# Spatial Factors Contributing to Aviation Accidents in Oregon & Washington

Brian Oliver
Peter Bordokoff
Patrick Holcomb

# What are the spatial factors leading to or causing general aviation accidents in Oregon & Washington?

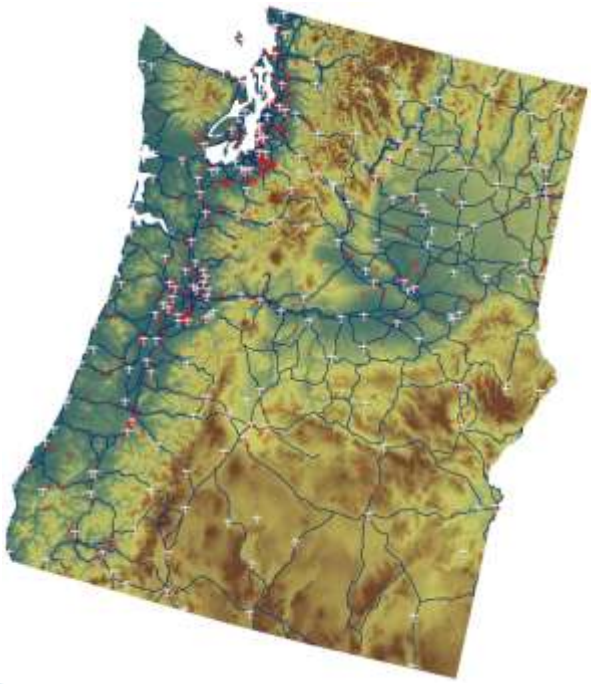
The goal of this project will be to analyze trends at airports throughout Oregon & Washington to see what atmospheric conditions, landscape conditions, or other spatial factors may cause aviation accidents.

## Data:

- National Transportation Safety Board accident database for Oregon & Washington (limited to general aviation accidents in fixed wing aircraft)

  Crash site locations
  Cities Shapefile

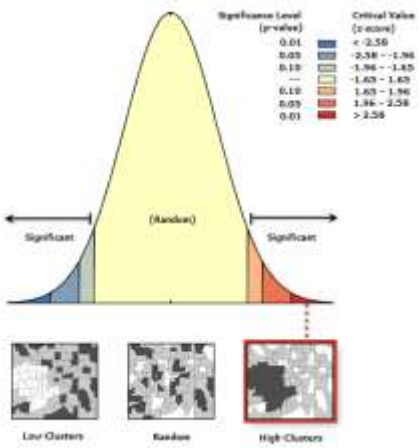
- F.A.A. airport locations and traffic counts
- Digital Elevation Model's for state elevation data



# Data Preparation

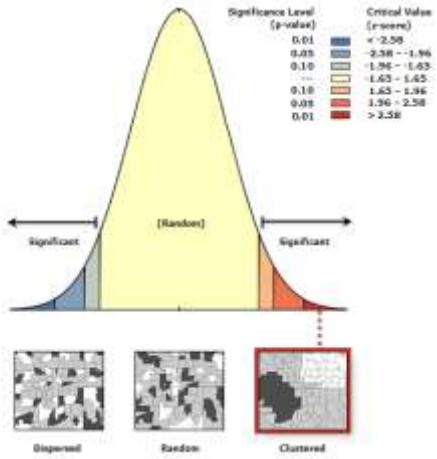
- Create XY locations for the accident sites
  - Converted NTSB to decimal degrees
- Assign elevation to accidents
  - Raster to points, created Thiessen Polygons, Spatially Joined

High/Low Clustering for Raw Crash Count




Given the z-score of 5.82, there is a less than 1% likelihood that this high-clustered pattern could be the result of random chance.

Moran's I for Raw Crash Count



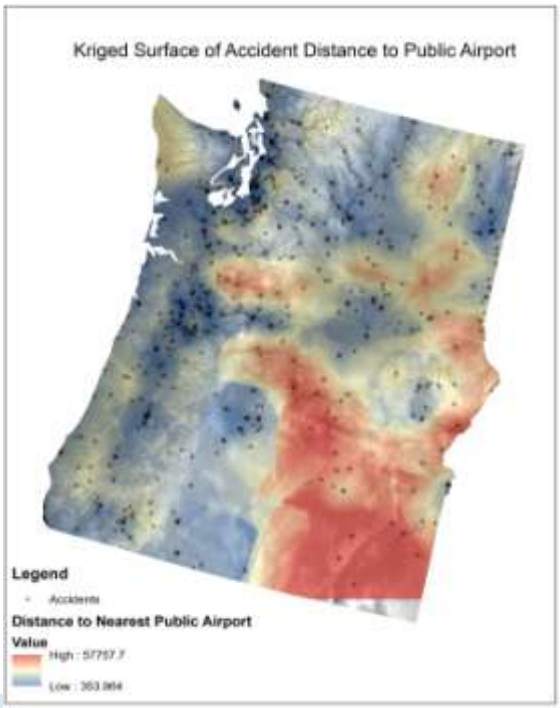

Given the z-score of 6.11, there is a less than 1% likelihood that this clustered pattern could be the result of random chance.

# Creating a Weighted Overlay

- Kriged Distance of Accident to Nearest Public Airport
- Kriged Map of Visibility at Accident Site
- Count of Accidents per Airport Polygon
- Kriged Map of Elevation at Accident Site

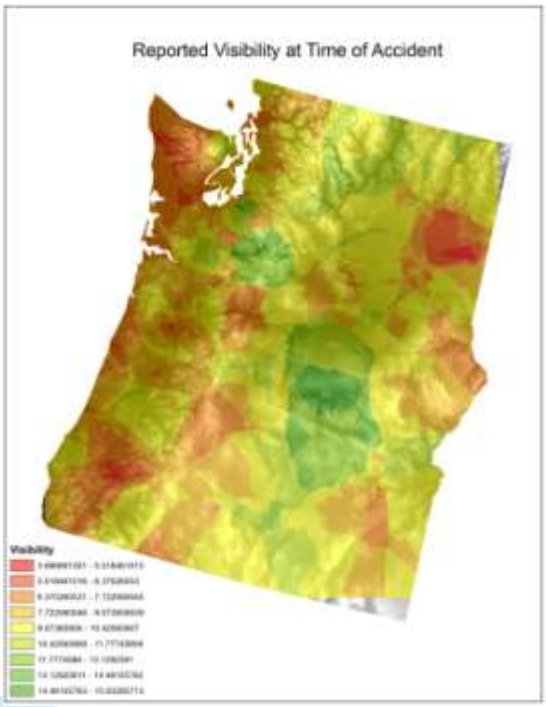
# Methods

- Near
- Kriging



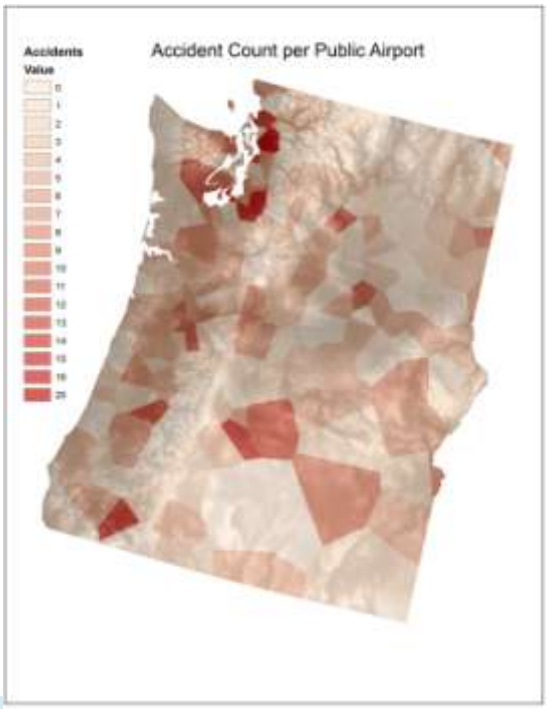

# Methods

- Kriging



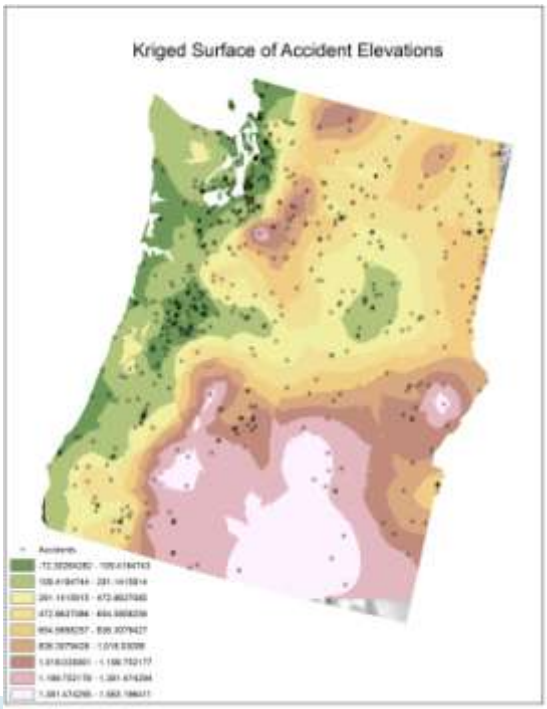
# Methods

- Thiessen Polygons
- Spatial Join to Accidents



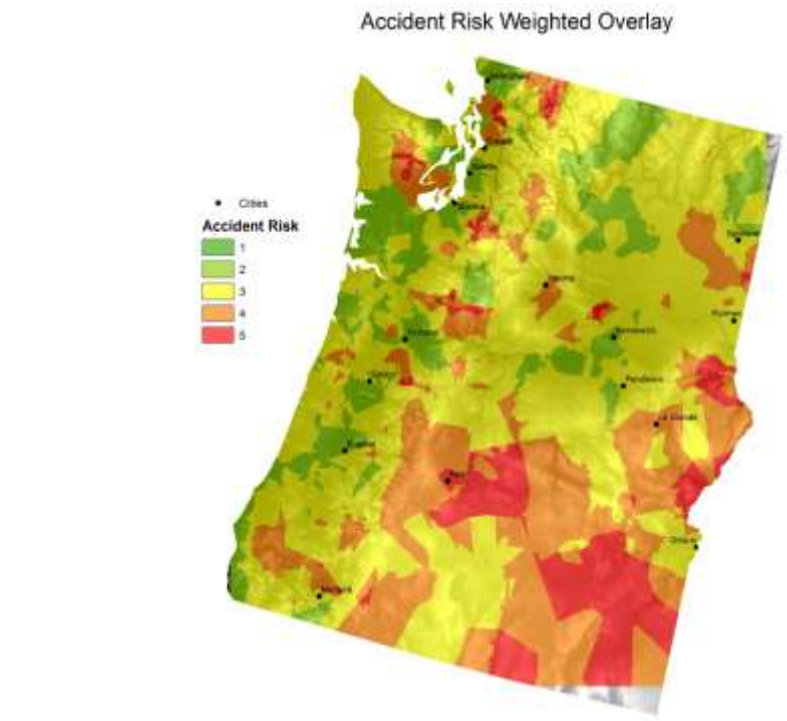

# Methods

- Kriging



# Weighted Overlay

- Classify All Layers (1-5)
- Convert All layers to Integer Format Raster
- Assigned Equal Weights



# Conclusions

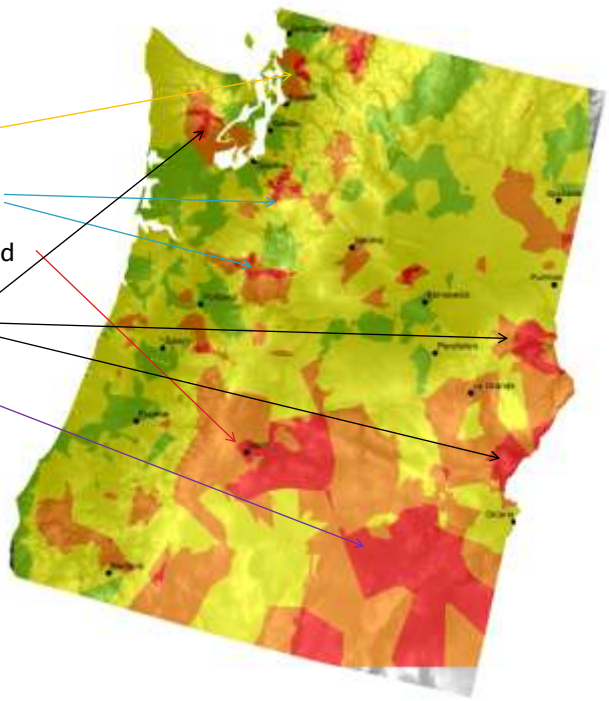
Maritime Weather

Sightseeing Flights

Vacationers going to Bend

High Mountain Flying

Remote Areas



# Data Sources

- FAA Airport Database
- NTSB Aviation Accident Database
- Experts:
  - Don Stevens, CFI (Hillsboro Aviation); Erin Kelly, Captain (Virgin America); Randy Oliver; Test Pilot (U.S. Army)
- Literature:
  - American Journal of Epidemiology, Vol. 155, No. 5 pg. 398 "Exploratory Spatial Analysis of Pilot Fatality Rates in General Aviation Crashes Using Geographic Information Systems" Jurek G. Grabowski, Frank C. Curriero, Susan P. Baker, and Guohua Li