

Demystifying Colloquial Tornado Alley

Delineation of New Tornado Alleys in the Central and Eastern United States

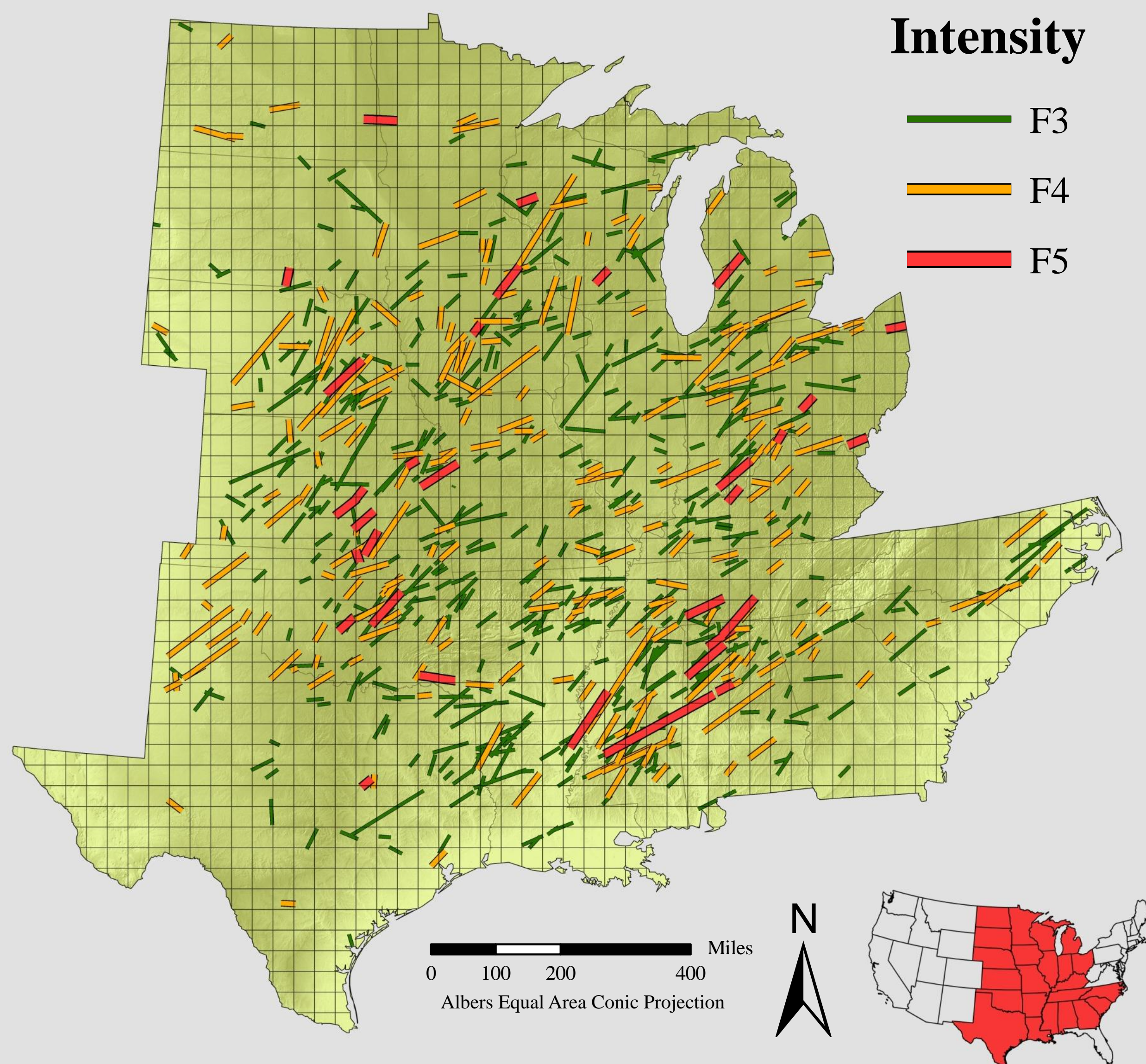
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Introduction

Tornado Alley, a colloquial term associated with an area of the Central United States that experiences a high frequency of tornadoes, is not an officially designated or recognized term by the National Weather Service. Given this information, **the goal of this research is to delineate new tornado alleys by analyzing the spatial distribution of F3 to F5 tornadoes with tracks greater than 20 miles in the Central and Eastern United States from 1950 to 2006.**

Figure 1:

Cell Units and F3-F5 Long-Track Tornadoes

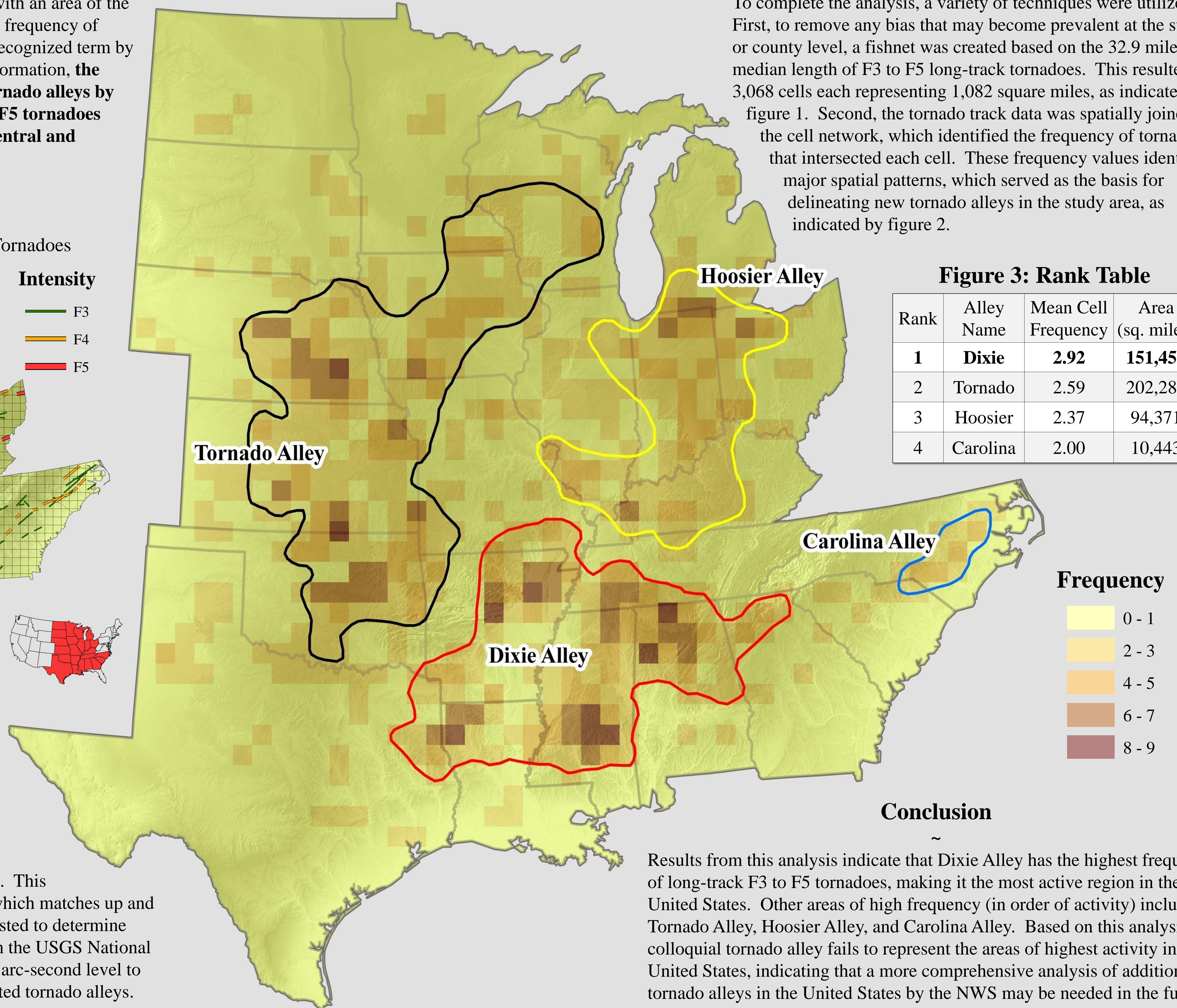


Data Sources

Data were acquired from two main sources. First, tornado track data were obtained from the National Weather Service (NWS) Severe Weather Report Database from 1950 to 2006. This is based on the NWS Severe Plot program, which matches up and concatenates the tornado segments that are listed to determine total path lengths. Secondly, DEM data from the USGS National Map Seamless Server were obtained at the 1 arc-second level to highlight the variances in terrain and delineated tornado alleys.

Figure 2: Delineated Tornado Alleys

Based on the Frequency of F3-F5 Long-Track Tornadoes per Cell



Methods and Results

To complete the analysis, a variety of techniques were utilized. First, to remove any bias that may become prevalent at the state or county level, a fishnet was created based on the 32.9 mile median length of F3 to F5 long-track tornadoes. This resulted in 3,068 cells each representing 1,082 square miles, as indicated by figure 1. Second, the tornado track data was spatially joined to the cell network, which identified the frequency of tornadoes that intersected each cell. These frequency values identified major spatial patterns, which served as the basis for delineating new tornado alleys in the study area, as indicated by figure 2.

Figure 3: Rank Table

Rank	Alley Name	Mean Cell Frequency	Area (sq. miles)
1	Dixie	2.92	151,454
2	Tornado	2.59	202,281
3	Hoosier	2.37	94,371
4	Carolina	2.00	10,443

Conclusion

Results from this analysis indicate that Dixie Alley has the highest frequency of long-track F3 to F5 tornadoes, making it the most active region in the United States. Other areas of high frequency (in order of activity) include Tornado Alley, Hoosier Alley, and Carolina Alley. Based on this analysis, colloquial tornado alley fails to represent the areas of highest activity in the United States, indicating that a more comprehensive analysis of additional tornado alleys in the United States by the NWS may be needed in the future.