How Big Was the Hail – Can We Know without an Eyewitness?

Introduction

Most people understand that small hail is harmless and big hail damages common building materials. Therefore, when investigating a hail claim, it is important to have a good estimation of the direction and size of hail that fell.

When a hailstorm passes through an area, the five key questions for the property owners are:

1. How big was the hail?
2. Did you see the hail?
3. Was your property hit?
4. When did it fall?
5. What did it do to the property?

Eyewitness Testimony vs a Photograph

Photographs are preferred over verbal descriptions. If the property owner has a photo, a good approximation on the size of the hail can be obtained. If there was something in the image that can be used as a reference, the hail can easily be scaled to get an estimated size.

For example, the following image shows an owner holding 4 hailstones. Assuming a width of a normal finger might be 5/8-inch, the hail scales to be 3 times the width of the finger; therefore, the hail was about 2-inches.

Verbal Testimony – The Human Perspective

Often, a verbal testimony might be all that is available. If the owner does not have a photograph and there are no hailstones in the freezer, the verbal testimony becomes even more crucial.

Everyone's perspective is unique; however, there are a limited number of answers to a basic question. Based on talking with a wide variety of people at numerous hail investigations, very few people ever taken out a ruler and measure the hail. Common answers to the question of, "How big was the hail" are as follows:

- The larger hailstones were about golf ball size.
- The hail was the size of ping pong balls, nickels, dimes, or marble size.
- The hail was not big, but there was a lot of it.
- Our neighbor said it was large hail.
- I do not know. I was not home.

While some of these are good approximations; most would admit that the actual size of the maximum hailstones that fell was difficult to estimate. The following image shows common spheres along with steel balls that are used for impact resistance testing of various materials. Without a means of measuring, it is difficult to discern the different sizes even while holding the items.

Historical Weather Data

Often, people will need a hail inspection at a specific property when there is no eyewitness of the event. There may be other properties nearby that experienced damaging hail, and the news may spread quickly through a neighborhood that the area experienced large hail.

Therefore, it is a reasonable concern of a property owner to state that others nearby are replacing roofs due to hail, but they do not know what happened at their property. In these cases, it is vitally important to gather as much information as possible from the historical weather data.

The remainder of the paper is a simple example of what can be determined from a weather history study. There are mainly three sources of information to research:

1. National Weather Service (NWS) Storm Reports.
2. Site Specific Weather Reports such as Benchmark, CoreLogic, or Hail Trace
3. Historical Weather Radar

May 9, 2022 Hailstorm – Willmar Minnesota

1. An owner supplied the following photograph.
2. The hail was scaled to be in the range of 2-inches.
3. The owner stated the hail fell around 8 am.
4. Parked cars in the driveway had broken windows.
5. The siding was damaged on the south wall.
6. There was some wind from the south.

(NWS) Storm Reports (refer to page 3 for more info)

1. The NWS showed numerous hail reports near the property on the reported date of loss.
2. The storm produced a path of significant NWS hail reports.
3. The property was within the boundaries of the path of significant NWS reports.
4. The closest report indicated 3-inch hail at 13:00 Coordinated Universal Time (UTC).

4 S WILLMAR Hail Report

County, State: KANDIYOHI, MN
(marker location is approximate)
Lat.: 45.07, **Lon.:** -95.05
Time: 2022-05-09 13:00 UTC
Hail Size: 3 IN. DIA.

PHOTO MEASUREMENT. (MPX)

Site Specific Weather Report (refer to page 4)

1. The report showed a 95 % probability of 1.5 inch hail at the property.
2. The report showed a 95 % probability 1.75 inch hail within 1 mile of the property.
3. The report showed a 100% probability of 3 inch hail within 5 miles of the property.

Historical Weather Radar (refer to page 5)

1. The storm produced strong reflectivity readings directly over the property.
2. The reflectivity reading were above 60 dbZ.
3. The stronger reflectivity readings matched the path of the NWS storm report.

Summary

1. We can get a good estimate on the hail size at a specific location when there is no eyewitness.
2. We can also get a good indication that significant hail did not fall at a given location at a specific time.

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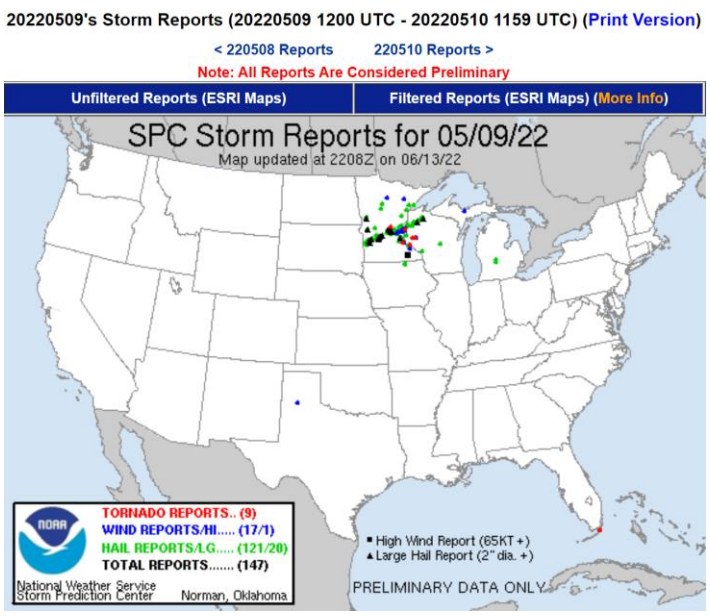
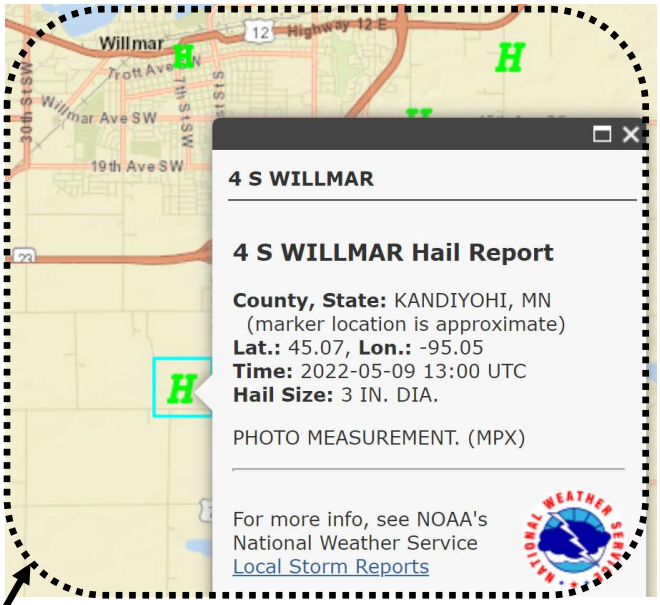
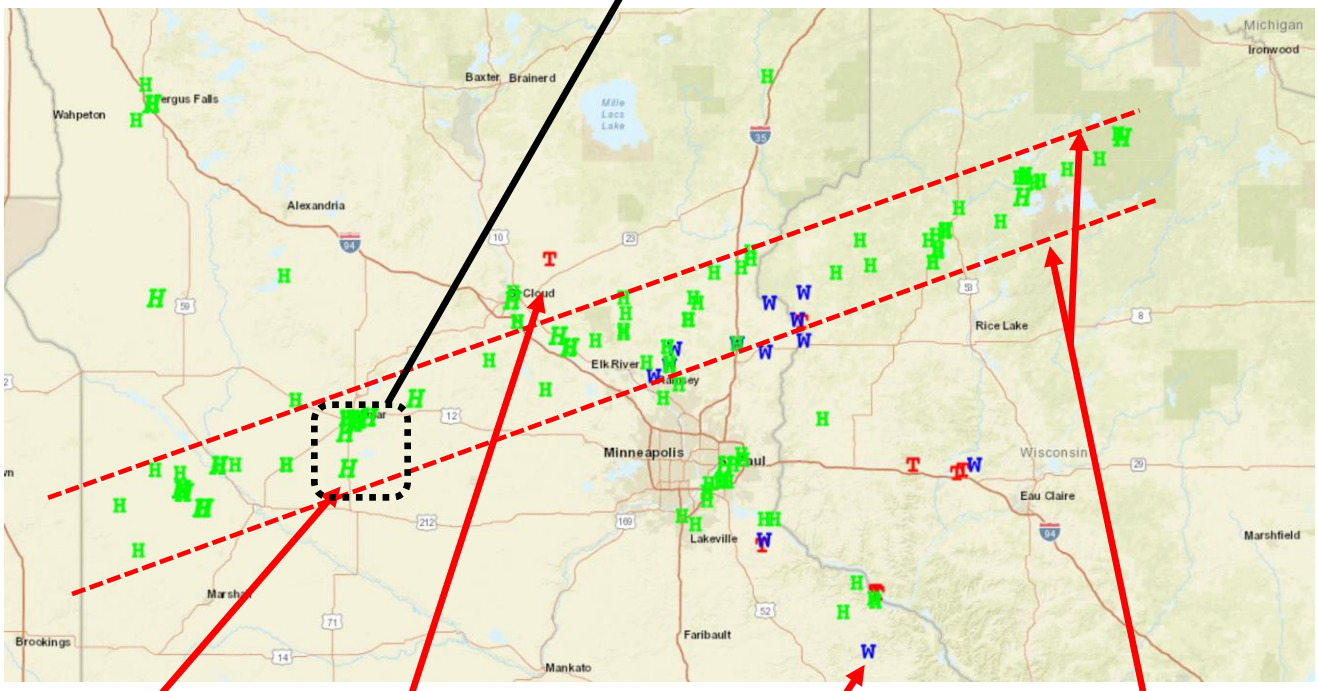




The NWS collects and organizes storm reports. The storm reports of each day are plotted on a map. The reports are categorized as Wind, Tornado, or Hail. NWS hail report are listed for 1-inch or larger hail.

A typical NWS Hail Report will list the approximate location, the time, and an estimate of the hail size. The above report shows 3-inch hail approximately 3 miles south of Willmar at 13 UTC on 2022-05-09.



The approximate location of the property was within the line of hail activity.

There were numerous NWS hail reports in Minnesota on the reported date of loss of 5/9/2022.

There were several NWS tornado reports within this storm system.

None of the tornado reports were near the property.

There were several NWS wind reports within this storm system.

None of the wind reports were near the property.

There was a band of severe hail that tracked along a diagonal.

The storm reports extending from western Minnesota and continuing into central Wisconsin.

Benchmark® Hail History Report

Date of Report:	**November 18, 2022 14:56 CST**
Claim Details:	
Property Address:	[redacted]
ZIP Code:	55201
Claim Number:	None
Date of Loss:	5/9/22
Cause of Loss:	HAIL
Assignment Date:	None
Report Period:	01 Jan 2009 - Present

Agent/Adjuster Name:	Richard Abbott
Address:	PO Box 403, CHISAGO CITY, MN, United States 55013
Phone:	6125996745
Email:	rick@abbottforensics.com
Latitude:	45.0473225
Longitude:	-95.030765

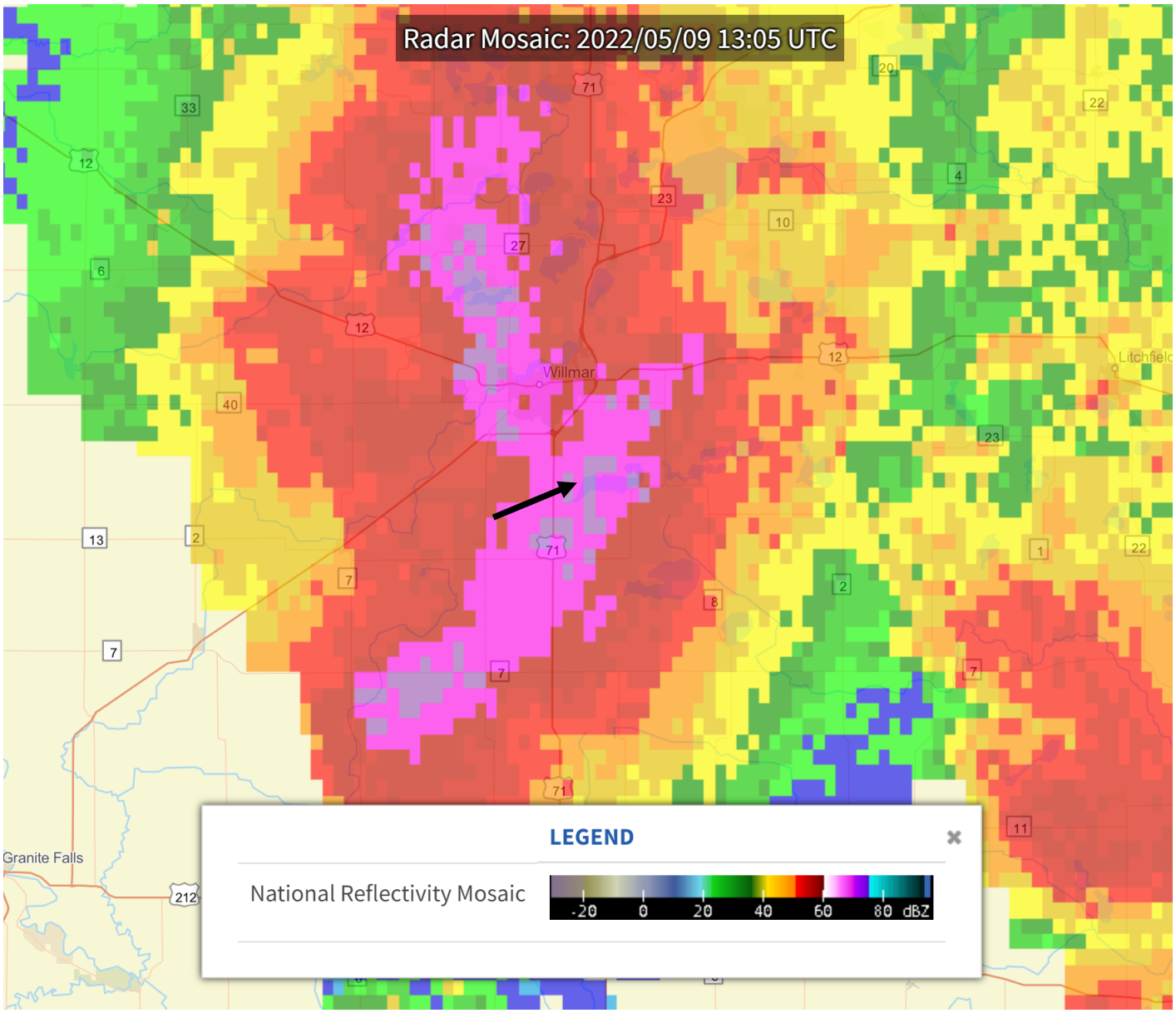
Summary: A significant hail event occurred at the address on the date inquired.

Benchmark® Weather History near location since 1 January 2009

		At Property Address			Daily Maximum Value Within 1 Mile			Daily Maximum Within 5 Miles		
	Date	Est. Hail Size (")	Est. Hail Prob (%)	Est. Wind Speed (mph)	Est. Hail Size (")	Est. Hail Prob (%)	Est. Wind Speed (mph)	Est. Hail Size (")	Est. Hail Prob (%)	Est. Wind Speed (mph)
13th Prior Hail Event	28-Aug-16	0.00	0	< 35	0.75	50	< 35	2.50	90	< 35
12th Prior Hail Event	11-Jun-17	1.25	50	35	1.50	50	35	2.25	70	35
11th Prior Hail Event	25-Aug-17	0.75	50	< 35	1.00	50	35	1.00	50	35
10th Prior Hail Event	28-May-18	1.00	50	40	1.00	50	40	1.25	50	45
9th Prior Hail Event	6-Jun-18	1.00	50	35	1.25	50	40	1.50	50	45
8th Prior Hail Event	9-Jun-18	0.00	0	< 35	0.75	50	< 35	1.25	50	< 35
7th Prior Hail Event	2-Jul-18	1.50	50	35	1.50	60	35	2.00	60	45
6th Prior Hail Event	4-Jun-19	0.00	0	50	0.75	50	50	1.75	50	55
5th Prior Hail Event	3-Jul-19	0.75	50	45	1.25	50	45	2.00	60	50
4th Prior Hail Event	2-Sep-19	1.50	50	35	1.75	50	35	2.25	60	40
3rd Prior Hail Event	11-Jul-20	0.75	80	< 35	0.75	85	< 35	2.50	90	35
2nd Prior Hail Event	28-Aug-20	1.00	50	40	1.00	50	40	1.00	50	40
1st Prior Hail Event	5-Apr-21	< 0.75	45	35	0.75	65	35	0.75	70	35
Date of Loss	9-May-22	1.50	95	35	1.75	95	40	3.00	100	40
1st Post Hail Event	11-May-22	0.00	0	35	0.75	50	35	1.50	50	40
2nd Post Hail Event	30-May-22	0.00	0	60	0.75	50	60	0.75	55	65
3rd Post Hail Event	31-Jul-22	< 0.75	5	< 35	0.75	55	< 35	0.75	55	< 35
Most Severe Hail (1/1/09 to today)	5-Jul-16	2.00	70	50	3.25	95	50	3.50	100	55

Comments

1. There were numerous other dates with smaller hail and with smaller probabilities of hail.
2. The most severe hail was recorded as 2-inch hail on 7/5/2016; however, the probability was only 70%.
3. 100% chance of 3-inch hail within 5 miles of the property was a significant event.



Source: NOAA https://www.ncei.noaa.gov/maps/radar/

The black arrow indicates the approximate direction of the storm.	The point of the arrow indicates the approximate location of the property.	The reflectivity was strong in the vicinity of the property.	Stronger reflectivity readings passed over the property.

Comments

1. Reflectivity is a measurement of the amount of H_20 in the air. That H_20 may be in the form of rain, snow, or hail.
2. The higher the reflectivity, the more H_20 there is in the air and the higher the chance of hail in the atmosphere.
3. Reflectivity reading greater than 60 dbZ usually means there was some amount of hail in the system.
4. Storm direction is important. The land in front of or behind an area of high reflectivity obviously has a greater probability of experiencing hail than areas outside the bounds of the high reflectivity.
5. Where and when the moisture reaches the ground is not exact, but there are boundaries.