

Probabilistic Hydrologic Outlook
National Weather Service Quad Cities IA IL
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...The Risk for Flooding this Spring is Above to Well Above Normal...

.2019 Spring Flood and Water Resources Outlook...

This is the first of two planned Spring Flood and Water Resource Outlooks for 2019 for the the Quad Cities Hydrologic Service Area, which covers portions of eastern Iowa, northwest and west central Illinois, and extreme northeast Missouri. Rivers included in this outlook are the Mississippi River and its tributaries from above Dubuque, Iowa to below Gregory Landing, Missouri. The primary tributary systems include the Maquoketa, Wapsipinicon, Cedar, Iowa, Skunk, North Skunk, and Des Moines Rivers in Iowa; the Fox River in Missouri; and the Pecatonica, Rock, Green, and La Moine Rivers in Illinois. This outlook is for the time period from late February through May.

.Flood Outlook Overview...

After a very wet fall season that caused nearly saturated soils across the area going into winter, other factors are coming together to raise the potential for flooding this spring season. The probability for flooding is very high for at least minor flooding along the Mississippi River and most tributary rivers across eastern Iowa, northwest and west central Illinois, and northeast Missouri. The Mississippi River will also have a well above normal chance of reaching major flood stages this spring. Some tributaries, including the Rock, Cedar, Iowa, and Wapsipinicon Rivers, will have a better than average chance to rise to moderate or major flood stages, especially at the lower ends of the river systems.

Current conditions suggest that snowmelt alone will cause rises on area rivers and at least minor flooding in many areas. Any additional snowfall or heavy spring-time rains will heighten the flood threat.

Main Points:

- * High confidence on widespread rises to near or above minor flood stage on all area rivers, but low confidence on the peak severity of any flooding that occurs.
- * Saturated soil conditions from southern Minnesota into northeast Wisconsin and all areas southward in the region, as well as deep frost in the northern parts of the region will lead to high amounts of runoff from snowmelt, spring-time rains, or a combination of the two.
- * Snowmelt alone will likely cause rises in river levels to near or above flood stage.
- * Any significant spring rains will increase the potential for high impact flooding this season.
- * Ice action in the rivers will continue to be a factor in potential flooding into March.
- * The rate of the snowmelt will be essential to the severity of flooding that occurs this spring.

Many factors are considered when determining the overall flood risk for the upcoming spring season. The combination of these influences factor into the final determination. These factors are discussed in detail below.

.Seasonal Precipitation: Above to Well Above Normal

Winter precipitation has been above normal. After a very wet fall season, the early winter months began dry. However, the wet pattern returned, as above normal snow and rain have fallen across the Upper Mississippi River basin beginning in January and has continued through late February.

.Snow Cover and Liquid Water Content: Above to Well Above Normal

The snowpack over much of the Upper Midwest is above normal, with the exception of an area from northeast Missouri through eastern Illinois. Some parts of Minnesota and Wisconsin have built up a snowpack of up to 25 inches of snow, which is up to a foot above normal in some locations for late February. Liquid content of the snow across this area is generally 2 to 4 inches, however there is also a large area that has 4 to 6 inches of liquid content. Along the southern periphery of the snowpack, liquid water content is generally 1 to 3 inches.

The pace of the snowmelt will be a high contributor to the severity of flooding that occurs.

.Soil Conditions: Well Above Normal

Soils across all of Iowa into southern Minnesota, Wisconsin and northern Illinois are nearly saturated, ranking in the 99th percentile of soil moisture rankings. This indicates there will likely be excessive amounts of runoff from snowmelt, rainfall, or the combination of the two going through the spring months. High amounts of runoff will lead to an enhanced threat for flooding.

.Frost Depth: Near to Above Normal

Frost depths of 18 to 46 inches have been observed across Minnesota and Wisconsin, which is deeper than normal. Further south and east, the frost depths do decrease, with 6 to 12 inches being common from south central Iowa through the northern half of Illinois. The frozen ground across the northern parts of the Upper Mississippi River basin will be a primary contributor to the amount of snowmelt and rainfall runoff entering the Mississippi River system this spring.

.River Conditions: Above Normal

River levels are running above normal for this time of year. They have remained at elevated levels since September.

While there are a few rivers that do have open water, the majority of area rivers are ice covered.

.Ice Jam Flooding:

Where rivers are still ice covered, moderate to heavy rain could cause ice to break-up and form ice jams. Any ice jams will have the potential to cause flooding. This will remain a threat until all area rivers are ice free. With another round of cold air expected to move into the area through the first part of March, it is anticipated that rivers will continue to see ice formation and therefore keep the threat for ice jam flooding.

.Weather Outlooks:

Below normal temperatures will be the story for the next month. An active weather pattern will keep storm systems moving across the country, however the storm track may shift to keep the probabilities for above normal precipitation outside of the Upper Mississippi River basin. This signal would indicate that the snowpack may not get built up significantly in the next 4 weeks, but with the colder temperatures, it will keep the snowpack in place. The longer into the spring that the snow remains, the higher the potential for a rapid snowmelt. A faster snowmelt could promote an increased chance for a higher degree of flooding.

.Summary:

The process of melting the snowpack will be essential to the severity of flooding that occurs this spring. A faster melt combined with heavy spring-time rains could cause high impact flooding, while a slow melt with little additional precipitation would cause flooding to be much less severe.

Ice jam flooding will be a possibility as long as ice remains in the rivers and cold air is anticipated across the area.

Again, the potential exists this spring season for high impact flooding. There are high probabilities that widespread minor flooding will occur, with a better than average chance for rises to moderate and major flood stages along the Mississippi River and the lower portions of some tributaries including the Rock, Cedar, Iowa, and Wapsipinicon Rivers.

.Numerical Weather Outlooks...

This outlook provides long-range probabilistic river outlooks for river basins in the NWS Quad Cities service area. This outlook is divided into three parts, the first part for the probabilities of minor, moderate and major flooding, the second part for high water and the final part for low water.

In Table 1 below, the current (CS) and historical (HS) or normal probabilities of exceeding minor, moderate and major flood stages are listed for the valid time period.

CS values indicate the probability of reaching a flood category based on current conditions.

HS values indicate the probability of reaching a flood category based on historical or normal conditions.

When the value of CS is greater than HS, the probability of exceeding that level is higher than normal. When the value of CS is less than HS, the probability of exceeding that level is lower than normal.

...Table 1--Probabilities for minor, moderate and major flooding...

Valid Period: 02/25/2019 - 05/26/2019

Location	Categorical			: Current and Historical : Chances of Exceeding : Flood Categories : as a Percentage (%)					
	Flood Stages (ft)			Minor		Moderate		Major	
	Minor	Mod	Major	CS	HS	CS	HS	CS	HS
:Mississippi River									
Dubuque LD11	16.0	17.0	20.5	>95	47	>95	37	57	10
Dubuque	17.0	18.0	21.5	>95	51	>95	41	68	11
Bellevue LD12	17.0	18.0	20.0	>95	32	86	20	56	10
Fulton LD13	16.0	18.0	20.0	>95	51	90	30	64	11
Camanche	17.0	18.5	20.5	>95	45	94	31	74	12
Le Claire LD14	11.0	12.0	13.5	>95	49	>95	32	82	16
Rock Island LD15	15.0	16.0	18.0	>95	57	>95	51	85	21
Ill. City LD16	15.0	16.0	18.0	>95	56	>95	44	86	20
Muscatine	16.0	18.0	20.0	>95	59	>95	44	85	19
New Boston LD17	15.0	16.5	18.5	>95	60	>95	54	92	27
Keithsburg	14.0	15.5	17.0	>95	60	>95	46	91	24
Gladstone LD18	10.0	12.0	14.0	>95	61	>95	45	85	21
Burlington	15.0	16.5	18.0	>95	60	>95	47	87	25
Keokuk LD19	16.0	17.5	19.0	92	30	80	23	59	11
Gregory Landing	15.0	18.0	25.0	>95	61	>95	40	25	<5
:Maquoketa River									
Manchester Hwy 20	14.0	17.0	20.0	39	21	19	14	10	<5
Maquoketa	24.0	26.0	28.5	80	18	69	13	42	6
:Wapsipinicon River									

Independence	12.0	13.0	15.0	:	26	8	16	7	10	<5
Anamosa Shaw Rd	14.5	18.0	21.5	:	75	24	30	10	11	<5
De Witt 4S	11.0	11.5	12.5	:	>95	67	>95	64	95	42
:North Skunk River										
Sigourney	16.0	18.0	21.0	:	>95	56	93	42	26	11
:Skunk River										
Augusta	15.0	17.0	20.0	:	88	42	80	32	47	14
:Cedar River										
Vinton	15.0	18.0	19.0	:	51	21	16	7	13	<5
Palo Blairs Ferry	12.5	15.5	17.0	:	66	30	15	6	8	<5
Cedar Rapids	12.0	14.0	16.0	:	76	32	49	18	24	7
Cedar Bluff	16.0	20.0	26.0	:	74	30	22	7	6	<5
Conesville	13.0	15.0	16.5	:	>95	53	69	20	21	6
:Iowa River										
Marengo	15.0	17.0	19.0	:	>95	69	93	47	22	6
Iowa City	23.5	24.5	26.0	:	17	6	14	<5	<5	<5
Lone Tree	16.0	18.5	22.0	:	32	15	10	6	<5	<5
Columbus Jct	23.0	25.0	26.5	:	40	13	20	5	13	<5
Wapello	21.0	25.0	27.5	:	>95	52	23	6	12	<5
Oakville	11.0	15.0	20.0	:	>95	49	22	5	6	<5
:English River										
Kalona	14.0	16.0	18.0	:	>95	50	92	30	37	15
:Des Moines River										
Keosauqua	22.0	25.0	27.0	:	23	9	10	<5	5	<5
St Francisville	18.0	22.0	25.0	:	76	39	15	6	7	<5
:Fox River										
Wayland	15.0	18.0	20.0	:	32	25	10	10	<5	<5
:Pecatonica River										
Freeport	13.0	14.0	16.0	:	>95	42	86	24	33	<5
:Rock River										
Como	12.5	15.5	18.0	:	90	20	34	8	10	<5
Joslin	12.0	14.0	16.5	:	>95	54	95	28	69	13
Moline	12.0	13.0	14.0	:	>95	51	93	28	80	20
:Green River										
Geneseo	15.0	16.5	18.0	:	59	23	39	17	21	9
:La Moine River										
Colmar	20.0	22.0	24.0	:	79	61	56	42	28	19

Legend

CS = Conditional Simulation (Current Outlook)

HS = Historical Simulation

ft = Feet

In Table 2 below, the 95 through 5 percent columns indicate the probability of exceeding the listed stage levels (ft) for the valid time period.

...Table 2--Exceedance Probabilities...

Location	Chance of Exceeding Stages at Specific Locations						
	95%	90%	75%	50%	25%	10%	5%
Valid Period: 02/25/2019 - 05/26/2019							
:Mississippi River							
Dubuque LD11	17.7	17.9	19.6	21.1	23.8	25.9	26.8
Dubuque	19.4	19.5	21.2	22.6	25.2	27.6	28.6
Bellevue LD12	17.3	17.4	19.0	20.5	22.5	23.6	24.4
Fulton LD13	17.7	18.0	19.5	21.0	23.4	25.6	26.9
Camanche	18.5	18.8	20.4	22.0	24.2	25.9	27.0
Le Claire LD14	12.3	12.6	13.9	15.2	17.1	18.4	19.2
Rock Island LD15	17.1	17.8	19.2	20.5	22.3	23.6	24.4
Ill. City LD16	16.8	17.6	19.3	21.1	24.2	25.1	25.7
Muscatine	18.7	19.6	20.9	22.3	24.4	26.1	27.3
New Boston LD17	17.9	18.9	20.4	21.6	23.6	25.1	26.0
Keithsburg	16.1	17.1	18.0	19.5	21.9	24.0	25.1
Gladstone LD18	12.5	13.6	14.6	16.5	19.4	21.5	22.6
Burlington	16.9	18.0	18.8	20.7	23.8	25.2	25.9
Keokuk LD19	15.2	16.3	17.9	20.1	23.0	24.7	26.0
Gregory Landing	18.4	18.6	20.8	22.6	25.0	26.6	28.1
:Maquoketa River							
Manchester Hwy 20	8.9	9.7	11.1	13.5	14.7	20.2	21.0
Maquoketa	20.7	21.6	25.1	27.9	29.4	32.1	33.8
:Wapsipinicon River							
Independence	8.0	8.4	9.2	10.0	12.2	14.9	16.5
Anamosa Shaw Rd	12.5	13.3	14.5	15.8	18.3	21.8	22.8
De Witt 4S	12.5	12.8	13.1	13.5	13.8	14.0	14.2
:North Skunk River							
Sigourney	16.9	18.2	19.1	19.6	21.1	23.6	25.3
:Skunk River							
Augusta	12.3	14.7	17.5	19.5	22.5	25.1	26.5
:Cedar River							
Vinton	12.2	12.9	13.7	15.2	16.5	19.7	21.2
Palo Blairs Ferry	11.0	11.5	12.3	13.2	14.3	16.8	18.1
Cedar Rapids	9.9	10.5	12.0	13.9	15.8	20.7	23.0
Cedar Bluff	14.3	14.6	15.9	17.8	19.4	24.1	26.4
Conesville	14.0	14.2	14.9	15.5	16.1	17.9	19.0
:Iowa River							
Marengo	17.0	17.2	17.5	18.1	18.6	19.6	19.9
Iowa City	19.5	19.5	19.6	19.6	20.1	25.2	25.9
Lone Tree	13.3	13.6	14.1	14.9	17.3	18.5	20.2
Columbus Jct	20.1	20.3	21.2	22.5	24.2	27.0	28.6
Wapello	21.5	21.6	22.3	23.4	24.8	28.1	30.6
Oakville	11.3	11.3	12.1	13.1	14.5	17.6	20.1
:English River							
Kalona	15.4	16.1	17.0	17.6	18.7	20.1	21.2
:Des Moines River							
Keosauqua	18.1	18.6	19.5	20.6	21.7	24.3	27.3
St Francisville	16.4	17.0	18.1	19.6	21.0	23.5	25.4

:Fox River							
Wayland	6.5	7.6	10.1	13.3	16.4	18.3	19.6
:Pecatonica River							
Freeport	13.6	13.7	14.3	15.2	16.3	17.4	18.7
:Rock River							
Como	11.5	12.5	13.3	14.7	16.1	17.9	19.3
Joslin	13.9	15.1	16.2	18.2	19.7	21.5	22.2
Moline	12.6	13.6	14.1	15.9	17.4	19.1	20.5
:Green River							
Geneseo	10.3	11.7	13.1	15.3	17.5	19.7	22.3
:La Moine River							
Colmar	13.7	16.2	20.6	22.4	24.3	25.3	26.0

In Table 3 below, the 95 through 5 percent columns indicate the probability of falling below the listed stage levels (ft) for the valid time period.

...Table 3--Non-Exceedance Probabilities...

Location	Chance of Falling Below Stages at Specific Locations						
	Valid Period: 02/25/2019 - 05/26/2019						
	95%	90%	75%	50%	25%	10%	5%
:Mississippi River							
Dubuque LD11	4.9	4.9	4.8	4.8	4.6	4.5	4.4
Dubuque	7.8	7.8	7.8	7.8	7.6	7.6	7.5
Bellevue LD12	4.7	4.7	4.7	4.6	4.3	4.2	4.0
Fulton LD13	4.8	4.8	4.8	4.8	4.7	4.6	4.6
Camanche	9.1	9.1	9.0	9.0	8.9	8.9	8.9
Le Claire LD14	4.8	4.8	4.8	4.8	4.7	4.6	4.6
Rock Island LD15	5.6	5.5	5.4	5.4	5.3	5.0	4.9
Ill. City LD16	4.6	4.5	4.4	4.4	4.3	4.1	4.0
Muscatine	6.6	6.6	6.5	6.5	6.5	6.4	6.3
New Boston LD17	4.9	4.8	4.7	4.6	4.5	4.3	4.1
Keithsburg	6.6	6.5	6.5	6.4	6.3	6.1	6.0
Gladstone LD18	2.3	2.2	2.1	2.1	2.0	1.8	1.7
Burlington	8.5	8.4	8.4	8.3	8.3	8.2	8.1
Keokuk LD19	4.6	4.5	4.4	4.3	4.2	3.9	3.8
Gregory Landing	6.7	6.7	6.7	6.6	6.6	6.6	6.5
:Maquoketa River							
Manchester Hwy 20	4.3	4.3	4.3	4.2	4.2	4.2	4.1
Maquoketa	11.6	11.6	11.5	11.3	11.2	11.0	10.9
:Wapsipinicon River							
Independence	5.2	5.2	5.2	5.2	5.2	5.1	5.1
Anamosa Shaw Rd	5.7	5.7	5.7	5.6	5.6	5.5	5.4
De Witt 4S	6.5	6.5	6.4	6.4	6.3	6.2	6.1
:North Skunk River							
Sigourney	5.0	5.0	5.0	4.9	4.7	4.5	4.4
:Skunk River							
Augusta	2.9	2.8	2.8	2.7	2.5	2.2	2.0
:Cedar River							
Vinton	3.3	3.3	3.3	3.2	3.1	2.9	2.9

Palo Blairs Ferry	3.9	3.9	3.8	3.7	3.6	3.5	3.4
Cedar Rapids	4.3	4.2	4.2	4.2	4.1	4.1	4.0
Cedar Bluff	5.3	5.3	5.3	5.2	5.1	5.0	4.9
Conesville	6.6	6.6	6.5	6.5	6.4	6.2	6.2
:Iowa River							
Marengo	7.3	7.3	7.3	7.2	7.1	7.0	6.9
Iowa City	10.8	10.7	10.7	10.3	9.9	9.3	9.1
Lone Tree	6.1	6.0	5.8	5.5	4.9	4.3	4.1
Columbus Jct	10.8	10.7	10.7	10.5	10.2	9.9	9.8
Wapello	13.5	13.5	13.4	13.3	12.9	12.5	12.3
Oakville	3.7	3.7	3.6	3.5	3.3	2.9	2.8
:English River							
Kalona	4.4	4.4	4.3	4.3	4.2	4.1	4.0
:Des Moines River							
Keosauqua	11.3	11.3	11.2	11.2	11.2	11.1	11.0
St Francisville	7.9	7.9	7.9	7.8	7.8	7.7	7.6
:Fox River							
Wayland	2.5	2.4	2.3	2.1	2.0	1.9	1.9
:Pecatonica River							
Freeport	6.5	6.4	6.3	6.0	5.5	5.1	4.9
:Rock River							
Como	5.4	5.3	5.1	4.8	4.6	4.2	4.0
Joslin	7.9	7.7	7.5	7.1	6.7	6.2	6.0
Moline	9.3	9.2	9.1	8.9	8.7	8.5	8.4
:Green River							
Geneseo	4.6	4.6	4.5	4.4	4.1	3.8	3.7
:La Moine River							
Colmar	5.4	5.2	4.8	4.2	3.8	3.3	3.3

These long-range probabilistic outlooks contain forecast values that are calculated using multiple season scenarios from 30 or more years of climatological data, including current conditions of the river, soil moisture, snow cover, and 30 to 90 day long-range outlooks of temperature and precipitation. By providing a range of probabilities, the level of risk associated with long-range planning decisions can be determined. These probabilistic forecasts are part of the National Weather Service's Advanced Hydrologic Prediction Service.

Visit our web site at <http://www.weather.gov/dvn> for more weather and water information.

This is the first Spring Flood and Water Resource Outlook for 2019. Long-range probabilistic outlooks are issued near the end of the month throughout the year. The next Spring Flood and Water Resources Outlook for 2019 will be issued on March 7, 2019.

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