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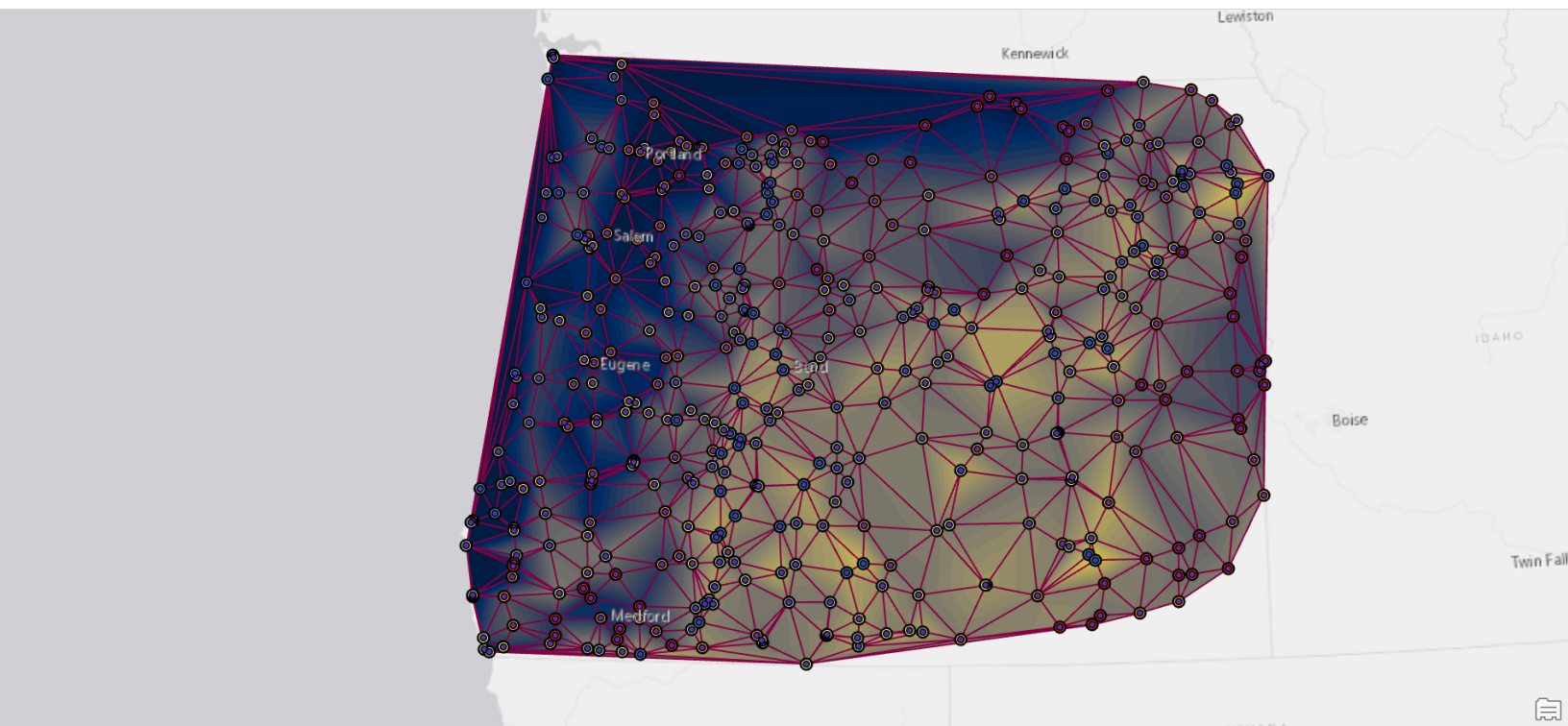
ENGR-180-01

21 October 2022

### LAB4-1

OPEN the attribute table and answer: What types of data are in the attribute table (based off the column headers)? How many sites are there (what is the number of assets in the table/number of rows)?

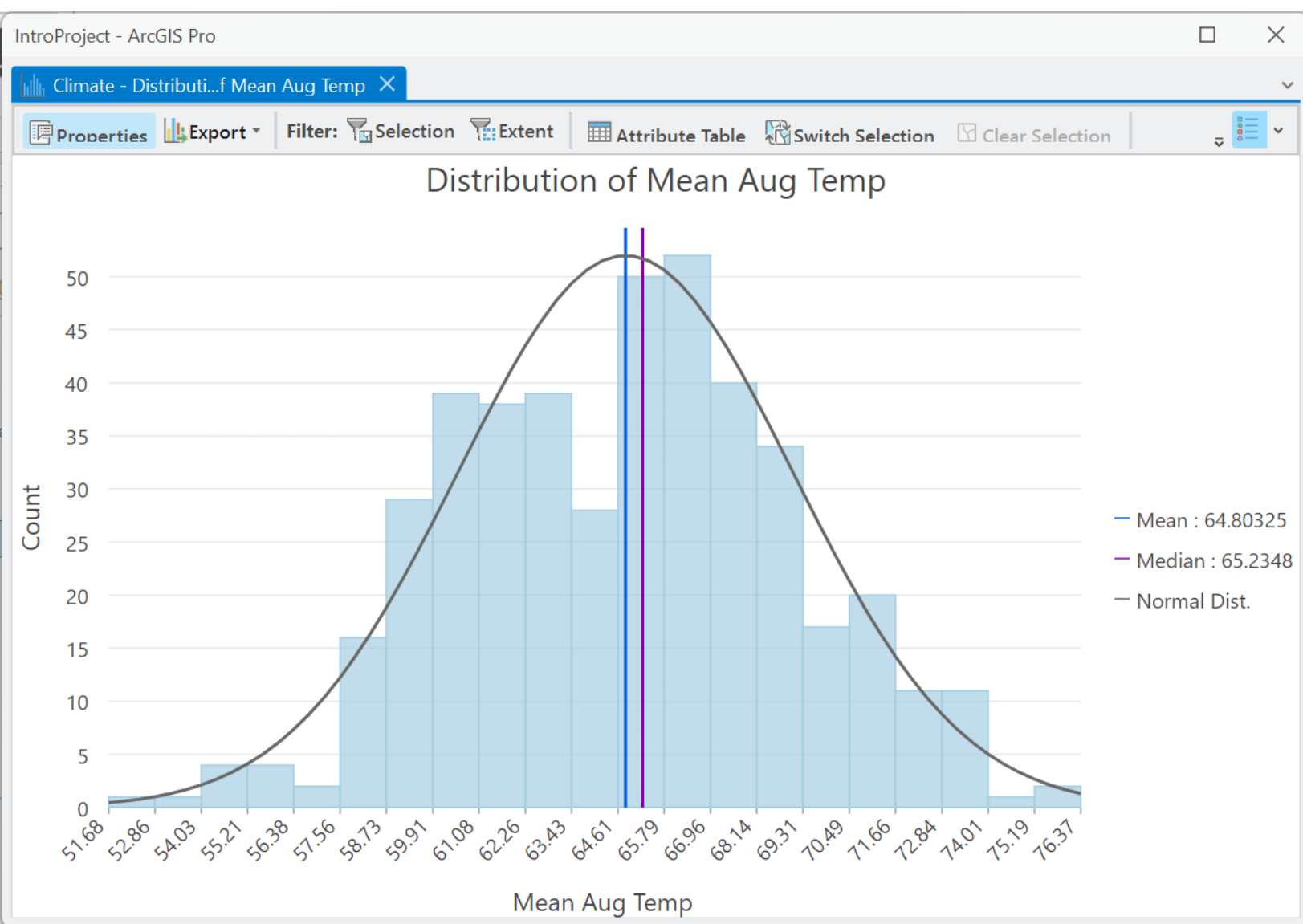
There are all kinds of data in the attribute table, relating to latitude, longitude, terrain data and even street name. There are roughly 439 sites (rows) in the table.



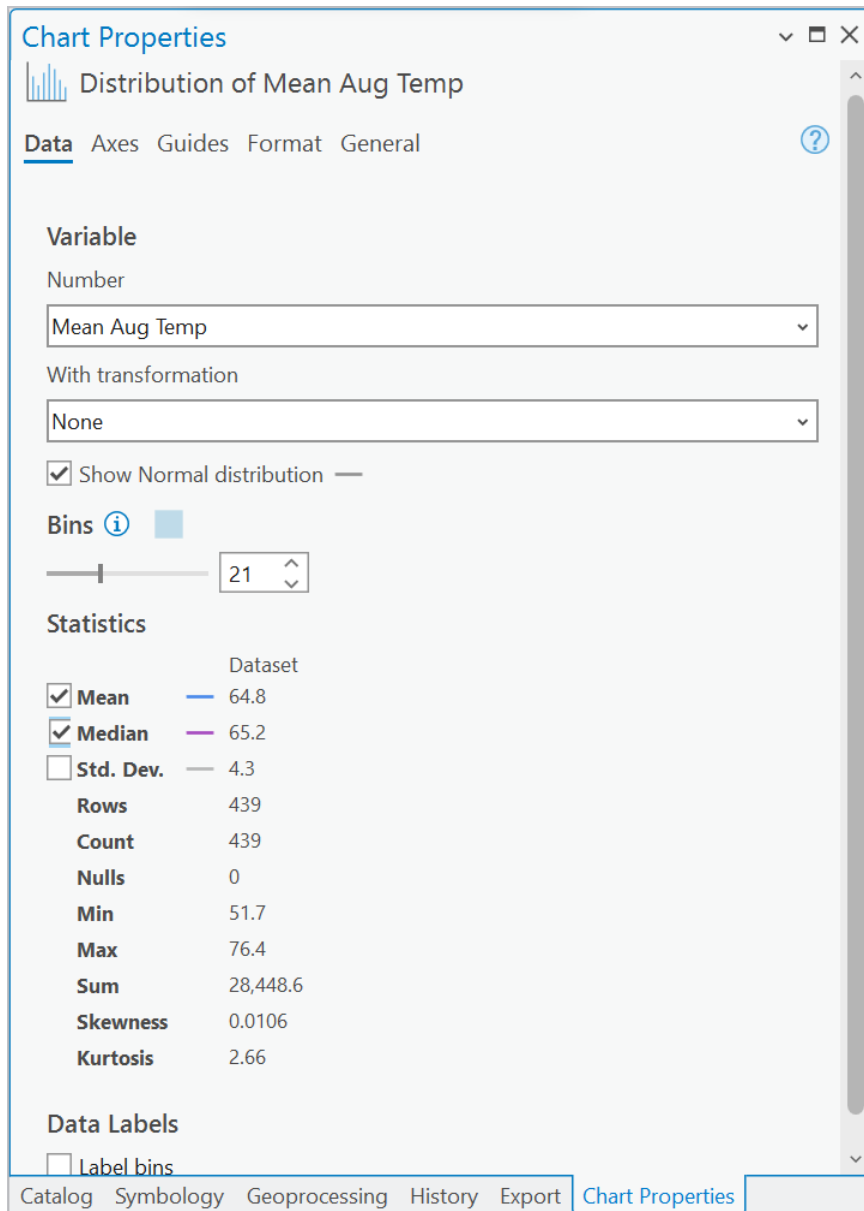
Above is a screenshot of my TIN surface with Edges on.

Submit a screenshot of the chart created for Mean Aug Temp with the mean, median, and normal distribution reference line. Based on a visual interpretation of the chart, are the values for Mean Aug Temp normally distributed?

The values for Mean Aug Temp are somewhat normally distributed although there are some values that fall outside of the conventional normal distribution curve, like 61.08 on the Mean Aug Temp chart falls outside of the normal distribution reference line. I have included the chart I created for the Mean Aug Temp below.



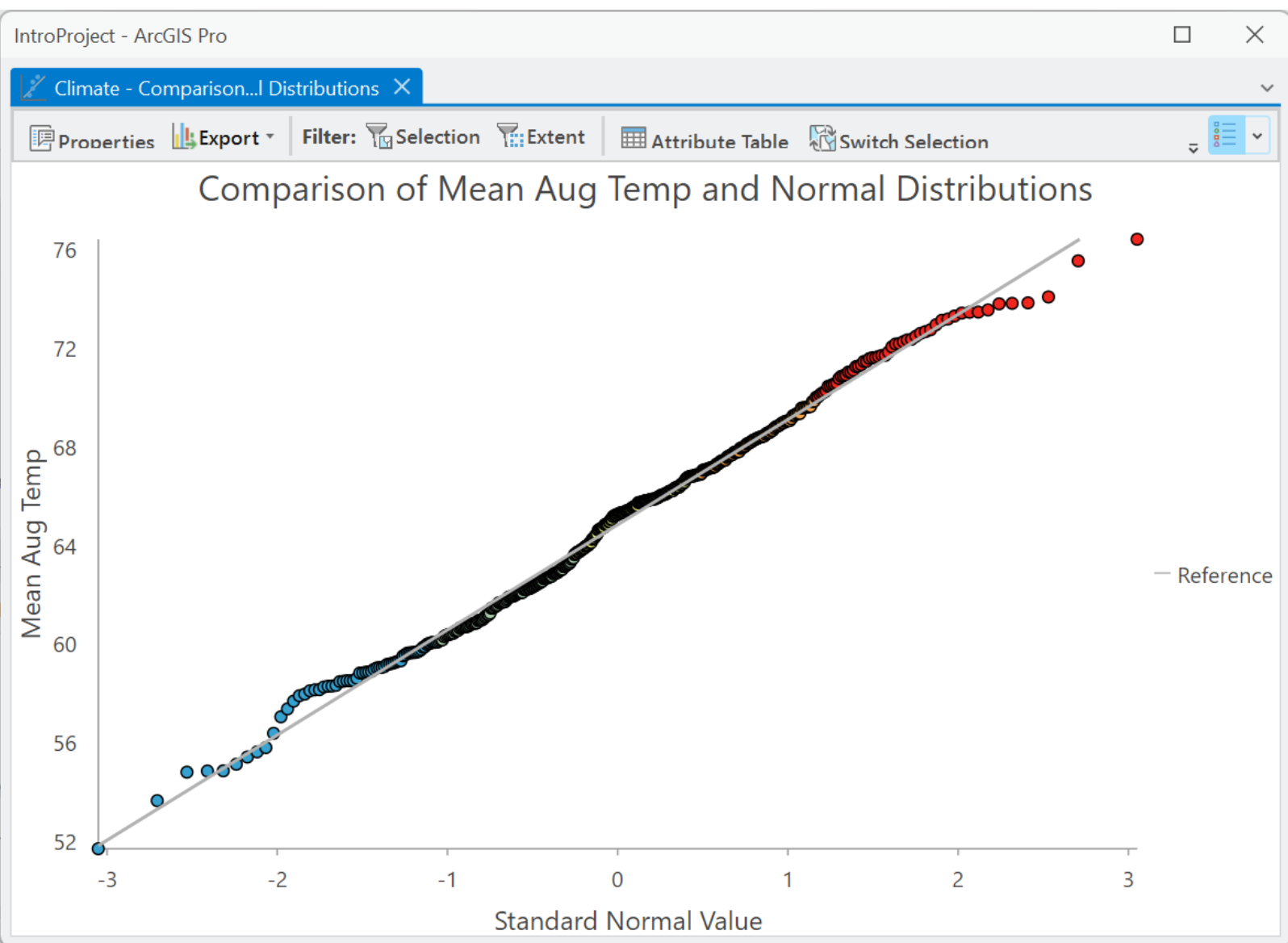
Submit a screenshot of your statistical/numerical results. Explain in written format if the data are normally distributed based on your statistical/numerical results



Based on the results, I can say that the data is normally distributed because the skewness for a normal distribution is always zero, and the skewness for this data falls in that category as well, since it is a positive value, we can tell it is skewed to the right, we can also tell that the data is

normally distributed because the Kurtosis for a standard normal distribution is three, but since the Kurtosis for this data is 2.66 which is close to the expected value of three, it also falls under the category of normally distributed. (*"1.3.5.11. Measures of skewness and kurtosis," n.d.*) .

Answer: Based on a visual interpretation of the chart, are the values for Mean Aug Temp normally distributed? Will the Mean Aug Temp values need to be transformed?



Based on a visual interpretation of the chart (QQ plot above) I believe the values for the Mean Aug Temp are not normally distributed and they will need to be transformed, especially the values that are on the ends of the plot, they will need to be transformed to fit a little closer to the reference line.

Submit a screenshot showing the spatial reference for the Climate layer and highlight/circle the units.

Layer Properties: Climate

General  
Metadata  
**Source**  
Elevation  
Selection  
Display  
Cache  
Definition Query  
Time  
Range  
Indexes  
Joins  
Relates  
Page Query

▼ Spatial Reference

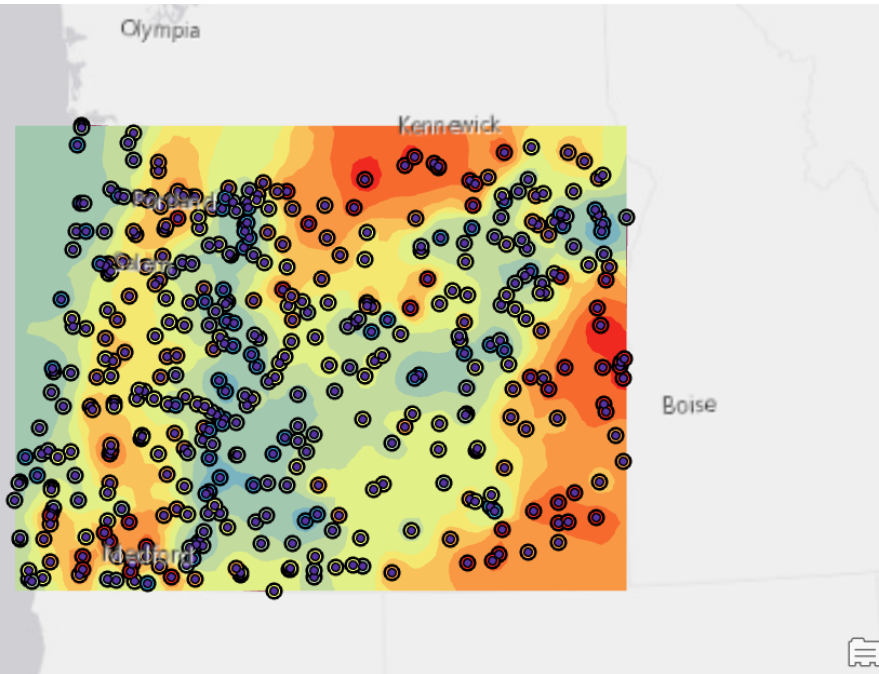
Projected Coordinate System	NAD 1983 (2011) Oregon Statewide Lambert (Meters)
Projection	Lambert Conformal Conic
WKID	6556
Previous WKID	102969
Authority	EPSG
Linear Unit	Meters (1.0)
False Easting	400000.0
False Northing	0.0
Central Meridian	-120.5
Standard Parallel 1	43.0
Standard Parallel 2	45.5
Latitude Of Origin	41.75

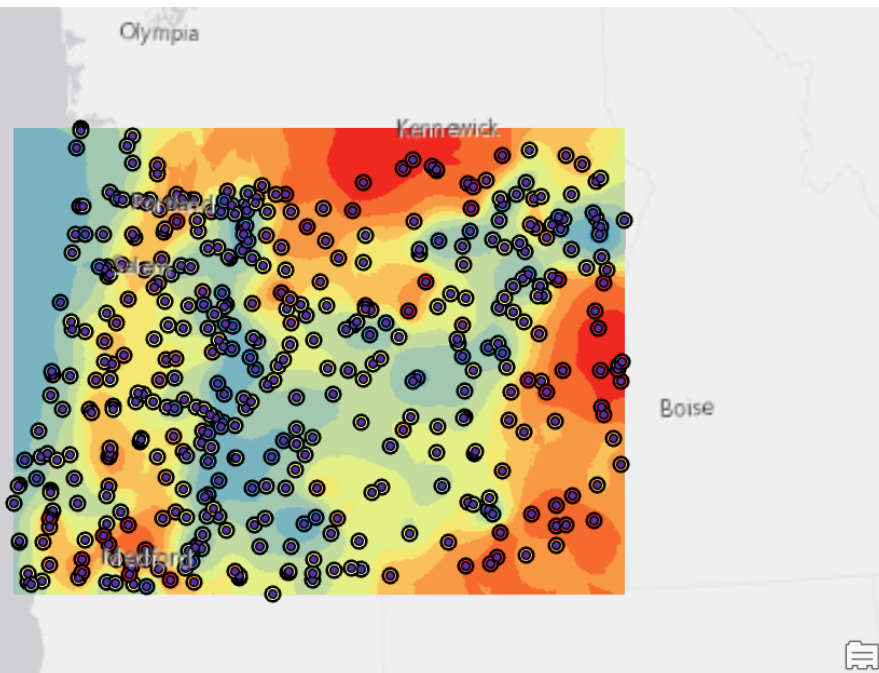
Geographic Coordinate System	NAD 1983 (2011)
WKID	6318
Previous WKID	104145
Authority	EPSG
Angular Unit	Degree (0.0174532925199433)
Prime Meridian	Greenwich (0.0)
Datum	D NAD 1983 2011
Spheroid	GRS 1980
Semimajor Axis	6378137.0

OK Cancel

1. Explain why there are differences in the two climate layers you interpolated. How/why does the method influence the visual result? Be specific to this dataset.



Climate-IDW



Climate-Kriging

The difference between the IDW and Kriging climate layers from a visual perspective in this dataset is that, the Kriging climate layer seems to be able to find and highlight similar areas better than the IDW climate layer can, this is due to the fact that the Kriging layer highlights are darker and cover a lot more areas than the IDW layer informed us with. The method influences the result because IDW calculates the unknown values (for interpolation) based on taking averages of the nearest values, so it makes sense that the areas it informed us with are lighter in comparison to the areas that the Kriging layer highlighted, Kriging which is much advanced than IDW, creates a weighted average of the data that, with increasing distance between the point at which the surface is estimated and the locations of the data points, returns an estimate of the underlying surface. ("Kriging," 2013) So it also makes sense as to why the Kriging layer is so detailed.

2. Describe how the two climate layers correspond to the interpolated Elevation TIN we made, particularly change in temperature correlating/corresponding to elevation.

The two climate layers correspond to the interpolated elevated TIN model from earlier in that the two layers both show the parts of the map that are hot and cold with the heat being represented with red hue blobs and the cold with blue hue blobs. In the TIN model this is demonstrated with the triangles and in those triangles it shows the areas with heat as deep blue as this is where the lower elevation on the coast meets the ridge, and areas with cold climate with brown colour triangles as these are the higher elevation areas.

### 3. Do ClimateKriging and ClimateIDW communicate the same message to your map reader?

#### Explain your reasoning.

I believe ClimateIDW and ClimateKriging communicate the same message to the map reader in that the two are both highlighting the same areas and with a union of both there would be very little difference, because the message they're trying to get across is the climate zones in Oregon and any reader can infer the zones that have been highlighted as cold/hot.

### 4. Can we use TIN interpolation on the climate data, in addition to kriging and IDW? Why or why not?

Yes we can use TIN interpolation on the climate data, in addition to Kriging and IDW, as these are all interpolation methods used to predict values at specific locations, the real question comes when deciding on which has the best prediction, for this climate dataset I believe Kriging was the best method because it returned results that were more accurate and it was better suited for this dataset, whereas TIN interpolation is best for terrain or elevation estimation.

#### Works Cited

1.3.5.11. Measures of skewness and kurtosis. (n.d.).

<https://www.itl.nist.gov/div898/handbook/eda/section3/eda35b.htm>

Kriging. (2013, January 11). Geographic Information Systems (GIS) in Public Health Research.

<https://www.hsph.harvard.edu/gis/arcgis-tips/kriging/>