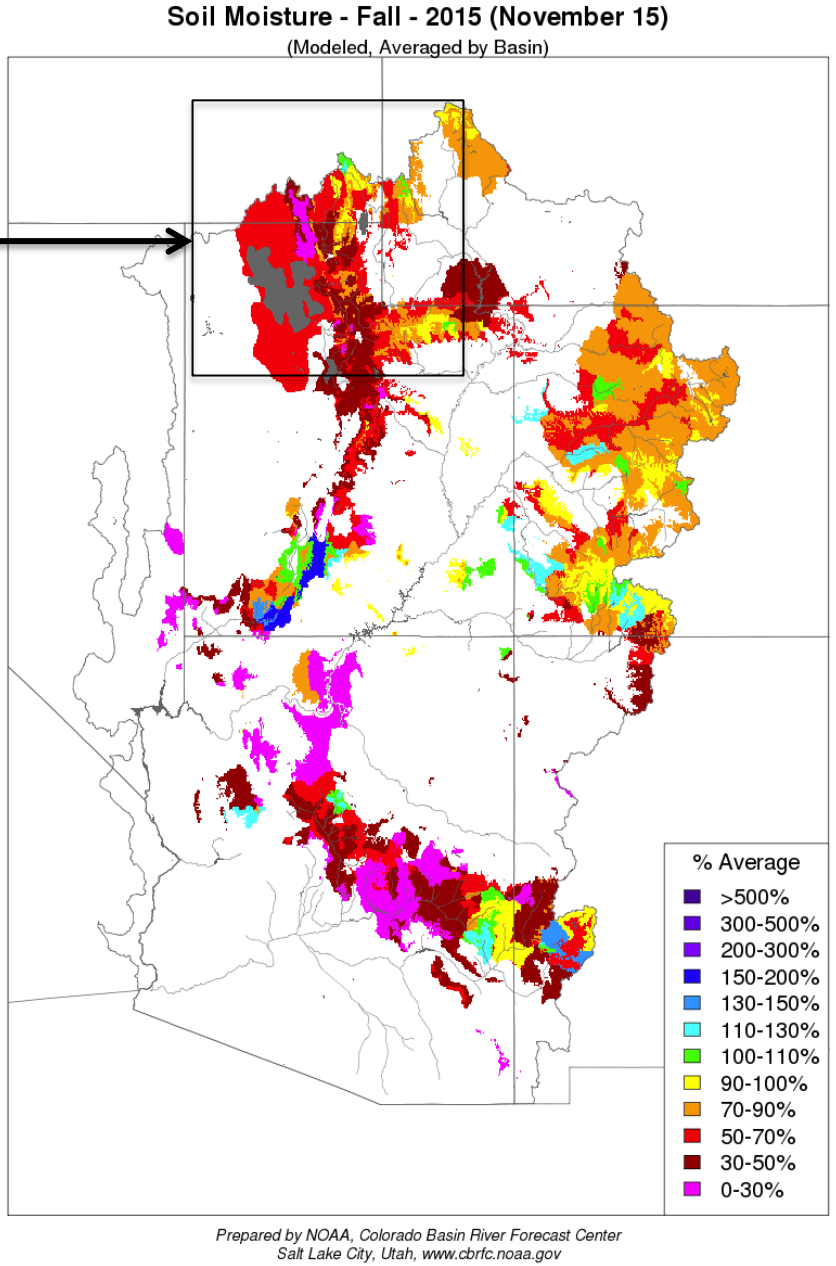
May 5th 2016
Significant Runoff Areas



Modeled Antecedent Soil Moisture, Entering Winter



Soil Moisture representation from the CBRFC hydrologic model



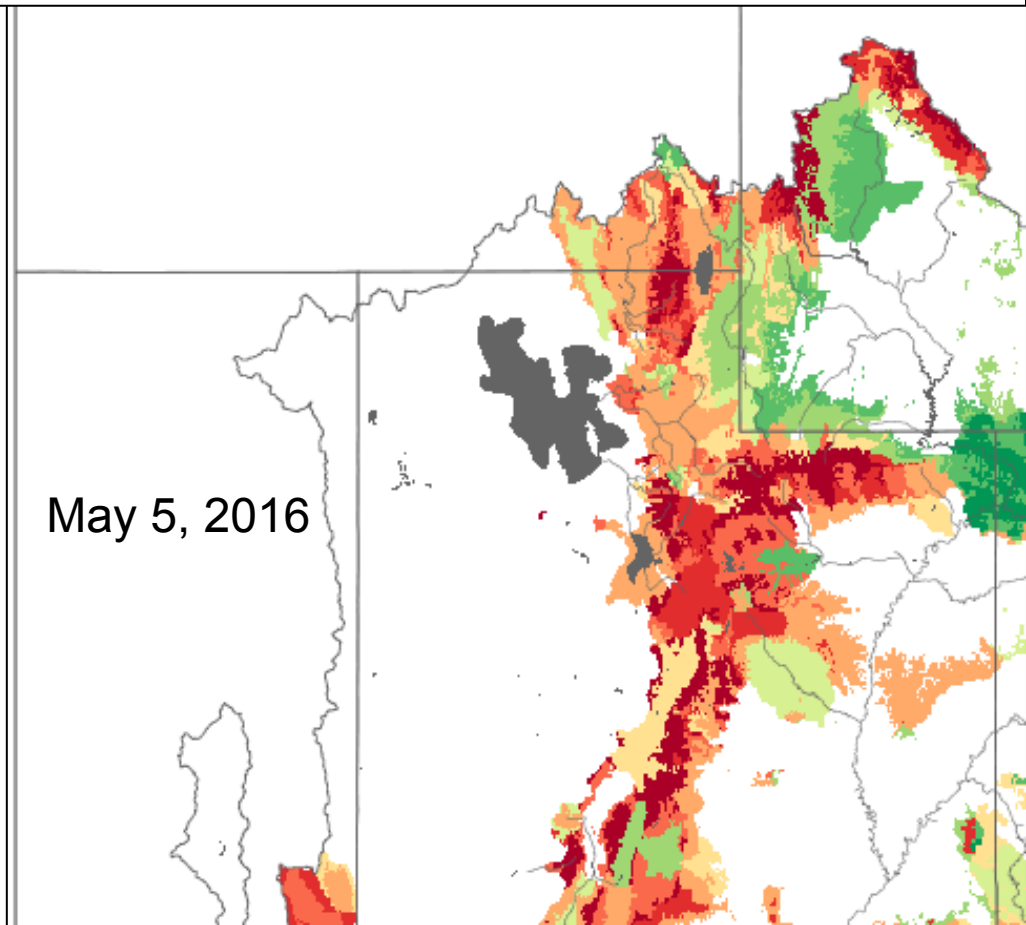
Model Soil Moisture Conditions: May 5, 2016

"Inches to Saturation" soil moisture map:

- gives an indication of where soils are becoming saturated in the CBRFC hydrologic model due to snowmelt and/or rainfall.
- Dark green areas show where the hydro model's soil moisture "tanks" are full or nearing full
- Runoff may begin soon in the green areas
- "how full is the soil moisture tank" information:
  - **does not** affect the overall water supply volume forecasts
  - but can provide an indication *during* the spring snowmelt of where runoff is more likely to actually be generated

Great Basin watersheds:

- Lower elevation areas where snowmelt is underway have **"fuller" soil moisture tanks**
- High elevation areas, where melt has been slower (or not yet begun), have "**emptier tanks**" and room for more water in the soil.



Water Supply Forecast Trend – April 1st to May 1st issuances

Nutshell:

- Not much change in April-July volume forecasts from the forecasts issued on April 1
- Overall, forecasts dropped about 7 %.
- Weber, Six Creeks, and Provo areas had near average precip for April 2016, but the Bear was drier.
- April 2016 precip wasn't enough to overcome the early start to runoff in March.

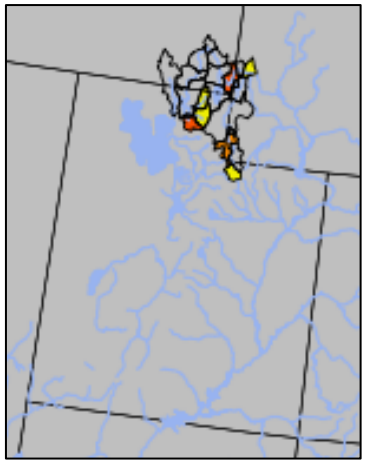
Average forecast change per basin, compared to April 1 forecasts:

- Provo: 9% decrease
- Six Creeks: 11% decrease (seems large, percentage-wise, because values are small)
- Weber: 3% decrease
- Bear: 4% decrease

Notable rain-driven flows for April 2016:

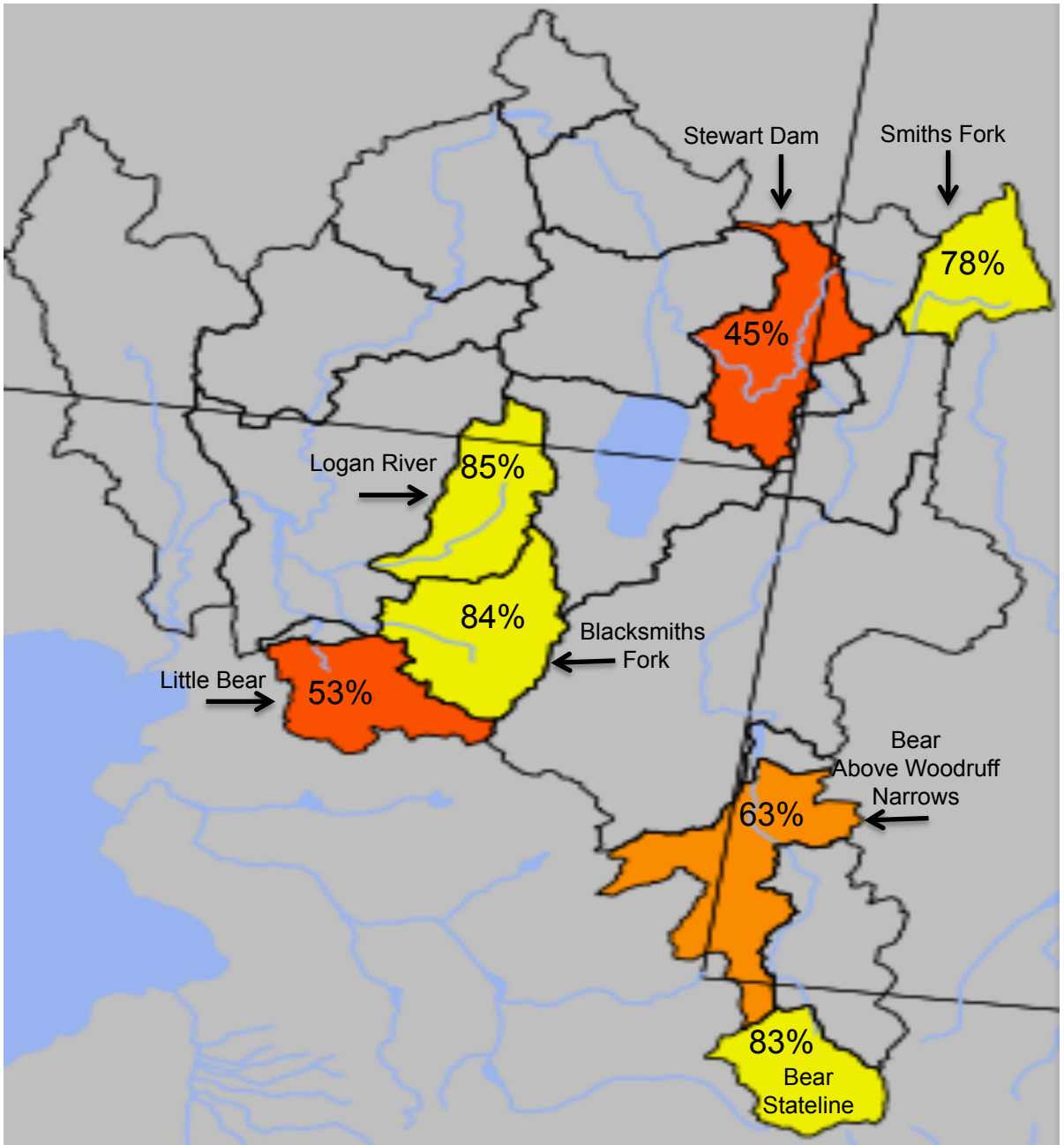
- Lambs Creek, 1.44 KAF, 153% of average
- Lost Creek, 4.4 KAF, 146%
- Ogden at Huntsville, 18.9 KAF, 139%
- Logan River, 17.2 KAF, 130%
- Hyrum Inflow, 11.1 KAF, 131%

May 1st Water Supply Forecasts – Bear River Basin

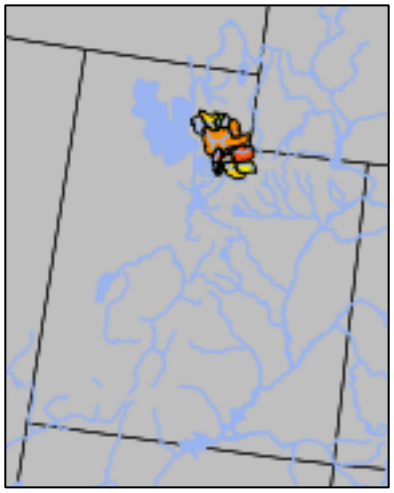


April-July
Forecast
Streamflow Volumes
(% of 1981-2010 average)

- Below 25%
- 25% - 35%
- 35% - 45%
- 45% - 55%
- 55% - 65%
- 65% - 75%
- 75% - 85%
- 85% - 95%
- 95% - 105%
- 105% - 115%
- 115% - 125%
- 125% - 135%
- 135% - 145%
- 145% - 155%
- 155% - 165%
- 165% - 175%
- Above 175%
- NA



May 1st Water Supply Forecasts – Weber River Basin



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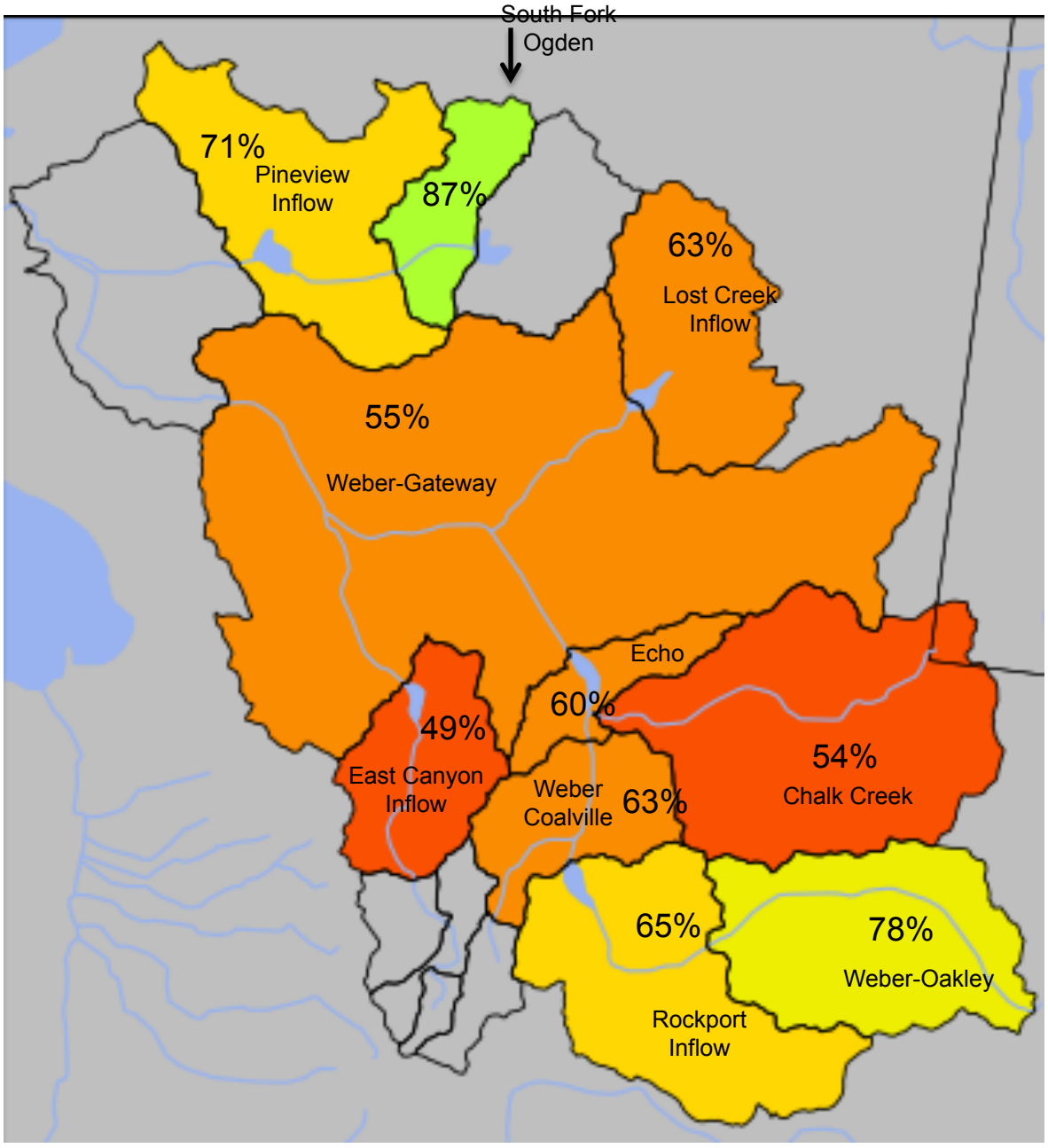
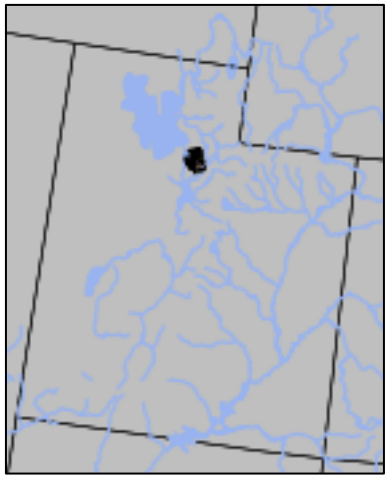


May 1st Water Supply Forecasts – Six Creeks



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- Above 175%
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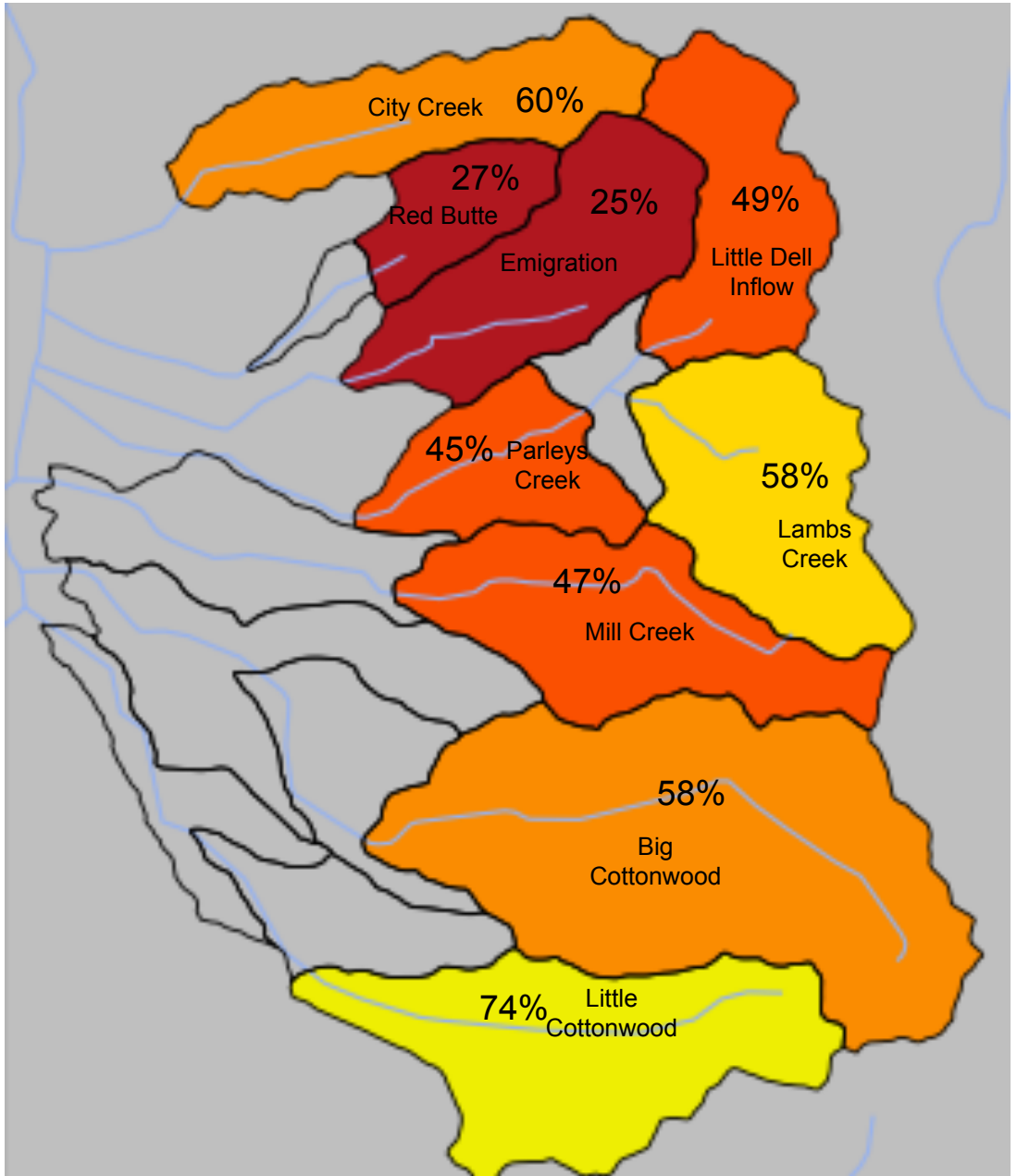
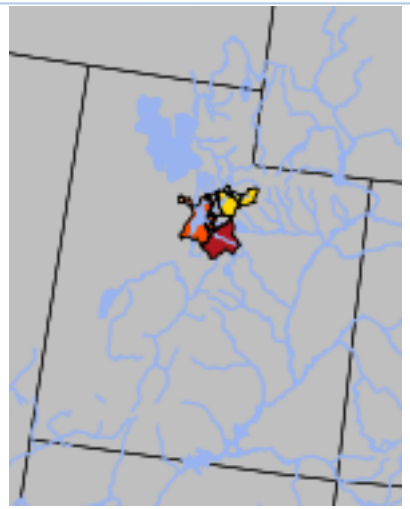


May 1st Water Supply Forecasts – Provo River / Utah Lake



April-July
Forecast
Streamflow Volumes
(% of 1981-2010 average)

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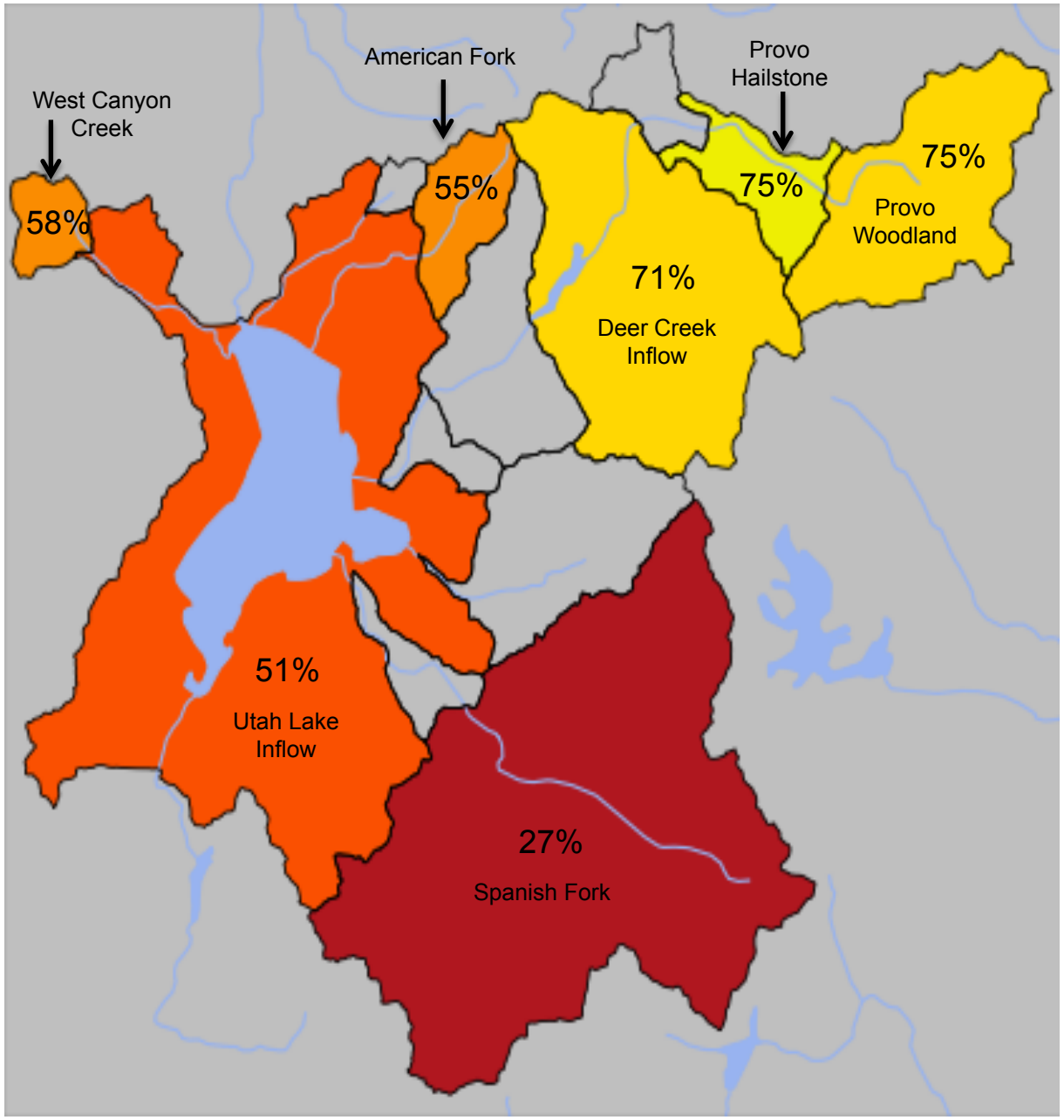
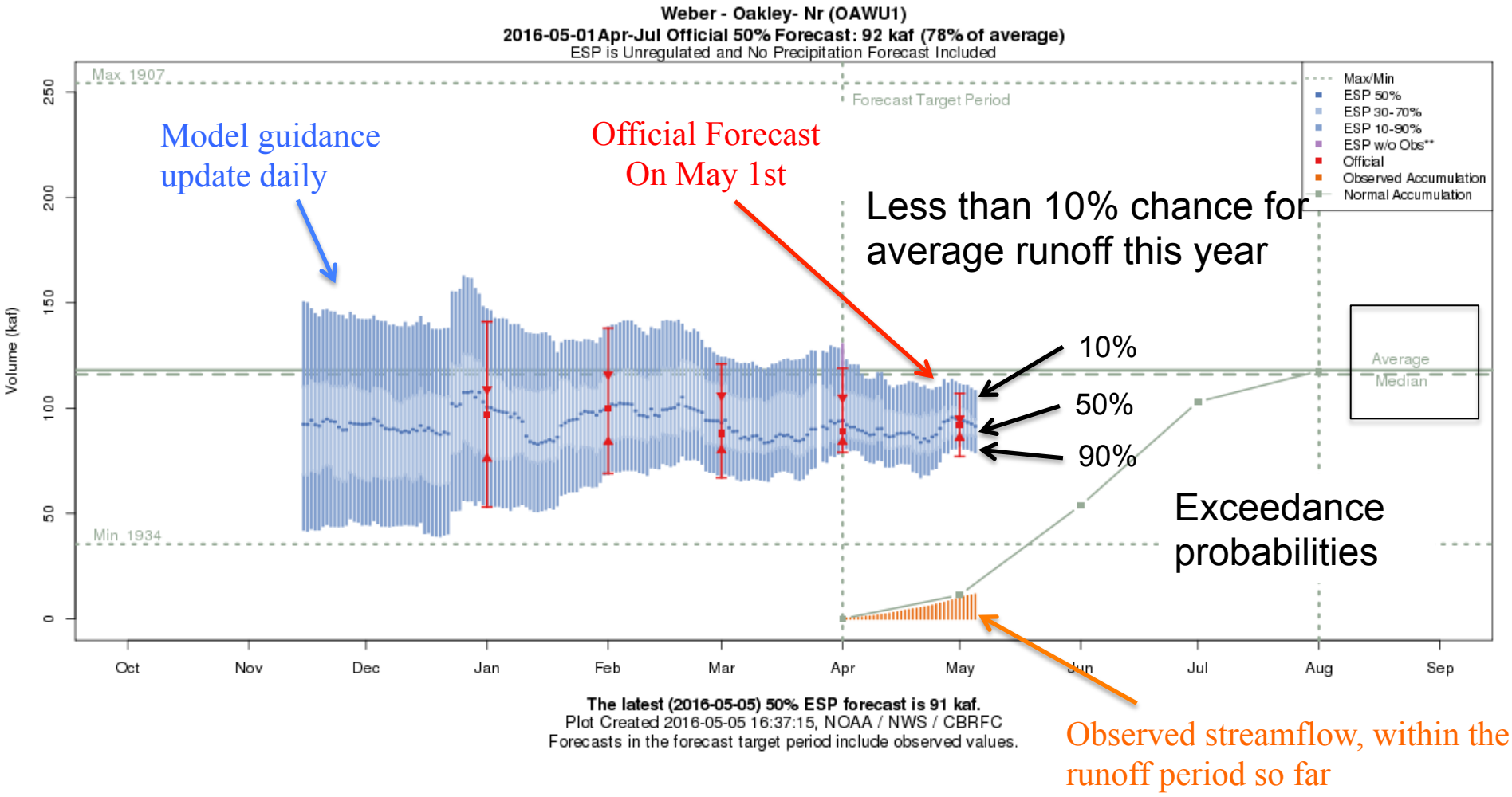
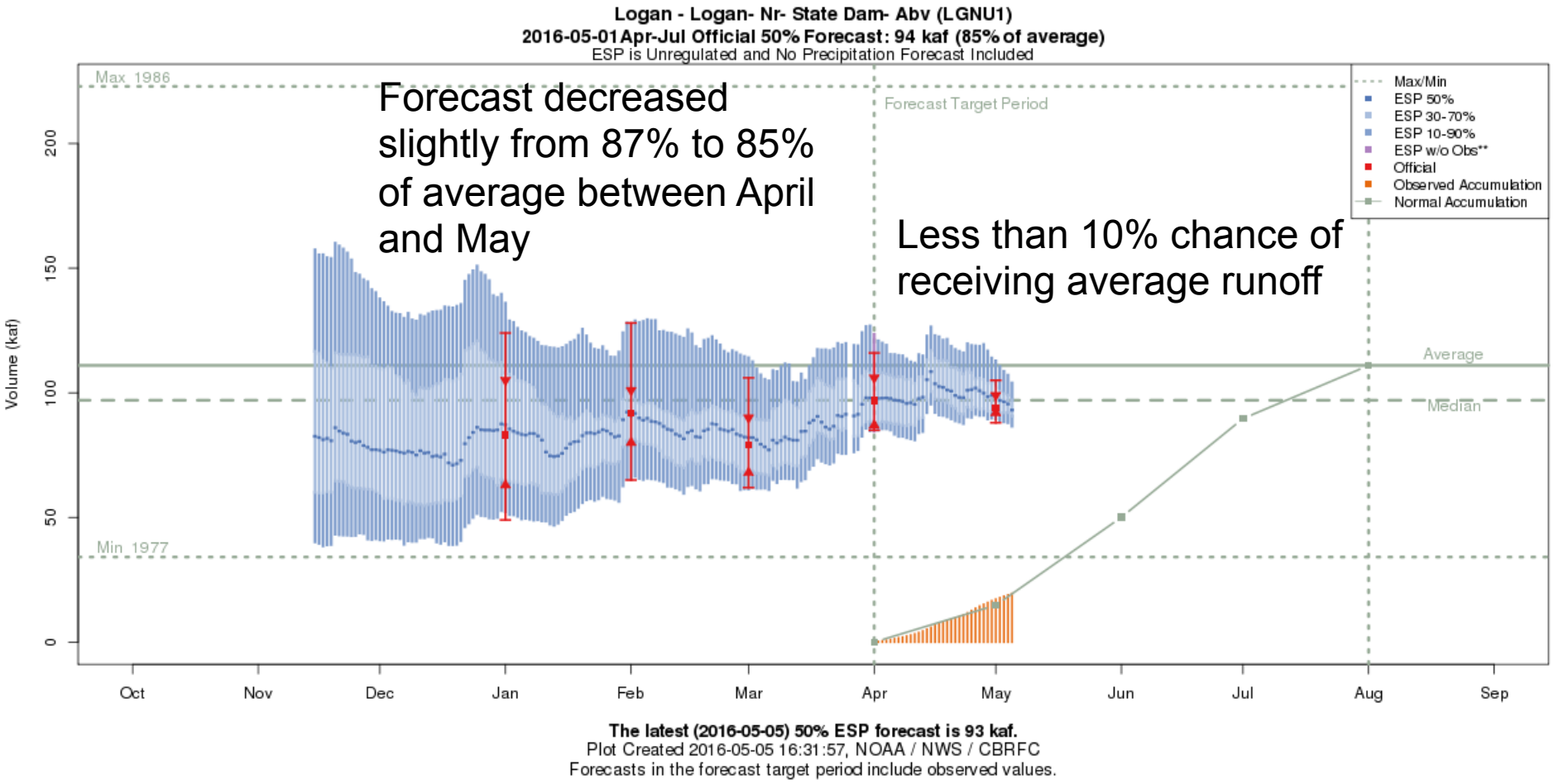


Weber River near Oakley forecast evolution plot

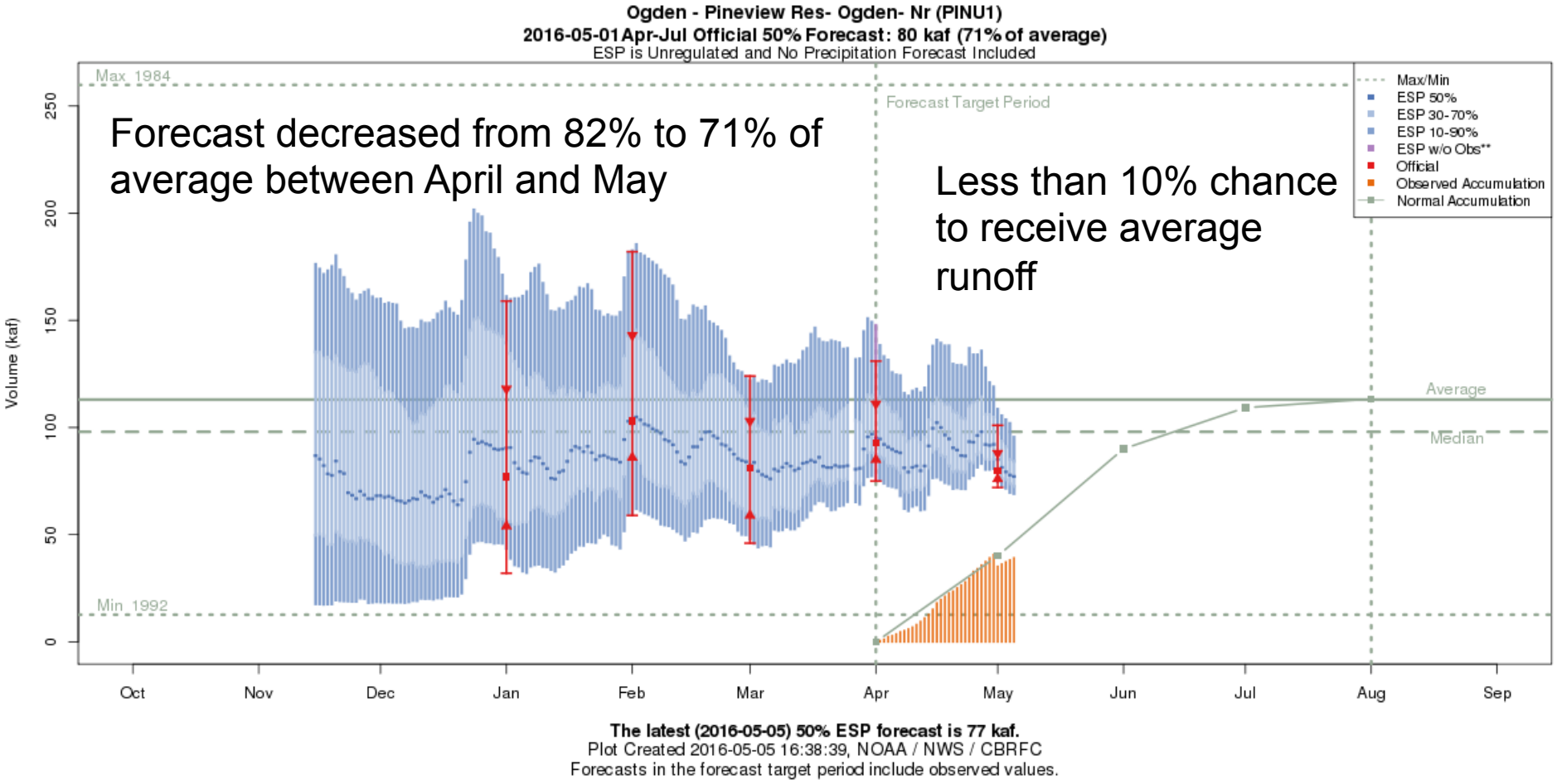
Forecast increased slightly from 75% to 78% of average between April and May



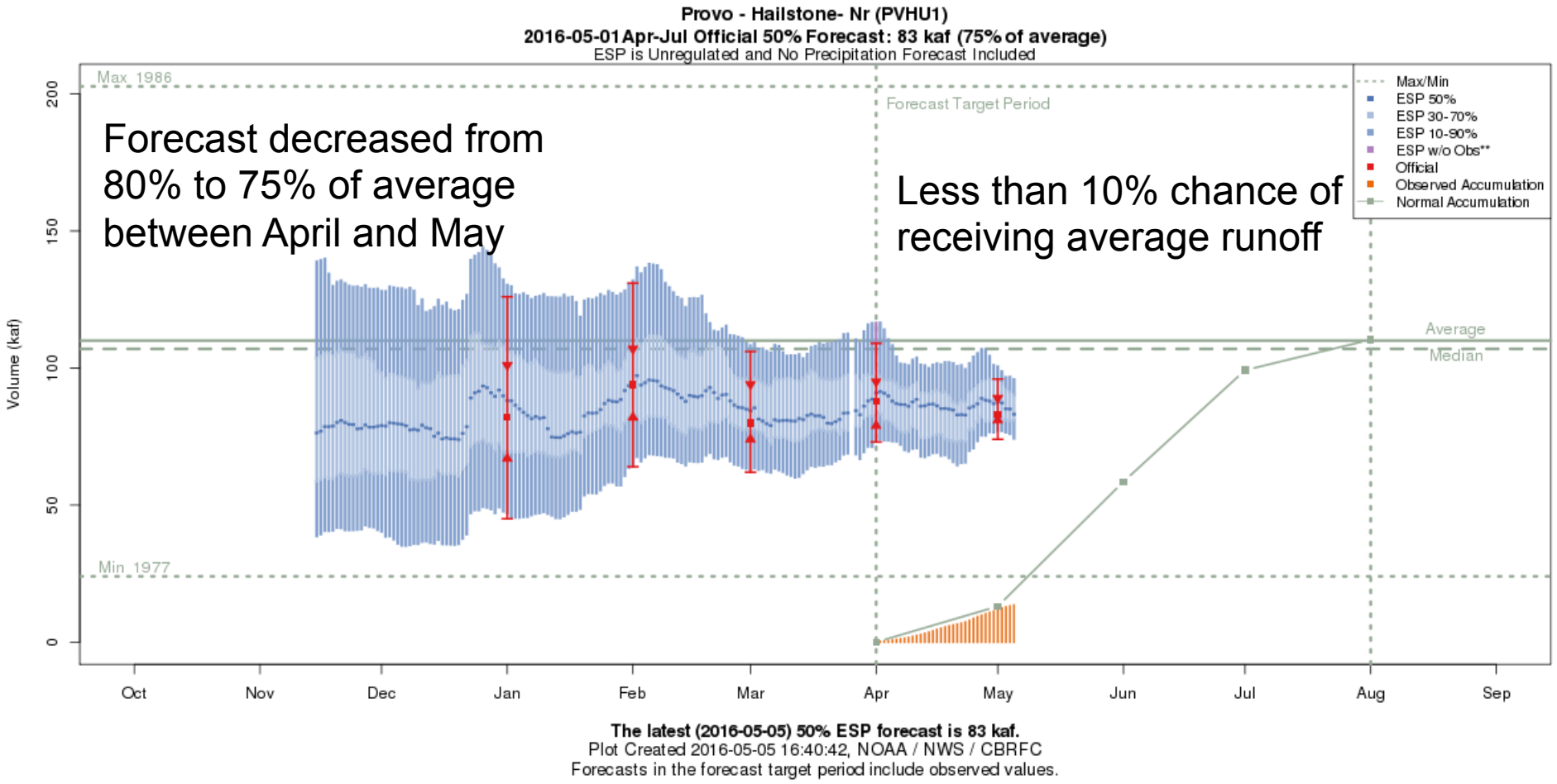
Logan River near Logan forecast evolution plot



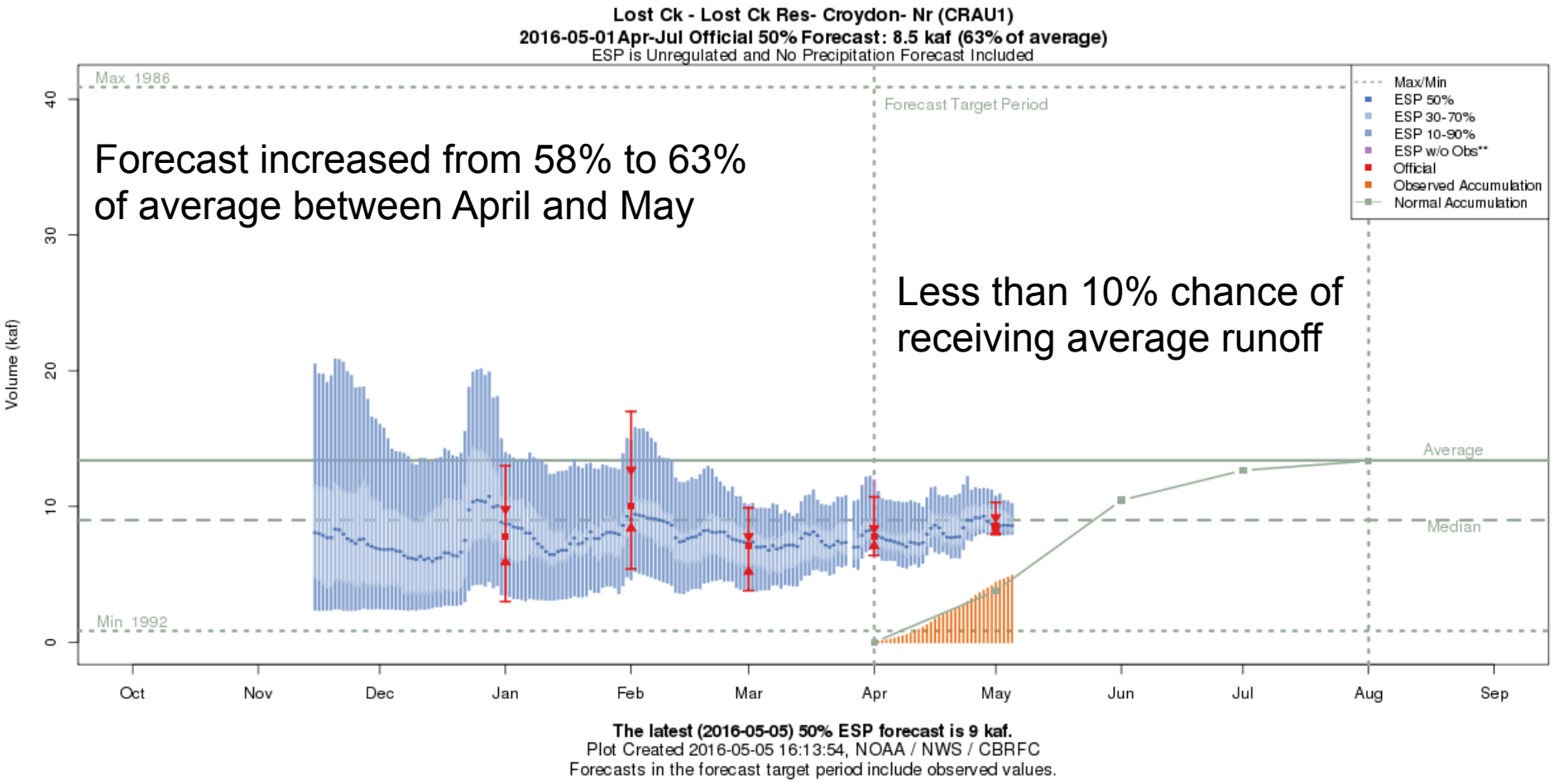
Pineview Reservoir inflow forecast evolution plot



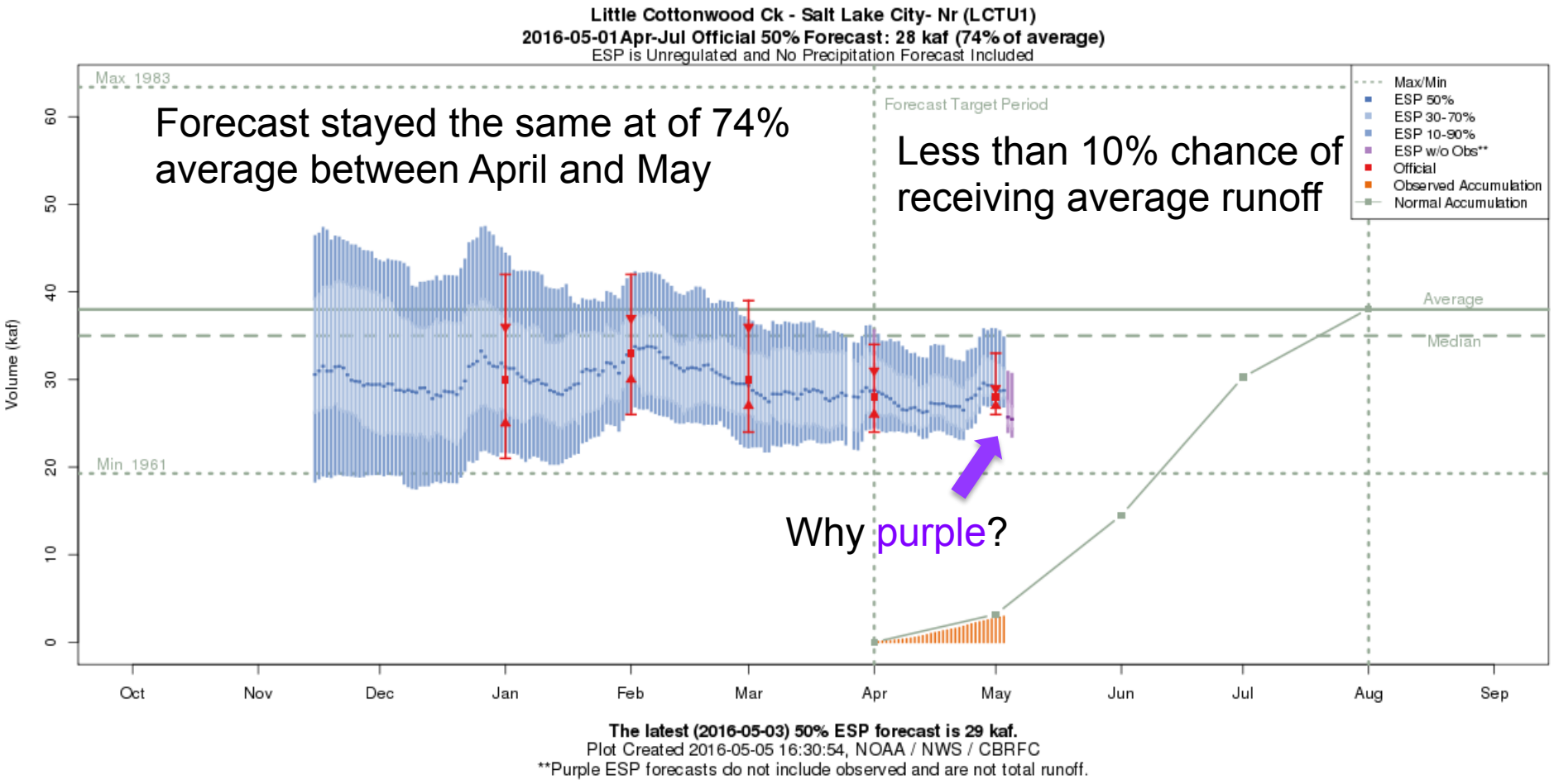
Provo River – Hailstone forecast evolution plot



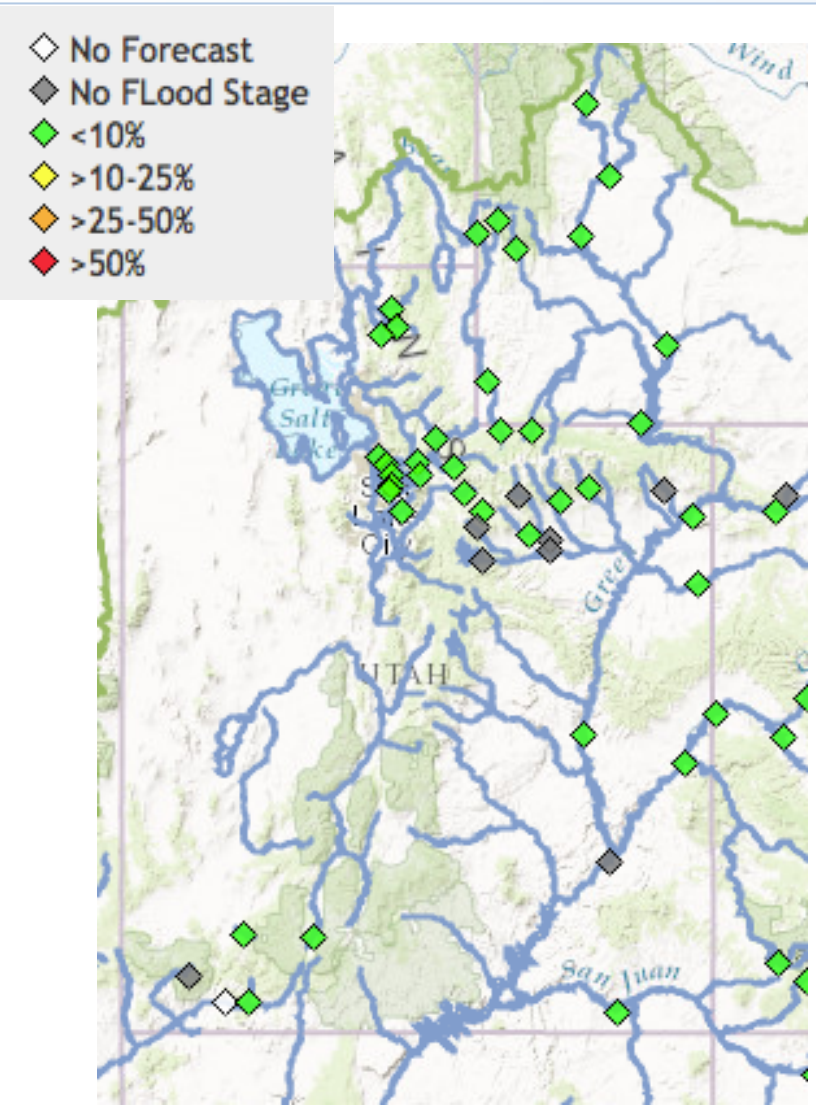
Lost Creek Inflow forecast evolution plot



Little Cottonwood Creek forecast evolution plot



Peak Flow Forecast Summary (mean daily CFS)



2016 Great Basin peaks <u>to date</u> for rivers and streams that may peak <u>soon</u>:

Blacksmith Fork (HRMU1): 312 cfs on April 14
Little Bear (PRZU1): 355 cfs on April 24
East Canyon Ck: 103 cfs on April 27
Emigration Creek: 20 cfs on April 27

Of the Great Basin peak flow forecast points that have not yet peaked, no site is currently forecast to exceed flood stage **due to snowmelt** at this time.

Peaks that are yet to occur will happen later this year than they did last year. Hooray!

<u>NOTE:</u>
Spring weather, such as extended periods of much above normal temperatures or heavy rainfall during melt, can cause flooding problems in any year.

Forecasts and/or flood levels do not exist on every stream.

From CBRFC homepage (www.cbrfc.noaa.gov):
-> "Rivers" drop down menu
-> select Peak Flow Map or List

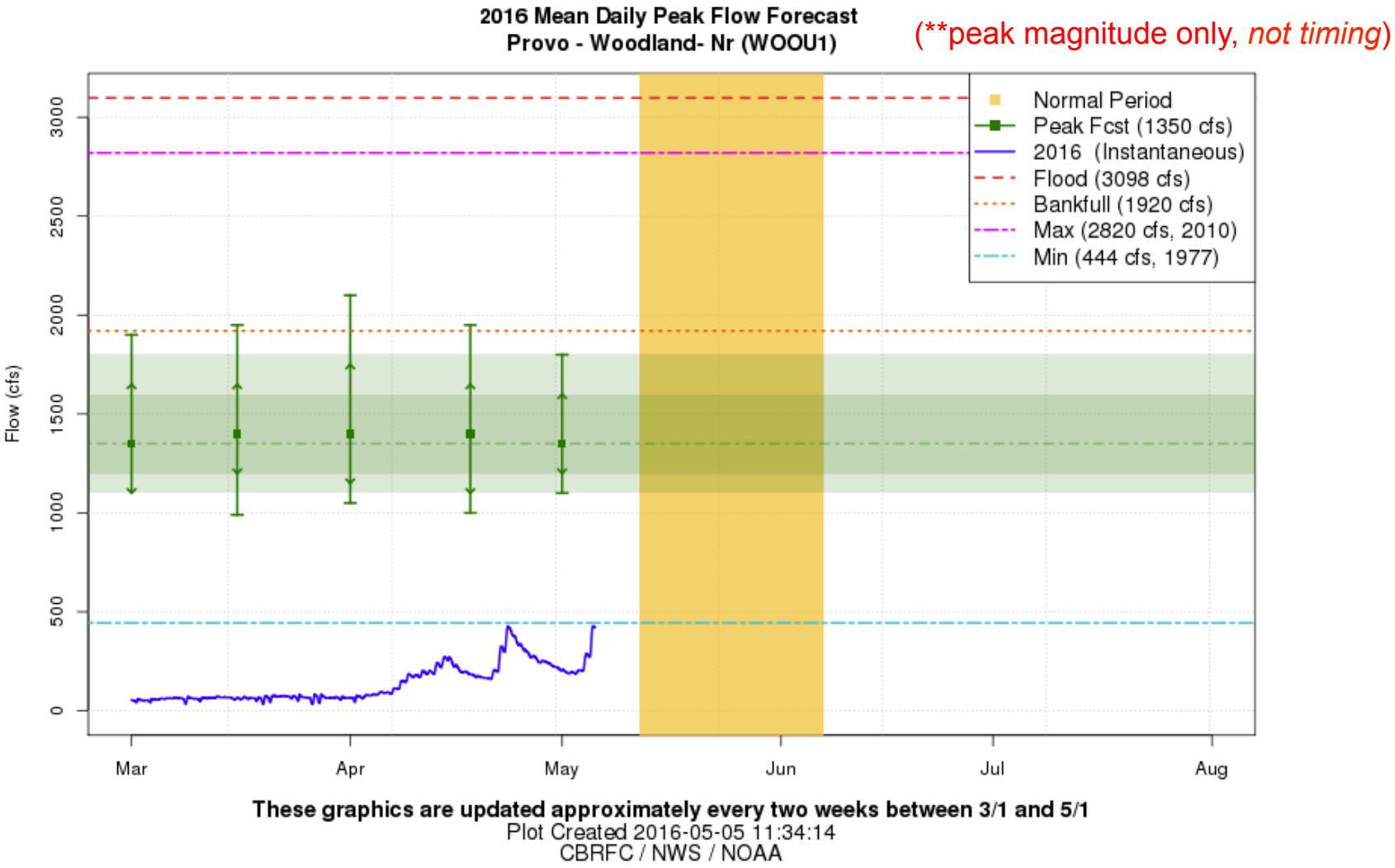
map: http://www.cbrfc.noaa.gov/lmap/lmap.php?interface=peak

list: http://www.cbrfc.noaa.gov/rmap/peak/peaklist.php

Peak Flow Forecast Evolution Plots

Barring a "Miracle May" like last year, or any other unexpected extreme amount, peak flow forecast evolution plots have been updated for the final time.

→ Please check www.cbrfc.noaa.gov for upcoming peak flows.

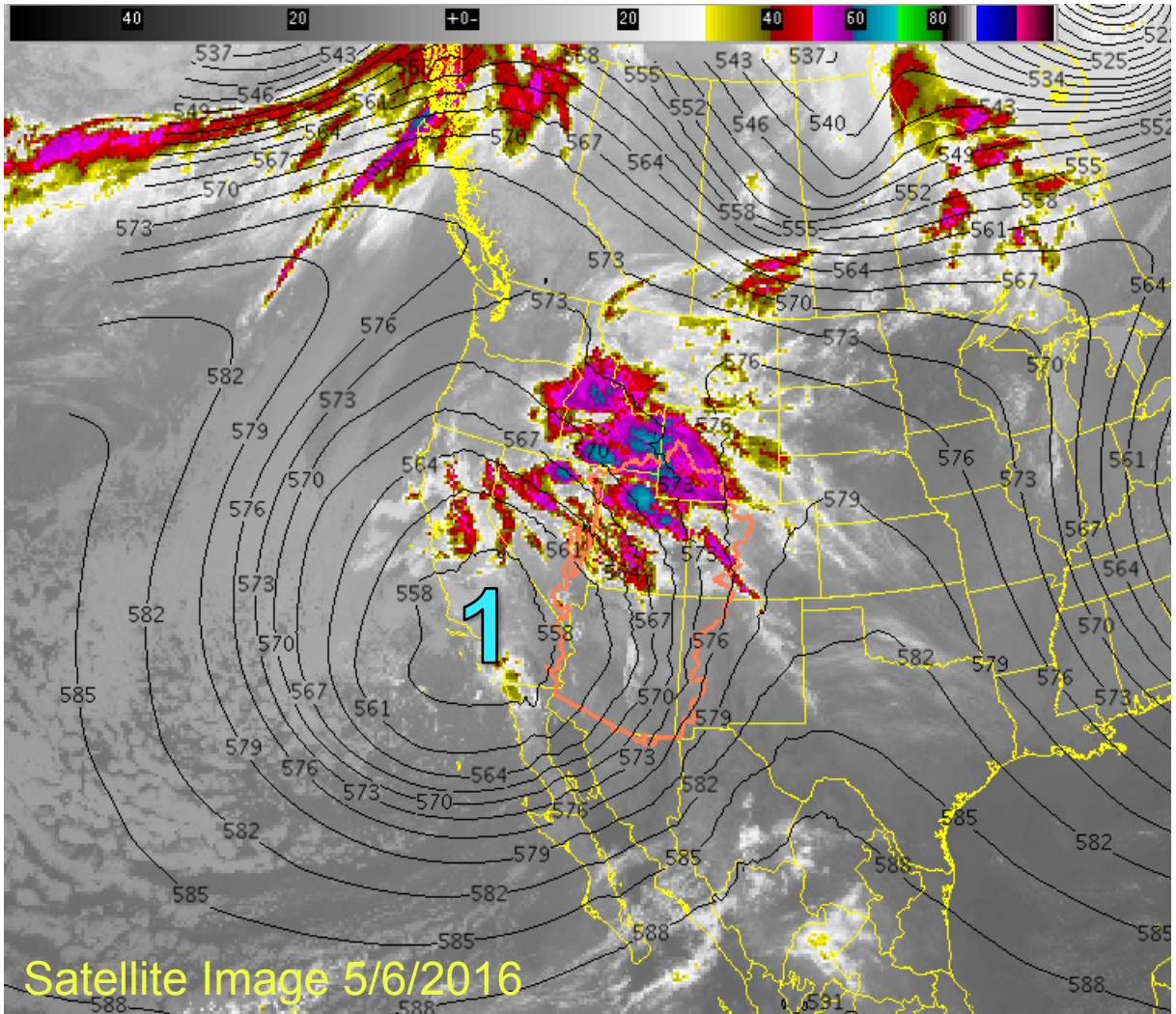


Upcoming Weather:

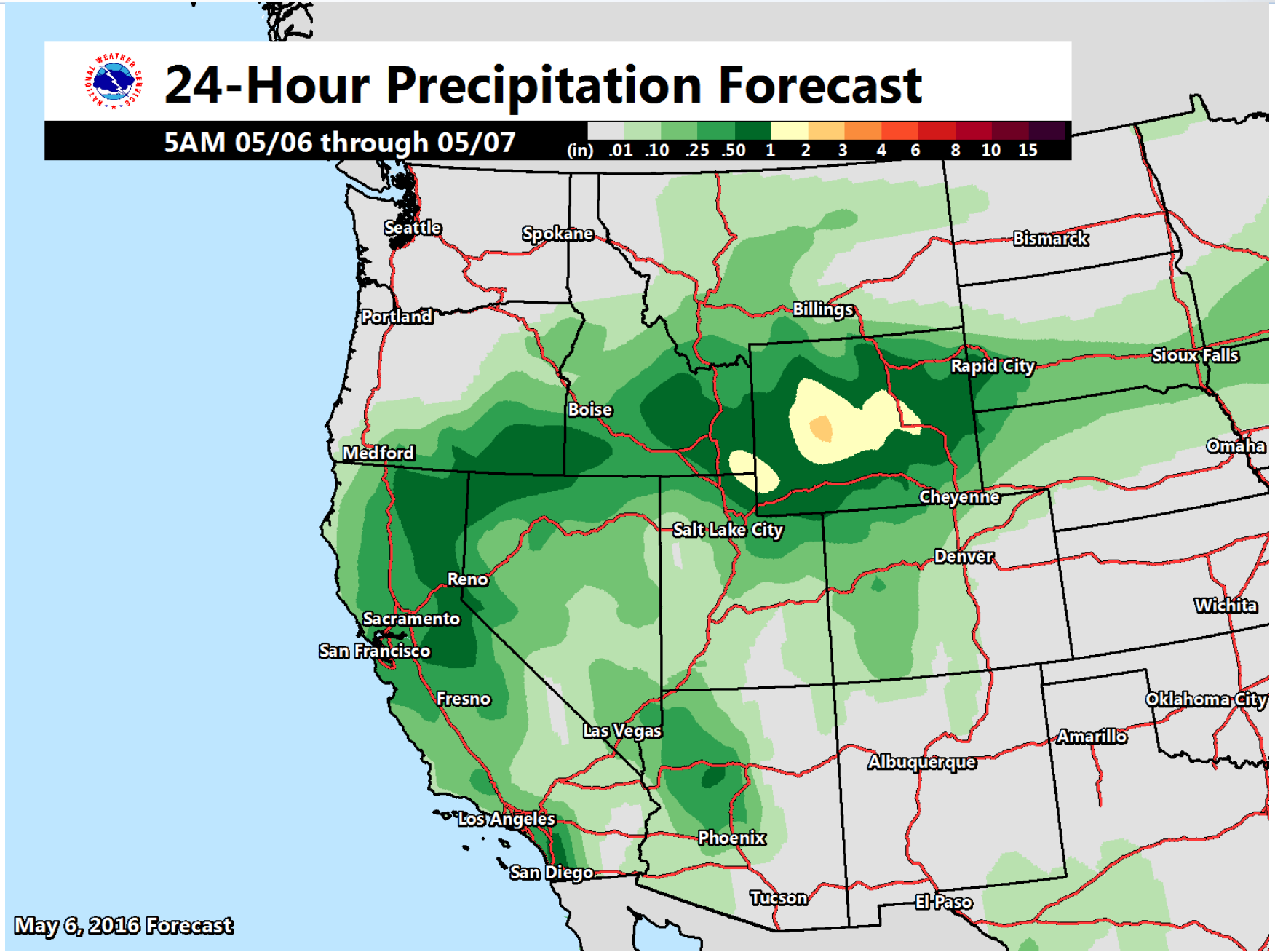
Another slow-moving weekend storm

1: Slow-moving storm system will move inland into southern California today (Friday 5/6)

- Storm will settle into the western U.S. for the weekend
- Main portion of this closed low will impact southern WY
- Precipitation will wrap around the storm and impact northern Utah
- Precipitation chances through early next week



Precipitation Outlook: Fri May 6 – Sat May 7

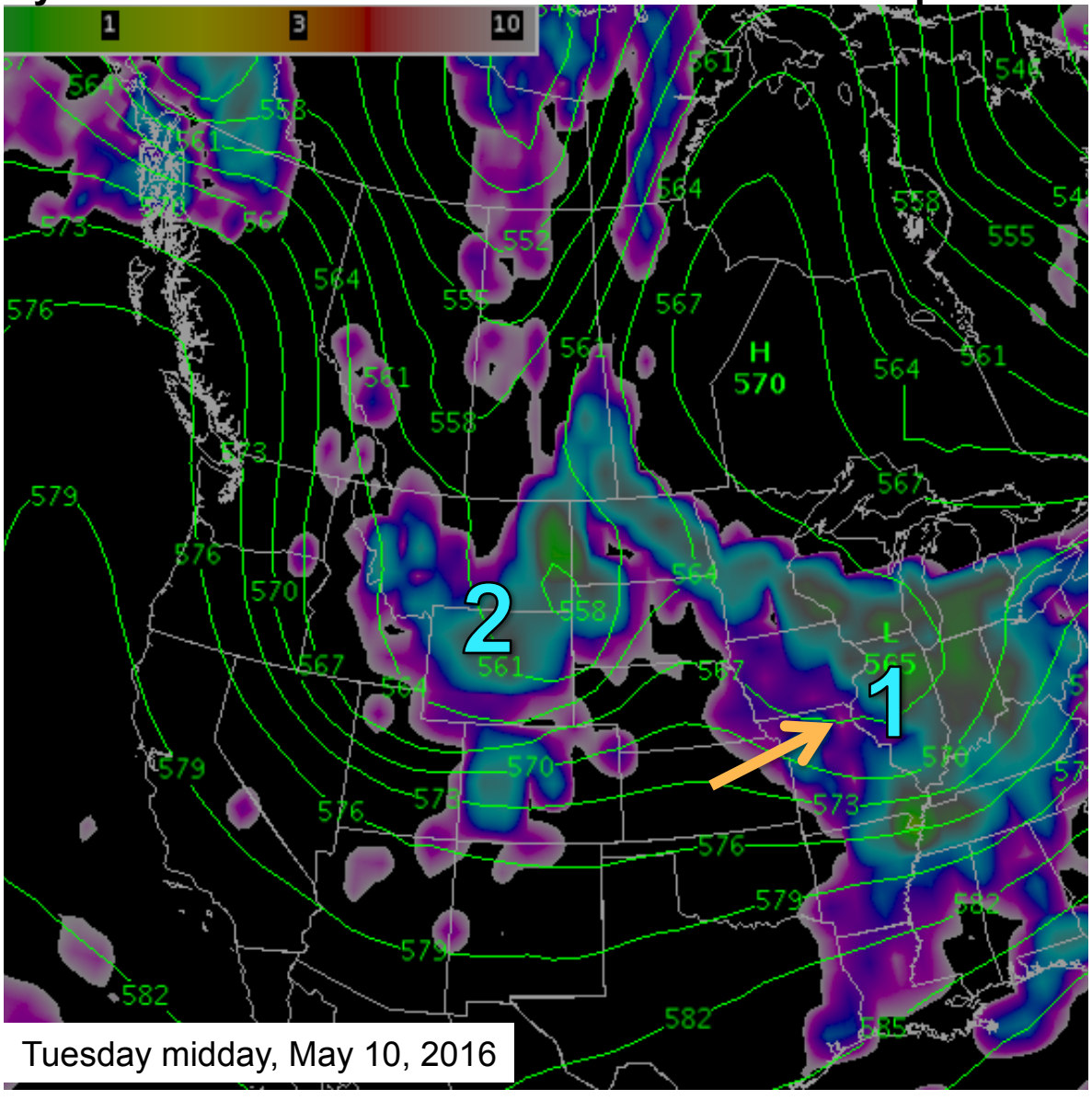


Upcoming Weather:

Another slow-moving storm for this weekend

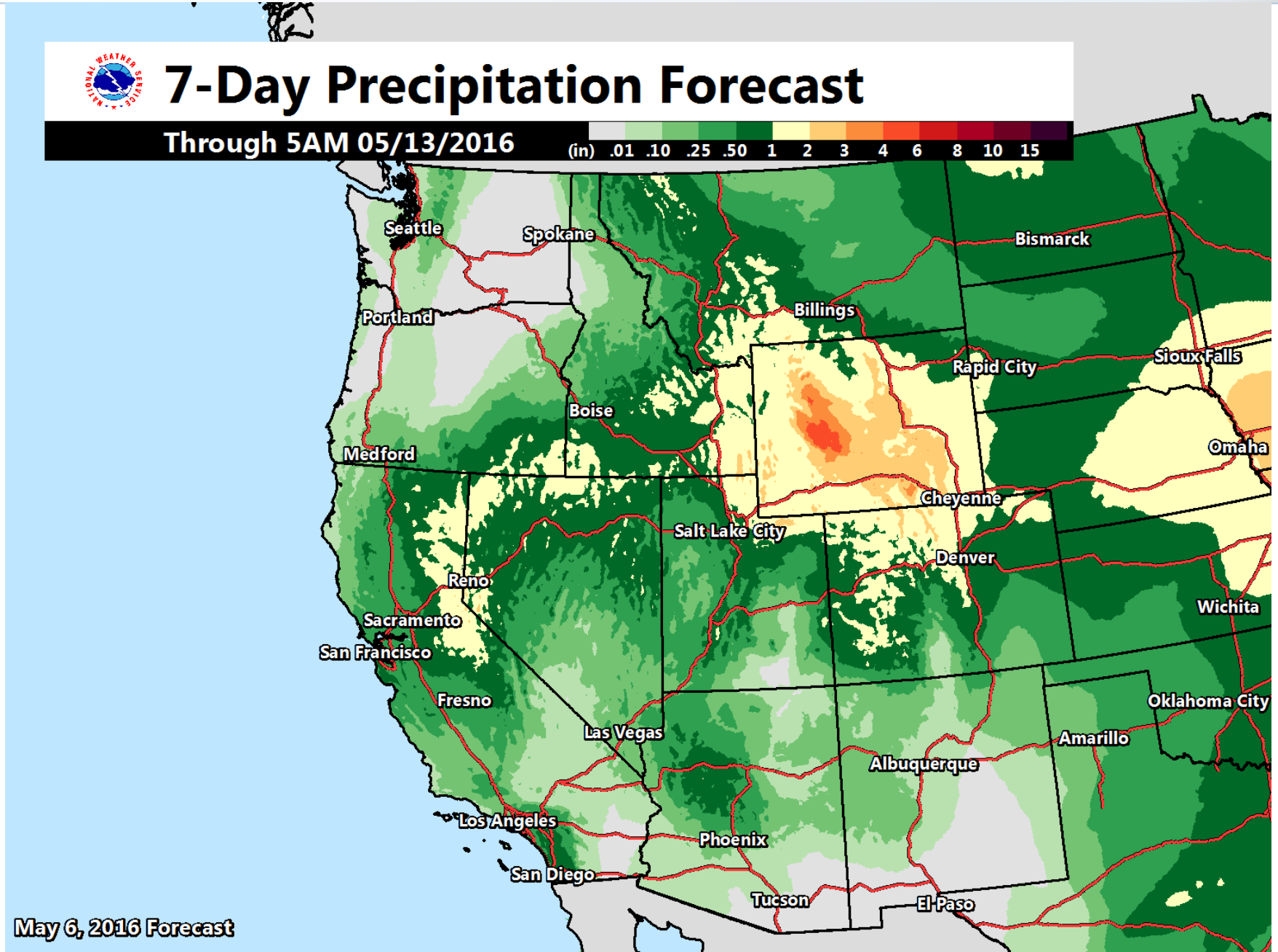
1: Weekend storm system moves out into the Great Plains starting on Monday

2: Showers may continue into next week as another storm drops south into our region



Tuesday midday, May 10, 2016

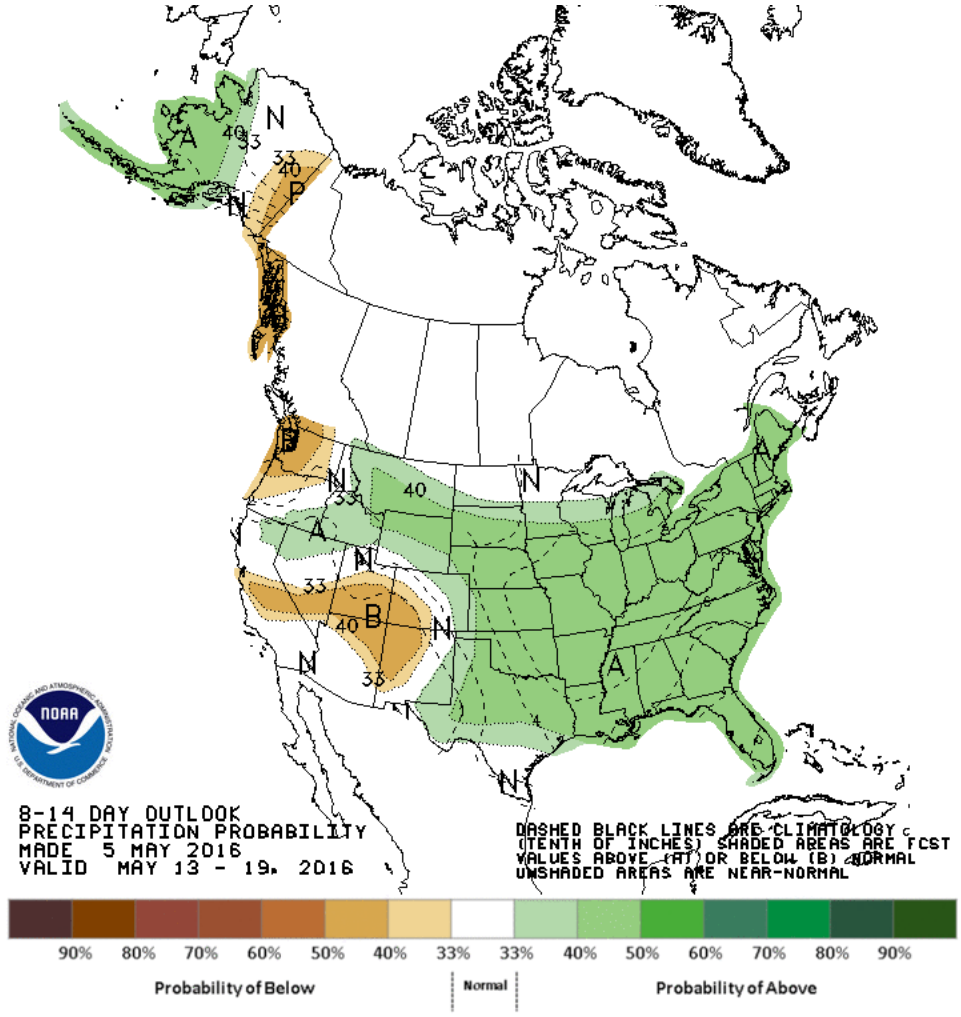
Precipitation Outlook: 7-Day Total (May 6-13, 2016)



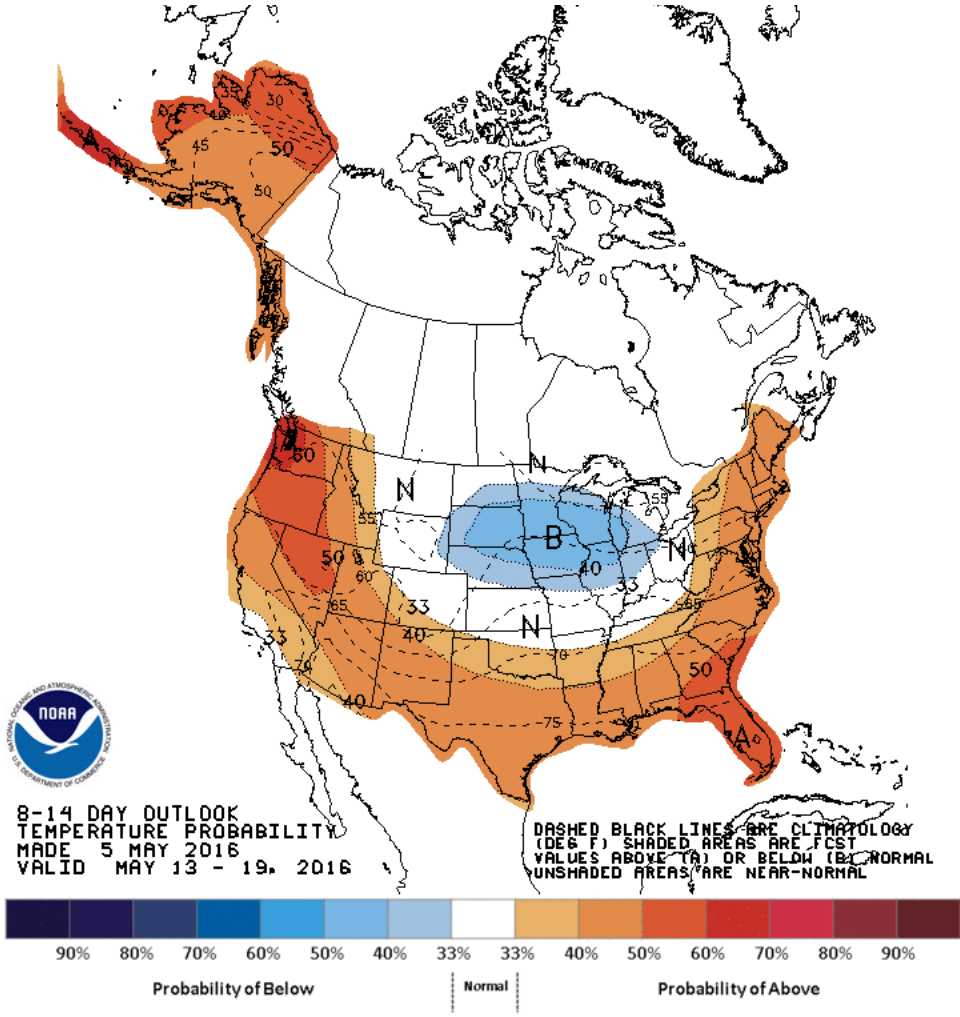
Weather outlook: May 13-19, 2016

Climate Prediction Center (www.cpc.ncep.noaa.gov)
8-14 day outlook

Precipitation

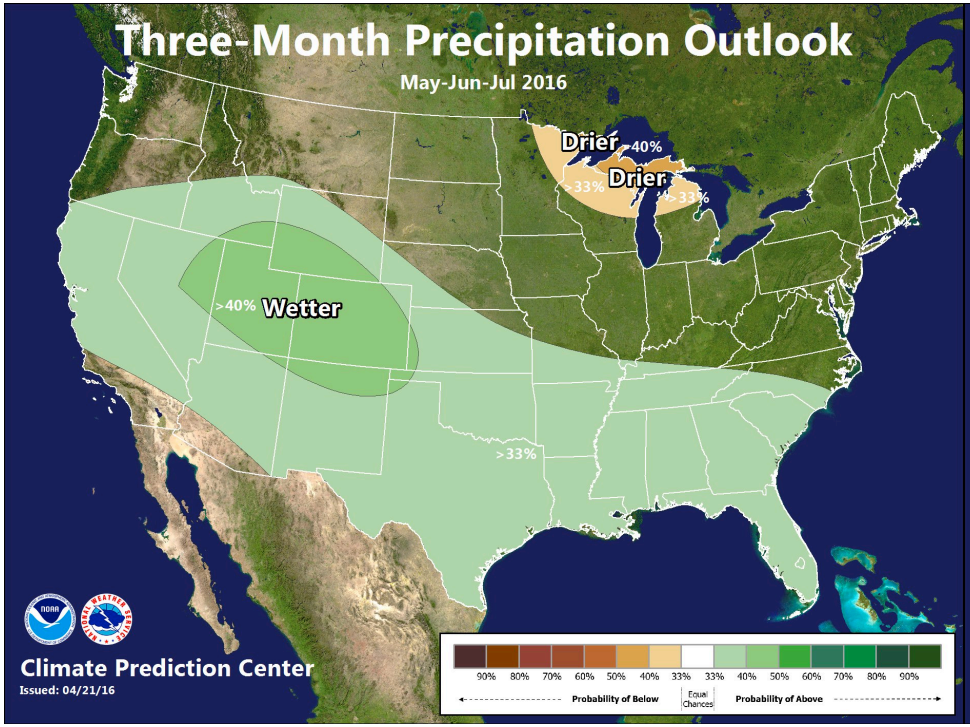


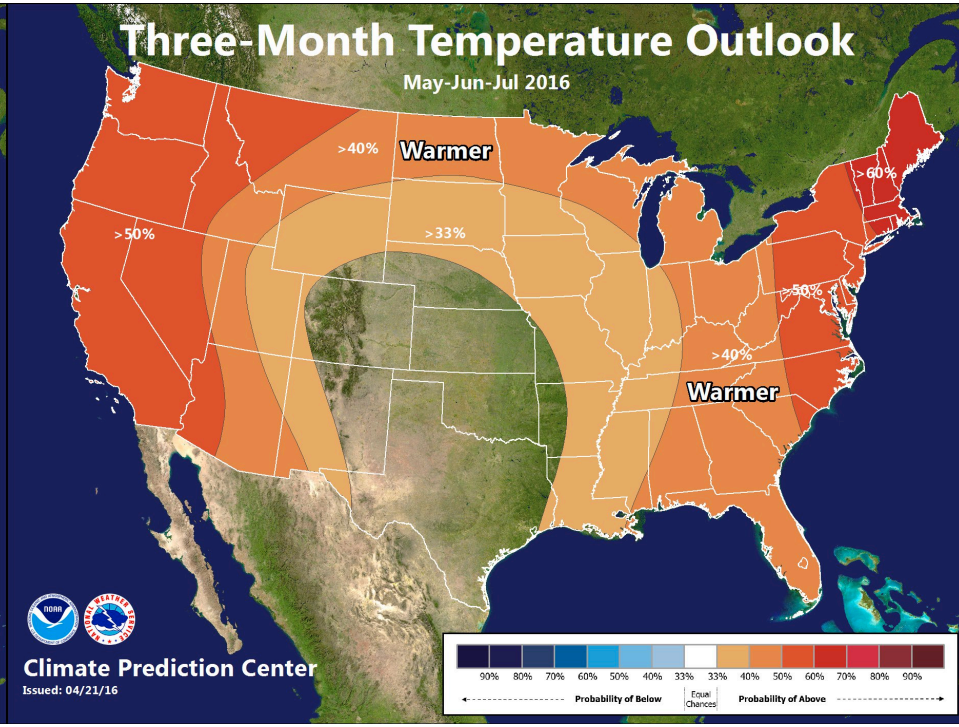
Temperature



Long range outlook: Climate Prediction Center (www.cpc.ncep.noaa.gov)

Climate Prediction Center – 3 month outlook for May-June-July 2016





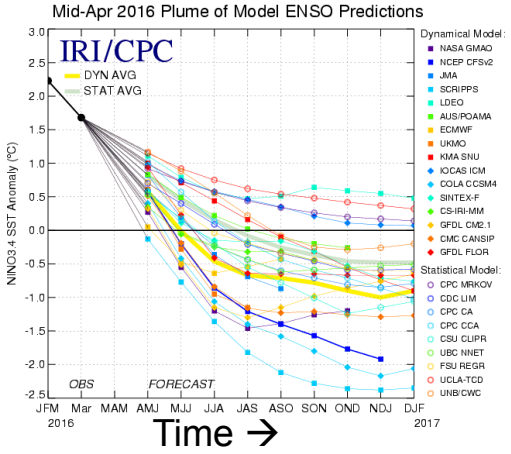
** For information only – CPC outlooks are not explicitly incorporated into CBRFC water supply forecasts

2015-2016 El Niño Event

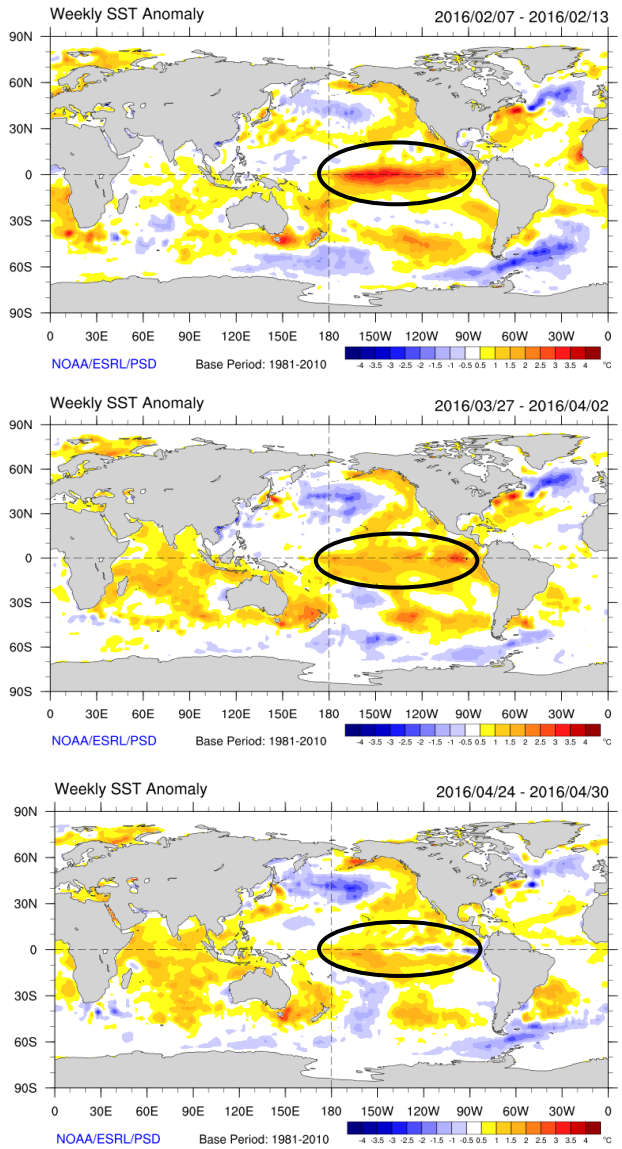
- The newsworthy El Niño event continues to weaken.
- 2015-2016 = one of the strongest El Niños on record (82-83, 97-98)
- El Niño impacts the jet stream strength, location, and storm tracks
- Favors Lower Colorado River Basin
- No solid correlation between El Niño/ La Niña and April-July runoff volumes in Great Basin
- If you're interested… chances for La Niña by this fall are increasing.

El Niño

La Niña



Sea Surface Temperature Anomalies



Early-mid Feb 2016

Late Mar – early Apr 2016

Late April 2016 (last week)

** For information only – ENSO information is not incorporated into CBRFC water supply forecasts for the EGB

Summary and Conclusions

First half of April = dismal precip ion the GB. Second half = several inches of water!

→ At the finish: near or a bit below average, precip-wise, for April 2016.

Runoff continues at low and middle elevations and at higher elevations in some areas.

Water supply forecasts decreased slightly from those issued a month ago.

Average runoff conditions not likely. ☹

Weather pattern looks active for the weekend and into early next week.

Long range outlooks show that above average precip is more likely for May-June-July

→ but any outcome is still possible

Contact Info

Great Basin water supply focal points: Paul Miller paul.miller@noaa.gov
Brent Bernard brent.bernard@noaa.gov

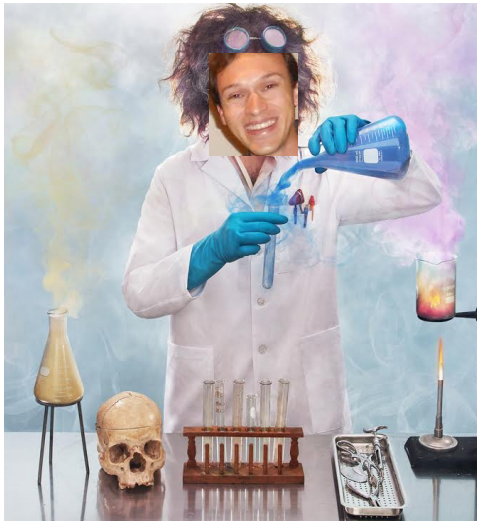
Sevier River Basin water supply focal point: Tracy Cox tracy.cox@noaa.gov

This eastern Great Basin water supply briefing = last one for Spring 2016**

** pending a “Miracle May” or other extreme weather event

** or any requests

We do take requests; please contact us, particularly Service Coordination Hydrologist Paul Miller – paul.miller@noaa.gov



Today’s briefing is available online: www.cbrfc.noaa.gov/present/present2016.cgi