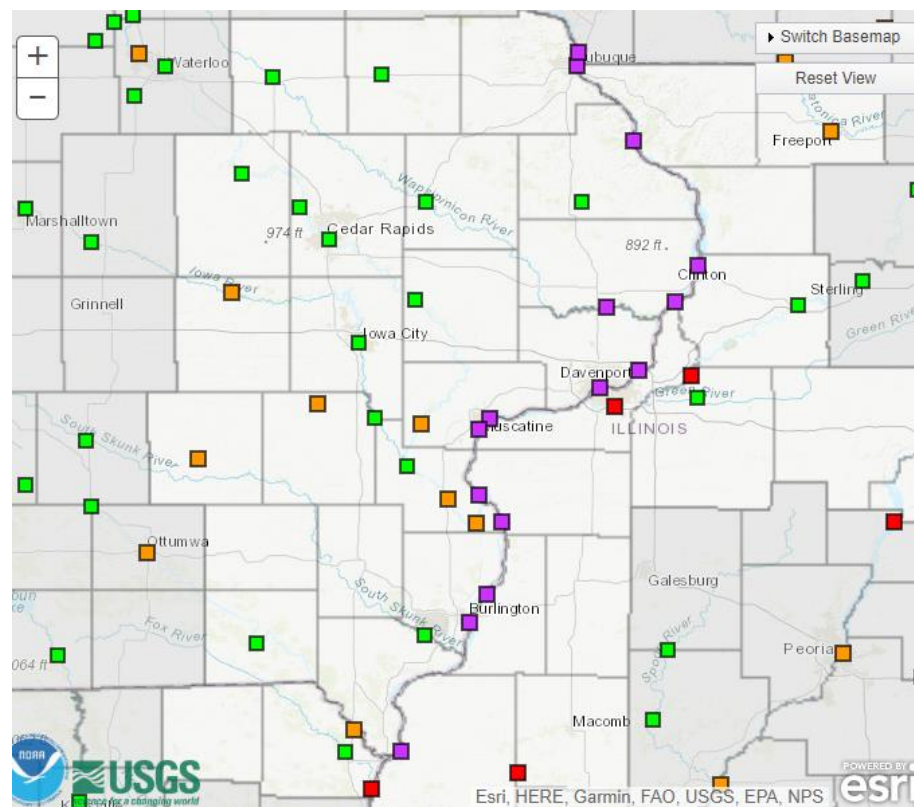




Elevated Risk for Flooding This Spring



> 50% Major Flooding
> 50% Moderate Flooding
> 50% Minor Flooding
< 50% Chance of Flooding
Long-Range Flood Risk Not Calculated

Colored boxes highlights locations with a 50% of reaching the correlated flood category.

The risk for flooding this spring will be elevated, with the highest potential along the Mississippi River.

Key Points:

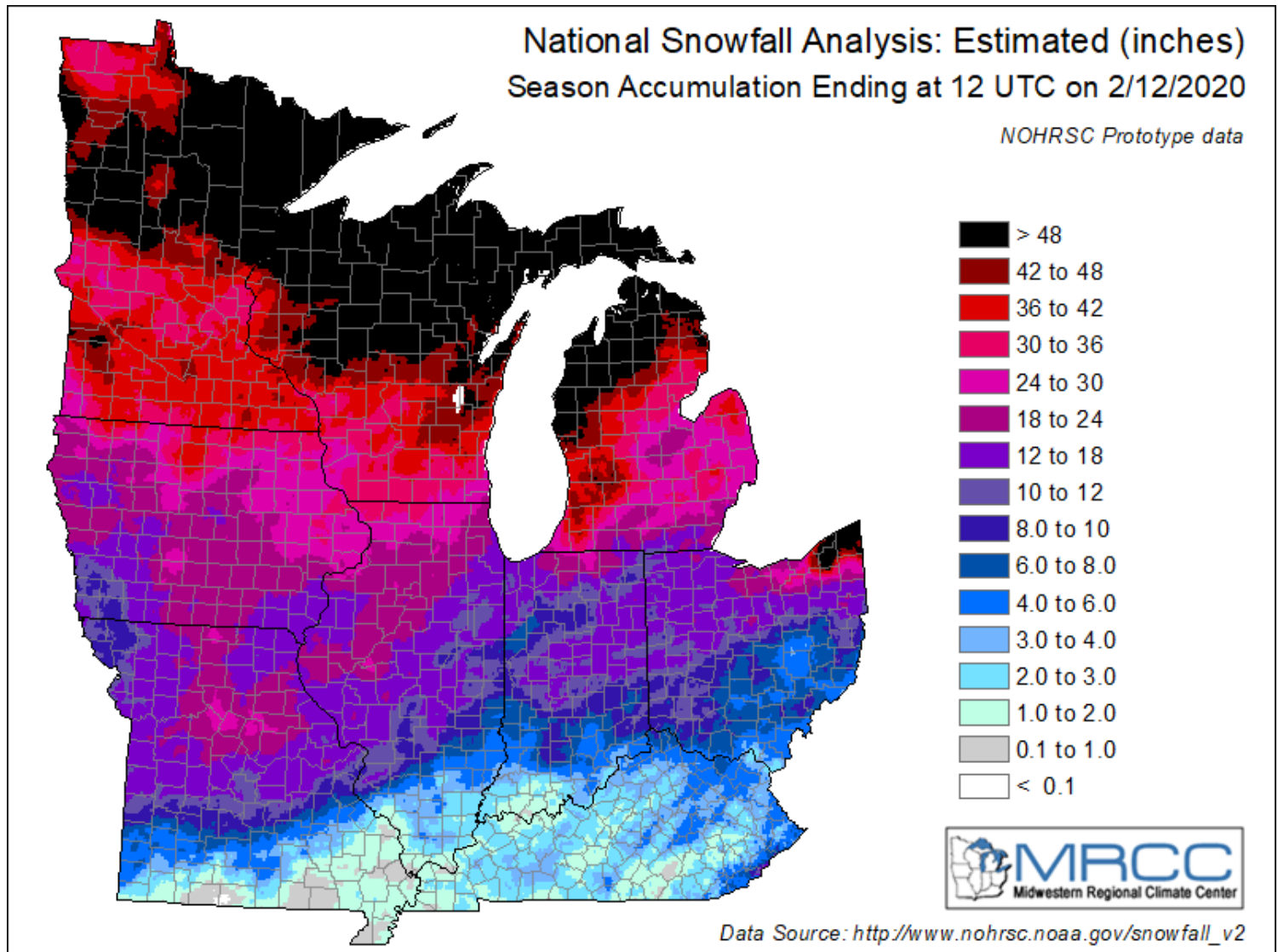
- Risk for widespread Minor Flooding is above normal for all area rivers.
- Risk for Major Flooding on the Mississippi River is much above normal.
- Long-duration flooding is a possibility on the Mississippi River if high soil moisture conditions persist through the spring.
- Saturated soils have persisted across the region since fall of 2019. The flood risk will remain elevated until soils dry out.
- Snowpack varies across the region. The current snow water equivalent in the northern half of the Upper Mississippi River watershed is well above normal. Locally, snow cover is limited, decreasing the flood threat for local rivers.
- The rate of the snowmelt, additional snowfall, and heavy spring rains will highly influence the severity of flooding that occurs this spring.

Note: High confidence on rises to near or above minor flood stage on all area rivers.
Low confidence on peak severity of any flooding that occurs.



Factors Considered in this Outlook

- Seasonal Temperatures and Precipitation
- Snow Cover/Liquid Water Equivalent
- Frost Depth
- Soil Moisture
- Current River Streamflows
- Weather Forecasts & Outlooks





Seasonal Temperatures/Precipitation

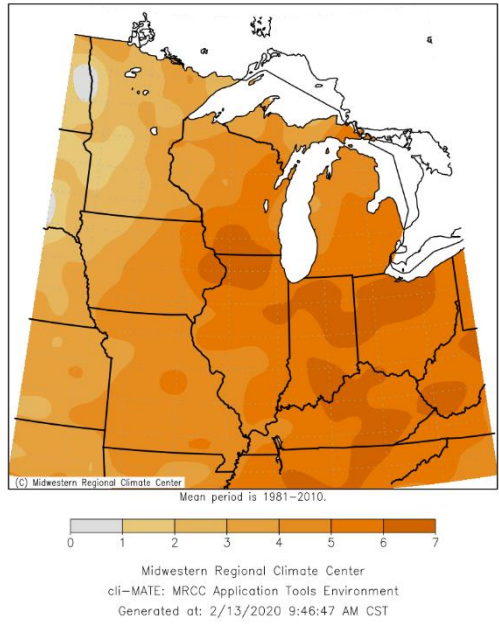
Average Winter Temperatures:

- Above Normal Temperatures this Winter
- Locally, averages have been 2-3 degrees below normal

Winter Precipitation:

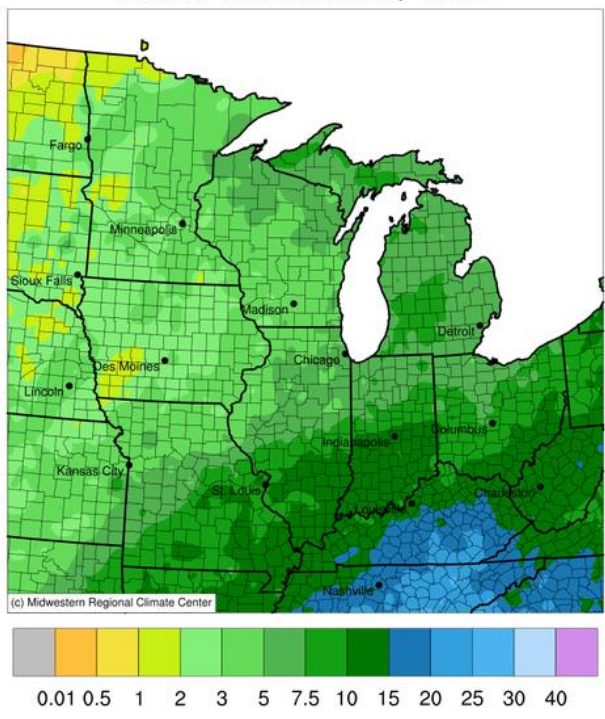
- Locally - near normal
- Upstream (Mississippi River watershed) – Above Normal

Average Temperature
Departure from Normal
Dec 1, 2019 – Feb 13, 2020



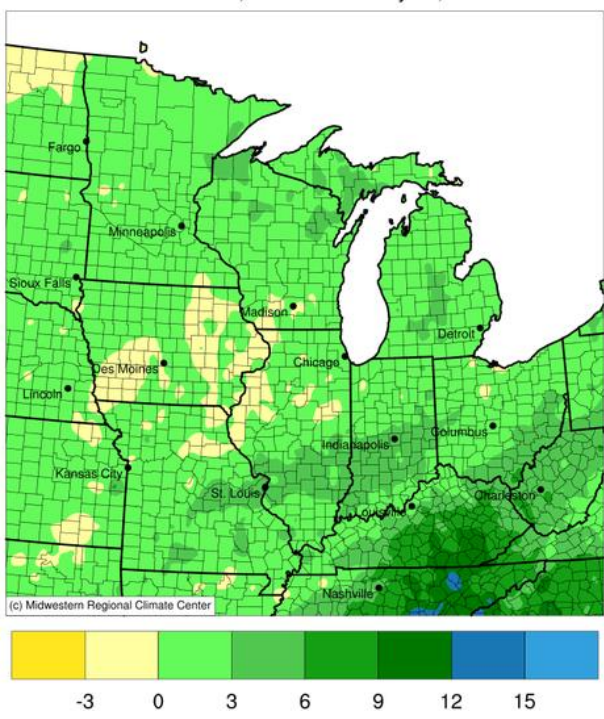
Accumulated Precipitation

December 01, 2019 to February 13, 2020



Accumulated Precipitation
Departure from Normal

December 01, 2019 to February 13, 2020

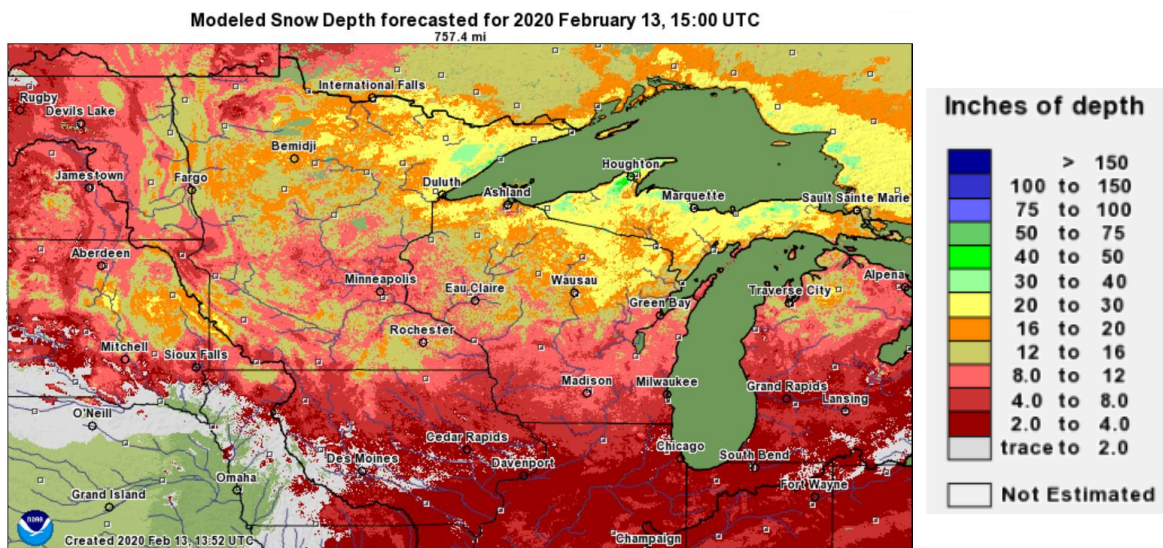


Images Courtesy of Midwest Regional Climate Center



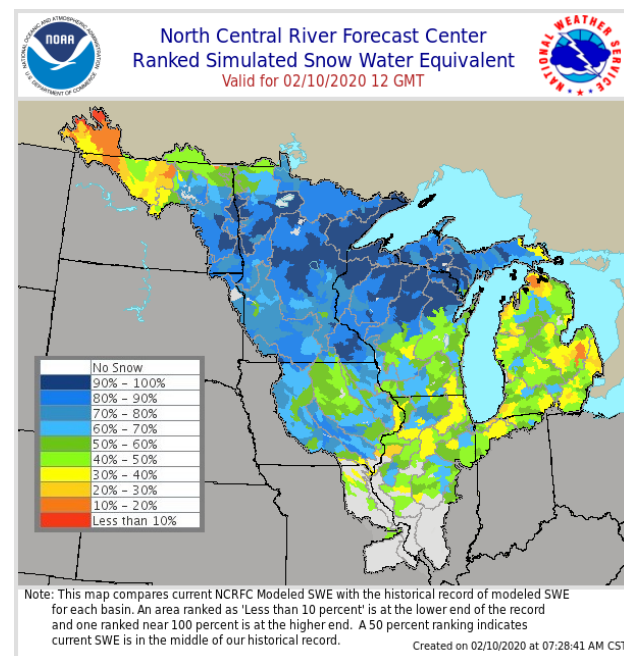
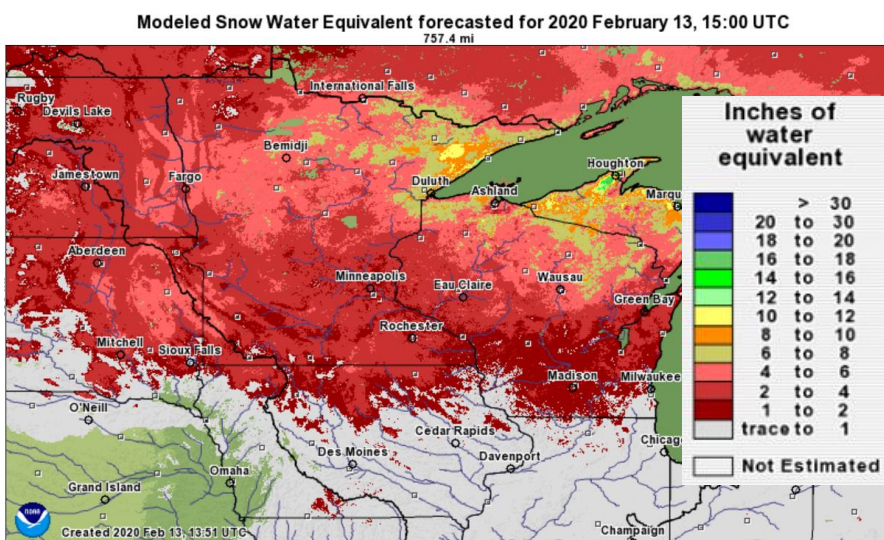
Snow Cover/Liquid Water Equivalent

Snow Cover (as of Feb 13, 2020)



Snow Water Equivalent (SWE) as of Feb 13, 2020:

- Widespread SWE of 2-4". Deepest snowpack has 4-6" of SWE
- The entire basin has near or above normal amounts of SWE



Contribution to flood potential:

- Snowmelt alone has a high potential for flooding. The severity will depend on the rate of the snowmelt.

Images courtesy
of NOHRSC.



Frost Depth

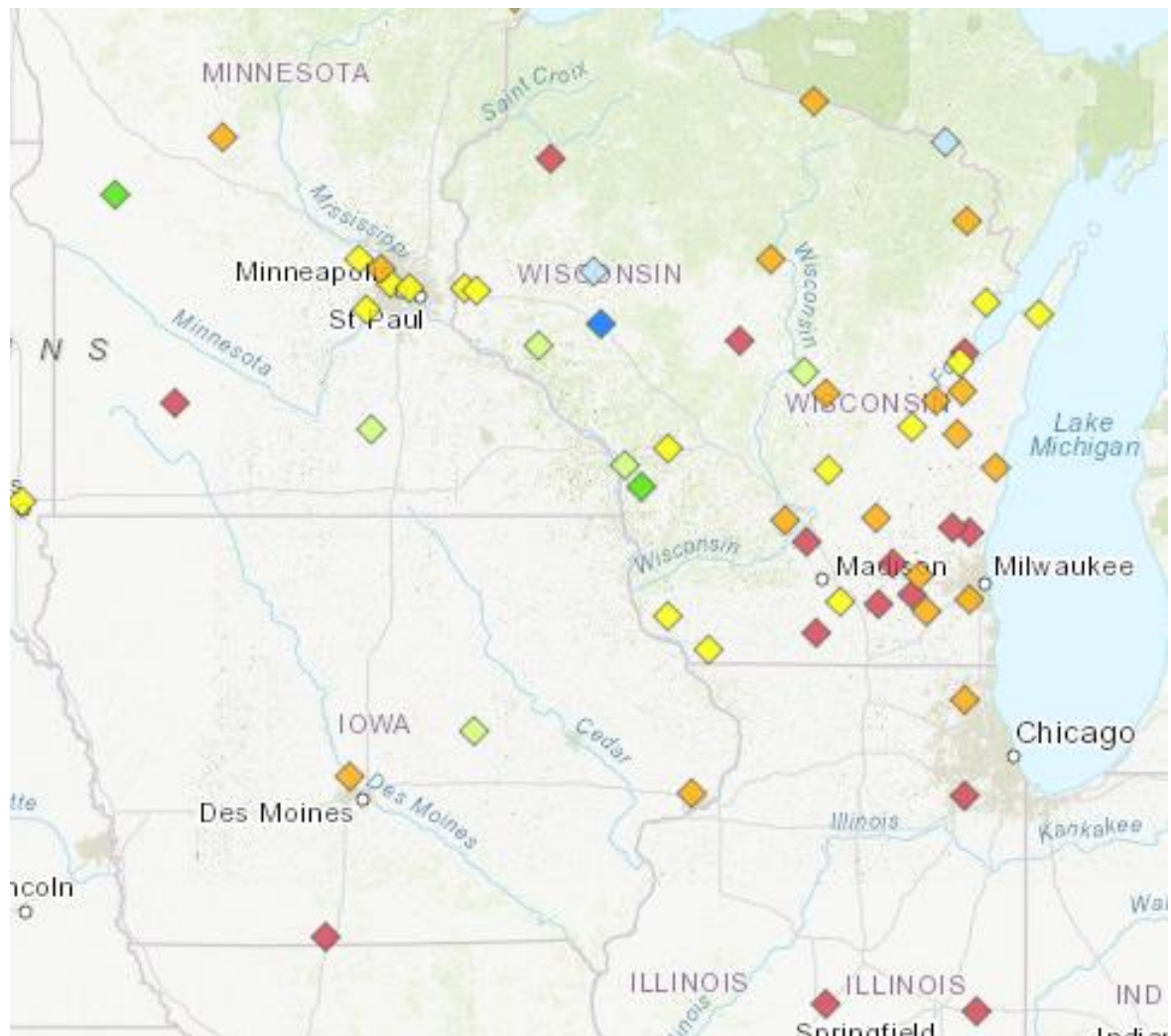
Frozen ground

- Frost depths are less than normal because of the warm winter

NCRFC_Frost_Depth

FrostDepth

- > 60 - 80
- > 48 - 60
- > 36 - 48
- > 24 - 36
- > 18 - 24
- > 12 - 18
- > 6 - 12
- > 3 - 6
- 0 - 3



Images courtesy of the NWS NCRFC

Contribution to flood potential:

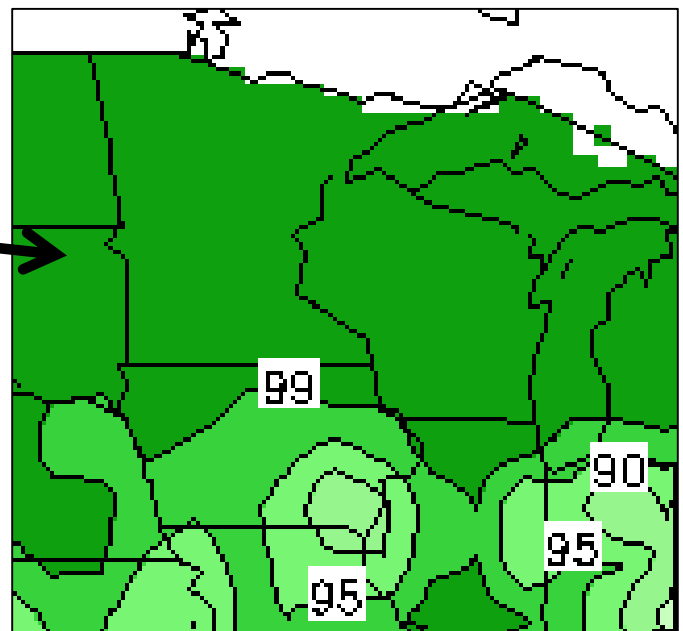
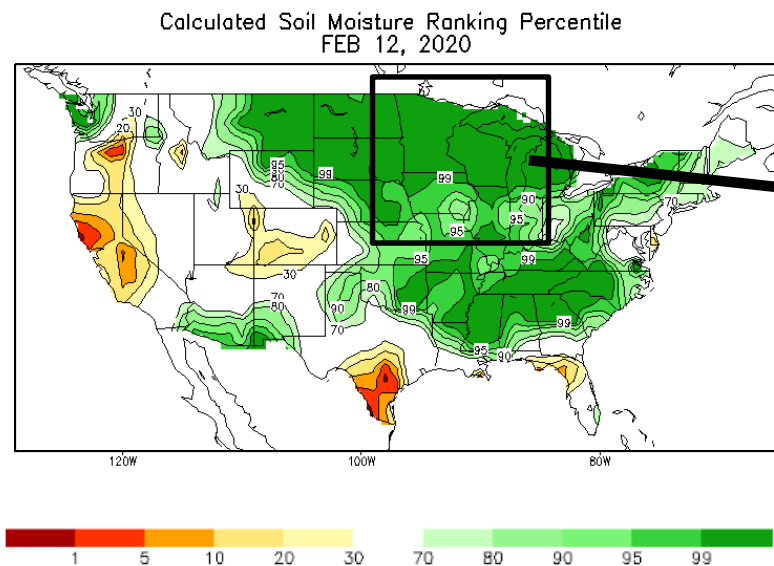
- While frozen ground persists – snowmelt or rains will be prohibited from soaking into the ground, and become direct runoff. However, the shallow frost may allow the ground to thaw earlier in the season to promote drying of the soils and at least some infiltration of runoff.



Soil Moisture/Drought

Wet/Saturated Soils → No Areas under Drought Conditions:

- Large area with very wet soils.
- The 99th percentile of soil moisture rankings indicate conditions are nearly saturated.



Images courtesy of the NWS Climate
Prediction Center

Contribution to flood potential:

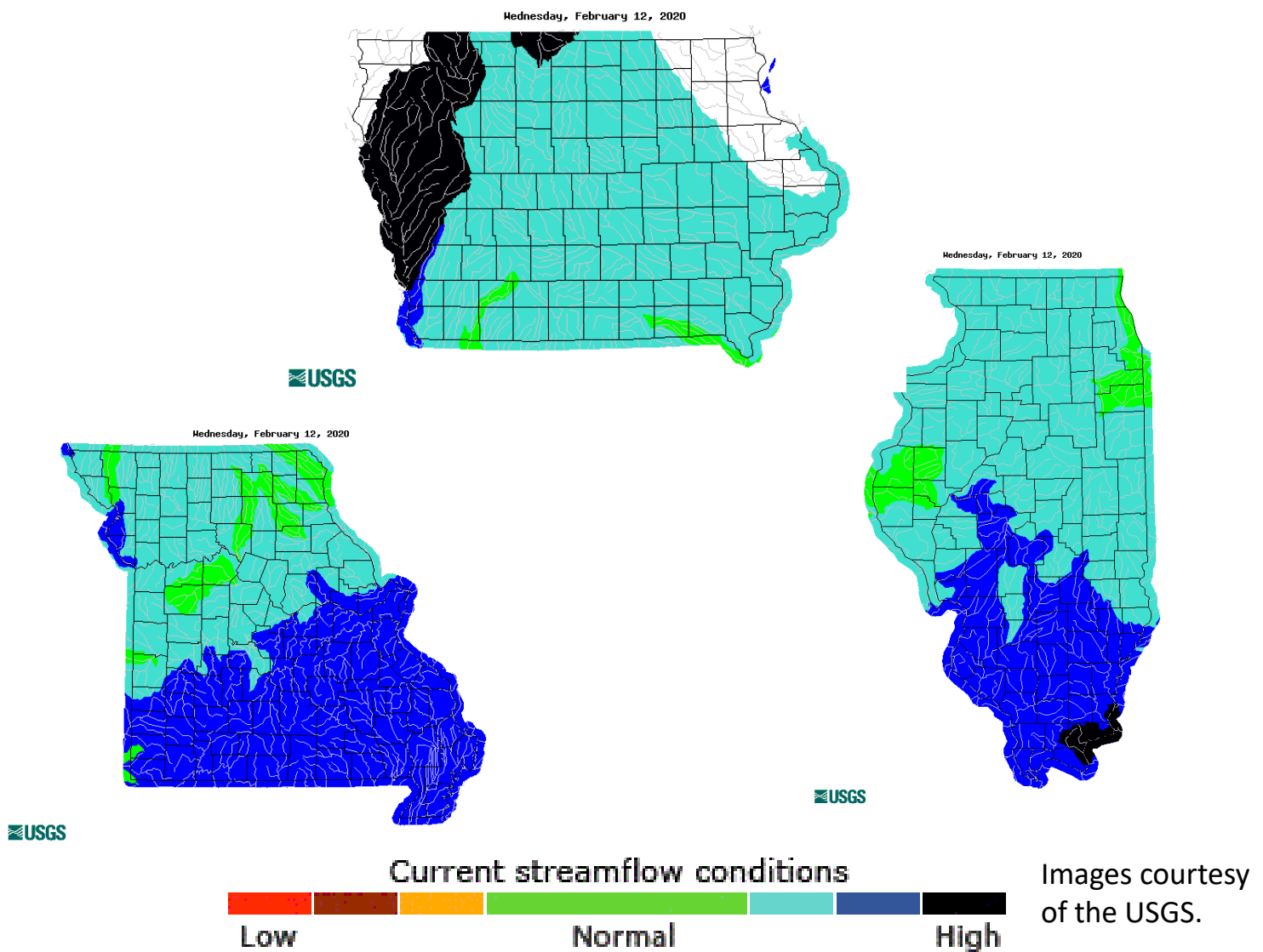
- The extremely wet soils mean any snowmelt or rainfall across the entire region will run directly into the river systems rather than being able to infiltrate into the ground.
- The areal extent of the very wet soils is concerning as the probability of having additional precipitation over saturated soils is very high, providing a high potential for efficient runoff processes.



Streamflows

Background Conditions:

- Streamflows are above normal and have been running at high levels since fall of 2019. Warm conditions in the coming weeks could lead to some snowmelt, with rising rivers a possibility.



Contribution to flood potential:

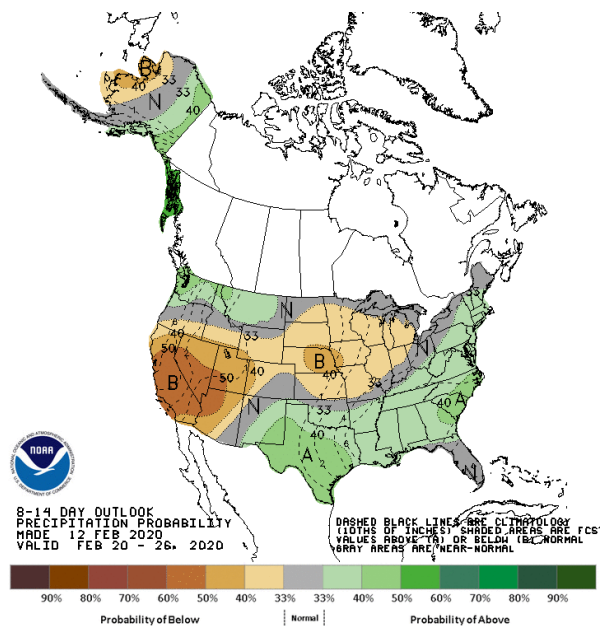
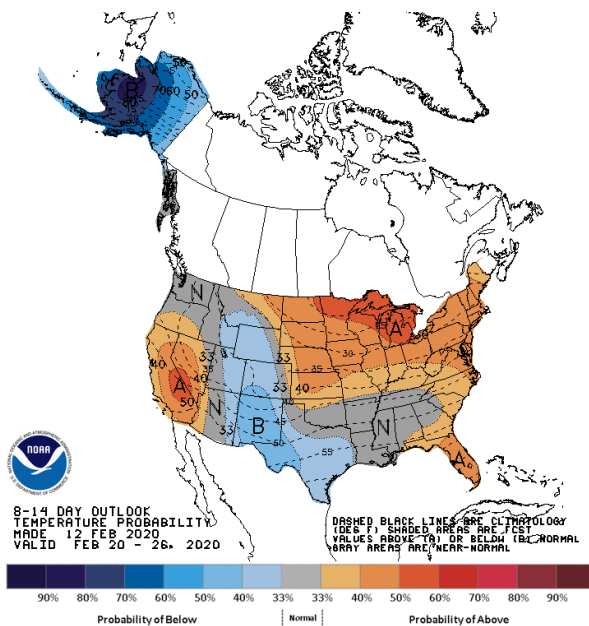
- Higher river levels will result in less capacity in the rivers for additional runoff from snowmelt water and spring rains.



Weather Outlooks

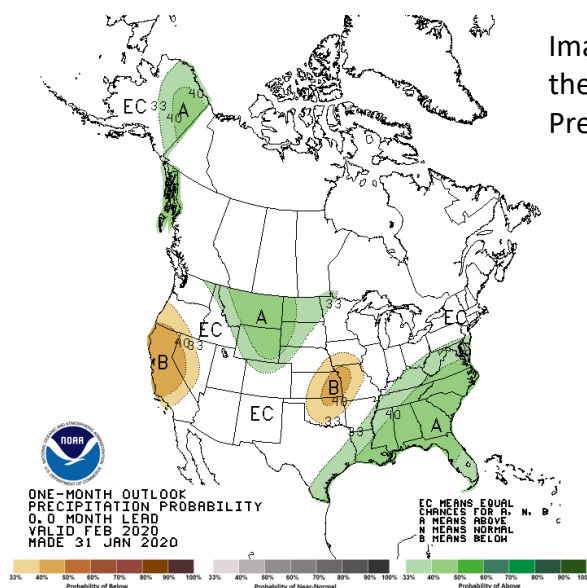
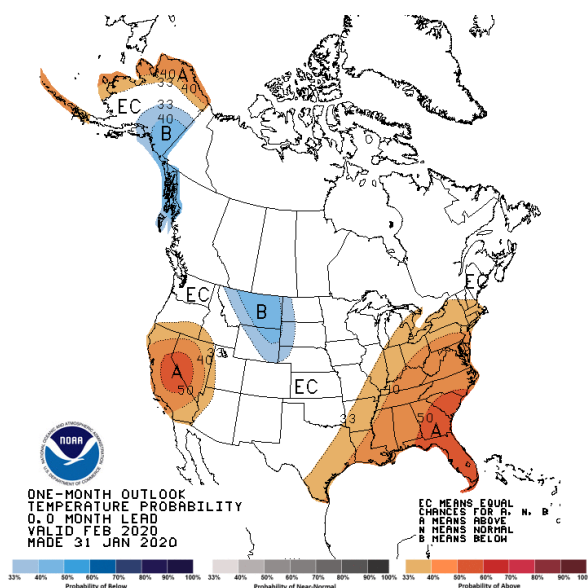
Week 2 Temperature and Precipitation Outlooks (2/20-2/26):

- Above normal Temperatures & below normal Precip favored



March Outlook:

- No clear signal for above or below normal temperatures. May have varying weather to average out to near normal.
- Odds are higher for a drier March, with wetter weather outside of the region.



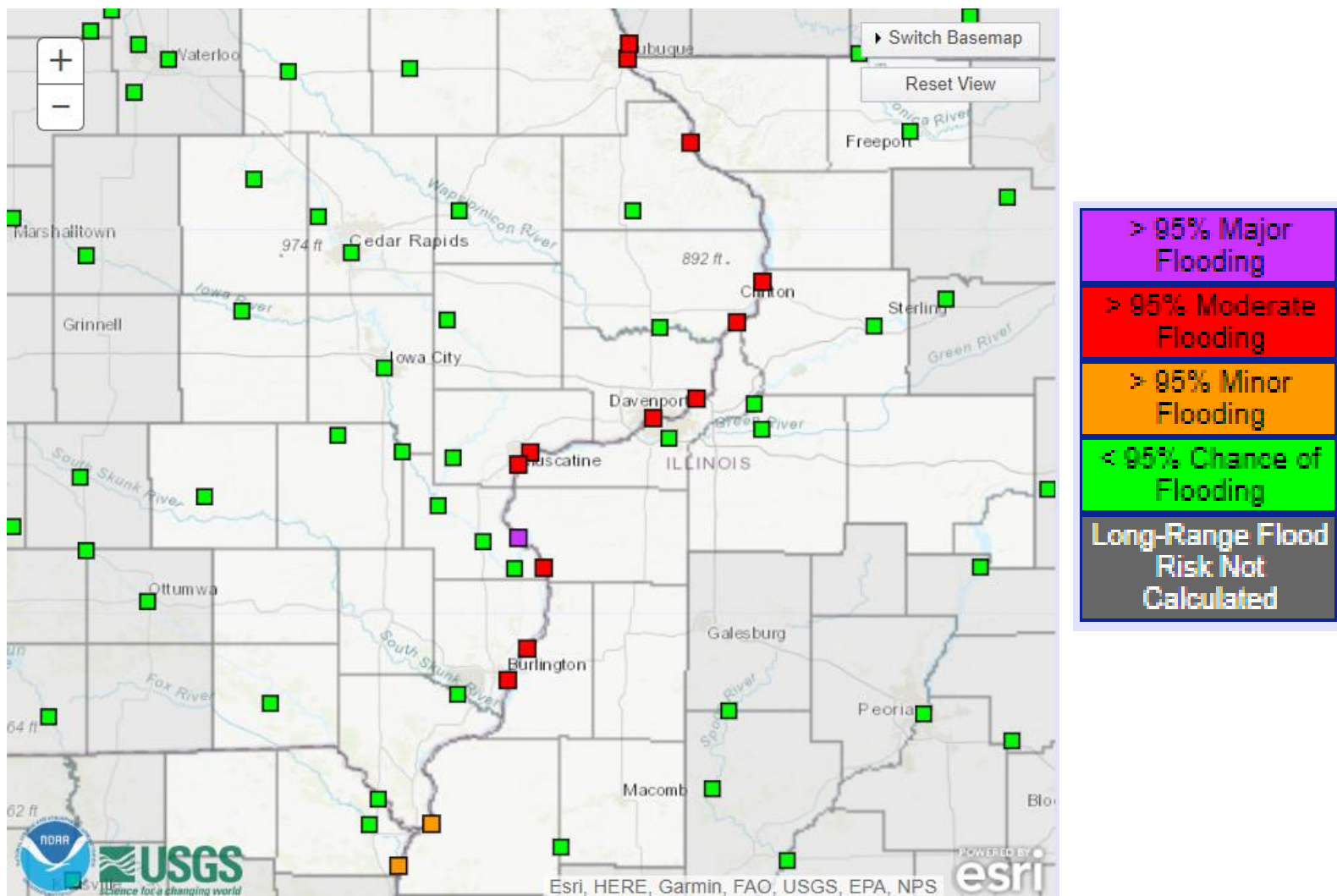
Images courtesy of
the NWS Climate
Prediction Center



Forecasts & Outlooks: High Probabilities

Locations with high chances for flooding:

- Greater than 95% chance to reach the labeled flood stage



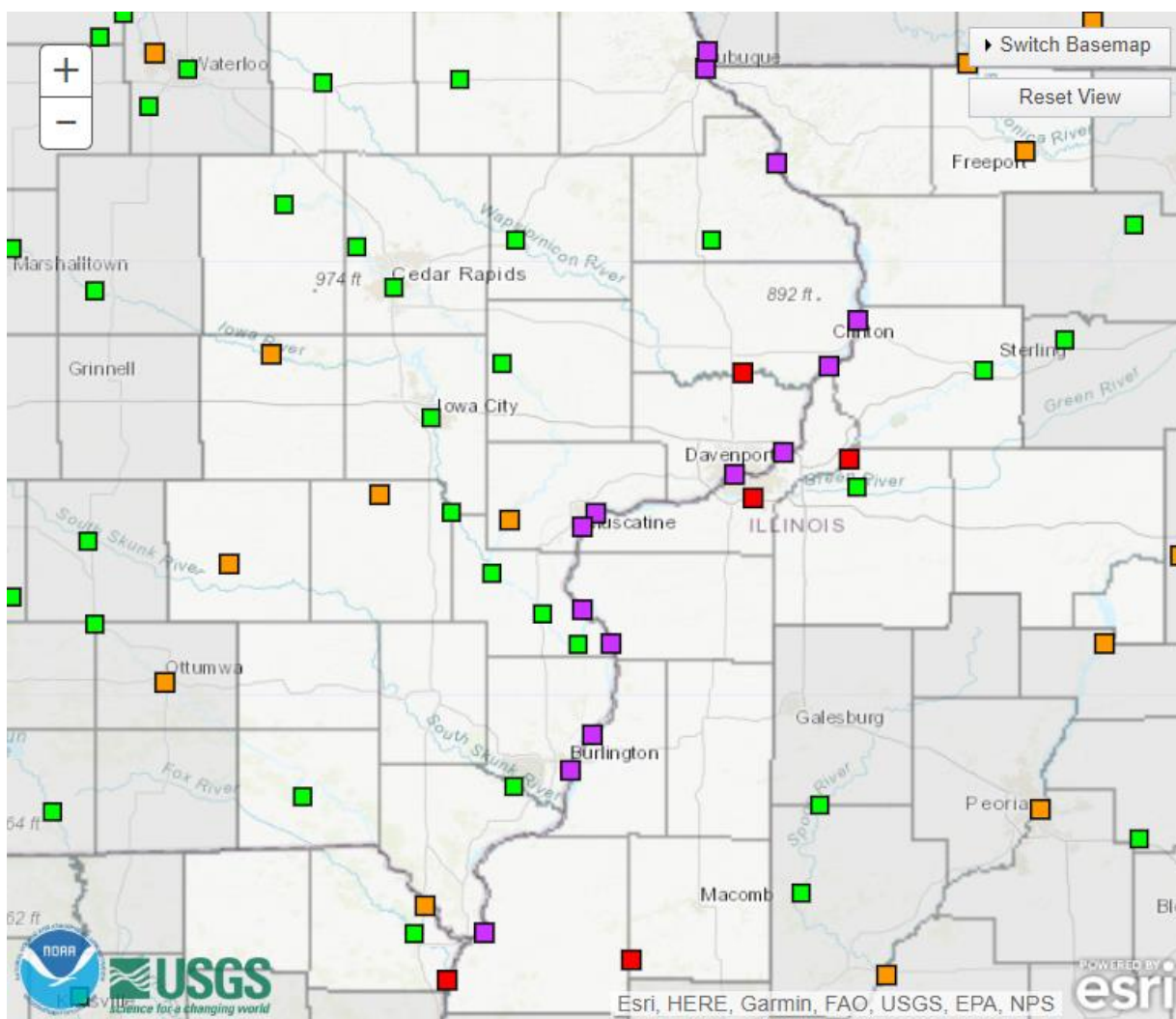
- Locations along the Mississippi River as well as a few tributaries are almost certain to reach at least moderate flood stage.
- While the flood risk is above normal, there isn't a high certainty of other locations reaching flood stage.



Forecasts & Outlooks: 50% Chance

Locations with chances for flooding:

- Around a 50% chance to reach the labeled flood stage



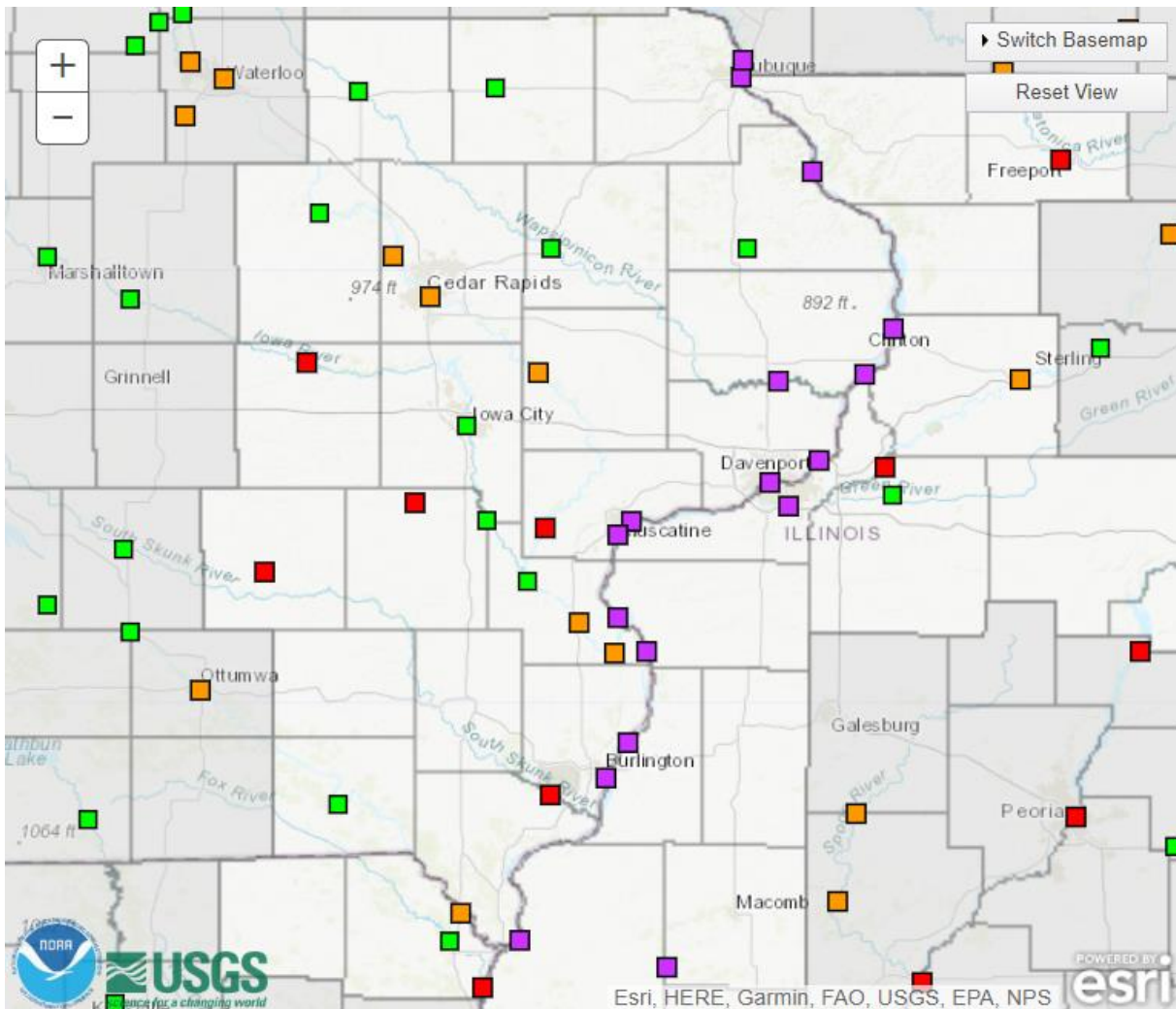
- The Mississippi River will have a 50% chance for reaching major flood stage. This is well above normal.
- The number of the local rivers also have a high probability to reach minor and moderate flooding. The lower Rock, lower Wapsipinicon Rivers, and La Moine Rivers also have a higher chance of reaching higher categorical flooding.



Forecasts and Outlooks: Lower Probabilities

Locations with chances for flooding:

- Around a 25% chance to reach the labeled flood stage



- This graphic shows that the many rivers in the local area have at least a small (25%) chance of reaching flood stage, with some showing at least a low probability of rising to moderate or major flood levels.



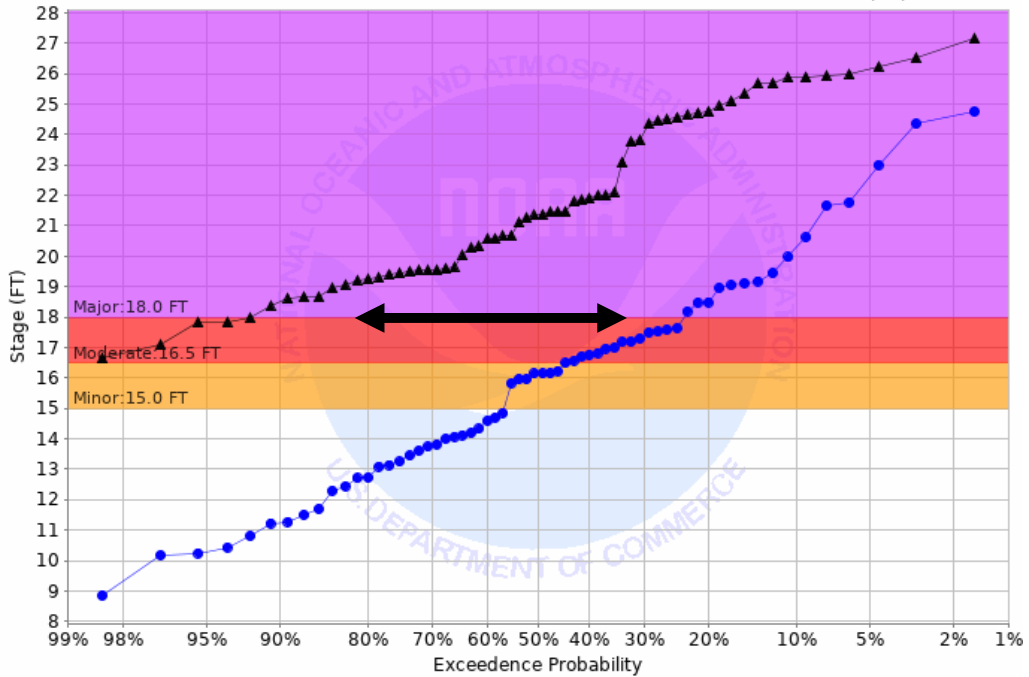
How far outside of normal is the flood risk?

Closer the lines are together the closer to normal the flood threat is.

▲ Conditional Simulation
● Historical Simulation

Example of higher risk Mississippi River locations: Burlington, IA (BRLI4)

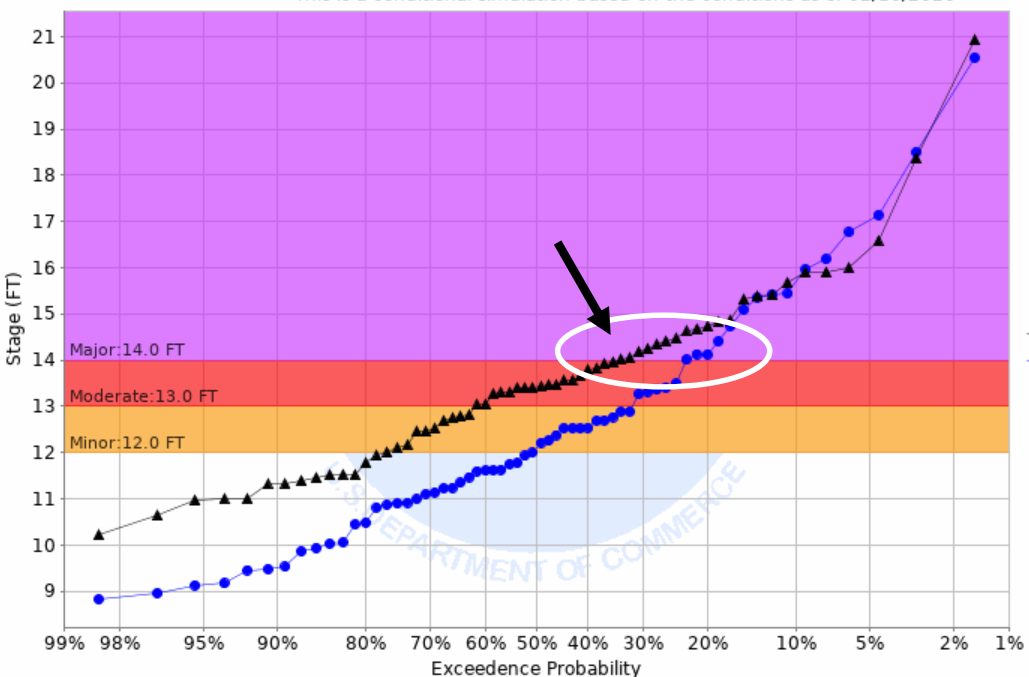
Chance of Exceeding River Stage at Mississippi River at Burlington (BRLI4)
Forecast for the period 02/17/2020 - 05/17/2020
This is a conditional simulation based on the conditions as of 02/10/2020



This graphic shows the probability of the Mississippi River at Burlington reaching Major Flood stage (18.0 ft) this year is roughly around 90%. In a normal year this gage has a 25% Of reaching 18.0 ft.

Example of lower risk locations - most local rivers: Moline, IL (MLII2)

Chance of Exceeding River Stage at Rock River at Moline (MLII2)
Forecast for the period 02/17/2020 - 05/17/2020
This is a conditional simulation based on the conditions as of 02/10/2020



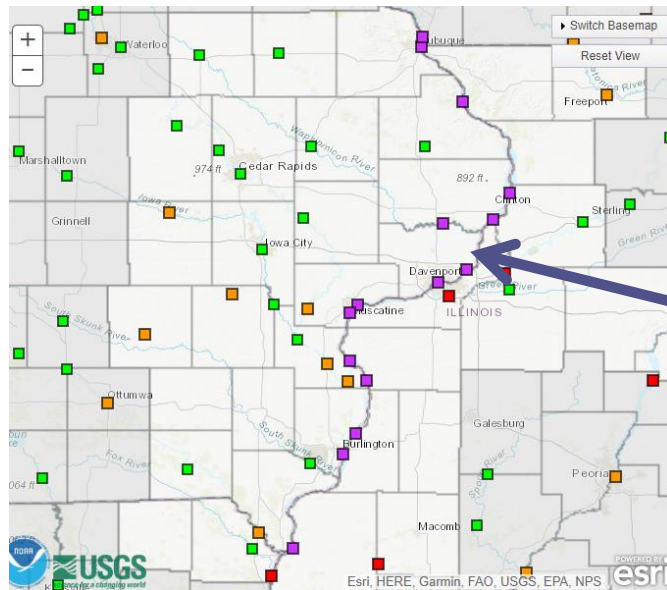
For the Rock River at Moline, the risk for reaching Major Flood Stage (14.0 ft) this year is 30%. In a normal year this gage has a 23% Of reaching 14.0 ft.



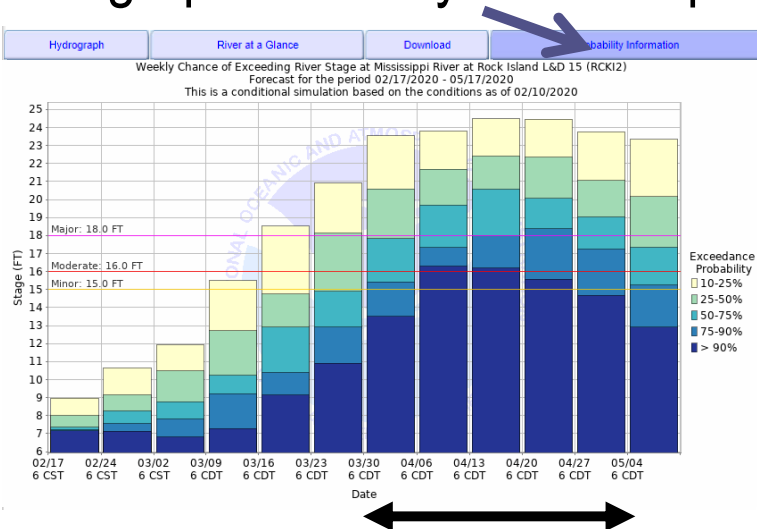
Probabilistic Outlook Information

Where to find the information:

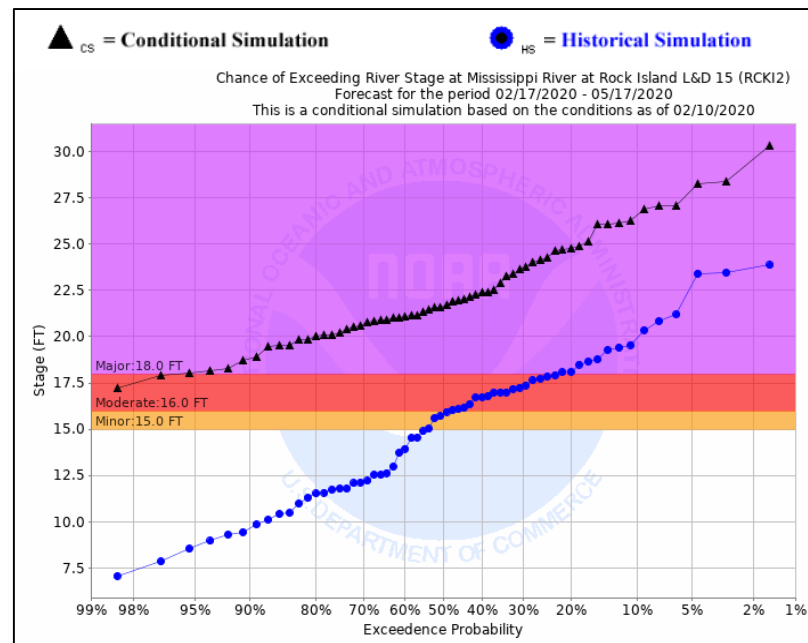
- https://water.weather.gov/ahps2/long_range.php?wfo=dvn
- To see the graphs, choose a location from the map.



- Choosing the Probability Information Tab will get you to the graphical analysis of the probabilities.



This graph shows the most likely timing of high river levels. For the Mississippi River this would indicate probabilities are highest through much of April into early May.





Information Sources

Where to find the information that was put into this outlook:

- Advanced Hydrological Prediction Service (AHPS) – water.weather.gov/ahps
- North Central River Forecast Center – www.weather.gov/ncrfc
- Probabilistic Information - https://water.weather.gov/ahps2/long_range.php?wfo=dvn
- Midwest Regional Climate Center (MRCC) – <http://mrcc.isws.illinois.edu/>
- US Geological Survey (USGS) WaterWatch page – <http://waterwatch.usgs.gov>
- National Operational Hydrologic Remote Sensing Center (NOHRSC) – www.nohrsc.noaa.gov
- NOAA Climate Prediction Center – www.cpc.ncep.noaa.gov
- NOAA Weather Prediction Center – www.wpc.ncep.noaa.gov
- US Drought Monitor – droughtmonitor.unl.edu

The Spring Flood Outlook will be updated

February 27, 2020

March 12, 2020



Bottom Line:



- High confidence on widespread river rises to near or above flood stage on all area rivers. Low confidence on peak severity of any flooding that occurs.
- Risk for **Major Flooding** on the Mississippi River is much above normal.
- Potential does exist this spring season for high impact and long duration flooding.
- Saturated soils will promote runoff rather than infiltration from snowmelt, spring-time rains, or a combination of the two.
- Flood risk will remain elevated until soils dry out.
- Snowmelt runoff alone may cause flooding. A continued wet pattern will make the threat for flooding higher.

Flood Quick Facts and Preparedness:

Quick facts you should know about flooding:

- Flooding can be caused by heavy rain, rapid snow melt, coastal storms, storm surge, waterway overflow, ice jamming, levee overtopping, dam failure, or from wastewater systems.
- Flooding has occurred in every U.S. state and territory.
- It only takes 6 inches of fast-moving water to knock you off your feet.
- A car can be moved in as little as 2 feet of water.
- 90% of all U.S. natural disasters declared by the President involve flooding.



Preparedness:

Know your risk: Are you in a flood-prone area? Know your zone: www.fema.gov/flood-zones

- You must purchase separate flood insurance for your home. There is a 30 day wait period between when you buy a flood insurance policy and when it goes into effect. Plan ahead!
- A **Flood Watch** is issued when conditions are favorable for flooding. *Time to prepare!*
- A **Flood Warning** is issued when flooding is imminent or occurring. *Time to act!*

Never drive into flood waters! Turn around, don't drown!

Find out more information at: www.weather.gov/dvn/2020_springfloodoutlook

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