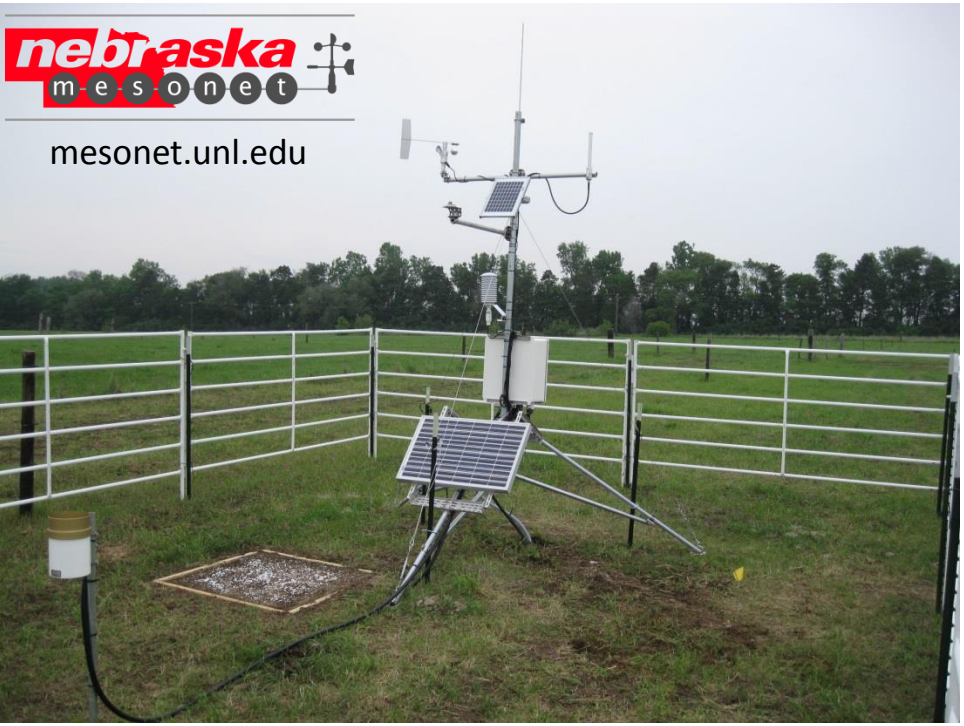
North Central U.S. Climate Summary & Outlook

March 16, 2017



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nsco.unl.edu

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National Drought Mitigation Center

AASC AMERICAN ASSOCIATION OF STATE CLIMATOLOGISTS

General Information

- **Providing climate services to the Central Region**
  - Collaboration activity between:
    - NOAA – National Centers for Environmental Information (Doug Kluck)
    - American Association of State Climatologists
    - Midwest and High Plains Regional Climate Centers
    - NOAA's Climate Prediction Center
    - National Drought Mitigation Center

- **Next Climate/Drought Outlook Webinar**
  - April 20th 2016, Dennis Todey, USDA Midwest Climate Hub Director

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

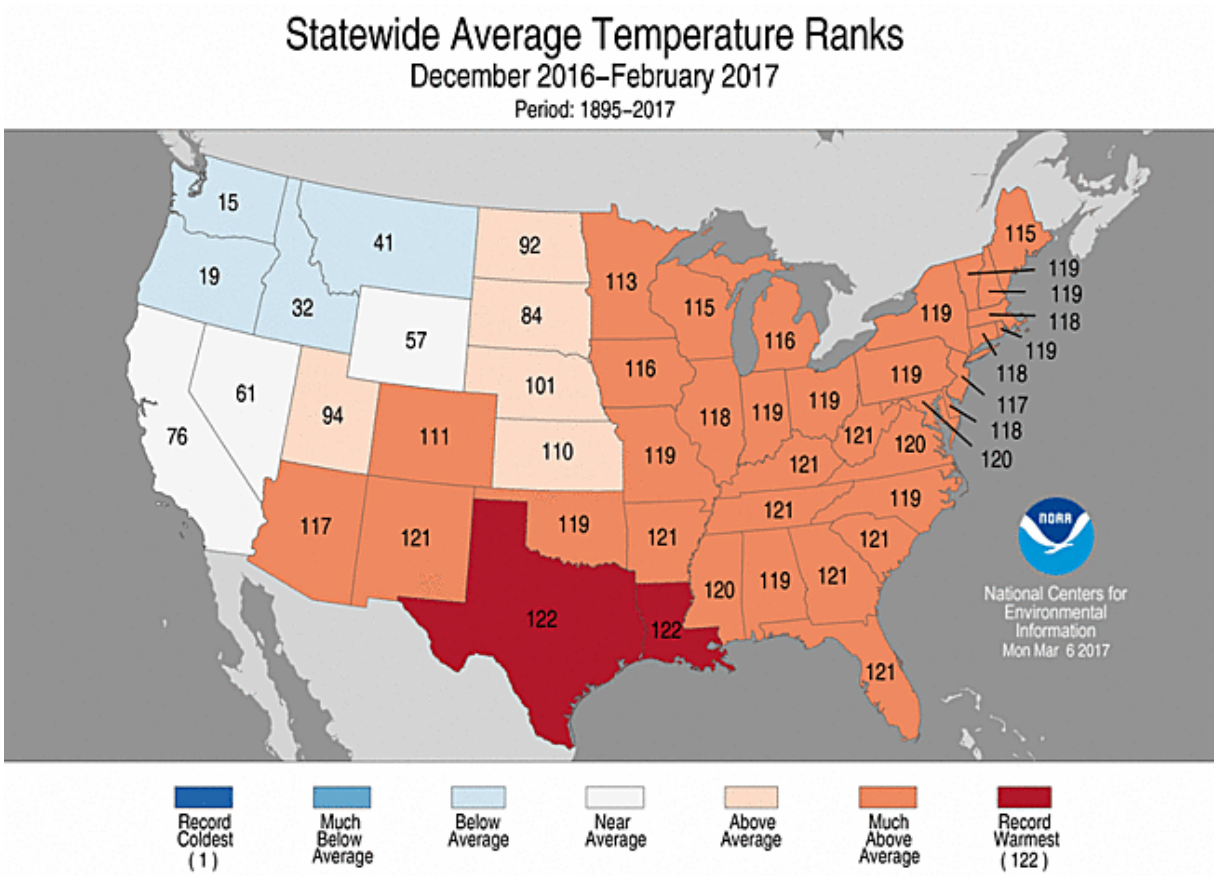
- **Past recorded presentations and slides can be found here:**
- http://mrcc.isws.illinois.edu/webinars.htm
- http://www.hprcc.unl.edu/webinars.php

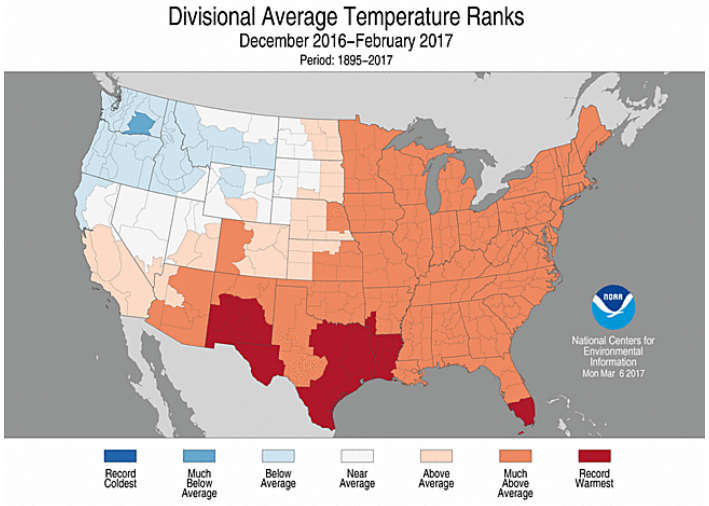
- **Open for questions at the end**

Agenda for Today

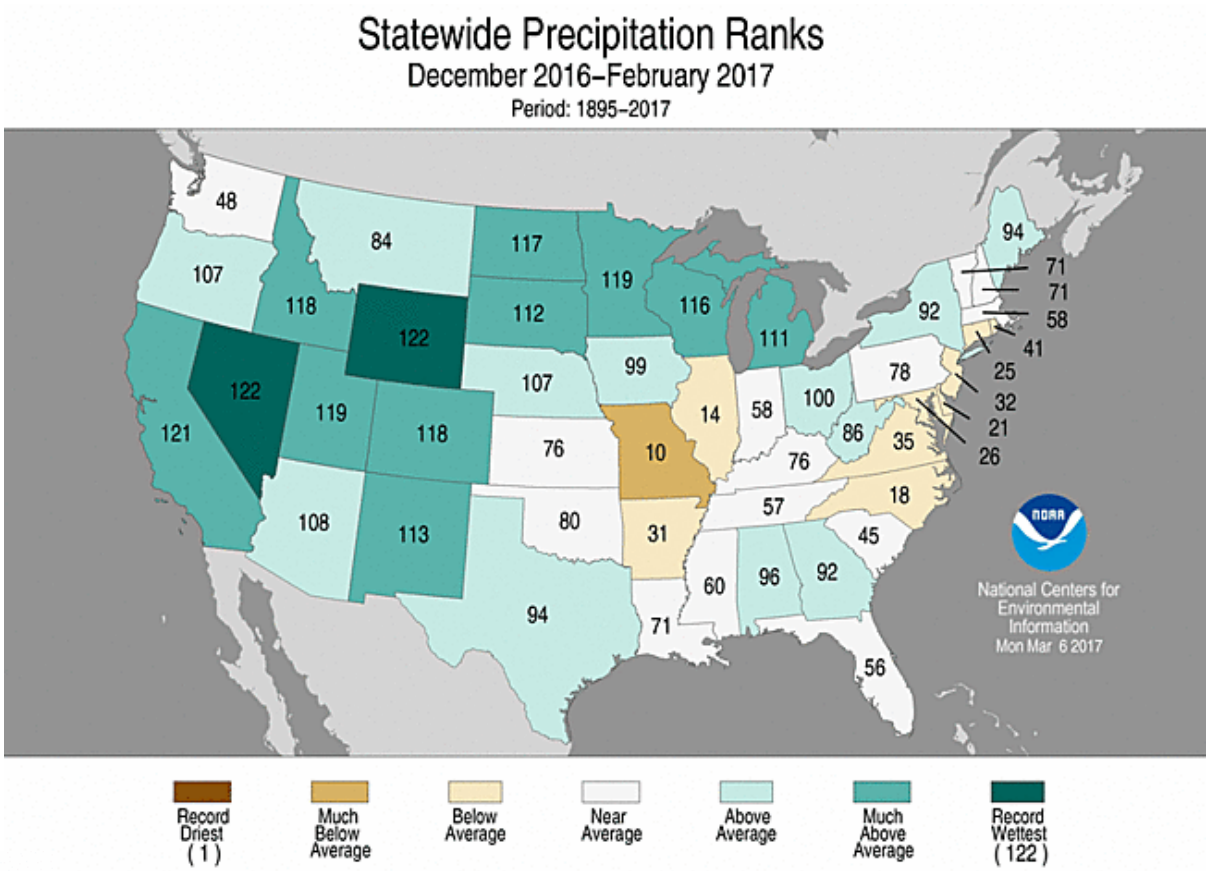
- **Winter recap**
- **February conditions**
- **How March is shaping up**
- **Impacts around the region**
- **El Niño?**
- **Climate outlooks**
- **Questions/Comments**

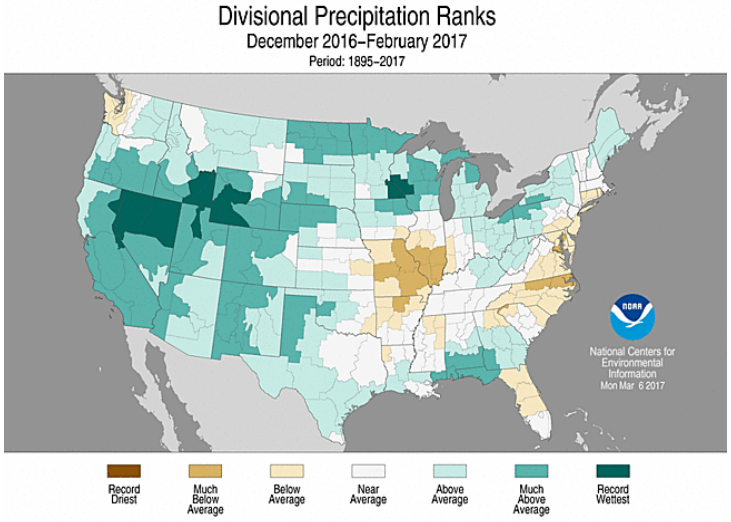
- The contiguous United States average **winter temperature** was 6th warmest on record.
- Warmth across North Central region, except western high plains.





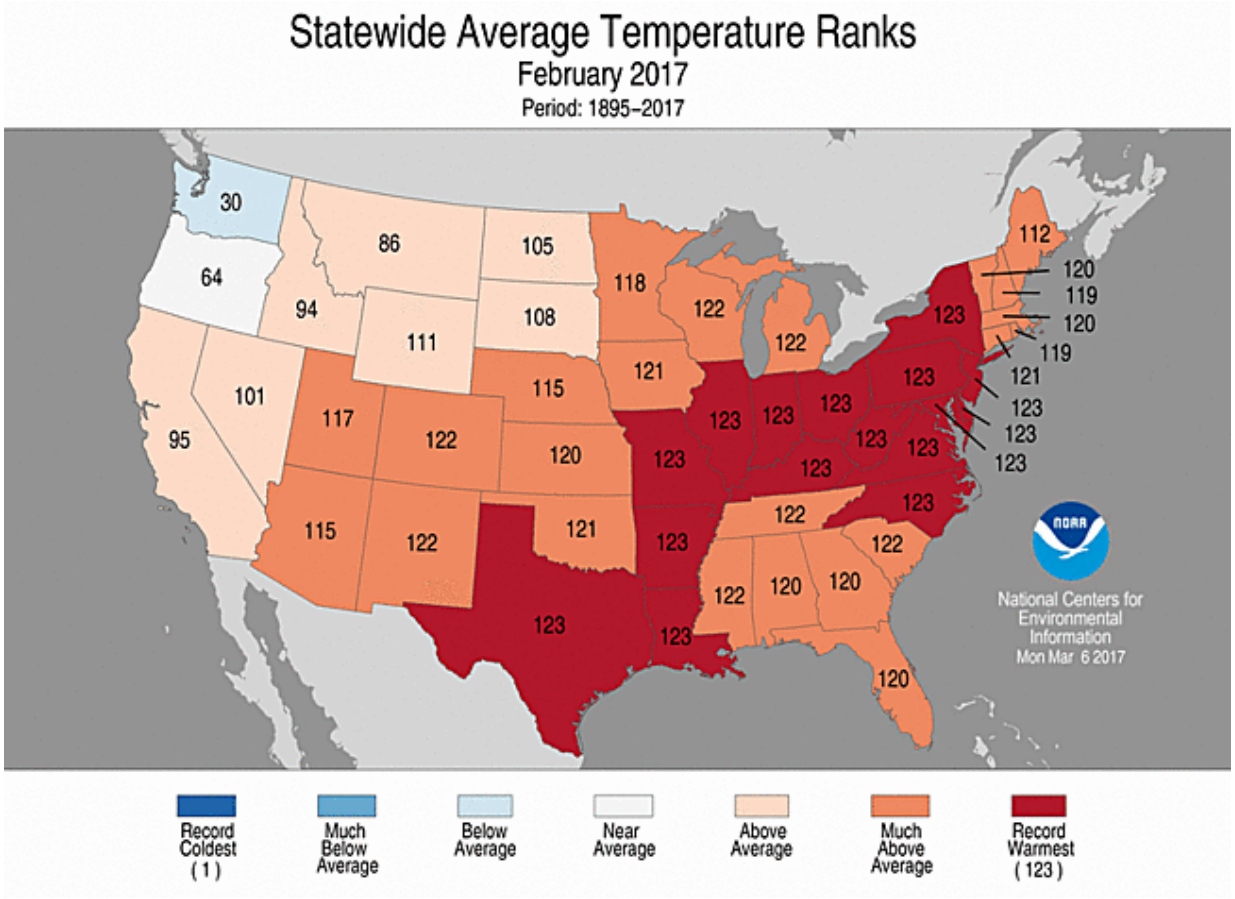
- The contiguous U. S. **winter precipitation** was 8th wettest on record.
- North Central saw wetness in the north/west (**WY had wettest winter on record**) and dry pocket centered in MO/IL.



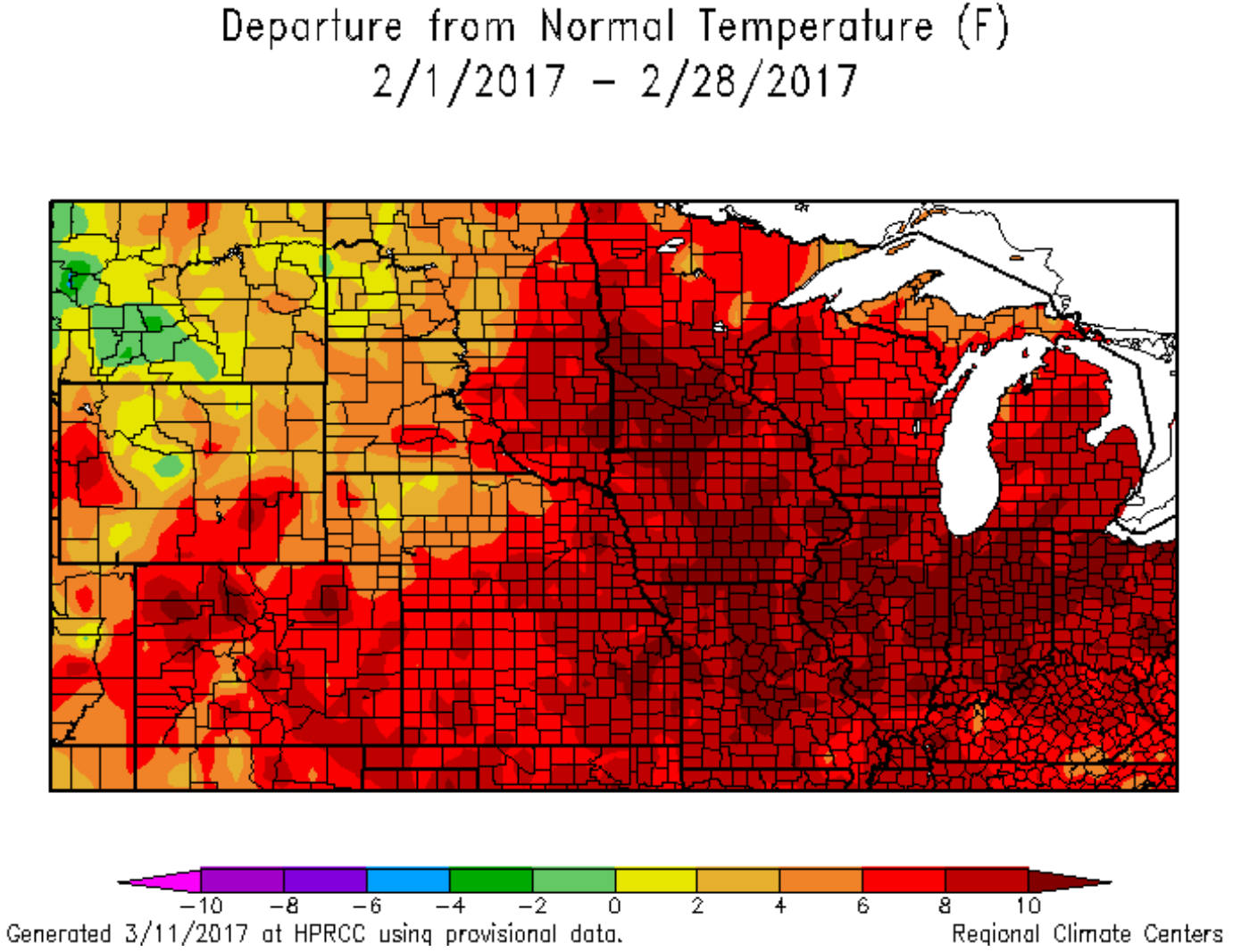


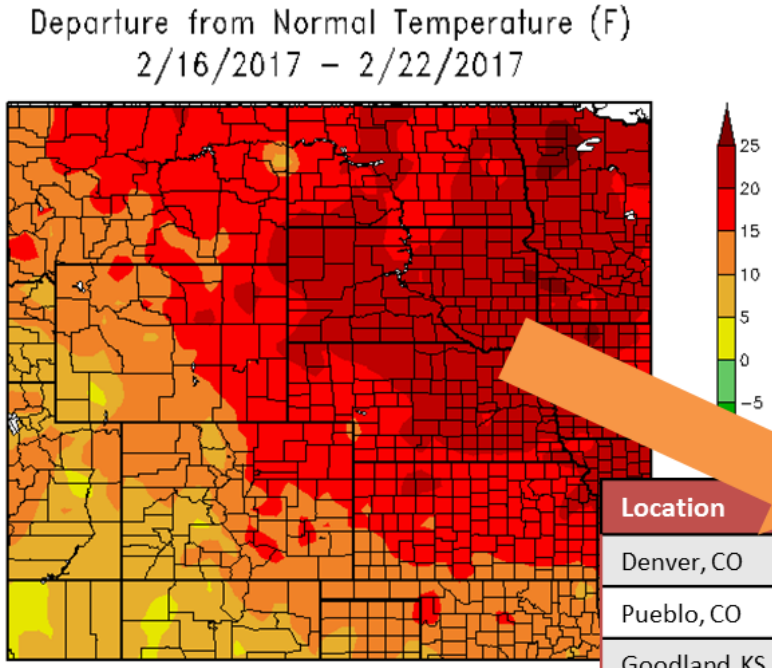
- The contiguous U. S. **average February temperature** 2nd warmest on record.

- **Record warmest February** for MO, IL, IN, OH, KY.
- **Top 5 warmest** for CO, KS, IA, MN, WI, MI



- Monthly temperature **departures exceeding 10°F** for portions of region.

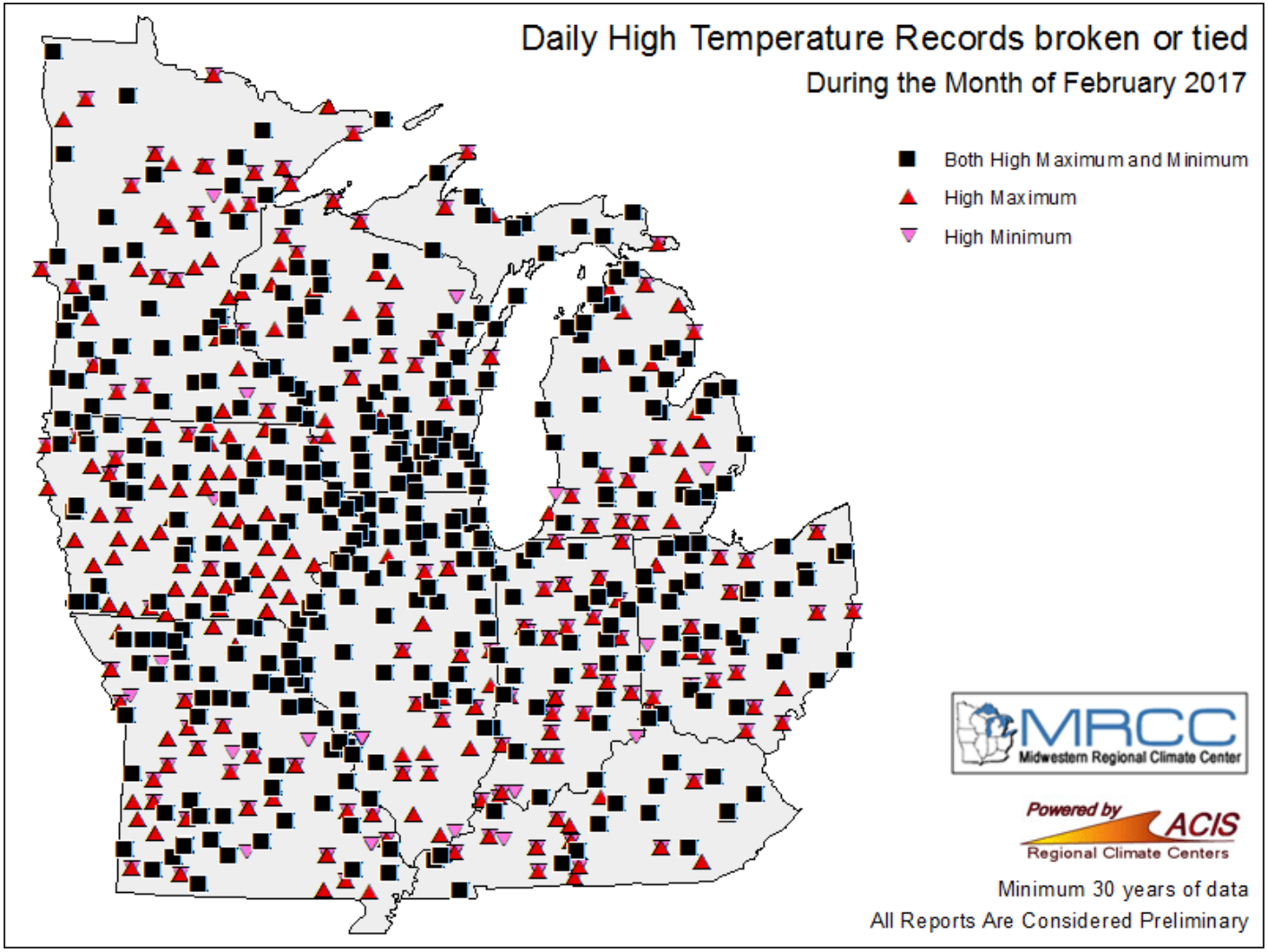




Generated 2/23/2017 at HPRCC using provisional data.

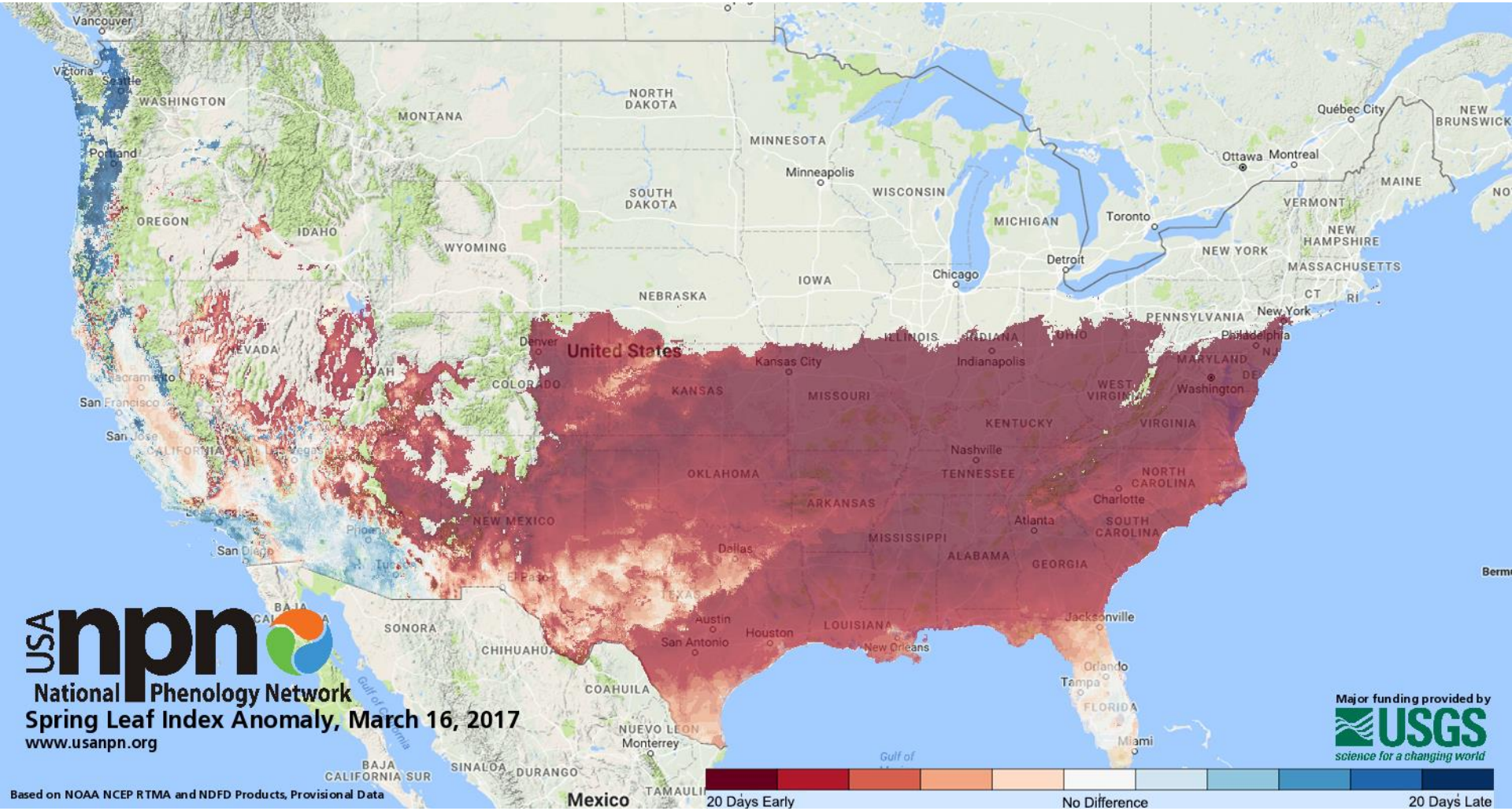
- Highs approaching **80°F** in the west.
- MANY daily high and low temperature **records broken** second half of February.

Location	New Record Highs Set This Week	Period of Record
Denver, CO	**75°F** (16th), **73°F** (21st)	1872-present
Pueblo, CO	**73°F** (16th), **77°F** (21st), **74°F** (22nd)	1888-present
Goodland, KS	**75°F** (16th), **78°F** (21st)	1895-present
Topeka, KS	**76°F** (16th), **77°F** (17th), **79°F** (22nd)	1888-present
Grand Forks, ND	**46°F** (19th)	1893-present
Fargo, ND	**53°F** (17th), **56°F** (19th), **54°F** (20th)	1881-present
North Platte, NE	**72°F** (16th), **79°F** (21st)	1874-present
Grand Island, NE	**73°F** (16th), **72°F** (17th), **77°F** (21st)	1895-present
Lincoln, NE	**72°F** (16th), **74°F** (17th), **73°F** (19th), **76°F** (21st), **76°F** (22nd)	1887-present
Omaha, NE	**67°F** (16th), **75°F** (17th), **71°F** (19th), **72°F** (21st), **75°F** (22nd)	1871-present
Huron, SD	**62°F** (16th), **63°F** (19th)	1881-present
Rapid City, SD	**72°F** (16th), **70°F** (19th)	1942-present
Cheyenne, WY	**61°F** (15th), **69°F** (16th)	1872-present

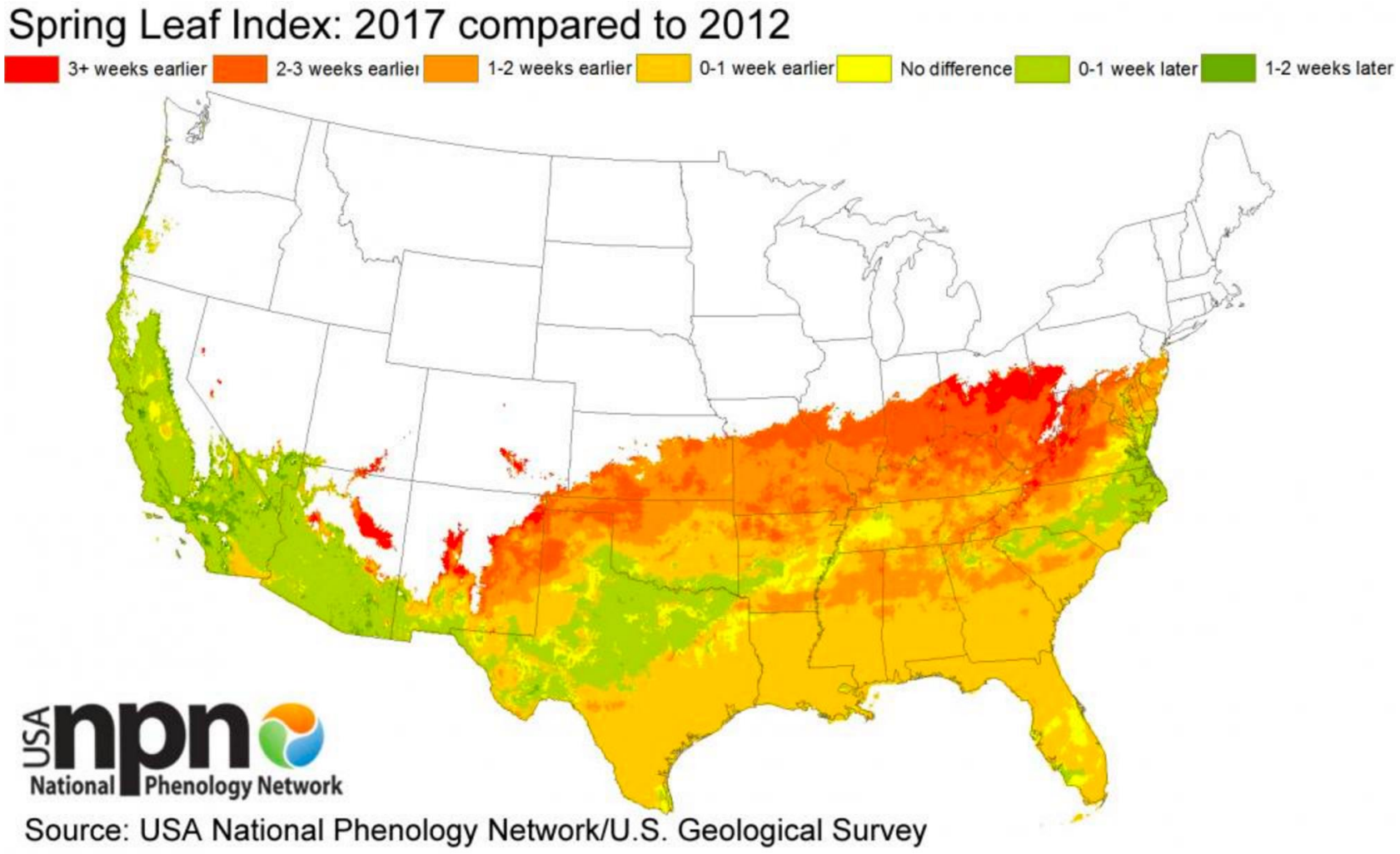


- MANY daily high and low temperature **records broken**.

- Progression of **spring phenology** is marching northward into North Central region a few weeks **ahead of schedule**.

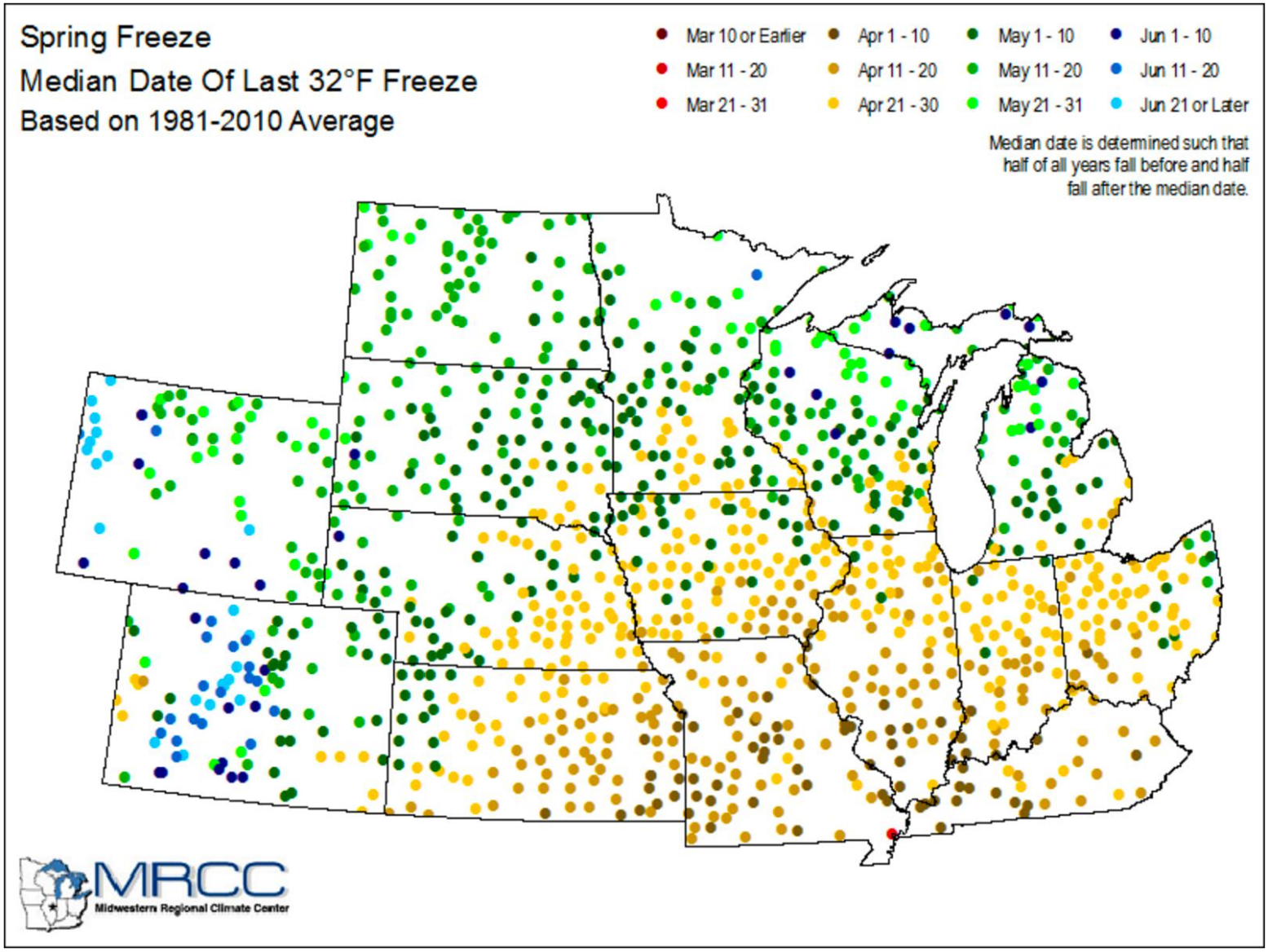


- Spring progression, **this year vs. 2012**

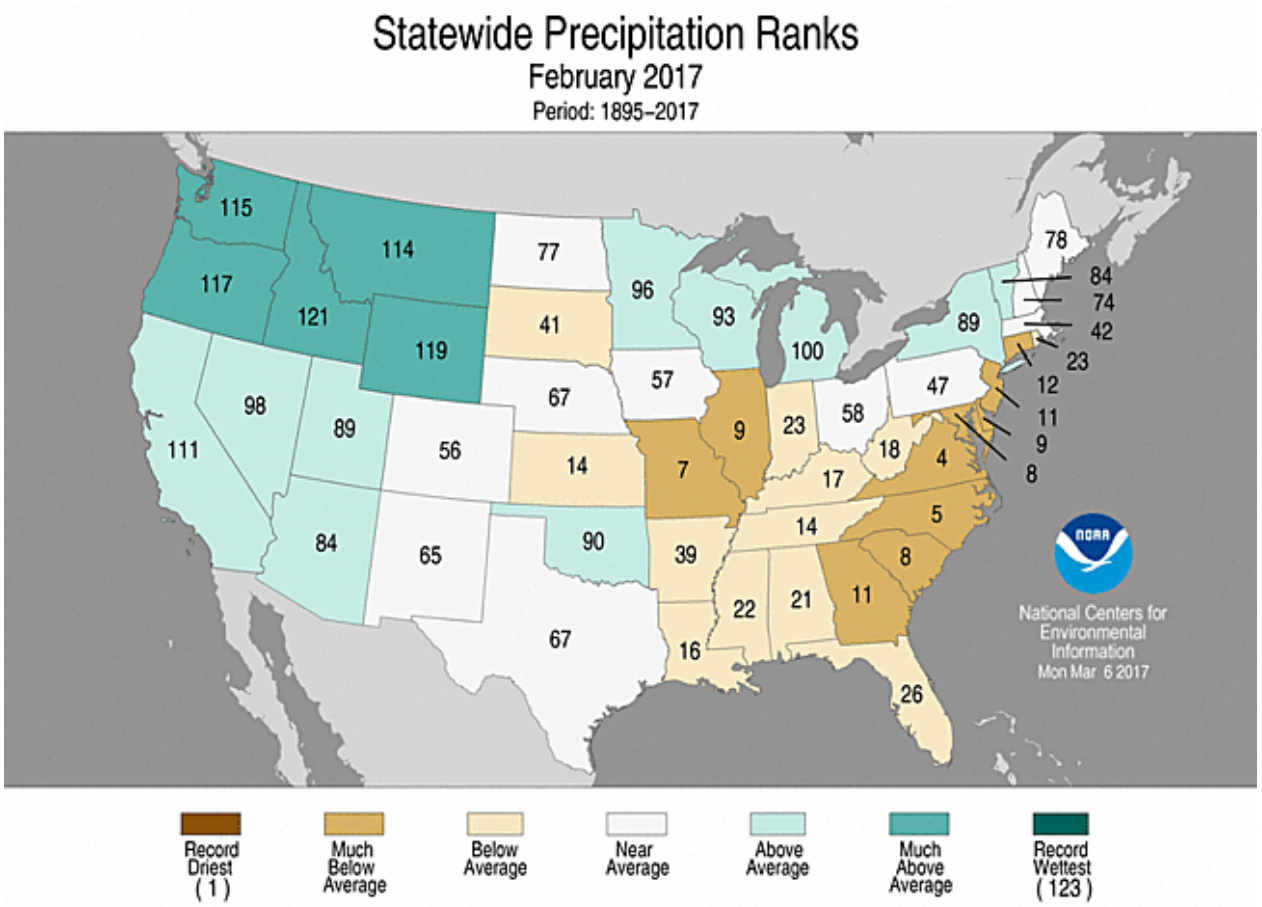


Leaf index for 2017 compared to 2012

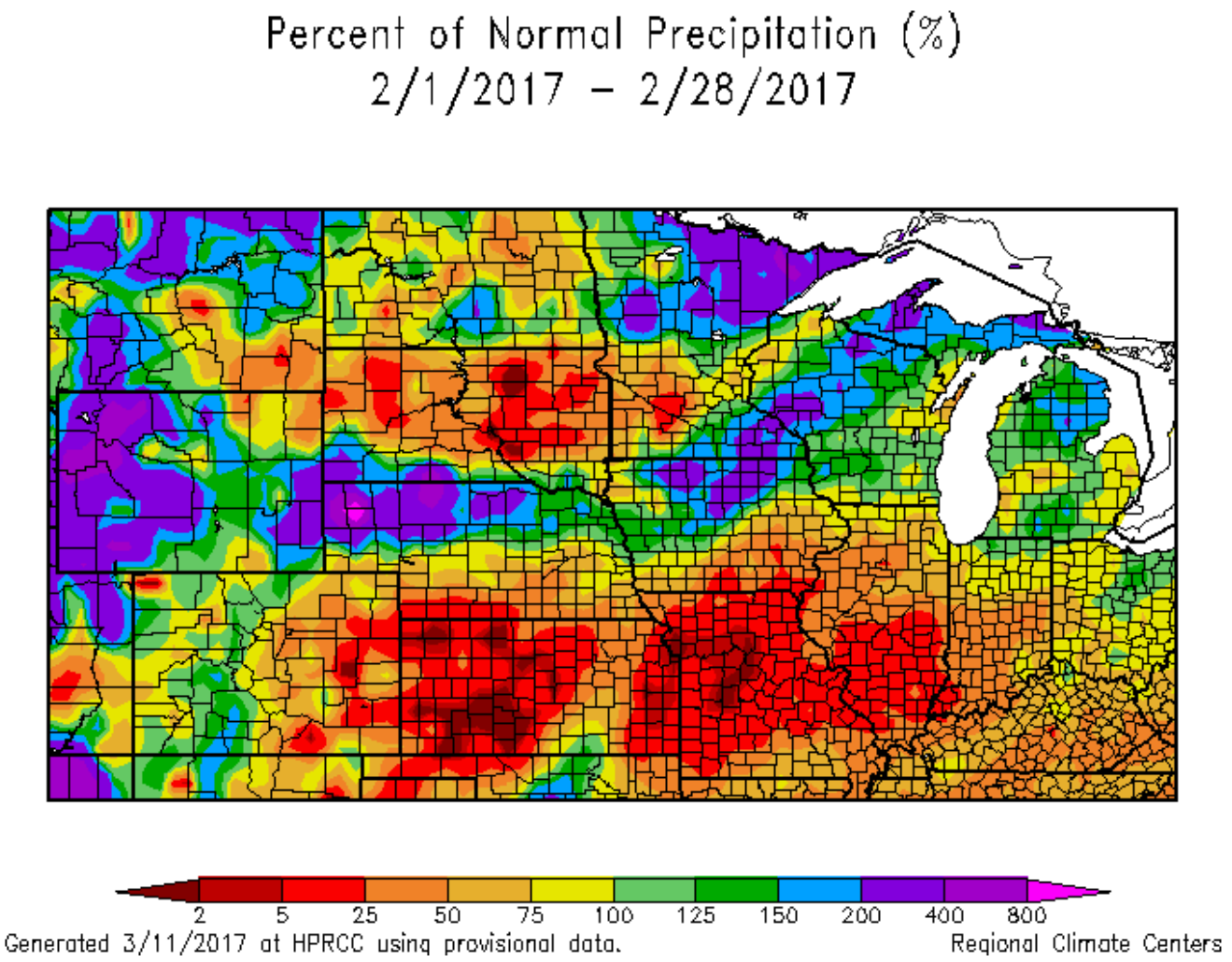
- **When is the last freeze**, on average?



- **February precipitation** varied across the region. Amounts dependent on location.
- **5th wettest** in Wyoming to **top 10 driest** in MO and IL.

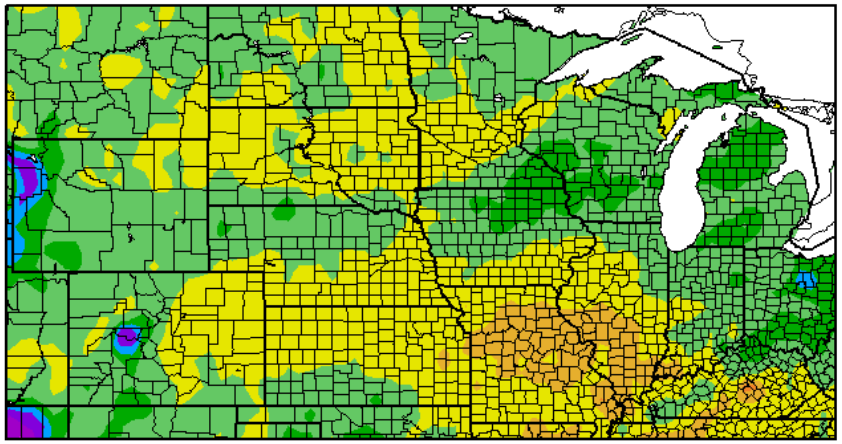


- **Heavy snows** across portions of the north.
- **Notable dryness** across portions of north and most of south.



- Precipitation departures **since January 1** show areas of deficit and surplus.

Departure from Normal Precipitation (in)
1/1/2017 – 3/14/2017

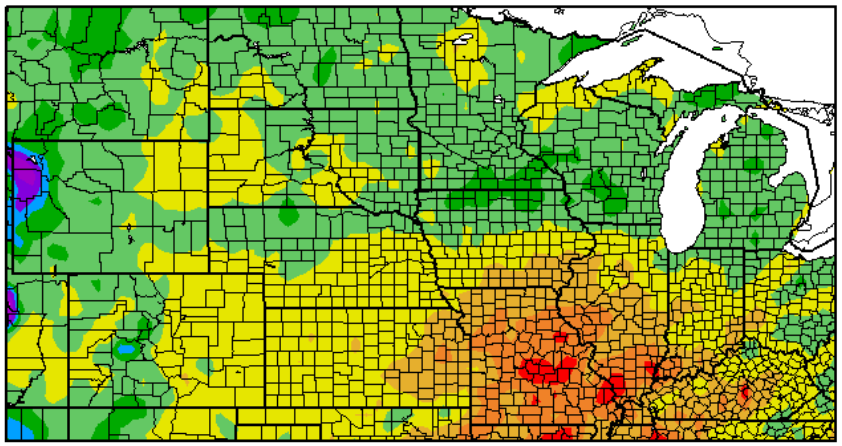


−10 −8 −6 −4 −2 0 2 4 6 8 10

Generated 3/15/2017 at HPRCC using provisional data. Regional Climate Centers

- Precipitation departures **since October 1** illustrate dryness signature over MO/IL.

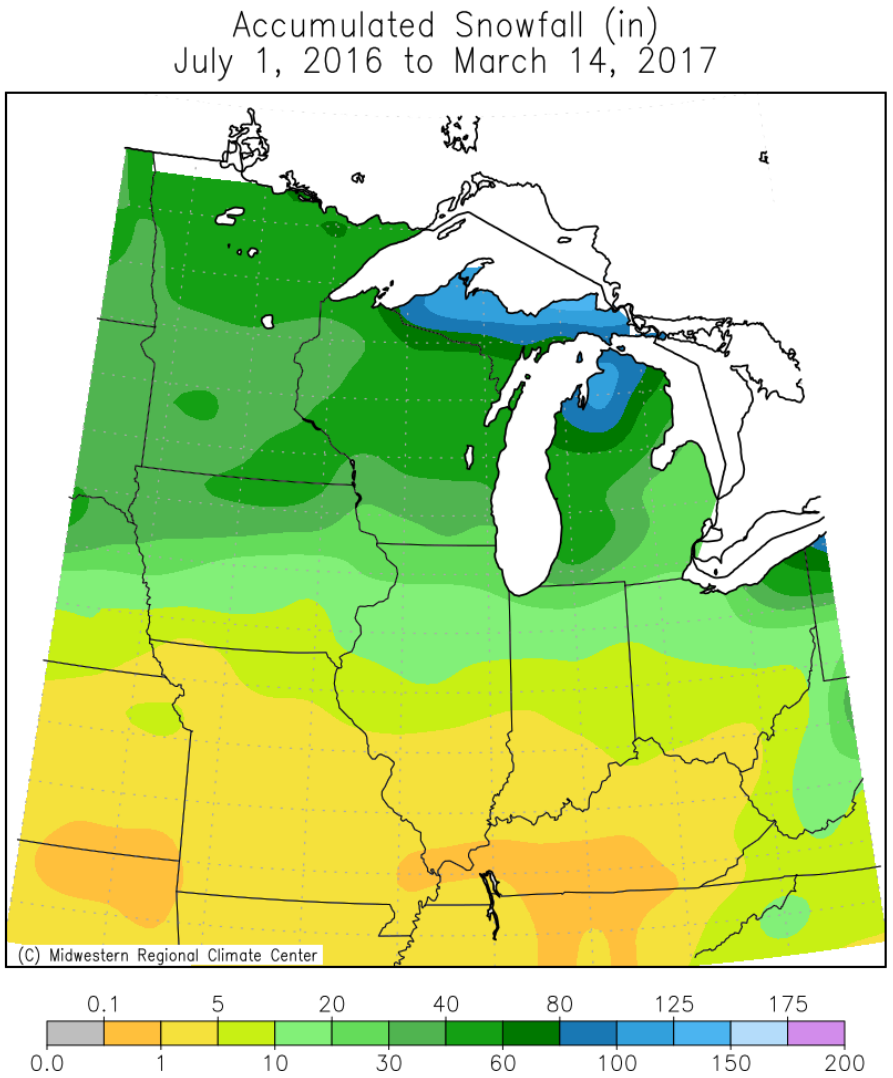
Departure from Normal Precipitation (in)
10/1/2016 – 3/14/2017

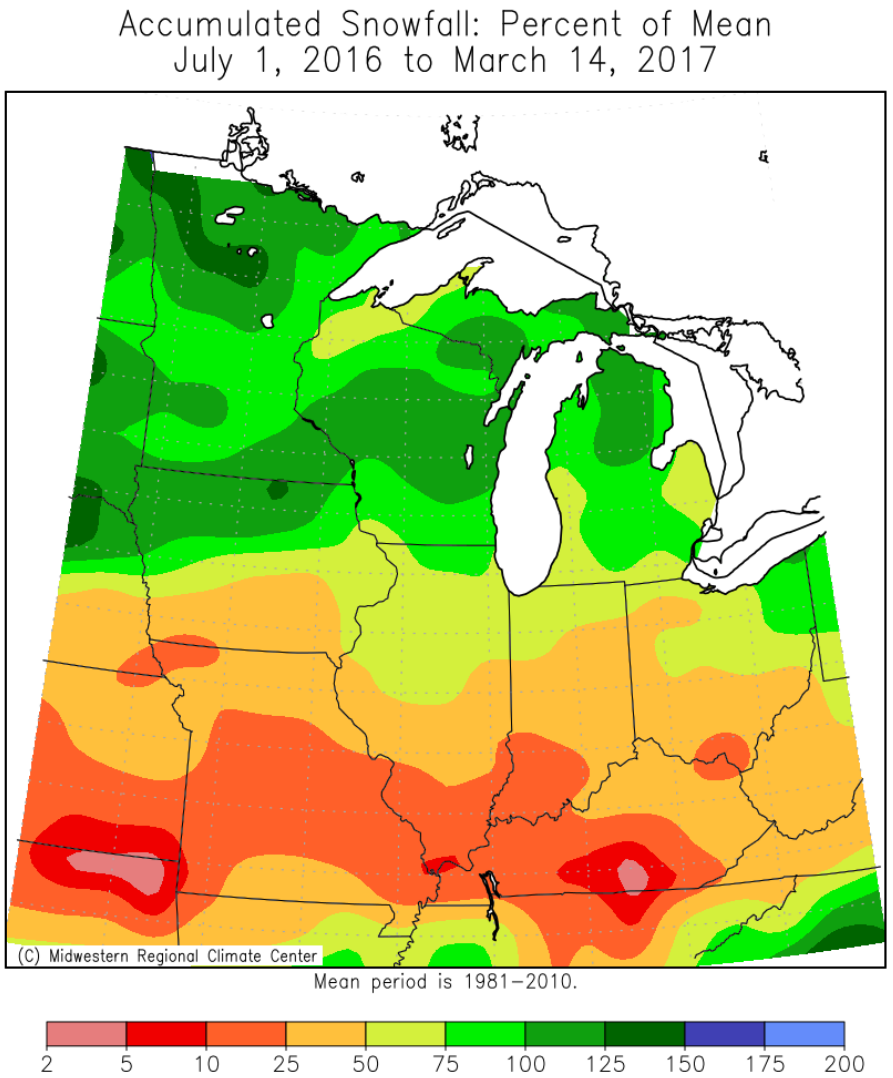


−15 −12 −9 −6 −3 0 3 6 9 12 15

Generated 3/15/2017 at HPRCC using provisional data. Regional Climate Centers

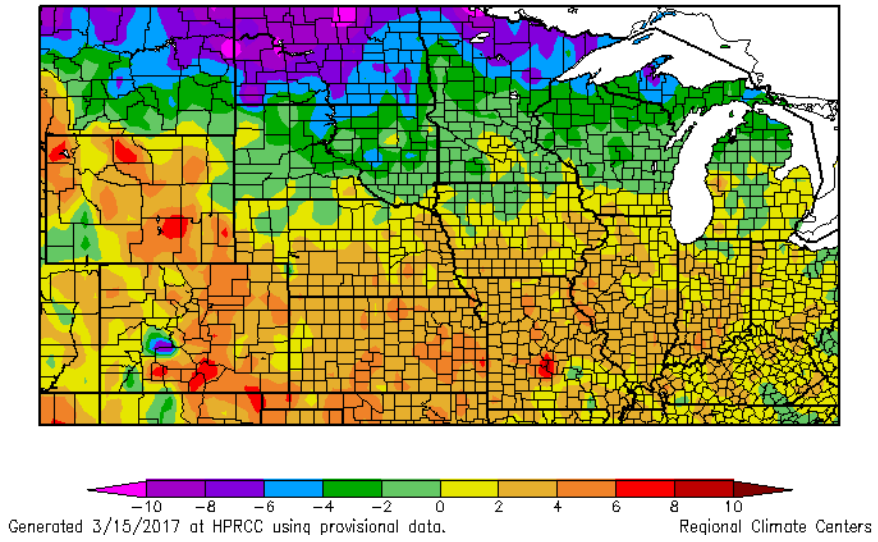
- **“Snow drought”** for southern half of the region with **less than 50% of normal** accumulation.





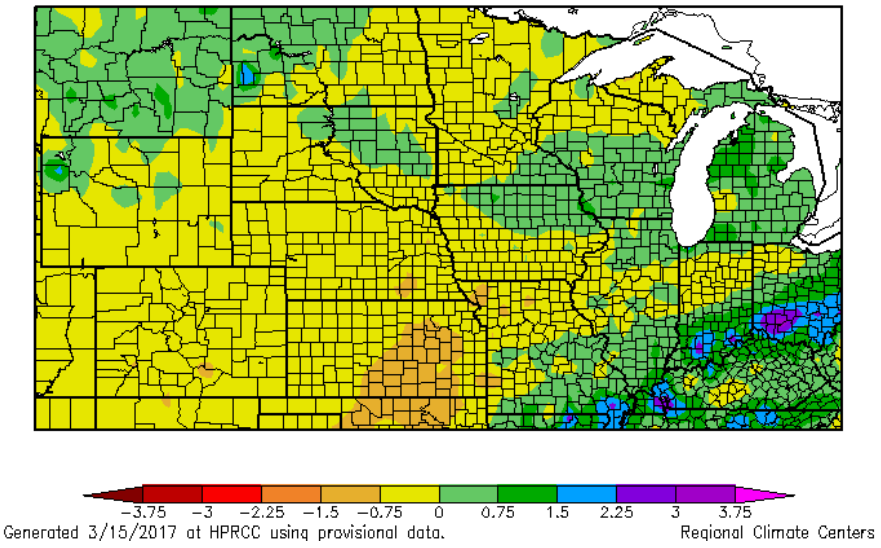
- Most recent two weeks show **cool area in the north** and **warmth in the south**.

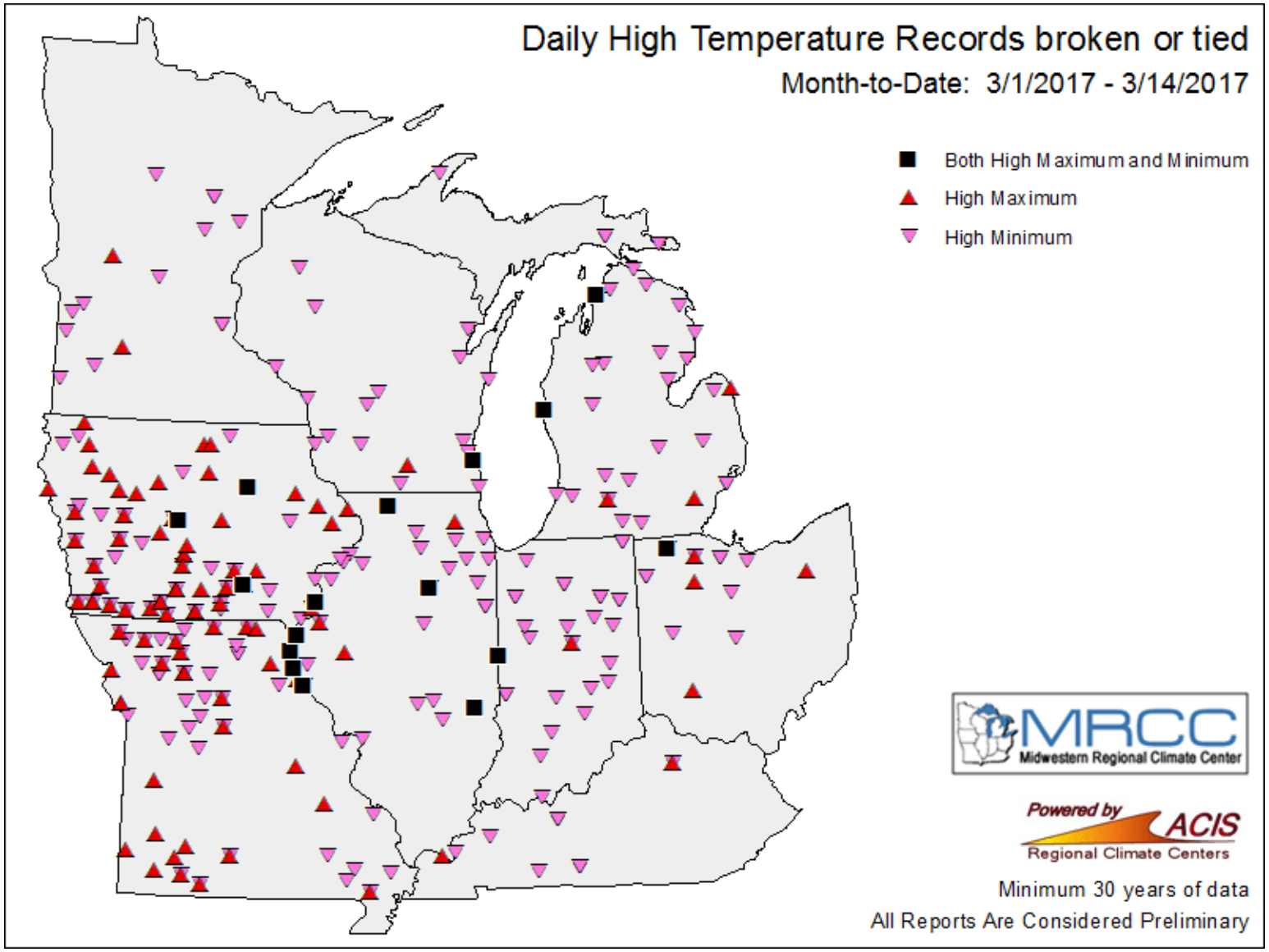
Departure from Normal Temperature (F)
3/1/2017 – 3/14/2017



- Most recent two weeks show pockets of **a little precipitation relief in the south**.

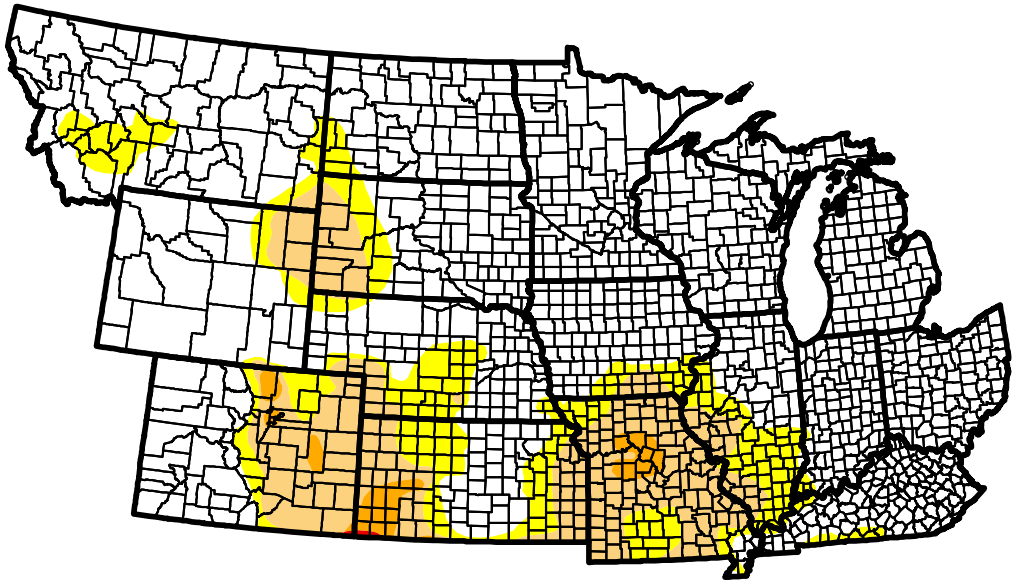
Departure from Normal Precipitation (in)
3/1/2017 – 3/14/2017




Daily High Temperature Records broken or tied
Month-to-Date: 3/1/2017 - 3/14/2017
Both High Maximum and Minimum
High Maximum
High Minimum
MRCC
Midwestern Regional Climate Center
Powered by ACIS
Regional Climate Centers
Minimum 30 years of data
All Reports Are Considered Preliminary

U.S. Drought Monitor

NWS Central Region



March 14, 2017

(Released Thursday, Mar. 16, 2017)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	72.96	27.04	14.97	1.54	0.06	0.00
Last Week *3/7/2017*	73.14	26.86	14.54	1.32	0.06	0.00
3 Months Ago *12/13/2016*	58.30	41.70	15.02	4.06	0.00	0.00
Start of Calendar Year *1/3/2017*	65.79	34.21	12.04	1.70	0.00	0.00
Start of Water Year *9/27/2016*	76.71	23.29	7.36	1.93	0.12	0.00
One Year Ago *3/15/2016*	73.98	26.02	3.50	0.63	0.00	0.00

Intensity:

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

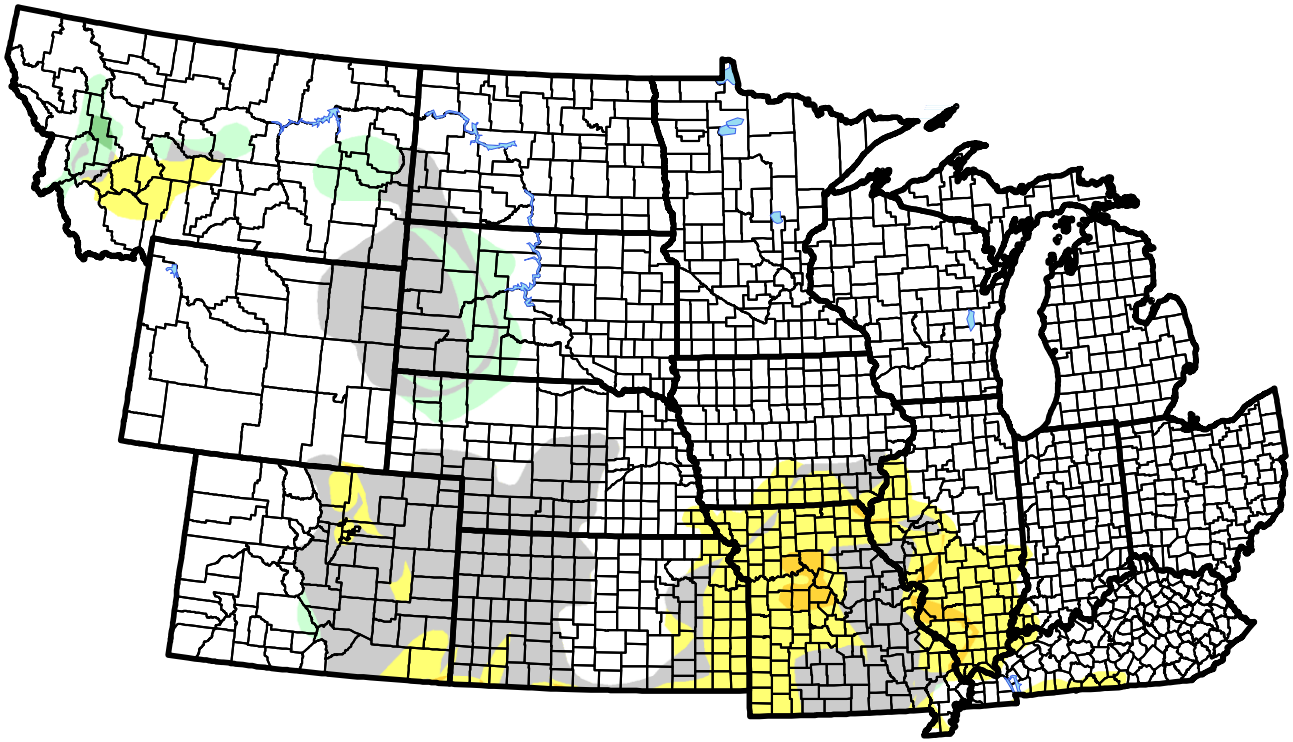
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:
Brian Fuchs
National Drought Mitigation Center

http://droughtmonitor.unl.edu/

U.S. Drought Monitor Class Change - NWS Central Region

1 Month



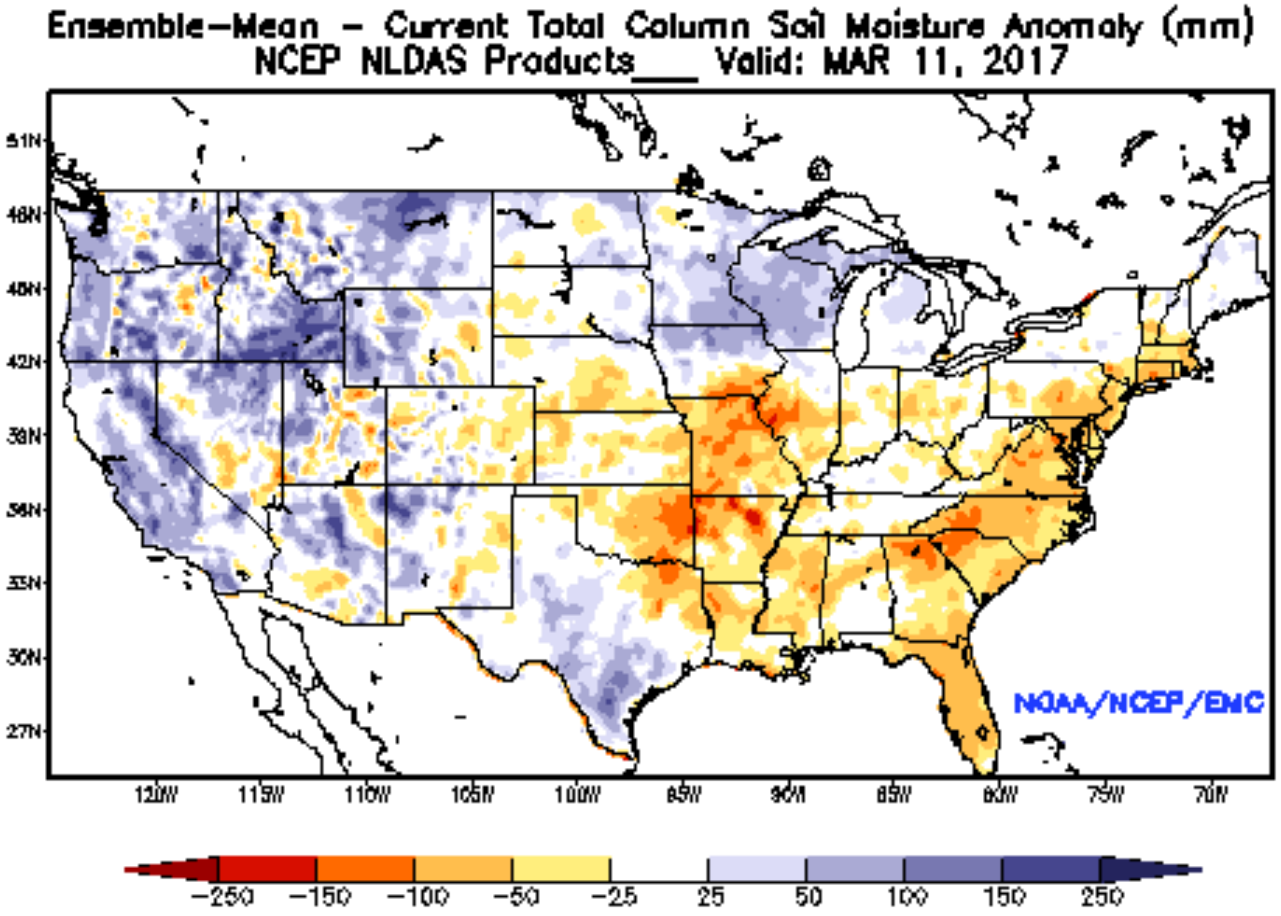
National Drought Mitigation Center

- 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

March 14, 2017
compared to
February 14, 2017

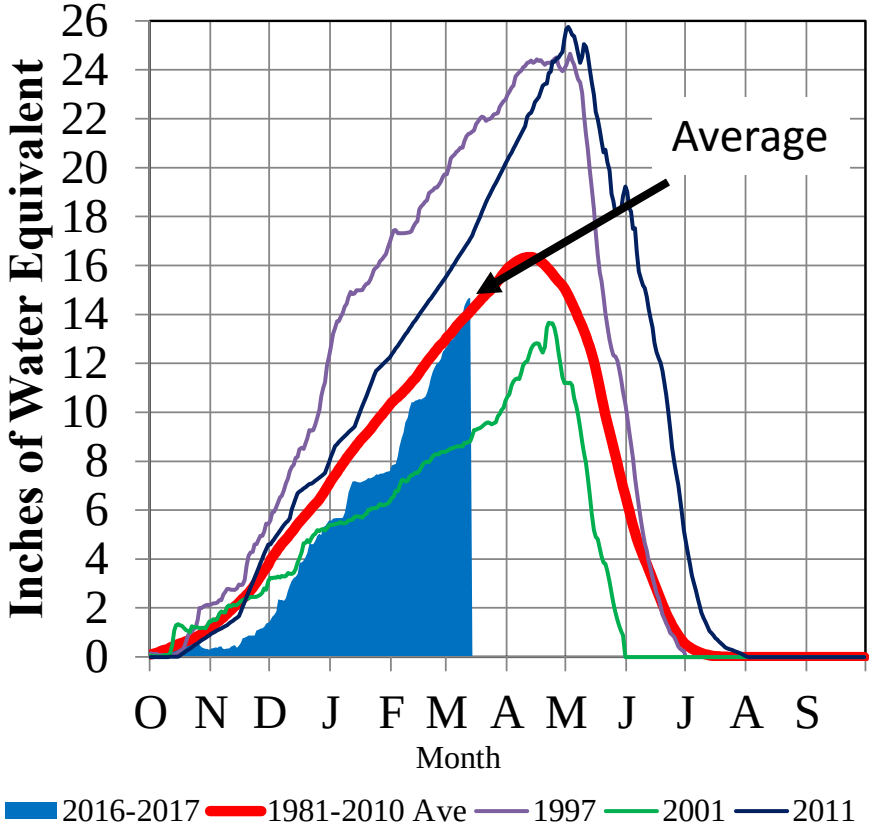
http://droughtmonitor.unl.edu

- Soil water conditions variable across region.

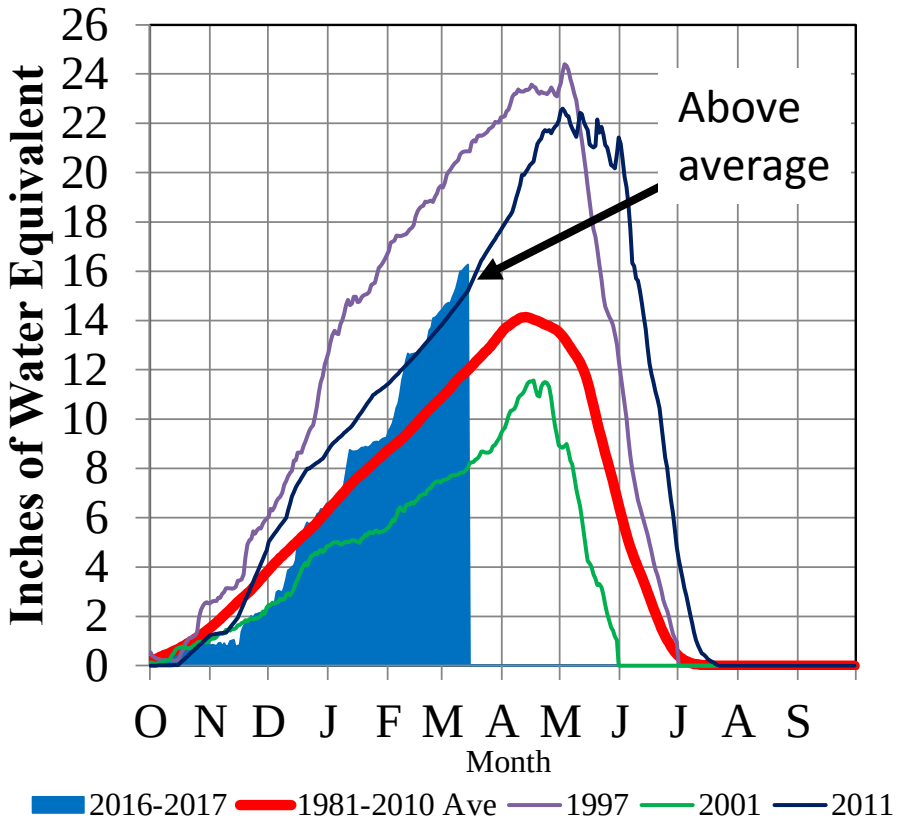


Missouri River Basin – Mountain Snowpack Water Content
2016-2017 with comparison plots from 1997*, 2001*, and 2011
March 13, 2017

Total above Fort Peck



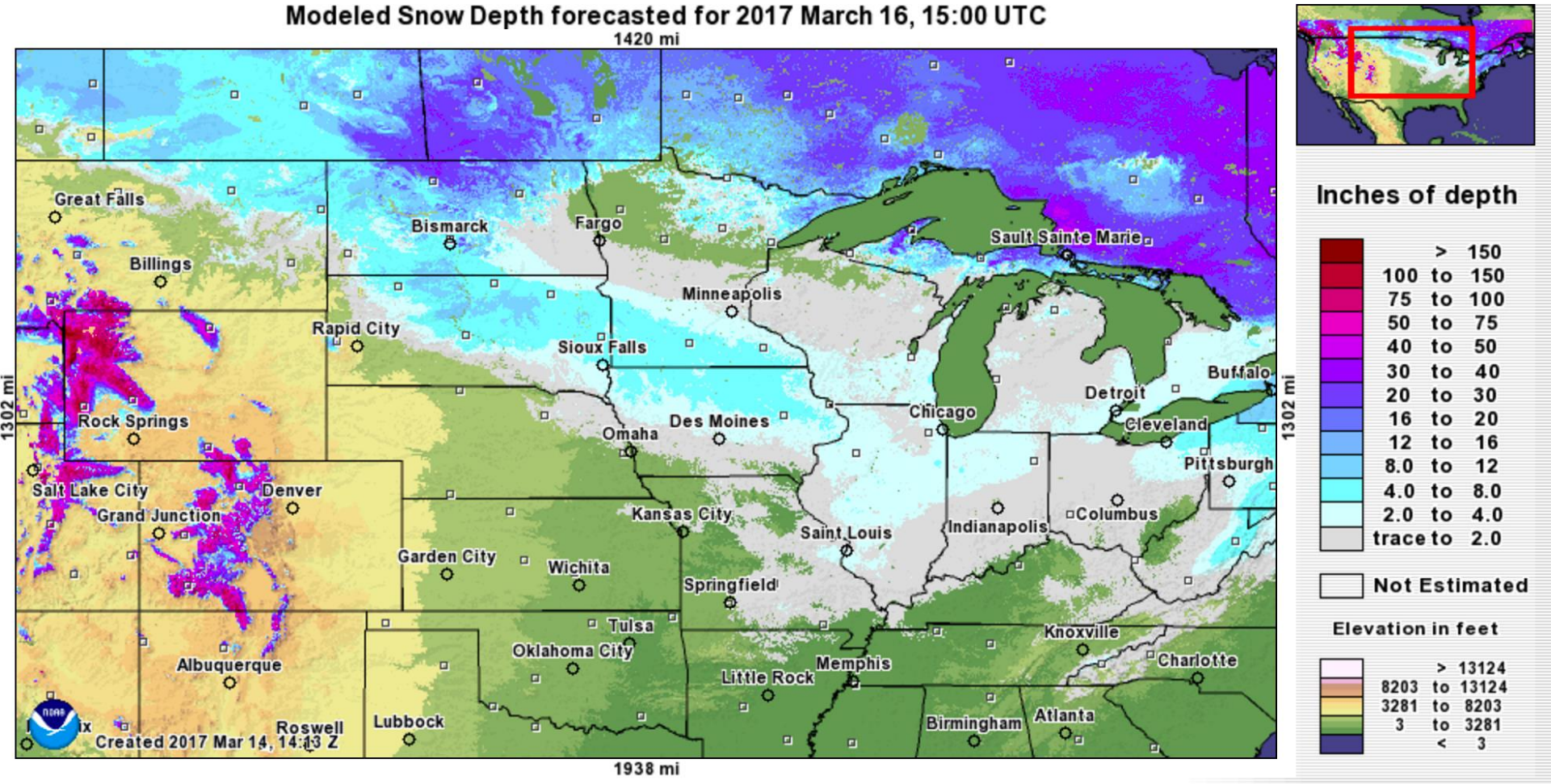
Total Fort Peck to Garrison



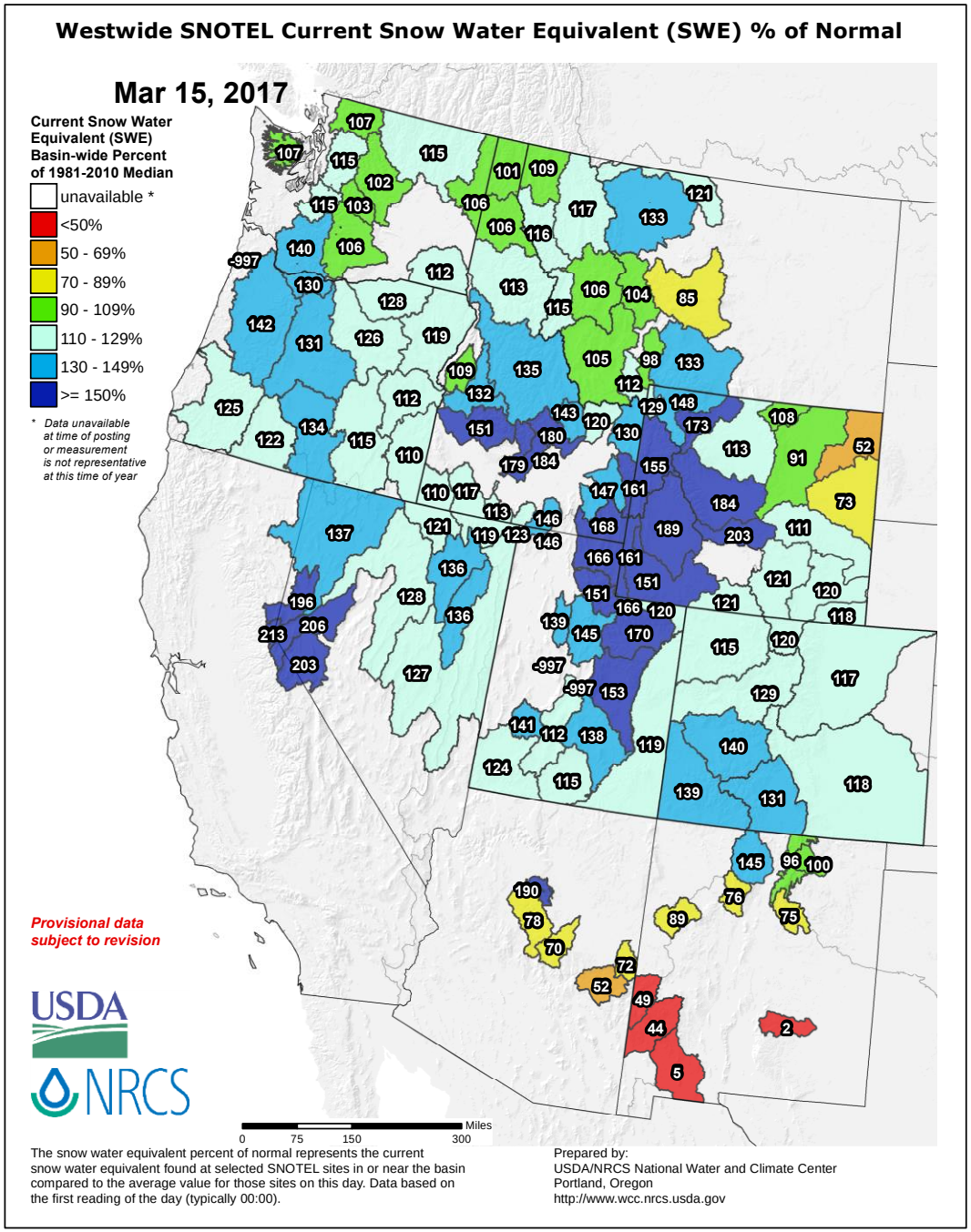
The Missouri River Basin mountain snowpack normally peaks near April 15. On March 13, 2017 the mountain Snow Water Equivalent (SWE) in the "Total above Fort Peck" reach was 14.7", 104% of average. The mountain SWE in the "Total Fort Peck to Garrison" reach was 16.3", 137% of average. Normally by March 15 about 87% of the peak mountain SWE has occurred in both reaches.

http://www.nwd-mr.usace.army.mil/rcc/reports/snow.pdf

- Current snow depth

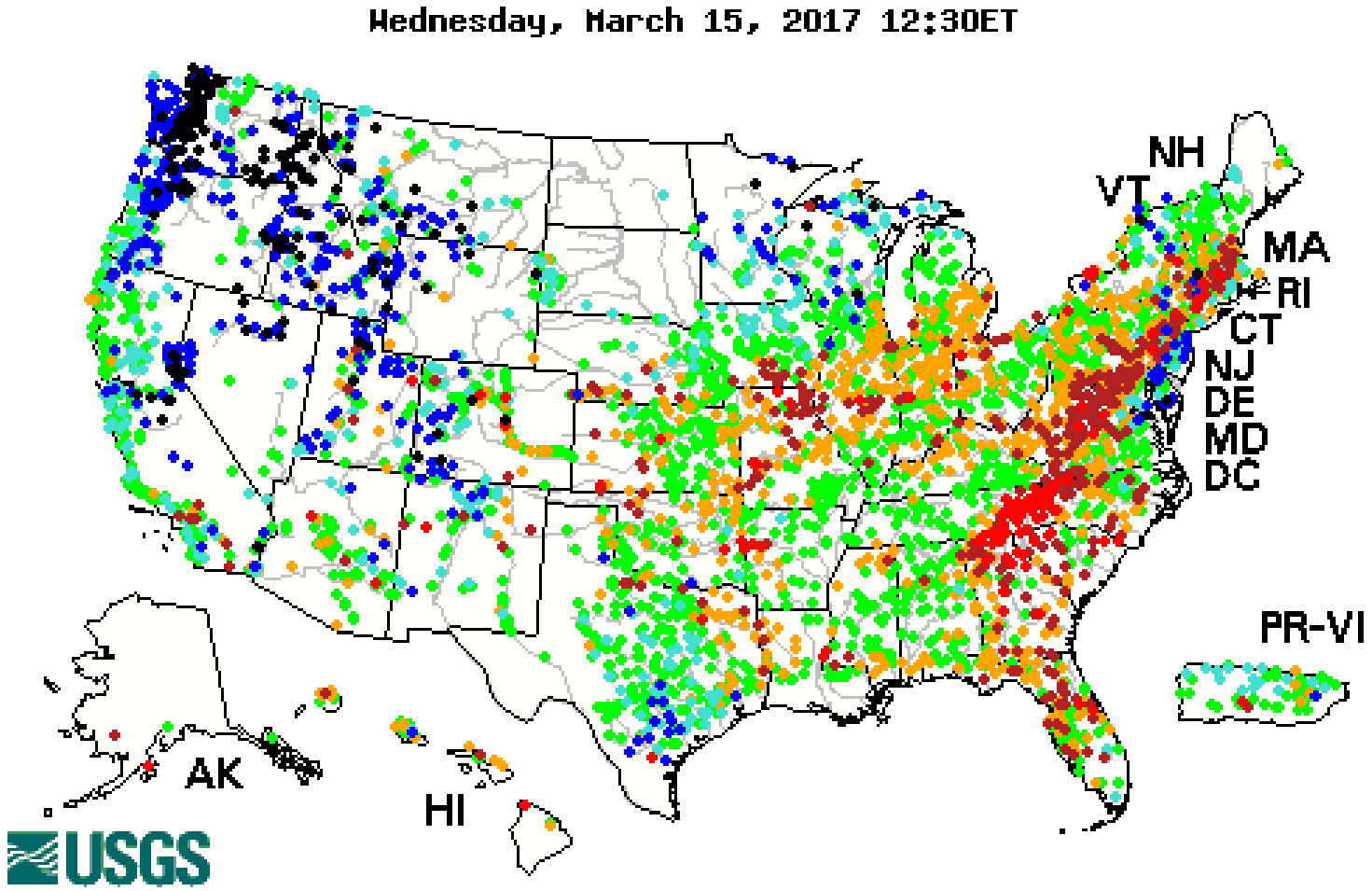


- Western U.S. snow water equivalent



http://www.wcc.nrcs.usda.gov/gis/snow.html

- Current streamflow

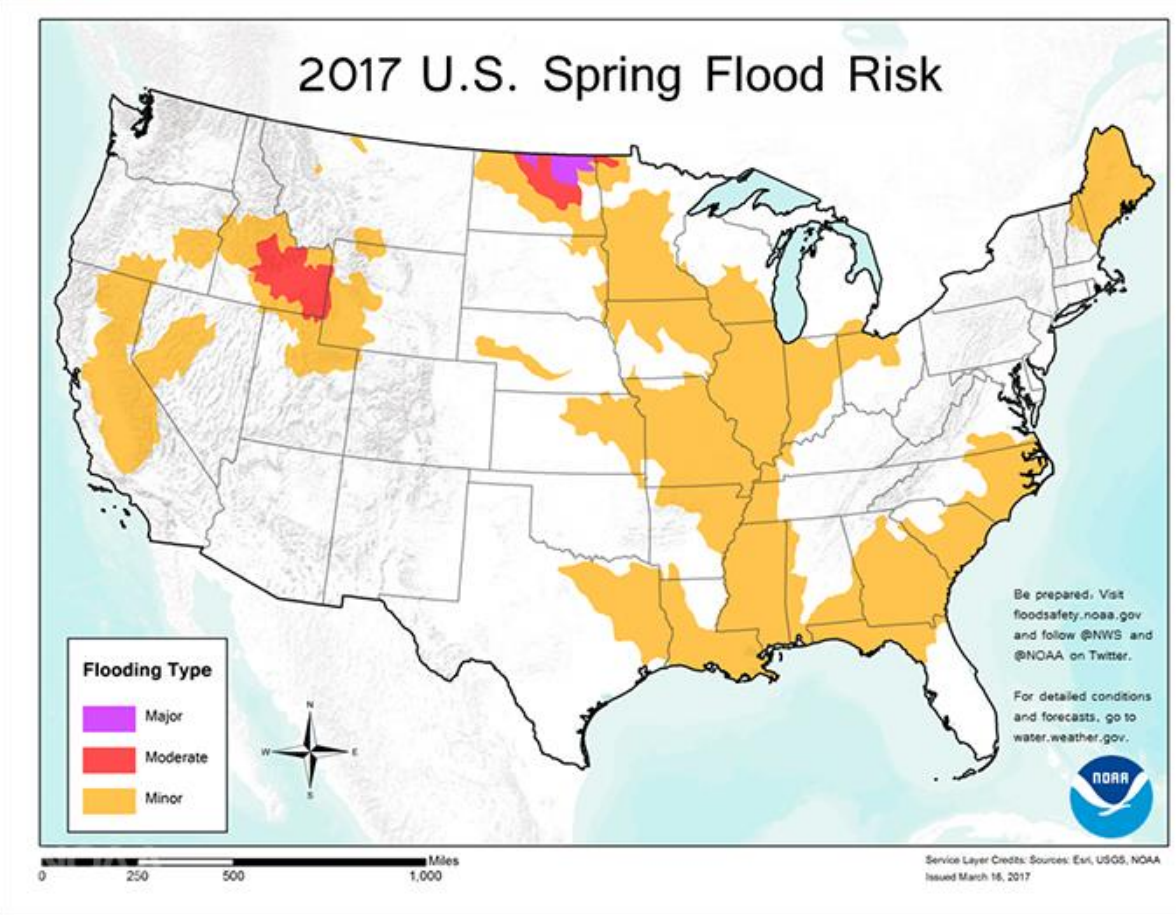


● High = The estimated streamflow is the highest value ever measured for the day of the year.

Explanation - Percentile classes						
Low	<10	10-24	25-75	76-90	>90	High
	Much below normal	Below normal	Normal	Above normal	Much above normal	

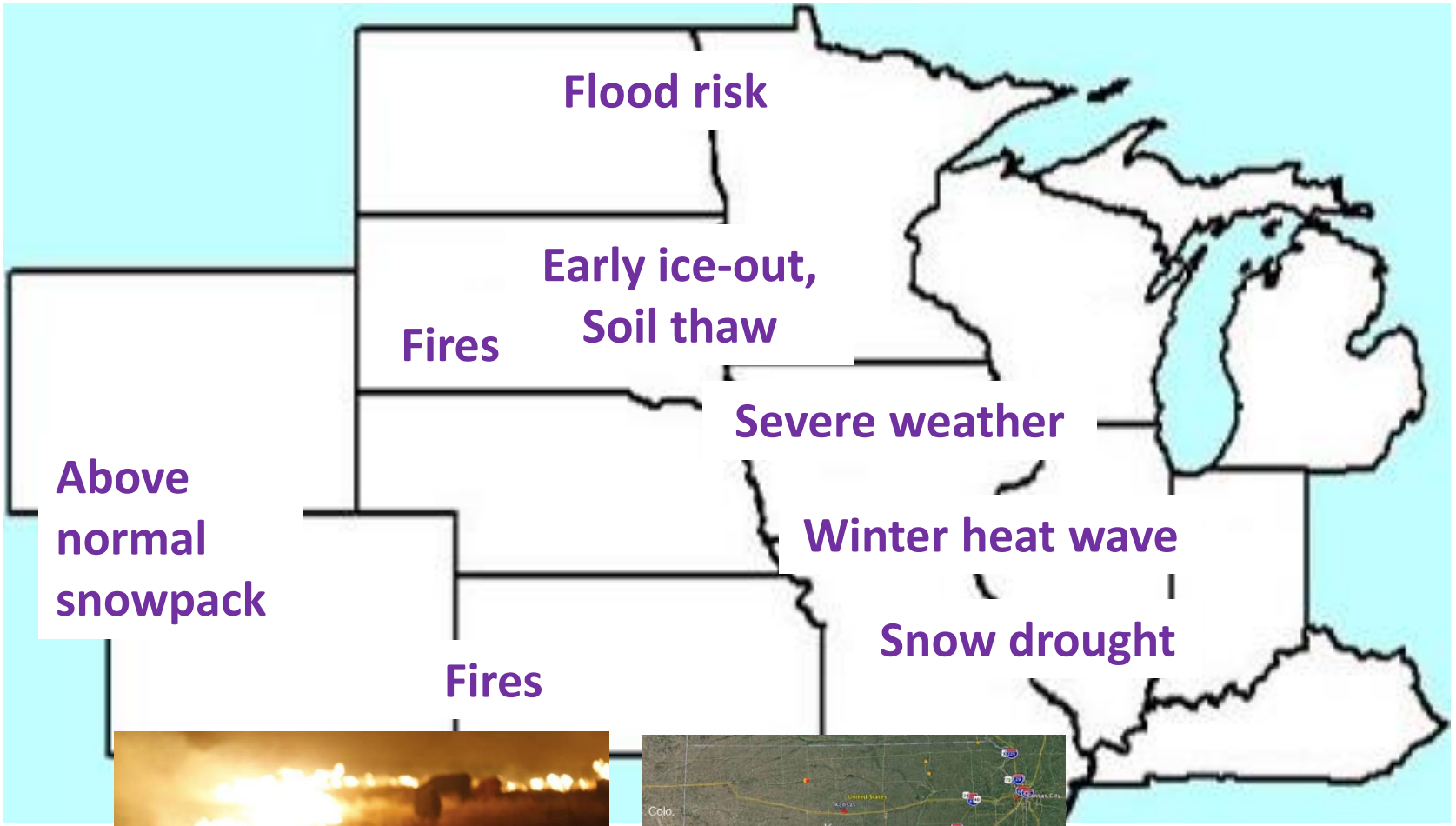
http://waterwatch.usgs.gov/?id=ww_current

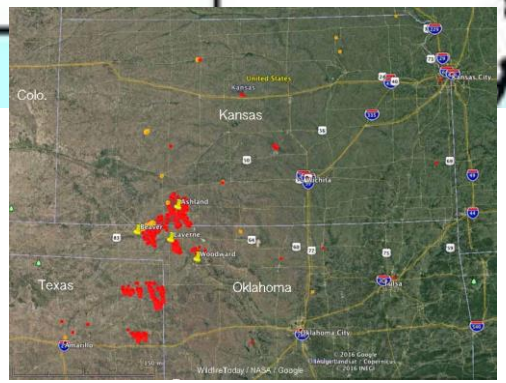
- Area of greatest concern is **northern ND Devils Lake, Souris, Red** (extensive snowpack and saturated soils)



http://www.noaa.gov/media-release/spring-outlook-risk-of-major-flooding-in-north-dakota-moderate-flooding-in-idaho

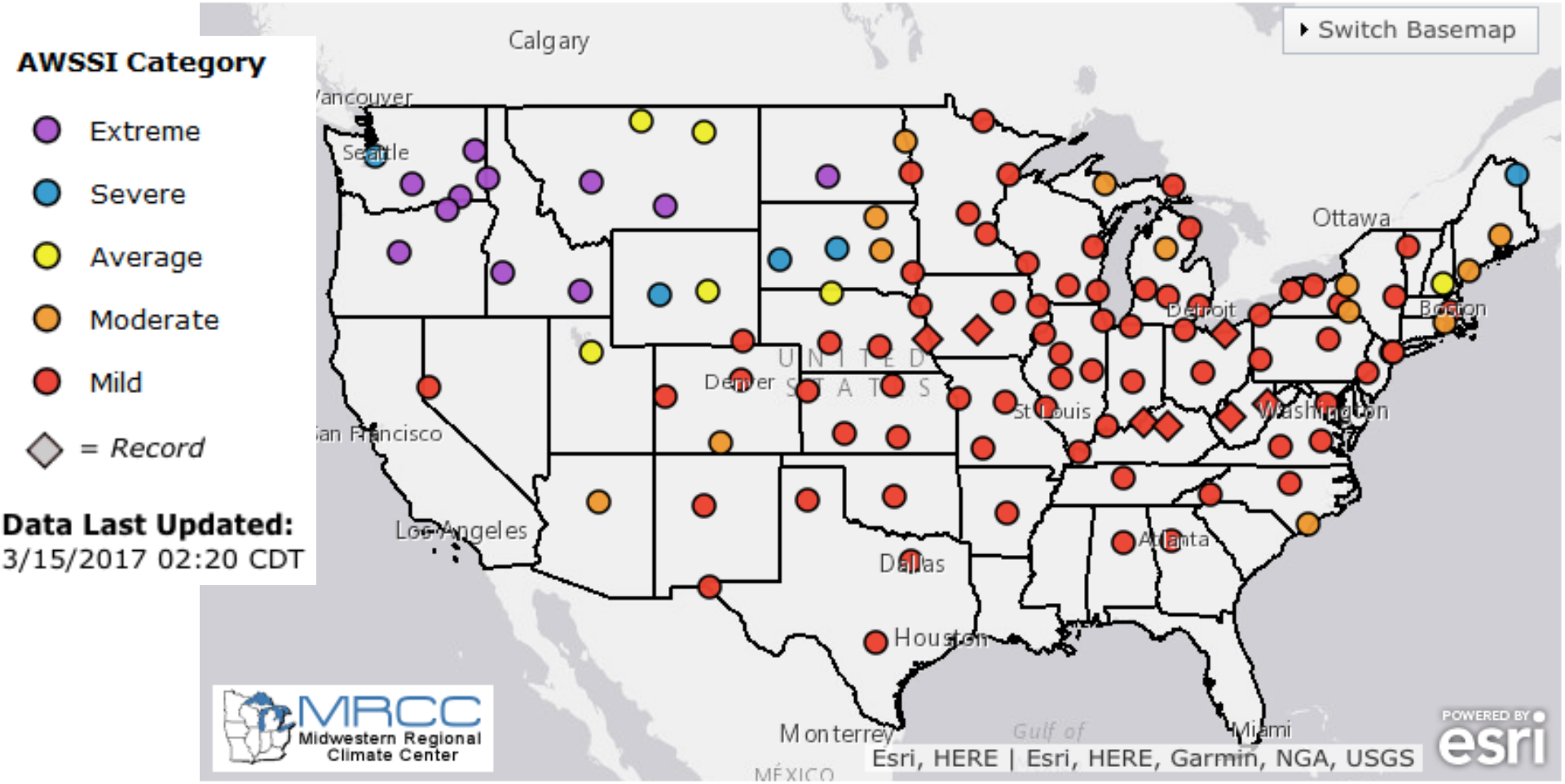
Events and Impacts



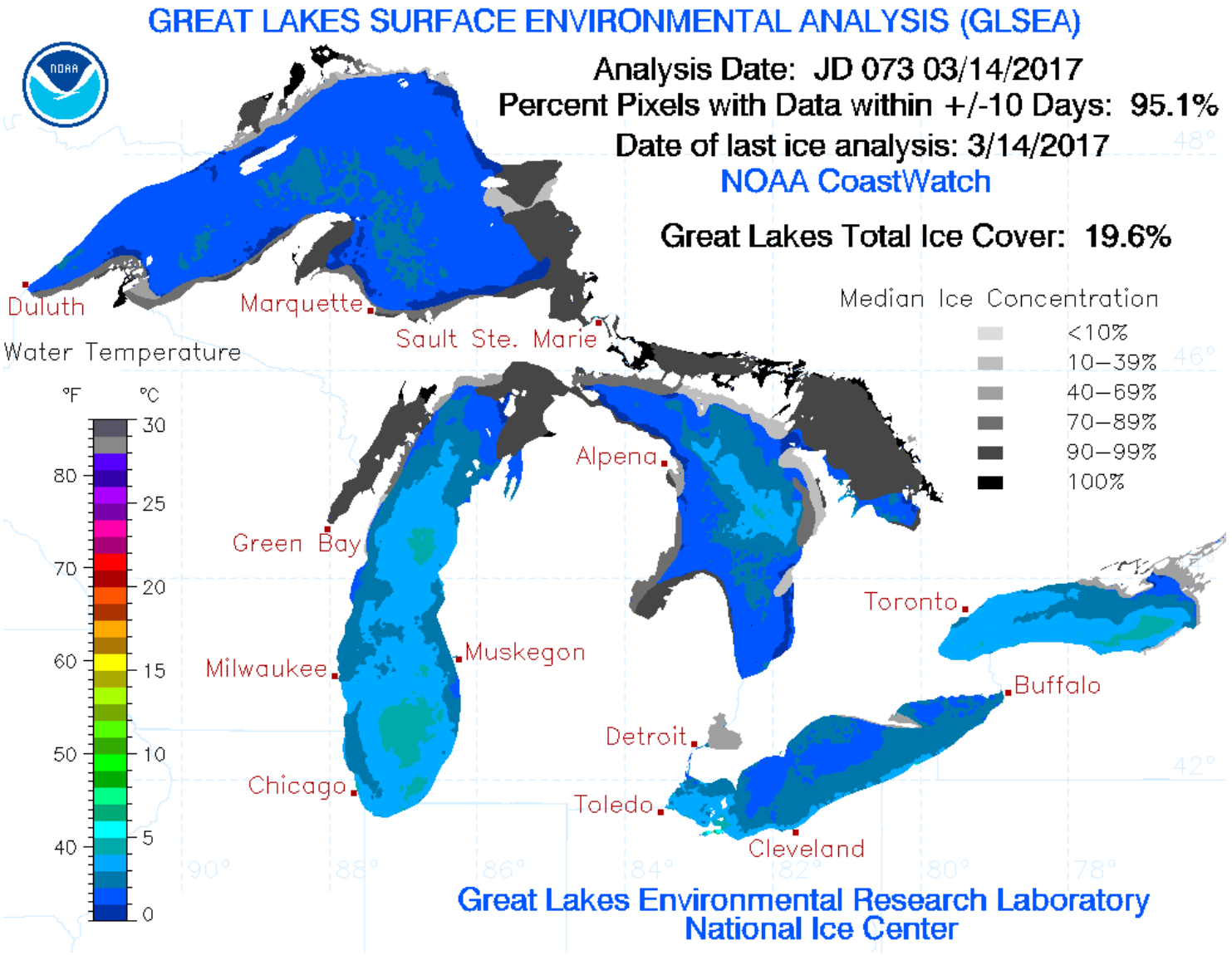


- Local Impacts – winter season severity to-date

Accumulated Winter Season Severity Index



- Local Impacts – ice cover at 20% below average except for Lake MI



Impacts around the region

Wyoming

severe ice jams causing flooding (Worland)
wet in the west, warm and windy in east with possible transportation impacts

Colorado

hot, dry, windy in the east; elevated fire danger and fire occurrence
snow-free at low elevations but higher areas holding onto snowpack without melt

Impacts around the region

Kansas	wildifires in early March, many acres burned, lives, homes and thousands of cattle lost (Ashland)
Nebraska	reports of early calving with warmth ag fieldwork taking place with spring anhydrous applications dry conditions in the south
South Dakota	some winter wheat breaking dormancy early (need to scout for pests and disease) major river flood risk likely *not* a concern ice out on lakes is early potential wildfire concerns
North Dakota	major river flood risk is in Red River

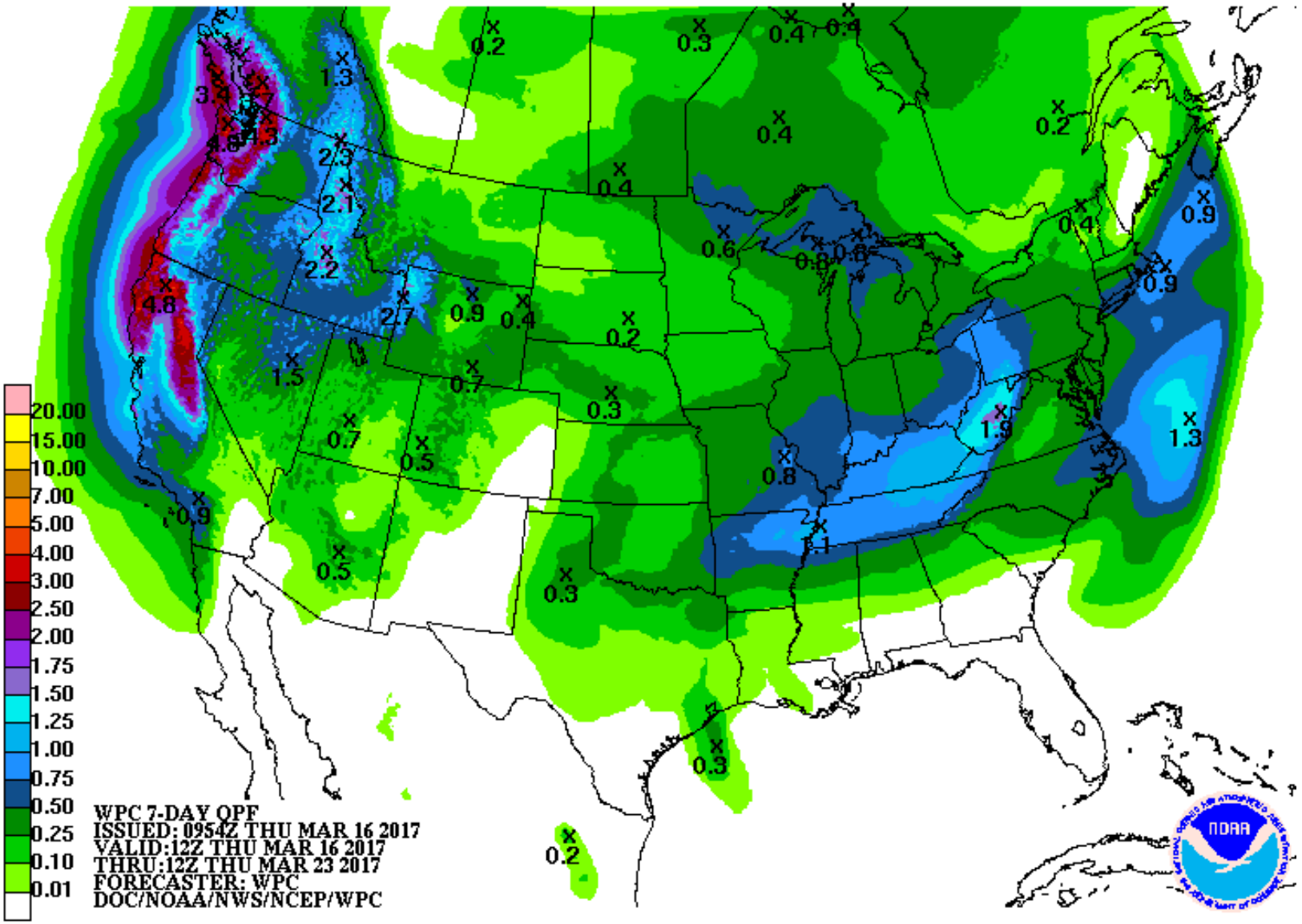
Impacts around the region

Illinois	agricultural fieldwork taking place with anhydrous applications mild winter may increase potential for more pests, lousy bird hunting season in the south with no sign of ducks and geese drought areas to watch are in the far west
Ohio	freeze warnings along Ohio River no damage reports yet, wait and see for now
Iowa	first reported February tornado on record with 10 for the season thus far
Minnesota	record early ice-out which some have since refrozen frost going out then refreeze earliest MN tornado reported high flows for the time of year on Mississippi (thaw was unusual) Red River has some concerns

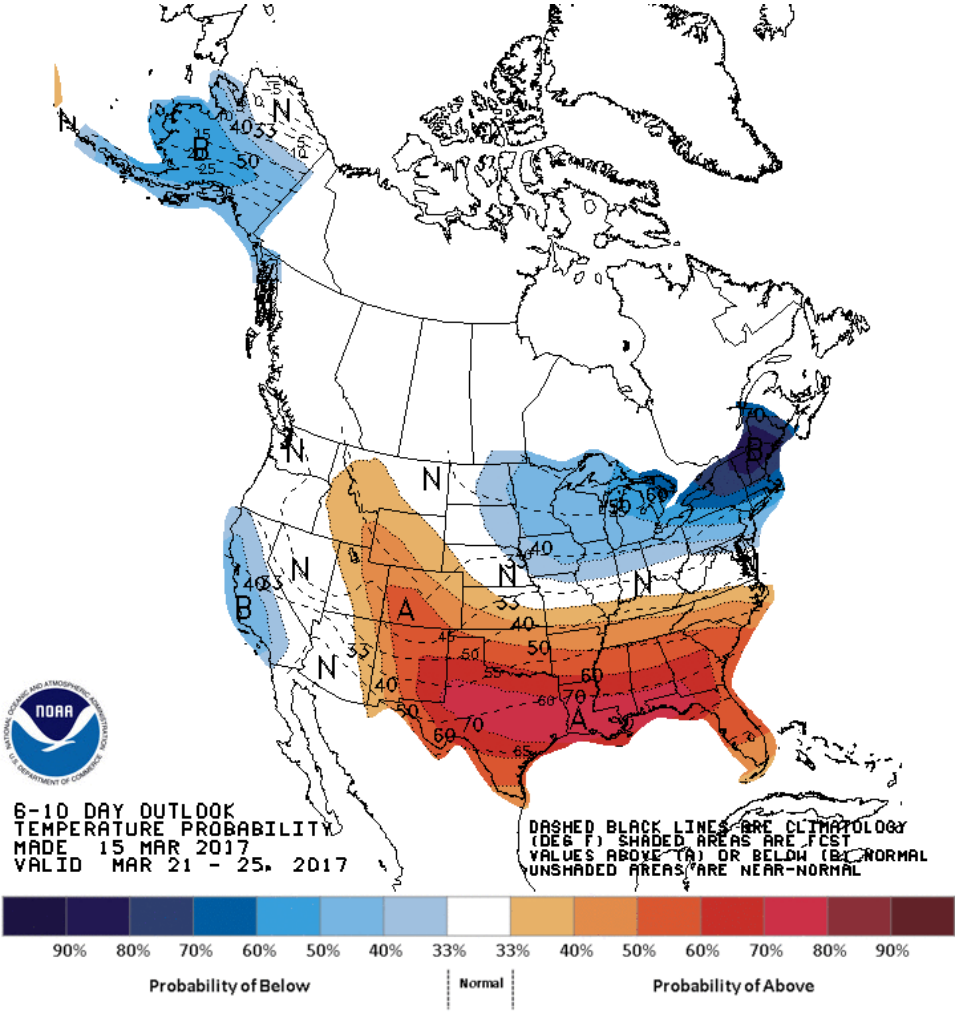
Climate Outlooks

- **Short-term**
- **River flood potential**
- **El Niño?**
- **Drought**
- **Summer and fall conditions**

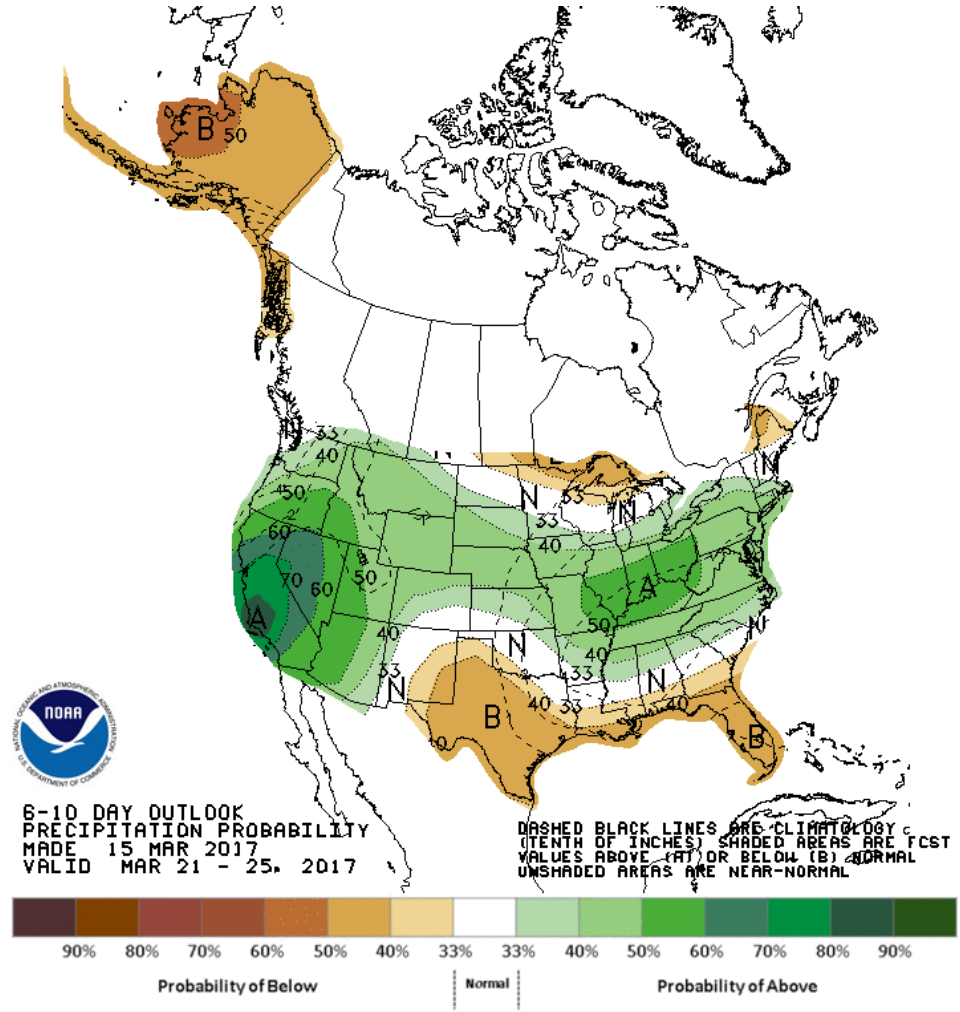
- Forecast Precipitation Amounts (7-day)



6-10 Day Outlook for Mar 21-25



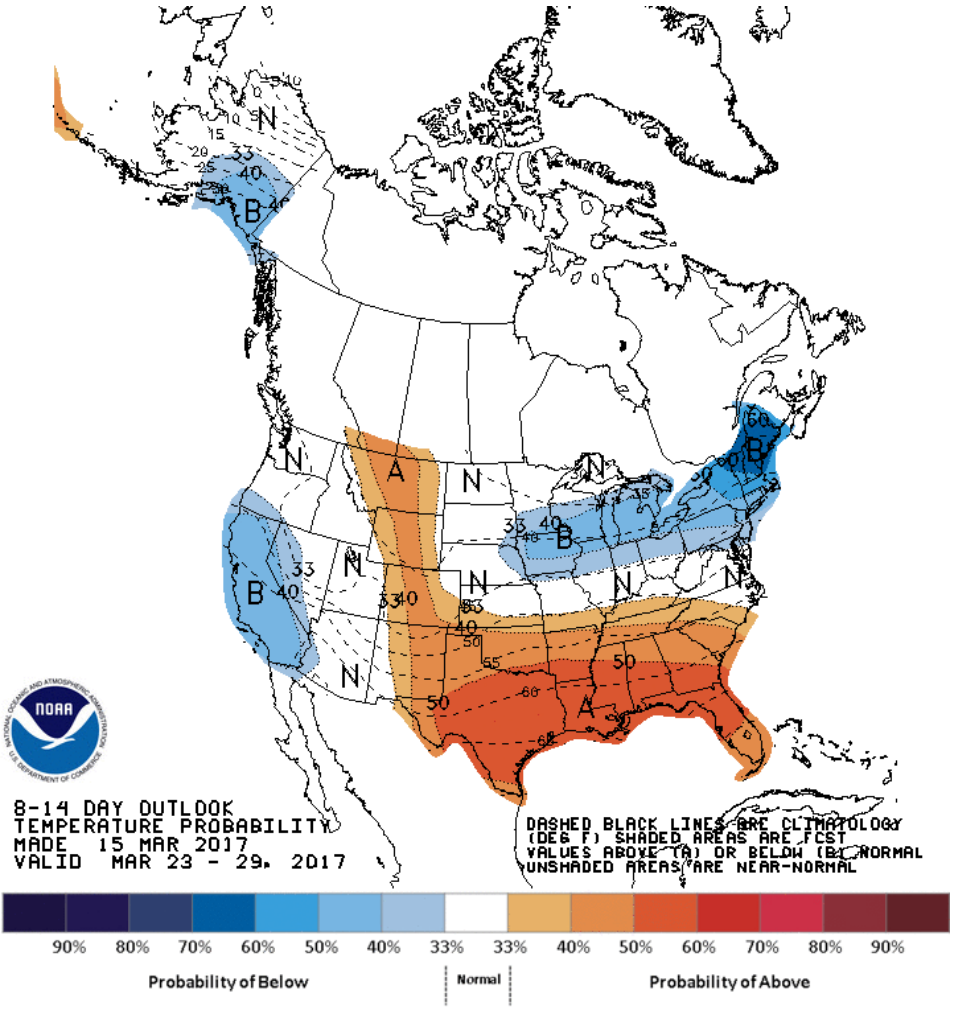
Temperature



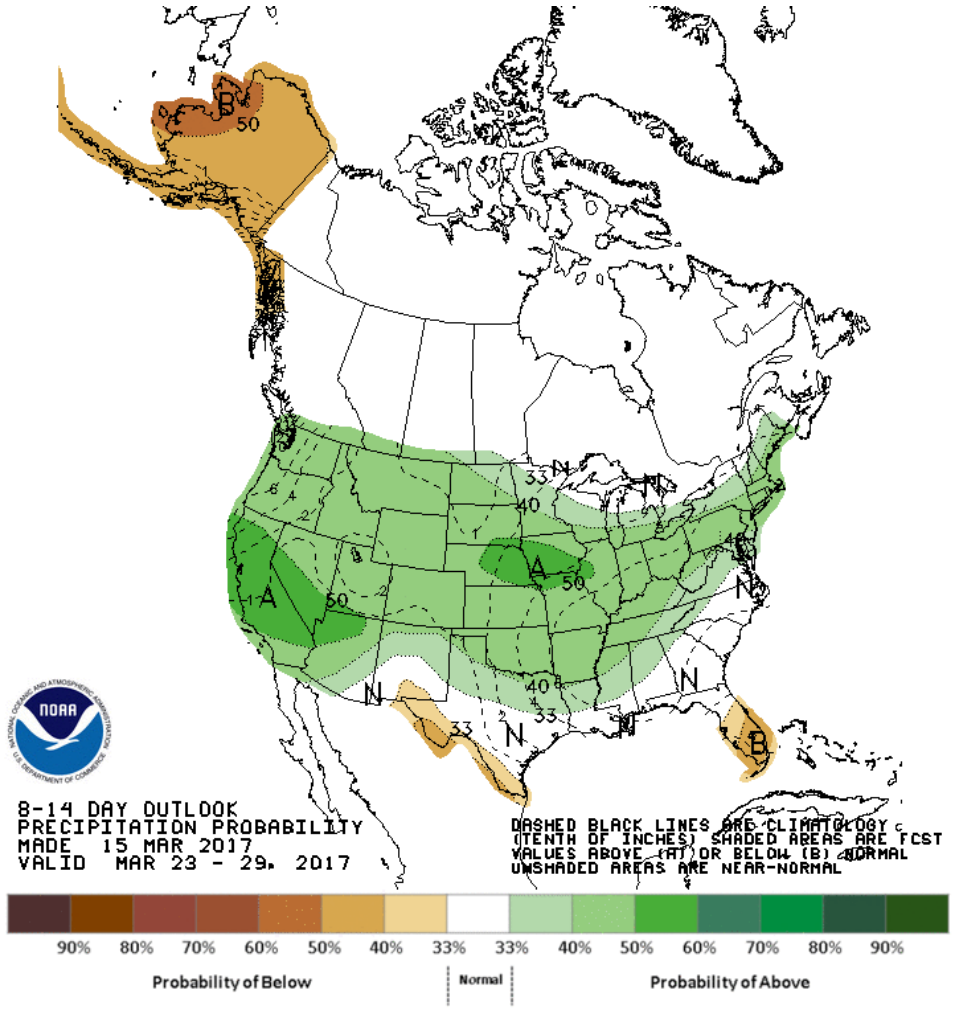
Precipitation

http://www.cpc.ncep.noaa.gov/

8-14 Day Outlook for Mar 23-29



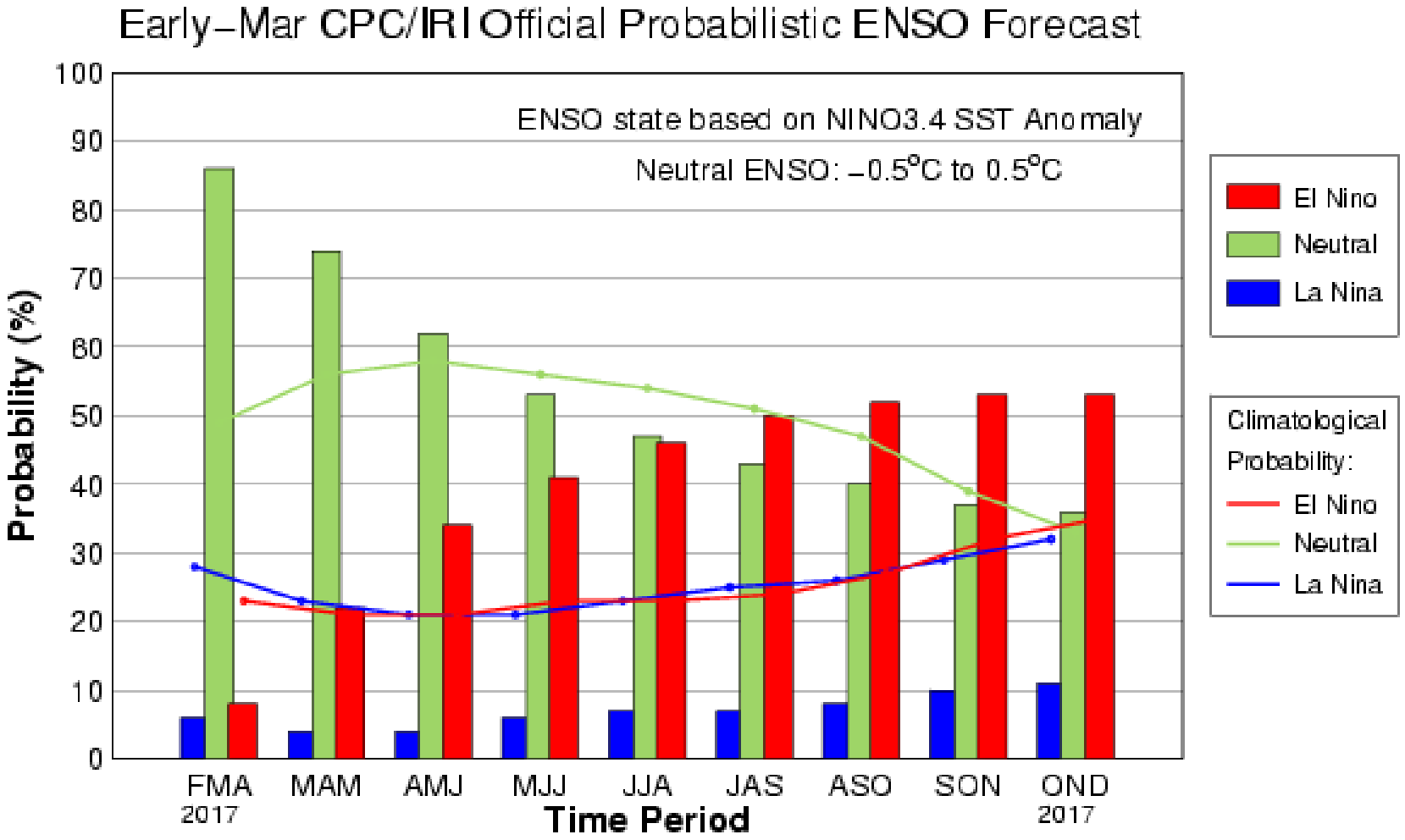
Temperature



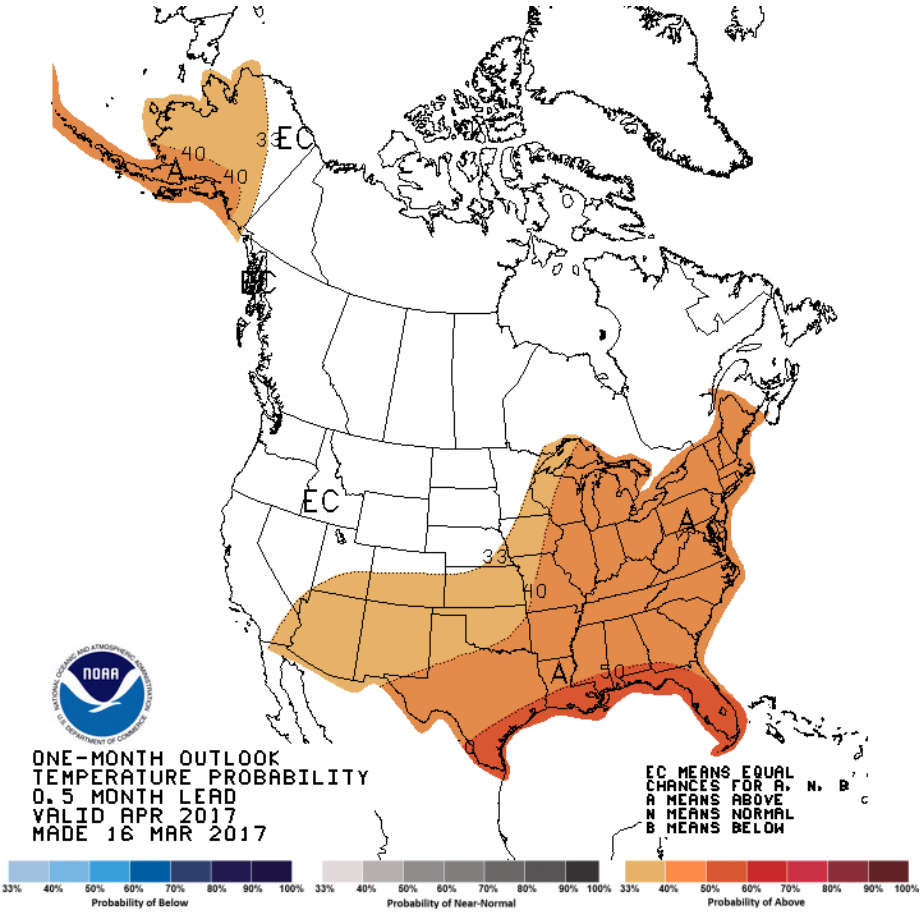
Precipitation

http://www.cpc.ncep.noaa.gov/

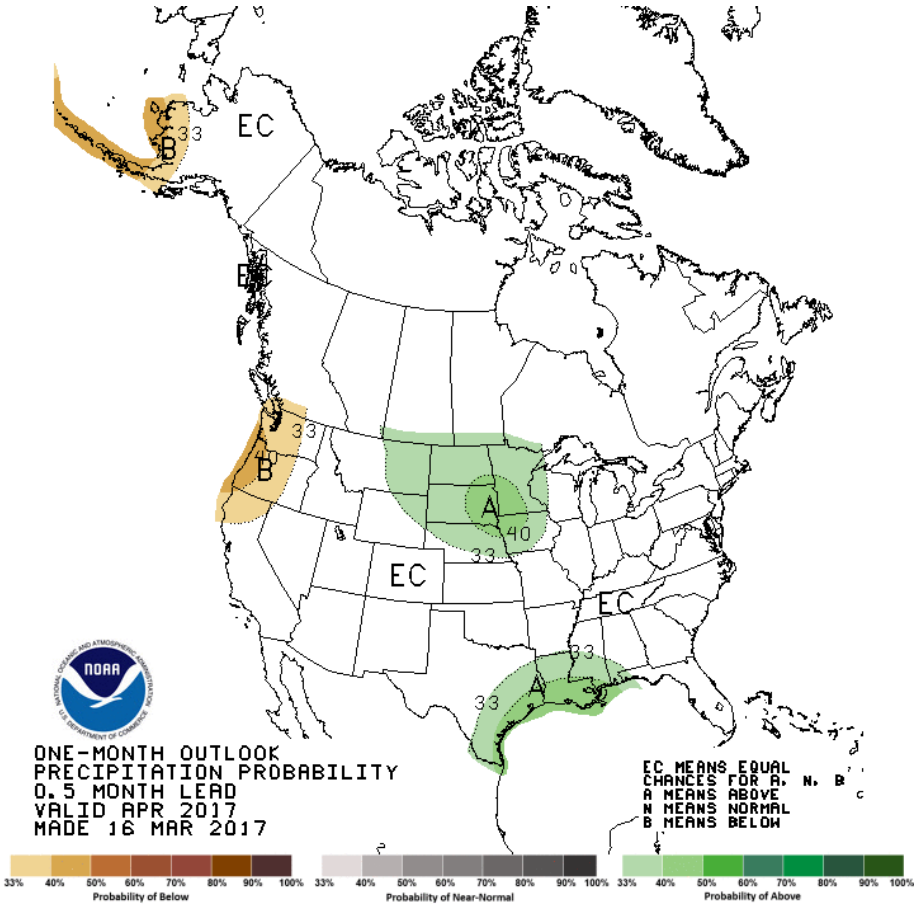
- El Niño is likeliest scenario by end of summer.



April Outlook



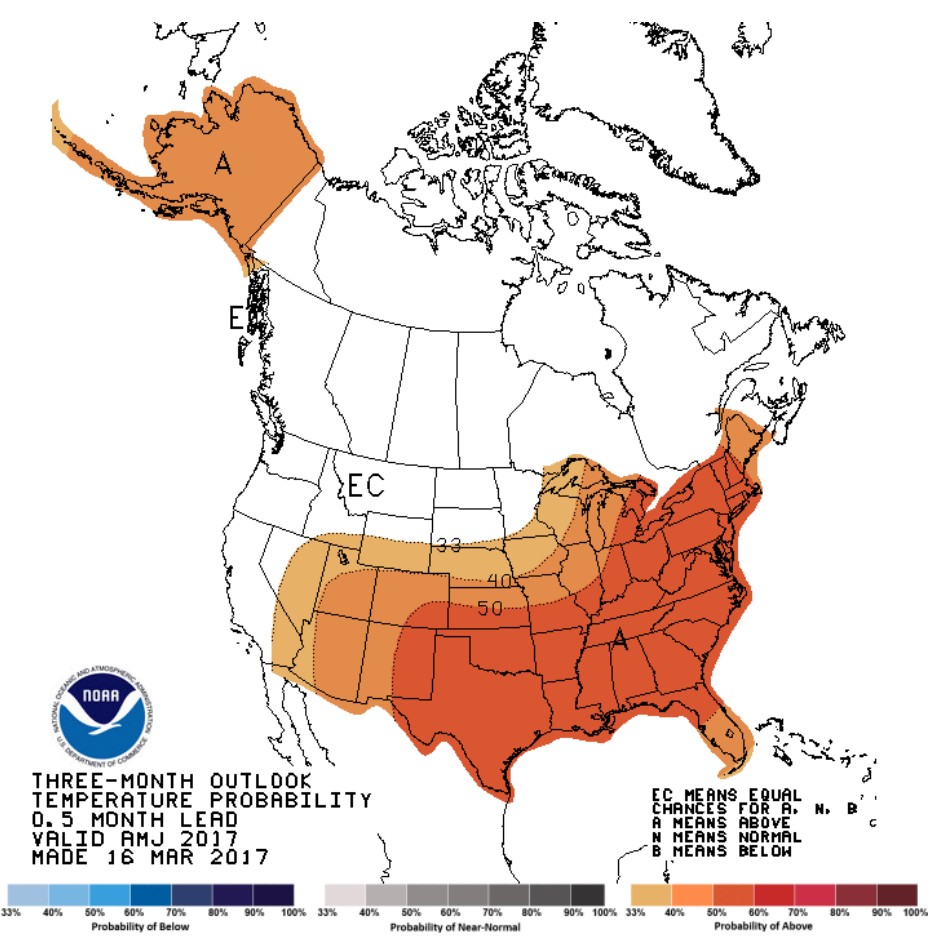
Temperature



Precipitation

http://www.cpc.ncep.noaa.gov/

Apr-May-Jun Outlook



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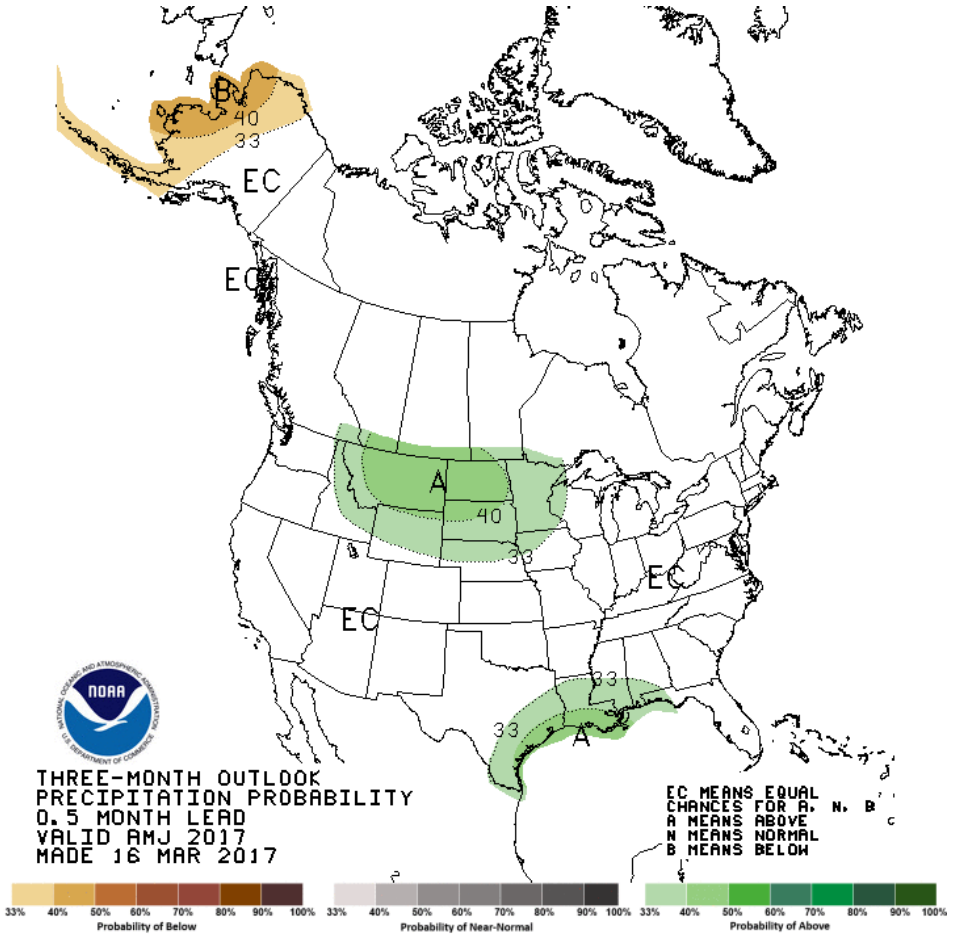


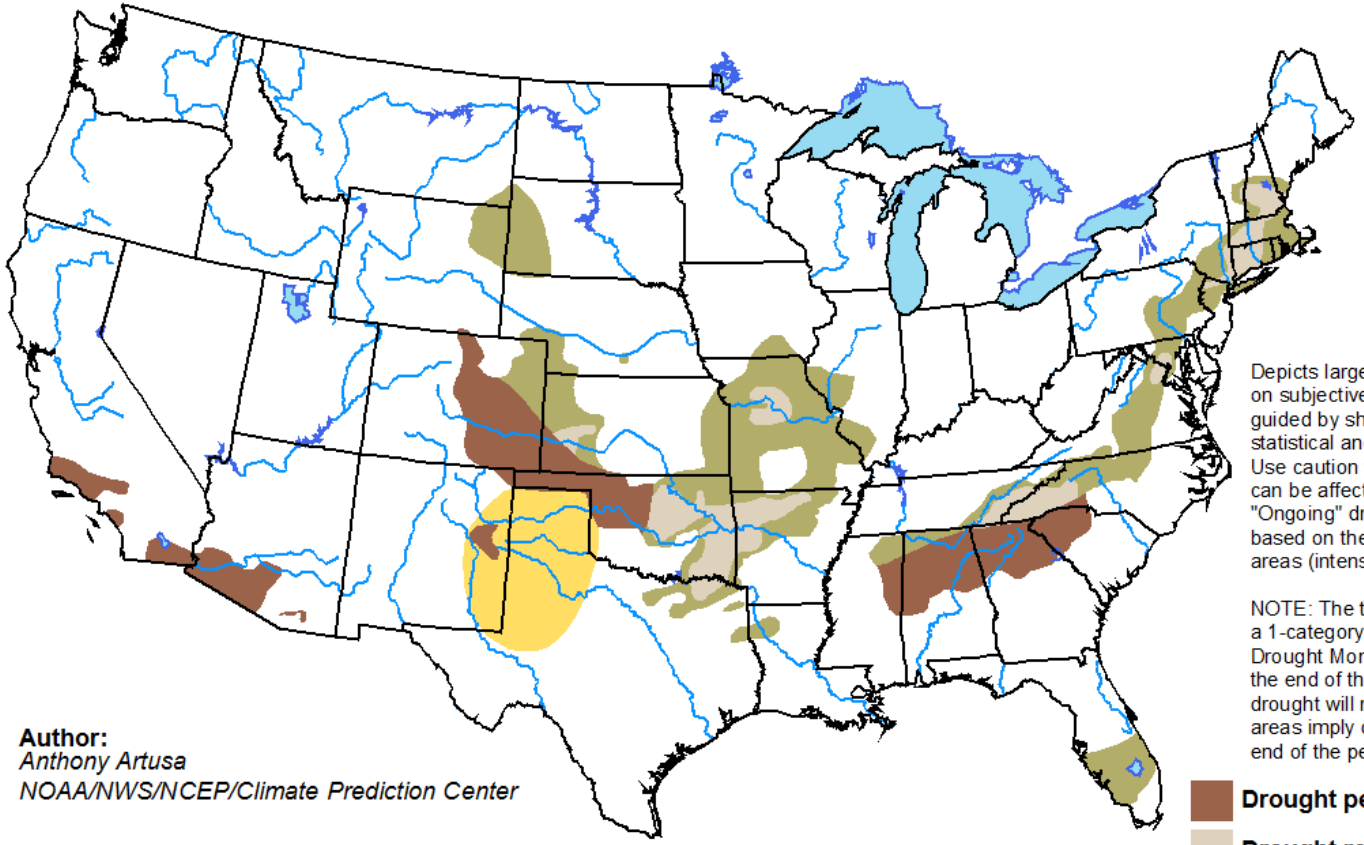
Precipitation

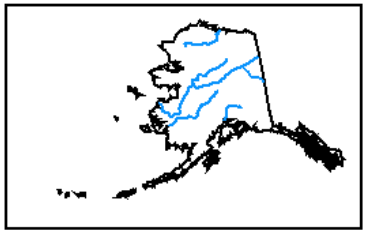
http://www.cpc.ncep.noaa.gov/

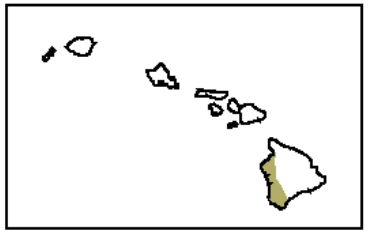
U.S. Seasonal Drought Outlook

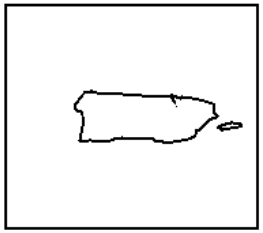
Drought Tendency During the Valid Period

Valid for March 16 - June 30, 2017
Released March 16, 2017









Author:
Anthony Artusa
NOAA/NWS/NCEP/Climate Prediction Center

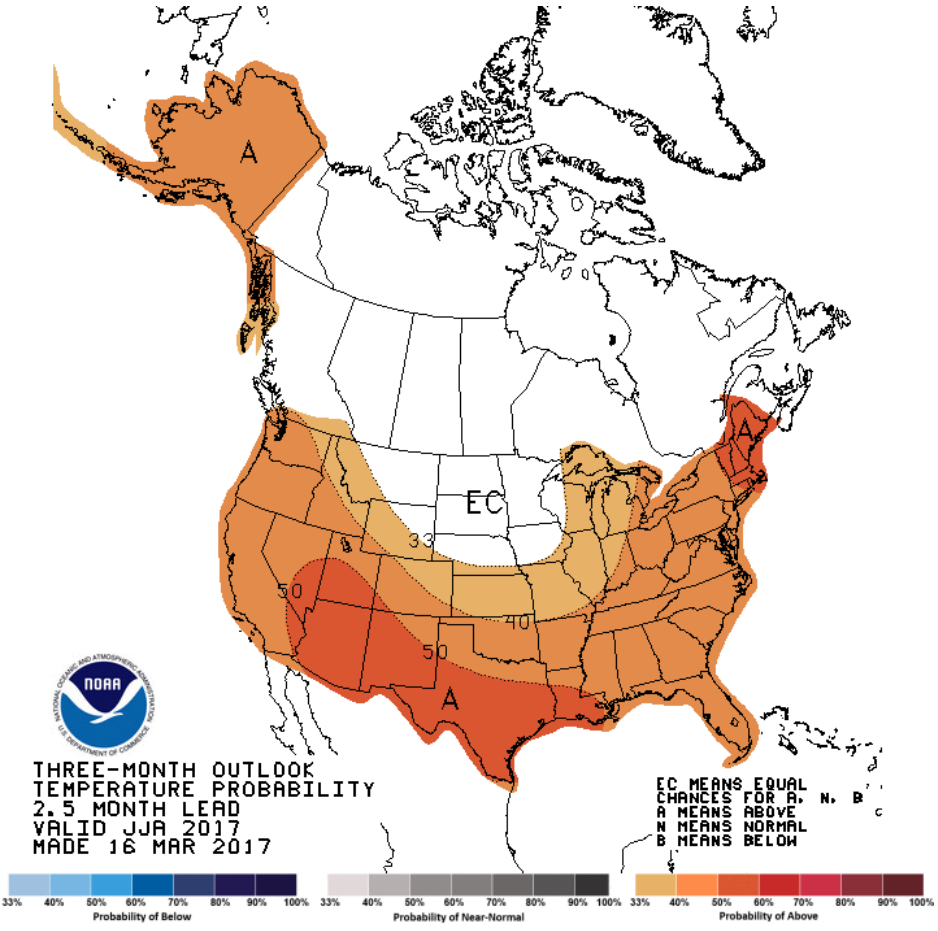
Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Use caution for applications that can be affected by short lived events. "Ongoing" drought areas are based on the U.S. Drought Monitor areas (intensities of D1 to D4).

NOTE: The tan 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).

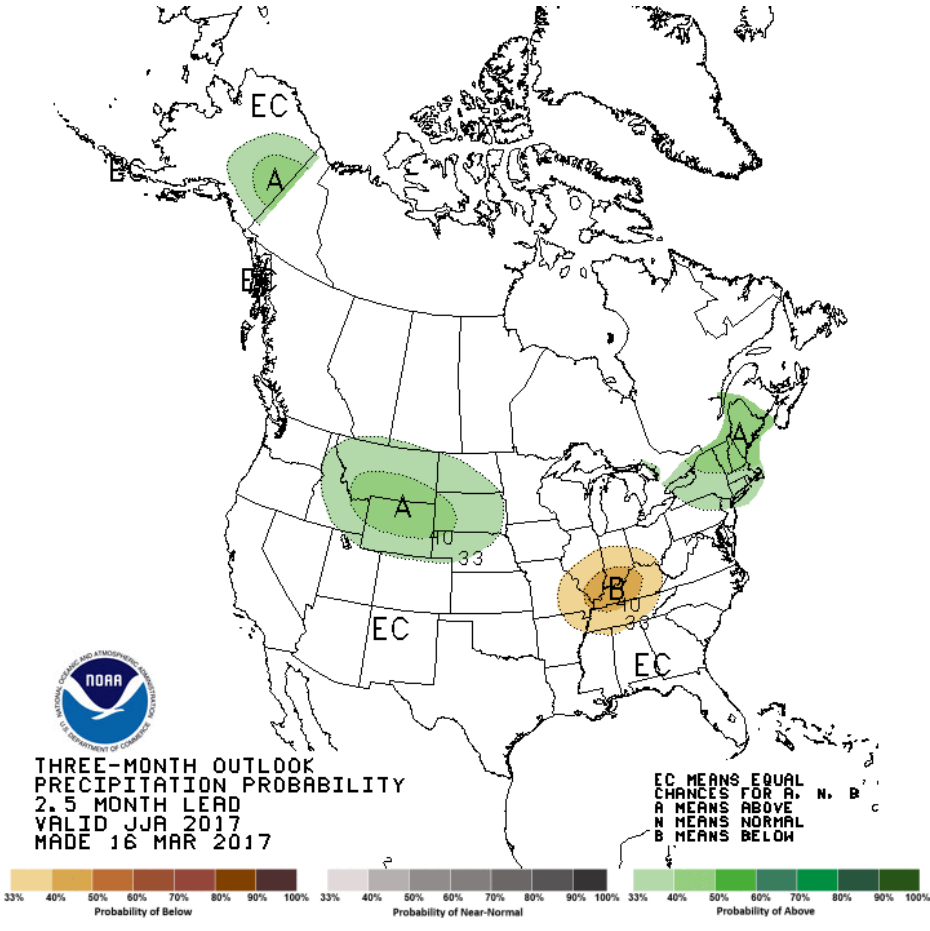
- **Drought persists**
- **Drought remains but improves**
- **Drought removal likely**
- **Drought development likely**

http://go.usa.gov/3eZ73

Jun-Jul-Aug Outlook



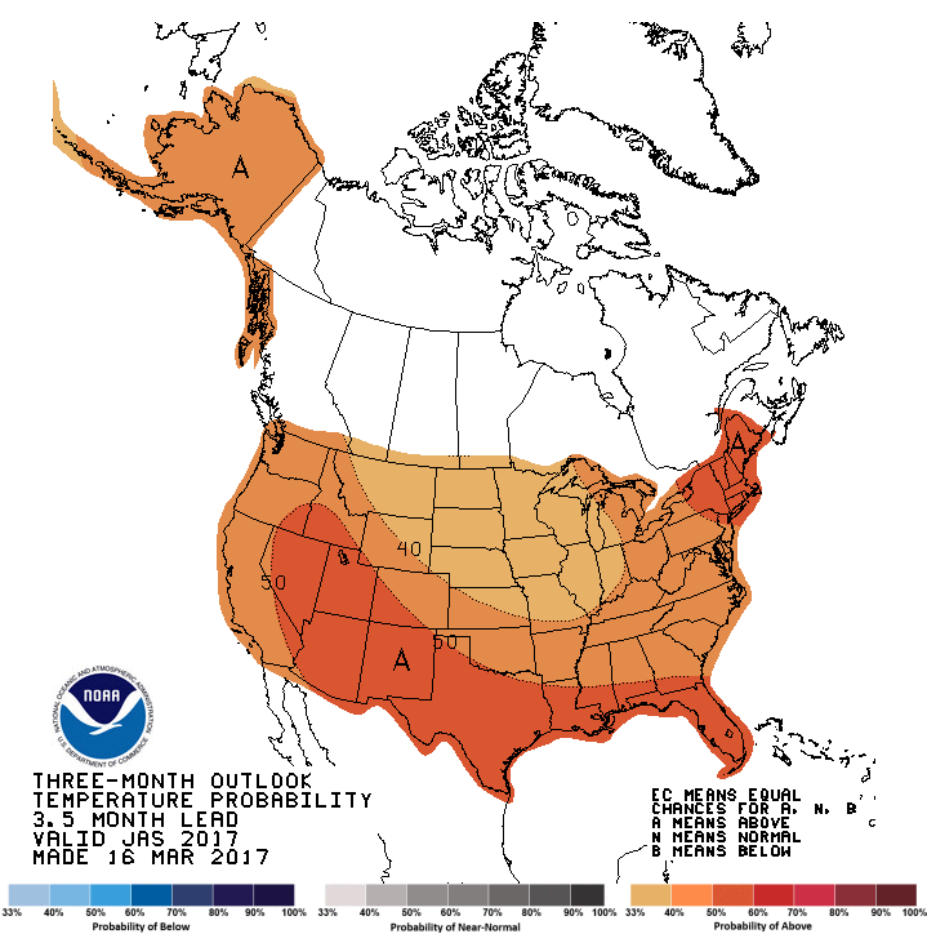
Temperature



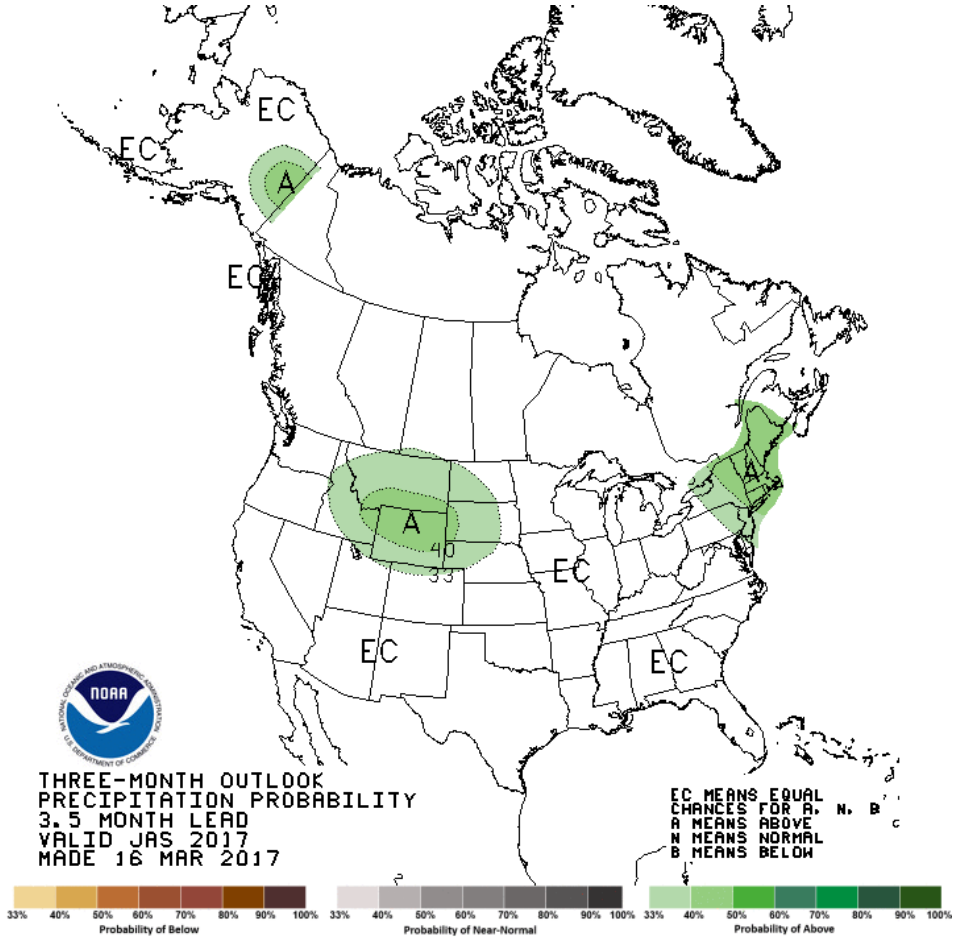
Precipitation

http://www.cpc.ncep.noaa.gov/

Jul-Aug-Sep Outlook



Temperature



Precipitation

http://www.cpc.ncep.noaa.gov/

Summary

- **Recent Conditions**
  - Record warmth over the past month.
  - Significant vegetative impacts due to freeze not apparent yet.
  - Fires in KS, CO and SD.
  - Early start to severe weather season.

  - Intensification of drought in MO/IL region.
  - Continued wetness in the north.

Summary

* **Outlooks**
  * Greatest flood potential for northeast ND (Souris, Red, Devils Lake).
  * If upcoming wet March comes though, will help with precip deficits in drought areas.

  * El Nino chances increase and are favored by end of summer.
  * Monthly, seasonal outlooks showing:
    - warmth for southern and eastern region and building over course of season,
    - wetness for northwest region

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 Centers for Environmental Information: https://www.ncdc.noaa.gov/news/national-centers-environmental-information
- Monthly climate reports (U.S. & Global): www.ncdc.noaa.gov/sotc/
- NOAA's Climate Prediction Center: www.cpc.ncep.noaa.gov
- Current Weather Forecasts: www.weather.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?

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  - Doug Kluck: doug.kluck@noaa.gov, 816-994-3008
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  - Natalie Umphlett: numphlett2@unl.edu ; 402 472-6764
  - Brian Fuchs: bfuchs2@unl.edu 402 472-6775

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  - crhroc@noaa.gov