

A light-colored map of Minnesota and Wisconsin serves as the background. It shows state boundaries, major cities like Minneapolis and St. Paul, and large bodies of water including Lake Superior, Lake Michigan, and Lake Superior. The text is overlaid on this map.

2019 Spring Flood Outlook

March 7 Update

**Covering Central/Southern
Minnesota and Western Wisconsin**

**National Weather Service
WFO Twin Cities**

March 7, 2019



**National Weather Service
Twin Cities/Chanhassen, MN**



Weather-Ready Nation
National Oceanic and Atmospheric Administration

Bottom Line – Flood Threat Has **INCREASED** over the past two weeks

- Since last briefing (Feb 21):
 - Added more snowpack on the ground
 - About 0.5” to 1.0” of water equivalent
 - Stayed very cold, so melt has not started
 - TWO more storms on the way
 - Major snowstorm this weekend, some rain mixed in over southern MN
 - Another next week, mix of rain and snow



Typical Spring Flood Factors

Quick Review

- **Soil Moisture**
 - Wet autumn of 2018 left soil moisture above normal before freeze up, especially over southern MN
- **Frost Depth**
 - 2 to 4 foot frost depth over the entire region...fairly deep frost, thaw has not started
- **Snowpack/Snow Water**
 - Well above normal, at 2.5 to 4.5 inches over a widespread area, with some 5-6 inch reports in the Minnesota headwater areas and western/northern Wisconsin. This ranks near historical high levels for early March:

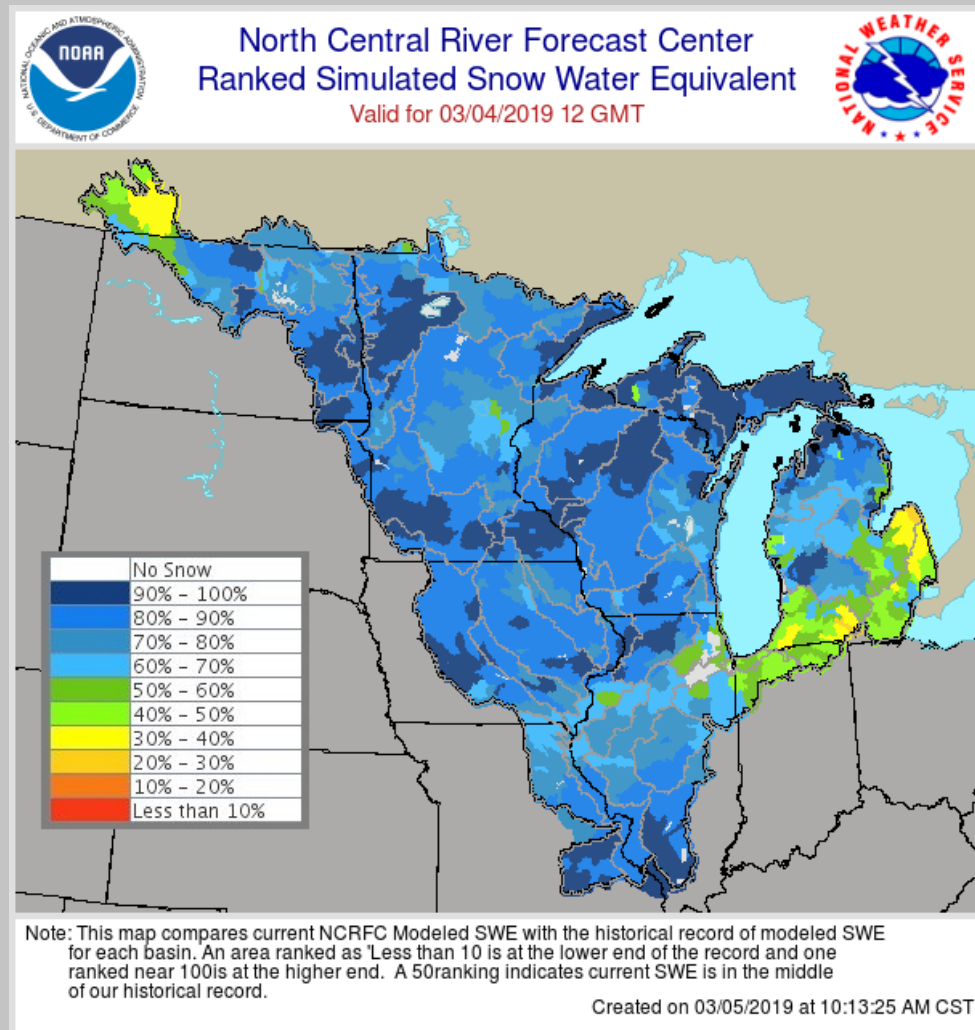


Snow Water Equivalent Ranks

The snow water equivalent is in the top 20 percent of historical record for MN and WI. Many in the top 10 percent.

The snowpack is also present over a very vast area...not just over a few basins or portions of states.

In short...we have the “fuel” present to drive a major snowmelt this spring.



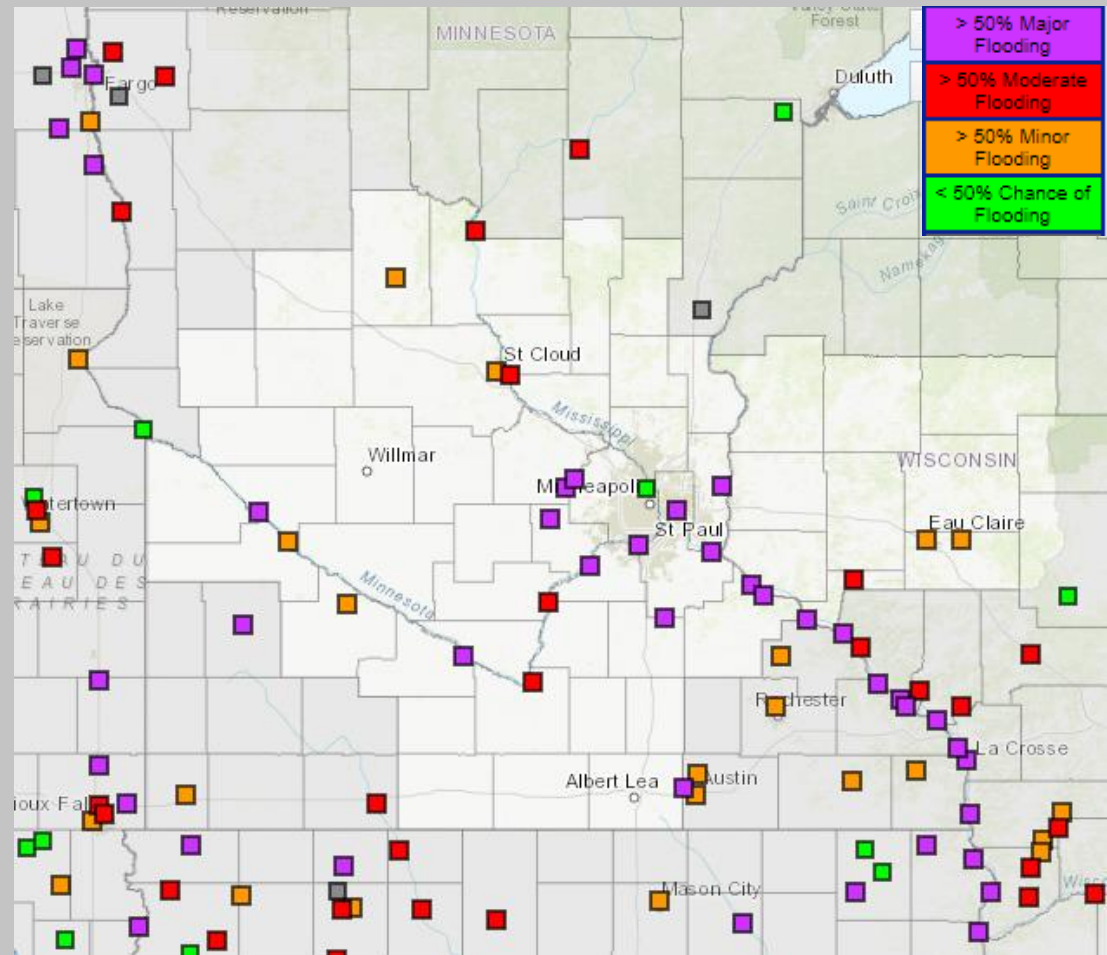
Probability of Exceeding Flood Stages

Including the forecast snow for this weekend, long range probabilities for spring flooding include:

At least 50 percent chance of reaching major flood stage in the Minnesota, Crow, St. Croix, and Mississippi River from St. Paul downstream.

Most others have a reasonable chance of reaching at minor or moderate flood stage.

Severity of flooding will depend on how fast we melt that snowpack.



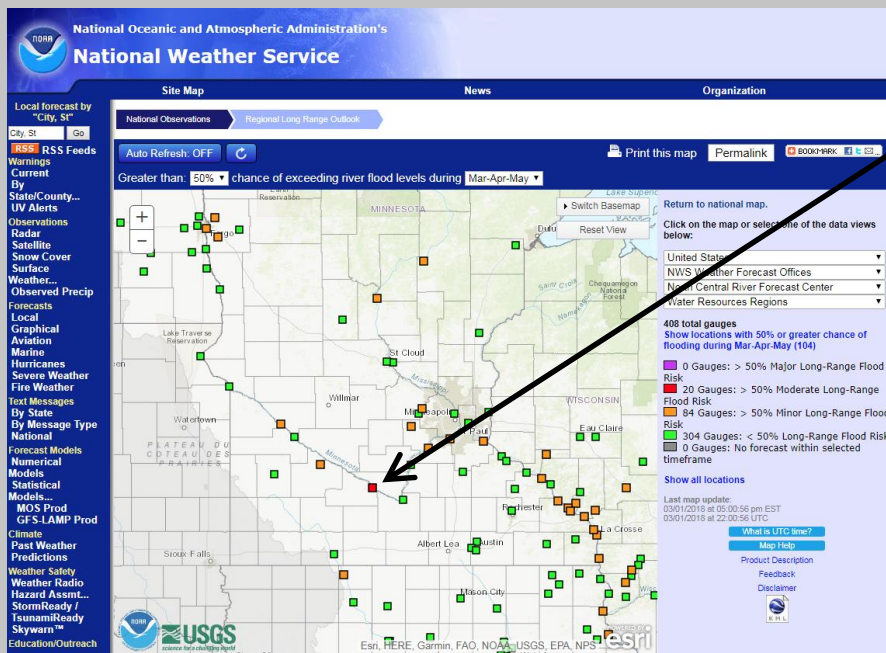
https://water.weather.gov/ahps2/long_range.php?wfo=MPX



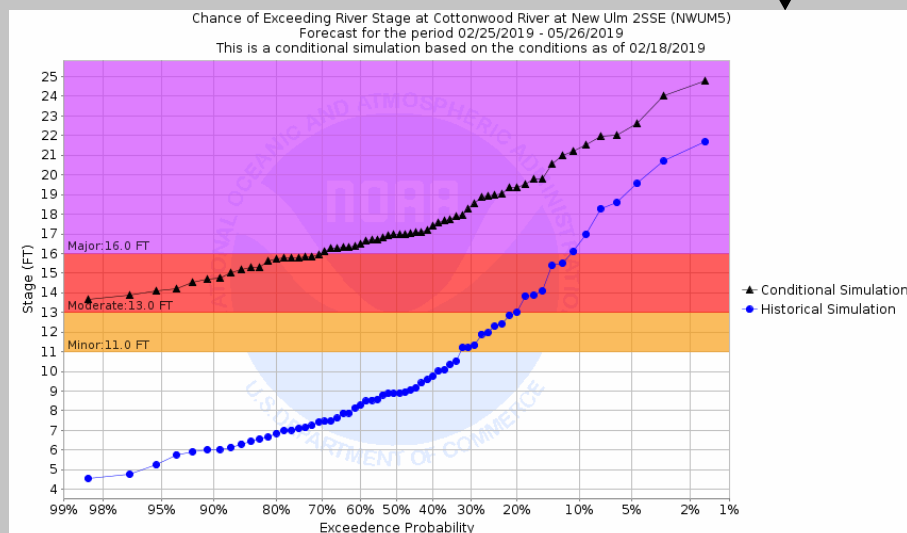
How to find/read the Long Range Graphs

Long range flood risk available at: https://water.weather.gov/ahps2/long_range.php?wfo=MPX

River forecasters run long range river models, including current soil moisture profiles, snow pack info, and 45-day model precipitation forecasts. The result is a graph of probability of reaching various stages .



Click a point in here -- hover over the “Probability Information” tab – and select the “...during Entire Period” graph. It will look something like this



Black Line represents the newest forecast – **Blue Line** represents historical average. When the **black** line is to the left/above of the **blue** line, the flood threat is above normal.



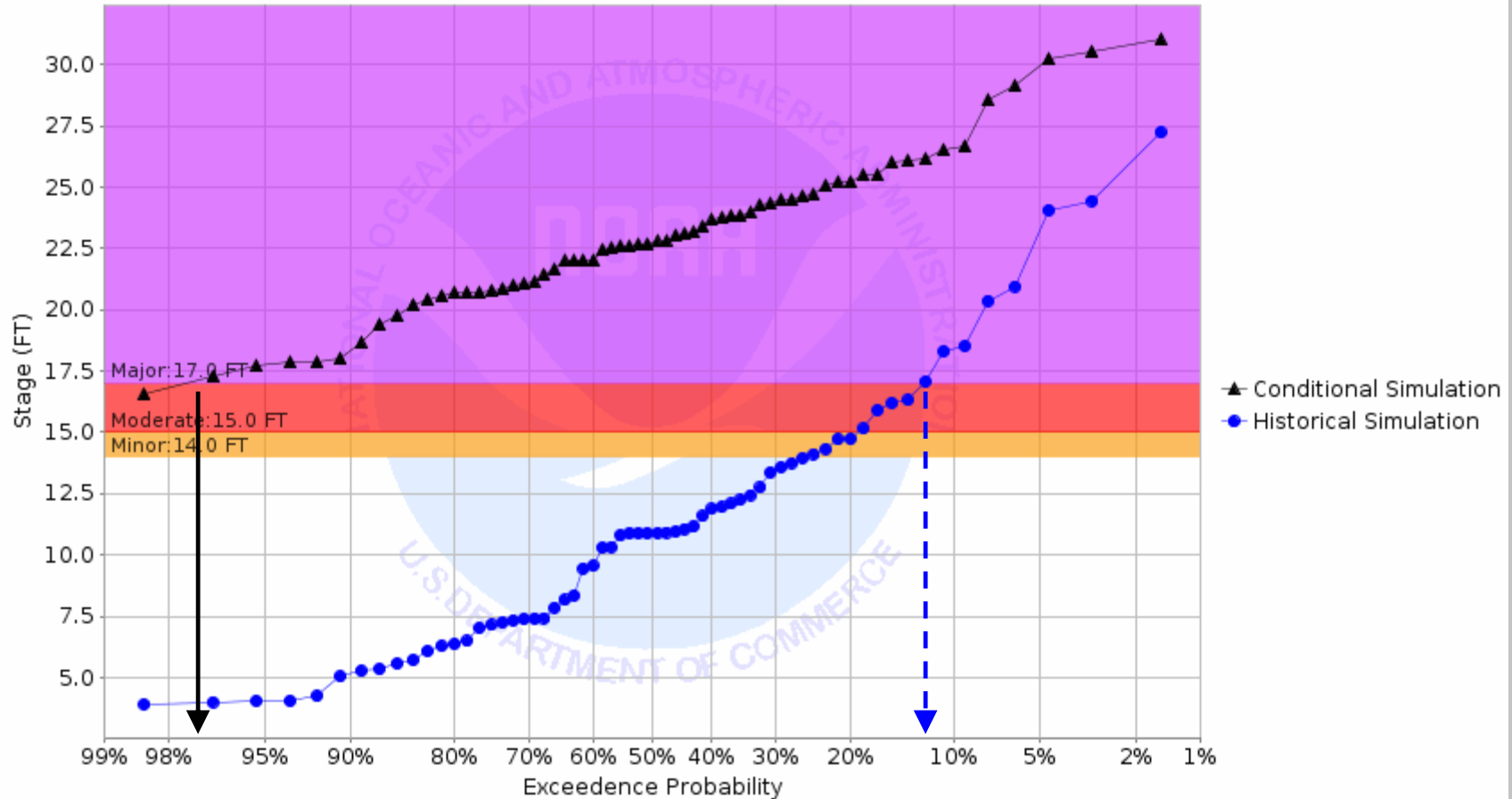
For Example, Look at the Mississippi River at St. Paul

Evaluating the probability of reach Major Flood Stage (17.0 feet)

Chance of Exceeding River Stage at Mississippi River at St Paul - Roberts St Brdg (STPM5)

Forecast for the period 03/11/2019 - 06/09/2019

This is a conditional simulation based on the conditions as of 03/04/2019



Black Line represents the newest forecast – **Blue Line** represents historical average.

Chance of reaching major flood stage (purple) this spring is about 97 percent, well above the 12% historical average.



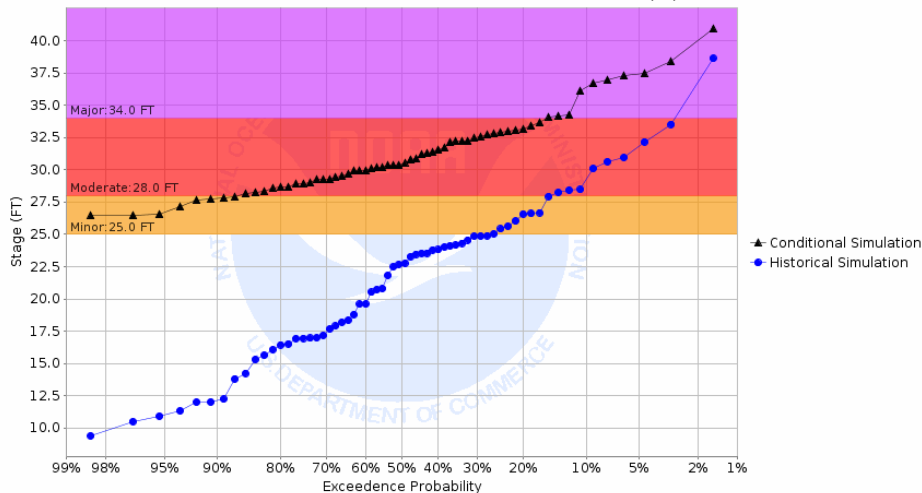
Significant Changes in last two weeks

Minnesota River at Jordan

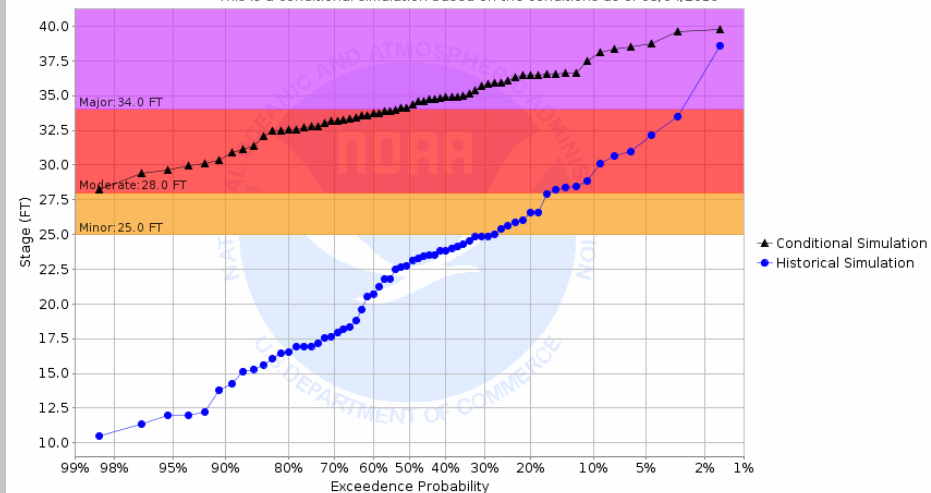
FEB 18th

MAR 04th

Chance of Exceeding River Stage at Minnesota River at Jordan (JDNMS)
Forecast for the period 02/25/2019 - 05/26/2019
This is a conditional simulation based on the conditions as of 02/18/2019



Chance of Exceeding River Stage at Minnesota River at Jordan (JDNMS)
Forecast for the period 03/11/2019 - 06/09/2019
This is a conditional simulation based on the conditions as of 03/04/2019



https://water.weather.gov/ahps2/long_range.php?wfo=MPX

Probability of reaching major flood stage has gone from 12% to near 50%

Black Line represents the newest forecast – **Blue Line** represents historical average.
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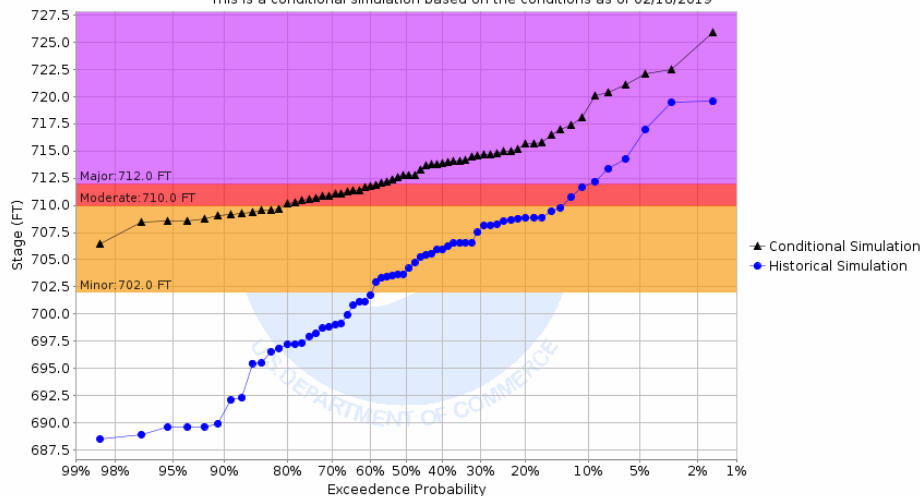
Significant Changes in last two weeks

Minnesota River at Savage

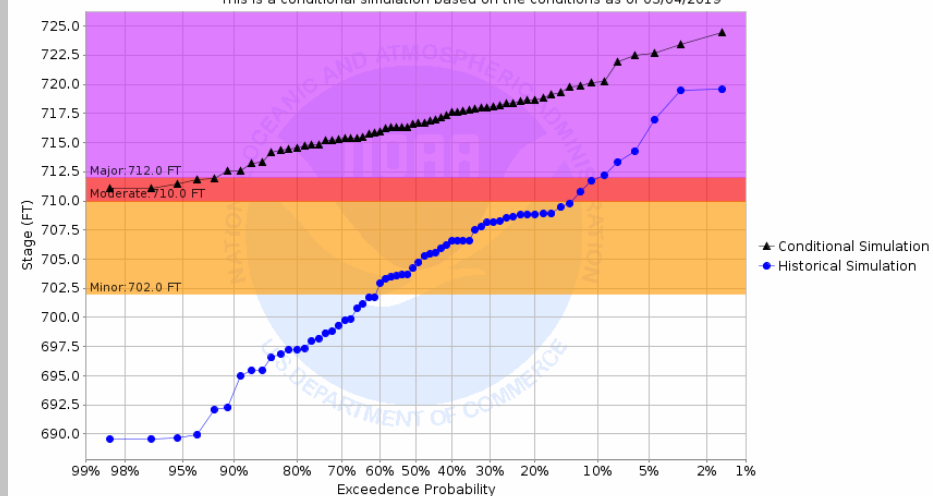
FEB 18th

MAR 04th

Chance of Exceeding River Stage at Minnesota River at Savage (SAVM5)
Forecast for the period 02/25/2019 - 05/26/2019
This is a conditional simulation based on the conditions as of 02/18/2019



Chance of Exceeding River Stage at Minnesota River at Savage (SAVM5)
Forecast for the period 03/11/2019 - 06/09/2019
This is a conditional simulation based on the conditions as of 03/04/2019



https://water.weather.gov/ahps2/long_range.php?wfo=MPX

Probability of reaching major flood stage has gone from 55% to near 91%

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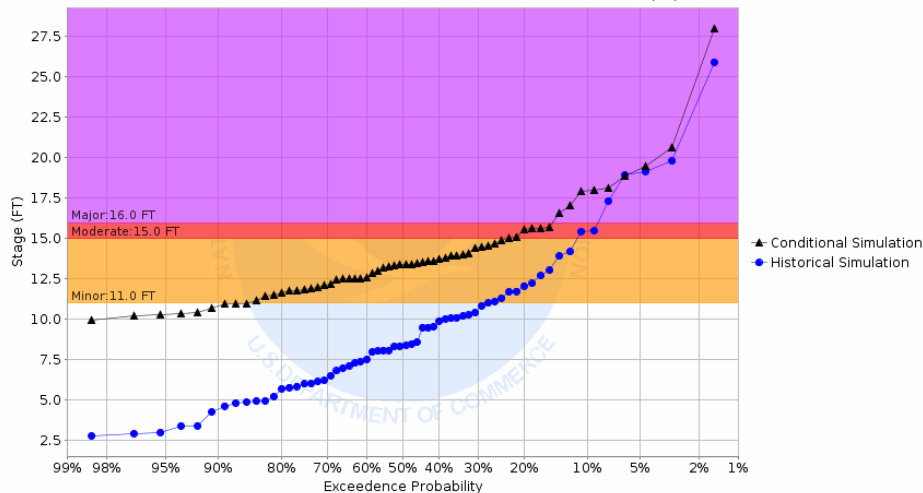
Significant Changes in last two weeks

SF Crow River at Mayer

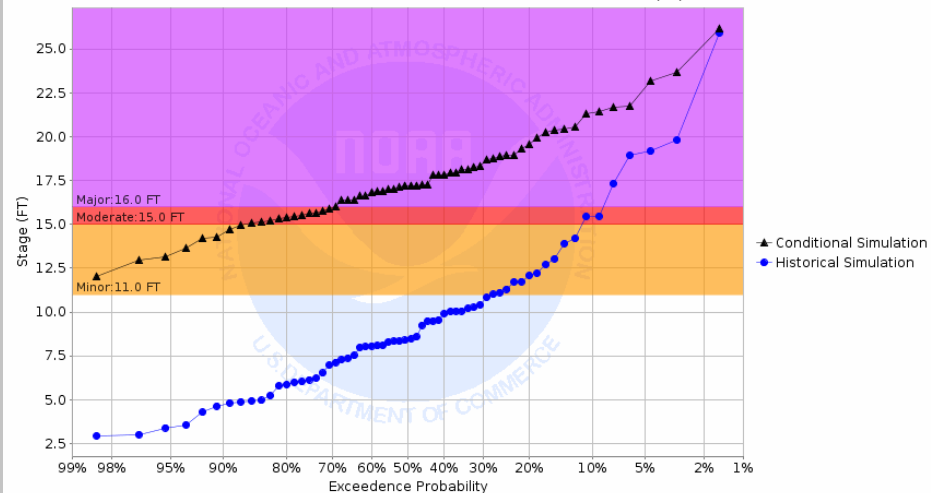
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Chance of Exceeding River Stage at South Fork Crow River at Mayer (MAYM5)
Forecast for the period 02/25/2019 - 05/26/2019
This is a conditional simulation based on the conditions as of 02/18/2019



Chance of Exceeding River Stage at South Fork Crow River at Mayer (MAYM5)
Forecast for the period 03/11/2019 - 06/09/2019
This is a conditional simulation based on the conditions as of 03/04/2019



https://water.weather.gov/ahps2/long_range.php?wfo=MPX

Probability of reaching major flood stage has gone from 15% to near 70%

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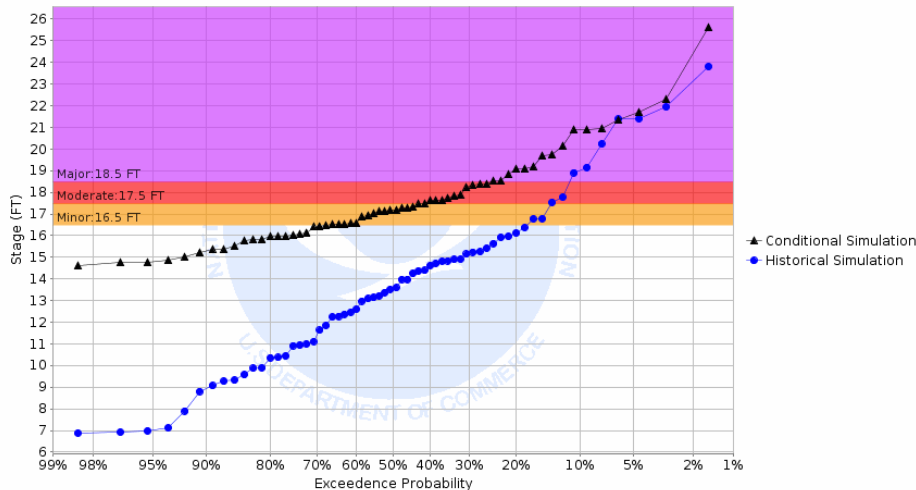
Significant Changes in last two weeks

SF Crow River at Delano

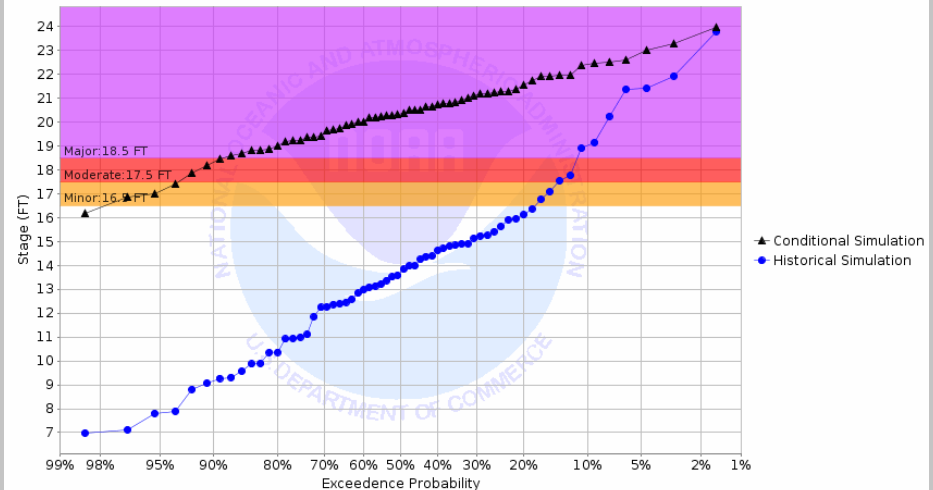
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Chance of Exceeding River Stage at South Fork Crow River at Delano (DELM5)
Forecast for the period 02/25/2019 - 05/26/2019
This is a conditional simulation based on the conditions as of 02/18/2019



Chance of Exceeding River Stage at South Fork Crow River at Delano (DELM5)
Forecast for the period 03/11/2019 - 06/09/2019
This is a conditional simulation based on the conditions as of 03/04/2019



https://water.weather.gov/ahps2/long_range.php?wfo=MPX

Probability of reaching major flood stage has gone from 22% to near 85%; nearly identical probability for **Crow River at Rockford**

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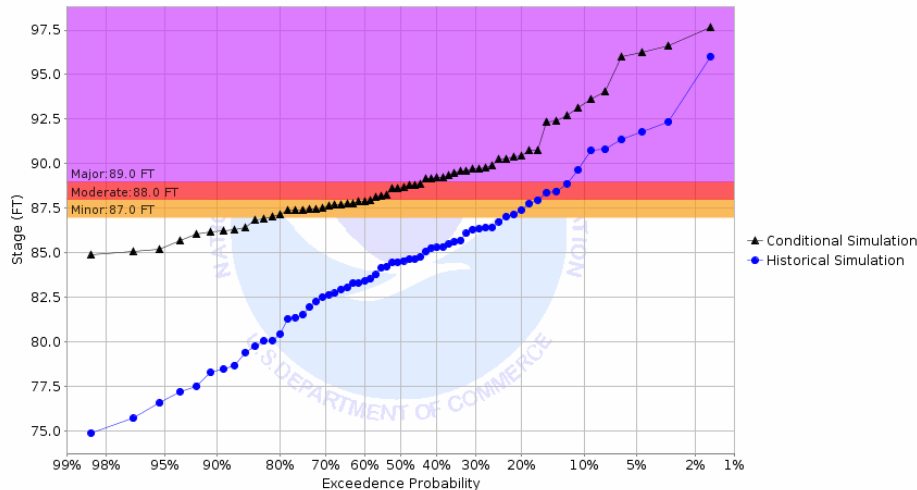
Significant Changes in last two weeks

St. Croix River at Stillwater

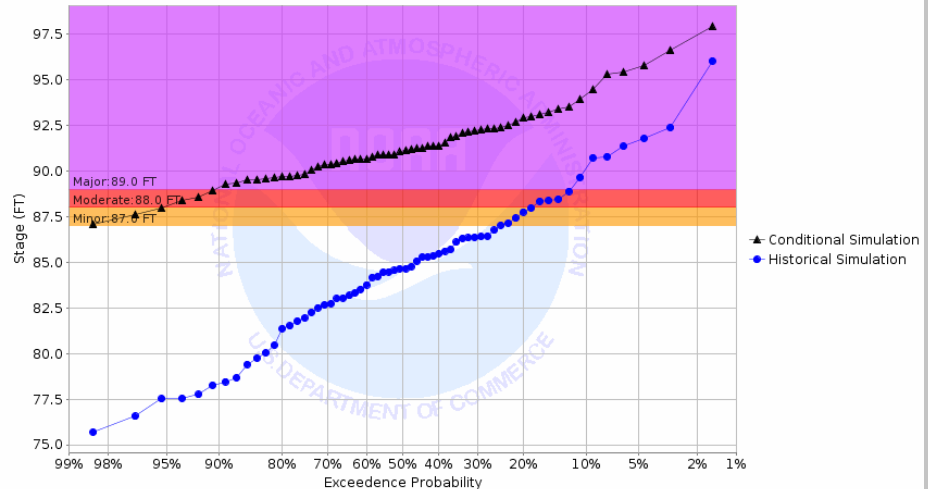
FEB 18th

MAR 04th

Chance of Exceeding River Stage at St Croix River at Stillwater (STLM5)
Forecast for the period 02/25/2019 - 05/26/2019
This is a conditional simulation based on the conditions as of 02/18/2019



Chance of Exceeding River Stage at St Croix River at Stillwater (STLM5)
Forecast for the period 03/11/2019 - 06/09/2019
This is a conditional simulation based on the conditions as of 03/04/2019



https://water.weather.gov/ahps2/long_range.php?wfo=MPX

Probability of reaching major flood stage has gone from 40% to near 90%

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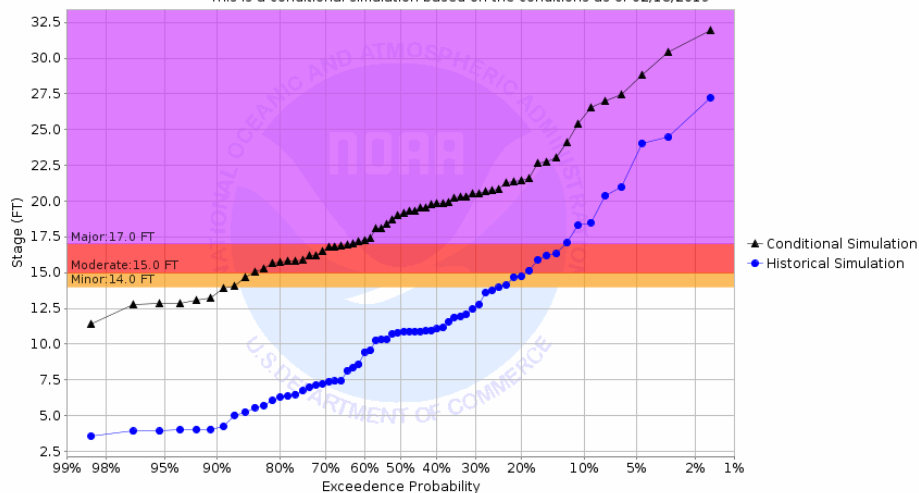
Significant Changes in last two weeks

Mississippi River at St. Paul

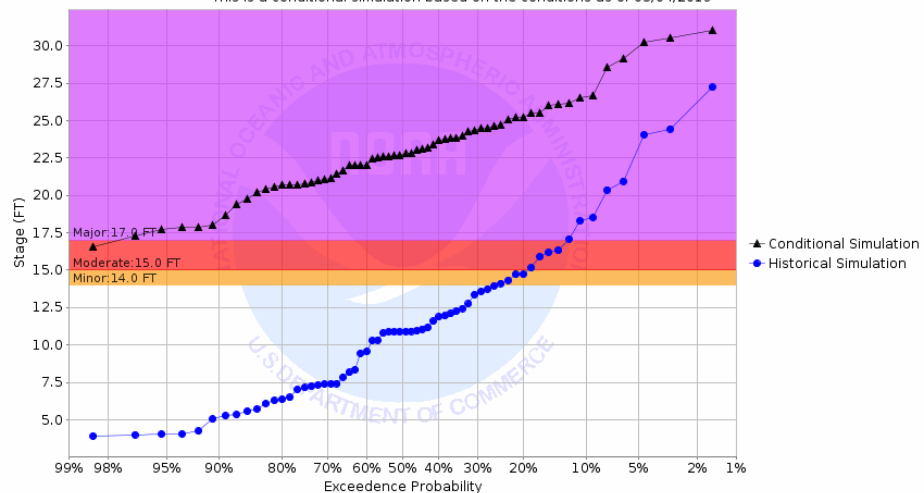
FEB 18th

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Chance of Exceeding River Stage at Mississippi River at St Paul - Roberts St Brdg (STPM5)
Forecast for the period 02/25/2019 - 05/26/2019
This is a conditional simulation based on the conditions as of 02/18/2019



Chance of Exceeding River Stage at Mississippi River at St Paul - Roberts St Brdg (STPM5)
Forecast for the period 03/11/2019 - 06/09/2019
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https://water.weather.gov/ahps2/long_range.php?wfo=MPX

Probability of reaching major flood stage has gone from 58% to near 96%

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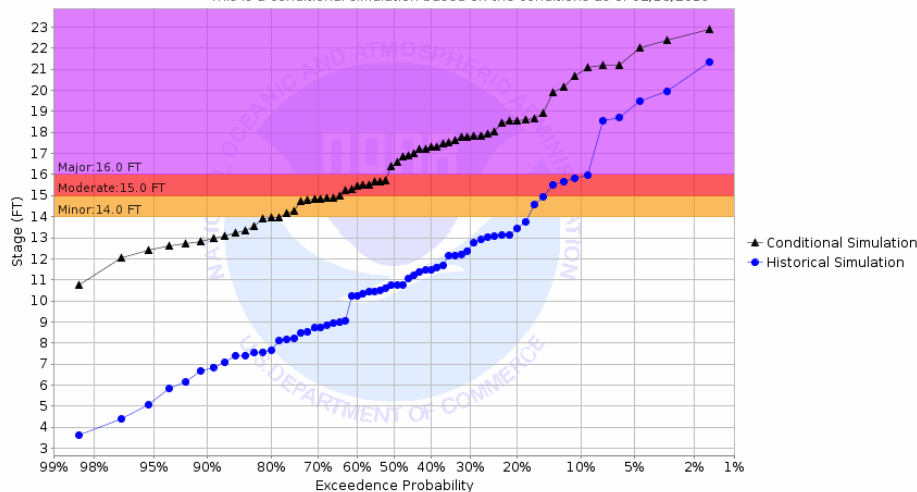
Significant Changes in last two weeks

Mississippi River at Red Wing

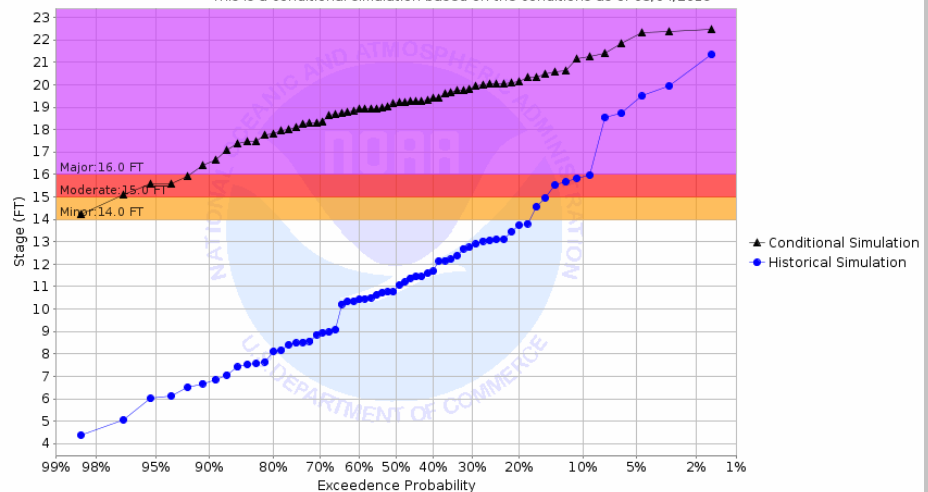
FEB 18th

MAR 04th

Chance of Exceeding River Stage at Mississippi River at Red Wing (REDM5)
Forecast for the period 02/25/2019 - 05/26/2019
This is a conditional simulation based on the conditions as of 02/18/2019



Chance of Exceeding River Stage at Mississippi River at Red Wing (REDM5)
Forecast for the period 03/11/2019 - 06/09/2019
This is a conditional simulation based on the conditions as of 03/04/2019



https://water.weather.gov/ahps2/long_range.php?wfo=MPX

Probability of reaching major flood stage has gone from 52% to near 92%

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Spring Flood Potential

Another way to check info

In addition to finding your river forecast point on the map and reading the graph, a text version of the long range outlook is also available here:

<https://water.weather.gov/ahps/water/textprods/index.php?wfo=mpx>

...TABLE 1--PROBABILITIES FOR MINOR...MODERATE AND MAJOR FLOODING...									
VALID PERIOD: 03/11/2019 - 06/09/2019									
				: CURRENT AND HISTORICAL : CHANCES OF EXCEEDING : FLOOD CATEGORIES : AS A PERCENTAGE (%)					
CATEGORICAL									
LOCATION	FLOOD STAGES (FT)			MINOR		MODERATE		MAJOR	
	MINOR	MOD	MAJOR	CS	HS	CS	HS	CS	HS
-----	-----	-----	-----	---	---	---	---	---	---
:REDWOOD RIVER									
REDWOOD FALLS	6.0	15.0	16.0	>95	24	5	<5	<5	<5
:COTTONWOOD RIVER									
NEW ULM	11.0	13.0	16.0	>95	34	>95	22	95	11
:MINNESOTA RIVER									
MONTEVIDEO	14.0	16.0	17.5	>95	43	>95	26	91	17
GRANITE FALLS	888.5	893.5	896.5	80	10	7	<5	<5	<5
MANKATO	22.0	25.0	30.0	>95	16	89	7	24	<5
HENDERSON	732.0	736.0	739.5	>95	22	90	8	49	<5
JORDAN	25.0	28.0	34.0	>95	28	>95	17	53	<5
SAVAGE	702.0	710.0	712.0	>95	61	>95	14	92	10
:LONG PRAIRIE RIVER									
LONG PRAIRIE	7.0	8.0	10.0	62	24	14	7	<5	<5
:SAUK RIVER									
ST CLOUD	6.0	7.0	9.0	62	18	13	10	<5	<5
:SOUTH FORK CROW RIVER									
MAYER	11.0	15.0	16.0	>95	28	87	11	69	9
DELANO	16.5	17.5	18.5	>95	18	94	14	89	11
:CROW RIVER									
ROCKFORD	10.0	12.0	14.0	>95	23	92	14	80	10
:MISSISSIPPI RIVER									
ST CLOUD	9.0	10.0	11.0	69	31	51	15	22	6
ANOKA	12.0	14.0	17.0	33	10	9	<5	<5	<5
MINNEAPOLIS	16.0	16.5	17.0	36	10	28	9	22	8
ST PAUL	14.0	15.0	17.0	>95	26	>95	19	>95	12



Primary Driver for Flood Severity

We've established that the flood threat is high. The severity of the flooding will depend on the weather conditions for the rest of March into April.

Best case: near normal temperatures, little rain; ideally temperatures reach the upper 30s or 40s during the day and drop below freezing at night.

Worst case: extended period of warm, wet weather; temperatures in the 50s-60s during the day, lows in the 40s, high dewpoints.

What is the long range outlook? ...



Near Term Forecast

Two more storms on the way

Winter Storm Likely This Weekend

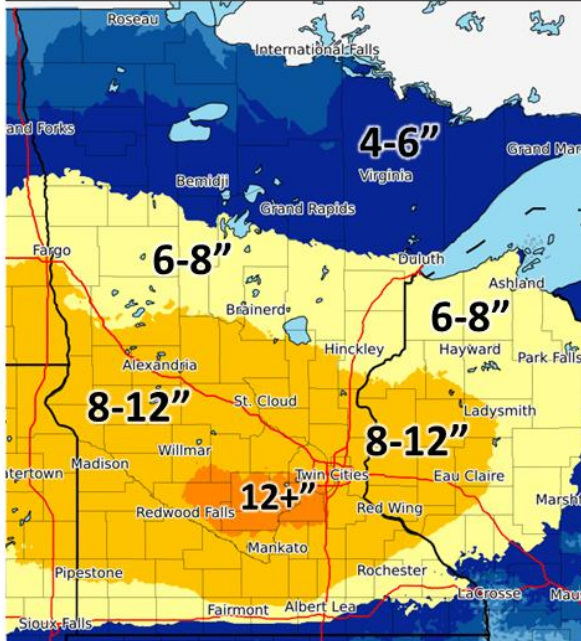
First storm this weekend...mostly snow, probably heavy snow over a large area. Adding more to the snowpack.

Second storm next week (not shown here)...may start as rain, then turn to snow.

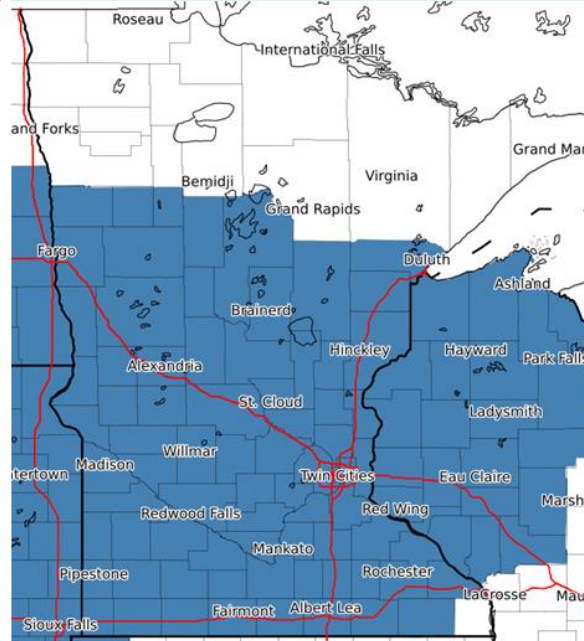
Not expected to start river flooding, but could lead to local urban/rural flooding from storm drain/culvert blockages, ponding.

Temps near/below normal.

Storm Total Snow



Winter Storm Watch



National Weather Service | Twin Cities

Issued: 4:45 AM Thursday, March 7, 2019

Long range forecasts courtesy of NOAA's NWS Climate Prediction Center; see more at <https://www.cpc.ncep.noaa.gov/>



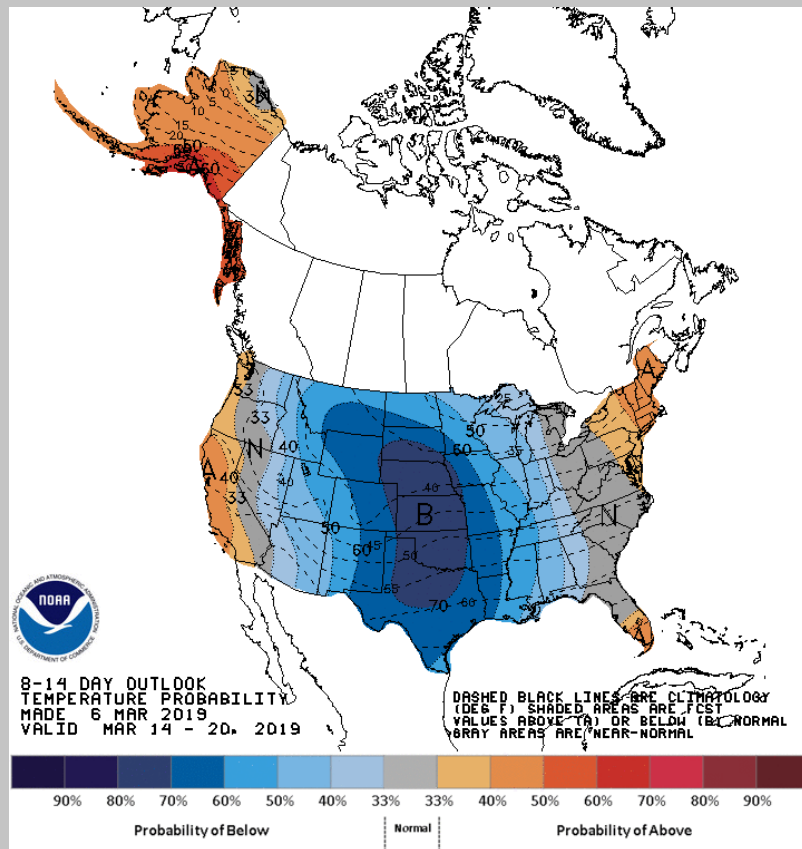
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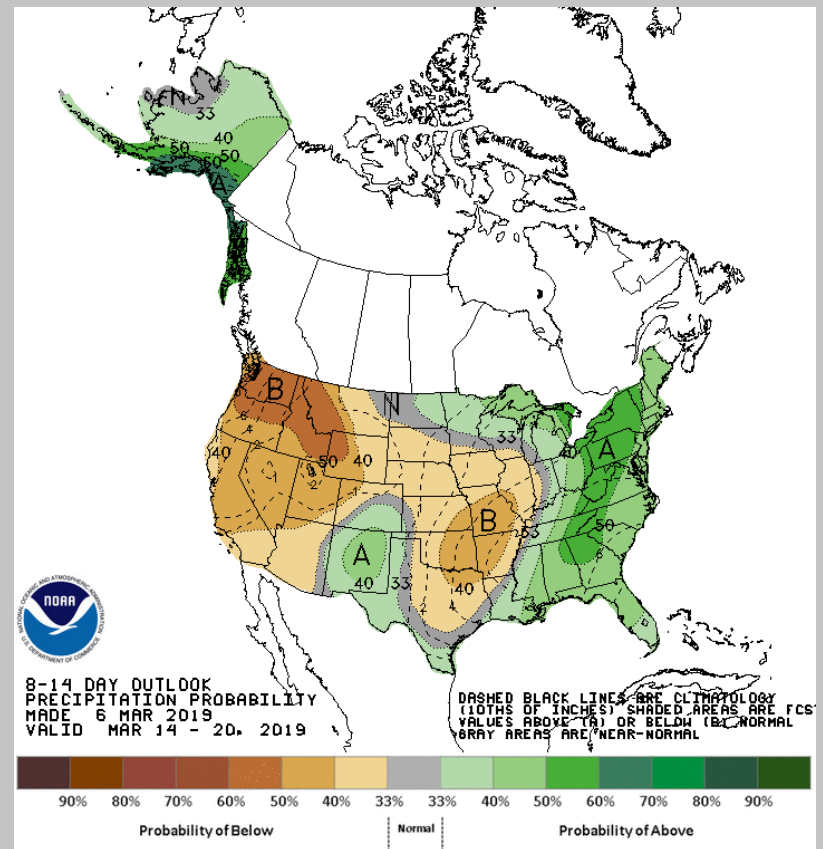
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8-14 Day Outlook

Cold trend continues through the middle of the month.



After storm number 2, precipitation threat looks minimal.



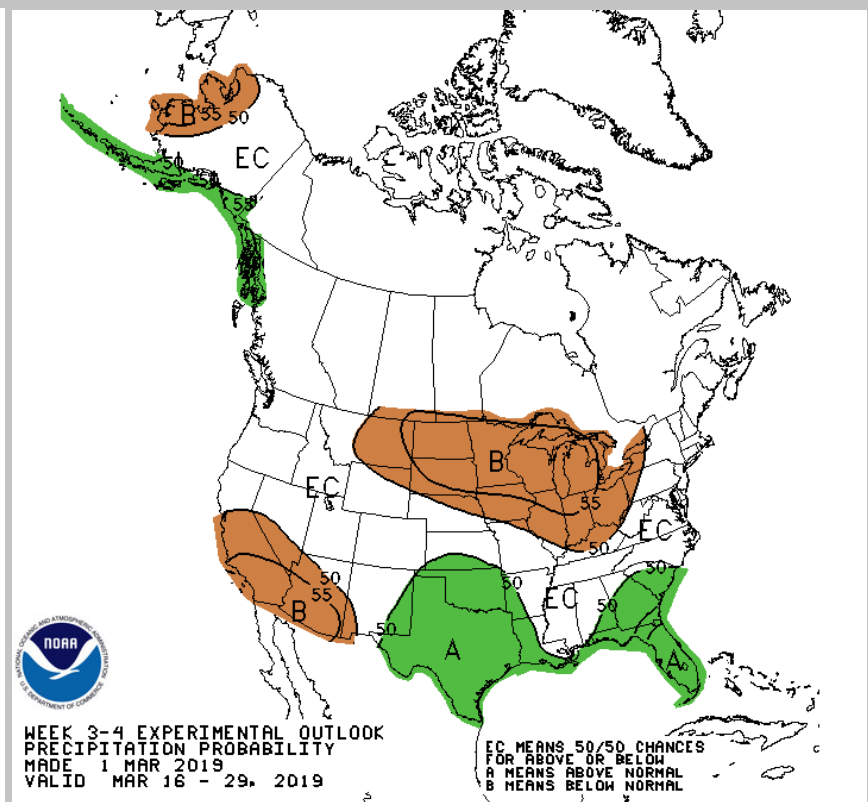
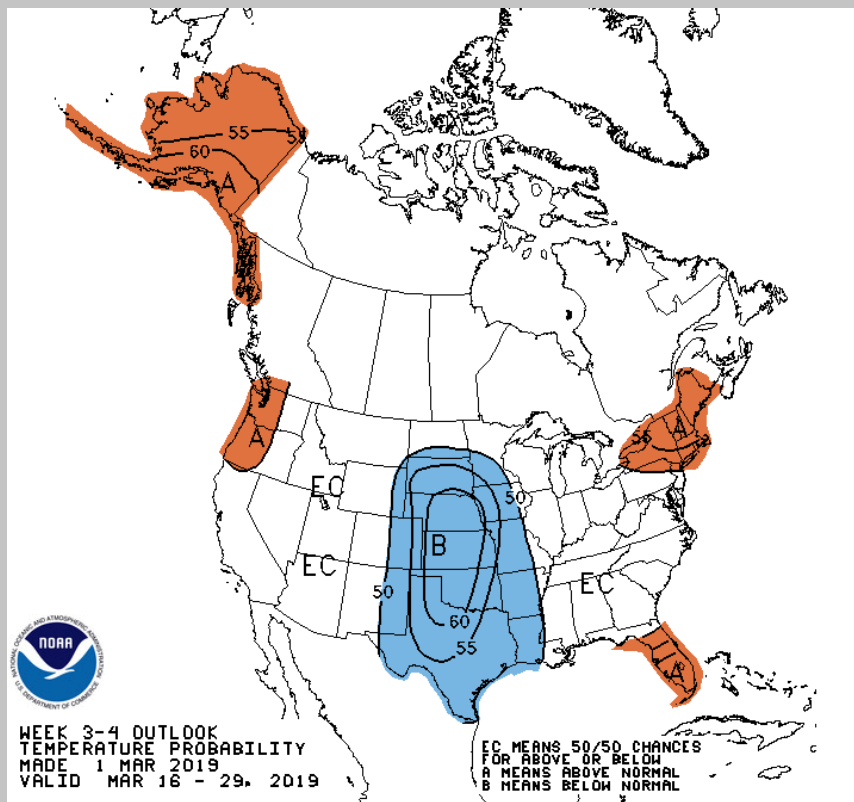
Long range forecasts courtesy of NOAA's NWS Climate Prediction Center; see more at <https://www.cpc.ncep.noaa.gov/>



Outlook for late March

Cooler than normal
temperatures still the rule.

Precipitation pattern calms
down.



Long range forecasts courtesy of NOAA's NWS Climate Prediction Center; see more at <https://www.cpc.ncep.noaa.gov/>



Overall

- After the two storms, forecast is at least encouraging. We have a long way to go, however.
- At this time, most likely time period for significant river flooding appears to be early to mid April.

Much will depend on the weather, of course.

- STAY TUNED to the CPC outlooks (<https://www.cpc.ncep.noaa.gov/>) and NWS Twin Cities forecasts <https://www.weather.gov/mpx/>).
- River forecasts will be shown at: <https://water.weather.gov/ahps2/forecasts.php?wfo=mpx>



Other Flood Threats

- Ice Jam Flooding – potential will rise as snow melts, ice breaks up, and water rises
- Lots of potential for urban and rural field flooding as the melt begins
 - Storm drains blocked, culverts clogged and frozen
 - Look for water backing up from fields over access roads, onto properties and threatening structures
 - Small stream flooding enhanced by backed up culverts, etc



Upcoming Outlooks and Services

This outlook will be updated as conditions change and/or the threat becomes more imminent.

We expect to hold a webinar next week (after the next two storms, to avoid confusion with the winter weather briefings).

Call us anytime on the 24/7 Operations Line: 952-361-6671

During the week, call Service Hydrologist Craig Schmidt:
952-368-2542; craig.schmidt@noaa.gov

Good Preparation and Good Luck, Everyone!!

