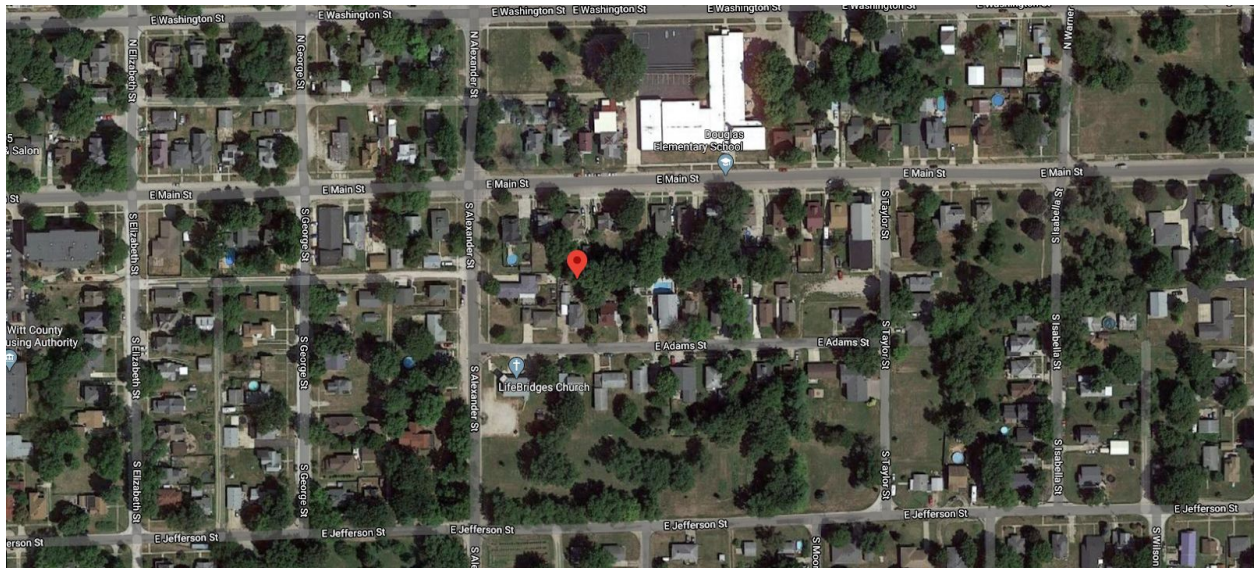


Lightning Report

23 July 2020

OVERVIEW

This investigation was assigned to Weather.Lawyer by a homeowner. On 21 July 2020 at approximately 10:30 am, his residence was struck by lightning. The homeowner requested a lightning strike report to submit for insurance purposes.



The following data collection, analysis, and conclusions are in regards to this specific investigation only. Data consists of NWS NEXRAD images, National Lightning Detection Network (NLDN) lightning strikes, and various surface analyses. The analysis was conducted for the given address with the geographical point of 40.152434,-88.9509475.

Weather Synopsis

A cold front triggered some thunderstorms in central Illinois (Image A). An area of heavy thunderstorms passed over the client's residence (Image B). There were numerous lightning strikes associated with these thunderstorms (Image C). Additionally, a severe thunderstorm warning was issued by the National Weather Service. These background images were used for this weather synopsis and as guidance for the remainder of the investigation.

DATA COLLECTION

The following data artifacts were collected to perform the Meteorological Analysis. The collected data are official government records known to exist that the time of analysis. Any additional weather information that becomes available may be included into this report at a later time. Data was collected from the National Center for Environmental Information (NCEI). NCEI is responsible for hosting and providing access to world weather archives, with comprehensive oceanic, atmospheric, and geophysical data. NCEI is the leading government authority for environmental information.

NEXRAD

NEXRAD is a network of 159 high-resolution S-band Doppler weather radars operated by the NWS. NEXRAD detects precipitation and atmospheric movement. Electro-magnetic beams return data which when processed can be displayed in a mosaic map, and show patterns of precipitation and its corresponding movement. The radar system operates in two basic modes, selectable by the operator: a slow-scanning *clear-air mode* for analyzing air movements when there is little or no activity in the area, and a *precipitation mode*, with a faster scan for tracking active weather. NEXRAD has an increased emphasis on automation, including the use of algorithms and automated volume scans. For this analysis, the central Illinois (ILX) radar was used. ILX was in precipitation mode at the time of the incident.

Lightning

The U.S. National Lightning Detection Network (NLDN) is a commercial lightning detection network operated by Vaisala, Inc. A network of antennae are connected to a central processor that records the time, polarity, signal strength, and number of strokes of each cloud-to-ground lightning flash detected over the United States.

The nowCOAST™ time-enabled map service provides maps of lightning strike density data from the NOAA/National Weather Service/NCEP's Ocean Prediction Center (OPC) which emulate (simulate) data from the future NOAA GOES-R Global Lightning Mapper (GLM). The purpose of

this product is to determine whether a cloud system is producing lightning and if that activity is increasing or decreasing. Lightning Strike Density, as opposed to display of individual strikes, highlights the location of lightning cores and trends of increasing and decreasing activity. The maps depict the density of lightning strikes during a 15 minute time period at an 8 km x 8 km spatial resolution. The lightning strike density maps cover the geographic area from 25 degrees South to 80 degrees North latitude and from 110 degrees East to 0 degrees West longitude. The map units are number of strikes per square km per minute multiplied by a scaling factor of 10^3 . The strike density is color coded using a color scheme which allows the data to be easily seen when overlaid on GOES imagery and to distinguish areas of low and high density values. The maps are updated on nowCOAST™ approximately every 15 minutes.

METEOROLOGICAL ANALYSIS

Overview

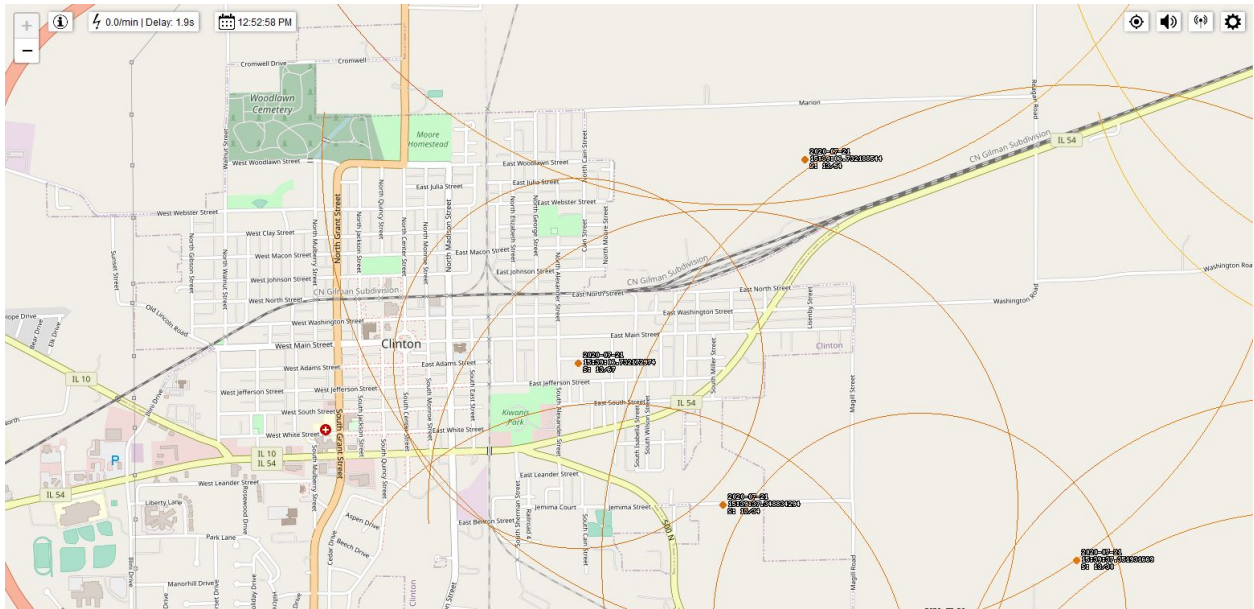
Lightning data was analyzed for this event. The lightning density (Image D) in the immediate area was approximately 35 strikes per mile for each second, indicating moderate to heavy lightning activity. A single lightning strike was recorded within 2 meters of the owner's residence. The multiplicity level was 3 and the polarity was negative.

Table 1 - Lightning Strike Data

Strike	Distance to location	Multiplicity	Polarity
1	+/- 2 meters	3	Positive

Lightning

The lightning data indicates the residence suffered a direct strike. Within this single strike, three strokes were recorded. When lightning makes a connection to the surface, multiple strikes can be recorded within that connection. This feature is known as multiplicity. Additionally, the polarity of the strike was positive. Positive lightning makes up less than 5% of all strikes. However, despite a significantly lower rate of occurrence, positive lightning is particularly dangerous for several reasons. Since it originates in the upper levels of a storm, the amount of air it must burn through to reach the ground is usually much greater. Therefore, electric fields associated with positive strikes are typically much stronger than those associated with negative strikes. The flash duration is also longer with peak charge and potential up to ten times greater as compared to negative strikes.



CONCLUSION

A cold front triggered thunderstorms in central Illinois leading to a dense area of lightning strikes surrounding the client's residence. A lightning strike with a positive polarity and multiplicity of 3 hit directly at the owner's residence at 10:34 AM on 21 July 2020.

CERTIFICATION

I certify the information contained in this report is accurate to the best of my professional ability and that all expressed opinions, findings, estimations, and interpolations were made within a reasonable degree of meteorological certainty.

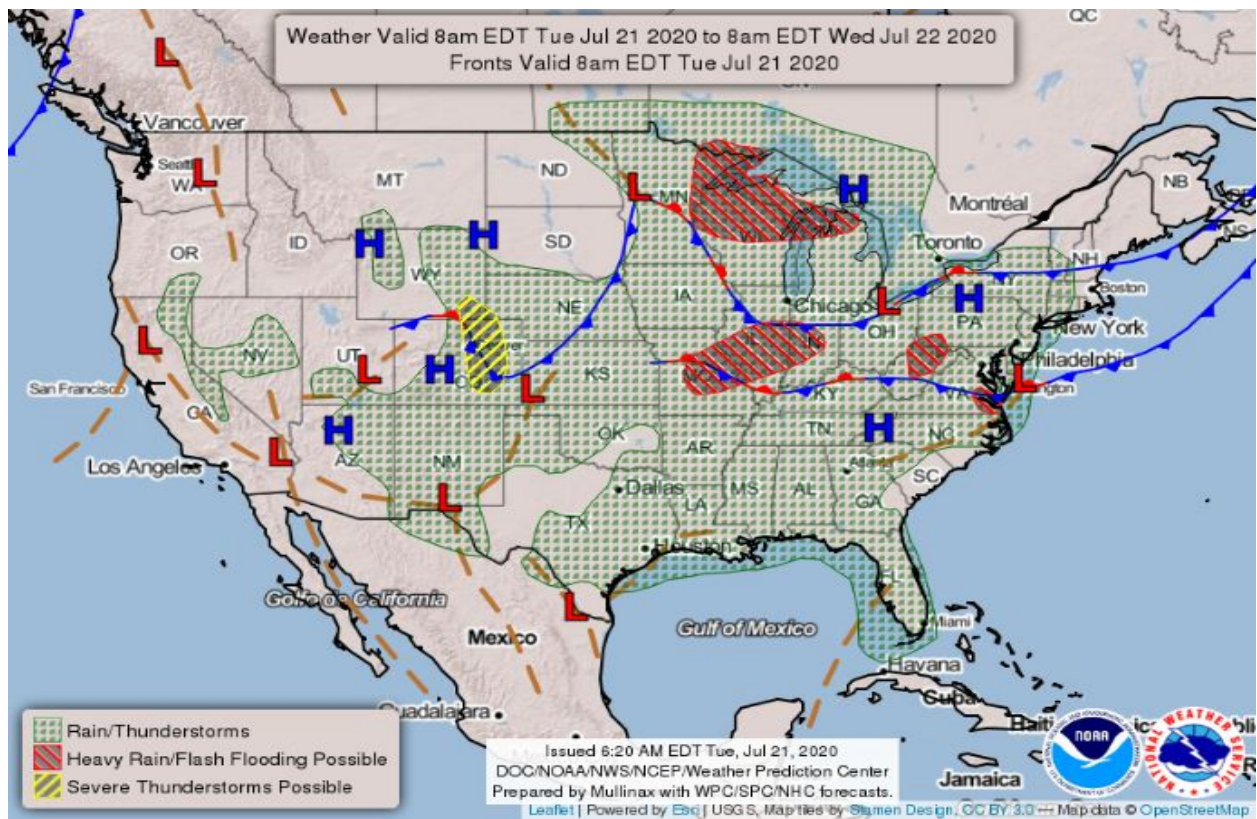


Image A - US Surface Analysis

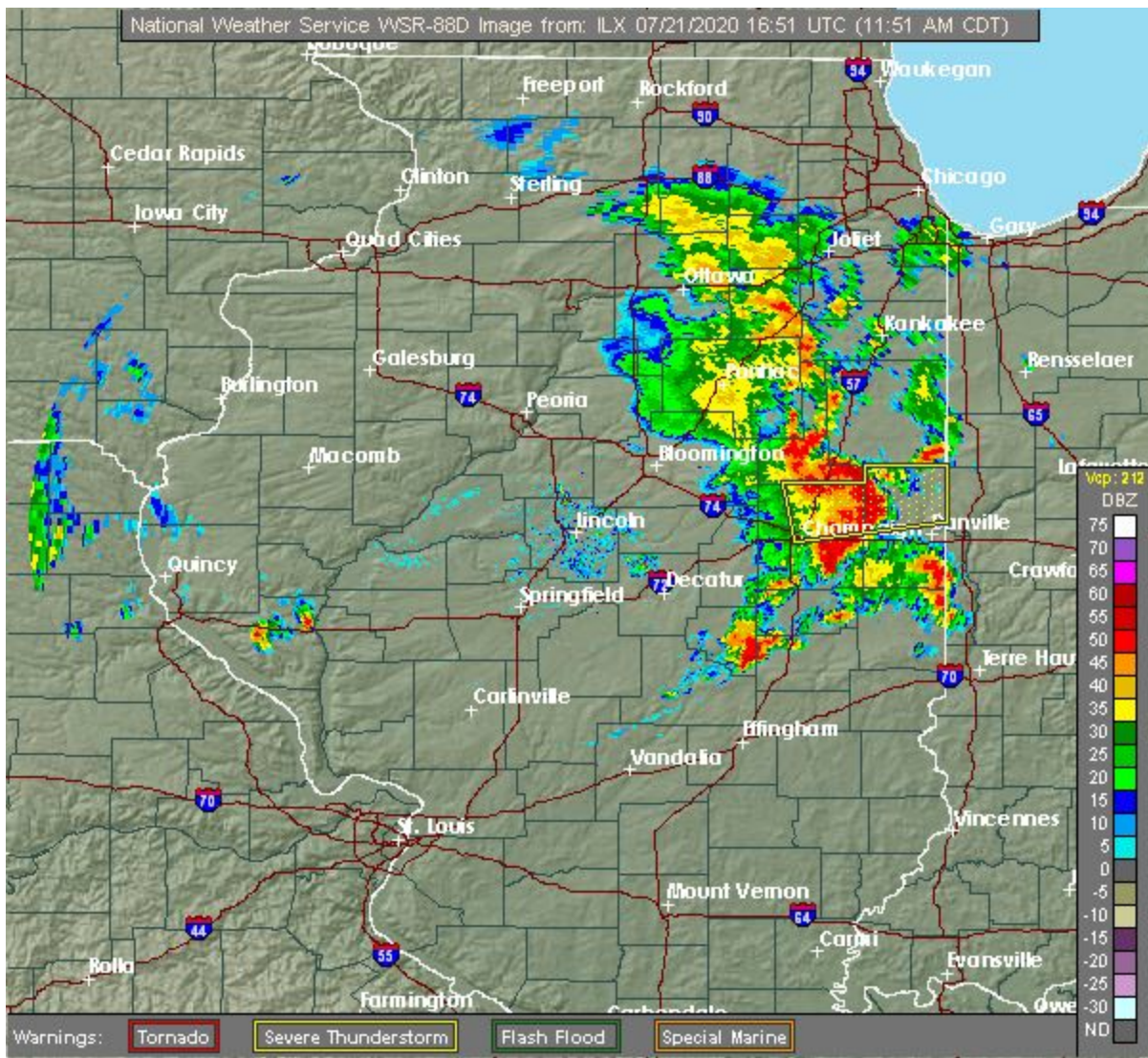


Image B - Central IL Radar

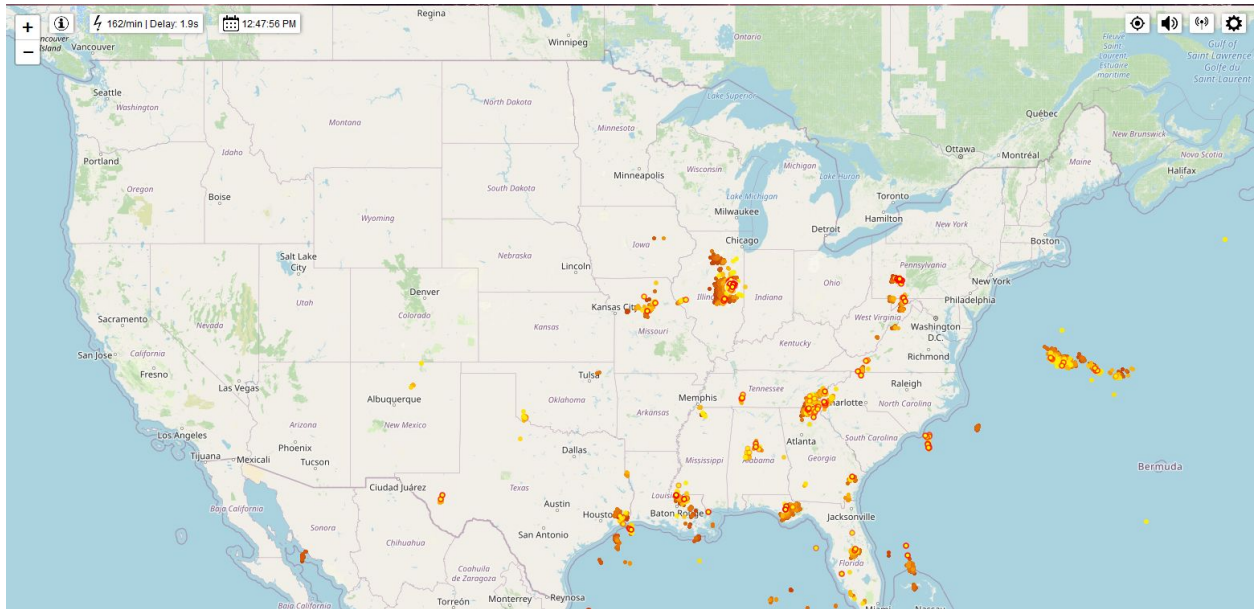


Image C - Lightning Summary

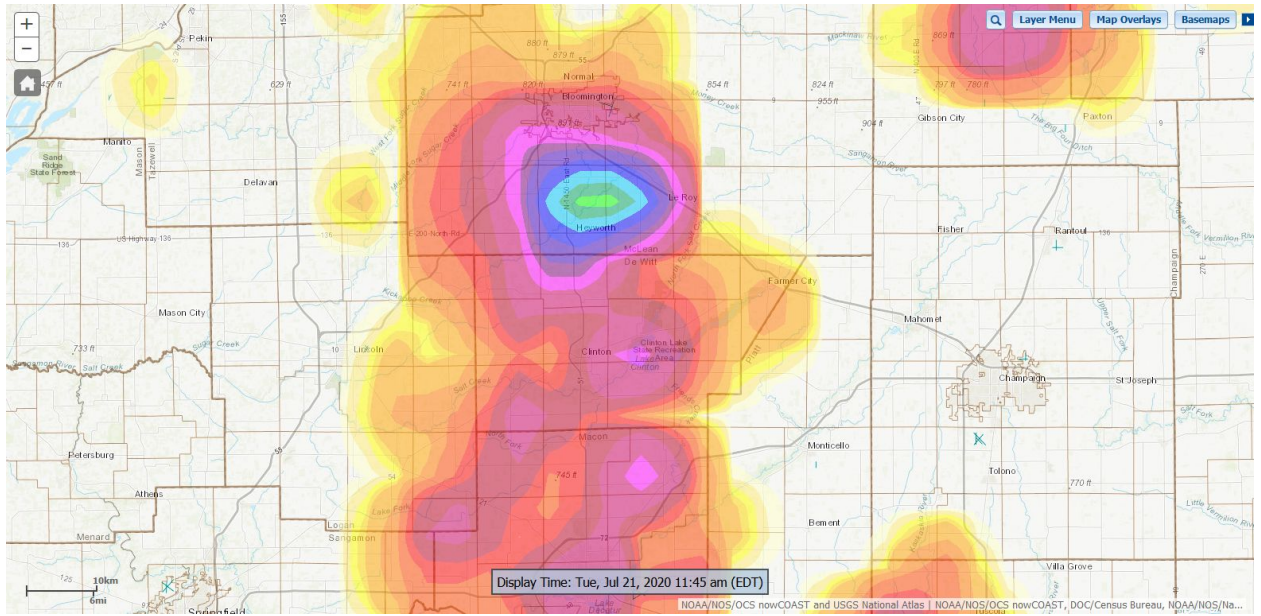


Image D - Lightning Strike Density