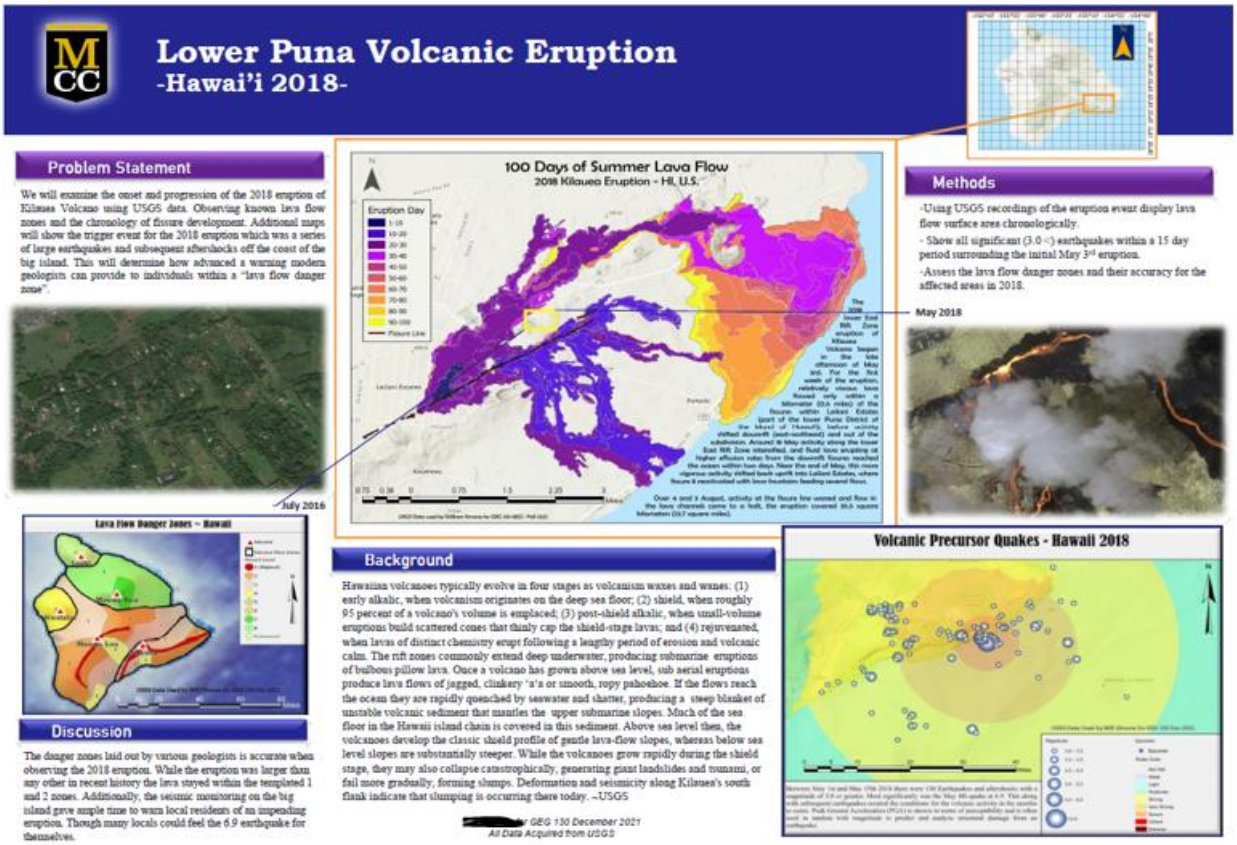
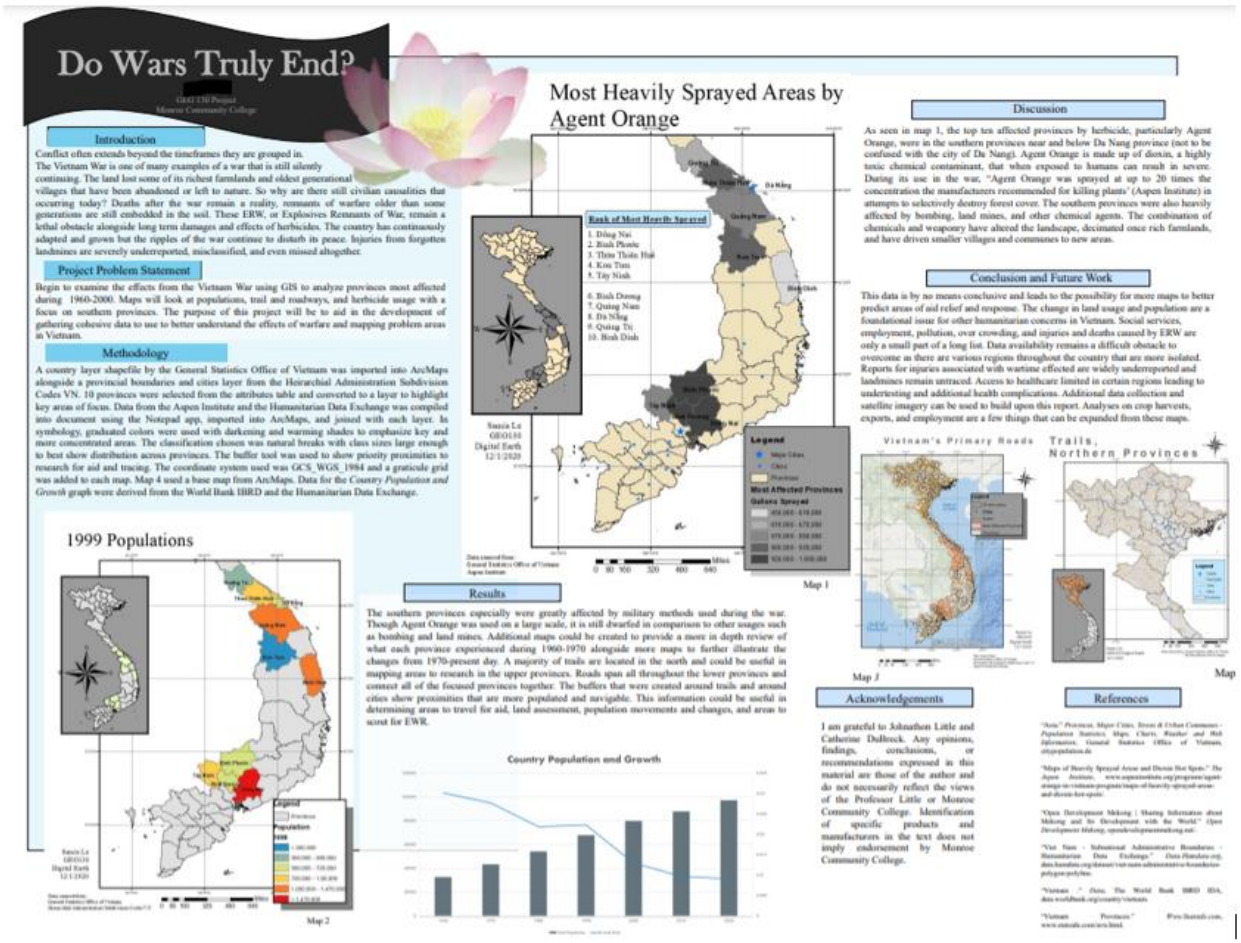
Digital Earth (GEG 130) Sample Final Projects





No Child Left Behind… Really?

[redacted]
GEG 130 Project

Grade 3 Math Scores

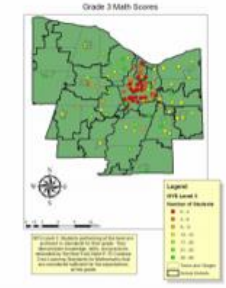


Figure 1. 3rd Grade Common Core Math Scores. Each dot represents the number of students who were found to be proficient at their grade level

Grade 3 English and Language Arts Scores

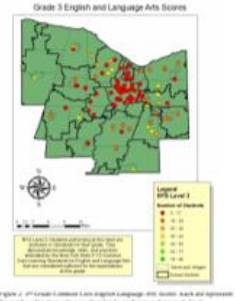


Figure 2. 3rd Grade Common Core English Language Arts Scores. Each dot represents the number of students who were found to be proficient at their grade level.

Introduction

Since the federal No Child Left Behind Act schools across the country have been forced to implement standardized testing as a means to determine student performance. These test scores are also used to grade teachers and schools on their ability to educate students. As a result, the schools who score the highest are often provided better funding as a reward for their student's achievements, and schools that score the lowest are withheld funding and possibly even shut down. Is that really what it means to leave no child behind?

Project Problem Statement

New York State implemented Common Core curriculum in July of 2010, and the first Common Core test was administered in 2013. How does geographic location effect the students' ability to learn? How does parental income levels and teacher to student ratios affect the quality of the education provided by each school? What impact do demographics have on Common Core test scores? Using ArcGIS common core test scores for 3rd Grade Math and English Literature Arts will be mapped across public schools in Monroe County. 3rd grade is one of the most critical years in a child's educational development, students who become demotivated in 3rd grade have a more difficult time striving for future academic achievements. Data regarding parental income and school budgets will be mapped in reference to each school district. The objective is to show how students who are given less opportunity to succeed will inevitably fail.

Methodology

Using Microsoft Excel, the Common Core test 3rd grade scores for the elementary schools in Monroe County was combined with the geographic data, longitude, latitude, and physical addresses into a *.csv file which could be mapped using ArcGIS over a shapefile of Monroe County towns and school districts for the first and second map. Using the same methodology, the budget information for each school district was entered into a *.csv file and combined with the school district geographic data on the third map. For the fourth, a map overlay of the Monroe County school districts was placed on a map showing average household income. Using Microsoft Excel each teacher to student ratio was drawn on a line graph, as well as a graph displaying the number of schools each school district maintains and a spreadsheet of the overall budget for each district in Monroe County. The Common Core test score and district budget information was gathered from the New York State Department of Education website, and the demographic information was provided by ESRI shapefiles.

Figure 3. A line graph representing the number of students per teacher in each school that is displayed in figures 1 and 2.

Results

Once the test scores and school budgets were mapped it became clear that, for math, the weakest scores came from those districts who receive the least amount of money. Additionally those same students for the most part appear to come from low income families. Each map shows a strong correlation between the poor test scores and underfunded schools. Though for math there are students who manage to succeed despite the difficulty of common core processes and lack of funding, in English language arts there are very few students across the county that are considered to be proficient. This information was unexpected and did no show as strong a correlation to geographic location. Also unexpected was the teacher to student ratio. Overall the average teacher to student ratio was very similar thus removing overwhelmed teachers as a possible cause of poor test scores.

Discussion

In agreement with the initial problem statement the schools that perform the poorest on standardized tests are those in the most desperate need for funding. To improve those test scores the only logical course of action is to keep these schools open and provide better opportunities for success for the students who attend. The student who comes from a low income family, who receives their education from a low budget school, who does poorly on standardized tests will become demotivated, disinterested and may eventually drop out of school without achieving their full potential. A student shouldn't be trapped by where they live or where they were born, they should be free to learn as much as they are capable of.

Conclusion

The life of a student who learns to take tests all year, who can't succeed without the proper tools that other students are given is grim. The teachers who work with these students are one of the only forces for change in their life. When standardized tests are a means to determine how effective that teacher is it diminishes the ability of the teacher to be the person that students in low income families, low budget schools need to succeed. There are more factors impacting these standardized test scores than the teacher who spends every day trying to make students better. Schools need to be properly funded, teachers need tools to educate their students with, to change their students lives for the better.

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Acknowledgements

I am grateful to Professor John Little and Monroe Community College. Any opinions, findings, conclusions, or recommendations expressed in this material are those of the author and do not necessarily reflect the views of the Professor Little or Monroe Community College. Identification of specific products and manufacturers in the text does not imply endorsement by Monroe Community College.

Average Houshold Income Per Census Region

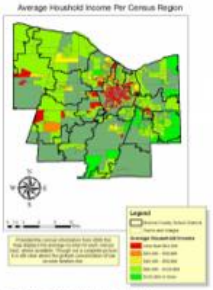


Figure 4. Data from the most recent census displaying the average household income where the information was available.

School District Estimated Budget Breakdown

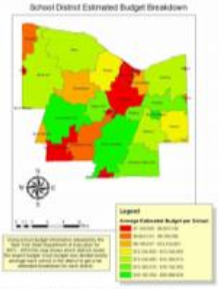


Figure 4. A breakdown of the total budget per school district divided by the number of schools the budget would be applied to.

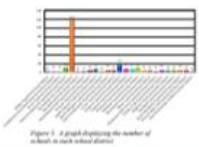


Figure 5. A graph displaying the number of schools in each school district

Figure 6. A chart displaying the overall budget for each school district

Strong and Deadly Tornadoes In the United States

By: [redacted]

GEG 130 Project

Strong Tornadoes in the Year 1965

Figure 1. This is a map showing strong tornadoes in the year 1965. The map also shows the paths that each tornado took, and which strong tornadoes produced fatalities. There was a strong outbreak this year in the Great Lakes Region.

Strong Tornadoes in the year 1984

Figure 2. This map is showing strong and deadly tornadoes in the year 1984. It also shows which tornadoes produced fatalities. There was a large tornado outbreak in the Carolinas this year.

Introduction

Everybody knows that Mother Nature can be a truly unforgiving force that does not hesitate to cause chaos and destruction. A tornado is an example of one of those unforgiving and destructive forces that Mother Nature can produce. In the United States tornadoes have caused Billions of dollars in damages and have killed thousands of people. Exploration of historical tornado tracks, fatalities they produced, and rank on the Fujita Scale within a GIS environment. This will show how strong a tornado was compared to how many fatalities it produced. The Fujita Scale is a scale that measures tornadoes based on their wind speeds and how much damage they produced. Locations where tornados occur often will also be visible.

Project Problem Statement

The goal is to find out if these super strong and super deadly tornadoes occur in the same areas over the years or are they scattered around and happen just by chance.

Methodology

In order to find this out data files through professor Little's data folder on the MCC M-drive were used. Shape files were added to ArcMap to create four maps for four different years. The maps will include the number of tornados that year, how strong they are (rank on the fujita scale), the number of fatalities they produced, where they were located, and their track. This data will be taken from the attribute table and a layer will be created from that data for a specific year. The years that were chosen were years that strong weather and strong tornadoes occurred in. The years that I have chosen are 1965, 1984, 1999, and 2003. All of these years had strong tornado outbreaks that produced severe damage and killed many people.

Figure 3. This graph is showing the number of strong tornadoes that occurred each year. In order for it to be considered a strong tornado it needs have a rank higher than 3 of the Fujita Scale.

Results

The goal of this project is to find out if strong and deadly tornadoes occur in the same areas over time or are they more scattered around and just happen by chance. By looking at these four maps, this question can be answered. Tornadoes do typically form in the Mid-Western states of the United States, but that doesn't always mean that these tornadoes will be strong and deadly. This also means that not all strong and deadly tornadoes will form in the Mid-West. From looking at these four maps a conclusion can be made that not all strong and deadly tornadoes form in the same areas. A lot of tornadoes do touchdown in the Mid-West, but a lot of the strong tornado outbreaks occurred in different parts of the country. There were strong outbreaks on the Mid-West, but strong outbreaks have also occurred in the Great Lakes Region, in the Carolinas, and the Southern United States.

Discussion

The project problem statement was, do strong and deadly tornadoes occur in the same area over time or are they scattered around and happen by chance? Based on these four maps the location of strong and deadly tornadoes changes over time. Tornadoes typically form and touchdown in the Mid-West, but that does not mean that they will occur in that area again over time. These findings seem too have been pretty accurate because in order to have a strong and deadly tornado you need to perfect conditions to form one. This does not limited them to form in a certain area. As long as the conditions are right a strong and deadly tornado could form almost anyway. These results show that over the years strong and deadly tornadoes form in different parts of the country, and are more scattered around rather than being just in one area.

Conclusion

These results show that strong and deadly tornadoes are not limited to one certain area, but instead they are scattered across the country. Since tornadoes form when the right conditions allow them too, they could form and touchdown almost anywhere. This means that cities and towns should become more tornado ready. If there is a possibility of a strong and deadly tornado, people should be prepared to find safety. Precautions should be put in place at public buildings and schools in case a strong tornado were to hit. If a strong and deadly tornado is possible than knowing what to do and where to go for safety is necessary. Knowing what to do in this kind of situation could be the difference between life and death. It is very important for people to be educated on the dangers of tornadoes and know what to do if one were to ever touchdown near you.

References

Esri. Accessed April 2016 Kerski, Joseph J. "ArcGIS." Platform. N.p., n.d. Web. 09 May 2016.

Acknowledgements

I am grateful to professor Little for all of the help that he provide throughout this semester. I would also like to thank Mahinsite and Joe for being part of my GEG130 group and for helping me out when I needed it.

Strong Tornadoes in the Year 1999

Figure 3. This map is showing strong tornadoes in the year 1999. This map also shows which tornadoes produced fatalities and which did not. There were many strong tornadoes spread all across the Mid-West.

Strong Tornadoes in the Year 2003

Figure 4. This map is showing strong tornadoes in the year 2003. It also shows which tornadoes produced fatalities and what paths they took. There was a strong tornado in the Georgia this year that produced damage, fatalities, and a lot of injuries.

Geographic Correlation Between Population, Income, and Yoga Studios in Monroe County

By [redacted]
GIS 130 Project

Yoga Studios in Monroe County

The map above shows the locations of all yoga studios in Monroe County.

Introduction

This project intends to find if there is a correlation between the location of yoga studios compared to population and income census data of the individual towns and cities in Monroe County New York.

Yoga studios are intended to offer yoga classes for all people and are not intended to be discriminatory.

It is important to note that this research will not show the incomes of individuals that actually attend yoga studios. Instead, it focuses on the demographics of the area where these studios are located.

Project Problem Statement

ArcGIS will be used to create four maps illustrating the location of yoga studios as they relate to the populations and incomes of Monroe County New York residents divided by individual towns and cities with census data from 2010 and 2013.

Methodology

An internet query was used to create a list of all yoga studios open in Monroe County, including the address, latitude, and longitude. A separate list was created for every town and city in Monroe County with the total population numbers from the most recent census data in 2010 and the average estimated household incomes in 2013.

A join by name was performed on the two .csv files to combine the data. A layer depicting the boundaries of the individual towns and villages of Monroe County was imported, labeled, and included on each map.

One map depicts the locations of all the yoga studios in Monroe County. It is a transparency overlaid on top of a world imagery raster image that helps give a visual understanding of the urban and rural areas of Monroe County. Each yoga studio is shown with a star, and these stars are present on each subsequent map to help create an environment for a visual correlation to be made between the yoga studio locations and the other data displayed.

One map shows the distribution of yoga studios compared to the total populations of each town in the county. This data was selected by attribute, separated using natural jenks, and shown using graduated colors.

One map depicts each towns' average estimated household incomes from 2013 to show if there is a correlation between wealth and the density of yoga studios. The information was selected by attribute, divided by equal interval, and depicted using graduated colors. This map is placed beside a graph that shows the specific values of each towns' average estimated household incomes in 2013.

One map focuses on the yoga studios within the City of Rochester. The highlighted area shows the boundaries of the city, which was selected by attribute, and it is overlaid world imagery to help see the city's layout underneath. This map is laid beside two images of maps provided by the City of Rochester website to look at the data compared to the separate neighborhoods. One of these images shows population density based on people per square mile, and the other image shows median household income in 2013.

Results

The results of this project show that there is a high density of yoga studios in the southeast corner of the City of Rochester and in the towns of Pittsford and Perinton. As can be seen on the graph, Pittsford and Perinton are two of the towns with the highest average estimated household incomes, while the City of Rochester has the lowest average estimated household income in Monroe County.

The City of Rochester has the highest population and the most yoga studios. The provided imagery shows more detailed information about the demographics of the City of Rochester. The areas with the most yoga studios are also many of the areas with the highest median household incomes, although they are not the most densely populated areas in terms of people per square mile.

City of Rochester Data

The images above were provided by the City of Rochester government website. They help illustrate the demographics of the neighborhoods within the City of Rochester.

City of Rochester Yoga Studios

The map to the right focuses on the distribution of yoga studios in the City of Rochester.

Discussion

The results show a strong correlation between high household income levels and a high density of yoga studios. Since the City of Rochester is an outlier compared to the other towns in terms of population, it is the focus of a separate map that shows the income and population distributions of city residents alone. This map, when compared to the provided imagery, again shows a strong correlation between high household income levels and a high density of yoga studios.

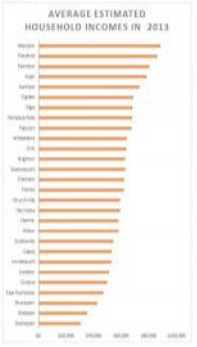
Population was less of an indicator of yoga studio locations. When looking at the county data distribution, and excluding the City of Rochester, it is surprising that Pittsford has so many yoga studios yet it is one of the least populated areas of the county. When looking at the county distribution alone, it is not surprising that the City of Rochester has the most yoga studios because it is so populated. However, when looking at the City of Rochester map data specifically, most of the areas with the highest populations do not have yoga studios.

Conclusion

These findings support the initial objective of looking into whether or not a correlation exists between population, income, and yoga studio locations in Monroe County.

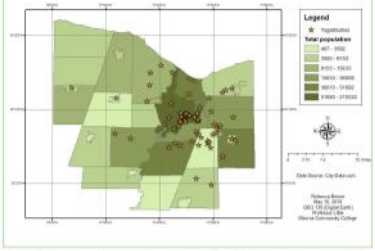
An area of future investigation could be devoted to finding more comparable data for the City of Rochester. The data does not match perfectly when considering the City of Rochester data calculated median income, while the county data was based on a mean calculation. Also, the City of Rochester data calculated population density based on the number of people per square mile, which is different than calculating the total population of an area.

Despite these variances in calculations, one may possibly conclude that the placement of yoga studios is not as inclusive as the practice of yoga itself is intended to be.



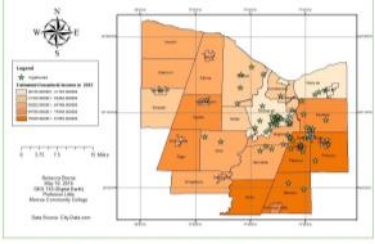
The vertical bar graph above shows the 2013 average estimated household incomes of the towns and villages of Monroe County from greatest to least.

Town and Village Populations in Monroe County



The map above shows the populations of the towns and villages of Monroe County as they relate to yoga studio locations.

Average Estimated Household Incomes in the Towns and Villages of Monroe County



The map above shows the estimated household incomes of Monroe County towns as they relate to yoga studio locations.

Acknowledgements

I am grateful to Professor Little and Monroe Community College for providing me with the knowledge and opportunity to create this project in May 2016. Any opinions findings, conclusions, or recommendations expressed in this material are those of the author and do not necessarily reflect the views of Professor Little or Monroe Community College.

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Where we landed on the Moon

Past landings help new frontiers

[redacted]

GEG 130 – Digital Earth, Intermission 2021/1/30/21

Background

We have successfully landed on the moon. Particularly during the Apollo missions, the United States landed in the mid-regions on the near side of the moon. The data collected was invaluable in learning about the moon's landscape through field research. As we send satellites to the moon, we always need to confirm our data by landing on the moon.

Problem Statement

From the research retrieved, we see we can only observe so much when sending roughly ~3 astronauts to the moon. As the new missions of NASA's Artemis program, we need to ask, where are places on the moon that are valuable to us, we have not field researched. Are there places on the moon where we can explore the most amount of lunar interesting features as possible.

Methods

·Method 1: The optimum landing area for a new mission needs to land somewhere with artifacts of past life, or past and future elemental materials. One of the best artifacts are Sinuous Rilles, the cracked valleys on the lunar surface that fossil, small volcanoes on the surface. These are mostly around the mare region of the lunar surface; this can be noted as another requirement for a new landing location.

·Method 2: I also address the 22.2 mile distance away from the previous Apollo Lunar 17 site to show us the distance traveled by the lunar rover. The second buffer is a 100-mile buffer to show geo-contacts and linear features that block the path for traveling farther past the traversed region.

·Method 3: I used a 100-mile buffer around mare Orientale validating the same distance from the apollo 17 buffer.

Results & Discussion

The results show from the buffers Apollo 17 had a rough area to traverse. Even with its amazing 22.2-mile rover record, the distance traveled is at the edge of the allotted space within the region from the landing site. This is due to the increase of geo features around the area. In Mare Orientale and Aristillus Crater we can see less geo features and more area to roam and collect data.

Future Work

The idea that rilles are the only requirement to obtain elemental materials, but even back on Earth, we use land artifacts to piece the past timeline to our present. These uses the scientific method, which is enhanced when we can physically be there to take datasets and witness the experiment. With the buffer's created we find many points of interest and beg the question of missions being able to move farther across the surface. The lunar rover on Apollo 17 traversed 22 miles. With a general estimate we can see that the astronauts are limited to spots that are clear for landing as well.

Acknowledgements & Sources

Lunar Surface Information:

https://en.wikipedia.org/wiki/Lunar_mare

http://volcano.oregonstate.edu/sinuous-rilles

https://en.wikipedia.org/wiki/Rille

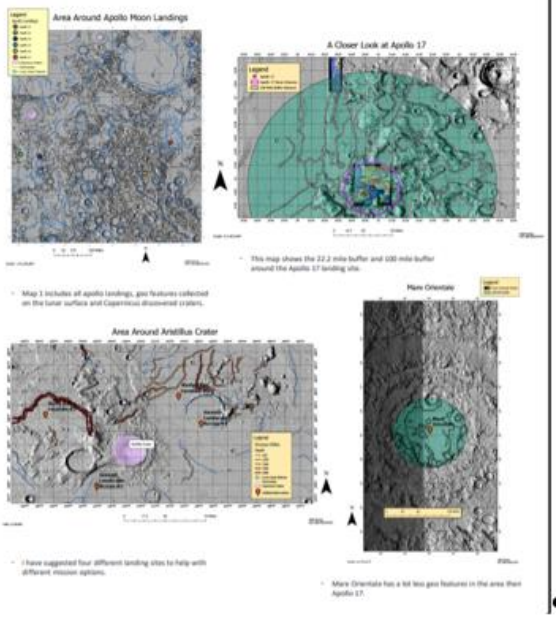
GIS Data:

https://airandspace.si.edu/explore-and-learn/topics/apollo/apollo-program/landing-missions/sites.cfm

https://ode.rsl.wustl.edu/moon/coverage/ODE_moon_shapefile.html

http://wms.lroc.asu.edu/lroc/rdr_product_select?

Results



- This map shows the 22.2 mile buffer and 100 mile buffer around the Apollo 17 landing site.
- Map 1 includes all apollo landings, geo features collected on the lunar surface and Copernicus discovered craters.
- I have suggested four different landing sites to help with different mission options.
- Mare Orientale has a lot less geo features in the area then Apollo 17.