

Hydrologic/Flood Summary for March 2019

Monthly temperatures were 2 to 7 degrees below the historical average across the HSA (Hydrologic Service Area). (Figure 1)

Monthly precipitation totals were below the historical average across most of west central Wisconsin. The remainder of the HSA saw above normal precipitation, or between 100 and 200 percent of normal. Precipitation surpluses ranged one half to around 1 inch above normal over the Minnesota portion of the HSA. (Figure 2, 7-9)

Soil moisture rankings were greater than the 90th percentile across most of the HSA. Far southern Minnesota had a ranking greater than the 99th percentile. (Figure 3)

Monthly average stream flows ranged from high to much above normal across most of the HSA. (Figures 4 and 5)

The entire HSA remained free of any drought designation. (Figure 6)

Snowfall for the month was above normal across the northern two-thirds of the HSA. Snowfall departures of 100 to 200% above normal were seen across this area. At the beginning of the month, modeled snow depth ranged from around one to two feet across much of the HSA. By the end of the month, snow depths ranged from around 2 to 6 inches over a small part of the central Minnesota and west central Wisconsin. The remainder of the HSA was snow free. At the beginning of the month, there was a 1 to 3 inches of water equivalent across much of the central portion of the HSA, with 3 to 7 inches across portions of west central Wisconsin and west central and southwest Minnesota. At the end of the month, water equivalent in the remaining snow pack of central Minnesota was around an inch or two. (Figures 10 and 13)

There was 1 heavy snow event that occurred over the HSA during the month. A general 3 to 8 inch snow fell across most of the HSA with the heavier totals long the northern portion of the area. (Figure 12)

Frost depths at the beginning of April were generally 12 to 36 inches across the northern HSA and frost free across much of the south. (Figure 11)

The spring snow melt began in earnest by the middle part of the month. Ice jams developed along the Sand Creek at Jordan and caused flooding at a trailer park in the city and many people (around 400) were evacuated. Ice jams also affected the Sauk River at St Cloud, the Cottonwood River at New Ulm, and the Cannon River at Northfield all around mid-month. The Minnesota River responded first with most river point locations seeing moderate to major flood stage crests through the remainder of the month. Several road closures were seen along the Minnesota watershed from New Ulm, Jordan and Chaska. Also, at the end of the month, most township roads and highways were flooded across Lac Que Parle County for several days. Most point locations along the Minnesota River remained in minor to moderate flood stage at the end of the month. The Mississippi reached flood stage around the third week of the month. Crests were in moderate to major category along the river with most locations still in moderate to major flood stage at the end of the month.

The following precipitation totals for March (in inches) are included for selected locations. The reports were obtained from automated surface observations sites (ASOS), local cooperative observers and supplemental volunteer observers.

<i>Minnesota</i>				<i>Wisconsin</i>			
County	Location	Amount	Type	County	Location	Amount	Type
Lac Qui Parle	Madison	3.26	NWS	Pepin	Durand	2.04	NWS
Nicollet	South Bend s1	3.12	HIDEN	Barron	Rice Lake	1.96	NWS
Yellow Medicine	Canby	3.10	NWS	Eau Claire	Eau Claire 3sw	1.80	NWS
Blue Earth	Mankato	3.03	HIDEN	Dunn	Menomonie	1.65	NWS
Ramsey	28N23W3	3.02	HIDEN	Chippewa	Chippewa Falls	1.60	NWS
Brown	Bashaw s29	2.87	HIDEN	Polk	Amery	1.59	NWS
Chippewa	Milan	2.76	NWS	Chippewa	Bloomer	1.51	NWS

Type – HIDEN – High Spatial Density Observation Network
 NWS - National Weather Service Cooperative Observation Networks

Number of Various Flood Products Issued During March 2019

Areal Flood Statements/Urban and Small Stream Advisories (MSPFLSMPX)	50
River/Areal Flood Warnings (MSPFLWMPX)	35
Flash Flood Warnings (MSPFFWMPX)	1
Hydrologic Outlooks (MSPESFMSP)	2
Flash Flood Statements (MSPFFSMPX)	1
Flood Watches/Statements (MSPFFAMPX)	14
Special Weather Statements w/ Flood info (MSPSPSMPX)	0

Figure 1. March 2019 Temperature Trends

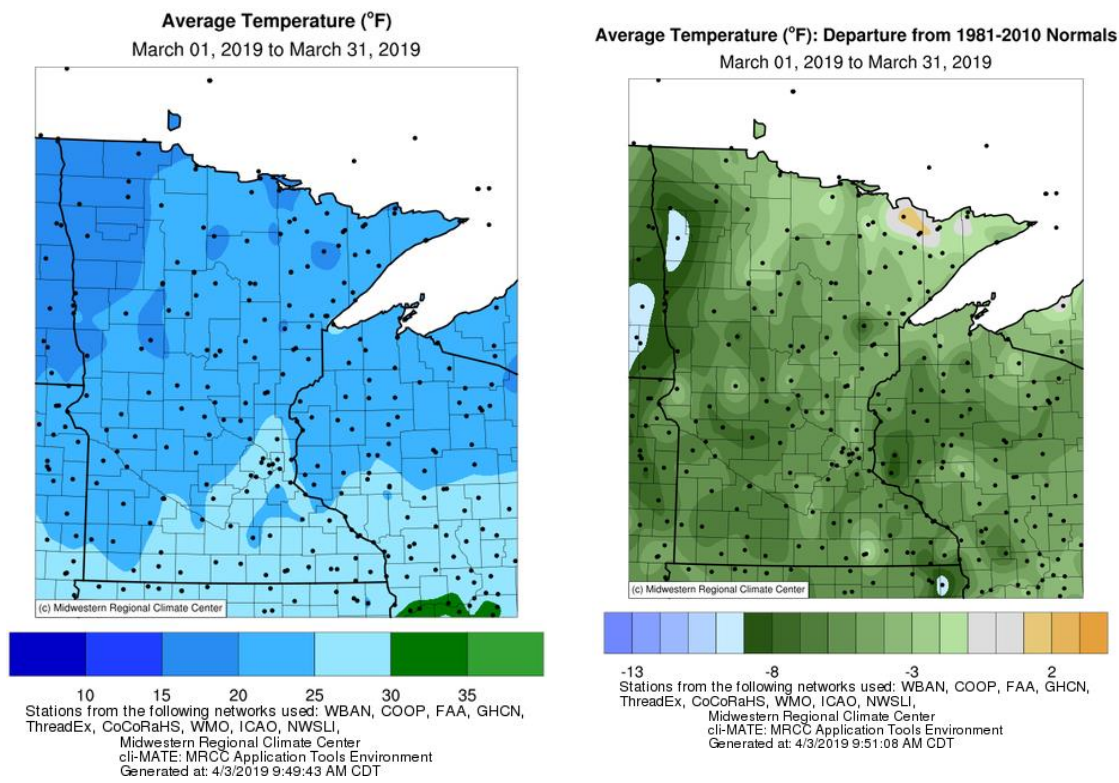


Figure 2. March 2019 Precipitation Trends

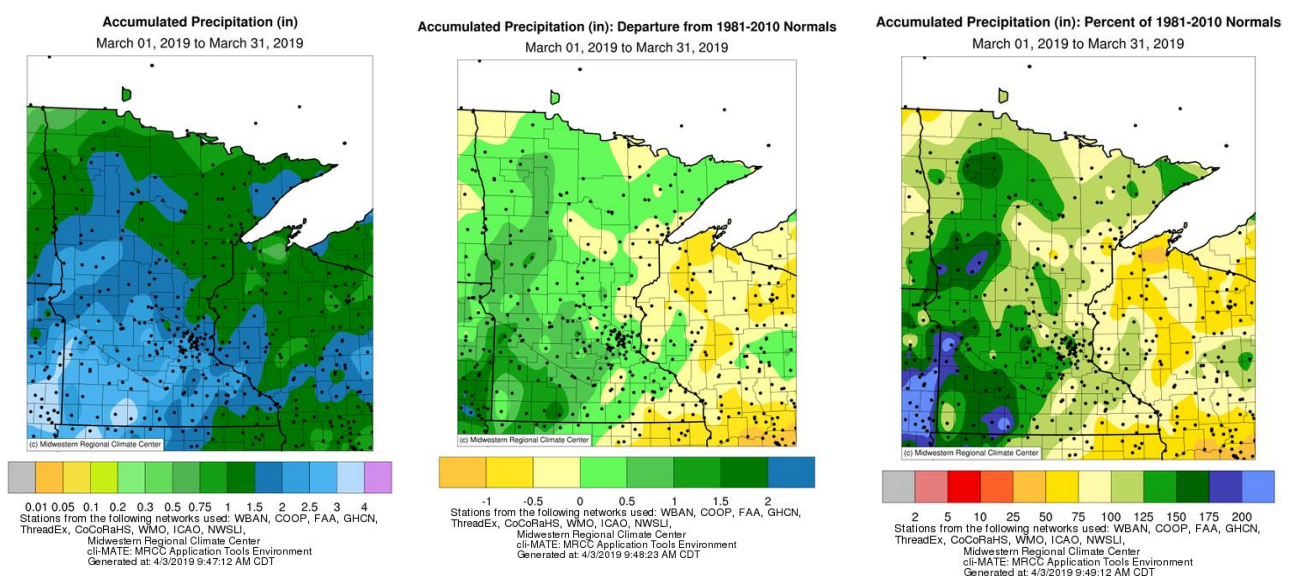


Figure 3. March 2019 Soil Moisture Trends

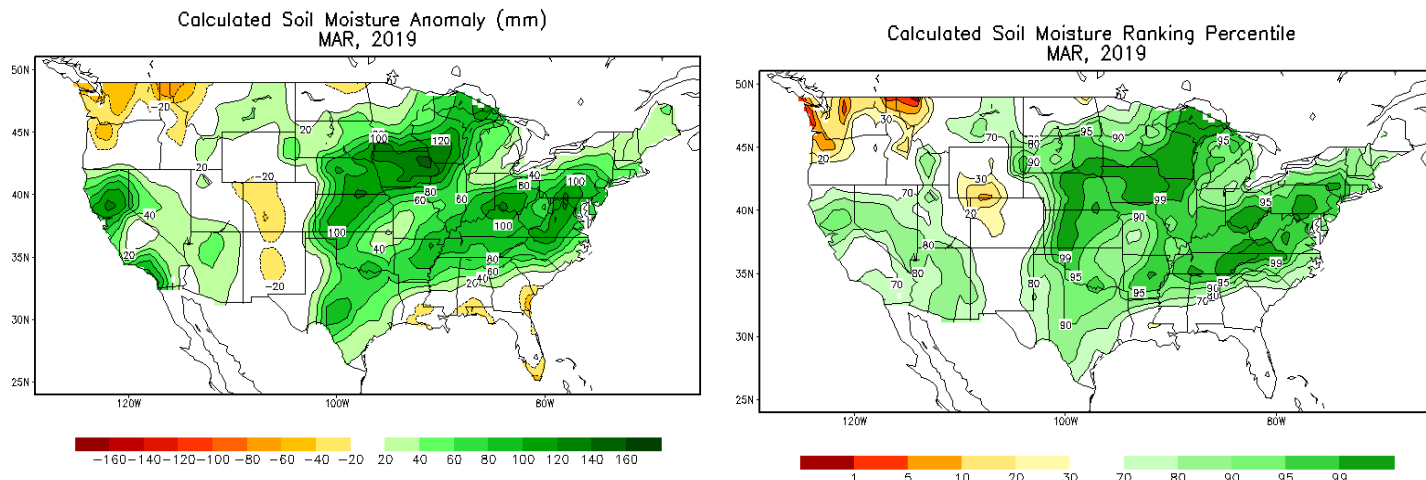
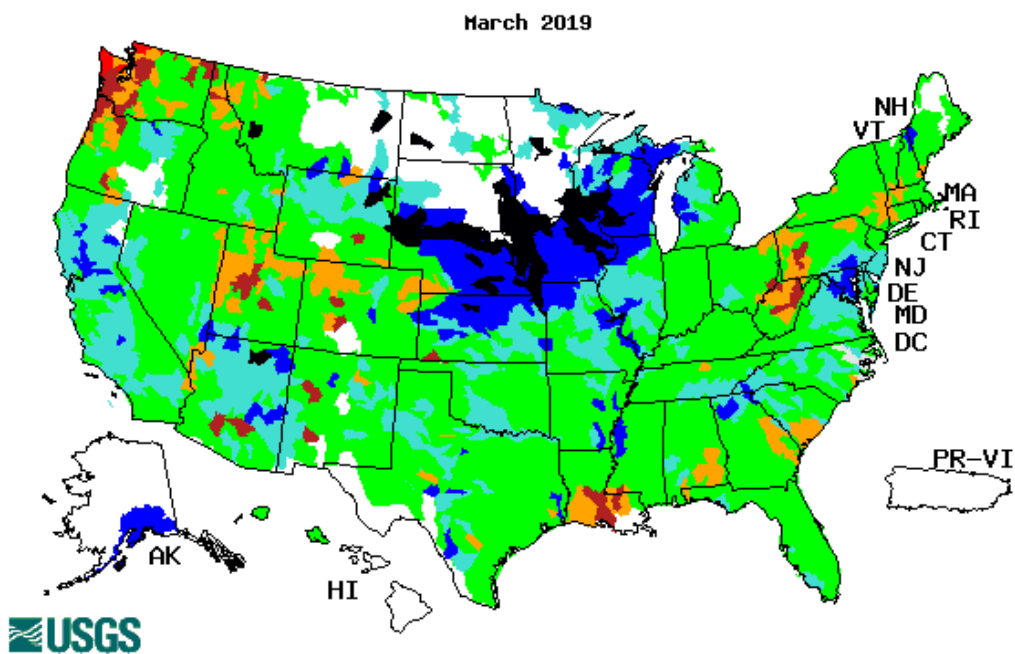
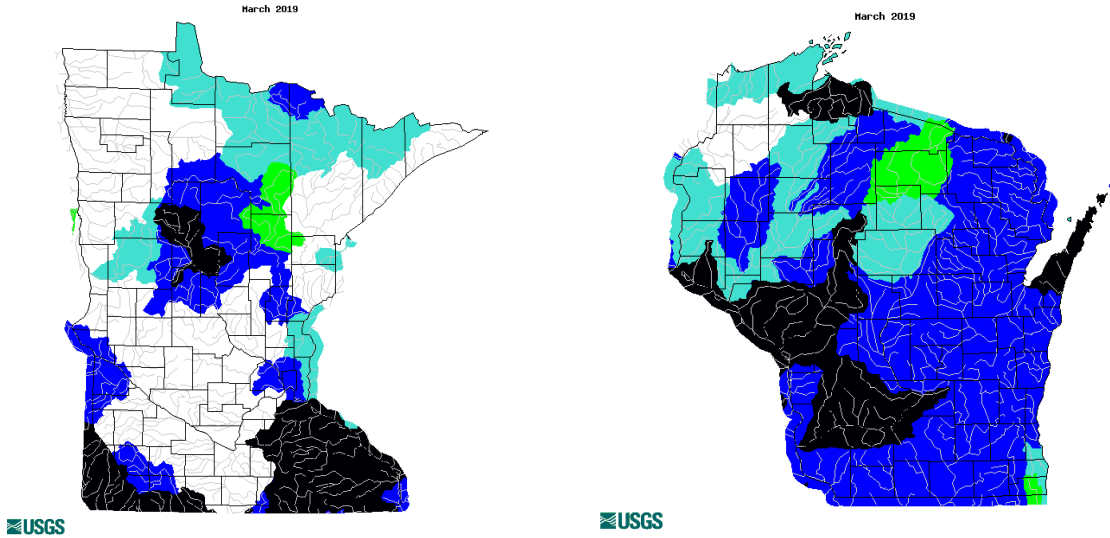


Figure 4. March 2019 Monthly Streamflow Compared to Historical Streamflow for the United States Courtesy of USGS



Explanation - Percentile classes						
Low	<10	10-24	25-75	76-90	>90	High
	Much below normal	Below normal	Normal	Above normal	Much above normal	No Data

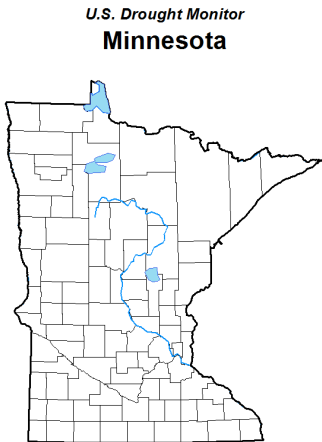
Figure 5. Minnesota/Wisconsin Average Streamflow For March 2019



Explanation - Percentile classes

	<10	10-24	25-75	76-90	>90	High	No Data
Low	Much below normal	Below normal	Normal	Above normal	Much above normal		

Figure 6. Minnesota/Wisconsin Drought Monitor For March 2019



U.S. Drought Monitor
Minnesota

March 26, 2019
(Released Thursday, Mar. 28, 2019)
Valid 8 a.m. EDT

	Drought Conditions (Percent Area)					
	None	D0	D1	D2	D3	D4
Current	100.00	0.00	0.00	0.00	0.00	0.00
Last Week (03-19-2019)	100.00	0.00	0.00	0.00	0.00	0.00
3 Months Ago (12-20-2018)	97.54	2.46	0.00	0.00	0.00	0.00
Start of Calendar Year (01-01-2019)	98.07	1.93	0.00	0.00	0.00	0.00
Start of Water Year (09-22-2018)	87.05	24.64	8.64	0.27	0.00	0.00
One Year Ago (03-27-2018)	94.36	4.26	1.37	0.00	0.00	0.00

Intensity:
 D0 Abnormally Dry D3 Extreme Drought
 D1 Moderate Drought D4 Exceptional Drought
 D2 Severe Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:
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U.S. Department of Agriculture

<http://droughtmonitor.unl.edu/>



U.S. Drought Monitor
Wisconsin

March 26, 2019
(Released Thursday, Mar. 28, 2019)
Valid 8 a.m. EDT

	Drought Conditions (Percent Area)					
	None	D0	D1	D2	D3	D4
Current	100.00	0.00	0.00	0.00	0.00	0.00
Last Week (03-19-2019)	100.00	0.00	0.00	0.00	0.00	0.00
3 Months Ago (12-20-2018)	100.00	0.00	0.00	0.00	0.00	0.00
Start of Calendar Year (01-01-2019)	100.00	0.00	0.00	0.00	0.00	0.00
Start of Water Year (09-22-2018)	100.00	0.00	0.00	0.00	0.00	0.00
One Year Ago (03-27-2018)	42.85	57.35	0.00	0.00	0.00	0.00

Intensity:
 D0 Abnormally Dry D3 Extreme Drought
 D1 Moderate Drought D4 Exceptional Drought
 D2 Severe Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

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Figure 7. Radar Observed Precipitation for March 2019

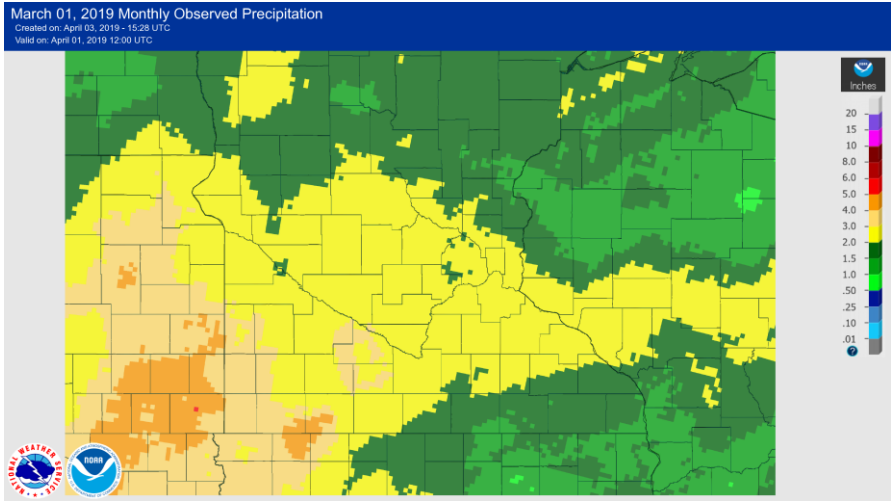


Figure 8. Radar Observed Departure Precipitation for March 2019

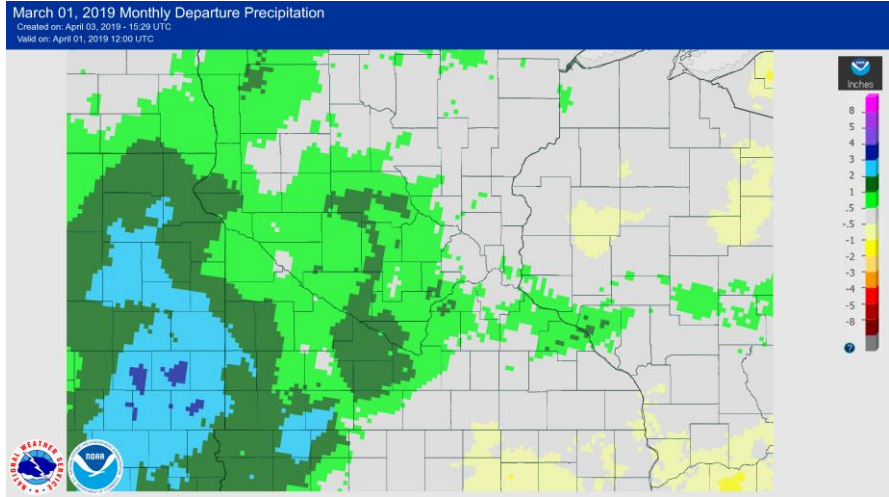


Figure 9. Radar Observed Percent Precipitation for March 2019

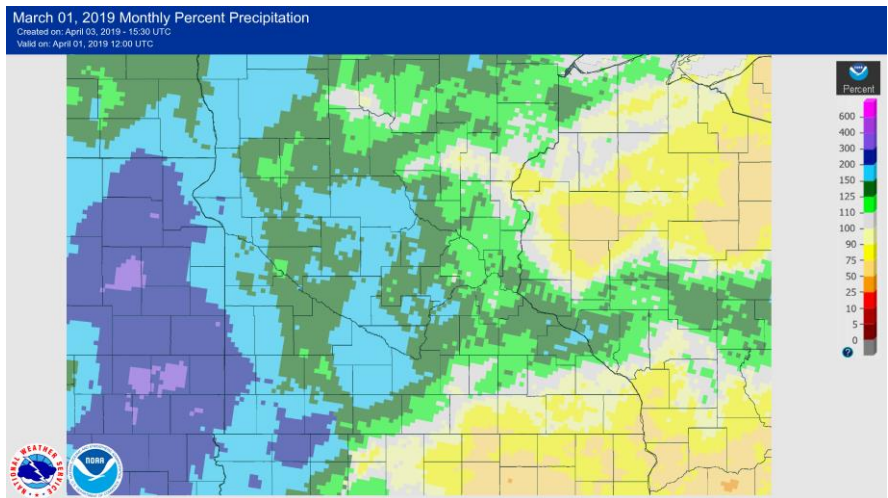


Figure 10. Snow Trends for March 2019

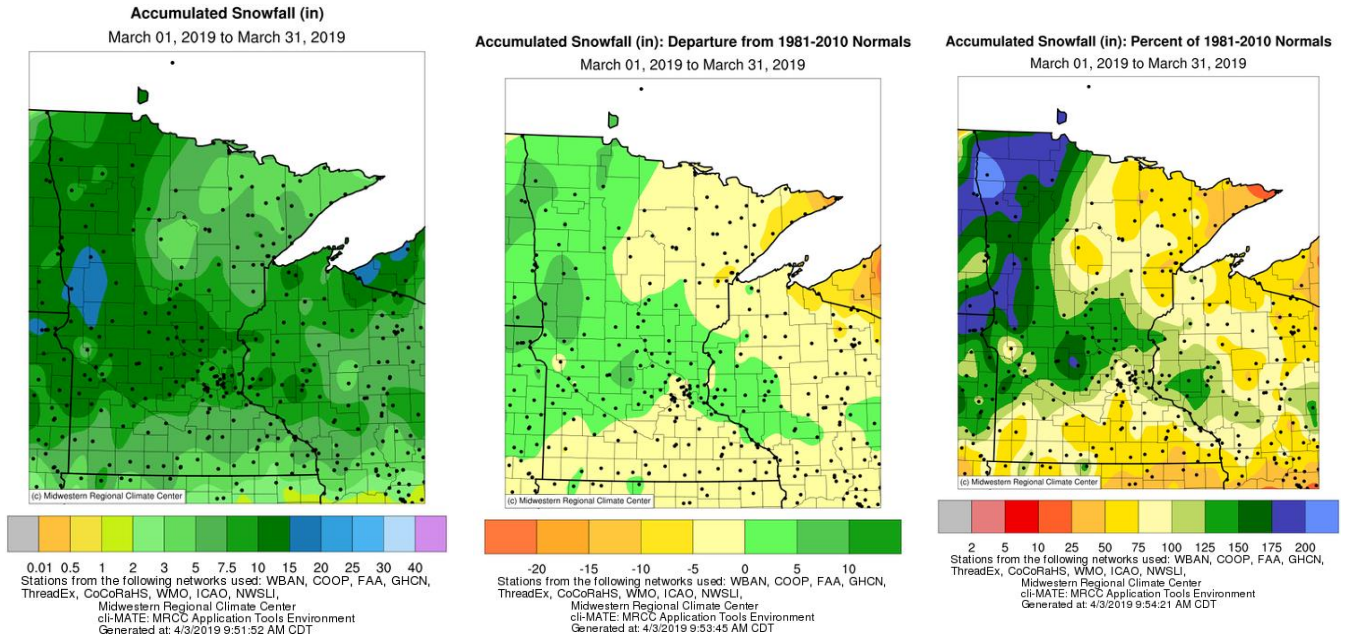


Figure 11. Frost Depth April 3

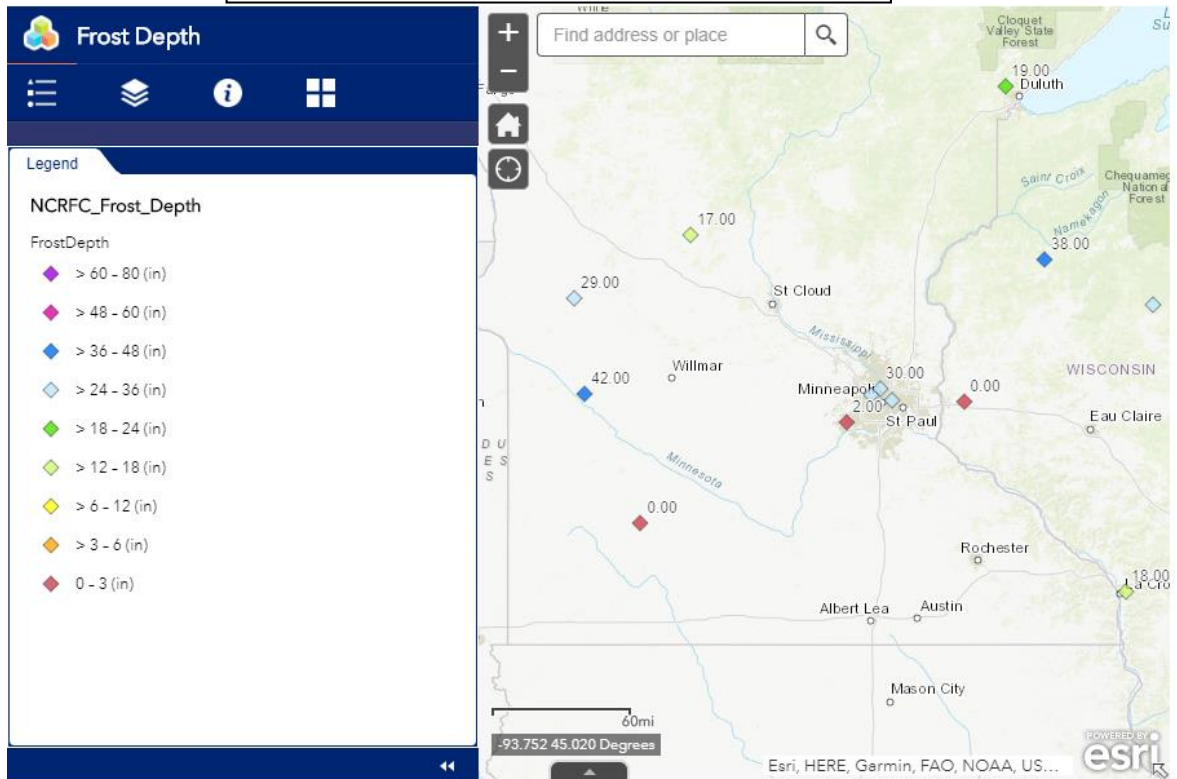
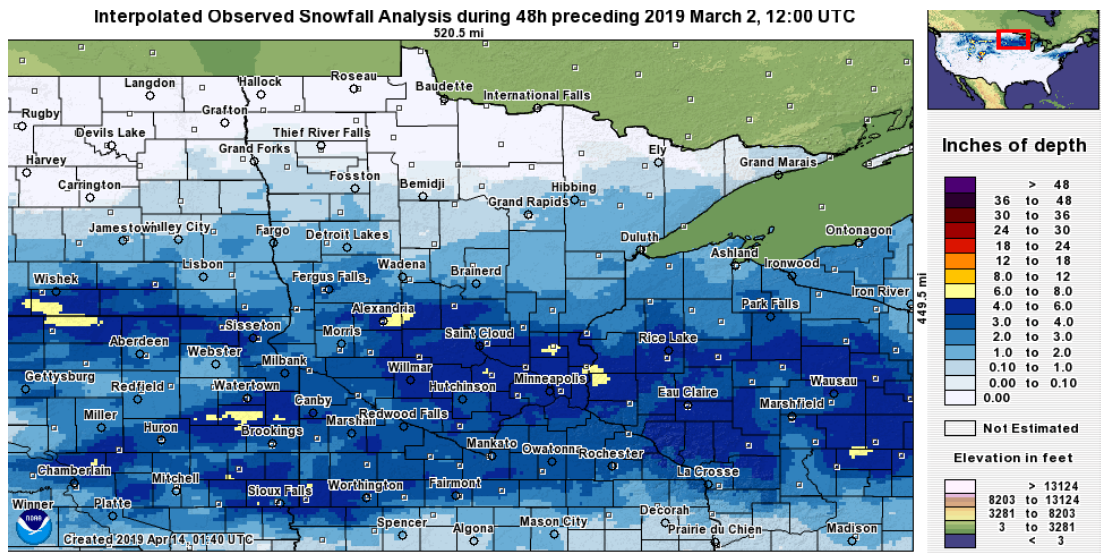
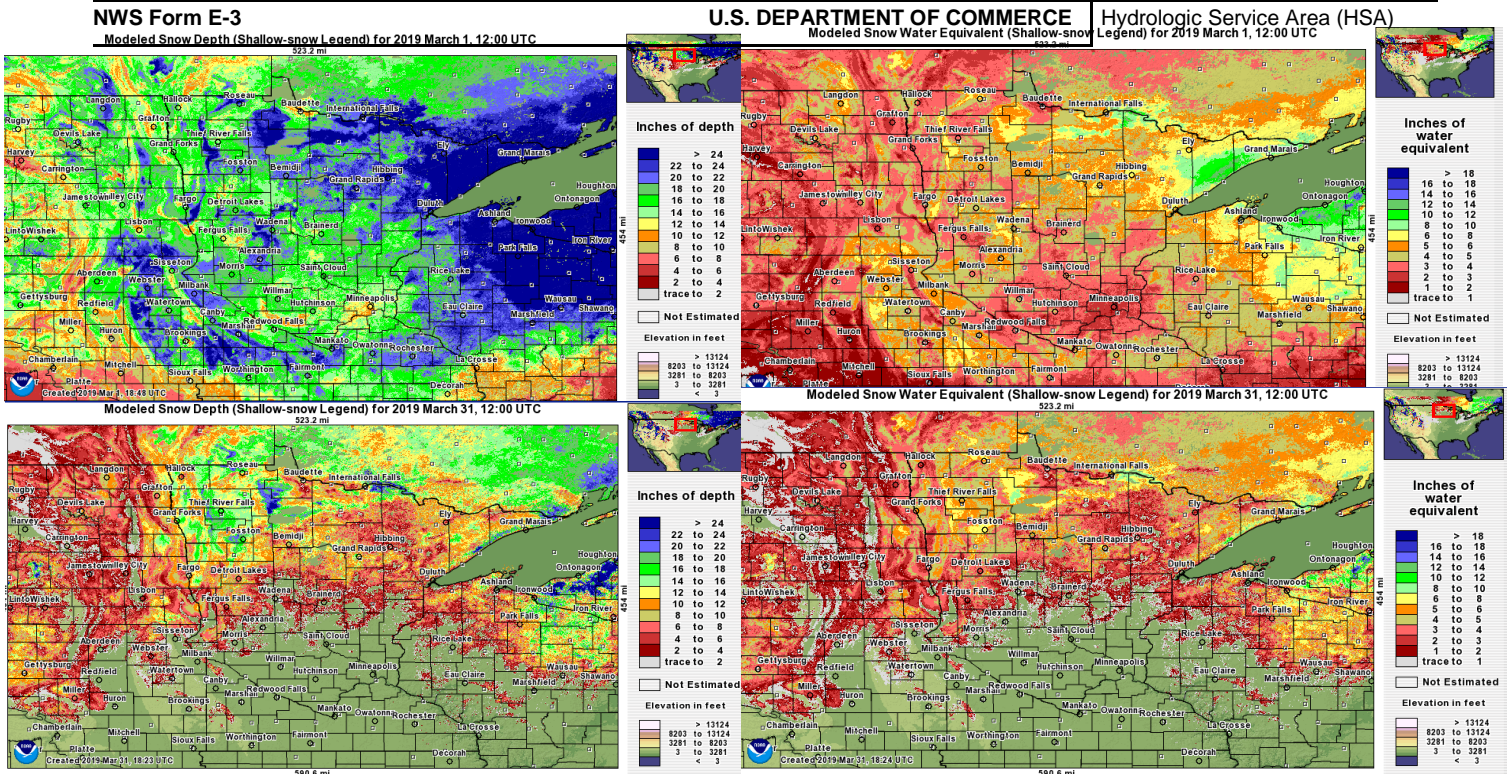


Figure 12. Snow Event March 1



**Figure 13. Modeled Snow Depth and Snow Water Equivalent
12z March 1 and 12z March 31**



FLOOD STAGE REPORT

REPORT FOR:
MONTH YEAR
Mar 2019

RIVER AND STATION	FLOOD STAGE (Feet)	ABOVE FLOOD STAGES (Date)		CREST	
		FROM	TO	STAGE (Feet)	DATE
Minnesota River at Montevideo (MVOM5)	14.0	03/24	End of month	21.98	03/30
Minnesota River at Granite Falls (GTEM5)	888.5	03/28	End of month	893.52	03/31
Redwood River at Redwood Falls (RWDM5)	6.0	03/18	End of month	17.84	03/24
Minnesota River nr Morton (MTNM5)	21.0	03/20	End of month	28.85	03/31
Cottonwood River nr Springfield (SPFM5)	22.0	03/16	End of month	29.41	03/23
Cottonwood River at New Ulm (NWUM5)	11.0	03/16	End of month	17.91	03/24
Minnesota River at New Ulm (NULM5)	800.0	03/20	End of month	807.56	04/02*
Minnesota River at Mankato (MNKM5)	22.0	03/20	End of month	26.24	03/22
Minnesota River at Henderson (HENM5)	732.0	03/19	End of month	738.52	03/24
Sand Creek at Jordan (SNM5)	10.0	03/14	03/18	12.03	03/15
Minnesota River at Jordan (JDNM5)	25.0	03/19	End of month	32.11	03/25
Minnesota River at Savage (SAVM5)	702.0	03/21	End of month	712.60	03/30
Sauk River at St. Cloud (STCM5)	6.0	03/24	End of month	6.81	03/26
South Fork Crow River at Mayer (MAYM5)	11.0	03/20	End of month	15.43	03/27
South Fork Crow River at Delano (DELM5)	16.5	03/22	End of month	19.84	03/25
Crow River at Rockford (RKF5)	10.0	03/21	End of month	14.42	03/30
Mississippi River at St. Paul (STPM5)	14.0	03/23	End of month	20.19	03/31
Mississippi River at Hastings L/D #2 (HSTM5)	15.0	03/23	End of month	19.49	03/31
Mississippi River at Red Wing L/D #3 (RDWM5)	680.5	03/27	End of month	682.87	04/01*
Mississippi River at Red Wing (REDM5)	14.0	03/27	End of month	15.81	04/01*
Cannon River at Northfield (NRF5)	897.0	03/15	03/27	899.10	03/22
North Fork Zumbro River nr Wanamingo (WGOM5)	18.0	03/14	03/15	18.68	03/14
Middle Fork Zumbro River at Pine Island (PNLM5)	17.0	03/14	03/16	18.27	03/15
St. Croix River at Stillwater (STLM5)	87.0	03/27	End of month	88.48	03/31

The asterisk (*) denotes a crest date that occurred in a different month from this report.