



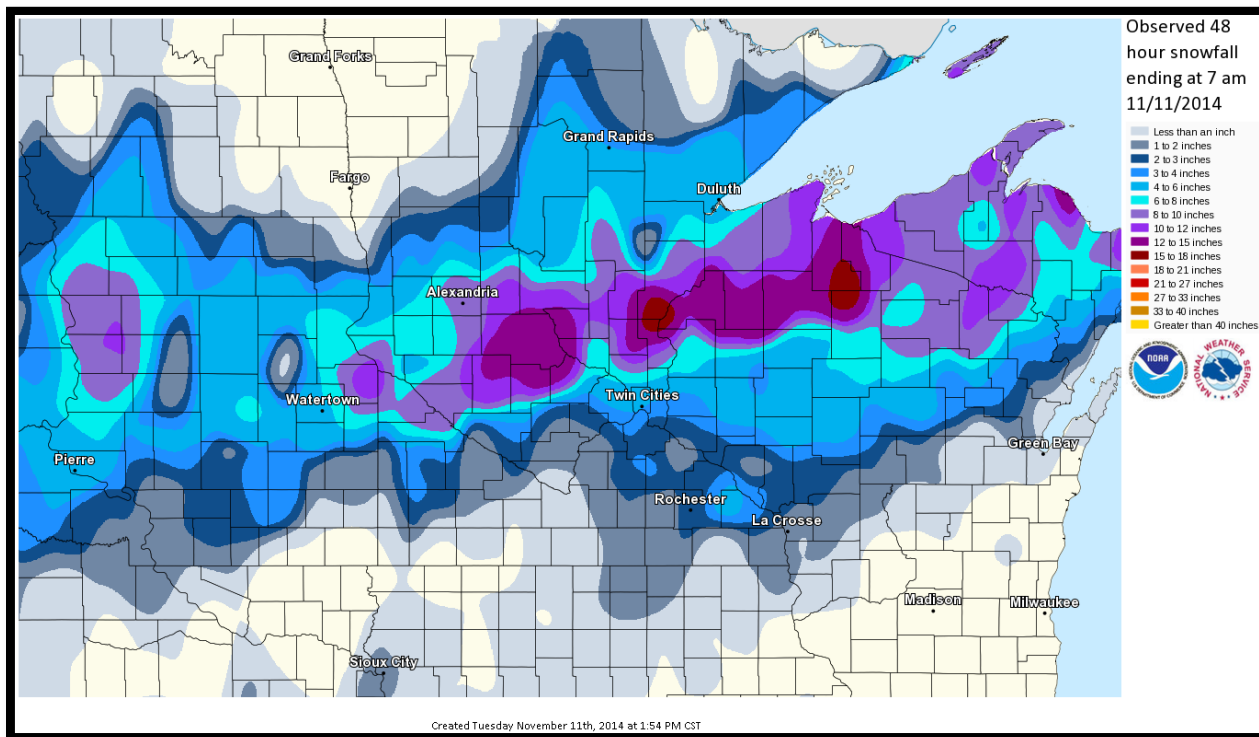
National Weather Service Twin Cities

November 10, 2014 Winter Storm

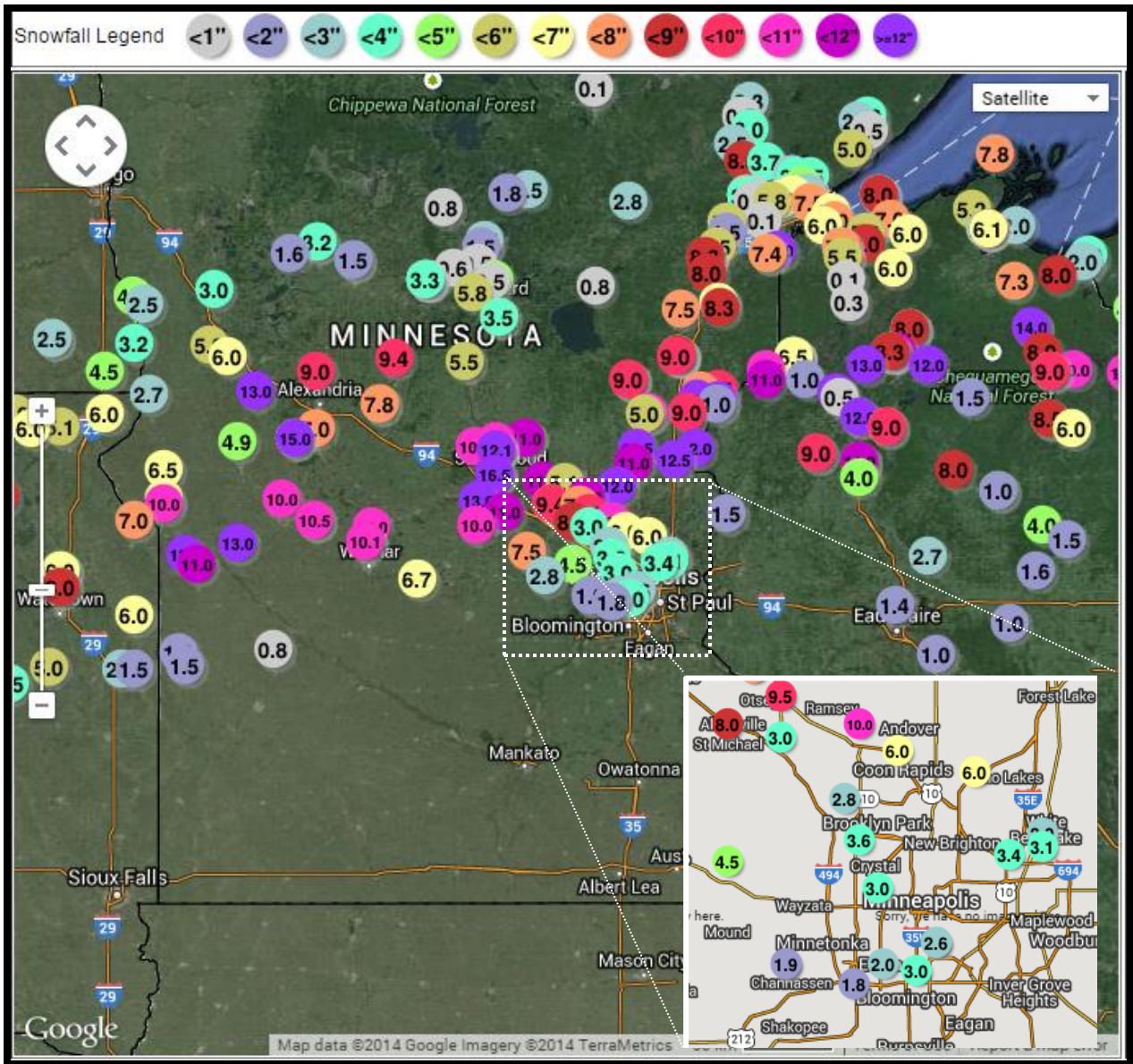
Note: This data is preliminary and subject to change



Accumulation Maps:



This product is an objective analysis of NWS Cooperative Observer Program (COOP) and Community Collaborative Rain, Hail and Snow Network (CoCoRaHS) snowfall reports. CoCoRaHS data is from non-NWS sources and may have not been fully quality controlled.



The map above shows snowfall totals as of Monday evening. Notice the stripe of 10+ inches across central MN into northern WI. Also, there is a very sharp cutoff on the southern edge of the heaviest snow. This was especially evident across the Twin Cities metro, where 10" fell across the northwest, and only 1-2" across the south (lower right map).

Event Facts:

- **Snow Accumulation:**
 - 10-14" from Madison MN to Willmar MN, St Cloud MN, Mora MN, to Rice Lake WI.
 - 1-3" from Cottonwood MN to Shakopee MN to Eau Claire WI
- **Impacts:**
 - Travel was the main impact. The Monday morning commute was very slow.
 - Conditions improved during the day except for those areas that received the heavy snow totals.
- **Other:**
 - The sharp cutoff in snow totals were the most challenging part of the forecast.

Report List:

INCHES	LOCATION	ST	COUNTY	TIME
16.50	CAMBRIDGE	MN	ISANTI	0530 PM
16.50	ST AUGUSTA	MN	STEARNS	0302 PM
15.50	2 N NORTH BRANCH	MN	CHISAGO	0813 AM
15.00	4 NE RUSH CITY	MN	CHISAGO	0859 PM
15.00	STARBUCK	MN	POPE	0337 PM
14.50	8 ESE PRINCETON	MN	ISANTI	1010 PM
13.80	MILACA	MN	MILLE LACS	0730 AM
13.60	3 N KIMBALL	MN	STEARNS	0600 AM
13.50	ST CLOUD	MN	STEARNS	0600 AM
	MEASURED AT THE PRISON.			
13.00	4 SSW WOLF CREEK	MN	CHISAGO	0840 AM
	OCCURRED OVER AMADOR TOWNSHIP.			
13.00	ENE BRAHAM	MN	ISANTI	0720 AM
13.00	RICE	MN	BENTON	0938 PM
13.00	MILAN	MN	CHIPPEWA	0700 PM
13.00	KIMBALL	MN	STEARNS	1210 PM
12.50	1 SW LITTLE FALLS	MN	MORRISON	0610 AM
12.50	7 NE MAPLE LAKE	MN	WRIGHT	0933 PM
12.50	NORTH BRANCH	MN	CHISAGO	0300 PM
12.50	5 NW MADISON	MN	LAC QUI PARLE	0300 PM
12.00	8 ENE NORTH BRANCH	MN	CHISAGO	0600 PM
12.00	ST FRANCIS	MN	ANOKA	0401 PM
11.50	SAUK RAPIDS	MN	BENTON	0816 AM
11.30	ELK RIVER	MN	SHERBURNE	0620 PM
11.00	ANNANDALE	MN	WRIGHT	0630 PM
11.00	MADISON	MN	LAC QUI PARLE	0420 PM
11.00	3 N BECKER	MN	SHERBURNE	0403 PM
11.00	5 SW FOLEY	MN	BENTON	0310 PM
11.00	RICE LAKE	WI	BARRON	0254 PM
11.00	ISANTI	MN	ISANTI	1235 PM
10.50	ST JOSEPH	MN	STEARNS	0542 PM
10.50	MURDOCK	MN	SWIFT	0255 PM
10.50	1 ENE BRAHAM	MN	KANABEC	0120 PM
10.10	WILLMAR	MN	KANDIYOHI	0445 PM
10.00	SAUK RAPIDS	MN	BENTON	0325 PM
10.00	ANOKA	MN	ANOKA	0310 PM
10.00	5 NNE WILLMAR	MN	KANDIYOHI	0230 PM
10.00	KINGSTON	MN	MEEKER	1258 PM
10.00	BENSON	MN	SWIFT	1225 PM
10.00	ST CLOUD	MN	STEARNS	1210 PM
10.00	4 SE OTSEGO	MN	WRIGHT	0745 AM

9.50	MURDOCK	MN	SWIFT	1100 AM
9.50	12 N BRUCE	WI	RUSK	0740 AM
9.40	MONTICELLO	MN	WRIGHT	0615 PM
9.40	LONG PRAIRIE	MN	TODD	0355 PM
9.00	ANDOVER	MN	ANOKA	1047 AM
9.00	GRANITE FALLS	MN	YELLOW MEDICINE	0840 AM
9.00	CUMBERLAND	WI	BARRON	0813 AM
9.00	3 N ALEXANDRIA	MN	DOUGLAS	0525 PM
9.00	CUMBERLAND	WI	BARRON	0222 PM
9.00	MORA	MN	KANABEC	0217 PM
9.00	5 NE RUSH CITY	MN	PINE	0200 PM
8.50	WILLMAR	MN	KANDIYOHI	0430 PM
8.00	ST MICHAEL	MN	WRIGHT	0456 PM
8.00	MORA	MN	KANABEC	0223 PM

RELAYED BY NWS DULUTH.

8.00	LADYSMITH	WI	RUSK	1200 PM
8.00	5 SW FOLEY	MN	BENTON	1115 AM
7.80	2 N SAUK CENTRE	MN	STEARNS	0215 PM
7.80	2 N SAUK CENTRE	MN	STEARNS	0214 PM
7.60	OTSEGO	MN	WRIGHT	0336 PM
7.50	BLAINE	MN	ANOKA	0700 AM
7.50	WAVERLY	MN	WRIGHT	0454 PM
7.00	GLENWOOD	MN	POPE	0848 PM

LIQUID PRECIPITATION OF 0.36 INCHES.

7.00	MORA	MN	KANABEC	0258 PM
7.00	RICE LAKE	WI	BARRON	1230 PM
7.00	CUMBERLAND	WI	BARRON	1210 PM
7.00	ST CLOUD	MN	STEARNS	1000 AM

7.0 INCHES OF SNOW MEASURED AT SAINT CLOUD
STATE UNIVERSITY AS OF 10 AM.

6.80	AUGUSTA	WI	EAU CLAIRE	0845 AM
6.70	COSMOS	MN	MEEKER	0330 PM
6.00	CIRCLE PINES	MN	ANOKA	0610 PM
6.00	COON RAPIDS	MN	ANOKA	0303 PM
6.00	MONTICELLO	MN	WRIGHT	1045 AM
5.50	MAPLE PLAIN	MN	HENNEPIN	0700 AM
5.50	1 SW LITTLE FALLS	MN	MORRISON	1120 AM
5.40	EAU CLAIRE	WI	EAU CLAIRE	1200 PM

MEASURED AT WQOW TV.

5.10	1 SSE FRIDLEY	MN	ANOKA	0705 AM
5.10	5 NNE BIG LAKE	MN	SHERBURNE	0900 AM
5.00	ENE BRAHAM	MN	ISANTI	1000 AM
4.90	MORRIS	MN	STEVENS	0800 AM
4.50	MAPLE PLAIN	MN	HENNEPIN	1145 AM
4.40	2 ENE PLYMOUTH	MN	HENNEPIN	0700 AM
4.00	WATERTOWN	MN	CARVER	0430 AM
4.00	1 N CAMERON	WI	BARRON	1052 AM
3.80	WACONIA	MN	CARVER	1135 AM
3.60	EXCELSIOR	MN	HENNEPIN	0922 PM
3.60	NEW HOPE	MN	HENNEPIN	0100 PM
3.40	WSW LITTLE CANADA	MN	RAMSEY	0957 AM
3.30	MSP INTL AIRPORT	MN	HENNEPIN	1200 PM
3.30	WATERTOWN	MN	CARVER	1100 AM
3.20	3 SW DOWNTOWN MINNEAPOL	MN	HENNEPIN	0700 AM
3.10	1 NNW NORTH ST PAUL	MN	RAMSEY	0230 PM
3.00	1 ESE CHANHASSEN	MN	HENNEPIN	0700 AM
3.00	3 NE BURNSVILLE	MN	DAKOTA	0600 AM
3.00	3 SW MSP INTL AIRPORT	MN	HENNEPIN	0310 PM
3.00	8 NW MSP INTL AIRPORT	MN	HENNEPIN	1224 PM

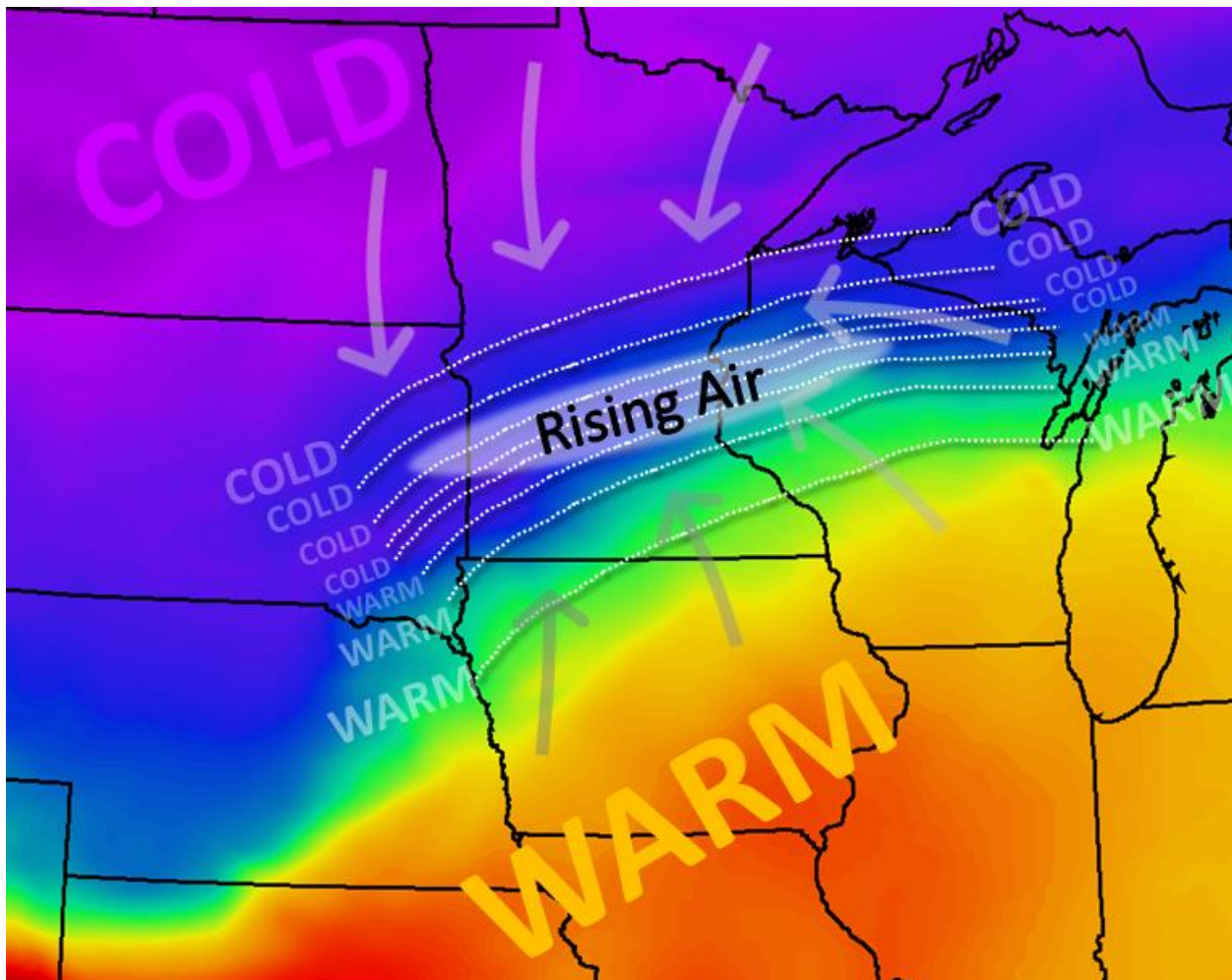
OCCURRED ON UPTON AVE APPROXIMATELY 4 MILES
SOUTHWEST OF LAKE HARRIET.

3.00	ROGERS	MN	HENNEPIN	0854 AM
2.80	1 NNE MAPLE GROVE	MN	HENNEPIN	0844 AM
2.70	JIM FALLS	WI	CHIPPEWA	0543 PM
2.50	INVER GROVE HEIGHTS	MN	DAKOTA	0933 AM
2.20	CHANHASSEN	MN	CARVER	1200 PM
MEASURED AT THE NWS FORECAST OFFICE.				
2.00	2 SSE EDINA	MN	HENNEPIN	0455 PM
2.00	1 S WHITE BEAR LAKE	MN	RAMSEY	0920 AM
1.80	3 ESE EDEN PRAIRIE	MN	HENNEPIN	0842 AM
0.50	MANKATO	MN	BLUE EARTH	0839 AM

Summary:

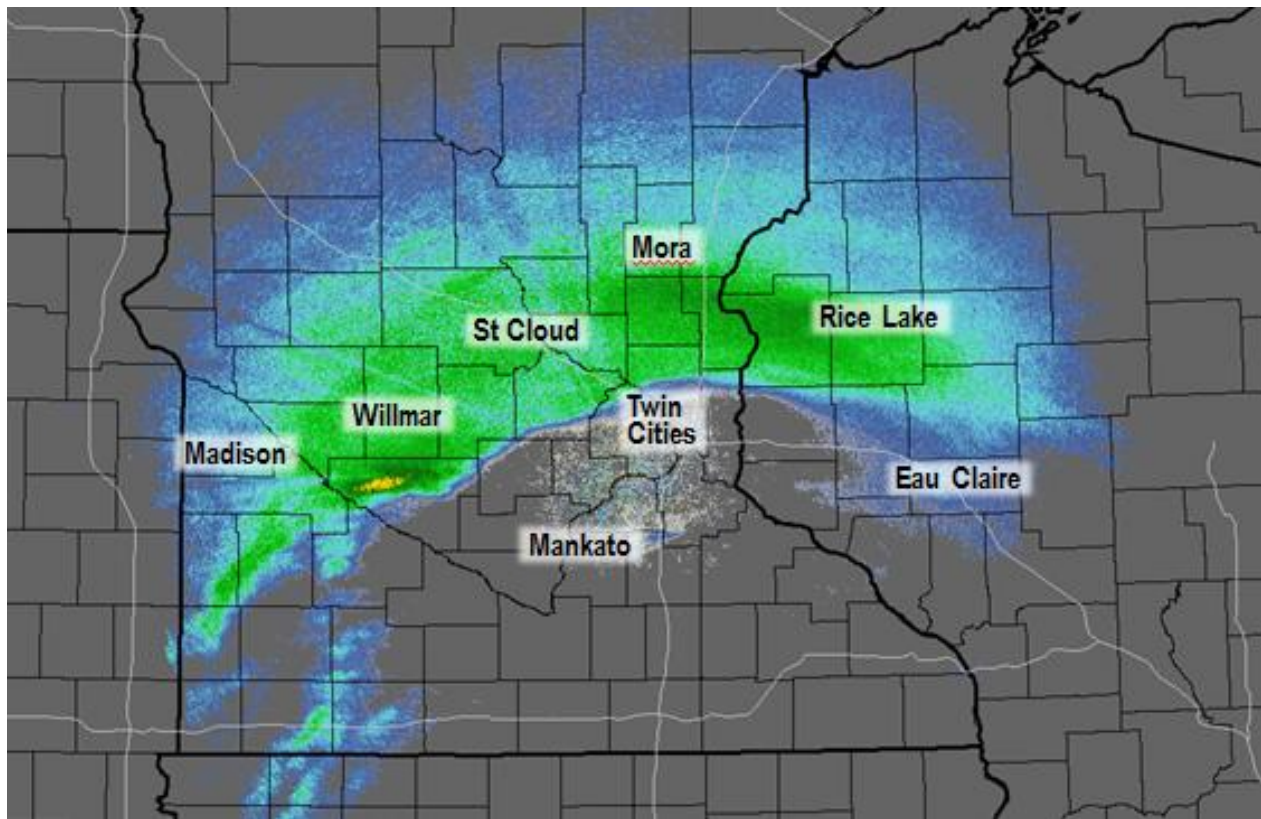
A frontal boundary was the focus for the heavy snow. This front strengthened across central MN and northern WI, through a process called [frontogenesis](#). When this happens, the energy of the atmosphere is released in the form of a narrow corridor of rising air, and produces a band of heavy snow. The band of heavy snow is shown in the following radar image.

There was a strong signal in the forecast models that this type of feature would develop and produce over a foot of snow along a line in Minnesota and Wisconsin. The challenge was pinpointing that exact location of where this would occur.



The image above shows the temperatures in the lower atmosphere on the morning of Monday November 10, 2014. The dashed white lines represent the temperature gradient, or change. The

arrows represent the wind, which was causing the temperature lines to move closer together. This led to a narrow corridor of rising air.



Radar reflectivity from Monday morning. The green area shows heavy snow from Madison to Willmar, St Cloud, Mora, and Rice Lake. Meanwhile areas to the south had little if anything.