



A State Record Tornado Outbreak?

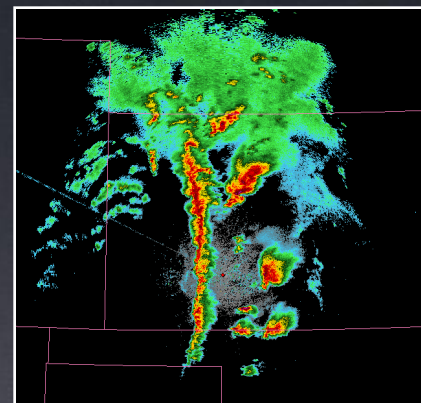
Preliminary Investigation of 23 May 2008 Supercells and Tornadoes

Mike Umscheid

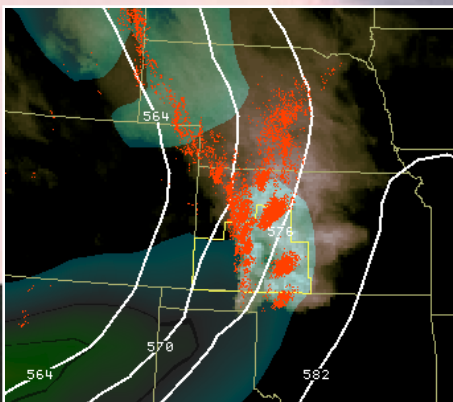
National Weather Service Forecast Office – Dodge City, KS

Jeff Hutton

National Weather Service Forecast Office – Dodge City, KS



12th High Plains Conference – Hays, KS
September 4-5, 2008



Tornado “**C8**” (rated EF-4)

Southwest of Quinter, KS

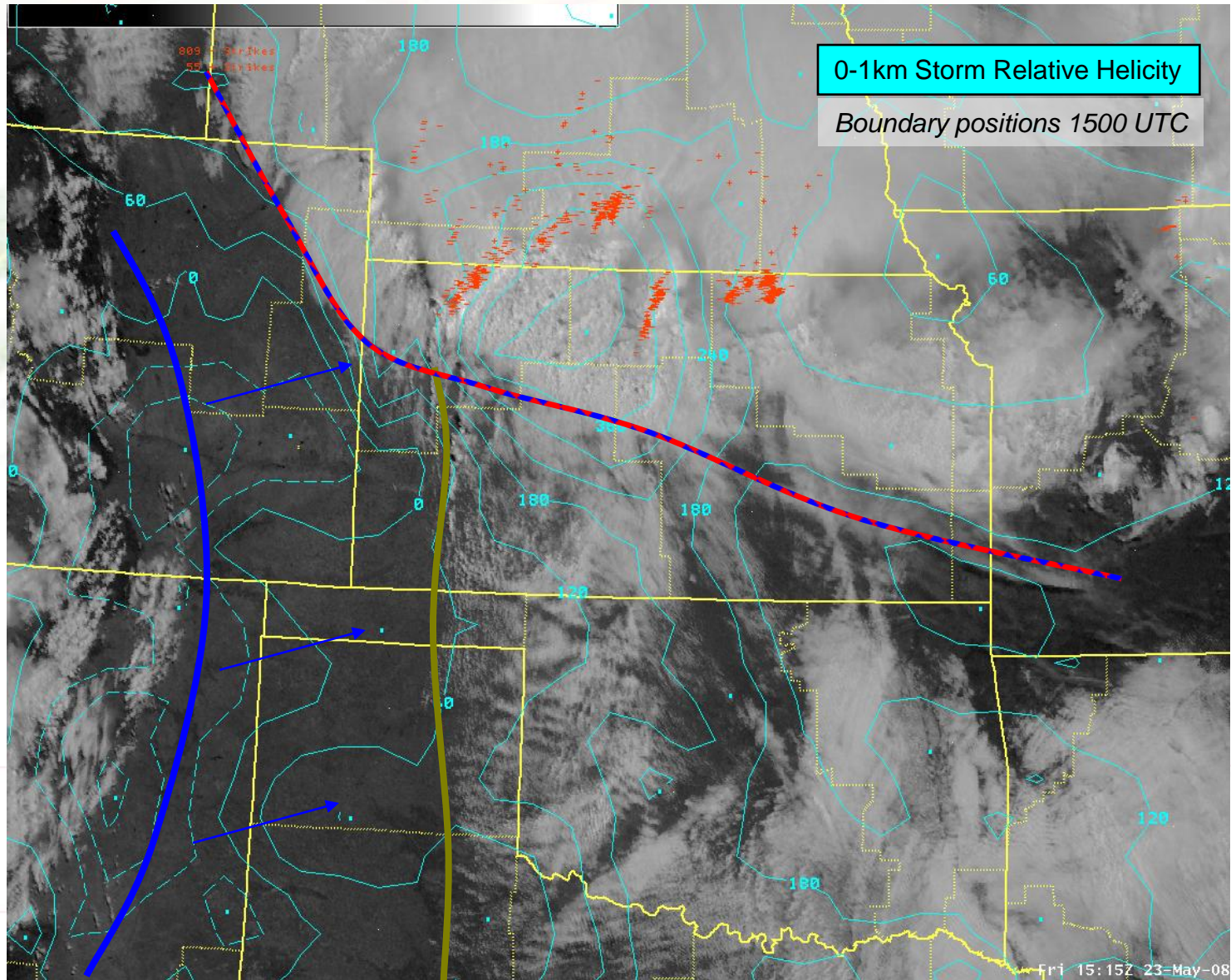
© *Bill Hark*



Outline

- Quick synoptic overview
- Previous one-day state records
- 23 May supercells & tornado tracks
 - Identification scheme modeled after Speheger et al. 2002 (3 May 1999 Oklahoma tornado outbreak)
 - 4 “phases” of outbreak
 - *Dighton to Quinter (15 tornadoes)*
 - *Ness City to Ellis (17 tornadoes)*
 - *OK-KS border monsters (33 tornadoes)*
 - *Cold front supercells (4 tornadoes)*
 - A look at some of the notable tornadoes (*1/2 mile wide or larger*)
 - *WSR-88D KGLD & KDDC “super-res” imagery*

May 23rd Setting





One-day state tornado records

- state record (Kansas)
 - **36** on *5 May 2007*
 - **21** on *26 April 1991*
- state record (National)
 - **67** on *24 June 2003 (South Dakota)*
 - **67** on *20 September 1967 (Texas)* *Hurricane Beulah
 - **65** on *3 May 1999 (Oklahoma)*



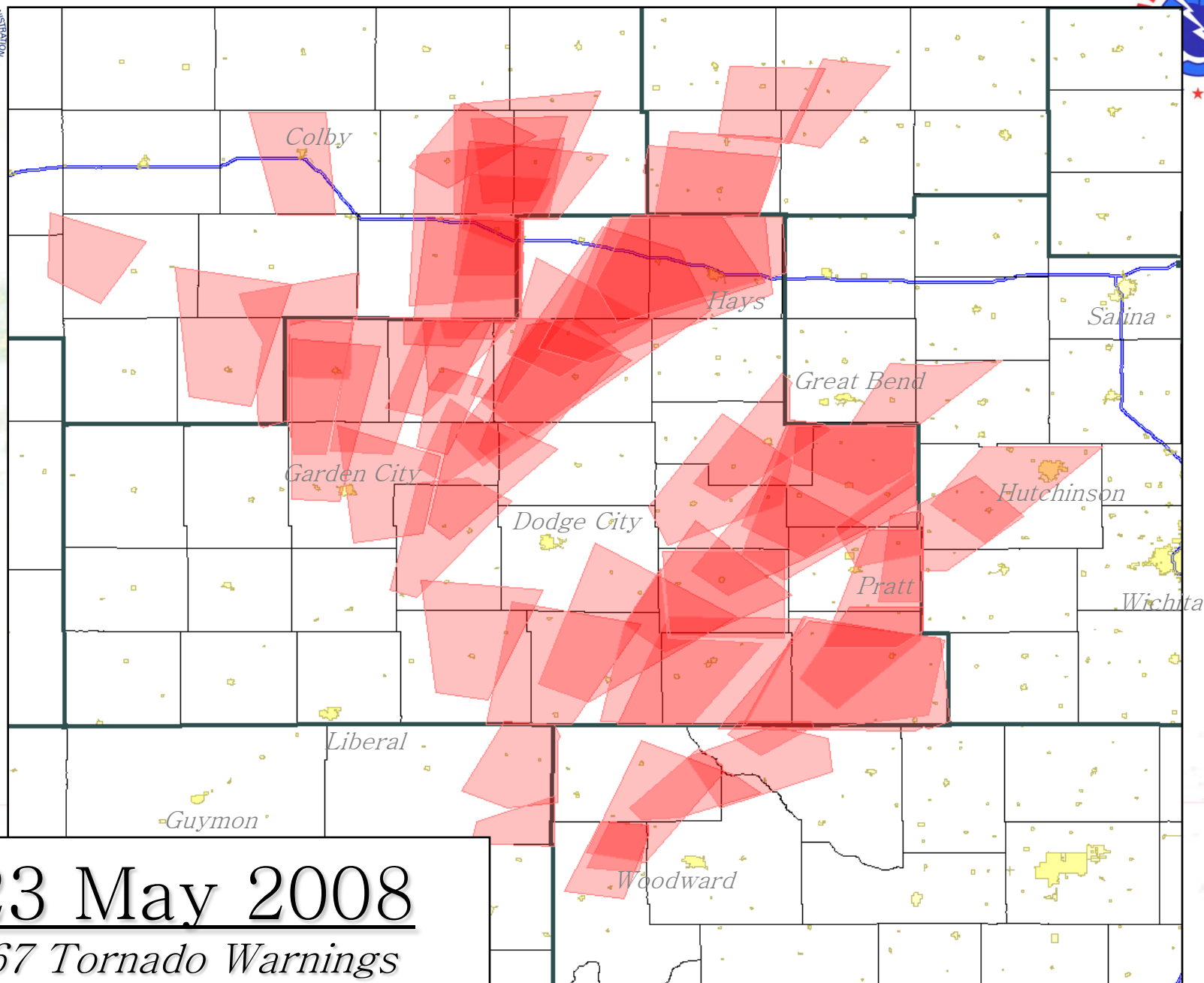
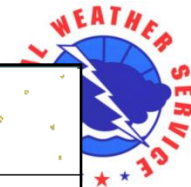
23 May 2008

Outbreak Statistics

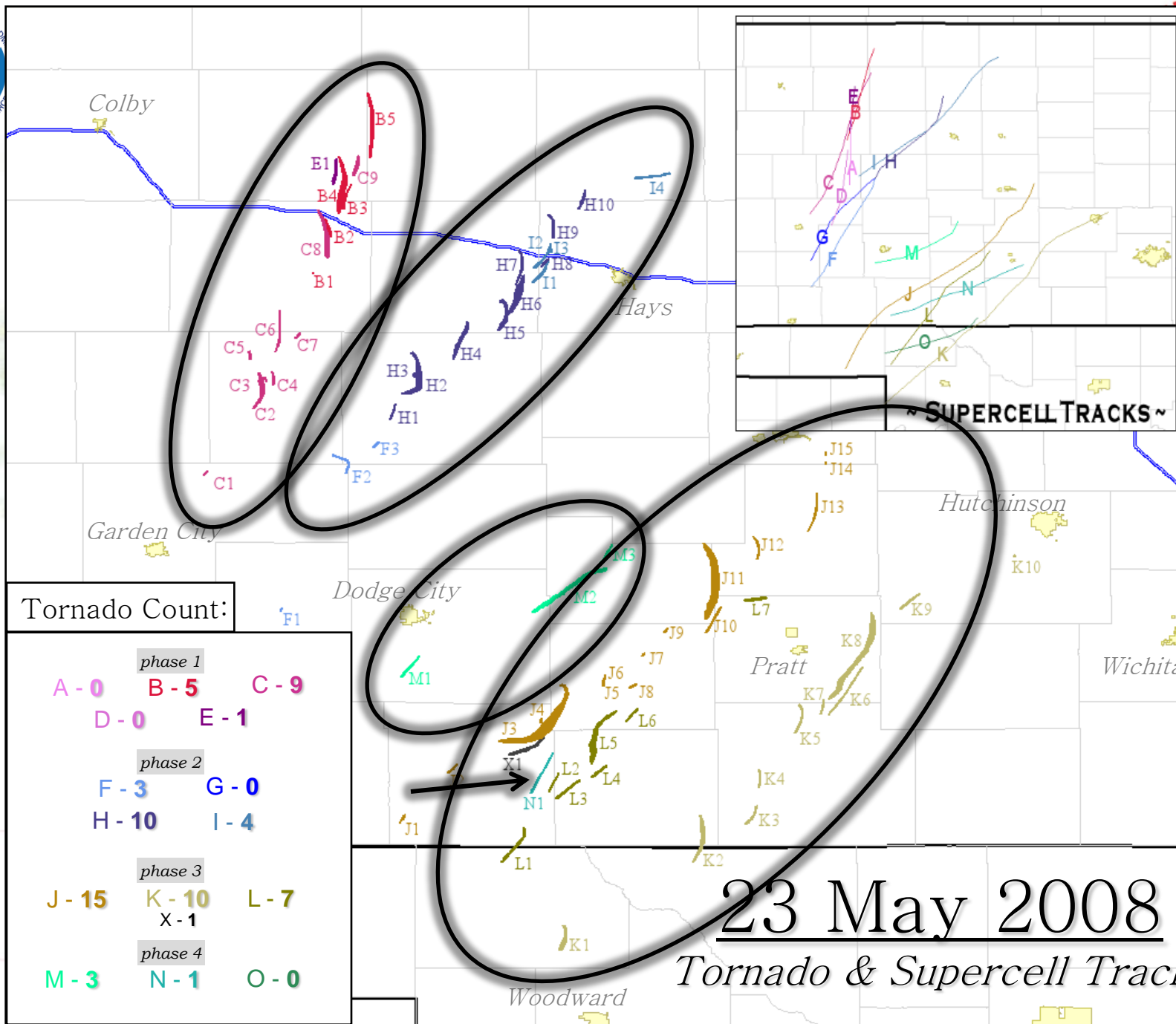
- **15 Supercells**
 - **11** tornado producing
 - **7** sig-tor producing
- **69 “cluster outbreak” Tornadoes***
 - **69** total tornadoes in Kansas**
 - **78** total tornadoes on 23 May
 - **13** half-mile wide or larger
 - **5** mile-widers
 - **16** sig-tors
 - **9** EF-2, **6** EF-3, **1** EF-4
- **2 fatalities**

* Not including **2** additional brief tornadoes in WFO GLD area unassociated with supercells. Also not including **7** other small tornadoes along the Cheyenne Ridge area

** Would set a new “national” 24-hr state record



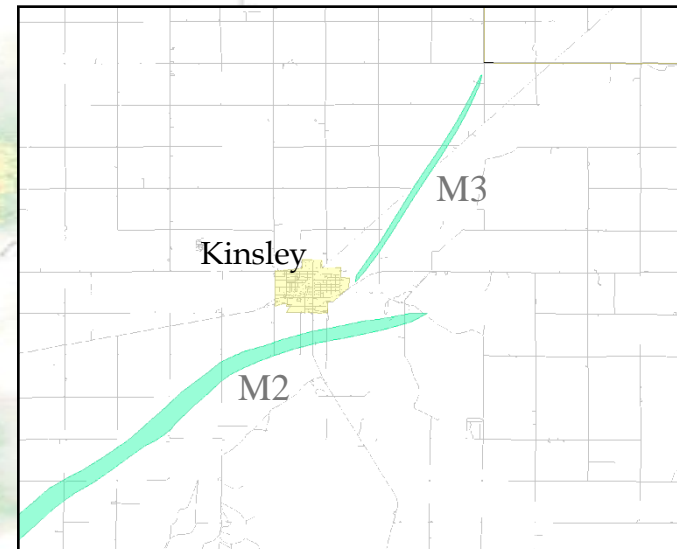
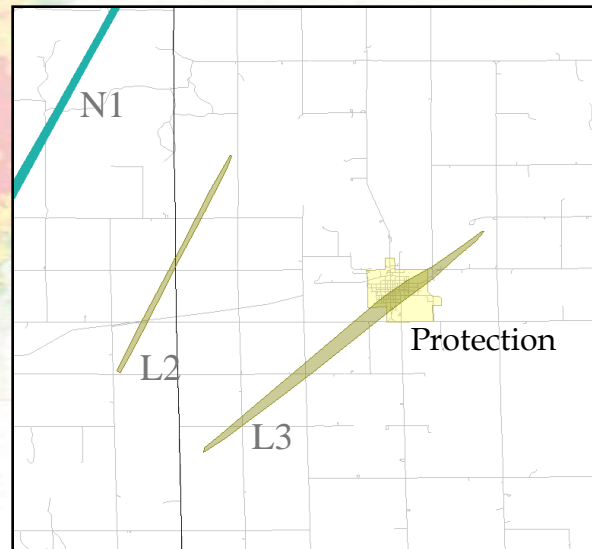
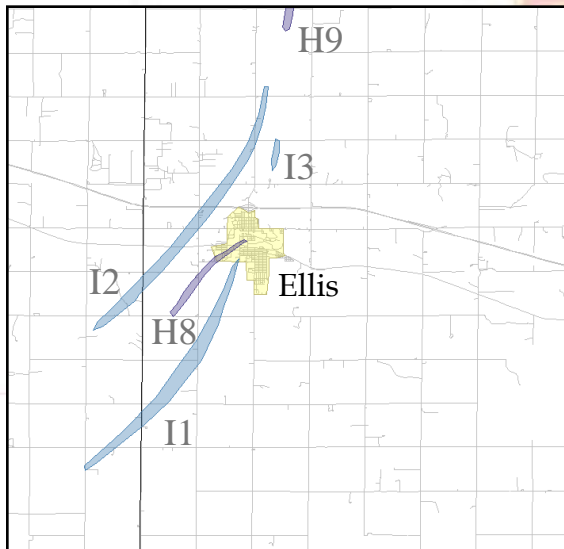
23 May 2008
67 Tornado Warnings



23 May 2008

Communities impacted & close-calls

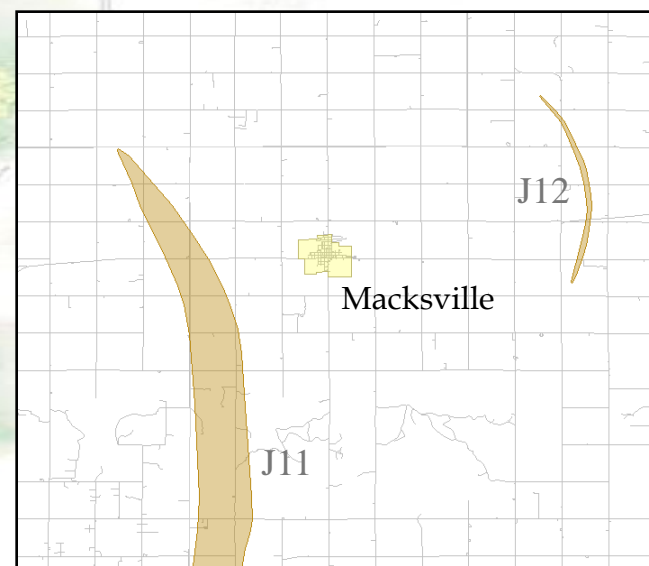
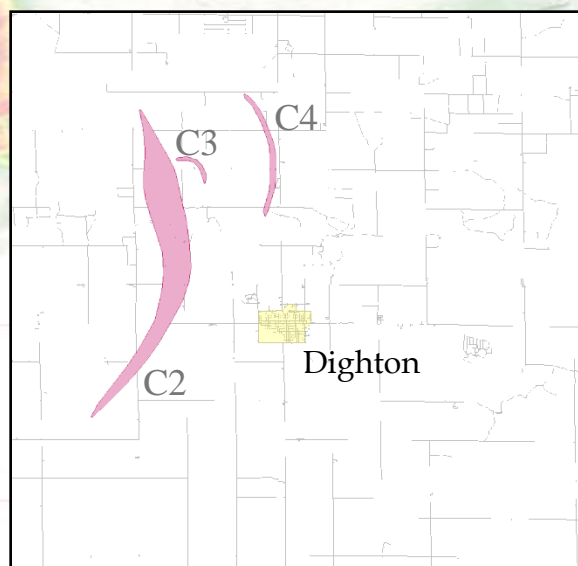
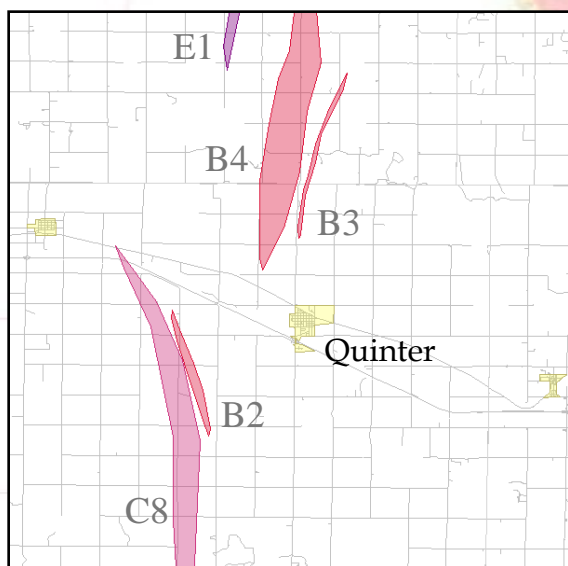
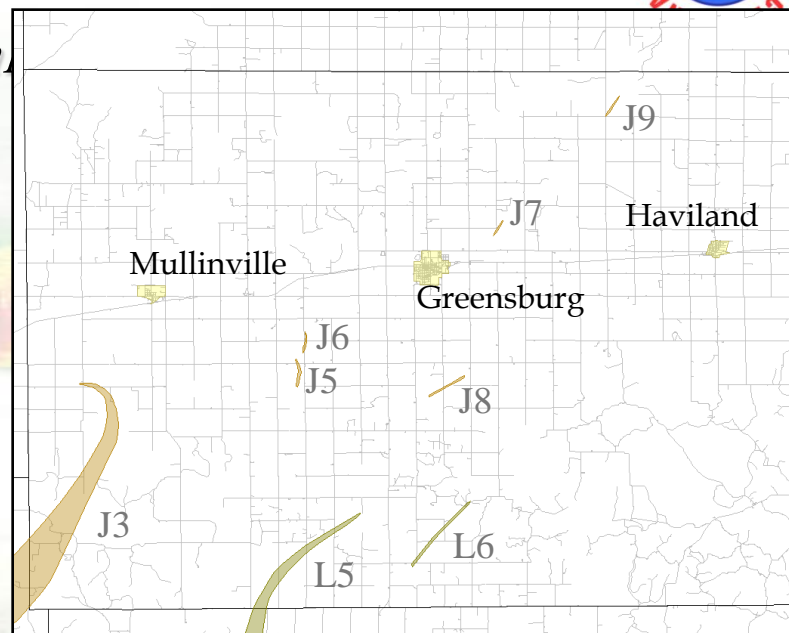
- Directly & partially impacted communities
 - Ellis, KS (*EF-1 damage mainly to W and SW part of town*)
 - Protection, KS (*relatively light EF-1 rated damage in town*)
 - Kinsley, KS (*areas of EF-1 to EF-2 damage southeast outskirts of town*)



23 May 2008

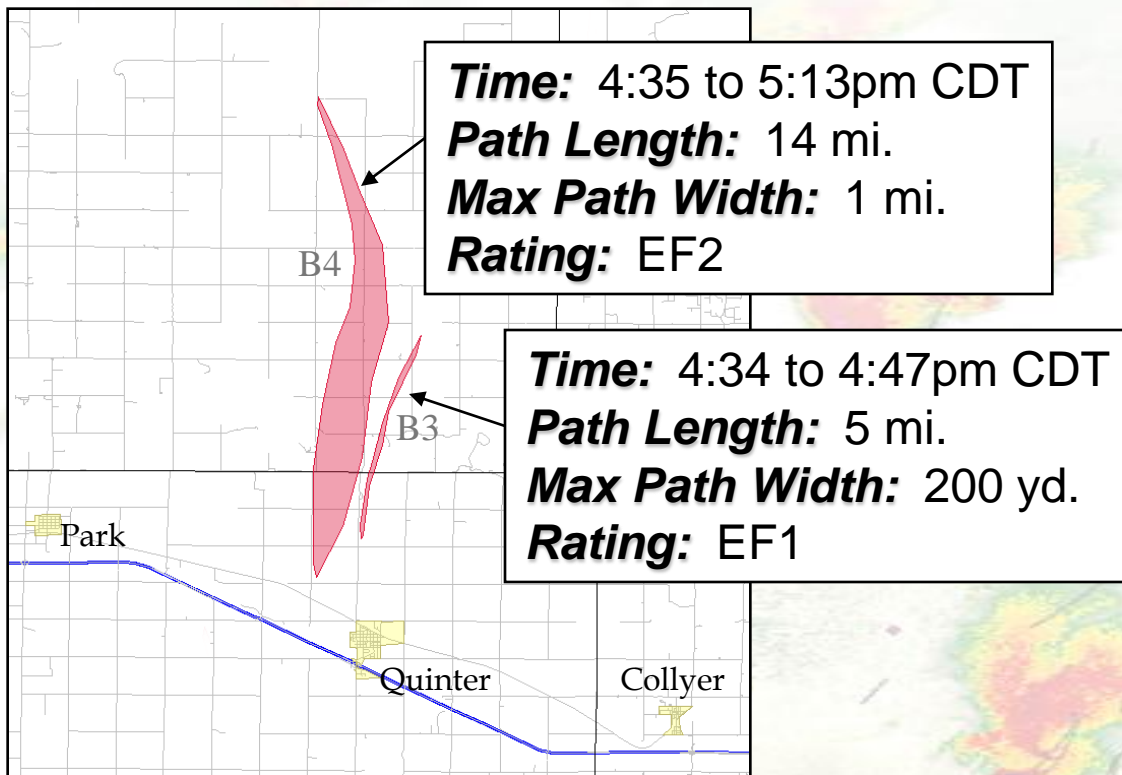
Communities impacted & close-calls

- A number of close calls!
 - Quinter, KS
 - Dighton, KS
 - Macksville, KS
 - Greensburg, KS (again)
 - Others: Coldwater, Park, Ransom



Notable Tornadoes

"B3 & B4"

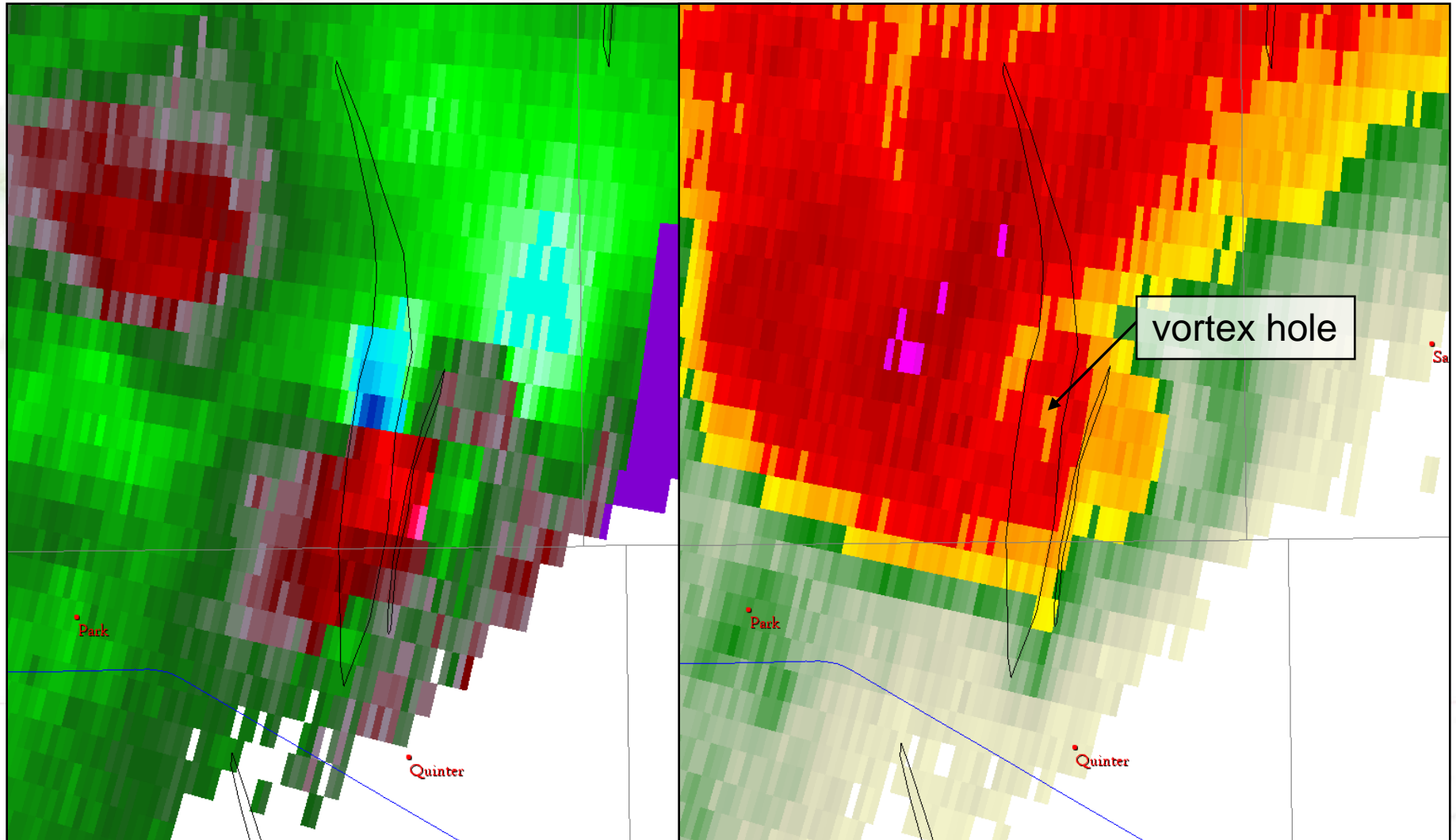


May 23, 2008 - North Of Quinter, Kansas



Notable Tornadoes

“B4” Super-Res Imagery (WSR-88D KGLD)

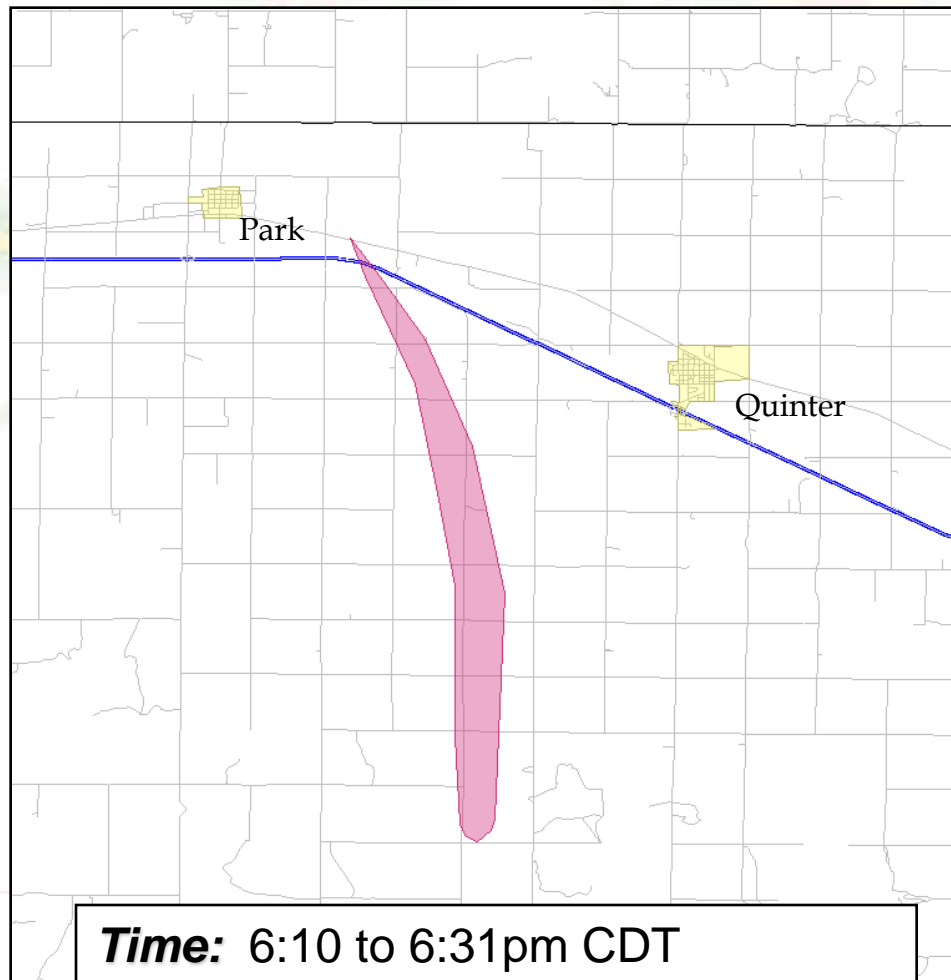


2149 UTC (4:49pm CDT)

0.5° (7000 FT ARL) RANGE = 69NM

Notable Tornadoes

"C8"



Time: 6:10 to 6:31pm CDT

Path Length: 11.4 mi.

Max Path Width: 1320 yd. (0.75 mi.)

Rating: EF4

© Bill Hark



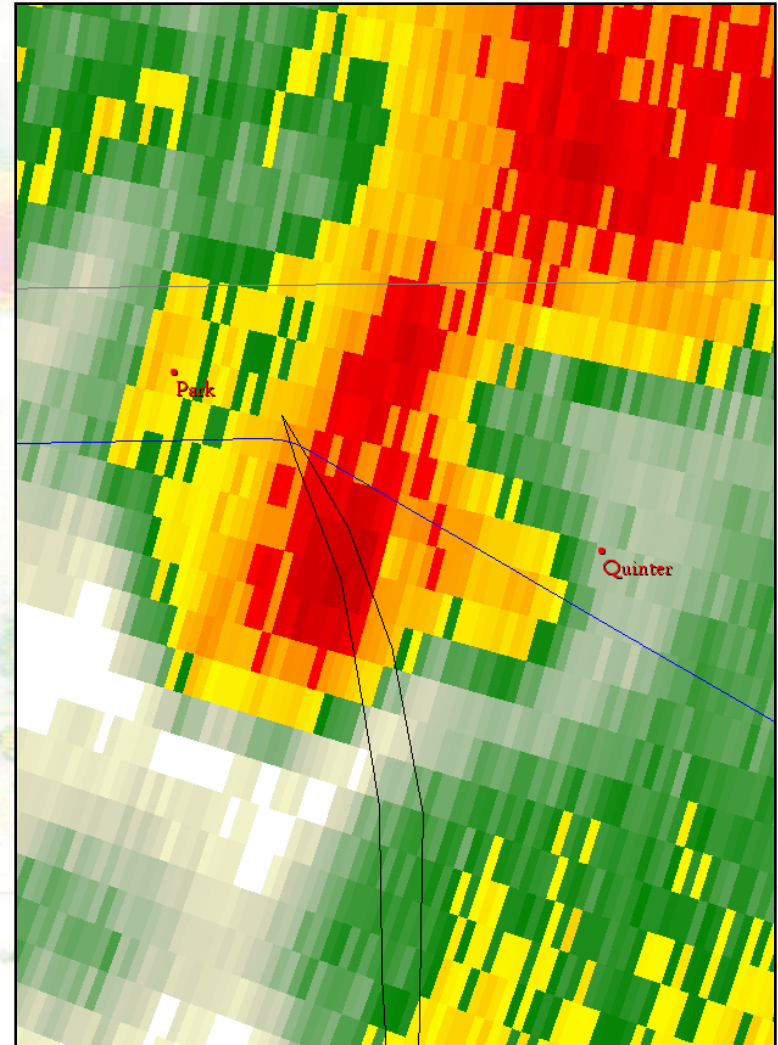
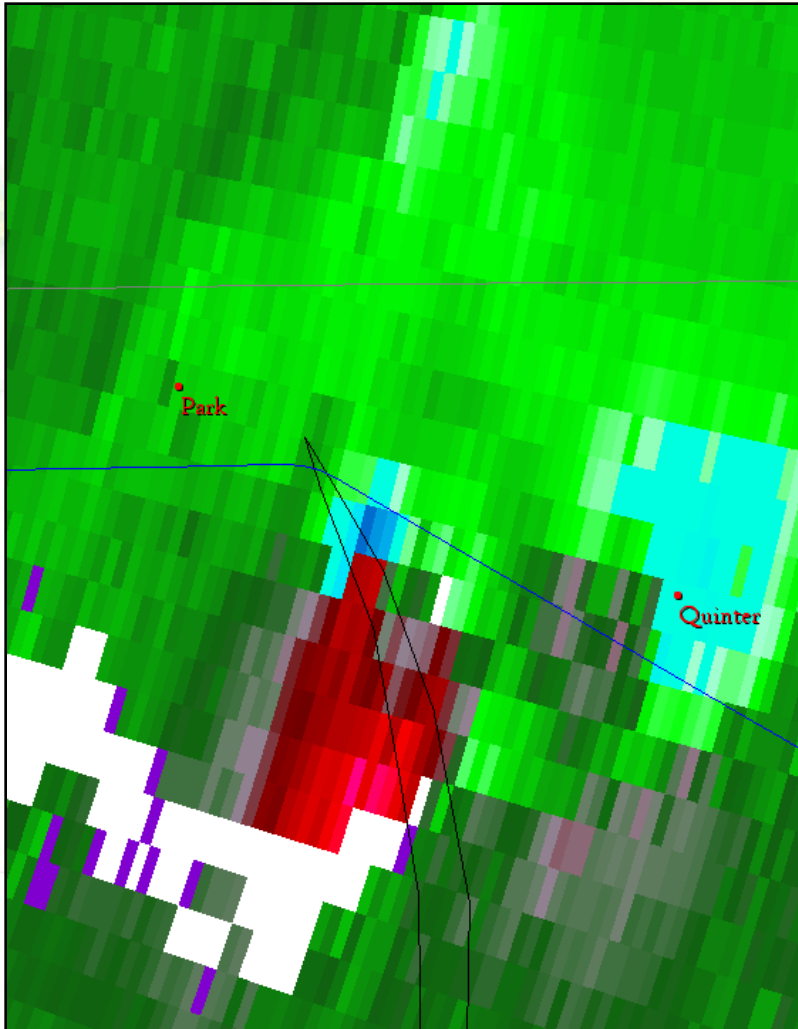
© Doug Raflik



© Bill Hark

Notable Tornadoes

“C8” Super-Res Imagery (WSR-88D KGLD)



2326 UTC (6:26pm CDT)

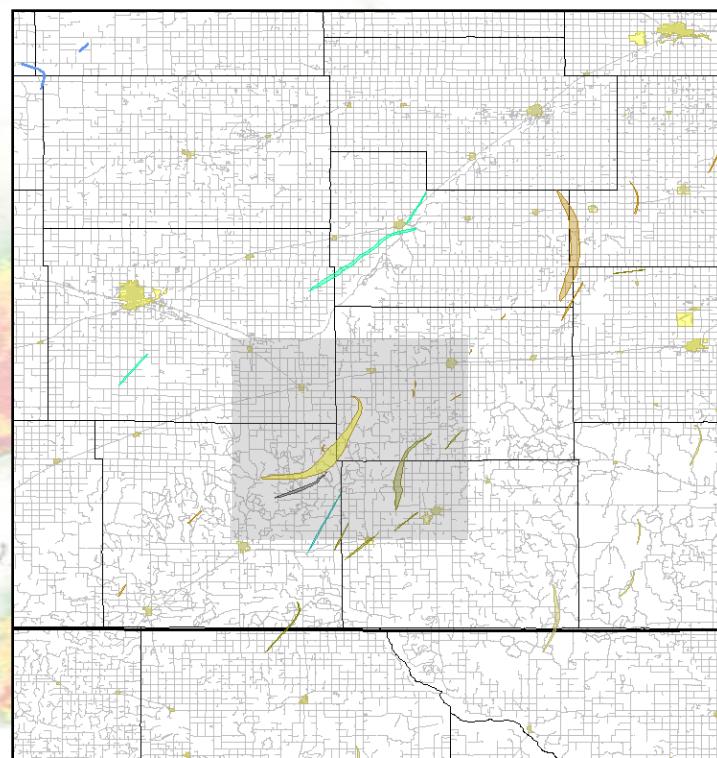
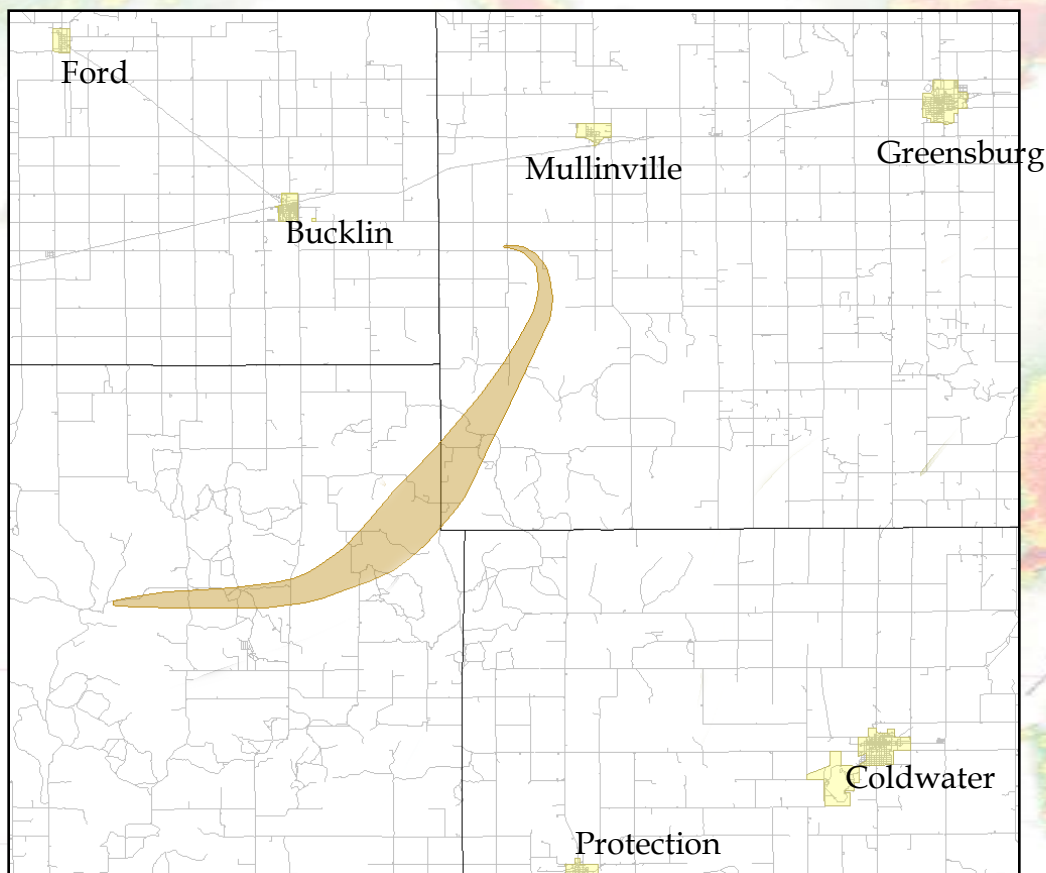
0.5° (6800 FT ARL) RANGE = 67NM



Notable Tornadoes

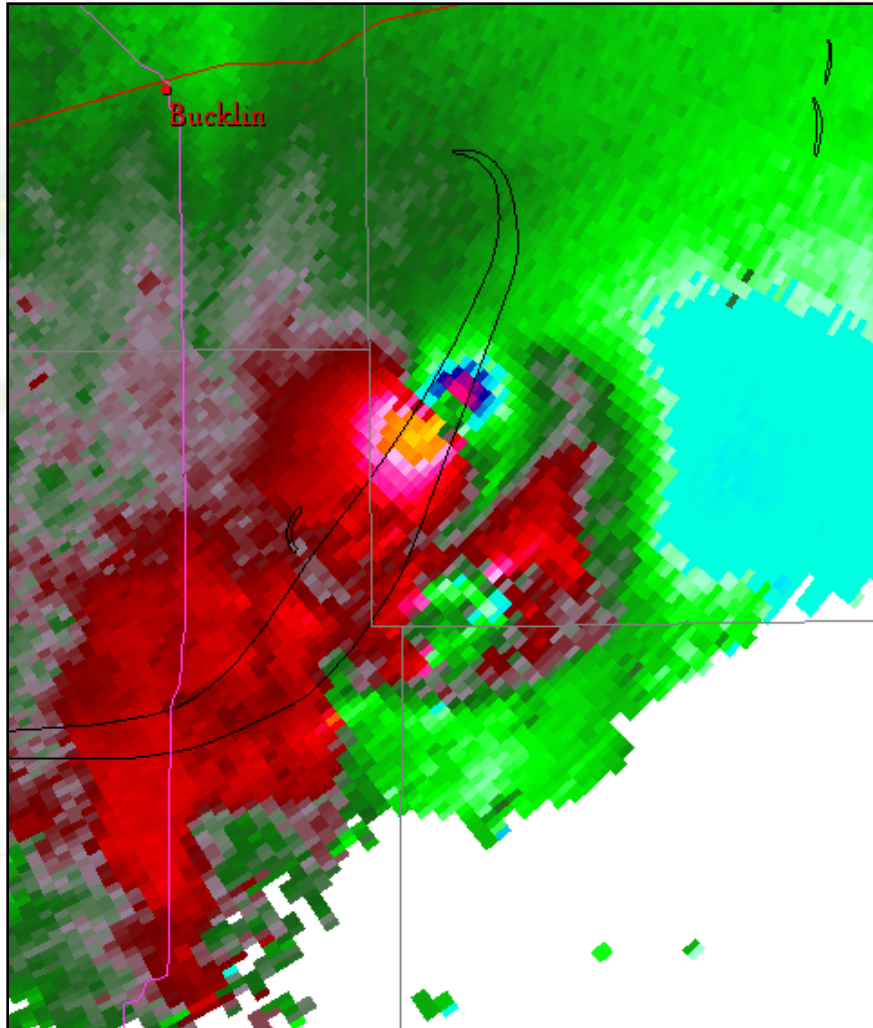
"J3"

Time: 7:25 to 8:14pm CDT
Path Length: 20.9 mi.
Max Path Width: 1.8 mi.
Rating: EF3 (+)

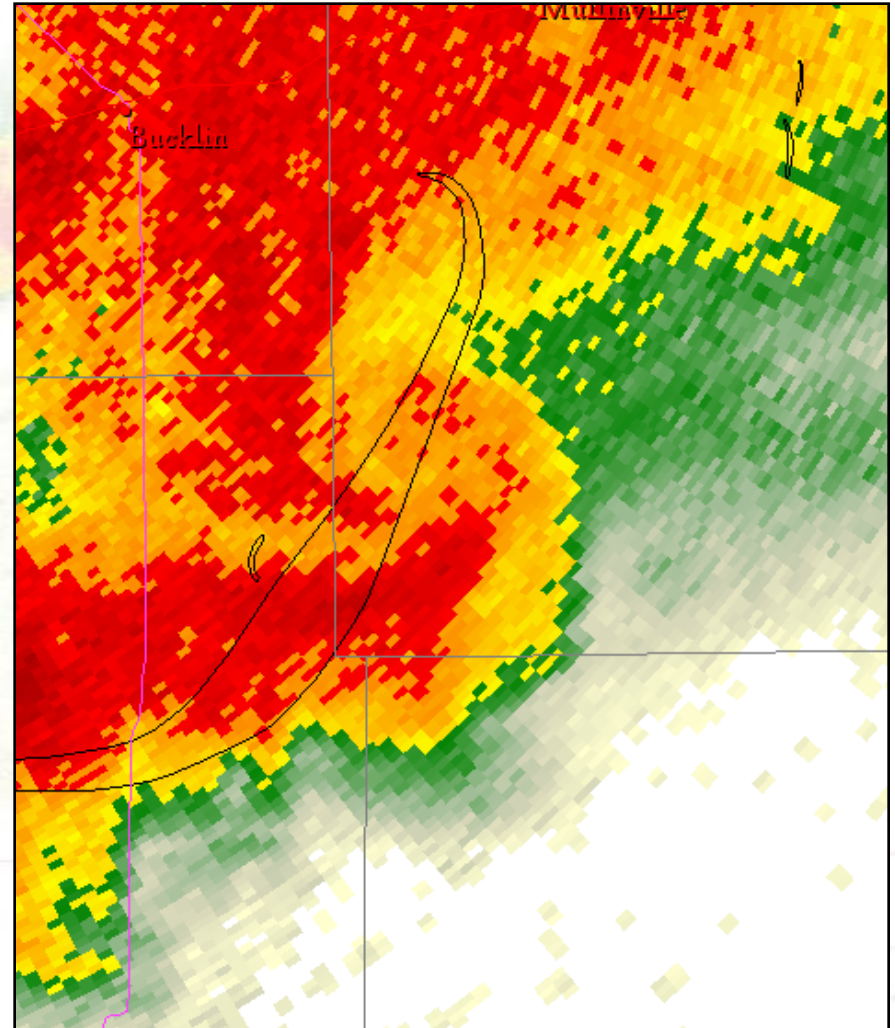


Notable Tornadoes

"J3" Super-Res Imagery (WSR-88D KDDC)



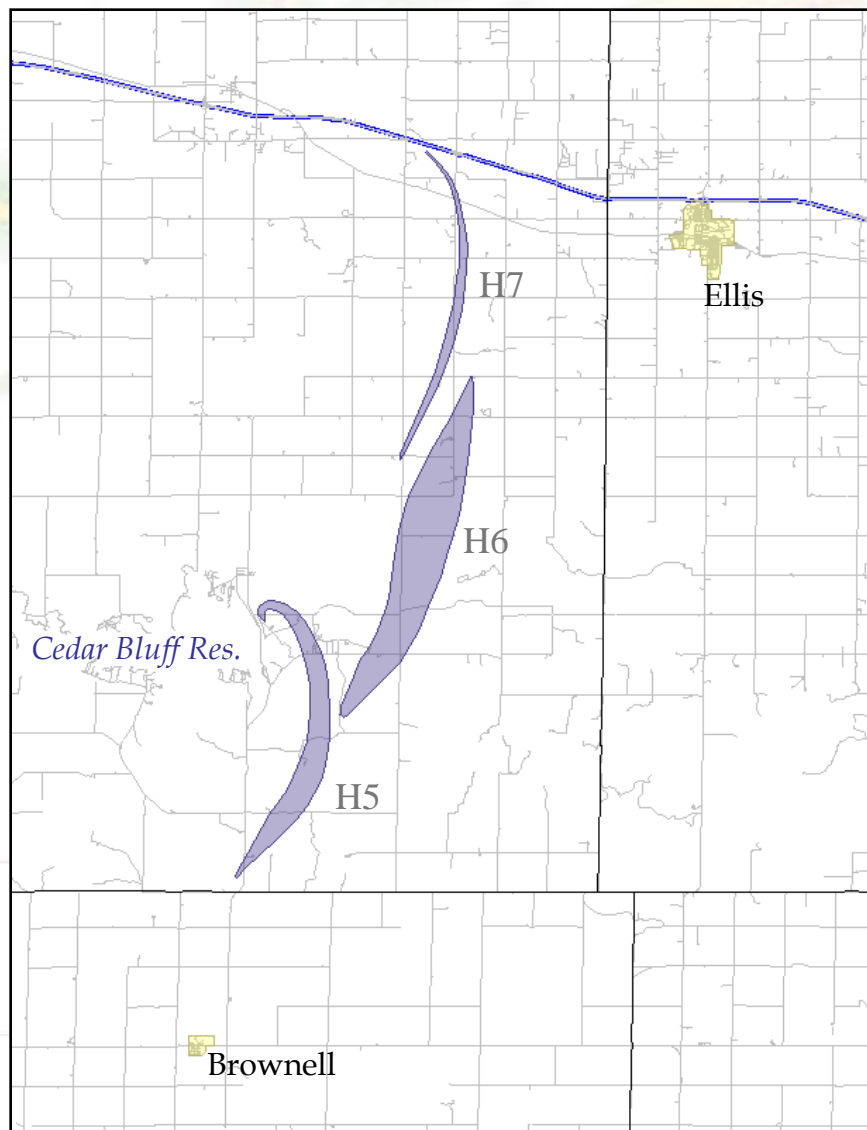
0053 UTC (7:53pm CDT)



0.5° (2100 FT ARL) RANGE = 28NM

Notable Tornadoes

“H5”, “H6”, “H7” series

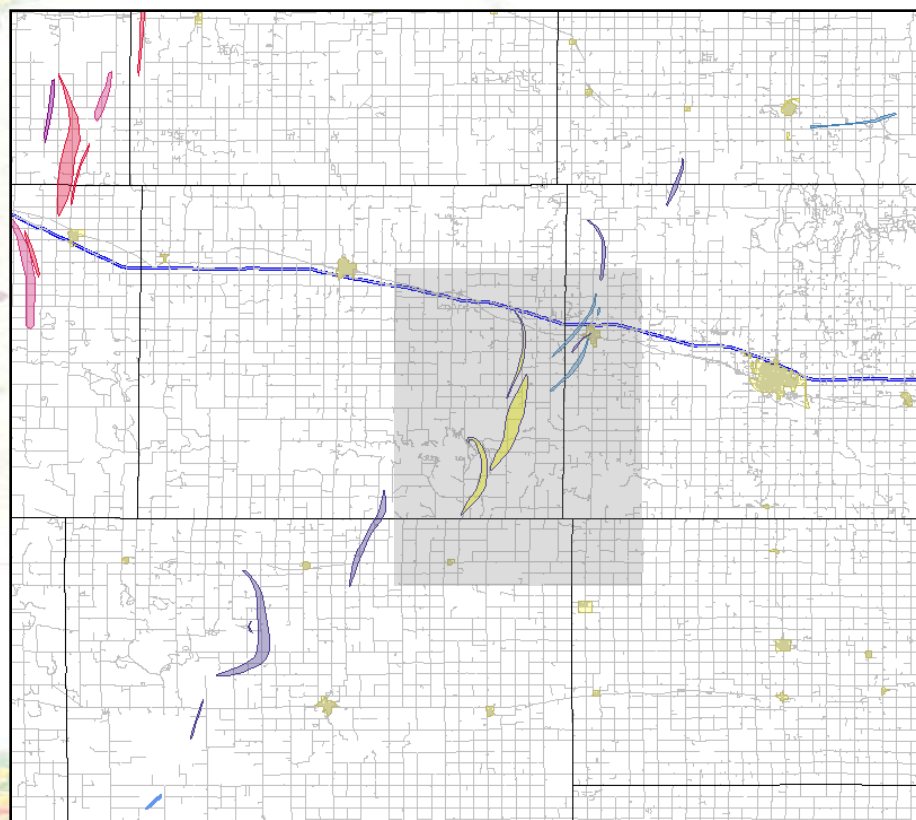


Time: 7:49 to 8:36pm CDT (3 combined)

Path Length: 25.3 mi. (3 combined)

Max Path Width: 1 mi. (H6)

Rating: **H5** – EF1, **H6** – EF2, **H7** – EF2





Notable Tornadoes

"H5" (near Cedar Bluff Reservoir)



©Katie Burtis



© capturethestorm.com



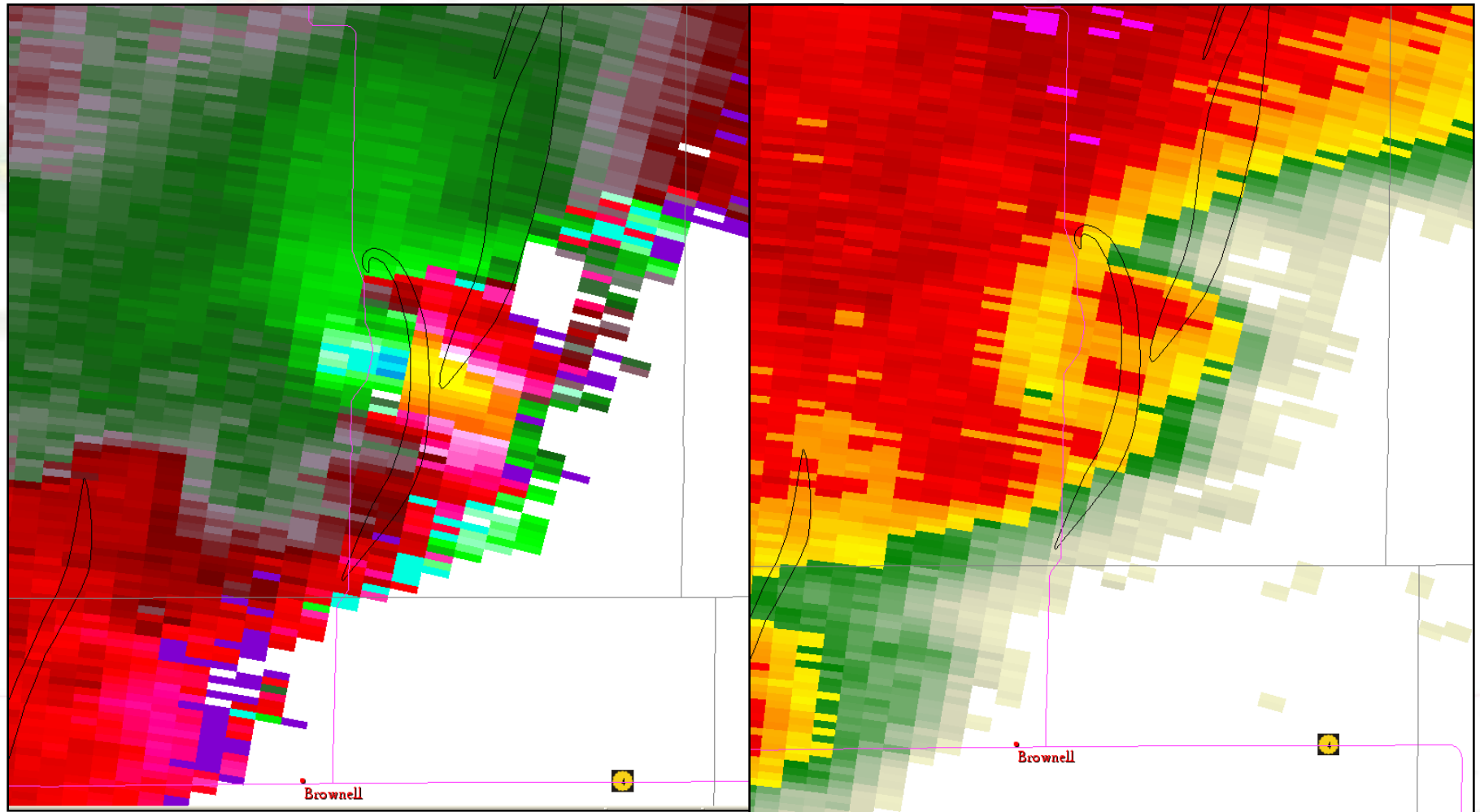
© capturethestorm.com



© capturethestorm.com

Notable Tornadoes

“H5” Super-Res Imagery (WSR-88D KDDC)



0058 UTC (7:58pm CDT)

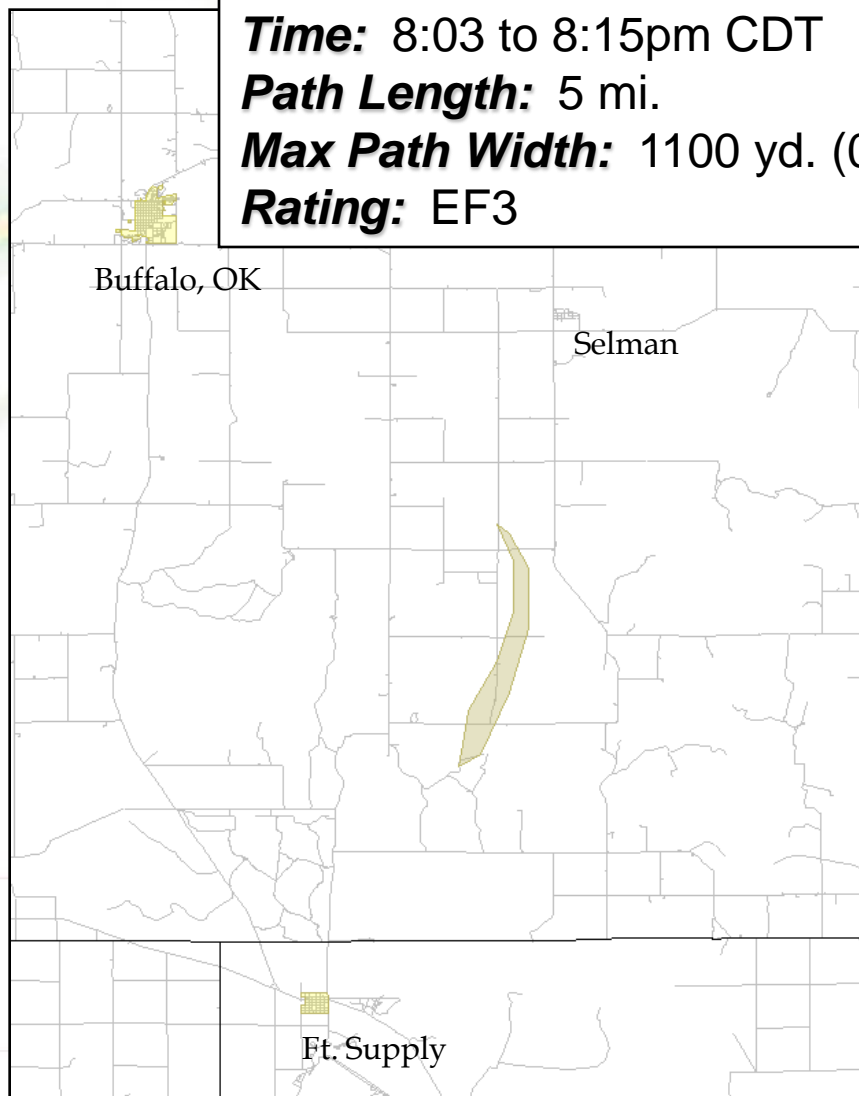
0.5° (6100 FT ARL) RANGE = 62NM



Notable Tornadoes

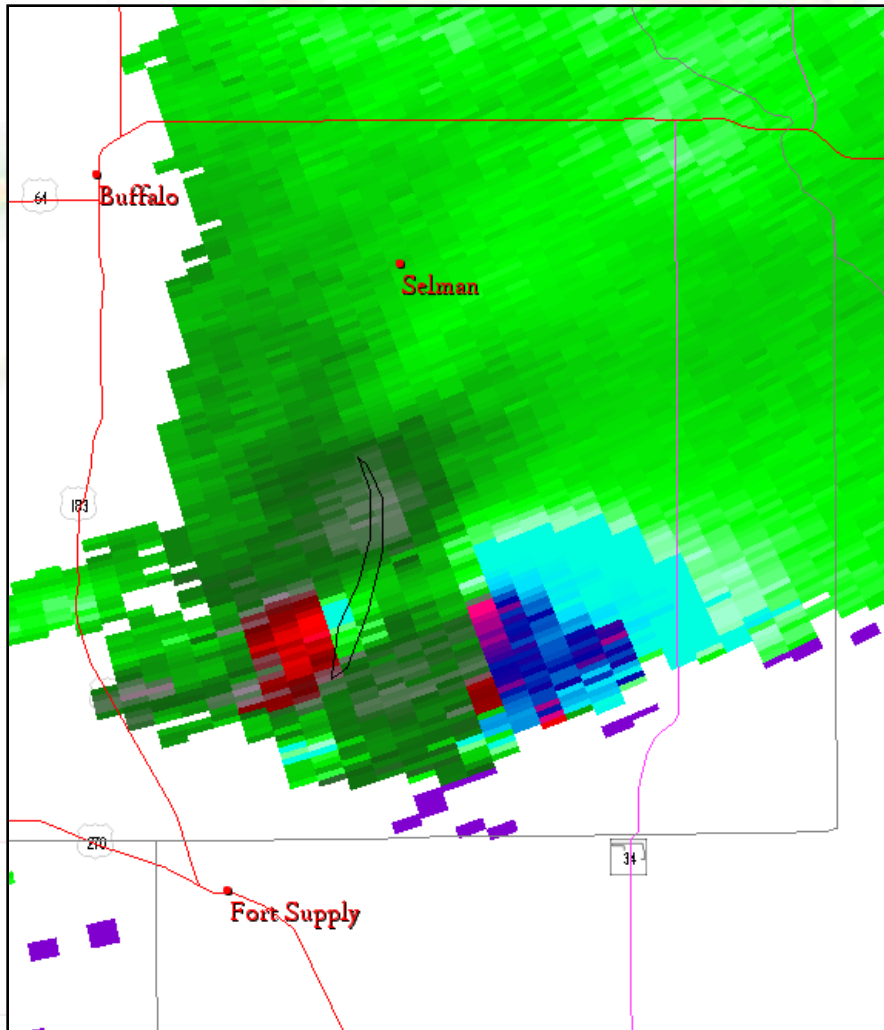
"K1"

Time: 8:03 to 8:15pm CDT
Path Length: 5 mi.
Max Path Width: 1100 yd. (0.6 mi.)
Rating: EF3

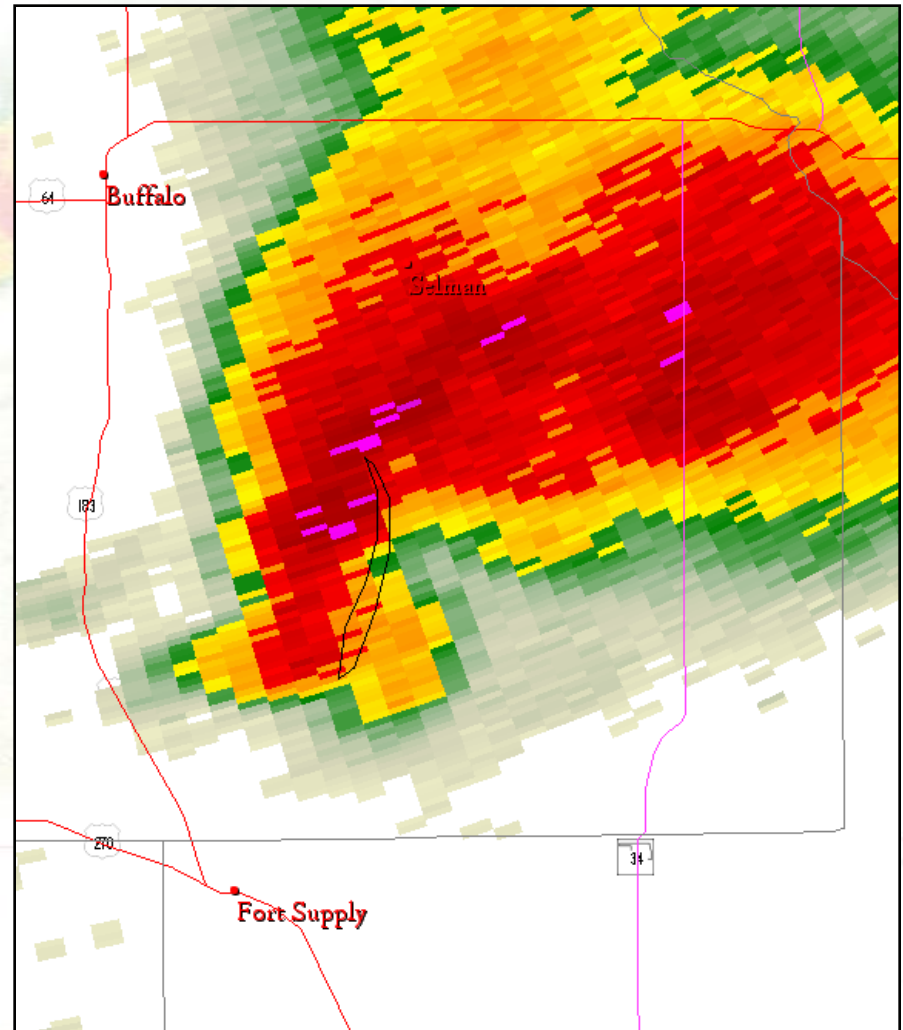


Notable Tornadoes

“K1” Super-Res Imagery (WSR-88D KDDC)



0103 UTC (8:03pm CDT)

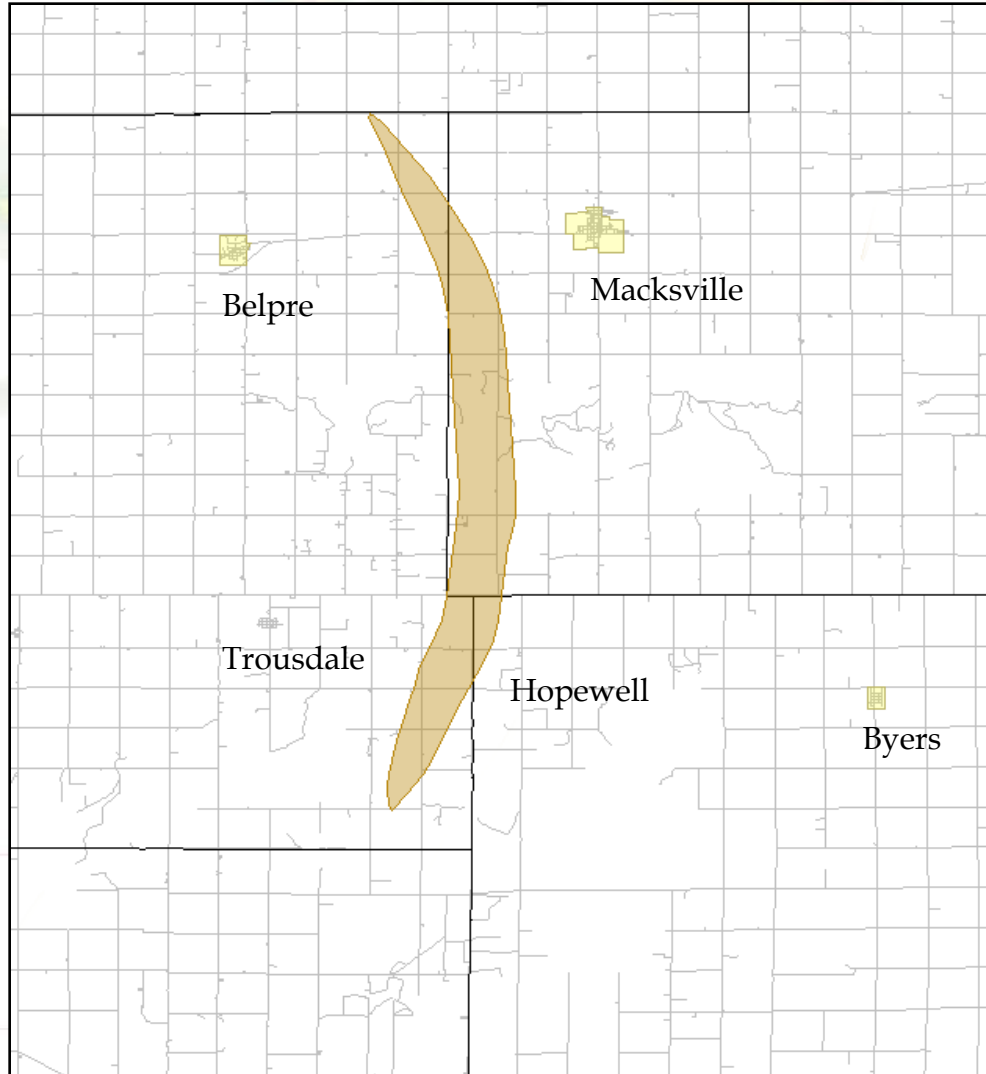


0.5° (7000 FT ARL) RANGE = 69NM



Notable Tornadoes

"J11"

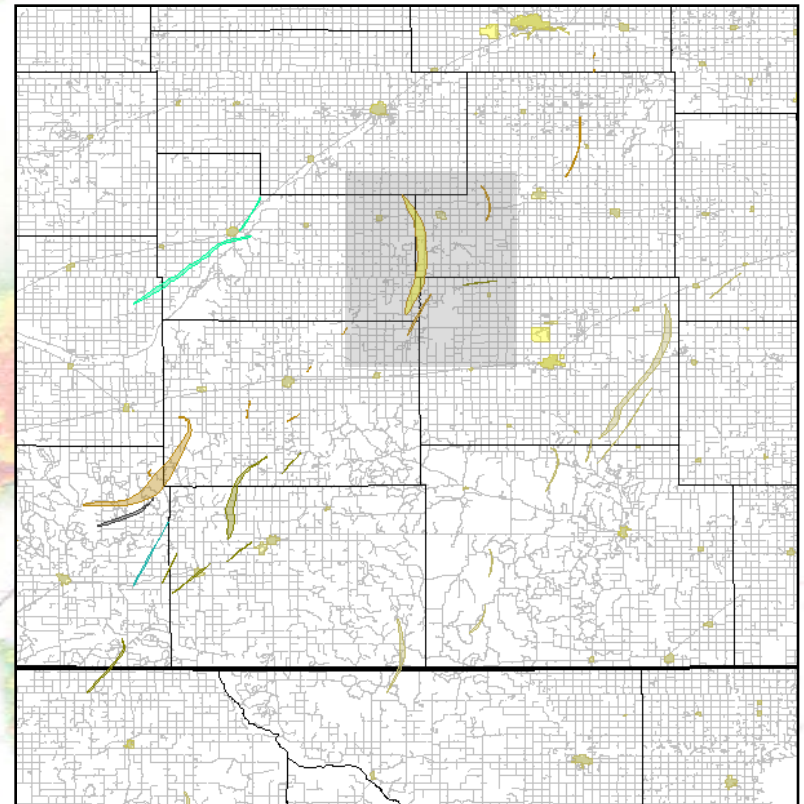


Time: 9:17 to 9:47pm CDT

Path Length: 18.2 mi.

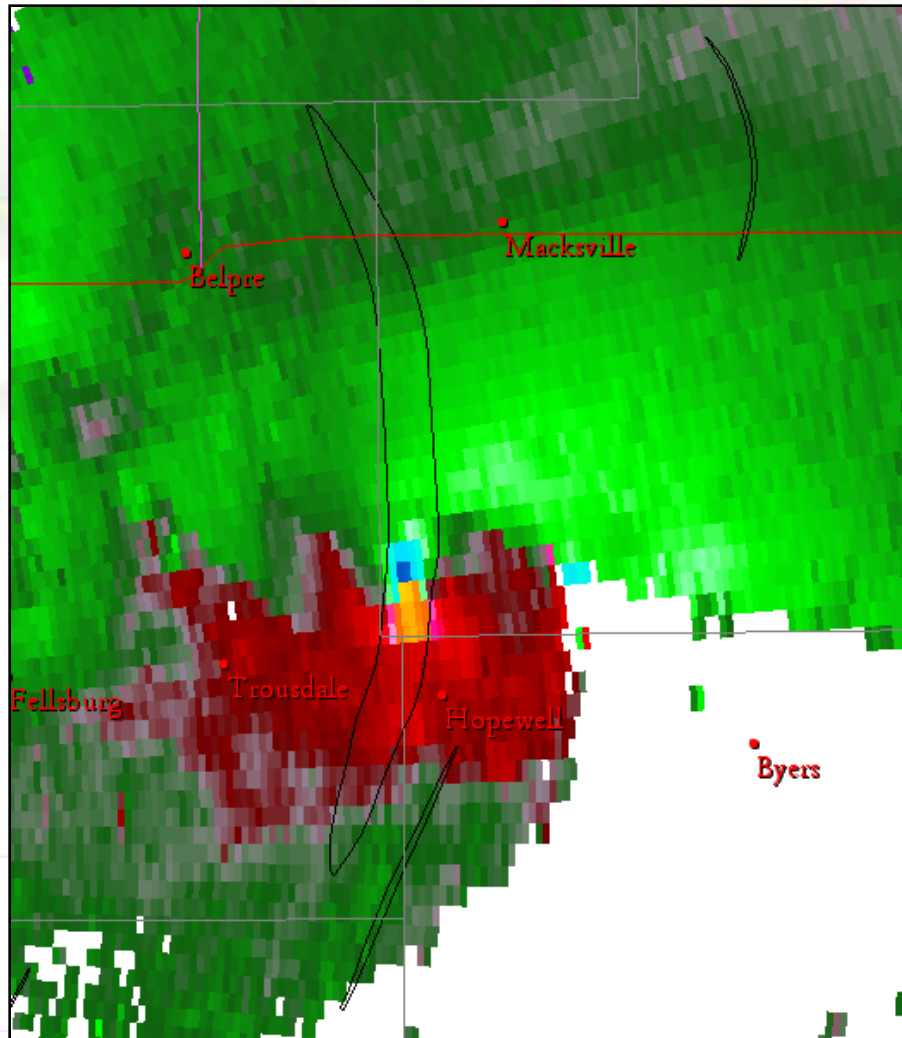
Max Path Width: 1935 yd. (1.1 mi.)

Rating: EF3

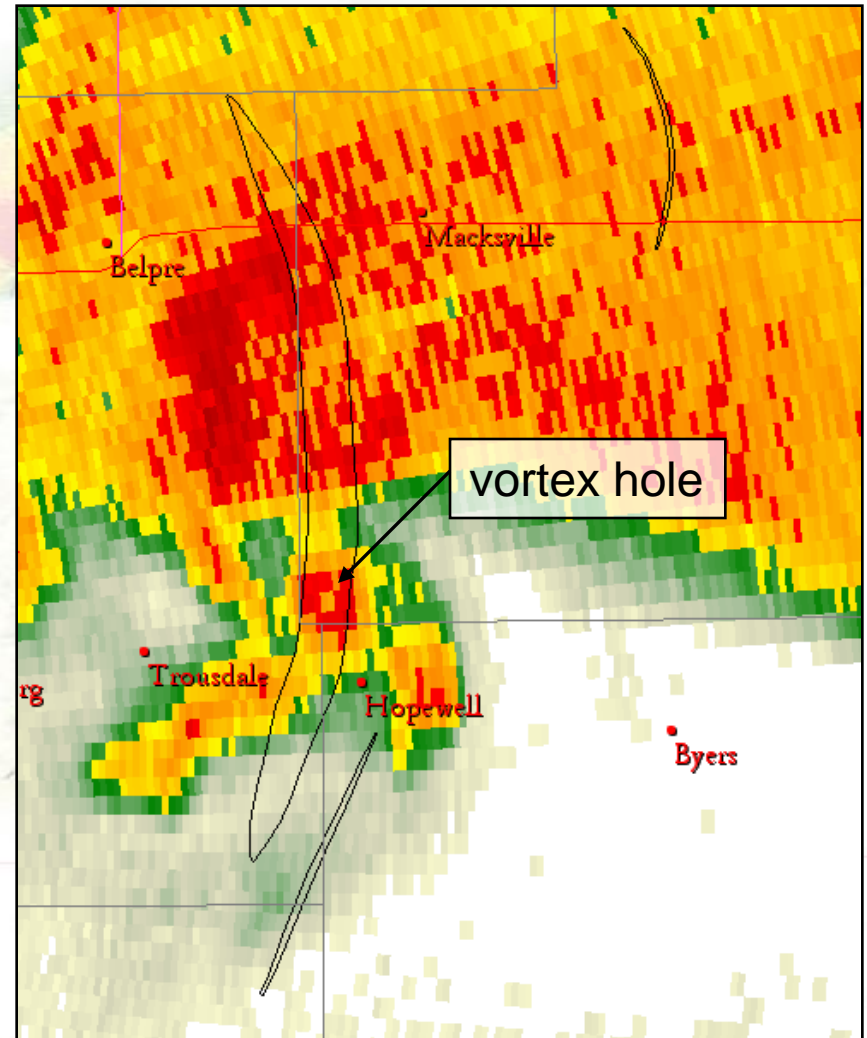


Notable Tornadoes

“J11” Super-Res Imagery (WSR-88D KDDC)



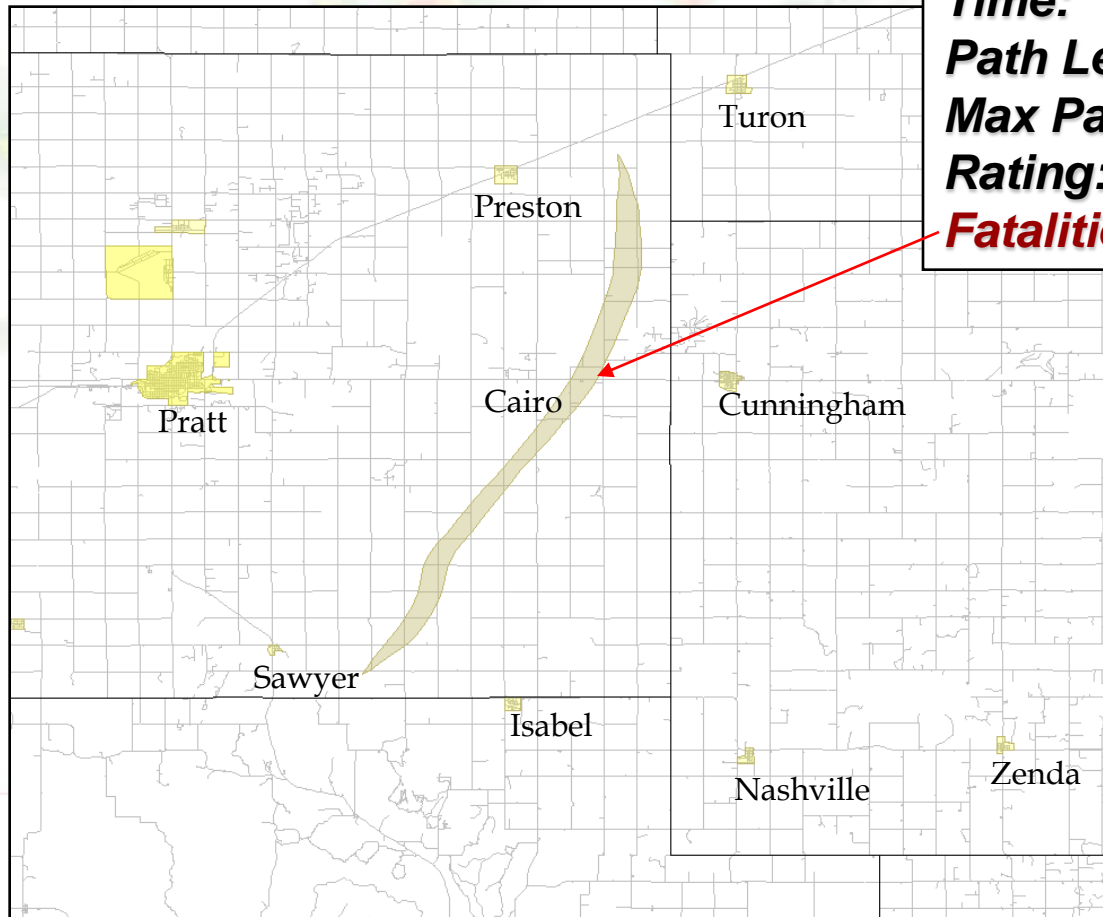
0226 UTC (9:26pm CDT)



0.5° (2100 FT ARL) RANGE = 28NM

Notable Tornadoes

"K8"



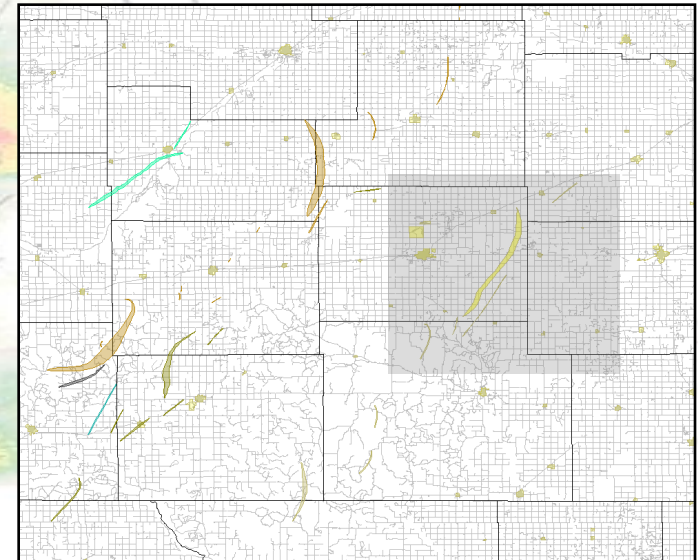
Time: 10:24 to 11:05pm CDT

Path Length: 21.9 mi.

Max Path Width: 1430 yd. (0.8 mi.)

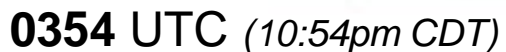
Rating: EF3

Fatalities: 2





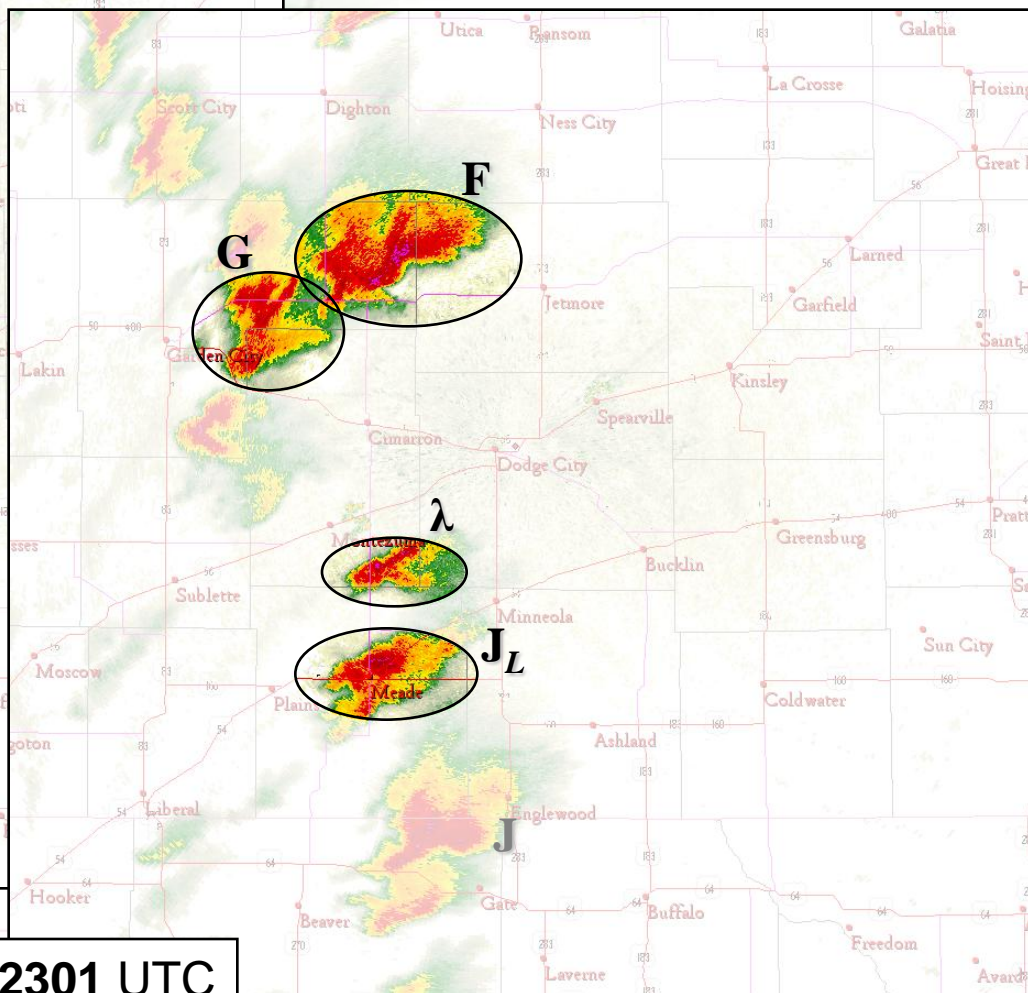
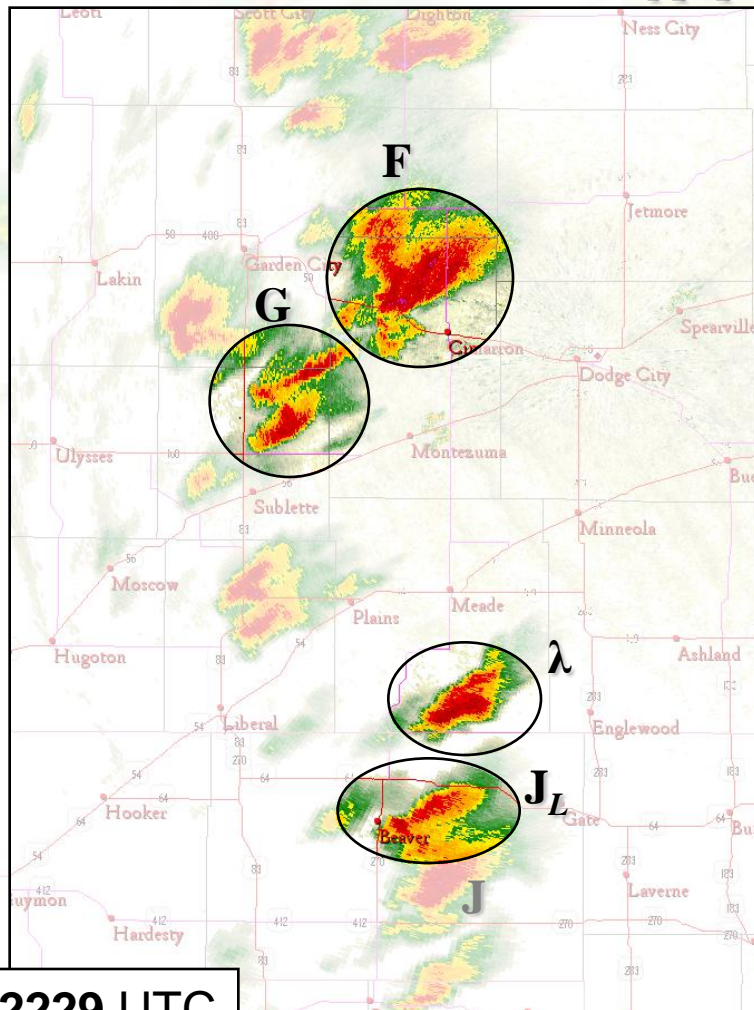
“K8” Super-Res Imagery (WSR-88D KDDC)



0.5° (7300 FT ARL) RANGE = 70NM

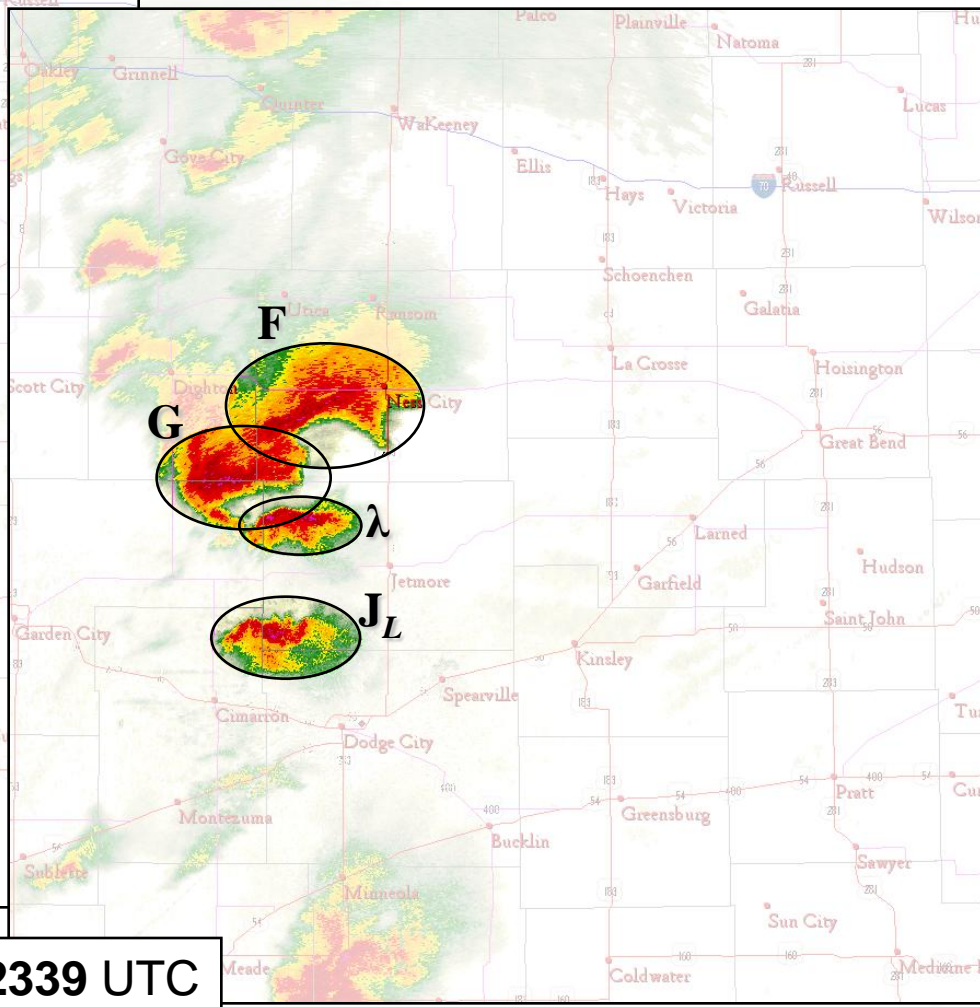
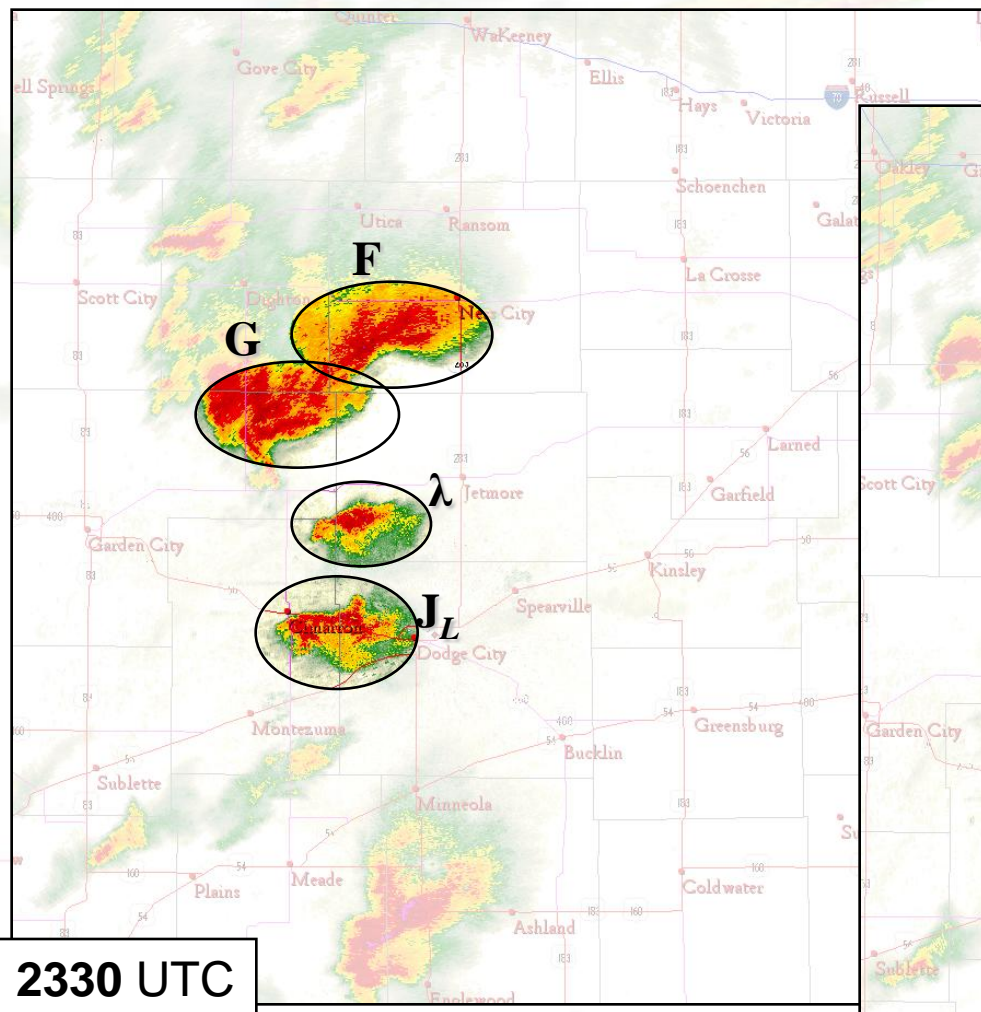
Ness County Storm Merger

A 4-to-1 merger!



Ness County Storm Merger

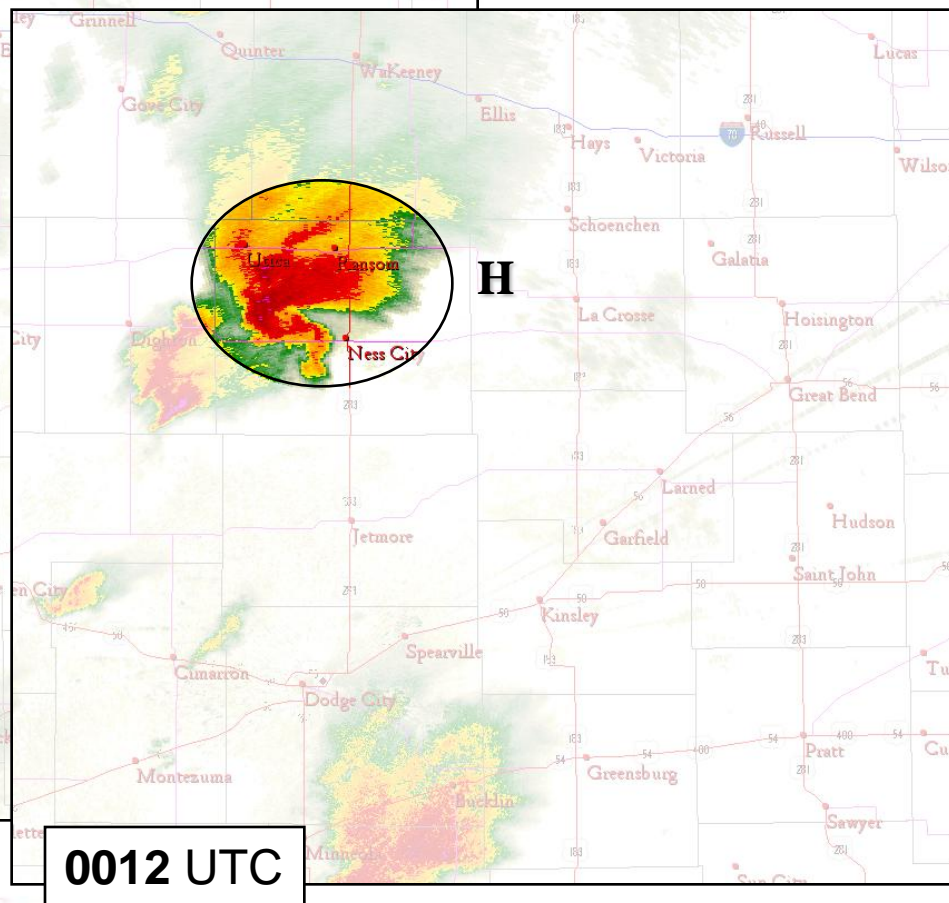
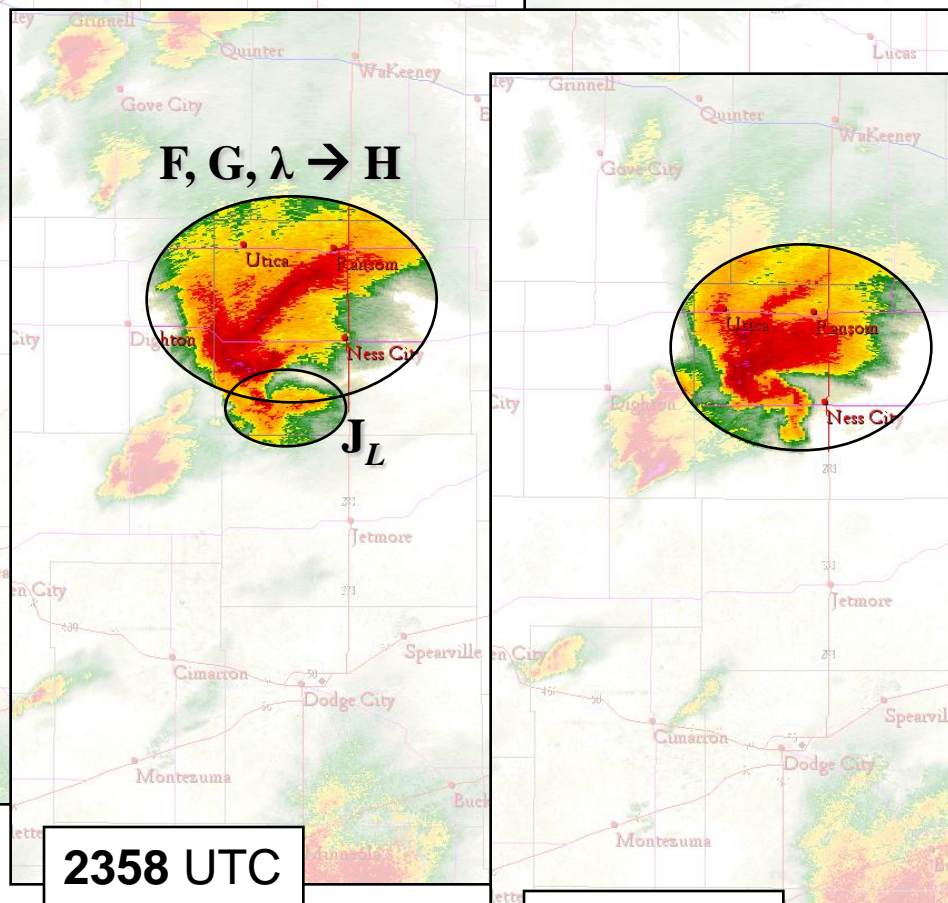
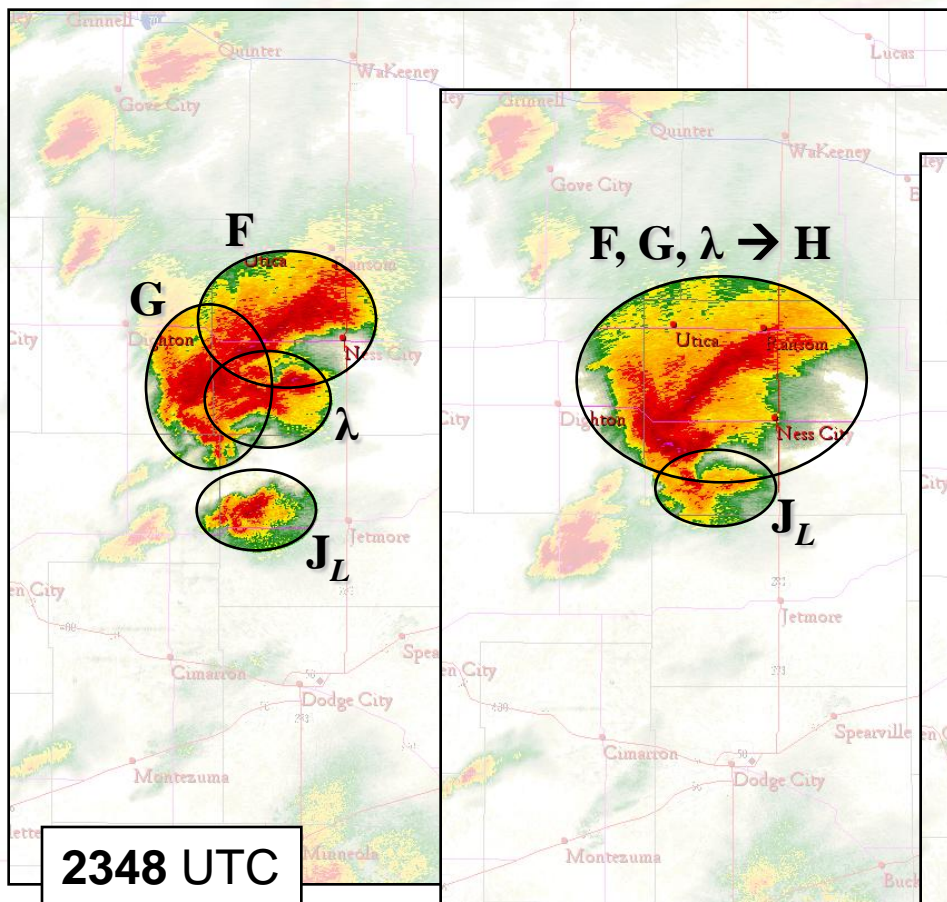
A 4-to-1 merger!



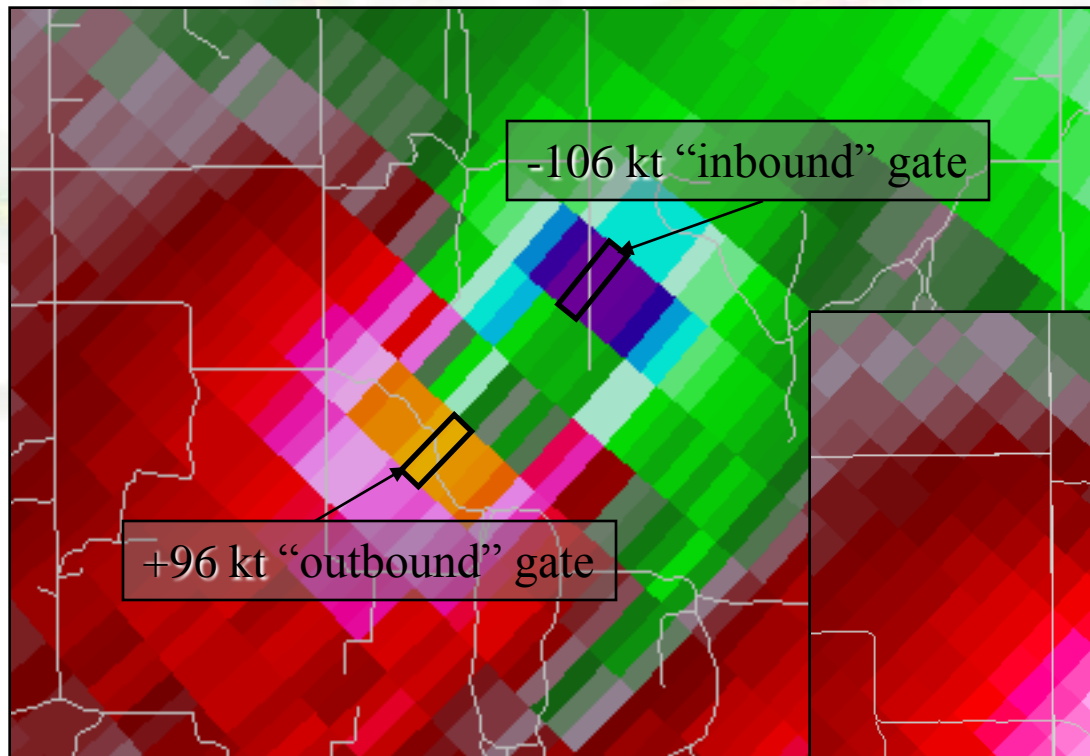


Ness County Storm Merger

A 4-to-1 merger!



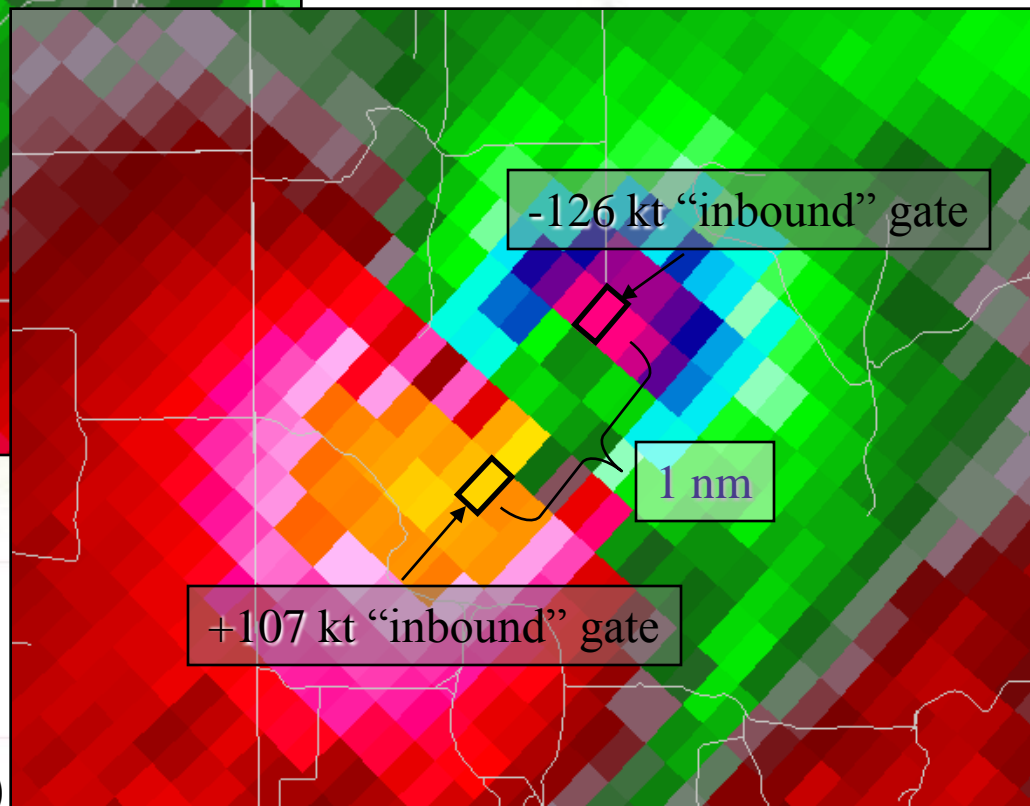
Legacy Res -vs- Super Res



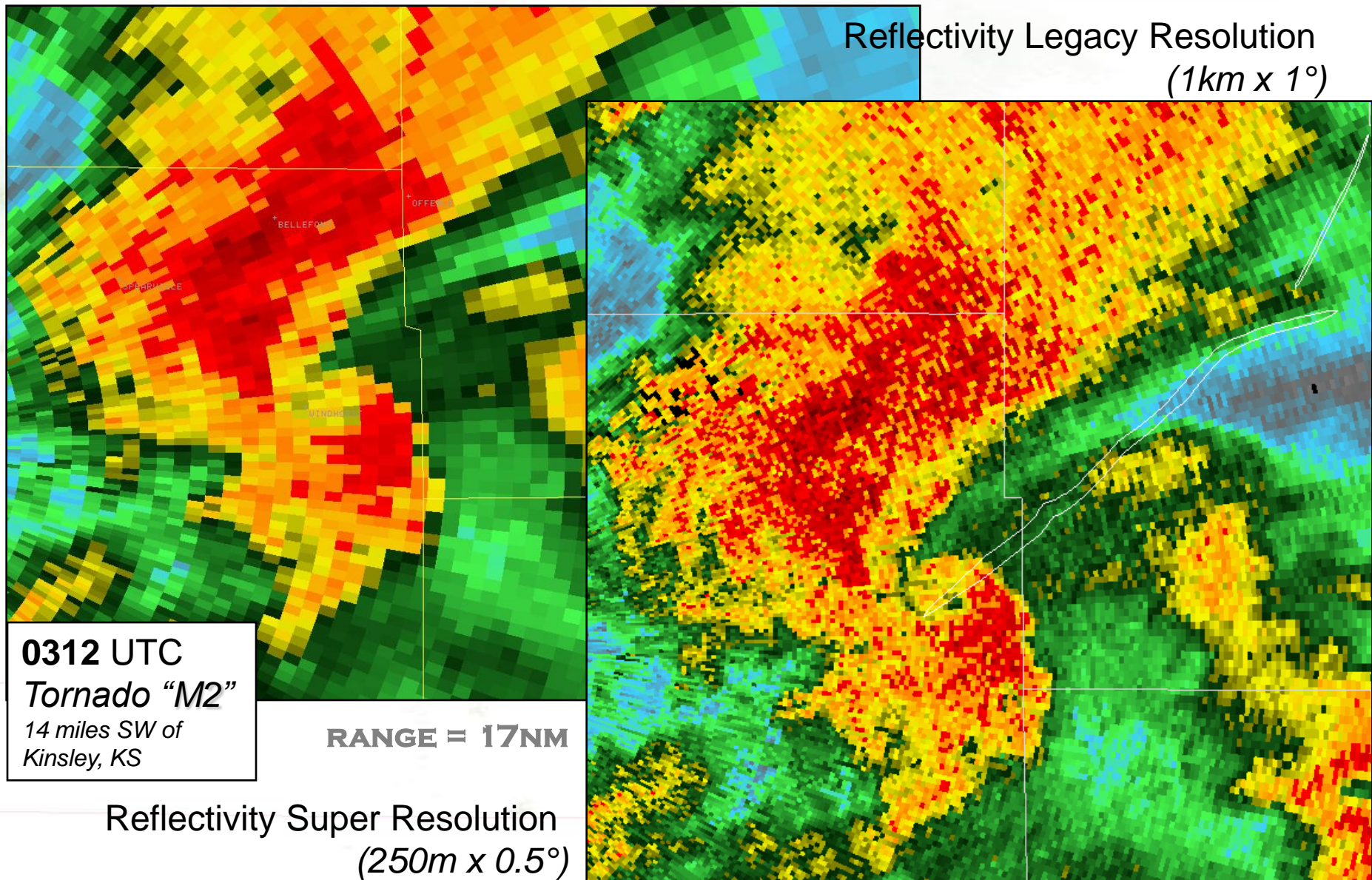
0053 UTC
Tornado “J3”
16 miles SW of
Greensburg, KS

RANGE = 29NM

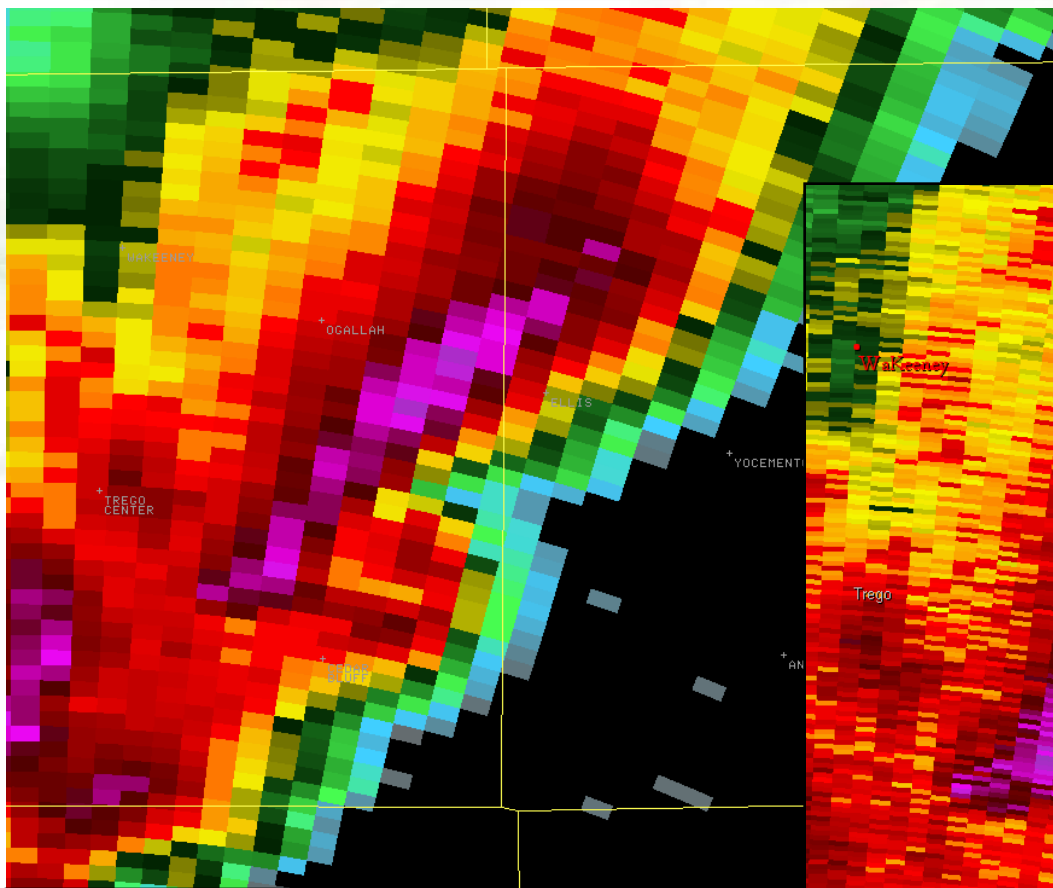
Velocity Super Resolution
(250m x 0.5°)



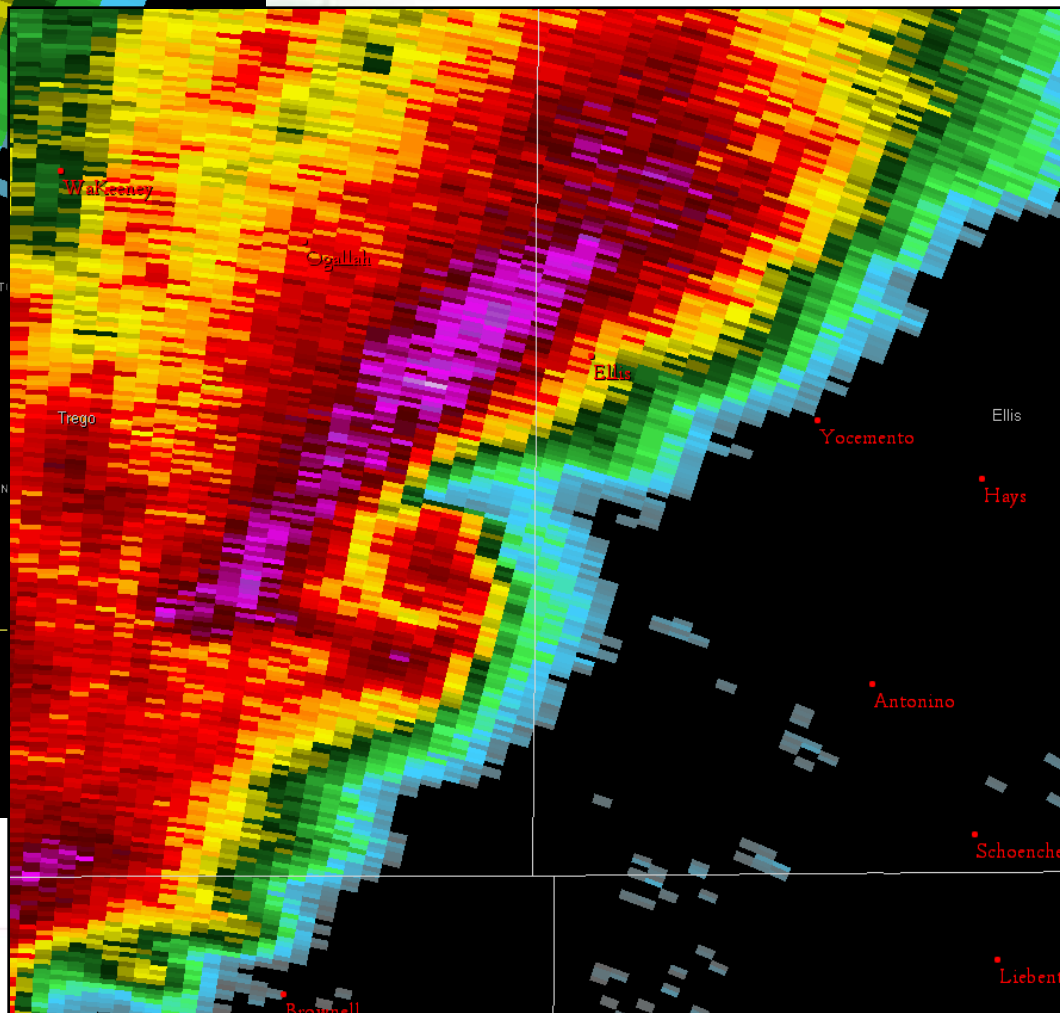
Legacy Res -vs- Super Res



Legacy Res -vs- Super Res



Reflectivity Legacy Resolution
(1km x 1°)



0112 UTC

Tornado "H6"

10 miles SW of Ellis, KS

RANGE = 68NM

Reflectivity Super Resolution
(250m x 0.5°)

Thank You!

