**Executive Summary**

The National Oceanic and Atmospheric Administration (NOAA) reports that the United States experiences an average of 1,000 tornadoes per year. Most of these tornadoes are found in the Great Plains in an area, unofficially, known as Tornado Alley. The second most vulnerable area for multiple tornadoes to strike is in the southern United States in what is lesser known as Dixie Alley.

This capstone project will use publicly available data from NOAA to analyze both Tornado Alley and Dixie Alley tornadoes in terms of frequency, magnitude, time of day and most deadly while seeking to understand which “Alley” is more dangerous and why.

A cursory internet search shows that Tornado Alley experiences a greater number of tornadoes while Dixie Alley events have more causalities. The objectives of this project are to 1) confirm this statement, 2) provide an in-depth analysis as to why this is true and 3) to make recommendations on steps that can be taken to mitigate tornado risk to individuals and their families.

NOAA datasets will be used to explore weather related data, Census Bureau data will provide population densities in the areas of interest and data from the International Code Council will reveal what residential building codes are presently in place to address tornadoes or high winds.

**Motivation**

I have selected this project because I find this topic and all naturally occurring disasters for that matter, fascinating. I’ve worked as a disaster management program manager and have witnessed the catastrophic impact such events have on people’s lives. This capstone project is an opportunity for me to provide compelling information, powered by data to save lives.

**Data Question**

Which is more deadly, Tornado Alley or Dixie Alley and why?

Gagan, J., Gerard, Gordan, J. (2010). A Historical and Statistical Comparison of “Tornado Alley” to “Dixie Alley.” <http://nwafiles.nwas.org/digest/papers/2010/Vol34No2/Pg145-Gagan-etal.pdf>

Ashley, S., Strater, S. (2016). Recipe for Disaster: How the Dynamic Ingredients of Risk and Exposure Are Changing the Tornado Disaster Landscape. *American Meteorological Society*. https://journals.ametsoc.org/bams/article/97/5/767/69885

**Minimum Viable Product (MVP)**

Fact based presentation in Tableau that draws conclusions from the analysis and makes recommendations to federal and state legislatures responsible for governing residential construction, city planners and residential building codes committees on possible adjustments to construction codes and standards. The end goal is to provide information that will serve to limit causalities in homes resulting from tornadoes. The presentation will be delivered in a zoom environment and supported by visualizations to include histograms, line charts, and maps.

**Schedule (through 1/7/2021)**

1. Get the data (find data sources) (start 11/21 | finish 11/29 – duration: 8 days)
2. Import/perform EDA/Analyze data (start 11/30 | finish 12/20 – duration: 20 days)
3. Create Presentation of your Analysis (start 12/21 | finish 12/27 – duration: 6 days)
4. Rehearse (start 12/28 | finish 12/3/20 – duration: 6 days)
5. Internal demos (1/4/2021)
6. Demo Day!! (1/7/2021)

**Data Sources**

* NOAA Storm Events Database <https://www.ncdc.noaa.gov/stormevents/>
* International Code Council <https://www.iccsafe.org/>
* Manufactured Housing Institue <https://www.manufacturedhousing.org/building-codes-and-standards/>
* US Census Bureau <https://www.census.gov/construction/nrc/index.html>
* US Census Bureau <https://www.census.gov/data/tables/2010/dec/density-data-text.html>

**Known Issues and Challenges**

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| Anticipated Challenges | Management Plan |
| Lack of confidence in coding skills necessary to draw meaningful conclusions from the data within the given time constraints. | Seek assistance from the experts, early and often. |
| Locating concrete data to support changes to existing building codes. | Dig deeper into FEMA datasets as it’s highly plausible that this issue has been raised. |
| Locating convincing data to support the obvious - why manufactured homes are a death trap in a tornado. | Keep searching, it’s likely that the answer will come from “web scraping” techniques. |
| Its known that unknown challenges will arise. | As there are still many competing priorities before full devotion to this project can been applied, start early. |
| Request for data or api key | Presently unknown |
| Known data cleaning steps | Presently unknown |