USDA Midwest Climate Hub
U.S. DEPARTMENT OF AGRICULTURE

North Central US Climate-Drought Outlook
20 April 2023

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515-294-2013

USDA United States Department of Agriculture
Midwest Climate Hub

General Information

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

- **Next Regular Climate/Drought Outlook Webinar**
  - May 18, 2022 (1 PM CDT) Justin Glisan – State Climatologist for Iowa (Iowa Department of Agriculture and Land Stewardship)

- **Access to Future Climate Webinars and Information**
- http://www.drought.gov/drought/content/regional-programs/regional-drought-webinars
  - https://mrcc.purdue.edu/multimedia/webinars.jsp
  - https://hprcc.unl.edu/webinars.php
- **Open for questions at the end (enter them along the way).**

Agenda

- **Current Conditions**
- **Impacts**
  - **Issues/Events**
  - **Hydro**
  - **Ag (freeze, planting)**
  - **Fire**
  - **Other**
- **Outlooks**
  - **La Niña ends – El Niño ahead?**
  - **Summer**

Photo:
Melissa Widhalm, MRCC
West Lafayette, IN
April 2023

Photo:
Brett Heitshusen _ NWS-MT
April 2023

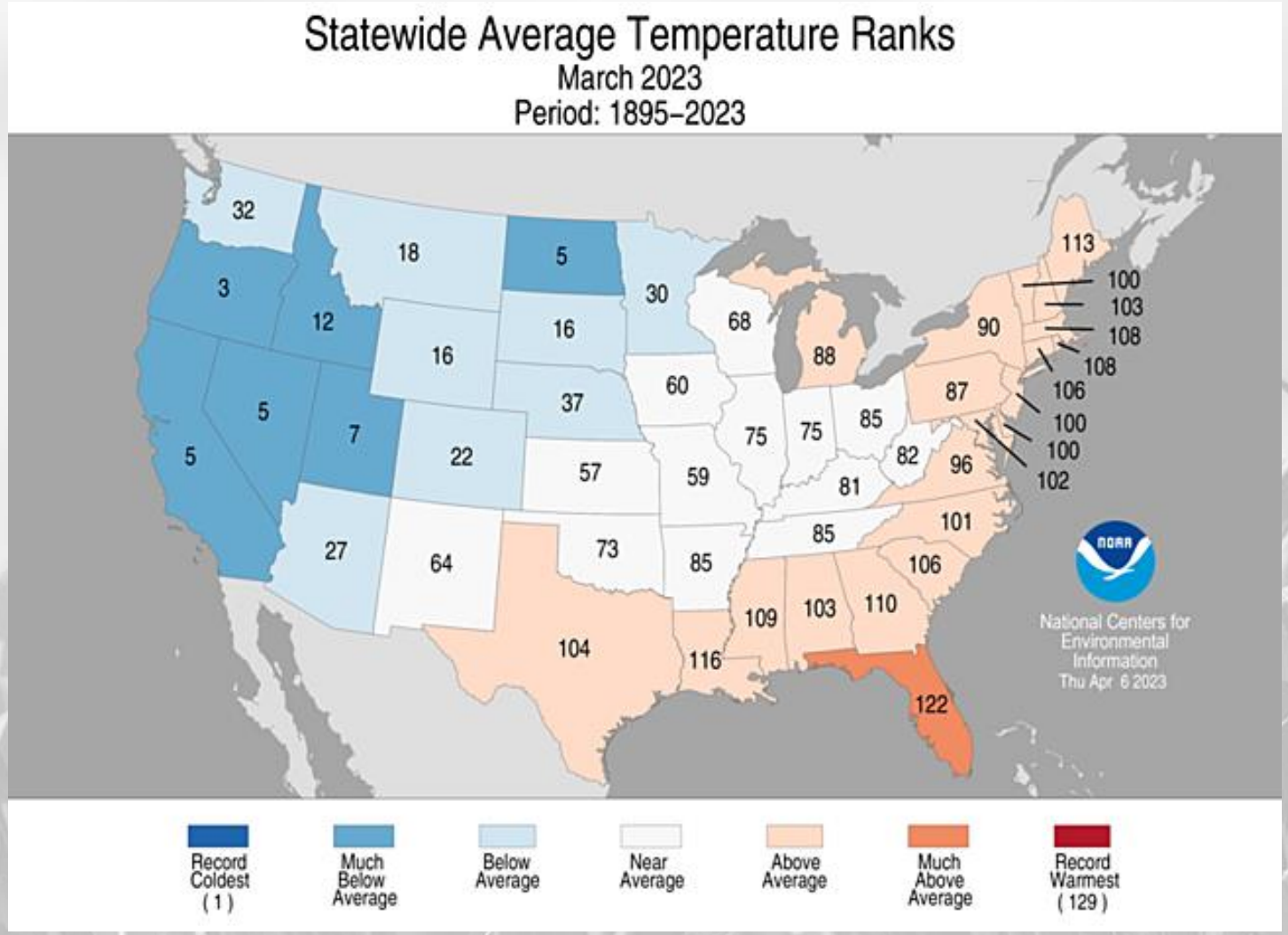
REVIEW/CURRENT CONDITIONS

Photo:
Brenda Toft, USDA-FSA
Lincoln County, CO
April 2023

March Temperature Recap

Continuation of general winter pattern: warm south/east, cooler north/west.

North Dakota top 5 coldest (partially snow cover)

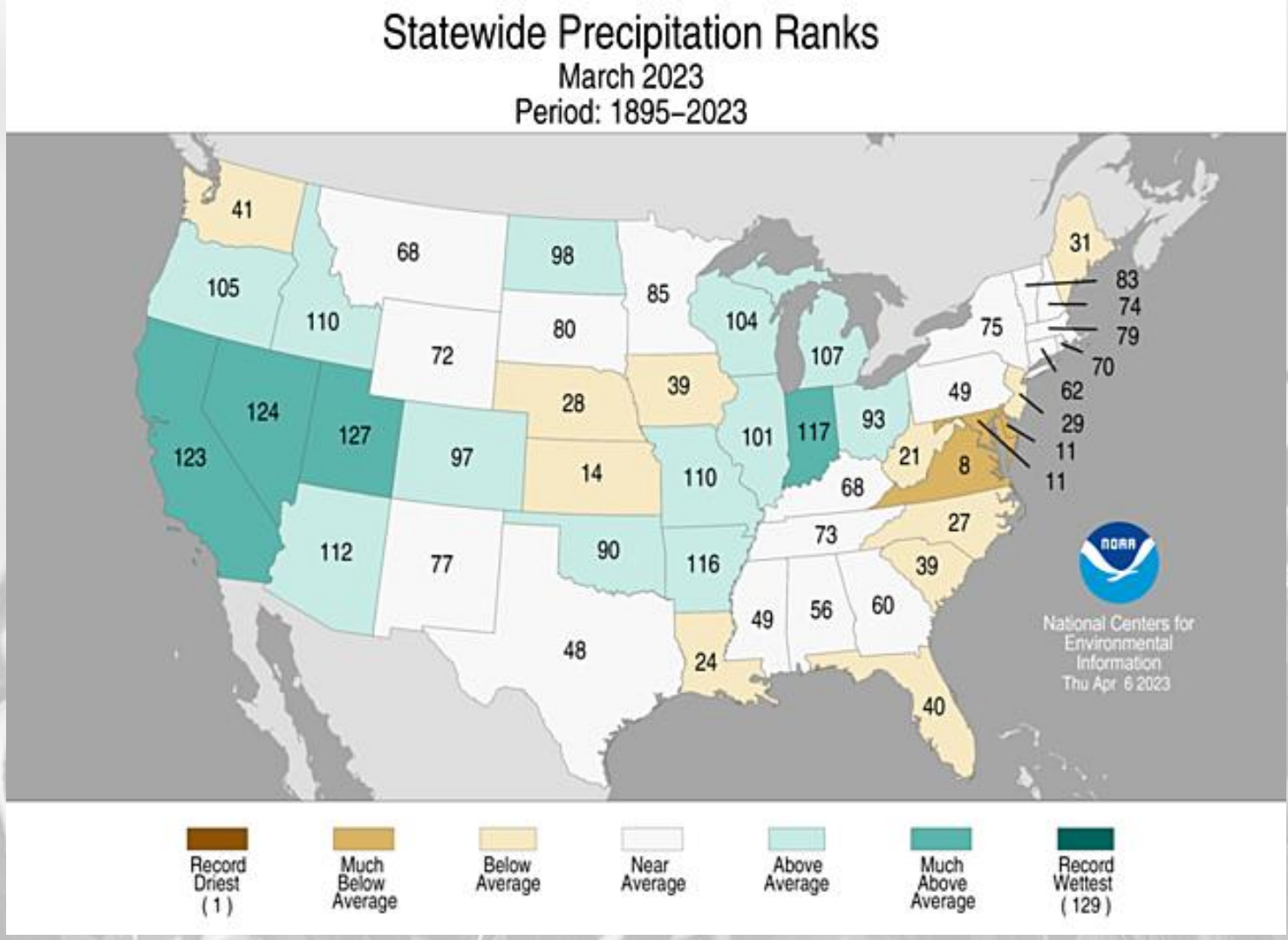


http://www.ncdc.noaa.gov/temp-and-precip/us-maps/

March Precipitation Recap

Wet eastern Corn Belt. Dry central Plains.

No top 10 categories.

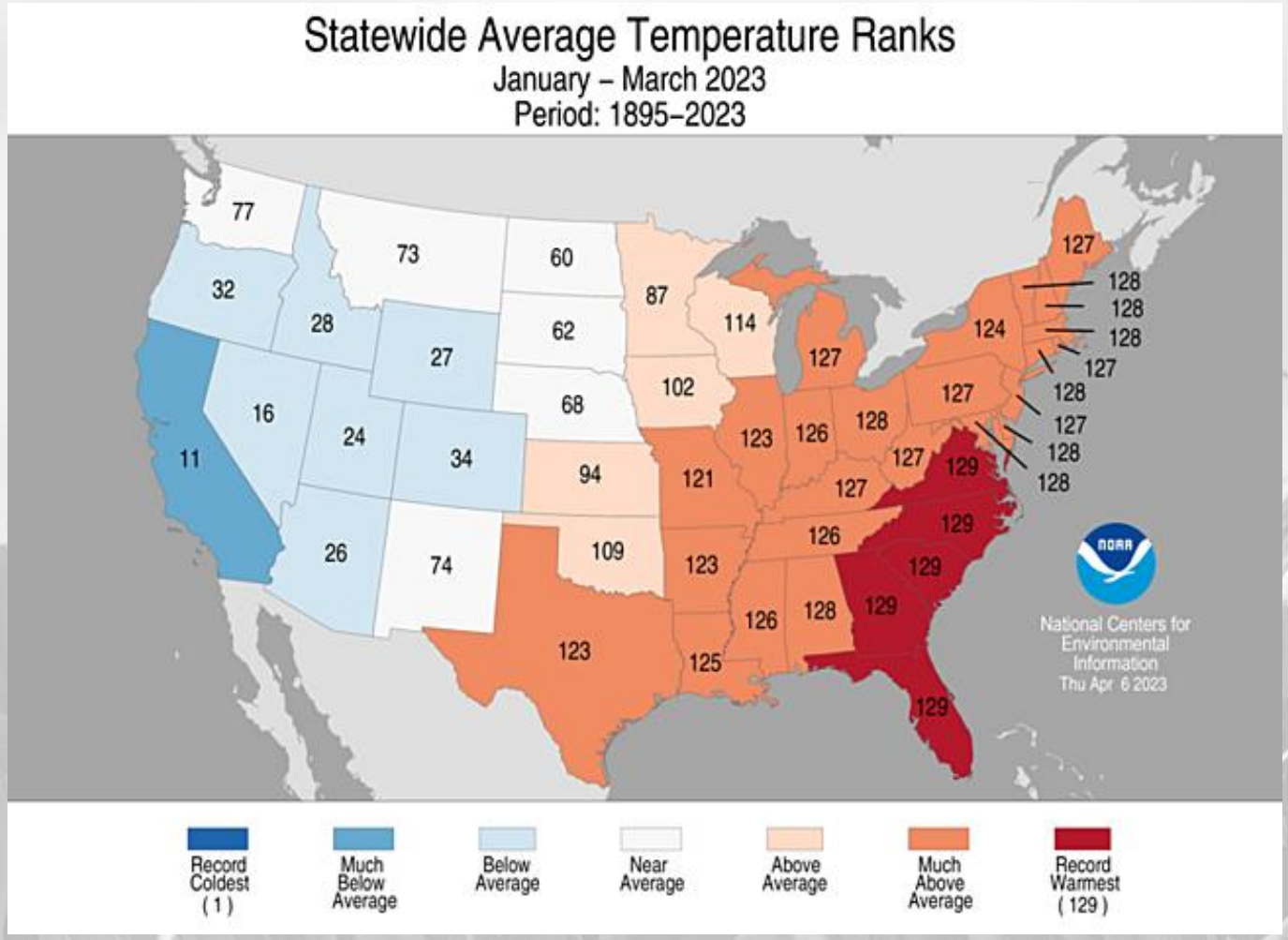


http://www.ncdc.noaa.gov/temp-and-precip/us-maps/

January-March Temperature Recap

Similar temperature pattern much of the winter. Warm east/cold west. Closer to average Plains.

Top 10 warmest MO to MI/OH.

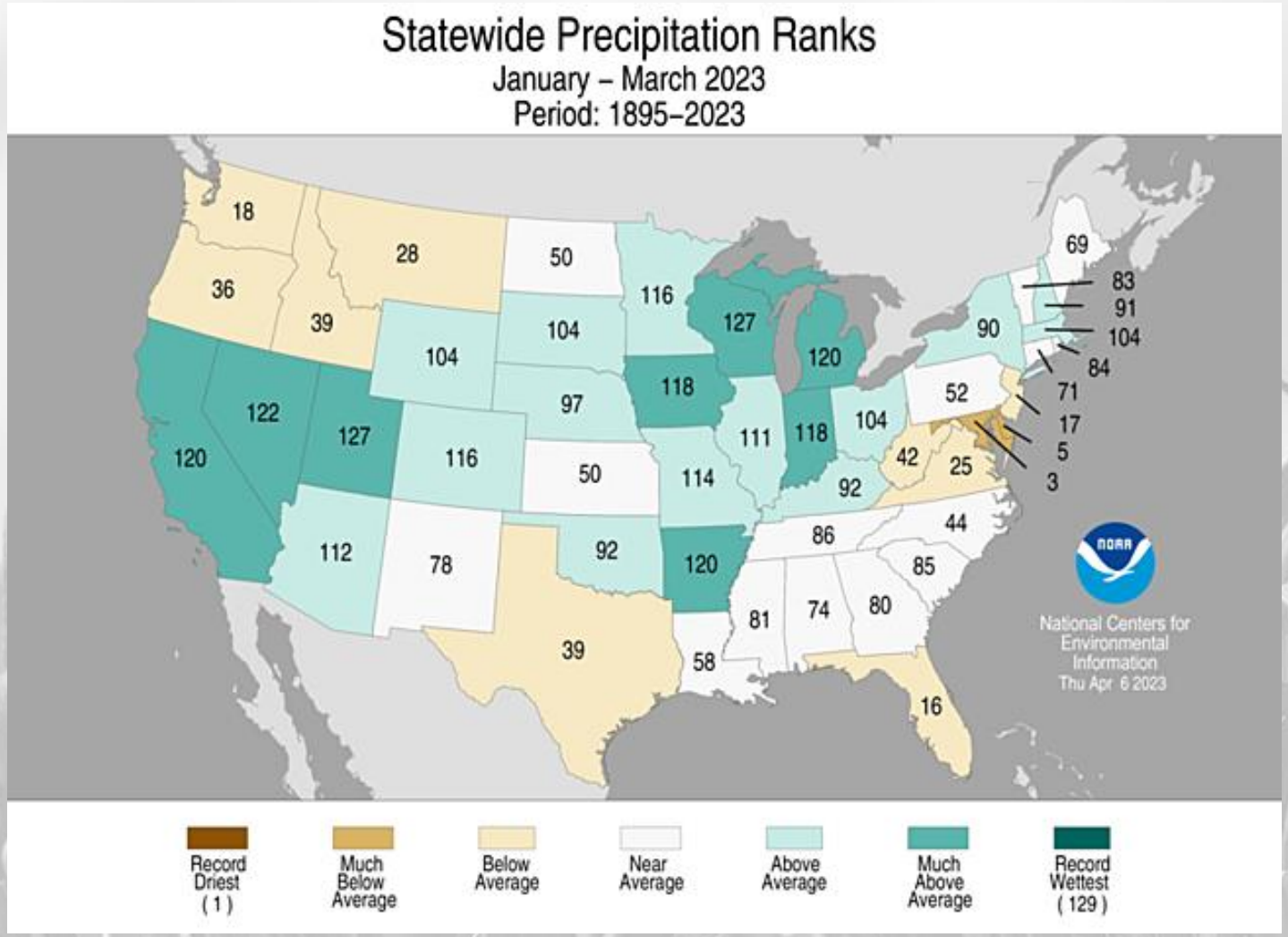


http://www.ncdc.noaa.gov/temp-and-precip/us-maps/

January-March Precipitation Recap

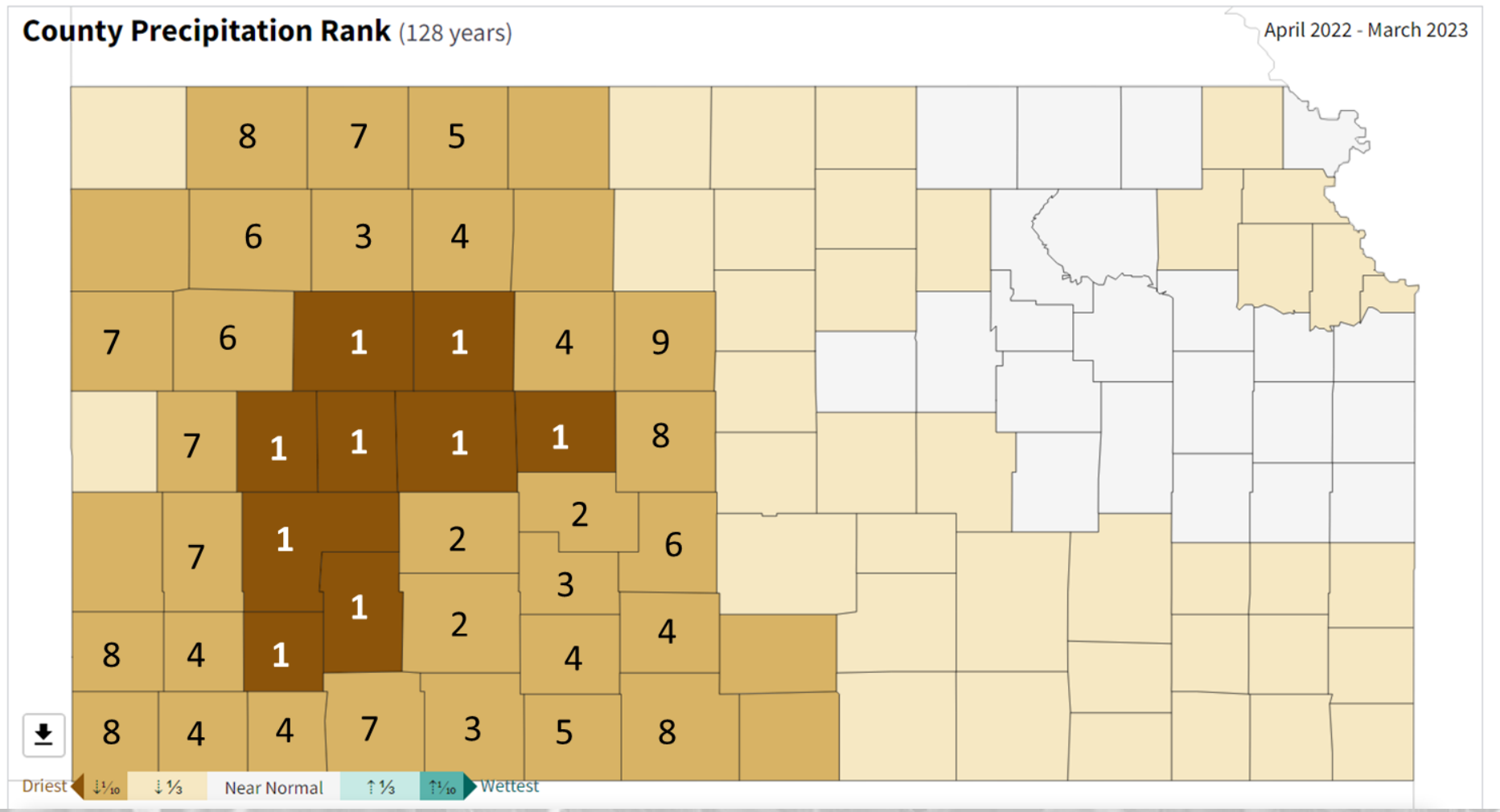
Clear path on precipitation from California across central US.

Top 10 wettest WI/MI.



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

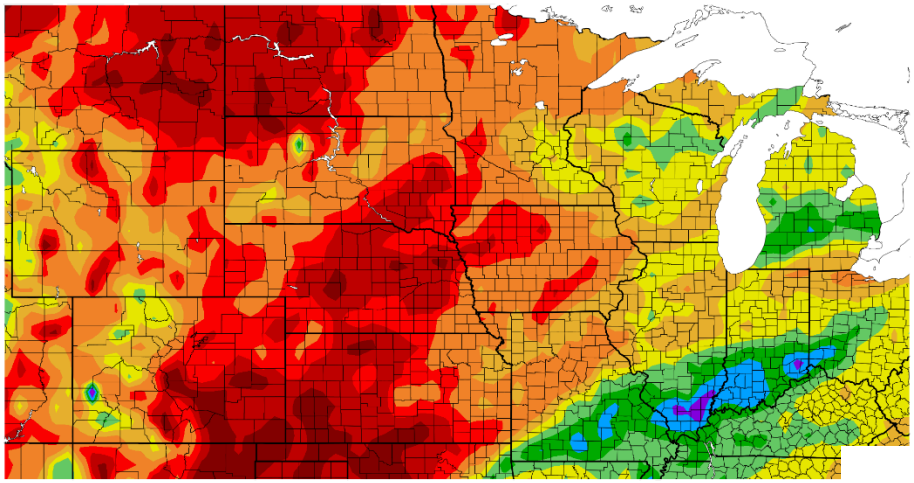
April 22-March 23 Precipitation Recap

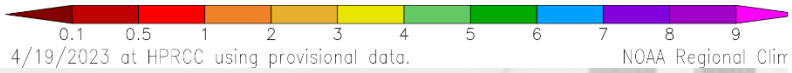


Courtesy Matt Sittel – KS Climate Office

Last 30 days Precipitation

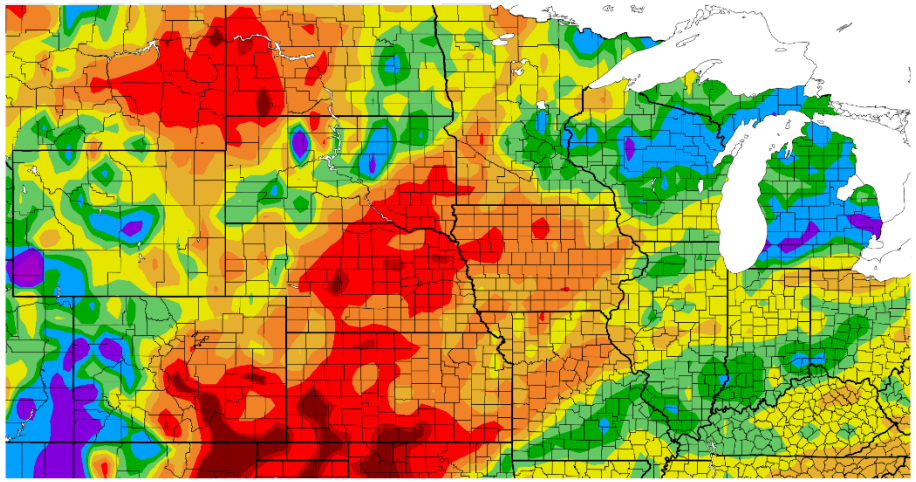
Precipitation (in)
3/20/2023 – 4/18/2023





Generated 4/19/2023 at HPRCC using provisional data. NOAA Regional Clim

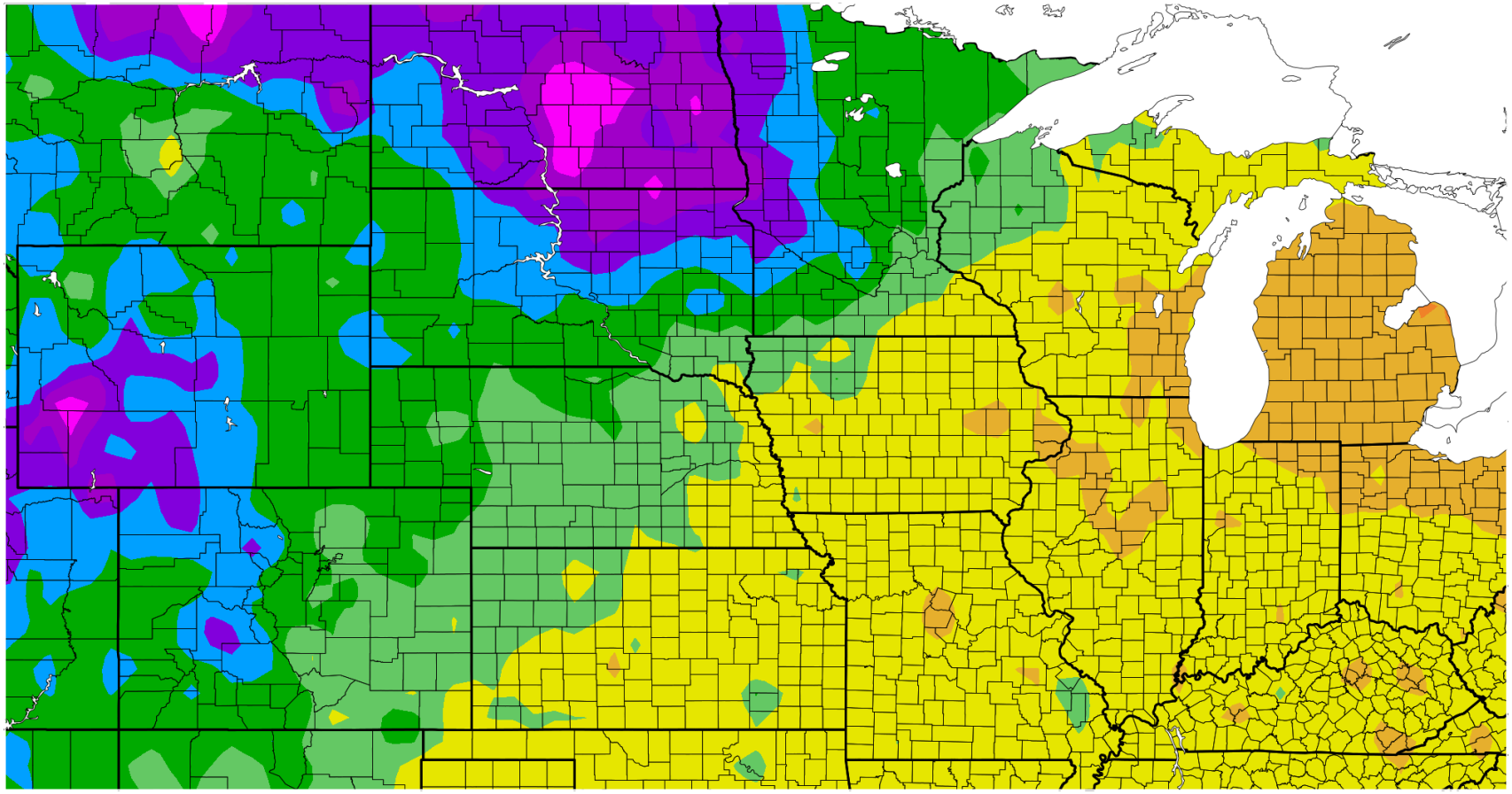
Percent of Normal Precipitation (%)
3/20/2023 – 4/18/2023



Generated 4/19/2023 at HPRCC using provisional data. NOAA Regional Climate Centers

- Large area of dry in Plains with pockets of wet.
- Wetter around Great Lakes.
- Good for spring planting – not good for drought recovery.

Departure from Normal Temperature (F)
3/20/2023 - 4/18/2023



−15 −12 −9 −6 −3 0 3 6 9 12 15

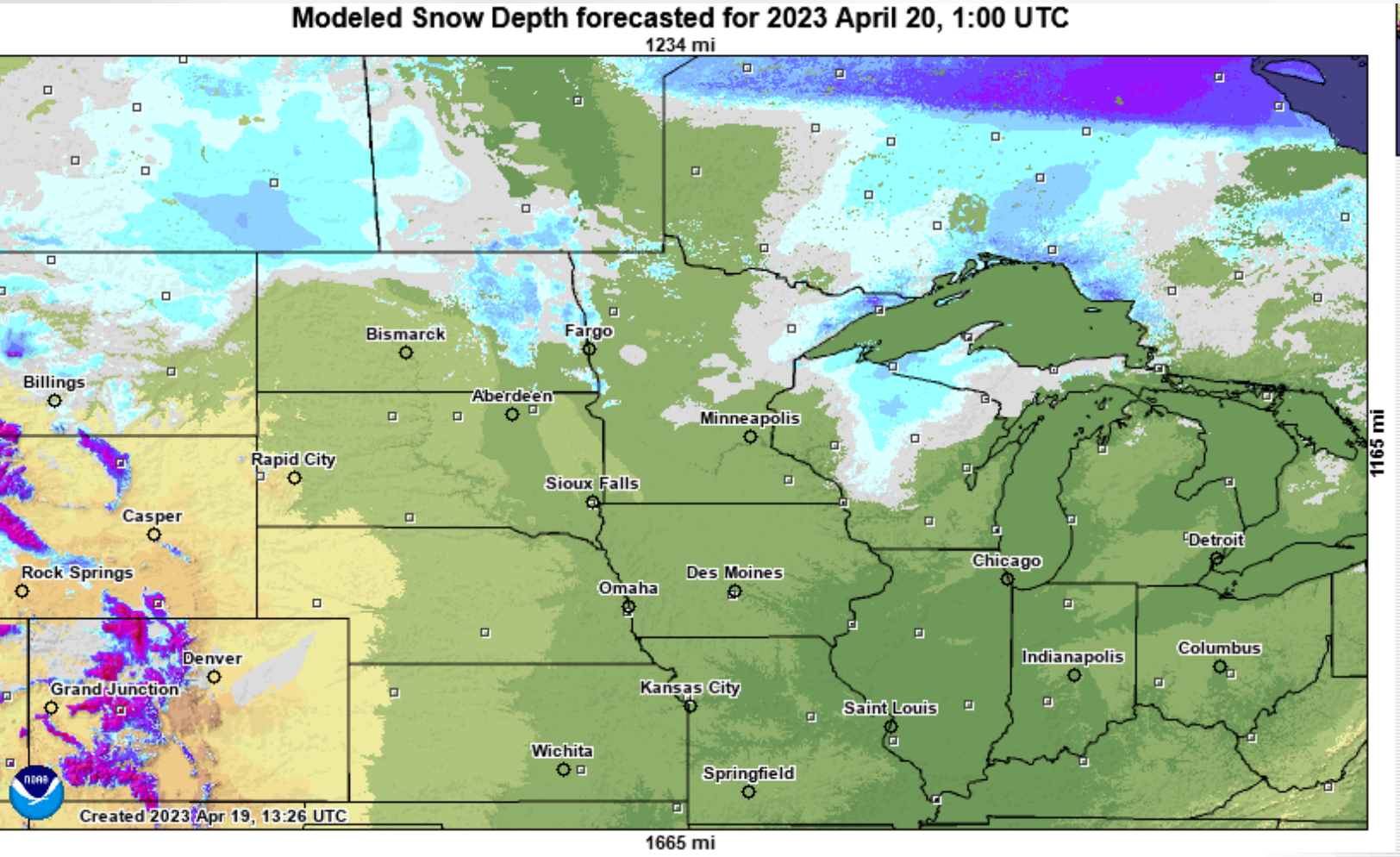
Generated 4/19/2023 at HPRCC using provisional data.

NOAA Regional Climate Centers

ISSUES/EVENTS

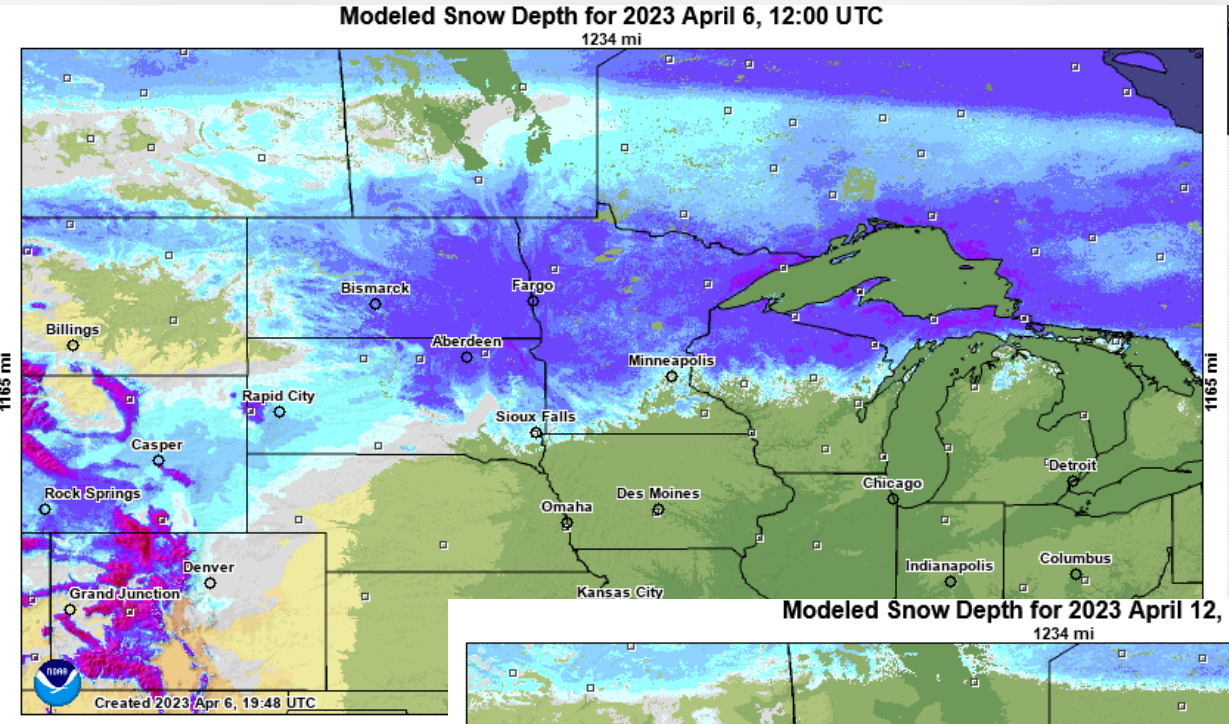
Photo:
Chip Redmond
KS Climate Office

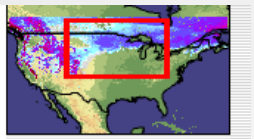
Snow on Ground

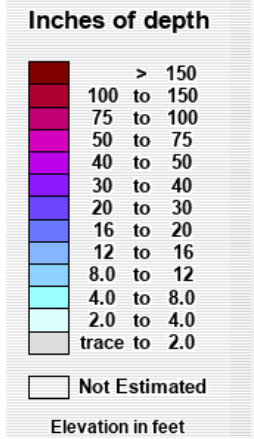


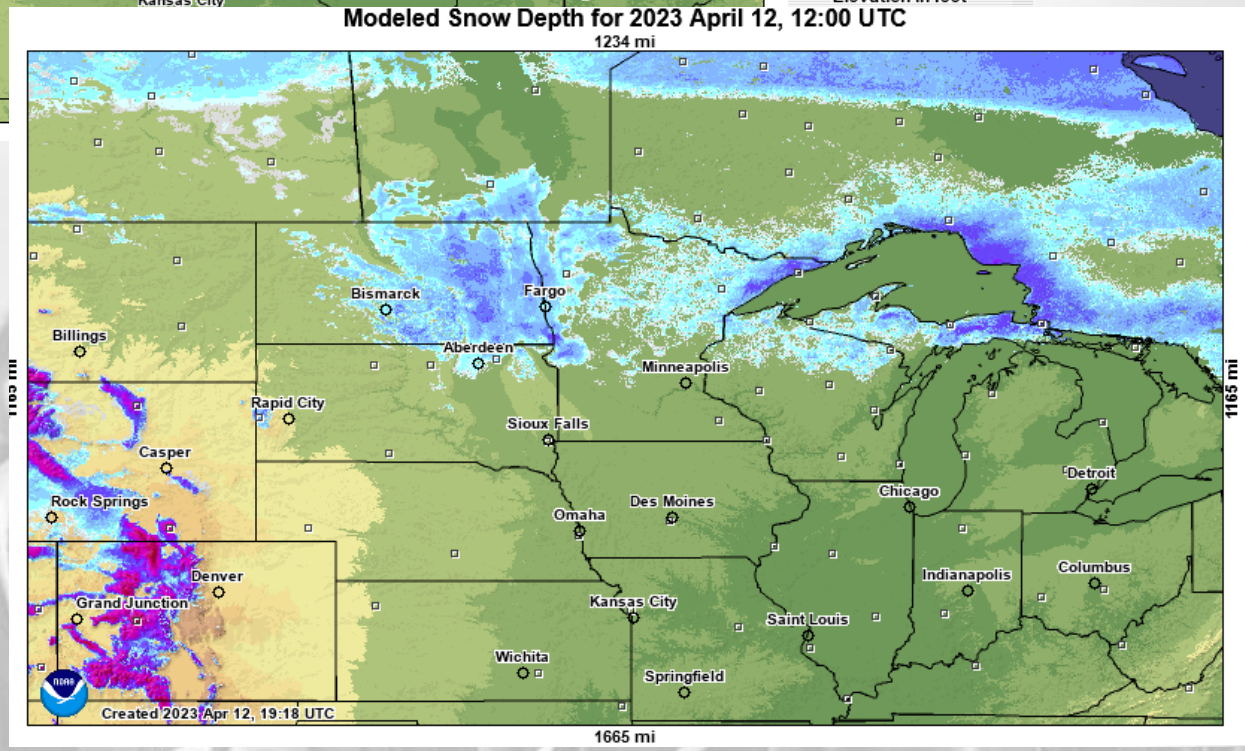
https://www.nohrsc.noaa.gov/interactive/html/map.html?

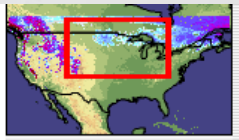
Snow Loss

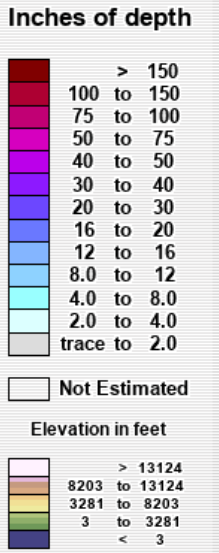






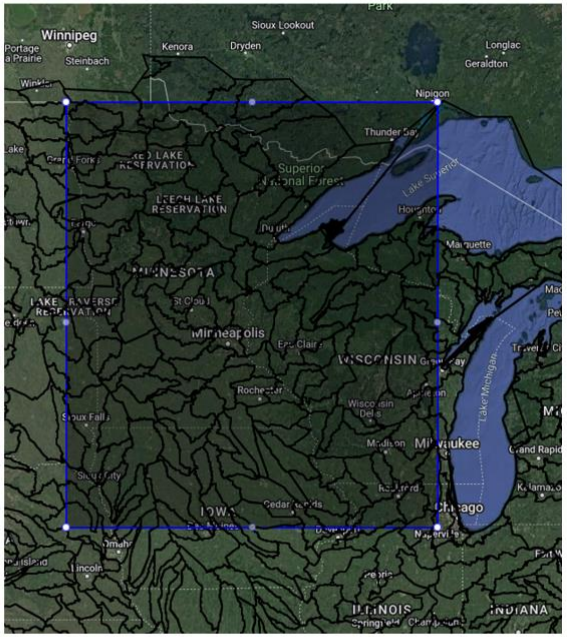


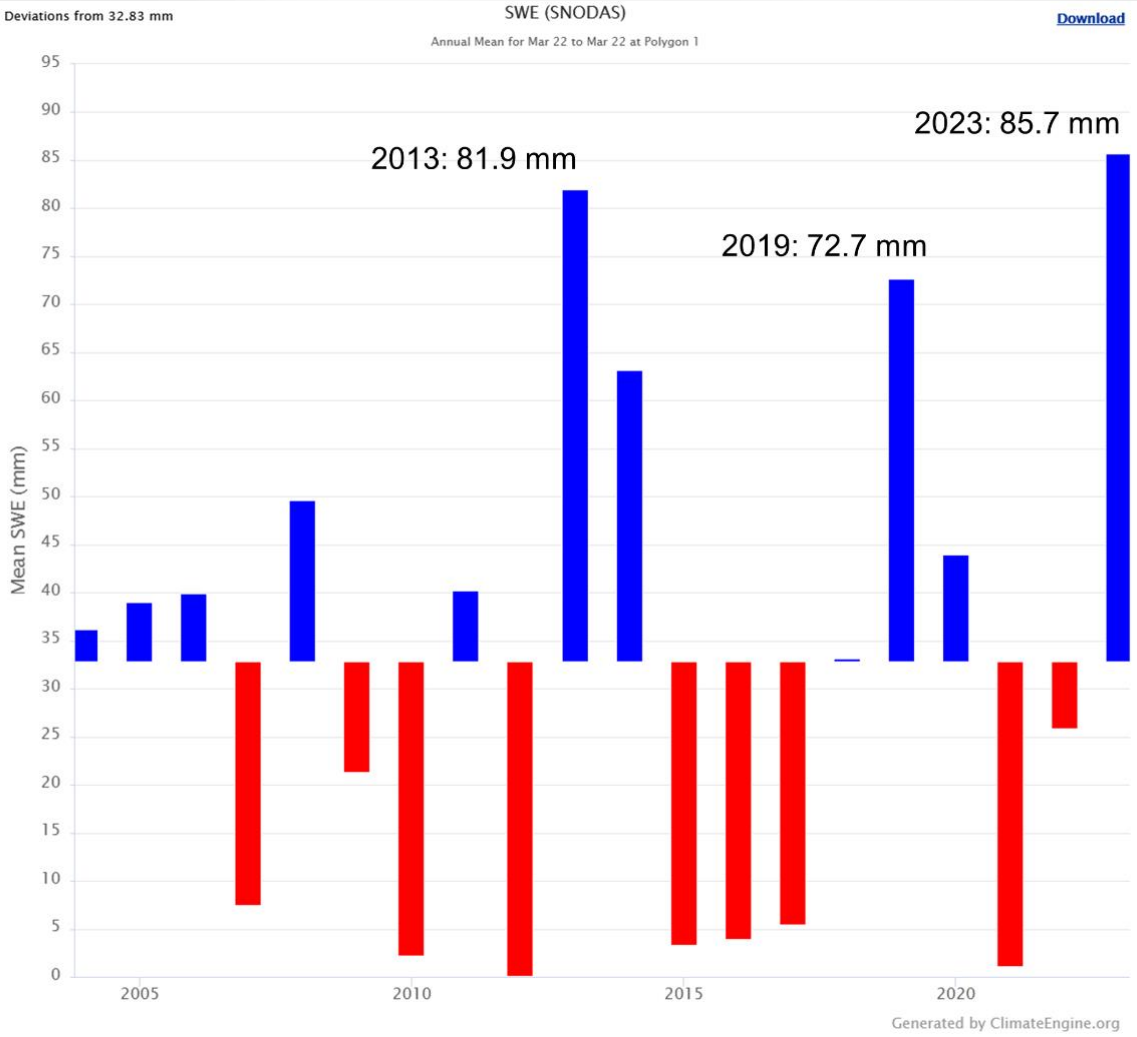




https://www.nohrsc.noaa.gov/interactive/html/map.html?

Areal Snow Amounts



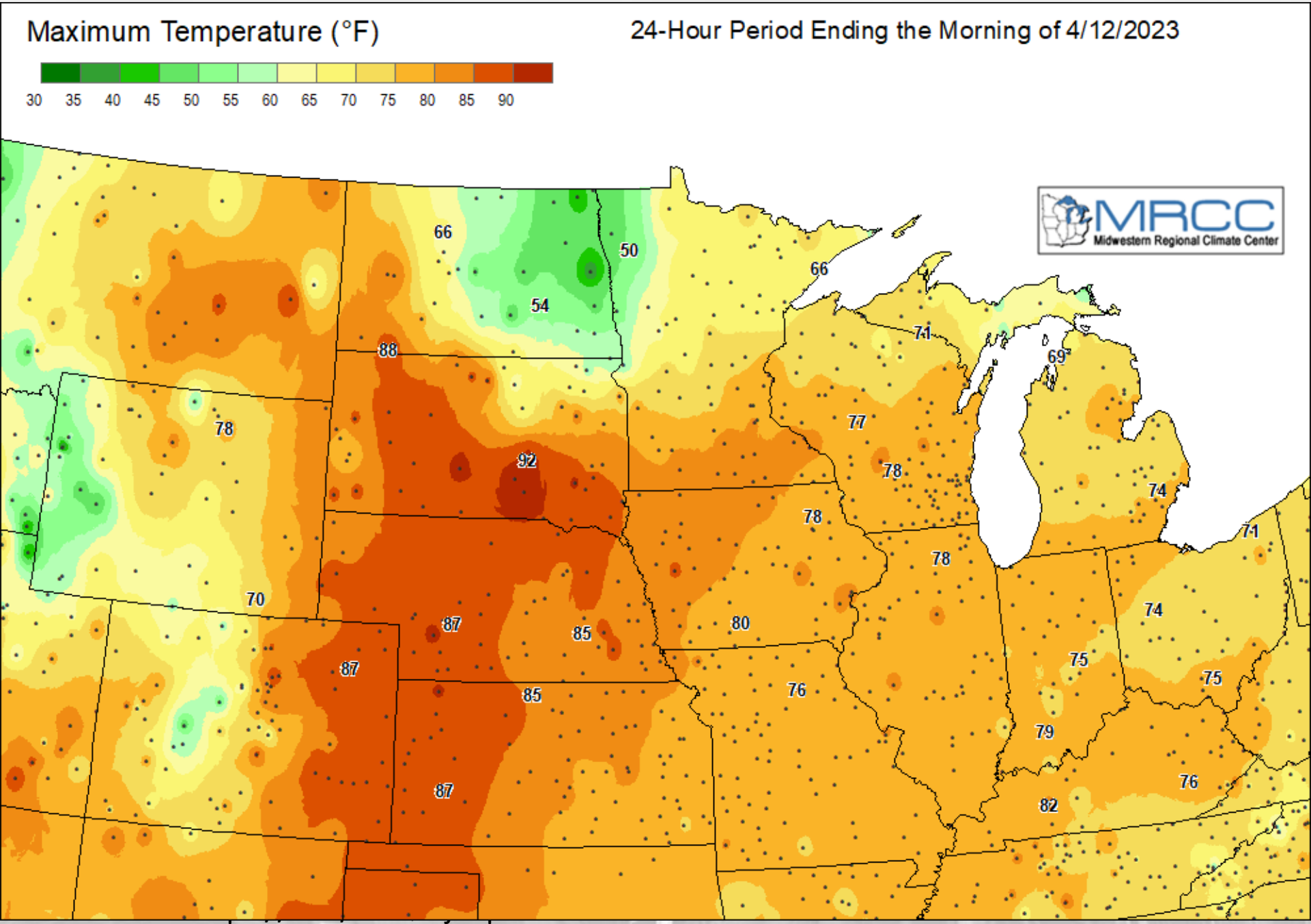


Snow Records

- Duluth – 1st 137.1 inches.
- Rhinelander, WI 1st with 119.4 inches
- Riverton, WY - 1st with 92.6 inches
- Wood, SD - 1st with 91.1 inches (previous record was 76.6 inches)
- St. Cloud, MN – 2nd with 86.6 inches
- Minneapolis, MN – 3rd with 90.3 inches
- Bismarck, ND - 3rd with 99.8 inches
- Glasgow, MT - 3rd with 64.8 inches
- Casper, WY - 3rd with 134.2 inches
- Winner, SD - 3rd with 80.0 inches

Snow Impacts

- Increased stress/death pronghorn-mule deer in Wyoming (also pneumonia)
- Stress on cattle Plains prolonged winter
  - Increased feed needs from snow/cold
  - Young livestock stress cold during calving (losses seem significant)
  - Cattle issues mud, breaking legs stuck in mud.
- Flooding/runoff (will discuss more)


Maximum Temperature (°F)
30 35 40 45 50 55 60 65 70 75 80 85 90
24-Hour Period Ending the Morning of 4/12/2023
MRCC
Midwestern Regional Climate Center
66
50
54
66
88
71
69
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92
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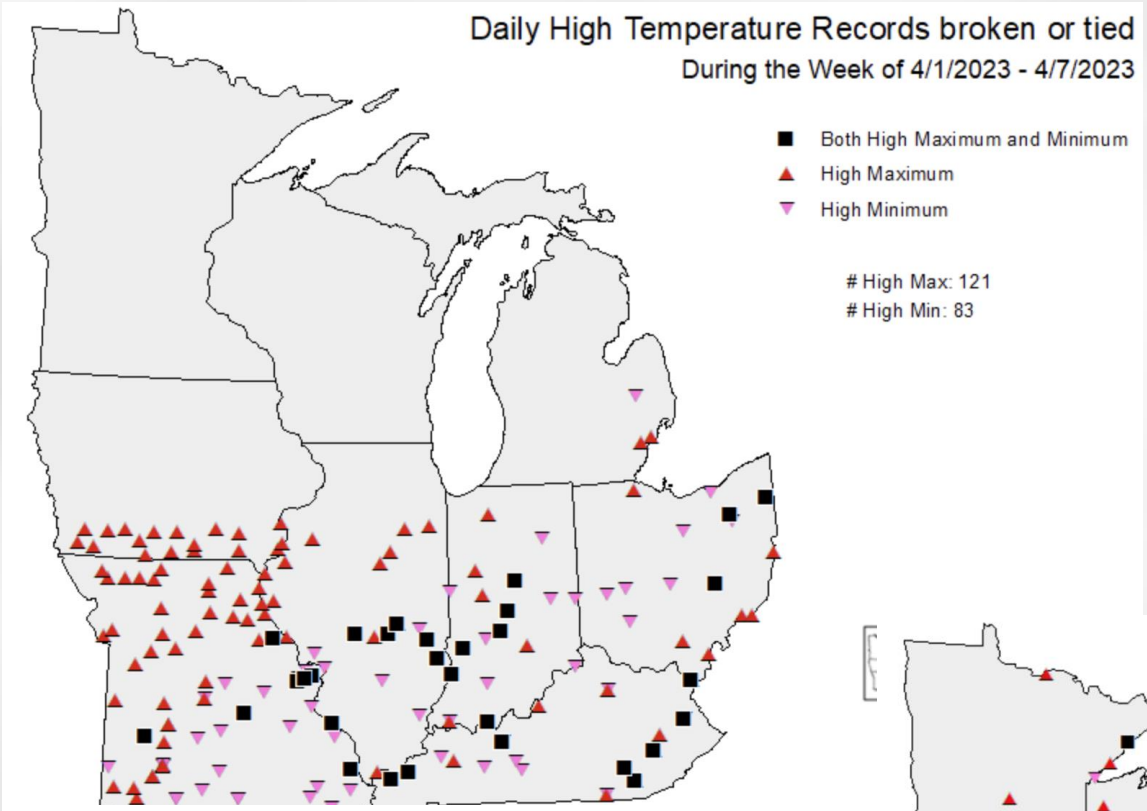
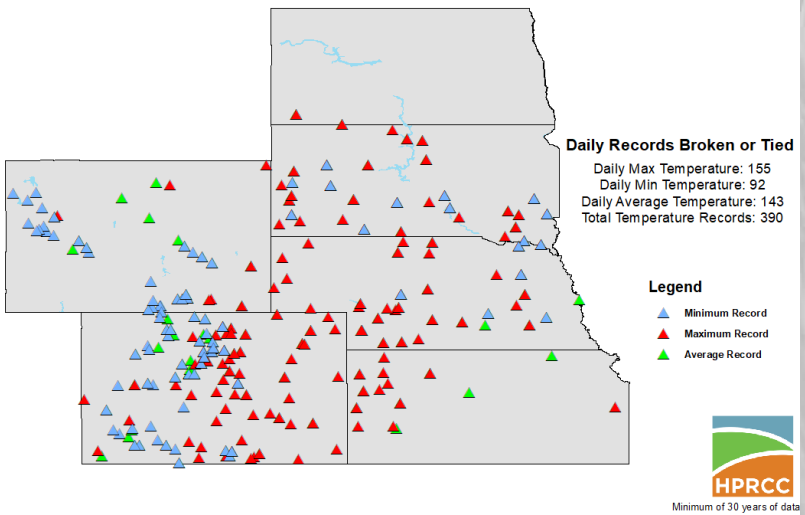
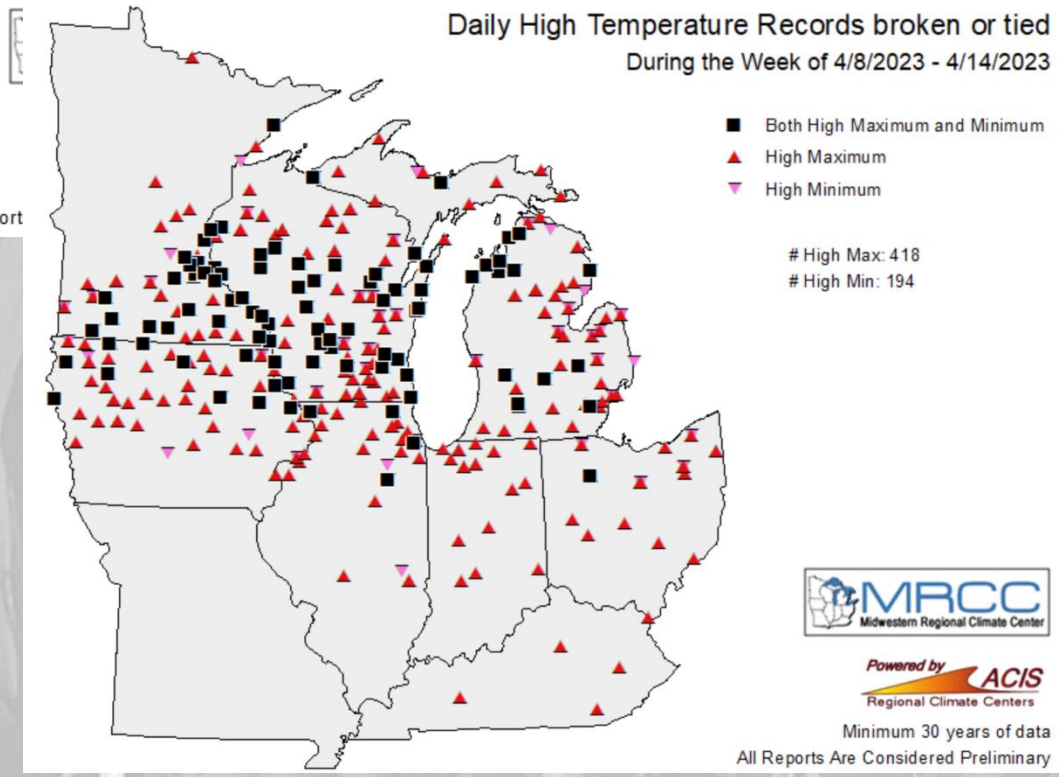
Temperature Records



April 12th High Temperature Records Broken or Tied





Dry Air/Evaporation/ET

- Dry air leading to high evaporation/ET rates – daily losses almost summer-like
- Ex: Champaign, IL soils lost 1” water in a week early April

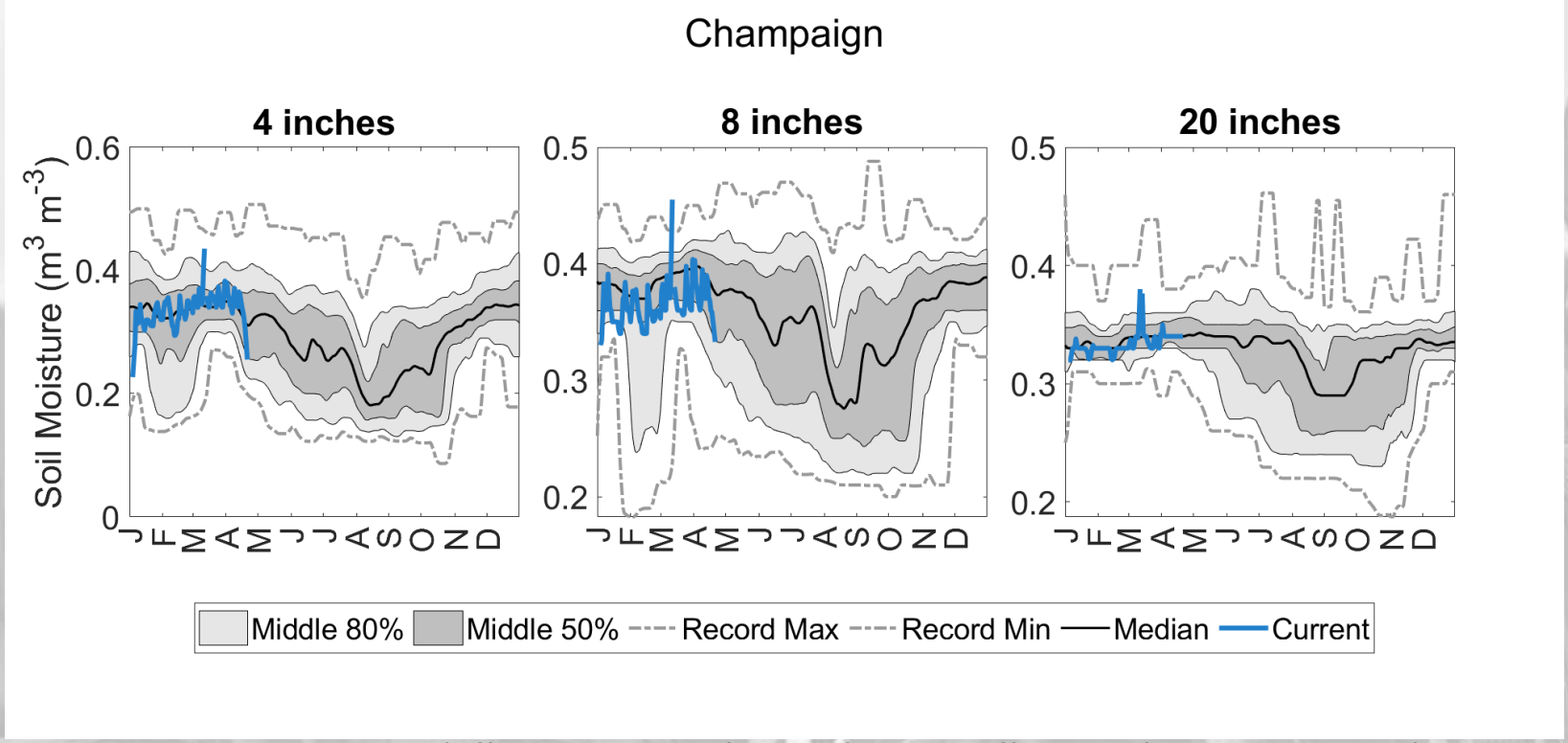
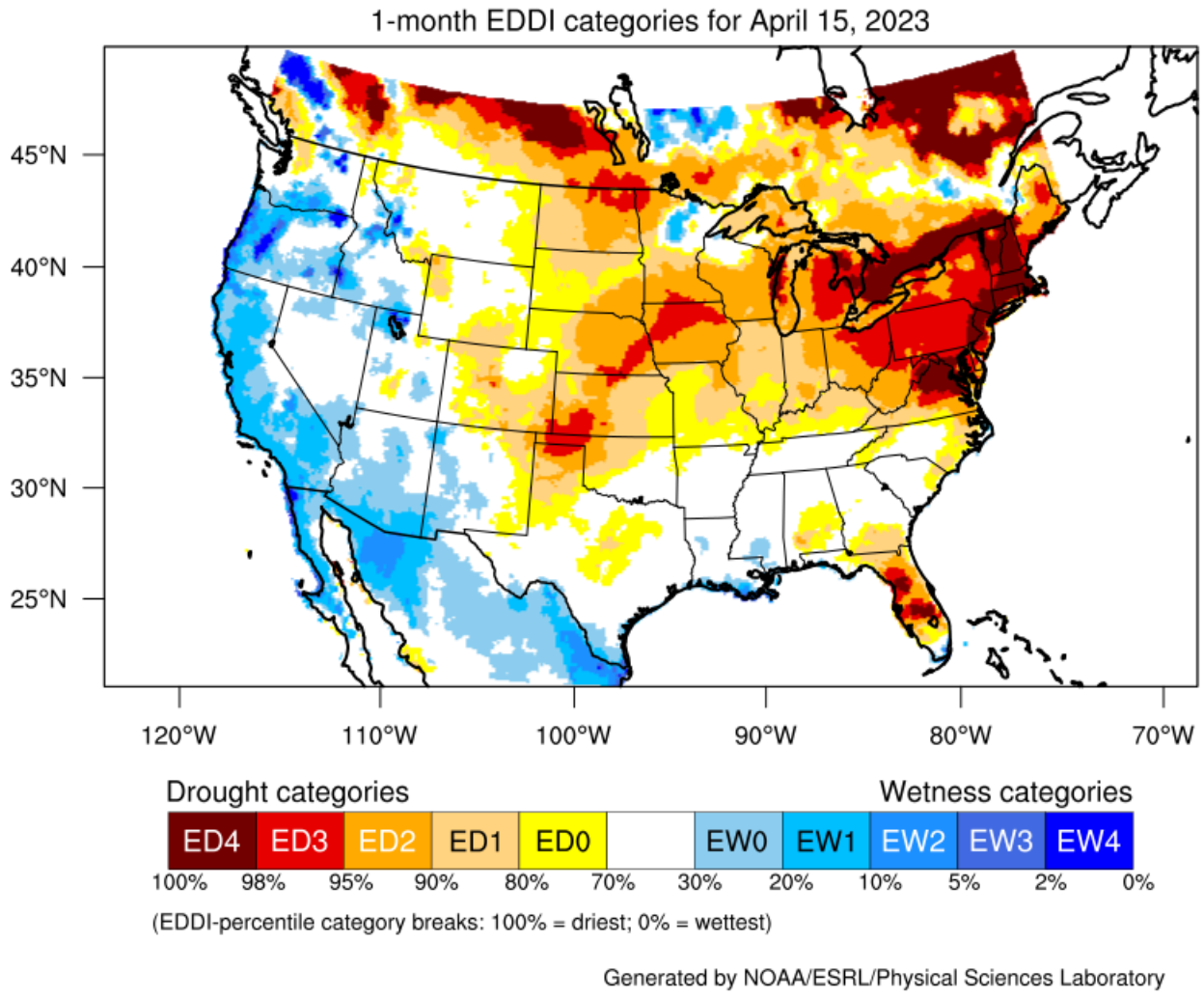


Image – Trent Ford Illinois State Climatologist – Illinois Climate Network

EDDI – Evaporative Demand Index

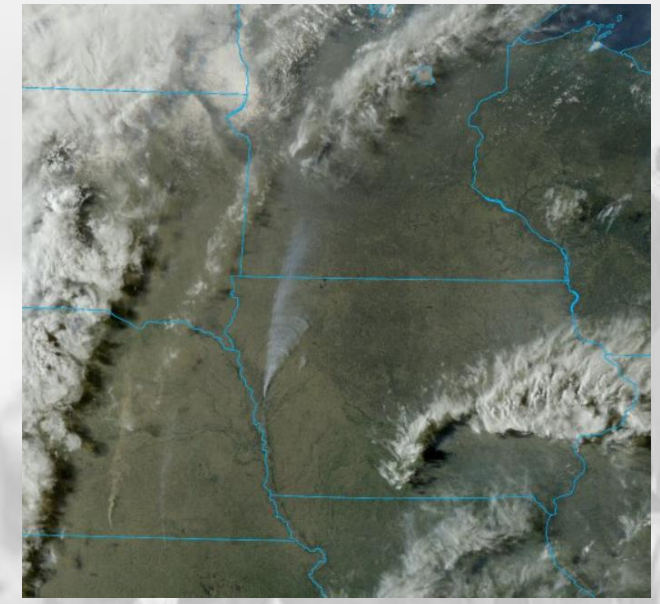


Atmospheric demand equivalent of D2-D3 drought conditions across much of region.

https://www.esrl.noaa.gov/psd/eddi /

Fire

- Several states reported fires
- Mostly smaller – nothing major
- Some planned burns/others unplanned.
- Periodic smoke issues Des Moines/Plains
- Grass fires in Wisconsin

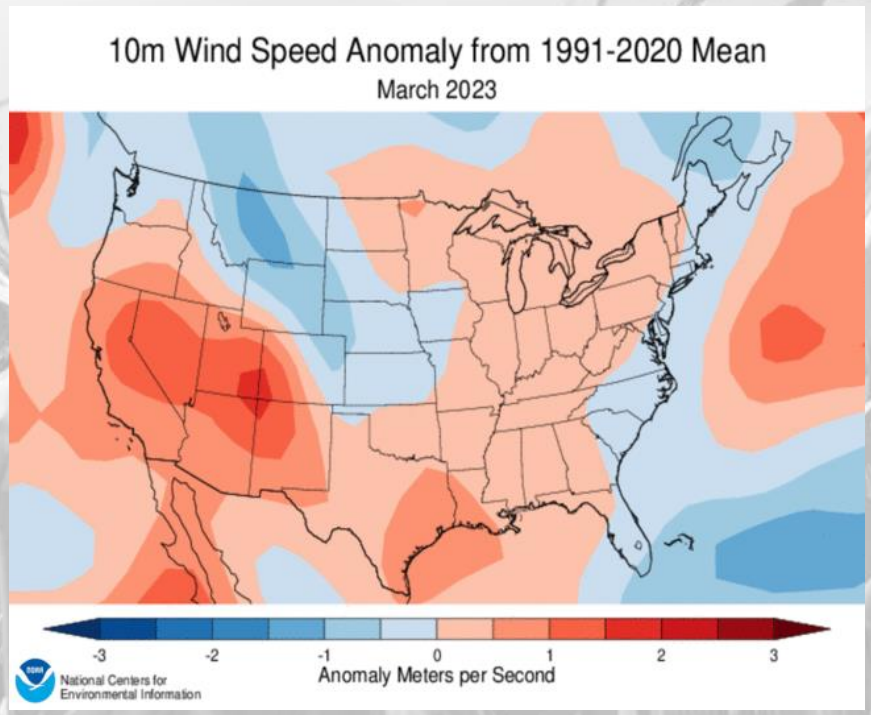


Satellite:
13 April 2023
Fires – IA/NE

Photo:
Chip Redmond
KS State Climate Office

Wind

- No major difference so far this year. (Jan/Mar below, Feb above)
- KS April somewhat above avg.
- Red flag warnings frequent
  - Wind and dry conditions
  - Dry surface-not greened up

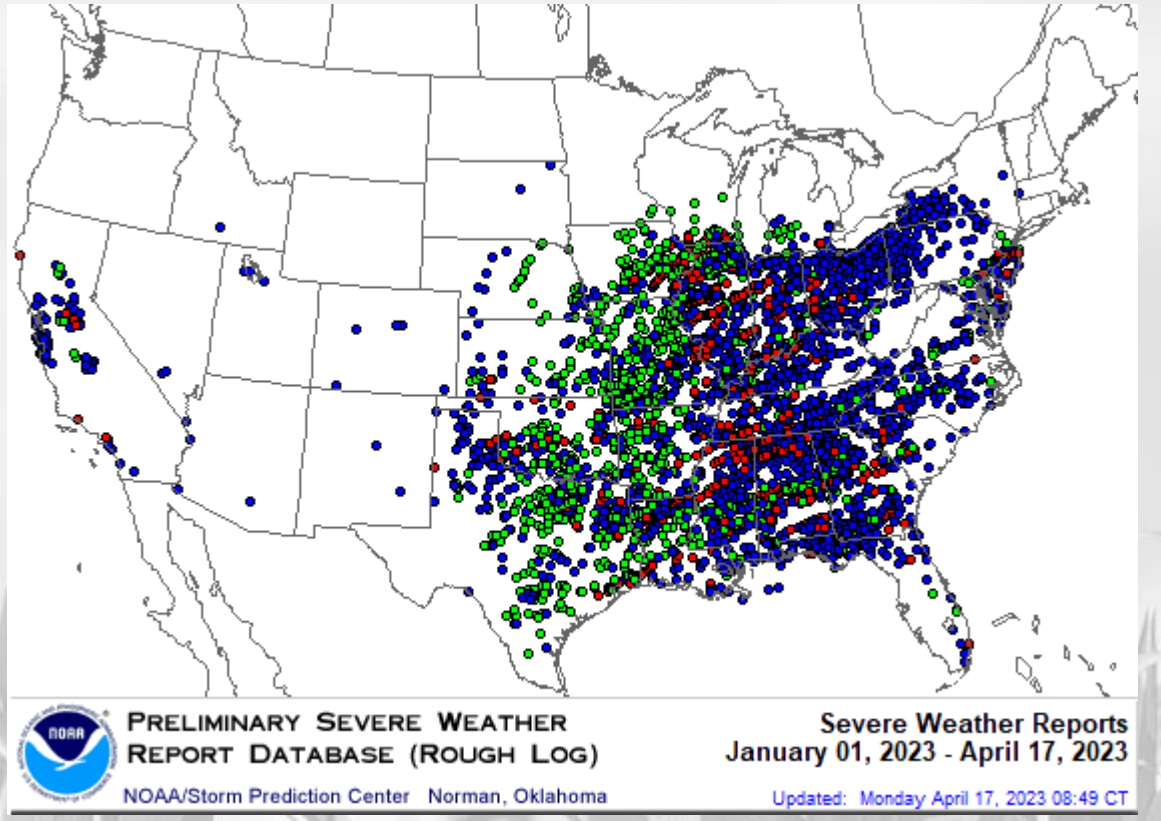


https://www.ncei.noaa.gov/access/monitoring/wind/maps/202303

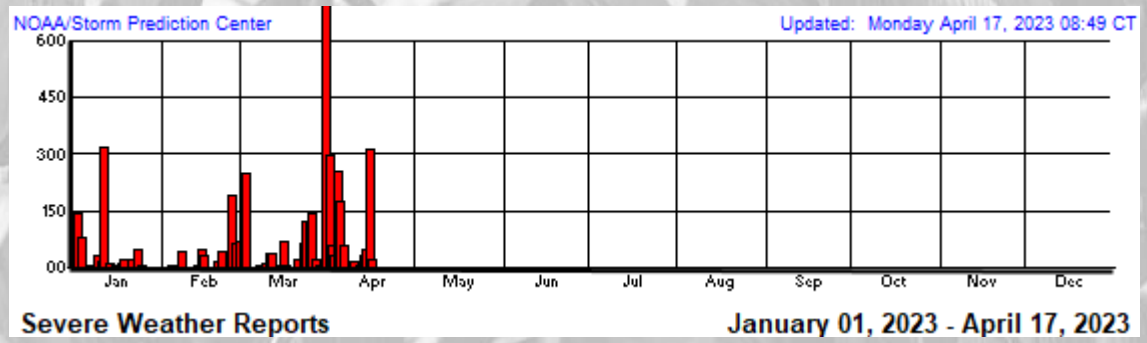
Enhanced Severe Weather Season

- 2023 Severe Weather Reports

- Very active early season south/east parts of region
- March 31-April 1 – Record severe weather outbreak IL/IN
- Quieter in the Plains/north.



- School destroyed –Robinson, IL
- NWS-Lincoln.



https://www.spc.noaa.gov/climo/online/monthly/newm.html

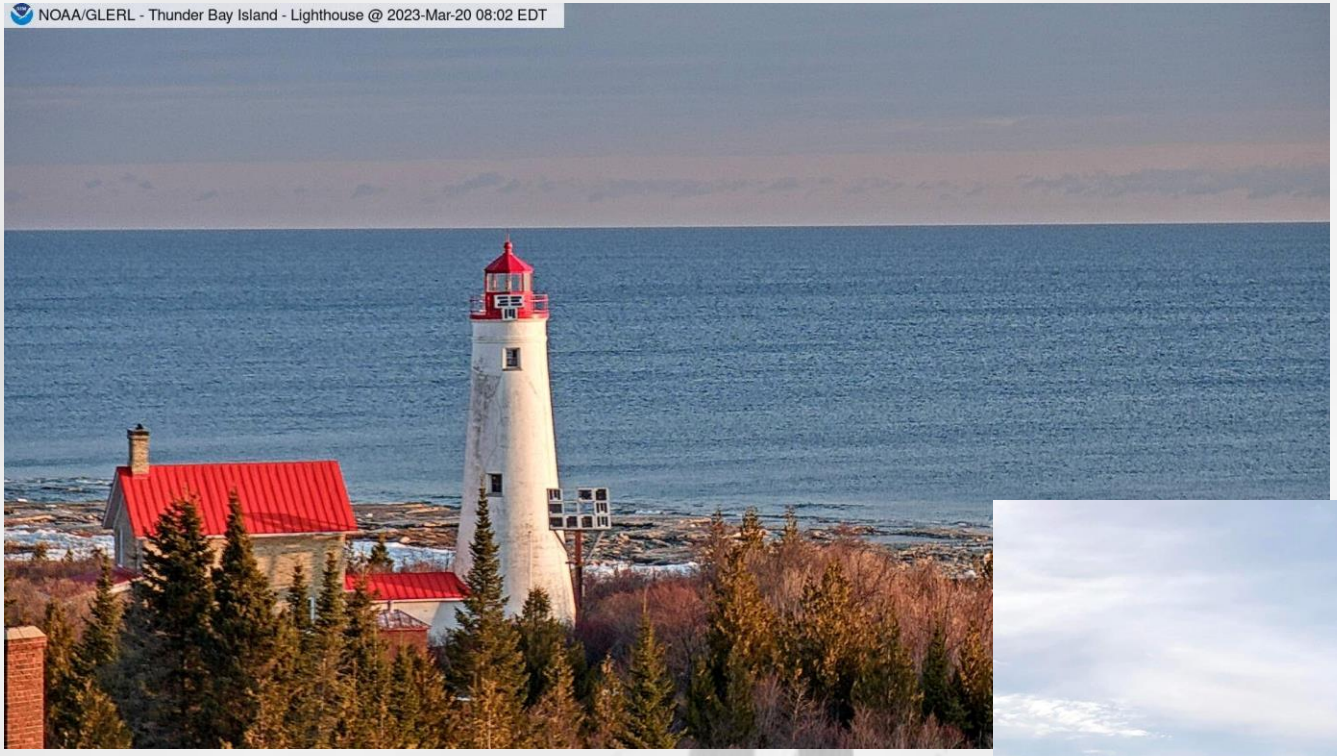


Photo:
Thunder Bay
NOAA GLERL Webcam
20 March 2023

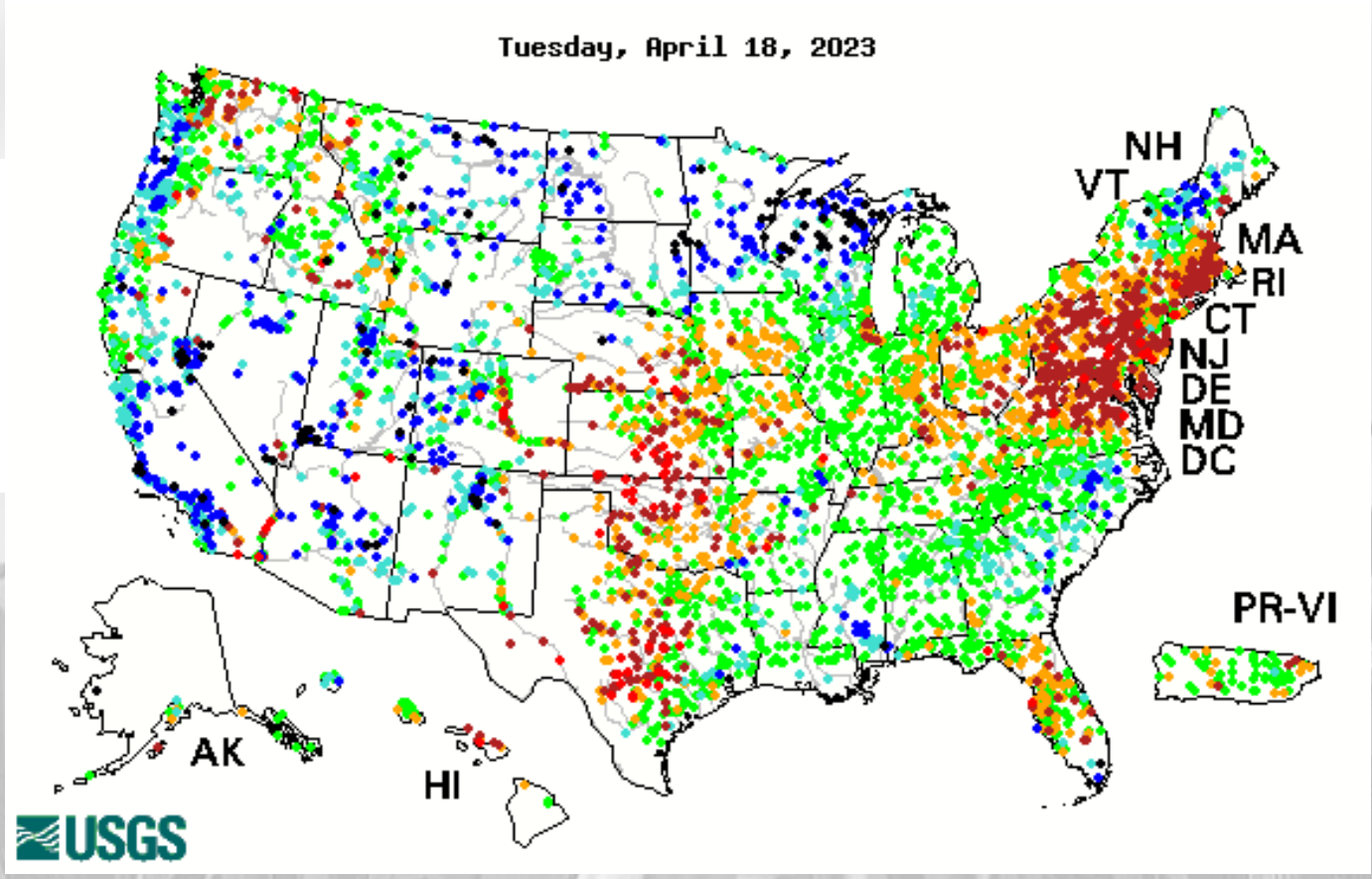
HYDROLOGIC IMPACTS

Photo:
Casselton, ND
Greg Kemple (via Adnan Akyuz
NSDU/state clim.

7-Day Average Streamflow

Tuesday, 18 April 2023

- High end streanflows north (snow melt)
- Low in Plains (MO/IA)
- Also low eastern Corn Belt

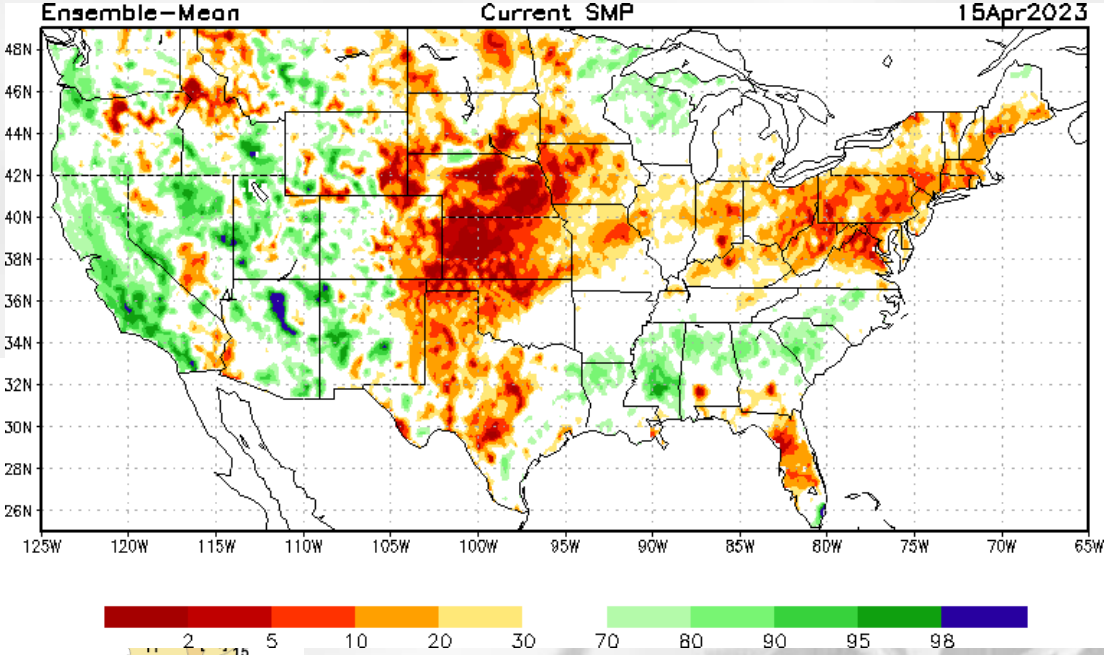


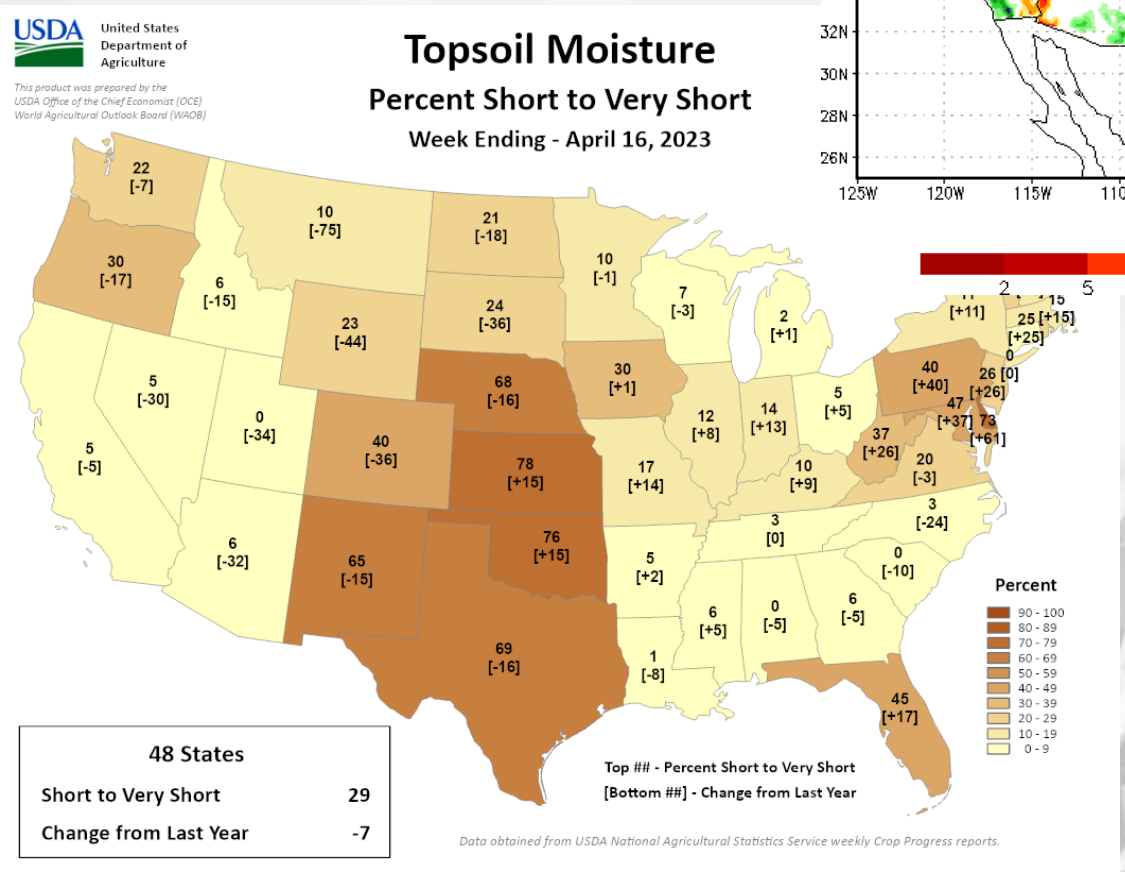
Explanation - Percentile classes						
Low	<10	10-24	25-75	76-90	>90	High
	Much below normal	Below normal	Normal	Above normal	Much above normal	

http://waterwatch.usgs.gov/index.php?id=pa07d

Soil Moisture

- Ongoing dryness in Plains
- Some dryness developing east
- Unknown north (snow cover-frozen soils)



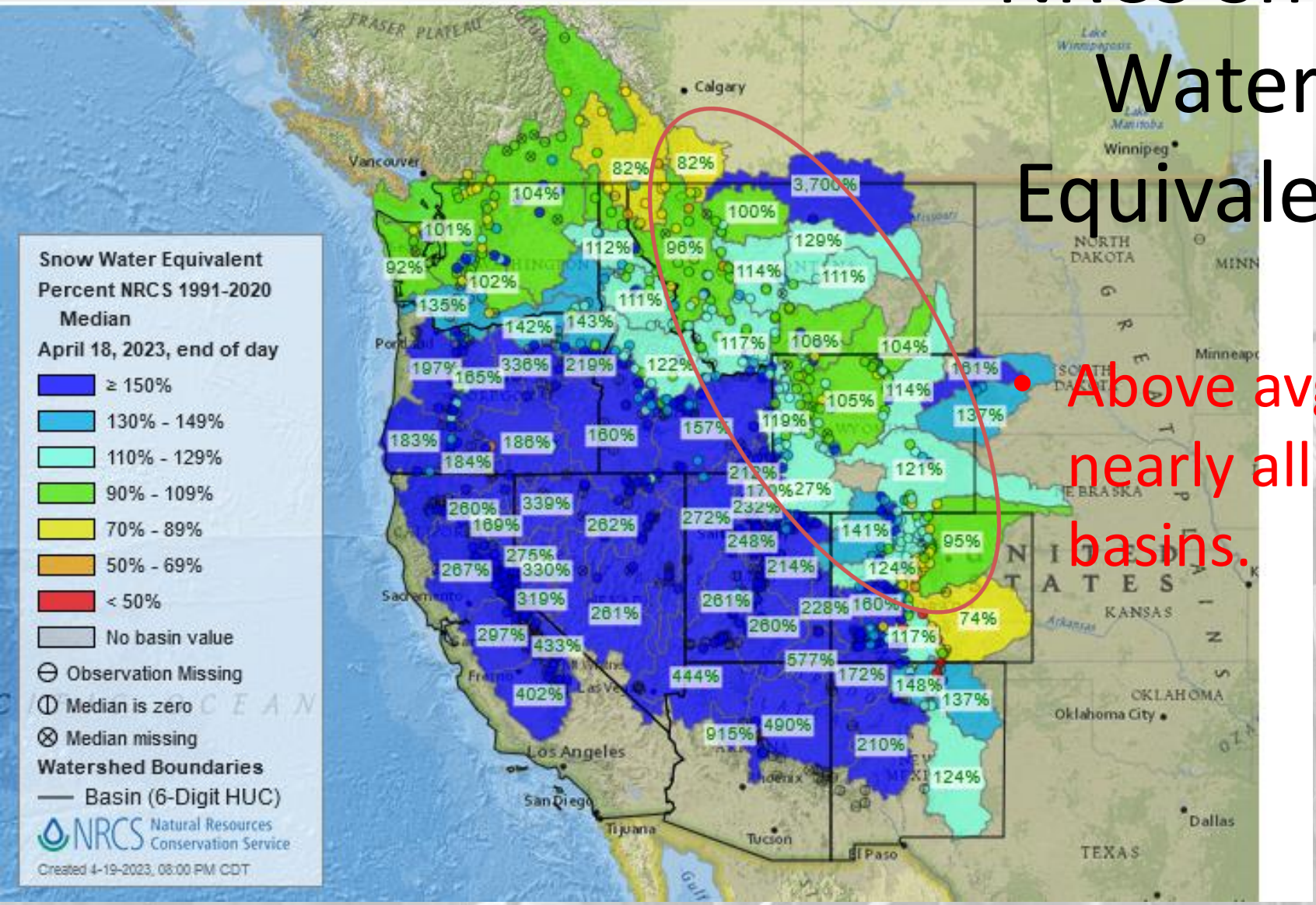


https://agindrought.unl.edu/Other.aspx

https://weather.msfc.nasa.gov/sport/case_studies/lis_CONUS.html

http://www.cpc.ncep.noaa.gov/products/Soilmst_Monitoring/US/Soilmst/Soilmst.shtml#

NRCS Snow Water Equivalent



- Above avg. nearly all basins.

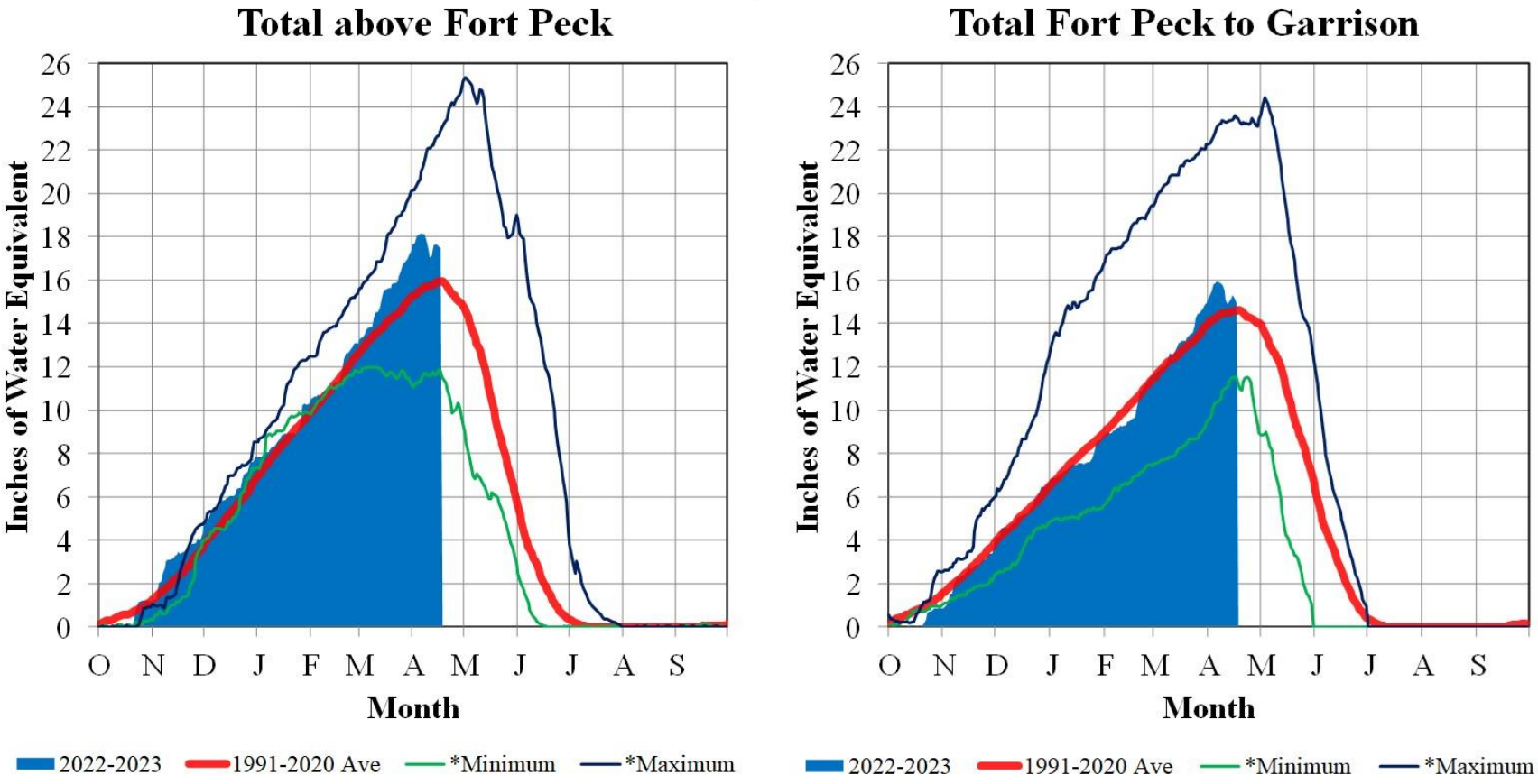
https://www.nrcs.usda.gov/wps/portal/wcc/home/

Various water issues

- Flooding on many major rivers north
  - Some past peak (Big Sioux Minnesota)
  - Getting rolling (James, Mississippi)
  - Mississippi possible top 3 crest (north of La Crosse, WI)
- Some snow – much removed. Some additional snow coming.
- Mountains just reaching peak snow, runoff starting.
  - Milk River (MT) another crest coming
- East mostly normal – seeing some drying.
- Cold – delayed ice-out MN
- Winterkill issues in some lakes (low water-cold-ice)

Missouri River Basin – Mountain Snowpack Water Content
2022-2023 with comparison plots from recent high and low years

17-Apr-2023



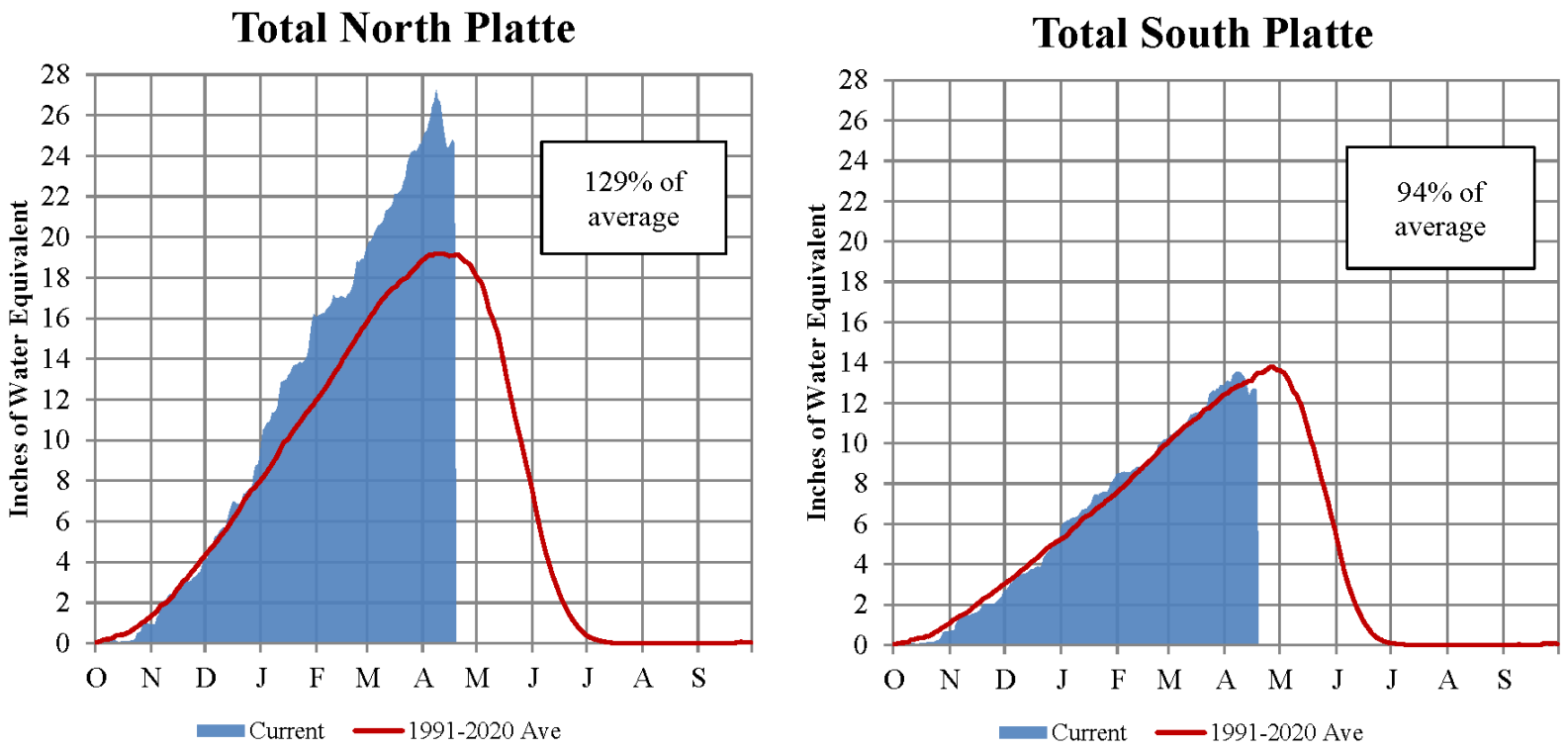
On April 17, 2023 the mountain Snow Water Equivalent (SWE) in the "Total above Fort Peck" reach is 17.5" and 96% of the annual peak remains. The mountain SWE in the "Fort Peck to Garrison" reach is 14.9" and 94% of the annual peak remains. The normal peak for both reaches occurs near April 17. The "Total above Fort Peck" reach peaked on April 6 at 18.2" SWE and 114% of the normal peak. The "Fort Peck to Garrison" reach peaked on April 6 at 15.9" SWE and 109% of the normal peak.

*Minimum peak SWE between 1991-2020 occurred in 2015 above Fort Peck, and in 2001 between Fort Peck and Garrison.
Maximum peak SWE between 1991-2020 occurred in 2011 above Fort Peck, and in 1997 between Fort Peck and Garrison.

Provisional data. Subject to revision.

https://www.nwd-mr.usace.army.mil/rcc/reports/snow.jpg

Platte River Basin - Mountain Snowpack Water Content
Water Year 2022-2023
April 19, 2023

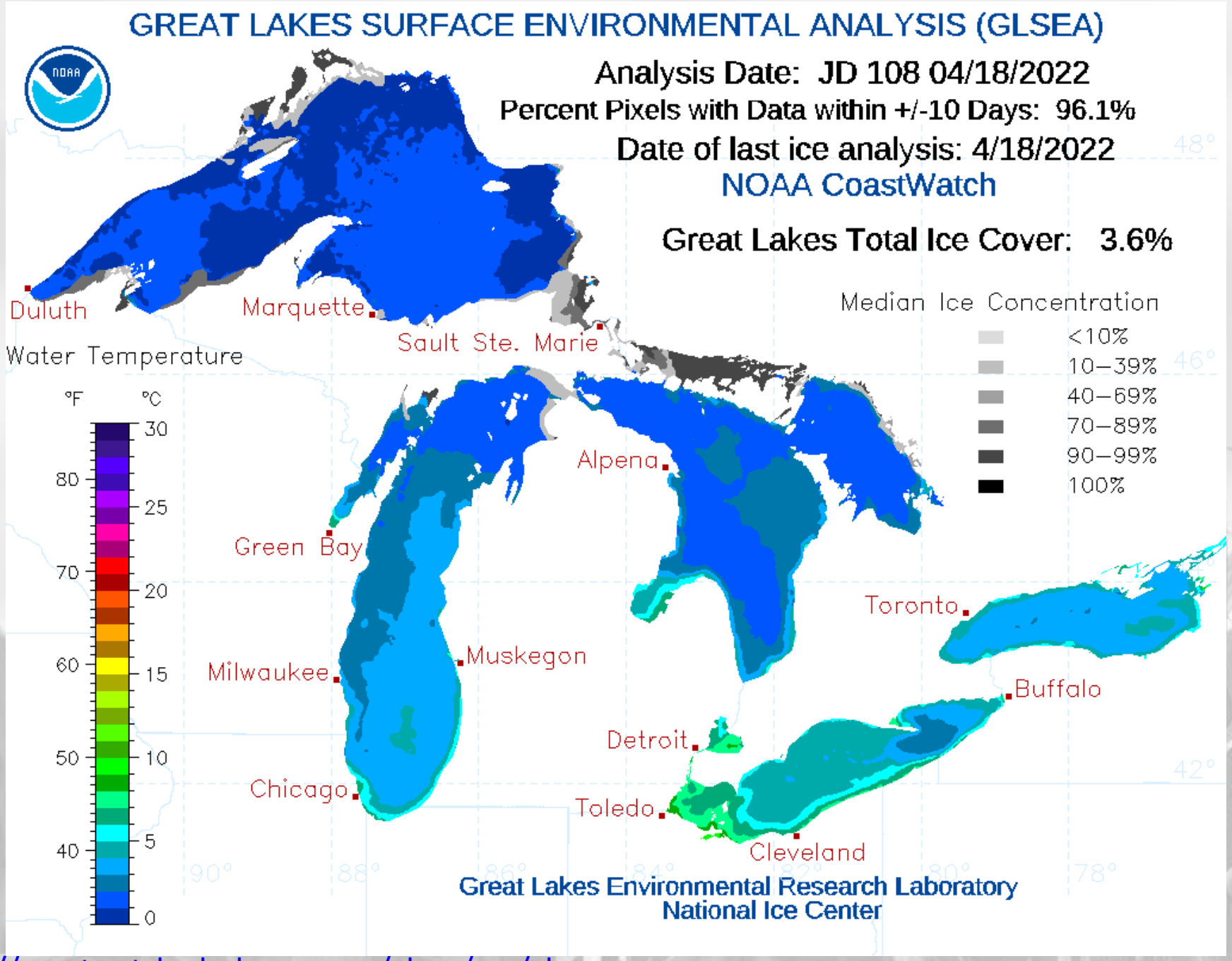


The North and South Platte River Basin mountain snowpacks normally peak near April 10 and the end of April, respectively. The snowpack began melting on April 8 in both basins. As of April 19, 2023, the mountain snowpack SWE in the "Total North Platte" reach is 24.6", 129% of the (1991-2020) average. The mountain snowpack SWE in the "Total South Platte" reach is 12.6", 94% of the (1991-2020) average.

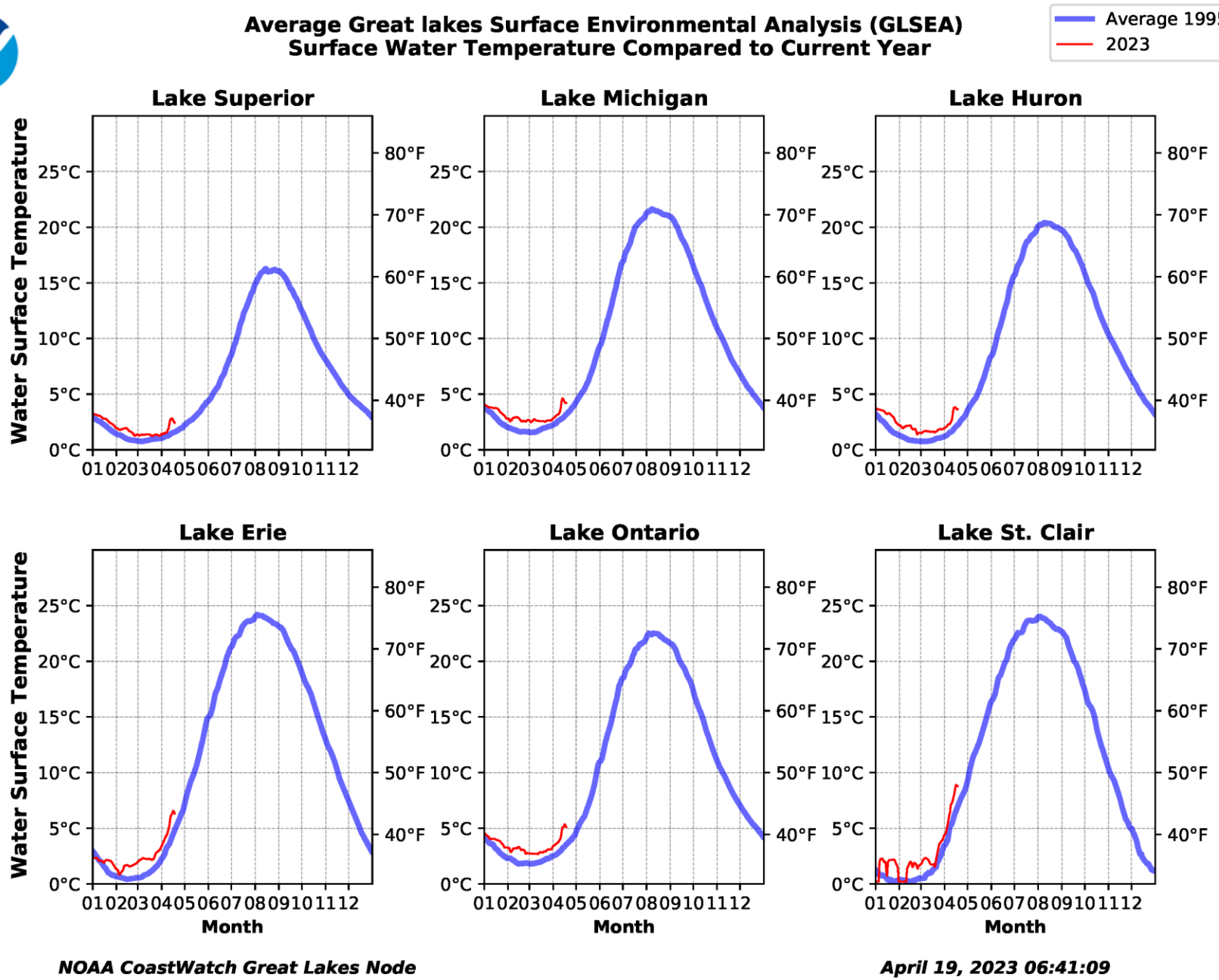
Source: USDA, Natural Resource Conservation Service

Provisional Data. Subject to Revision

https://www.nwd-mr.usace.army.mil/rcc/reports/platte_snow.png



https://coastwatch.glerl.noaa.gov/glsea/cur/glsea_cur.png



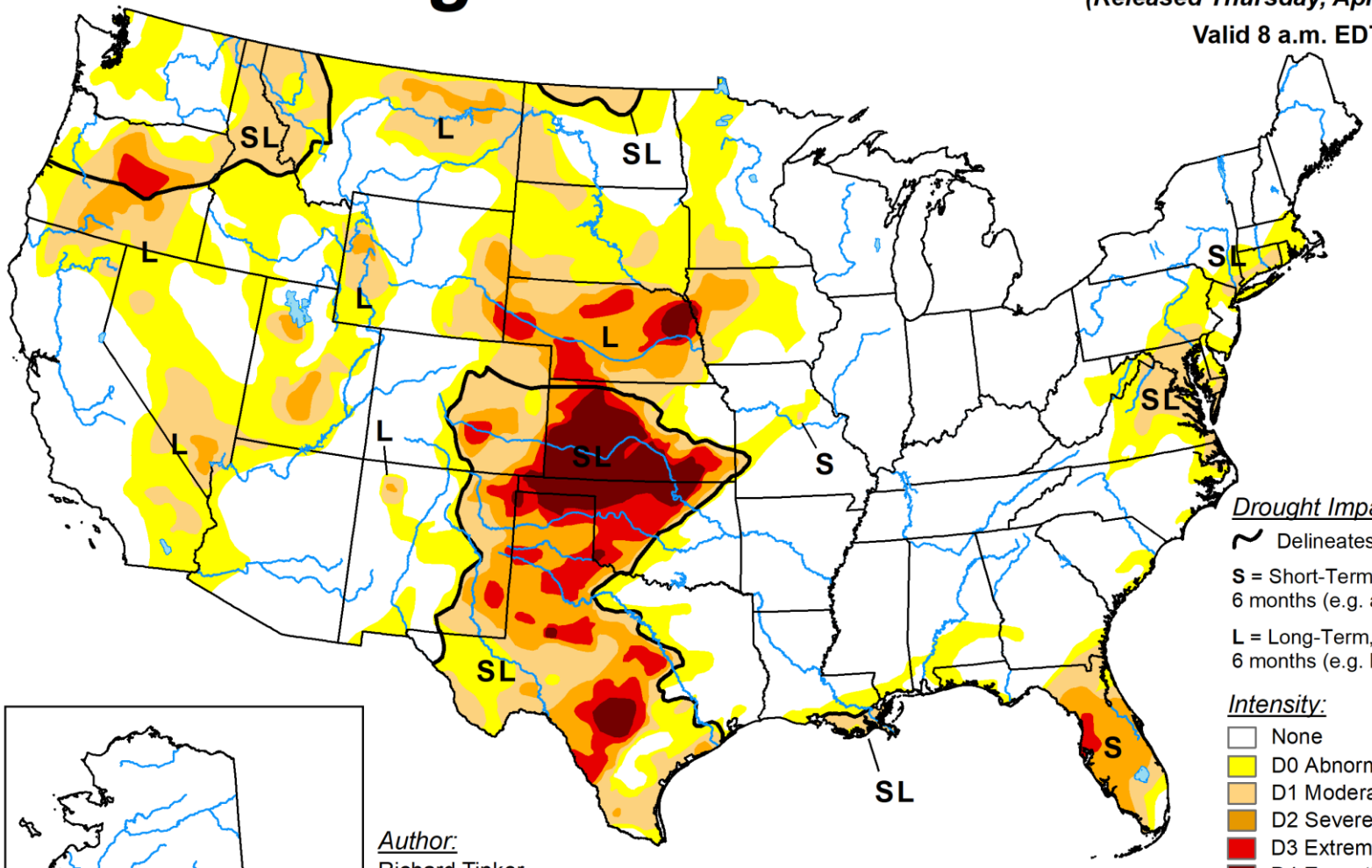
https://coastwatch.glerl.noaa.gov/glsea/cur/glsea_cur.png

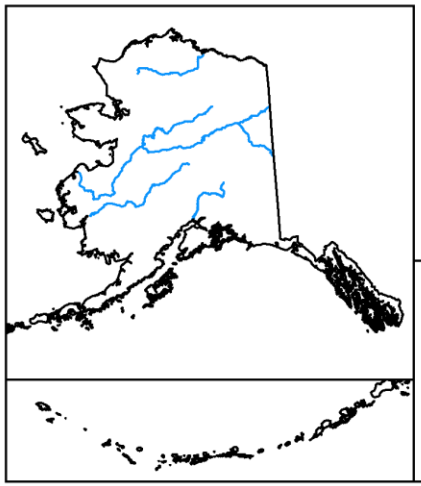
U.S. Drought Monitor

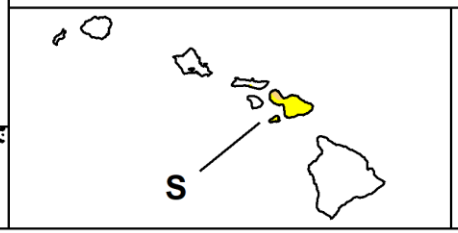
April 18, 2023

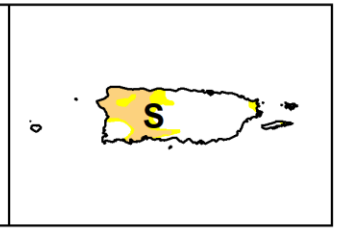
(Released Thursday, Apr. 20, 2023)

Valid 8 a.m. EDT









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:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

Author:

Richard Tinker

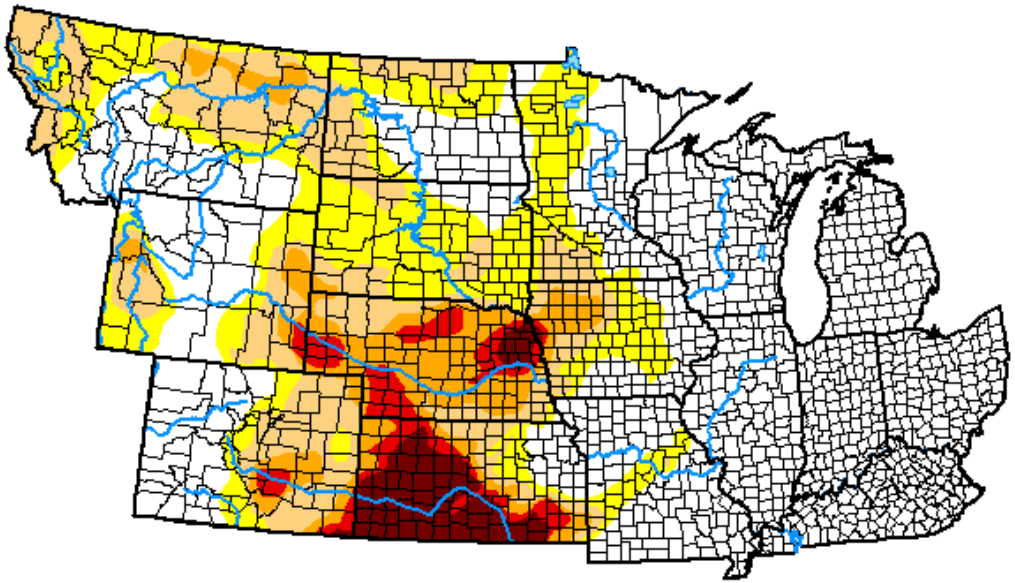
CPC/NOAA/NWS/NCEP

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx

USDA NDMC NOAA

droughtmonitor.unl.edu

U.S. Drought Monitor
NWS Central



April 18, 2023
(Released Thursday, Apr. 20, 2023)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	52.50	47.50	29.24	13.77	6.57	3.61
Last Week *04-11-2023*	50.77	49.23	29.97	14.26	6.54	3.50
3 Months Ago *01-17-2023*	29.08	70.92	44.90	22.56	9.76	3.40
Start of Calendar Year *01-03-2023*	25.76	74.24	48.98	24.27	9.90	3.48
Start of Water Year *09-27-2022*	27.00	73.00	47.70	23.08	8.80	2.73
One Year Ago *04-19-2022*	42.01	57.99	47.49	31.76	11.70	0.19

Intensity:

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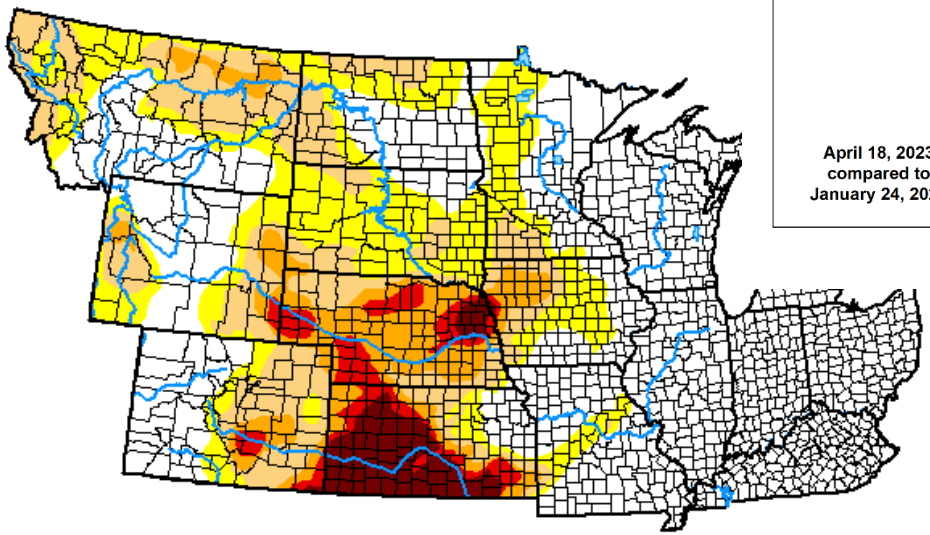
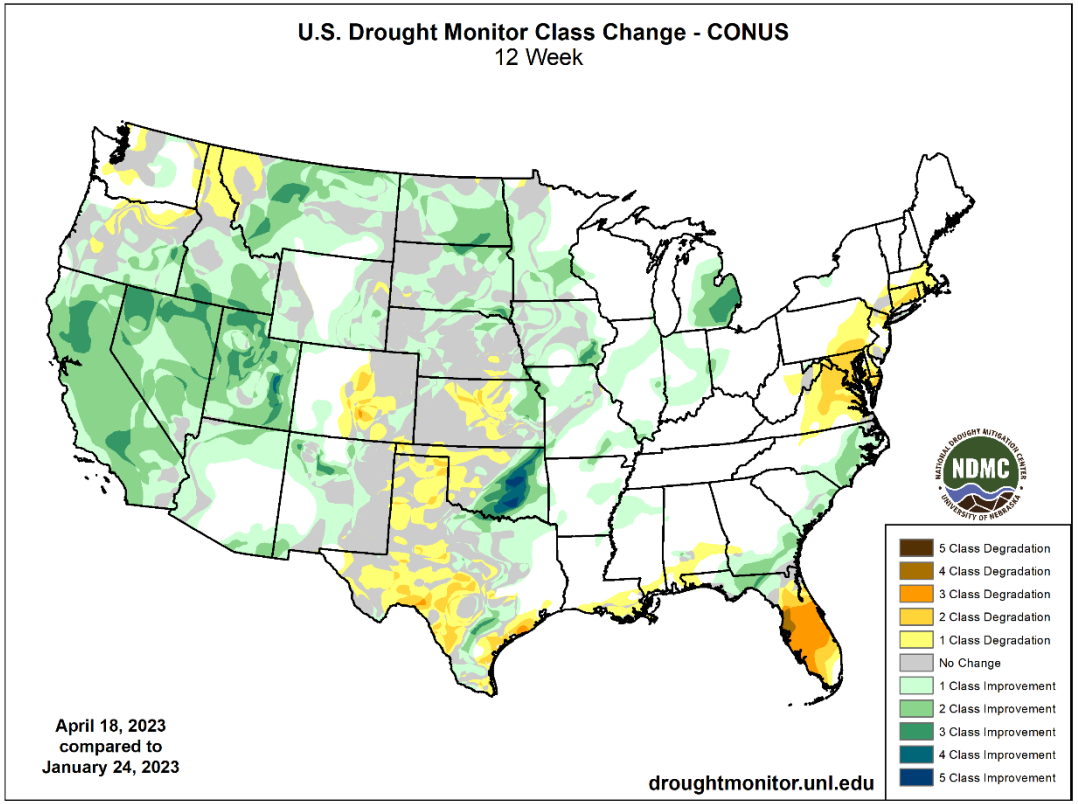
U.S. Drought Monitor

NWS Central





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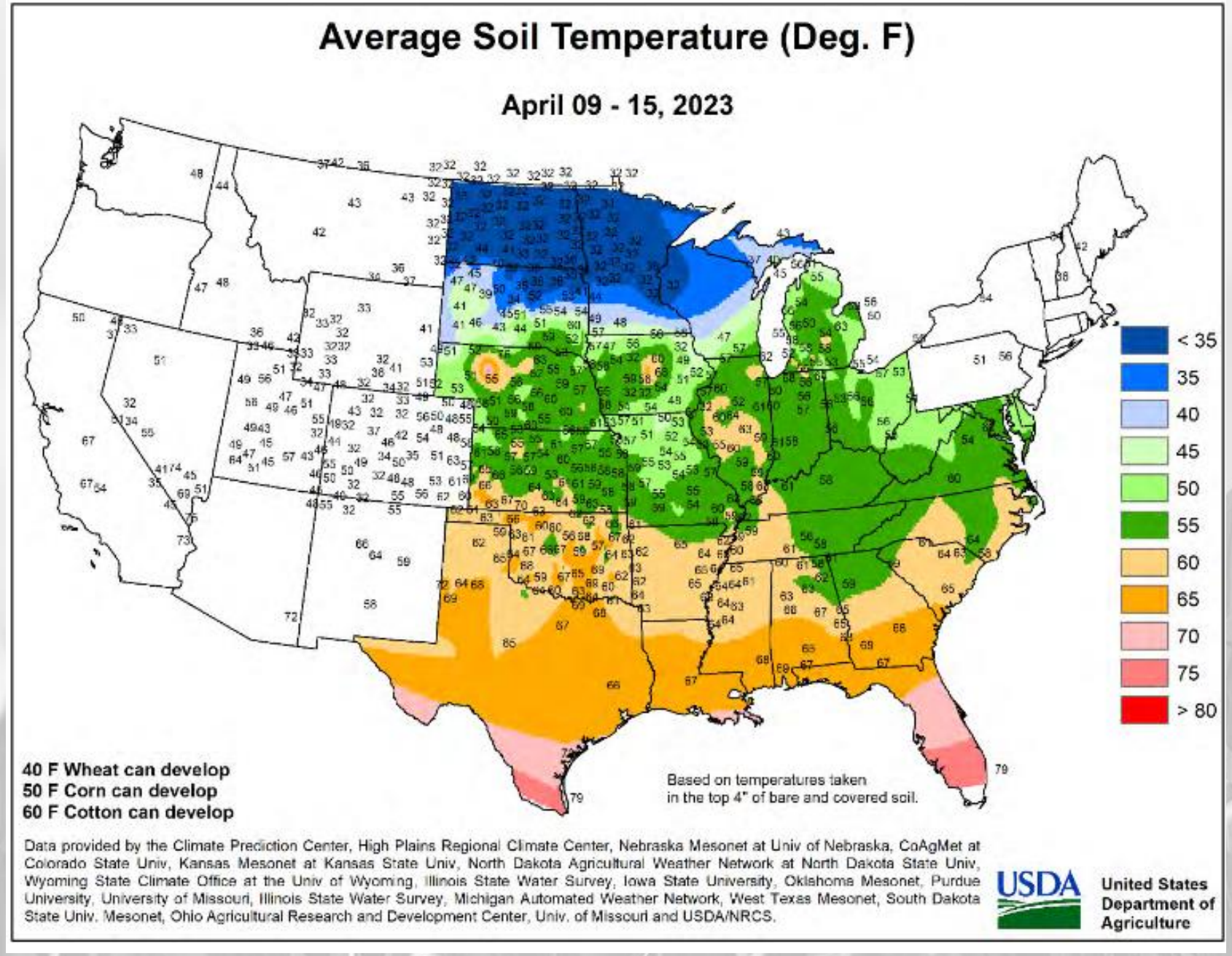
Author:
Richard Tinker
CPC/NOAA/NWS/NCEP

USDA NDMC NOAA

droughtmonitor.unl.edu

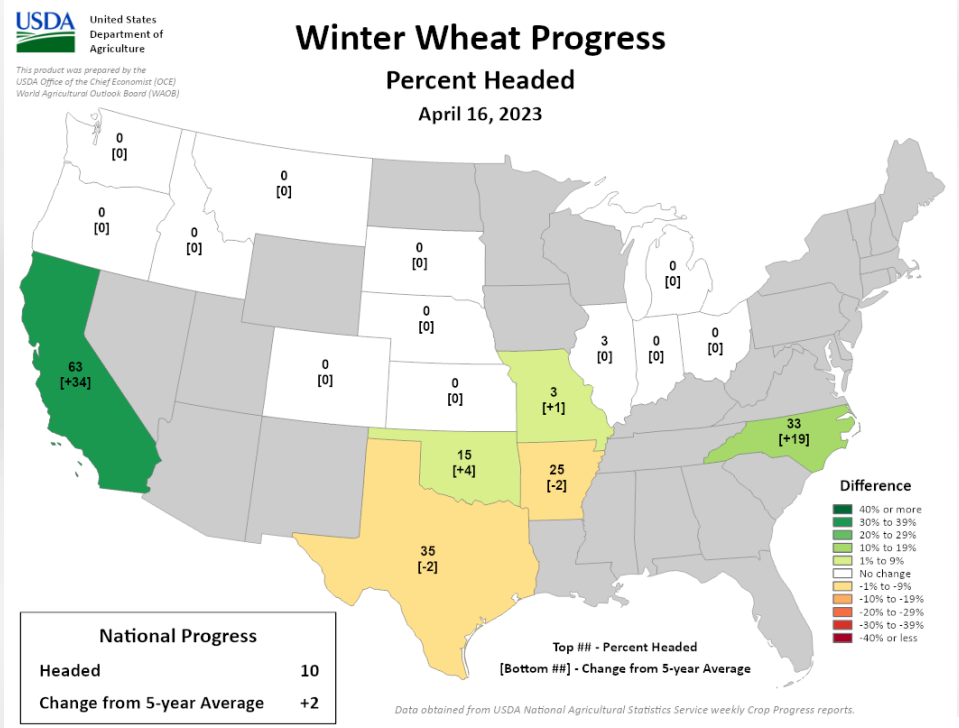
Photo:
Storm Damage– Hans Schmitz (Purdue)

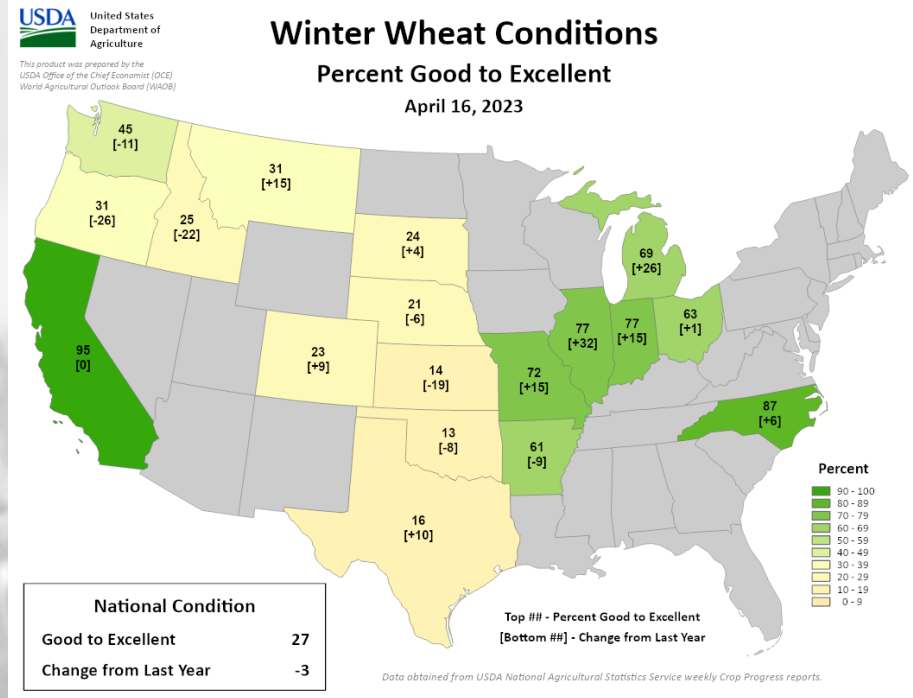
AGRICULTURAL IMPACTS

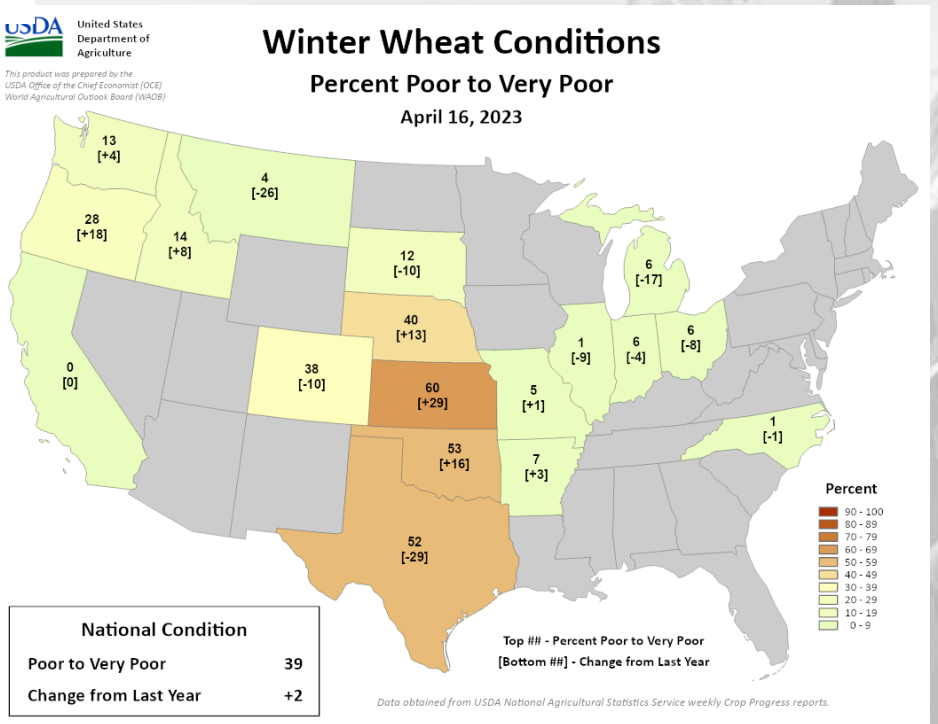


https://www.usda.gov/sites/default/files/documents/wwcb.pdf

USDA NASS Crop Progress Winter Wheat







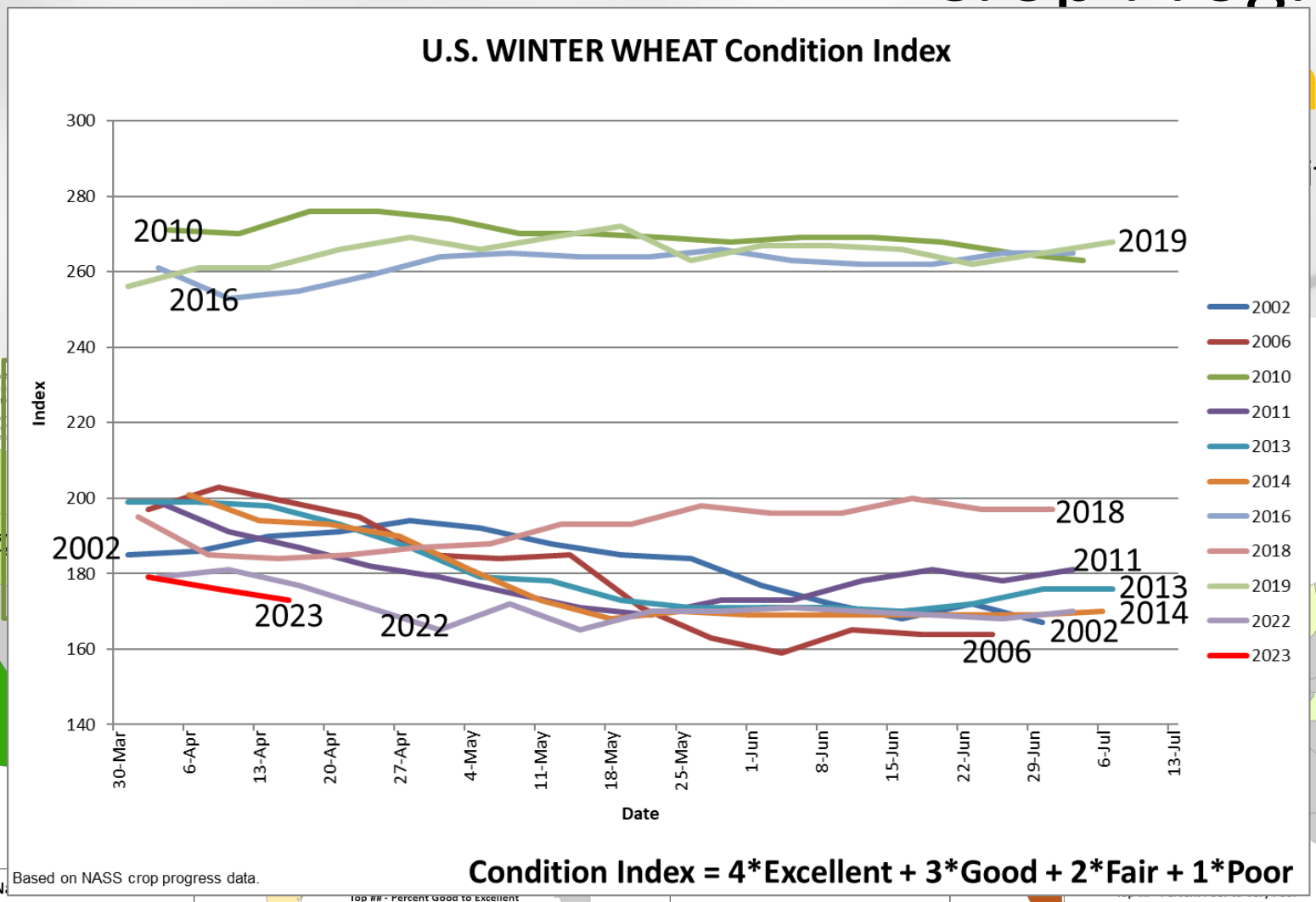
Worst winter wheat conditions since 1996
1996 much worse in Midwest (winter kill)

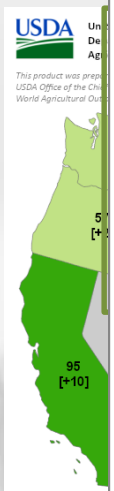
USDA NASS Crop Progress

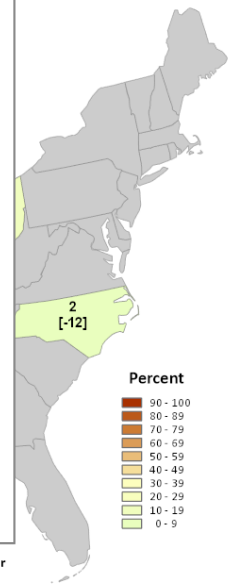
eat

ttle behind

impacting







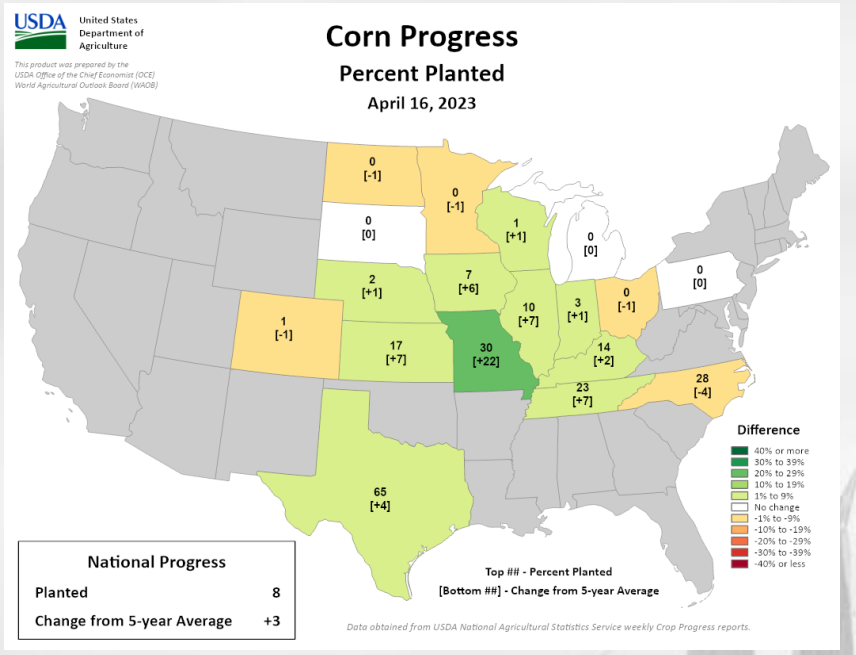
Good to Excellent	30
Change from Last Year	-23

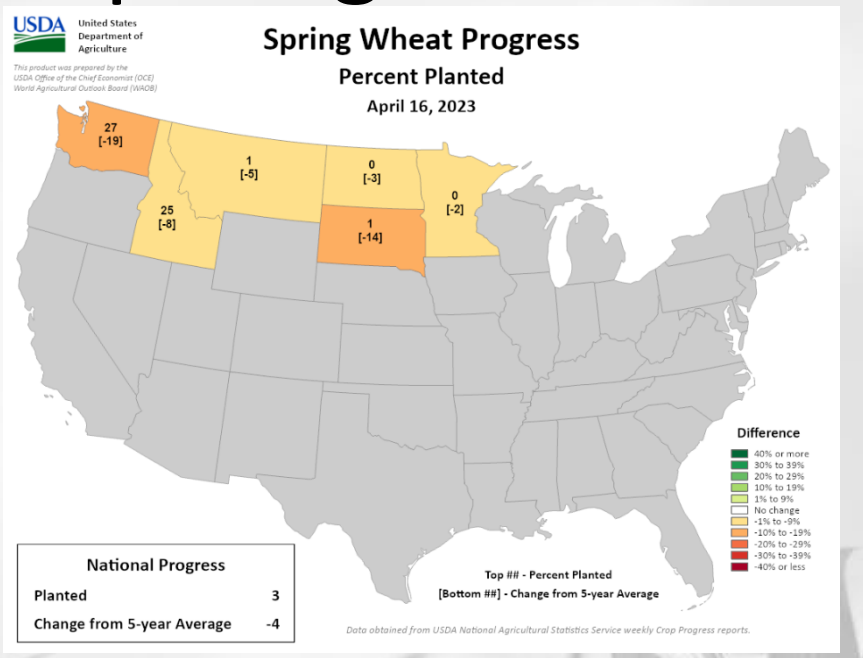
Poor to Very Poor	37
Change from Last Year	+20

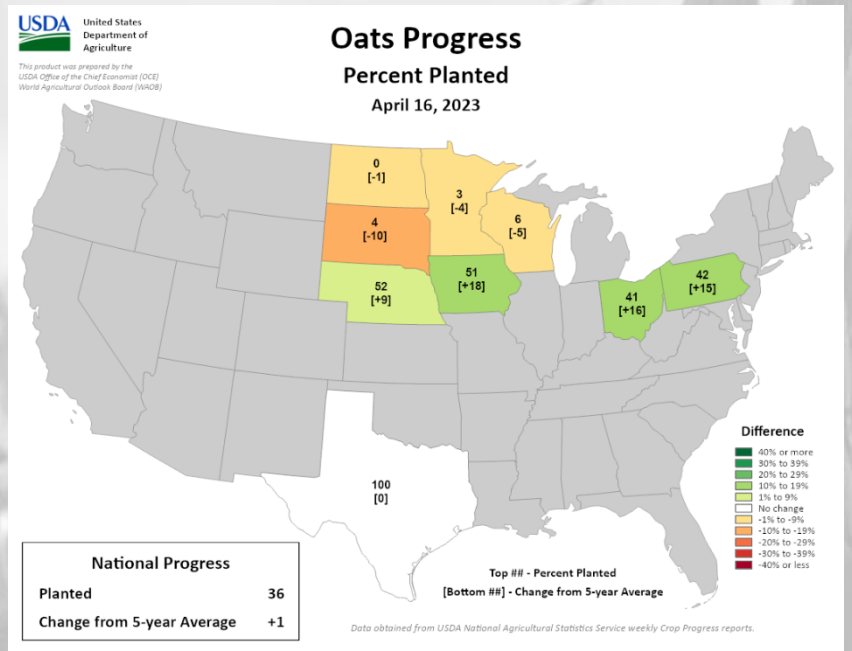
[Bottom ##] - Change from Last Year

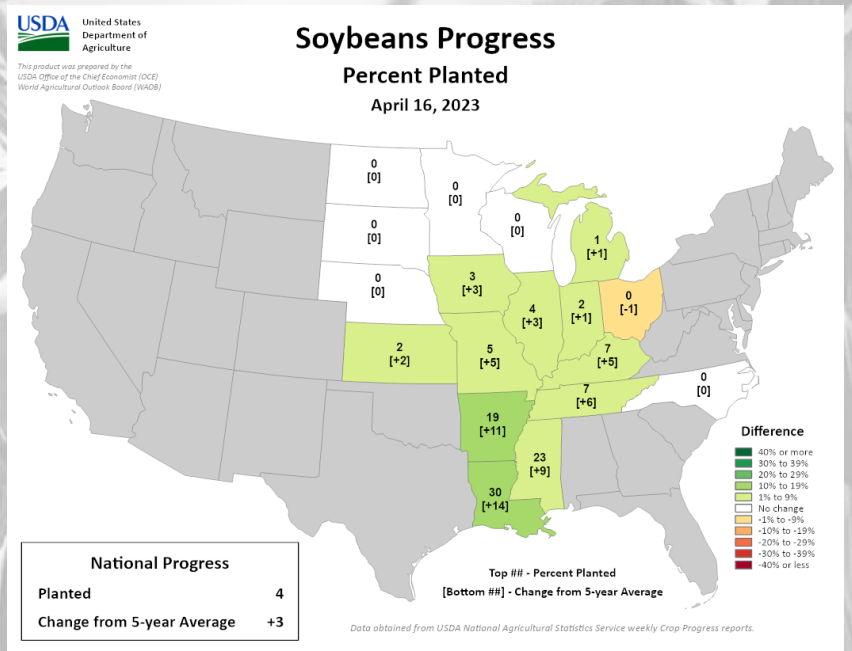
Data obtained from USDA National Agricultural Statistics Service weekly Crop Progress reports.

USDA NASS Crop Progress



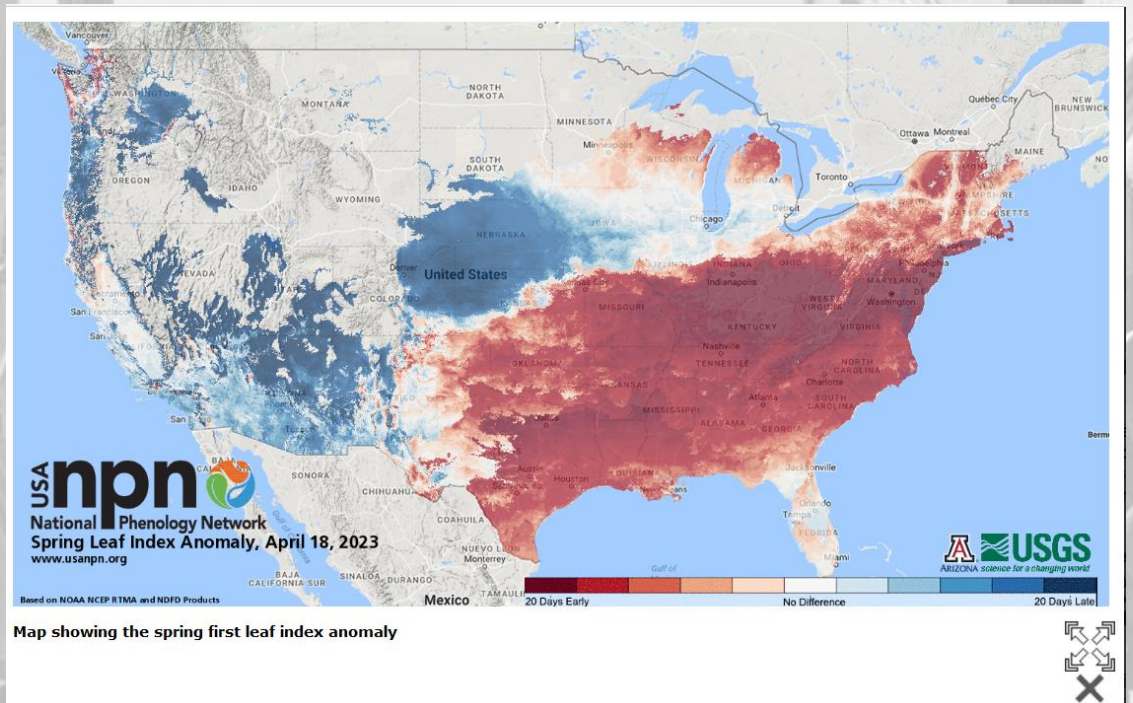






Various ag

- Recent cold slowed specialty crops – but at risk with pending cold.
- Alfalfa – similar concerns north
- Winter wheat very poor



Map showing the spring first leaf index anomaly

https://www.usanpn.org/news/spring

Photo:
Chip Redmond KS Climate Office

OUTLOOKS

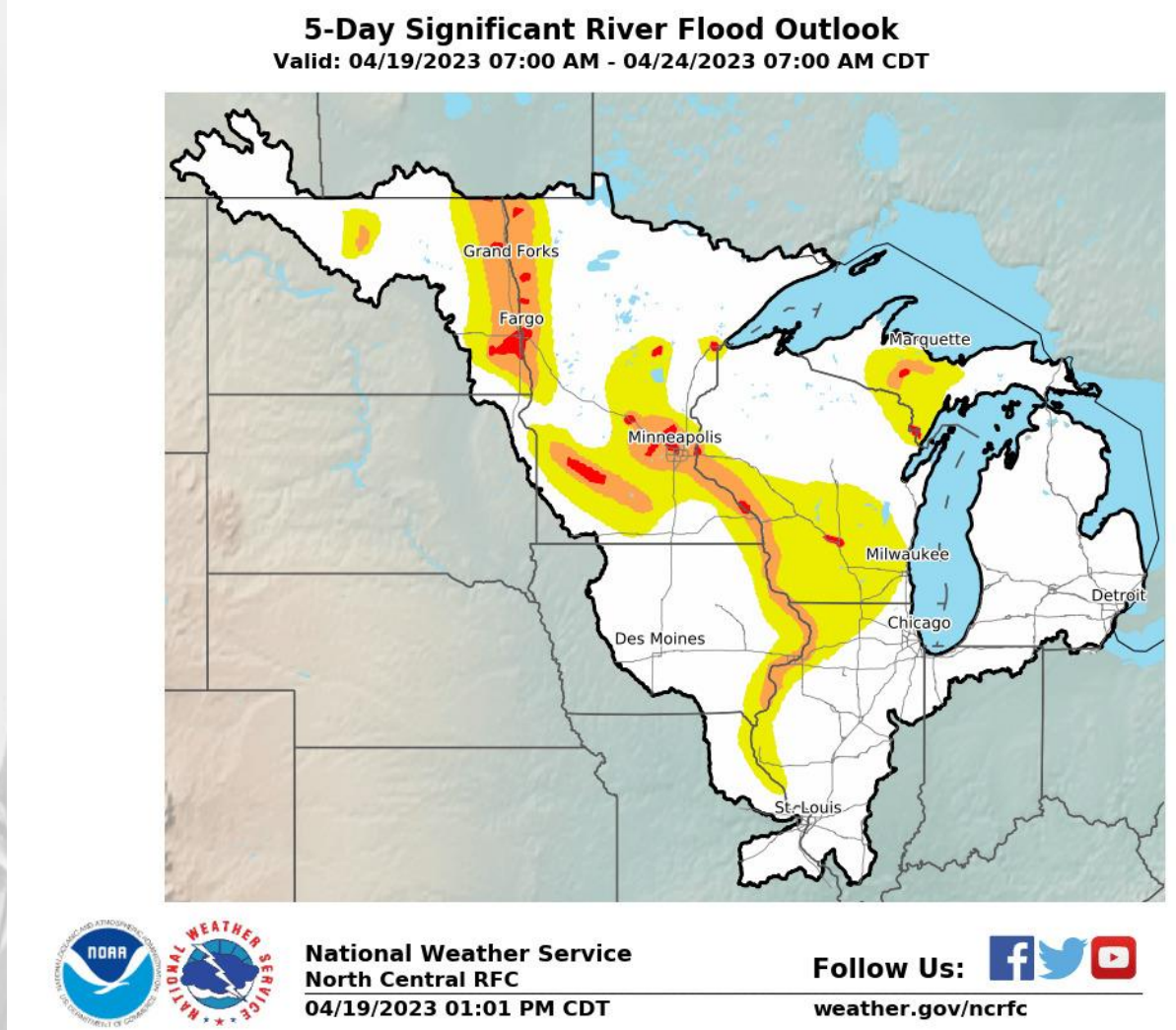
Photo:
Brett Heitshusen _ NWS-MT
April 2023

Climate Outlooks

- **El Niño status…..**
- **7-day precipitation forecast**
- **8-14 day outlook**
- **May**
- **Seasonal/Summer season**

Photo:
Elm River, SD
Laura Edwards, SDSU Extension
(state climatologist)

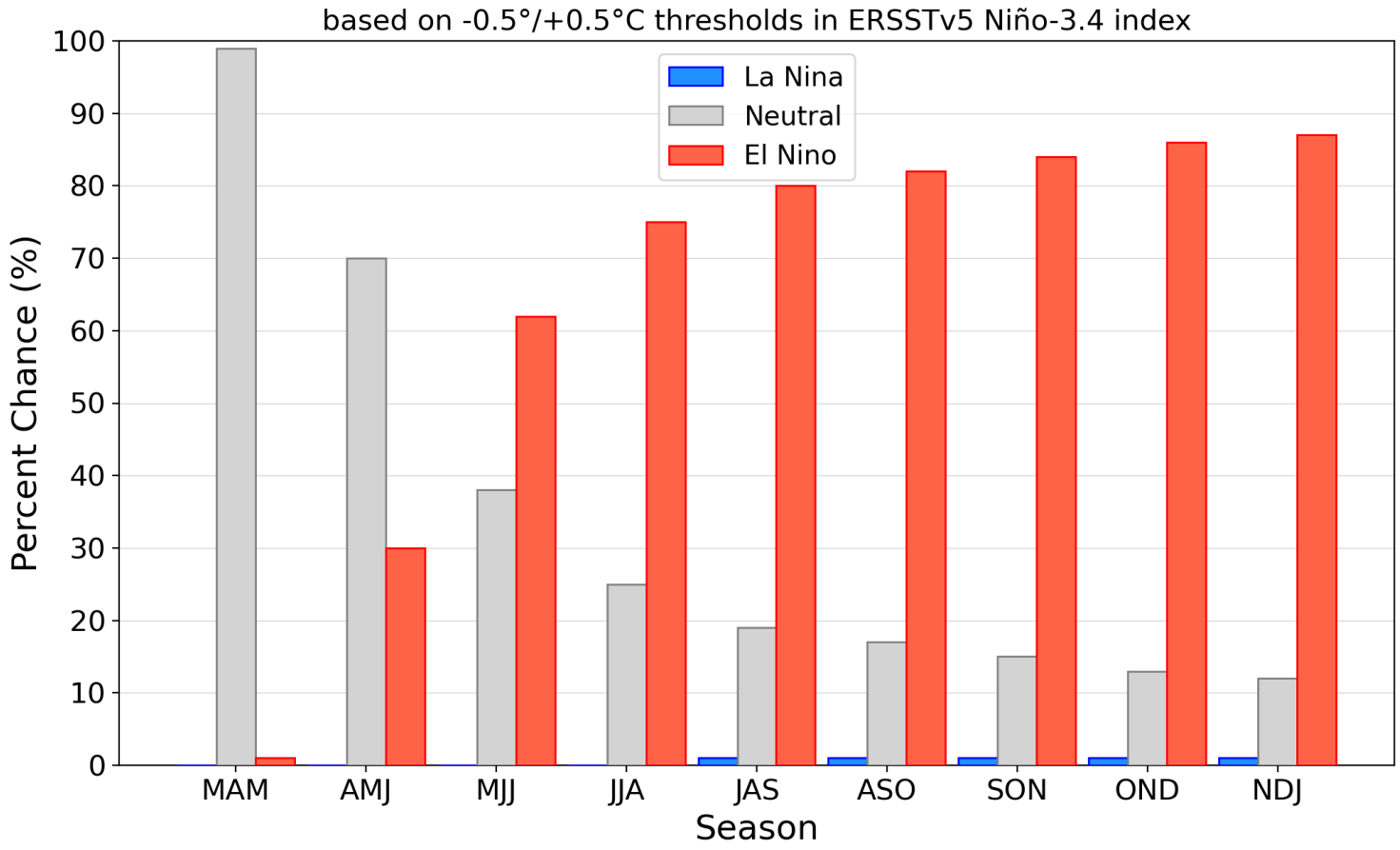
NWS RFC River Outlook



https://www.weather.gov/ncrfc/LMI_FOP_summary

ENSO Outlook Status

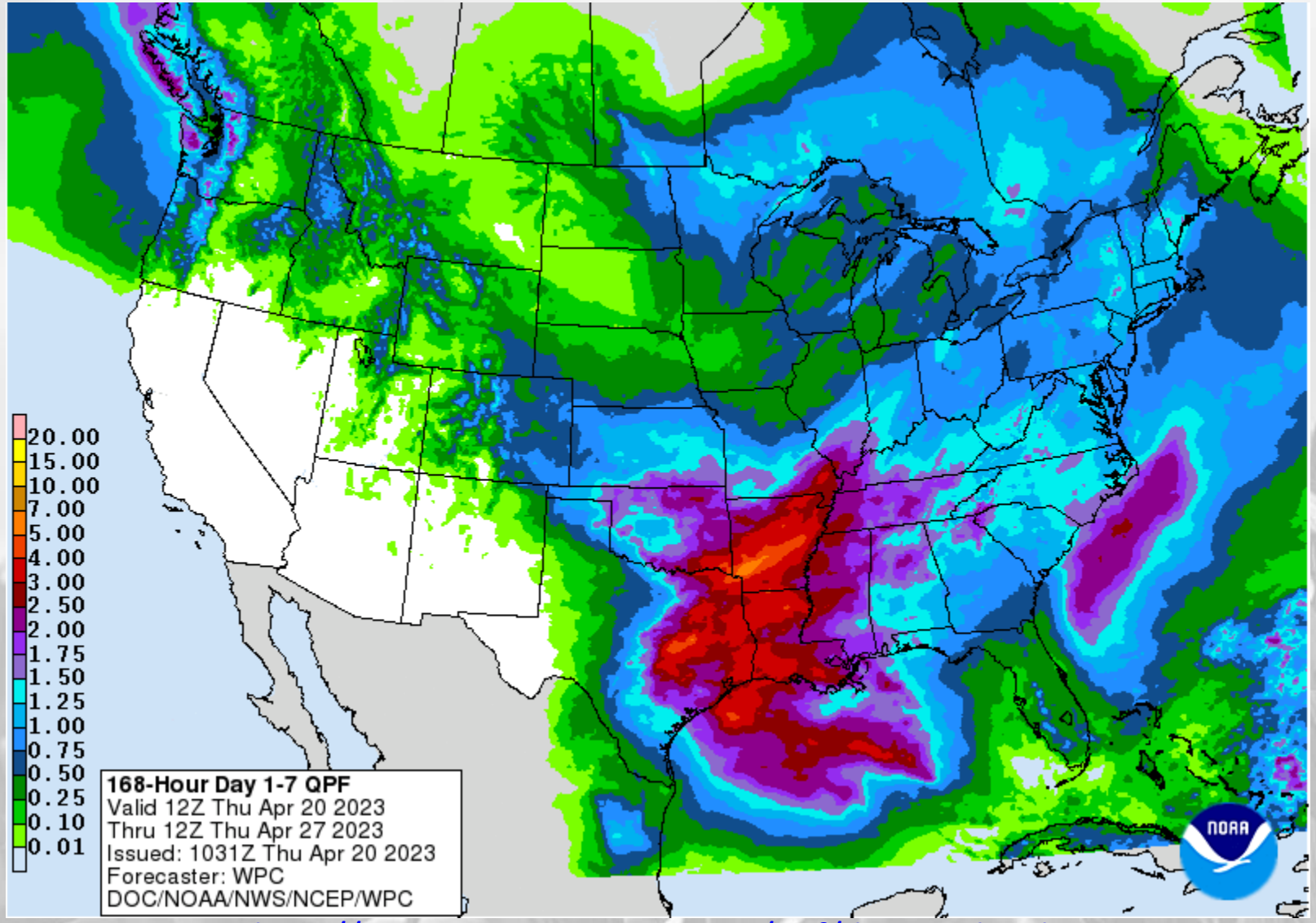
La Niña done. Currently neutral conditions. Increasing chances El Niño. Possibly strong episode. El Niño Watch.



https://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/?enso_tab=enso-cpc_plume

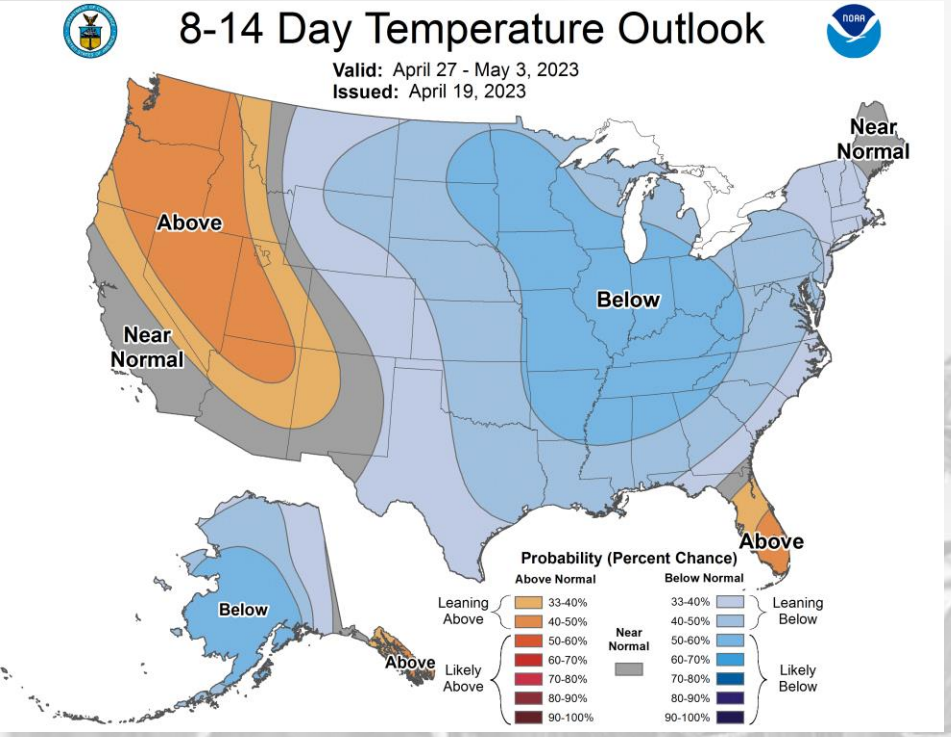
7-day Quantitative Precipitation Forecast

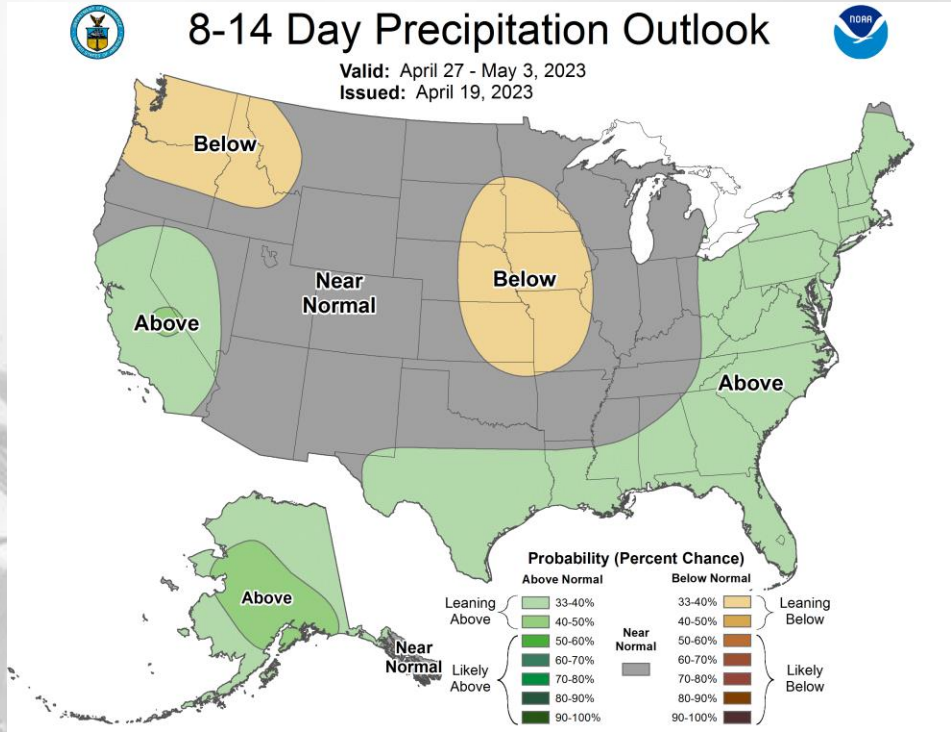
Valid: 7 AM Thu 20 April – 7 AM Thu 27 April



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

Temperature and Precipitation Probabilities for 27 April – 3 May 2023

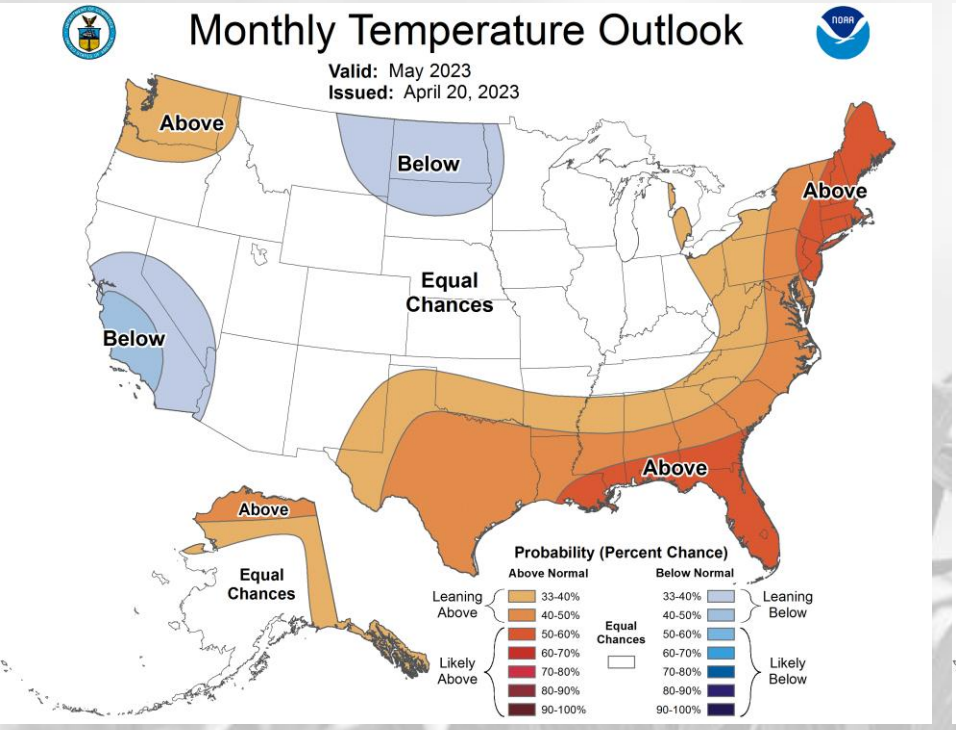


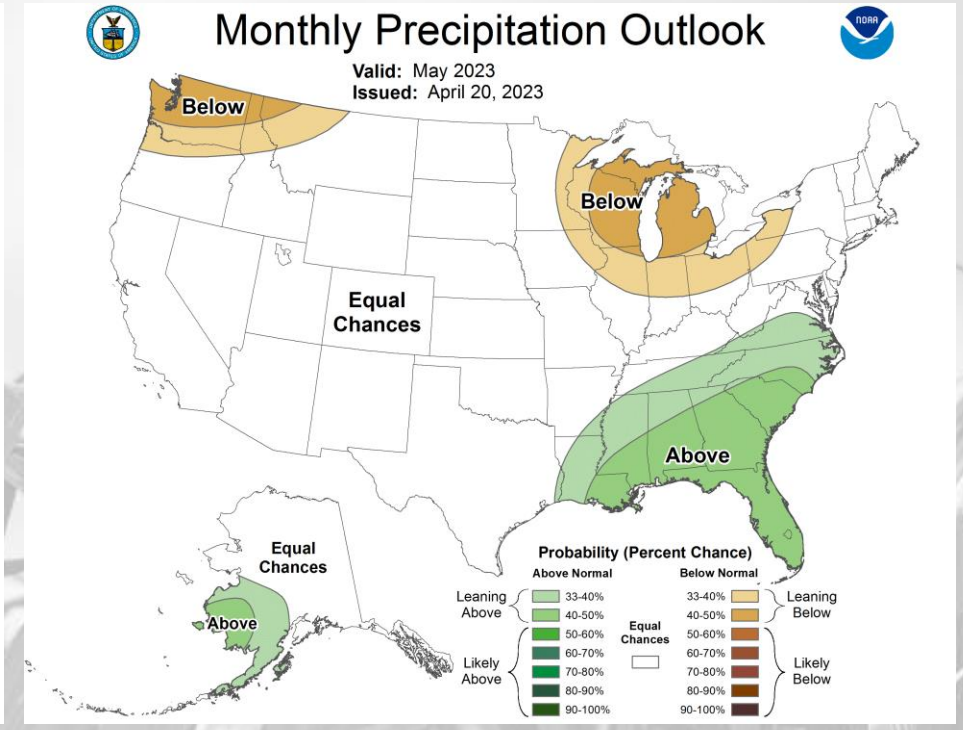


Temperature **Precipitation**

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

May Temperature and Precipitation Probabilities

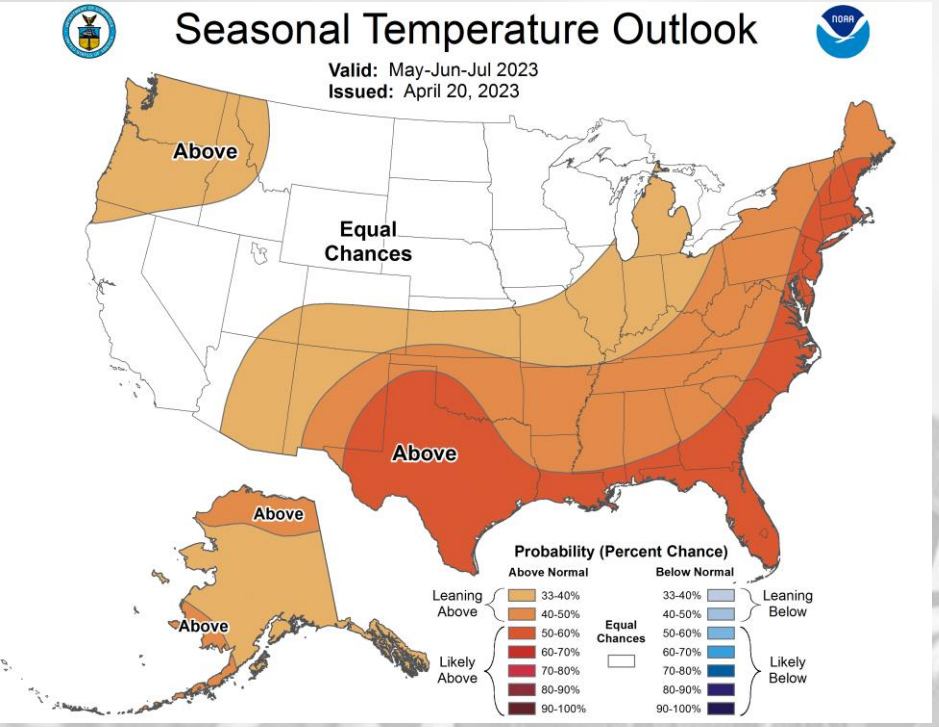


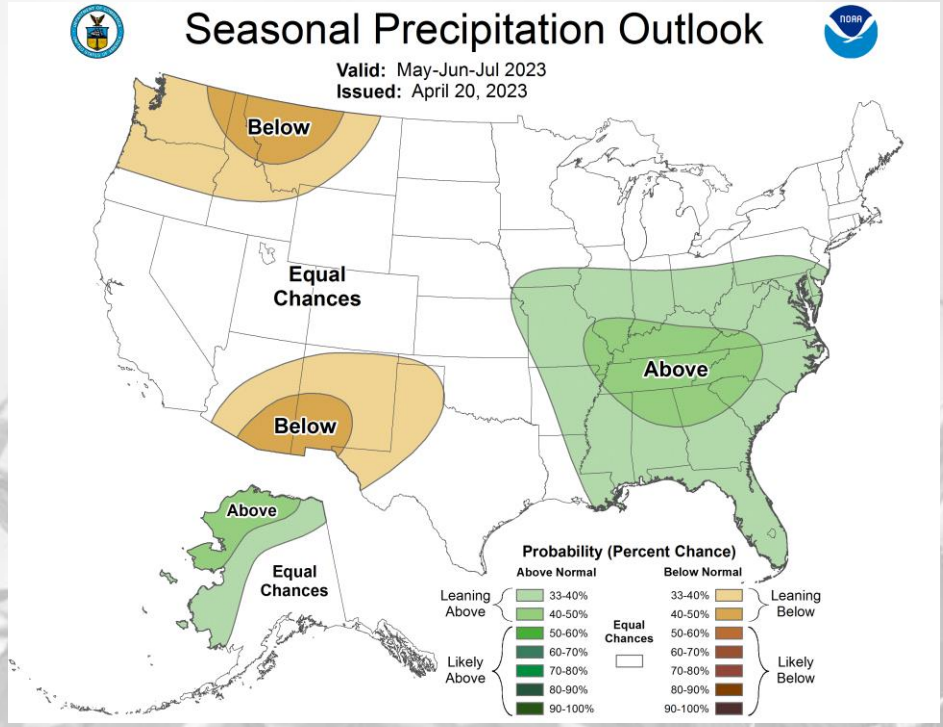


Temperature **Precipitation**

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

May-July Temperature and Precipitation Probabilities

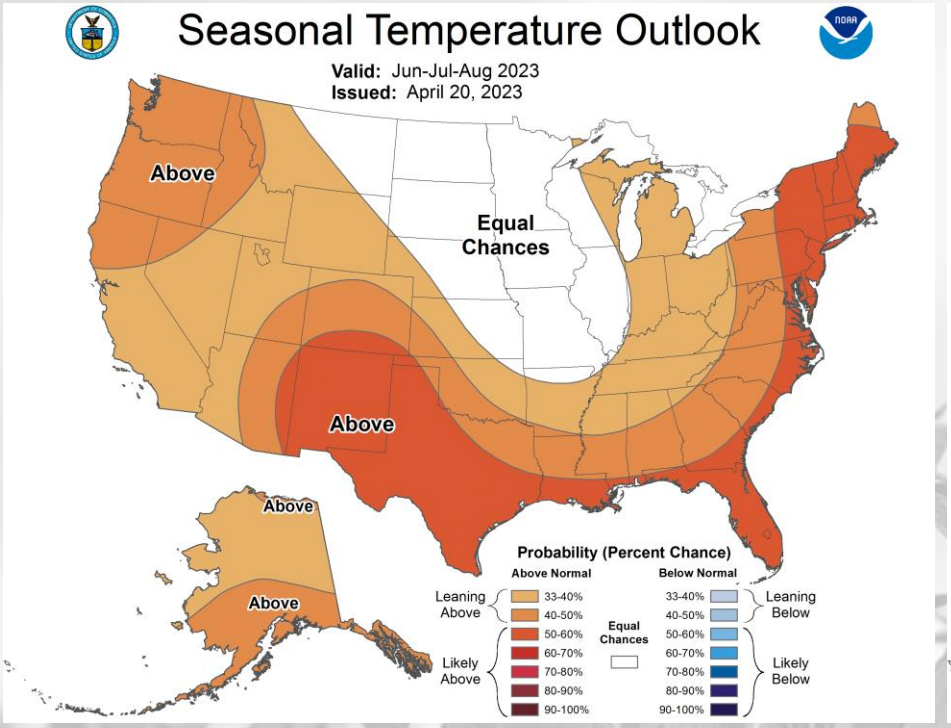


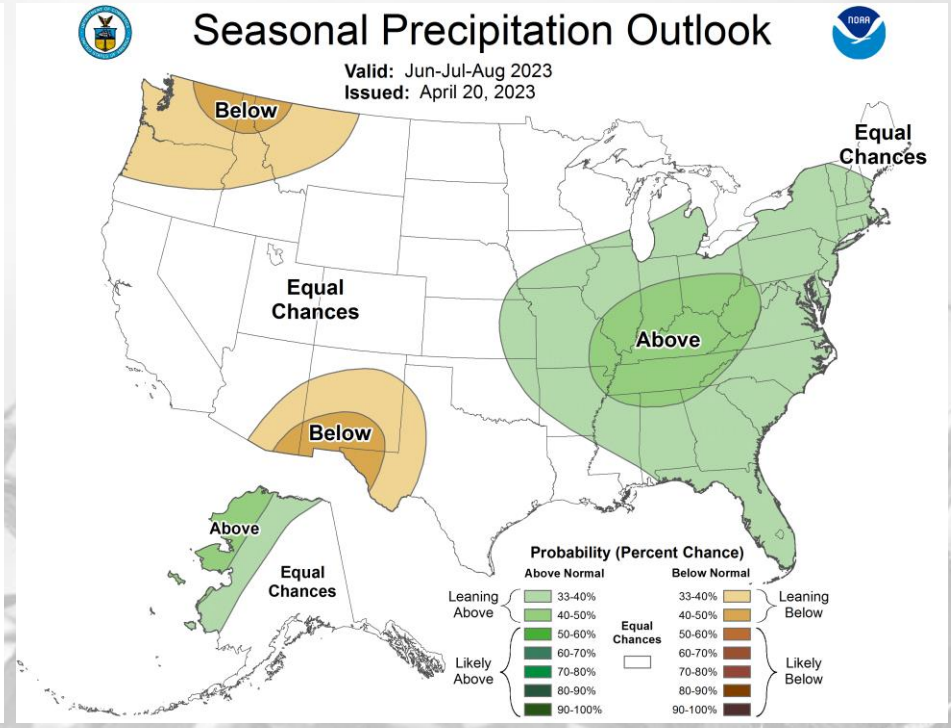


Temperature **Precipitation**

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

June-August Temperature and Precipitation Probabilities

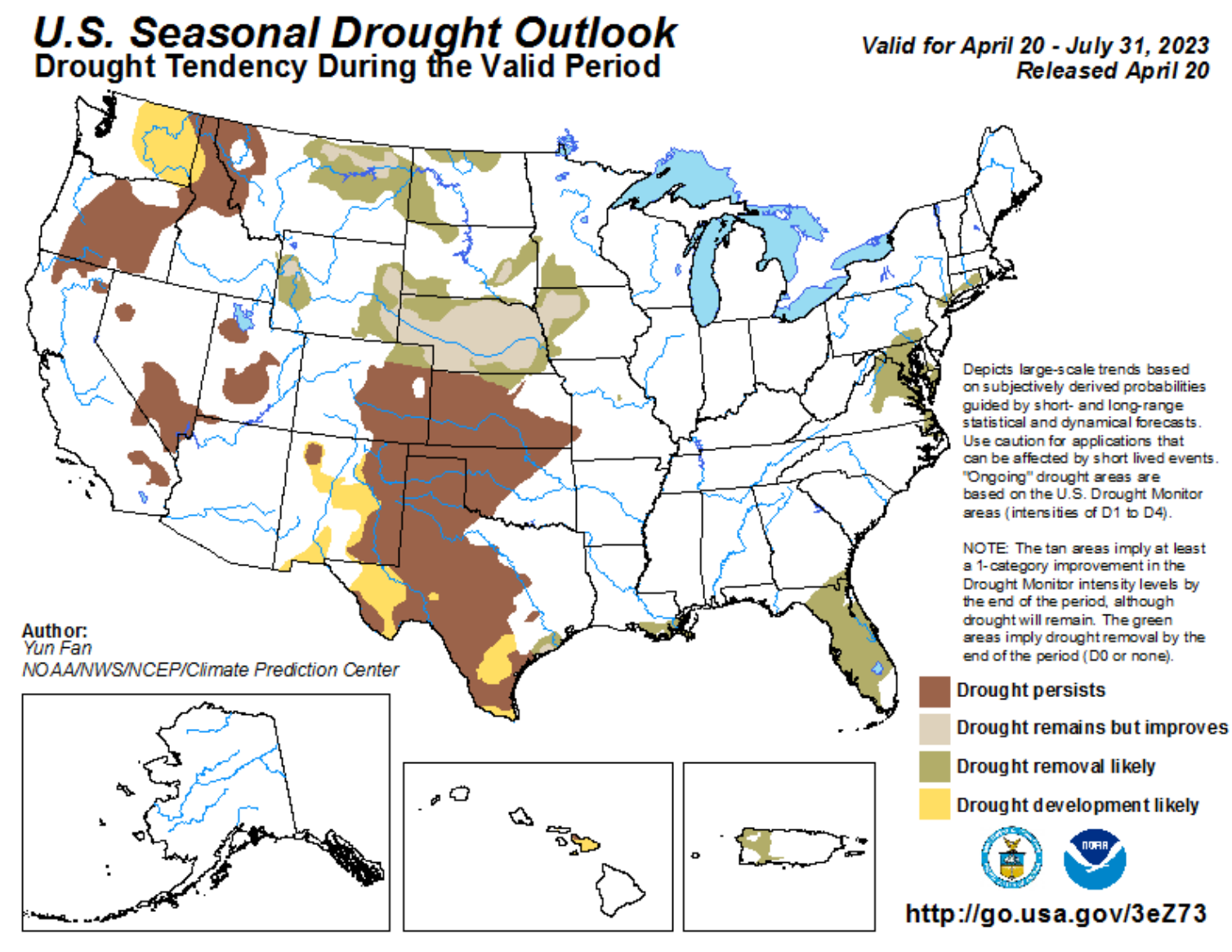




Temperature **Precipitation**

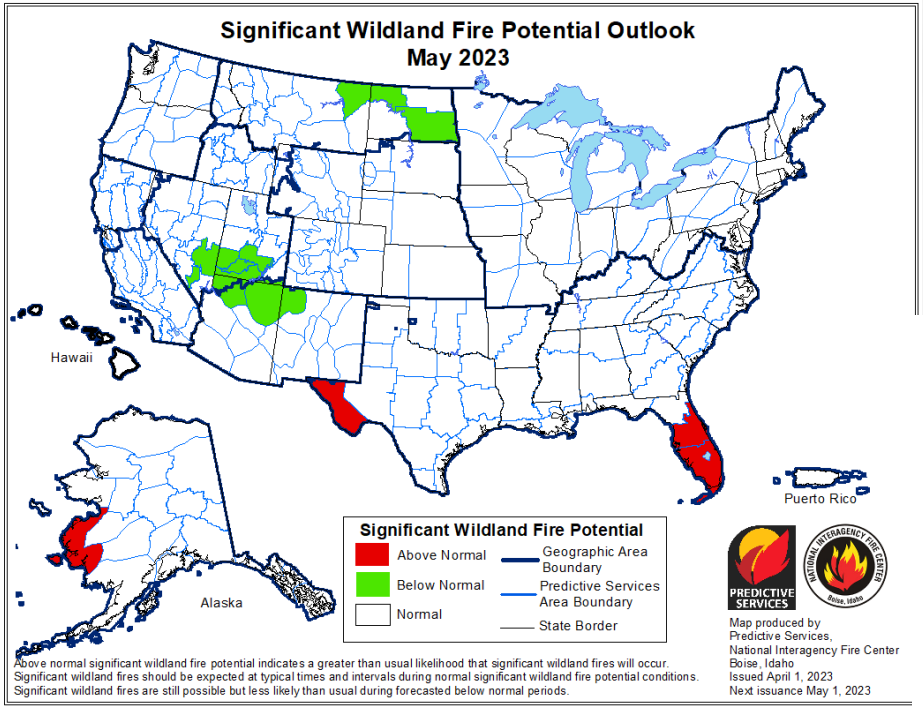
https://www.cpc.ncep.noaa.gov/products/predictions/long_range/seasonal.php?lead=02

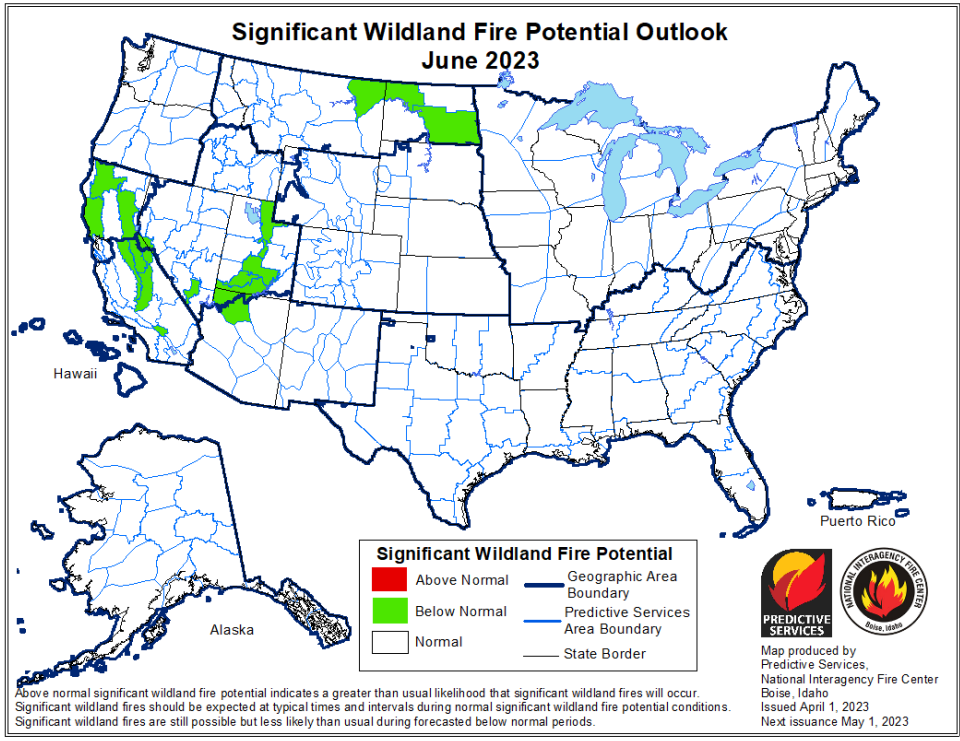
Drought Outlook through 31 July

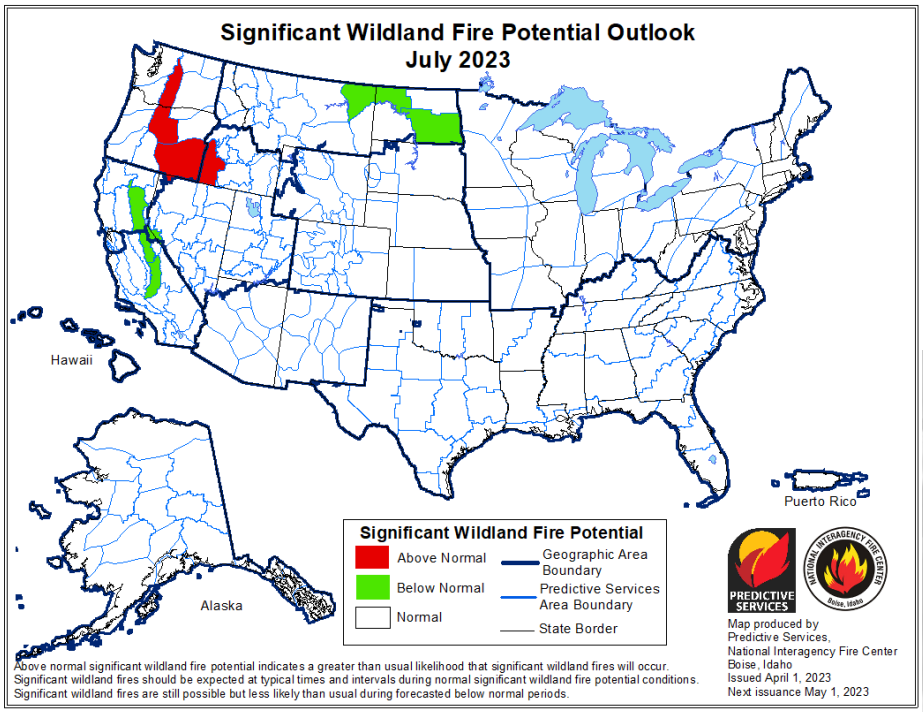


http://www.cpc.ncep.noaa.gov/products/expert_assessment/season_drought.gif/

Wildland Fire Potential







https://www.nifc.gov/nicc/predictive/outlooks/outlooks.htm

Summary - Conditions

* Generally wetter east/drier west – some smaller variations
* Warmer east – cooler west.
* Drought issues persist much of Plains into IA/MN
* Cool soils north.
* Still snowmelt issues in rivers – not done with snow….
* Other longer term drought issues west (surface water/rangeland/winter wheat)

Summary - Outlooks

* La Niña gone – likely transitioning to El Niño. Speed and El Niño strength seem more question
* Reduces some drought risk into growing season.

* Overall less confidence in outlooks without La Niña/El Niño in play.
* Better chances warmer/wetter east – not strong.
* Not much to say in Plains. Should help drought some but have serious deficits to overcome.

Further Information - Partners

- **Today's and Past Recorded Presentations and :**
  - https://mrcc.purdue.edu/multimedia/webinars.jsp
  - https://hprcc.unl.edu/webinars.php
- 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/**
- USDA Climate Hubs https://www.climatehubs.usda.gov/
- State climatologists
  - http://www.stateclimate.org
- Regional climate centers
  - http://mrcc.purdue.edu
  - http://www.hprcc.unl.edu

Thank You and Questions?

- Questions:
  - **Climate:**
  - Dennis Todey: dennis.todey@usda.gov , 515-294-2013
  - Doug Kluck: doug.kluck@noaa.gov, 816-994-3008
  - Melissa Widhalm: mwidhalm@purdue.edu 765-494-8191
  - Gannon Rush: grush2@unl.edu
  - Brian Fuchs: bfuchs2@unl.edu 402 472-6775
  - Molly Woloszyn: molly.woloszyn@noaa.gov

  - **Weather:**
  - crhroc@noaa.gov

For More Information

Midwest Climate Hub

@dennistodey

https://www.climatehubs.oce.usda.gov/hubs/midwest

Dennis Todey, Director

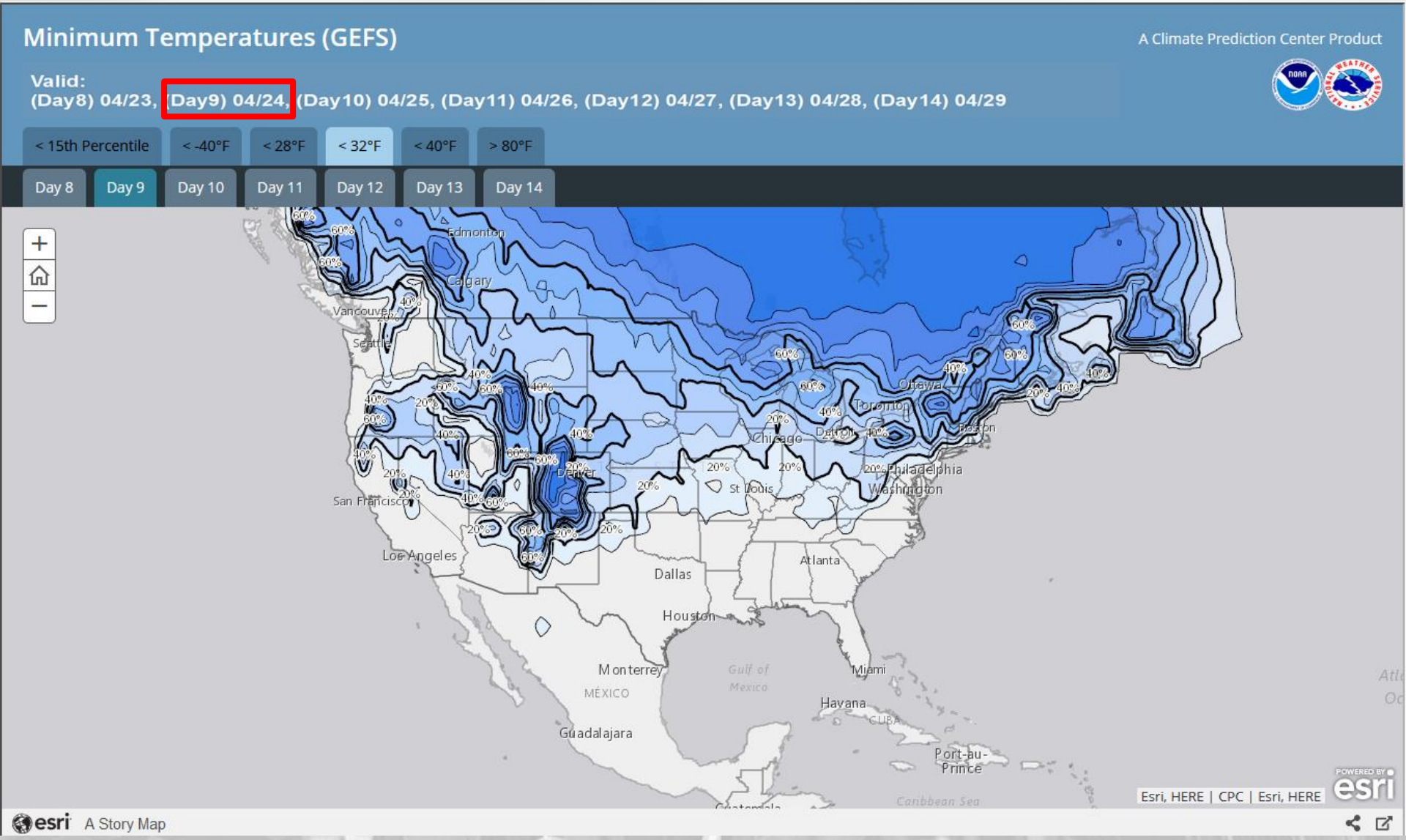
515-294-2013

Dennis.todey@ars.usda.gov

Grass Fires Necedeh, WI
Steve Vavrus, UW-M (Wisconsin SC)

National Laboratory for Agriculture and the Environment
Attn: Midwest Climate Hub
1015 N University Blvd
Ames, Iowa 50011-3611

Risk of Temperature < 32 F



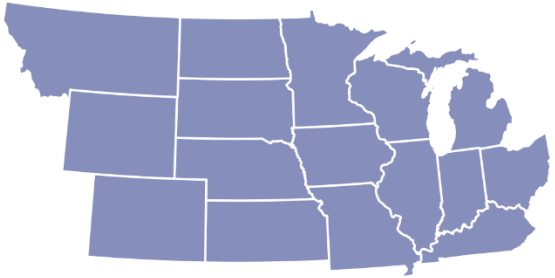
Other Crop Impacts

Frozen soybeans IL Chelsea Harbach, Director of the U of I Northwestern Illinois Ag R&D Center

- Other crop reports
  - Some small grain/cover crop damage in Northern Plains
  - Row crops mostly unaffected (corn, soybeans, others). Some early planted soybeans in IL probably lost.
  - Not emerged from soil or can recover from freeze

Making the Webinars

REGISTER
Scan QR code ▶▶▶
attendee.gotowebinar.com/register/7528179497868100876



Partners

- Central Region Climate Services Director (RCSD)
- Central Region National Weather Service (NWS)
- NOAA National Integrated Drought Information System (NIDIS)
- American Association of State Climatologists (AASC)
- Regional Climate Centers (RCCs)
- State Climate Offices
- USDA Climate Hubs (Midwest and Northern Plains)
- USDA Office of the Chief Economist
- State Universities and Extension
- National Drought Mitigation Center

Presenters & Network

- 22 unique webinar presenters since 2011
- 45 local experts across the region provide pre-webinar input on areas of concern

Monthly Webinar

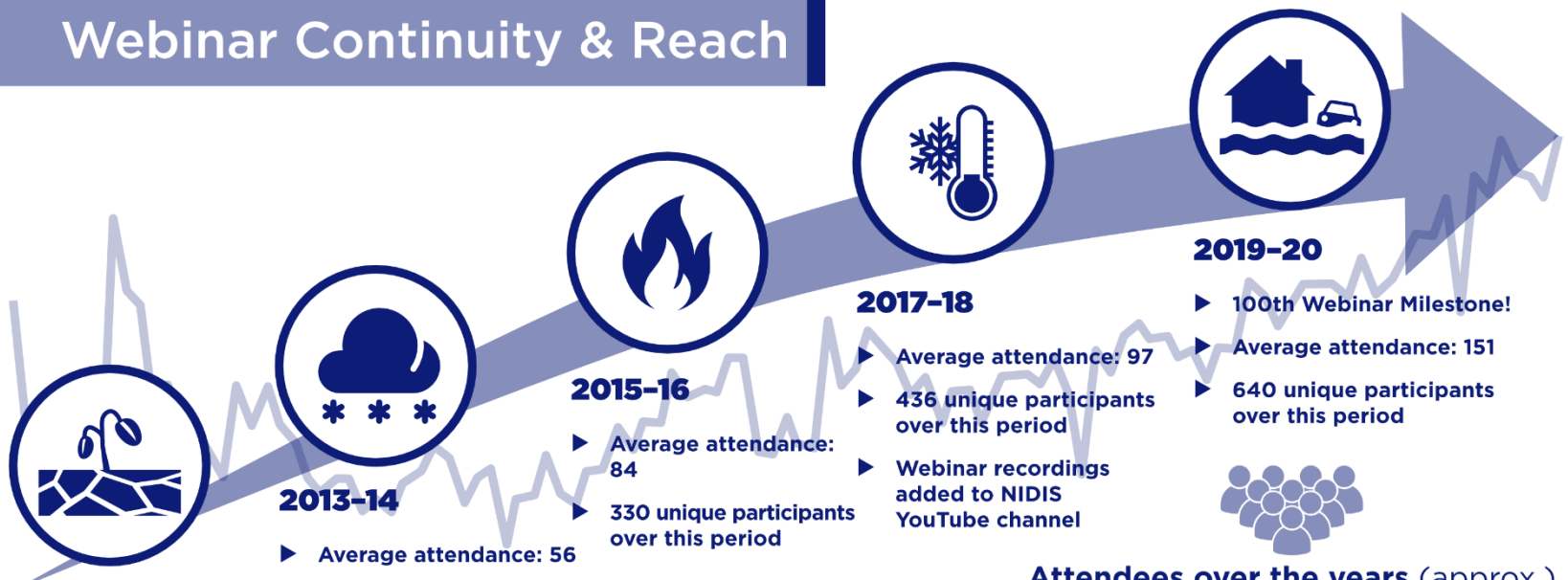
- Livestream
- 45-minute presentation
- 15-minute audience interaction Q&A
- Recording and presenter slides archived for later viewing and sharing: **NIDIS** | **MRCC** | **HPRCC**
  click names to view

Data/Information Provided

- Current conditions with historical perspective
- U.S. Drought Monitor
- Crop status reports
- Current impacts
- Seasonal information
- Hydrology
- Monthly/seasonal outlooks
- El Niño Southern Oscillation impacts
- Big picture and regional specifics
- Possible impact of future events

The North Central U.S. Monthly Climate and Drought Summary and Outlook

Webinar Continuity & Reach



2011–12

- Webinar launch in response to 2011 Missouri River flooding
- Continued in response to 2012 drought
- Average attendance: 79 geographically focused on Missouri River Basin

2013–14

- Average attendance: 56
- Expanded geographic focus to include the Midwest

2015–16

- Average attendance: 84
- 330 unique participants over this period

2017–18

- Average attendance: 97
- 436 unique participants over this period
- Webinar recordings added to NIDIS YouTube channel

2019–20

- 100th Webinar Milestone!
- Average attendance: 151
- 640 unique participants over this period

"A great summary in one hour that would take me a day to dig around and look through all the same material."

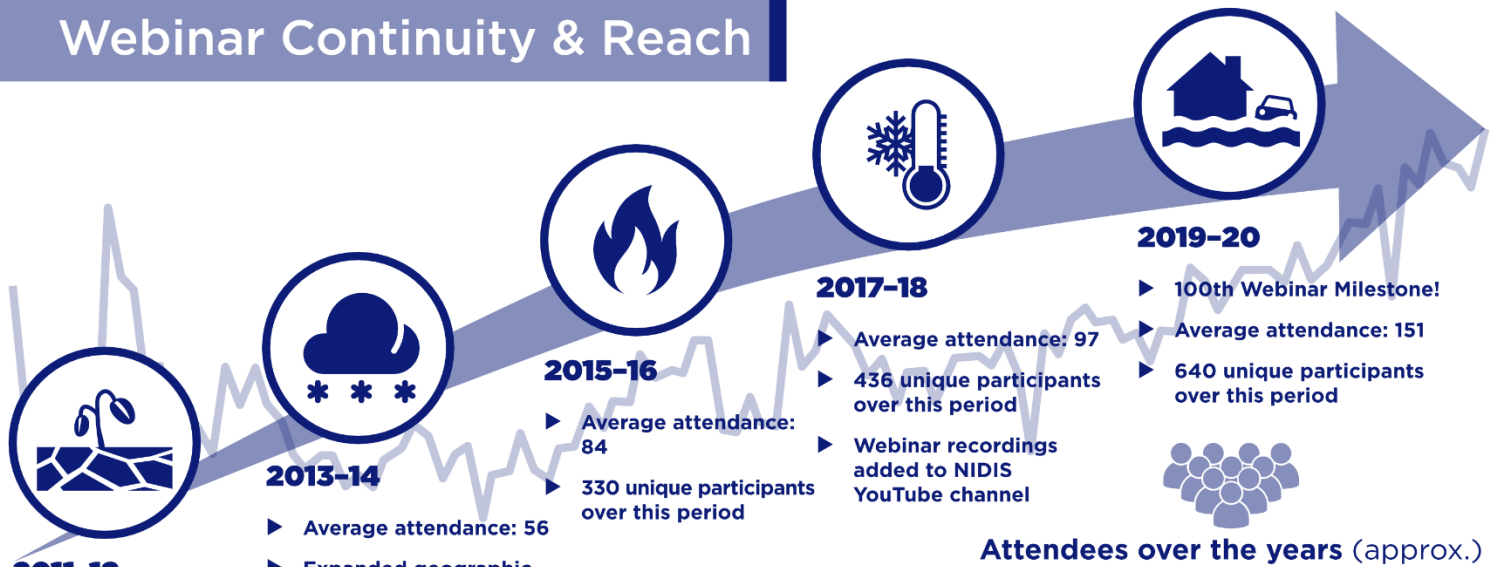
Attendees over the years (approx.)

- 670 Federal Agency Staff
- 230 State Government Staff
- 40 Tribal Government/ Agency Staff
- 290 Academic and Research Staff
- 200 Business & Industry Leaders, including Farmers
- 40 Media Writers
- 85 City, Municipality, County Staff
- 50 Individuals
- 80 Non-profit and Trade Organization Staff
- 10 Elected Representative Offices
- 15 International Entities

Over 13,500 webinar views (live and YouTube) from 2011–2020

The North Central U.S. Monthly Climate and Drought Summary and Outlook

Webinar Continuity & Reach



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- 15 International Entities

Over 13,500 webinar views (live and YouTube) from 2011–2020

https://drought.unl.edu/Projects/Detail.aspx?id=34