

Midwest Derecho - 2023

Assessment Period: June 29, 2023

Publication Date: July 18, 20203

USDA NASS

Disaster Monitoring Team




Event Summary

- **Location:** Midwest U.S. (Missouri, Illinois, Indiana, Kentucky and Tennessee)
- **Timeframe:** June 29, 2023
- **Event:** Midwest Derecho (https://www.weather.gov/dvn/summary_062923)
 - A derecho tracked east across the Midwest on the morning of Thursday, June 29, 2023.
 - Frequent winds above 80 mph caused widespread wind damage to crops, trees, and structures.



Event Summary

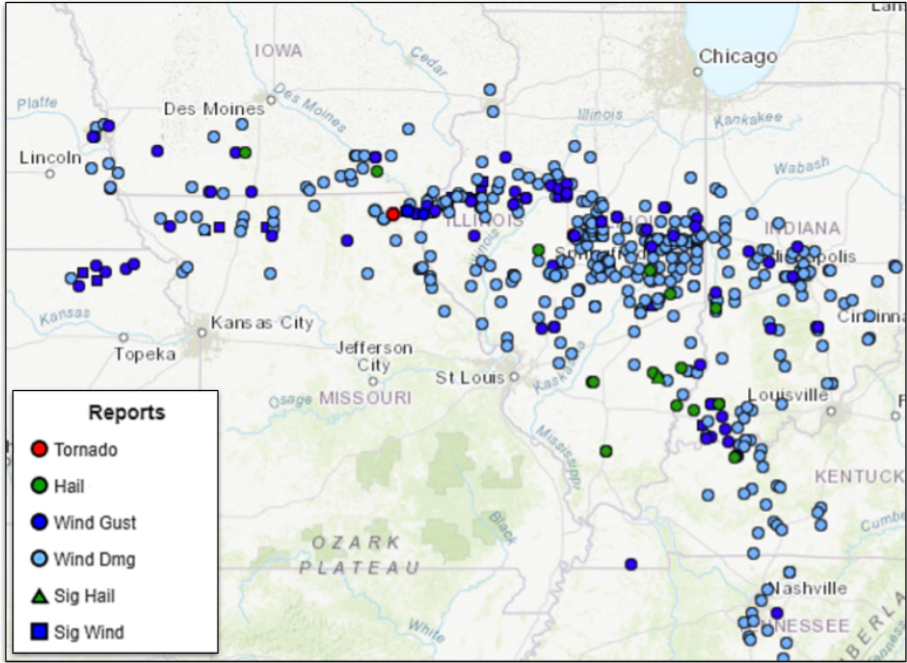


A Look at the June 29 Derecho

Widespread wind damage from north of Kansas City east-southeast into the Ohio River Valley


June 30, 2023
6:40 PM

Preliminary June 29 Severe Weather Reports




Thank you to our many trained spotters for their reports!

- Organized storms intensified as they tracked east across far northern Missouri on the morning of Thursday, June 29
- Frequent winds of 80-100+ mph, at times stronger and persisting for many minutes, brought down hundreds of trees and damage to numerous susceptible structures, with **over 500 reports** of wind damage received thus far!
- Derechos are the most intense of organized thunderstorms and track over a large area, often producing winds to near or even over 100 mph -- equivalent to an EF1 tornado but over a much larger footprint!



NWS Storm Survey - Adrian, IL



National Oceanic and
Atmospheric Administration

U.S. Department of Commerce

National Weather Service
Quad Cities, IA/IL

https://www.weather.gov/images/dvn/Past_Events/2023/0629/derecho_overview.png



Datasets used for impact assessment

- 1) Using NOAA Real-Time Mesoscale Analysis (RTMA) wind speed (gust) for wind damage assessment. RTMA data is a high-spatial and temporal resolution analysis for near-surface weather conditions. This dataset includes hourly analyses at 2.5 km for CONUS. (https://developers.google.com/earth-engine/datasets/catalog/NOAA_NWS_RTMA).
- 2) Using the 5 tornado tracks identified by NOAA NWS for wind damage assessment.
- 3) Using Sentinel-1 SAR images for flood impact assessment. SAR images acquired from July 3 and July 8 cover northwestern, central and southern Illinois, central and southwestern Indiana, western Kentucky, and eastern Missouri.

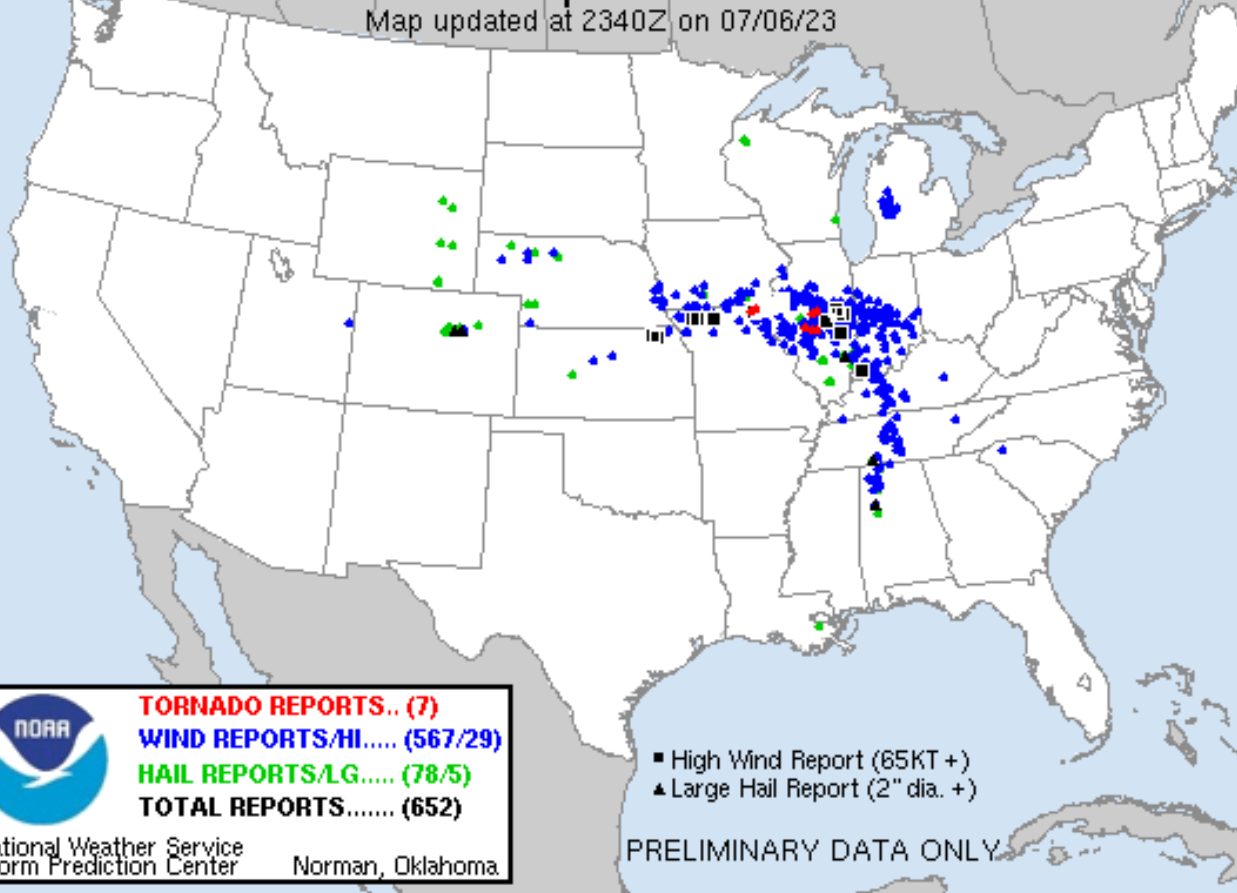


A severe weather system that swept through a large section of central Illinois on June 29, 2023, damaged some crops while bringing much needed rain to others. (<https://brownfieldagnews.com/news/derecho-flattens-some-central-illinois-crops-brings-needed-rain-to-others>)

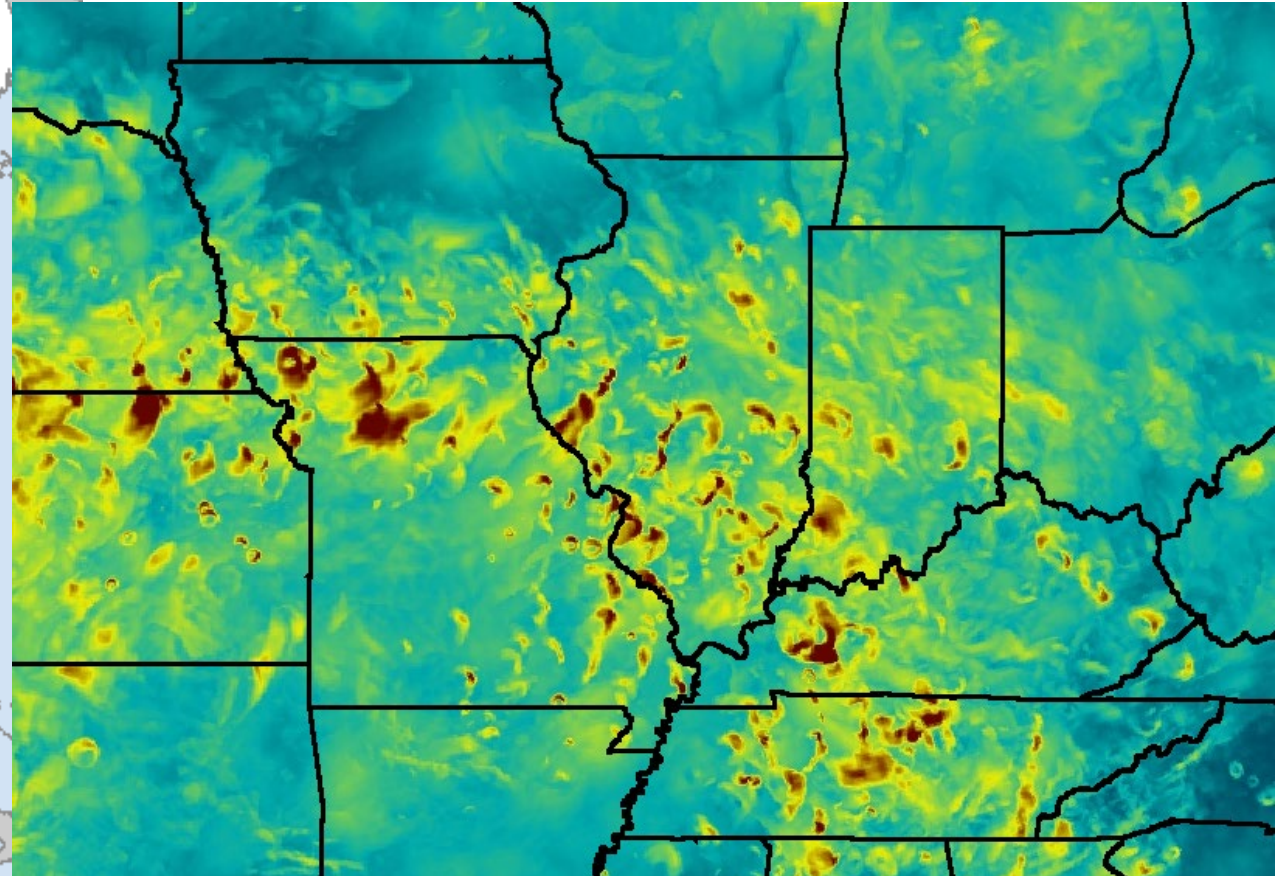


SPC Storm Reports for 06/29/23

Map updated at 2340Z on 07/06/23



NOAA Real-Time Mesoscale Analysis (RTMA)



20230629's Storm Reports (20230629 1200 UTC - 20230630 1159 UTC)

<https://www.spc.noaa.gov/exper/archive/event.php?date=20230629>

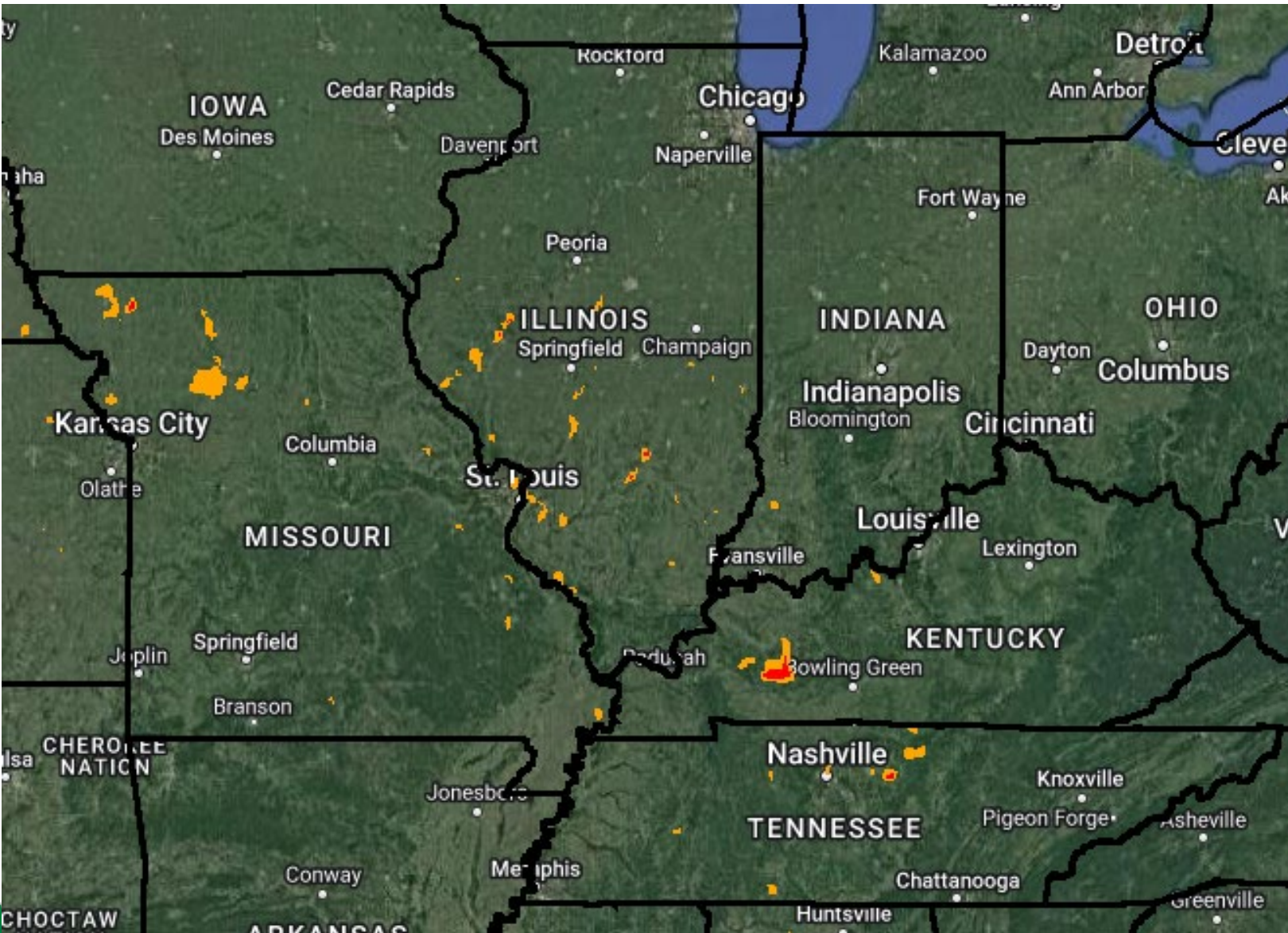
Wind gust speed (mph)



Maximum wind gust speed (2023-06-29, 00:00:00 - 2023-07-01, 23:00:00) extracted from Google Earth Engine



NOAA Real-Time Mesoscale Analysis (RTMA)



Maximum wind gust speed

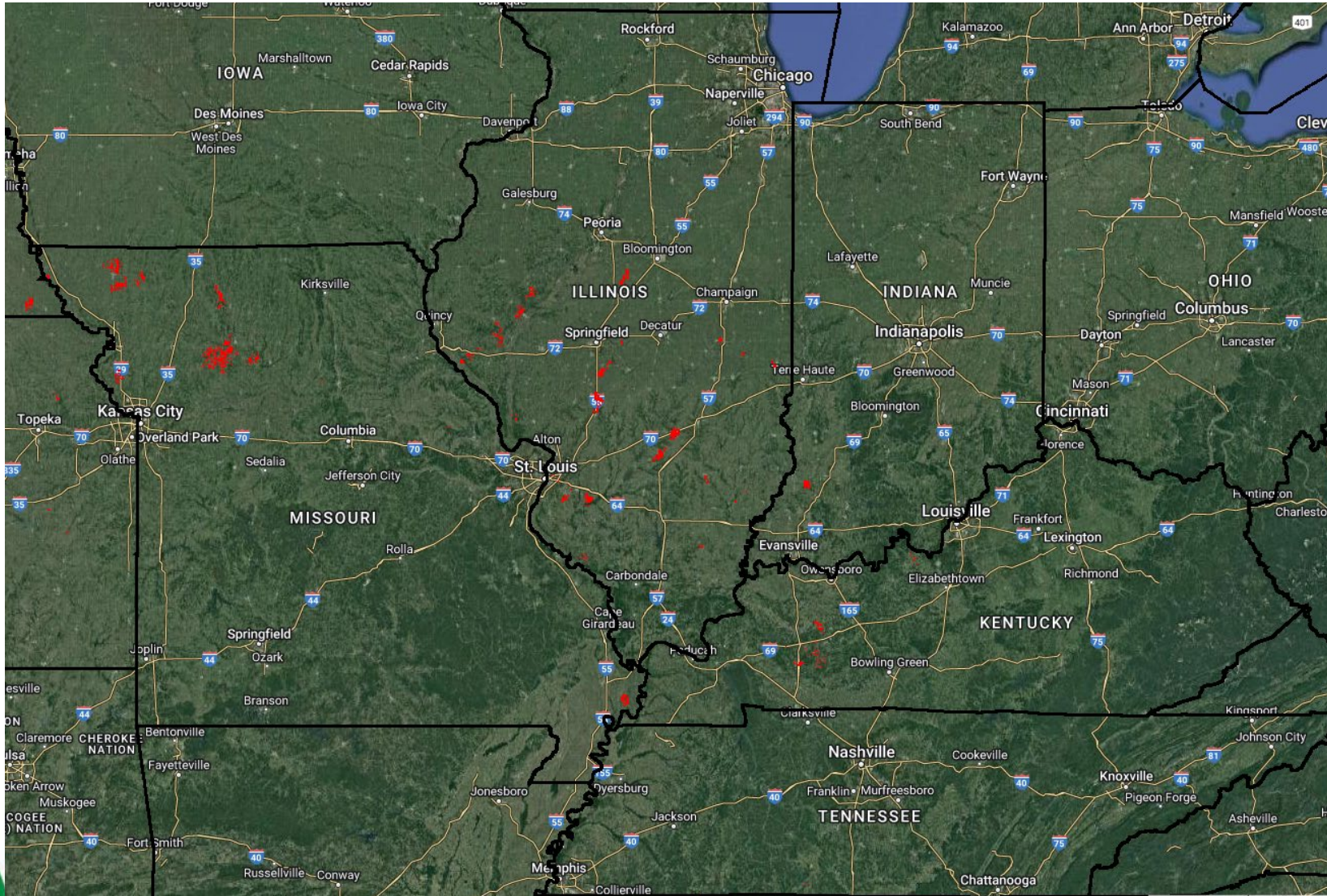
EF0 (65-85 mph)

EF1 (86-110 mph)

Maximum wind gust speed (2023-06-29, 00:00:00 - 2023-07-01, 23:00:00)
extracted from Google Earth Engine



Cultivated land within EF0 and EF1



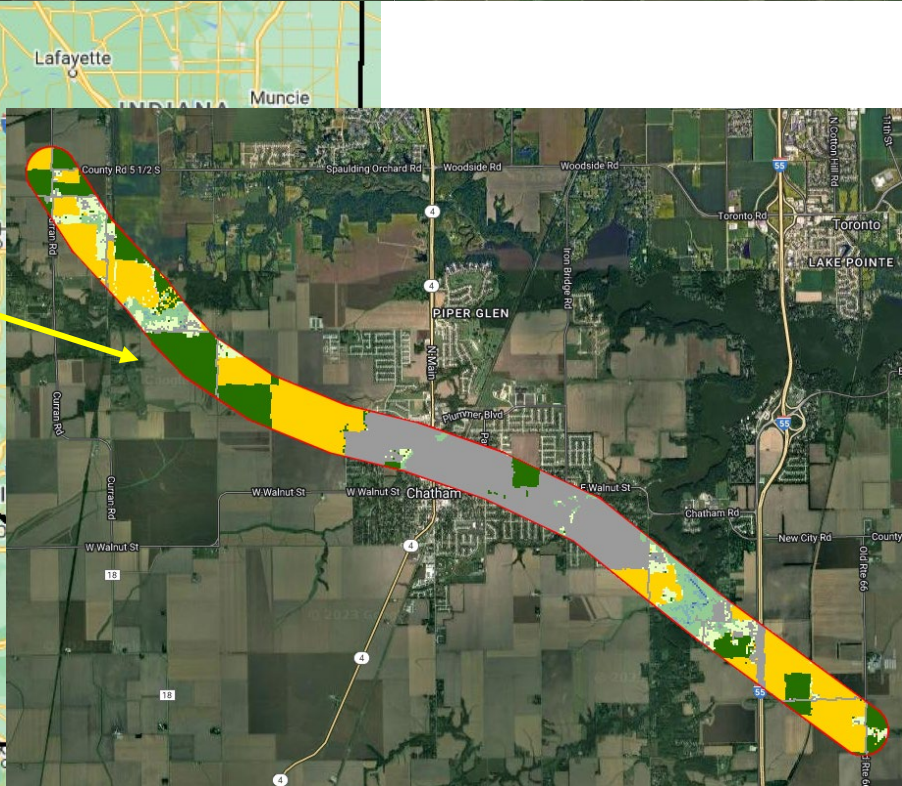
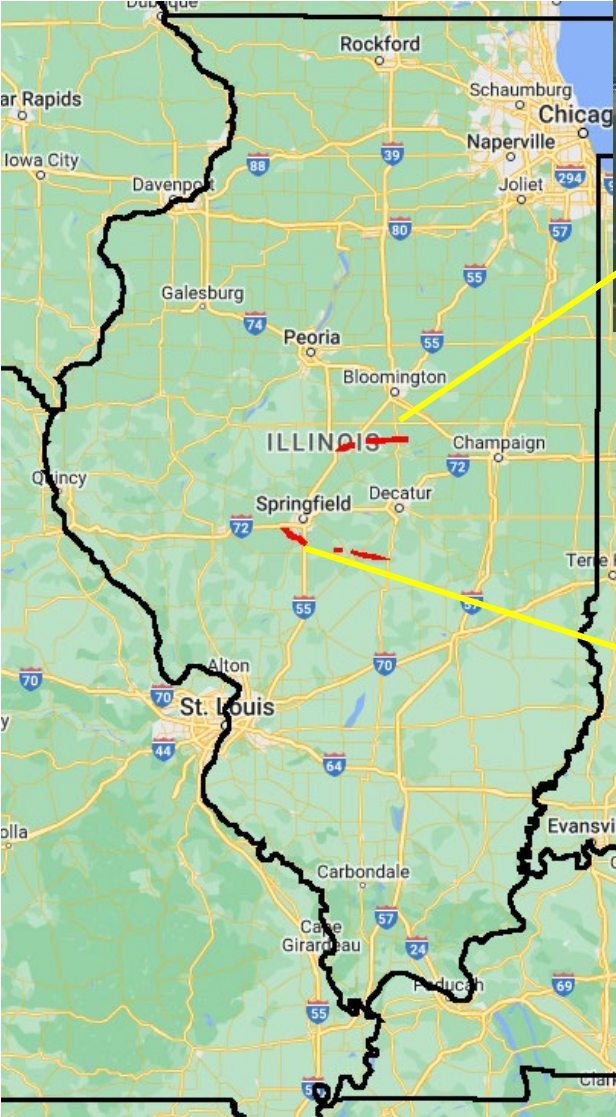
A corn field flattened near Carthage, Illinois. Photo provided by a Crop-Tech client.

<https://www.agweb.com/news/crops/corn/derecho-packs-punch-100-mph-winds-flattens-cornfields-and-crushes-grain-bins-across>

 Cultivated land impacted



Tornadoes June 29, 2023, Illinois



Tornado track in a corn field near Chatham, IL (Photo by Kyle Golden)

https://www.weather.gov/ilx/june29_derecho

Fields identified were derived from 2022 CDL



Assessment was conducted by buffering the tornado tracks (using the maximum width) identified by NOAA NWS (https://www.weather.gov/ilx/june29_derecho)



Crops impacted by wind

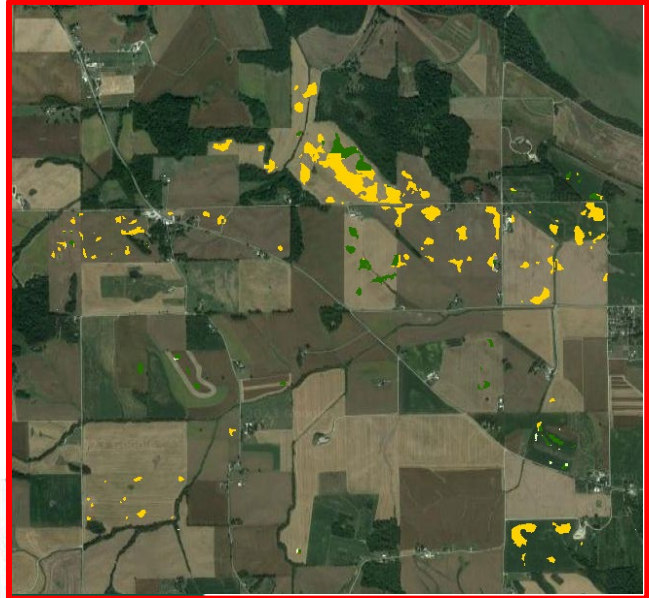
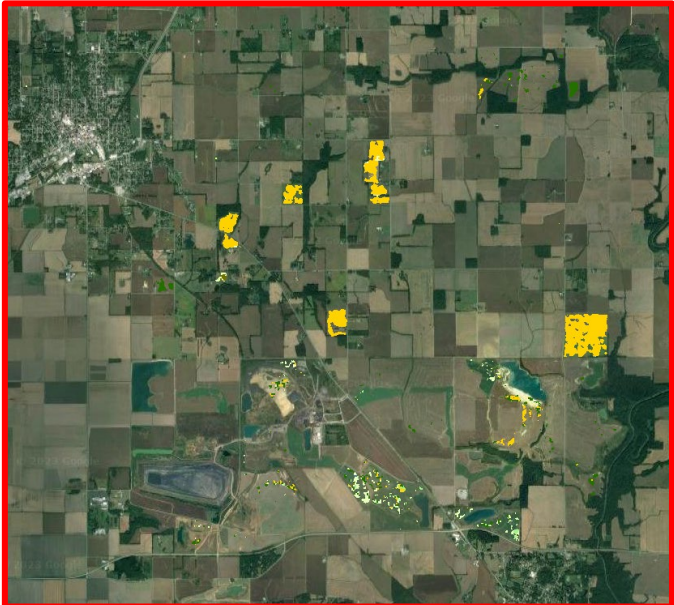
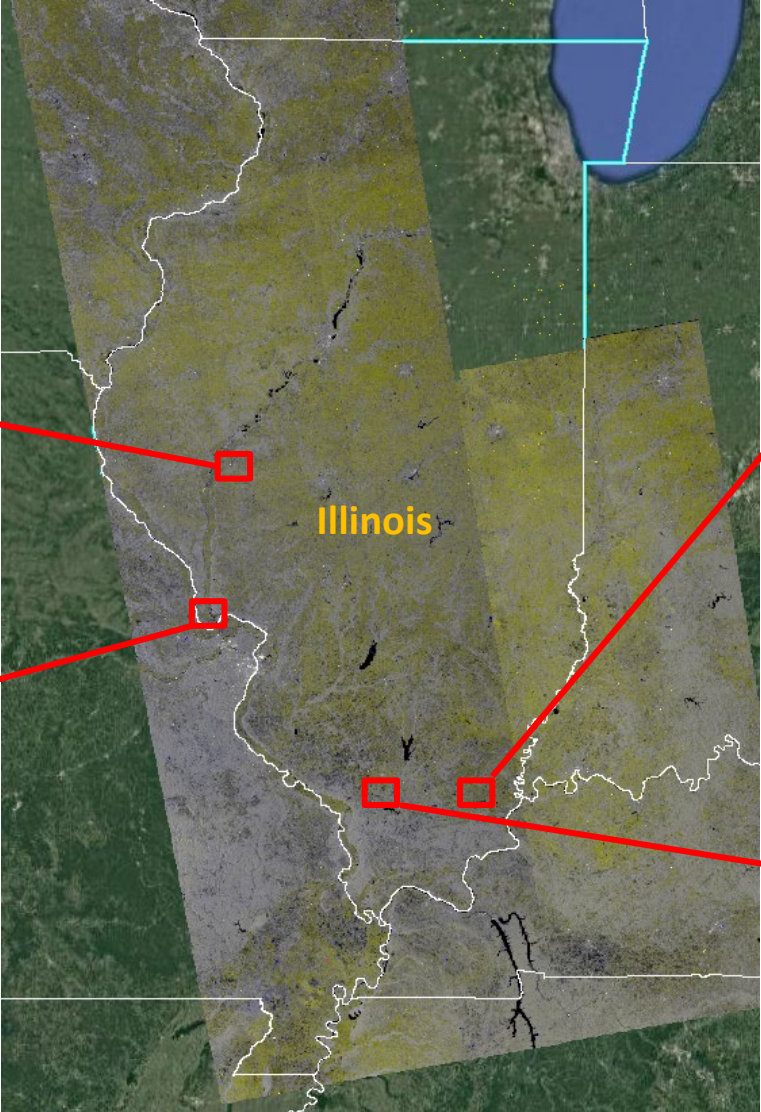
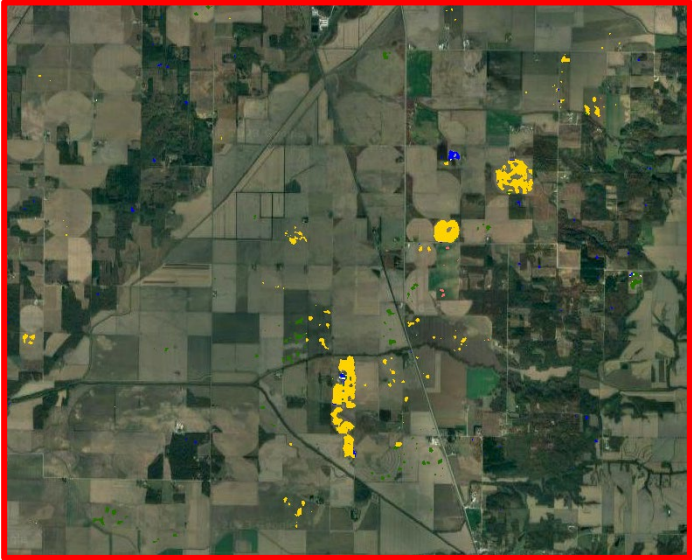
State	Crop Type	Total Statewide Acres (2022)*	Total Acres Impacted	Percent of Acres within EF0 (%)	Percent of Acres within EF1 (%)	Percent of Acres along Tornado Tracks (%)
Missouri	Corn	3,350,000	62978.34	1.842	0.038	N/A
	Soybeans	6,100,000	115775.47	1.860	0.038	N/A
Illinois	Corn	10,800,000	75401.60	0.627	0.035	0.036
	Soybeans	10,800,000	82378.45	0.693	0.039	0.030
Indiana	Corn	5,250,000	3299.22	0.063	N/A	N/A
	Soybeans	5,850,000	3856.77	0.066	N/A	N/A
Kentucky	Corn	1,440,000	13719.96	0.725	0.228	N/A
	Soybeans	1,950,000	20822.73	0.737	0.331	N/A
Tennessee	Corn	840,000	1514.73	0.177	0.004	N/A
	Soybeans	1,650,000	2491.77	0.142	0.009	N/A

*Total Statewide acres based on official 2022 NASS estimates of acres planted (corn and soybeans)

<https://quickstats.nass.usda.gov/#C646E7A6-2A2A-31A5-87C9-07F49E7958A0>



Flood detection from Sentinel-1 SAR images, Illinois



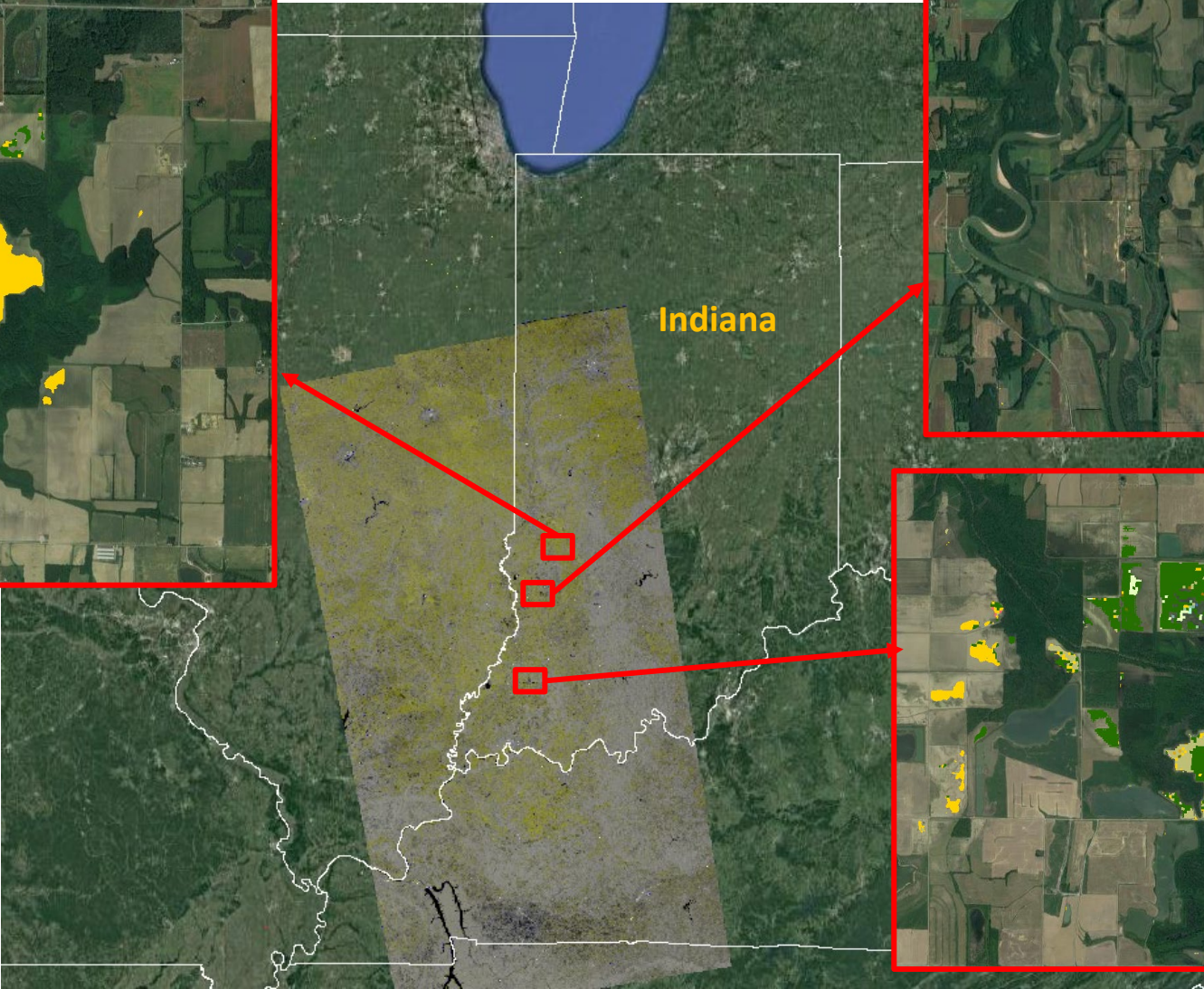
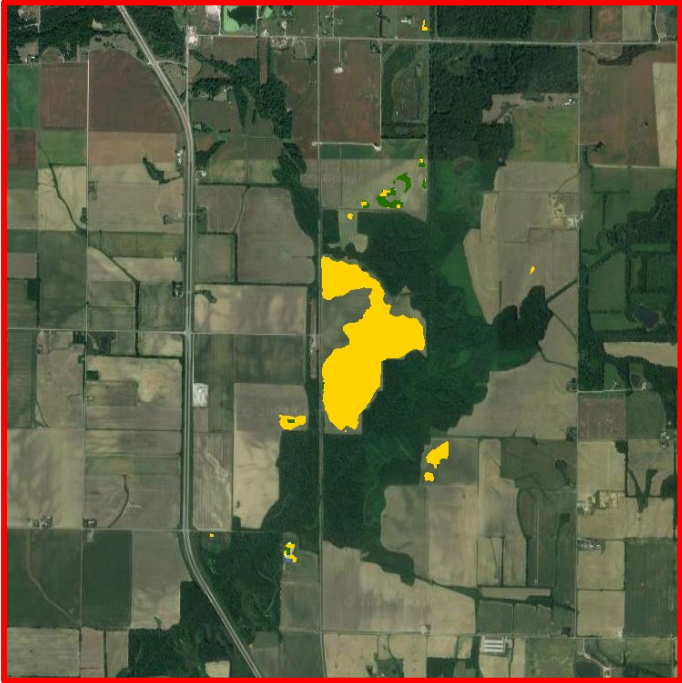
Flooded crops

-  Corn
-  Soybeans

Fields identified were derived from 2022 CDL



Flood detection from Sentinel-1 SAR images, Indiana



Flooded crops

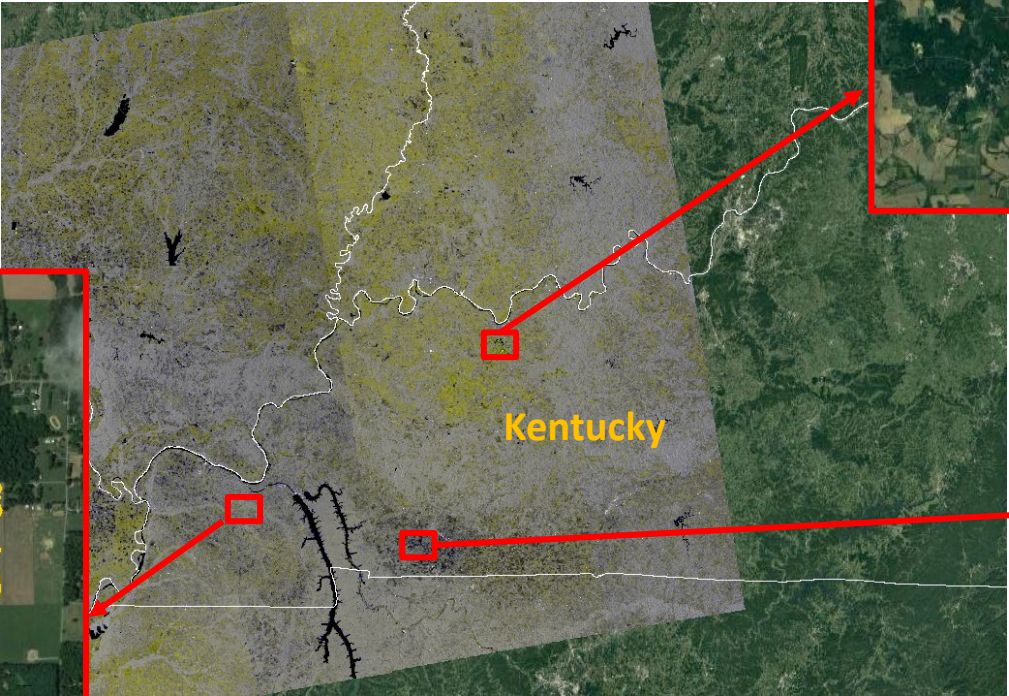
-  Corn
-  Soybeans



Fields identified were derived from 2022 CDL



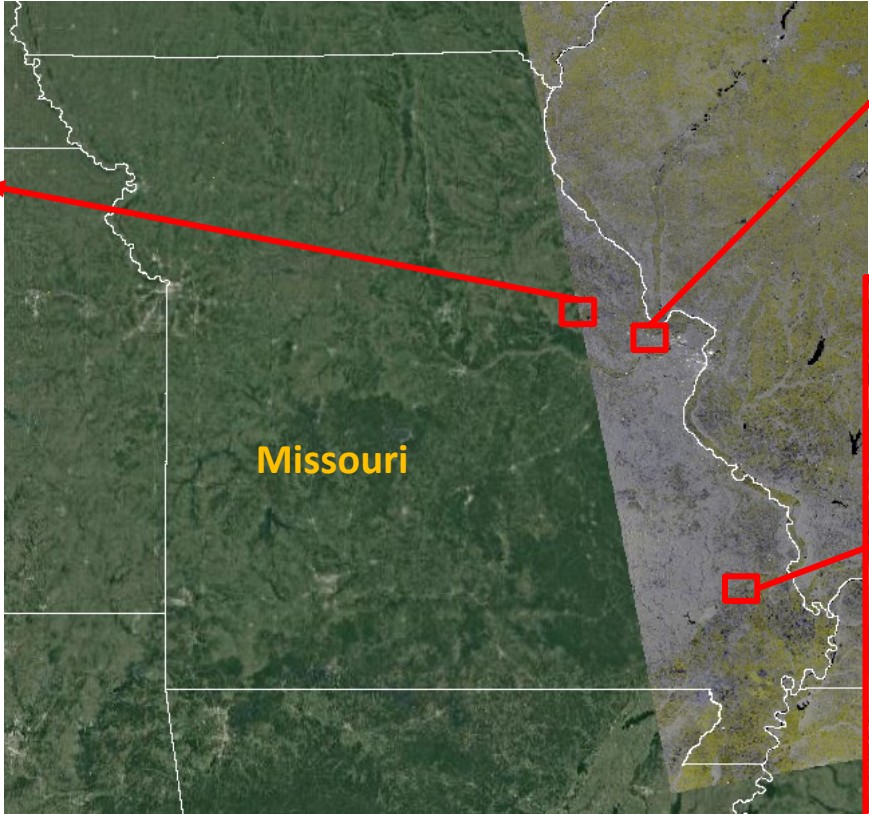
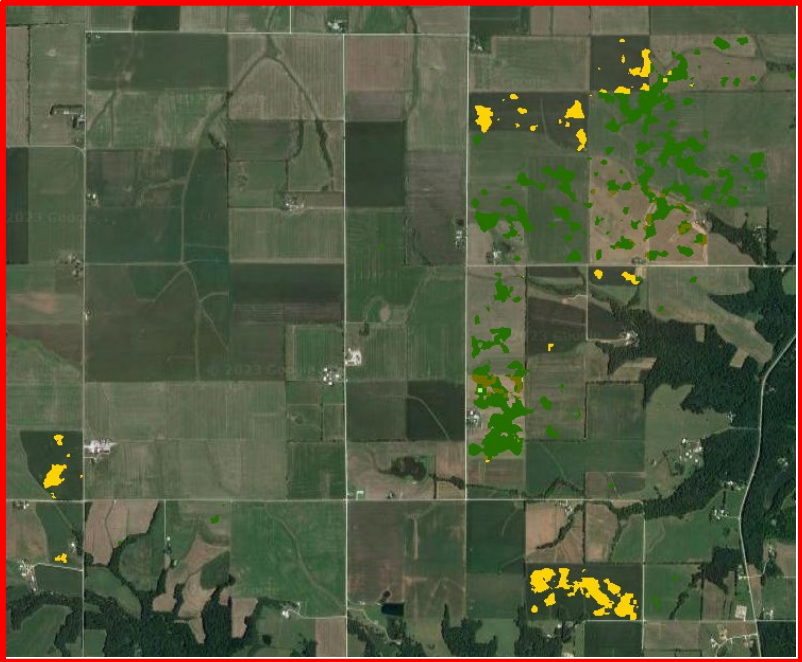
Flood detection from Sentinel-1 SAR images, Kentucky



Flooded crops
Corn
Soybeans

Fields identified were derived from 2022 CDL

Flood detection from Sentinel-1 SAR images, Missouri



Flooded crops

-  Corn
-  Soybeans

Fields identified were derived from 2022 CDL



Crops impacted by floods

State	Crop Type	Total Statewide Acres (2022)*	Total Acres Inundated	Percent of Acres Inundated (%)
Missouri	Corn	3,350,000	1703.99	0.051
	Soybeans	6,100,000	2825.32	0.046
Illinois	Corn	10,800,000	4834.64	0.045
	Soybeans	10,800,000	6579.55	0.061
Indiana	Corn	5,250,000	3201.37	0.061
	Soybeans	5,850,000	4359.82	0.075
Kentucky	Corn	1,440,000	1238.29	0.086
	Soybeans	1,950,000	2648.92	0.136
Tennessee	Corn	840,000	N/A	N/A
	Soybeans	1,650,000	N/A	N/A

*Total Statewide acres based on official 2022 NASS estimates of acres planted (corn and soybeans)

<https://quickstats.nass.usda.gov/#C646E7A6-2A2A-31A5-87C9-07F49E7958A0>

