Summary of Current Conditions and the Spring and Summer Outlook for the Missouri basin, Upper Mississippi basin, Red River of the North, Souris River, and Great Lakes Drainage

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May 2, 2019
Key Messages
What is New since early April

- Extremely long duration flooding on mainstem rivers is expected to continue

- Mississippi River in the Quad Cities area is now at Day 40 above Major flood levels and the crest is forecast to break 1993 flood levels

- The mainstem Missouri and Mississippi Rivers will see several peaks into June

- Late spring and summer rain events are more likely to produce excessive rainfall

- Some areas have saturated soils and are currently experiencing flash flood impacts with less than 1 inch of rain
• **Moderate** to **Major** flooding continues in North Dakota, South Dakota, Minnesota, Iowa, Wisconsin, Illinois, Indiana, Kansas, and Missouri, and a few sites further downstream in the lower Mississippi basin.

• Southeastern Colorado snowmelt flooding has begun earlier than normal and is melting quickly and will need to be monitored for the next 6-7 weeks.

• The region continues to be **vulnerable to flooding** due to very wet soil conditions and elevated rivers and lakes. Late Spring and Summer thunderstorms may cause additional flooding/flash flooding.
• Comparing USGS 28-day average stream flows from early April

• Above Normal flows in much of the Missouri, Ohio, and upper and lower Mississippi River basin

http://waterwatch.usgs.gov/
Flood Outlook
Through mid-June 2019
50% or Greater Chance of Flooding

March 7, 2019

March 31, 2019

April 30, 2019
Valid through mid-July

http://water.weather.gov/ahps/region_long_range.php?rfc=myrfc&percent=50
Moderate to Major flooding may continue into June and July in the Mississippi River basin and portions of the Missouri River basin.

Flooding chances remain higher and more widespread than last year and in several years.

Long duration flooding at very high levels is expected to continue.
Past Precipitation

Past 30 days

Past 7 days
Precipitation Forecasts for May 2-9

Days 1-3, Days 4-5, Days 6-7

Days 1-3

Days 4-5

Days 6-7
Heavy rain is expected the next 7 days across the lower Missouri, Ohio, and Mississippi River basins.

Looking into Week 2 there is a chance for two more significant weather systems May 10-12 and May 16-18.
USACE Flood Storage Used

Flood Storage Capacity Used
1 May 2019

52.7% Missouri River mainstem

16.5% Upper Mississippi River

10.3% Arkansas River

9.2% Ohio River

2.8% Barkley Res

2.3% Kentucky Res

89.9% Yazoo River

7.9% Red River

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Historical Precipitation Rankings Last 12 months
(April 2018 - March 2019)

Long term wetness – Last 12 months:
• Wettest in 124 years of record
  Upper Mississippi, Ohio, Northeast
• Wettest state WI, IA, KY
• Top ten wettest OH, MI, NE, IL, IN

https://www.ncdc.noaa.gov/sotc/
January – March 2019 Temperature and Precipitation Ranks

Cool and wet persisted through the first 3 months of the year.
March 2019 Temperature and Precipitation State Rankings

- Relatively drier pattern except for NE, CO, SD
- Cool plains

https://www.ncdc.noaa.gov/sotc/national/201902
Last 30 and 90 Day Temperature Departures from Normal

Departure from Normal Temperature (°F)
4/1/2019 – 4/30/2019

- Last 90 days cooler than normal
- Last 30 days cooler than normal
  - north-northeast and warmer
  - south

Generated 5/1/2019 at HPRCC using provisional data.
NOAA Regional Climate Center
Precipitation – Last 30 Days

Last 30 days continued wet to extreme wet over most of the area.

https://water.weather.gov/precip
Soil Moisture

Current Conditions

• Still widespread very wet conditions
• Has been wet for several months
• Drying will take months
Mountain Snowpack
Current Conditions

- Near average to slightly above conditions
- At the end of average mountain accumulation period
- Snowmelt through June
Shifting to Outlooks

- El Nino
- Weeks 2, 3, 4
- May
- May – July
- June – August
El Niño conditions are favored to continue through fall 2019 with diminishing chances (~50% in October-November-December).
May 9th - May 15th Probability Outlooks
Temperatures and Precipitation

- Decent chances for below normal temperatures
- Slightly elevated chances for above normal precipitation across Midwest/Plains (near normal chances Upper Mississippi)
Potential Week 2 Precip & Temp Extremes (May 9-15)

- Major storm systems focused on the S. Plains – Lower Mississippi to the Mid-Atlantic
- Beginning May 9\textsuperscript{th} but stretching through the 15\textsuperscript{th}
- Cooler than normal temps north – potential freeze/frost far north

https://www.cpc.ncep.noaa.gov/
- Enhanced chances for above normal precipitation entire region (except far north)
- Enhanced chances for below normal temperature across the plains (border to border)

https://www.cpc.ncep.noaa.gov/
May – June - July
Temperature and Precipitation Probabilities

- Enhanced chances for precipitation across most of the are with focus in WY, northern CO. Equal chances Great Lakes and northern areas of MN/ND
- Leaning below normal temperatures central Plains, equal chances for above, below and near normal temperatures most of region w/above normal chances east.

https://www.cpc.ncep.noaa.gov/
- Enhanced chances for above normal precipitation continues (except for Great Lakes areas)
- Mostly equal chances with some slight leaning toward warmer than normal temperatures east/west
Summary – Long Term Outlooks

• May – June climatological wettest time of the year on average
  • Average rainfall will continue to cause flooding

• May – continued better chances for above normal precipitation

• May – July: continued better chances for above normal precipitation

• El Nino: Potential contributor to continuing wetness in some areas.
Soil Temperature

- Cold temperatures limiting some planting/planted crops
- Crops are sitting in many soils below 50 F (typical temperature for corn)
- 40 F appropriate for small grains
- Southern Corn Belt areas are somewhat warmer.

[Map showing soil temperature distribution]

https://mrcc.illinois.edu/RMP/currentMaps.html
Crop Impacts

Photo – OSU Extension

U.S. Oats Progress

Percent Emerged
April 28, 2019

National Progress

<table>
<thead>
<tr>
<th>Emerged</th>
<th>31</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change from 5-year Average</td>
<td>-10</td>
</tr>
</tbody>
</table>

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

Difference

-45% or less
-26% to -25%
-19% to -25%
-13% to -19%
-9% to -13%
-5% to -9%
-1% to -5%
0% to 1%
4% to 10%
10% to 20%
20% to 30%
30% to 40%
40% or More

TOP 20% - Percent Emerged

BOTTOM 10% - Change from 5-year Average
Assorted AG Issues

• Crop planting is delayed over much of the region driven mainly by wet soils, but also cool soil temperatures

• Frequency of rain issues on planting/reaching critical planting time

• Further south planting has moved ahead more.

• Crop conditions are mixed (what has been planted - though delayed). Winter wheat poorer in the eastern wheat areas/better western areas.

• Various winter issues on alfalfa

• Delayed shipments (grain out – fertilizer in) Mississippi due to high water
Assorted AG Issues - 2

- Increased potential for disease/poor emergence
- Wet fall pushed some field work to spring
- Many prevent plant acres likely to occur.
- Still inundated acres in flooded areas
- Damaged acres in NE largely from flooding (sand, residues and trash)

https://www.climatehubs.oce.usda.gov/sites/default/files/5.2.19MidwestFocusAgOutlook.pdf
Current NCRFC Flood Status for the Red River of the North and Souris River Basins

Latest Observed Stages

Red River of the North (Moderate to Minor, most forecasts in Moderate):

- Continue slow recession throughout the RRN mainstream with mostly slow recession or steady flow in tributaries.
- Elevated River levels may continue through early May depending on precipitation pattern.
- Most all of the snow is melted in the entire RRN basin. (Souris: still some mostly near Minot, ND and near trace amounts near Devils Lake).
- Frozen ground not too much of a concern. (upwards of top 18+ inches thawed out)

Souris:

- Mostly continue recession.

No significant rises predicted

Forecast to continue to Decline
Latest Observed Stages

**Minnesota River:**
- Continue very slow fall
  (Moderate to Minor Flooding ongoing-high flows; week +)

**Upper Mississippi to Dubuque, IA (Major to Minor):**
- Continue very slow fall-mostly minor flooding for week + (future rainfall dependent)
- Dubuque (Railroad Bridge) forecast to be below Major on Saturday at around 21.5 feet.
Current NCRFC Flood Status for Mid Mississippi River (Dubuque, IA to St Louis, MO)

Latest Observed Stages

Mid Mississippi (Major to Moderate, but most levels in Major):

- Currently cresting near Camanche, IA; Continue rises near Davenport, IA area and downstream within Major flooding.
- Mississippi River near Rock Island, near record flooding. Areas of concern for additional breaches along this stretch. The river at St. Louis is forecast to crest early next week around 42.5 feet.
- With widespread 2+ inches total for the 7-day forecast, both Physical and Mental fortitudes will continue to be tested.
- This has been the longest this section of the Mississippi has been in Major flood (40 days) and with the uncertainty in the rain forecast, this long duration of flooding will continue to be even longer.
- Both the Illinois and Missouri River basins will continue to add significant water above St. Louis.
Current NCRFC Flood Status for the Illinois River

**Illinois River** (Major to Minor, but most levels in or going to Major):

- Continue rise throughout the system. Illinois at Morris forecast to crest today or tomorrow near 23.5 feet.

- Will continue to add significant water to the Mississippi River during this time of long duration high water adding to the stress on levee and water control systems.

- Central and southern Illinois forecast to receive significant rainfall within the next 7-days (3+ inches).

- Very High levels will continue beyond a few weeks from now; depending on rainfall amounts and frequency.
Current NCRFC Flood Status for the St Joseph, Yellow, Kankakee and Iroquois Rivers

Latest Observed Stages

Rivers: (Major to Minor):

- Near crests on the St. Joseph and Yellow Rivers. The Kankakee will continue to rise in the next week or so with a potential record within Major stage at Shelby near 13 feet over the weekend.
- The Iroquois cresting now or soon, within Minor flood levels.
- Forecast rainfall within the next 7 days will keep levels up and prolong the recessions.
NCRFC, Hudson Bay: Souris & Red River of the North Basins
Flood Potential Outlook: (through late-July)

> 50% chance of exceeding flood levels

Near Normal to Slightly Above Normal Flood Risk in the Souris River Basin (rain dependent)

Even though the Red River North will remain high for the next few weeks, the likelihood of exceeding what has already happened is very unlikely.

Normal Flood Risk and Inflow continues for Devils Lake area

Above to Much Above Normal Flood Risk in the RRN mainstem (more risk in lower ~third of basin)

Higher Flood Risk Area, mostly receding- spring rain dependent
Above to Near Normal Flood Risk
Continues in the next few months; saturated soils, above normal winter snowpack and uncertainty with future rainfall remains.
NCRFC, Mississippi Basin
Flood Potential Outlook: (through late-July)

> 50% chance of exceeding flood levels

**Above to Much Above Normal Flood Risk** continues for the Minnesota River and Mississippi Headwaters area in Minnesota and along the Mainstem Mississippi River

- Higher than Normal flows will continue through May and possibly into July with several peaks in June.
- The river has not had a chance to come back down from spring melt and as widespread spring rains continue, river levels will continue to be high.
- Again, Illinois R. and Missouri R. inputs will keep lower end of NCRFC area in flood during this period along with widespread saturated soils exacerbating conditions even when < inch of rainfall.
MISSOURI RIVER BASIN CURRENT FLOODING

In South Dakota:
James River: major, falling above Forestburg, crest now at Forestburg, expected to crest at mouth in a couple weeks.
Big Sioux River: moderate, falling

In Iowa:
Little Sioux River: minor, cresting
Big Sioux River: moderate, falling

In Kansas:
Big Blue: minor, steady
Marais des Cygnes: moderate, cresting

In Missouri:
Osage River basin: moderate, cresting
Grand River: moderate, cresting
Several smaller tribs: moderate, cresting

Missouri River below Gavins:
Minor Neb City—Miami  ~300 miles
Moderate Glasgow—mouth  ~ 200 miles
James River:

For locations which have already crested, this will likely be the 2019 high.

For locations downstream of Forestburg SD, the expected crests over the next couple of weeks, will likely be the 2019 high.

Some locations will not fall below minor flood stage for several weeks (couple of months).

Take-home Point: While streams within the James basin remain high for the next several weeks, the likelihood of exceeding what has already happened (or is about to happen over the next couple of weeks) is very unlikely.
MISSOURI BASIN
FLOOD POTENTIAL OUTLOOK (90-day)

Floyd: Minor flooding likely.

Little Sioux: Moderate level flooding likely.

Big Sioux: Expect to see moderate.
MISSOURI BASIN
FLOOD POTENTIAL OUTLOOK (90-day)

Lower basin: episodic moderate level flooding likely next 3 months due to convective activity.

This includes the Missouri River from Nebraska City to the mouth at St. Louis.
• Mountain snowpack has (hopefully!!!) attained its 2019 peak accumulation (mid-April). No significant flooding from mountain melt is expected. (Well, keeping an eye on the Bighorn Basin.)

• Plains snowpack no longer a factor.

• Eastern portion of the Missouri River basin still has ENHANCED RISK for flooding.

• Thunderstorm activity sure to bring episodic moderate level flooding across lower basin (southern IA, eastern KS, southeastern NE, MO.) VERY ACTIVE SPRING FLOOD SEASON STILL AHEAD.
Due to current very wet conditions, the region is vulnerable to future storm systems.

- **Above to Much Above Normal** Flood Risk – Mississippi basin (including main-stem Mississippi River) and eastern Missouri basin
- **Normal Flood Risk** – Souris and western Missouri basin

**PLEASE MONITOR FUTURE FORECASTS AND OUTLOOKS**

- NOAA/National Weather Service will continue to monitor the flood risk.
The recording can be found here:  [https://hprcc.unl.edu/webinars.php](https://hprcc.unl.edu/webinars.php) or [http://mrcc.illinois.edu/multimedia/webinars.jsp](http://mrcc.illinois.edu/multimedia/webinars.jsp)

Next Webinar:  May 16\textsuperscript{th} – Martha Shulski – Nebraska State Climatologist
NWS RFC
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Long-Range River Outlook can be found at:

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

Real-time AHPS River Forecasts are at:

http://water.weather.gov/ahps/forecasts.php

*Next Monthly Central U.S. Climate and Drought Outlook Webinar will be May 16, 2019

http://www.weather.gov