

July 23-24, 2011: Scattered Severe Winds in Wisconsin and Heavy Rain in the Owatonna Area

On July 23rd, Minnesota and Wisconsin remained on the northern periphery of a very warm, moist, and unstable air mass, as has been the case much of this month. Such a weather pattern can often be favorable for multiple waves of storms. During the 23rd, there were scattered storms across the area during the morning, and some in the early evening. Later in the evening, stronger thunderstorm development occurred from south central Minnesota into west central Wisconsin. These storms were primarily capable of strong winds and heavy rainfall, but sporadically had a large hail threat. The storms that developed in western Wisconsin would further organize as they developed southeast, producing more wind damage in southwest Wisconsin in the early morning hours of the 24th.

Storm Reports

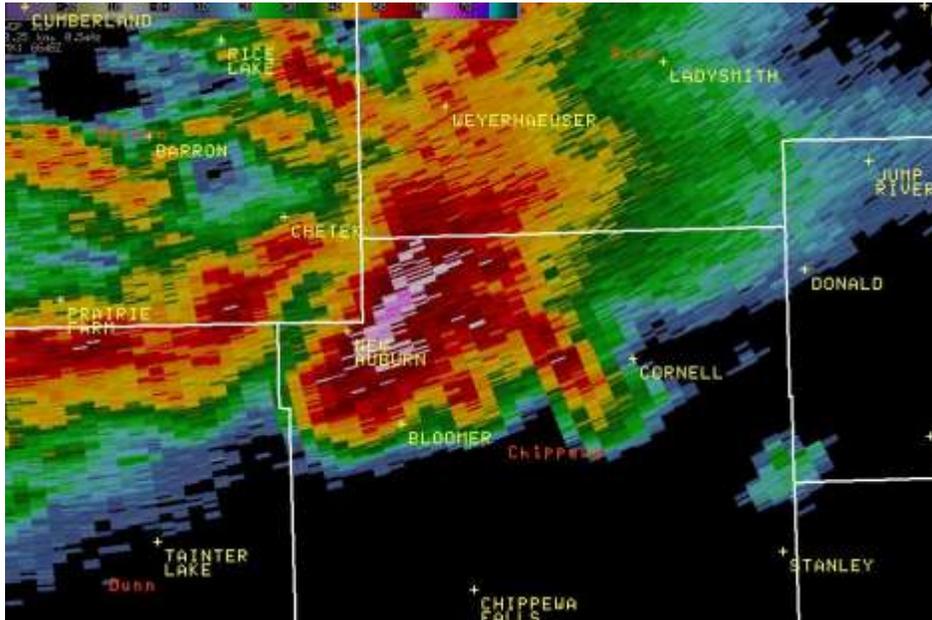


Map of Wind and Heavy Rainfall Reports

PRELIMINARY LOCAL STORM REPORT...SUMMARY
 NATIONAL WEATHER SERVICE TWIN CITIES/CHANHASSEN MN
 734 PM CDT SUN JUL 24 2011

..TIME...	...EVENT...	...CITY LOCATION...	...LAT.LON...
..DATE...	...MAG....	..COUNTY LOCATION..ST..	...SOURCE....
	..REMARKS..		
1050 PM 07/23/2011	TSTM WND DMG	3 SW RIVER FALLS PIERCE	44.83N 92.66W WI LAW ENFORCEMENT
	TREE DOWNED BETWEEN RIVER FALLS AND PRESCOTT. TIME AND LOCATION ESTIMATED.		
1057 PM 07/23/2011	TSTM WND DMG	7 S ISLAND LAKE CHIPPEWA	45.22N 91.37W WI LAW ENFORCEMENT
	SCATTERED TREES DOWNED IN THE AREA. ESTIMATED TIME AND LOCATION.		
1130 PM 07/23/2011	HEAVY RAIN M2.50 INCH	3 NNW BLOOMER CHIPPEWA	45.15N 91.52W WI TRAINED SPOTTER
1141 PM 07/23/2011	TSTM WND DMG	CADOTT CHIPPEWA	44.95N 91.15W WI LAW ENFORCEMENT
	SCATTERED TREES DOWNED. ESTIMATED TIME.		
1145 PM 07/23/2011	TSTM WND DMG	6 S MENOMONIE DUNN	44.80N 91.91W WI LAW ENFORCEMENT
	TREES DOWNED IN DUNN TOWNSHIP. LOCATION AND TIME ESTIMATED.		
1151 PM 07/23/2011	TSTM WND DMG	STANLEY CHIPPEWA	44.96N 90.94W WI CO-OP OBSERVER
	ROOF DAMAGE OCCURRED TO AN OLDER BUSINESS. AN 18 INCH DIAMETER TREE WAS DOWNED IN FANDRY PARK ON THE WEST SIDE OF TOWN. ESTIMATED TIME.		
0200 AM 07/24/2011	HEAVY RAIN M4.00 INCH	5 S DEERFIELD STEELE	44.10N 93.37W MN TRAINED SPOTTER

Scattered Strong Winds in Western Wisconsin



1050 PM CDT, 0.5° Reflectivity Image



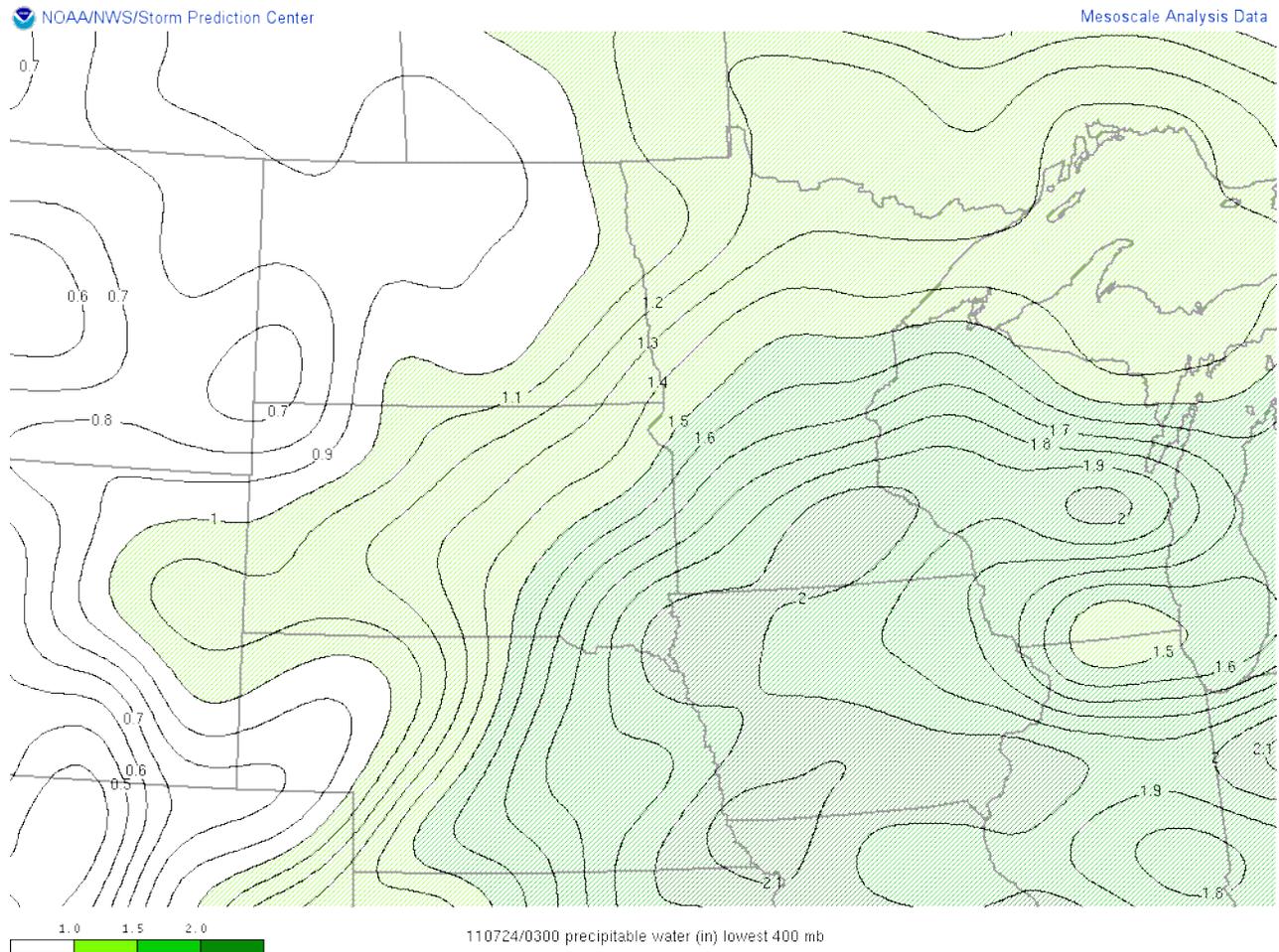
1050 PM CDT, 0.5° Storm-Relative Motion Image

These are 10:50 pm 0.5° radar images from NWS Duluth. The storm relative motion image reflects strong convergence around 12,000 ft within this already strong storm, as shown in reflectivity. This signature, which had depth to it as seen in other radar angles, is what meteorologists refer to as a MARC signature. NWS Duluth radar captured this better because of its viewing angle being perpendicular to the storm's southeast motion. NWS meteorologists have the ability to overlay the highest resolution data of all

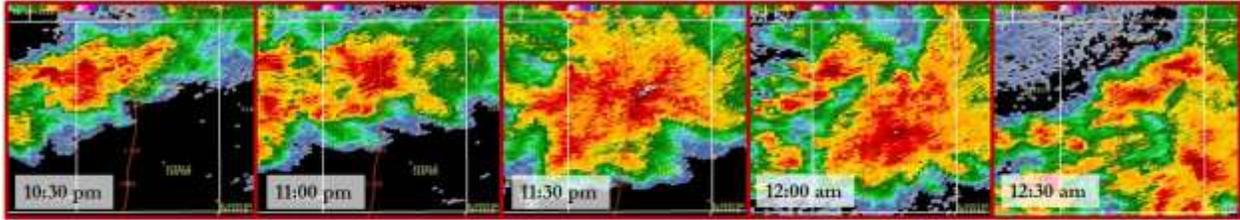
neighboring radar sites as well as quickly collaborate with neighboring NWS offices towards accurate and timely warnings.

Heavy Rain in the Owatonna Area

Due to a very moist atmosphere, storms were particularly efficient at producing heavy rainfall on the 23rd into the early morning hours of the 24th. The precipitable water image to the right indicates extremely high values of 1.75 to over 2 inches. At times, storms trained slowly eastward, such as near Owatonna in Steele County. The radar sequence below reflects just how long heavy rainfall rates were over the county. The red shades of reflectivity are indicative of at least 50 dBz. Given the environment, 50 dBz would equate to rainfall rates around 0.20 of an inch in five minutes. With that high of reflectivity over the same area for two hours, rainfall amounts of several inches occurred. The NWS did issue a Flash Flood Warning for that area at 11:32 pm.

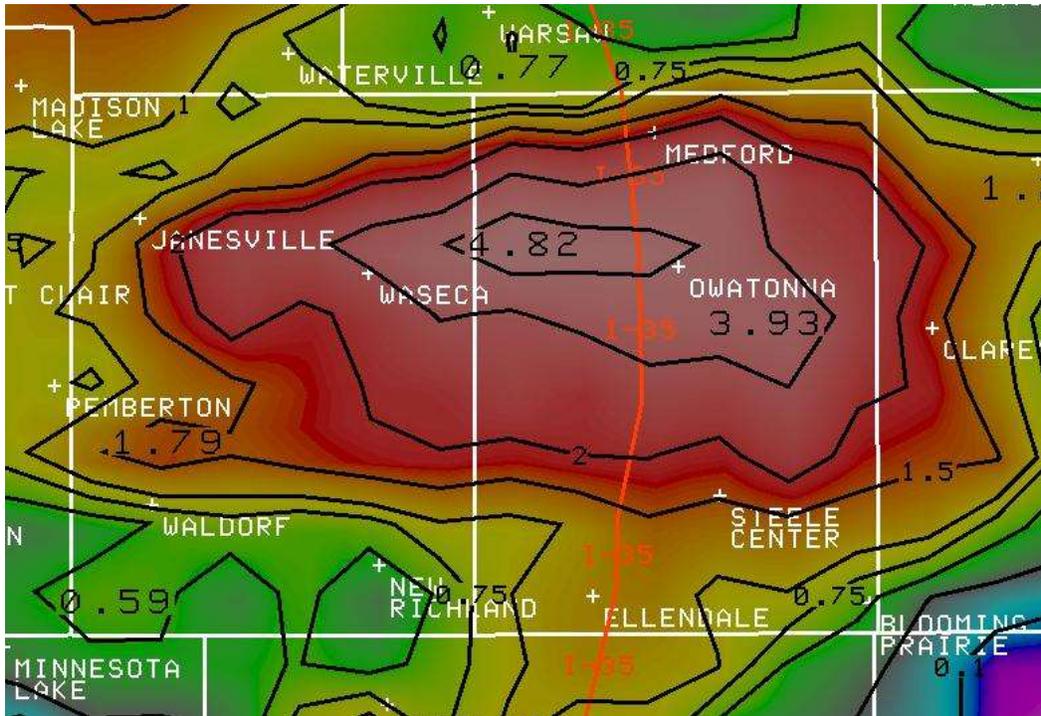


July 23rd 10pm Analysis of Precipitable Water



July 23-24th 0.5° base reflectivity images over Steele County every 30 minutes. Rainfall totals of 2 to 4 inches occurred.

Radar Sequence of Storms with Heavy Rain Over and Near Owatonna



Computer Model Estimate of Rainfall Over Steele and Waseca Counties