Central Region Climate & Drought Outlook
February 20, 2020

TRENT FORD

ILLINOIS STATE CLIMATOLOGIST

ILLINOIS STATE WATER SURVEY | PRAIRIE RESEARCH INSTITUTE

UNIVERSITY OF ILLINOIS, URBANA-CHAMPAIGN

General Information

Providing Climate Services to the Central Region

- Collaboration Activity Between:
  - USDA Climate Hubs
  - American Association of State Climatologists
  - Midwest and High Plains Regional Climate Centers
  - NOAA NCEI/NWS/OAR/NIDIS
  - National Drought Mitigation Center
- Access to Future Climate Webinars & Past Recordings can be found:
  - http://mrcc.isws.Illinois.edu/multimedia/webinars.jsp
  - http://www.hprcc.unl.edu/webinars.php

Next Climate/Drought Outlook Webinar

- Thursday, March 19 – Jeff Andresen & BJ Baule (Michigan State Climatologist's Office)

NWS Spring Hydrologic Outlook Webinar

- Thursday, February 27 @ 2:30 CT
- Register: https://attendee.gotowebinar.com/register/5268300473561473293

Open Questions at the End

Outline

Recent Climate Conditions
- January review
- Last 30-, 60-days

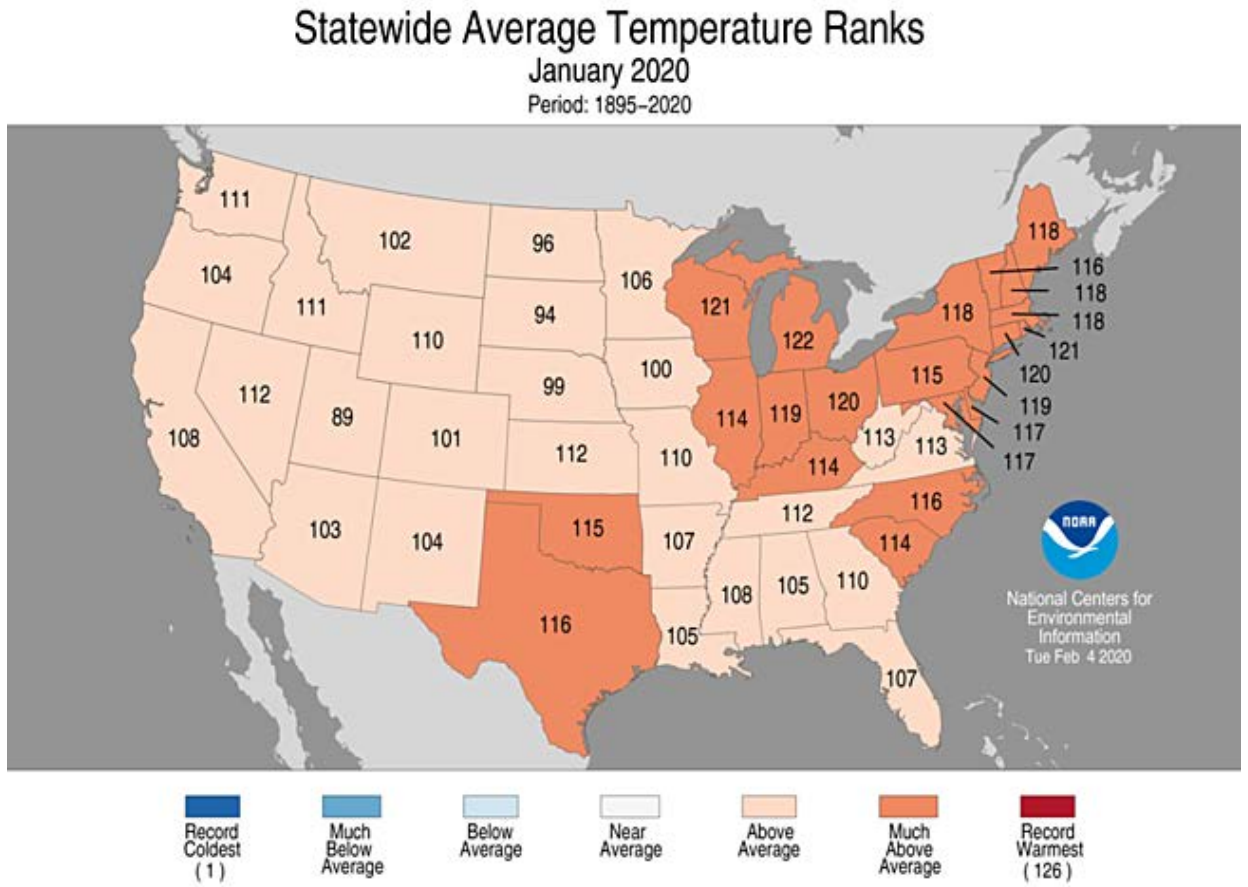
Current Hydrology Conditions
- Snow, Soils, & Streams (oh my!)
- Great Lakes

Impacts
- Agriculture & Ecosystems
- Flooding & Coastal Erosion

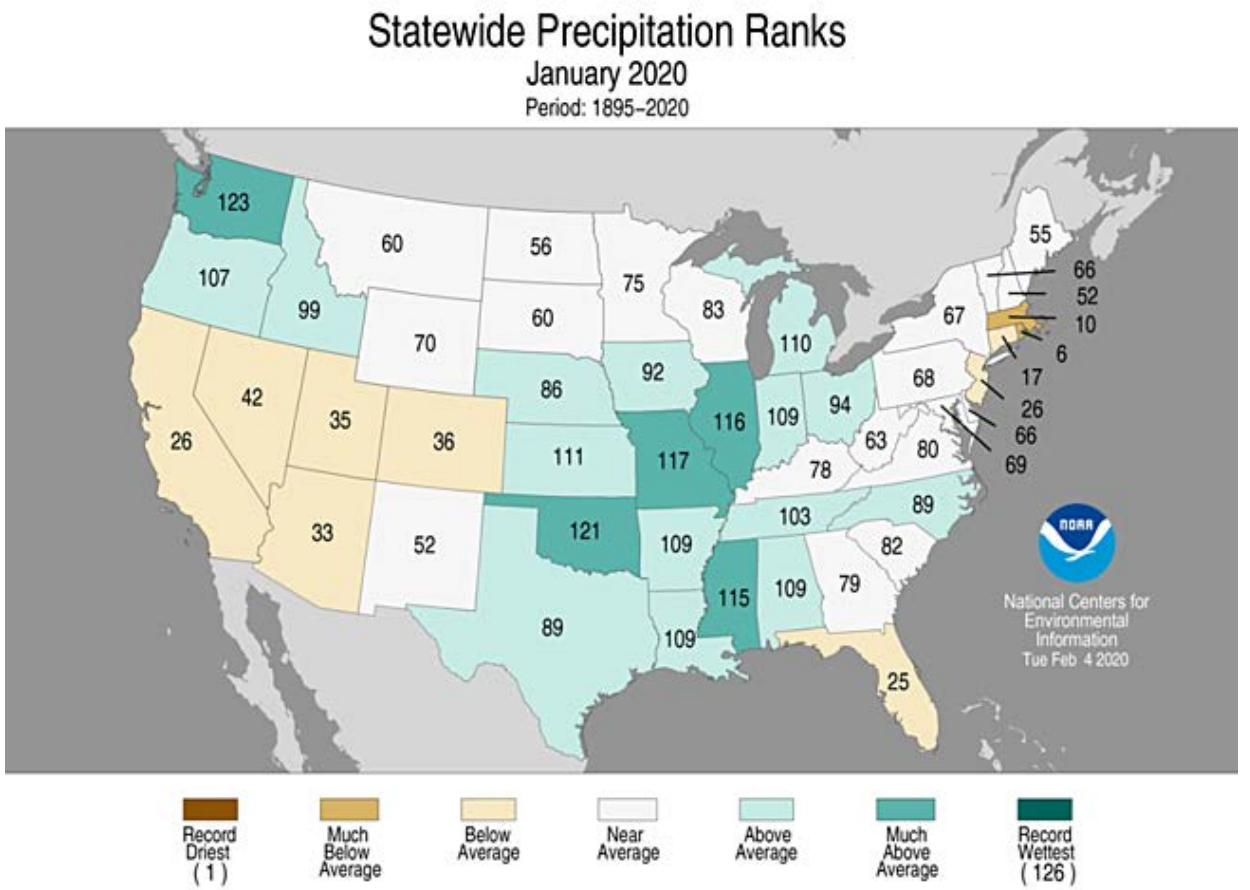
Outlooks
- ENSO & Short-term
- Spring & Beyond

Recent Climate Conditions

January Climate Review



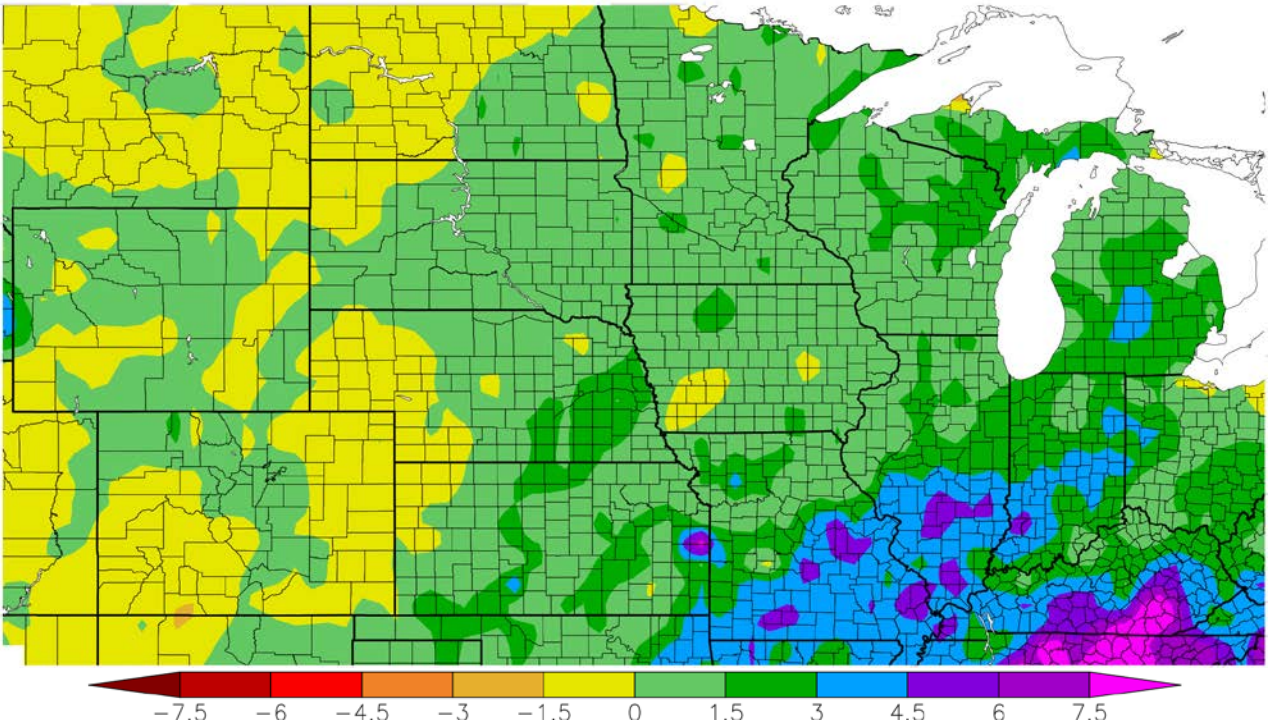
Source: https://www.ncdc.noaa.gov/temp-and-precip/us-maps/

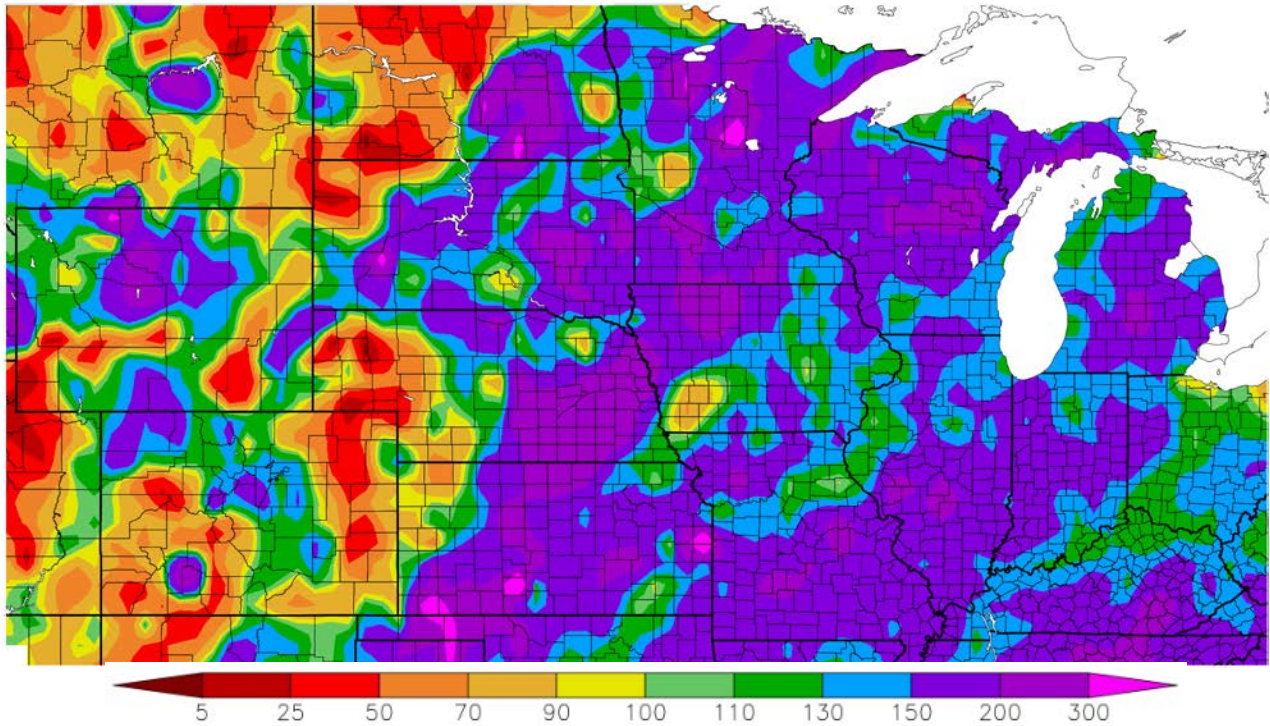


- Top 10 wettest January in IL and MO
- Top 5 warmest January in WI, MI, OH
- 4 stations in OH broke January high max temperature records

Precipitation – Last 60 Days

Departure from Normal



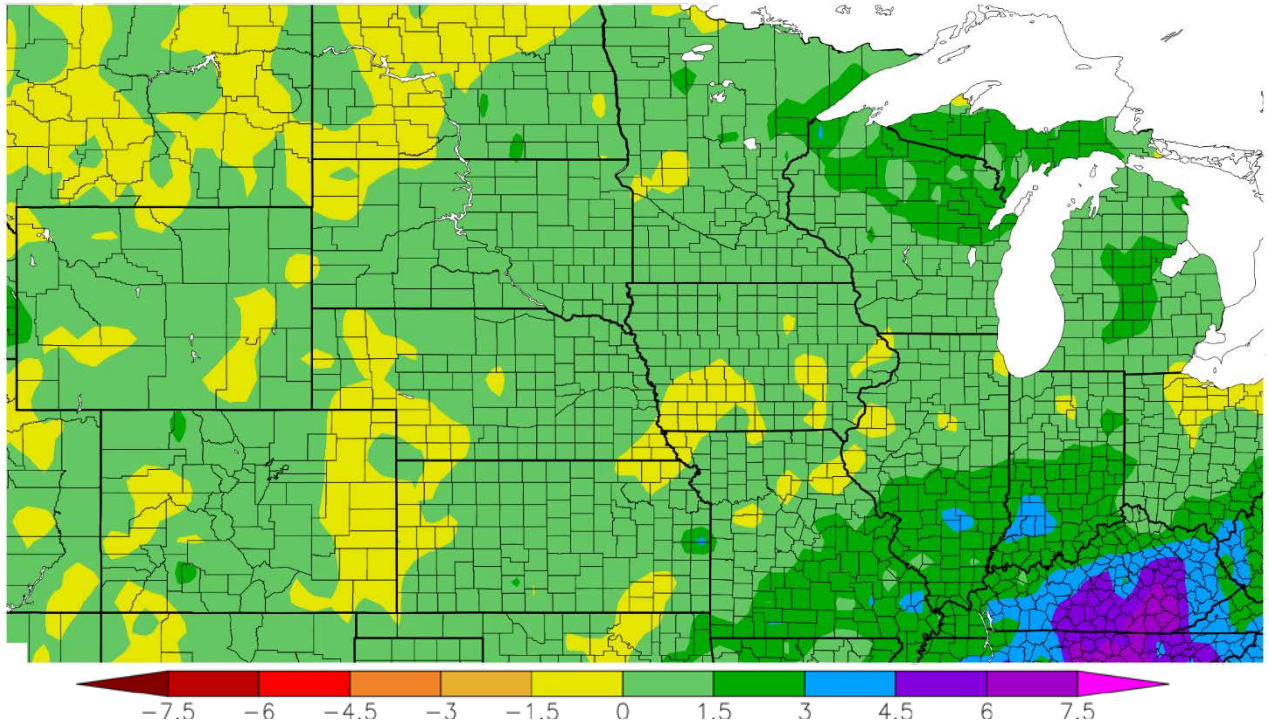


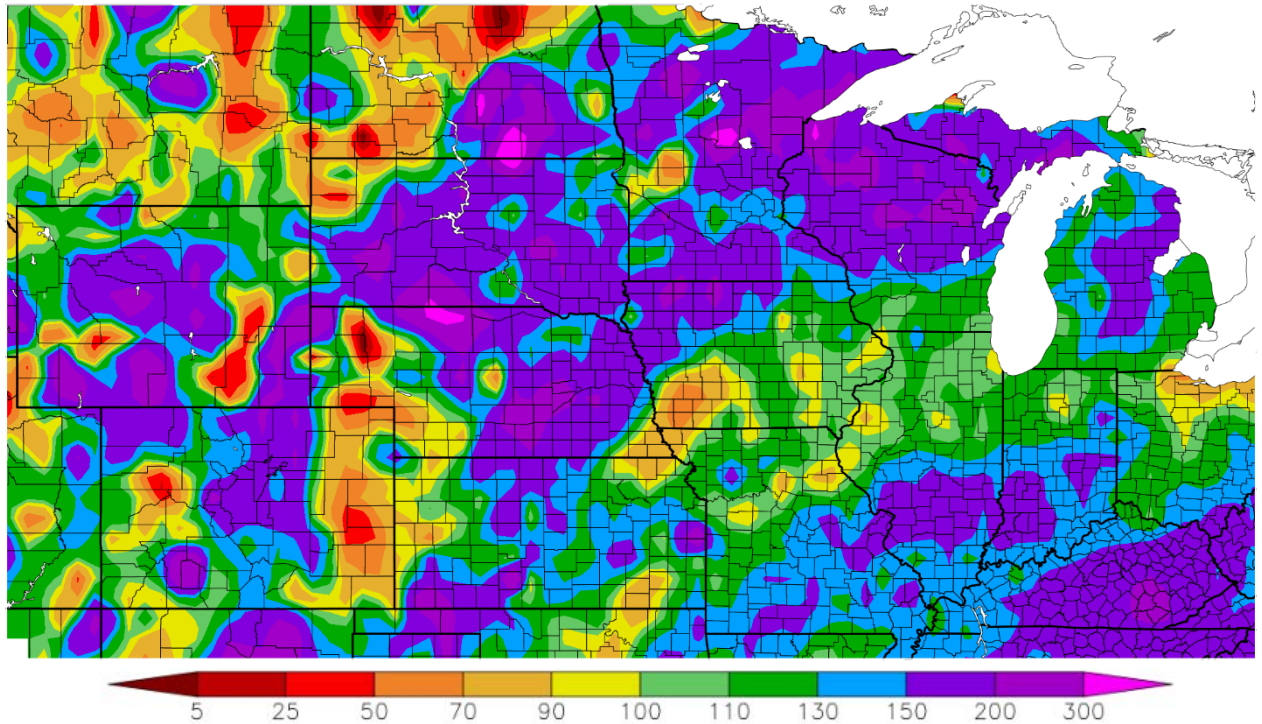
Source: HPRCC, hprcc.unl.edu

- Most of eastern half of the region experienced 150 – 300% of normal precipitation
- Predominantly drier conditions in western region, areas of eastern CO at 10 – 25% normal precipitation

Precipitation – Last 90 Days

Departure from Normal



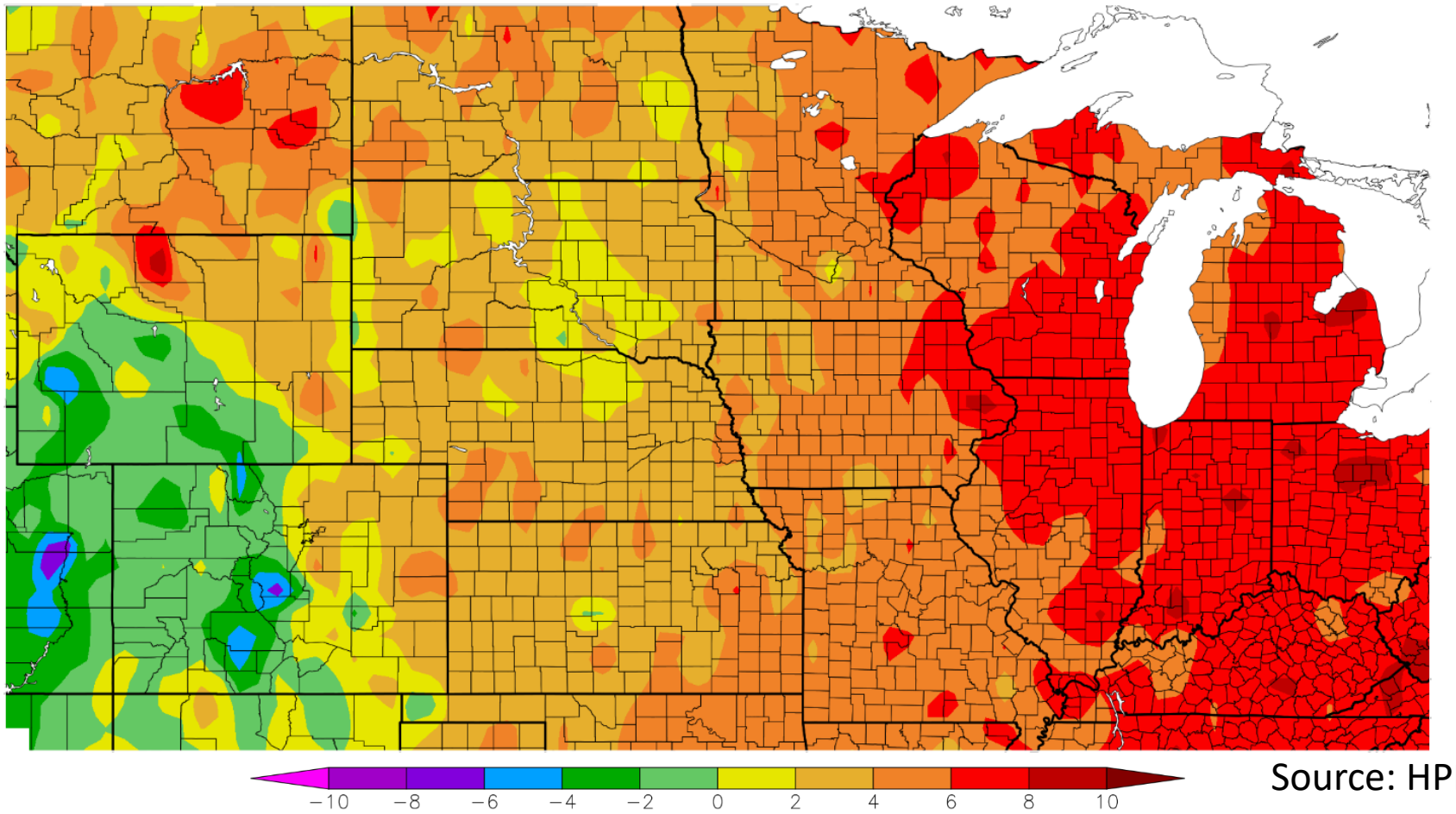


Source: HPRCC, hprcc.unl.edu

- 90-day % normal emphasize very wet conditions in Upper Midwest, Ohio Valley

Temperature Departure (°F)

60-day

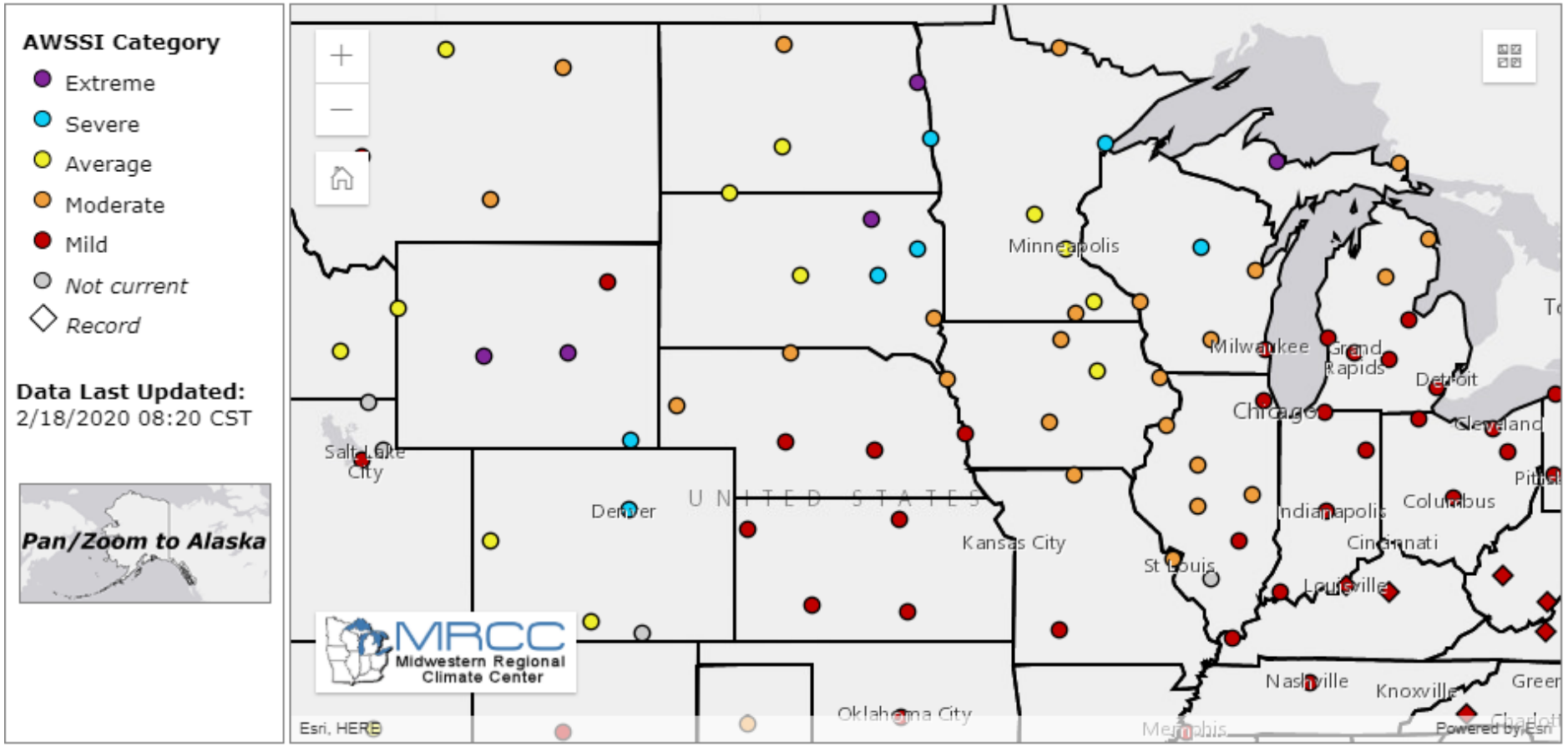


Source: HPRCC, hprcc.unl.edu

- Warmer than normal conditions have persisted from end of 2019

“Winter” Severity So Far

- Accumulated Weather Season Severity Index (AWSSI)
- Daily accumulation based on snowfall, snow depth, minimum/maximum temperature
- Represents cumulative winter season “severity” with respect to historical record



Source: MRCC, https://mrcc.illinois.edu/research/awssi/indexAwssi.jsp

“Winter” Severity So Far

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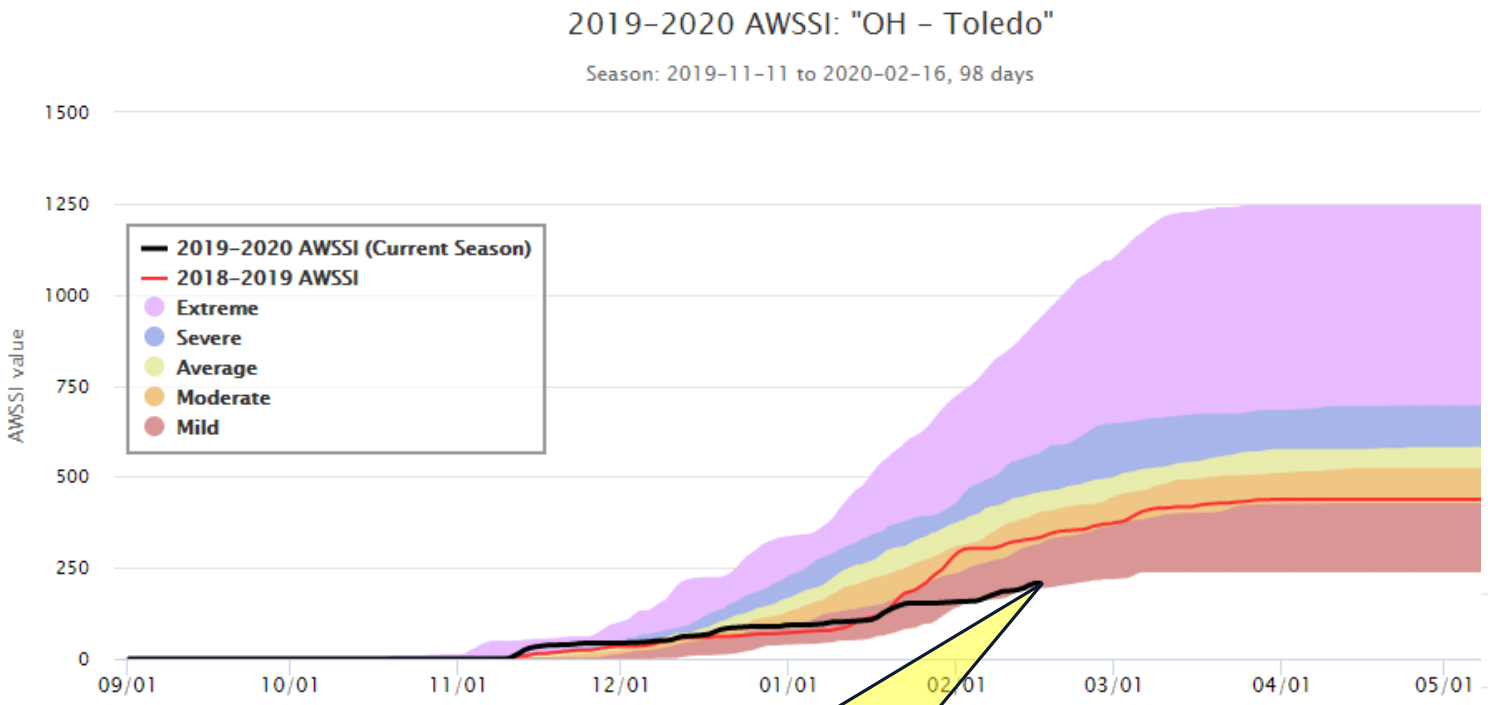
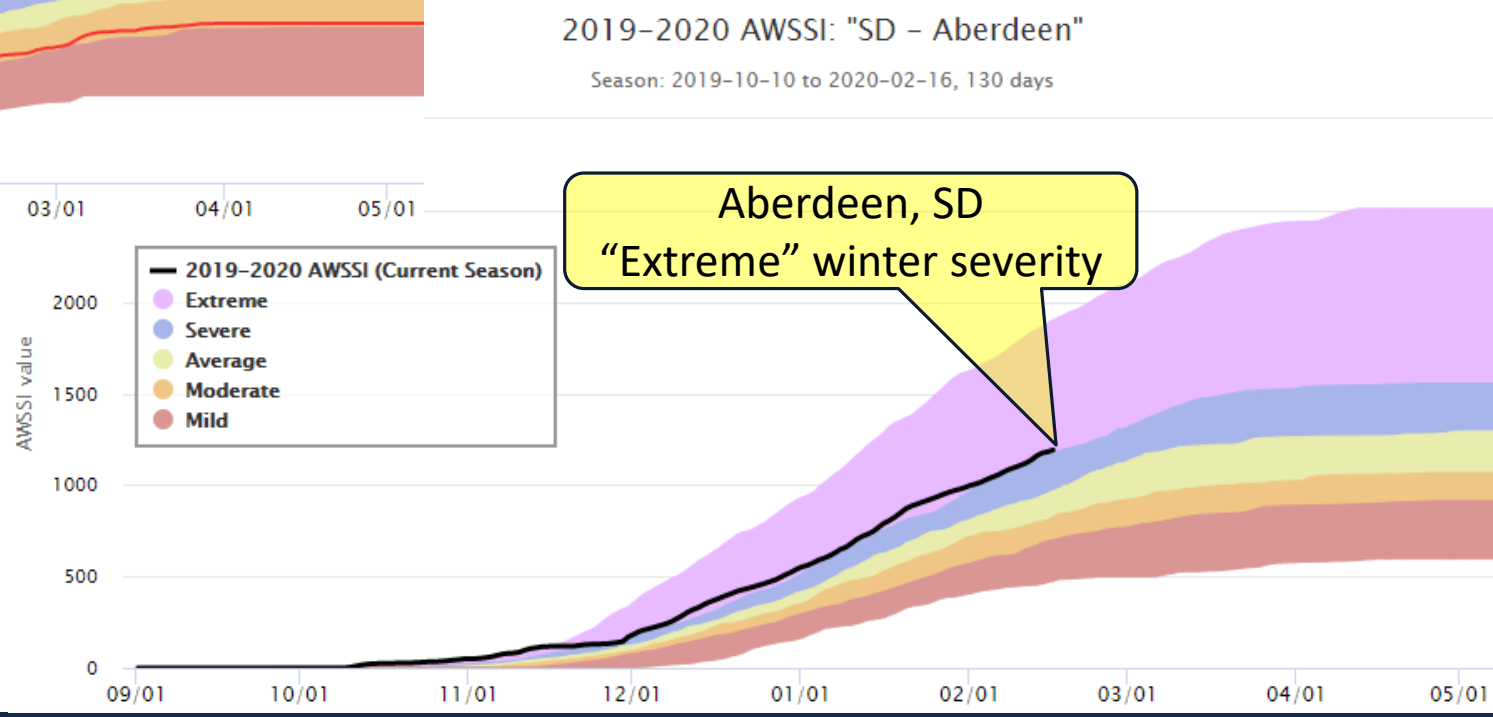


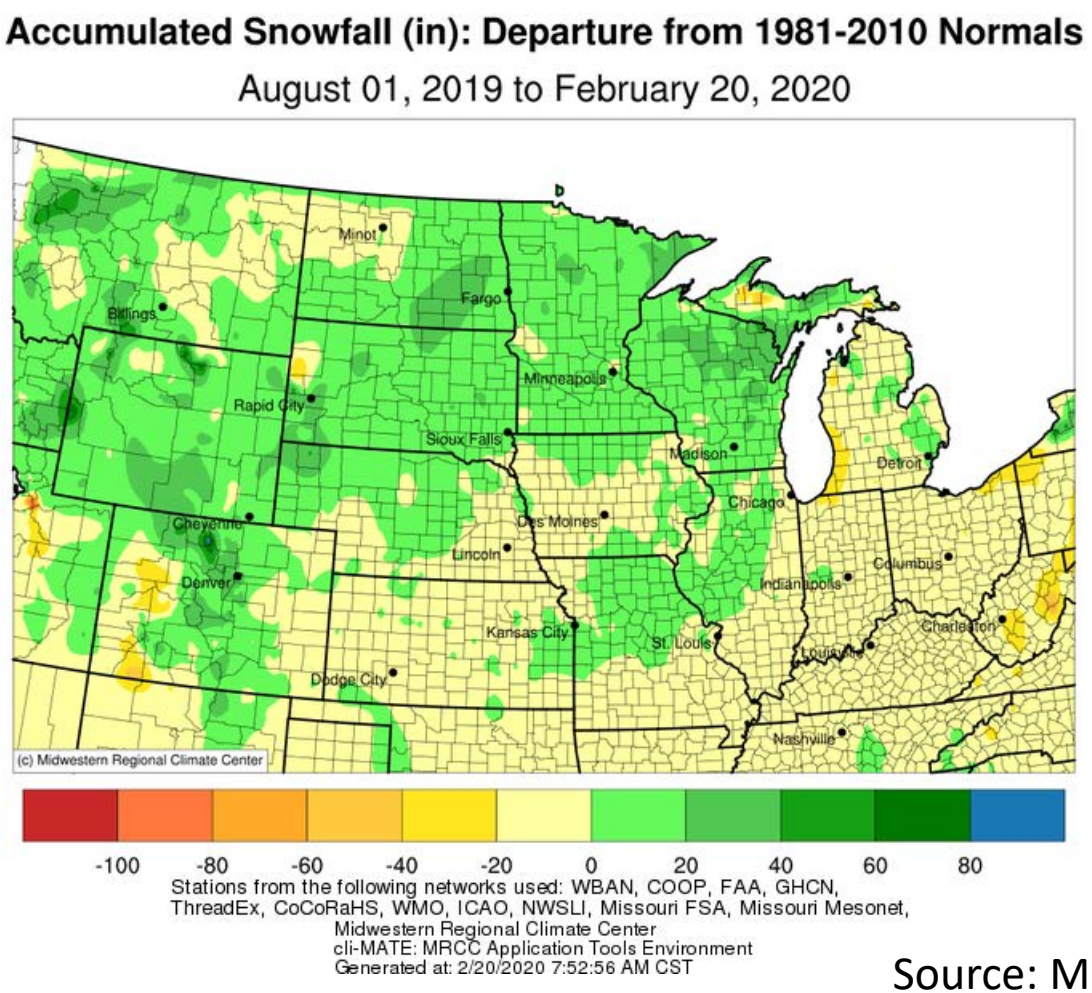
Toledo, OH:
near record low severity

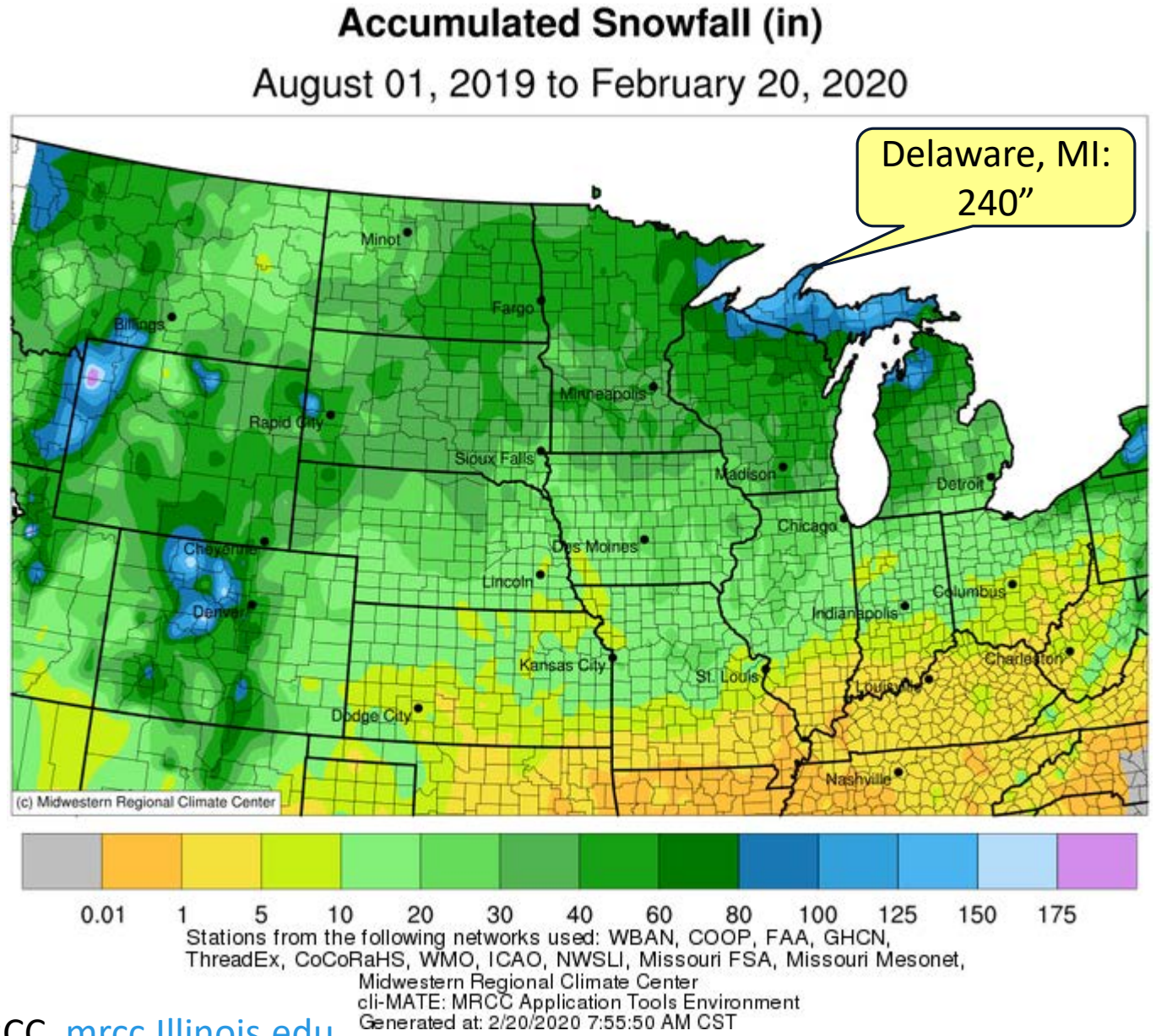


Aberdeen, SD
“Extreme” winter severity

Current Hydrology Conditions

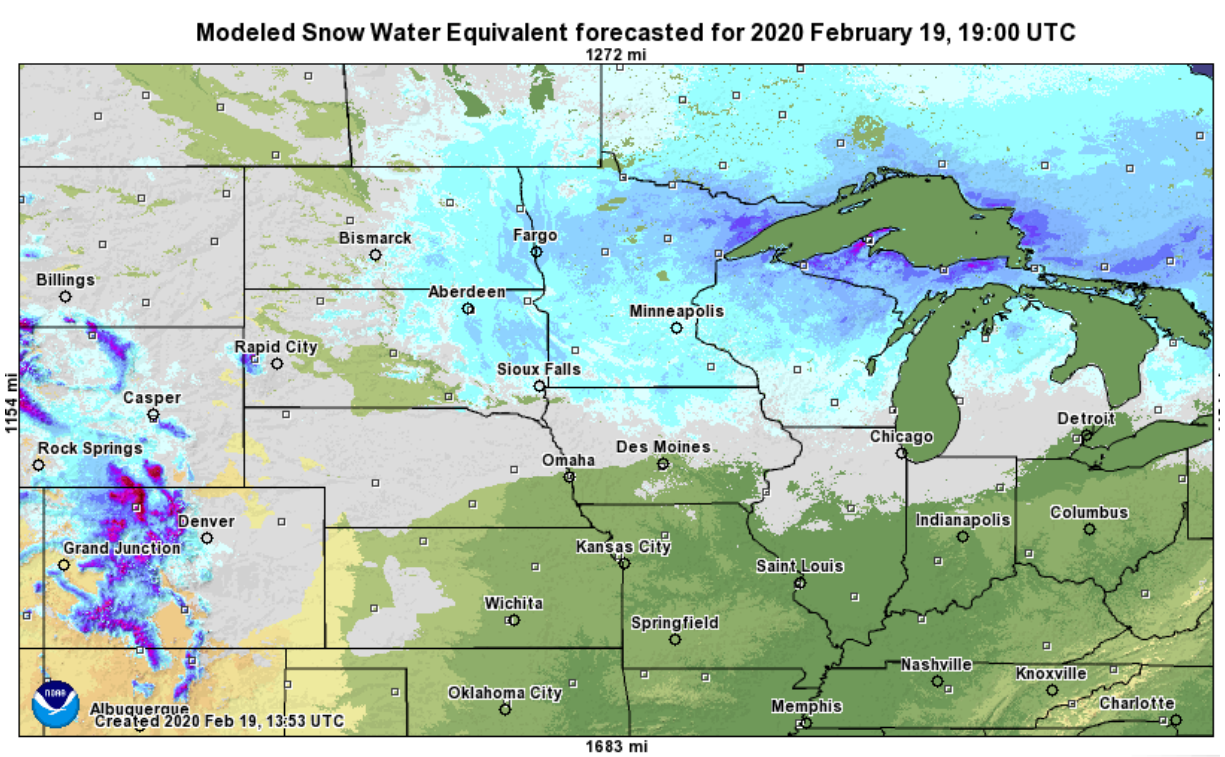
Accumulated Snowfall

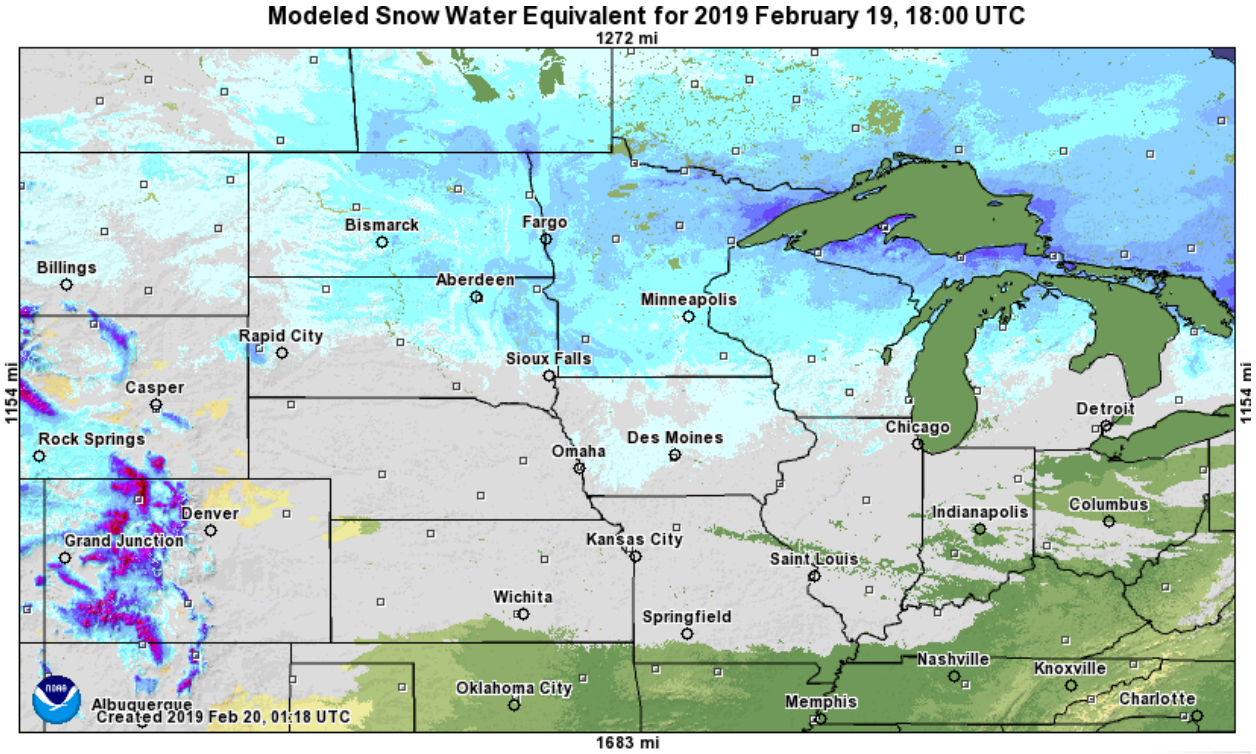




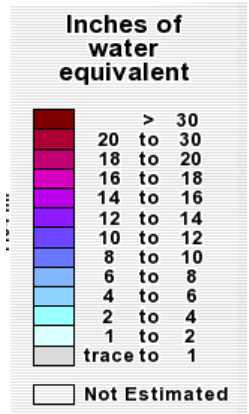
Source: MRCC, mrcc.Illinois.edu

Snowpack (snow water equivalent)





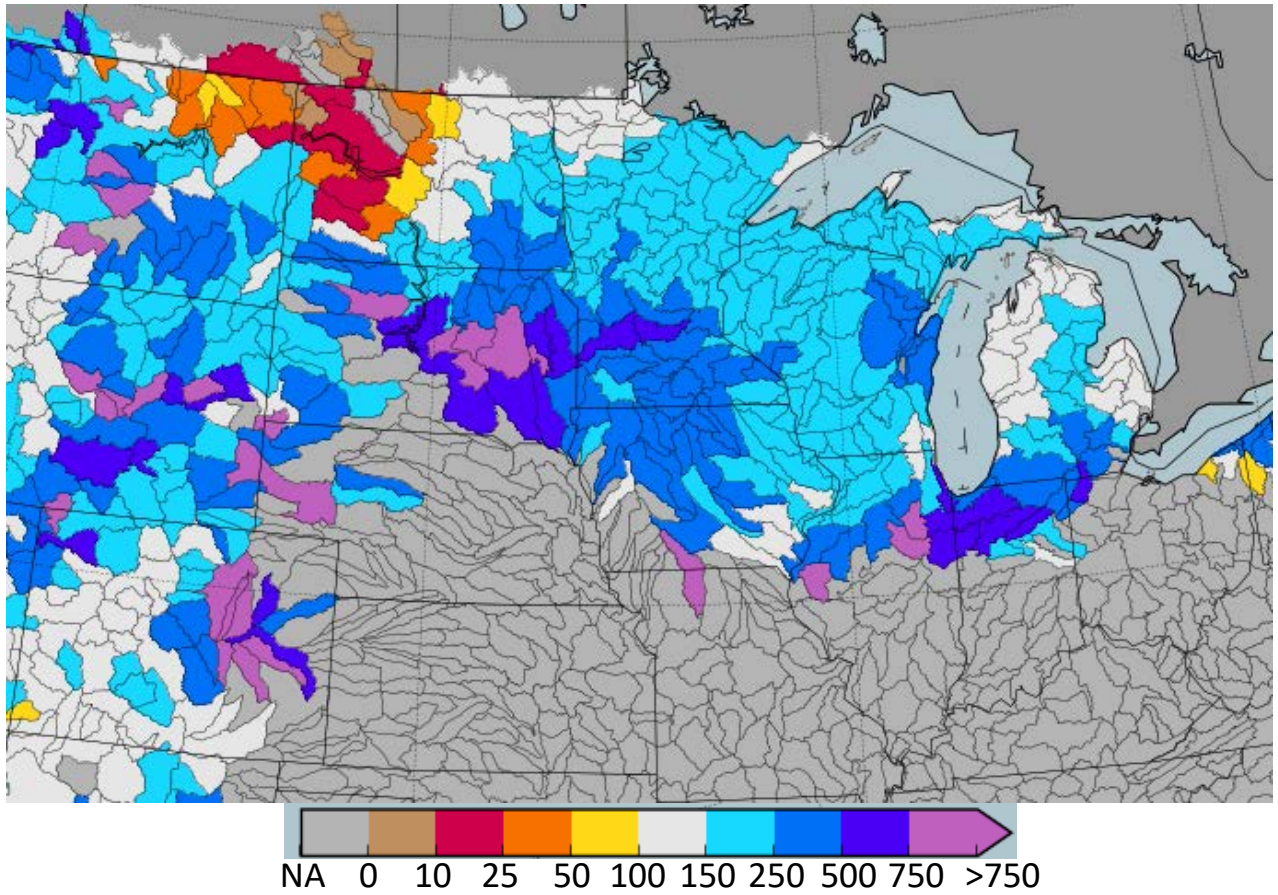
https://www.nohrsc.noaa.gov/interactive/html/map.html



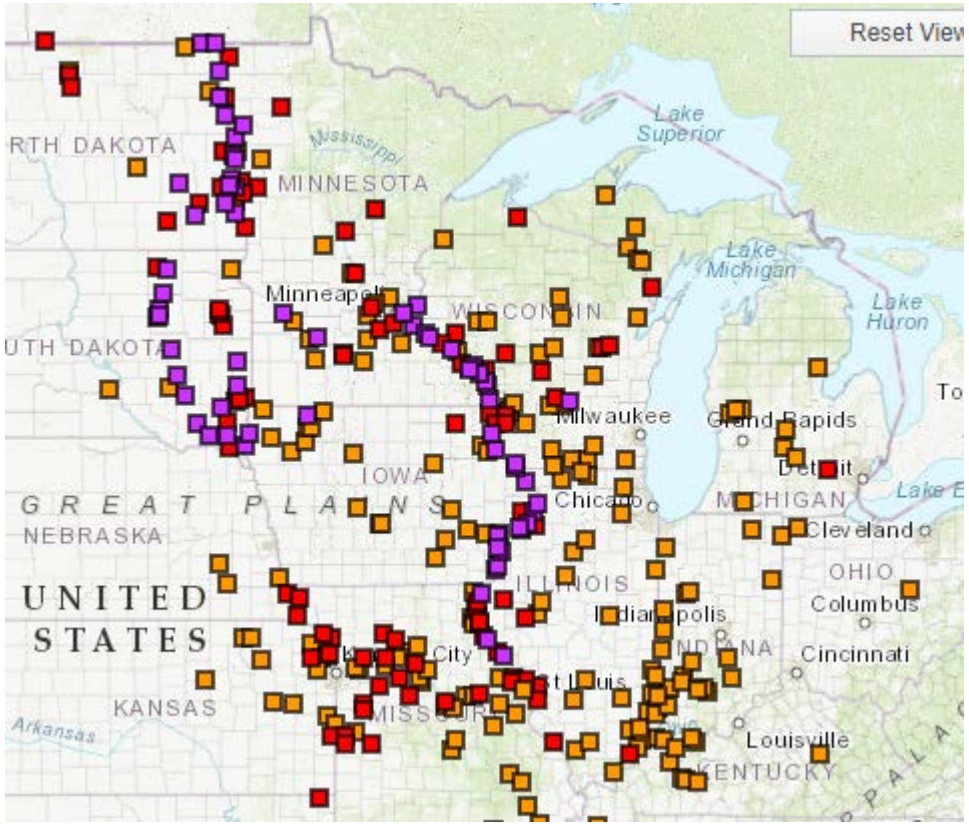
- Larger snowpack this year than last in northern ND, WI, Upper Peninsula
- Smaller snowpack in western Dakotas/eastern MT, all of southern Midwest

Snowpack & Spring Flooding Risk

Source: https://www.nohrsc.noaa.gov/nsa/



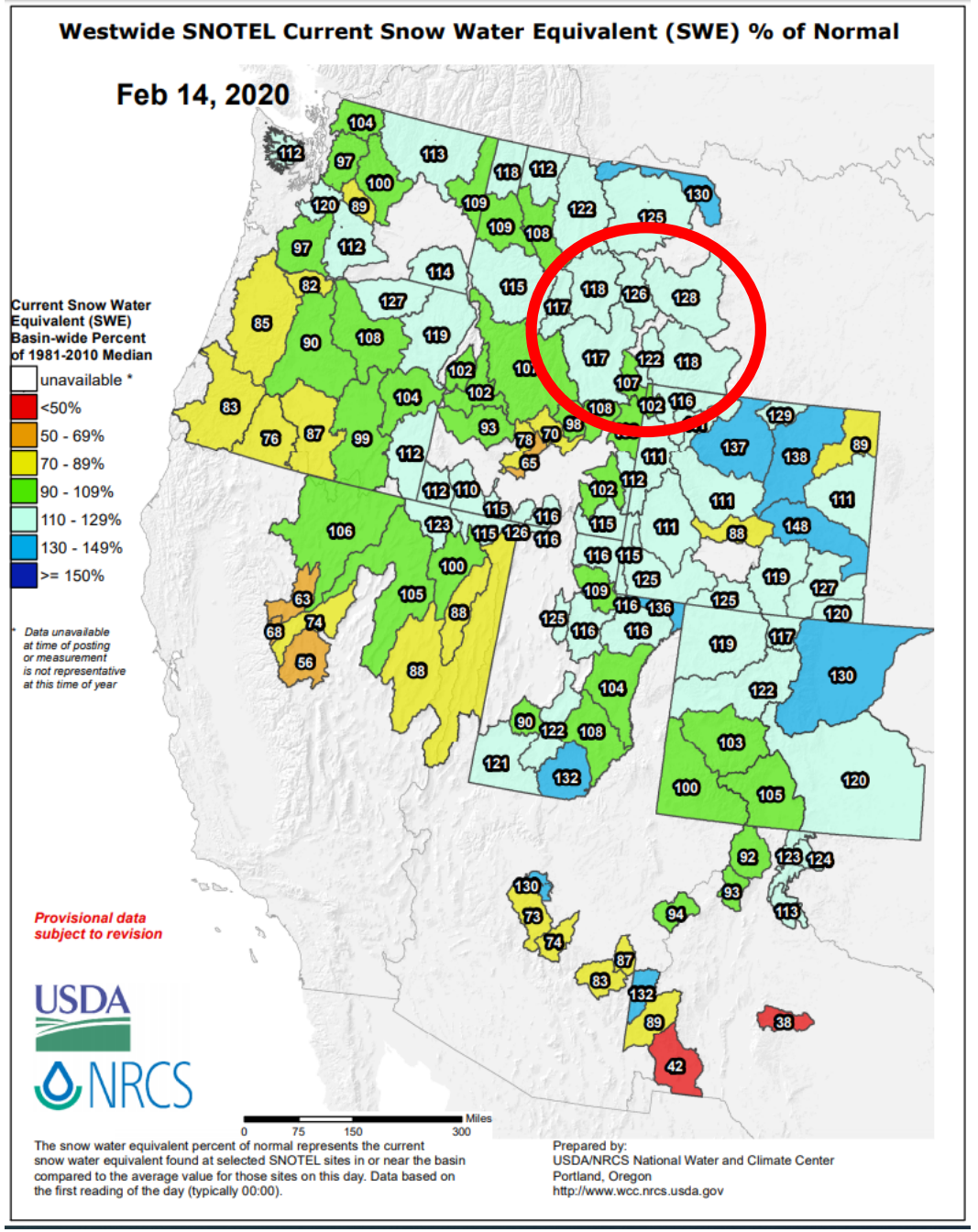
Source: https://water.weather.gov/ahps/region_long_range.php?rfc=mvrfc&percent=50



455 gauges with 50% or greater chance of flooding during February – April

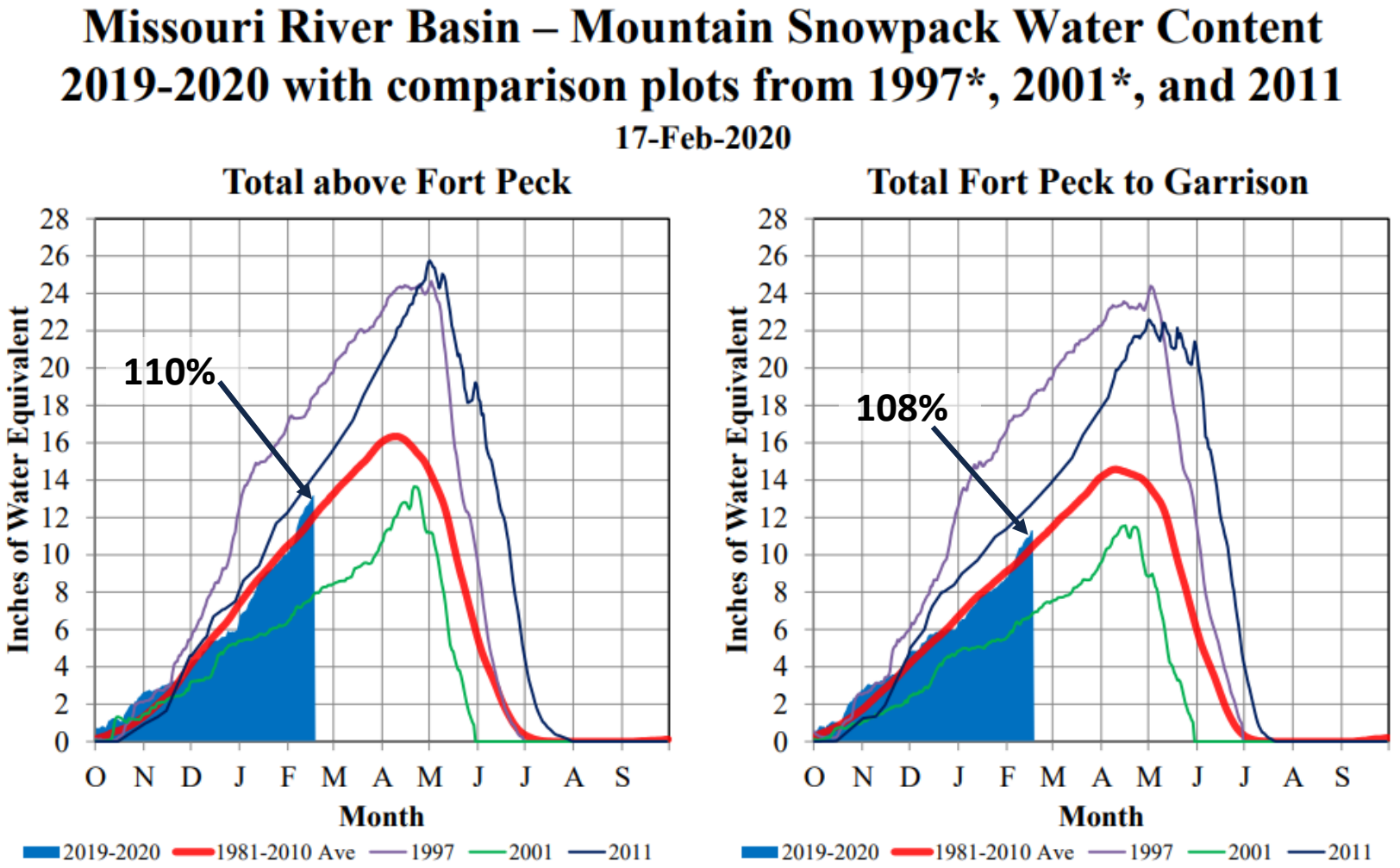
Mountain Snowpack

- USDA/NRCS Snow Water Equivalent (% normal)
- Missouri Basin headwaters near to above normal snowpack



https://www.wcc.nrcs.usda.gov/snow/snotel-wereports.html

Mountain Snowpack – Missouri River Basin

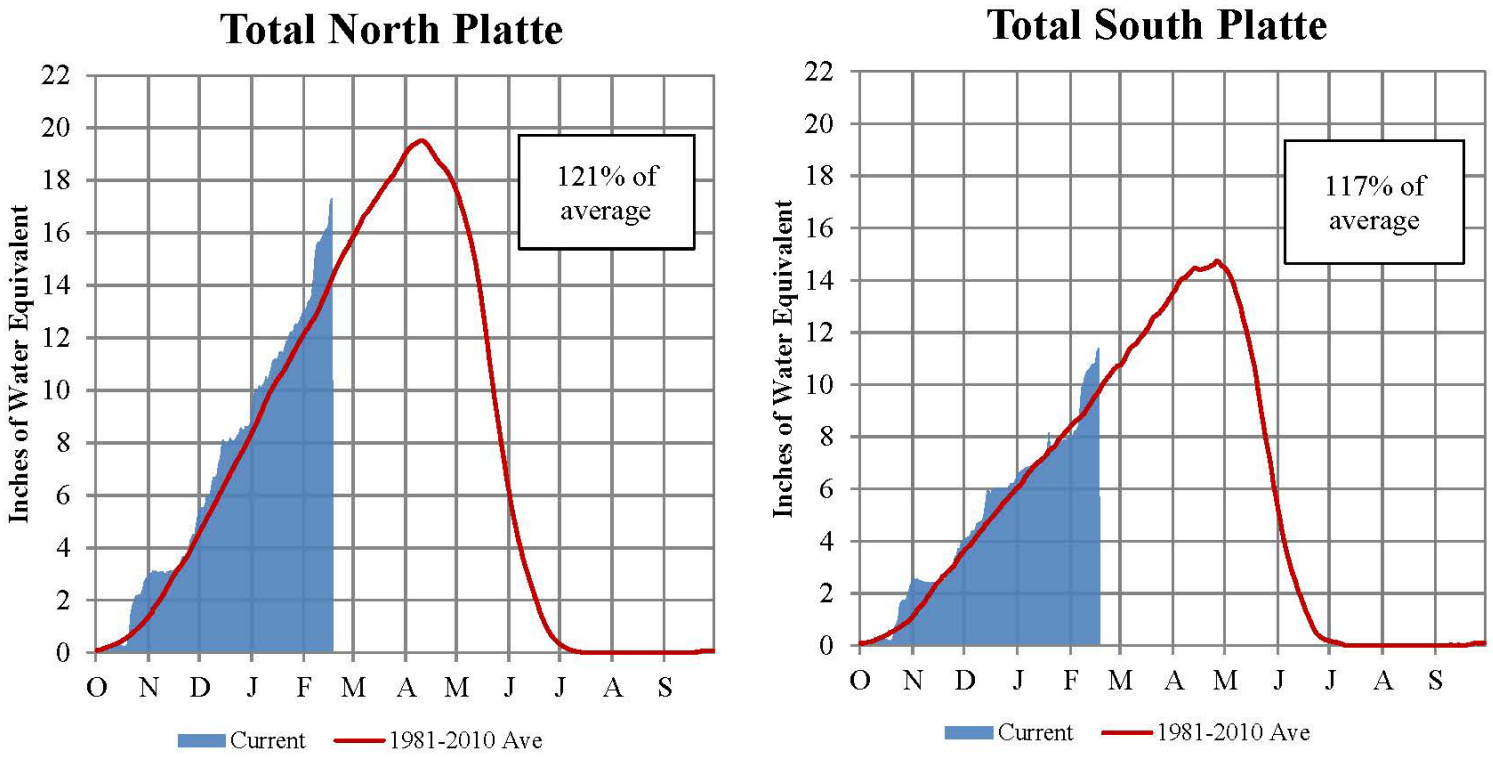


The Missouri River Basin mountain snowpack normally peaks near April 15. On February 17, the mountain Snow Water Equivalent (SWE) in the "Total above Fort Peck" reach was 13.2", 110% of the February 17 average. On February 17, the mountain SWE in the Fort Peck to Garrison reach was 11.3", 108% of the February 17 average.

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

Mountain Snowpack – Missouri River Basin

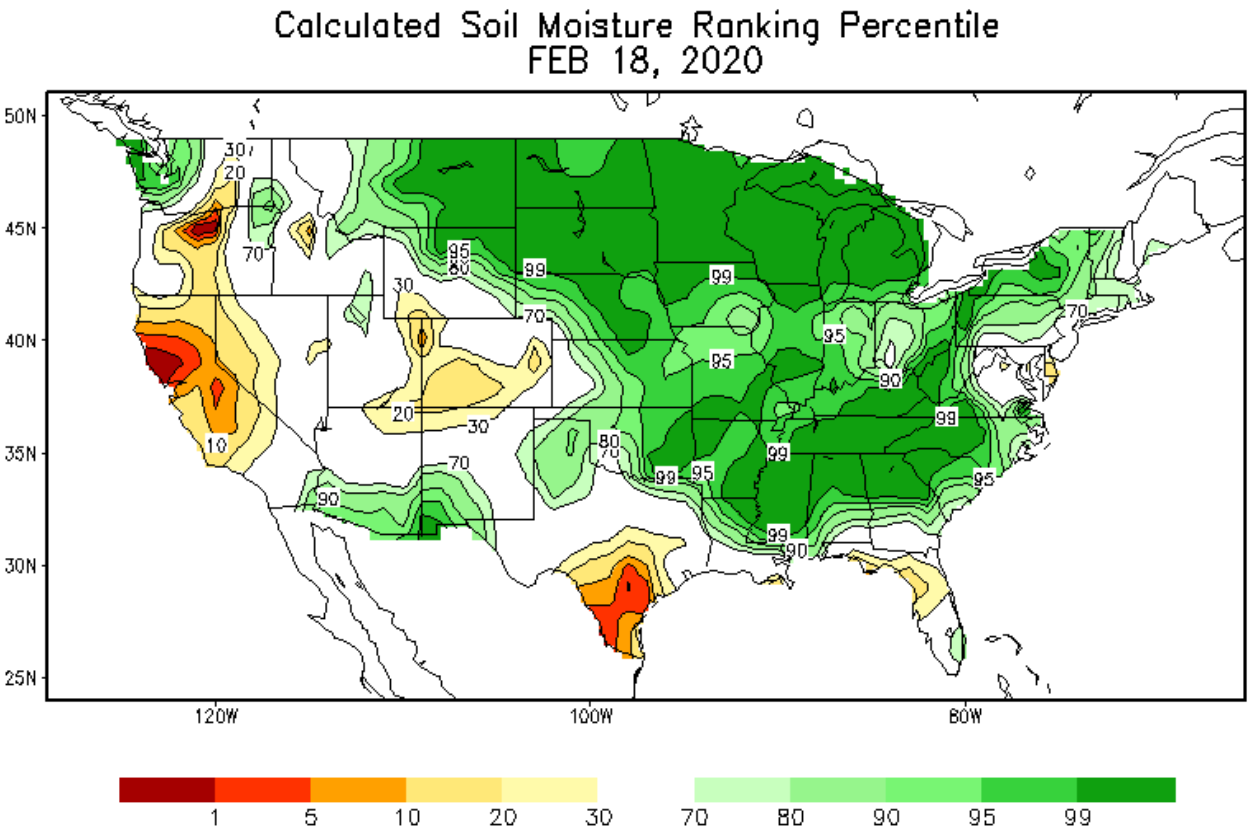
Platte River Basin - Mountain Snowpack Water Content
Water Year 2019-2020
February 18, 2020



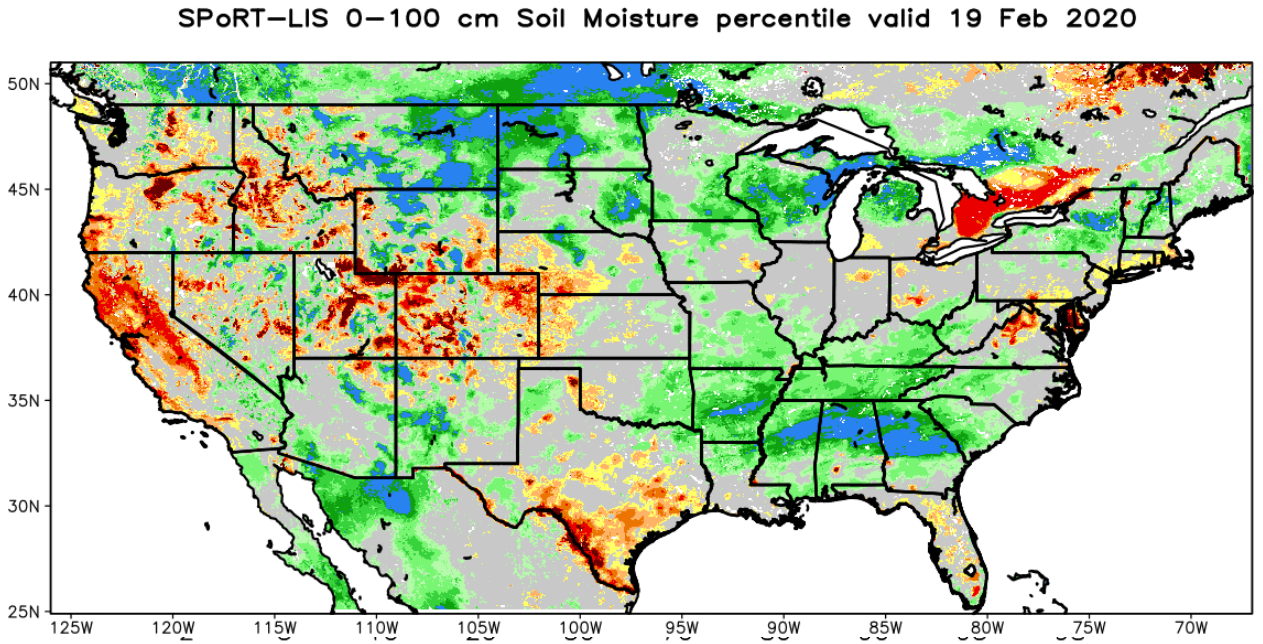
The North and South Platte River Basin mountain snowpacks normally peak near April 15 and the end of April, respectively. As of February 17, 2020, the mountain snowpack SWE in the "Total North Platte" reach is currently 17.3", 121% of average. The mountain snowpack SWE in the "Total South Platte" reach is currently 11.4", 117% of average.

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

Soil Moisture

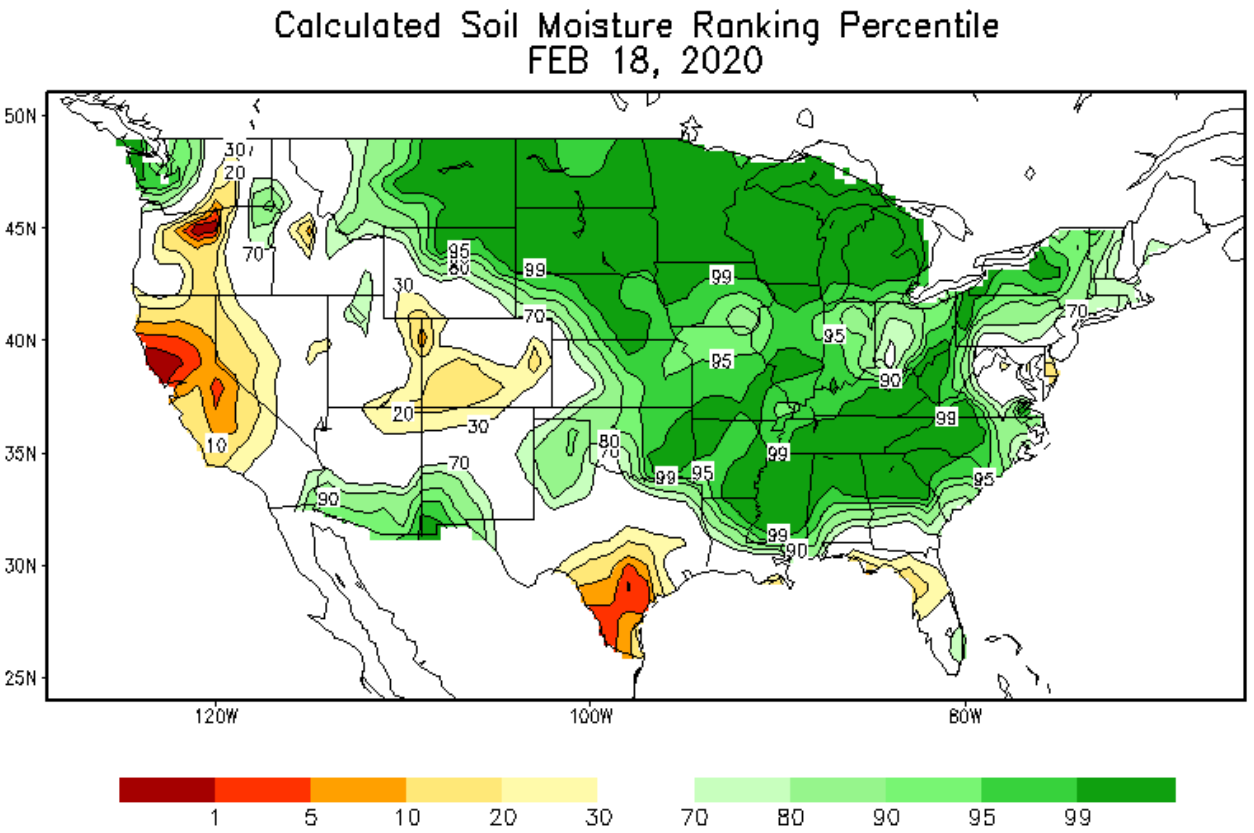


Source:
cpc.ncep.noaa.gov/products/Soilmst_Monitoring/US/Soilmst/Soilmst.shtml#



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

Soil Moisture



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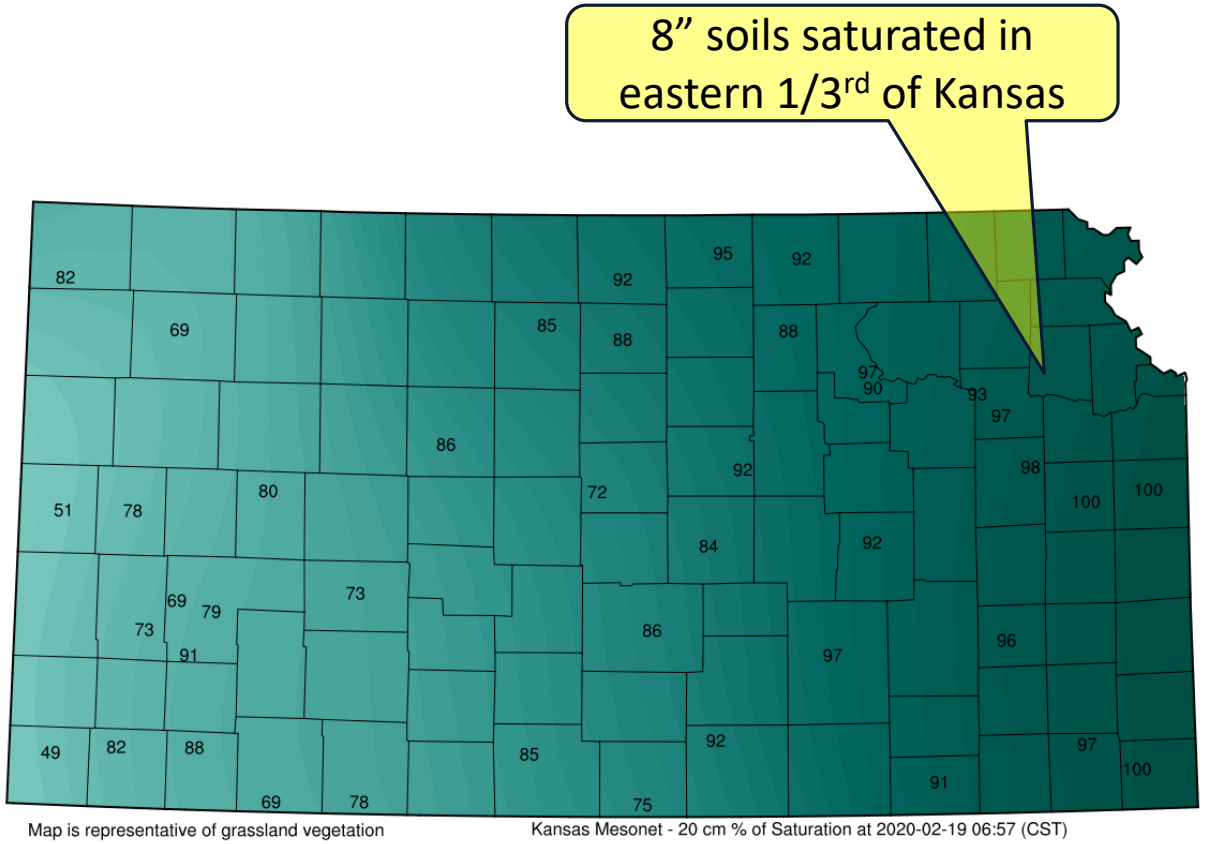
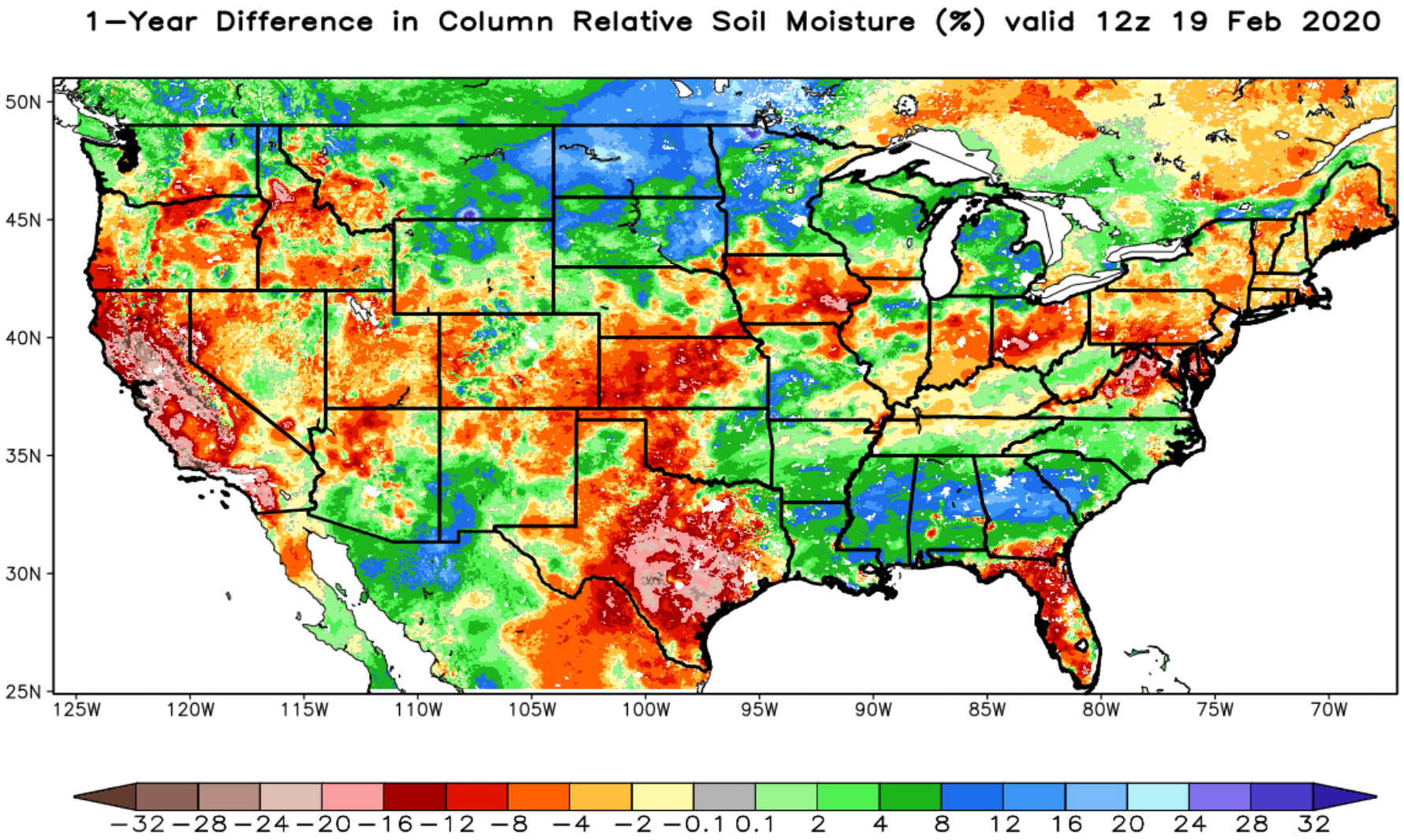


Source: https://mesonet.k-state.edu/agriculture/soilmoist/

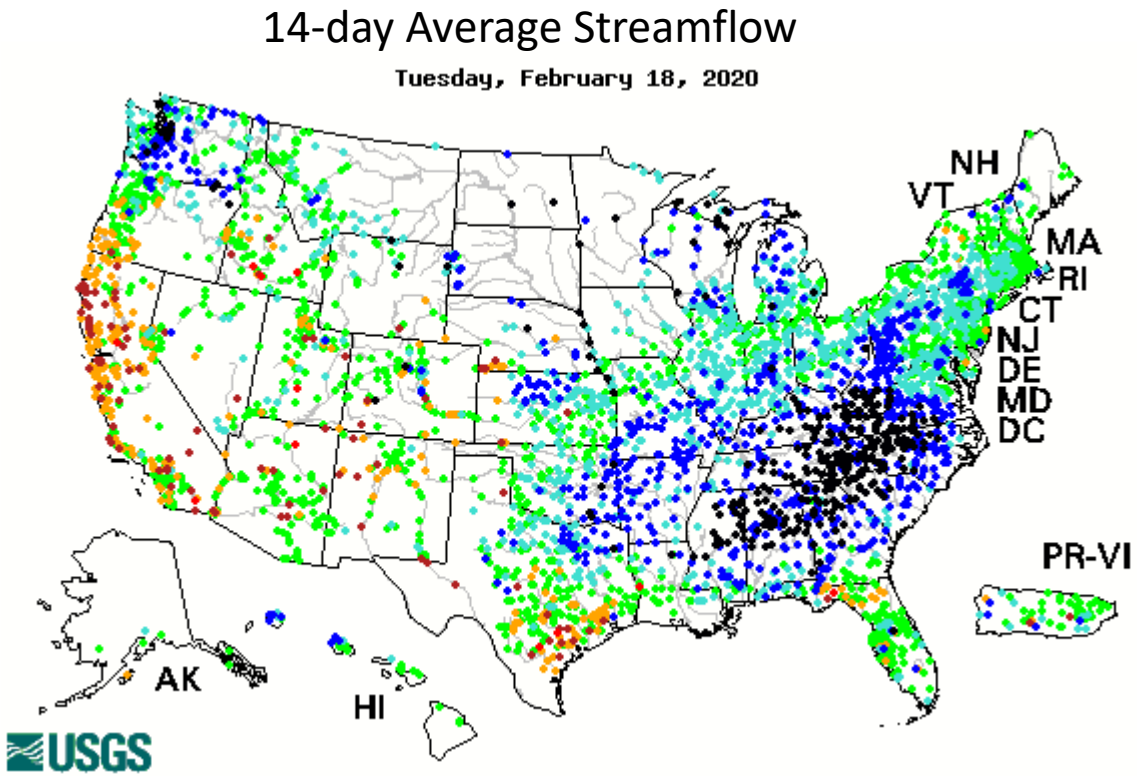
Soil Moisture

- 1-year change soil moisture
- Dakotas much wetter than last year
- Eastern corn belt drier, but not dry

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



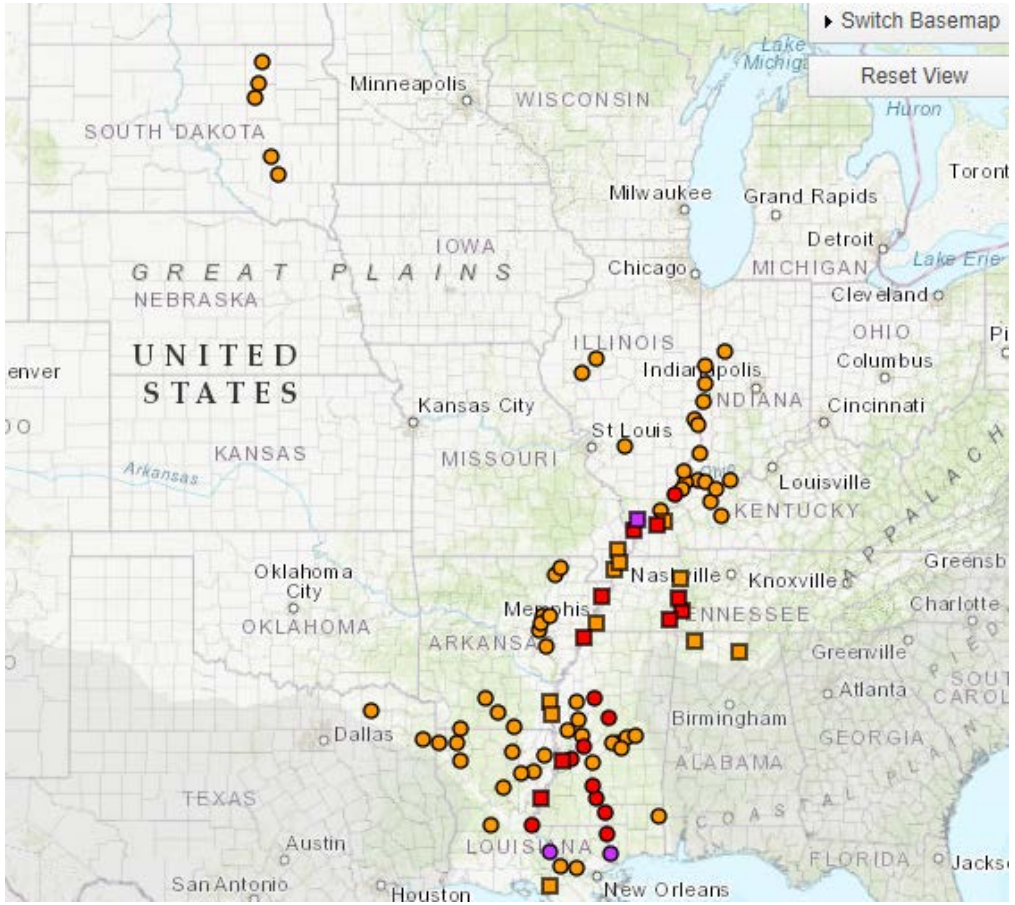
Streamflow



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

Source: waterwatch.usgs.gov

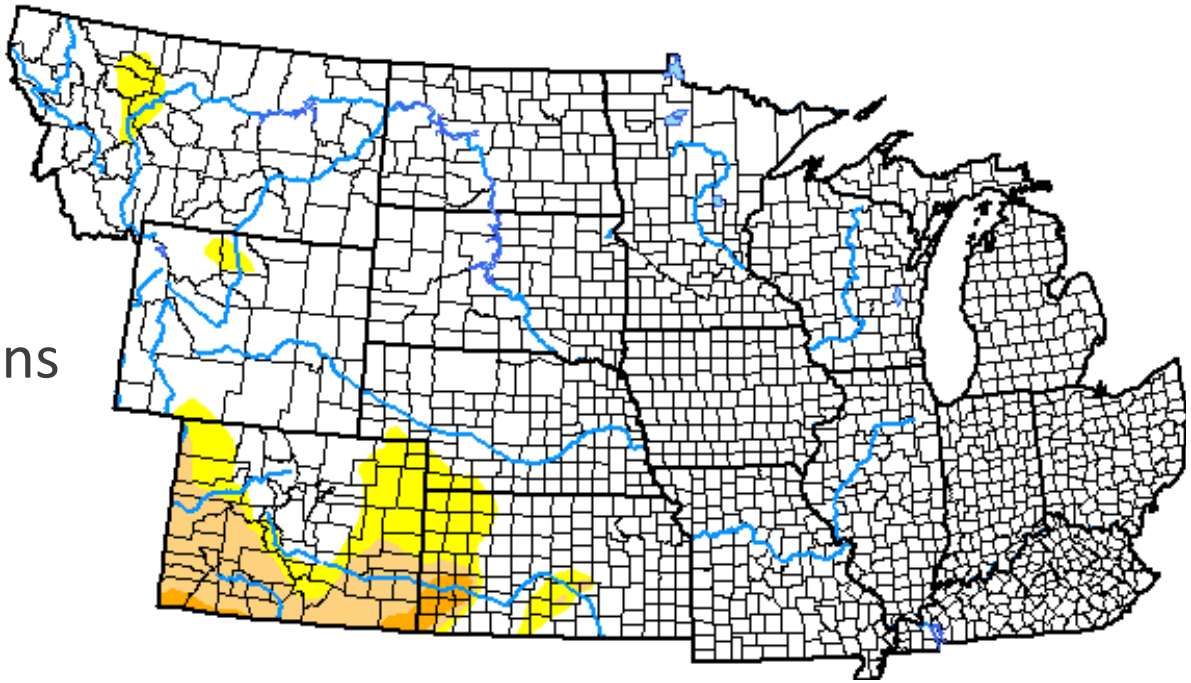
Source: https://www.weather.gov/ncrfc/



- 93 gauges in MS basin currently in flood
- Mostly minor flooding along Wabash, James Rivers
- Heavy precipitation in Southeast US = major flooding on OH and lower MS Rivers

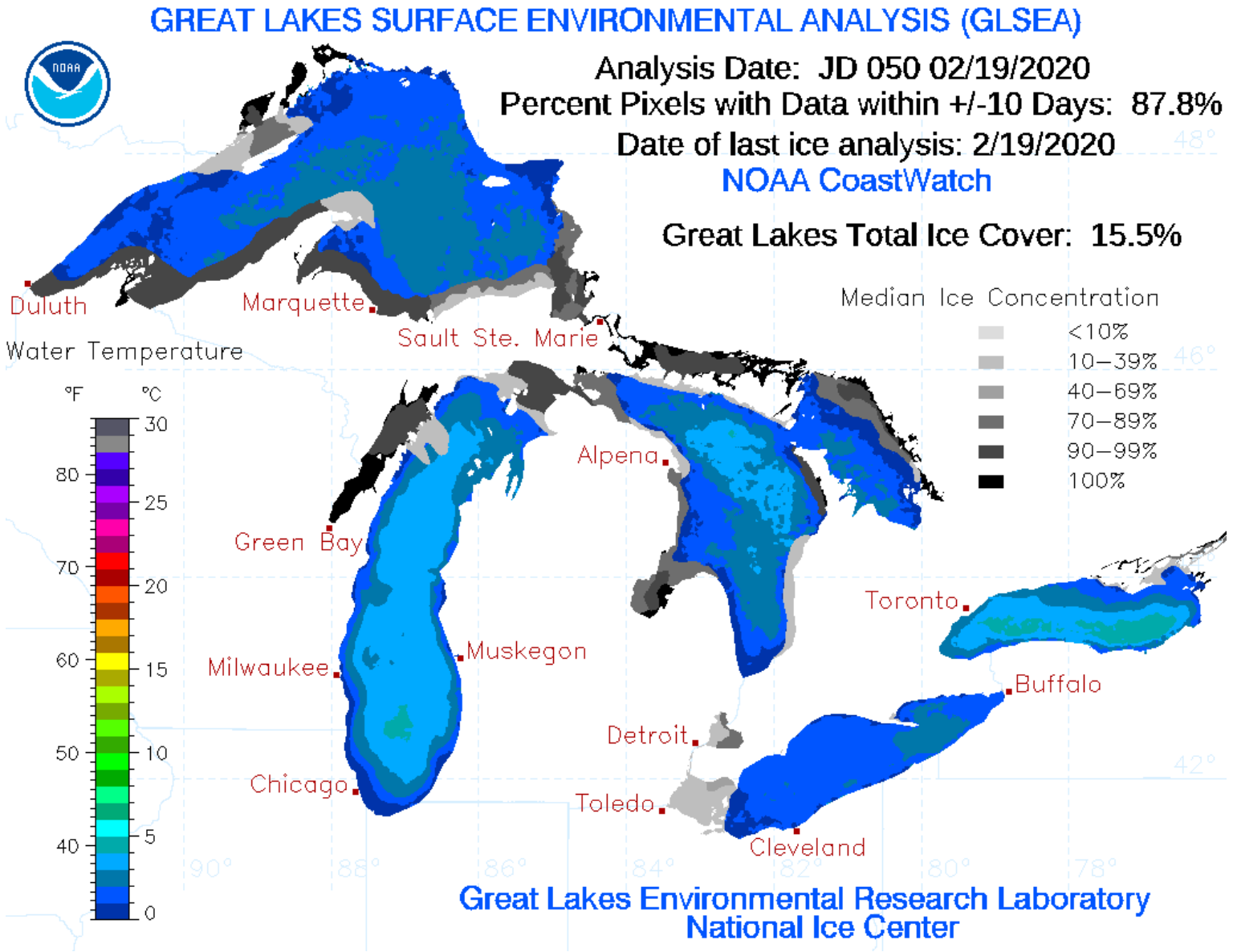
Drought

- Some improvement in western CO
- Low risk of drought expansion moving into spring, although conditions



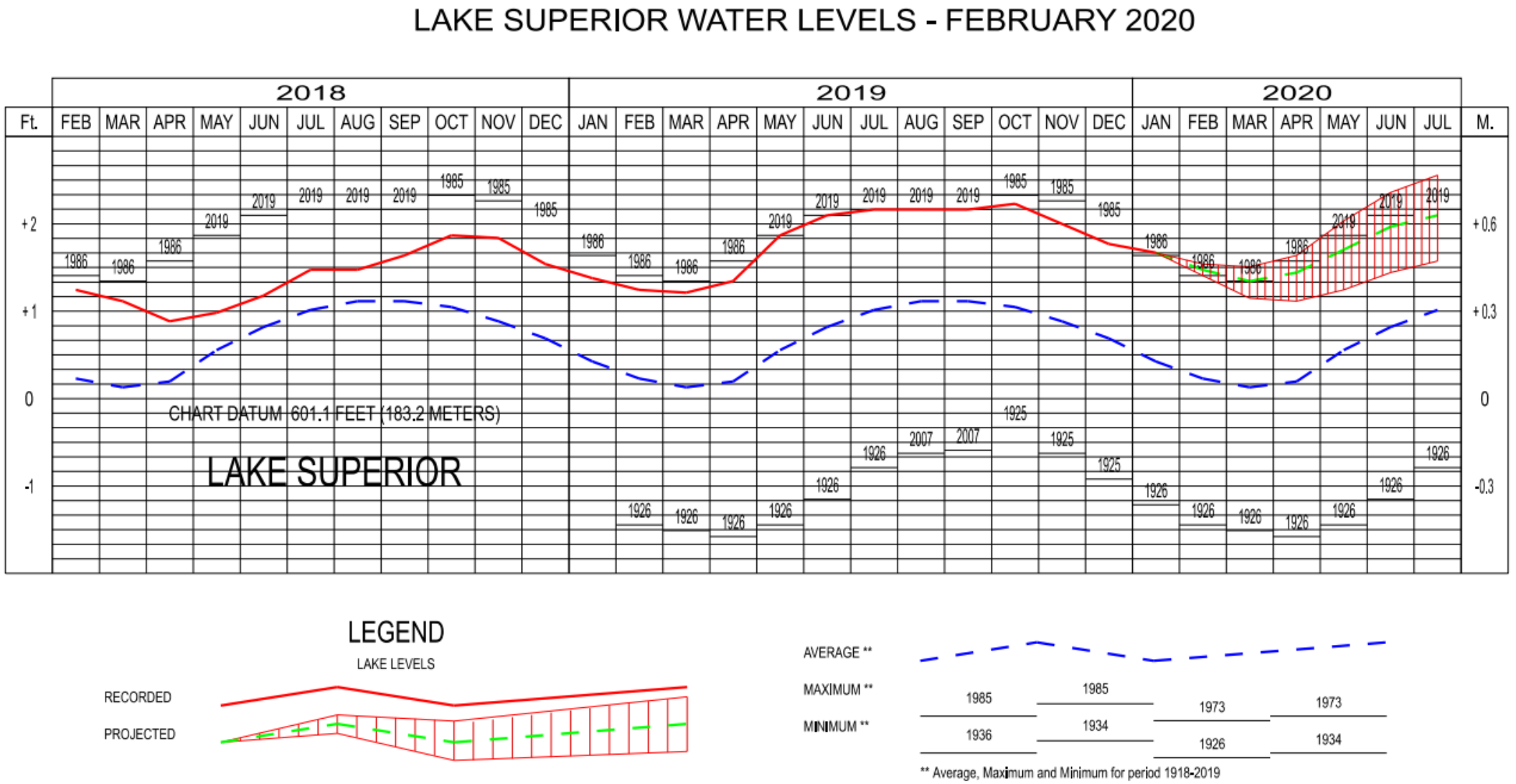
Great Lakes Temperatures

- Great Lakes temperatures remain above normal in response to warm winter
- Total 15% ice cover – 66% this time last year, 42% in 2018
- Less ice allows for more lake evaporation, removes buffer for lakeshore damage



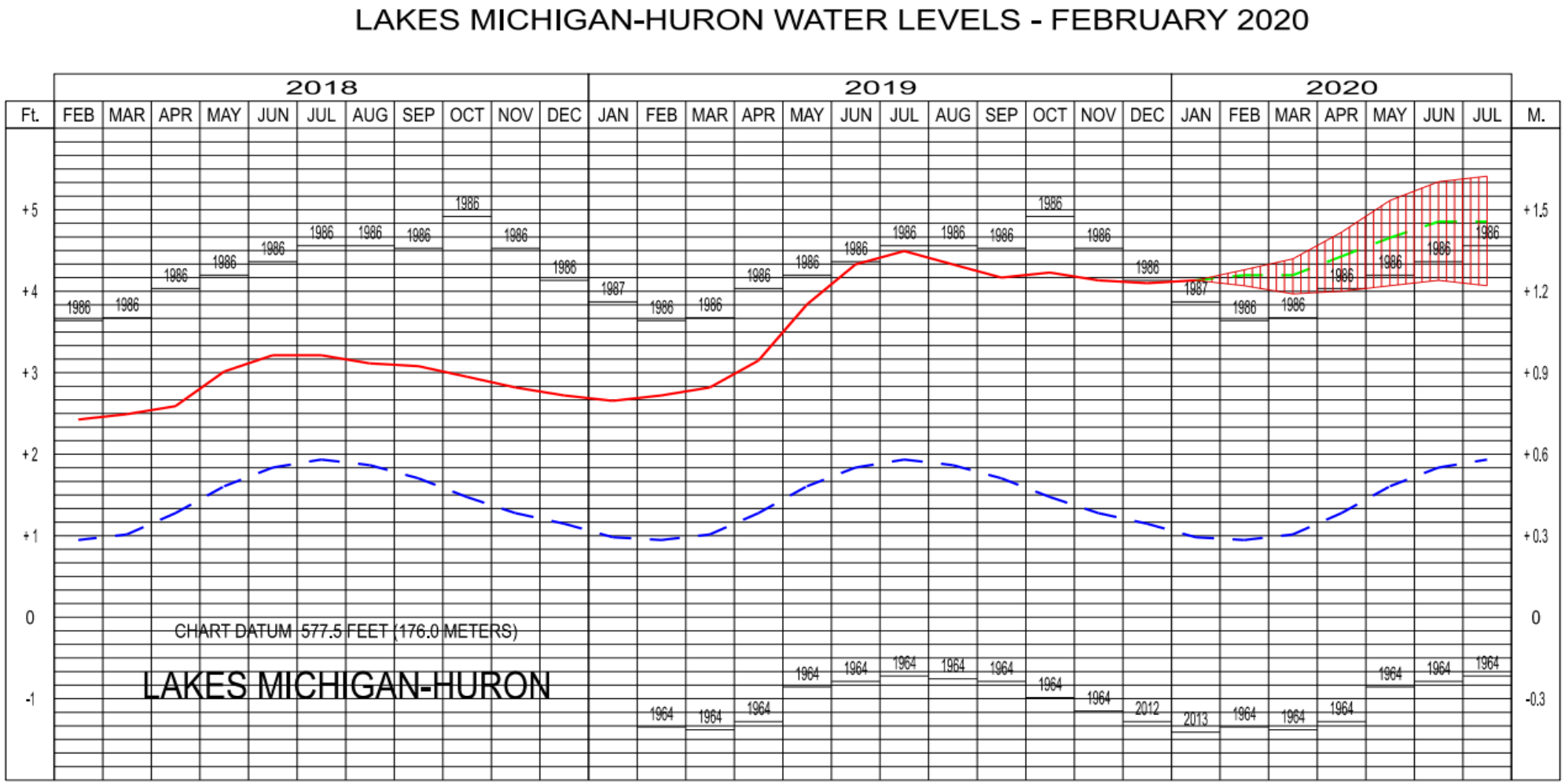
Source: https://www.glerl.noaa.gov/data/ice/

Great Lakes Levels



https://www.lre.usace.army.mil/Missions/Great-Lakes-Information/Great-Lakes-Water-Levels/Water-Level-Forecast/Monthly-Bulletin-of-Great-Lakes-Water-Levels/

Great Lakes Levels



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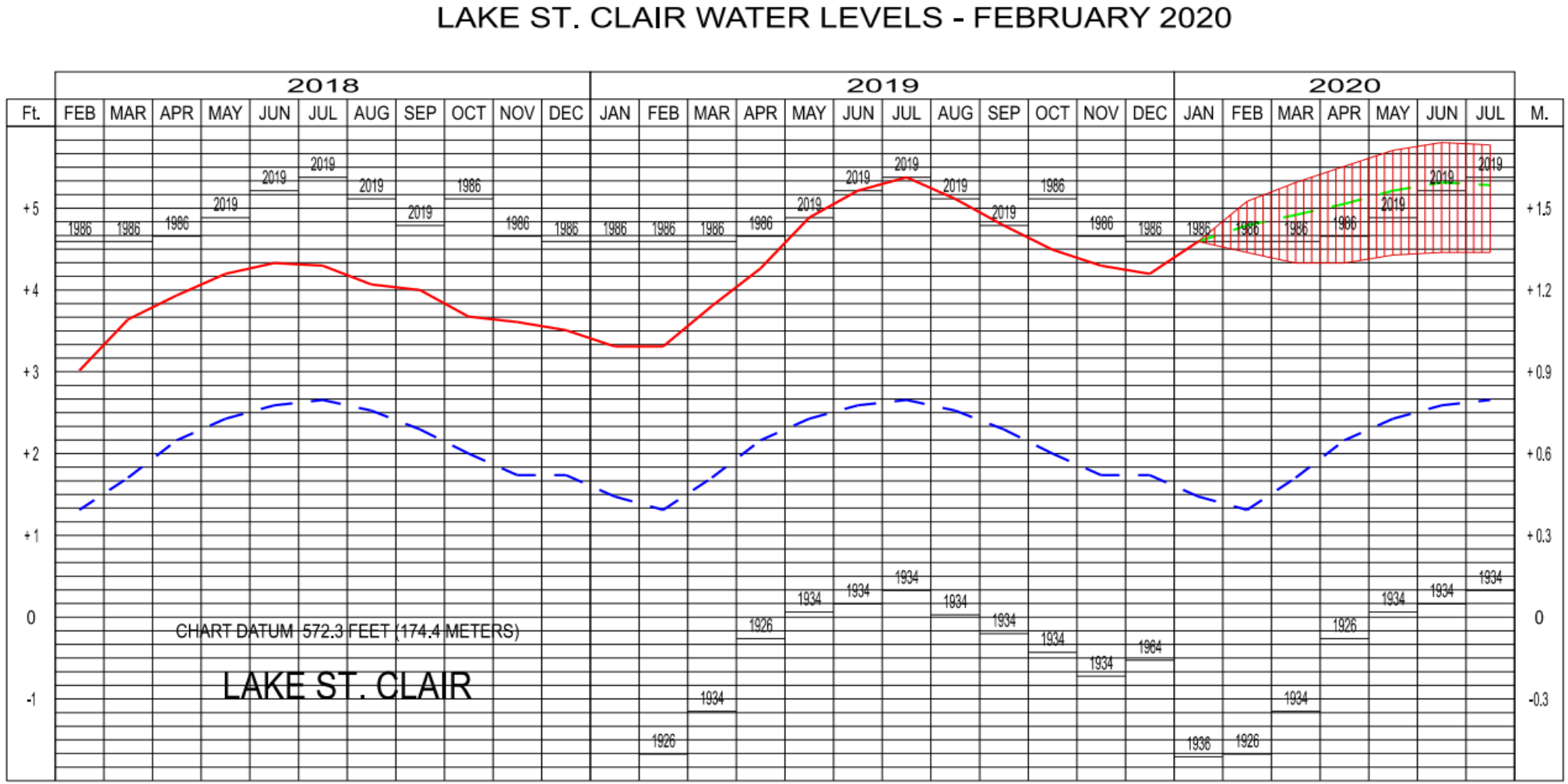
Great Lakes Levels



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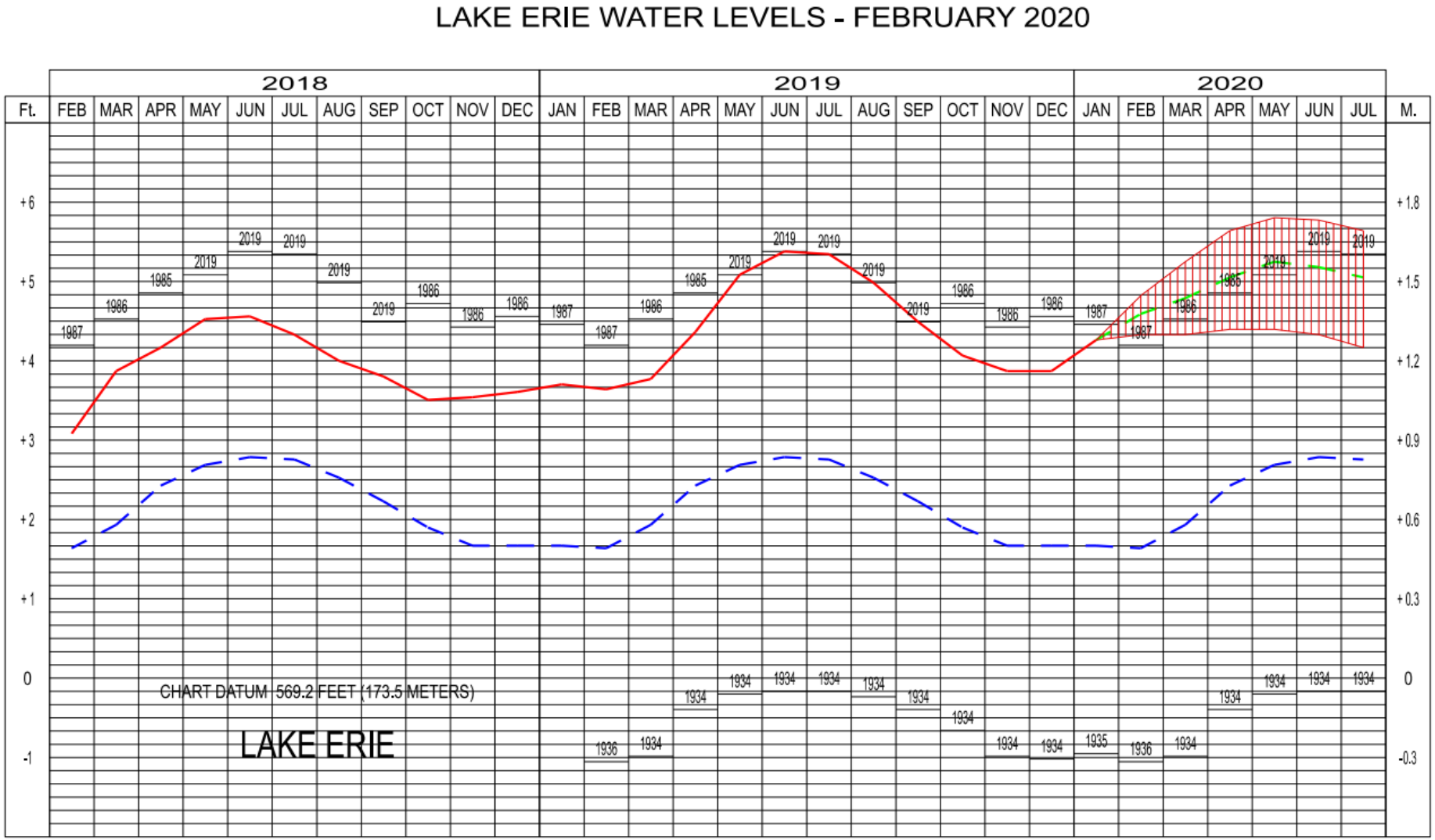

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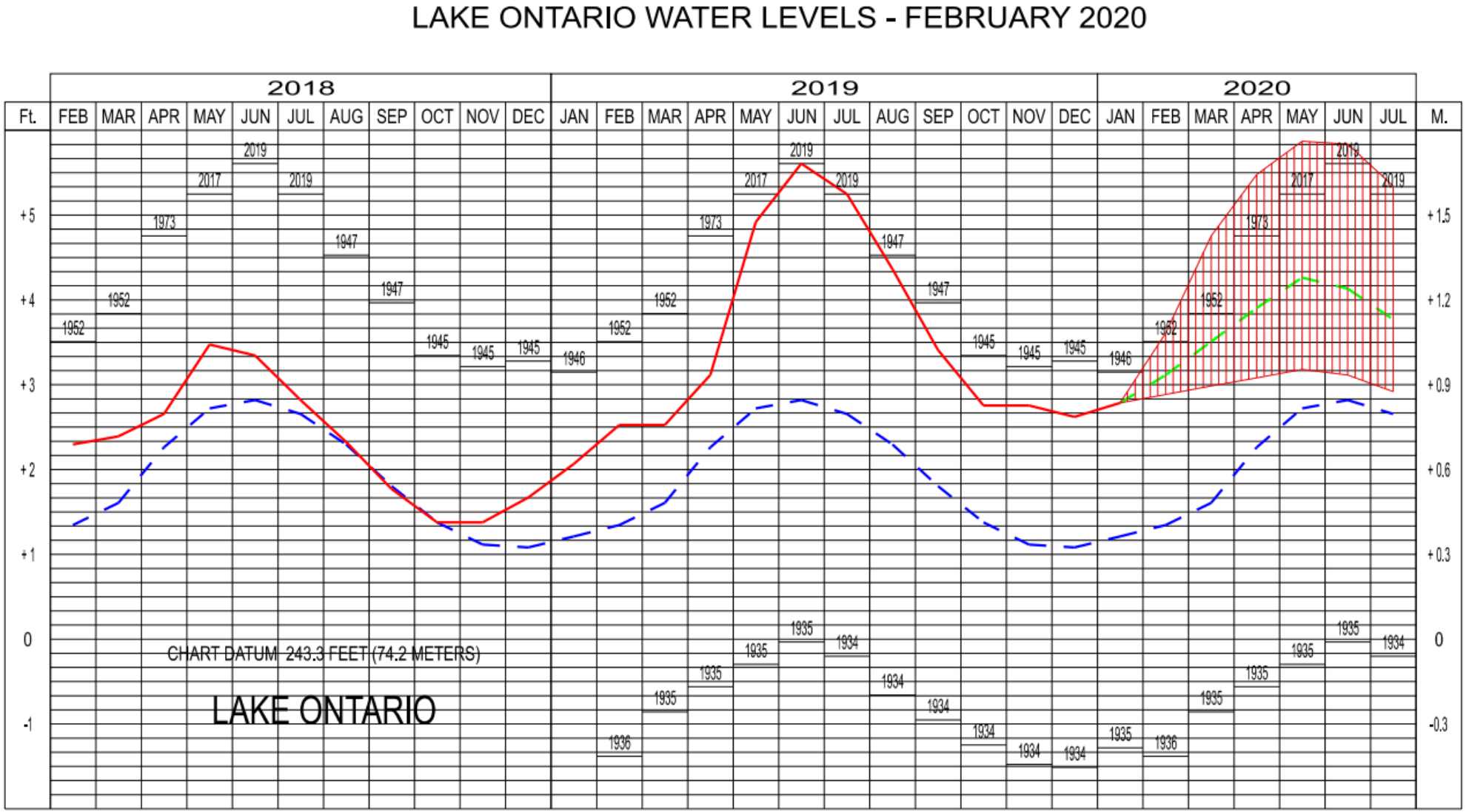

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Impacts

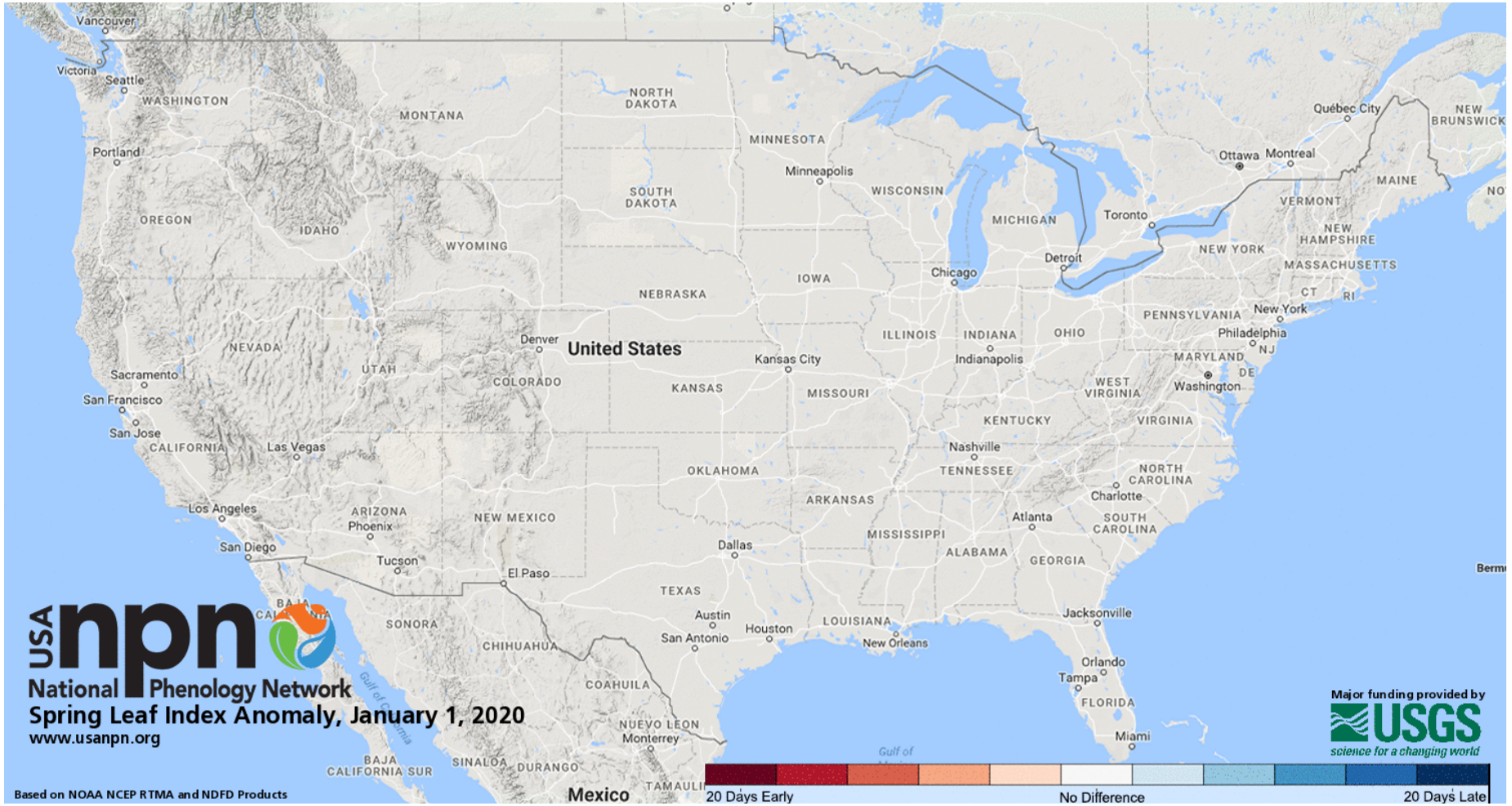
Agriculture & Ecosystem Impacts

- Continued challenges harvesting 2019 acres in the North Dakota
  - NASS estimate – 51% of ND corn acres were unharvested as of January 27th
- Wet soils a concern across most of the region, delays very possible come spring
- Increased risk of wheat midge caused by persistently wet conditions
- Unfrozen soils this winter have been able to drain surface moisture with less flooding, still a long way to go for mitigating spring flooding
- Dry conditions in eastern CO stressing winter wheat, livestock

Agriculture & Ecosystem Impacts – Early Spring

Source: https://usanpn.org/

- Spring leaf out has commenced in southeast US
- Earlier than normal in red areas, 18 days early in Nashville, TN

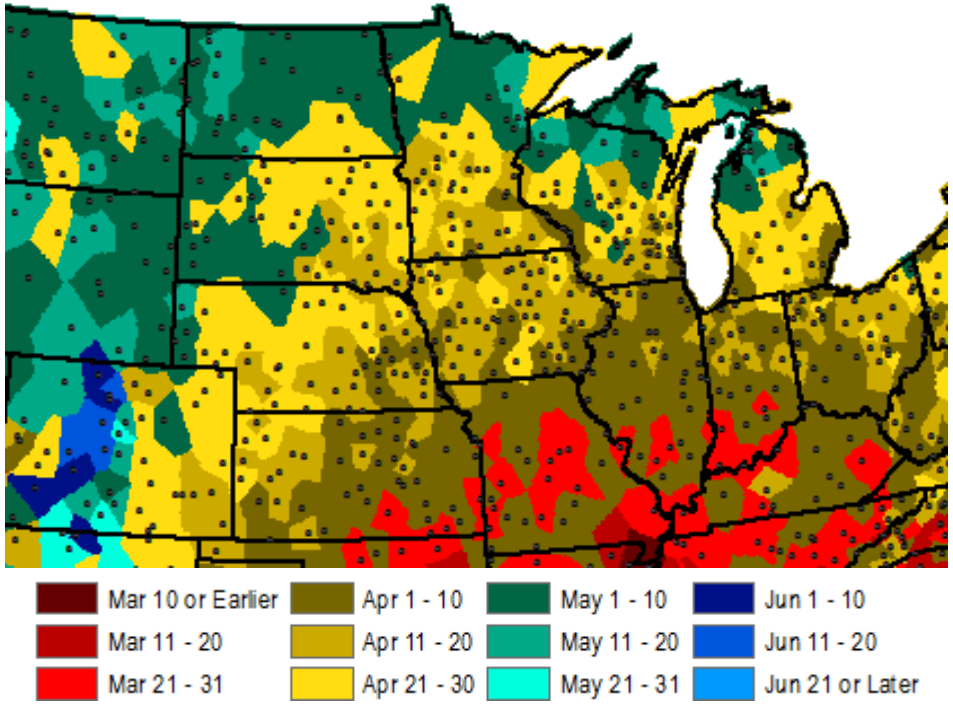


Map shows daily progression of NPN Spring Leaf Index Anomaly, an indicator of the start to spring phenology. Index is based on reported first leaf on lilac and honeysuckle cultivars.

Agriculture & Ecosystem Impacts – Early Spring

- Winter wheat dormancy break in southern Ohio and southern Illinois
- Peach/apple bud “coloring up” around St. Louis area, not yet breaking

Median Date of Last 28°F Freeze
Source: https://mrcc.Illinois.edu/VIP/




Southern Ohio
Source: A. Wilson

Great Lakes Coastal Impacts

- Great Lakes levels + winter storms have caused significant damage, erosion along lakeshores
- MI: houses sliding into lakes, flooded sewer/septic, roads needing to be moved inland… MIDOT estimates $100 million in road damage so far
- Multiple cities and states have called for federal emergency declaration… $25 million damages in Chicago estimated from January storms alone

Other Impacts

- Multiple fatalities reported due to flooding along Tennessee & Ohio Rivers
- USACE estimates of levee damage of $1-2 billion from 2019 flooding
- NE, KS, MO, IA Governors signed agreement to combat flooding in MO Basin
- Ground blizzard in ND/MN closed roads (including I-29 between SD and Canada) and schools, several accidents reported
- Ice jams caused flooding along NE highway 275, rescues from flooded cabins
- USACE continues to release water at Gavins Point to prepare MO basin for spring flooding – 35,000 CFS vs. normal 17,000
- Thin lake ice, vehicles going through in South Dakota

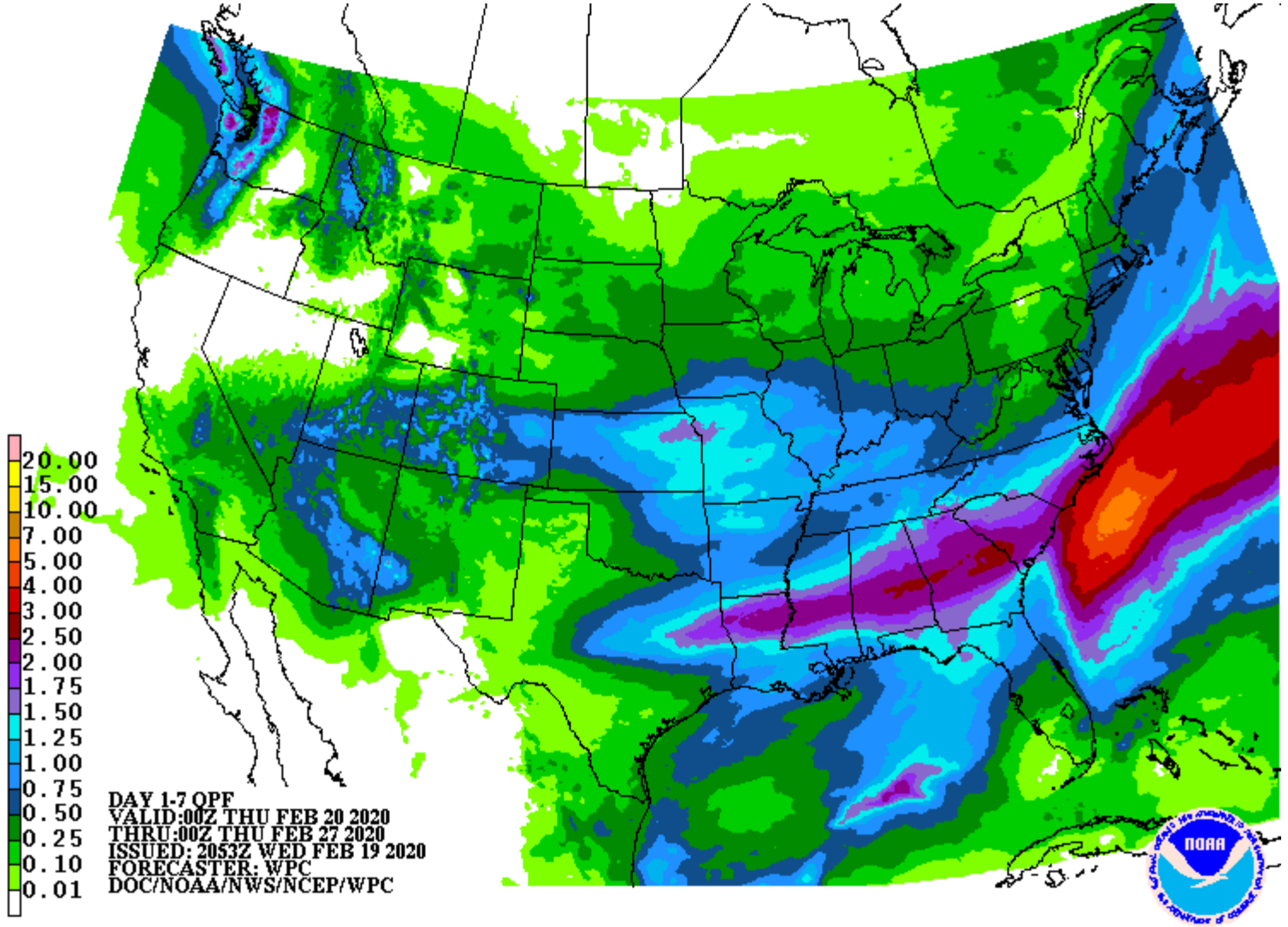
Lake Thompson, South Dakota
Source: Tom Bunker

Outlooks

7-day Precipitation Forecast

Source: wpc.ncep.noaa.gov/qpf/

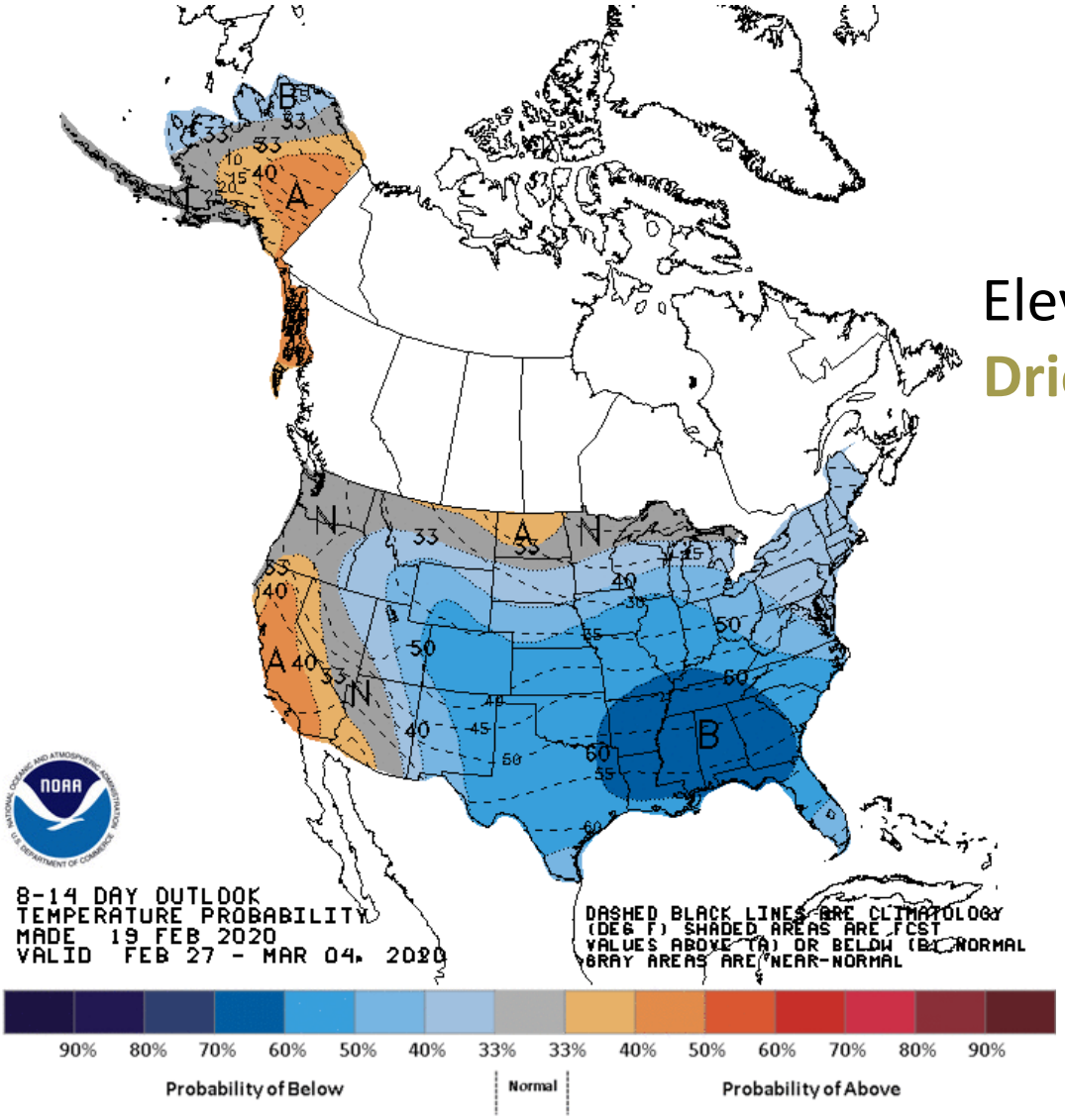
- Wet week forecasted for most of the region
- 7-day totals approaching 2” around Kansas City
- Heavy rainfall in middle MS, lower OH, and TN valleys could worsen flood conditions in southern IN, IL, and western KY

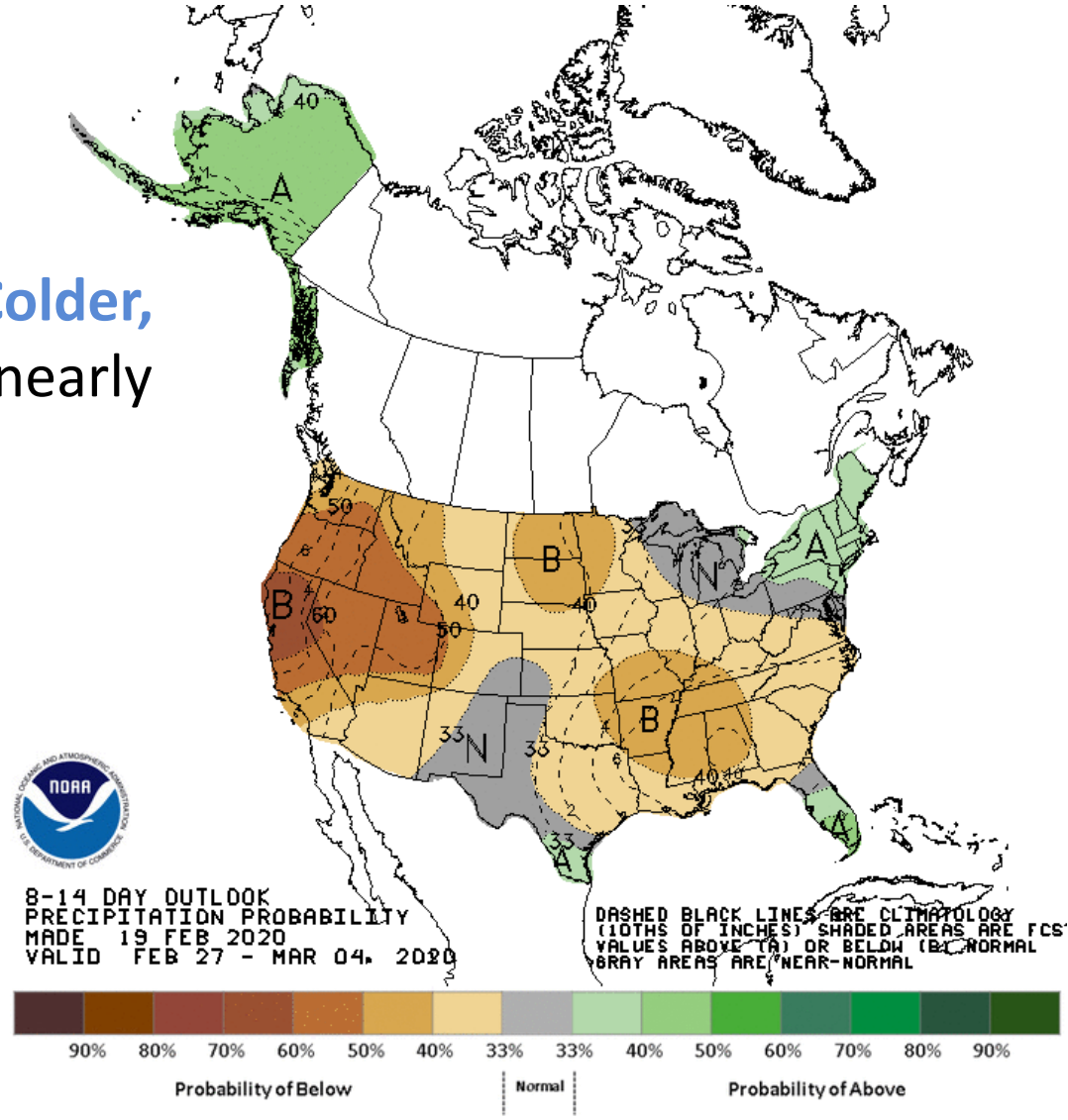


8-14 Day Outlooks

Source: cpc.ncep.noaa.gov/products/predictions/814day/

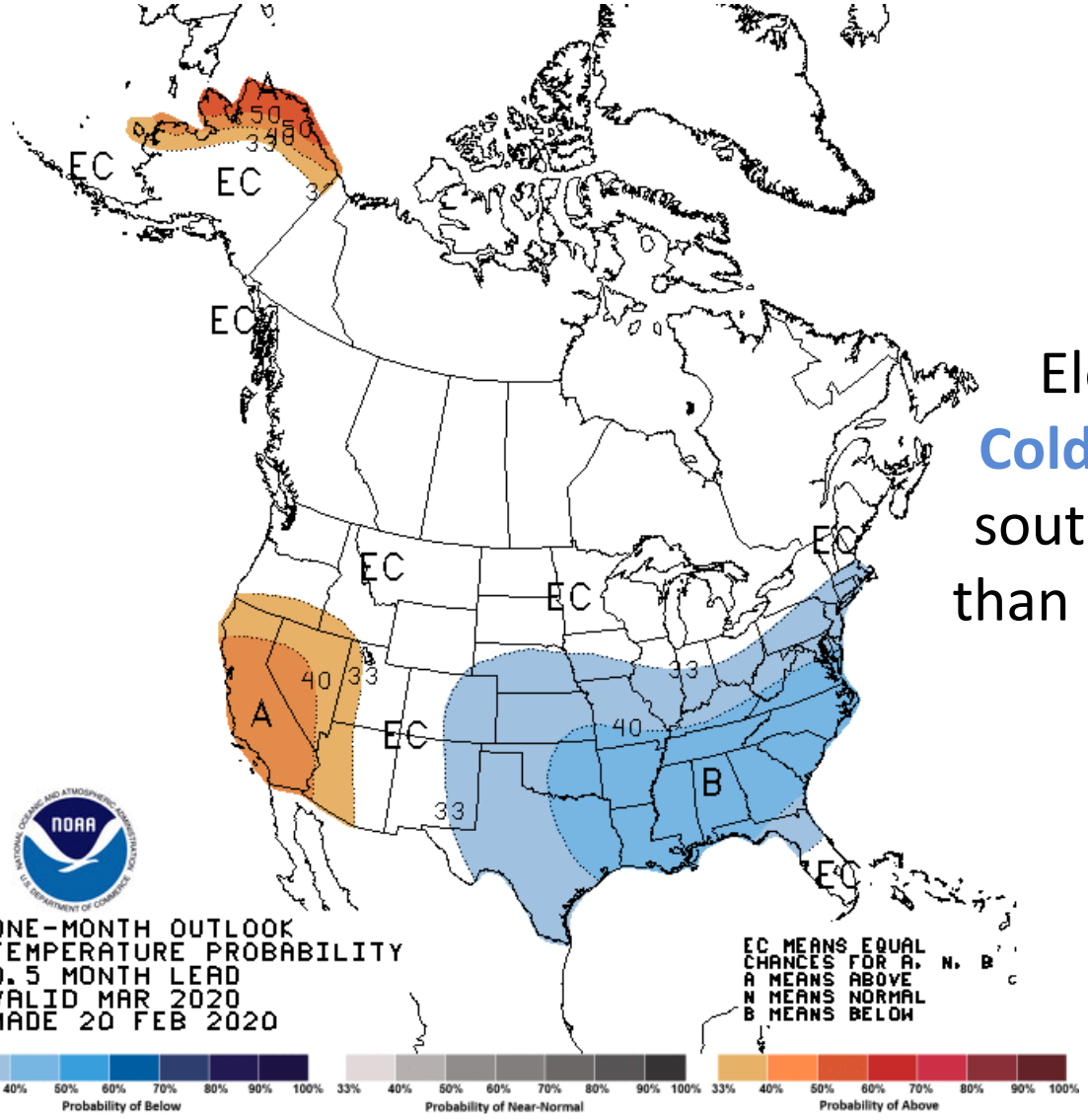
Elevated odds of: **Colder,** **Drier** than normal nearly everywhere



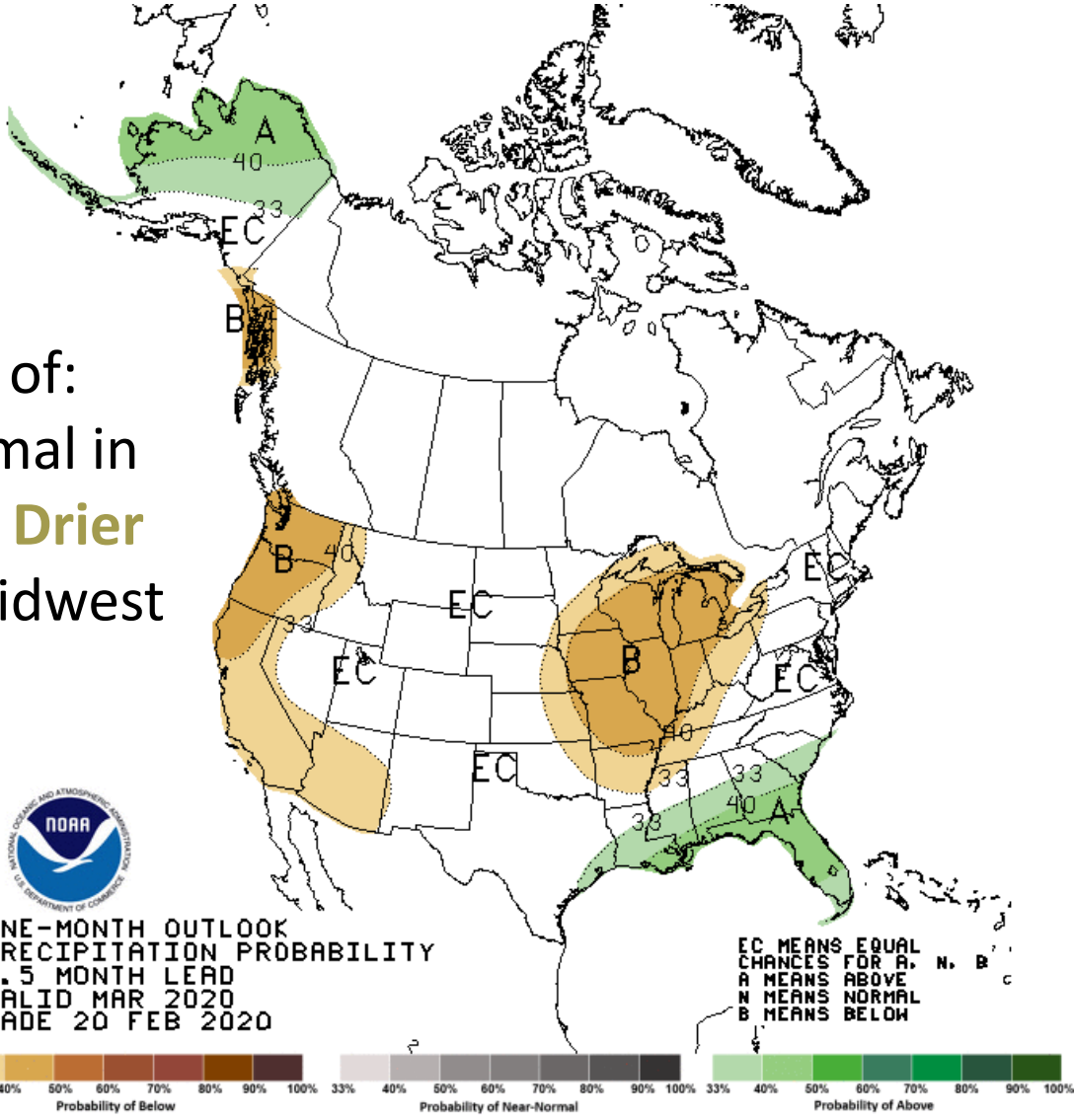


March Outlooks

Source: cpc.ncep.noaa.gov/products/predictions/814day/

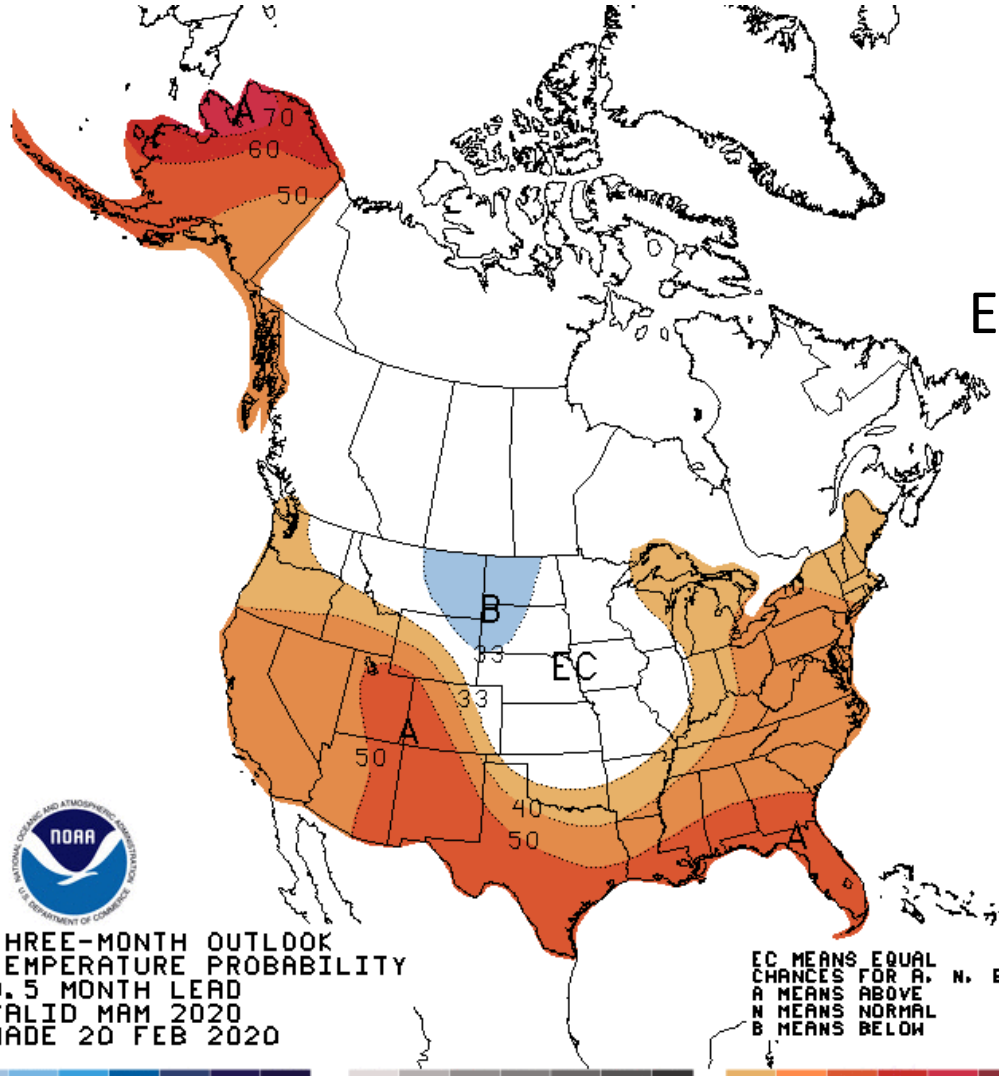


Elevated odds of:
Colder than normal in southern region; **Drier** than normal in Midwest

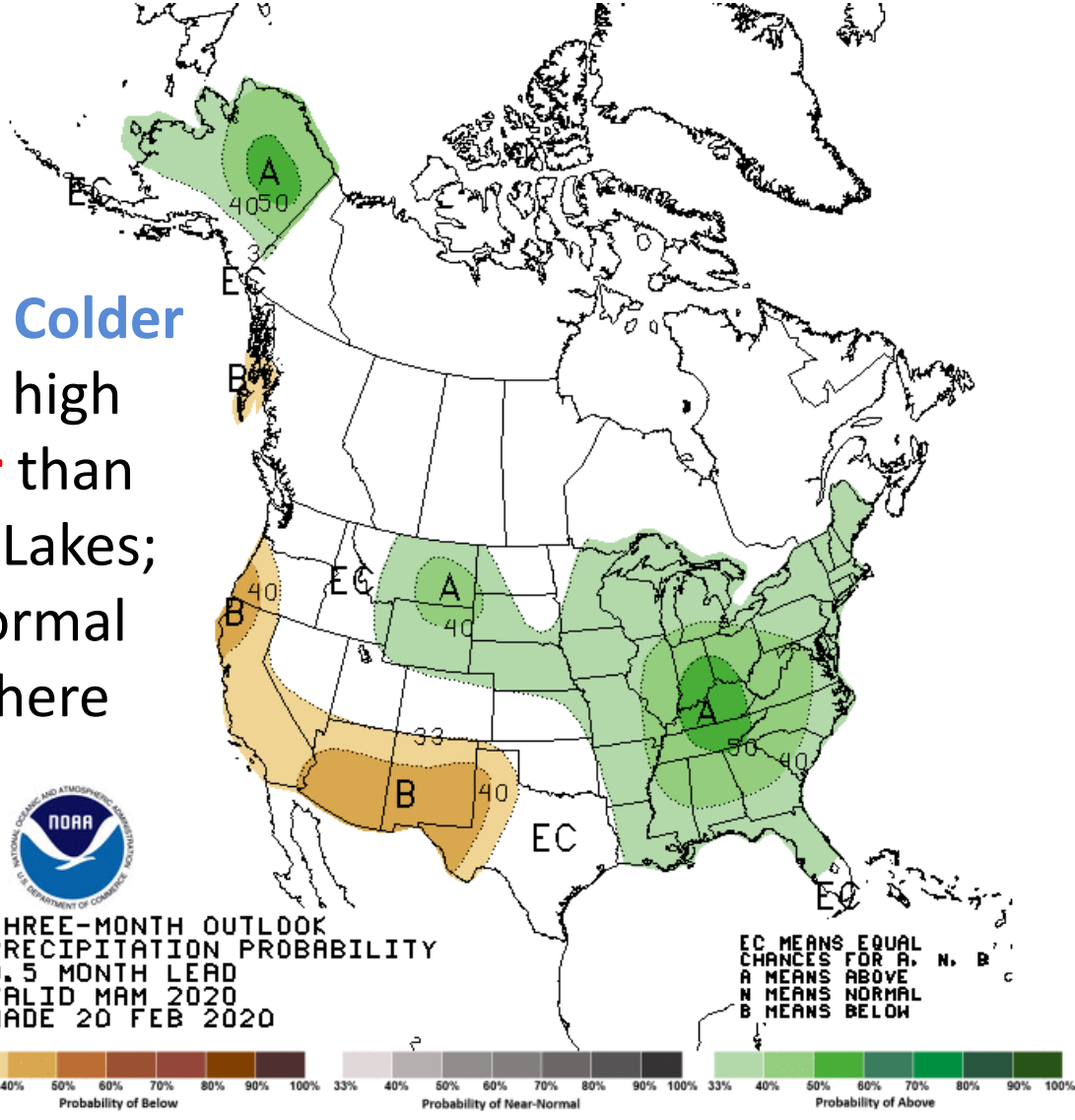


Seasonal Outlook – MAM

Source: cpc.ncep.noaa.gov/products/predictions/814day/

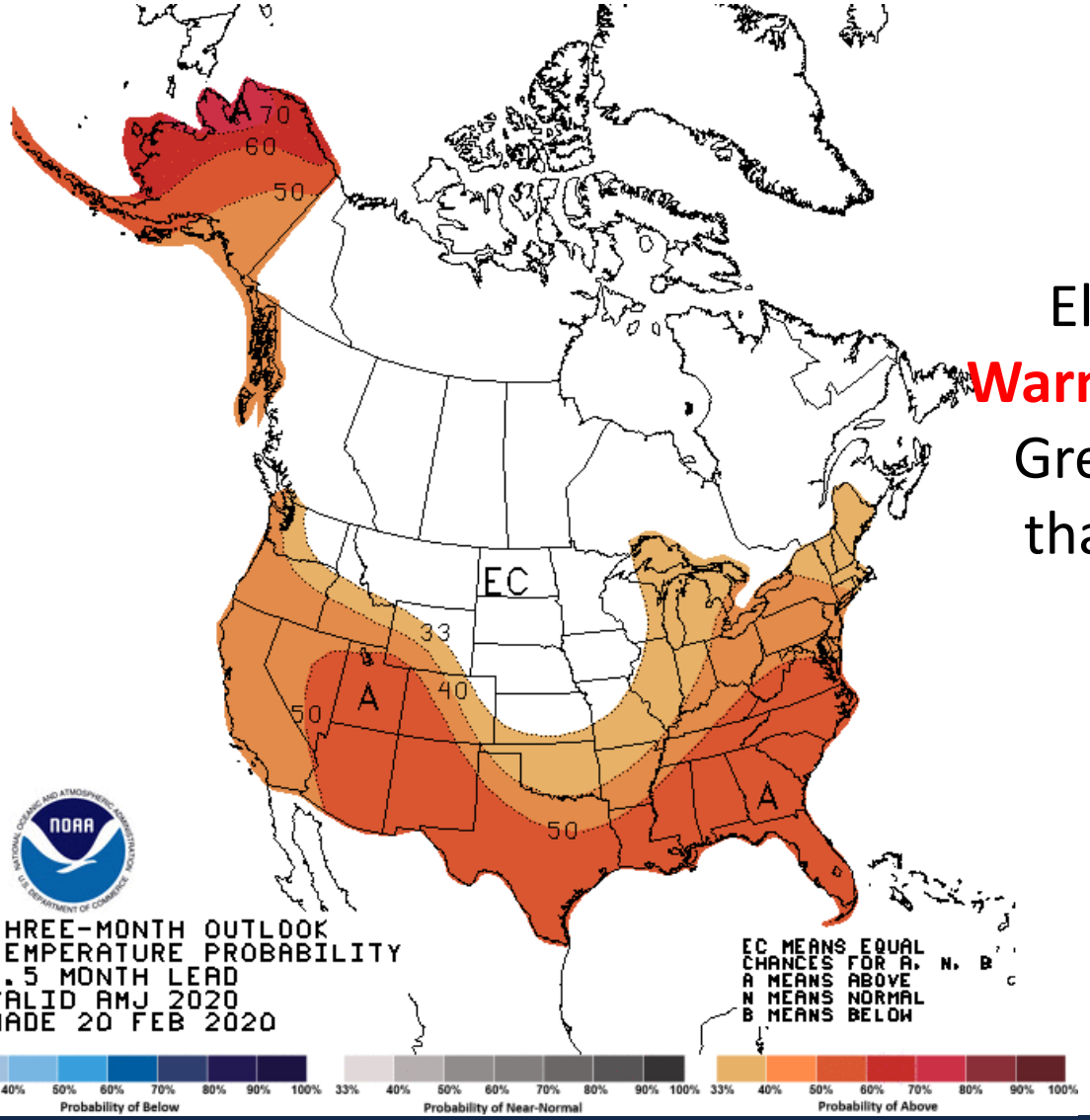


Elevated odds of: **Colder** than normal in high plains; **Warmer** than normal in Great Lakes; **Wetter** than normal nearly everywhere

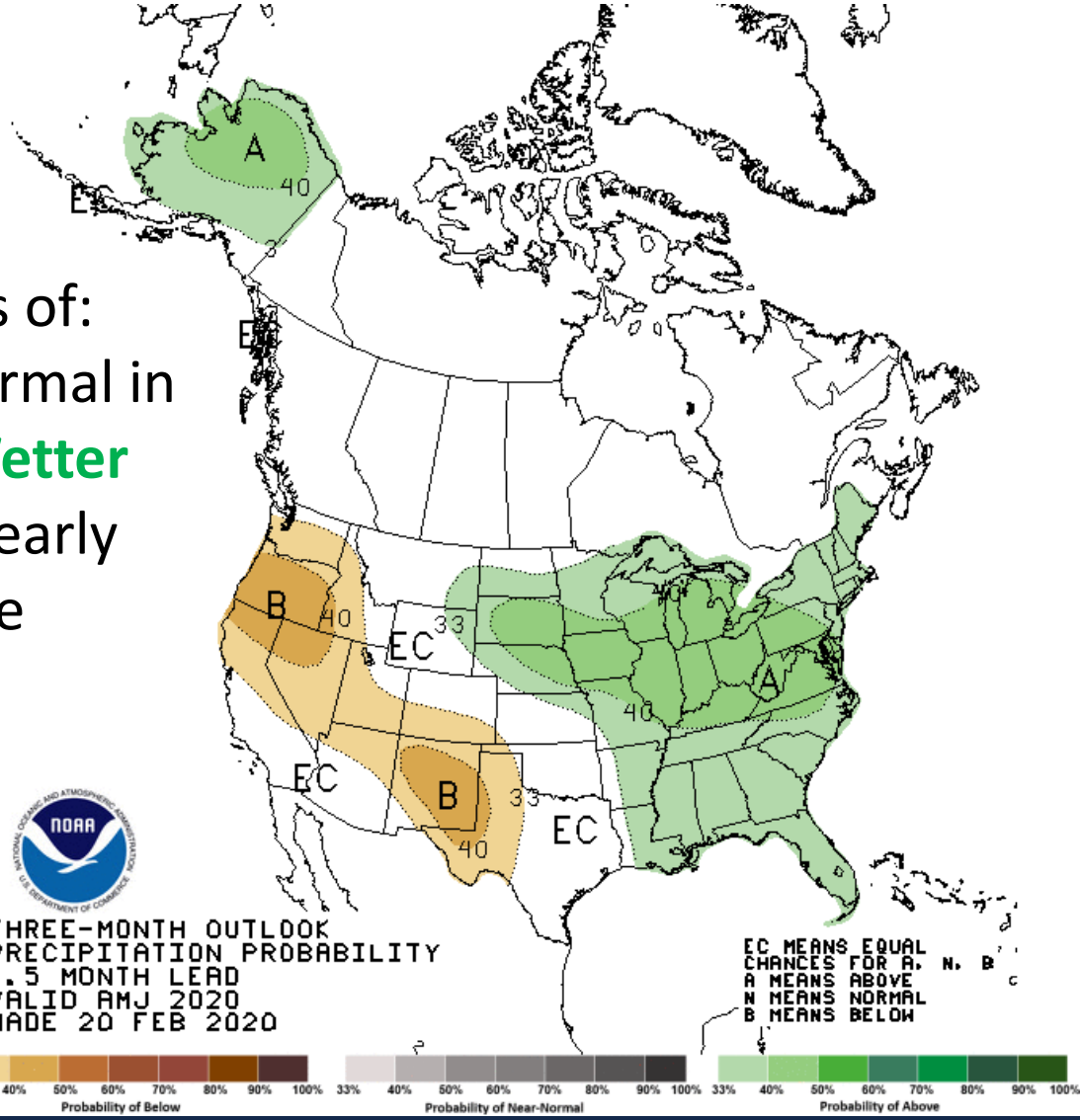


Seasonal Outlook – AMJ

Source: cpc.ncep.noaa.gov/products/predictions/814day/

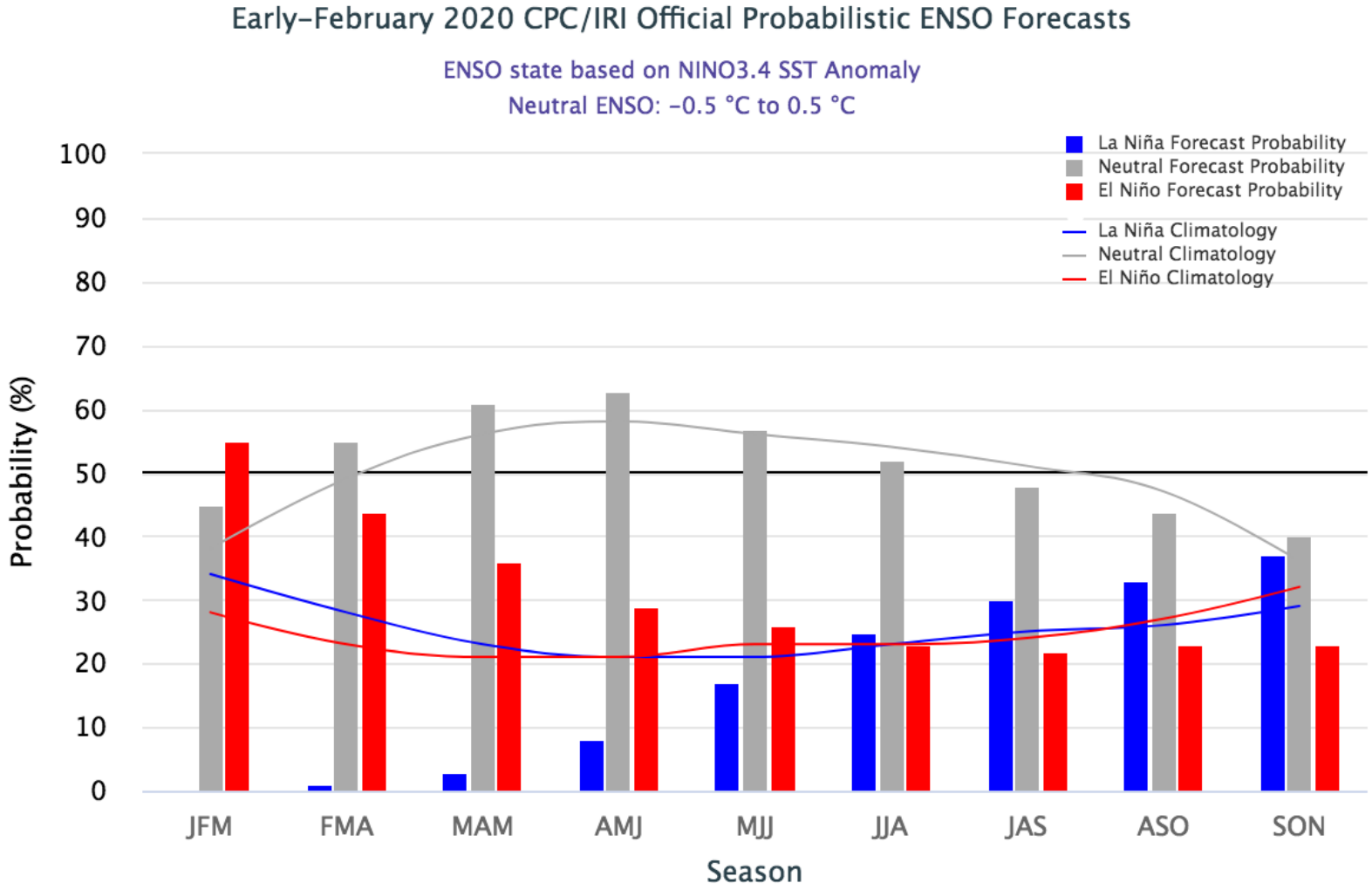


Elevated odds of: **Warmer** than normal in Great Lakes; **Wetter** than normal nearly everywhere



El Niño-Southern Oscillation (ENSO) Outlooks

- Neutral phase since start of winter
- Neutral phase forecasted through summer



USACE Great Lakes Outlook

Lake Superior:
Lake Superior is forecast to be within a couple inches of record high levels through July.

Michigan-Huron:
Lake Michigan-Huron is forecast to be above last year's levels and record high levels in each of the next 6 months.

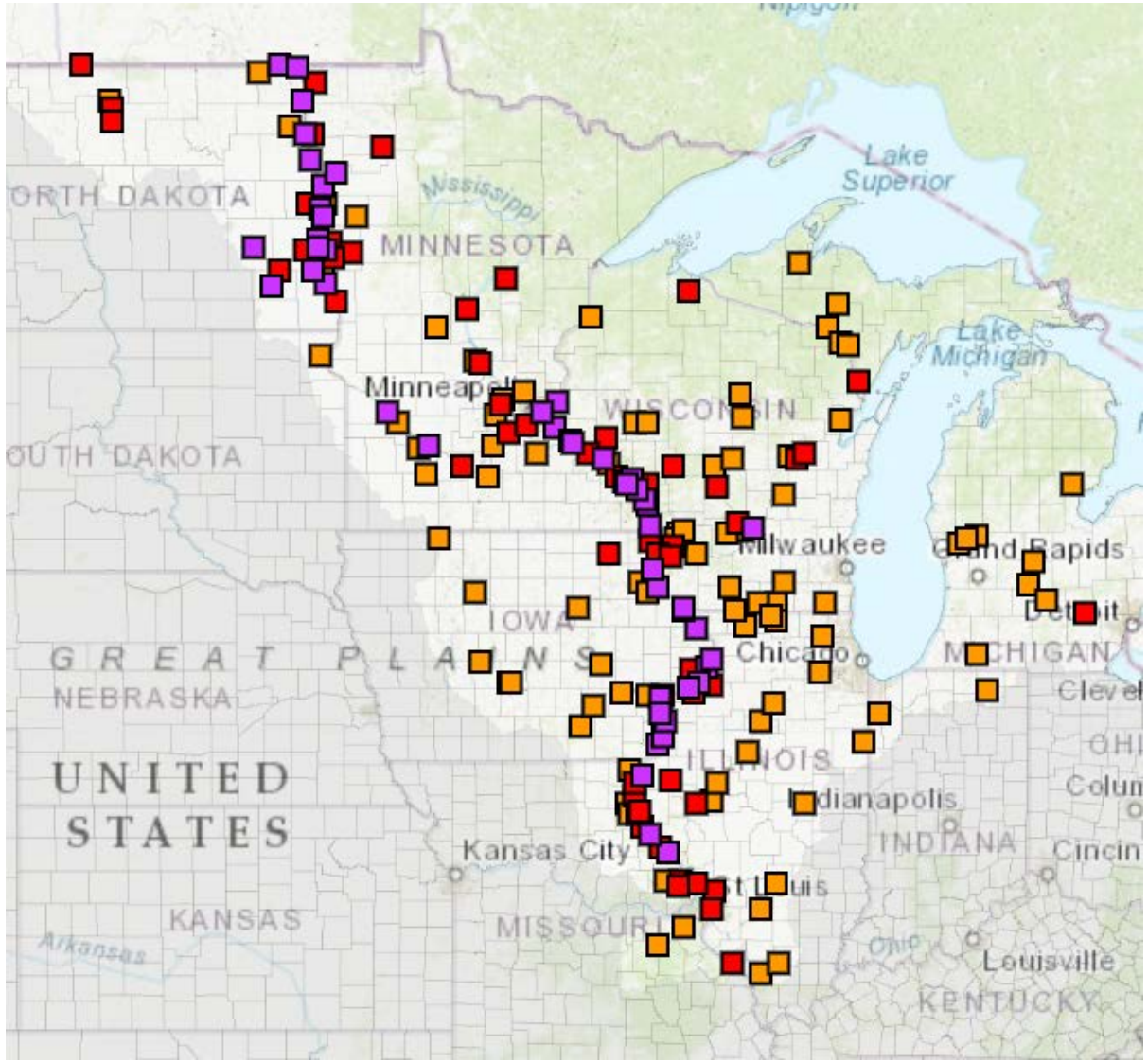
St. Clair:
Lake St. Clair is forecast to be above record high levels through June, and within an inch of the record in July.

Erie:
Lake Erie is forecast to be above record high levels through May, and within a few inches of record high levels in June and July.

Ontario:
Lake Ontario is forecast to be below record high levels throughout the next 6 months.

NWS River Forecast Center Spring Flood Outlooks – Upper Mississippi

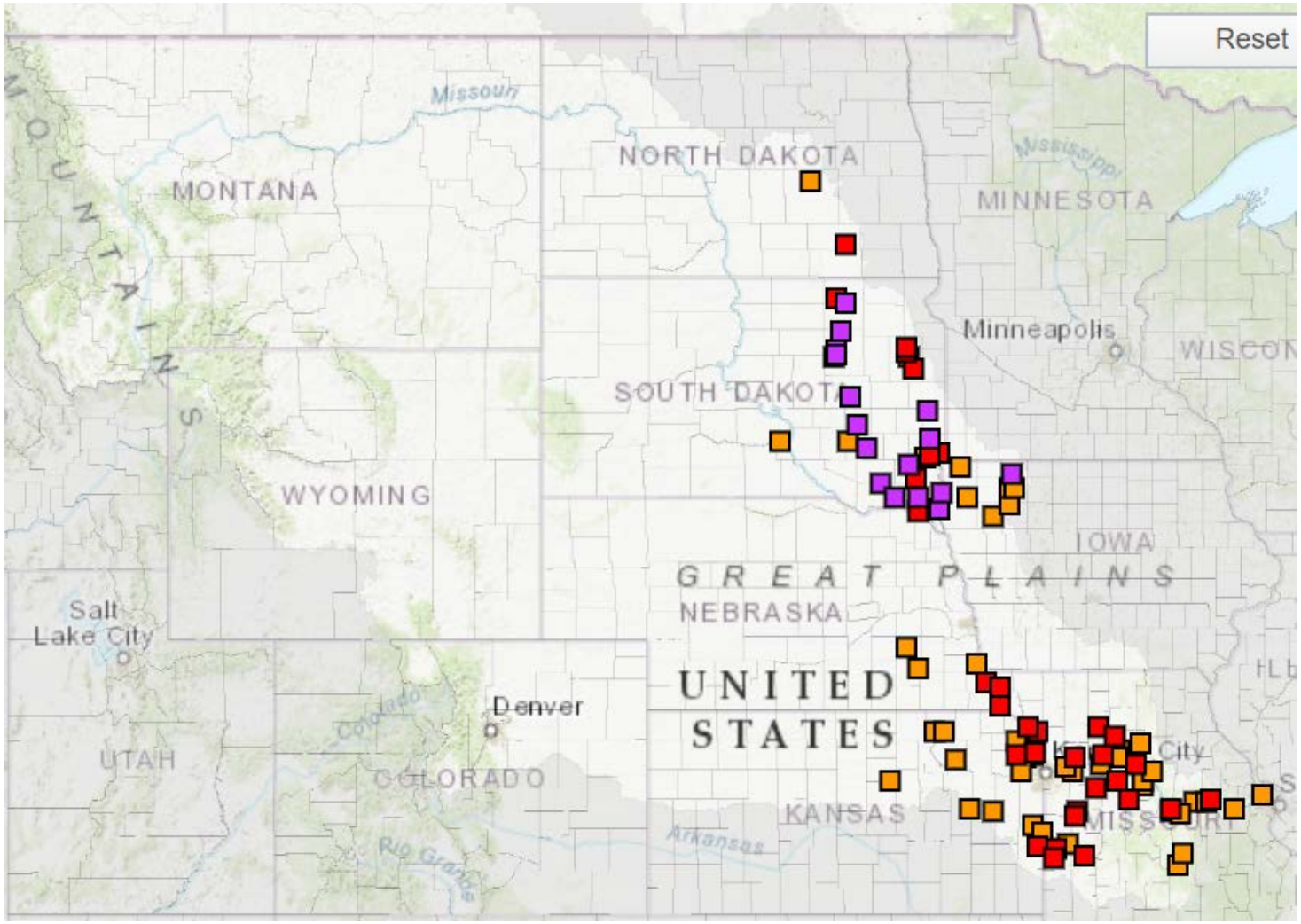
- Risk of widespread minor flooding is above normal across the region
- Risk of major flooding on the MS River is much above normal
- Long-duration flooding is a possibility on the MS River if soils maintain high moisture through spring
- SWE in northern half of region is above normal… rate of snowmelt, additional snowfall, heavy spring rains influence flooding severity
- 197 gauges with 50% or greater chance of flooding during February – April, 111 gauges with 90% or greater chance of flooding



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

NWS River Forecast Center FC Spring Flood Outlooks – Missouri

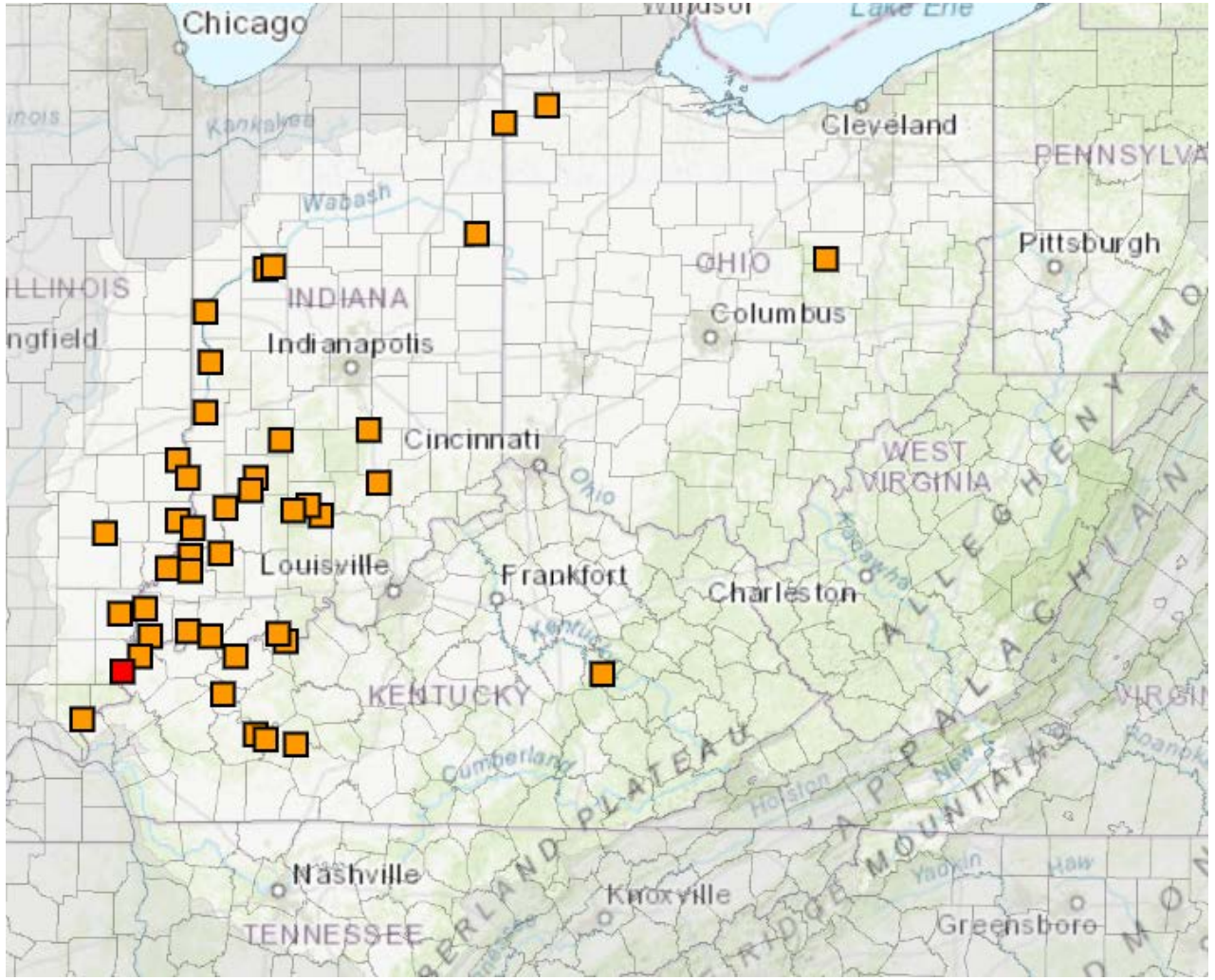
- Risk of widespread minor flooding is above normal across the region
- Risk of major flooding on the MO River is much above normal
- High water content snow in eastern Dakotas, above average runoff in upper MO basin
- 94 gauges with 50% or greater chance of flooding during February – April, 36 gauges with 90% or greater chance of flooding



Source: https://www.weather.gov/mbrfc/

NWS River Forecast Center Spring Flood Outlooks – Ohio

- Slightly drier than last year across OH basin
- Heavy precipitation in lower OH, TN valleys helped an early start to the “flood season”
- 43 gauges with 50% or greater chance of flooding during February – April, 23 gauges with 90% or greater chance of flooding



Source: https://www.weather.gov/ohrfc/

Summary

- Wetter than normal conditions in January, February: streams remain above normal, near record wet soils across the region
- Warm winter so far – vegetation dormancy break could be an issue in eastern corn belt
- Great Lakes: reduced ice cover, very high levels, M-H basin could break every month's record this year
- Snowpack: well above normal in Upper Midwest, below normal in western Dakotas/high plains; high water content snowpack
- Heavy rain in southeast led to early start to flooding season in KY, Southern IL
- Short-term outlooks: colder than normal, drier south/wetter north
- Longer-term outlooks: wetter than normal across the region
- **Elevated spring flood risk in all MS, MO, & OH basins**

Further Information – Partners

- Today's & Past Recorded Presentations at:
  - https://mrcc.Illinois.edu/multimedia/webinars.jsp
  - https://hprcc.unl.du/webinars.php
- NOAA National Centers for Environmental Information: www.ncei.noaa.gov
- Monthly climate reports (US & Global): https://www.ncdc.noaa.gov/sotc/
- NOAA Climate Prediction Center: www.cpc.ncep.noaa.gov
- Climate Portal: www.climate.gov
- U.S. Drought Portal: www.drought.gov
- National Drought Mitigation center: https://drought.unl.edu
- State Climatologists: http://www.stateclimate.org
- Regional Climate Centers:
  - Midwestern – https://mrcc.isws.Illinois.edu
  - High Plains – https://hprcc.unl.edu

Thank You, Questions?

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