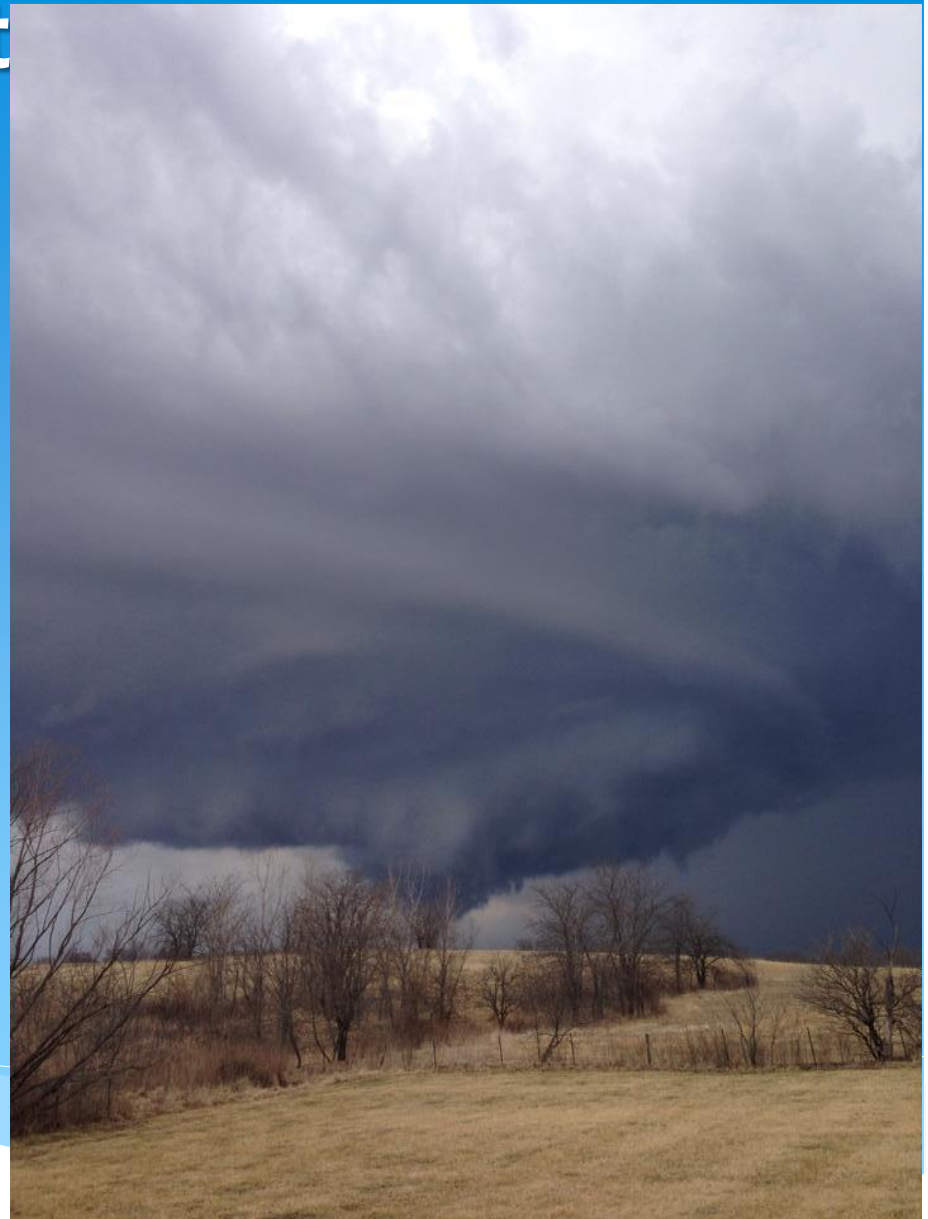


Midwest and Great Plains Climate- Drought Outlook 17 April 2014

Dr. Dennis Todey
State Climatologist
South Dakota State Univ.
dennis.todey@sdstate.edu
605-688-5141



Tornado-Trenton, MO– Amy Madden

General Information

- * **Providing climate services to the Central Region**
 - * Collaboration Activity Between:
 - * State Climatologists
 - * Doug Kluck & John Eise (NOAA/NWS)
 - * American Association of State Climatologists
 - * Midwest and High Plains Regional Climate Centers
 - * National Drought Mitigation Center/USDA

- * **Next Regular Climate/Drought Outlook Webinar**
 - * May 15, 2014 (1 PM CDT)
 - * May 1, 2014 (1 PM CDT) – Special Missouri River

- * **Access to Future Climate Webinars and Information**
- * <http://www.drought.gov/drought/content/regional-programs/regional-drought-webinars>

- * <http://mrcc.isws.illinois.edu/webinars.htm>
- * <http://www.hprcc.unl.edu/webinars.php>
- * **Operator Assistance for questions at the end**

Agenda

- * **Current Conditions**

- * **Impacts**

- * **Great Lakes**

- * **Missouri River**

- * **Wheat Belt**

- * **General Spring Ag**

- * **Outlooks**

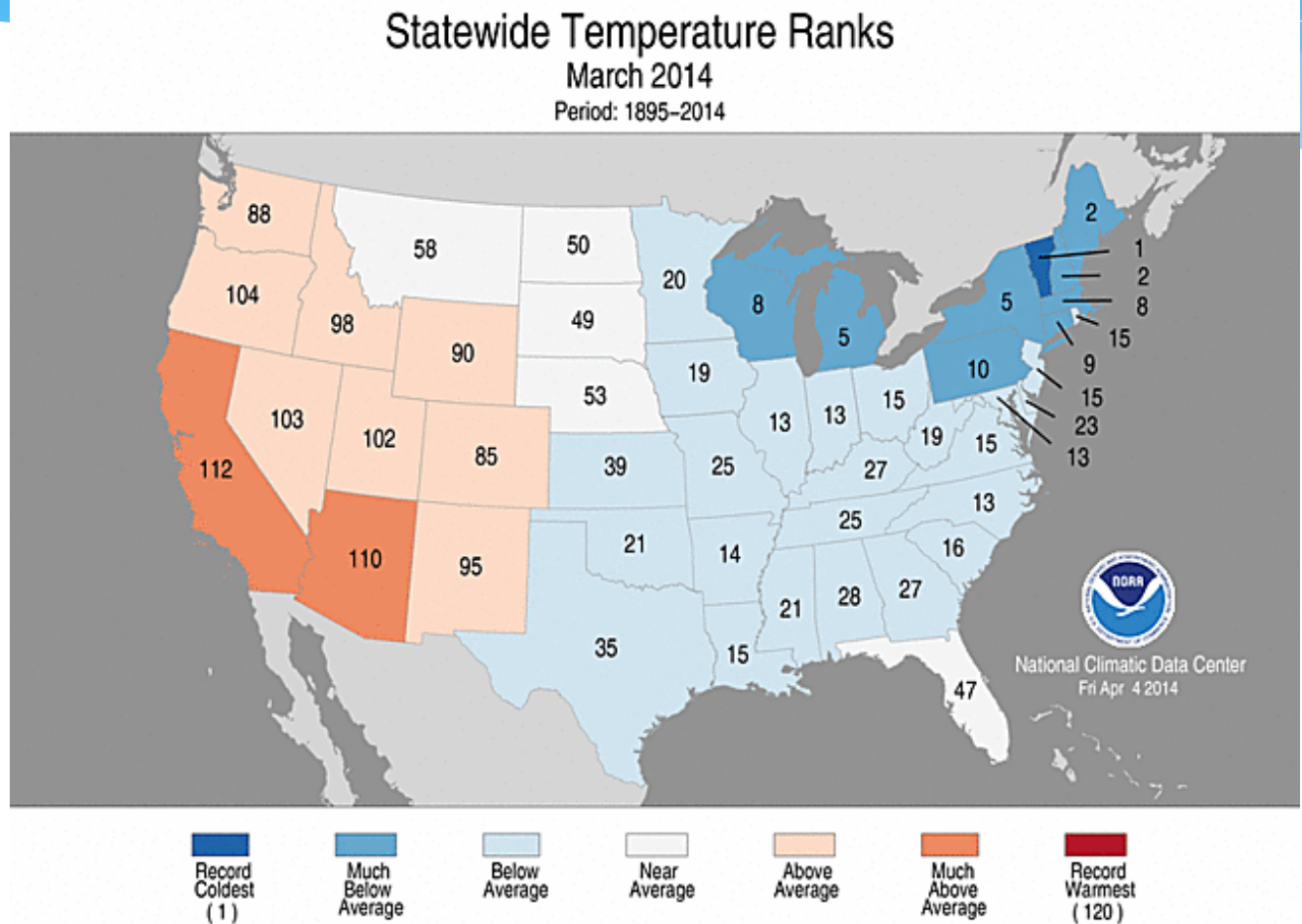
- * **El Nino**

Review/Current Conditions

March Temperature Recap

The pattern shows a clear ridge – trough pattern across the country.

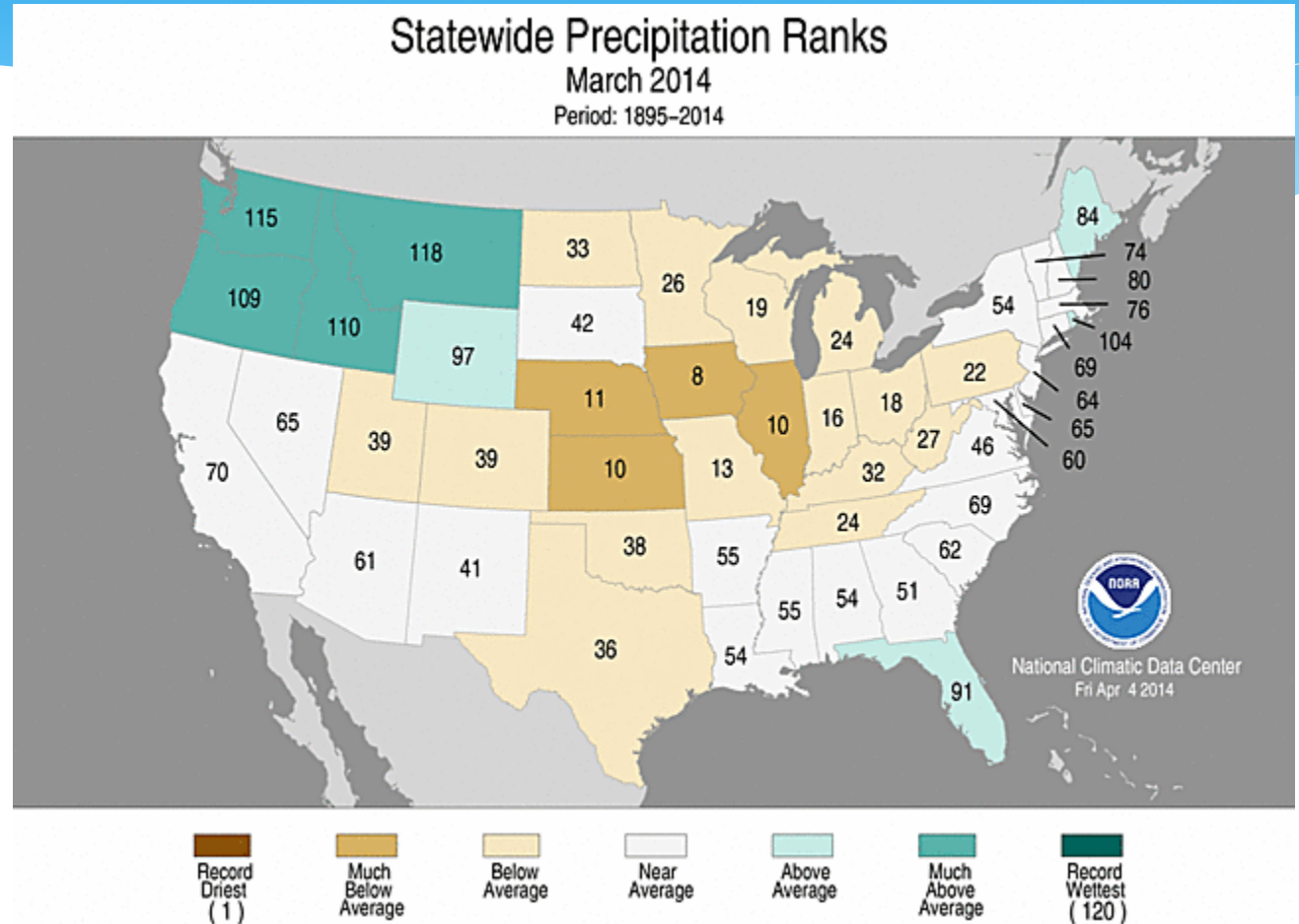
Persistent cold Great Lakes and eastern half of country



March Precipitation Recap

**Dry corn belt and
Midwest**

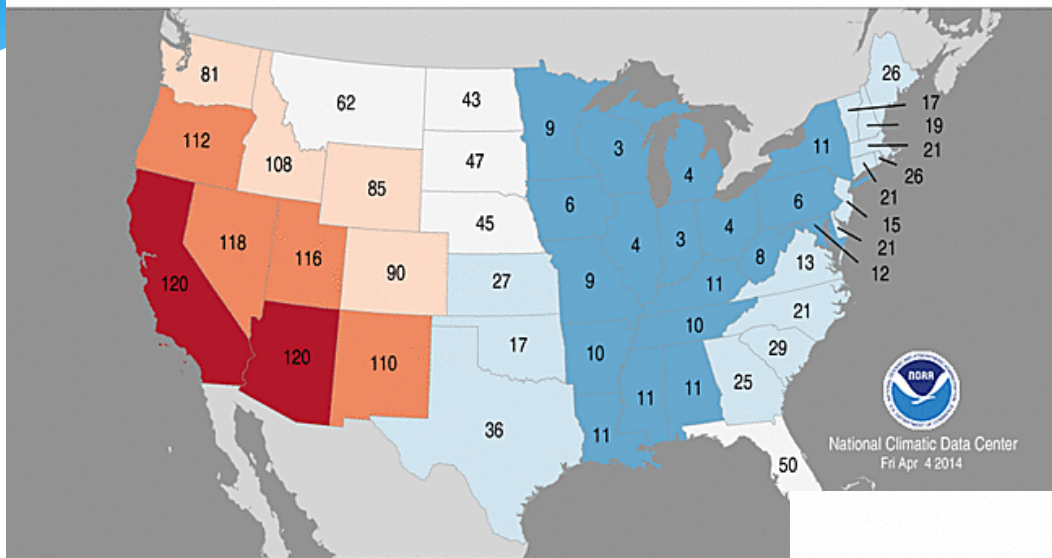
**Wet in northwest –
Missouri River
headwaters**



Statewide Temperature Ranks

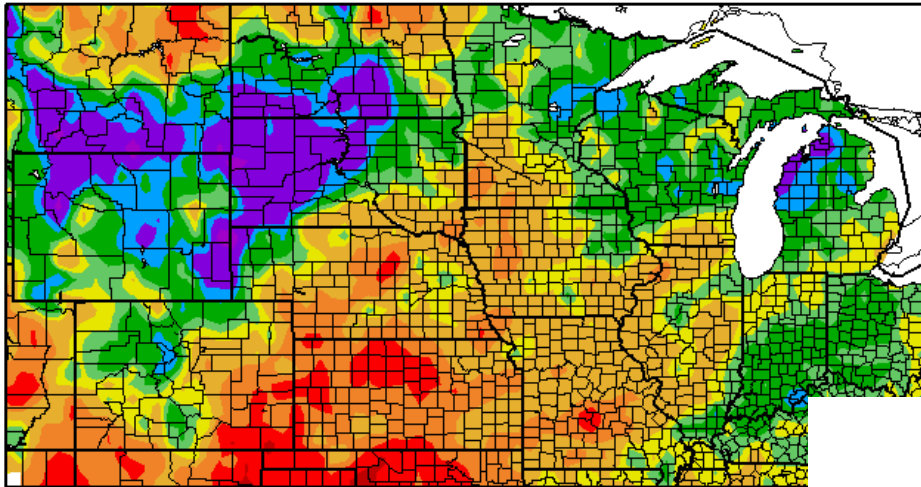
January–March 2014

Period: 1895–2014

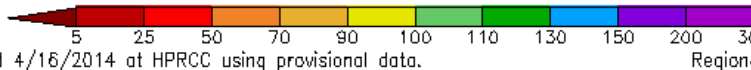


Percent of Normal Precipitation (%)
10/1/2013 – 4/15/2014

Water Year (Oct. 1) precipitation

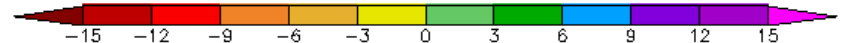
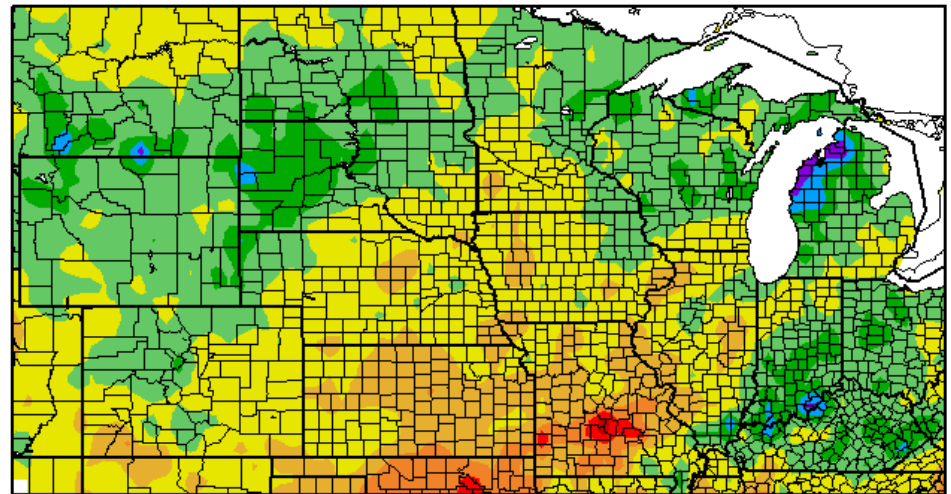


Departure from Normal Precipitation (in)
10/1/2013 – 4/15/2014



Generated 4/16/2014 at HPRCC using provisional data.

**Wet northwest – dry
central/southwest**



Generated 4/16/2014 at HPRCC using provisional data.

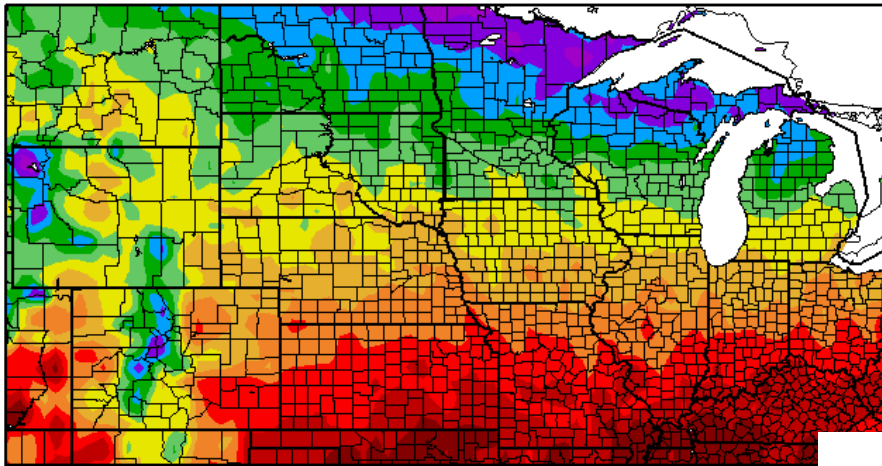
Regional Climate Centers

<http://www.hprcc.unl.edu/maps/current/>

HPRCC – Regional Climate Centers

Temperature (F)
3/18/2014 – 4/16/2014

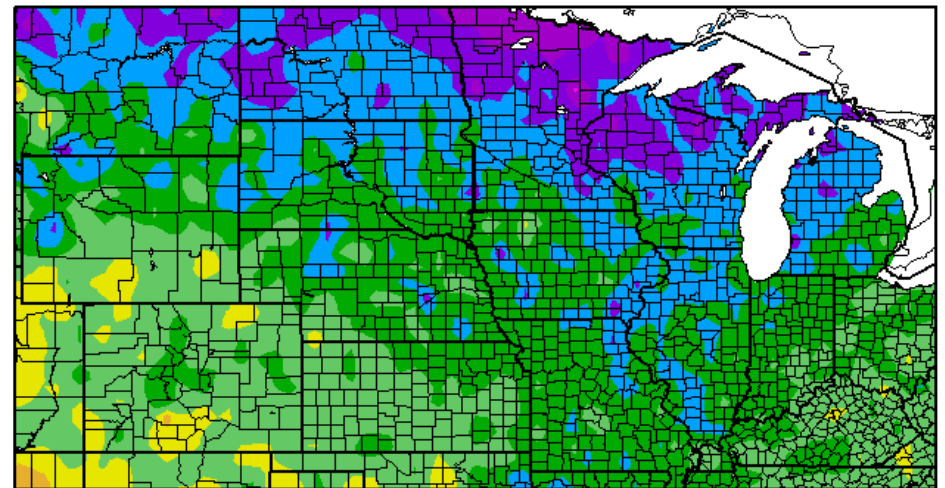
Most recent 30-day temperatures



Generated 4/17/2014 at HPRCC using provisional data. Regional Clim

Departure from Normal Temperature (F)
3/18/2014 – 4/16/2014

Still generally cool – worst north



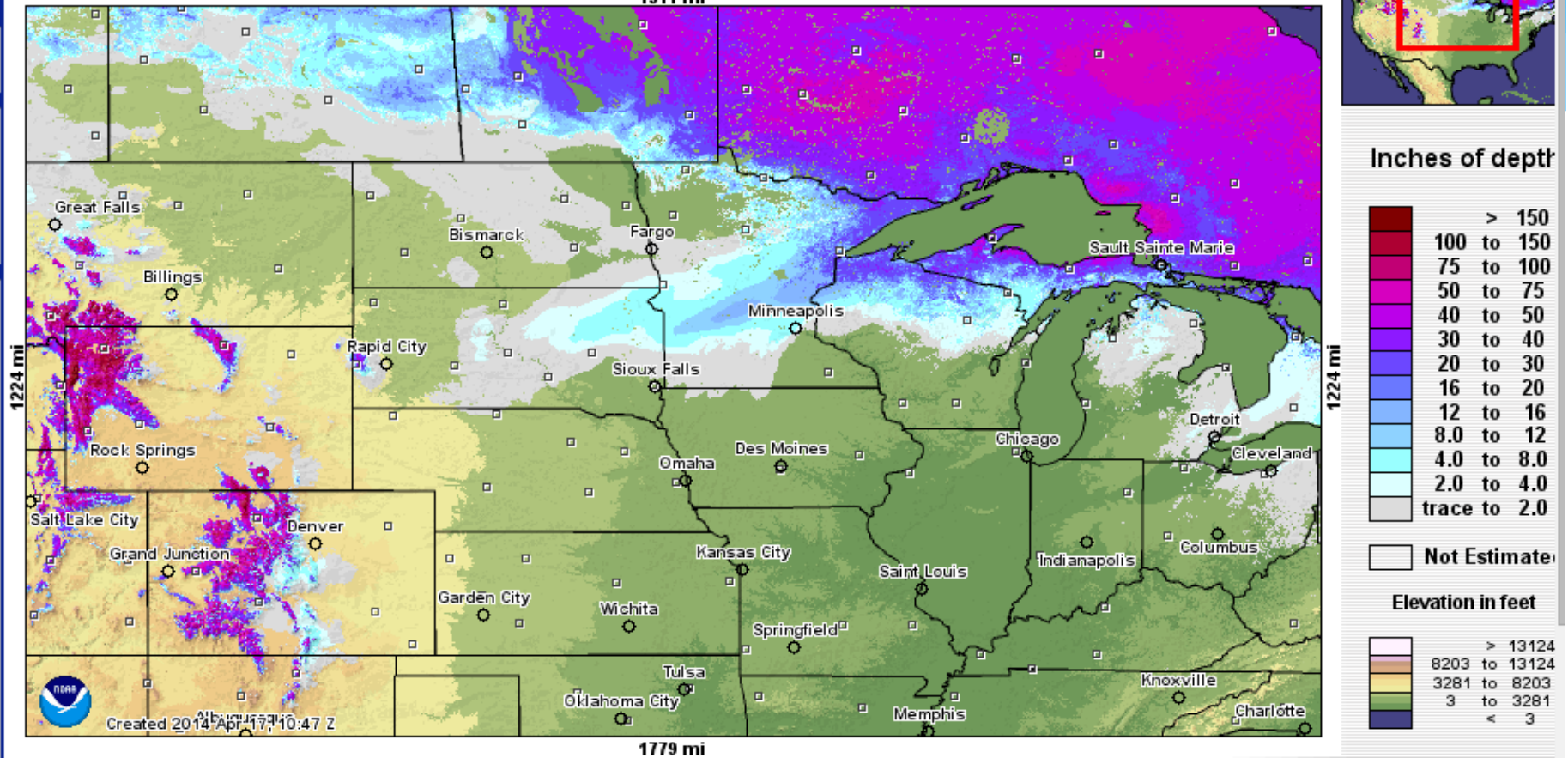
<http://www.hprcc.unl.edu/maps/current/>

HPRCC – Regional Climate Centers

Generated 4/17/2014 at HPRCC using provisional data. Regional Climate Centers

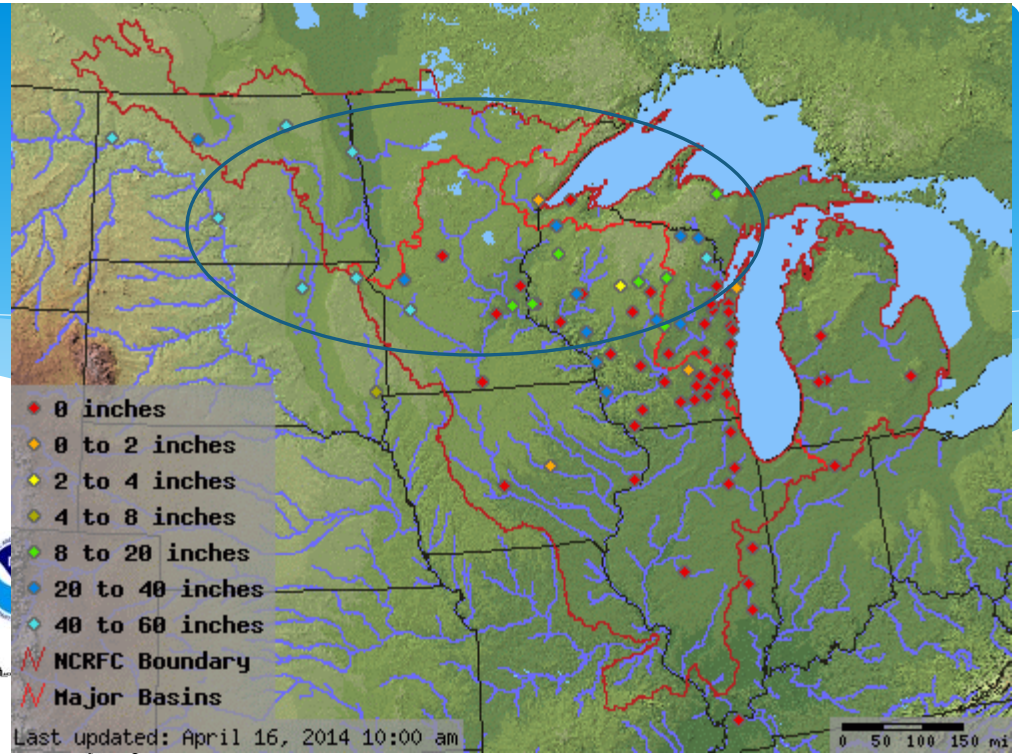
Snow cover

Modeled Snow Depth for 2014 April 17, 6:00 Z
1311 mi

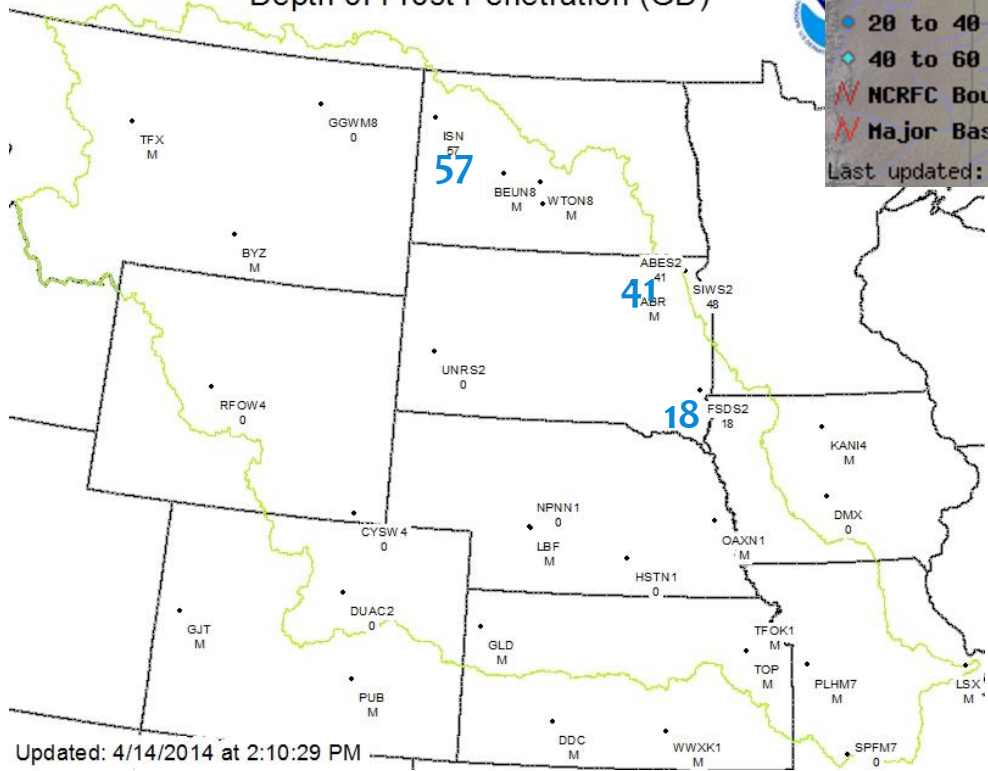


<http://www.nohrsc.noaa.gov/interactive/html/map.html?>

Frost Depths



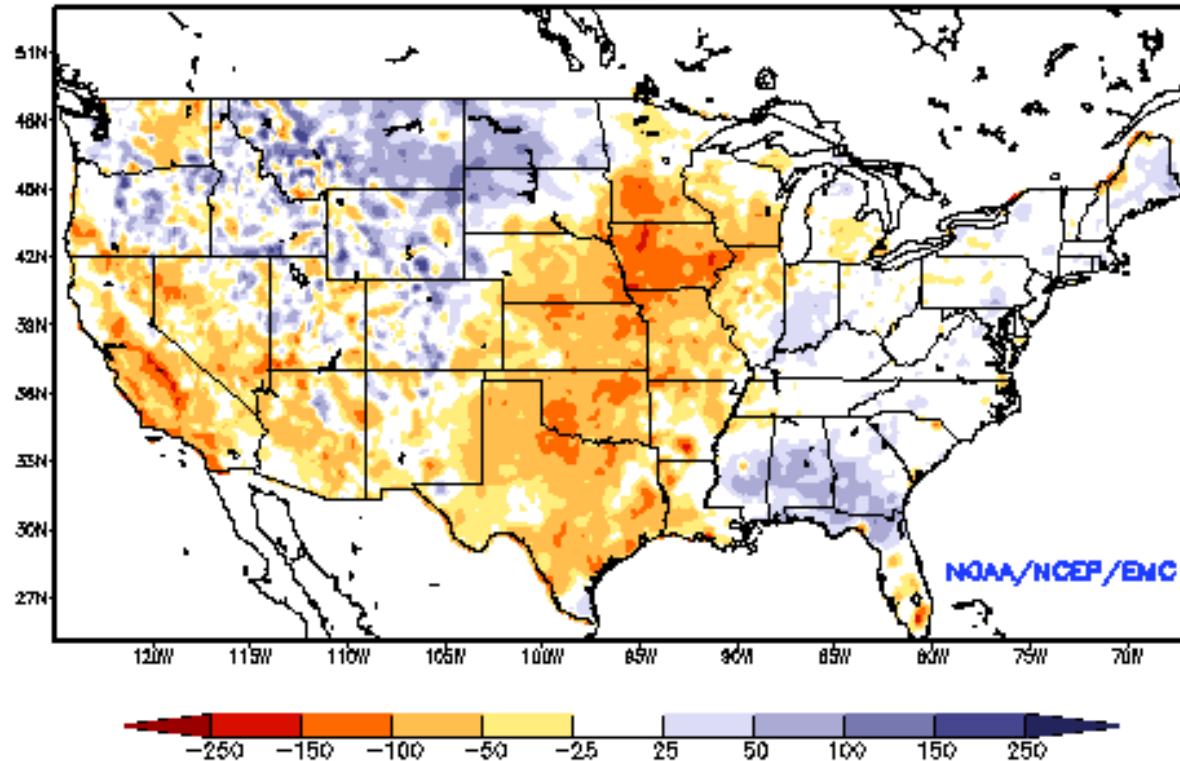
Depth of Frost Penetration (GD)



Updated: 4/14/2014 at 2:10:29 PM

Soil Moisture and Recovery

Ensemble-Mean - Current Total Column Soil Moisture Anomaly (mm)
NCEP NLDAS Products Valid: APR 12, 2014

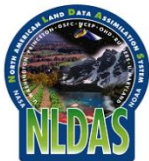


Wet area in the northern Plains

Central Corn Belt and Winter wheat belt drier

Recent rains some recovery and frost removal

Soil Moisture Anomaly in millimeters



U.S. Drought Monitor North Central

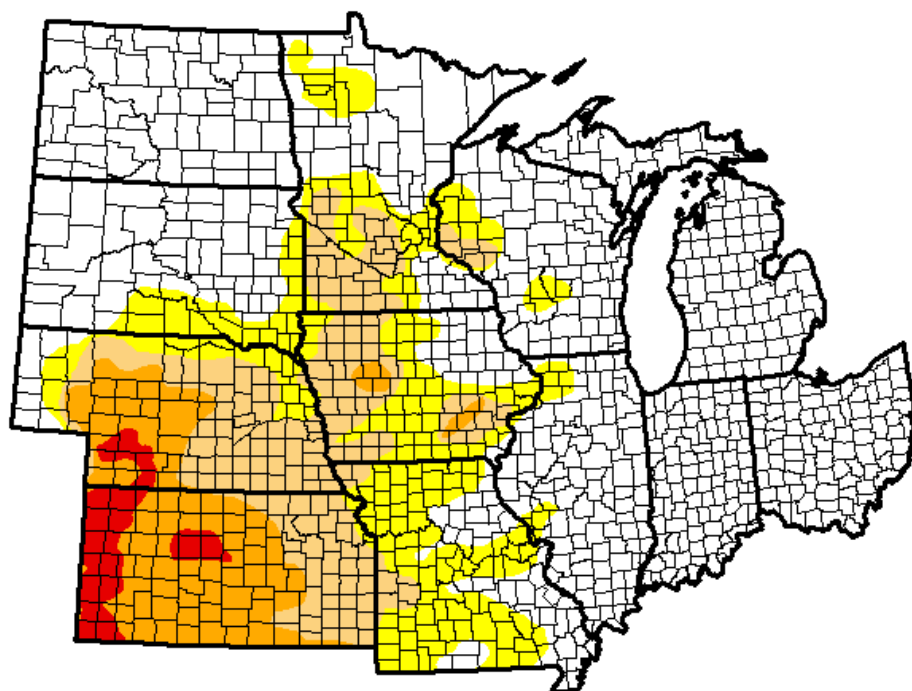
April 15, 2014

(Released Thursday, Apr. 17, 2014)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0	D1	D2	D3	D4
Current	59.56	16.32	13.07	8.69	2.37	0.00
Last Week <i>4/8/2014</i>	56.48	17.94	14.93	8.66	1.98	0.00
3 Months Ago <i>1/14/2014</i>	58.10	20.49	13.17	7.15	1.08	0.00
Start of Calendar Year <i>12/31/2013</i>	58.55	20.04	13.18	7.15	1.08	0.00
Start of Water Year <i>10/1/2013</i>	37.82	26.00	20.08	14.87	1.22	0.00
One Year Ago <i>4/16/2013</i>	43.31	11.11	13.76	12.54	16.63	2.65



Intensity:

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

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:

*Brian Fuchs
National Drought Mitigation Center*



<http://droughtmonitor.unl.edu/>

Impacts

The image features a solid blue background with a white wavy line at the bottom. The word "Impacts" is centered in white text.

Impacts

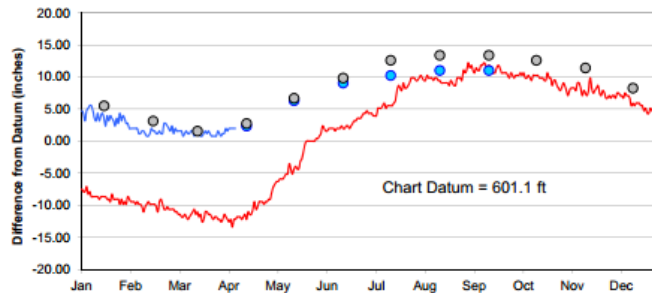
Great Lakes

Great Lakes

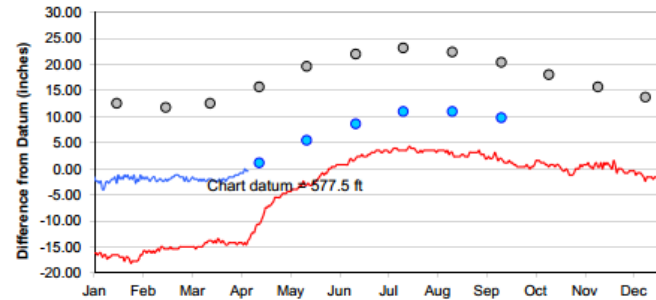
- * Still frozen (40.6%) – peak 92% - highest since 1979
- * Slowing start of shipping season
 - * Steel mills – southern lakes short on iron ore
 - * Port Green Bay no ships – usually first by April 3
 - * Shifting transport to truck/train or delaying
- * Helped levels recover
 - * Additional run-off from snow
 - * Frozen cover limited winter evaporation

Great Lakes Levels

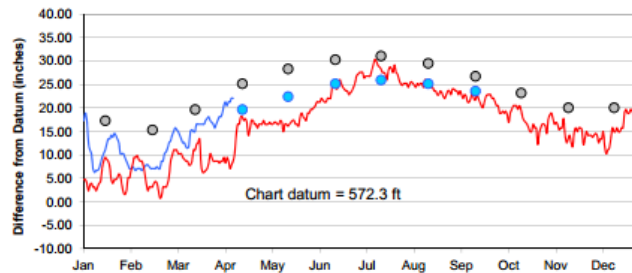
Lake Superior



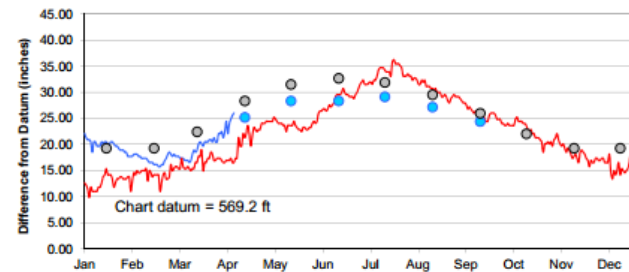
Lake Michigan-Huron



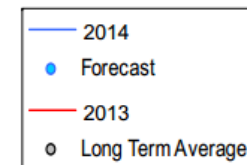
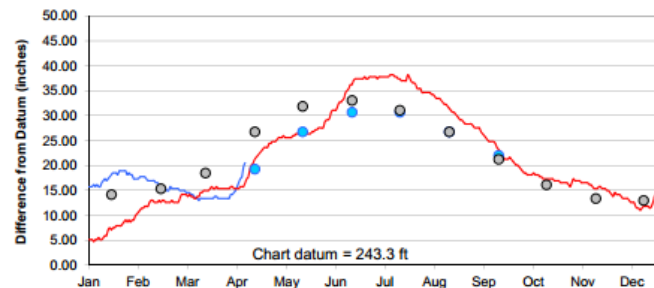
Lake St. Clair



Lake Erie



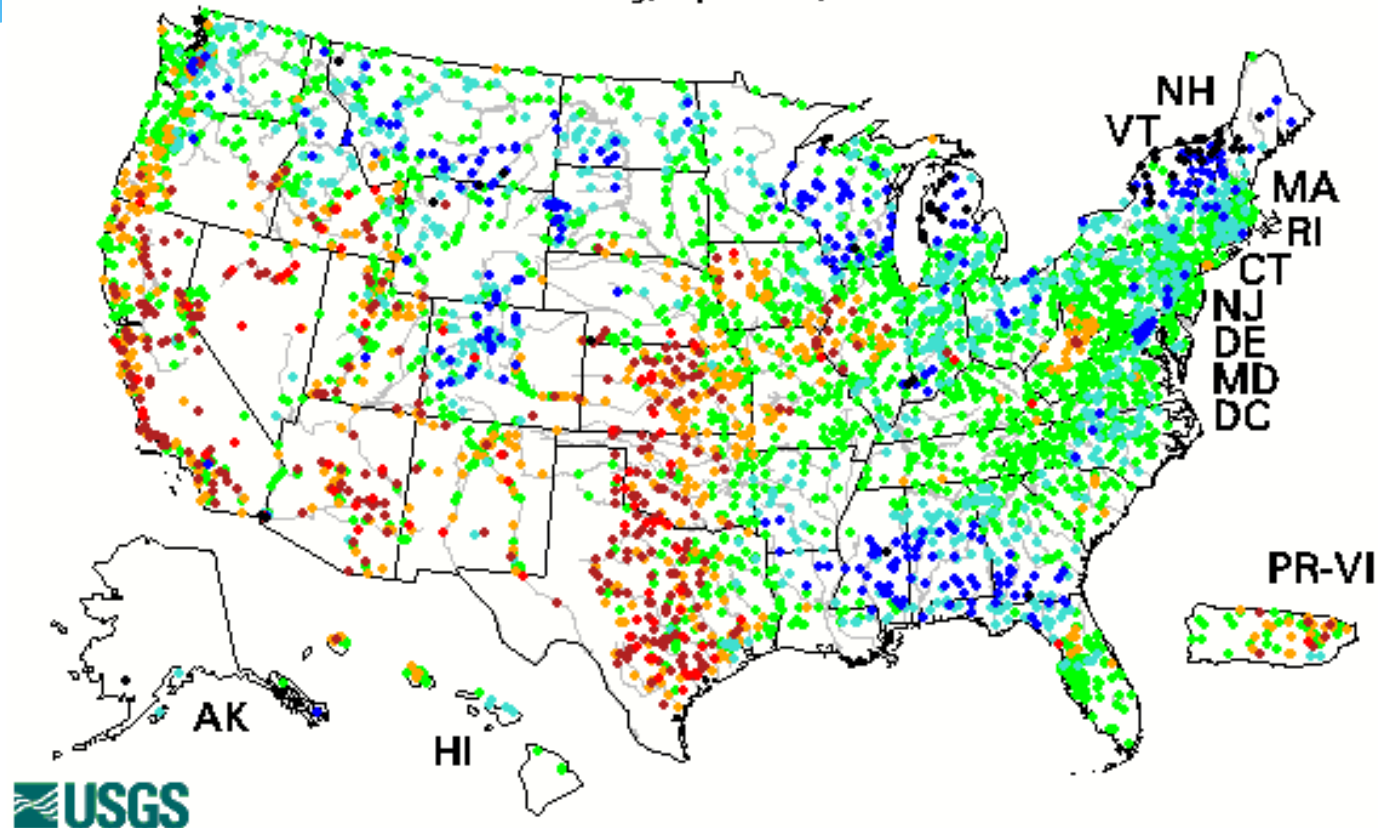
Lake Ontario



U.S. Army Corps of Engineers
Detroit District
<http://www.lre.usace.army.mil>

7-Day Average Streamflow

Wednesday, April 16, 2014



Thursday, 17 Apr. 2014

http://waterwatch.usgs.gov/?id=ww_current

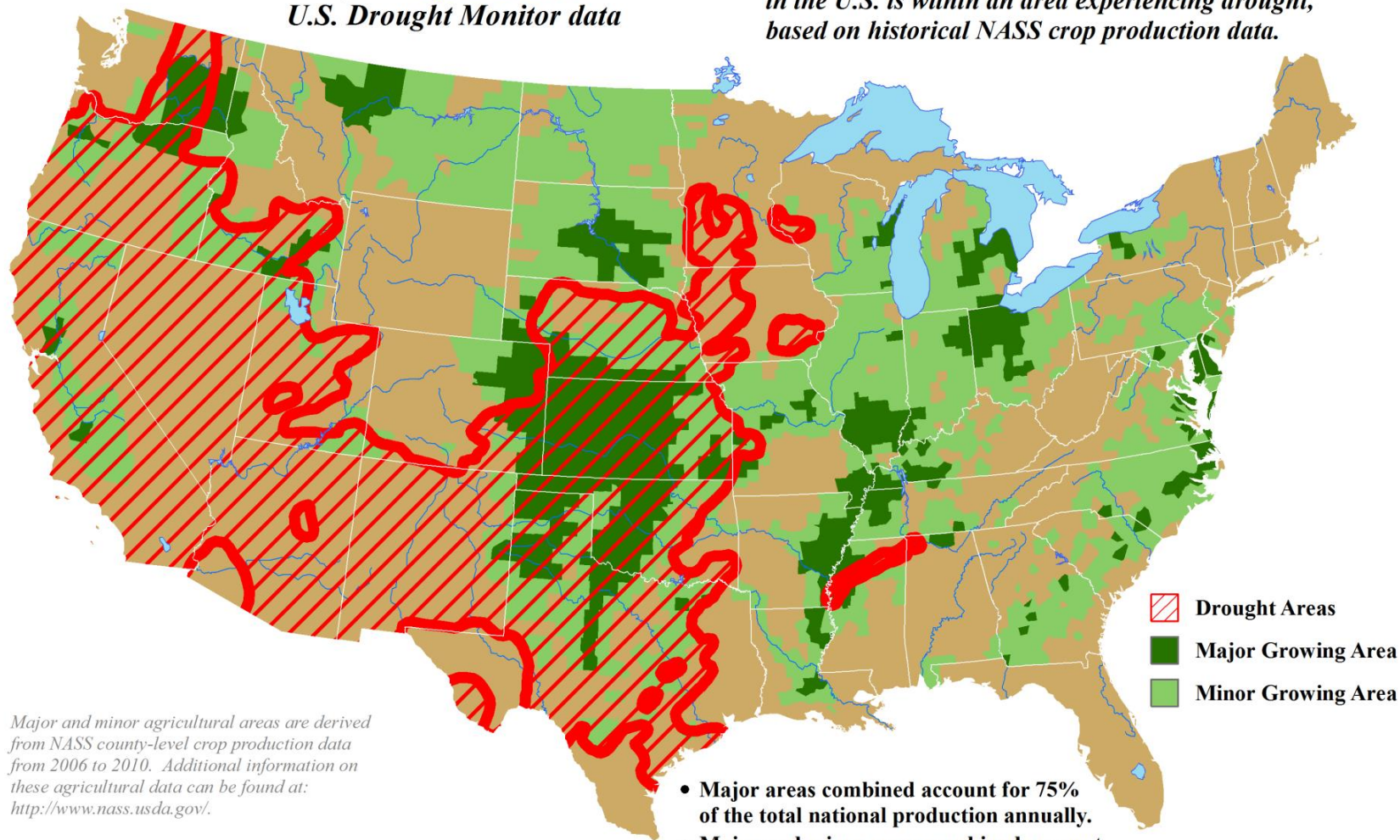
Impacts

Wheat Belt

U.S. Winter Wheat Areas Experiencing Drought

Reflects April 15, 2014
U.S. Drought Monitor data

Approximately 52% of the winter wheat grown
in the U.S. is within an area experiencing drought,
based on historical NASS crop production data.

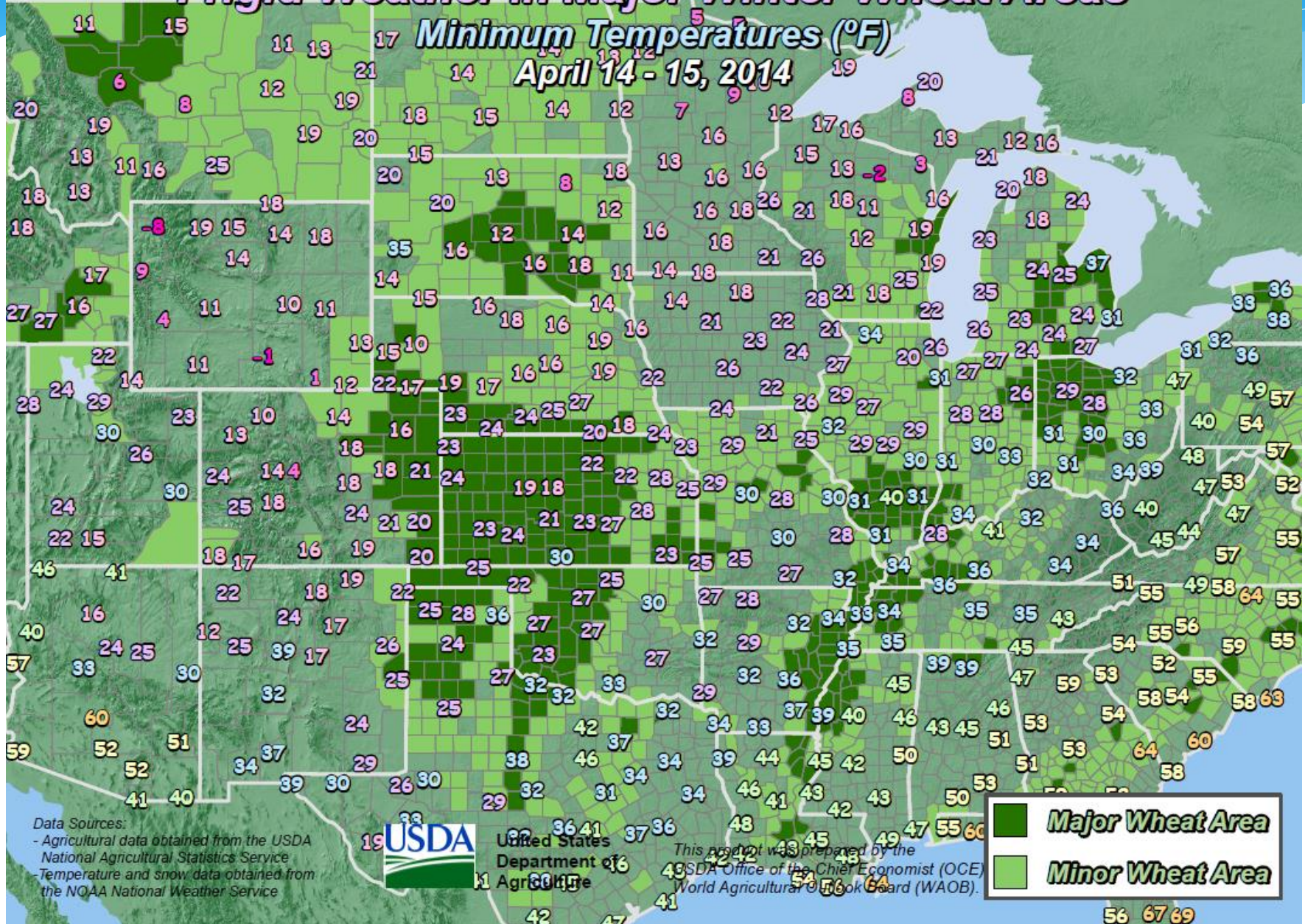


Major and minor agricultural areas are derived from NASS county-level crop production data from 2006 to 2010. Additional information on these agricultural data can be found at: <http://www.nass.usda.gov/>.

Mapped drought areas are derived from the U.S. Drought Monitor product and do not depict the intensity of drought in any particular location. More information on the Drought Monitor can be found at: <http://droughtmonitor.unl.edu/>.

Frigid Weather in Major Winter Wheat Areas

Minimum Temperatures (°F) April 14 - 15, 2014



Data Sources:
 - Agricultural data obtained from the USDA National Agricultural Statistics Service
 - Temperature and snow data obtained from the NOAA National Weather Service



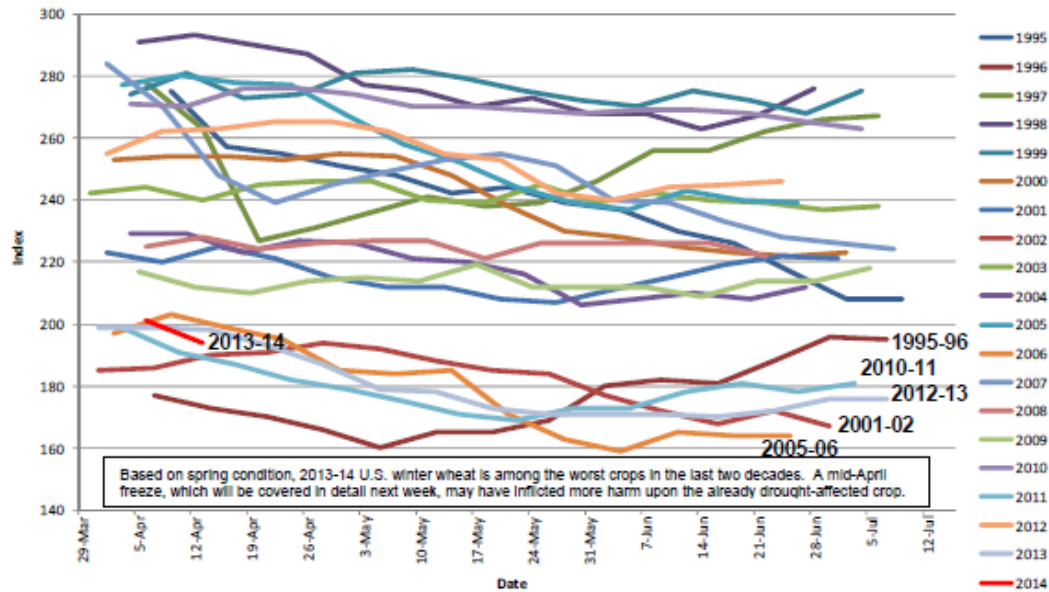
United States
 Department of
 Agriculture

This product was prepared by the
 USDA Office of the Chief Economist (OCE),
 World Agricultural Outlook Board (WAOB).

	Major Wheat Area
	Minor Wheat Area

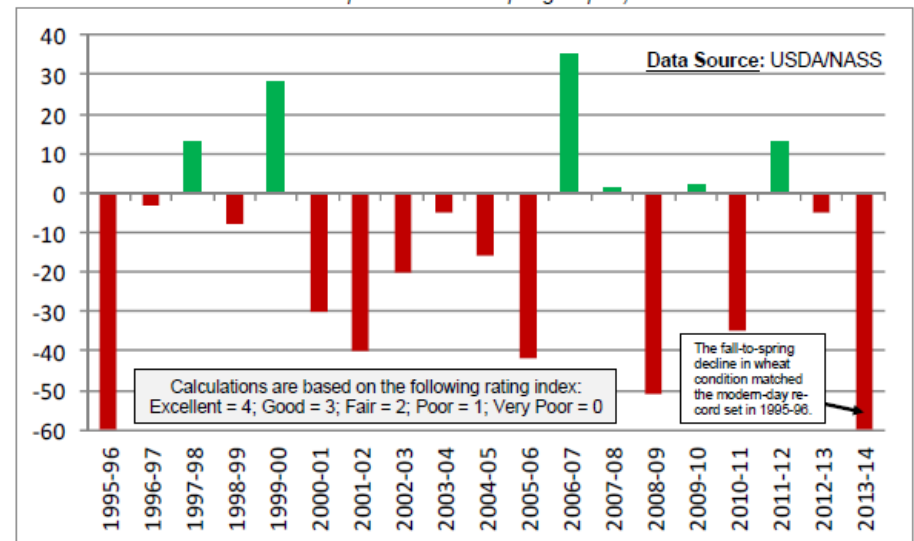
56 67 69

U.S. WINTER WHEAT Condition Index



Based on NASS crop progress data.

Autumn to Spring Change in U.S. Winter Wheat Condition
From the Last Autumn Report to the First Spring Report, 1995-96 to 2013-14



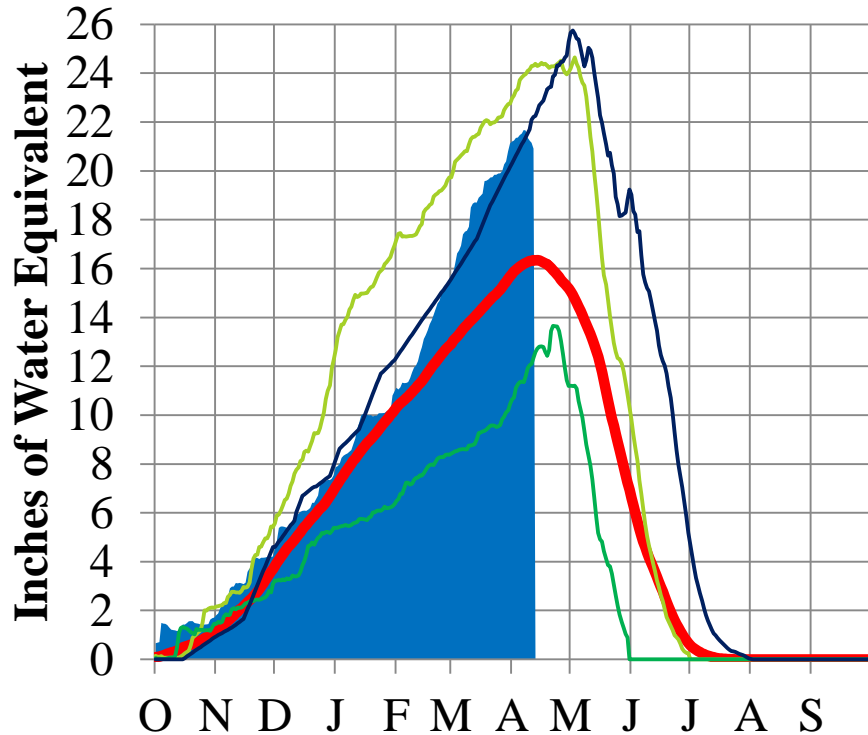
Impacts

Missouri River/Flooding

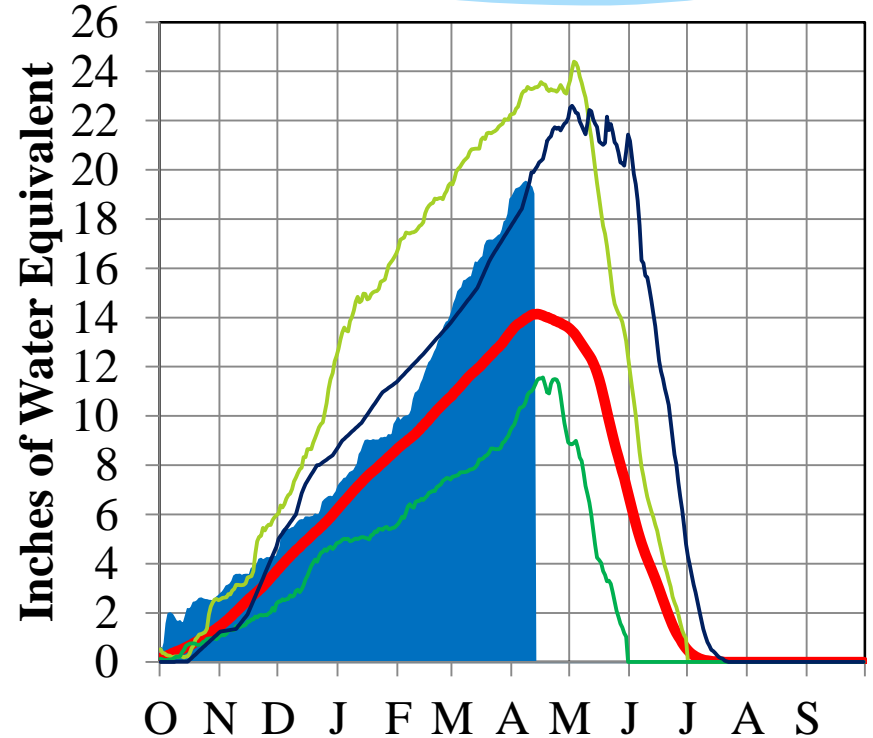
Missouri River Basin – Mountain Snowpack Water Content 2013-2014 with comparison plots from 1997*, 2001*, and 2011

April 12, 2014

Total above Fort Peck



Total Fort Peck to Garrison



■ 2013-14 ■ 1981-2010 Ave ■ 1997 ■ 2001 ■ 2011

■ 2013-14 ■ 1981-2010 Ave ■ 1997 ■ 2001 ■ 2011

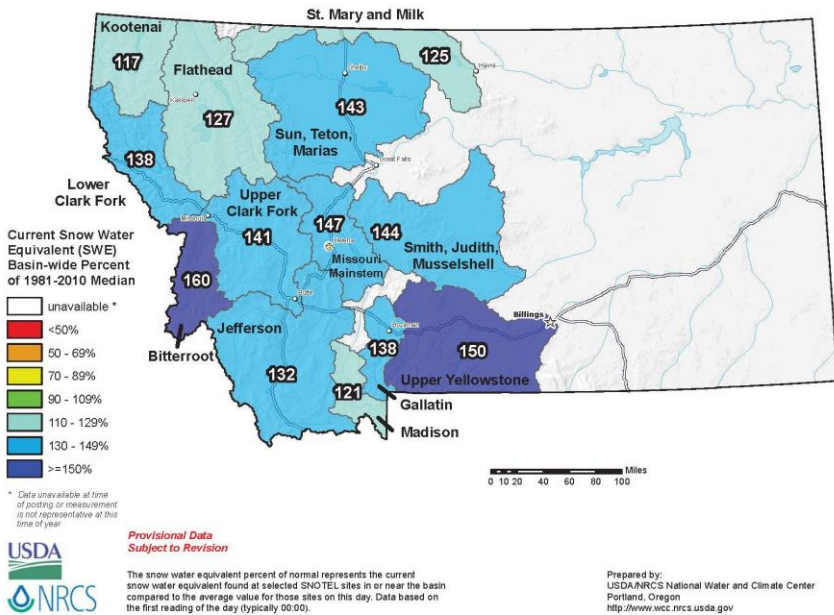
On April 12, 2014 the mountain snowpack in the “Total above Fort Peck” reach was 20.9”, 127% of the 1981-2010 30-year average. The mountain snowpack in the “Total Fort Peck to Garrison” reach was 19.0”, 135% of the 1981-2010 30-year average. By April 1 normally 97% of the peak has accumulated. The Missouri River basin mountain snowpack normally peaks near April 15.

*Generally considered the high and low year of the last 20-year period.

Provisional data. Subject to revision.

Montana SNOTEL Current Snow Water Equivalent (SWE) % of Normal

Apr 12, 2014



Wyoming SNOTEL Current Snow Water Equivalent (SWE) % of Normal

Apr 12, 2014

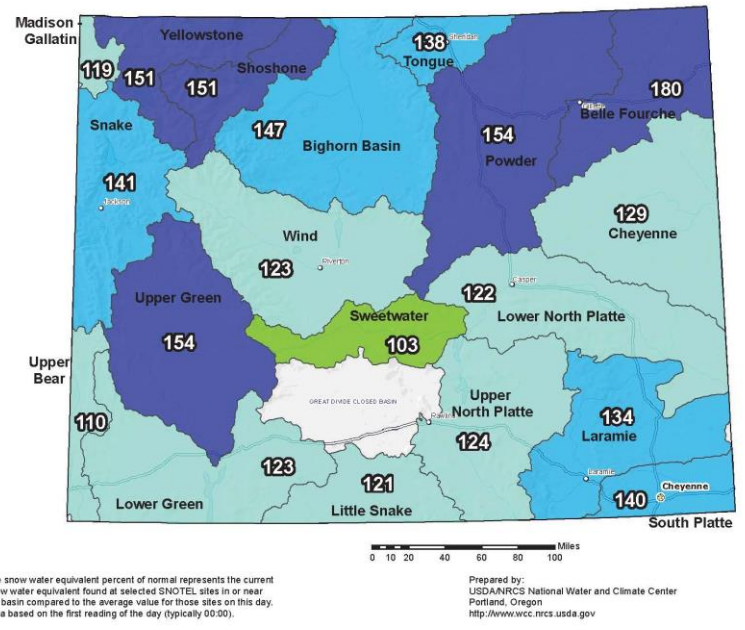
Current Snow Water Equivalent (SWE) Basin-wide Percent of 1981-2010 Median

- unavailable *
- <math><50\%</math>
- 50 - 69%
- 70 - 89%
- 90 - 109%
- 110 - 129%
- 130 - 149%
- >=150%

Provisional Data Subject to Revision



The snow water equivalent percent of normal represents the current snow water equivalent found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day. Data based on the first reading of the day (typically 00:00).



Colorado SNOTEL Current Snow Water Equivalent (SWE) % of Normal

Apr 12, 2014

Current Snow Water Equivalent (SWE) Basin-wide Percent of 1981-2010 Median

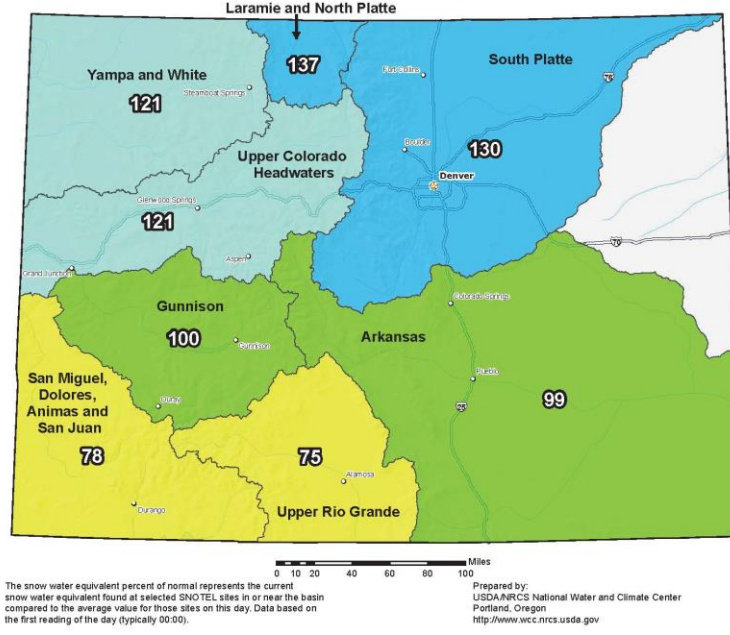
- unavailable *
- <math><50\%</math>
- 50 - 69%
- 70 - 89%
- 90 - 109%
- 110 - 129%
- 130 - 149%
- >=150%

** Data unavailable at time of posting or measurement is not representative at this time of year.*

Provisional Data Subject to Revision



The snow water equivalent percent of normal represents the current snow water equivalent found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day. Data based on the first reading of the day (typically 00:00).

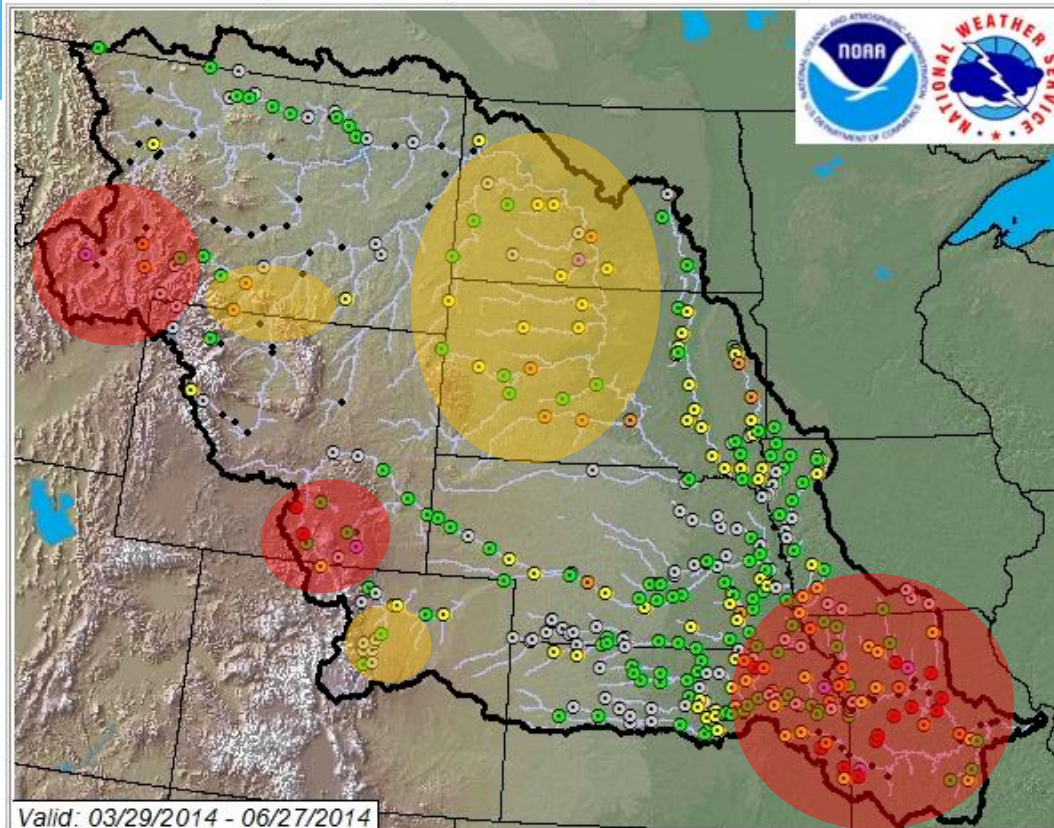


MISSOURI BASIN

RIVER FORECAST CENTER

Probabilities of exceeding Minor Flood Levels

(click on specific points to view probabilistic outlooks)



Percent Chance of Minor Flooding

- | | | |
|------------------|-------------|-------------|
| • Not Calculated | ⊙ < 5% | ● 5% - 20% |
| ● 21% - 40% | ● 41% - 60% | ● 61% - 80% |
| ● > 80% | | |

Rivers likely to experience minor (and maybe moderate) flooding

- Big Hole River, MT
- Gallatin River, MT
- North Platte, WY
- Laramie, WY
- Marais des Cygnes—
Osage River basin, KS & MO
- Grand River, MO
- Chariton River, MO
- Platte River, MO
- Missouri River, some reaches
- Smaller streams in MO & extreme eastern KS

Areas to watch:

- Smaller streams in

MISSOURI BASIN

SPRING FLOOD SUMMARY

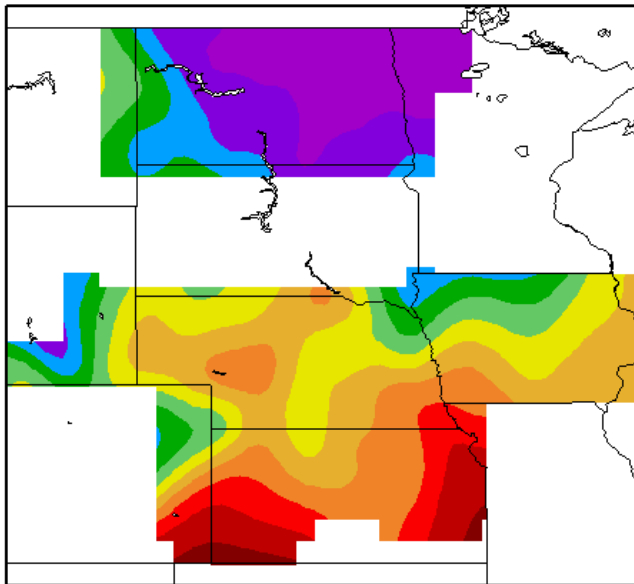
- **Above average mountain snowpack. Typical accumulation season nearing end.**
- **Insignificant plains snowpack.**
- **Northern Plains soils beginning to thaw, but very wet.**
- **Significant flooding has already occurred due to lower elevation mountain snowmelt and plains snowmelt. But this flooding was greatly enhanced by ice-covered rivers.**
- **Ice-jam induced flooding is no longer a threat!!!**
- **Only minor and isolated flooding is expected due to the mountain snow runoff alone.**
- **Have to keep watch on western portions of the Dakotas, as rain events could lead to localized minor flooding.**
- **Minor-to-moderate flooding due to thunderstorms highly likely to continue in eastern Kansas and Missouri for next few months. Not atypical!!!!**

Impacts

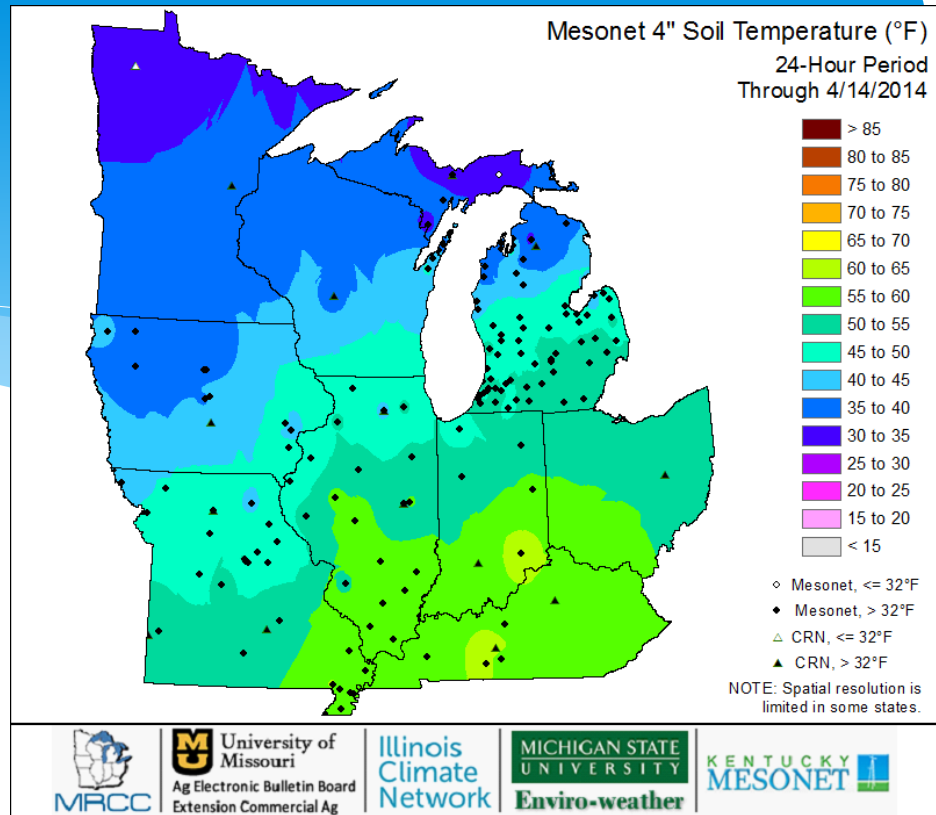
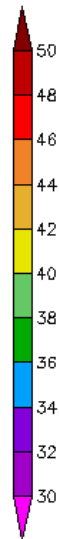
Spring Ag Activity

Soil temperatures

Soil Temperature (F at 4 inches)
4/15/2014 - 4/15/2014

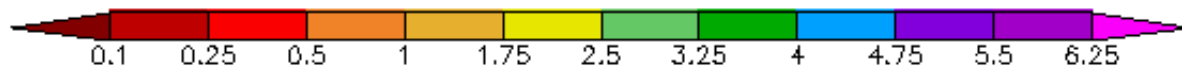
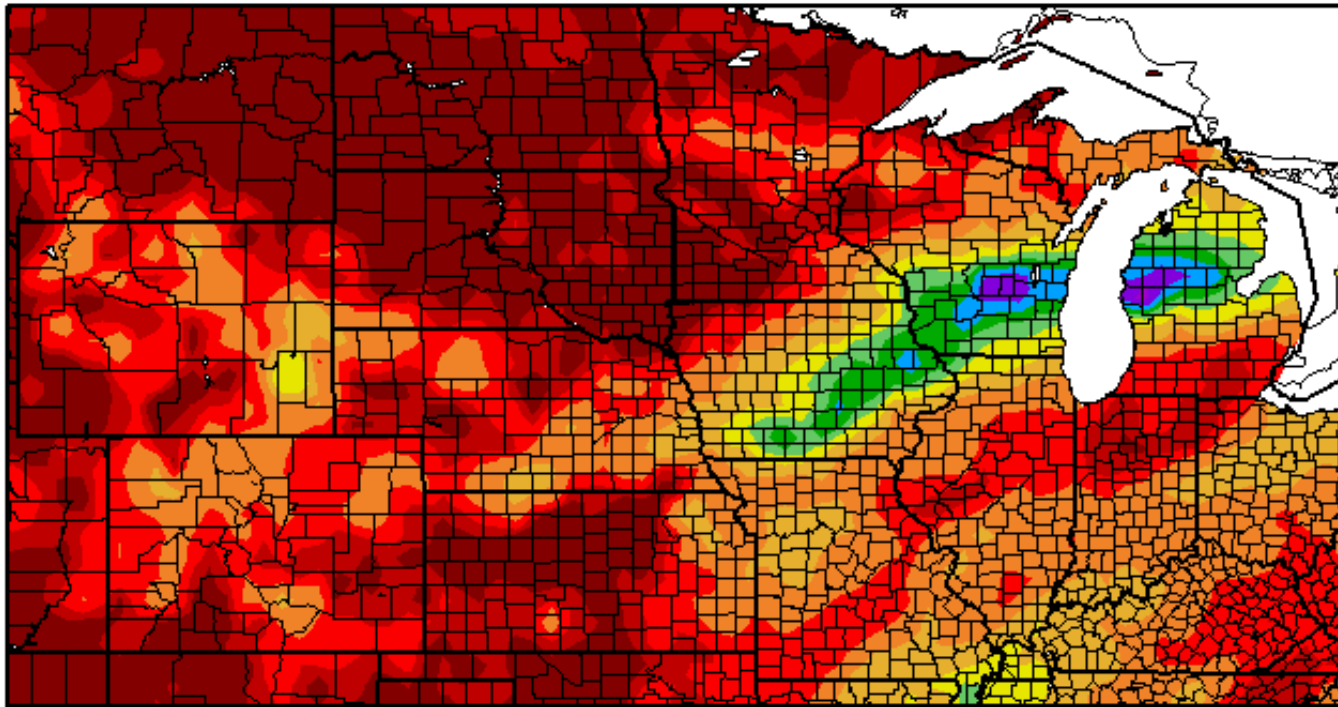


High Plains Regional Climate Center
Generated 4/16/2014 using AWDN data.



Last 7 day precipitation

Precipitation (in)
4/10/2014 - 4/16/2014



Generated 4/17/2014 at HPRCC using provisional data.

Regional Climate Centers

Planting Progress

Corn Percent Planted

	Prev Year	Prev Week	Apr 13 2014	5-Yr Avg
CO	0	NA	0	2
IL	1	NA	1	10
IN	0	NA	0	5
IA	0	NA	0	2
KS	3	4	11	9
KY	6	NA	4	17
MI	0	NA	0	1
MN	0	NA	0	2
MO	7	2	9	16
NE	0	NA	1	1
NC	25	NA	20	31
ND	0	NA	0	0
OH	1	NA	0	2
PA	1	NA	0	2
SD	0	NA	0	1
TN	10	2	7	25
TX	56	54	57	55
WI	0	NA	0	0
18 Sts	2	NA	3	6

These 18 States planted 91% of last year's corn acreage.

Oats Percent Planted

	Prev Year	Prev Week	Apr 13 2014	5-Yr Avg
IA	19	7	29	51
MN	1	NA	0	24
NE	56	7	28	51
ND	0	NA	0	4
OH	22	1	6	32
PA	26	NA	4	35
SD	15	NA	16	22
TX	100	100	100	100
WI	0	NA	0	21
9 Sts	38	NA	9	47

These 9 States planted 65% of last year's oat acreage.

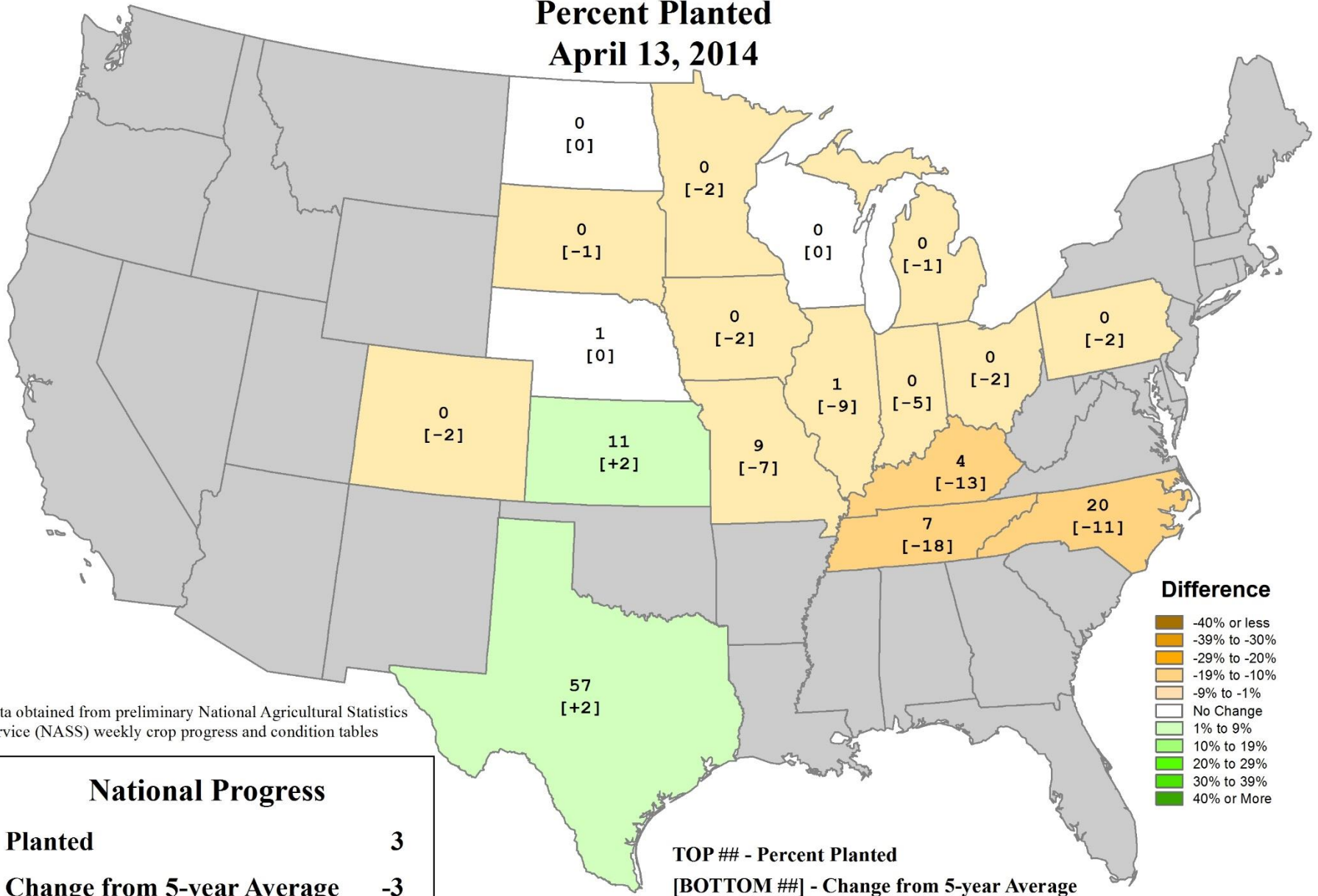
Spring Wheat Percent Planted

	Prev Year	Prev Week	Apr 13 2014	5-Yr Avg
ID	45	31	56	31
MN	0	NA	0	13
MT	6	NA	3	8
ND	0	NA	0	5
SD	6	NA	6	22
WA	48	20	46	42
6 Sts	5	NA	6	NA

These 6 States planted 99% of last year's spring wheat acreage.

U.S. Corn Progress

Percent Planted
April 13, 2014



Data obtained from preliminary National Agricultural Statistics Service (NASS) weekly crop progress and condition tables

National Progress	
Planted	3
Change from 5-year Average	-3

TOP ## - Percent Planted
[BOTTOM ##] - Change from 5-year Average

Agricultural issues

- * Soil temperature limiting
- * Soil moisture a little dry west – moist east (IN- OH – MI)

- * Planting progress slowed – still early
 - * Some small grains
 - * Corn in southern corn belt
 - * Field work – tillage, fertilizer app./N

- * Livestock losses near/below average – fortunate after huge fall losses

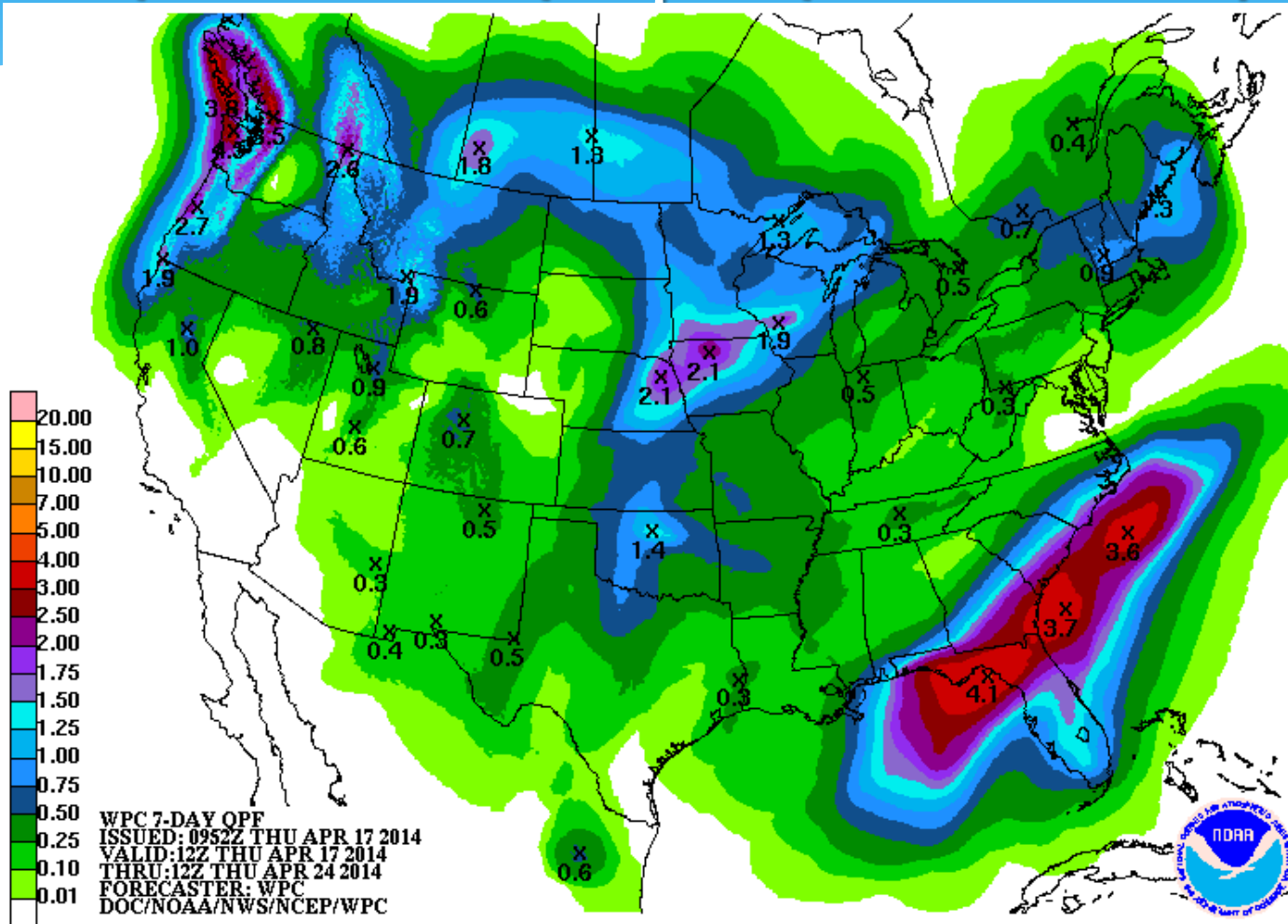
- * Concerns over winter freeze damage
 - * Winter wheat
 - * Hort Crops – MI – some damage reported already

Outlooks

Climate Outlooks

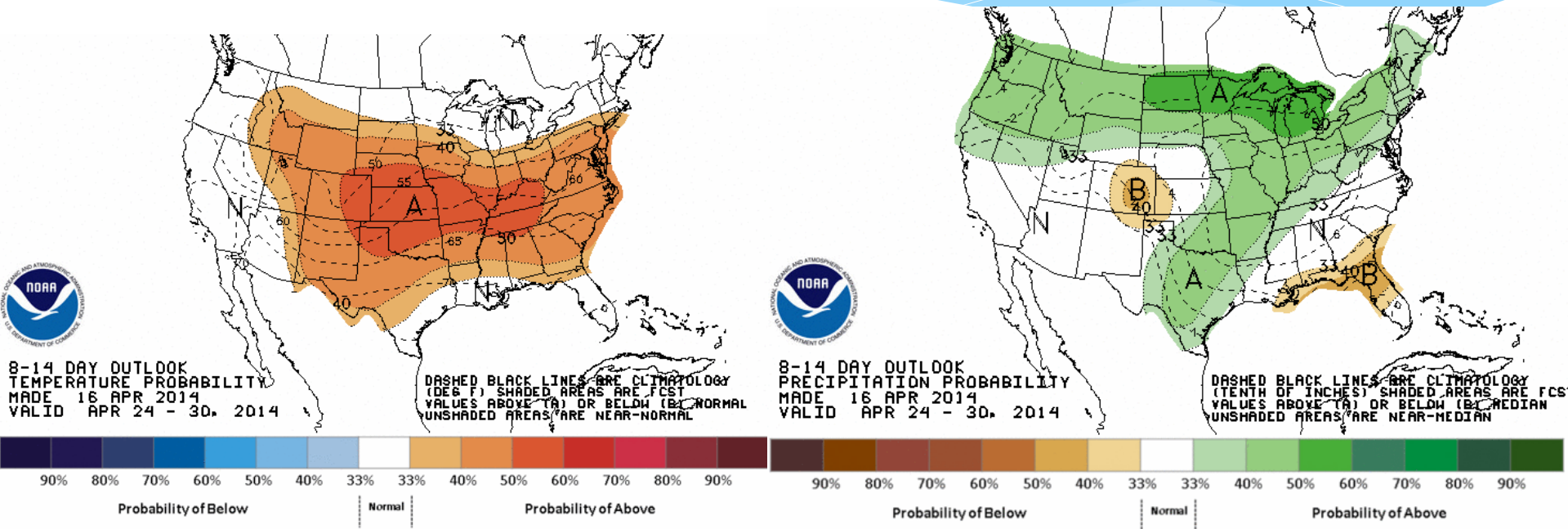
- * **7-day precipitation forecast**
- * **8-14 day outlook**
- * **May**
- * **3 Months (May-July)**
- * **Seasonal Drought Outlooks**
- * **El Nino**

7-day Quantitative Precipitation Forecast Valid: 7 AM Thu 17 Apr – 7 AM Thu 24 Apr



<http://www.wpc.ncep.noaa.gov/qpf/day1-7.shtml>

Temperature and Precipitation Probabilities for 24 Apr. – 30 Apr. 2014

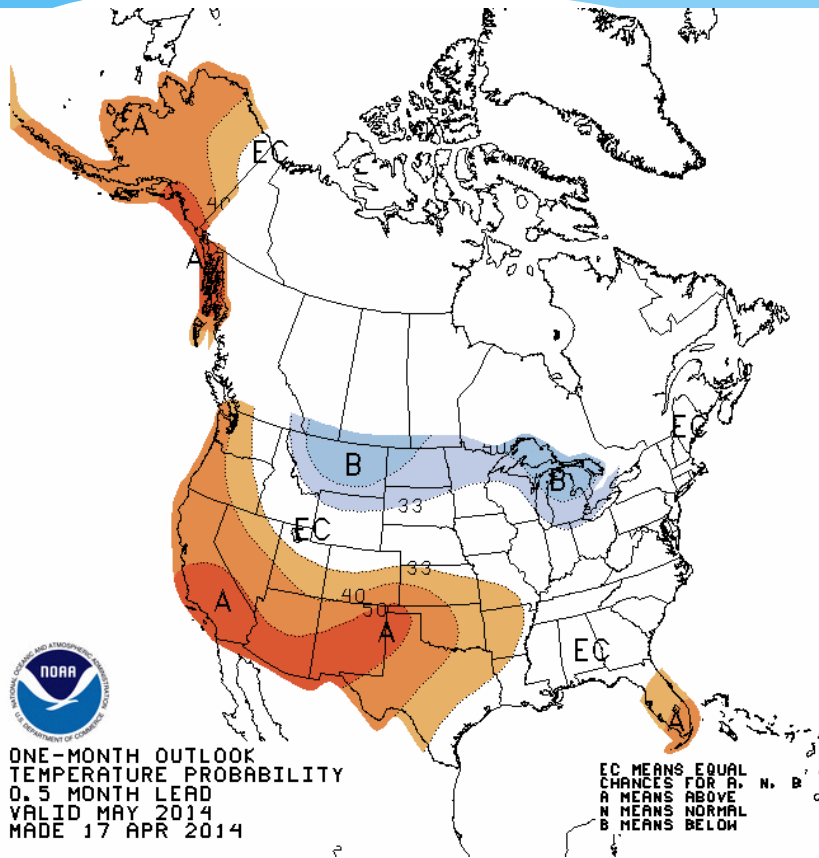


Temperature

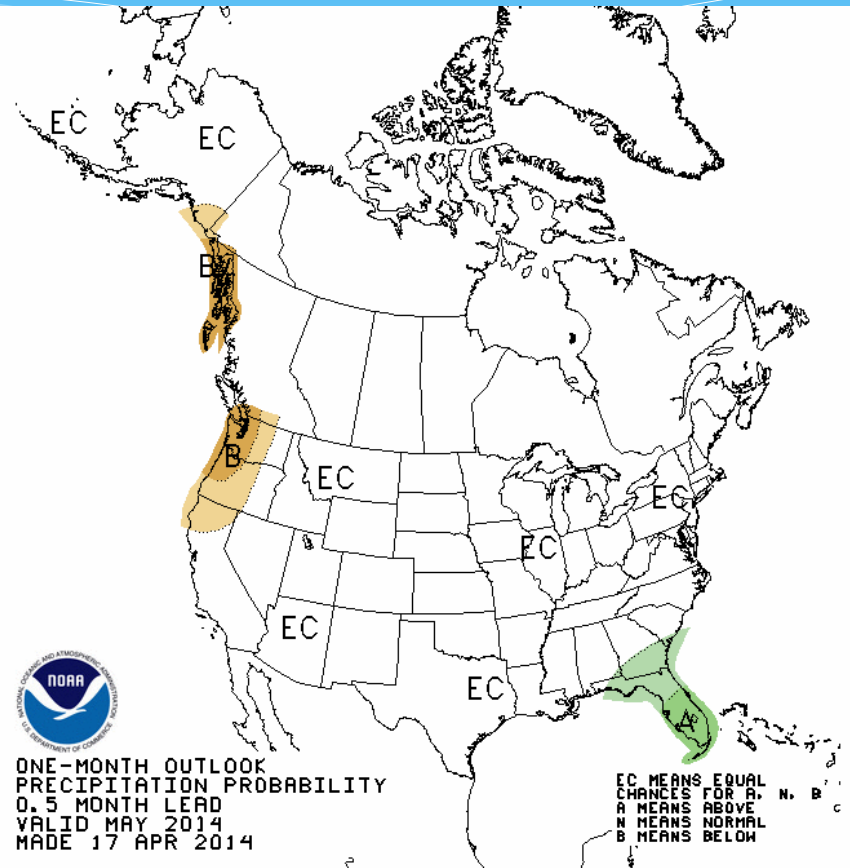
Precipitation

<http://www.cpc.ncep.noaa.gov/products/predictions/814day/index.php>

May Temperature and Precipitation Probabilities



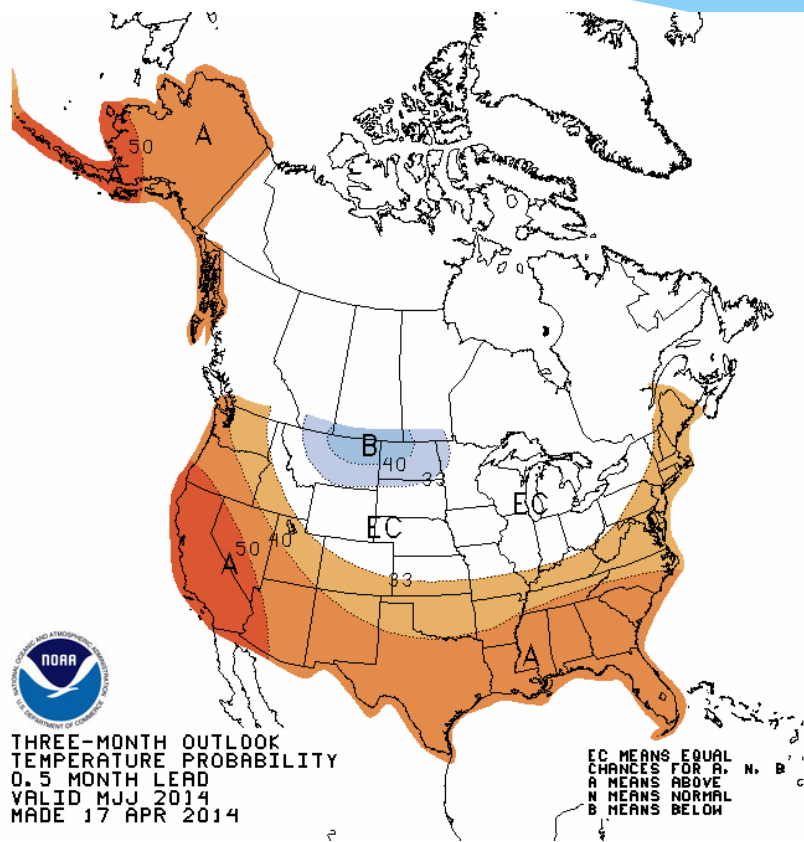
Temperature



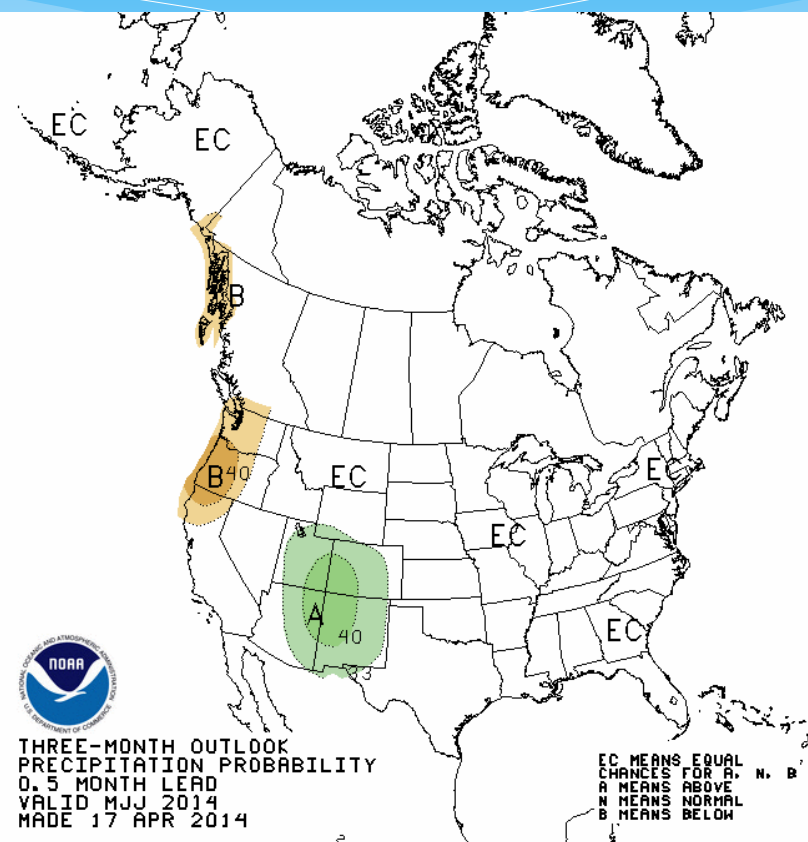
Precipitation

<http://www.cpc.ncep.noaa.gov/products/predictions/30day/>

3 Month Temperature and Precipitation Probabilities (May – July)



Temperature

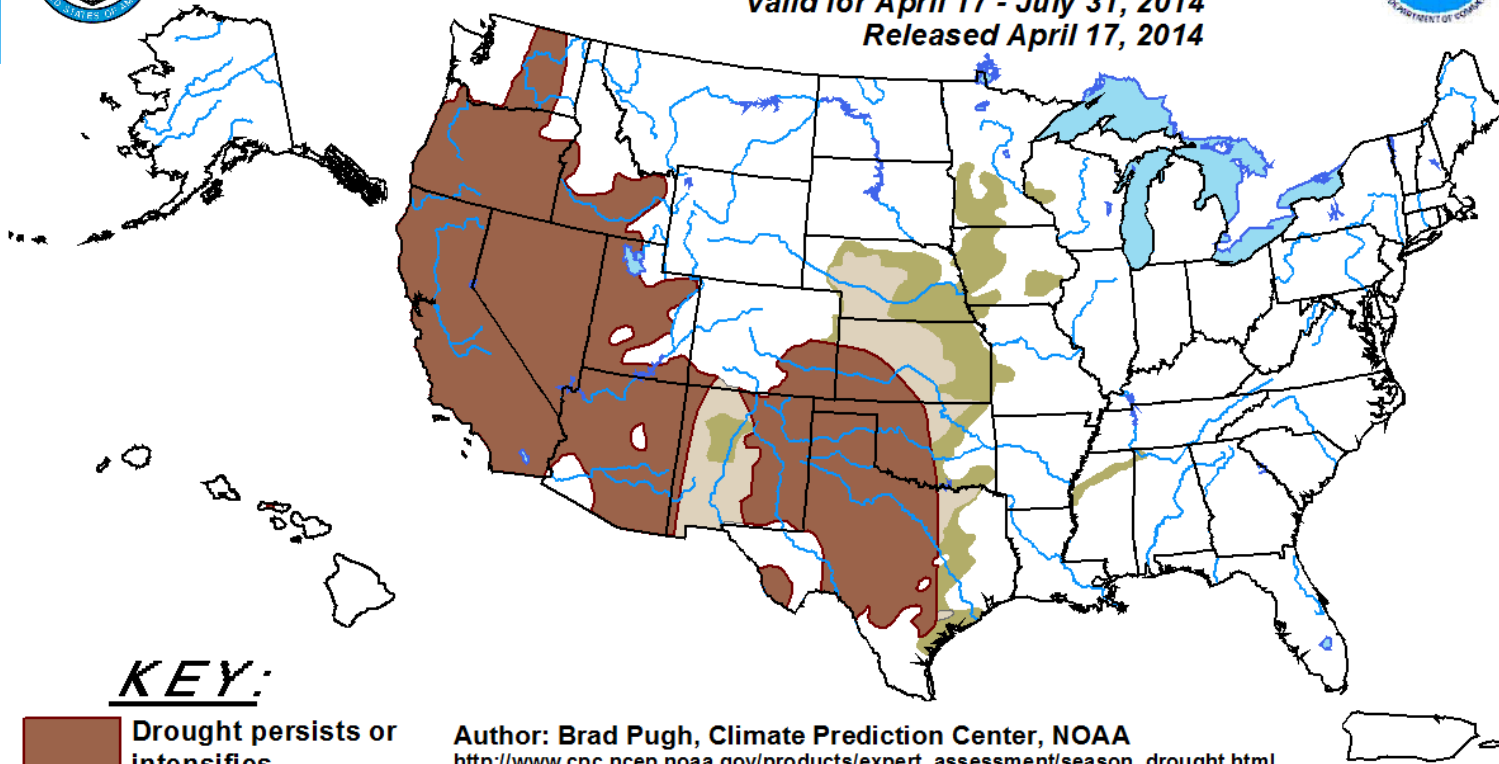


Precipitation





Drought Outlook through 31 July



U.S. Seasonal Drought Outlook Drought Tendency During the Valid Period *Valid for April 17 - July 31, 2014* *Released April 17, 2014*



KEY:

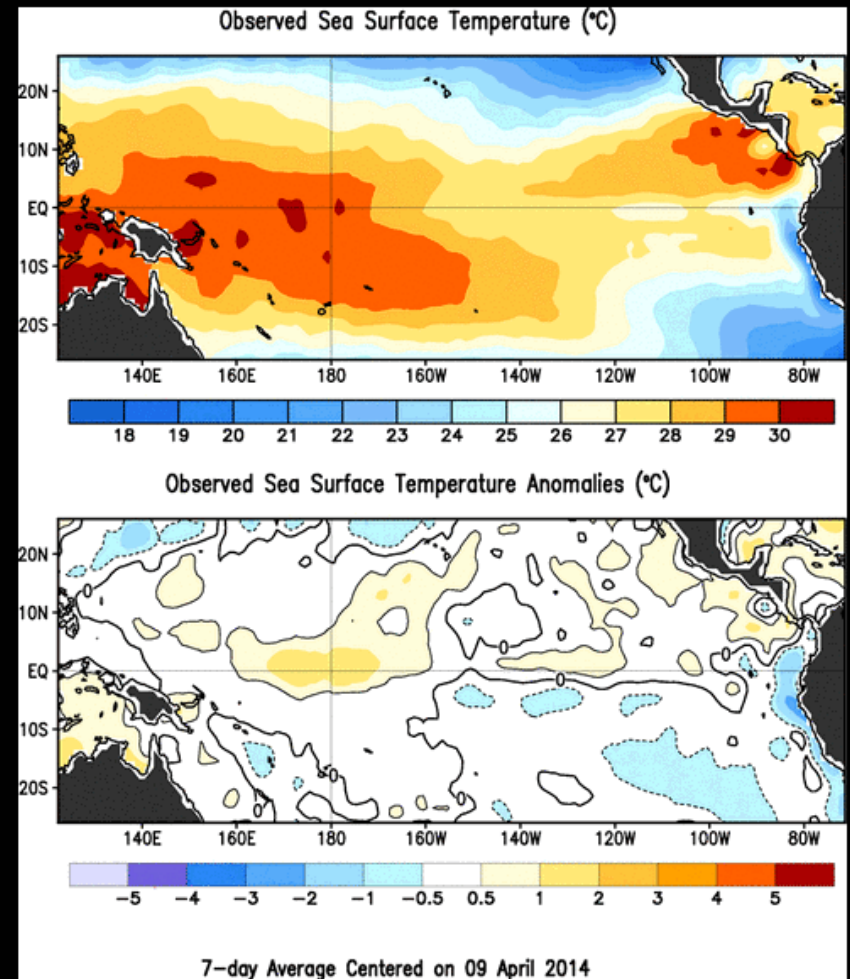
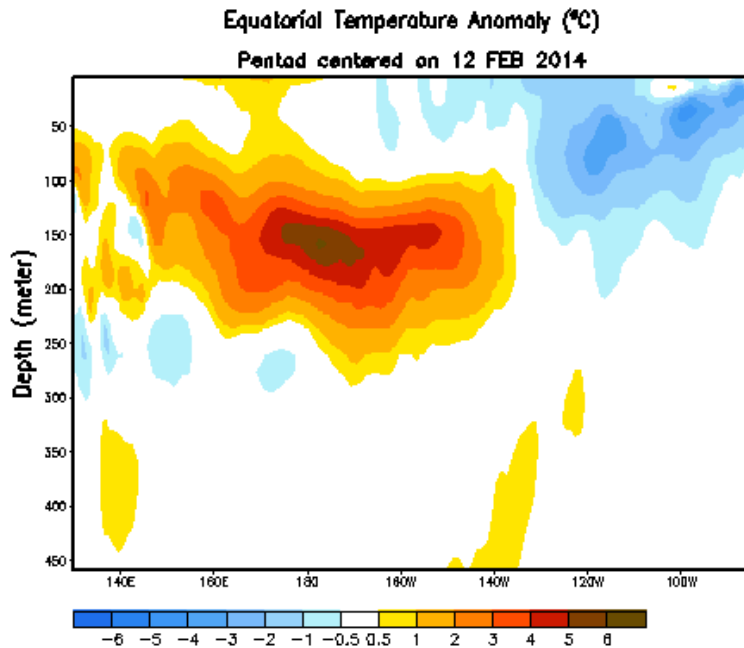
-  Drought persists or intensifies
-  Drought remains but improves
-  Drought removal likely
-  Drought development likely

Author: Brad Pugh, 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)

Warm water progression in Pacific

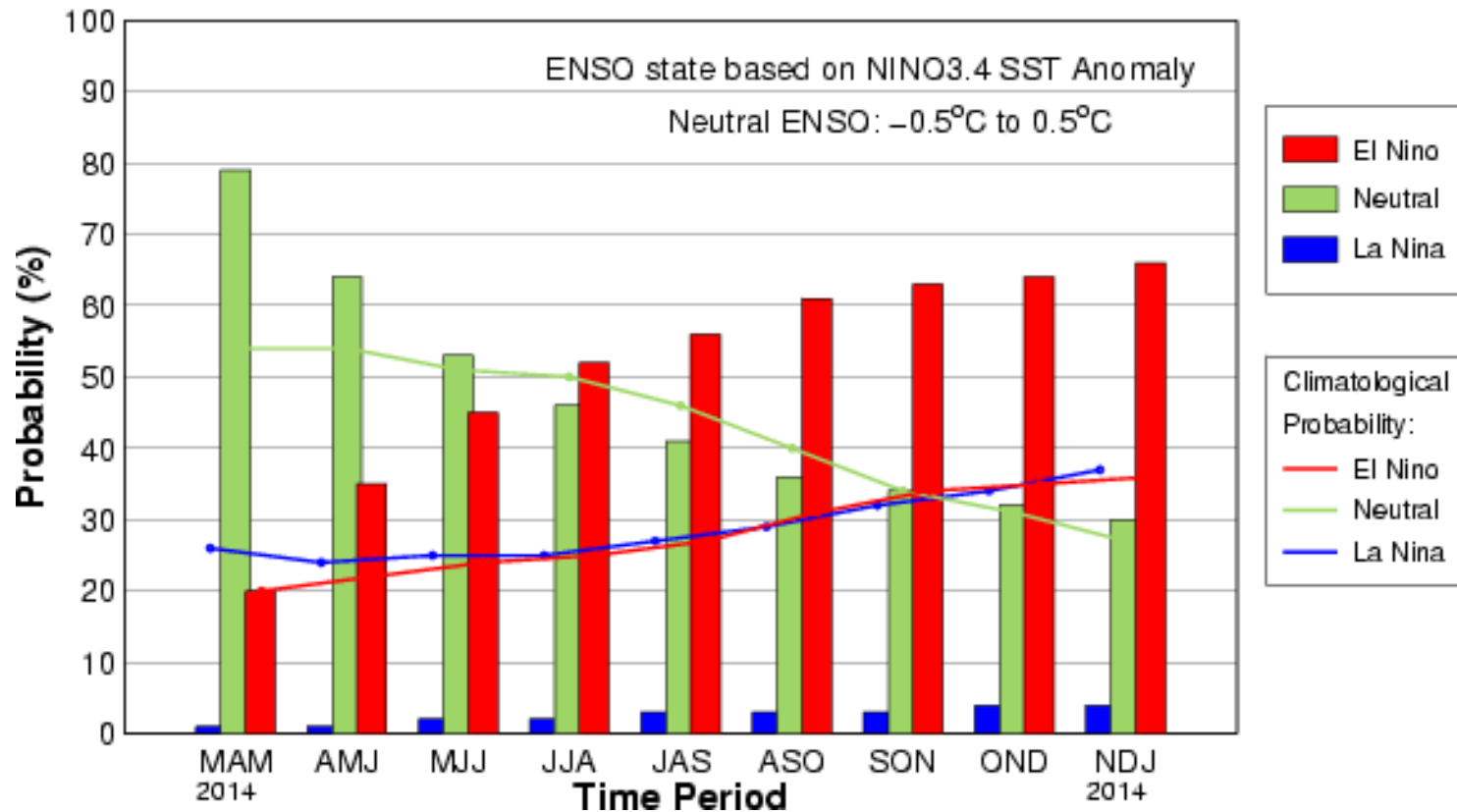


CPC/IRI Probabilistic ENSO Outlook

(updated 10 April 2014)

El Nino likely is likely through the Northern Hemisphere fall 2014.

Early-Apr CPC/IRI Consensus Probabilistic ENSO Forecast



Summary - Conditions

- * Generally cool 30 day – more recent warm – late freeze
- * Slow start to ag activity – impacting winter wheat
- * Soils cool – some still frozen north
- * Soil moisture higher NW – drier central to SW – wet east

- * Monitoring Missouri and tribs for flooding some likely/has occurred
- * Great Lakes frozen recovering levels – slowing commerce

Summary - Outlooks

- * ENSO-neutral transitioning to El Nino
- * Cooler expected northern plains/Great Lakes
- * Wet more likely only in CO – not well defined elsewhere
- * Drought will conditions south and west – slight improvement likely central
- * Some spring flood potential – convective and snow melt area. Continue to monitor the Missouri.
- * Good runoff from all mountain areas

Further Information - Partners

- * **Today's and Past Recorded Presentations and :**
- * <http://mrcc.isws.illinois.edu/webinars.htm>
- <http://www.hprcc.unl.edu>
- NOAA's National Climatic Data Center: www.ncdc.noaa.gov
 - Monthly climate reports (U.S. & Global):
www.ncdc.noaa.gov/sotc/
- NOAA's Climate Prediction Center: www.cpc.ncep.noaa.gov
- Climate Portal: www.climate.gov
- U.S. Drought Portal: www.drought.gov
- National Drought Mitigation Center: <http://drought.unl.edu/>
- State climatologists
 - * <http://www.stateclimate.org>
- Regional climate centers
 - * <http://mrcc.isws.illinois.edu>
 - * <http://www.hprcc.unl.edu>

Thank You and Questions?

- * Questions:

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