2020 Spring Flood Outlook – Update #2
National Weather Service – WFO Quad Cities
March 12, 2020
Key Points

- Main Concerns:
  - *Local Rivers:* near to slightly above average for most area rivers
    - Slight improvement in past 2 weeks
    - Any flooding will now be driven by spring rains
  - *Mississippi River:* much above average on Mississippi River
    - Improvement over the past 2 weeks (mostly on the higher end)

- Rises ongoing on area rivers and the Mississippi river due to snowmelt runoff and recent rains.

- Spring precipitation and rate of snowmelt will influence how high river levels get, but this remains uncertain.

- An elevated risk for flooding will persist until soils are able to dry out.
Precipitation – Past 30 Days
Temperatures March

Image courtesy of Midwestern Regional Climate Center (MRCC)
Snowpack remains far northern parts of the watershed
- Change in past 2 weeks: Significant loss of snow
- Rivers in the black circle are now observing responses from the snowmelt

Images courtesy of NOHRSC (NWS)
Snowpack remains far northern parts of the watershed

- Change in past 2 weeks: Significant loss of SWE
- Rivers in the black circle are now observing responses from the snowmelt
- 2” to 6”, localized up to 8” SWE remain in upper reaches of the watershed

Images courtesy of NOHRSC (NWS)
Liquid Water in the snowpack:
- Loss of significant SWE in the past 2 weeks
  - Widespread 1” to 3”, up to 4” in some areas
- Remaining snowpack has near normal SWE for mid March
Frozen Ground

2/26/2020

- Ground continues to thaw
- Frozen ground will not have a high degree of impact on the flood risk this spring.

[Map showing frost depth]

https://www.weather.gov/ncrfo/LMI_FrostDepthMap

* Can overlay current snow analysis from NOHRSC and precipitation forecast from WPC
Soil Moisture

- Areal extent of the extremely wet soils is very widespread
- Even the ‘drier’ areas (SE Iowa/N Missouri) still above 80th percentile.
- Primary contributor to above normal risk
- Flood risk will stay high until soils can dry out
- Minimal change in the past 2 weeks
Streamflows

- Rising streamflows due to runoff from widespread snowmelt and recent rainfall
- Above normal streamflows have persisted over the past few months.

Images courtesy of US Geological Survey
Week 2 Weather Outlook
March 19th – 25th
Week 2 Hazards Outlook
March 18\textsuperscript{th} – 25\textsuperscript{th}

Risk of Heavy Precipitation
Valid: 03/18/2020-03/24/2020

Day 8-14 U.S. Hazards Outlook
Valid: 03/18/2020-03/24/2020

Climate Prediction Center
Made: 03/19/2020 3PM EDT
Follow us: www.cpc.ncep.noaa.gov
3 Month Weather Outlooks
March/April/May

NOAA Climate Prediction Center – www.cpc.ncep.noaa.gov
What is the Flood Risk? Change in past 2 weeks?

https://water.weather.gov/ahps/region_long_range.php?rfc=ncrfc&percent=50 → Mouse over gage of interest
What is the Flood Risk?

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

Mouse over gage of interest
What is the Flood Risk? And how much outside of normal is it?

Rock River at Joslin

Iowa River at Marengo
Long-Range River Outlooks

Locations with high chances for flooding:

- Greater than 90% chance to reach the labeled flood stage
Long-Range River Outlooks

Highlighted gages have at least a 50% chance to reach colored stage.
Number adjacent to the gage is the probability of reaching the colored stage level.
Long-Range River Outlooks

Locations with chances for flooding:

- Around a 25% chance to reach the labeled flood stage → Lower Confidence (Probability)
## Long-Range River Outlooks

### Flood Stage & Record Levels

<table>
<thead>
<tr>
<th>Minor</th>
<th>Mod</th>
<th>Major</th>
<th>Record</th>
</tr>
</thead>
<tbody>
<tr>
<td>16.0</td>
<td>17.0</td>
<td>20.5</td>
<td>25.69</td>
</tr>
<tr>
<td>17.0</td>
<td>18.0</td>
<td>21.5</td>
<td>26.81</td>
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<tr>
<td>17.0</td>
<td>18.0</td>
<td>20.0</td>
<td>23.51</td>
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<td>16.0</td>
<td>18.0</td>
<td>20.0</td>
<td>24.75</td>
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<tr>
<td>17.0</td>
<td>18.0</td>
<td>20.0</td>
<td>24.65</td>
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<tr>
<td>11.0</td>
<td>12.0</td>
<td>13.5</td>
<td>17.75</td>
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<td>15.0</td>
<td>16.0</td>
<td>18.0</td>
<td>22.70</td>
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<td>18.5</td>
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<td>14.0</td>
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<td>17.0</td>
<td>24.49</td>
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<td>10.0</td>
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<td>22.46</td>
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<td>18.0</td>
<td>25.73</td>
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<tr>
<td>16.0</td>
<td>17.5</td>
<td>19.0</td>
<td>27.58</td>
</tr>
<tr>
<td>15.0</td>
<td>18.0</td>
<td>25.0</td>
<td>28.49</td>
</tr>
</tbody>
</table>

For example, Dubuque LD11 has a flood stage of 25.69 feet, with minor, moderate, major, and record levels marked as follows:

- Minor: 19.8 feet
- Moderate: 21.5 feet
- Major: 20.0 feet
- Record: 16.0 feet

Other locations like Dubuque, Bellevue LD12, and others follow the same pattern with their respective flood stages and flood levels.
2020 Mississippi River Spring Snowmelt Timing
(Dubuque, IA → Gregory Landing, MO)

Rising river levels expected through March. Peak river levels remain highly uncertain. *Flooding from snowmelt runoff alone is not a certainty.*

Locations that do reach flood stage will likely see that happen between March 18 and March 25. Timing and peak heights is *highly* dependent on additional precipitation in the next several weeks.

### When will the Mississippi River Crest? *

- Most Likely Timing of Mississippi River Crest

- March 20
- March 25
- March 30
- April 2

*NOTE: Dry conditions through March would keep peak levels lower. In this case, some locations could crest at levels below flood stage. Stay tuned to official forecasts and flood products over the coming weeks.*
## Overview of Flood Risk Factors

<table>
<thead>
<tr>
<th>Factors</th>
<th>Impact to Potential Spring Flooding</th>
<th>Change Since Last Outlook</th>
</tr>
</thead>
<tbody>
<tr>
<td>River Levels</td>
<td>Increased Threat</td>
<td>Higher river levels in the past 2 weeks due to snowmelt and recent rains</td>
</tr>
<tr>
<td>Soil Moisture</td>
<td>Increased Threat</td>
<td>Unchanged</td>
</tr>
<tr>
<td>Snowpack/Liquid Equivalent</td>
<td>Increased Threat – Mississippi *</td>
<td>Extensive Melting – causing impending river rises</td>
</tr>
<tr>
<td></td>
<td>Decreased Threat – Local Rivers</td>
<td>Unchanged – still no snowcover</td>
</tr>
<tr>
<td>Rate of Snowmelt</td>
<td>Unknown</td>
<td>N/A</td>
</tr>
<tr>
<td>Frost Depth</td>
<td>Decreased Threat</td>
<td>Slightly Improved – thawing ground</td>
</tr>
<tr>
<td>Spring Precipitation</td>
<td>Near Normal</td>
<td>N/A</td>
</tr>
<tr>
<td>Ice Jam Flooding</td>
<td>Decreased Threat</td>
<td>Improved – loss of river ice</td>
</tr>
</tbody>
</table>

* Following the upcoming high water on the Mississippi River, the loss of snowpack will decrease the threat for more significant flooding

**Combination of factors**

- **Mississippi River:** Well Above Normal Risk for Flooding
- **Local Rivers:** Near to Above Normal Risk for Flooding (Minor)
Mississippi River – Well Above Normal
Local Rivers – Near to Above Normal

• Flood risk remains well above normal for the Mississippi River and near to slightly above normal for local rivers
• Risk for major flooding on the Mississippi River has been reduced due to conditions that occurred over the past 2 weeks
• Rises through March on the Mississippi River from snowmelt runoff.
• Low confidence on the peak severity on eventual flooding
• Until soil moisture dries out, flood risk will remain above normal.
Spring Flood Outlook Dates

Outlook Schedule
Last Update: March 12, 2020

Information from this outlook can be found:
From the North Central River Forecast Center
https://www.weather.gov/ncrfc/

From the Quad Cities Weather Forecast Office:
Quad Cities - weather.gov/dvn/2020_springfloodoutlook

Jessica Brooks
NWS Quad Cities
jessica.brooks@noaa.gov
Information Sources

- Midwest Regional Climate Center (MRCC) – http://mrcc.isws.illinois.edu/
- NOAA Climate Prediction Center – www.cpc.ncep.noaa.gov
- NOAA Weather Prediction Center – www.wpc.ncep.noaa.gov
- North Central River Forecast Center – www.weather.gov/ncrfc
- https://www.weather.gov/ncrfc/LMI_ROF_NFP_SpringHydroOutlook
- Advanced Hydrological Prediction Service (AHPS) – water.weather.gov/ahps
- US Drought Monitor – droughtmonitor.unl.edu
- NWS Quad Cities - https://www.weather.gov/dvn/2020_springfloodoutlook
NWS AHPS Webpage
weather.gov/dvn → Rivers and Lakes tab

Extended Outlooks
50% or Greater Chance

Long Range Outlooks
AHPS

Weekly Chance of Exceeding River Stage at Mississippi River at Rock Island L&D 15 (RCK12)
Forecast for the period 04/29/2019 - 07/28/2019
This is a conditional simulation based on the conditions as of 04/22/2019

https://water.weather.gov/ahps2/long_range.php?wfo=DVN
Long Range Outlooks

Chance of Exceeding River Stage at Mississippi River at Rock Island L&D 15 (RCKI2)
Forecast for the period 04/29/2019 - 07/28/2019
This is a conditional simulation based on the conditions as of 04/22/2019

https://water.weather.gov/ahps2/long_range.php?wfo=DVN
Area Forecast Discussion

When there is active flooding or a concern for flooding to develop, the NWS Quad Cities will provide a technical discussion about forecast in our Area Forecast Discussion.

This discussion is updated frequently through the day and contains the thoughts of our forecasters on the weather and hydrological concerns.

https://forecast.weather.gov/product.php?site=DVN&issuedby=DVN&product=AFD&format=CI&version=1&glossary=1
River Flood Outlooks

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

http://www.wpc.ncep.noaa.gov/nationalfloodoutlook/
Snow Cover
National Operational Hydrologic Remote Sensing Center

Modeled Snow Depth for 2019 February 22, 18:00 UTC

www.nohrsc.noaa.gov
Excessive Rain Outlooks

wpc.ncep.noaa.gov
Soil Moisture

Calculated Soil Moisture Ranking Percentile
MAY 21, 2019

Drought Status

U.S. Drought Monitor
Midwest

May 14, 2019
(Released Thursday, May 16, 2019)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>D0-D4</th>
<th>D1-D4</th>
<th>D2-D4</th>
<th>D3-D6</th>
<th>D4</th>
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<tbody>
<tr>
<td>Current</td>
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<td>0.00</td>
<td>0.00</td>
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<tr>
<td>Last Week</td>
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<td>0.00</td>
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<tr>
<td>3 Months Ago</td>
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<td>Start of Calendar Year</td>
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<td>Start of Water Year</td>
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<td>1.71</td>
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<tr>
<td>One Year Ago</td>
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<td>25.38</td>
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<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Intensities:
- None
- 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:
Curtis Riganti
National Drought Mitigation Center

droughtmonitor.unl.edu

- https://www.drought.gov/drought/
- droughtmonitor.unl.edu
Stream Levels
US Geological Survey

https://waterwatch.usgs.gov/
Stream Levels

https://waterwatch.usgs.gov/
Week 2 Weather Outlook

NOAA Climate Prediction Center – www.cpc.ncep.noaa.gov
Week 2 Risk of Heavy Precipitation

Risk of Heavy Precipitation
Valid: 05/30/2019-06/05/2019

***Experimental***

Climate Prediction Center
Made: 05/22/2019 3PM EDT
Follow us: www.cpc.ncep.noaa.gov

NOAA Climate Prediction Center – www.cpc.ncep.noaa.gov
Weeks 3 & 4 Outlooks

NOAA Climate Prediction Center – www.cpc.ncep.noaa.gov
ONE-MONTH OUTLOOK
TEMPERATURE PROBABILITY
0.5 MONTH LEAD
VALID JUN 2019
MADE 16 MAY 2019

ONE-MONTH OUTLOOK
PRECIPITATION PROBABILITY
0.5 MONTH LEAD
VALID JUN 2019
MADE 16 MAY 2019

NOAA Climate Prediction Center – www.cpc.ncep.noaa.gov