Spotter Newsletter

Spring 2022

Welcome from the NWS Detroit/Pontiac office. With Spring just around the corner, it is time to start thinking about severe weather season and SkyWarn Spotter Training. The first half of this season's training will be all virtual. We are planning to return to some in person classes the latter half of the spring. Since there are likely to be some additions to our SkyWarn schedule after this newsletter is sent, we encourage you all to check our website Detroit/Pontiac, MI (weather.gov) for additions throughout the month of March and April. We hope you enjoy this year's presentation, whether it is virtual or in person.

As always, be sure to check out our website for the latest information and forecasts. Supplementary forecast information can also be found at:

Latest News…

- SkyWarn training will be a virtual and hopefully in person this year.
- Michigan Severe Weather Awareness Week: March 20-26; Statewide Tornado Drill March 23rd at 1 PM.

In this Issue

This year's Skywarn Spotter training will be virtual with the hope of some in person classes later in the Spring. In person classes will be determined based on the most recent Covid trends. If in person classes are held later in the spring; the dates, times and locations will be determined at a later time.

Spotter training classes cover severe weather hazards including thunderstorms and tornadoes. This includes the general structure and movement of severe thunderstorms, identification of important storm features, and safety concerns.

- All classes last about 75 minutes.
- They are **free** and open to the public.
- Must be **age 13 or older to report.**
- The webinars have a limit of 150 registrations, so be sure to sign up early to save your spot!
- In person classes will be open to the public.

***** Important: Please note that a class will NOT be held in every county every year. You may attend a class in any location, regardless of where you live. *****

Date / Start Time	Webinar Registration Links
Tuesday, March 8th at 7 PM	https://register.gotowebinar.com/register/5330473474336715534
Monday, March 14th at 7 PM	https://register.gotowebinar.com/register/5459608915995906571
Saturday, April 9th at 10 AM	https://register.gotowebinar.com/register/1618996108476802573
Tuesday, April 12th at 7 PM	https://register.gotowebinar.com/register/2218804990196061452

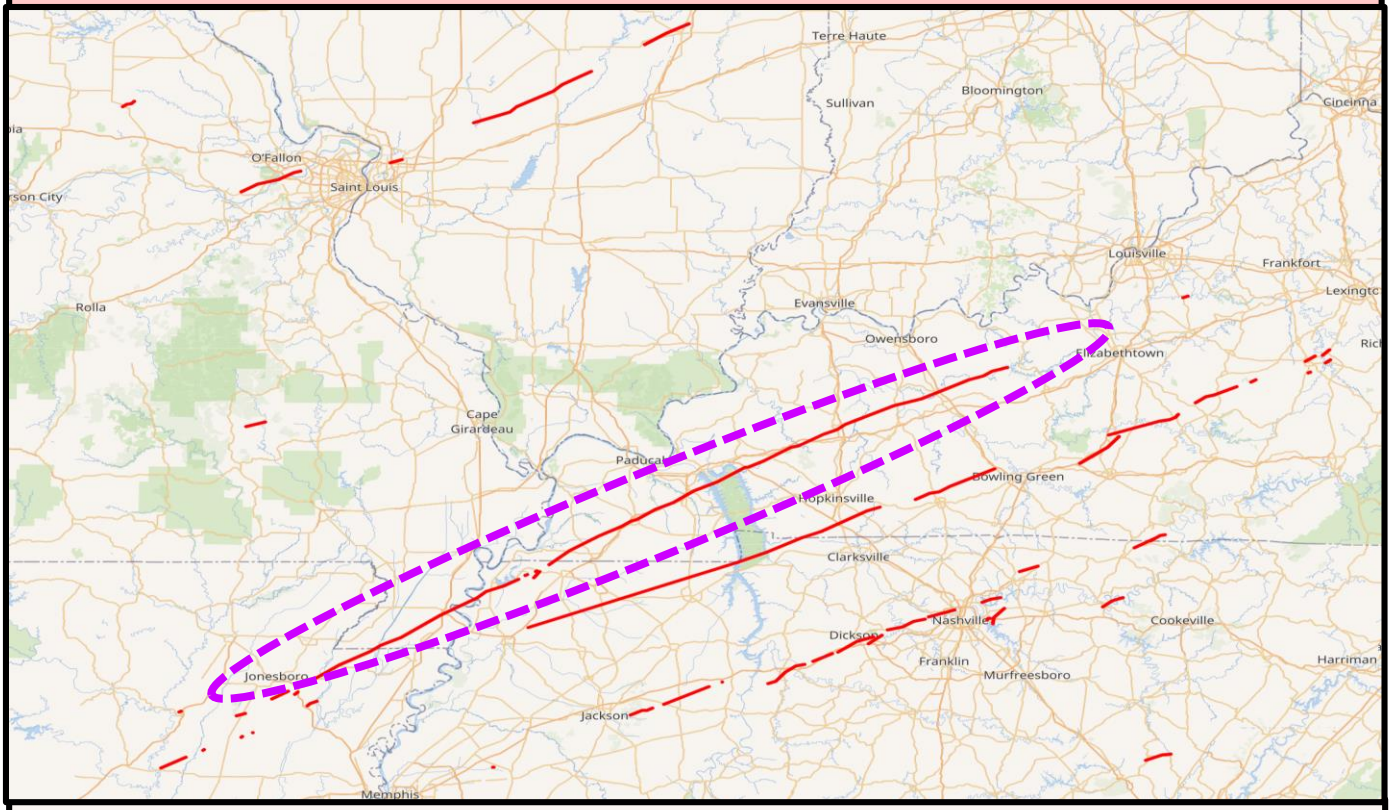
Keep checking our Skywarn Schedule Website throughout the spring for additional on line classes and for the dates, times and locations of in person classes if we are able to host a few of those.

If you cannot make one of the Skywarn classes this year, there are a couple of alternatives for Skywarn Training. An online Skywarn training is available through the NOAA MetEd web site. Currently there are two courses, each taking about one hour to complete...The Role of the Skywarn Spotter and Skywarn Spotter Convective Basics.

This past December of 2021 will go down as one of the more impactful Decembers in terms of weather across the US. Aside from being mild across Michigan [Detroit and Saginaw had their 8th warmest December on record and Flint had its 7th], there was little high impact weather across Southeast Michigan except for a high wind event on the 11th, where wind gusts of 45 to 65 MPH were reported. [High Wind Event December 11, 2021 (weather.gov)] That was not the case in other parts of the country. Heavy snows hit the Pacific Northwest, Sierra Nevada's and Rockies. A December tornado outbreak struck Kentucky. The plains also experienced an episode of severe storms/tornadoes, hurricane force winds and wind driven wildfires. This article will focus on the Kentucky tornadoes of Dec 10-11 and the Midwest tornado/high winds/wildfires of Dec 15.

To see some of the impressive images from the Sierra Nevada's December snows, Reference this Los Angeles Times Story

December 10-11 Tornado Outbreak



Outline showing most of the tornado tracks; the track highlighted in purple was from the same supercell that crossed 4 states and did EF 4 damage in Mayfield, KY

A December of Extremes

On the evening and early morning hours of December 10-11, 2021 a potent storm system moving across the central United States resulted in widespread severe weather across the region, including significant long track tornadoes. Tornadoes occurred in seven states; Indiana, Illinois, Missouri, Kentucky, Arkansas, Tennessee and Mississippi. NWS storm surveys found a violent EF-4 tornado began in far northwest Tennessee and moved across western Kentucky, striking the city of Mayfield, KY. Preliminary findings indicate high end EF4 damage in western Kentucky. The total path length of this tornado was 165.7 miles; starting in Obion County TN and ending in Breckinridge County, KY. Another long-track EF-3 tornado with estimated peak winds of 160 MPH started in Dyer County, TN and traveled 122.7 miles through northwest Tennessee and into Christian and Todd Counties in western Kentucky.

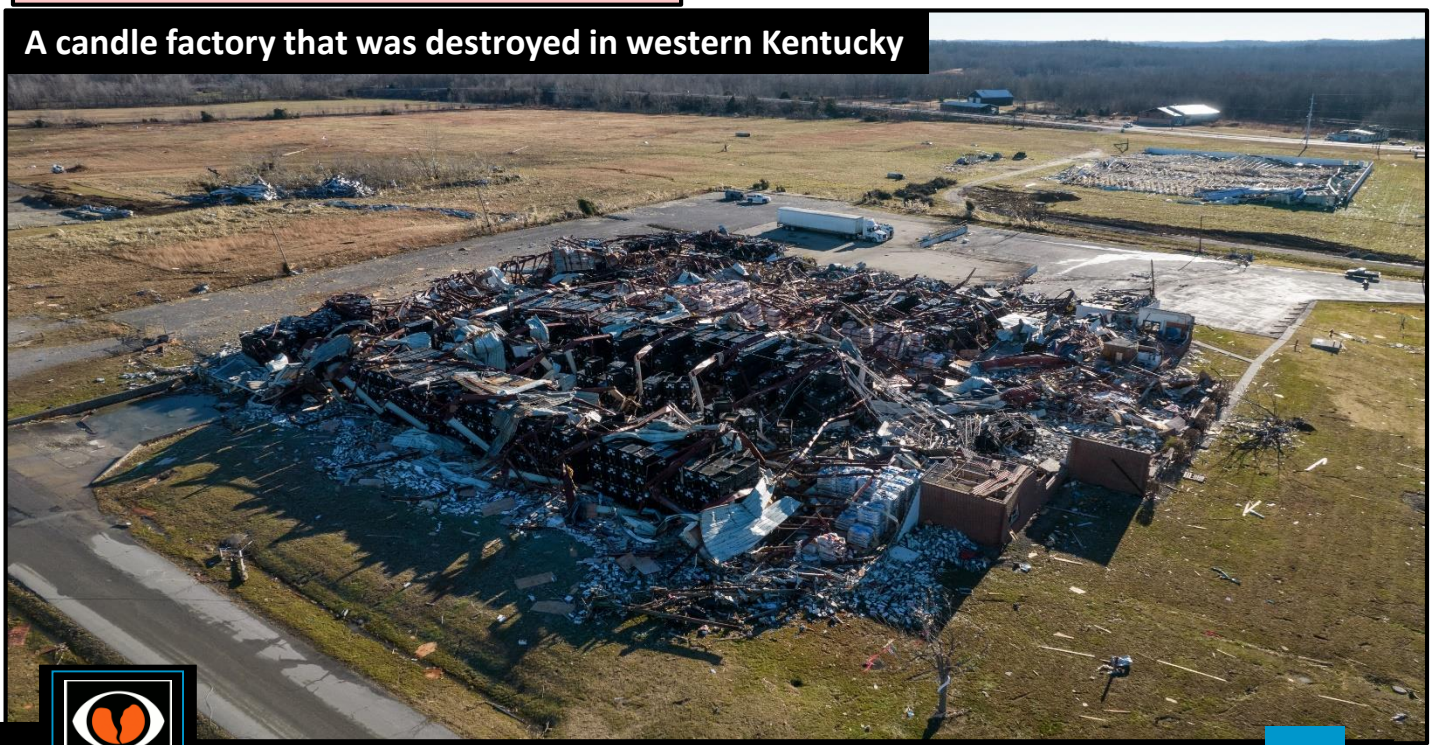
This outbreak caused 90 fatalities, over 126 injuries and produced and estimated 3.9 billion dollars in damages.

Mayfield, KY

Mayfield, KY

Bremen, KY

A candle factory that was destroyed in western Kentucky



There are several web sites that give a much more detailed look at the environment that produced these destructive tornadoes and much more detail about the individual tornado paths and their damage. They are listed below. You can be assured that spotter reports were also used to help compile this data and certainly helped in warning downstream communities during the actual tornado events.

NWS Paducah, Kentucky – This is the National Weather Service office which covers the area of western Kentucky that bore the brunt of the tornado damage, including the city of Mayfield.

NWS Louisville, Kentucky – This is the NWS office which covers central Kentucky. This region primarily marked the eastern end of the outbreak.

NWS St Louis, Missouri – This is the NWS office which covers much of eastern Missouri and western Illinois. This region also experienced considerable damage from the tornadoes.

NWS Memphis, Tennessee – This is the NWS office which covers the area on the western and southern edge of the outbreak.

NWS Little Rock, Arkansas – The NWS office on the western edge of the outbreak. They too have some interesting material in their storm summary.

NWS Storm Prediction Center – Gives the convective outlook prior to the outbreak.

Wikipedia Article – Gives a very detailed overview of the entire event.

The December 15th Severe Weather Outbreak

Just a few days after the Dec 10-11 tornado outbreak, an incredibly intense low pressure system lifted across the Upper Midwest. This system produced an enormous amount of severe weather, which included a derecho (long track damaging straight line winds) and a tornado outbreak across the Midwest, with severe weather extending as far north as Minnesota and Wisconsin. This storm system also produces hurricane force winds over the central plains, leading to wind driven wildfires in Kansas. Not only was this storm system associated with record December warmth in the plains, but it also produced some snow in northern and central Minnesota.

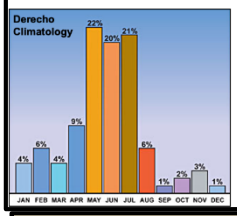
The image below is a brief summary from the storm prediction center. You can see that this event produced the largest number of significant (> 75 MPH) reports from any previous derecho event. Spotter reports certainly contributed to this data. The graph in the bottom right also shows the monthly frequency in derecho events. They peak in May, June and July. December derecho events account for only 1% of all derecho events. This essentially indicates that this was an extremely rare event.

Most Preliminary Significant (75+ mph) Wind Gusts in a Day since 2004*

Top 8 Days by Number of Preliminary Significant (75+ mph) Wind Gusts

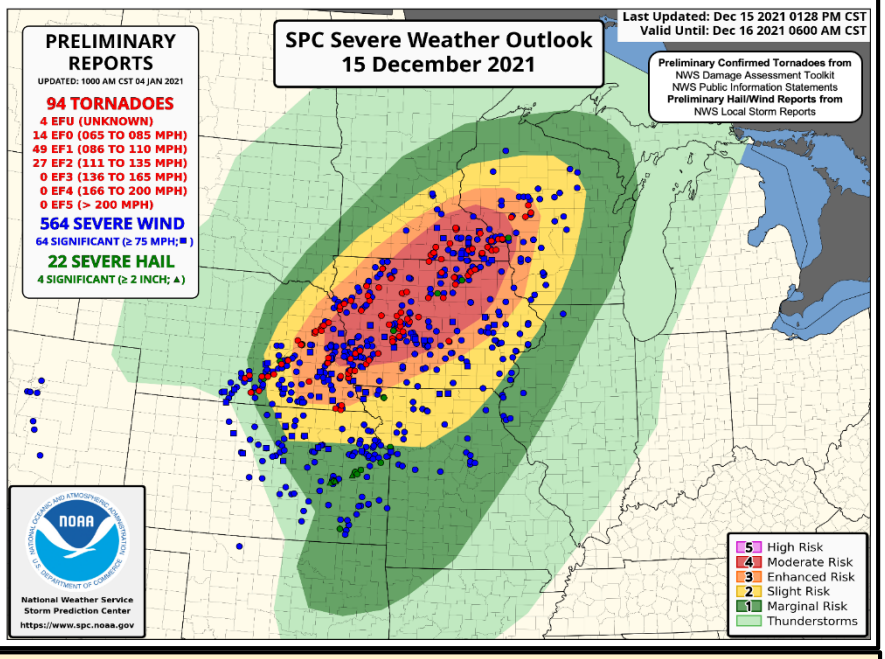
Date	# of 75+ mph wind gusts	Event
12/15/2021	64	Central Plains to Upper Mississippi Valley Derecho
8/10/2020	53	Midwest (Iowa) Derecho
6/6/2020	47	Rockies to Northern Plains Derecho
6/29/2012	37	Midwest to Mid-Atlantic Derecho
6/14/2014	31	Central Plains to Midwest Severe
6/16/17	24	Central Plains Severe
6/30/14	23	Midwest Derecho
6/10/21	23	Northern Plains Severe

*Data from 2004 to present. 2021 data is preliminary and subject to change before final storm data publication.

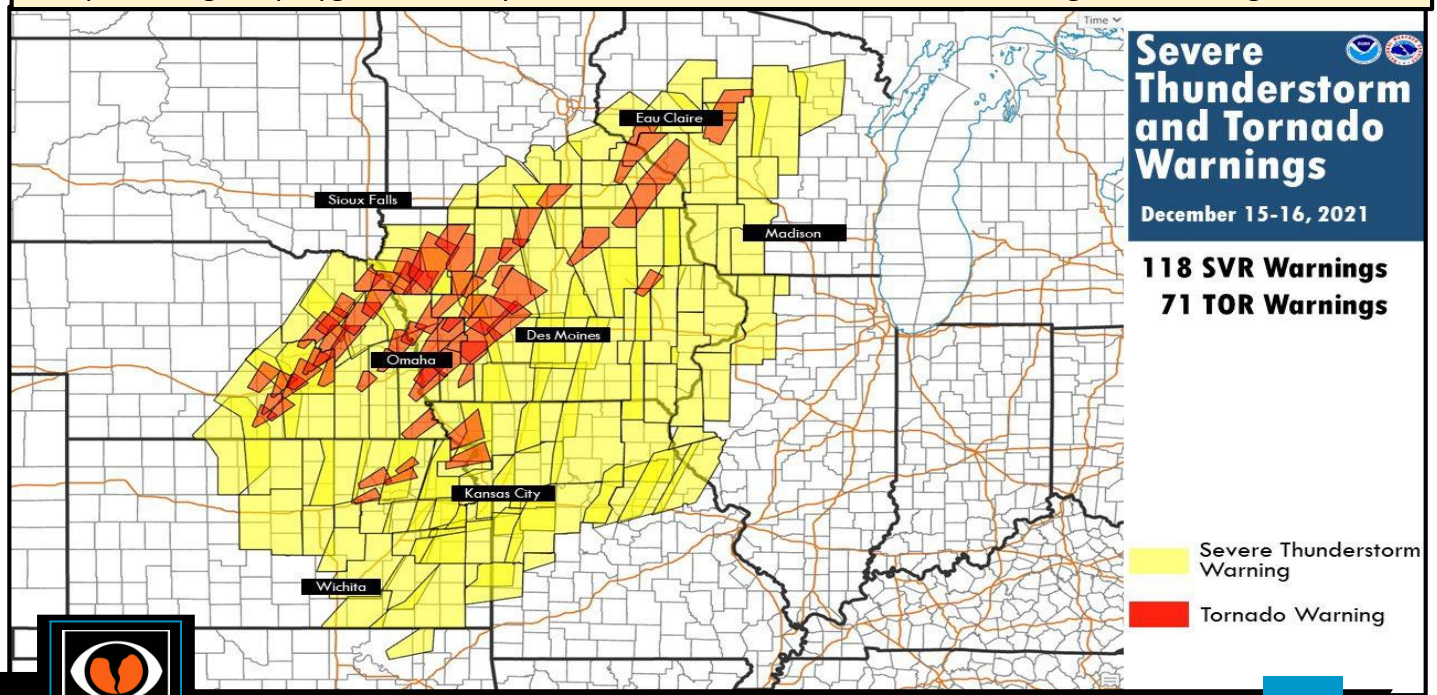


1% (or less) of all derechos occur in the month of December

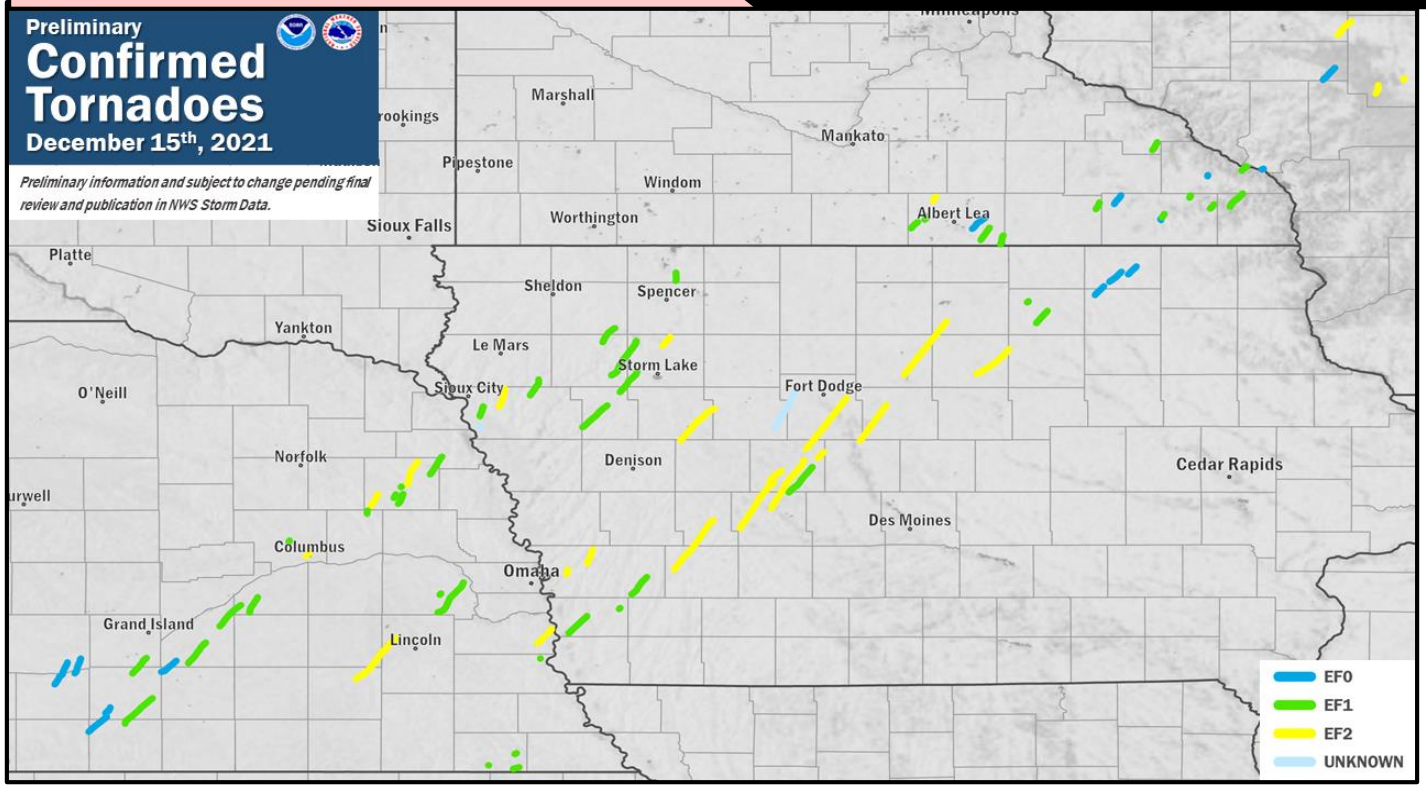
Derecho Climatology Illustration by Dennis Cain. Located at SPC Derecho FAQ page.



Map showing the polygons for every severe thunderstorm and tornado warning issued during the event.



Map showing the tornado tracks



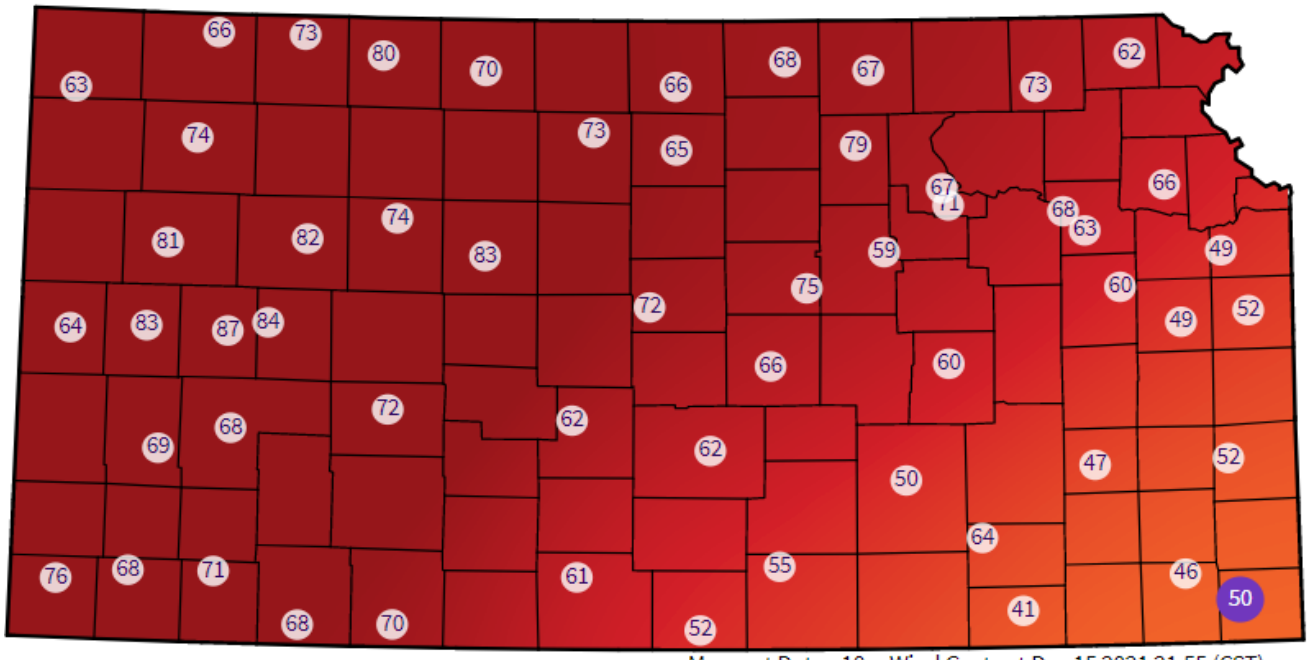
Below are some of the damage pictures from Iowa, courtesy of NWS Des Moines

Much like the Dec 11-12th event, local National Weather Service offices put together event summaries which describe in detail the environmental conditions which led to this event, radar imagery and more detailed damage information. Here are some of those links:

NWS Des Moines | NWS Quad Cities | NWS Sioux Falls | NWS Omaha

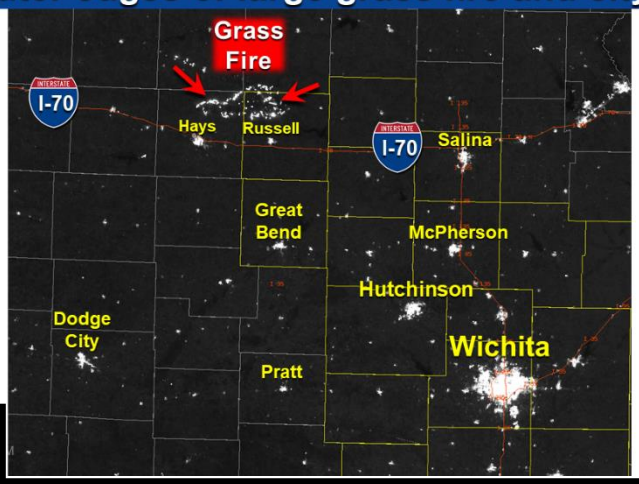
NWS Kansas City | NWS La Crosse, WI | NWS Minneapolis

In addition to the storms, much of the Central Plains experienced non thunderstorm hurricane or near-hurricane force winds. These strong winds and dry conditions even fueled a massive wind driven wildfire in Kansas. The map below shows the peak 10m non-thunderstorm wind gusts across the state of Kansas.



Mesonet Data - 10m Wind Gusts at Dec 15 2021 21:55 (CST)

VIIRS polar satellite night time imagery shows outer edges of large grass fire and city lights



Satellite Image
Dec 16th 2021
2:05AM CST

For more detailed info on these winds and the wildfires;

NWS Wichita

Wikipedia Article

NOTE: A separate storm system on Dec 30th triggered a massive and destructive wind driven wildfire in Colorado. Here is more on that event.

A Cold and Dry January

After a mild December across the Great Lakes, a dominate polar low became established over Hudson Bay in January. This delivered frequent bouts of arctic air across the Great Lakes region throughout the month. Not only were these air masses cold, they were also very dry. In fact, overall the lake effect activity was not terribly prolific despite the cold air. While the Great Lakes did contribute some snow in the lake effect belts, the dry cold air kept the amounts relatively light. As for Southeast Michigan, most of the systems that affected the area simply lacked moisture. The biggest storm system to affect eastern North America during the month occurred on January 14-17. This storm system essentially circumnavigated the state of Michigan thanks to a sharp mid level trough overhead. The storm system affected locations from Iowa to the Southeast US before lifting northward and hitting Cleveland, Buffalo and Toronto, Ont. with upwards of 20 inches of snow. Jan 14-17, winter storm The biggest snowmaker for the month of January for Se Mi actually occurred on the 24th, a general 2 to 4 inches fell across the area; not exactly an exciting event for those snow lovers.

The most prolonged period of arctic air sat over the region during the end of the month. In fact, from January 20th through January 31st, Southeast Michigan did not break freezing. All three of the Southeast Michigan climate sites were below normal for temperatures this January. Detroit's average temperature was 20.3 deg (5.5 deg below normal); Flint's average was 17.6 deg (5.4 deg below normal) and Saginaw's was 17.9 deg (5.1 deg below normal).

The average monthly snowfall for Southeast Michigan in January is around 15 inches, which the entire area come up short. For the month of January, Detroit received 8.8 inches, Flint had 13.9 inches and Saginaw had 9.8 inches. If you look at total liquid precip (liquid content of the snow and any rain), all three Southeast Michigan climate sites were extremely dry (with Detroit and Saginaw having the 5th driest January on record); see the char below.

Top 20 Wettest/Driest Januaries in Southeast Lower Michigan (in.)

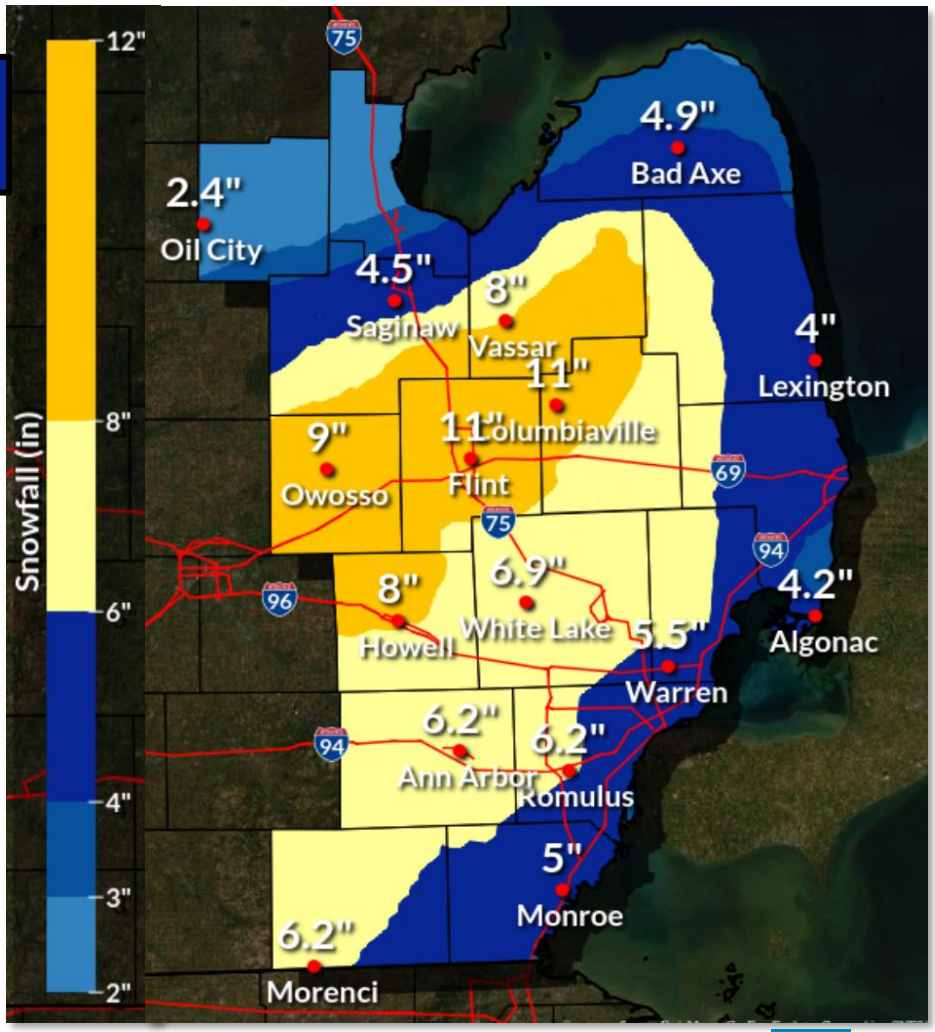
Rank	Detroit Area*				Flint Bishop**				Saginaw Area***			
	Wettest		Driest		Wettest		Driest		Wettest		Driest	
	Total	Year	Total	Year	Total	Year	Total	Year	Total	Year	Total	Year
1	5.02	1932	0.23	1961	4.02	2006	0.07	1945	4.04	1998	0.24	1945
2	4.96	1874	0.28	1921	3.90	2013	0.26	2003	3.74	1993	0.29	1919
3	4.38	1950	0.42	2003	3.56	1947	0.32	1961	3.55	1932	0.38	1921
4	4.31	1916	0.45	1945	3.36	2020	0.41	1940	3.50	1950	0.40	1934
5	4.27	1929	0.52	2022	3.21	1950	0.45	1921	3.43	2005	0.44	2022
6	4.12	2020	0.57	1981	3.17	1951	0.46	1971	3.26	2013	0.46	1961
7	3.95	1913	0.57	1902	3.13	2017	0.48	1958	3.19	1967	0.46	1933
8	3.92	1993	0.64	1963	3.07	1932	0.51	1966	3.11	1914	0.50	2003
9	3.87	1907	0.68	1966	3.05	1998	0.56	1984	3.09	1999	0.50	1942
10	3.85	1930	0.69	2001	2.93	2005	0.57	1977	3.06	1978	0.54	1981
11	3.74	1965	0.69	1980	2.89	1999	0.59	1981	3.00	2006	0.59	1980
12	3.64	1937	0.76	2010	2.89	1975	0.62	2022	2.97	1962	0.62	1984
13	3.45	2013	0.78	1984	2.80	1993	0.63	1963	2.92	1974	0.68	1977
14	3.43	1982	0.80	1958	2.61	1974	0.63	1934	2.91	1969	0.74	1920
15	3.40	2005	0.84	1983	2.60	1965	0.70	1986	2.79	1965	0.75	1926
16	3.36	2002	0.87	1938	2.60	1949	0.78	1970	2.72	1982	0.77	2021
17	3.34	1904	0.91	1919	2.53	2014	0.82	1922	2.71	1959	0.77	2009
18	3.32	1898	0.92	1891	2.52	1959	0.83	2010	2.67	1951	0.78	1912
19	3.26	1974	0.94	1894	2.49	2008	0.91	1925	2.64	1975	0.79	1986
20	3.26	1914	0.97	1875	2.41	1967	0.93	1936	2.63	1997	0.81	1964

* Detroit Area precipitation records date back to November 1874.
** Flint Bishop precipitation records date back to January 1921.
*** Saginaw Area precipitation records date back to January 1912.

Groundhogs Day Snowstorm
Feb 2, 2022

After the frigid end to January, temperatures finally broke the freezing mark the first day of February. In fact, temperatures actually rose well into the 40s. This warmth however was short lived. In typical Michigan fashion, it was followed by the first winter storm of the season. A slow moving frontal system settled over the Great Lakes and Ohio Valley on Feb 2nd to 3rd. A wave of low pressure and a powerful upper jet triggered widespread rain along this front late on Feb 1st and early on the 2nd which then transitioned to snow from west to east as arctic air slowly seeped back into the area. A second wave of low pressure lifted along the front on Thursday. The snow from this second system clipped portions of the area with an additional 2 to 4 inches of snow. In the days leading up to this event, there were several model solutions that brought this second wave right into Se Mi on Thursday, suggesting the possibility for some prolific 48-hour snowfall totals across portions of Se Mi. As the event approached, most models backed off the extent to which this second wave would impact Se Mi. There did however remain strong agreement among a wide array of model solutions that the first wave on Wednesday, the 2nd would produce a swath of 12+ inch snow totals across Se Mi, aligned from Adrian/Monroe up through Ann Arbor/Detroit and into Port Huron. While the strong agreement among the weather models seemed to support a high confidence forecast, mother nature had an other idea in mind. The entire system ended up becoming established a little farther northwest. This placed the axis of heavies snow from Lansing/Owosso across Flint and into portions of the thumb. Meanwhile, much of the eastern portions of the area experienced a much later change over to snow. This of course significantly ate into the snow totals.

Map of the observed total snowfall for the Feb 2nd Snow Storm



This event showcased the need for and benefit of having real time spotter reports coming into our office as this event was unfolding. The NWS DTX radar happened to be down during this event, so it was of benefit to get early reports. Thanks to you, spotter reports and cooperative observer reports comprised the storm total snowfall which went into making this map.

For more information on this winter storm, check out the NWS Detroit Web Article.

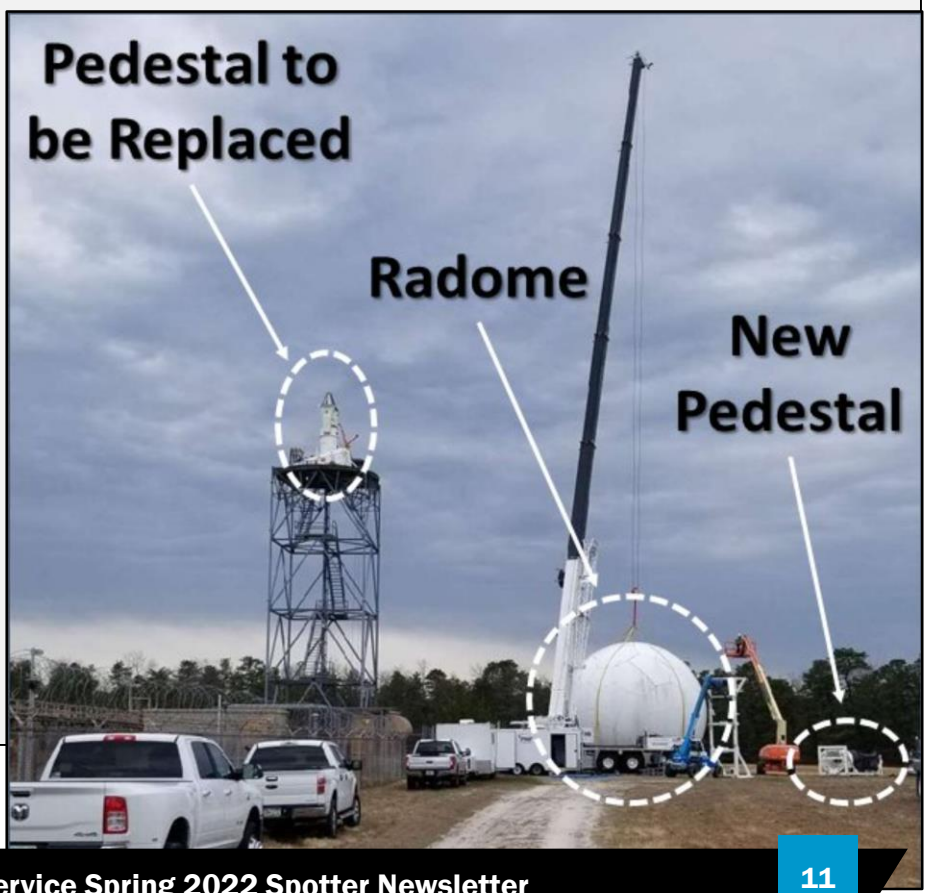
Service Life Extension Program

You may have noticed that the NWS Detroit radar was down for a couple weeks in late January/early February. The radar was down as it was undergoing some major hardware replacement (in this instance a Pedestal replacement), a process that all of the NWS radars across the country are undergoing. The WSR-88D was originally designed for a 20-year service life. Most of the radar systems in the field are now approaching or have exceeded that point. This program provides the technology refresh and depot level overhaul of necessary subsystems to ensure the radar system can perform reliably for another 20 years. Below lists the four main components of the radar that are being replaced; which is occurring in stages. These are all part of the Radar Service Life Extension Program (SLEP).

Signal Processor
The current signal processor will be replaced with a new, state of the art digital signal processor capable of supporting algorithm upgrades for the foreseeable future.

Transmitter
The radar transmitter will be refurbished with a redesigned modulator, new electrical backplane and control circuitry, new internal cabling, electrical filter capacitors, circuit breakers, indicator lamp fixtures, etc.

Pedestal
The pedestal refurbishment project will replace all fielded antenna pedestals with factory-refurbished pedestals. All drive gears, motors, position sensors will be replaced with new equipment. Waveguide components and the radome will also be replaced. This project will take the longest to implement, because each pedestal in the field will be removed, refurbished, and installed in another field site in a round robin fashion. Here is a time lapse loop of the pedestal replacement at DTX.



Equipment Shelters
The radar equipment shelters and backup generator shelters will be refurbished on site. This project includes the roof, external vent hoods, doors, caulking, paint.

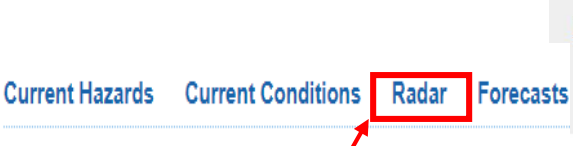
NWS Low Bandwidth Radar

Beginning on Feb 15, 2022, the newly approved and available NWS "Local Standard Radar" webpages will be available. These new NWS Local Standard Radar pages will provide low bandwidth users a reliable fast-loading website for radar images, loops and warnings on their mobile phone, tablet or computer. The new webpages resemble the functionality of the now-discontinued RIDGE 1 webpage.

Following the release of the Enhanced Radar (GIS) product, partners and customers requested a simpler product as an option to meet either restricted bandwidth or for application development needs. Adding the new Local Standard Radar option is designed to meet those needs. The website loads quickly and has a user-friendly interface to view NWS NEXRAD radar images, loops and warning polygons whether you are on a mobile phone, tablet, or computer.

Local Standard Radar Features:

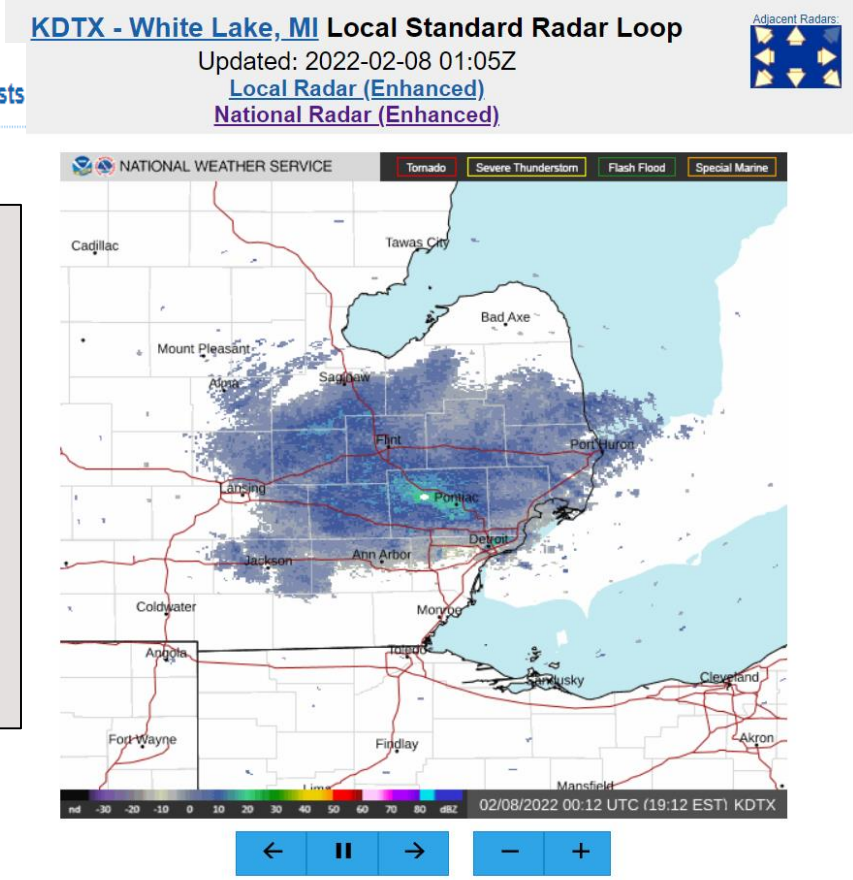
- Radar defaults to the most recent loop (10 frames; last 45 minutes) from any individual WSR-88D radar, but only Base Reflectivity
- Radar loops and images are automatically updated every five minutes
- Website displays warning polygons in effect (Tornado, Severe Thunderstorm, Flash Flood, and Snow Squall Warnings)
- Offers easy-to-use loop control buttons, including the ability to pause the loop, advance forward/backward one frame, and speed up/slow down the loop
- Standard Radar images are centrally produced in the background via the RIDGE II Opengeo server, which is actively monitored and supported 24x7. However, Local Standard Radar webpages are hosted locally.



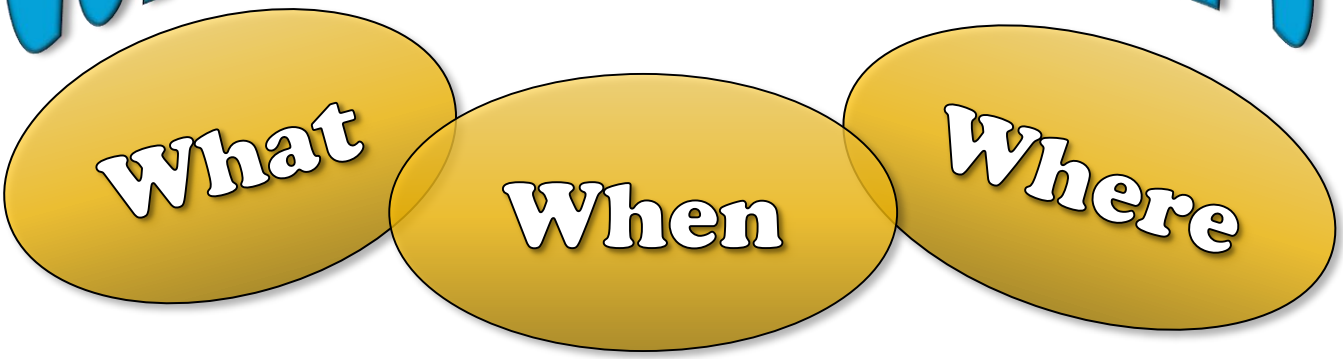
Placing your mouse of the Radar menu on The top of the NWS Detroit webpage will now give three options.

- Local Enhanced Radar
- Local Standard Radar (Low Bandwidth)
- Regional/National Standard Radar (Low Bandwidth)

Example of the Local Standard Radar image (Right)



Communicate the 3 W's



Example Report of a Good Report

"Hello, my name is _____ and I have a storm report for you. At 5:35pm, we had golf ball size hail near the intersection of Eleven Mile and Woodward Ave in Royal Oak. It lasted for about 5 minutes and caused some damage to siding and cars."

Also try to include other important info – damage, injuries, etc.

There Are Multiple Ways To Report

US National Weather Service Detroit / Pontiac Michigan

NWSDetroit or use the hashtag #miwx

nwslidtx@noaa.gov

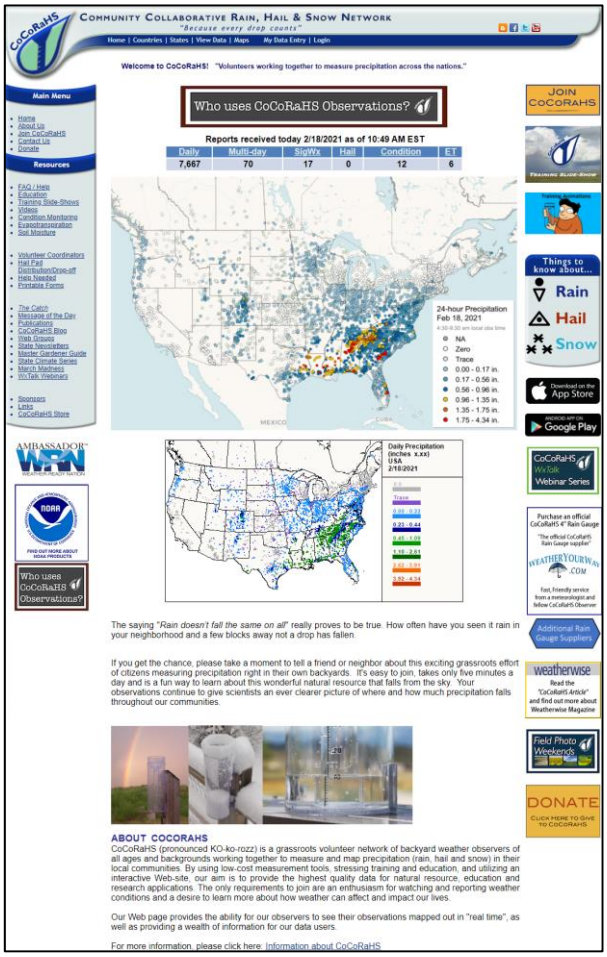
1-800-808-0006
Reports ONLY – answered 24/7

A supplementary photo in addition to verbal reports are always appreciated!

Amateur Radio

K8DTX@winlink.org
Contact local net control for info

Link to the website:
www.cocorahs.org



CoCoRaHS stands for the Community Collaborative Rain Hail and Snow Network. This program is separate from the National Weather Service spotter network. The program is a national program and the precipitation reports are shared among the National Weather Service and other government agencies, the media, and educational institutions. Participants in this program report their 24-hour rain and/or snow reports every morning around 7 am on a website.

Links To YouTubeTraining Materials

Getting Started with CoCoRaHS
Measuring Hail
Measuring Extreme Rainfall

If you would like to sign-up as a volunteer observer and become part of our expanding network, please click here: ***"Join the CoCoRaHS Network"***.

NWS web sites useful for obtaining forecasts:

Local Hazardous Weather Information
https://www.weather.gov/dtx/dss

Hazardous Weather Outlook (HWO)
http://www.weather.gov/crh/outlooks?sid=dtx

Storm Prediction Center (SPC)
http://www.spc.noaa.gov

Follow us on Facebook and Twitter

National Weather Service Detroit/Pontiac

Address
9200 White Lake Road
White Lake, MI 48386

Phone
248-620-9804