North Central Drought Outlook
15 November 2018

Snow near Salina, KS
11/8/2018
Mary Knapp, KSU

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General Information

- **Providing climate services to the Central Region**
  - Collaboration Activity Between:
    - State Climatologists/American Association of State Climatologists
    - NOAA NCEI/NWS/OAR/NIDIS
    - USDA Climate Hubs
    - Midwest and High Plains Regional Climate Centers
    - National Drought Mitigation Center

- **Next Regular Climate/Drought Outlook Webinar**
  - December 20, 2018 (1 PM CST): Presenter Justin Glisan, IA State Climatologist
- **Access to Future Climate Webinars and Information**
- http://www.drought.gov/drought/content/regional-programs/regional-drought-webinars
- **Recordings of Past Webinars**
- *http://mrcc.isws.illinois.edu/webinars.htm*
- *http://www.hprcc.unl.edu/webinars.php*
- **Open for questions at the end**

Agenda

- **Recent Conditions**
- **Impacts**
- **Outlooks**
  - **El Niño**
  - **Winter season**

Snow beginning to fall in Aberdeen, SD, November 2018.
Photo courtesy: Laura Edwards, SDSU Extension
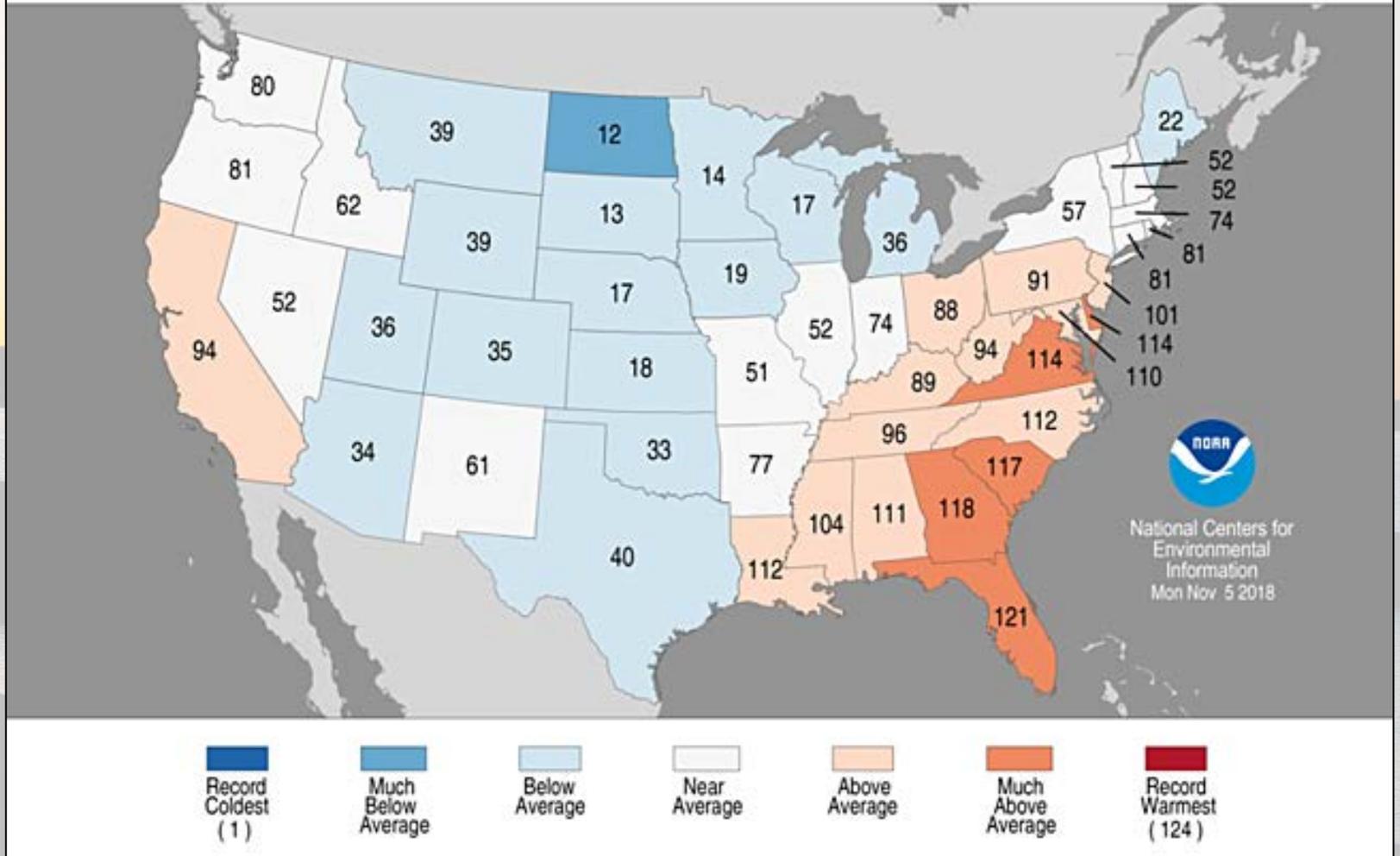
A look back

Recent Conditions

Photo Courtesy: Pete Boulay, Minnesota State Climatology Office

October Temperature Ranks

http://www.ncdc.noaa.gov/temp-and-precip/us-maps/

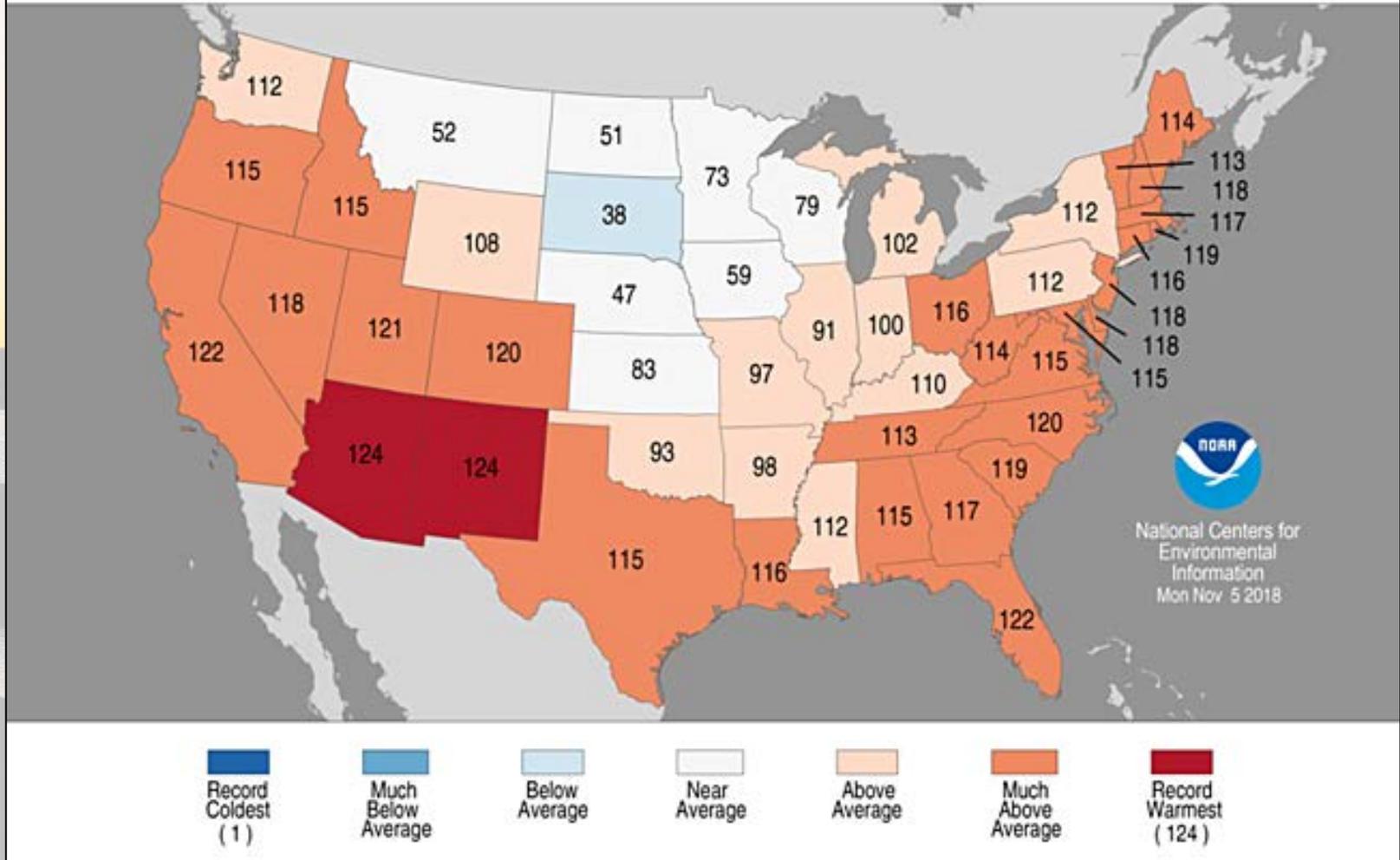# Year-To-Date Temperature Ranks

Statewide Average Temperature Ranks
January–October 2018
Period: 1895–2018

http://www.ncdc.noaa.gov/temp-and-precip/us-maps/

October Precipitation Ranks

http://www.ncdc.noaa.gov/temp-and-precip/us-maps/
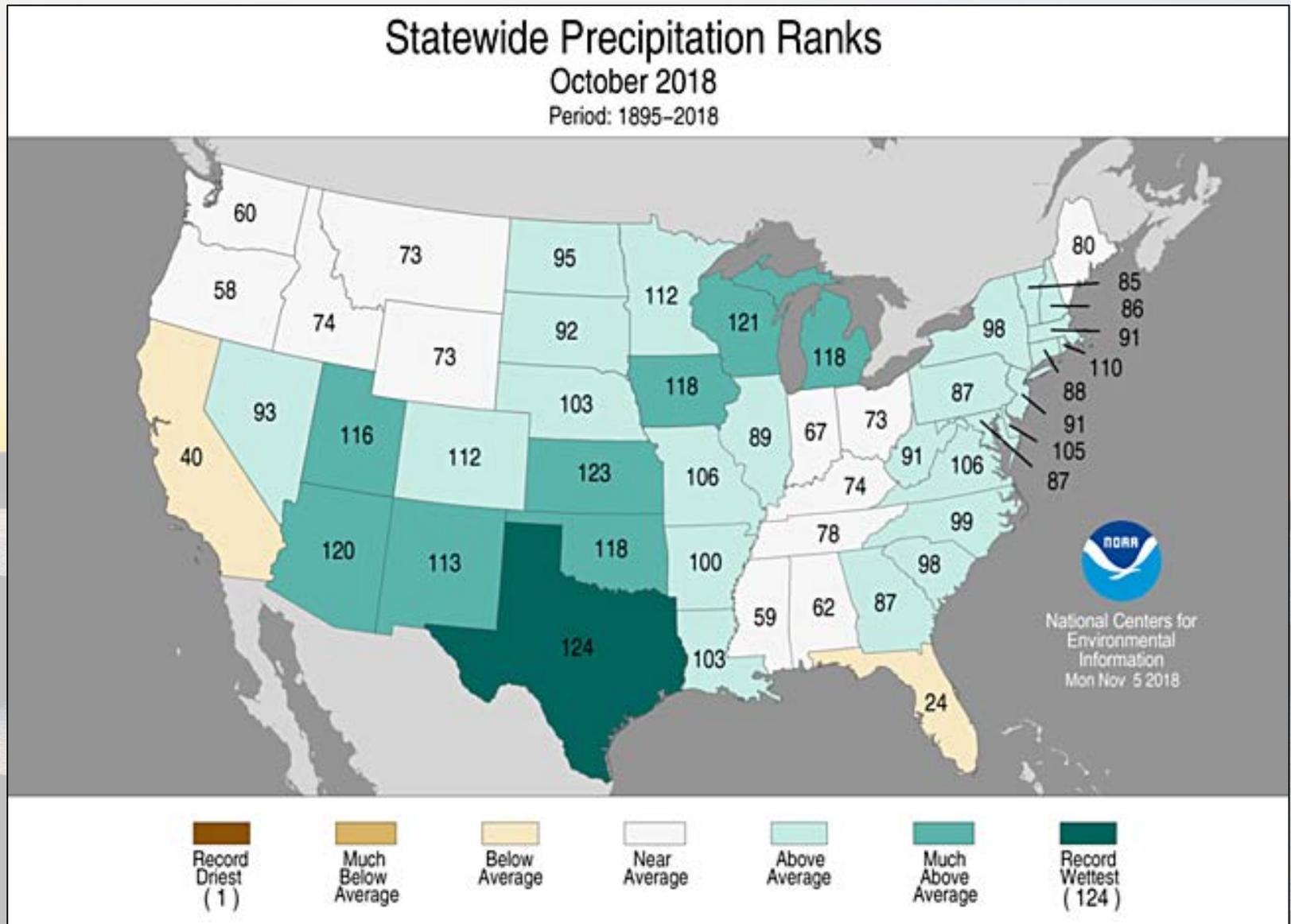
Year-To-Date Precipitation Ranks

http://www.ncdc.noaa.gov/temp-and-precip/us-maps/
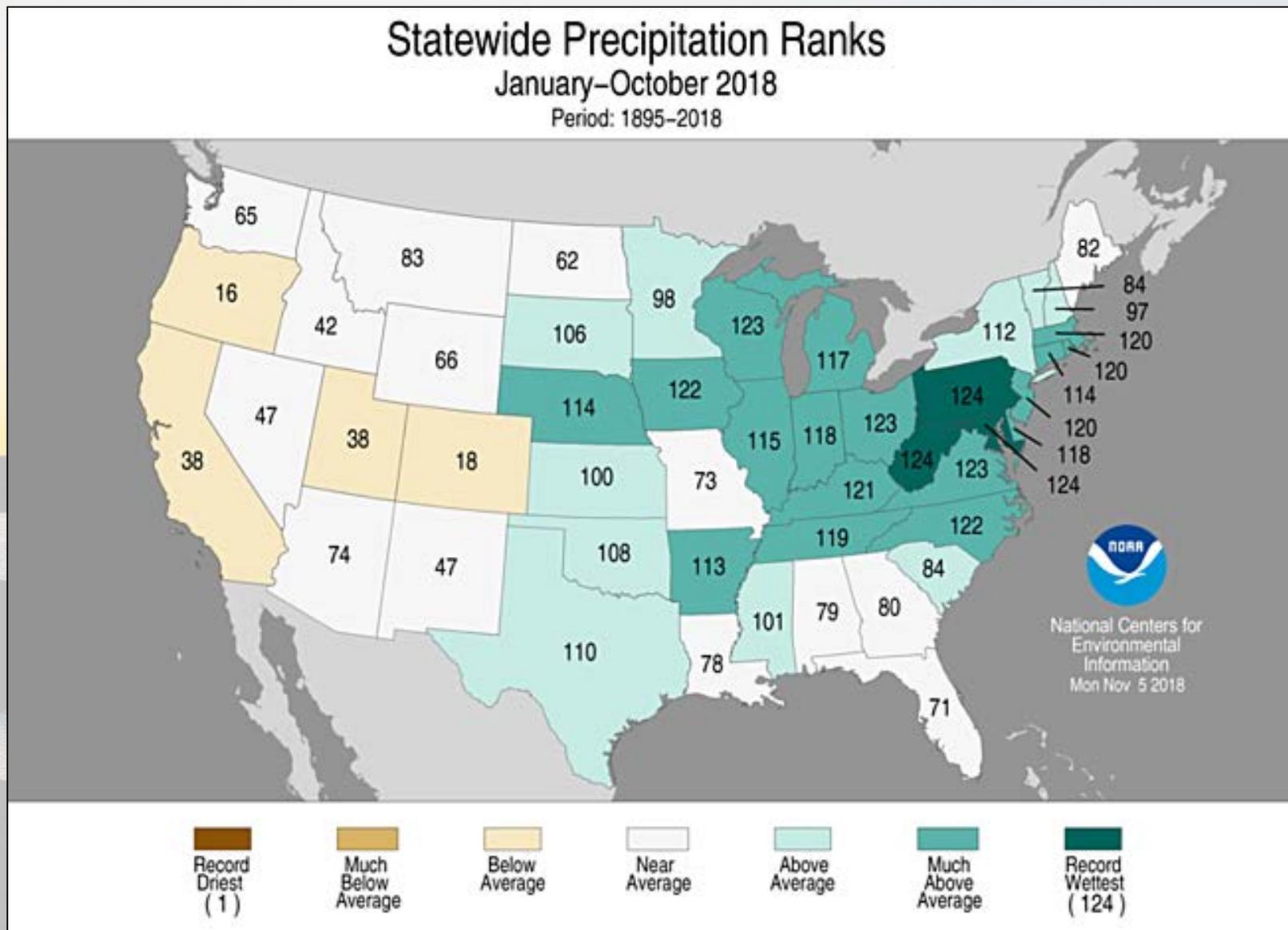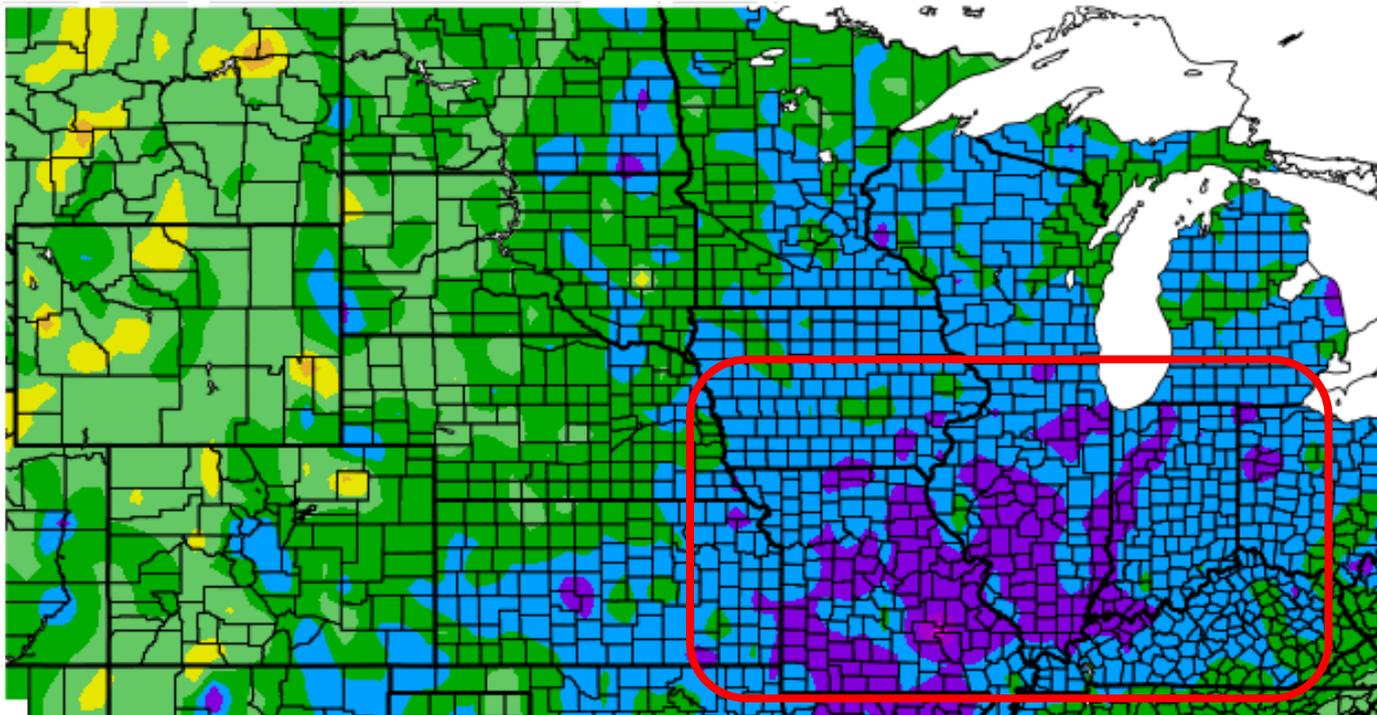
Last 30 Days

Departure from Normal Temperature (F)
10/15/2018 – 11/13/2018

Generated 11/14/2018 at HPRCC using provisional data.

NOAA Regional Climate Centers

https://hprcc.unl.edu/maps.php?map=ACISClimateMaps

Last 30 Days

Percent of Normal Precipitation (%)
10/15/2018 – 11/13/2018
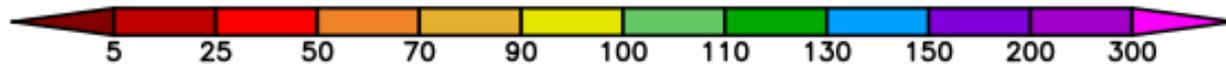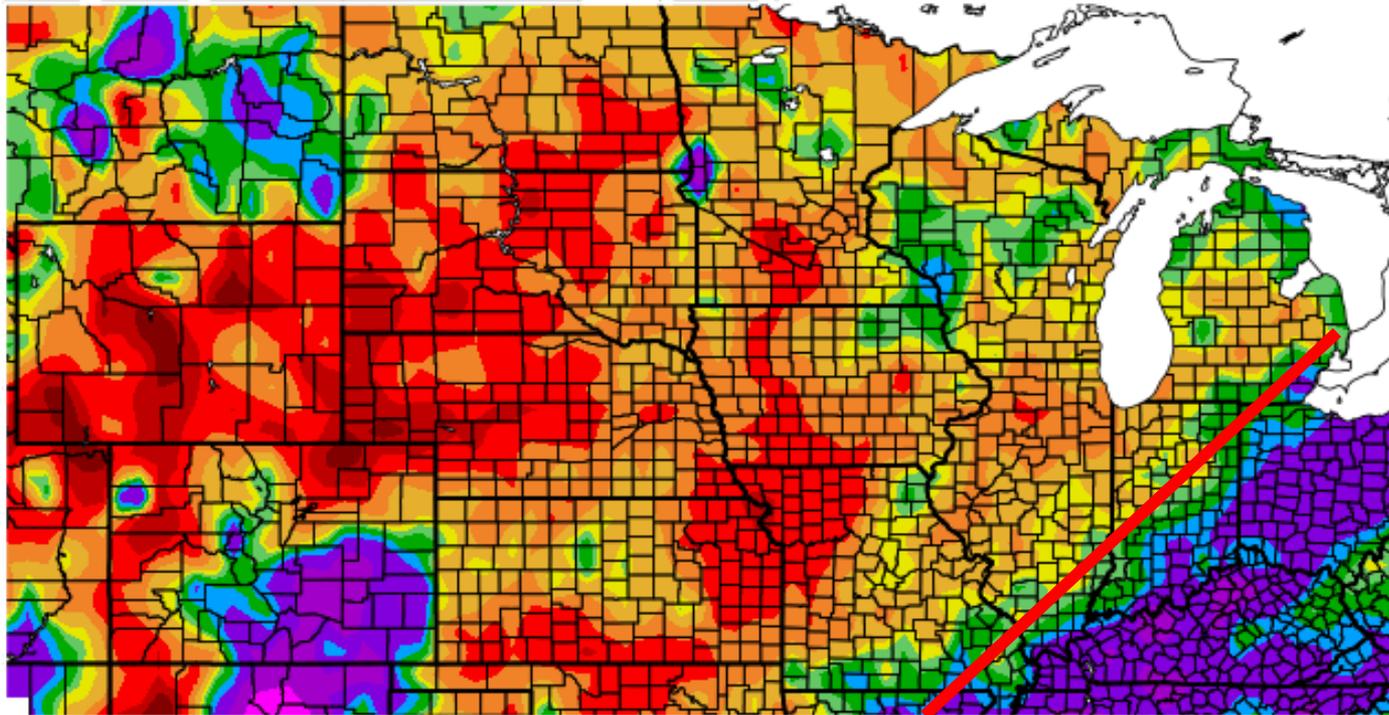
Generated 11/14/2018 at HPRCC using provisional data.

NOAA Regional Climate Centers

https://hprcc.unl.edu/maps.php?map=ACISClimateMaps

Modeled Soil Moisture

http://www.emc.ncep.noaa.gov/mmb/nldas/drought/
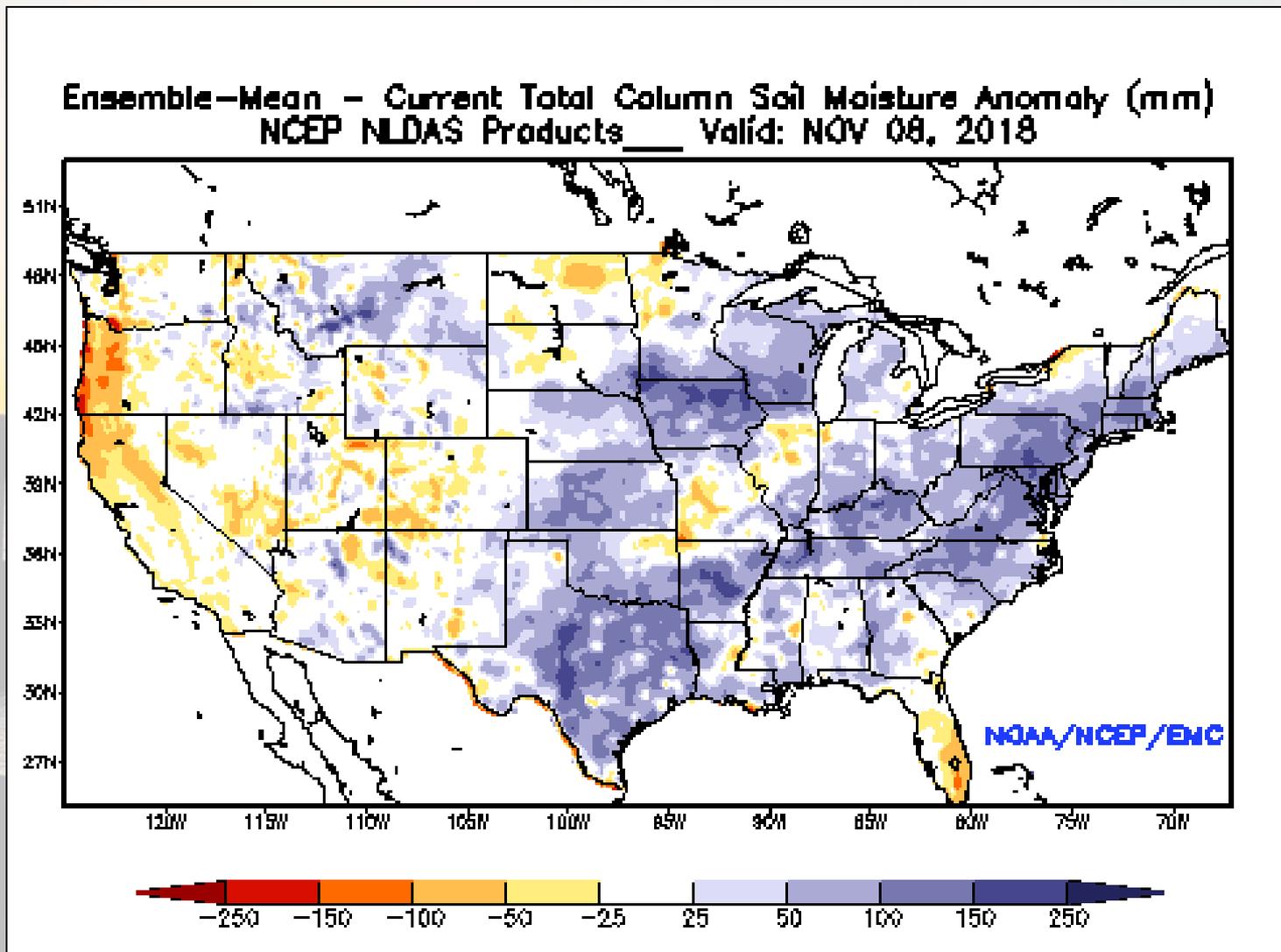
28-Day Average Streamflow

Wednesday, November 14, 2018
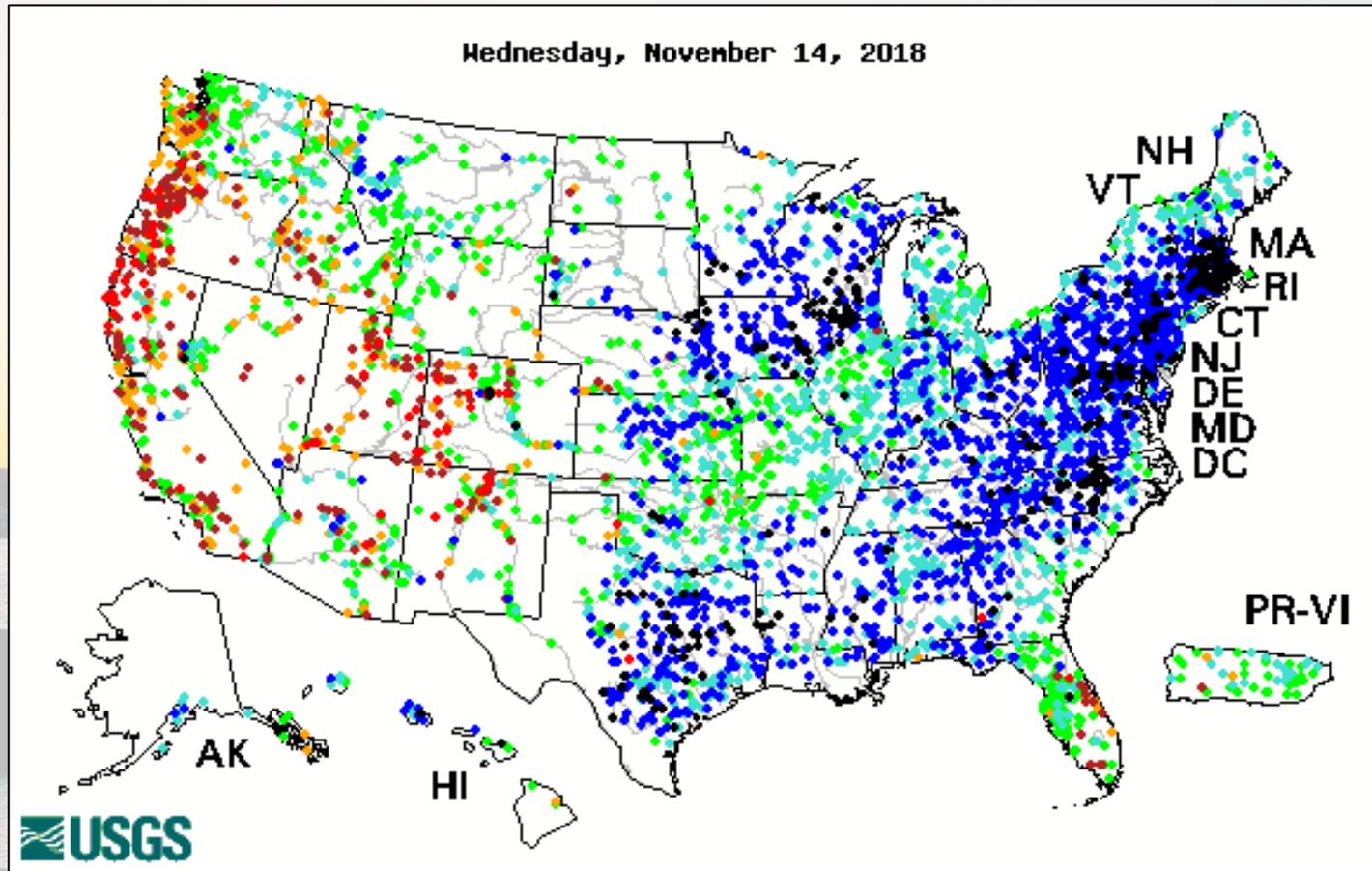
Explanation - Percentile classes

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

U.S. Drought Monitor
NWS Central Region

November 13, 2018
(Released Thursday, Nov. 15, 2018)
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	80.90	19.10	9.22	5.22	3.08	1.20
Last Week 11-06-2018	80.28	19.72	9.31	5.65	3.17	1.21
3 Months Ago 08-14-2018	53.93	46.07	22.31	12.07	6.48	1.28
Start of Calendar Year 01-02-2018	44.74	55.26	22.30	7.69	2.03	0.00
Start of Water Year 09-25-2018	64.00	36.00	17.93	9.15	5.03	1.49
One Year Ago 11-14-2017	67.00	33.00	16.30	6.32	1.96	0.00
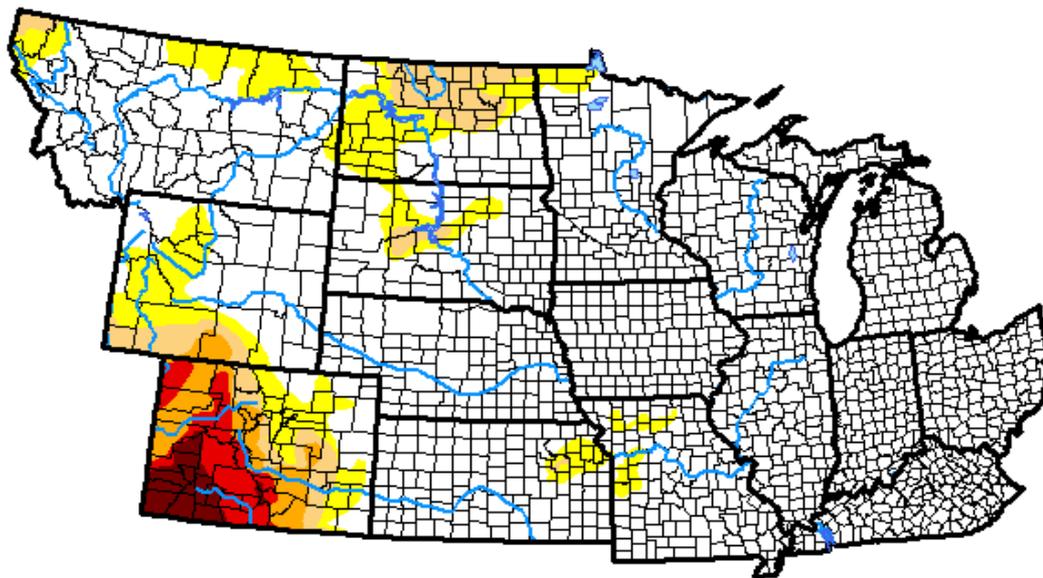
Intensity:

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

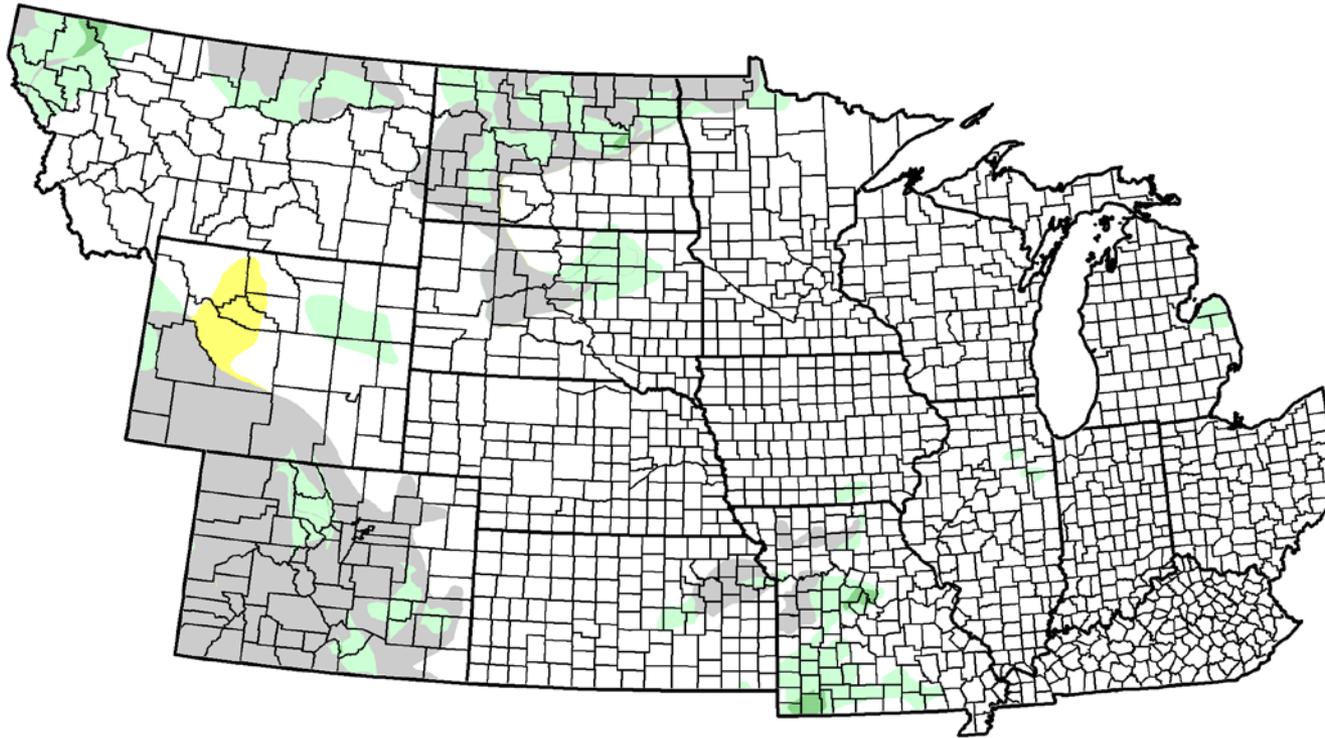*The Drought Monitor focuses on broad-scale conditions.
Local conditions may vary. See accompanying text summary
for forecast statements.*

Author:
David Simeral
Western Regional Climate Center

USDA   NDMC   NOAA

http://droughtmonitor.unl.edu/

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

November 13, 2018
compared to
October 16, 2018

http://droughtmonitor.unl.edu

■	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

It's that time of year....snow

https://www.nohrsc.noaa.gov/nsa/
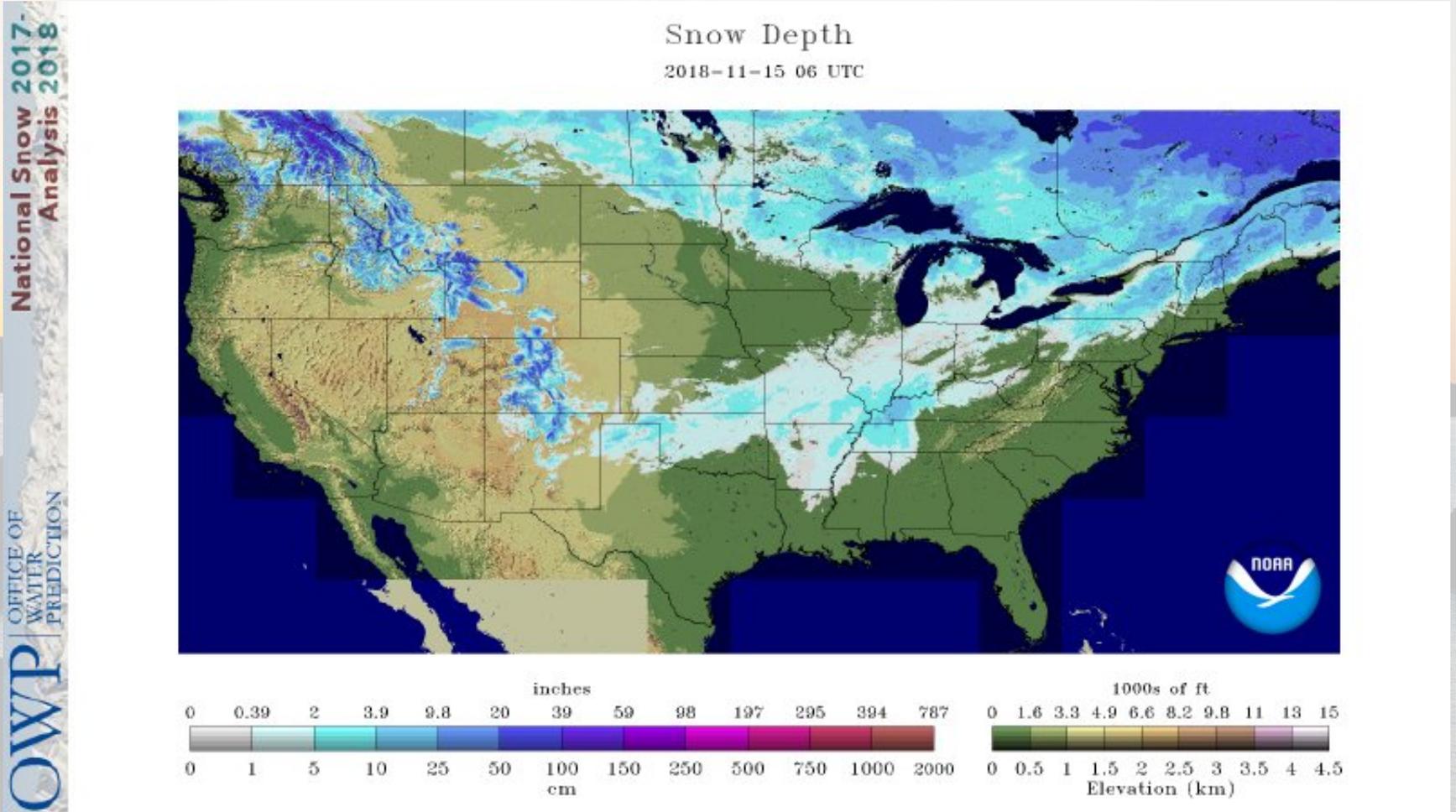
Westwide SNOTEL Current Snow Water Equivalent (SWE) % of Normal

Nov 14, 2018

https://www.wcc.nrcs.usda.gov/gis/snow.html
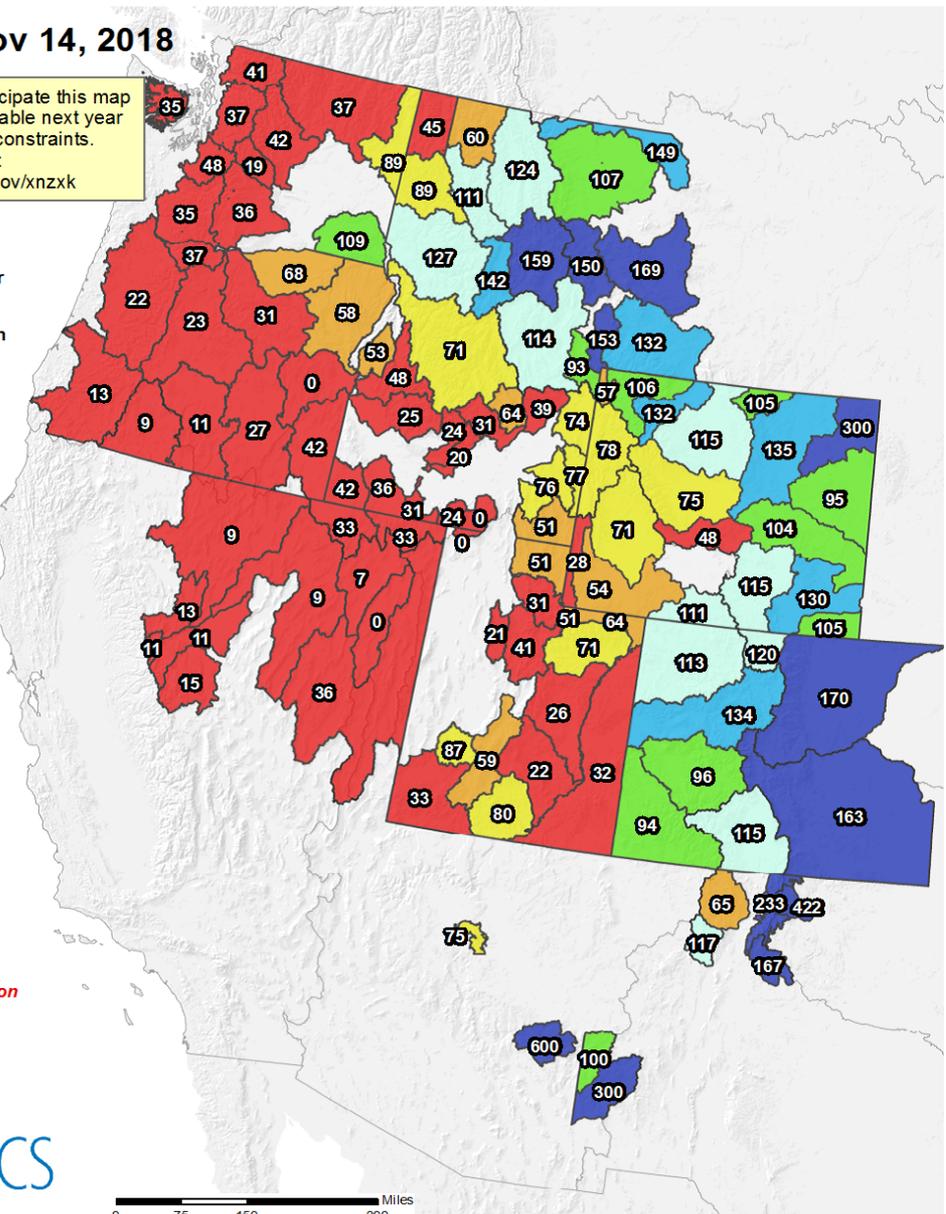
Impacts:
Wet Conditions,
Cooler......

Photo courtesy: Drake Spaeth, Waukesha, WI

Near-Record Wet Year: 2018

ThreadEx Sites	State	2018 Accumulation as of 11/13 (inches)	Rank (Jan-Dec)	Start Year
Waterloo	IA	51	2	1895
Sioux Falls	SD	37.92	2	1893
Madison	WI	48.26	3	1869
Lexington	KY	64.26	3	1872
Sioux City	IA	35.74	4	1889
Rapid City	SD	24.3	4	1942
Louisville	KY	61.2	5	1872
Green Bay	WI	37.15	6	1886
Milwaukee	WI	42.09	6	1871
Jackson*	KY	58.12	6	1981
Valentine	NE	28.16	6	1889
Dubuque	IA	48.9	7	1873
Rockford	IL	45.74	7	1893
Cleveland	OH	46.6	8	1871
Columbus	OH	48.76	9	1878
Youngstown	OH	45.5	10	1896
Zanesville	OH	46.89	10	1895

* Jackson, KY period of record starts in 1981

Ranking is relative to calendar year (Jan-Dec),
This is where stations would rank if no more precipitation
occurred from 11/14 - end of the year.

Percent of Normal Precipitation (%)
1/1/2018 – 11/13/2018

Generated 11/14/2018 at HPRCC using provisional data.
NOAA Regional Climate Centers
25 50 70 80 90 100 110 120 130 150 175
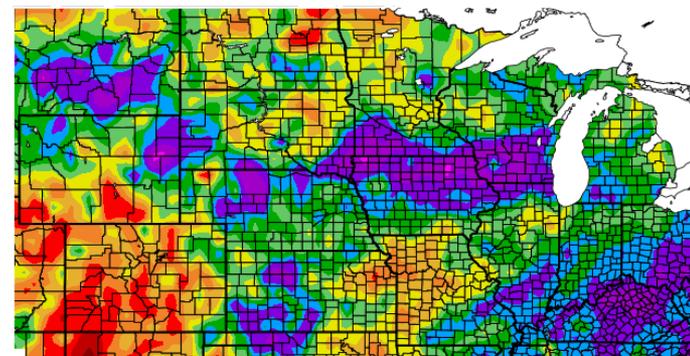
Near-Record Wet Year: 2018

Some additional sites approaching wettest years on record
- Belle Fourche, SD (7th, 23.34 in.)
- Hays 1S, KS (4th, 34.89 in.)
- Liberal, KS (9th, 27.46 in.)
- Redbird, WY (3rd, 20.36 in.)
- Yankton 2E, SD (1st, 39.71 in)
- Elizabeth, IL (1st, 56.38in)* shorter record 1984-present

Harvest Progress: Corn

U.S. Corn Progress

Percent Harvested
November 11, 2018

Map values (TOP = Percent Harvested, [BOTTOM] = Change from 5-year Average):

- 62 [−16]
- 87 [−2]
- 71 [−14]
- 69 [+3]
- 67 [+2]
- 77 [−9]
- 83 [−5]
- 78 [−3]
- 69 [−7]
- 77 [−3]
- 89 [−6]
- 94 [+1]
- 96 [+3]
- 88 [+2]
- 94 [0]
- 98 [0]
- 99 [0]
- 94 [0]

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

Difference
- -40% or less
- -39% to -30%
- -29% to -20%
- -19% to -10%
- -9% to -1%
- No Change
- 1% to 9%
- 10% to 19%
- 20% to 29%
- 30% to 39%
- 40% or More

National Progress	
Harvested	84
Change from 5-year Average	-3

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

Harvest Progress: Sorghum

U.S. Sorghum Progress

Percent Harvested
November 11, 2018
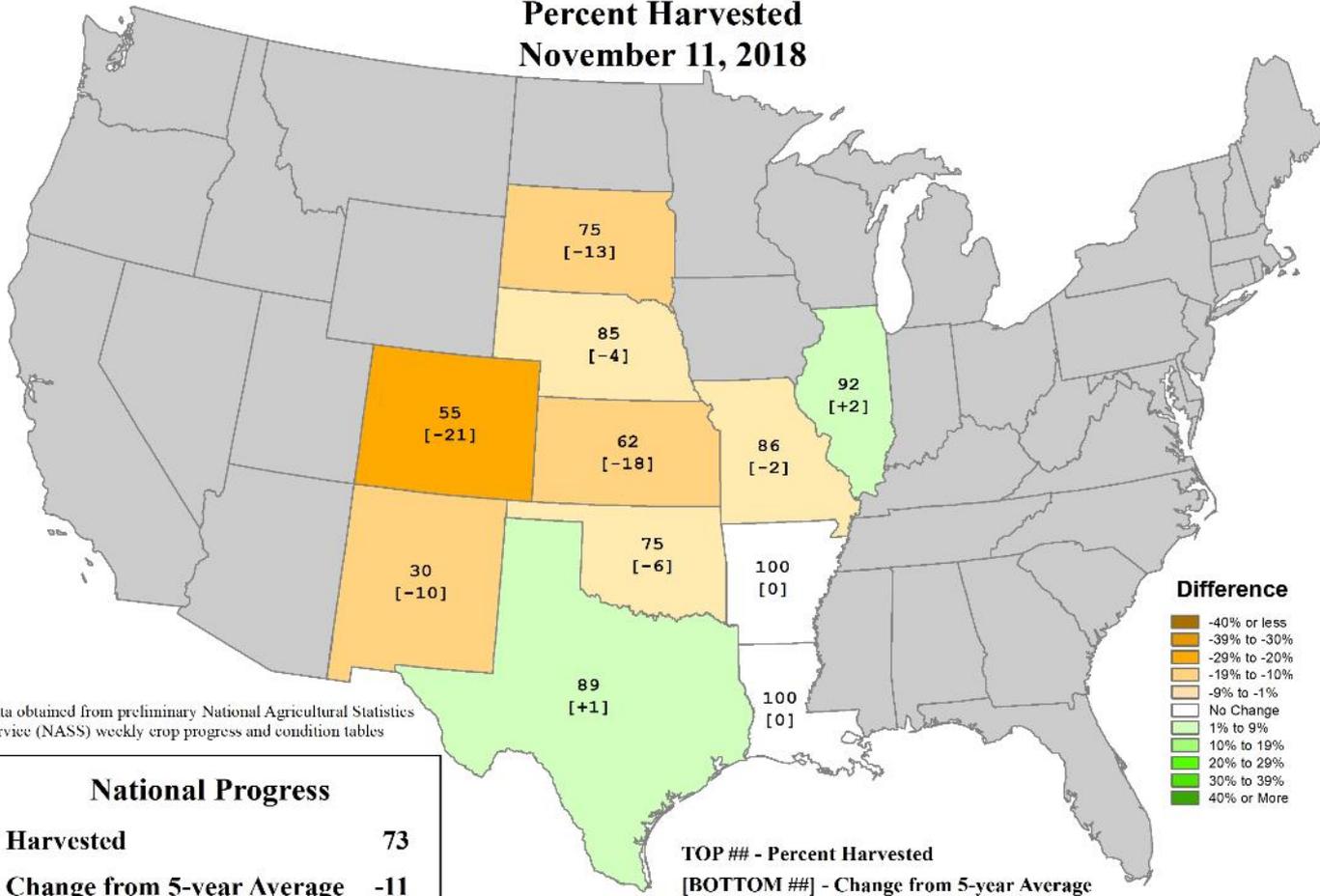
75 [-13]

85 [-4]

92 [+2]

55 [-21]

62 [-18]

86 [-2]

30 [-10]

75 [-6]

100 [0]

89 [+1]

100 [0]

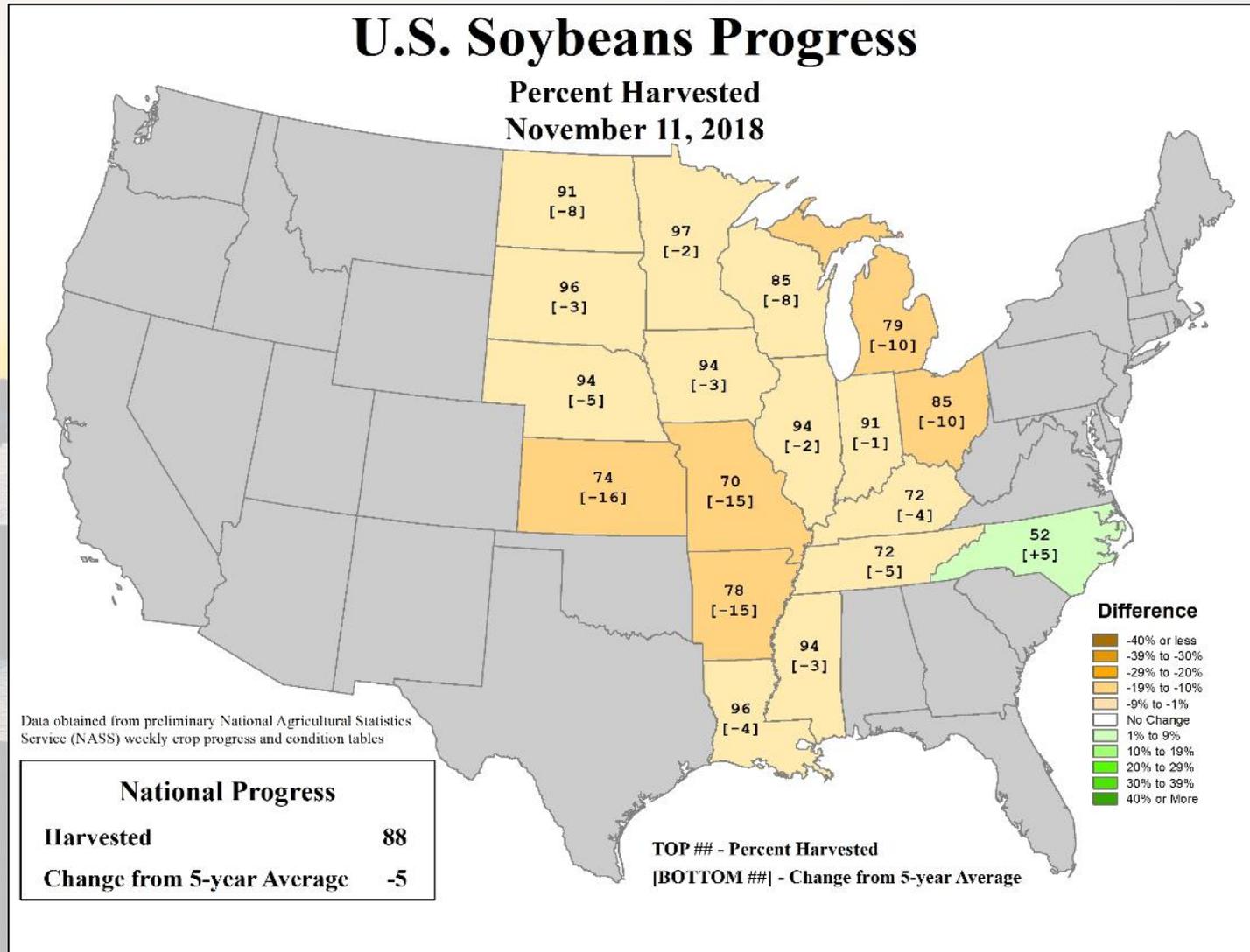Data obtained from preliminary National Agricultural Statistics Service (NASS) weekly crop progress and condition tables

Difference

- -40% or less
- -39% to -30%
- -29% to -20%
- -19% to -10%
- -9% to -1%
- No Change
- 1% to 9%
- 10% to 19%
- 20% to 29%
- 30% to 39%
- 40% or More

National Progress

Harvested	73
Change from 5-year Average	-11

TOP ## - Percent Harvested

[BOTTOM ##] - Change from 5-year Average

Harvest Progress: Soybeans

Harvest Progress: Soybeans

- US Soybean Harvest is the 3rd slowest on record in the modern era (1995-present)

- Slowest since 2009

- Seen some improvement in recent weeks, after a marked slow down in October.

- "Harvest season is a "lousy" time of year for drought improvement to take place"

U.S. SOYBEANS: Percent Harvested

Based on NASS crop progress data.

Planting: Winter Wheat Emergence
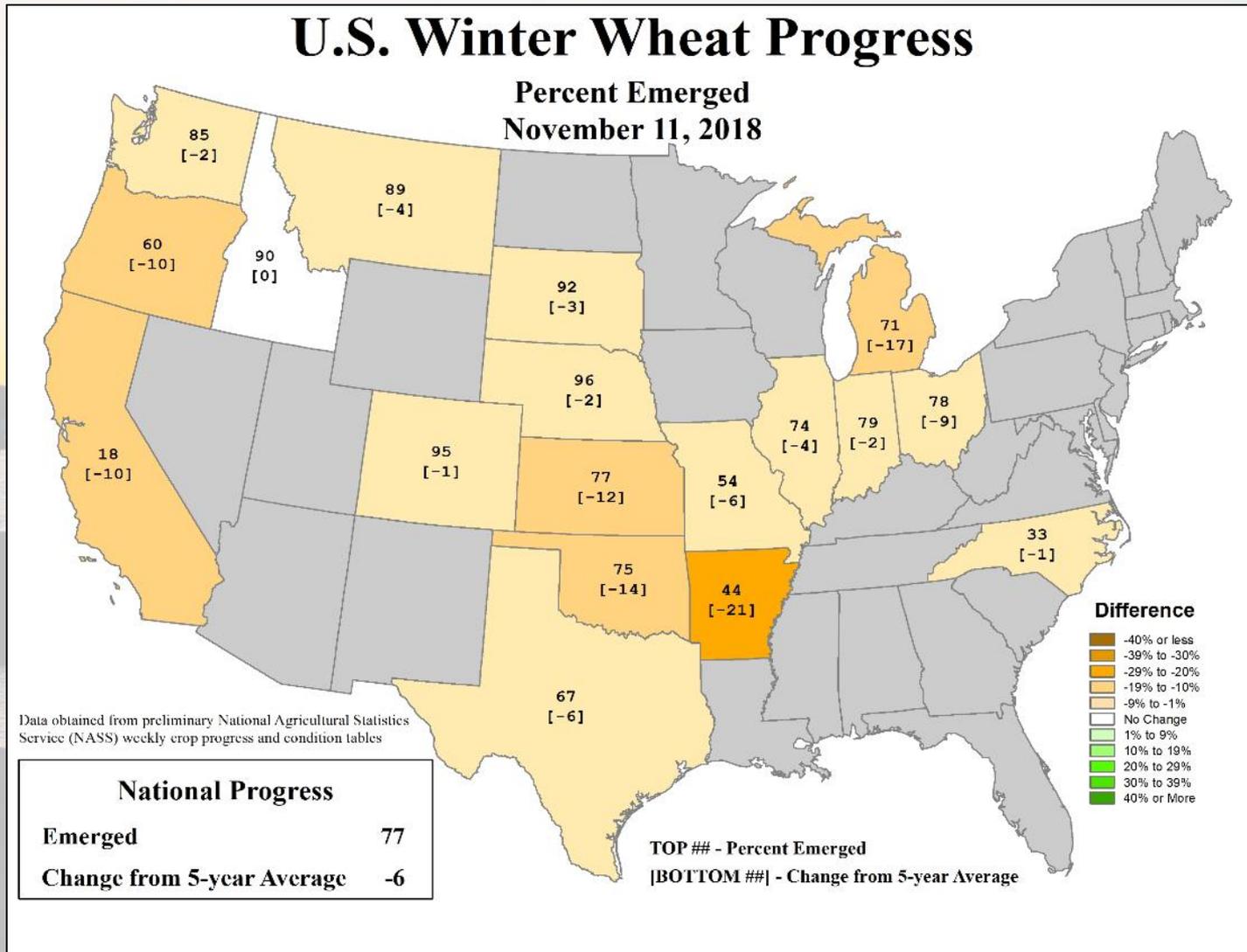
State Impacts

- Cooler than normal temperatures over the past several weeks over the entire region (SD, KS, MN, IA, IL, IN, MI, OH, NE)
  - Minnesota reported statewide average 7.7 degrees below normal for the first 13 days of November
  - Good conditions for beet piling (MI)
- Wet conditions across much of the region in early October and continuing in central and eastern regions delayed harvest (SD, NE, KS, IA, IL, IN, MI, OH, KY)
  - Improvement in recent weeks
  - Waiting for soils to freeze in particularly wet areas (SD)
  - Poor grain drying in field (MI)
  - Sunflower harvest on time with 5-year average (SD)
  - "Biggest seller in area are log chains to pull tractors and combines out" (IL)
- Winter Wheat Impacts
  - Flood Damage (KS)
  - Reduced number of acres (IN,MI)
- Grain Quality/Disease Issues
  - Concerns over soybeans dropping/swelling/sprouting (NE, IA, OH, MI)
  - Stink bug damage/fungal issues in soybeans (IN)
  - Vomitoxin in corn reported (MI)

State Impacts

- Lack of Growing Degree Days lead to immature sorghum/soybeans at freeze (KS)
- <mark>Wind damage</mark>
  - Power outages/damage in Cuyahoga County on election day (OH)
  - Corn blow down in areas across northern 2/3 of state (IN)
- Soils starting to freeze as the season progresses and snow cover gets established (SD, MN, NE, MI)
- <mark>Ice-Up is occurring on smaller lakes (SD, MN)</mark>
  - Three weeks early (MN)
  - About average (NE SD)
- <mark>Road-side pheasant counts up 47% (SD)</mark>

Photo Courtesy: Nebraska Crop Watch (@UNL_Cropwatch, Twitter)

Missouri River

Missouri Mainstem Reservoir Status (as of 11/6/18):

- Runoff from eastern SD rivers was 2nd highest for a month in October (120 yrs.). These are unregulated: James, Vermilion and Big Sioux.

- 2018 will be 3rd highest runoff year for the Upper Missouri River basin, behind 1997 and 2011.

- The calendar year runoff forecast for the Missouri River Basin above Sioux City, updated on November 1, is 41.4 MAF (163% of average)

- Project releases will be above average through November to evacuate the bulk of the stored flood waters before reducing to winter releases.

System Storage Comparison

*In January 2011, the Base of Flood Control was 56.8 MAF, and the Top of Exclusive Flood Control was 73.1 MAF.

http://www.nwd-mr.usace.army.mil/rcc/reports/pdfs/weeklyupdate_previous.pdf
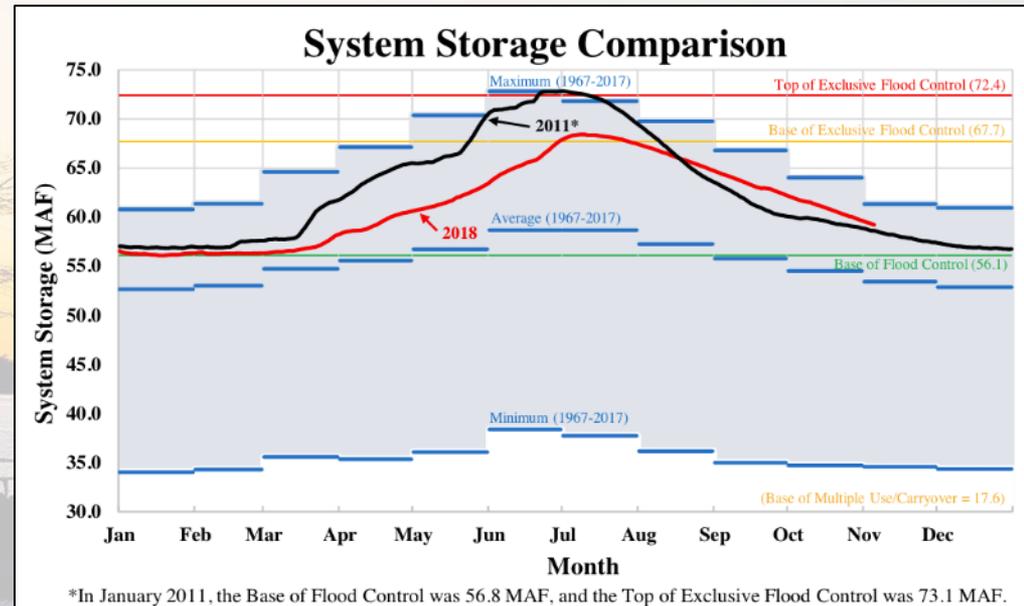
Great Lakes Water Levels

- All 5 lakes running above long-term averages
  - Superior, Michigan-Huron, and Erie near last year's levels
  - Ontario somewhat lower than same time in 2017
- Forecasts suggest that over the next 6 months levels on all Great Lakes will remain above long-term averages (1918-present)
- Surface water temperatures on all lakes are slightly below to near normal (1992-2018)

https://www.glerl.noaa.gov/data/wlevels/data/superiorLevelsMeters.png
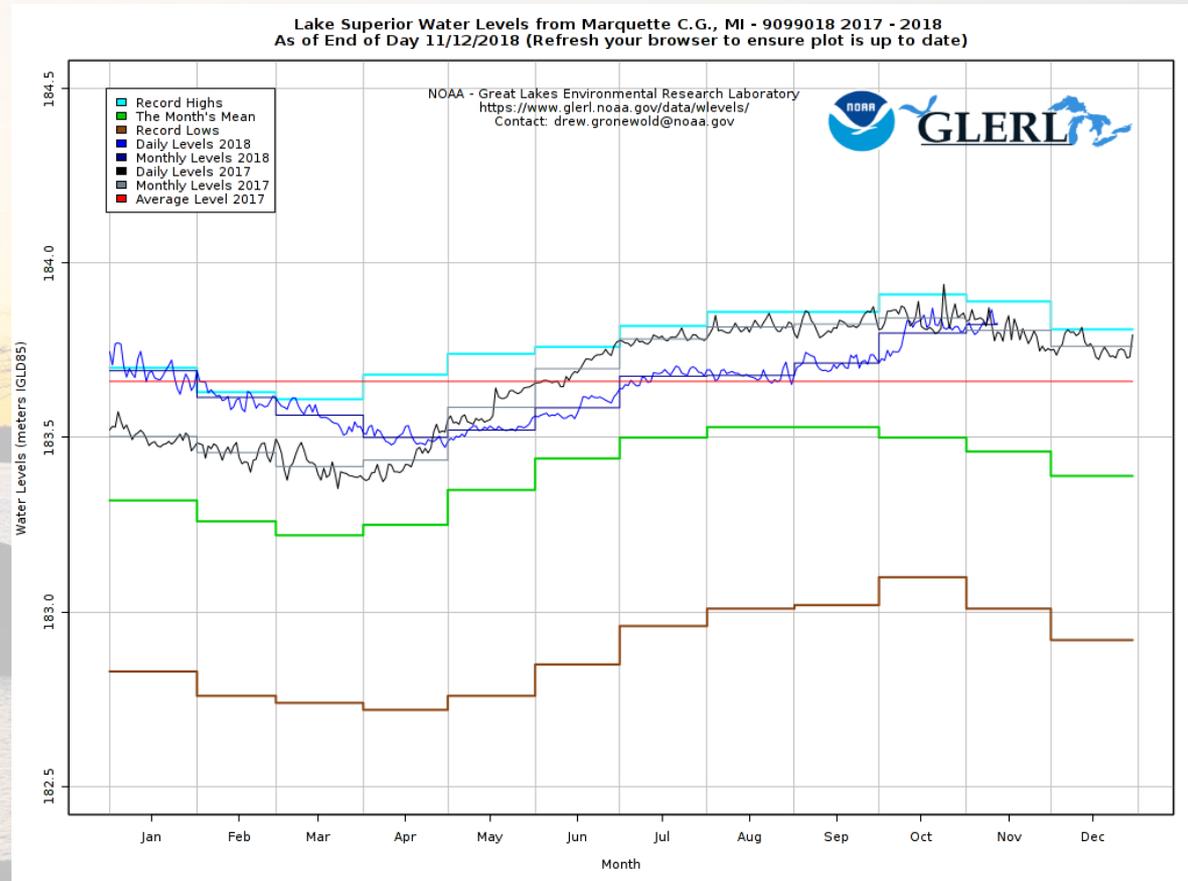
Great Lakes Harmful Algal Bloom

GREAT LAKES

Lake Erie algae bloom less severe than predicted

Cecelia Smith-Schoenwalder, E&E News reporter

Published: Thursday, November 1, 2018

Lake Erie's algal bloom was less severe than expected. NOAA Great Lakes Environmental Research Laboratory/Flickr

Lake Erie's annual harmful algae bloom this summer was less severe than NOAA had predicted, according to a seasonal assessment.

NOAA had forecast the bloom to be a 6 on its severity scale, but the **analysis** showed it to be a 3.6, which is a relatively mild bloom.

This bloom was more severe than 2016's bloom but much milder than 2017's bloom, which at nearly 8.5 was tied for the third-worst observed this century (*Greenwire*, Nov. 8, 2017).

Summary - Conditions

- Cooler temperatures across the region, particularly in the central areas

- Missouri/Upper/Mid Mississippi River flows continue to be higher than average for this time of year

- Cold and wet conditions have slowed harvests/planting in much of the region, though improvements seen in recent weeks

- Lake levels are above long-term averages and are likely to continue to be high

- Moving into Spring, flooding may be a substantial concern in basins where soil moisture and stream flows are high going into winter/freeze-up

El Niño: Outlook Winter 2018-2019

El Niño briefings:

Midwest: https://www.drought.gov/drought/documents/el-nino-impacts-and-outlook-midwest-region-october-2018

Great Lakes: https://www.drought.gov/drought/documents/el-nino-impacts-and-outlook-great-lakes-region-october-2018

Missouri River Basin: https://www.drought.gov/drought/documents/el-nino-impacts-and-outlook-missouri-river-basin-october-2018

El Niño Watch

- 80% likely development through winter and 55-60% chance it will continue into Spring
- Historically, has meant warmer than average temperatures in north central states
  - Signal not as robust for weak El Niño events
- Not well correlated to precipitation for most of our region
- Forecasts calling for a weak El Niño event

El Niño Probabilities

https://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/?enso_tab=enso-quicklook
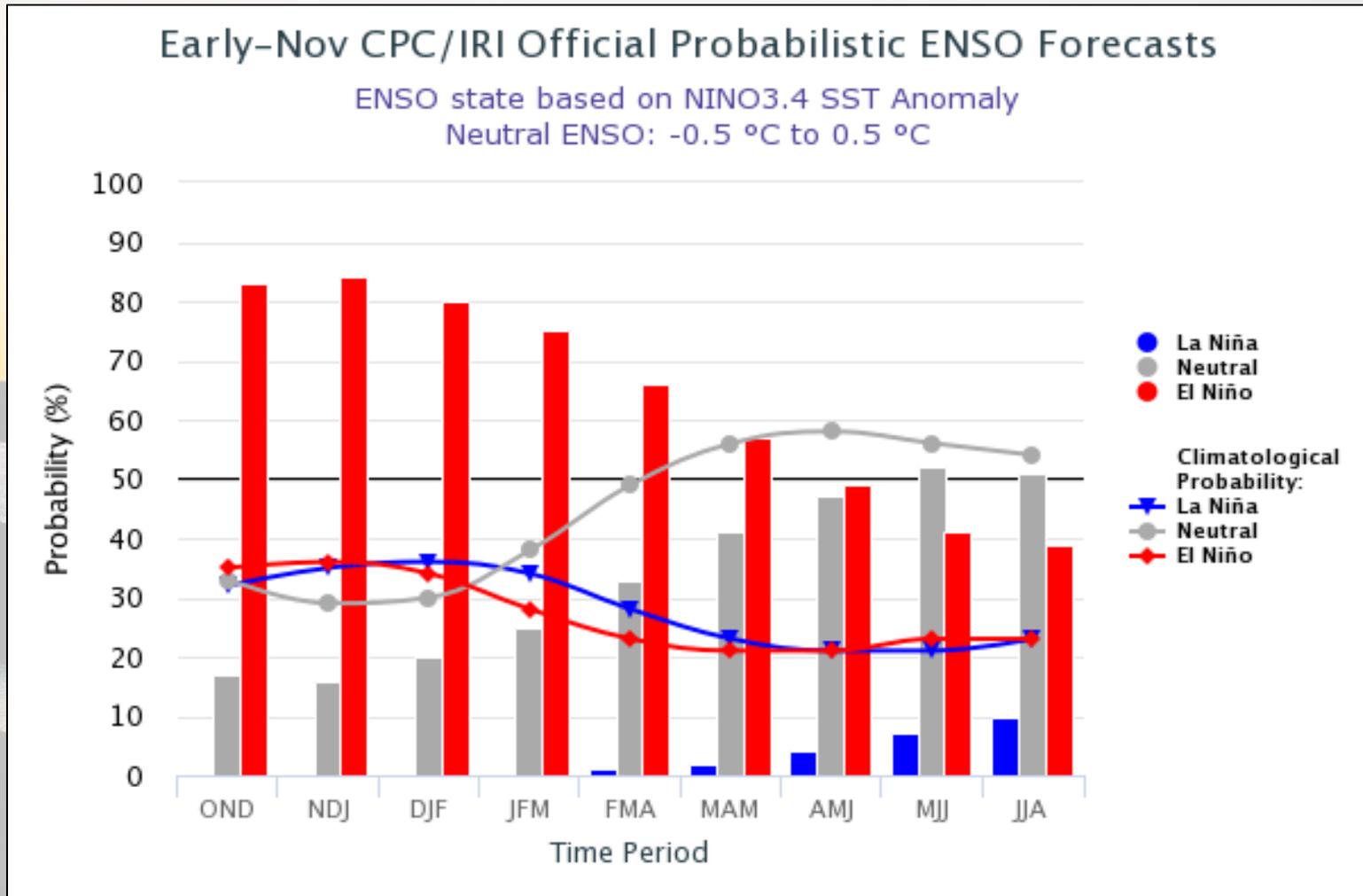
Temperature Anomalies: Weak El Nino Cases
1950-2010 Base Period

NOAA/NCEI Climate Division Composite Standardized Temperature Anomalies Versus 1951–2010 Longterm Average
Dec to Feb 2014–15,2006–07,2004–05,2002–03,1987–88,1979–80,1976–77,1977–78
1969–70,1958–59,1953–54,1951–52,
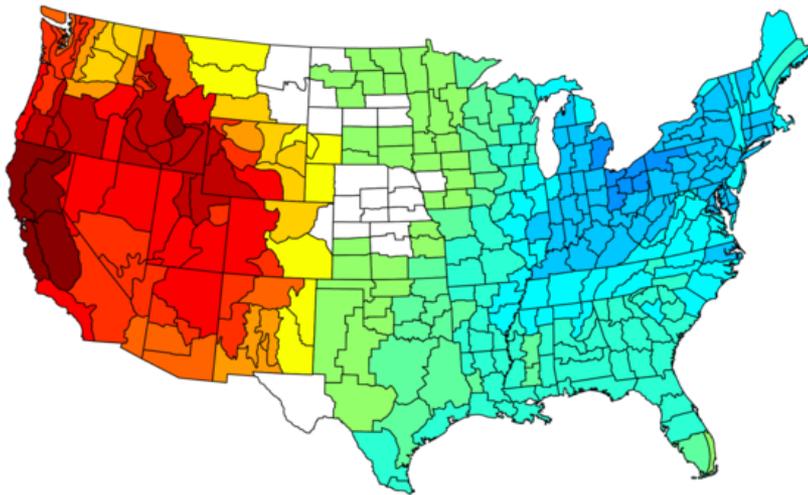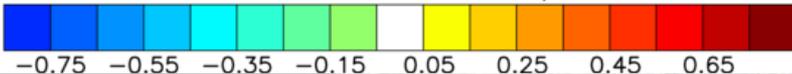
NOAA/ESRL PSD and CIRES–CU

NOAA/NCEI Climate Division Composite Standardized Temperature Anomalies Versus 1951–2010 Longterm Average
Dec to Feb 2014–15,2006–07,2004–05,2002–03,1987–88,1979–80,1969–70,1958–59
1953–54,1951–52,
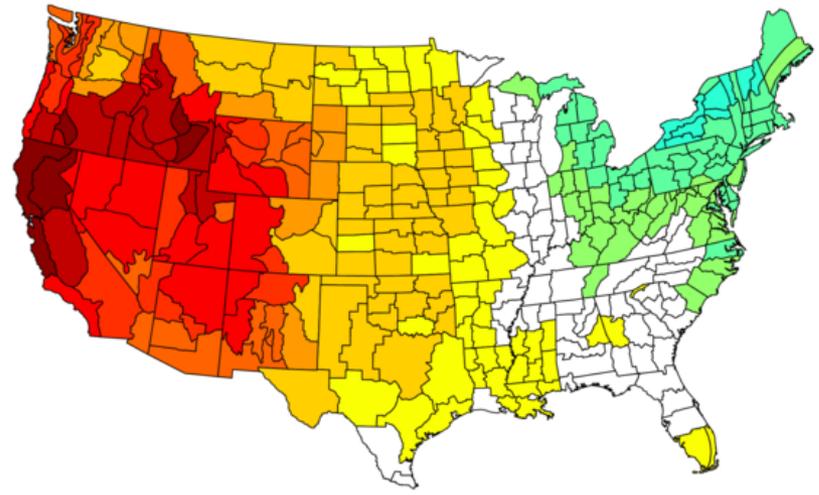
NOAA/ESRL PSD and CIRES–CU
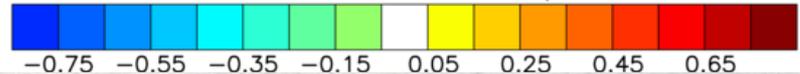
(W/out 1976 and 1977)

Precipitation Anomalies: Weak El Niño

WEAK 2002-03 1953-54 1987-88 1976-77
1977-78 2006-07 1958-59 1979-80
2004-05 2014-15 1951-52 1969-70

December-February
compared to 1981-2010

difference from average precipitation (in)

NOAA Climate.gov
Data: ESRL/NCEI

-12   0   12
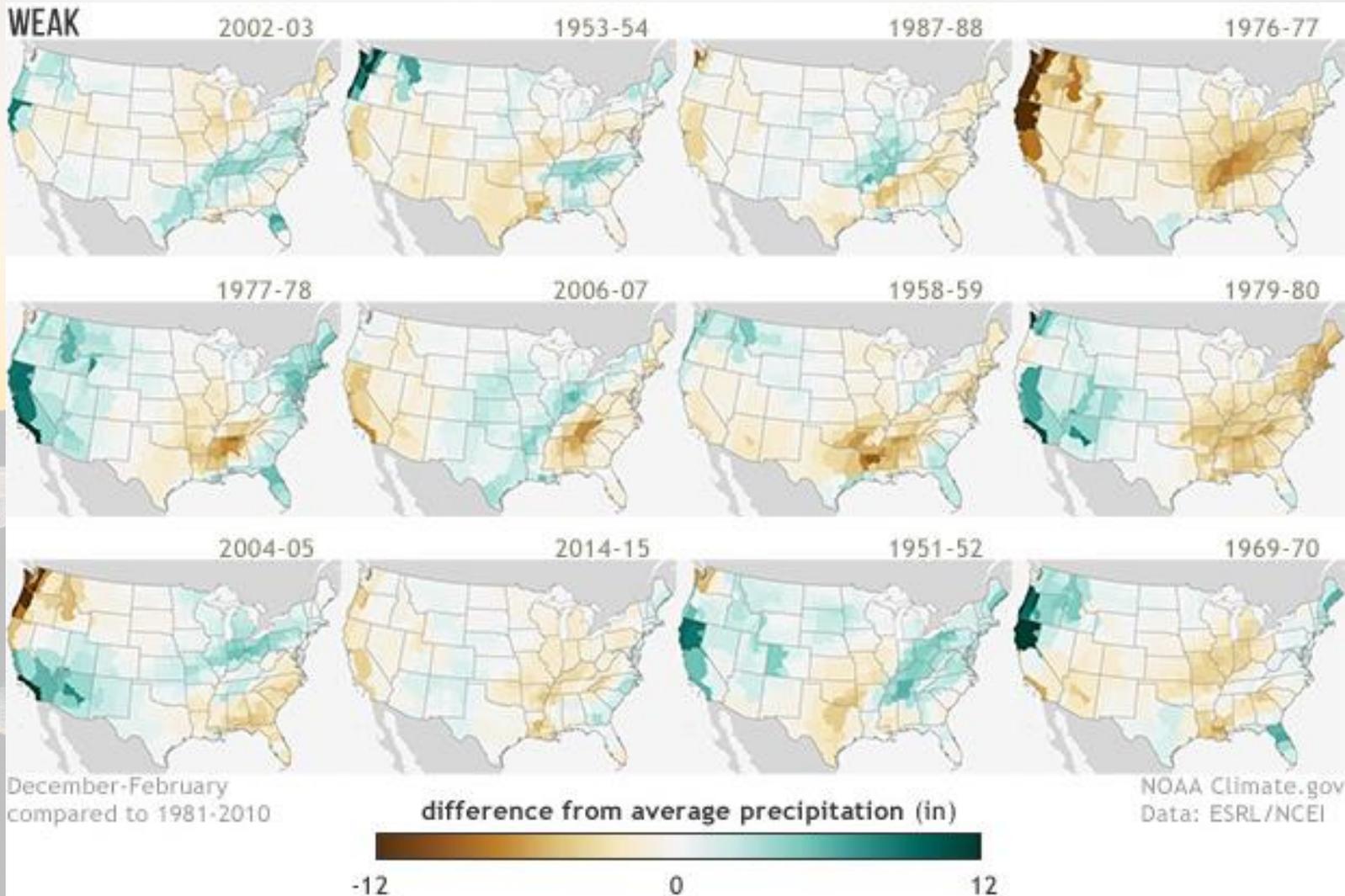
Great Lakes Ice Cover and ENSO
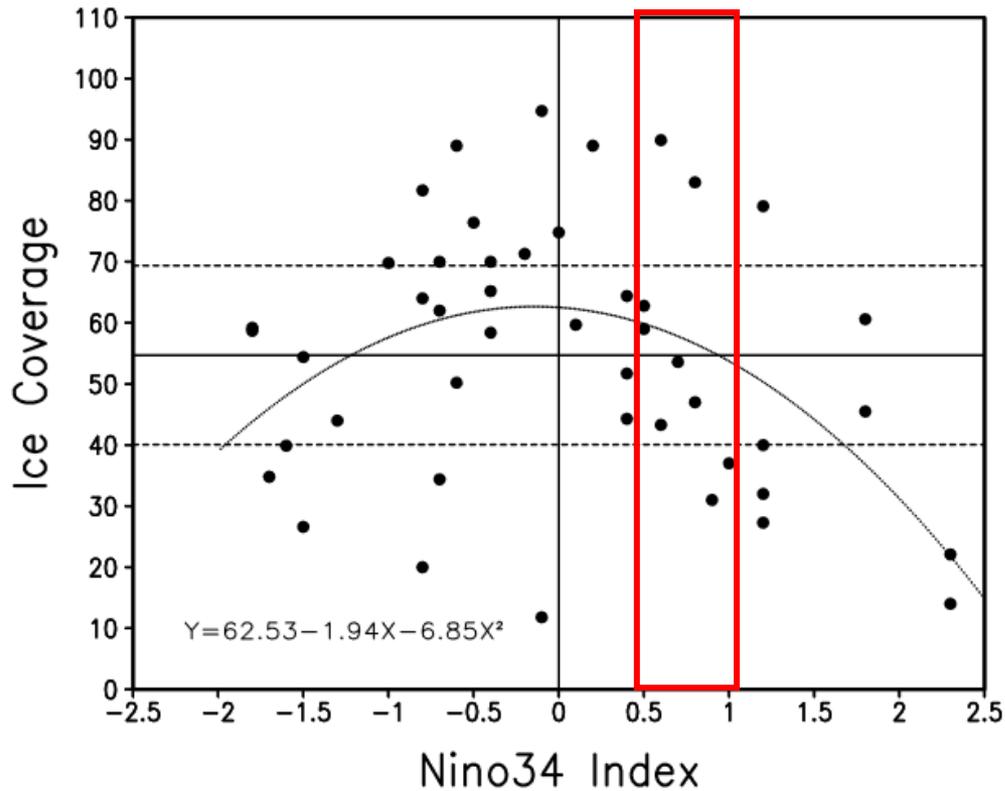
Figure 6. The plane scatter plot between ice coverage and ENSO index for the period 1963-2008.

$$Y = 62.53 - 1.94X - 6.85X^2$$

Take home is that, like temperature, Great Lakes ice cover leans low in weak El Niño events, but ***normal and high ice years can and do occur.***

https://www.glerl.noaa.gov/pubs/tech_reports/glerl-152/tm-152.pdf

Outlooks

Looking Ahead

Climate Outlooks

- 7-day precipitation forecast

- 8-14 day outlook

- December temperature and precipitation

- Winter season (DJF) temperature and precipitation
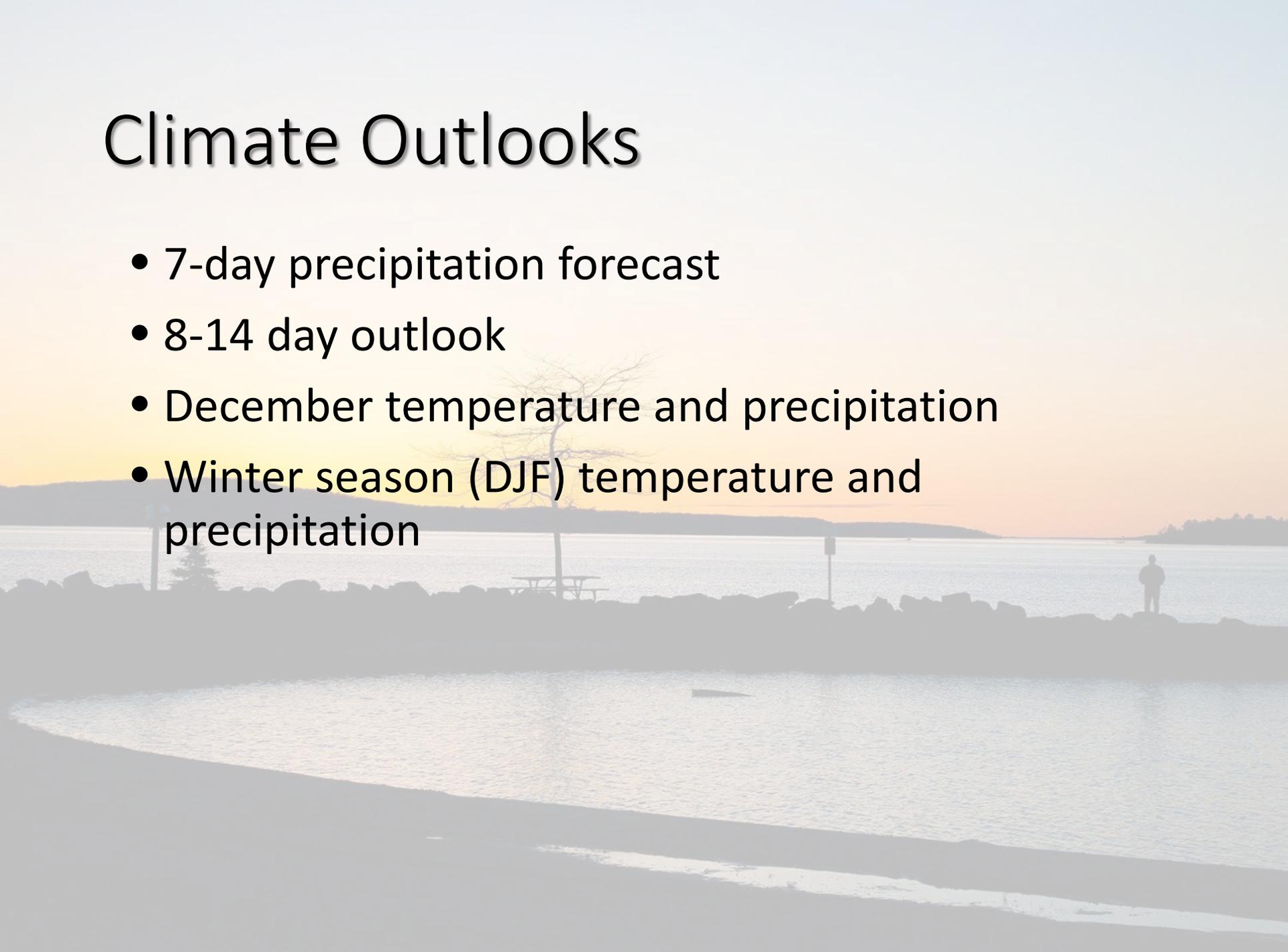
7-day Quantitative Precipitation Forecast
Valid: 15 Nov – 22 Nov

http://www.wpc.ncep.noaa.gov/qpf/day1-7.shtml
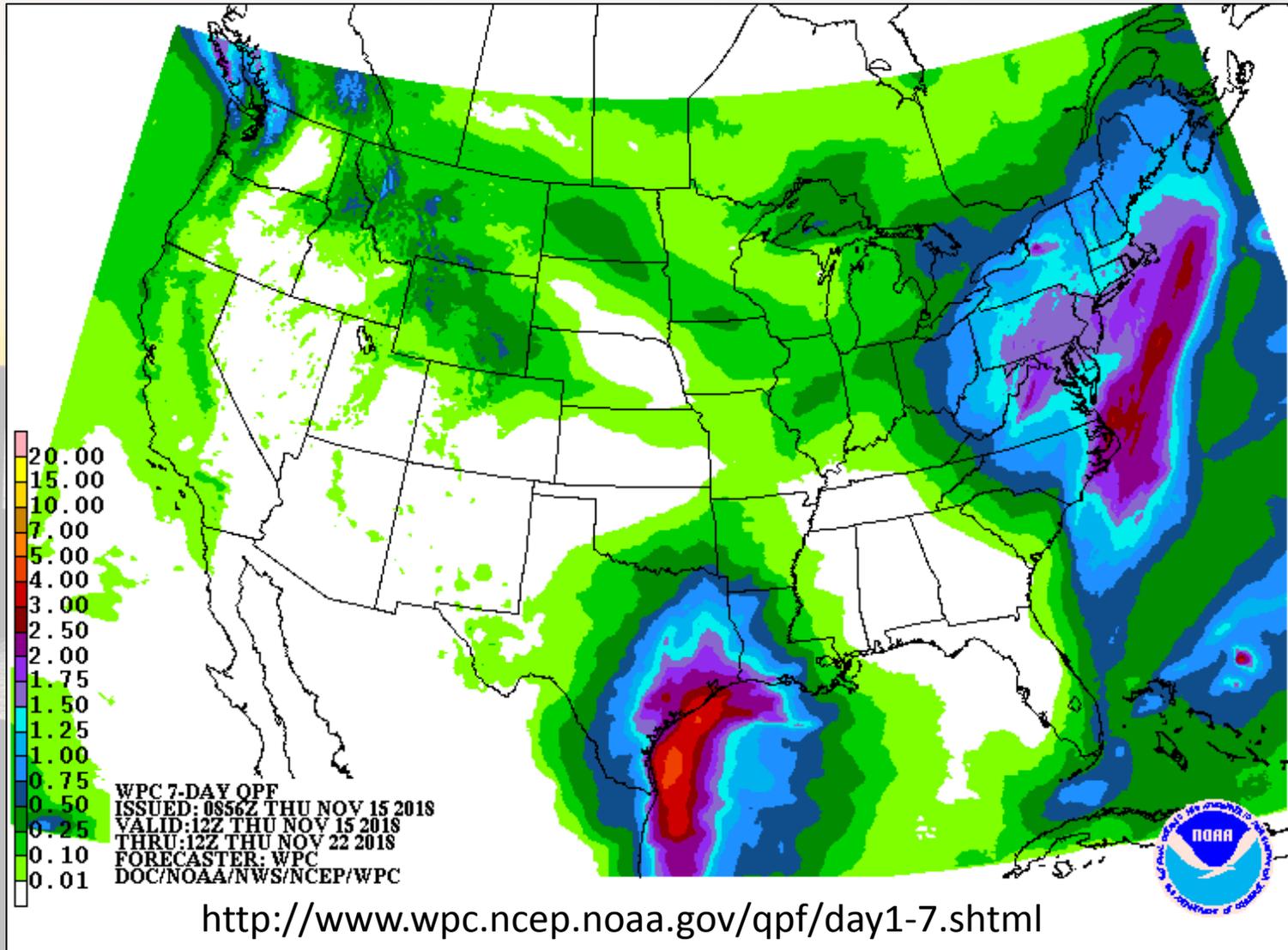
8-14 Day Outlook

Temperature

Precipitation

http://www.cpc.ncep.noaa.gov/products/predictions/814day/index.php
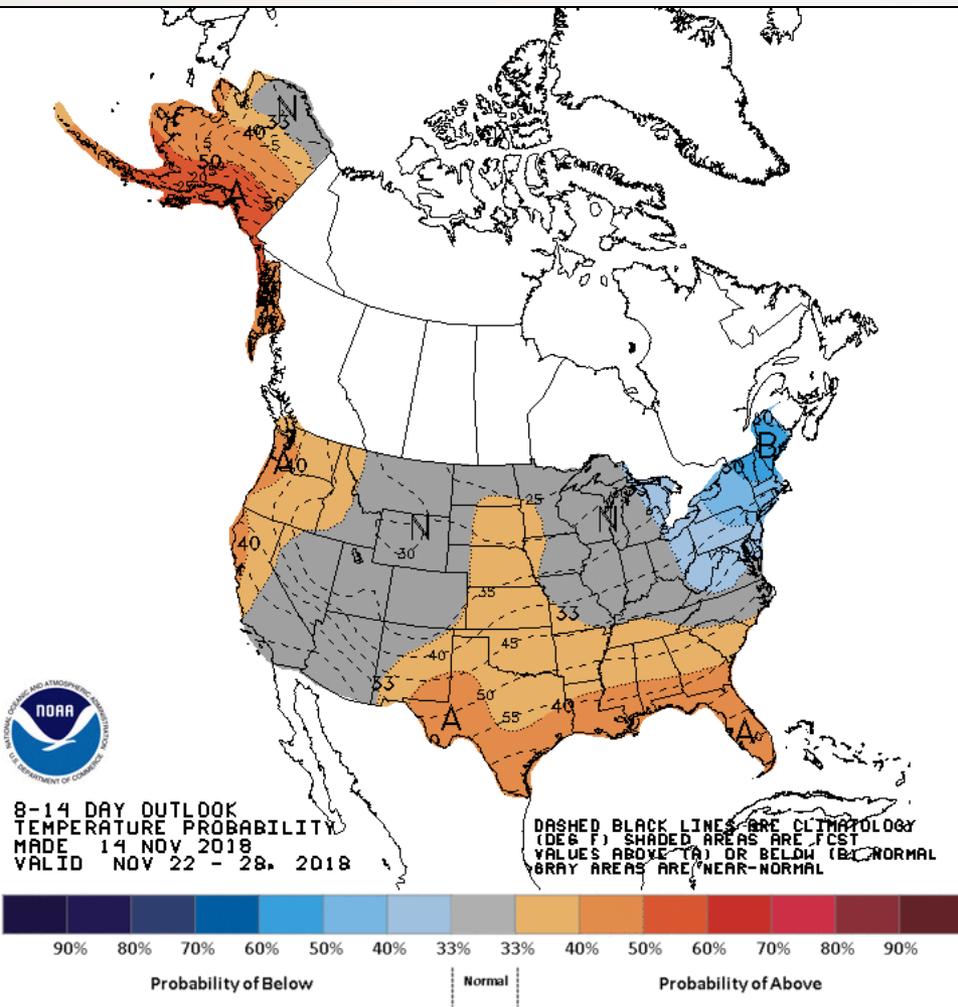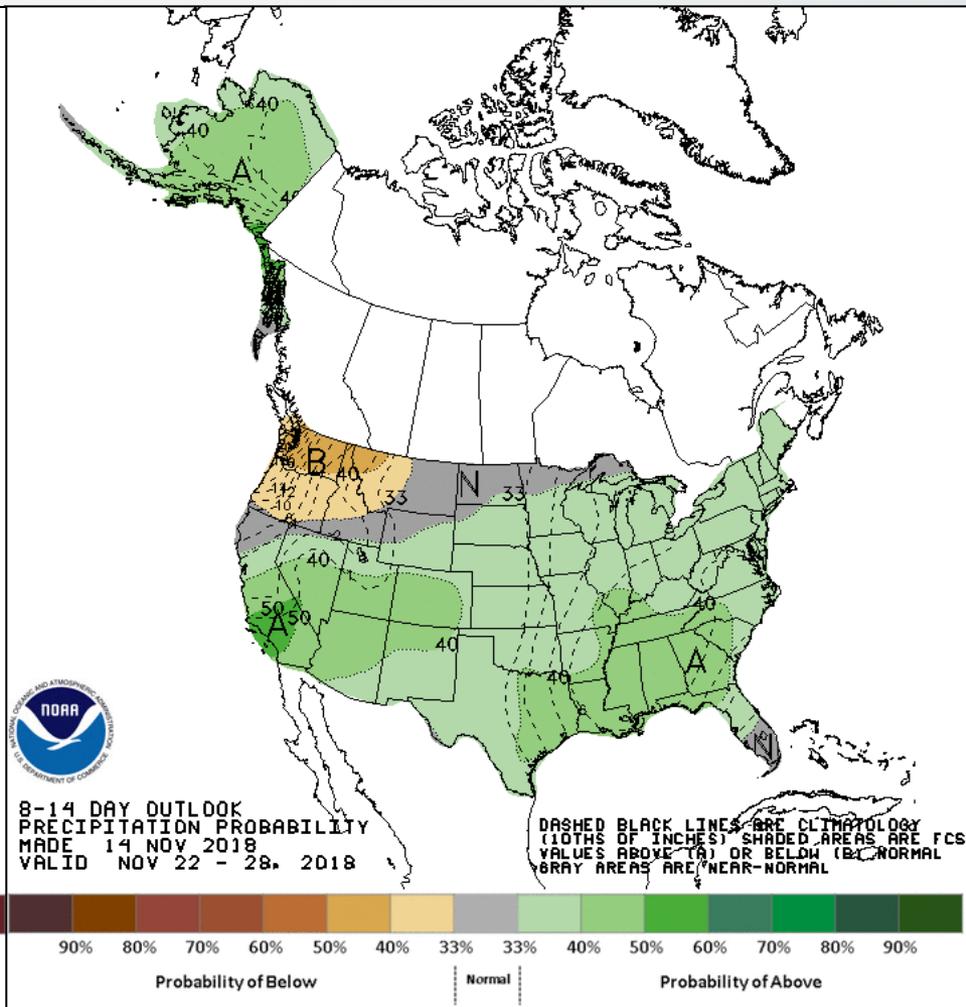
December Temperature and Precipitation Outlooks

Temperature

Precipitation

http://www.cpc.ncep.noaa.gov/products/predictions/30day/
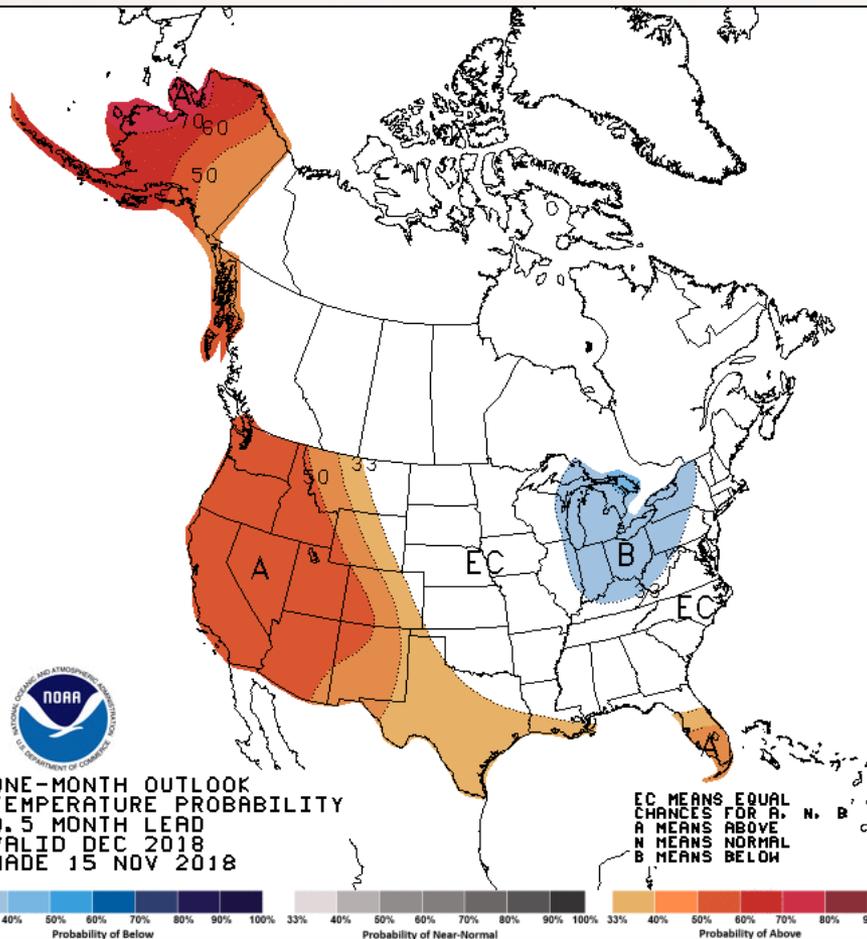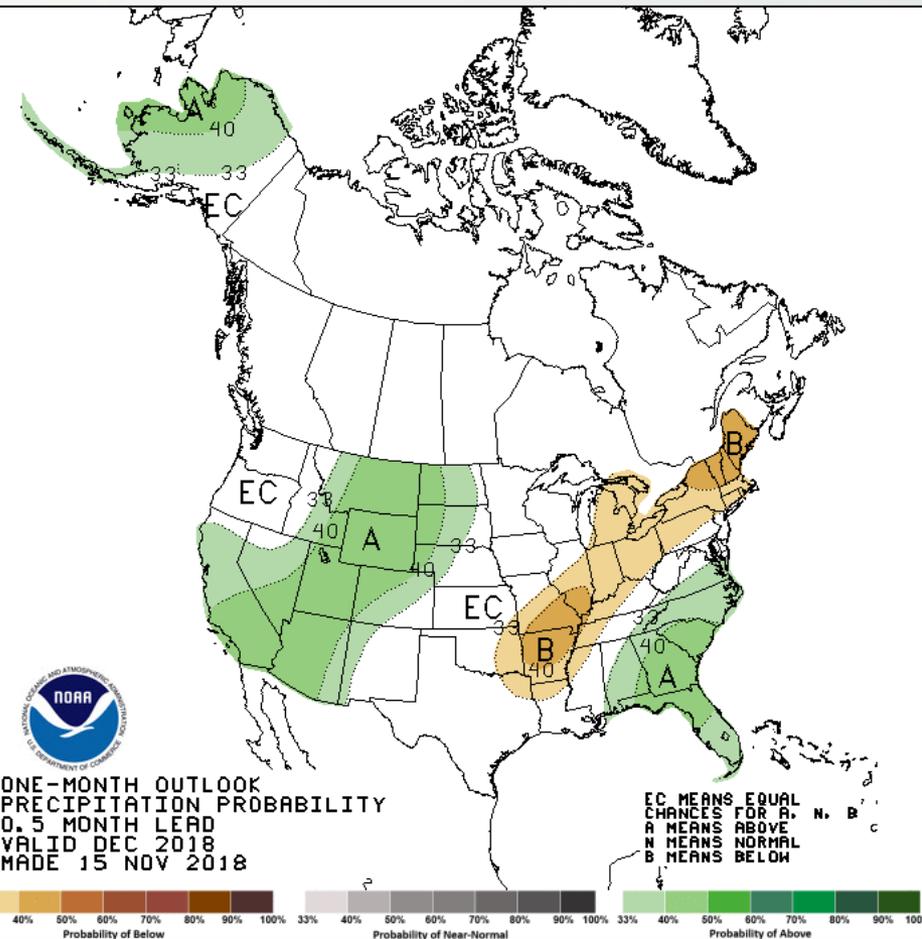
3 Month Temperature and Precipitation Outlooks, Dec-Feb

Temperature

Precipitation

http://www.cpc.ncep.noaa.gov/products/predictions/long_range/seasonal.php?lead=2
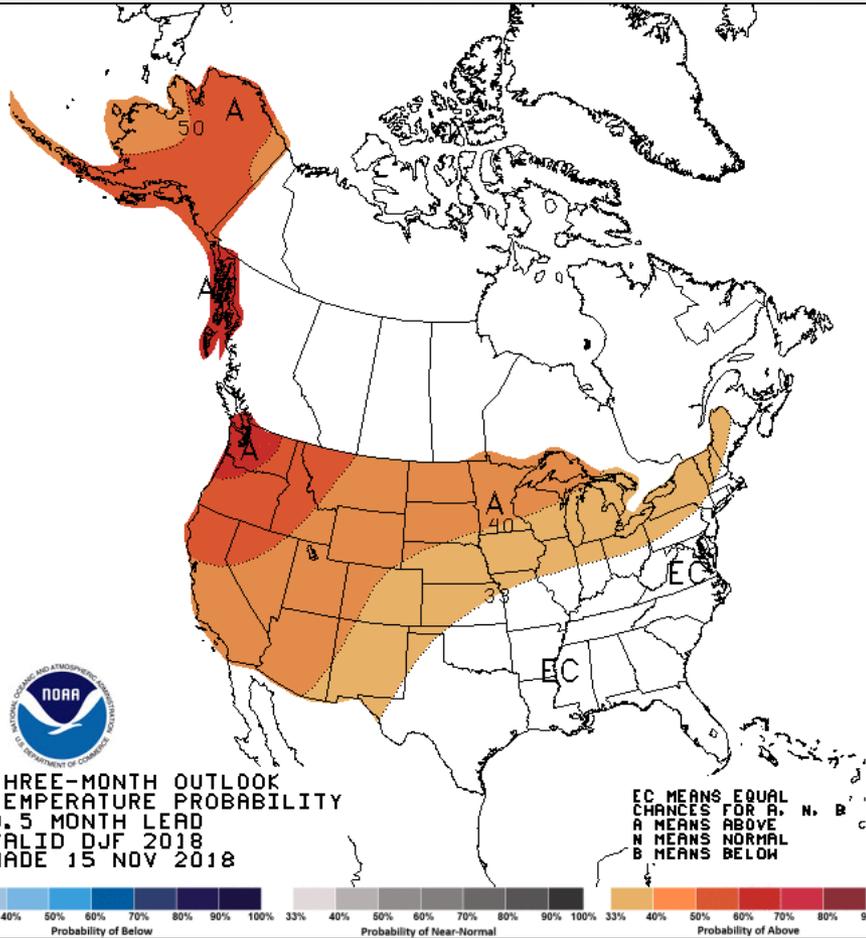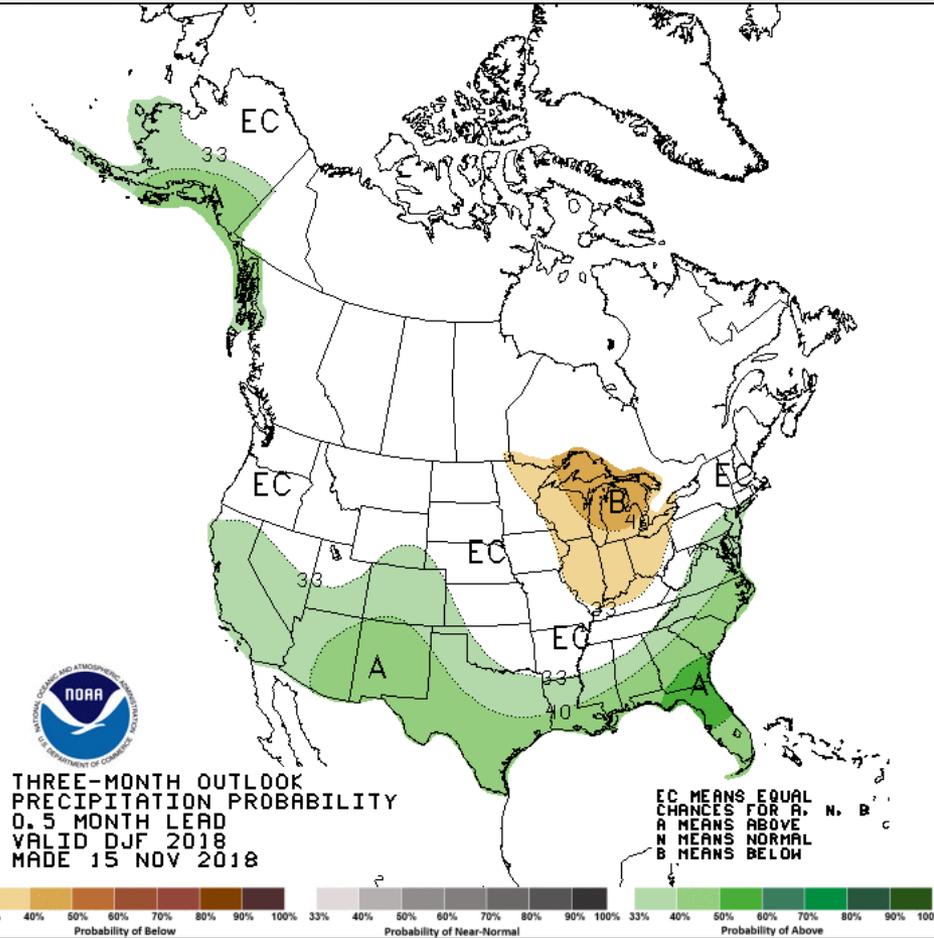
Seasonal Drought Outlook

Summary - Outlooks

- El Niño Watch:
  - Weak El Niño generally favors higher probabilities for warmer temperatures in western portions of the region; near normal in central to slightly cooler in east.
  - "Warmer does not mean warm"
- December: Equal Chances for Above/Below average temperatures in much of region, leaning warmer in far west, cooler in Great Lakes. Drier in central/east, wetter in southwest.
- Winter: Leaning warmer in north and west, drier in Great Lakes; wetter over Colorado/SE Wyoming.

Further Information - Partners

- **Today's and Past Recorded Presentations:**

- http://mrcc.isws.illinois.edu/webinars.htm
  http://www.hprcc.unl.edu

- NOAA's National Centers for Environmental Information: 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

  - https://mrcc.illinois.edu

  - http://www.hprcc.unl.edu

Thank You and Questions?

- Questions:
  - **Climate:**
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