NOAA's National Weather Service
Colorado Basin River Forecast Center

Recent Forecasts, Updates, and the Path Ahead

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Colorado Basin River Forecast Center

April 23rd, 2014

Overview

What You Should Take Away

Current Water Year Conditions and Forecasts

Other ongoing efforts

What You Should Take Away

Increased precipitation, particularly in the Green River Basin and Colorado headwaters area, has improved water supply forecasts since the beginning of the water year

- **April through July forecast for Lake Powell is 7.85 MAF (110% of average)**
- **Dry conditions persist throughout the Lower Colorado River Basin and the San Juan Basin**

CBRFC website has been improved

- **Easier access to data and products**
- **Improved graphics and options**

Significant Moments in Weather

By the middle of January, a ridge had built up along the Western United States, exacerbating drought conditions in California and diverting moisture away from much of the Colorado River Basin and Great Basin regions, although the Upper Green River Basin and portions of the Colorado headwaters benefitted from the ridge.

Backup link: https://docs.google.com/a/noaa.gov/file/d/0ByG81-Kslmp2LURvc3kxYlc4Y2M/edit

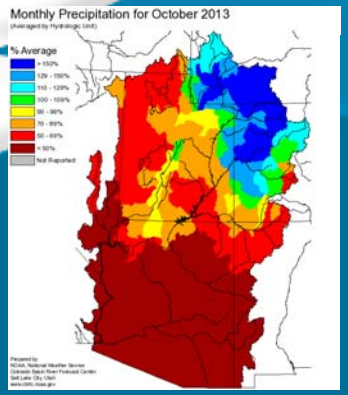
Significant Moments in Weather

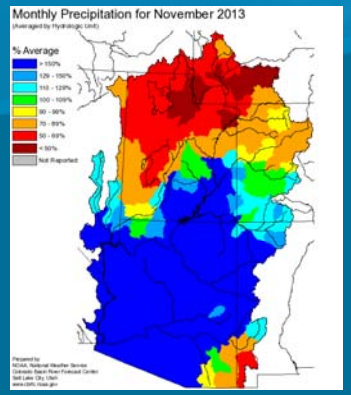
About a week into February, the weather pattern changed and the ridge broke down, allowing moisture to cross over much of the Colorado River Basin and Great Basin regions.

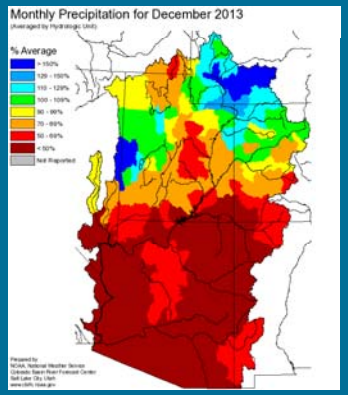
This active weather pattern has continued to persist, improving water supply conditions this year.

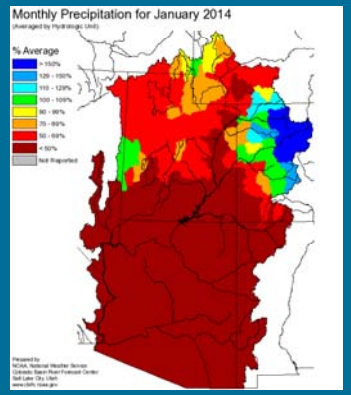
Backup link: https://docs.google.com/a/noaa.gov/file/d/0ByG81-Kslmp2YXAyTTdVc0ZjVWs/edit

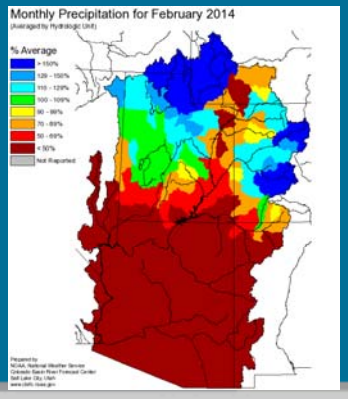
Current WY Conditions

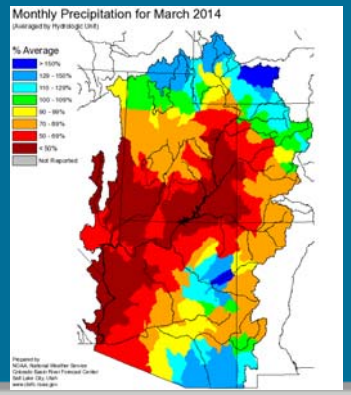


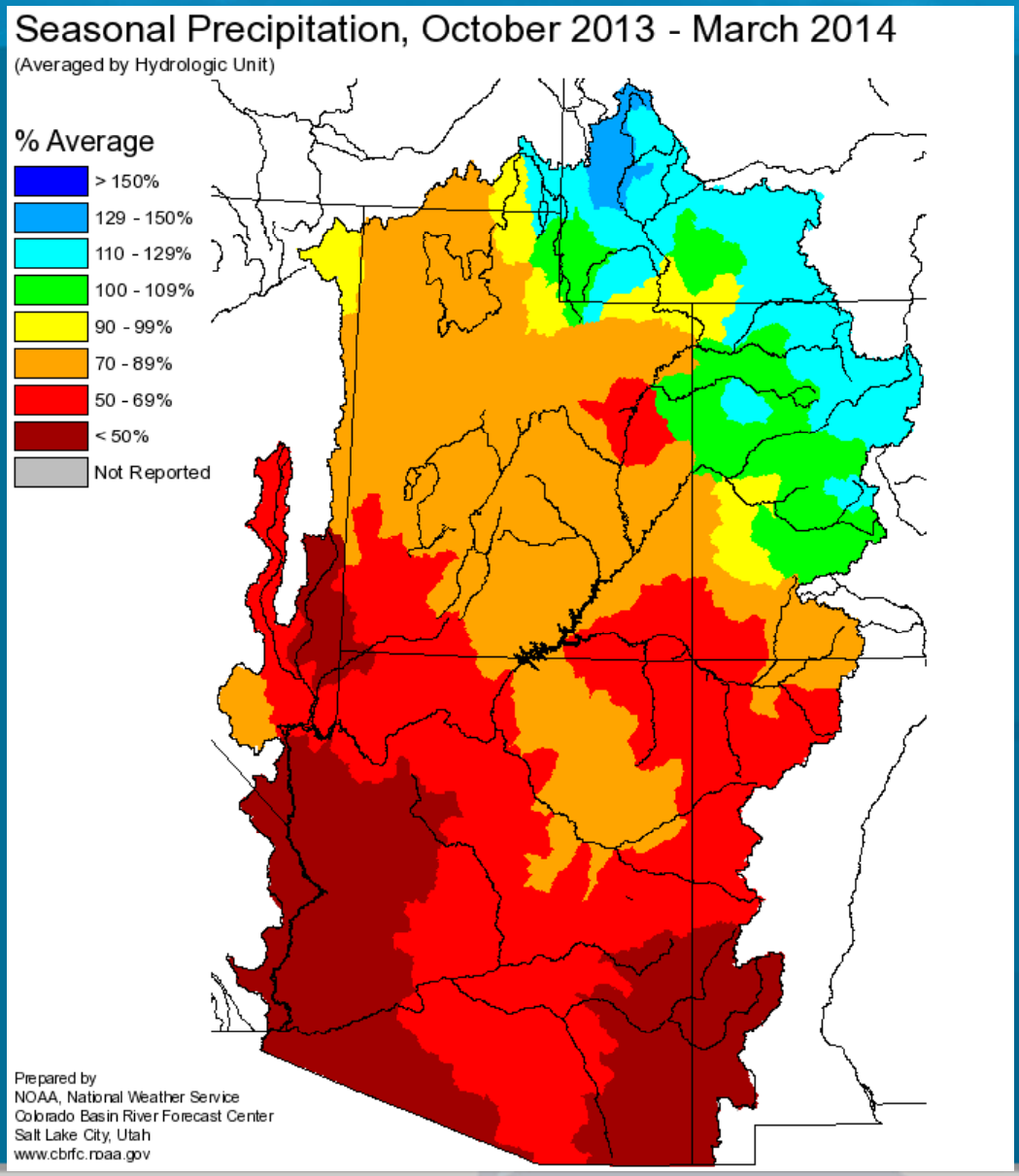




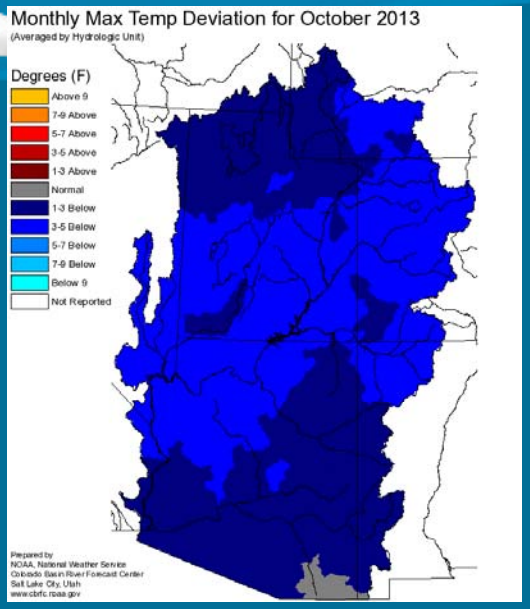
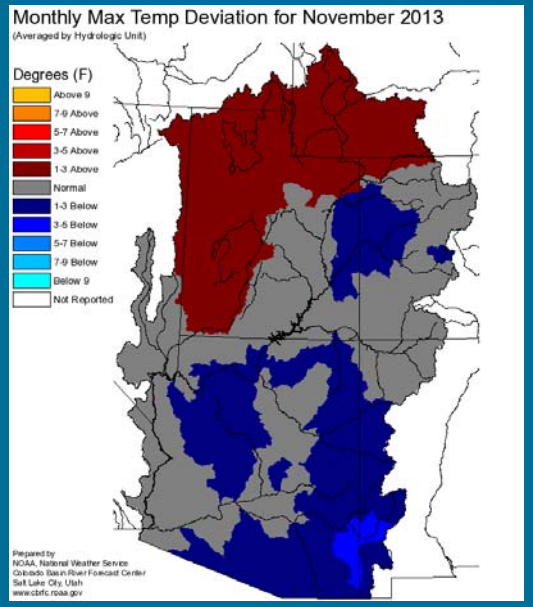
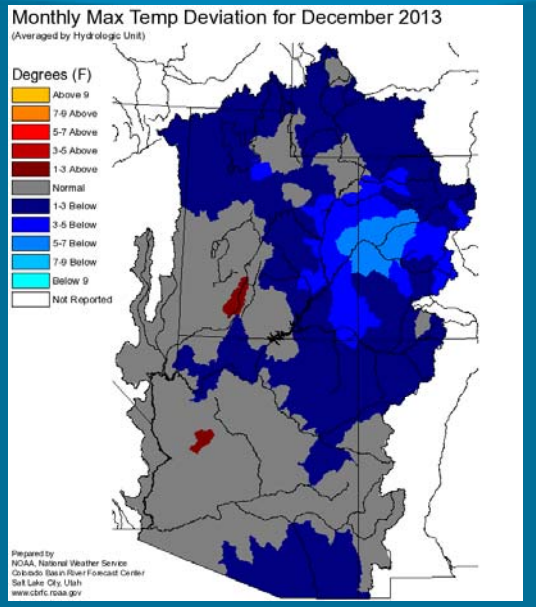
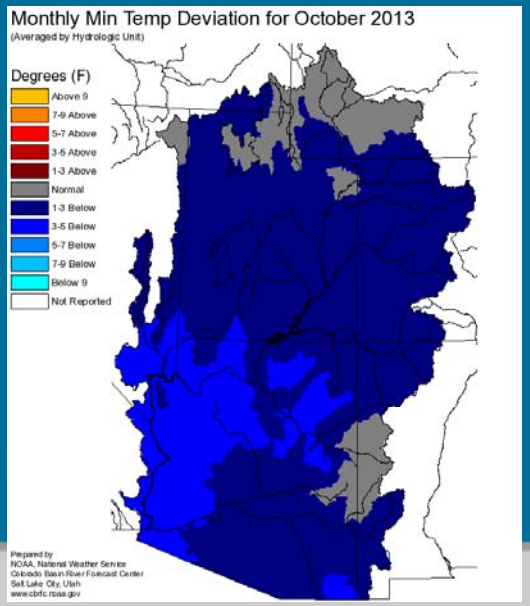
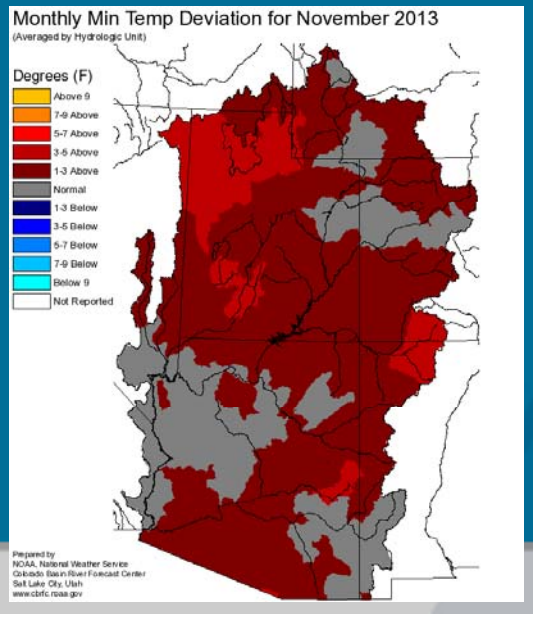
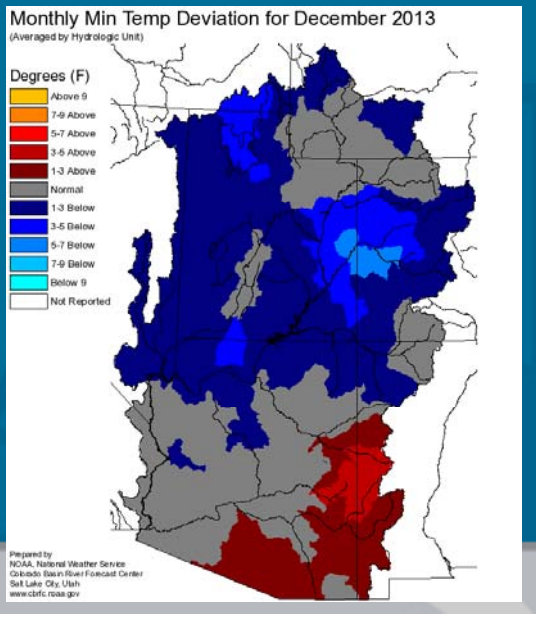








Current WY Conditions

	OCT	NOV	DEC
Max Temp Deviation			
Min Temp Deviation			

Current WY Conditions

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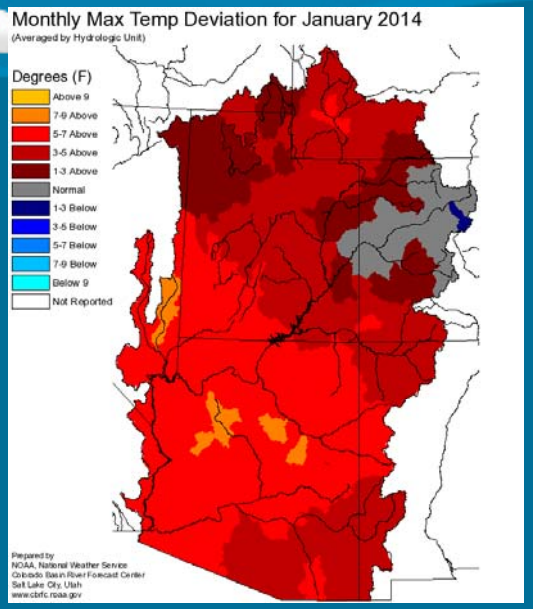
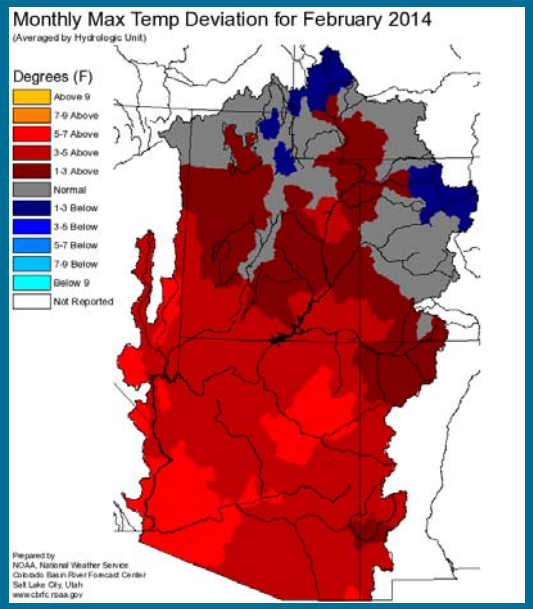
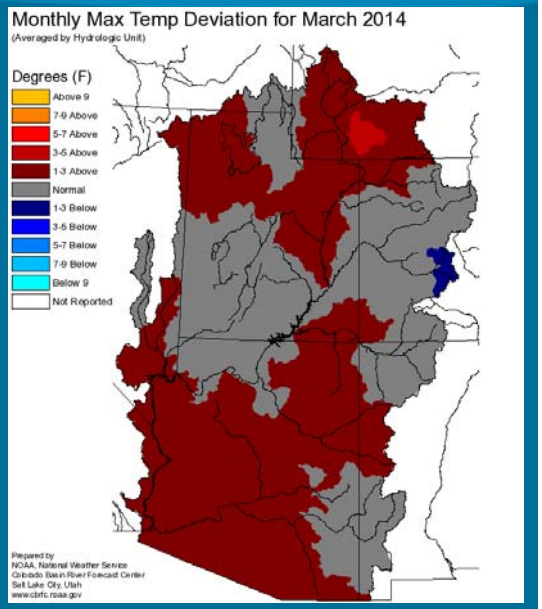
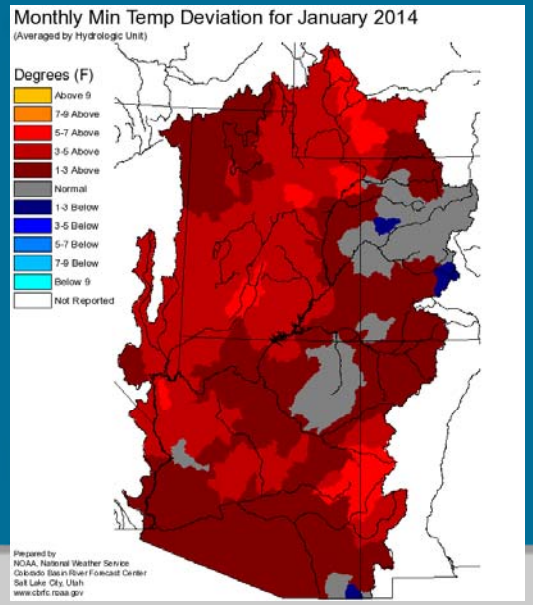
Max Temp Deviation

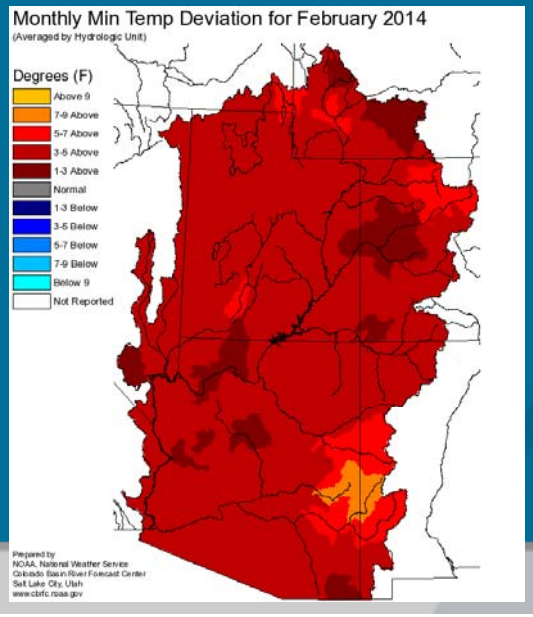


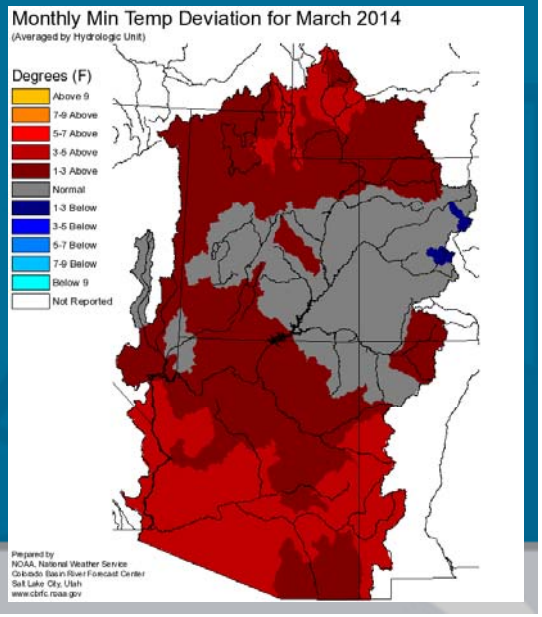




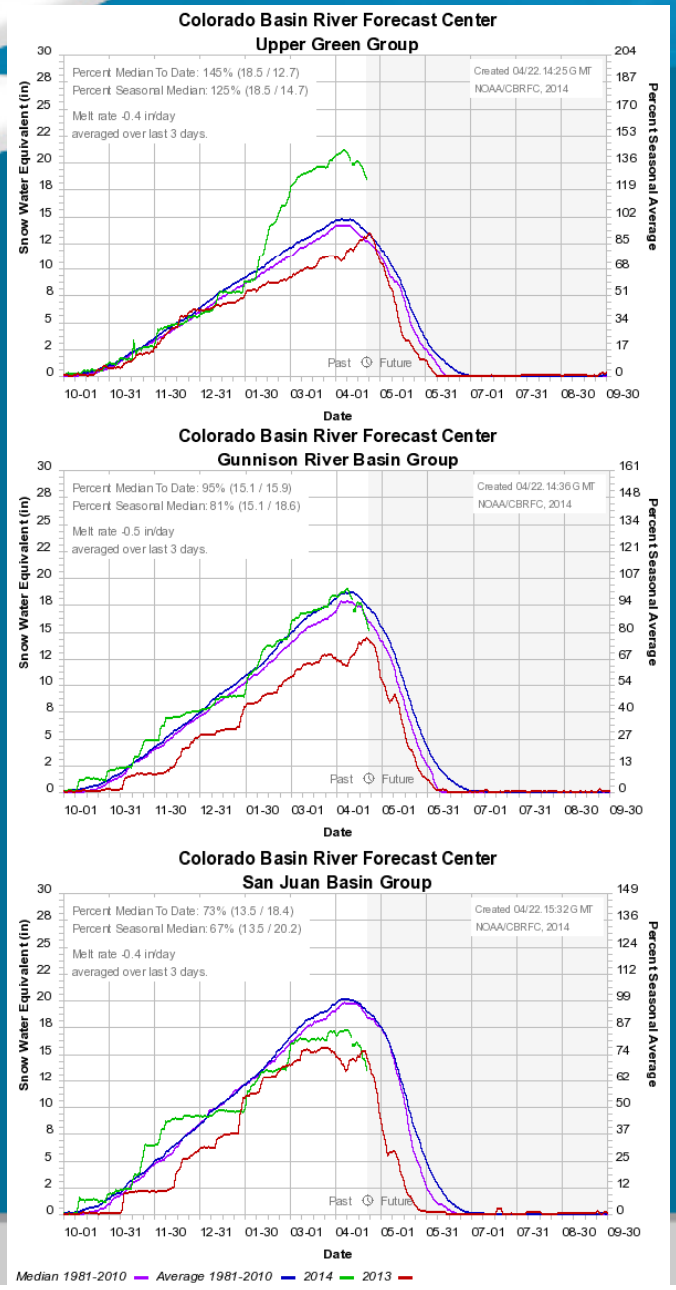
Min Temp Deviation

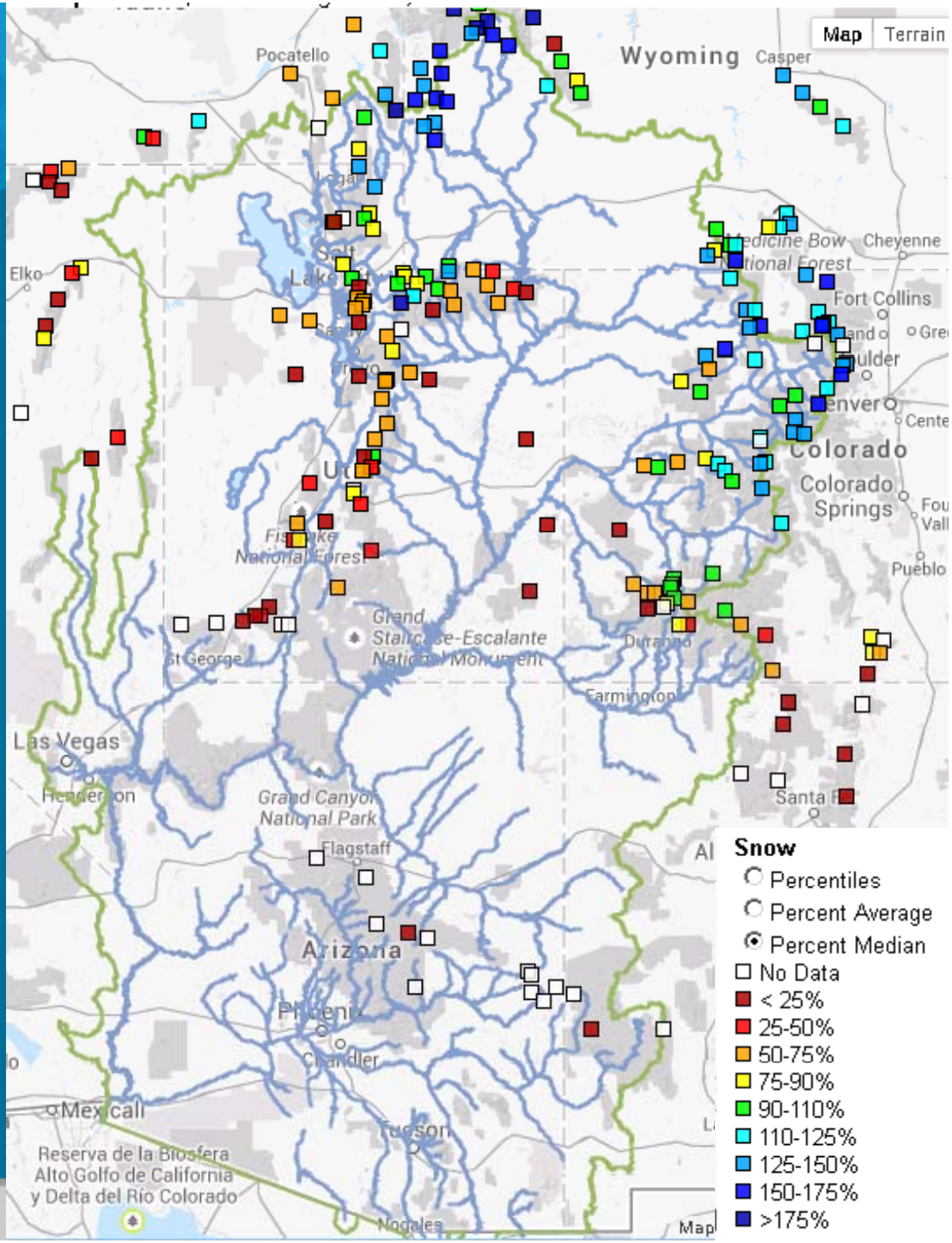




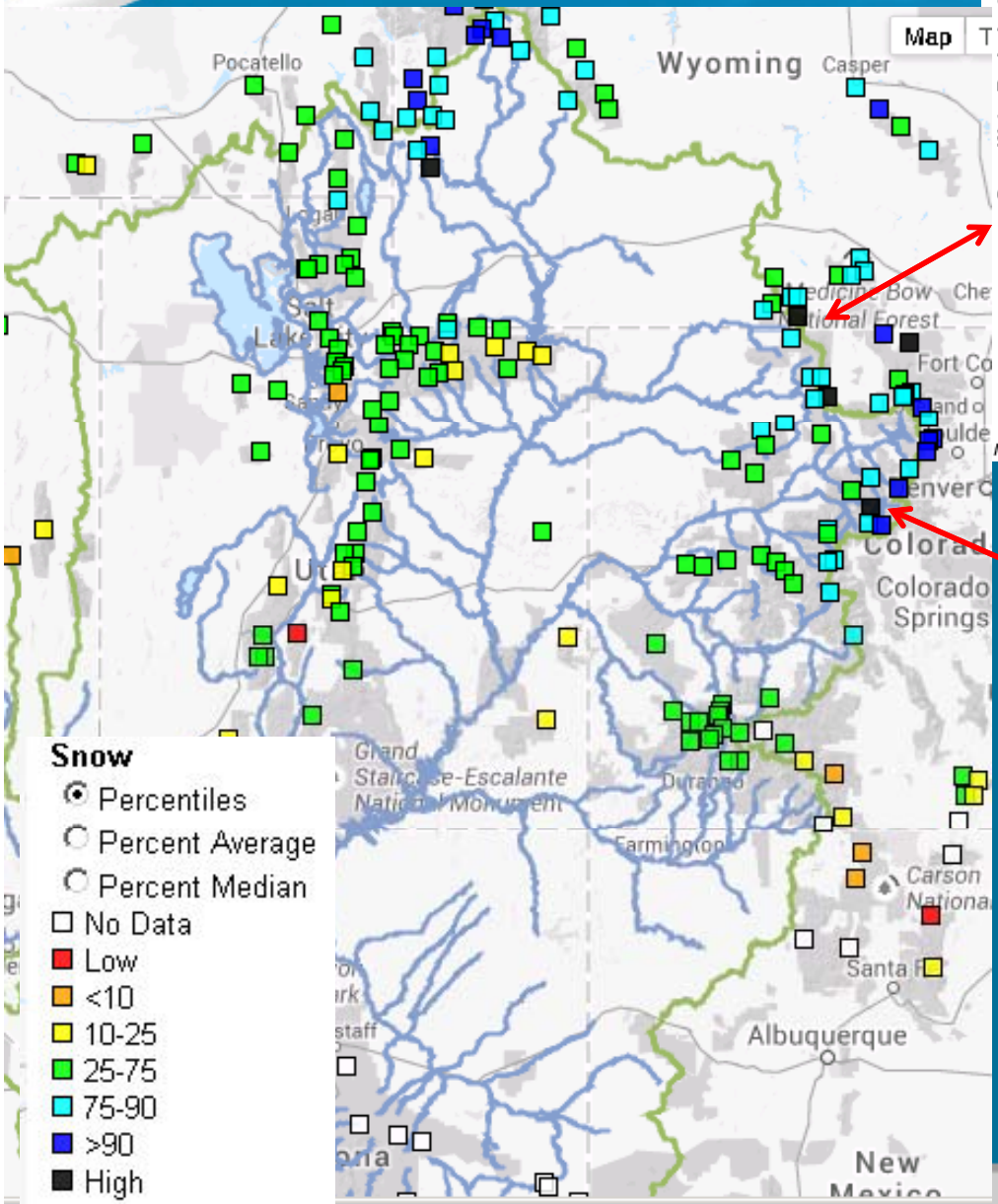


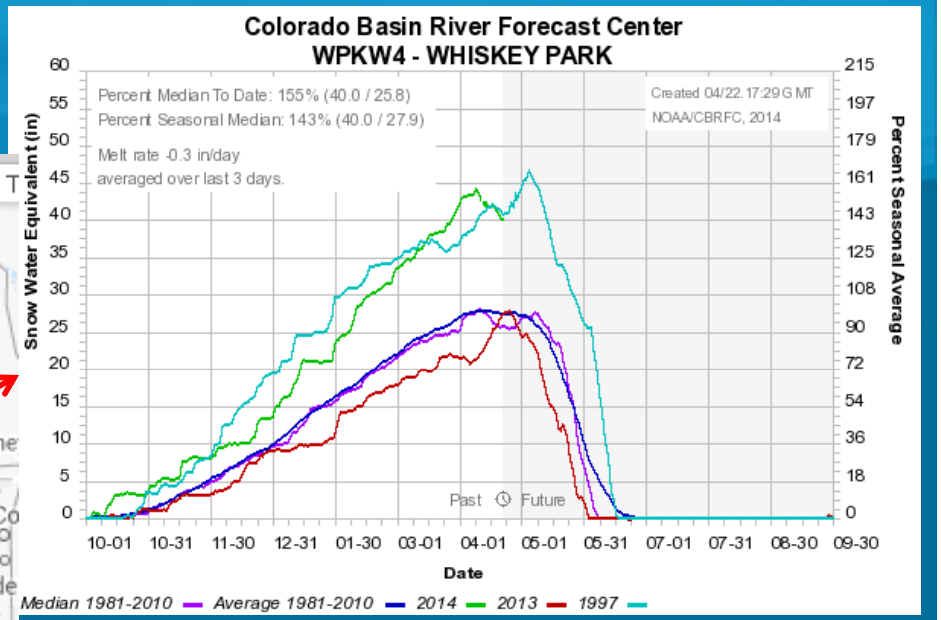
Snow

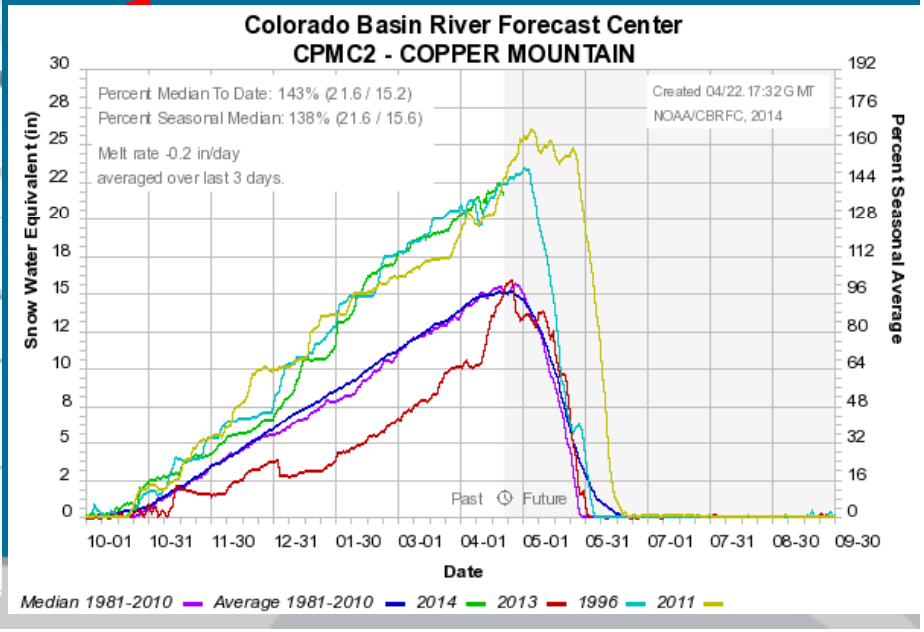

Colorado Basin River Forecast Center
Upper Green Group
Percent Median To Date: 145% (18.5 / 12.7)
Percent Seasonal Median: 125% (18.5 / 14.7)
Melt rate -0.4 in/day
averaged over last 3 days.
Created 04/22.14:25 GMT
NOAA/CBRFC, 2014
Snow Water Equivalent (in)
Percent Seasonal Average
Past
Future
10-01 10-31 11-30 12-31 01-30 03-01 04-01 05-01 05-31 07-01 07-31 08-30 09-30
Date
Colorado Basin River Forecast Center
Gunnison River Basin Group
Percent Median To Date: 95% (15.1 / 15.9)
Percent Seasonal Median: 81% (15.1 / 18.6)
Melt rate -0.5 in/day
averaged over last 3 days.
Created 04/22.14:36 GMT
NOAA/CBRFC, 2014
Snow Water Equivalent (in)
Percent Seasonal Average
Past
Future
10-01 10-31 11-30 12-31 01-30 03-01 04-01 05-01 05-31 07-01 07-31 08-30 09-30
Date
Colorado Basin River Forecast Center
San Juan Basin Group
Percent Median To Date: 73% (13.5 / 18.4)
Percent Seasonal Median: 67% (13.5 / 20.2)
Melt rate -0.4 in/day
averaged over last 3 days.
Created 04/22.15:32 GMT
NOAA/CBRFC, 2014
Snow Water Equivalent (in)
Percent Seasonal Average
Past
Future
10-01 10-31 11-30 12-31 01-30 03-01 04-01 05-01 05-31 07-01 07-31 08-30 09-30
Date
Median 1981-2010
Average 1981-2010
2014
2013


Map
Terrain
Pocatello
Wyoming
Casper
Elko
Cheyenne
Fort Collins
Colorado
Colorado Springs
Pueblo
Las Vegas
Grand Canyon National Park
Flagstaff
Arizona
Phoenix
Tucson
Reserva de la Biosfera Alto Golfo de California y Delta del Río Colorado
Nogales
Snow
Percentiles
Percent Average
Percent Median
No Data
< 25%
25-50%
50-75%
75-90%
90-110%
110-125%
125-150%
150-175%
>175%

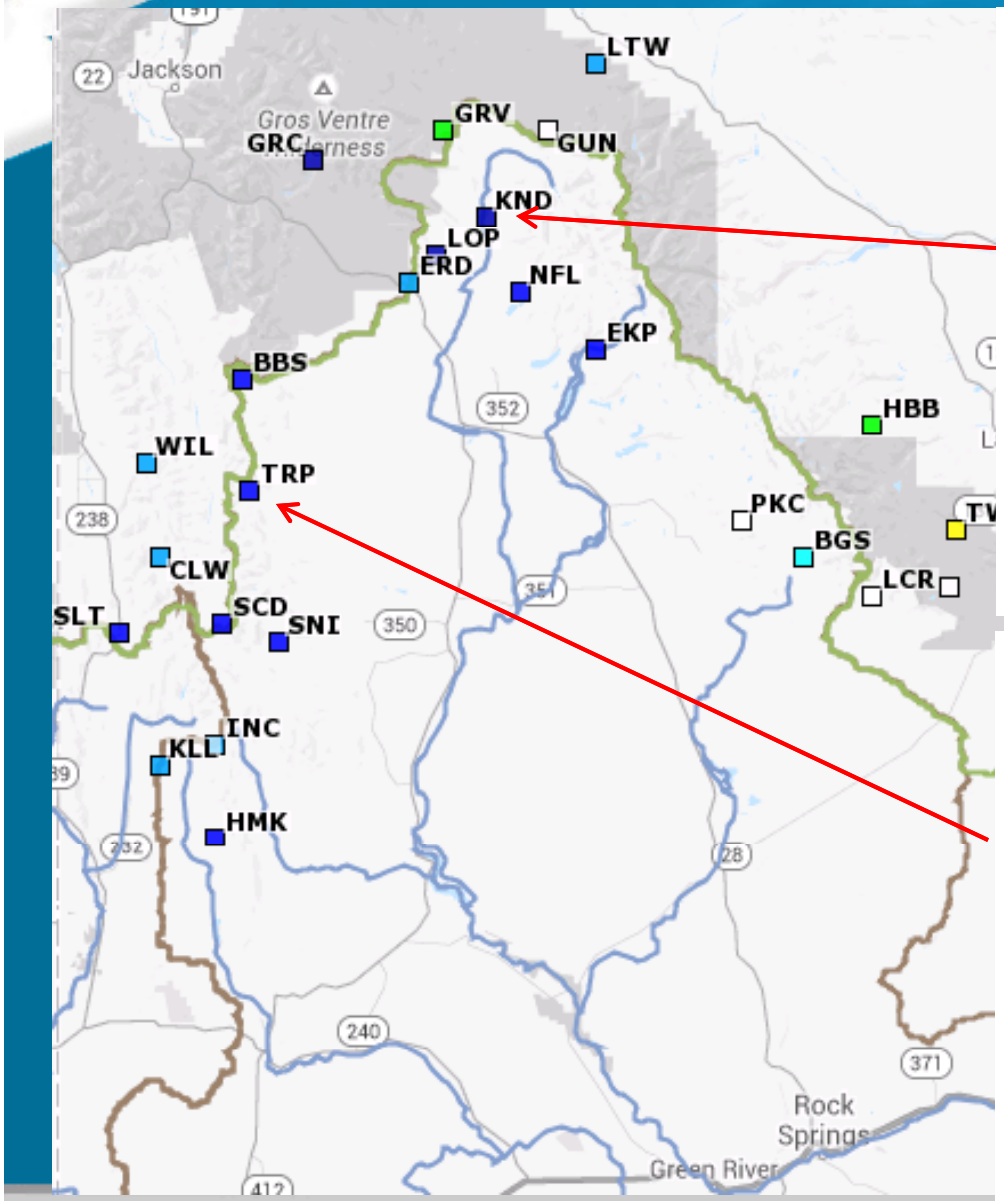
Historical Ranking – April 3rd

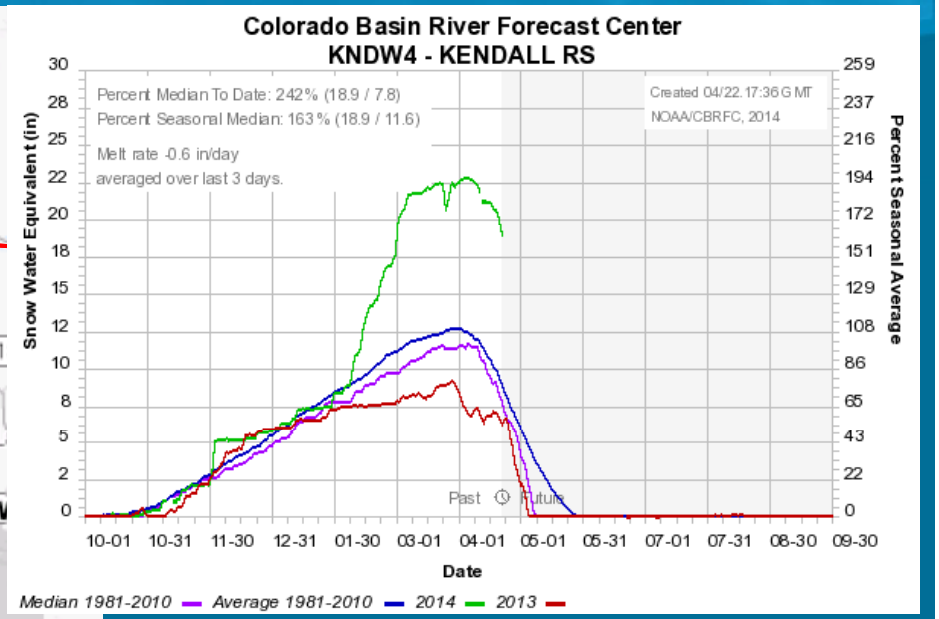


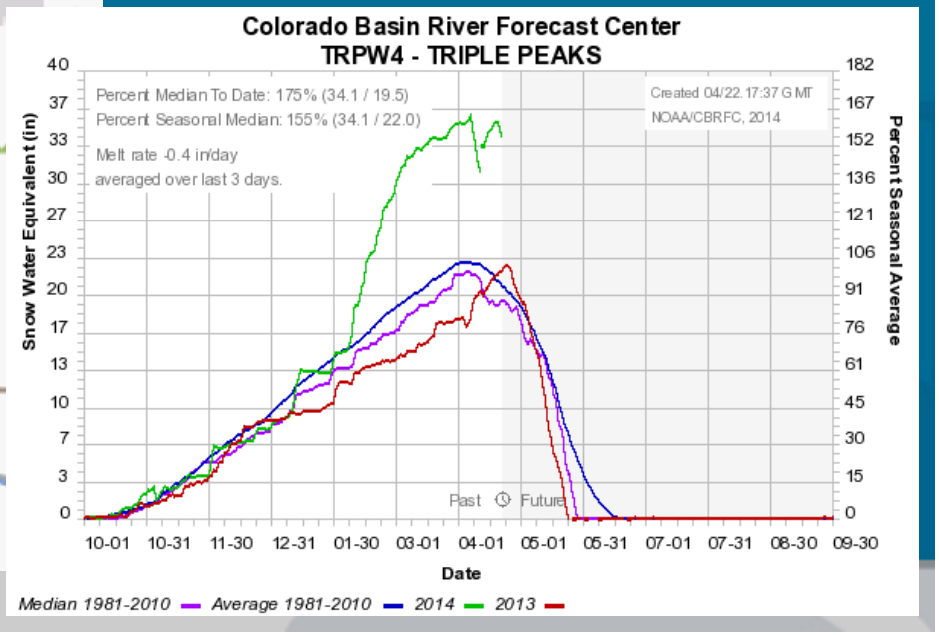




SNOW - Green River Basin (above Fontenelle)

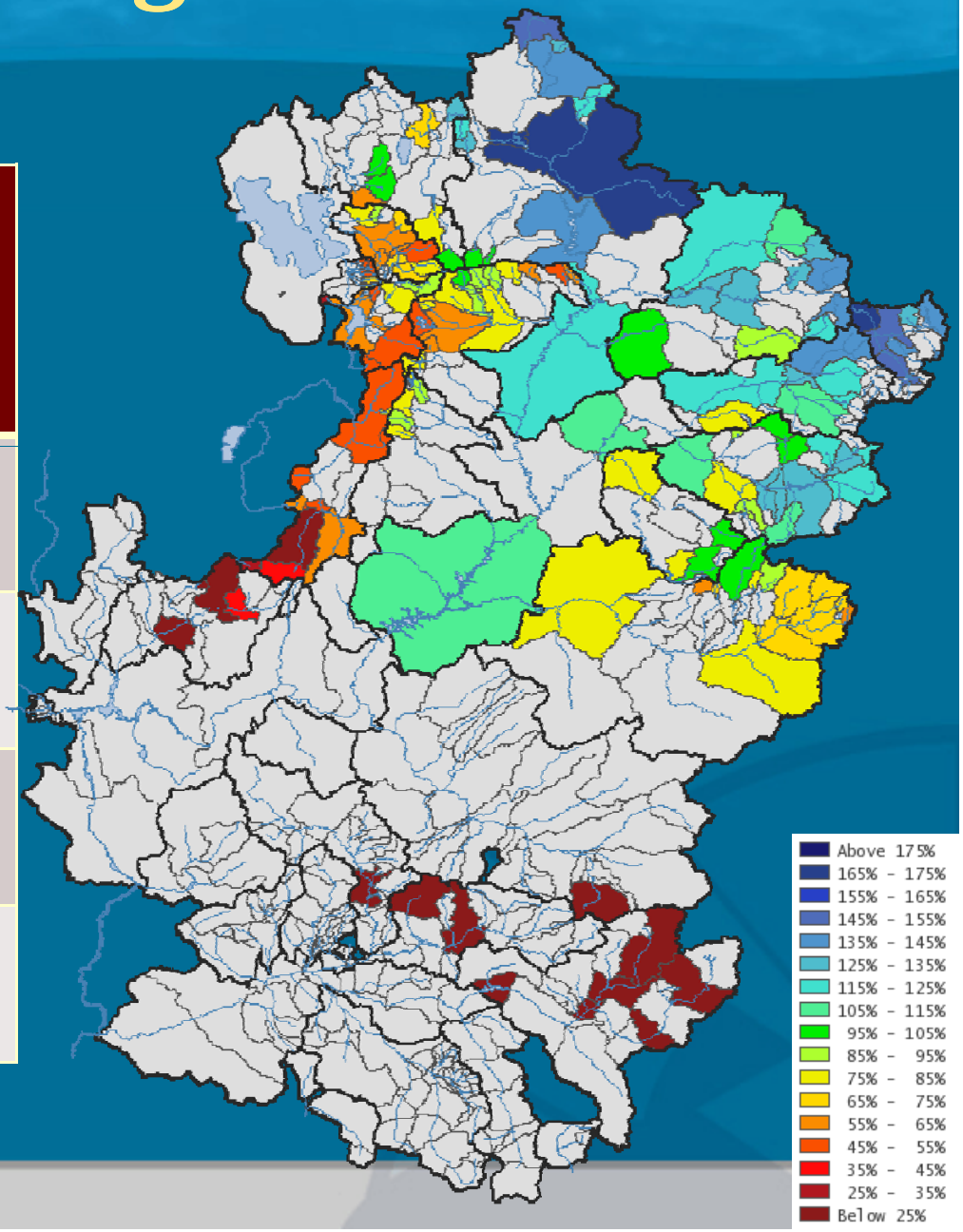






Current Unregulated Forecast

Lake Powell April-July Unregulated Forecast (MAF) (% of Average)			
Month	Min	Most	Max
Oct.	3.44 (48%)	6.49 (91%)	12.84 (180%)
Jan.	4.0 (56%)	6.81 (95%)	10.2 (143%)
Apr.	5.8 (81%)	7.85 (110%)	10.3 (144%)



What has contributed to our forecast?

Good precipitation (snow) in portions of the basin that contribute to flow in the Colorado River

- **Despite a slow start, precipitation in northern headwaters has been good**
- **Forecast tempered by drier conditions to the south**

Better antecedent soil moisture conditions

- **Soil moisture conditions have improved since last year, hopefully will contribute to a more efficient runoff**

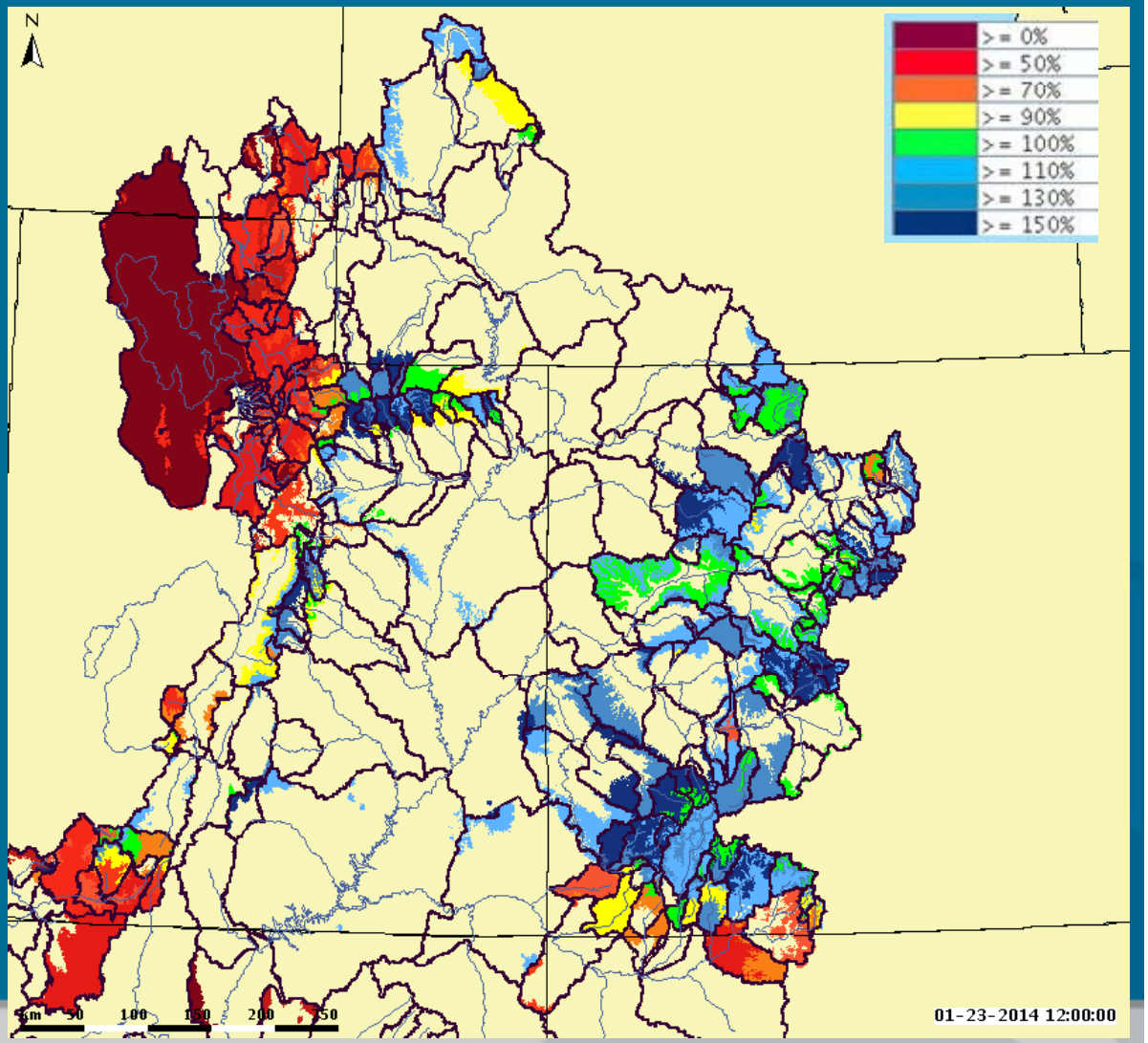
Modeled Soil Moisture – Entering Winter

Soil moisture in the Upper Colorado River Basin is generally above average in contributing areas.

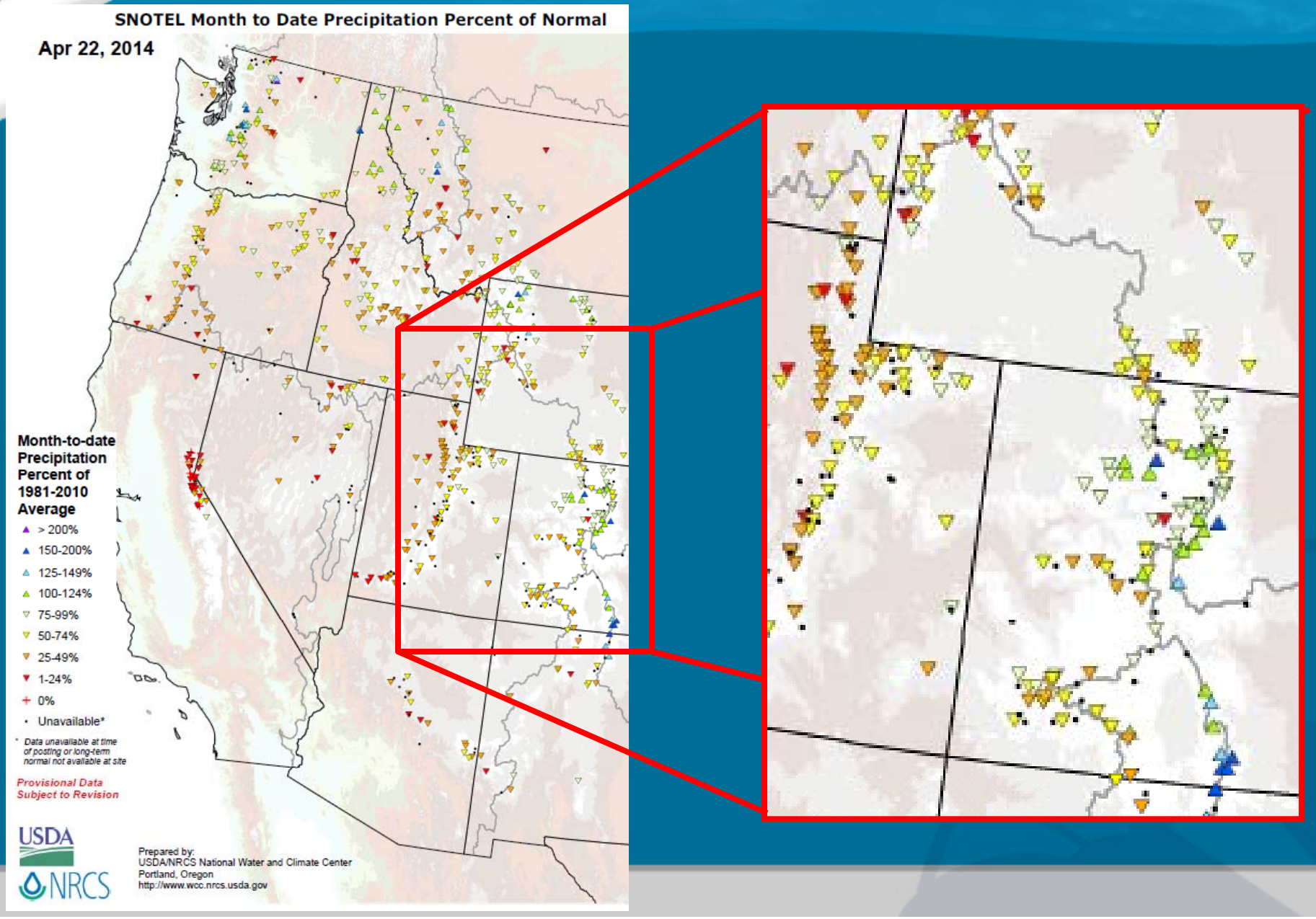
Positive effect in the upper Colorado

Negative affect in the Great Basin and Lower Colorado River Basin

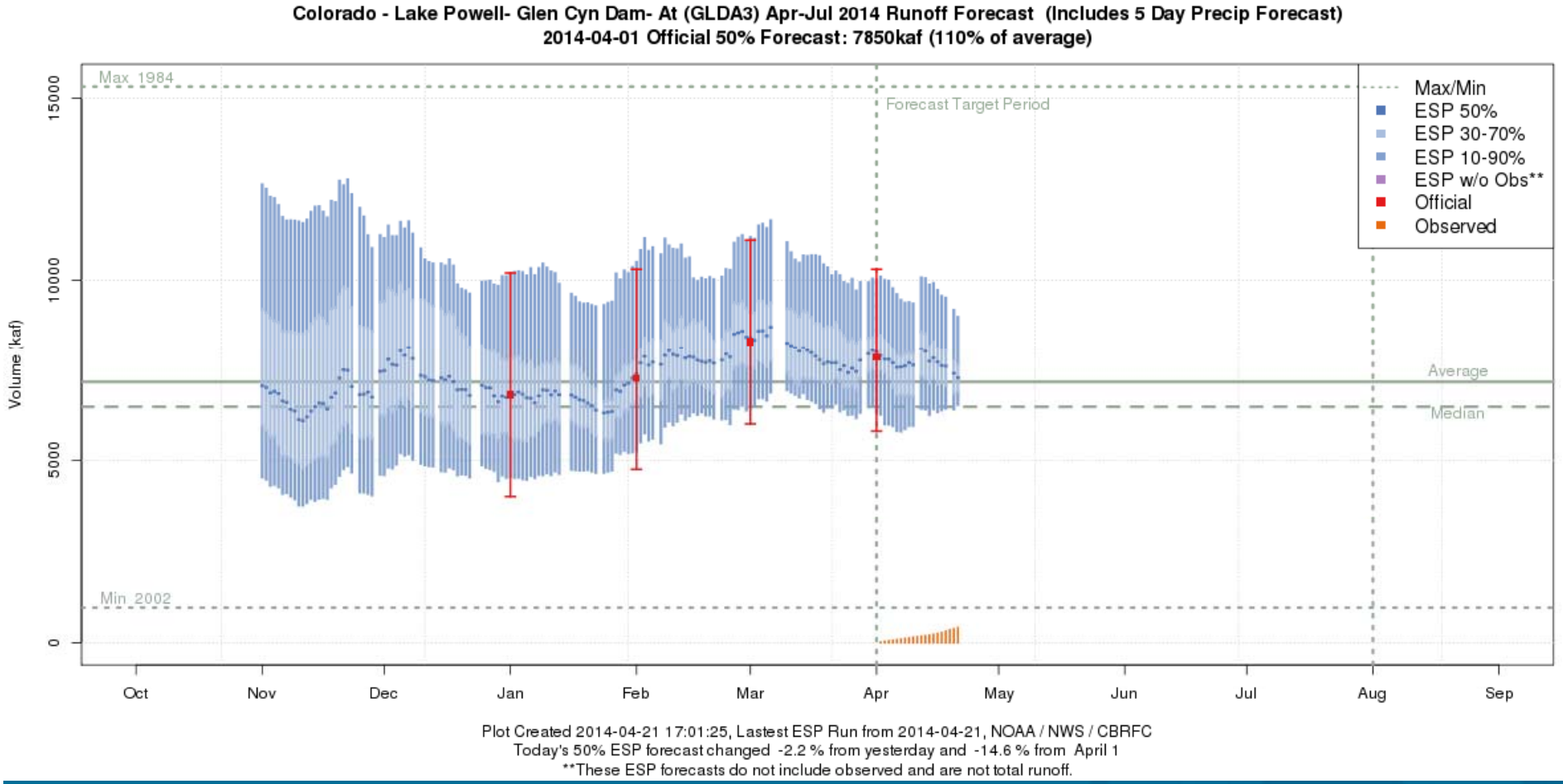
Less influential in areas that have been persistently dry and have low snow (parts of the San Juan)



March Precipitation



Latest ESP


Colorado - Lake Powell- Glen Cyn Dam- At (GLDA3) Apr-Jul 2014 Runoff Forecast (Includes 5 Day Precip Forecast)
2014-04-01 Official 50% Forecast: 7850kaf (110% of average)
Max, 1984
Min, 2002
Forecast Target Period
Average
Median
Max/Min
ESP 50%
ESP 30-70%
ESP 10-90%
ESP w/o Obs**
Official
Observed
Volume (kaf)
15000
10000
5000
0
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Plot Created 2014-04-21 17:01:25, Lastest ESP Run from 2014-04-21, NOAA / NWS / CBRFC
Today's 50% ESP forecast changed -2.2 % from yesterday and -14.6 % from April 1
**These ESP forecasts do not include observed and are not total runoff.

ENSO Watch

It is important to remember that the correlation between ENSO and most of the area in the CBRFC region is not strong, and probably only applicable to the Lower Colorado Region

Also important to remember is that the ENSO phenomenon has been correlated with precipitation, not streamflow, so antecedent conditions could still play a large role

ENSO Watch

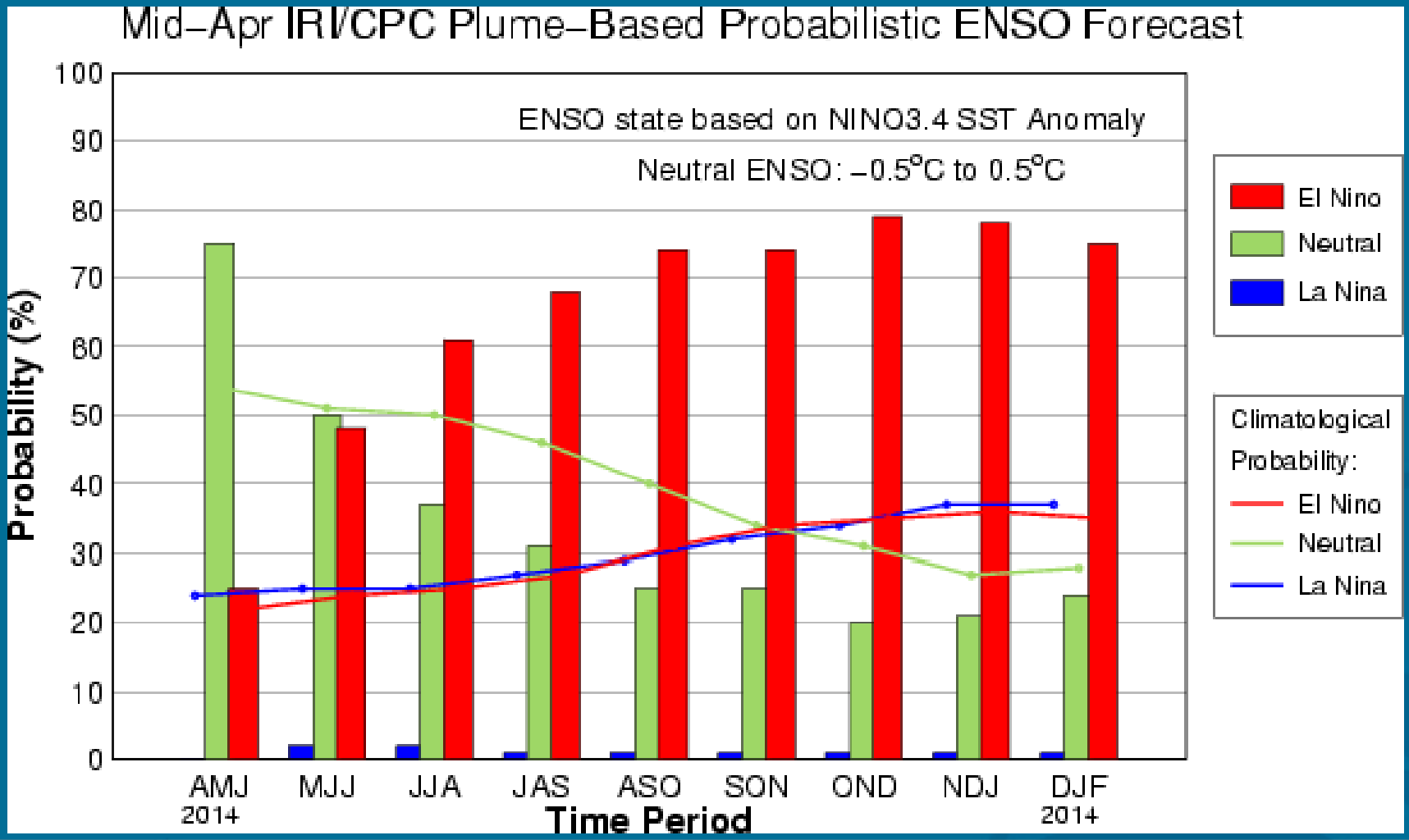
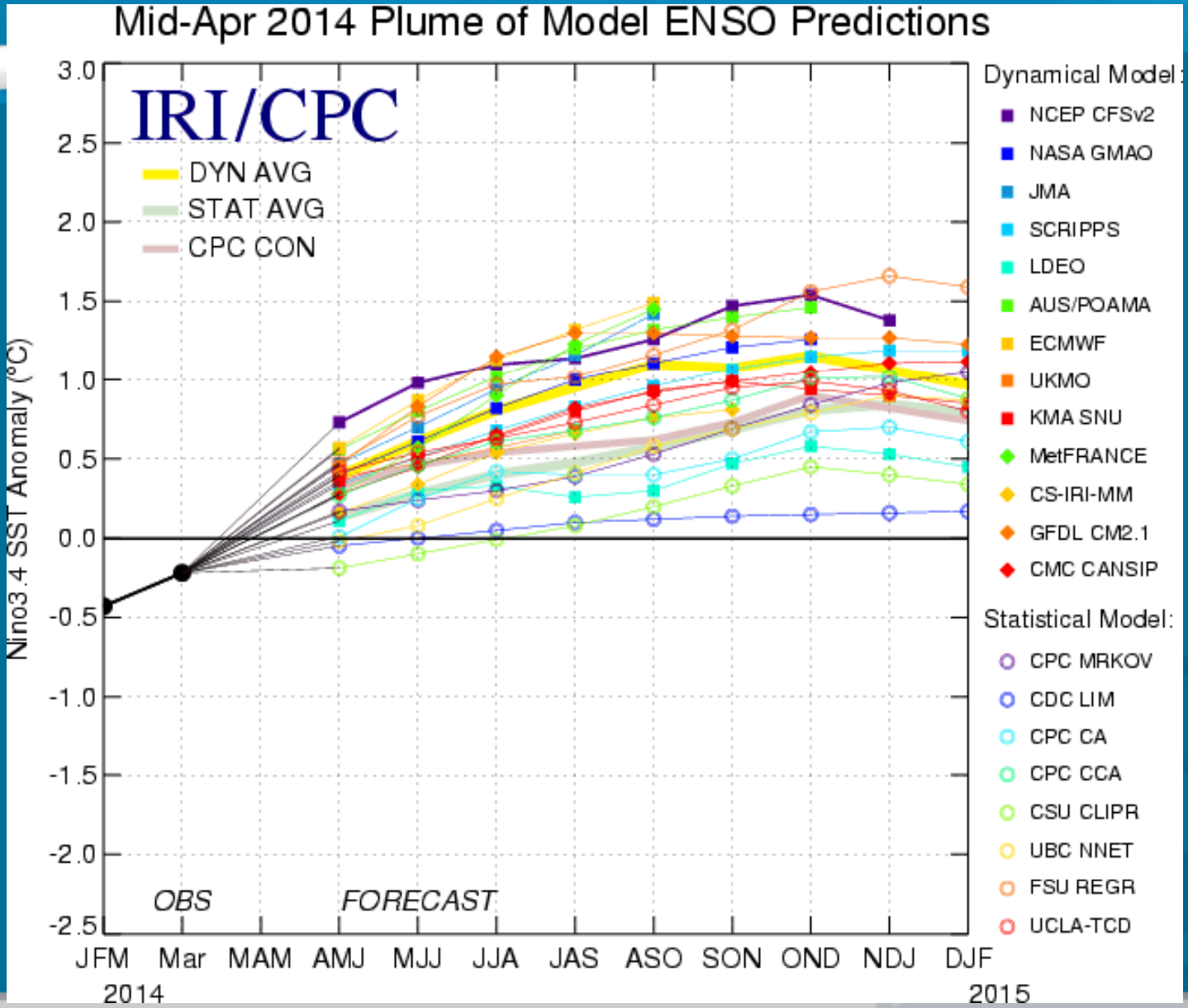


Figure from: http://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/?enso_tab=enso-quicklook

ENSO Watch



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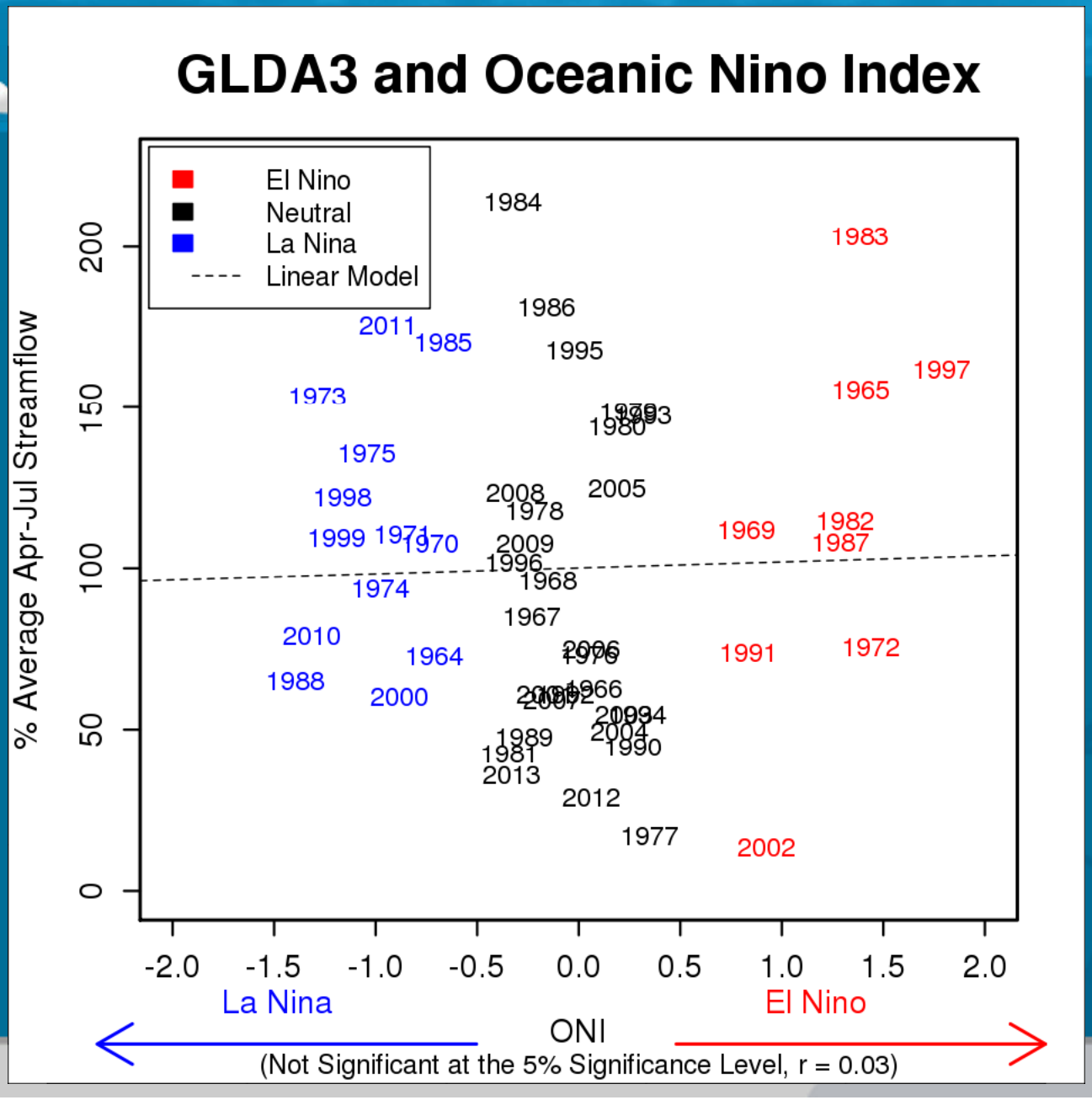
ENSO Watch


GLDA3 and Oceanic Nino Index
El Nino
Neutral
La Nina
Linear Model
% Average Apr-Jul Streamflow
0
50
100
150
200
-2.0
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
2.0
La Nina
El Nino
ONI
(Not Significant at the 5% Significance Level, r = 0.03)
1984
1983
1986
2011
1985
1995
1997
1965
1973
1980
1975
1998
2008
2005
1978
1969
1982
1999
1971
1970
2009
1987
1996
1974
1968
1967
2010
1964
1991
1972
1988
2000
1966
1989
2004
1990
1981
2013
2012
1977
2002

Other Ongoing Efforts

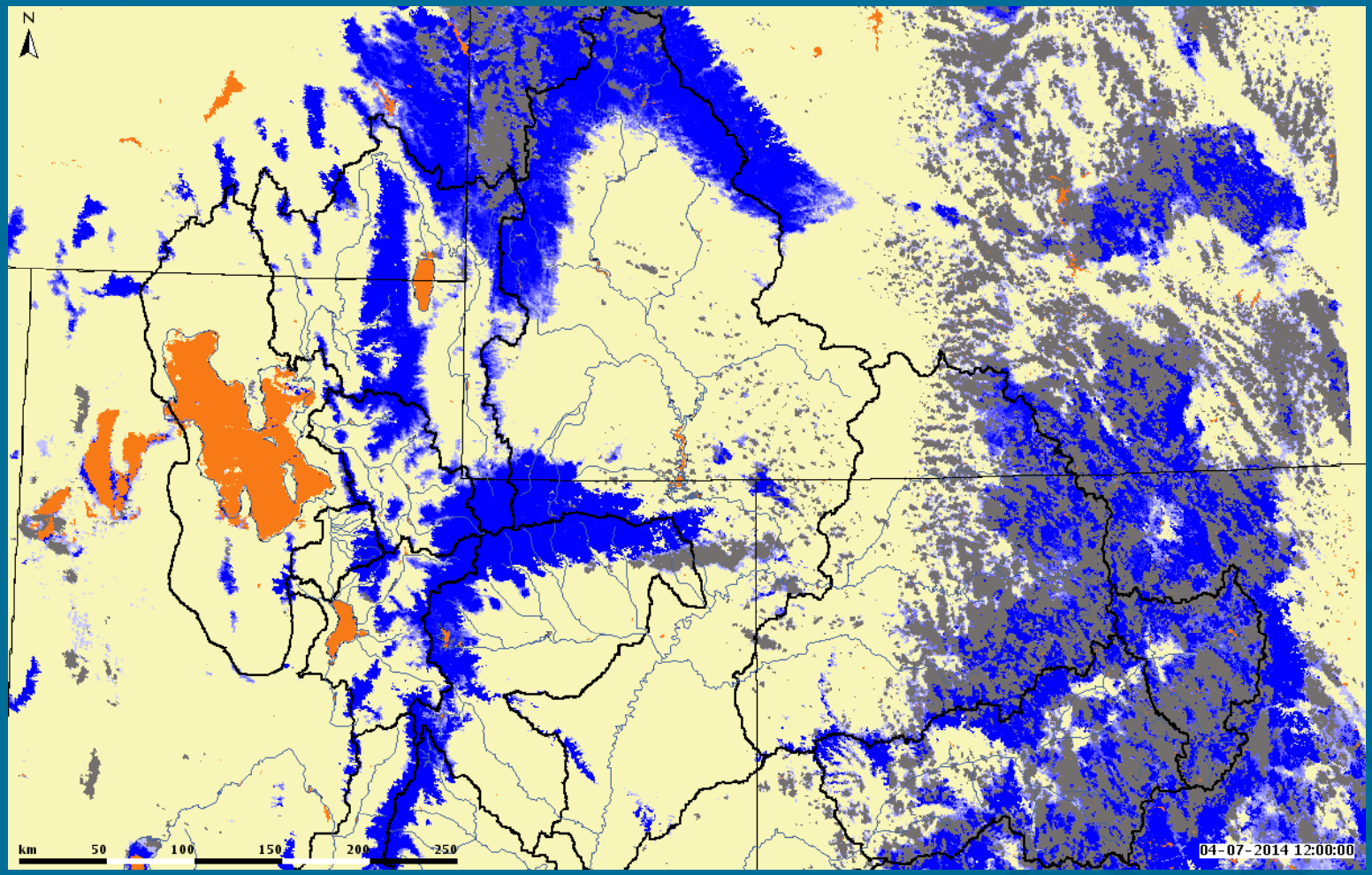
Continued use of MODSCAG snow data to qualitatively assess snow coverage throughout the CBRFC area

New use of MODDRFS for qualitatively assessing dust radiative forcing on snow

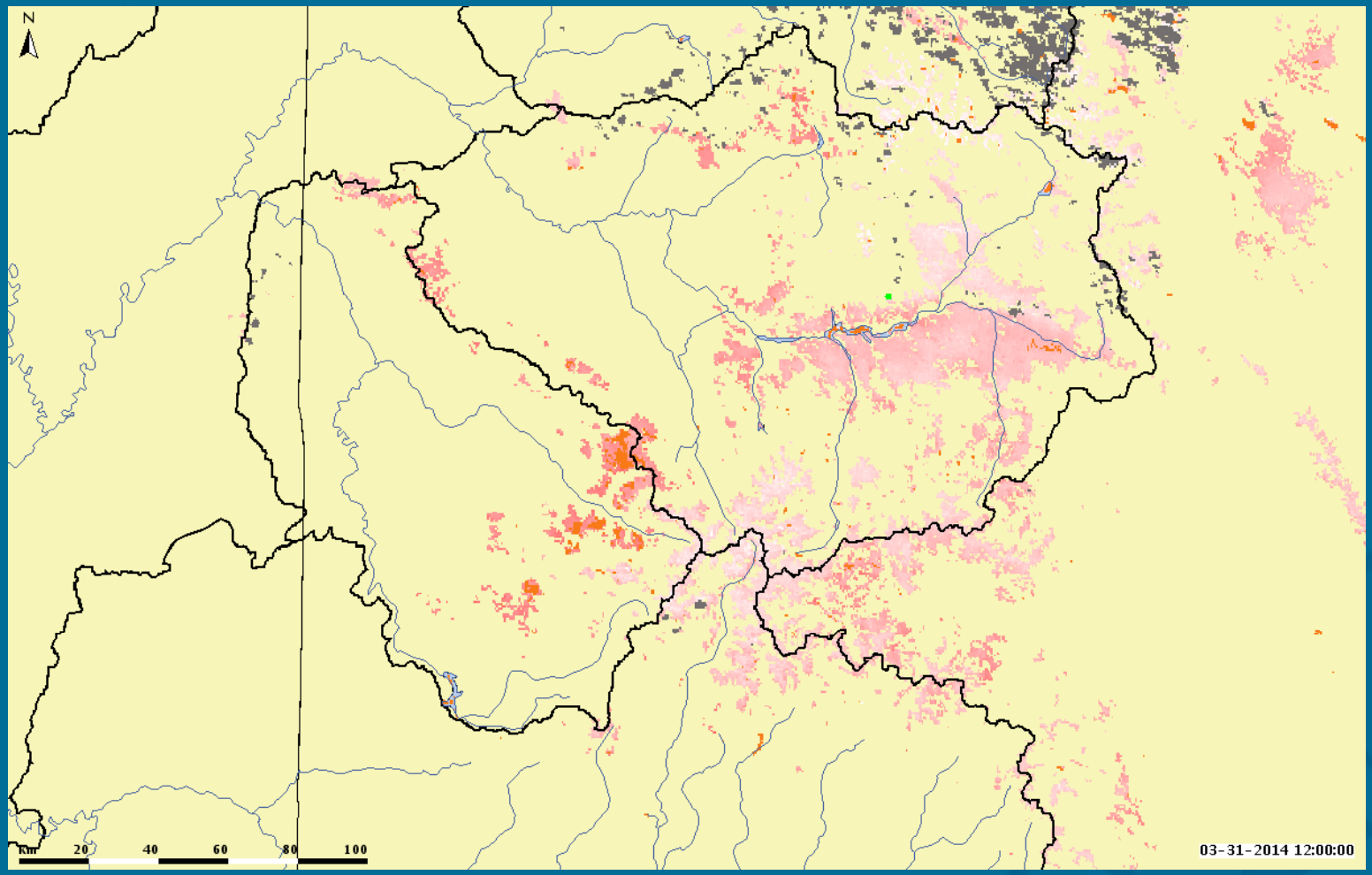
Further development of verification products

…and much more!

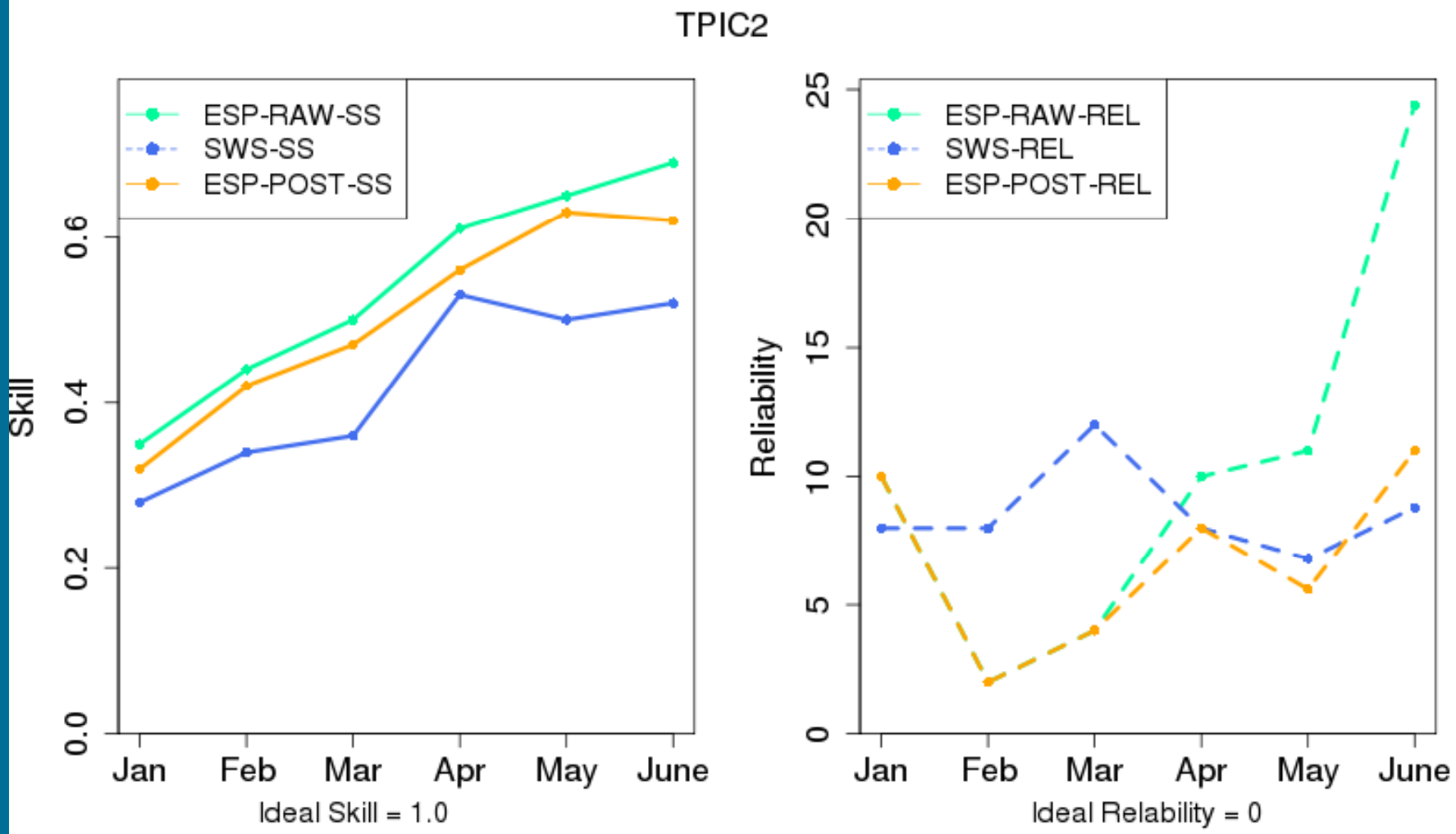
MODSCAG



MODDRFS



Verification



One last quick note…

NOAA, in partnership with NIDIS, sponsored a workshop at the CBRFC in response to recent drought conditions in the Colorado River Basin

- **Identify scientific and forecasting improvements to support drought related decision making**
- **Identify opportunities for NIDIS and the CBRFC to improve products and services**

Attended by municipal and rural water users and Reclamation

Currently working to draft a summary report and create a scoping team to meet recommendations from the meeting

QUESTIONS?