Winter 2010

Weekly Climate, Water & Drought Assessment

Today's Agenda

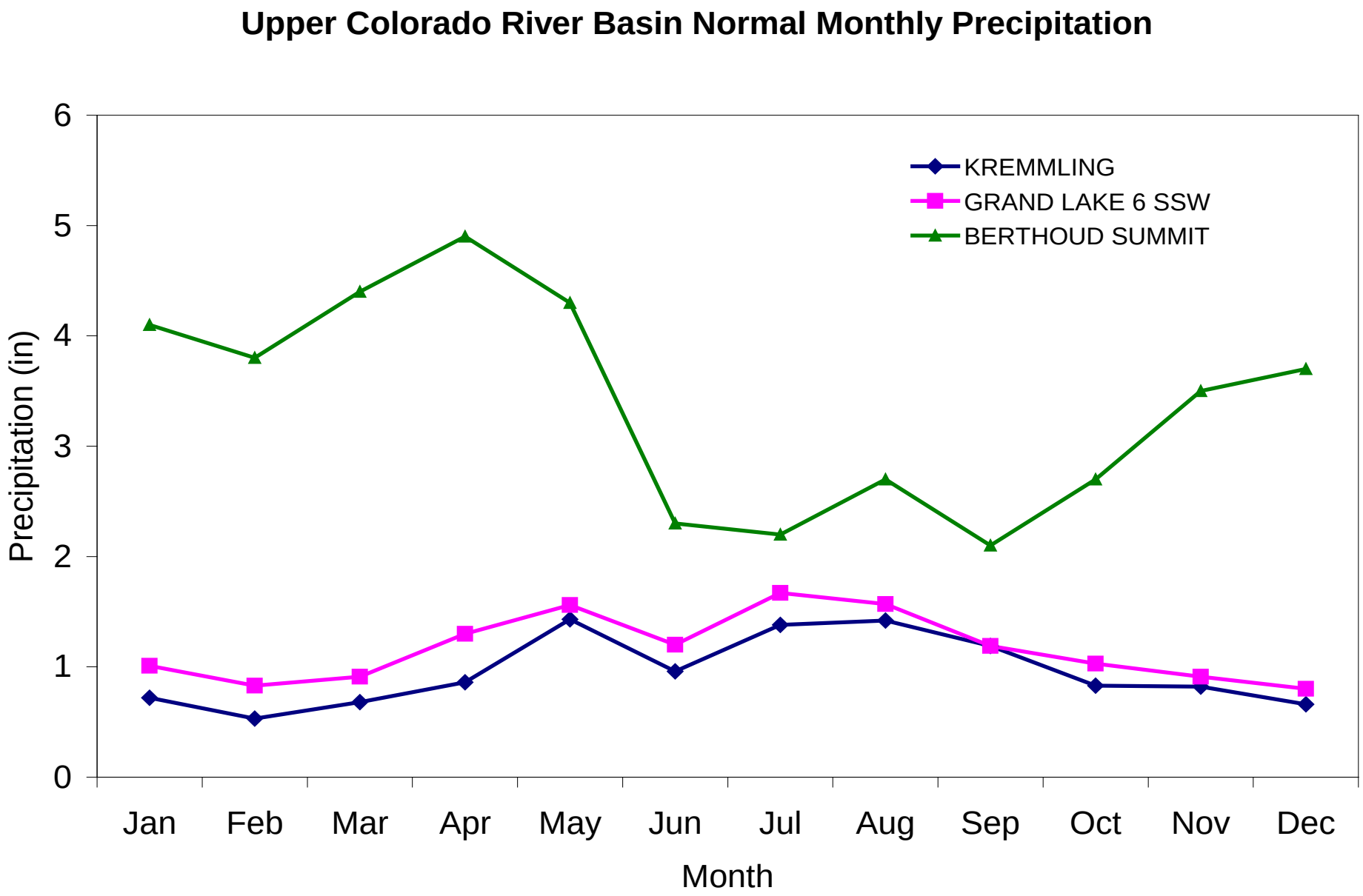
-Assessment of current water conditions

- Precipitation Forecast

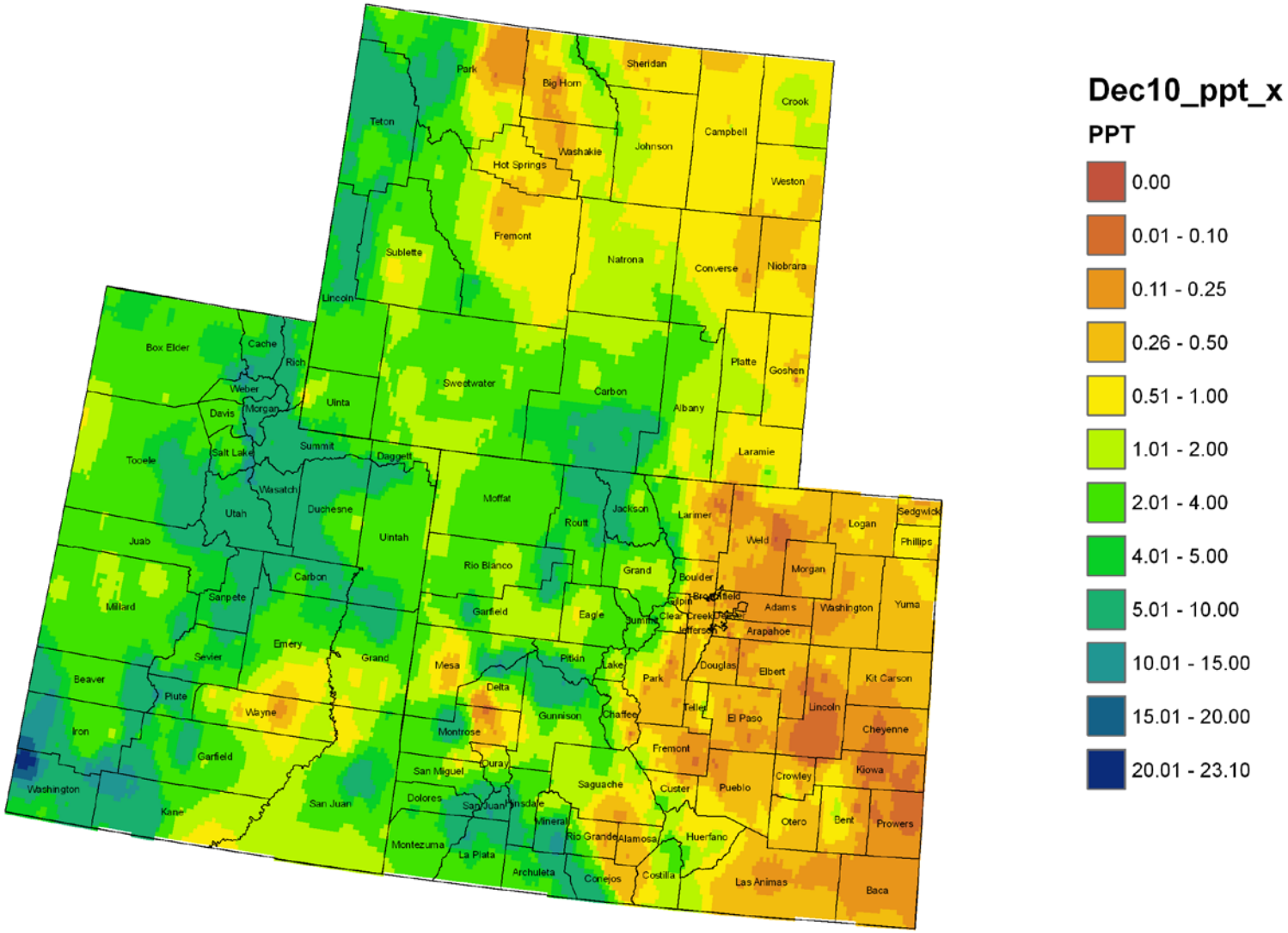
- Recommendations for Drought Monitor

Precipitation/Snowpack Update

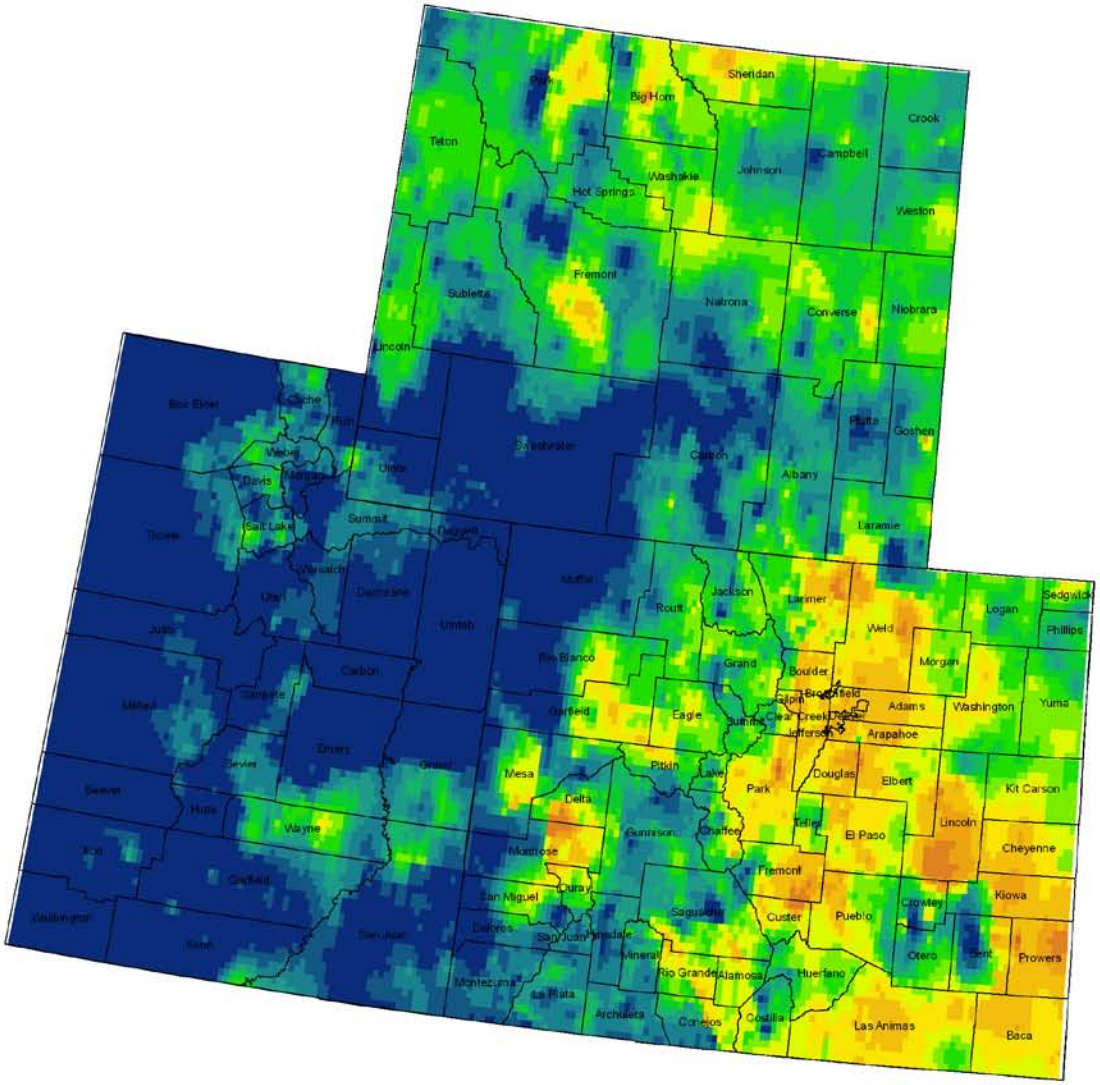
Upper Colorado Normal Precipitation



Colorado, Utah and Wyoming Precipitation (in)
December 2010



Colorado, Utah and Wyoming Precipitation as Percentage of Average December 2010

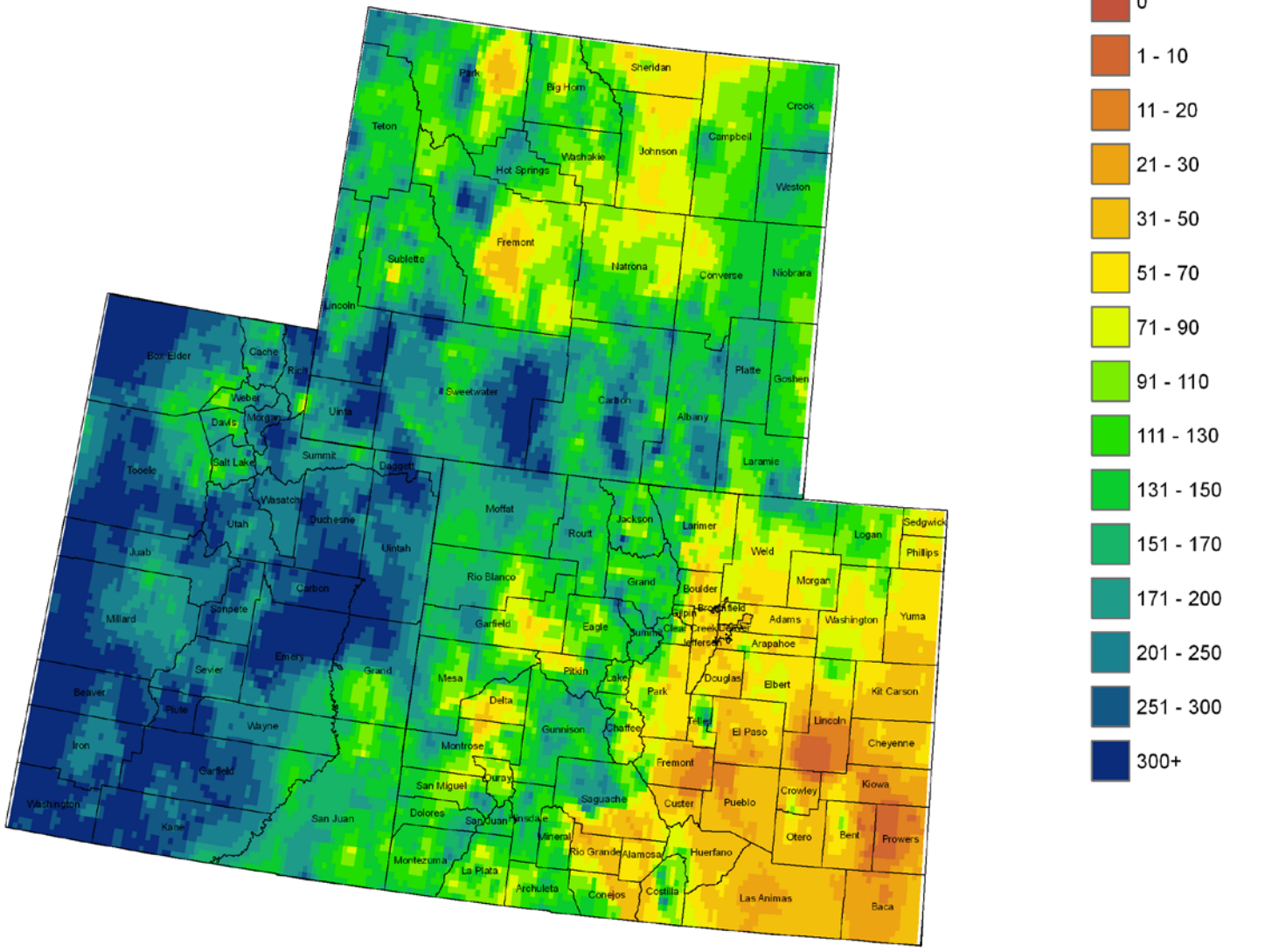


Dec10_pn

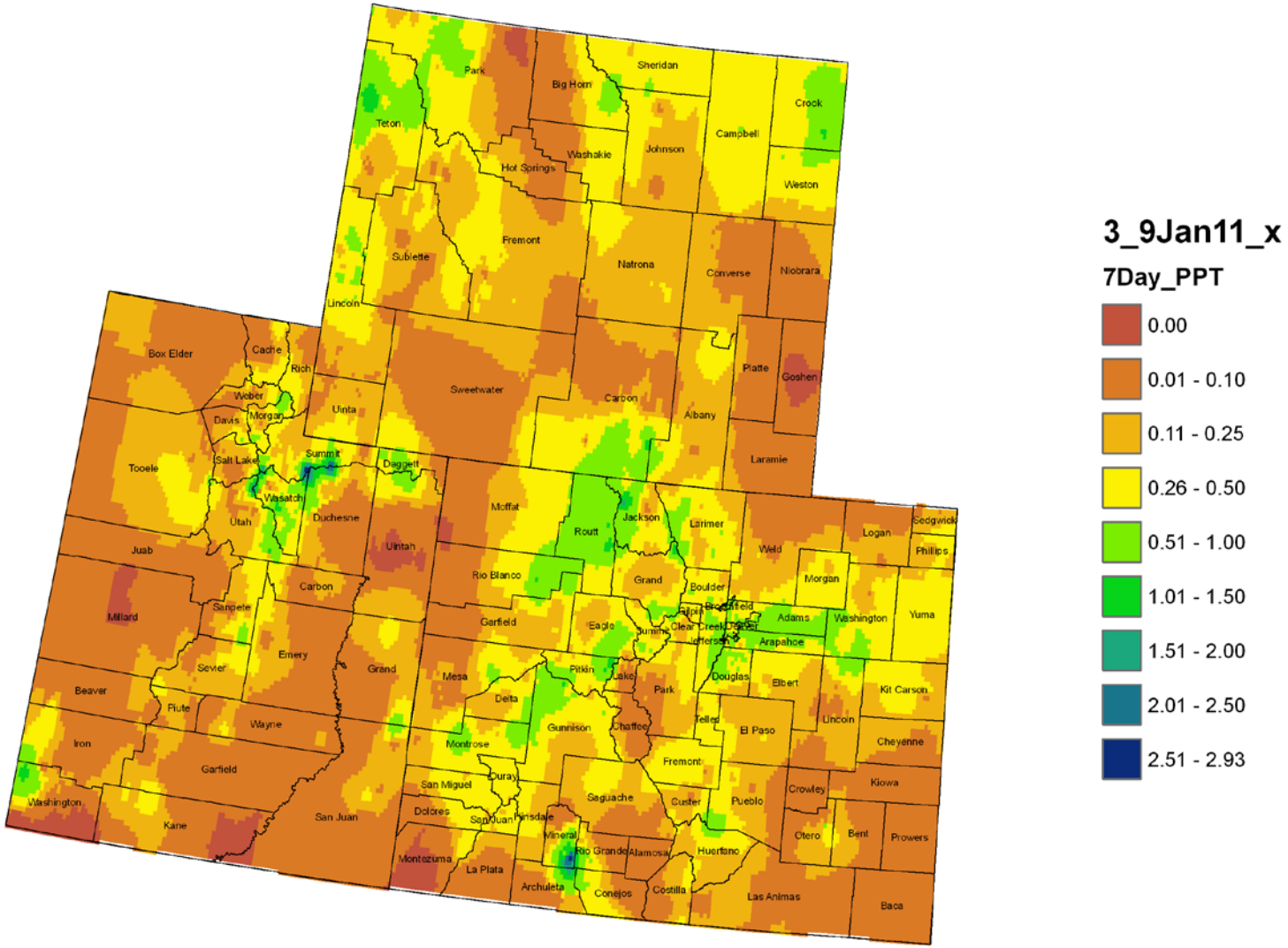
%norm

- 0
- 1 - 10
- 11 - 20
- 21 - 30
- 31 - 50
- 51 - 70
- 71 - 90
- 91 - 110
- 111 - 130
- 131 - 150
- 151 - 170
- 171 - 200
- 201 - 250
- 251 - 300
- 300+

Colorado, Utah and Wyoming Water Year Precipitation as Percentage of Average (Oct 10 - Dec10)



Colorado, Utah and Wyoming 7 Day Precipitation
3 - 9 January 2011



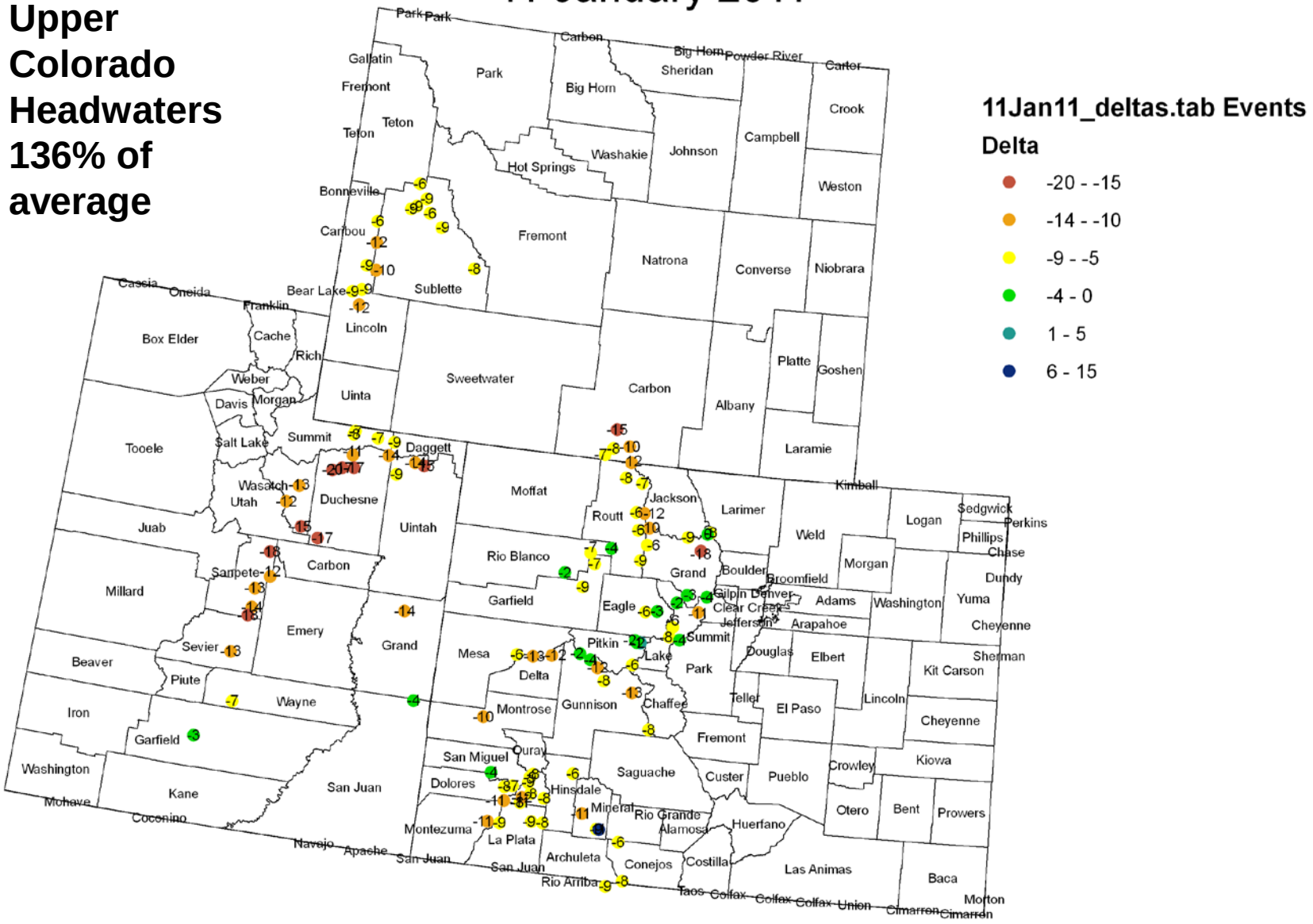
3_9Jan11_x

7Day_PPT

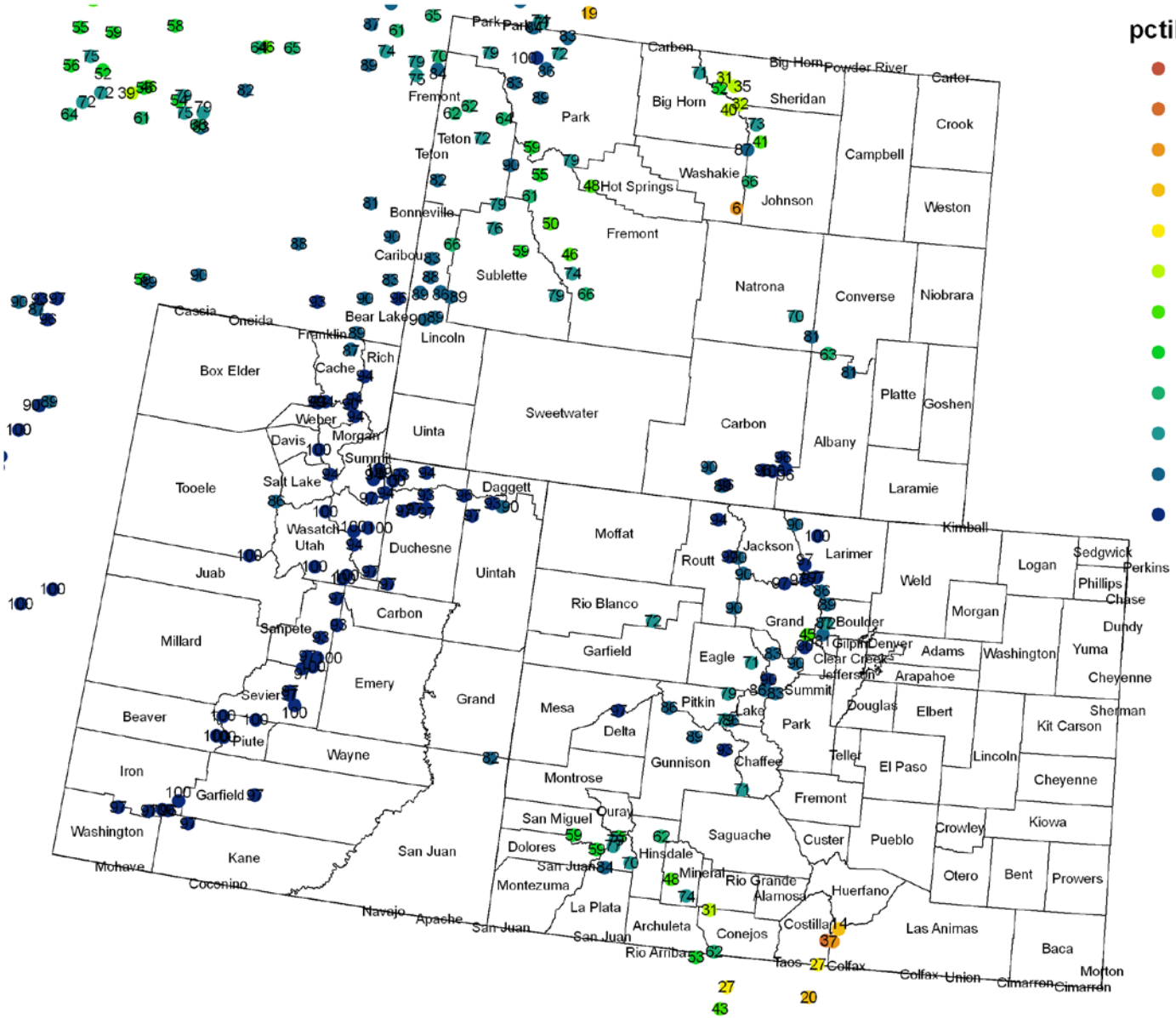
- 0.00
- 0.01 - 0.10
- 0.11 - 0.25
- 0.26 - 0.50
- 0.51 - 1.00
- 1.01 - 1.50
- 1.51 - 2.00
- 2.01 - 2.50
- 2.51 - 2.93

Snotel One Week Change in Water Year Precipitation as Percentage of Average 11 January 2011

Upper Colorado Headwaters 136% of average



Snotel Water Year Precipitation Percentile Ranking
11 January 2011

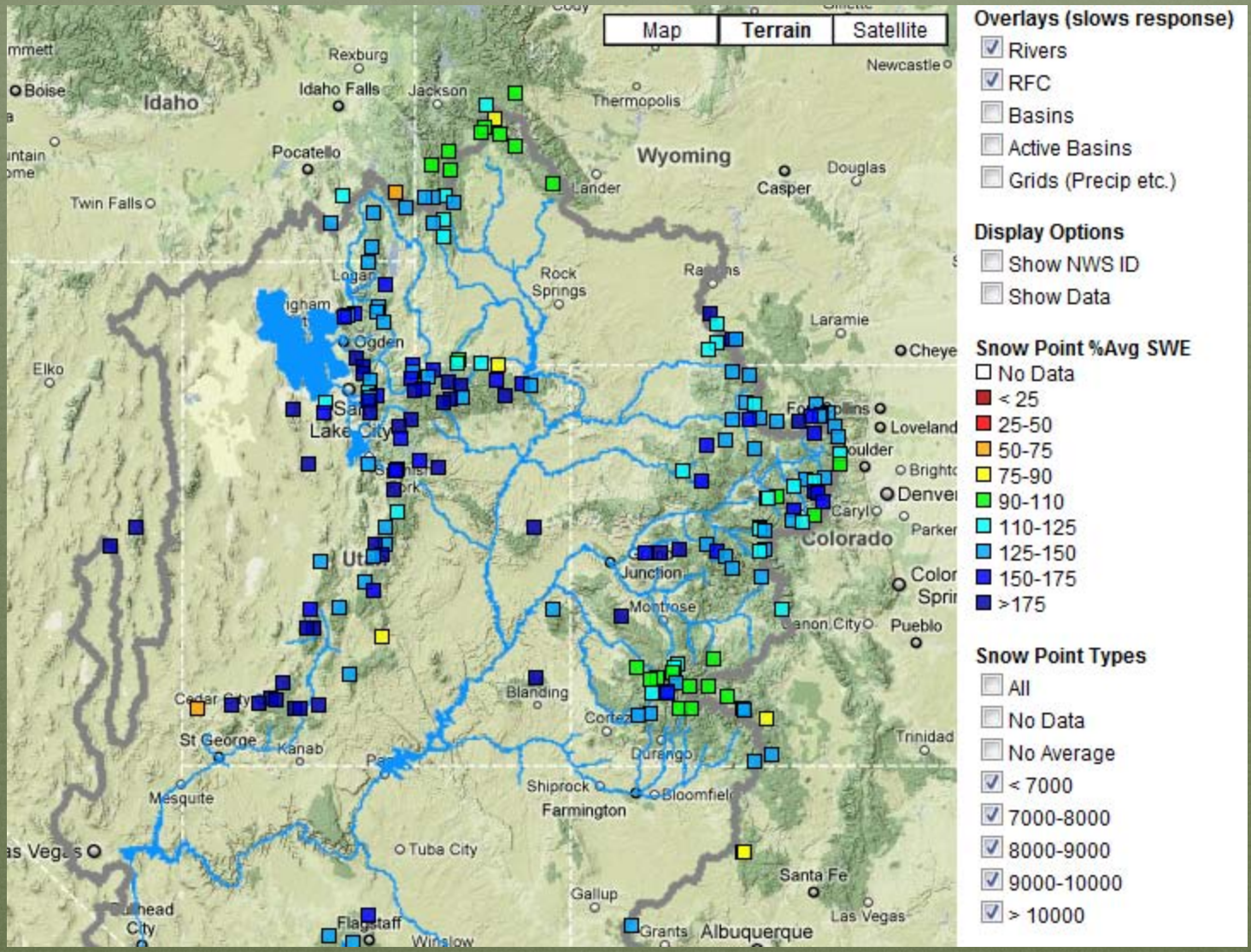


11Jan11_ptile.tab Events

pctile

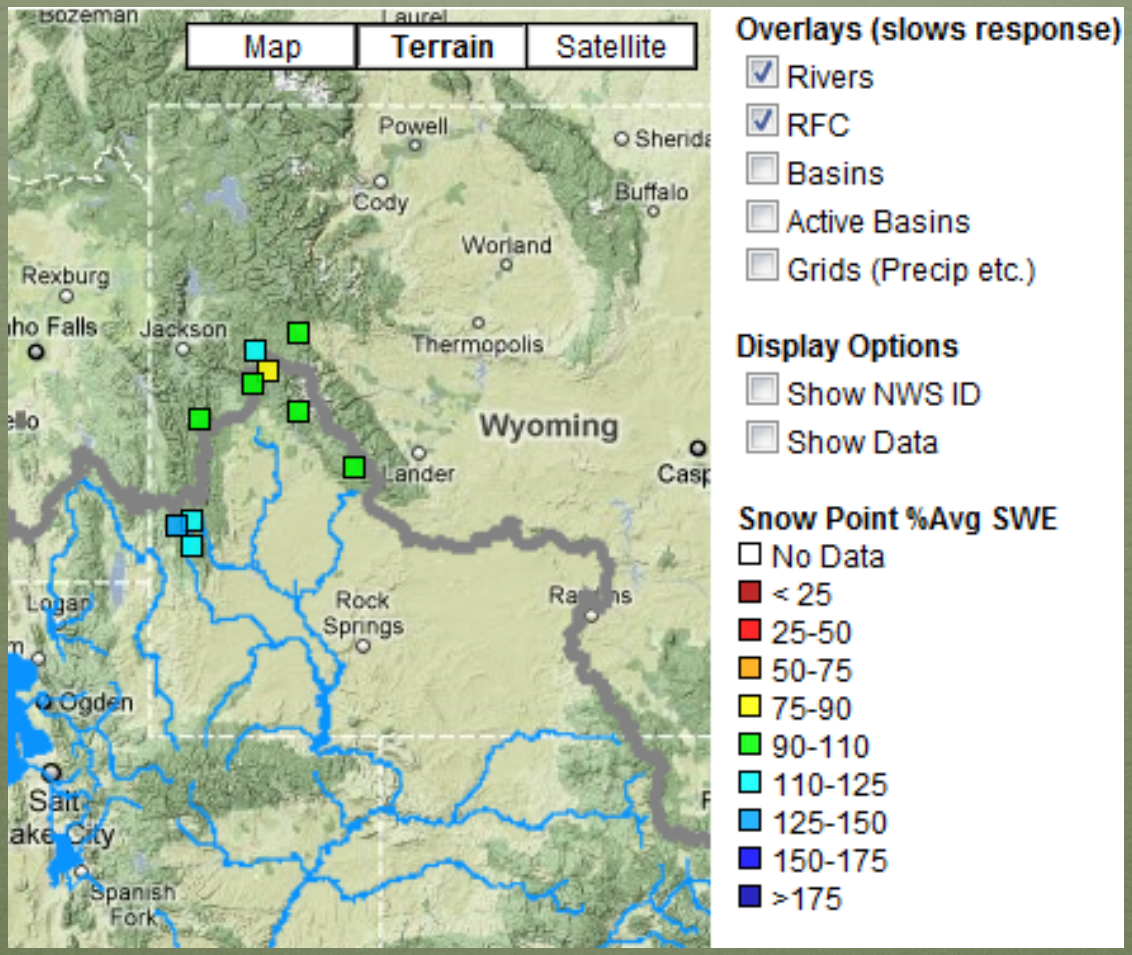
- D4: 0 - 2
- D3: 3 - 5
- D2: 6 - 10
- D1: 11 - 20
- D0: 21 - 30
- Uncategorized: 31 - 40
- Uncategorized: 41 - 50
- Uncategorized: 51 - 60
- Uncategorized: 61 - 70
- Uncategorized: 71 - 80
- Uncategorized: 81 - 90
- Uncategorized: 91 - 100

Upper Colorado River Basin

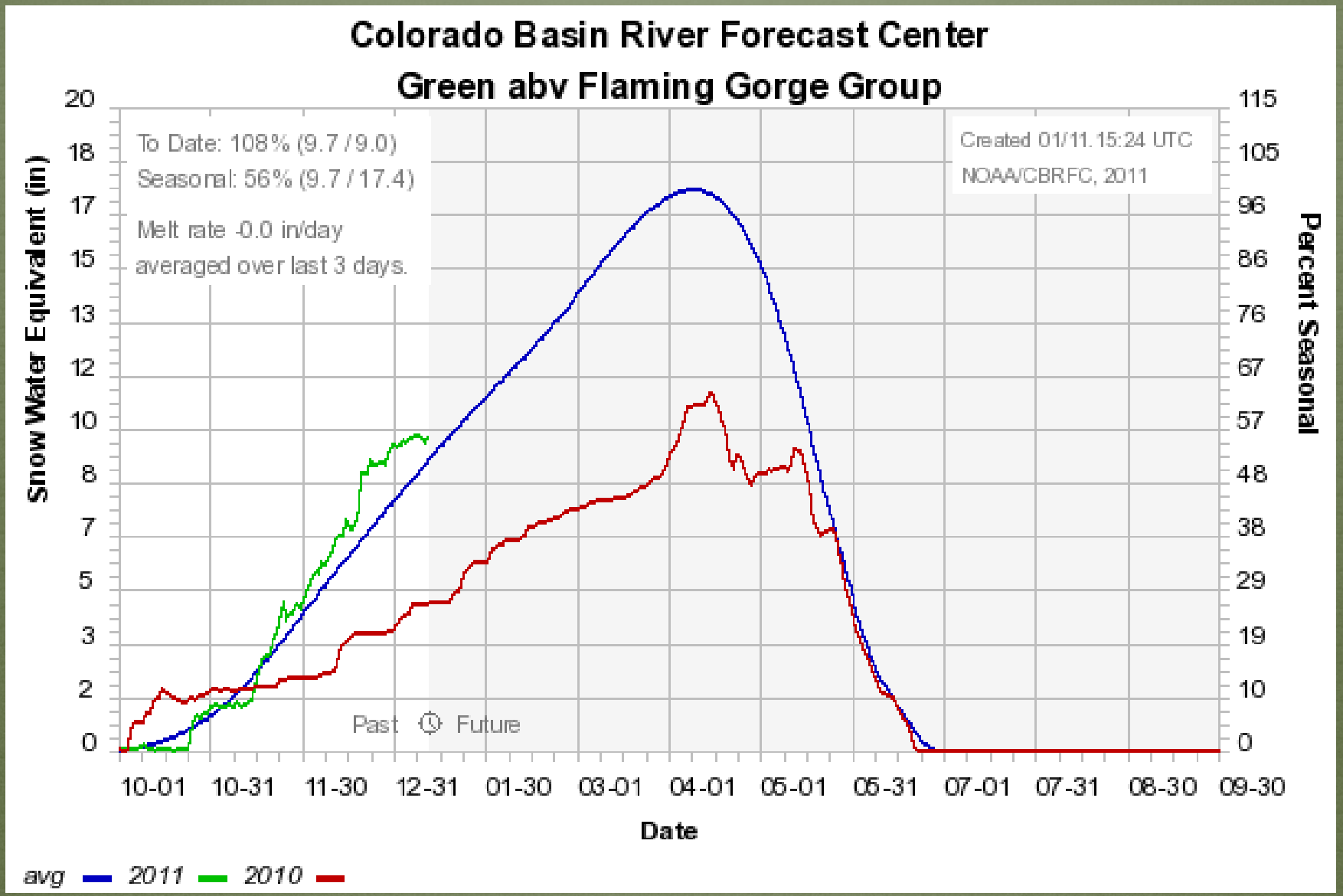


NATIONAL WEATHER SERVICE
Colorado Basin River Forecast Center

Green River Basin above Flaming Gorge

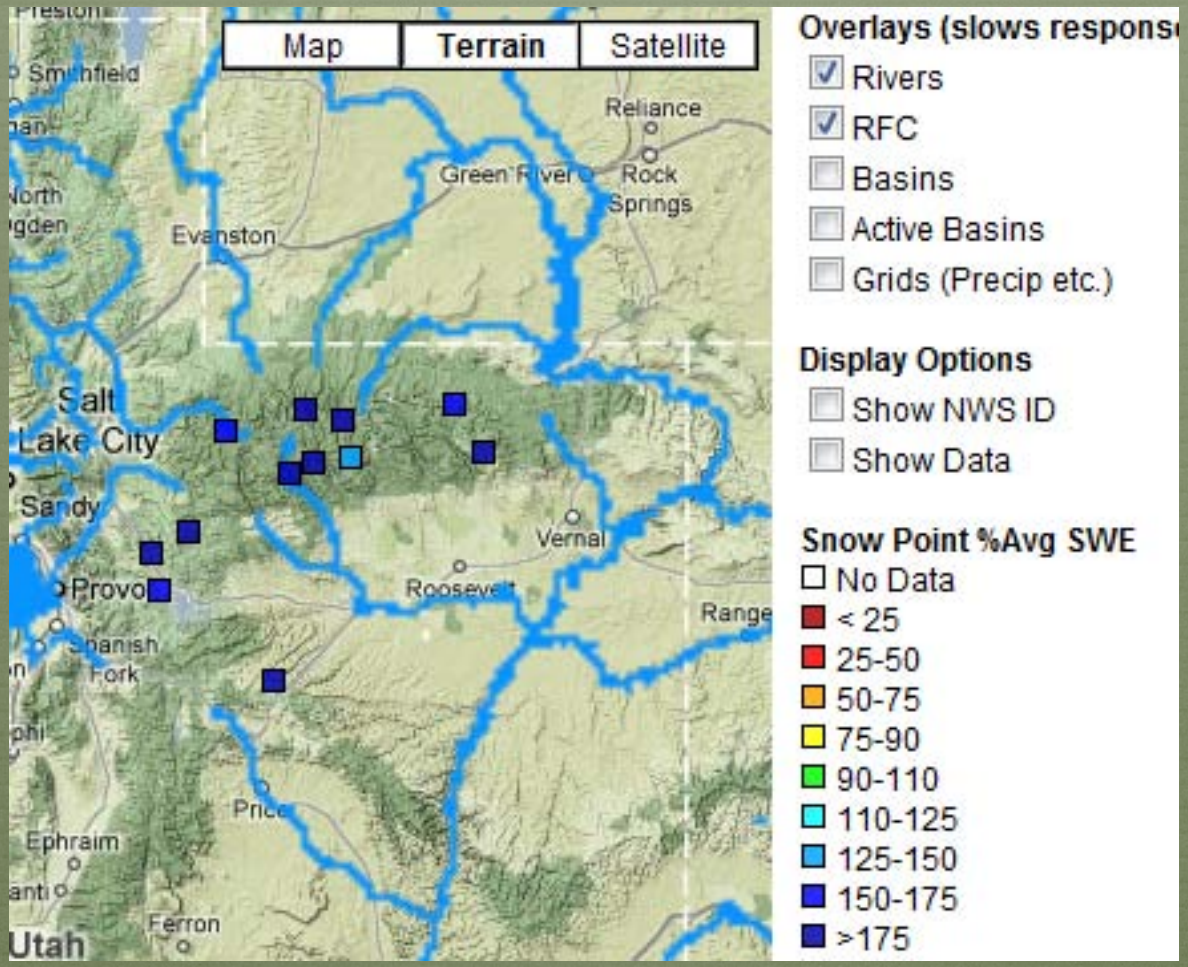


NATIONAL WEATHER SERVICE
Colorado Basin River Forecast Center

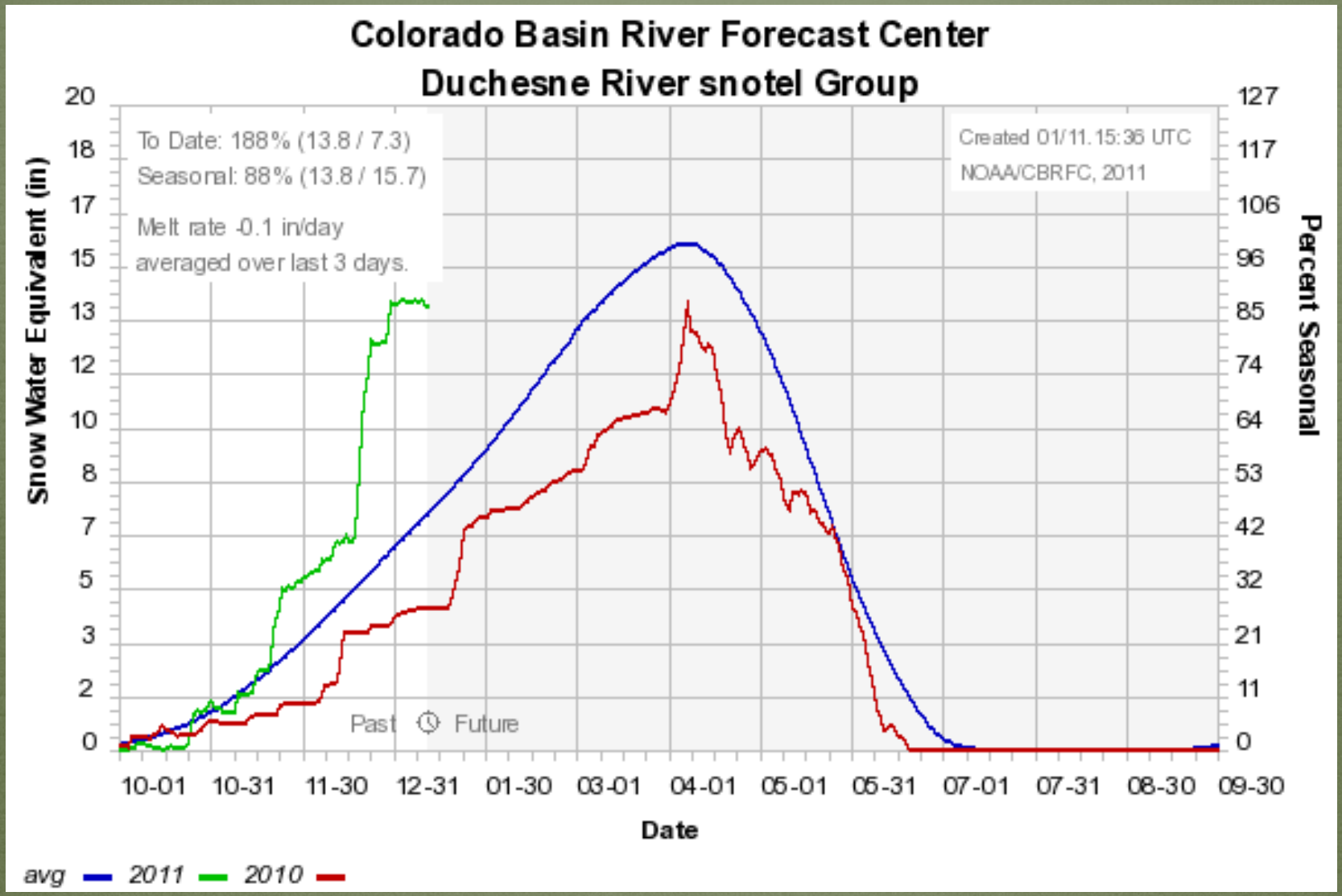


Snowpack % of average to date: 108%
Seasonal average: 56%

Duchesne River Basin

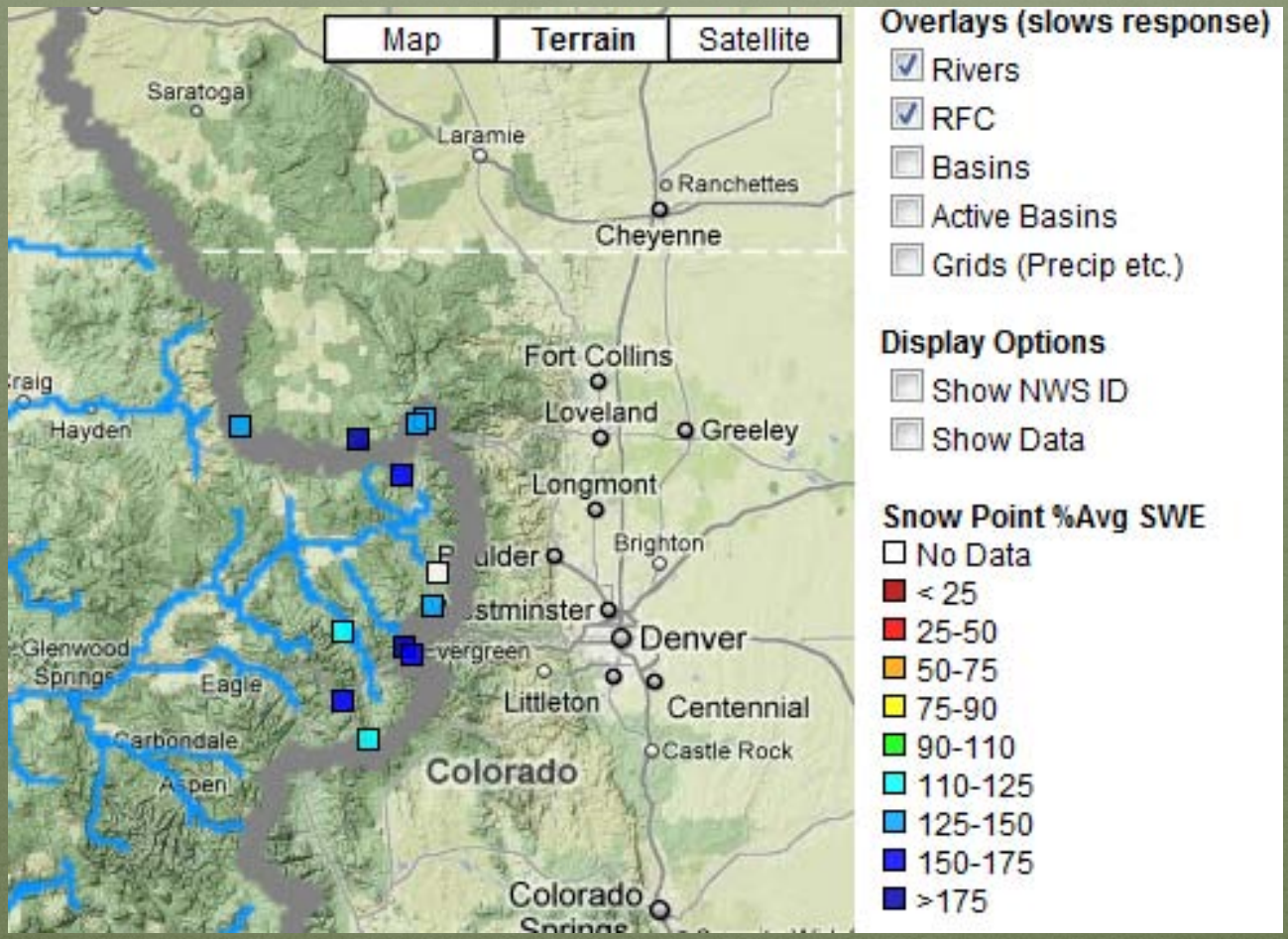


NATIONAL WEATHER SERVICE
Colorado Basin River Forecast Center

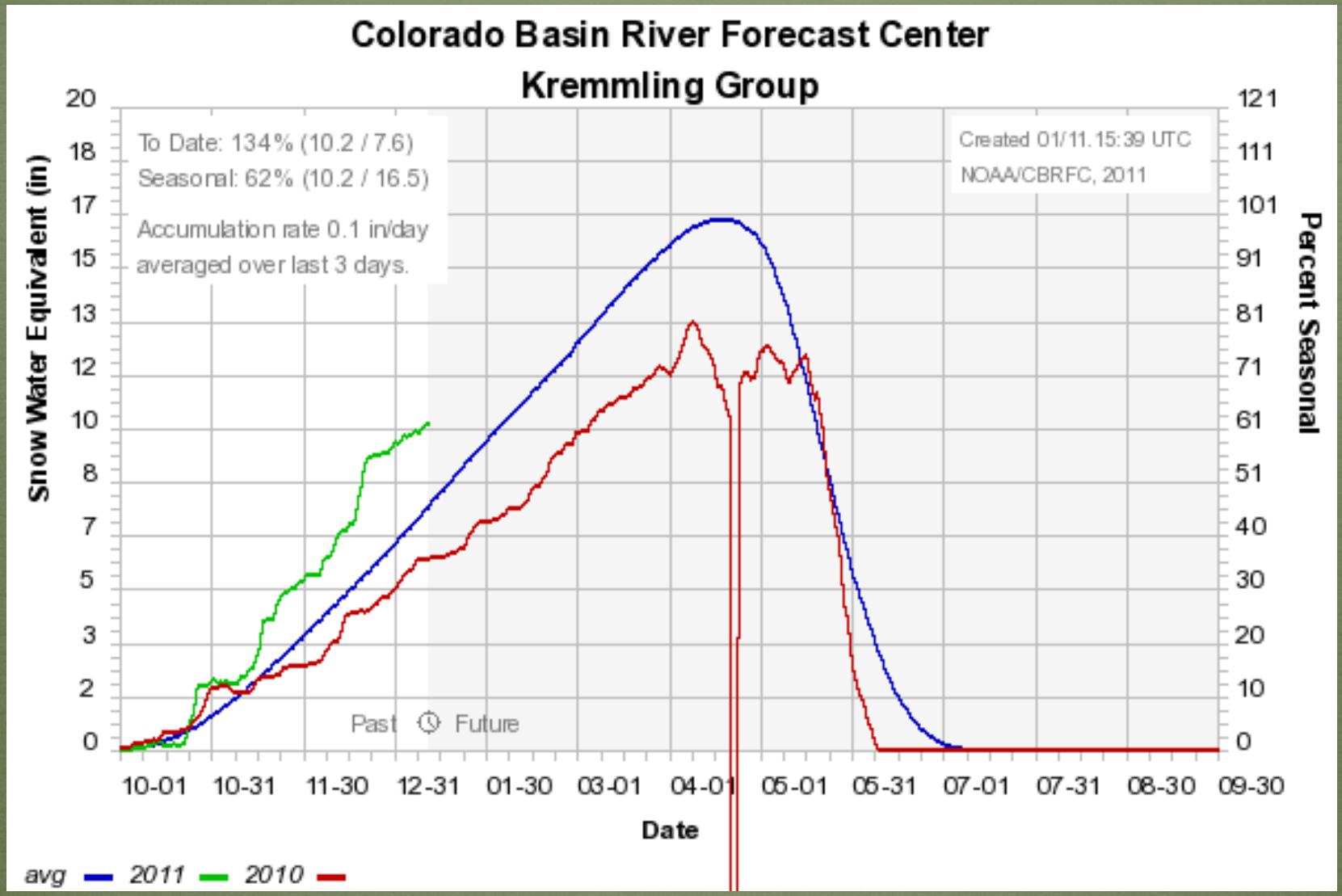


Snowpack % of average to date: 188%
Seasonal average: 88%

Upper Colorado above Kremmling

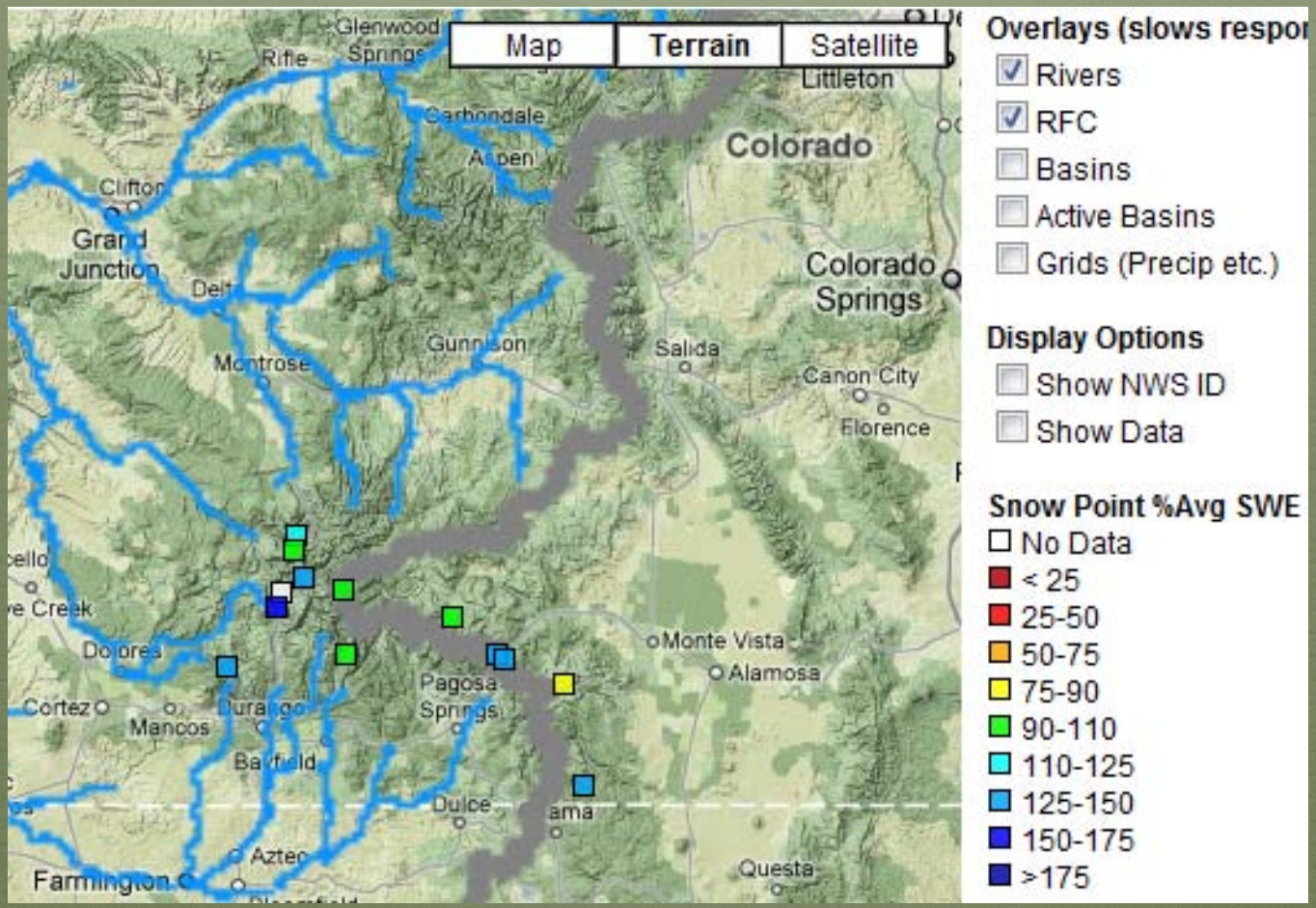


NATIONAL WEATHER SERVICE
Colorado Basin River Forecast Center

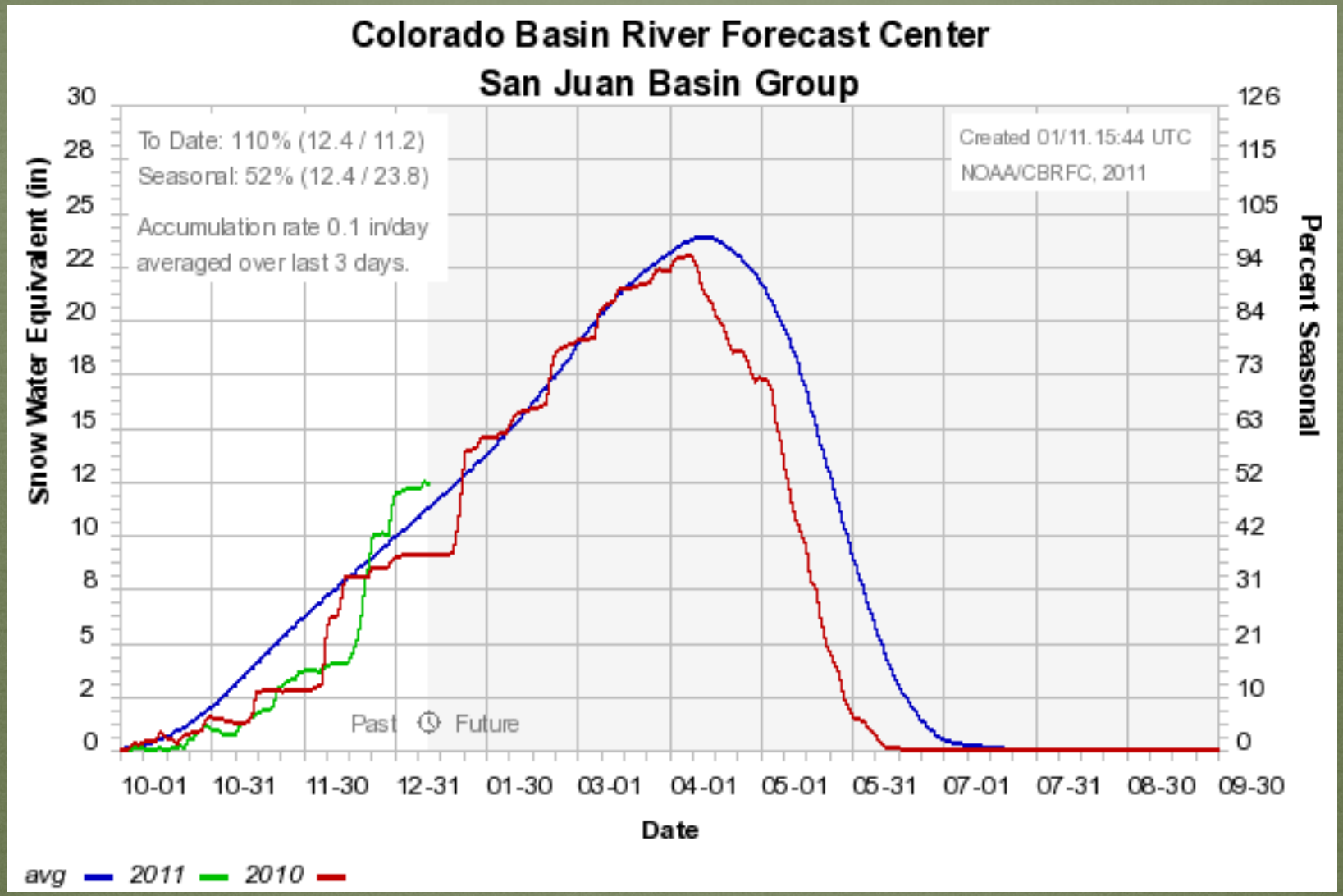


Snowpack % of average to date: 134%
Seasonal average: 62%

San Juan Basin



NATIONAL WEATHER SERVICE
Colorado Basin River Forecast Center

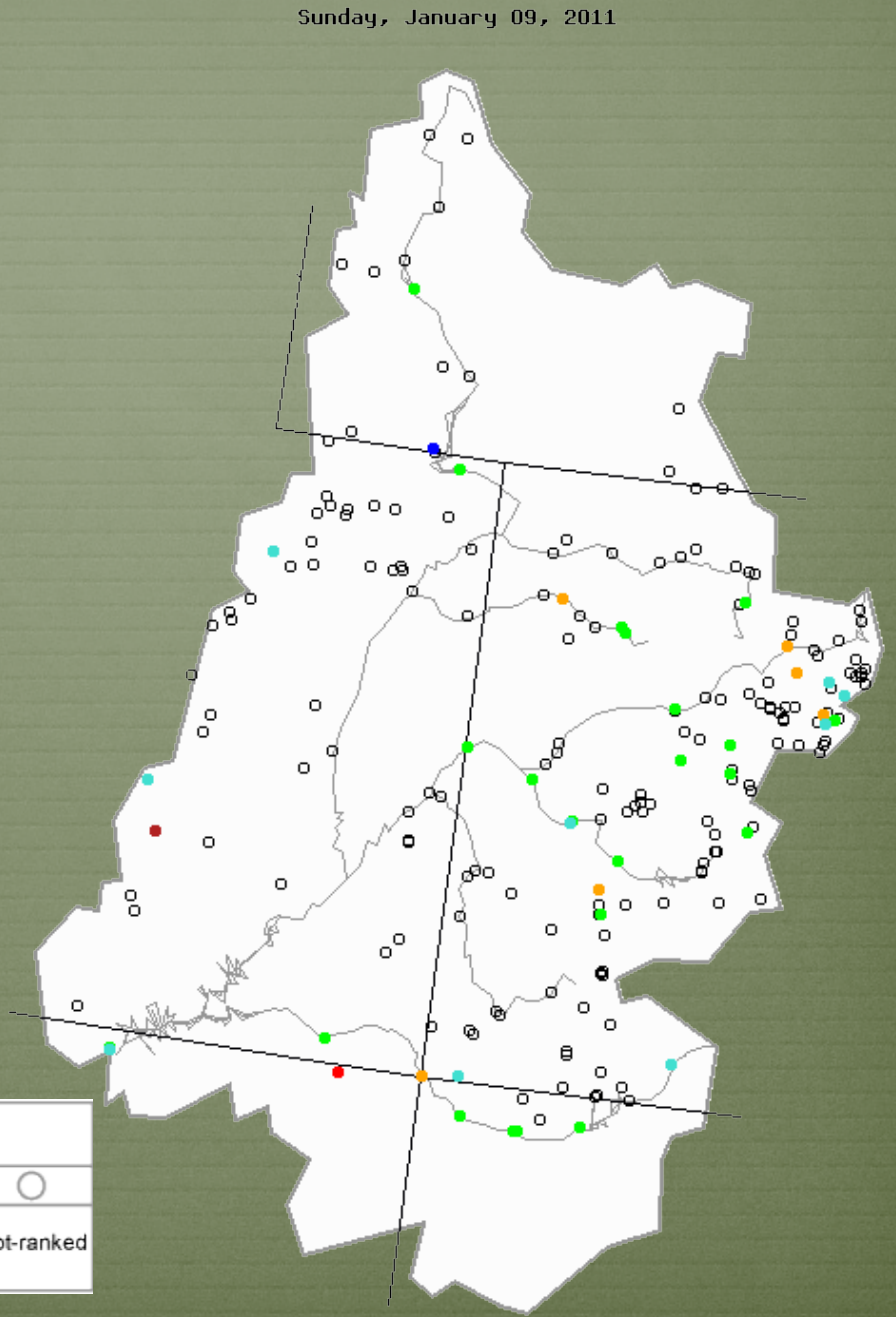


Snowpack % of average to date: 110%
Seasonal average: 52%

Streamflow Update

Michael Lewis USGS

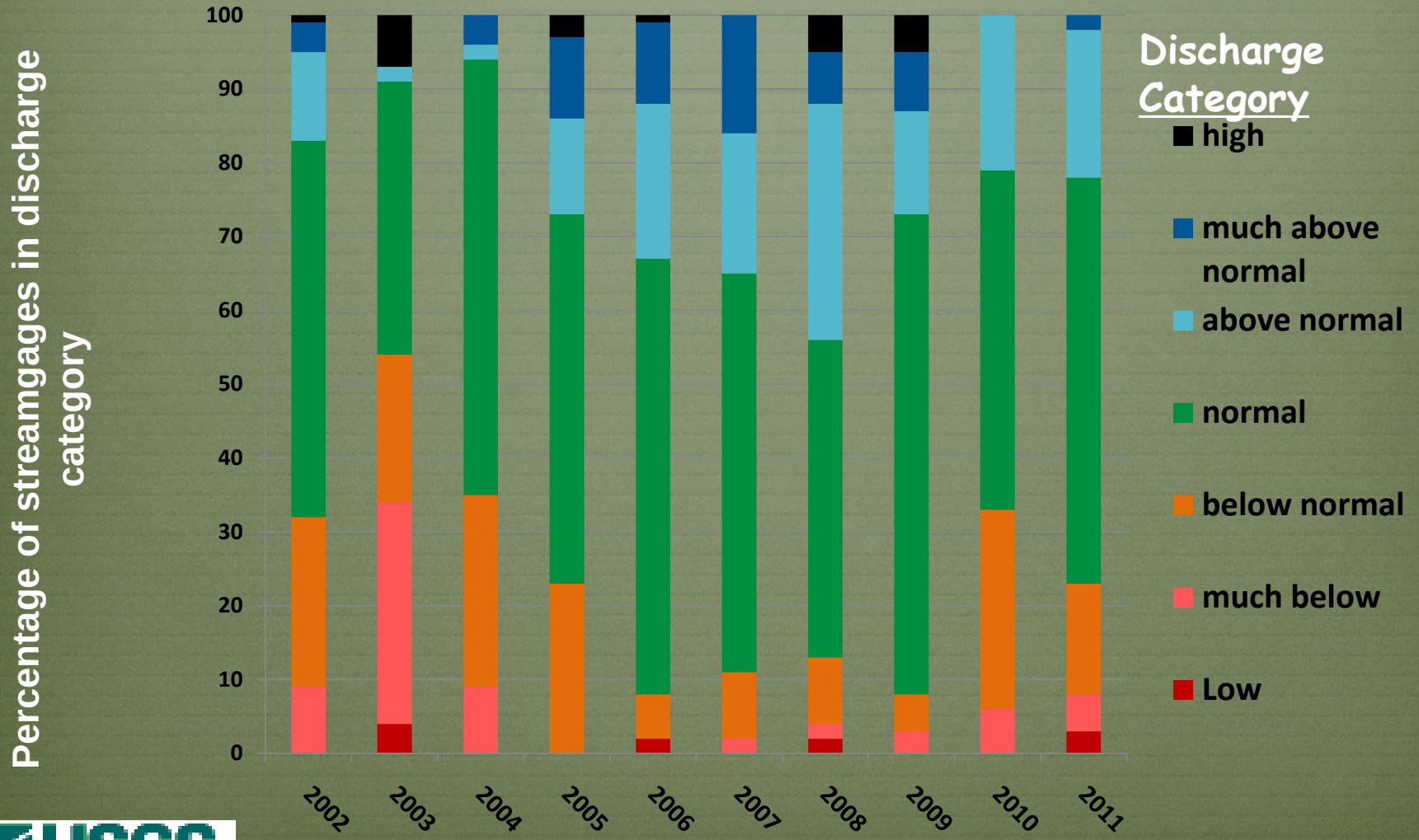
7-day average discharge compared to historical discharge for the day of the year (January 9)



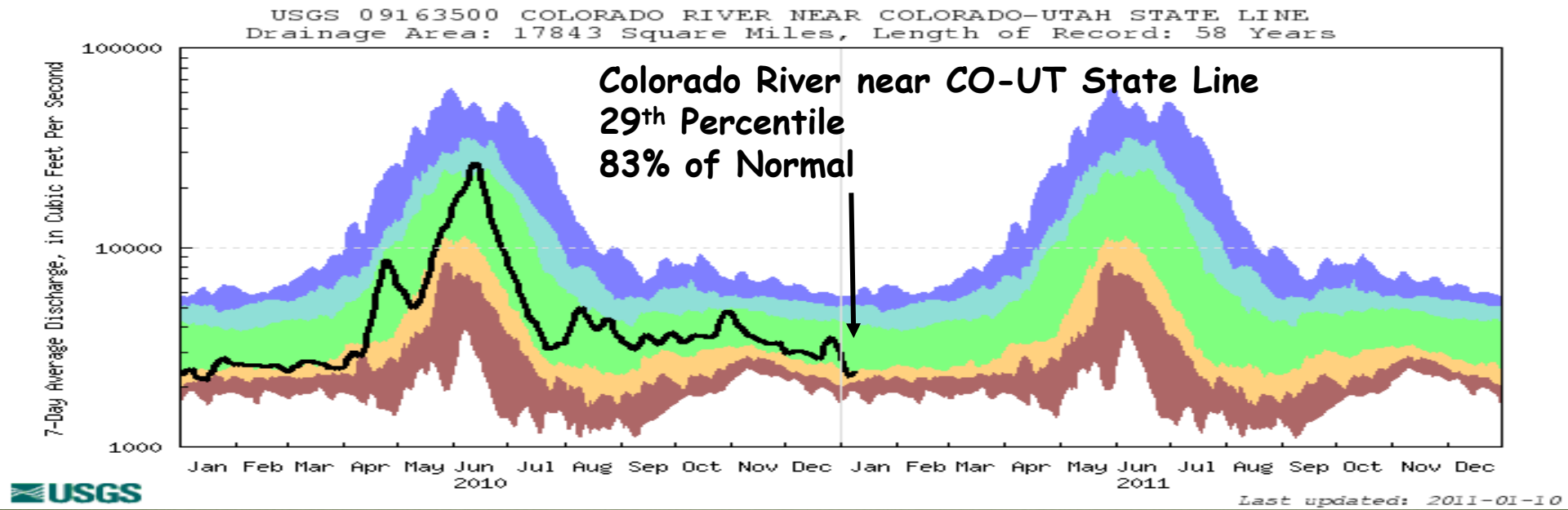
Explanation - Percentile classes							
Low	<10	10-24	25-75	76-90	>90	High	Not-ranked
	Much below normal	Below normal	Normal	Above normal	Much above normal		

USGS

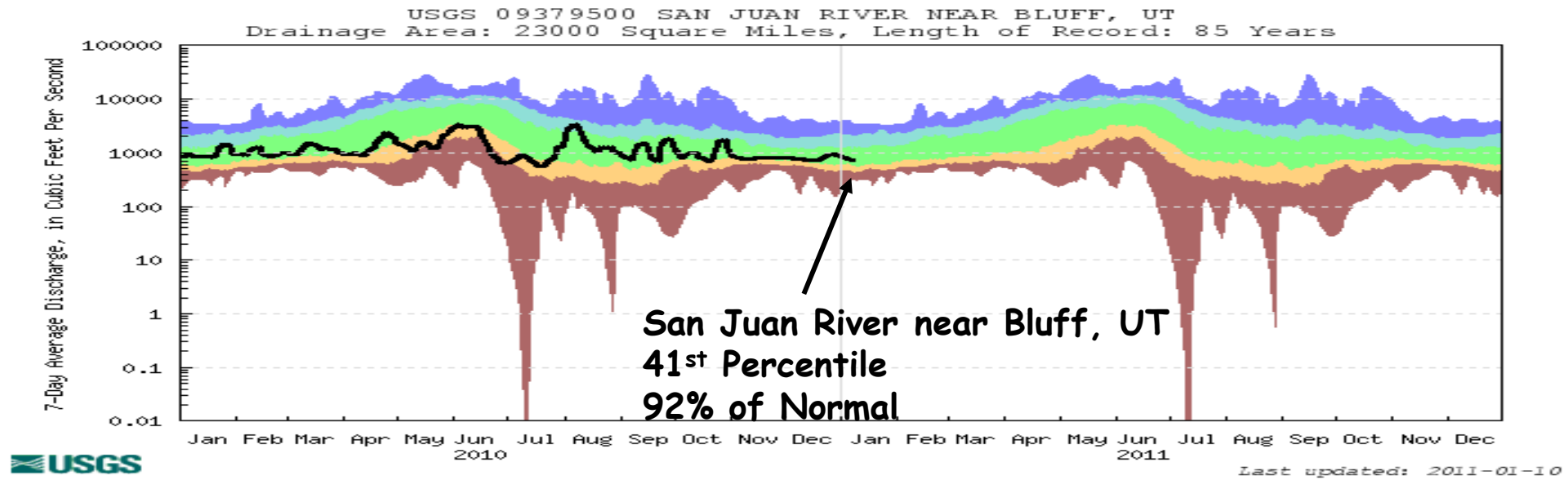
-Upper Colorado River Basin- Comparison of 7-day Average Discharge For January 8, 2002-2011



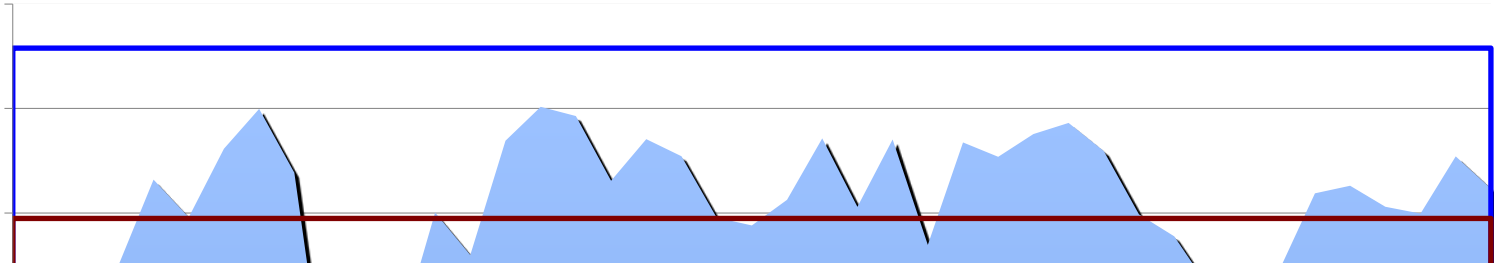
USGS

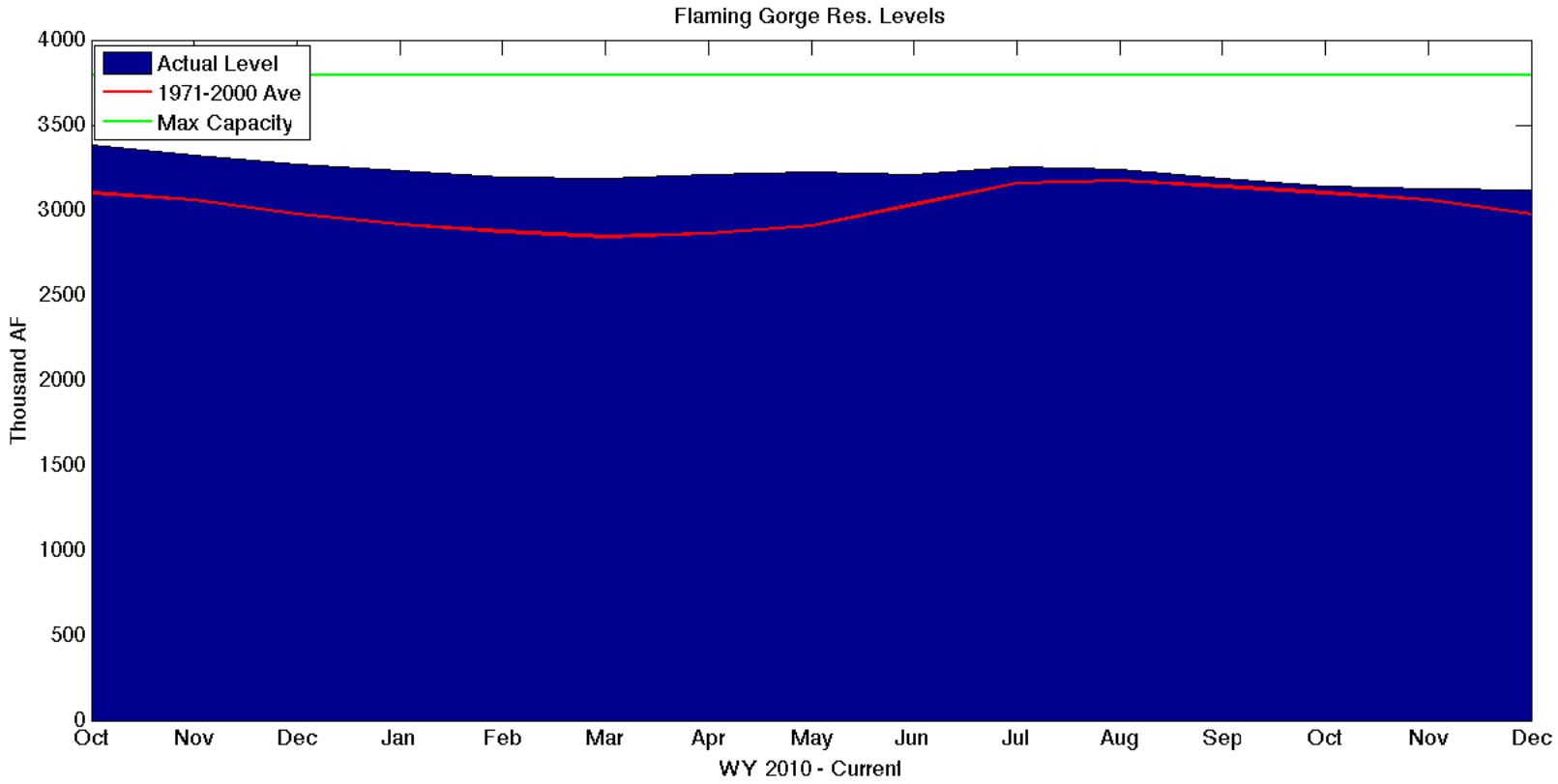


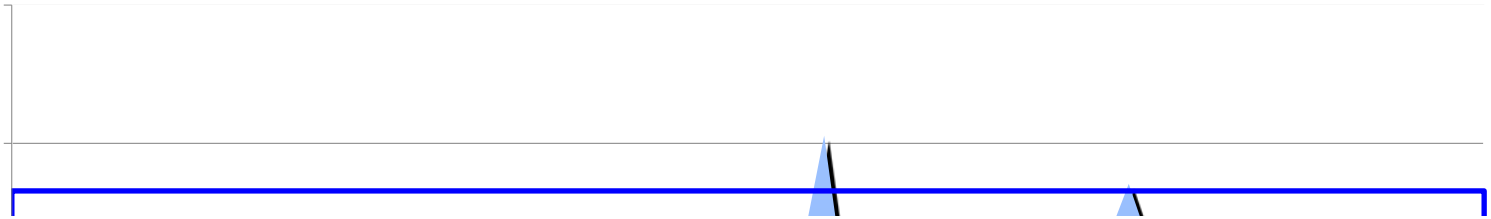
Green River at Green River, UT
Ice Affected



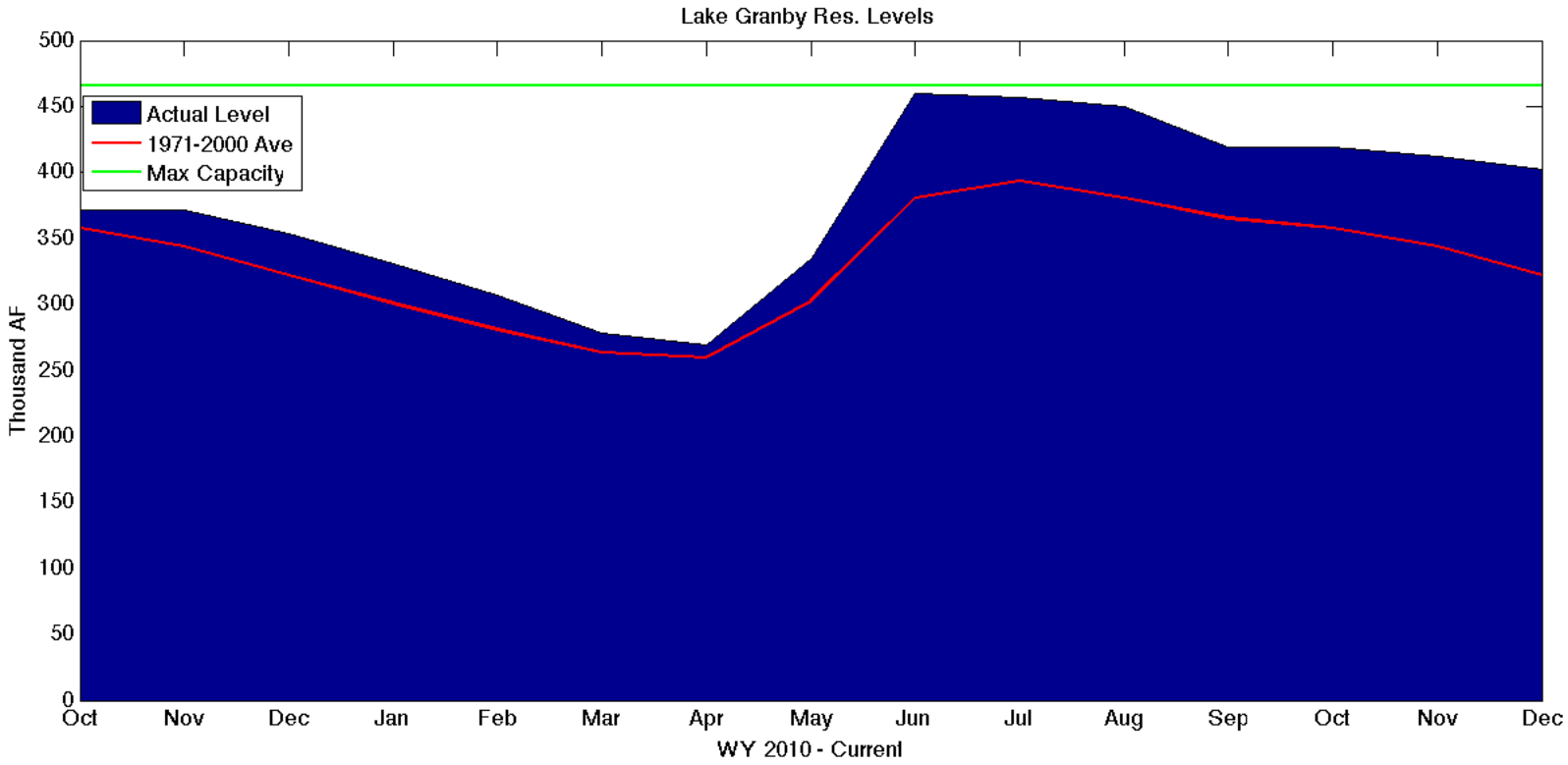
Reservoir Update

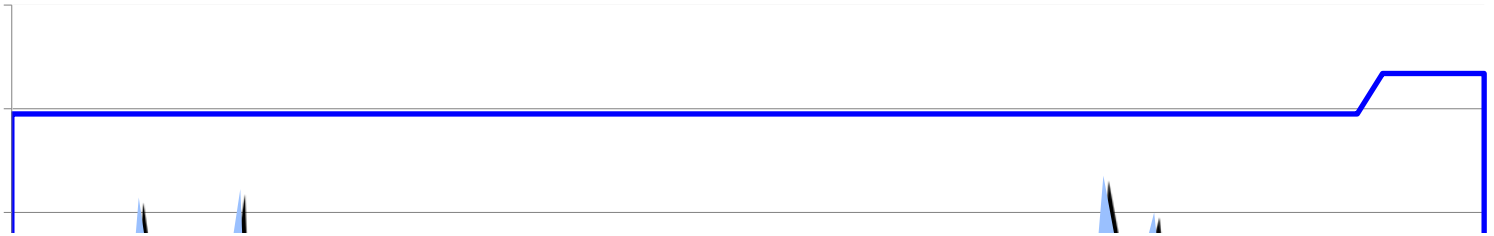

Max Capacity
1971-2000 Ave


Flaming Gorge Res. Levels
Actual Level
1971-2000 Ave
Max Capacity
Thousand AF
4000
3500
3000
2500
2000
1500
1000
500
0
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
WY 2010 - Current

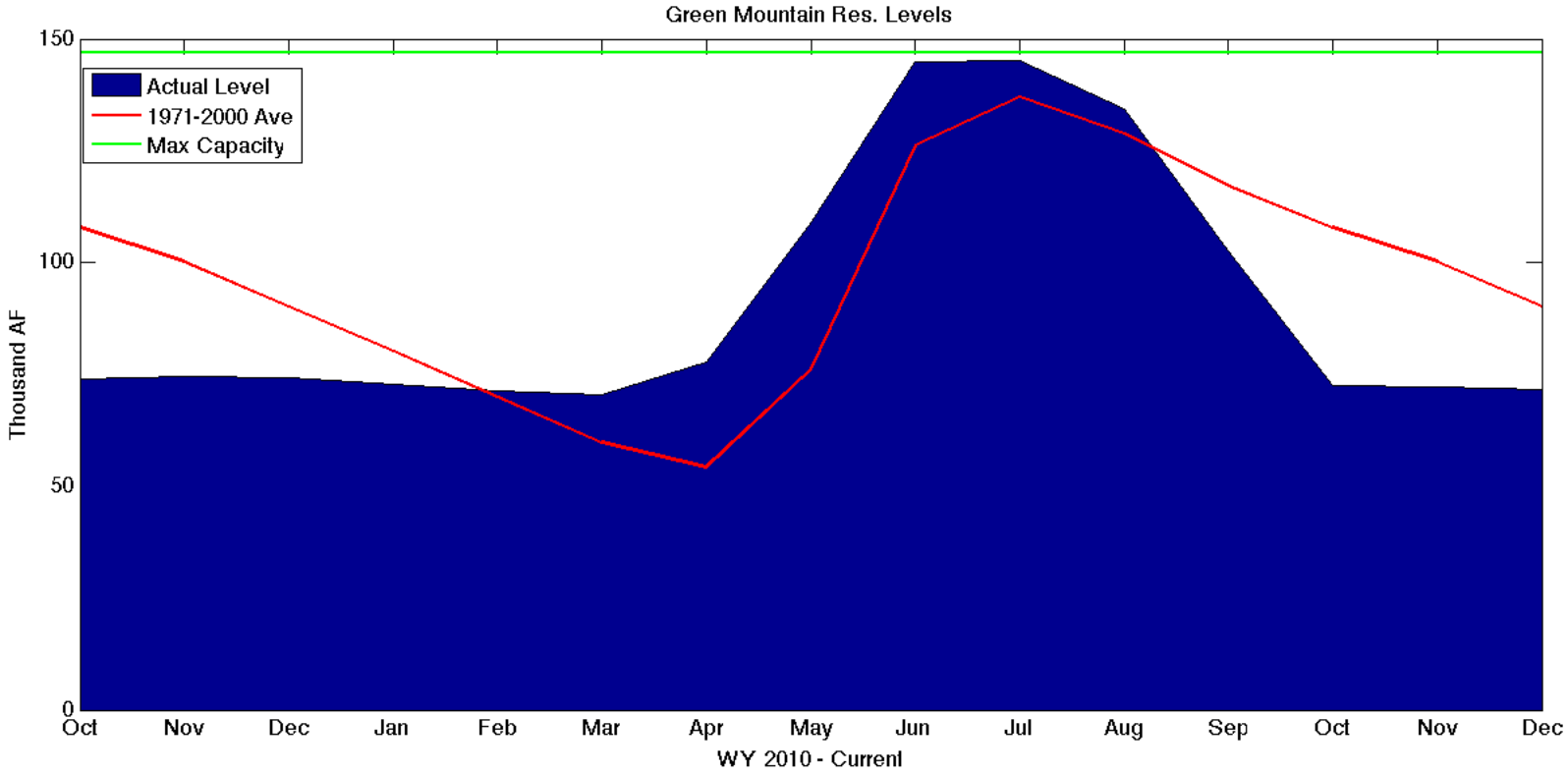


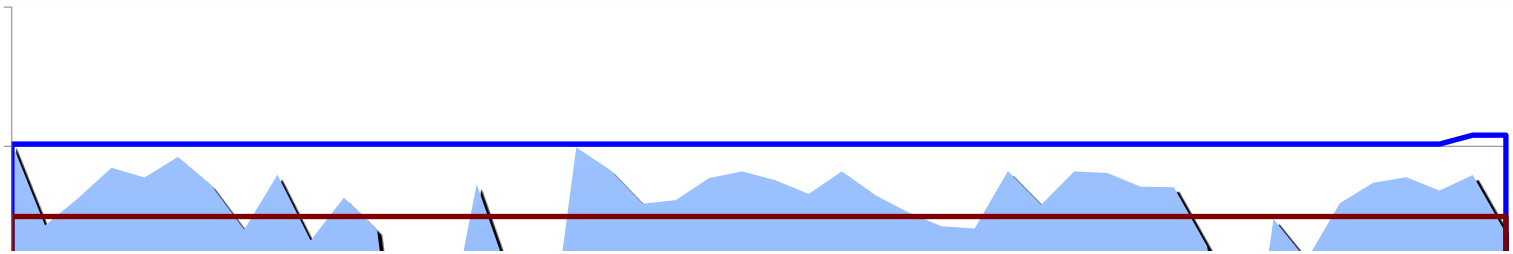
Max Capacity

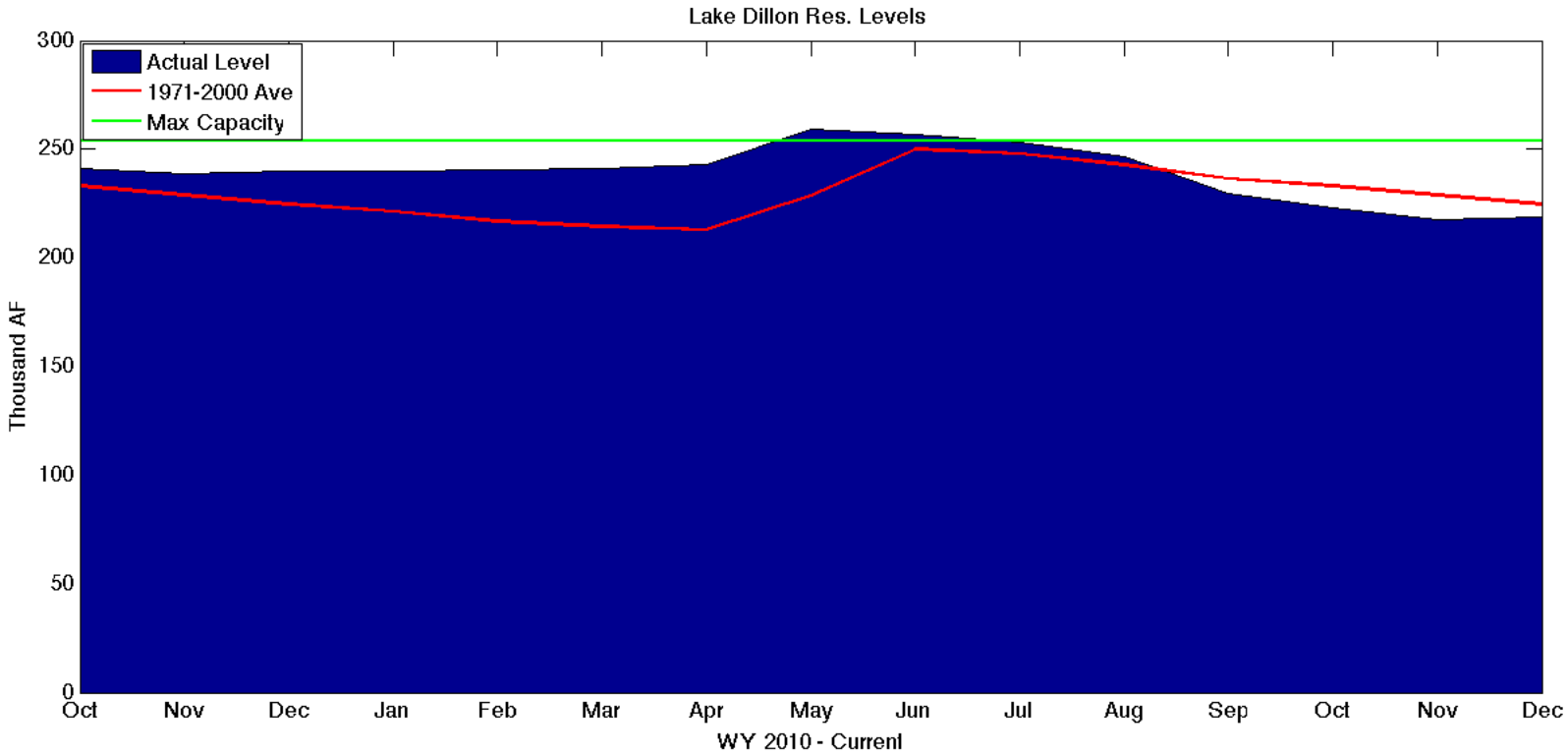




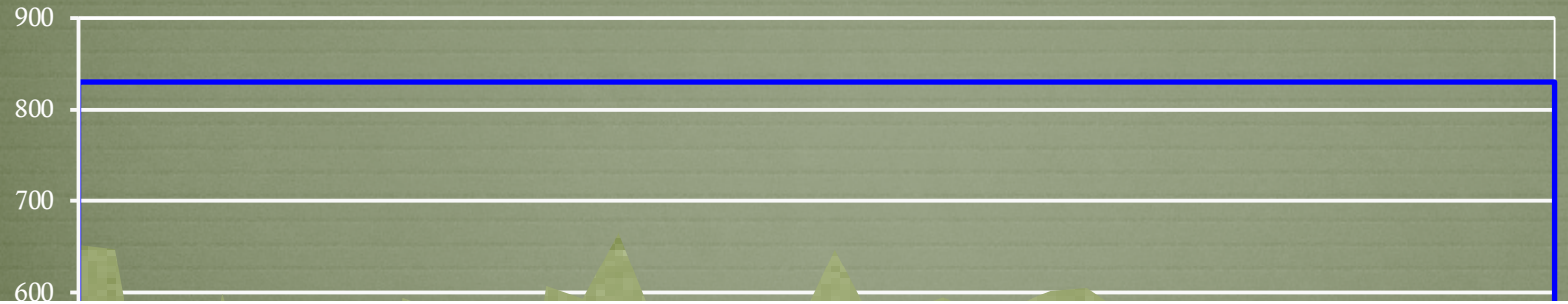
Max Capacity

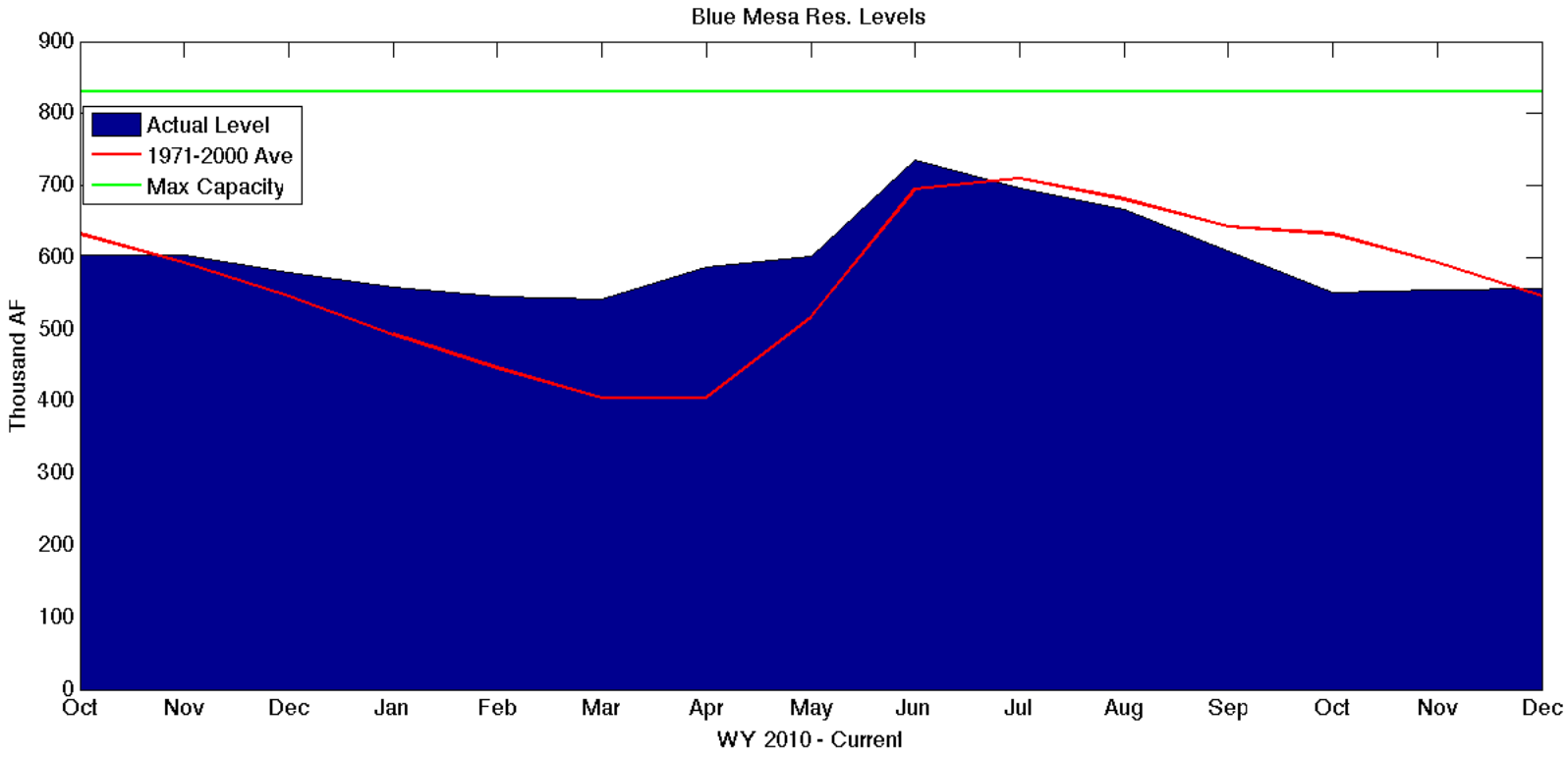



Max Capacity
1971-2000 Ave

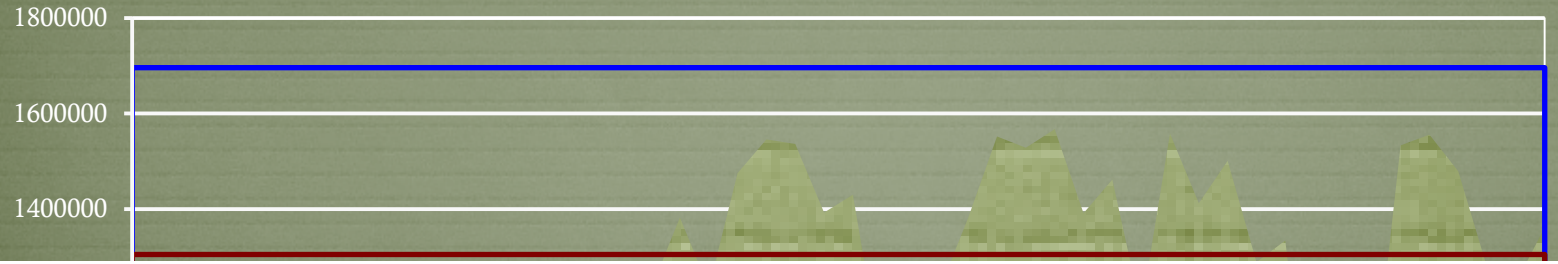

Lake Dillon Res. Levels
Actual Level
1971-2000 Ave
Max Capacity
Thousand AF
300
250
200
150
100
50
0
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
WY 2010 - Current

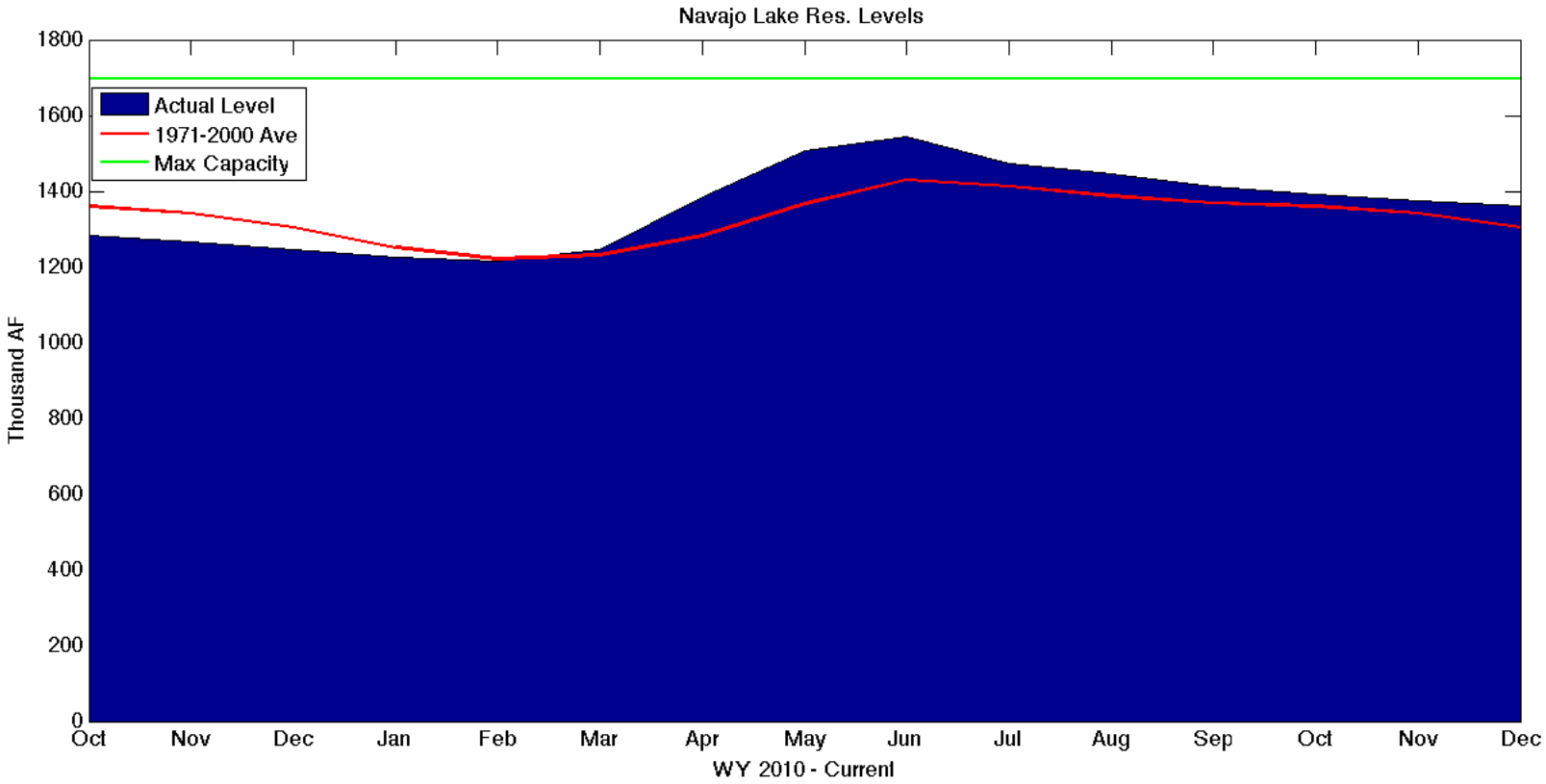
Blue Mesa December Reservoir Storage



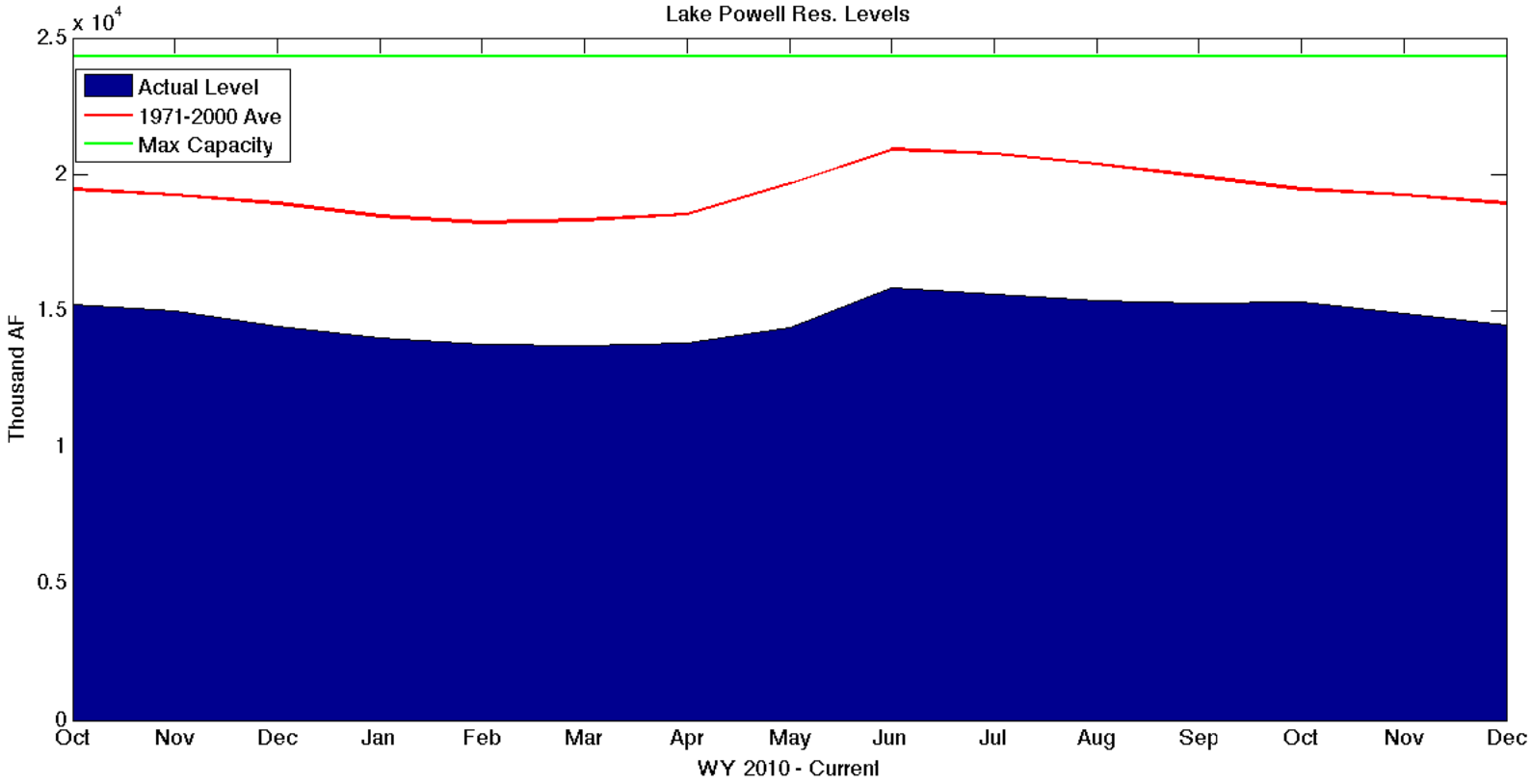


Navajo Lake December Reservoir Storage

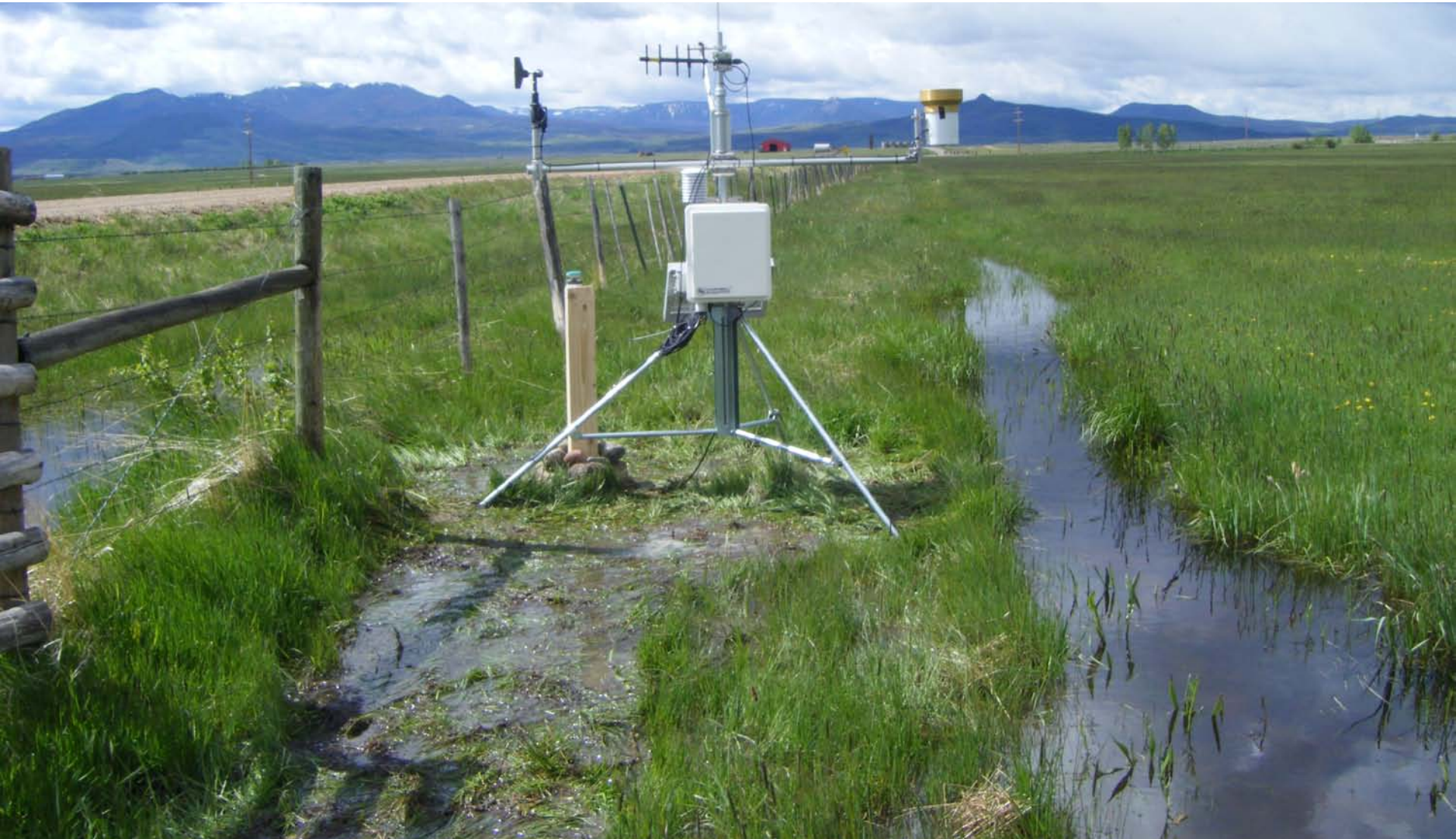




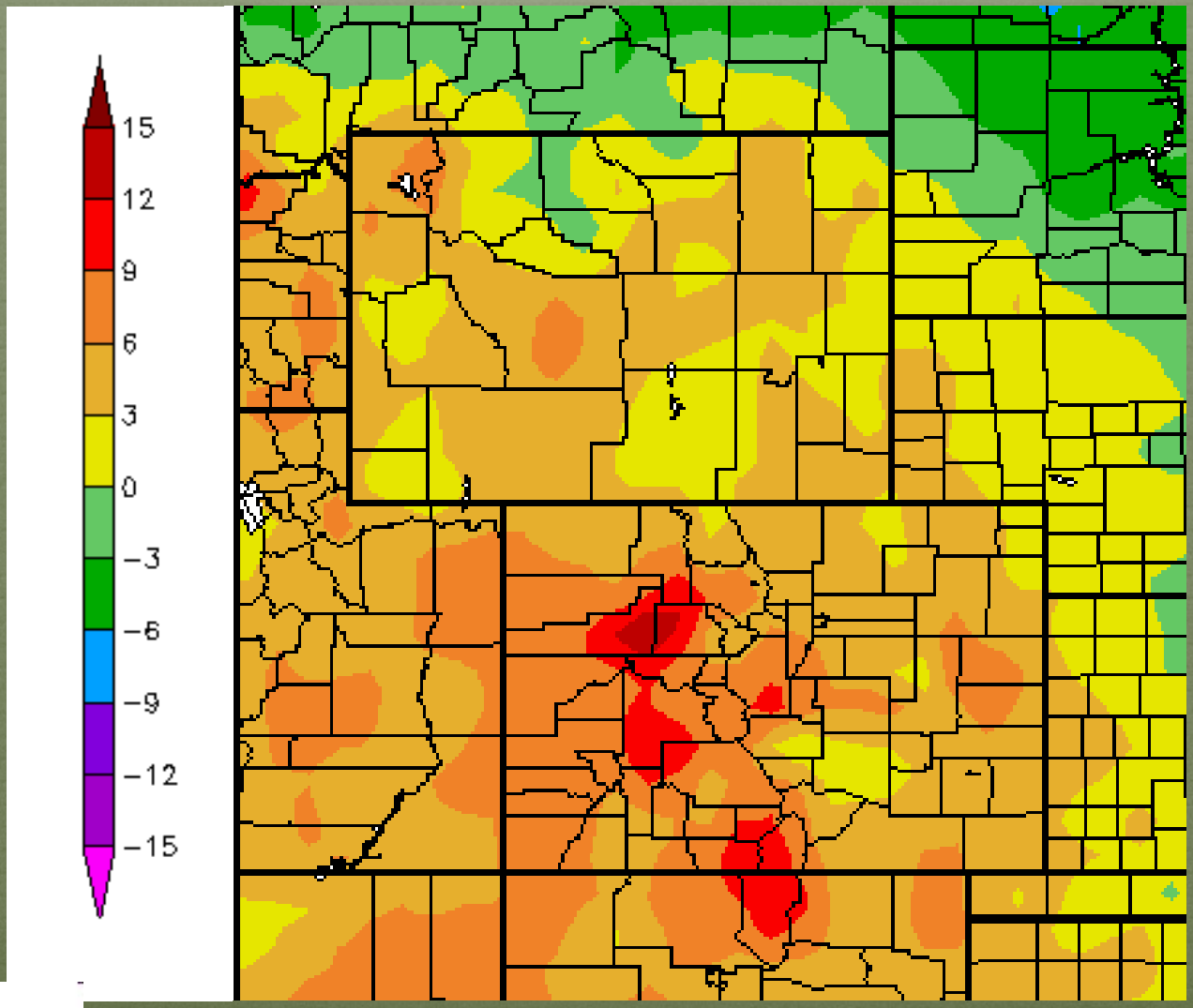
Lake Powell December Reservoir Storage



Water Demand

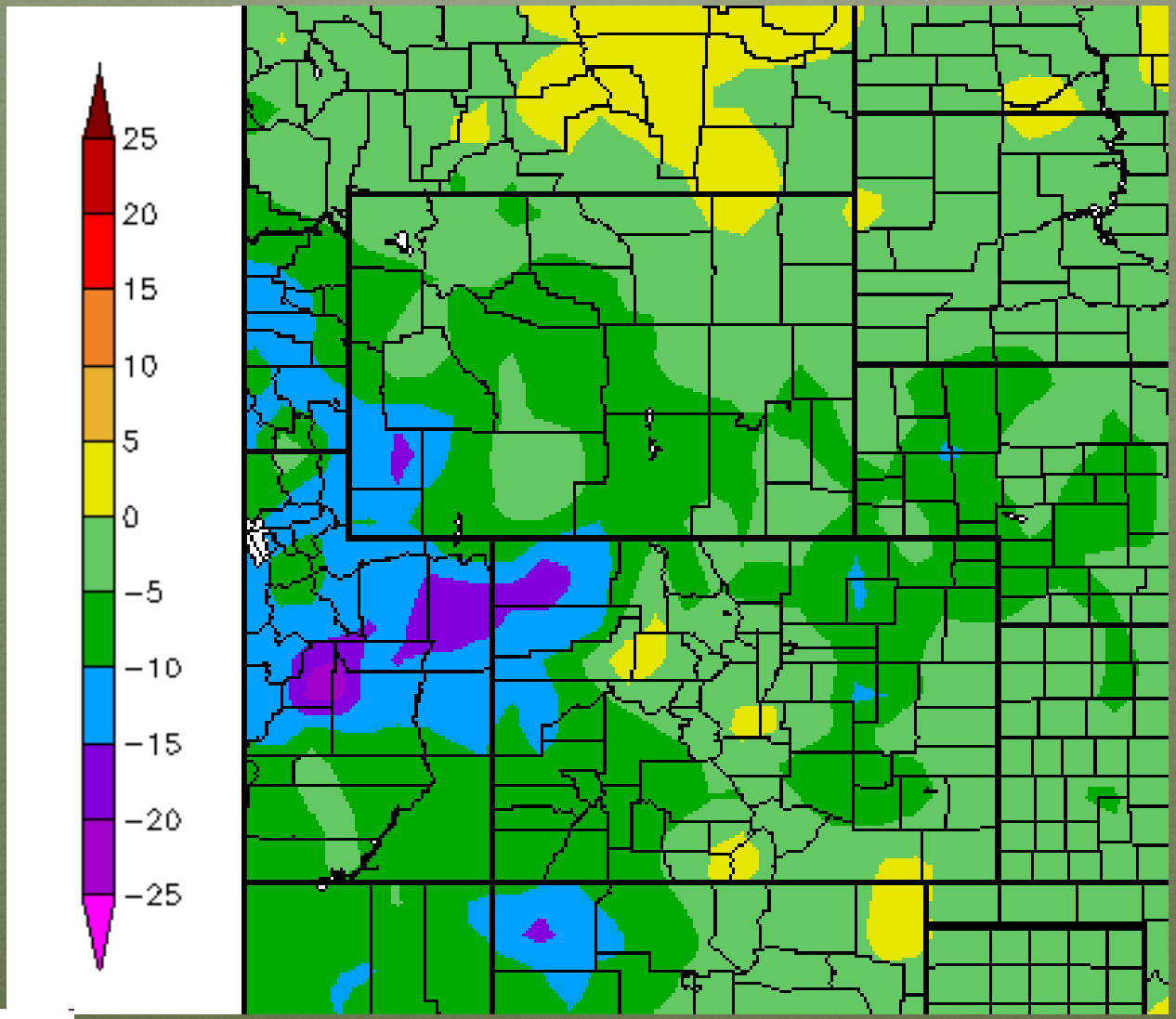


Temperature Departure from Normal
12/1/2010 – 12/31/2010

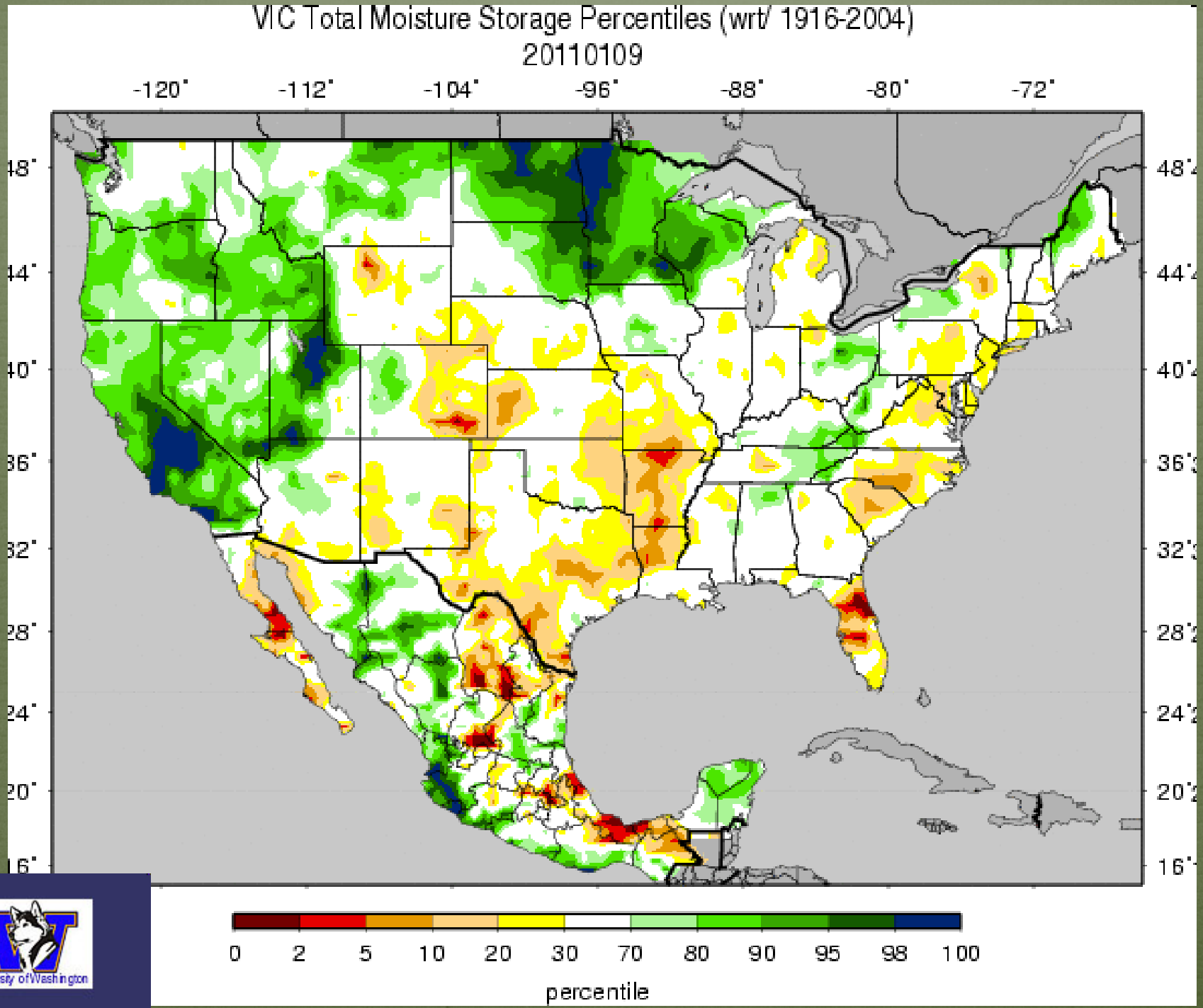


High Plains Regional Climate Center

Temperature Departure from Normal
1/1/2011– 1/10/2011



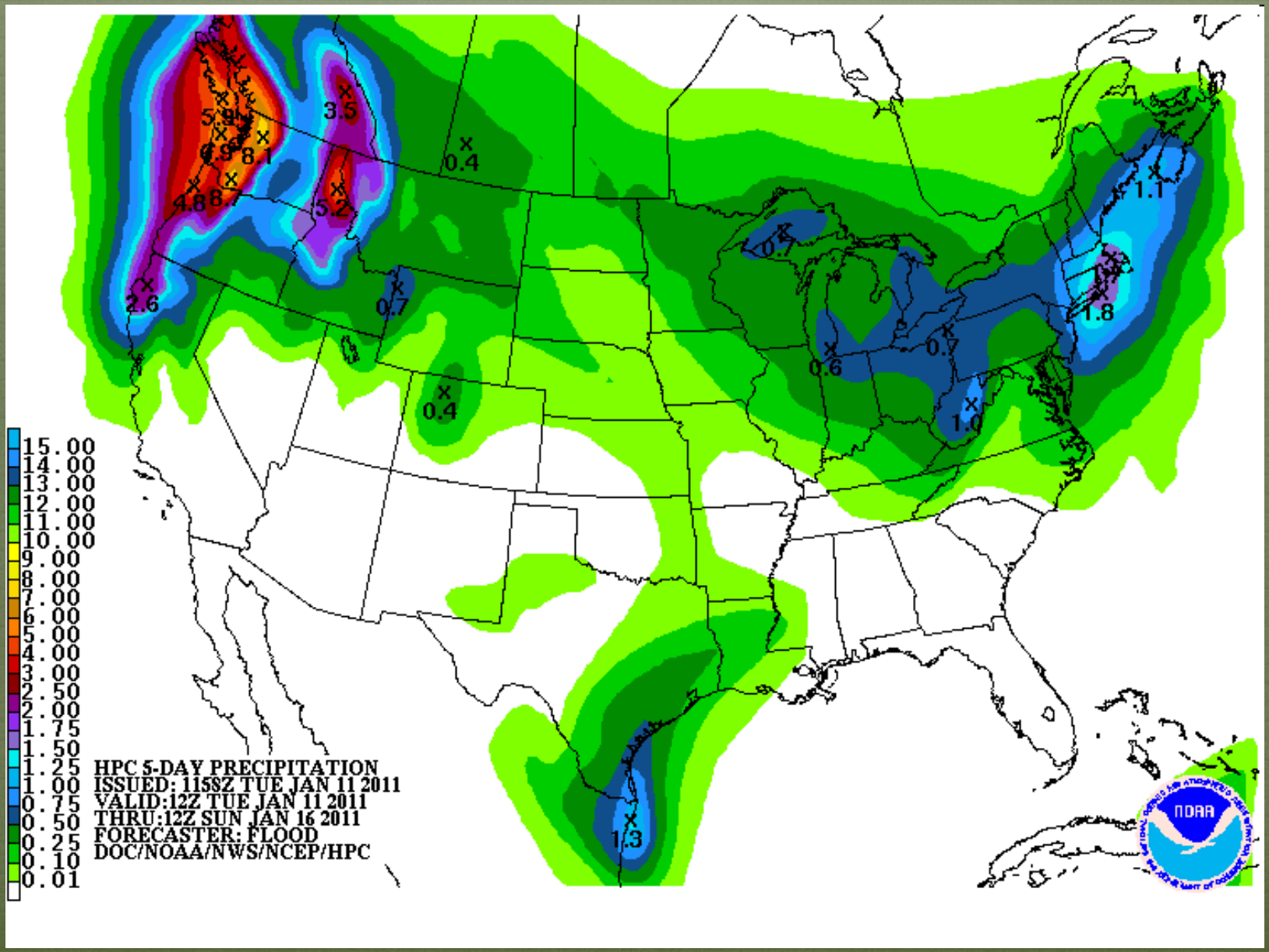
High Plains Regional Climate Center



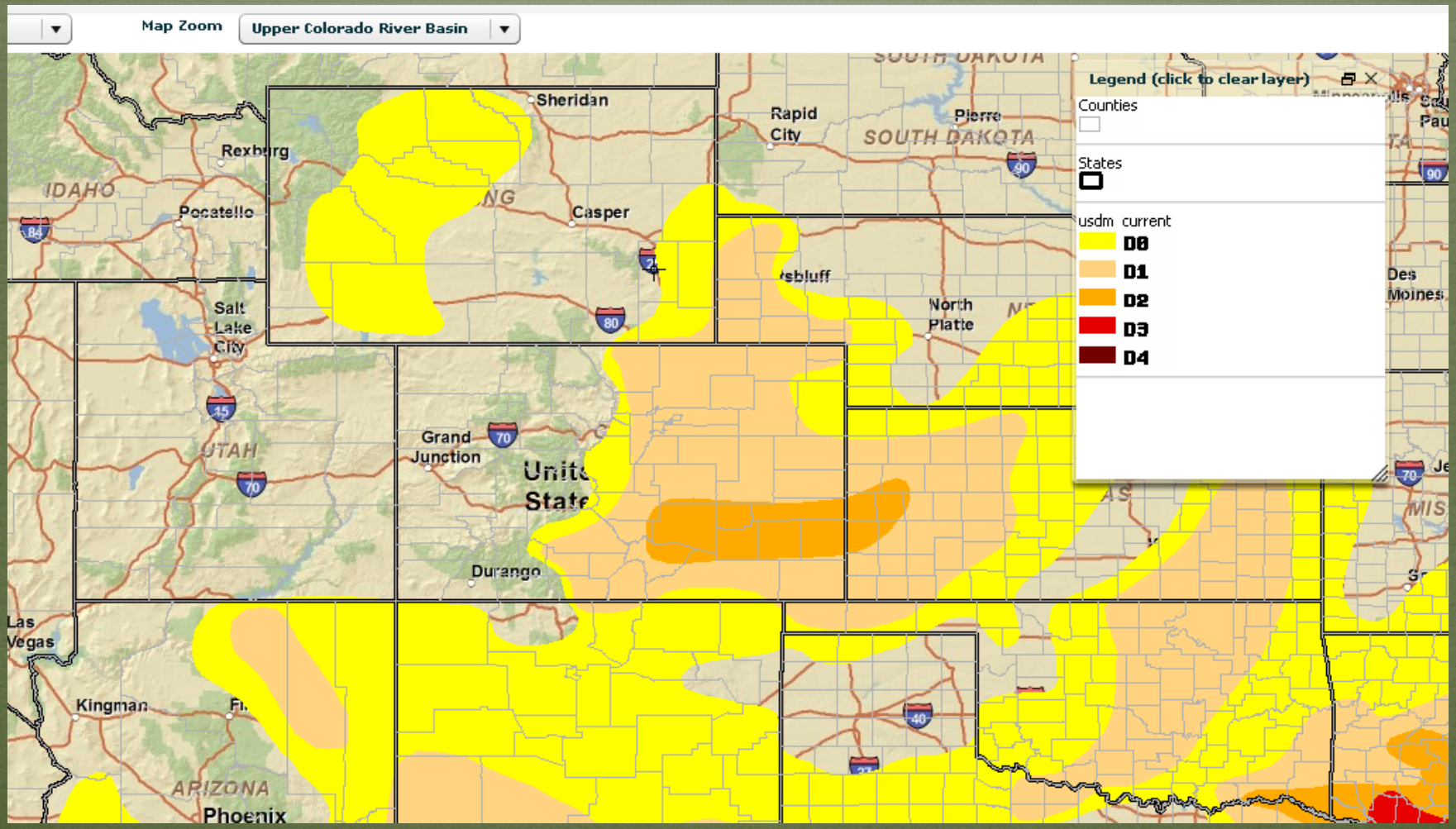
University of Washington

Precipitation Forecast

5 Day QPF


15.00
14.00
13.00
12.00
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.50
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.10
0.01
HPC 5-DAY PRECIPITATION
ISSUED: 1158Z TUE JAN 11 2011
VALID:12Z TUE JAN 11 2011
THRU:12Z SUN JAN 16 2011
FORECASTER: FLOOD
DOC/NOAA/NWS/NCEP/HPC
NOAA

Recommendations



INFO

For more information

NIDIS Weekly Climate, Water and Drought Assessment Summary Upper Colorado River Basin January 11, 2011

Precipitation and Snowpack

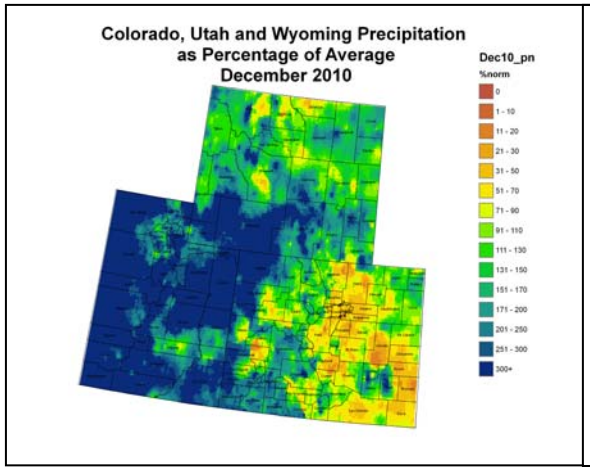


Figure 1: December 2011 Precipitation as Percentage of Average

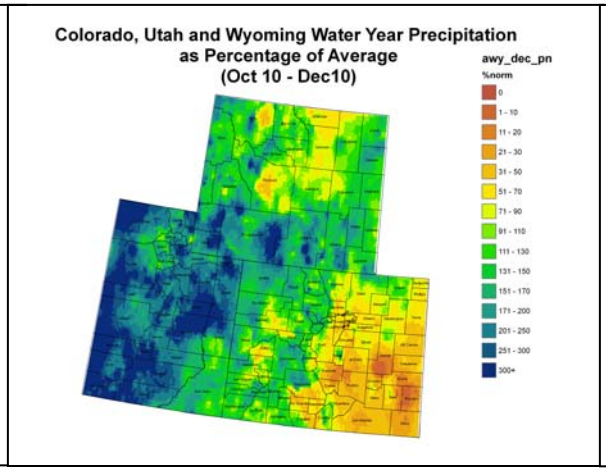


Figure 2: Water Year 2011 Precipitation as Percentage of Average

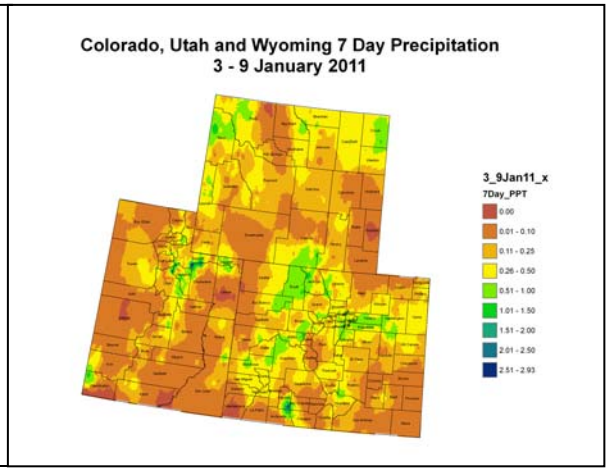


Figure 3: 7 Day Precipitation for 3 – 9 January 2011.

The majority of the Upper Colorado River Basin (UCRB) has received well above average precipitation for both December (Figure 1) and the water year overall (Figure 2). For the water year , the UCRB ranges from 91 to greater than 300 % of average. The exceptions to this include the valley areas on the Western slope and the majority of Colorado's Eastern plains, which are currently under drought designation by the U.S. Drought Monitor. Over that past week (Figure 3), the entire UCRB did receive some beneficial moisture, however it was below average for the mountains. It did finally benefit the Eastern plains of Colorado, however precipitation amounts were generally less than 0.50" and require no improvements to the current drought depiction. The Upper Colorado headwaters are at 136% of average for the water year.

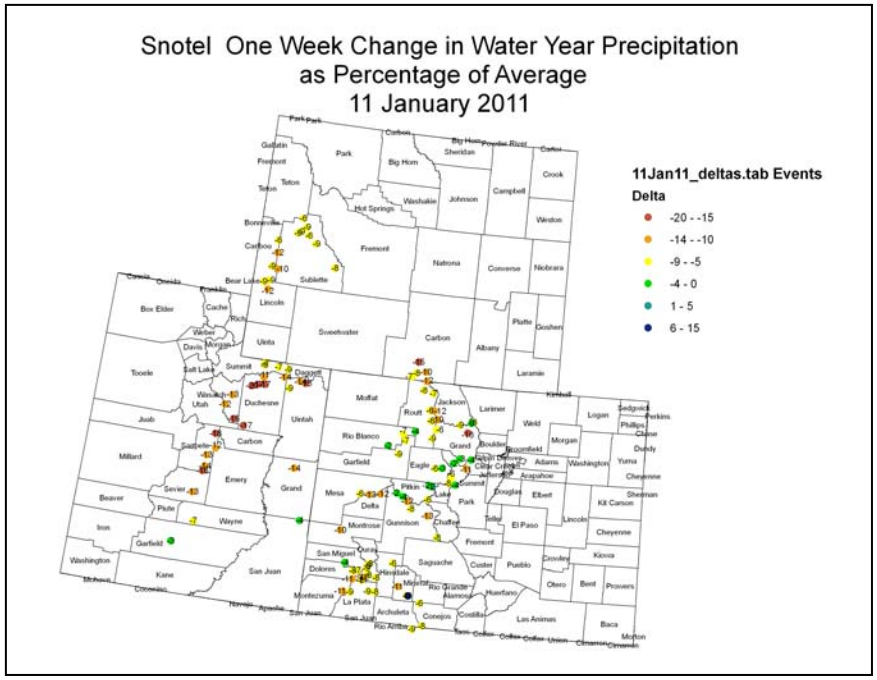


Figure 4: Snotel One Week Change in Water Year Precipitation Percent of Average.

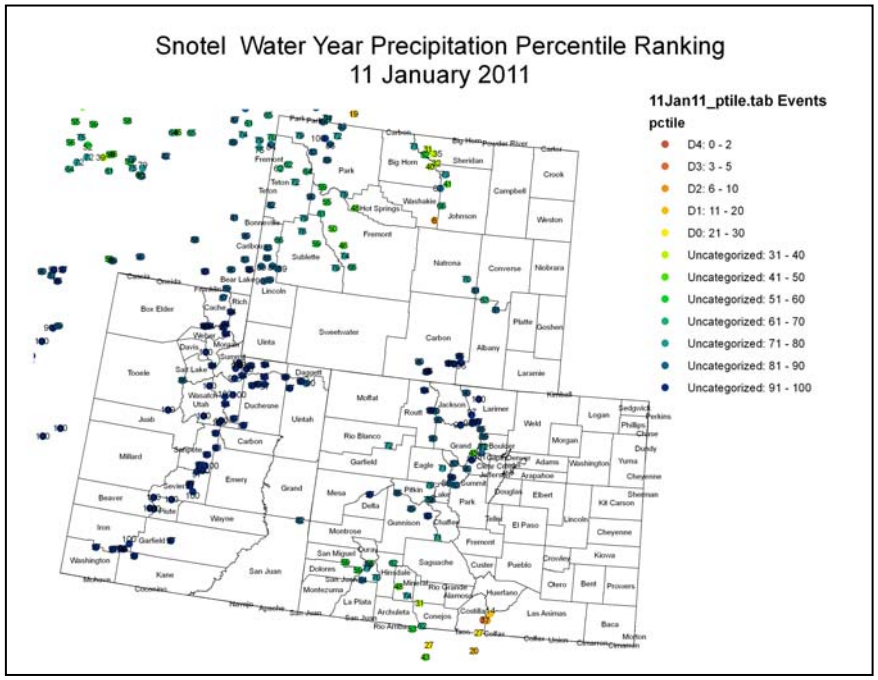


Figure 5: Snotel Water Year Precipitation Percentile Ranking.

Snotel weekly change in water year precipitation percents of average decreased at nearly all locations in the UCRB (Figure 4). The mountains did receive precipitation over the past week, however it was not enough to keep up with the normal precipitation for this time of year. The largest decreases were seen in Duchesne and Uintah counties in Utah due to their percents of average being so high the previous week. Figure 5 shows the percentile rankings for Snotel water year precipitation. These rankings are excellent for the UCRB with many of the Utah stations ranking above 90 (and many at 100), this indicates that it is one of the wettest starts to the Water Year at these locations. The NRCS reports this to be the best start to a Water Year since 1997. The exception to this is the Rio Grande basin, which is still showing percentile rankings in the 20-30 range.

Streamflow

Seven day average discharge conditions across the UCRB are showing good percentile rankings (Figure 6) with 77% of the gages reporting at or above normal conditions (greater than 25th percentile).

Figure 7 shows time series for key sites in the UCRB. The Colorado River at the CO-UT state line is 83% of normal (29th percentile) and the San Juan River near Bluff, UT is 92% of normal (41st percentile). The Colorado River gage did see a slight increase from last week while the San Juan gage decreased slightly from last week. Overall, streamflow conditions are favorable for this time of year.

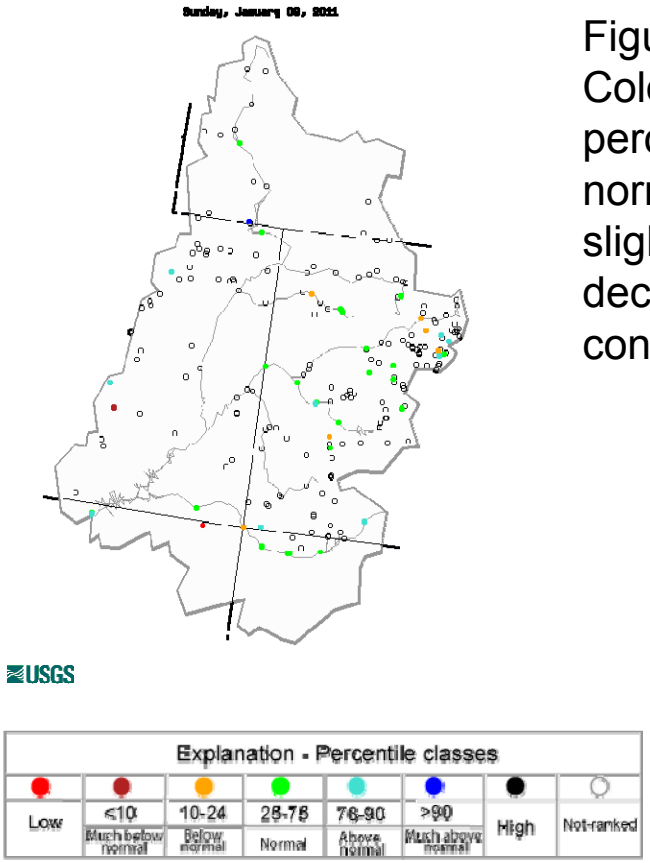


Figure 6: 7-day average discharge compared to historical discharge for January 9th.

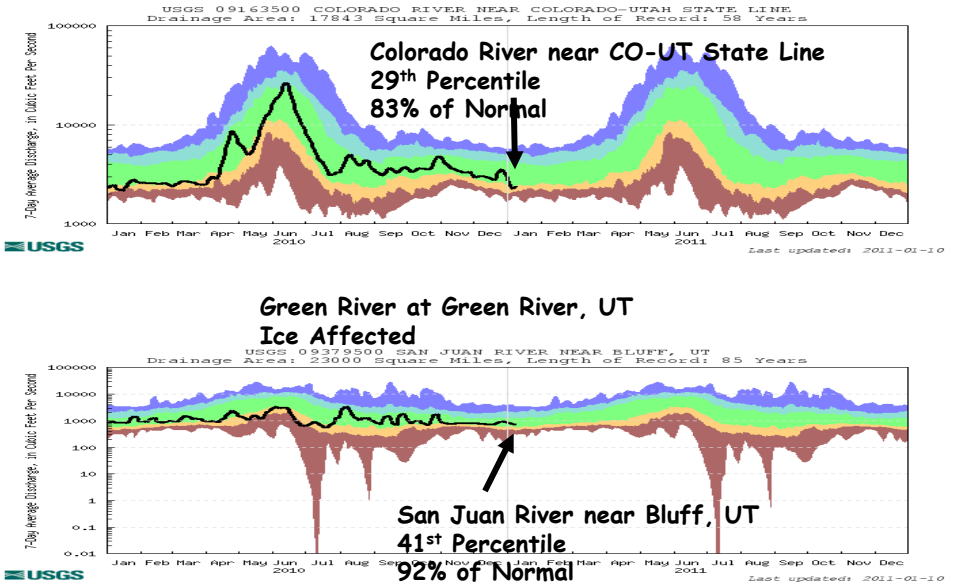


Figure 7: USGS 7 - day average discharge time series at the CO - UT state line (top), Green River, UT
(middle) and Bluff, UT (bottom). Note Green River is ice affected.

Water Supply and Demand

Temperatures:

Over the past week (Figure 8), temperatures were well below average for the majority of the UCRB, following extended periods of above average temperatures this Winter. The coldest areas were in NW Colorado, NE Utah and SW Wyoming. These areas saw temperature in the range of 10 -20 degrees below average. Cooler temperatures coupled with beneficial moisture have kept soil moisture conditions unchanged (Figure 9).

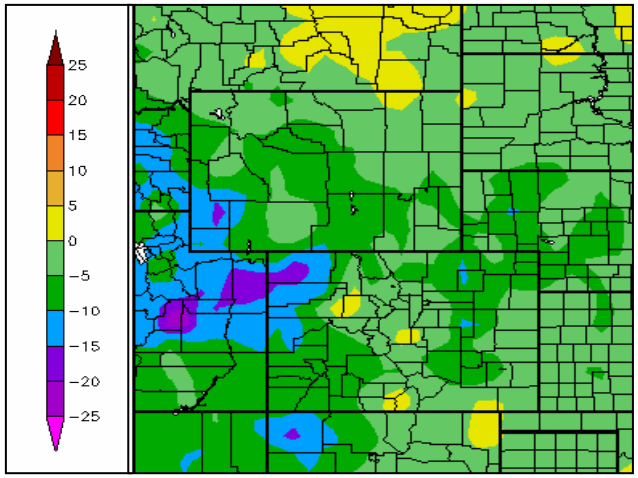


Figure 8: Temperature departure from average at NWS Cooperative stations from 1 - 10 January 2011.

Reservoirs and Flow Forecasts:

Thanks in part to generous December precipitation and warm temperatures, December inflow into Lake Powell was 96% of average, greater than originally forecast. Based on early January conditions, the April - July water supply forecasts are currently anticipating above average flows in much of the UCRB. We are currently in a critical period for decision making governing UCRB reservoir operations and releases out of Lake Powell, especially in light of the above average inflow forecasts. Fortunately, reservoirs in the UCRB upstream from Lake Powell are all near or above average for this time of year.

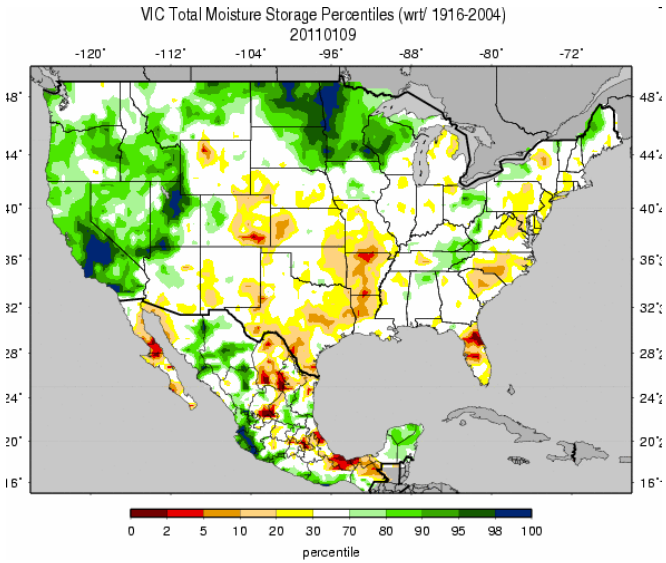


Figure 9: VIC soil moisture model for 9 January 2011.

Precipitation Forecast

The forecast for the UCRB over the next week is rather quiet. Quantitative precipitation forecasts (QPF) show the best chance of precipitation around 0.40" for the UCRB, mainly in the Northern and Central mountains in Colorado and the Green River Basin in Wyoming through Sunday (Figure 10). This pattern is forecast to persist into the next week, providing normal to less than normal precipitation amounts for the mountains for this time of year.

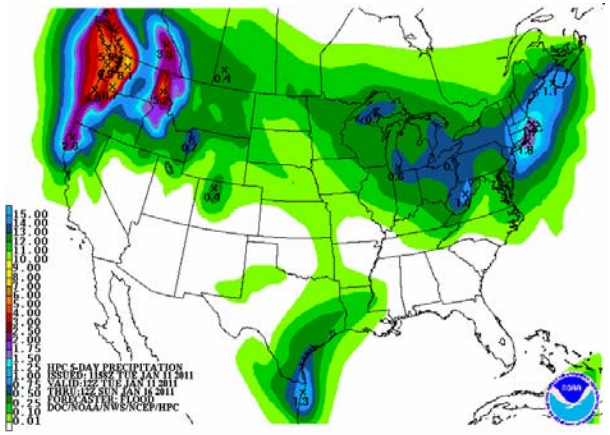


Figure 10: 5 Day QPF for the U.S. valid from Tues, Jan 10th through Sunday, January 16th.

Recommendations

In light of the excellent snowpack conditions and some beneficial moisture falling on the Eastern Plains, status quo has been recommended for the majority of the UCRB. One area of concern is the D0 around the four corners area ending directly on the Colorado/Utah border (Figure 11). In light of this, it was recommended that the USDM author look at this area to make sure the D0 is accurately depicted. Arizona input suggested the Colorado Plateau is very dry and D0 should remain in that area. No input or suggestions were made for northern New Mexico.

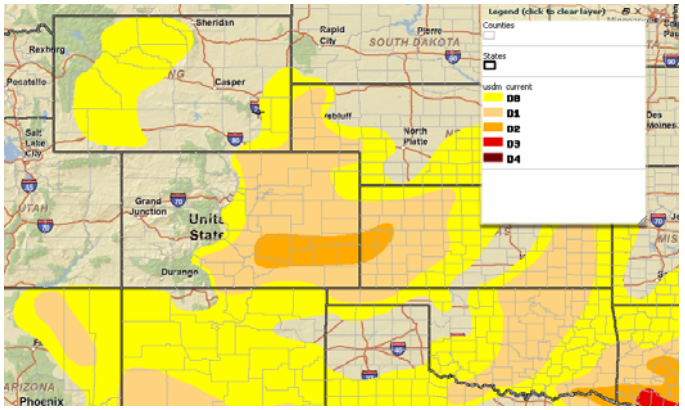


Figure 11: Current U.S. Drought Monitor, showing odd D0 border near the four corners area.