NE Drought Conditions CARC Update: March 28, 2014

Mark Svoboda and Brian Fuchs
National Drought Mitigation Center
University of Nebraska-Lincoln
School of Natural Resources

Current Conditions around Nebraska and the region…

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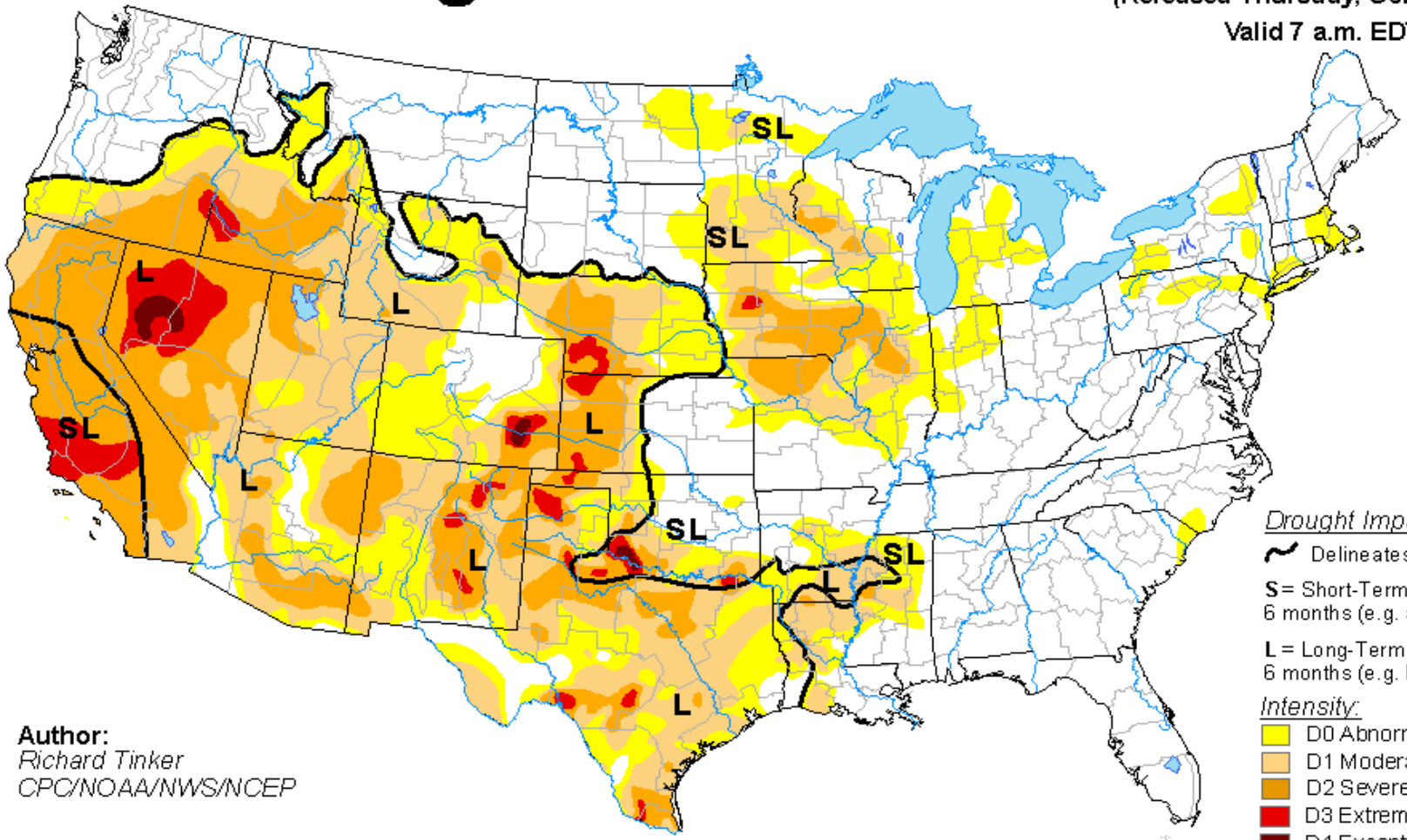
National Drought Mitigation Center

U.S. Drought Monitor

October 15, 2013

(Released Thursday, Oct. 17, 2013)

Valid 7 a.m. EDT



Author:
Richard Tinker
CPC/NOAA/NWS/NCEP

Drought Impact Types:

~ Delineates dominant impacts

S = Short-Term, typically less than 6 months (e.g. agriculture, grasslands)

L = Long-Term, typically greater than 6 months (e.g. hydrology, ecology)

Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
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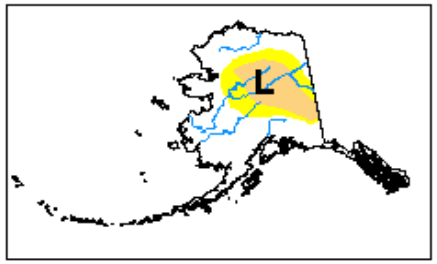
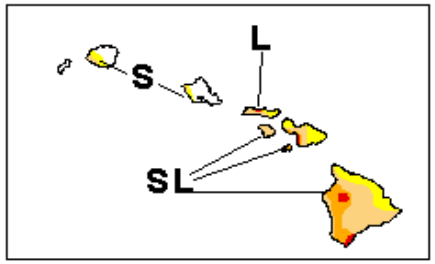
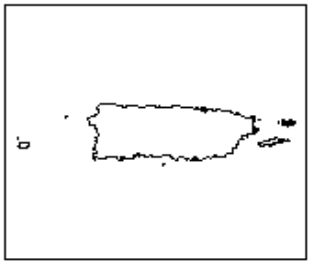
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.







USDA National Drought Mitigation Center

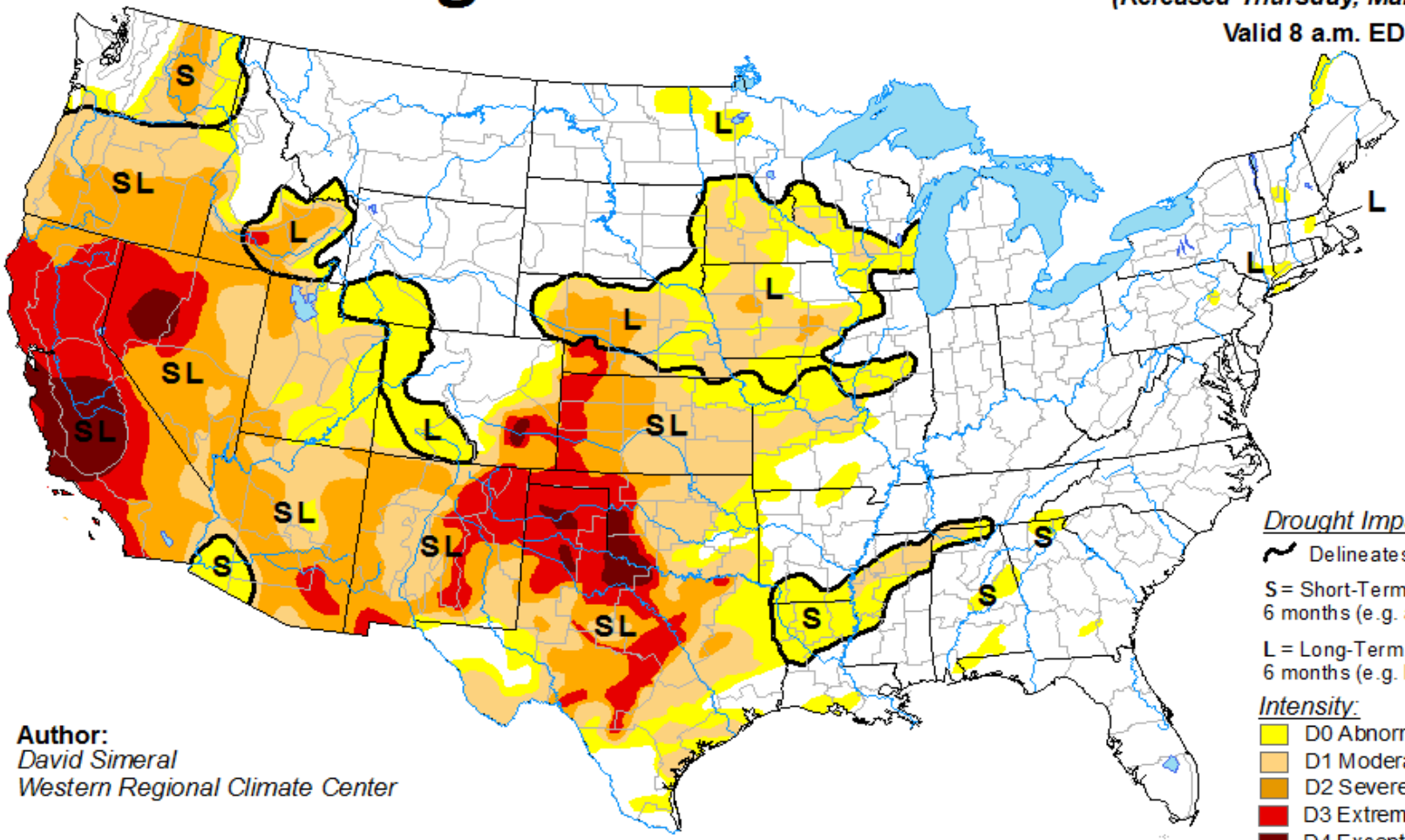
http://droughtmonitor.unl.edu/

U.S. Drought Monitor

March 25, 2014

(Released Thursday, Mar. 27, 2014)

Valid 8 a.m. EDT



Author:
David Simeral
Western Regional Climate Center

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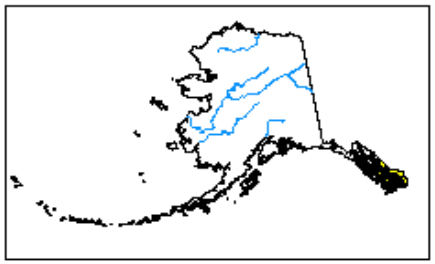

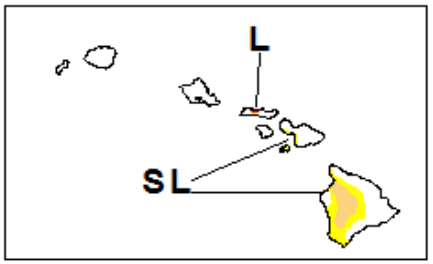

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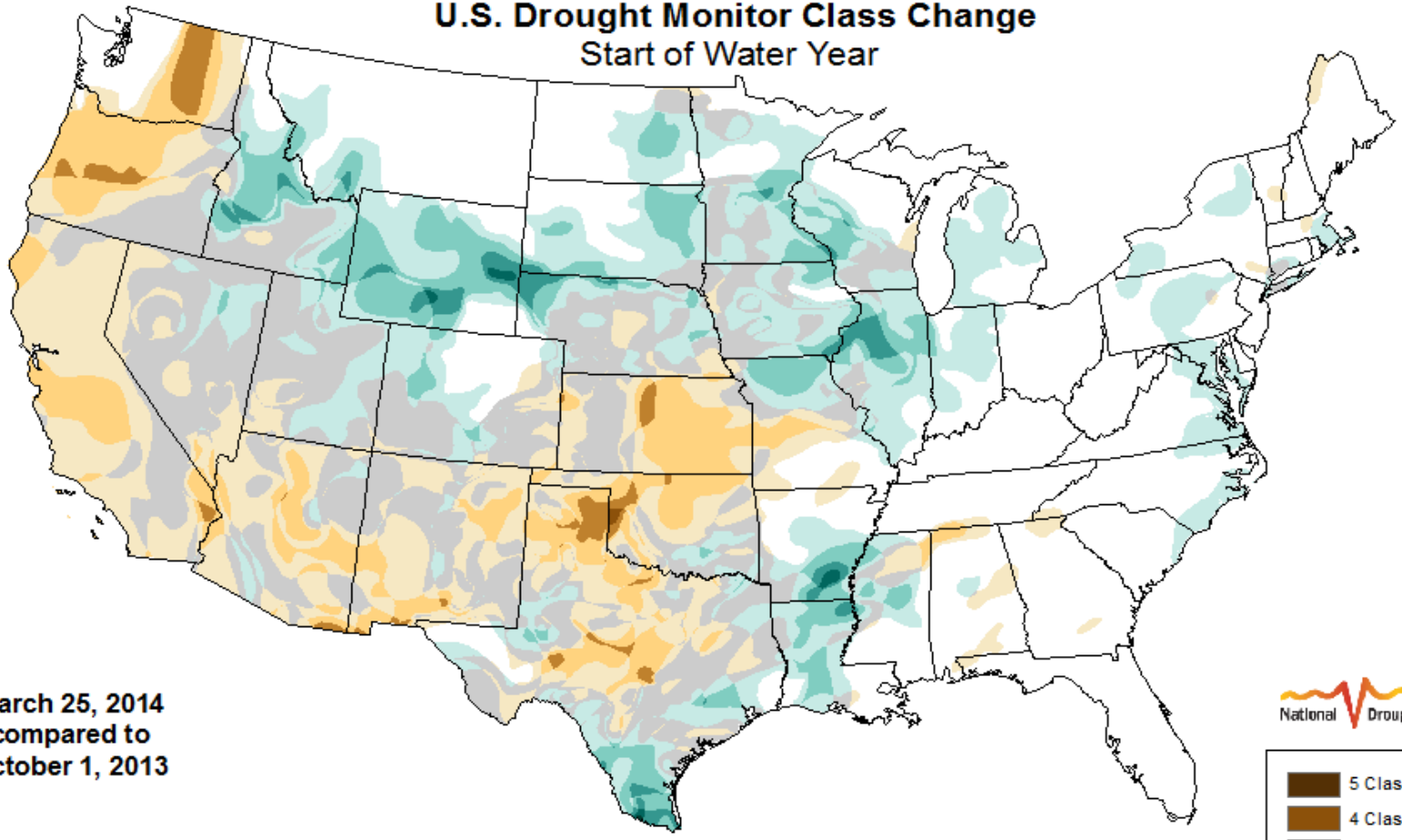
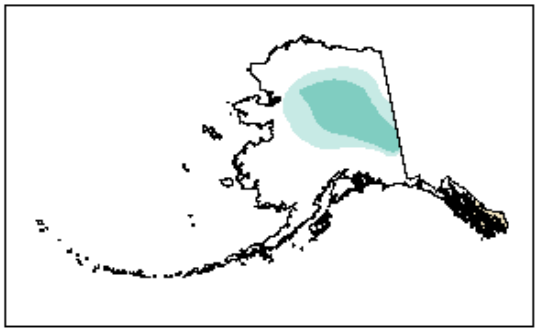
U.S. Drought Monitor Class Change

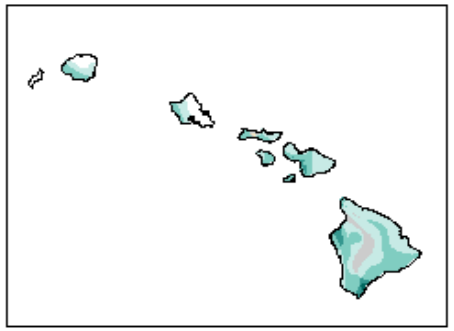
Start of Water Year

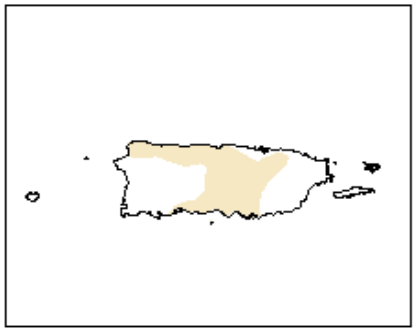


March 25, 2014 compared to October 1, 2013

National Drought Mitigation Center





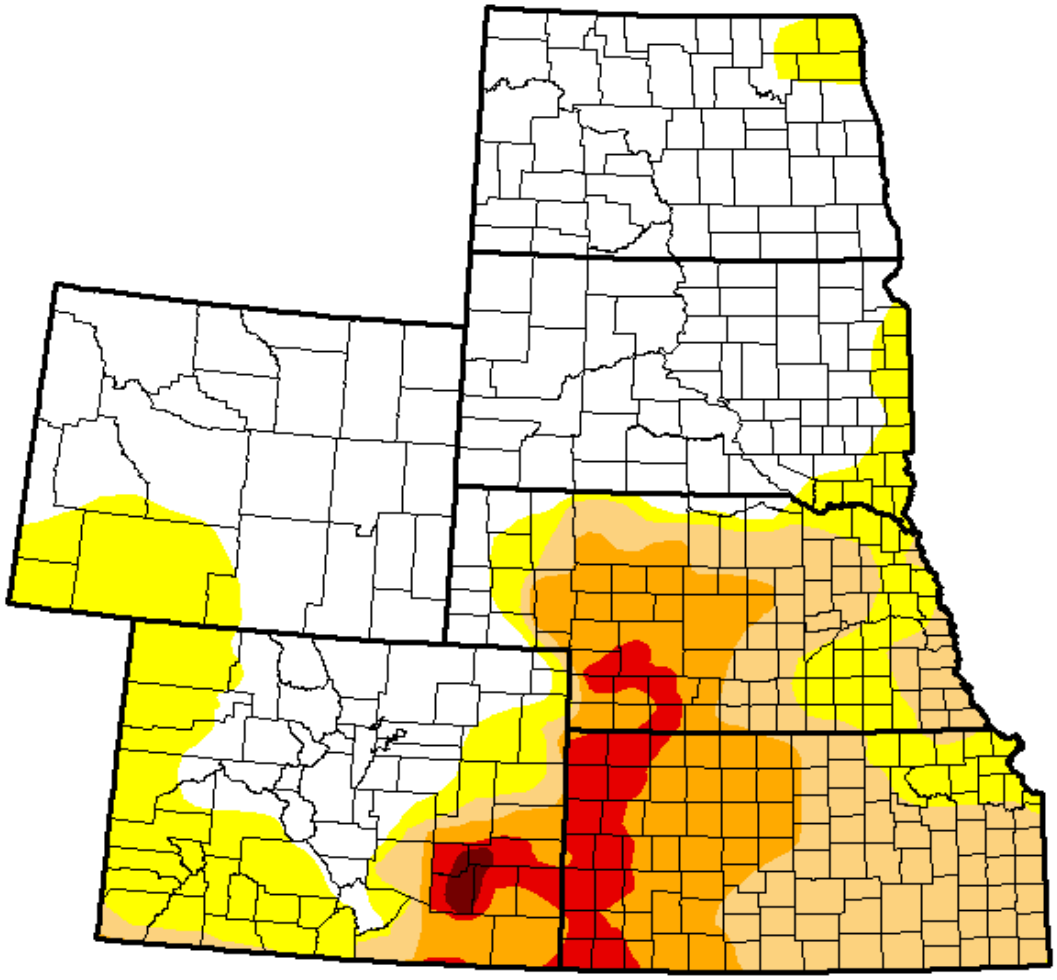


- 5 Class Degradation
- 4 Class Degradation
- 3 Class Degradation
- 2 Class Degradation
- 1 Class Degradation
- No Change
- 1 Class Improvement
- 2 Class Improvement
- 3 Class Improvement
- 4 Class Improvement
- 5 Class Improvement

http://droughtmonitor.unl.edu

U.S. Drought Monitor

High Plains



March 25, 2014

(Released Thursday, Mar. 27, 2014)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	52.35	47.65	29.23	14.68	4.13	0.30
Last Week *3/18/2014*	53.06	46.94	27.87	14.42	4.09	0.30
3 Months Ago *12/24/2013*	45.79	54.21	20.60	12.28	2.60	0.30
Start of Calendar Year *12/31/2013*	45.79	54.21	20.60	12.28	2.44	0.30
Start of Water Year *10/1/2013*	29.87	70.13	43.21	19.50	3.01	0.30
One Year Ago *3/26/2013*	4.65	95.35	91.34	81.30	54.82	22.24

Intensity:

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- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
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Author:
David Simeral
Western Regional Climate Center

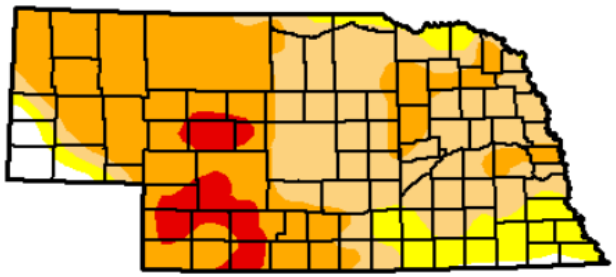
http://droughtmonitor.unl.edu/

U.S. Drought Monitor Weekly Comparison

Nebraska

Drought Severity

- D0 - Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional



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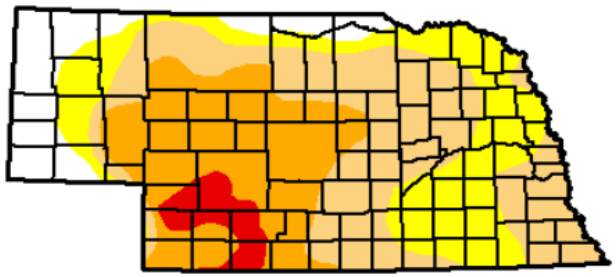
October 1, 2013



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March 18, 2014

Statistics | Time Series | Narrative

Statistics type: (•) Traditional (D0-D4, D1-D4, etc.) ( ) Categorical (D0, D1, etc.)

Week	Nothing	D0-D4	D1-D4	D2-D4	D3-D4	D4
10/1/2013	3.22	96.78	85.48	49.34	6.6	0
3/18/2014	11.88	88.12	64.93	30.67	4.38	0

U.S. Drought Monitor Weekly Comparison

Nebraska

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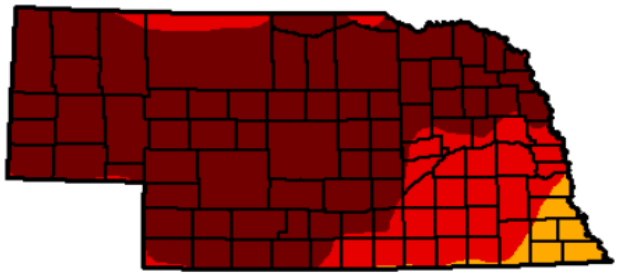
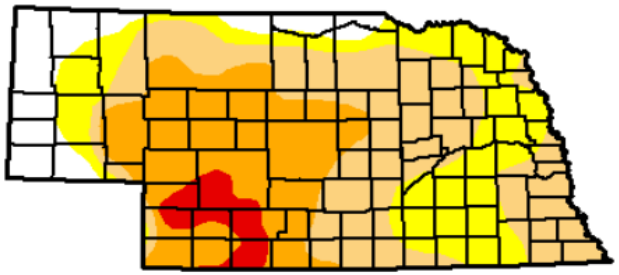


PNG PDF JPG

March 26, 2013



PNG PDF JPG

March 25, 2014

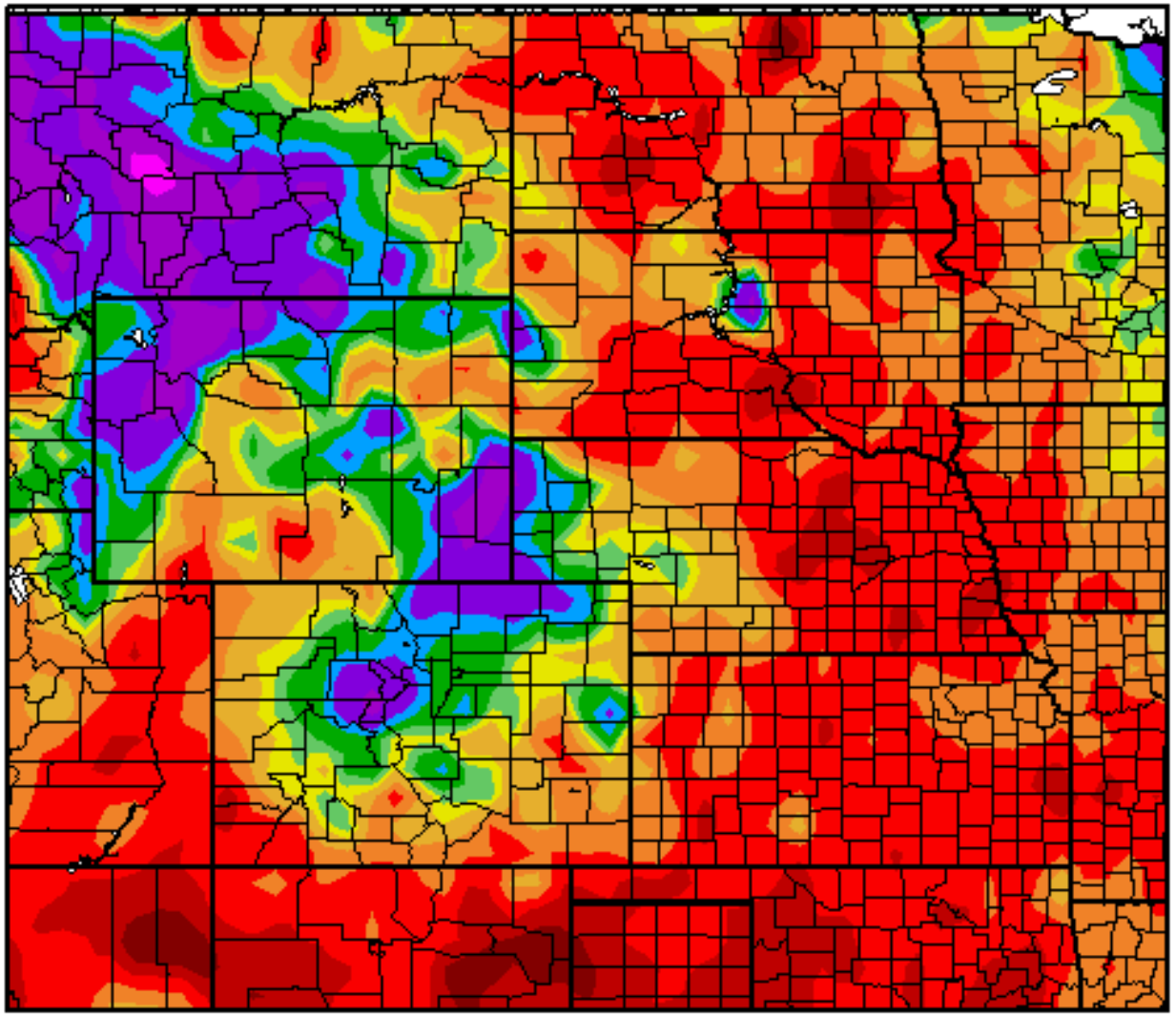
Statistics | Time Series | Narrative

Statistics type: (•) Traditional (D0-D4, D1-D4, etc.) ( ) Categorical (D0, D1, etc.)

Week	Nothing	D0-D4	D1-D4	D2-D4	D3-D4	D4
3/26/2013	0	100	100	100	96.13	76.16
3/25/2014	11.73	88.27	64.96	30.67	4.38	0

Percent of Normal Precipitation (%)

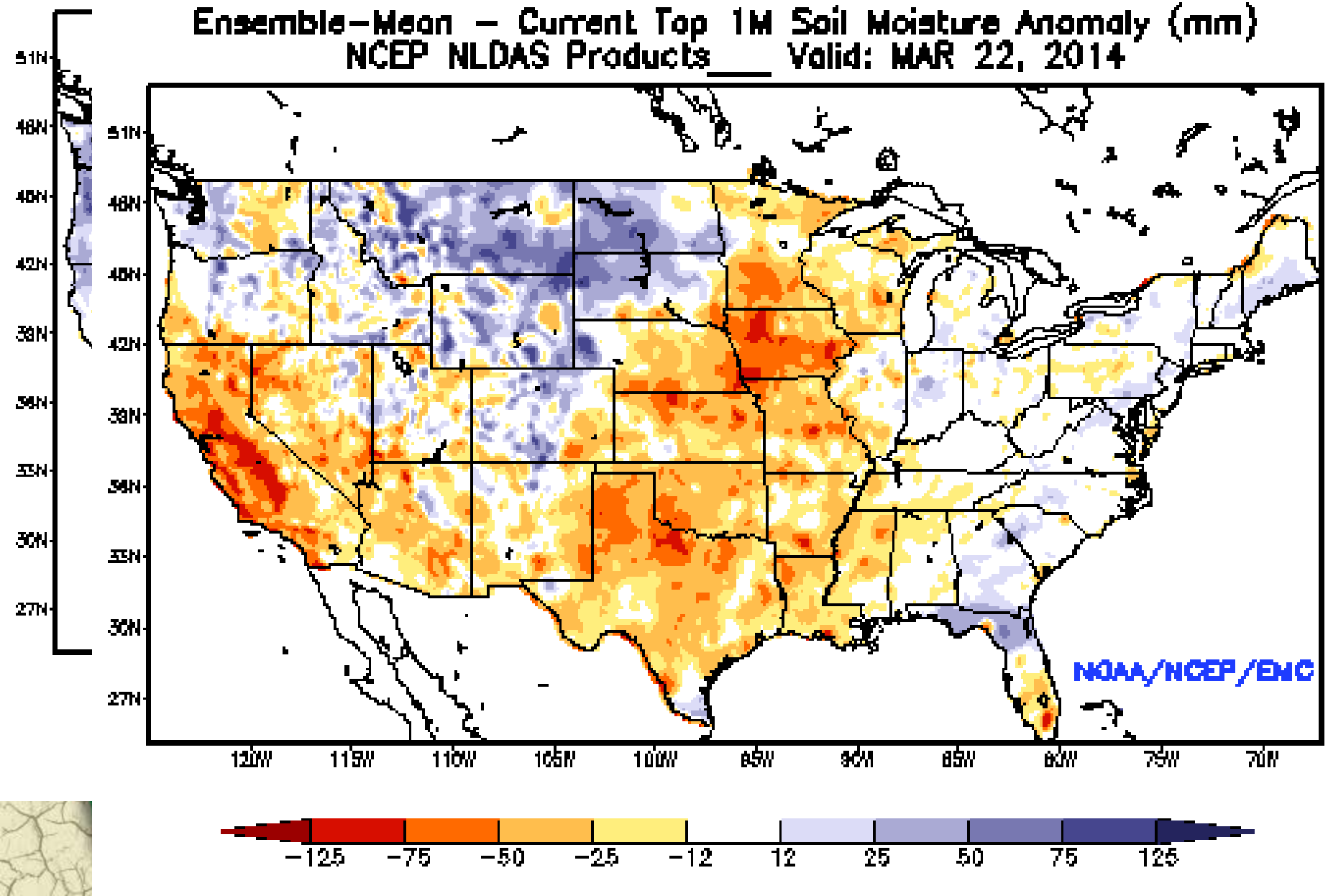
Percent of Normal Precipitation (%)
1/1/2014 – 3/26/2014



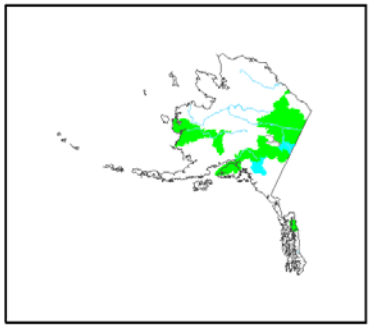
Generated

Generated 3/27/2014 at HPRCC using provisional data.

Regional Climate Centers


Ensemble-Mean - Current Top 1M Soil Moisture Anomaly (mm)
NCEP NLDAS Products___ Valid: MAR 22, 2014
51N
48N
45N
42N
39N
36N
33N
30N
27N
120W
115W
110W
105W
100W
95W
90W
85W
80W
75W
70W
NOAA/NCEP/EMC
-125
-75
-50
-25
-12
12
25
50
75
125

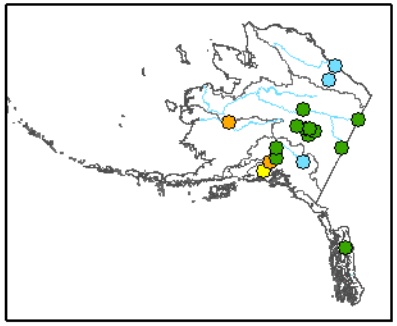
Spring and Summer Streamflow Forecasts as of March 1, 2013



Percent
1981 to 2010 Period
- > 180
- 150 - 180
- 130 - 149
- 110 - 129
- 90 - 109
- 70 - 89
- 50 - 69
- 25 - 49
- < 25
- No Forecast

Prepared by
USDA, Natural Resources Conservation Service
National Water and Climate Center
Portland, Oregon
http://www.wcc.nrcs.usda.gov

Spring and Summer Streamflow Forecasts as of March 1, 2014



Percent of
1981-2010 Average
- > 180
- 150 - 180
- 130 - 149
- 110 - 129
- 90 - 109
- 70 - 89
- 50 - 69
- 25 - 49
- < 25

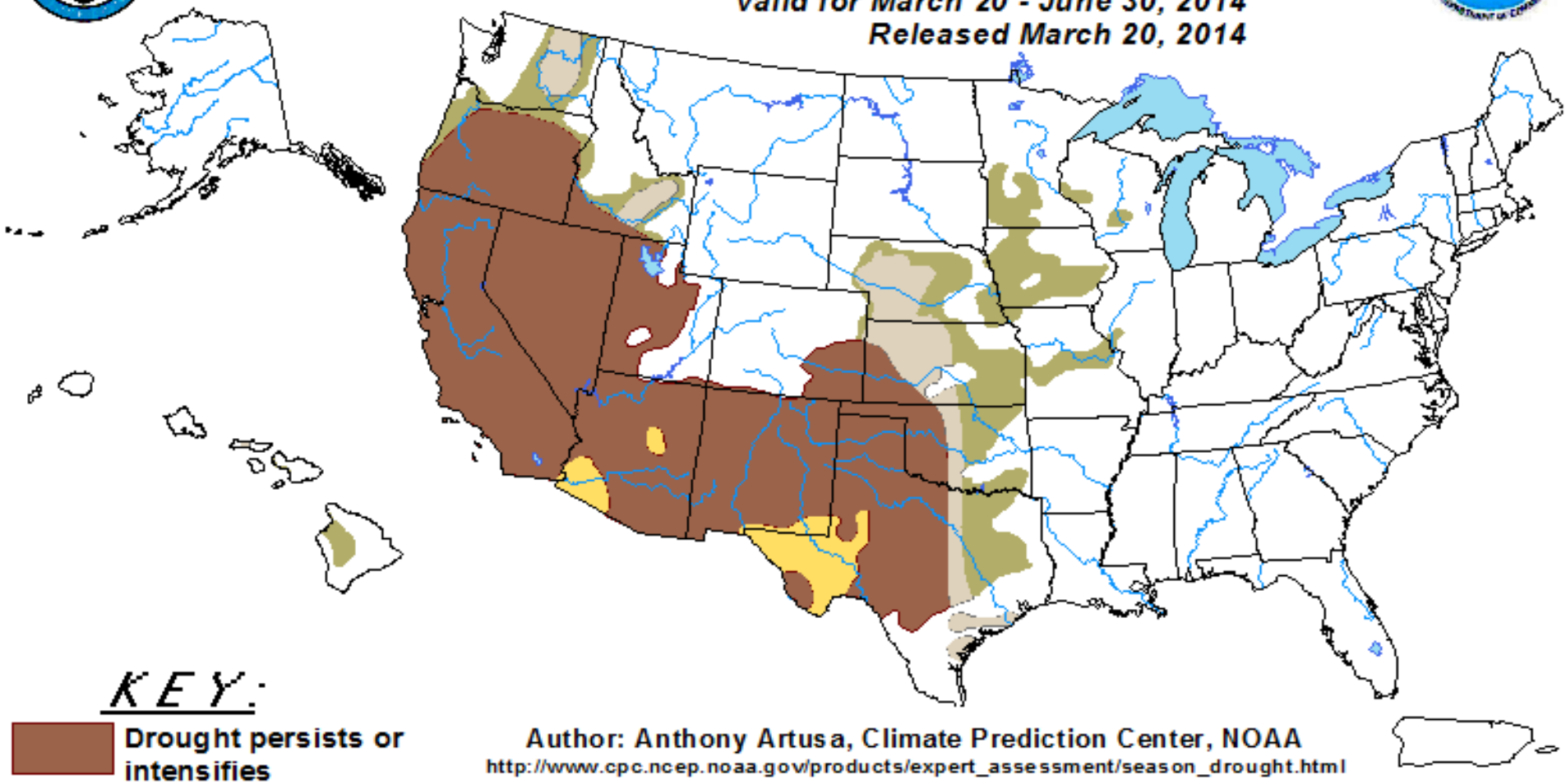
Prepared by:
USDA Natural Resources Conservation Service
National Water and Climate Center
Portland, Oregon
http://www.wcc.nrcs.usda.gov
Created: 10 Mar 2014 10:45

U.S. Seasonal Drought Outlook

Drought Tendency During the Valid Period

Valid for March 20 - June 30, 2014

Released March 20, 2014



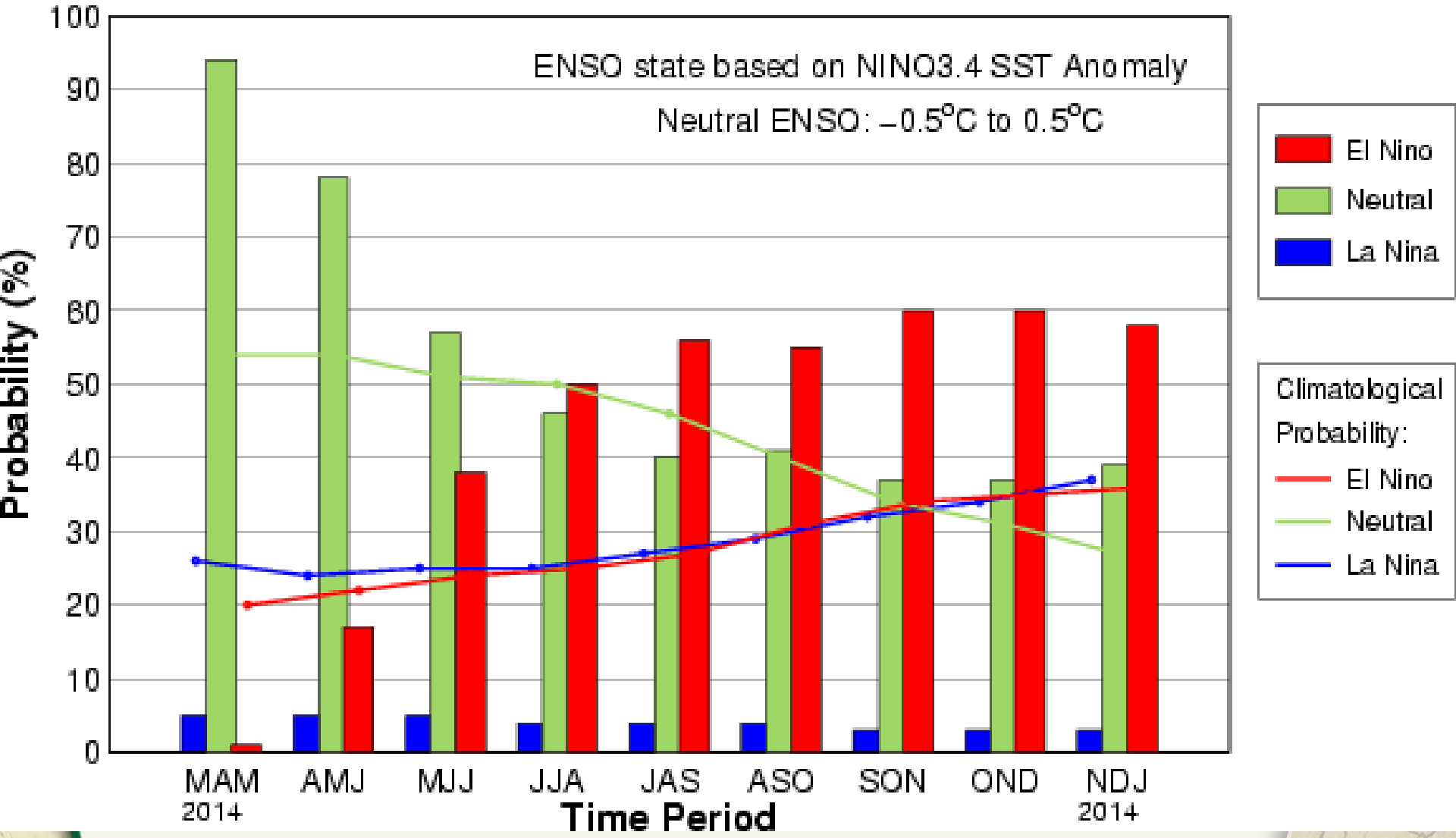
KEY:

- **Drought persists or intensifies**
- **Drought remains but improves**
- **Drought removal likely**
- **Drought development likely**

Author: Anthony Artusa, Climate Prediction Center, NOAA
http://www.cpc.ncep.noaa.gov/products/expert_assessment/season_drought.html

Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Short-term events -- such as individual storms -- cannot be accurately forecast more than a few days in advance. Use caution for applications -- such as crops -- that can be affected by such events. "Ongoing" drought areas are approximated from the Drought Monitor (D1 to D4 intensity).
For weekly drought updates, see the latest U.S. Drought Monitor.
NOTE: The tan area areas imply at least a 1-category improvement in the Drought Monitor intensity levels by the end of the period although drought will remain.
The Green areas imply drought removal by the end of the period (D0 or none)

Mid–Mar IRI/CPC Plume–Based Probabilistic ENSO Forecast



Climate/Drought Summary

- A winter of haves and have-nots in the region. Overall though, ***cold and dry w/ relatively dry snows*** in NE. Very little soil moisture recharge so far. ***Spring is going to be critical*** in making this deficit up as the soils thaw out.
- **38% of the contiguous U.S.** is currently in drought (D1 or worse). This time last year it was at **52%**.
- Current USDM (3/25) for NE shows **65% of the state in drought (D1-D4), down 20% (85%) since Oct. 1**
  - **Currently: 31% of NE in severe drought (D2)**
  - **Currently: 0% of NE in D4 and down to 4% in D3**
  - **100% of NE was in D1 or D2 a year ago this time**
  - **Southwest NE still feeling the brunt of the longer-term drought**
  - **Lack of soil moisture is a concern in NE and regionally, particularly to the south**

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Climate / Drought Summary

- The Climate Prediction Center's Seasonal Drought Outlook ***calls for improvement or removal of drought*** across the ***entire state*** by the end of June
  - I'm not as optimistic but I hope I'm wrong!
- Is ***El Niño*** on the way?

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Drought Risk Atlas (DRA):

- **Launched March 2014**
- **~3000 stations archived**
  - **139 clusters/regions developed and analyzed**
  - **SPI, SPEI, PDSI, sc-PDSI and Deciles through 2010**
  - **Weekly gridded maps for all parameters back to early 1900s**
- **Created to answer questions about the characteristics of drought:**
  - **Frequency/return periods**
  - **Duration**
  - **Trends**
  - **Intensity**
  - **Spatial extent**

- ***OPEN for business!***
- ***Droughtatlas.unl.edu***

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Nebraska Water Supply Update…

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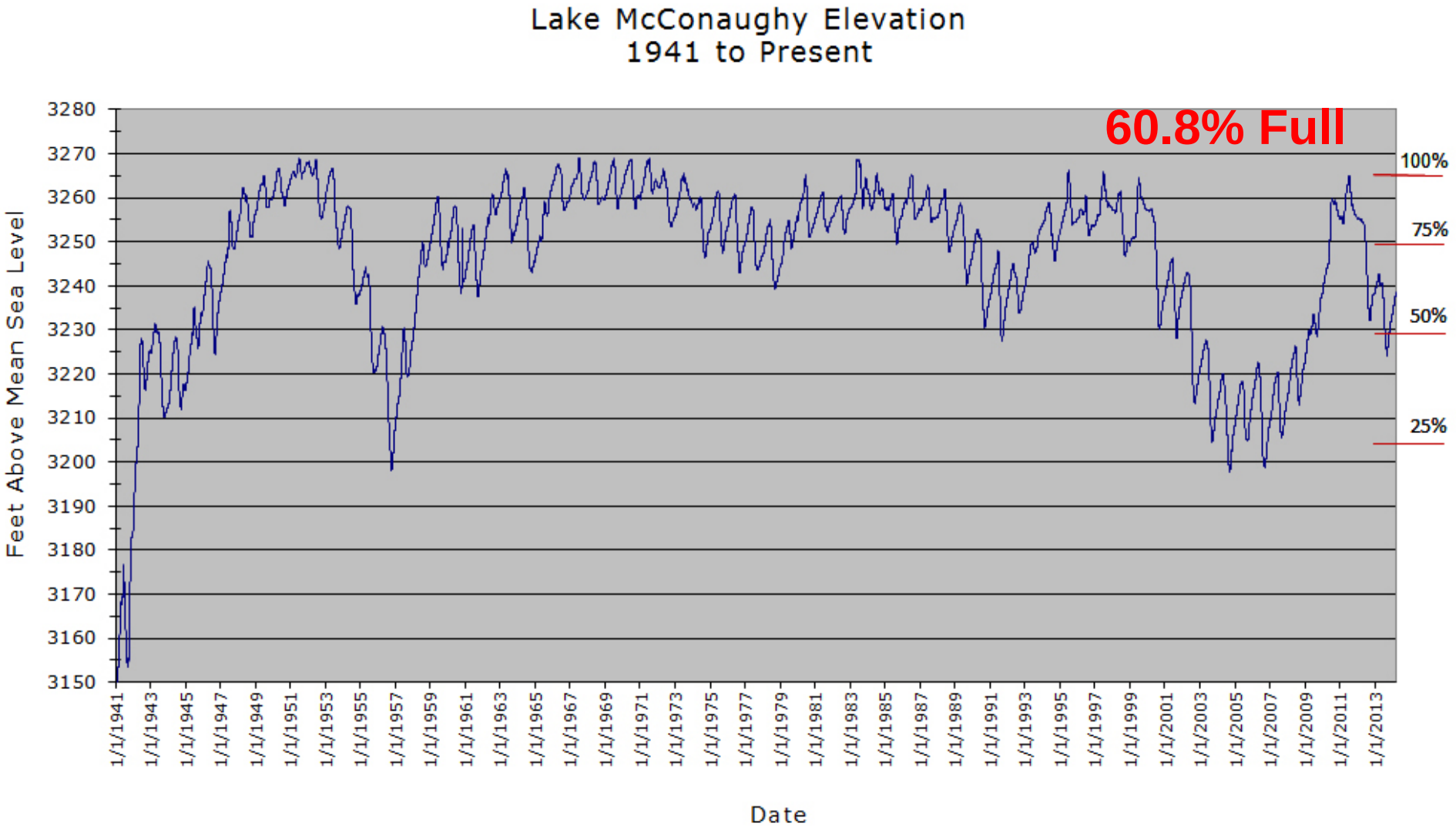

SOURCE: CNPPID www.cnppid.com

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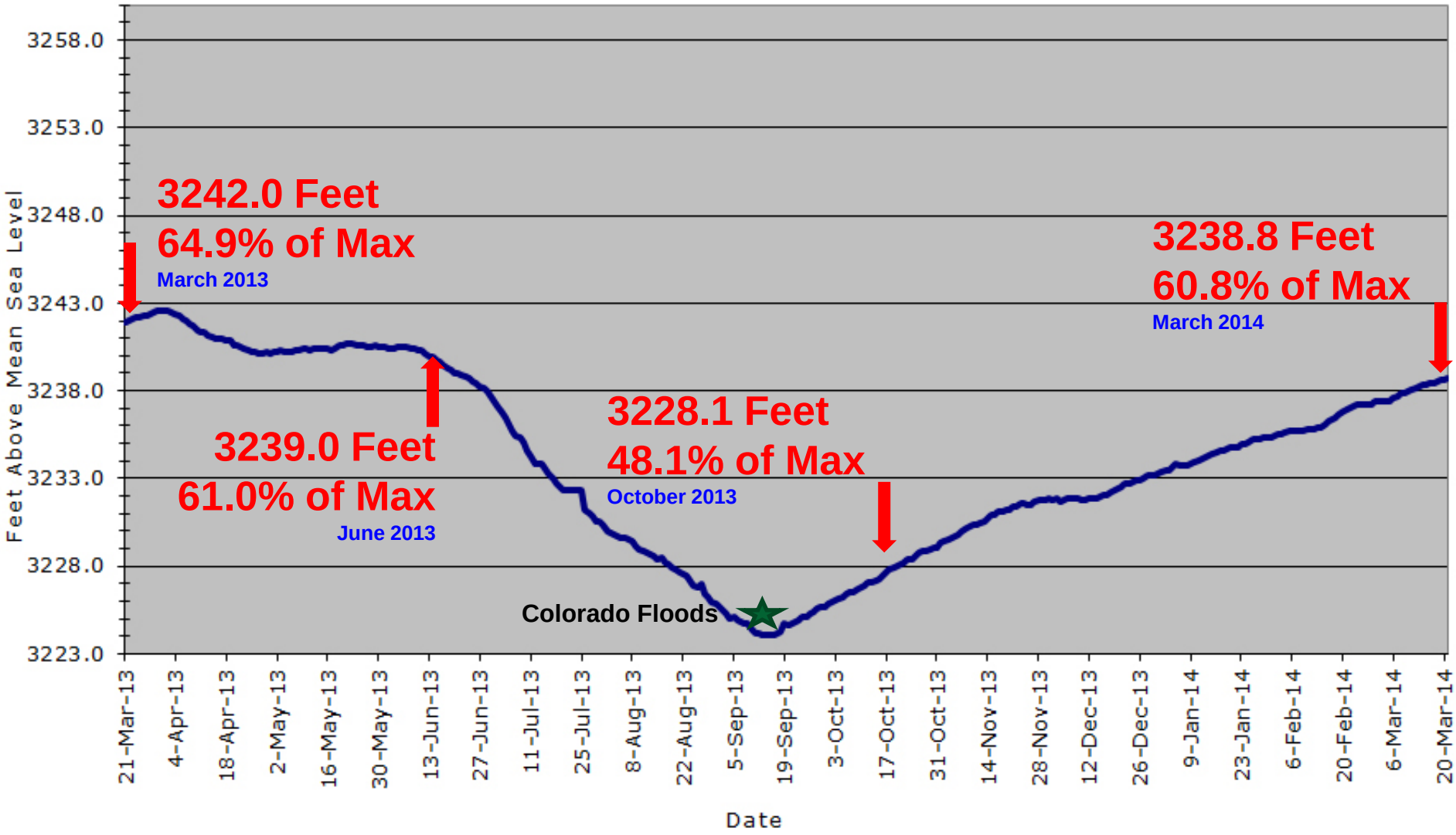
National Drought Mitigation Center

Lake McConaughy Elevation

March 21, 2013 to March 21, 2014



SOURCE: CNPPID www.cnppid.com

National Drought Mitigation Center

October 2013 CARC Meeting

Stream flow in cubic feet per second (cfs). Spot reading for current day; daily average for week, month, and year ago.

	Today (7 a.m.)	Week Ago	Month Ago	Year Ago
Inflows to Lake McConaughy (Current, Average & Median Inflow graph)	1,365	1,615	1,512	1,158
Total Lake McConaughy Outflow	0	1	0	0
North Platte below Keystone Dam	10	15	29	17
Keystone Dam Diversion	0	0	60	0
North Platte at North Platte	328	308	287	260
South Platte at Roscoe	770	1,560	19,300	44
South Platte at North Platte	1,520	2,254	12,389	92
Diversion to CNPPID Supply Canal	1,404	2,262	2,270	330
Platte River at Overton	1,640	2,331	722	180
Platte River at Kearney	2,240	2,661	348	26
Platte River at Grand Island	2,170	2,331	13	87

** Percent of capacity is dependent upon maximum elevations/operating levels at different times of the year. Lower maximum levels were established in 1974 after a 1972 storm caused damage to the dam's face. The limits are in effect for periods when high winds and waves are most likely to occur. (See Lake McConaughy Maximum Operating Levels table)*

*** Flow too low for gauge to measure*

@ - Yesterday's average flow

≠ - Ice affecting stream gauges; readings may not be accurate

N/A - Data temporarily unavailable (data not reported from gauge)

SOURCE: CNPPID www.cnppid.com

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National Drought Mitigation Center

March 2014 CARC Meeting

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	Today (7 a.m.)	Week Ago	Month Ago	Year Ago
Inflows to Lake McConaughy (Current, Average & Median Inflow graph)	782	890	842	801
Total Lake McConaughy Outflow	200	657	0	0
North Platte below Keystone Dam	7	3	0	13
Keystone Dam Diversion	N/A	162	185	0
North Platte at North Platte	422	402	250	348
South Platte at Roscoe	515	N/A	N/A	34
South Platte at North Platte	559	846	1,041	270
Diversion to CNPPID Supply Canal	1,005	1,273	1,316	623
Platte River at Overton	1,460	906	1,675	1,371
Platte River at Kearney	1,190	1,155	1,550	518
Platte River at Grand Island	746	1,753	1,300	444

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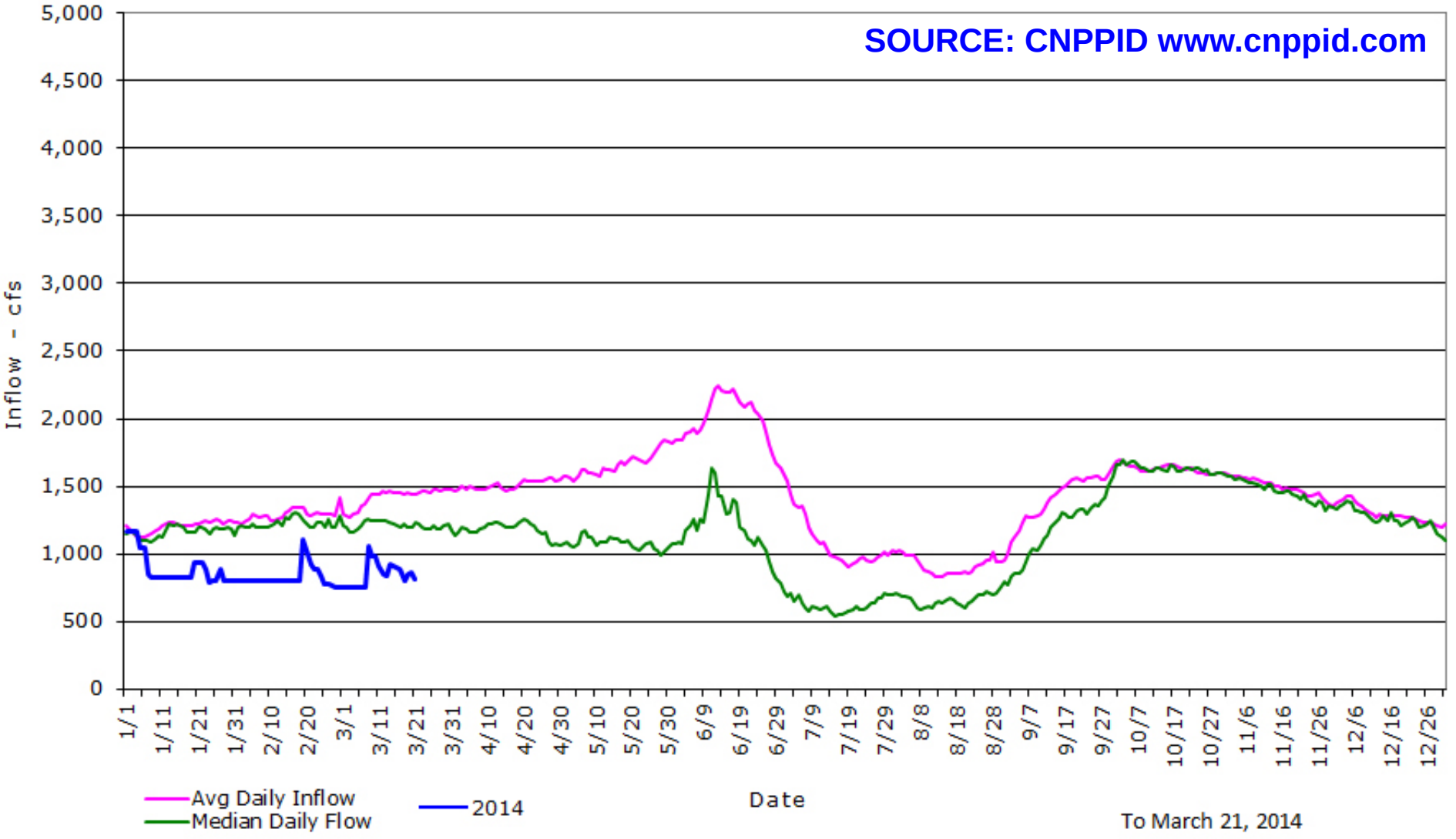
Daily Inflows - Lake McConaughy
Current, Average & Median Flows since 1941

Example to assist with reading graph: The average inflow for March 1 (measurements on every March 1 since 1941) is 1,308 cfs. Similarly, the median flow for March 1 (the middle value in the range of every March 1 reading since 1941) is 1,210 cfs.



To March 21, 2014

Lake McConaughy

At Lake McConaughy, inflows have dropped to about 780 cubic feet per second (cfs), below the 1,100 cfs median inflows that are normal for this time of year. The lake contained about 1,060,400 acre-feet of water, which is **60.8 percent** of capacity. This is higher than a month ago, but still below the 1,136,600 acre-feet a year ago (65.2% of capacity).

The anticipation of better run-off may come to fruition this year as the soils in the basin are in much better shape, reservoirs upstream are doing better, and the snow season has been good in the basin.

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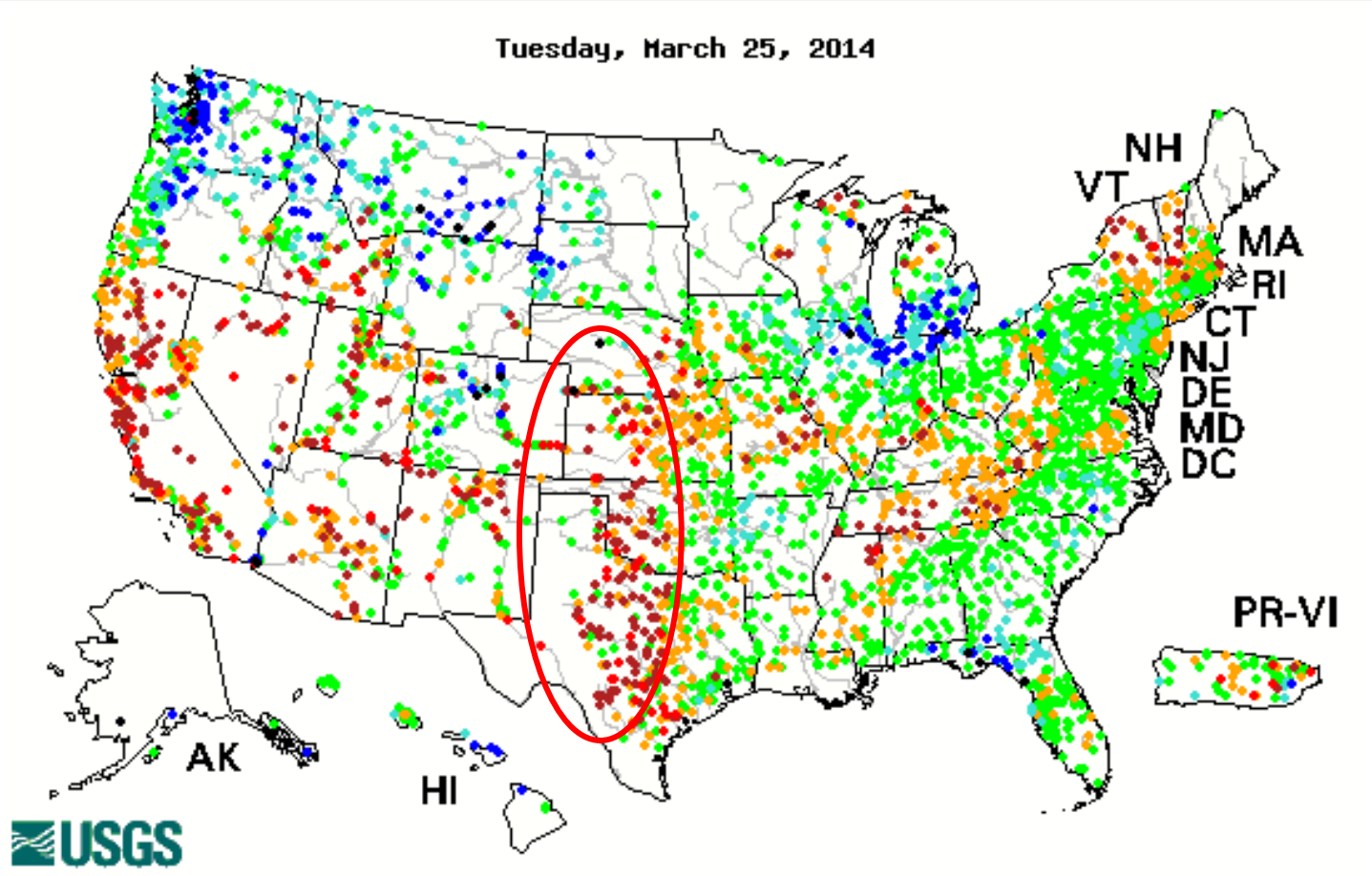
14-day average streamflow compared to historical streamflow for the day of year



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		

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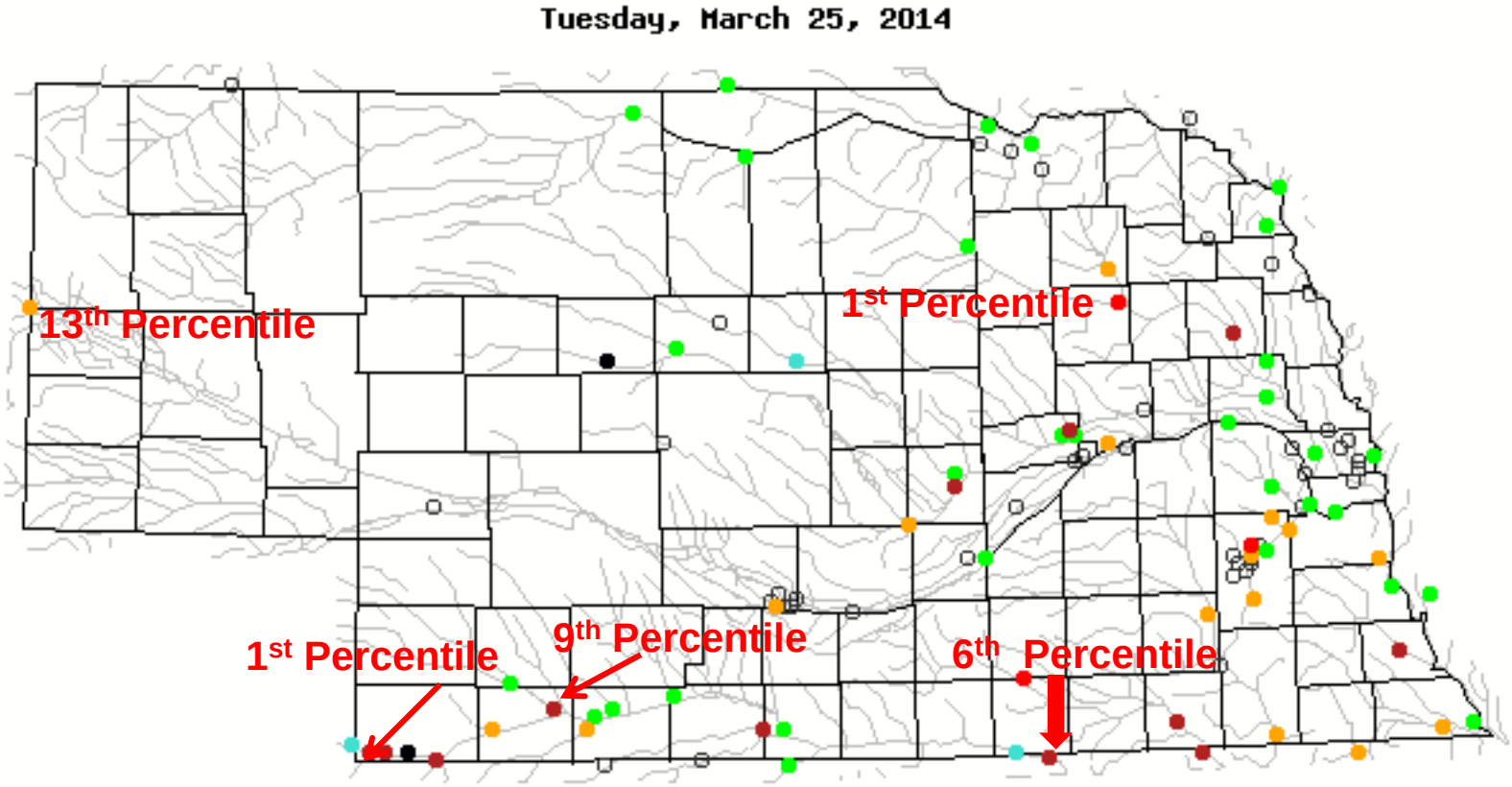
14-day average streamflow compared to historical streamflow for the day of year



USGS

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

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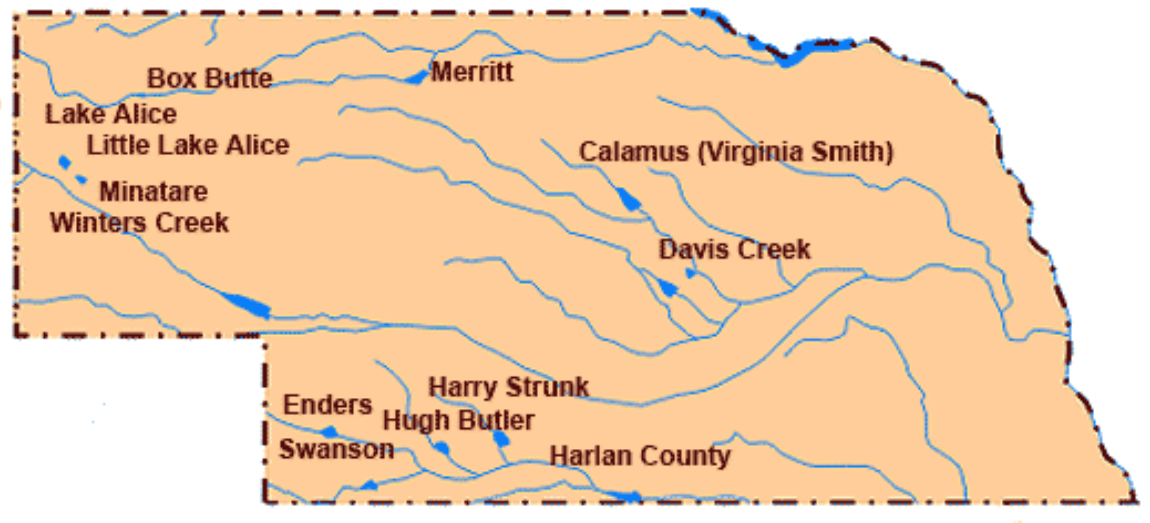
Republican River Basin

- **Hugh Butler:** 19.4%(16.8%) of conservation pool
- **Enders:** 31.1% (30.8%) of conservation pool
- **Harry Strunk:** 57.8%(43.6%) of conservation pool
- **Swanson:** 26.3% (25.1%) of conservation pool



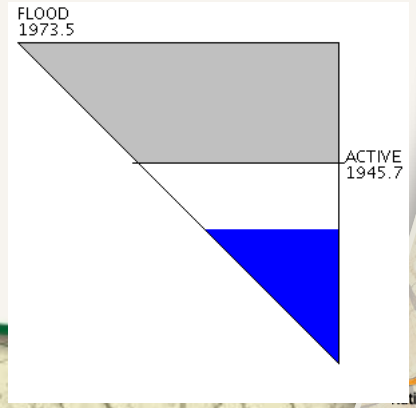
*values in red are from the last CARC meeting in October 2013

Source: BOR http://www.usbr.gov/gp/lakes_reservoirs

Republican River Basin

Harlan County Current Conditions

- ✓ Conservation Pool is 43.2% full (44.3%)
- ✓ 135,729 Acre-Feet in storage compared to 139,290 Acre-Feet of water in storage on October 2013.
- ✓ Last year at this time, 196,562 AF was in storage.
- ✓ Historical storage for this time of the year is 246,042 AF



Source: BOR http://www.usbr.gov/gp/lakes_reservoirs/

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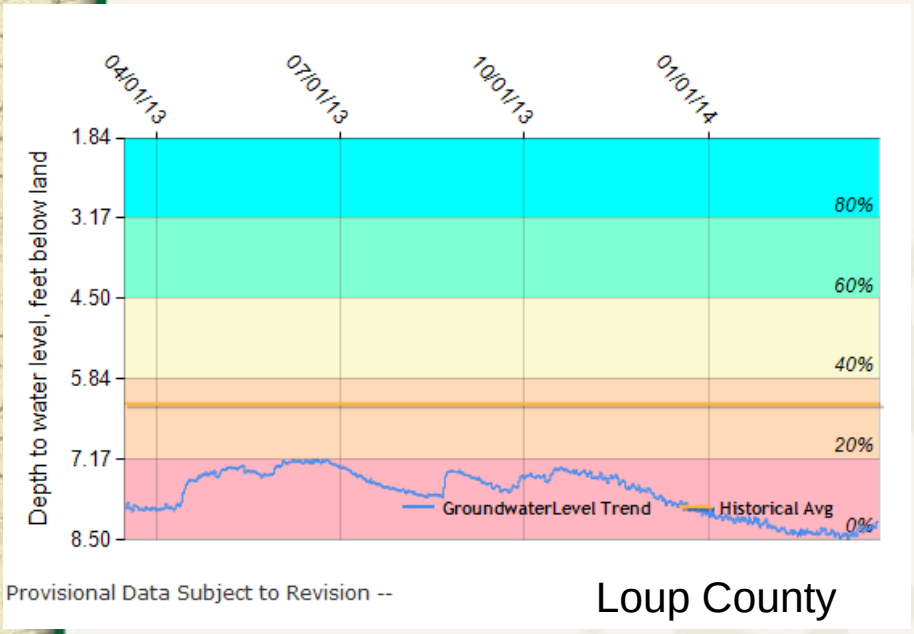
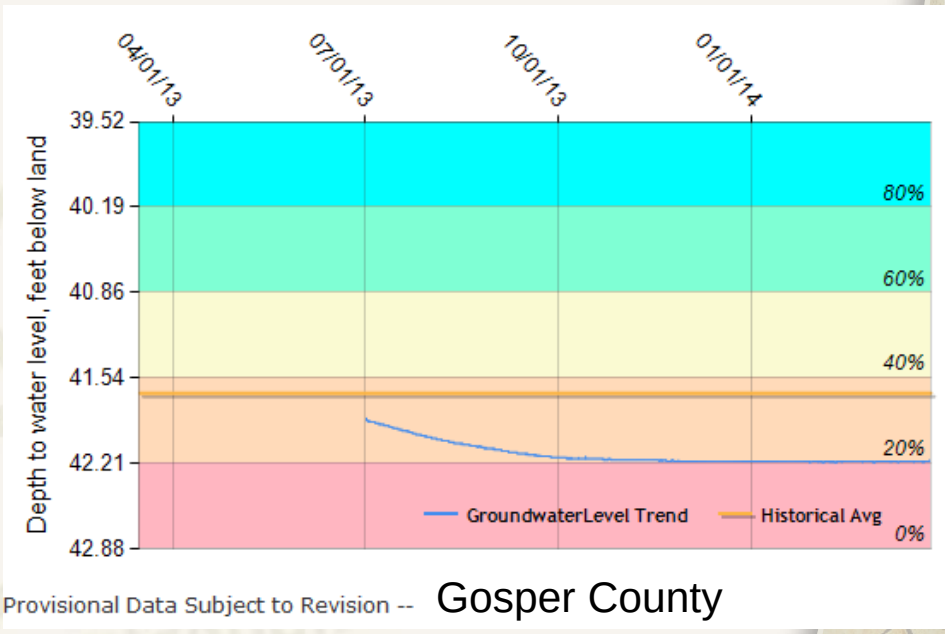
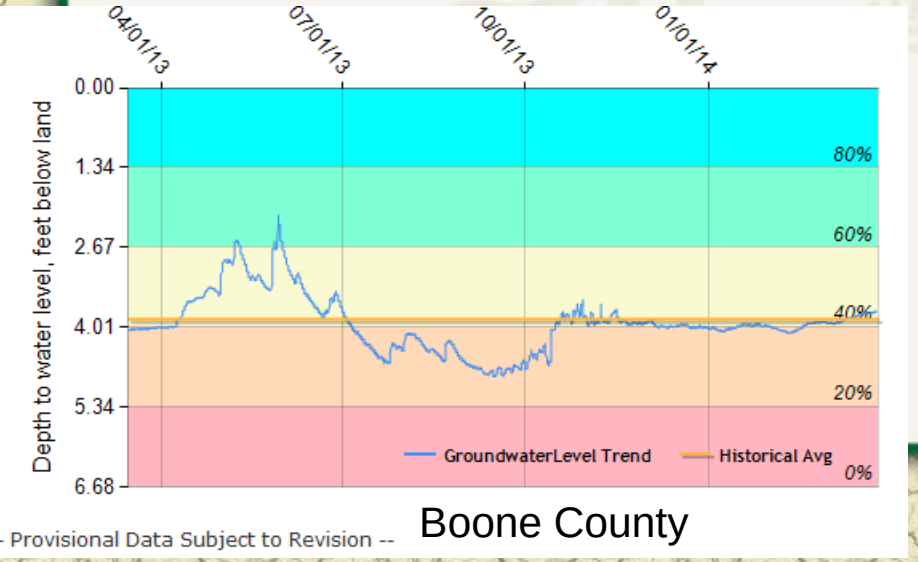
Well Data across Nebraska



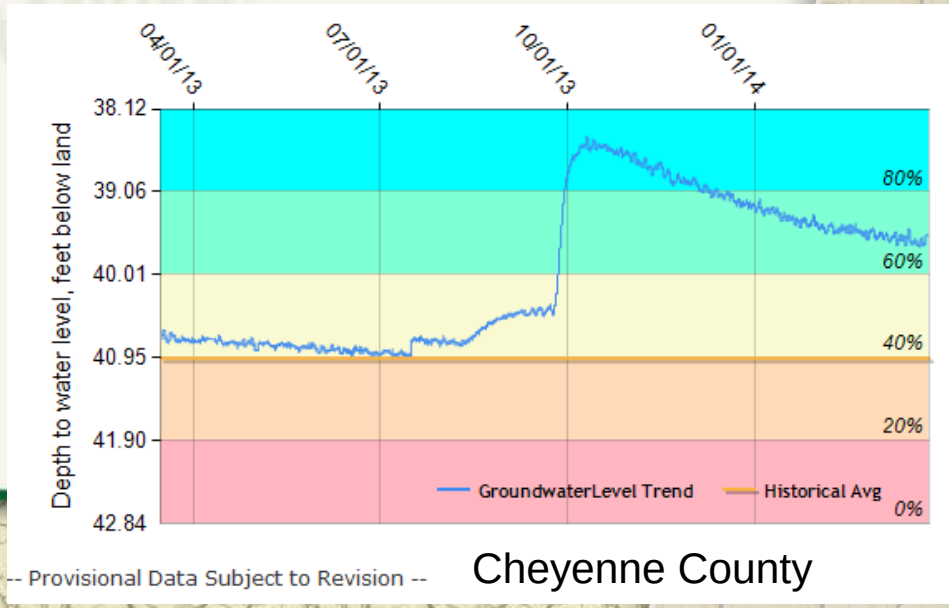
Loup County



Gosper County



Boone County



Cheyenne County

Water Supply Summary

- The drought conditions have eased in the region from the peak in 2012, but were followed by a very dry winter (2013-2014) in Nebraska. Good snow conditions in the Rocky Mountains and ample fall precipitation has allowed for a better hydrological/water supply situation, especially on the Platte Basin.

- Lake McConaughy is currently:
  - 10.7 feet lower than it was during the last CARC meeting in October 2013.
  - 3.2 feet lower than it was in March 2013.
  - The inflows have dropped off over the last few weeks (cold weather), but were still better than they were last year at this time. Inflows should start to reach the historical medians as runoff begins.

- Overall, storage in the Republican River basin has improved slightly over the last 5 months compared to levels at the end of October 2013.
  - Harlan County is currently:
    - 3,561 Acre-Feet lower than in October 2013 (last CARC meeting)
    - 60,833 AF lower than March 2013
    - 110,313 AF lower than the historical average for this time of year

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Any Questions ?

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