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Humboldt County Trails

Abstract:

Humboldt County has numerous public trails that anyone from, or visiting Humboldt can access. These trails showcase the wonder of nature in its preserved state that many people who are from large industrialized places do not normally get to see. The purpose of this project was to lay out multiple maps that illustrates the distance, route, and accessible trails that any individual may want to take. We collected data from various sources that include; Humboldt County's GIS Portal, the City of Arcata's GIS Portal, and ArcGIS' online data, while also collecting our own trail data with a GPS device. Although we were not able to find data on all the trails, the data we did find was helpful. However, the map we created covers one large section, which results in it being difficult to notice the details of all the trails when zoomed out. To fix this problem we showcased each of the trails in two sections, Arcata/McKinleyville, and Redwood National Park/Trinidad and went further into detail from there to focus on the individual trails featured in these areas. Seeing how little data that was available to us, tells us that there should be more GIS Portals to fill in the gaps of all the county trails out there. This project was very straightforward and allowed us to pick a topic that we believe will be useful to all hikers in Humboldt County.

Introduction:

The purpose of this project is to inform Humboldt County residents and visitors about the extensive network of hiking trails in Northern Humboldt County on: County, State, city and National Park lands. According to *Benefits of Hiking: A Means-End Approach on the Appalachian Trail,* "Escalation of sedentary lifestyle health issues in the United States create a need to encourage and promote physical activity; and research suggests that participation in exercise and recreation may help to mitigate many of these health issues." (Hill, Goldenberg, & Freidt, 2009). Humboldt County offers a wide range of hiking trails that can be enjoyed for their beauty as well as their contribution to physical health. Humboldt County is shown in figure 1. Figure 2 shows our study area in Humboldt County. In addition to the hiking trails locations, we provided a legend that relates permitted activities, such as: hiking, equestrian, and biking access. Our basemap is a topographic map from ArcMap. Our data includes trails in Redwood National and State Park, unincorporated county land city trails. For the data that we were unable to acquire, we hiked the trails ourselves and collected data using a handheld GPS device. We did this for a section of the Hammond trail, a trail in the McKinleyville land trust area, and the Trinidad head trail. By doing this, we displayed trails that there was previously no public data for. This made it possible for us show more extensive maps for the trails in Northern Humboldt County.
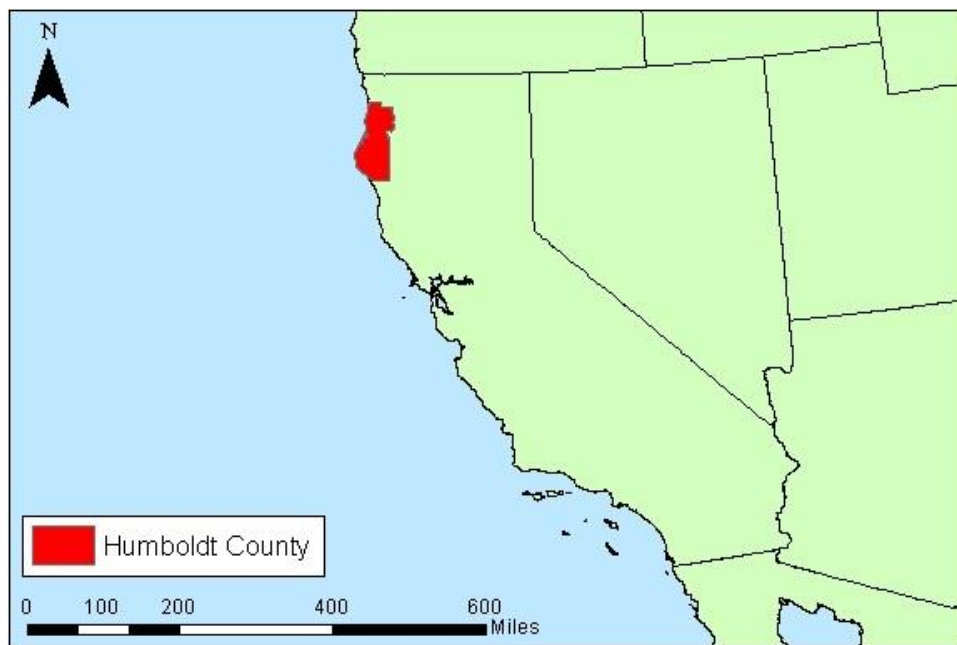
Figure 1. Locator map of Humboldt County

Figure 2: Detailed Locator Map of Study Area

Methods:

Our data was collected from a variety of sources, including Humboldt County's GIS portal, The National Park Service GIS portal, the City of Arcata's GIS portal as well as from ArcGIS' data source menu. We used the "Add data from ArcGIS online" for the Redwood National and State Park trails. County trail maps were harder to come by so we made our own trail data. To do this, we used a handheld GPS to mark a series of waypoints that we then overlaid onto an imagery basemap to connect these dots. Then we made a new shapefile and connected the waypoints. Figure 3 below shows the waypoints on the left and the new shapefile on the right.
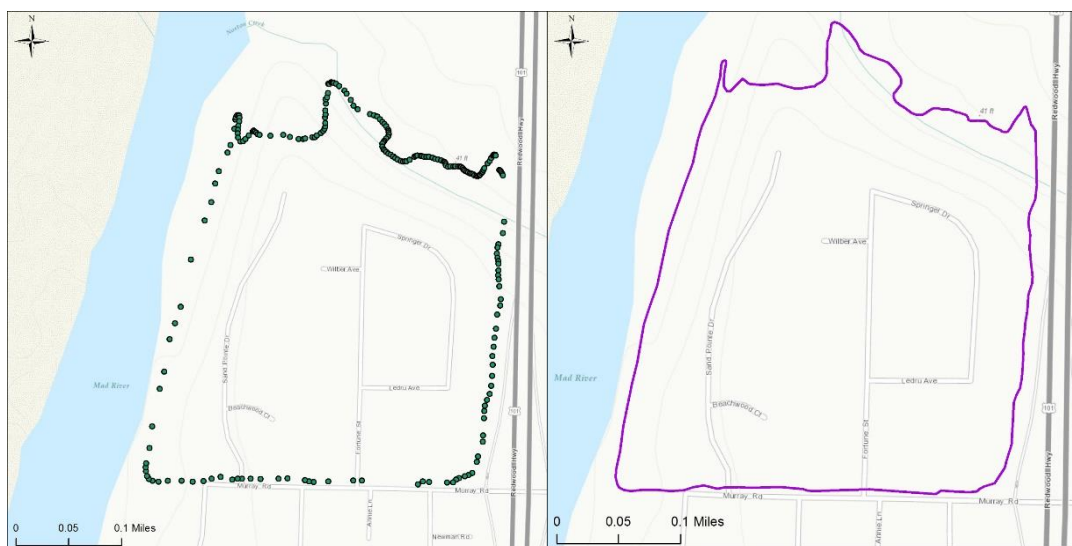

Figure 3. The image on the left shows the waypoints made with the handheld GPS on a portion of the Hammond Trail in McKinleyville, CA. The image on the right is the layer created by connecting the waypoints in ArcMap.

Because these trail layers were not made using high-tech mobile mapping devices, there is a small amount of error that must be considered. When overlaying the trails on a basemap, there is a difference ranging between 0.0 to 3.9 meters. Some parts of the trail have a negligible amount of deviation from the basemap, while other parts show a lot of deviation. The error was calculated using the Hammond Trail data and is estimated for the other two maps created using the waypoints and is shown below in Figure 4. To measure this error, we used a basemap that shows the trail as it is on the ground and put the trail layer on top of it and used the measure tool in ArcMap to measure the distance between the two. For the scope of this project and considering the level of skill we possess in mobile mapping, we considered this error acceptable, however, this trail data would likely not be suitable for more complex analysis.

Figure 4. The blue squares highlight areas where the trail layer is different from the basemap. Because of the data collection method used, this amount of error is to be expected.

Once we had all of our data, it was important to check the metadata and be sure that our data was useable. We used the projection NAD 1983 UTM Zone 10N. Most of our data had to be projected into this projection and the new shapefiles we created had to be defined. Additionally, because the data we got for the National Parks was for the entire country, it was important to include only trails and boundaries in our study area of Northern Humboldt County. To do this we used the clip tool. We chose Humboldt County as the boundary and clipped the National Park Boundary and trails shapefiles. We saved these new files as shapefiles and used them for our final map. Figure 5 shows our study area, Humboldt County, and the National Park boundary and trails that were outside of our study area.
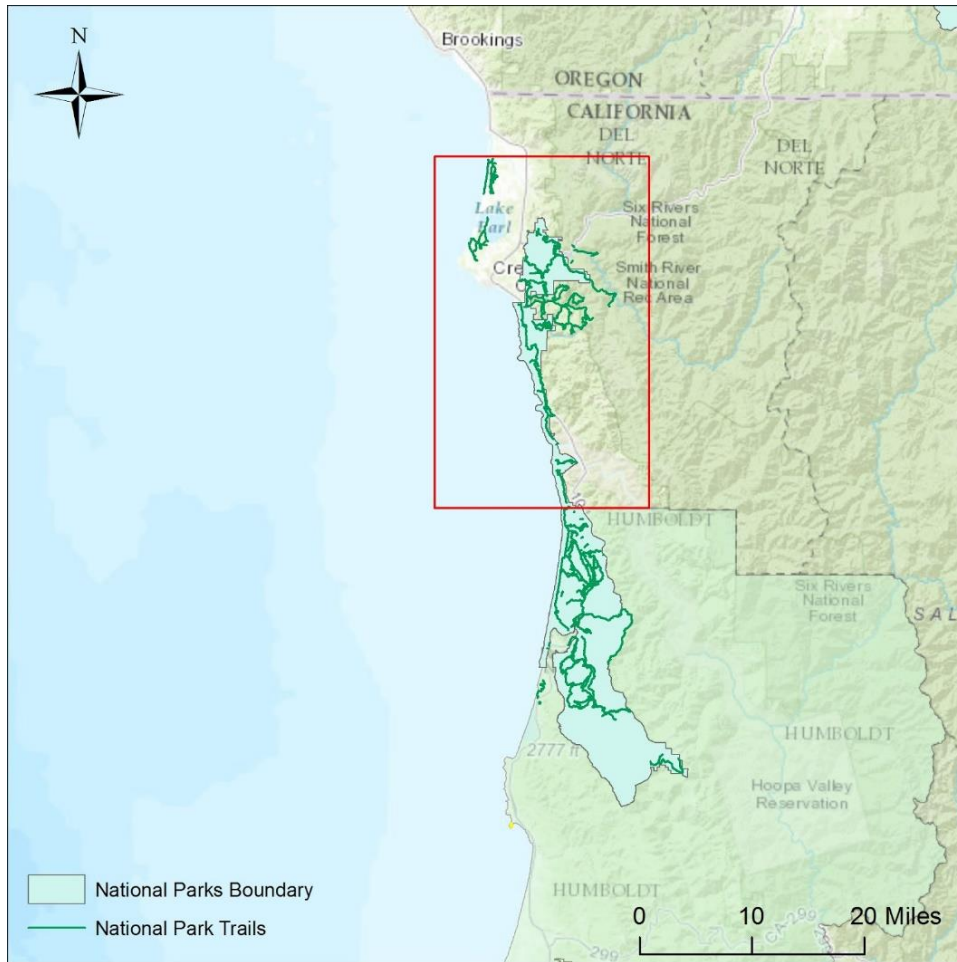
Figure 5. The red box shows the area that we clipped. We only wanted to analyze the trails within Humboldt County and the data we collected was for the entire state.

The trail data that we obtained from the City of Arcata and the National Parks trail data included different uses for the trails. Some allow bikes, horses, and hiking while others have restrictions. We used the "select by attribute" feature to identify the activities allowed on the trails. Dogs are not allowed on trails in National Parks, but they are allowed in the Arcata Community Forest, the Hammond Trail, McKinleyville Land Trust, and the Trinidad Head if they are leashed.

Results:

The results from our analysis are shown below. Figure 6 shows the entire study area. Figure 7 shows the northern extent of our study area in greater detail.
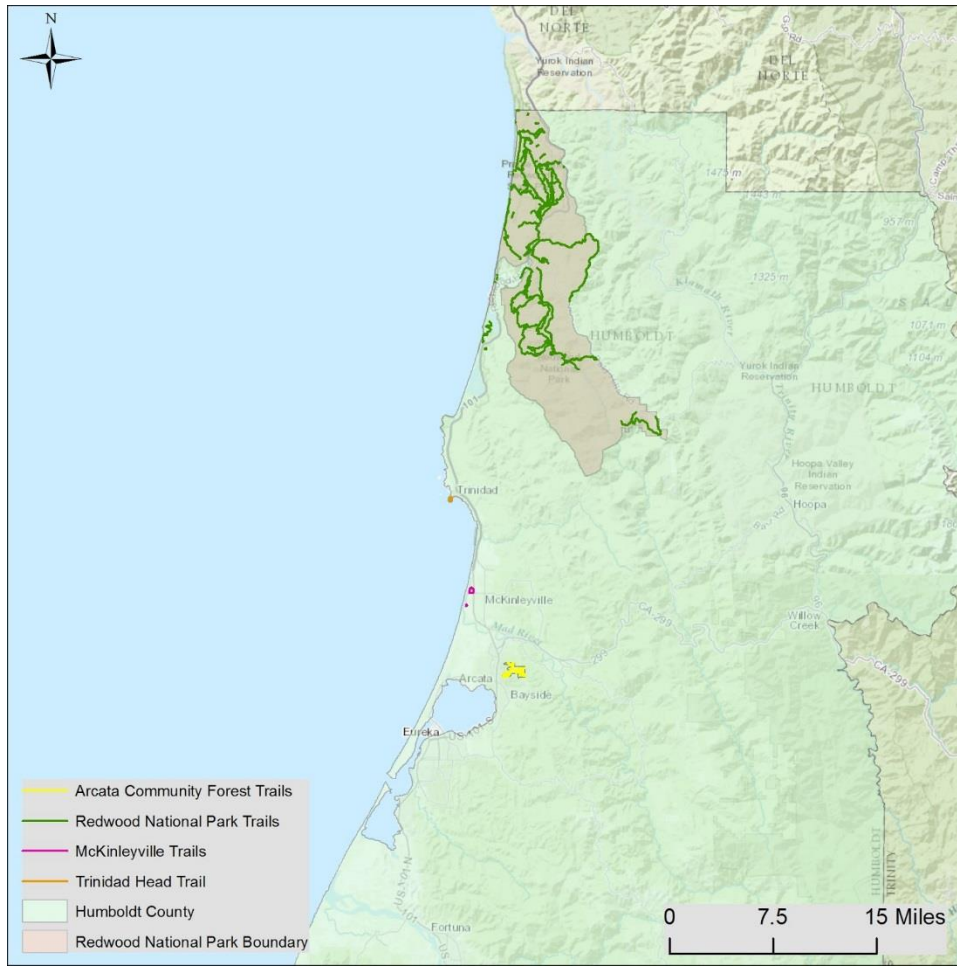

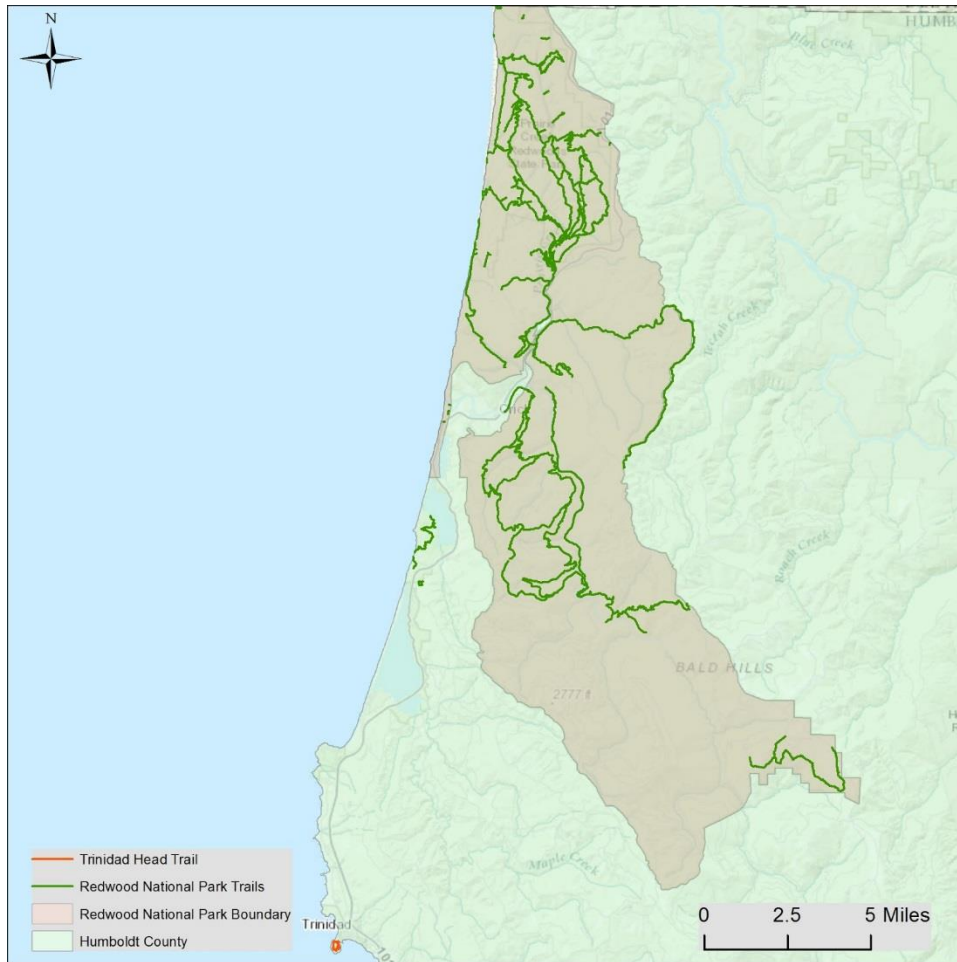Figure 6. Our study of Northern Humboldt County.

Figure 7. The Northern extent is shown here with Trinidad in the lower corner and the Redwood National park boundary and trails.
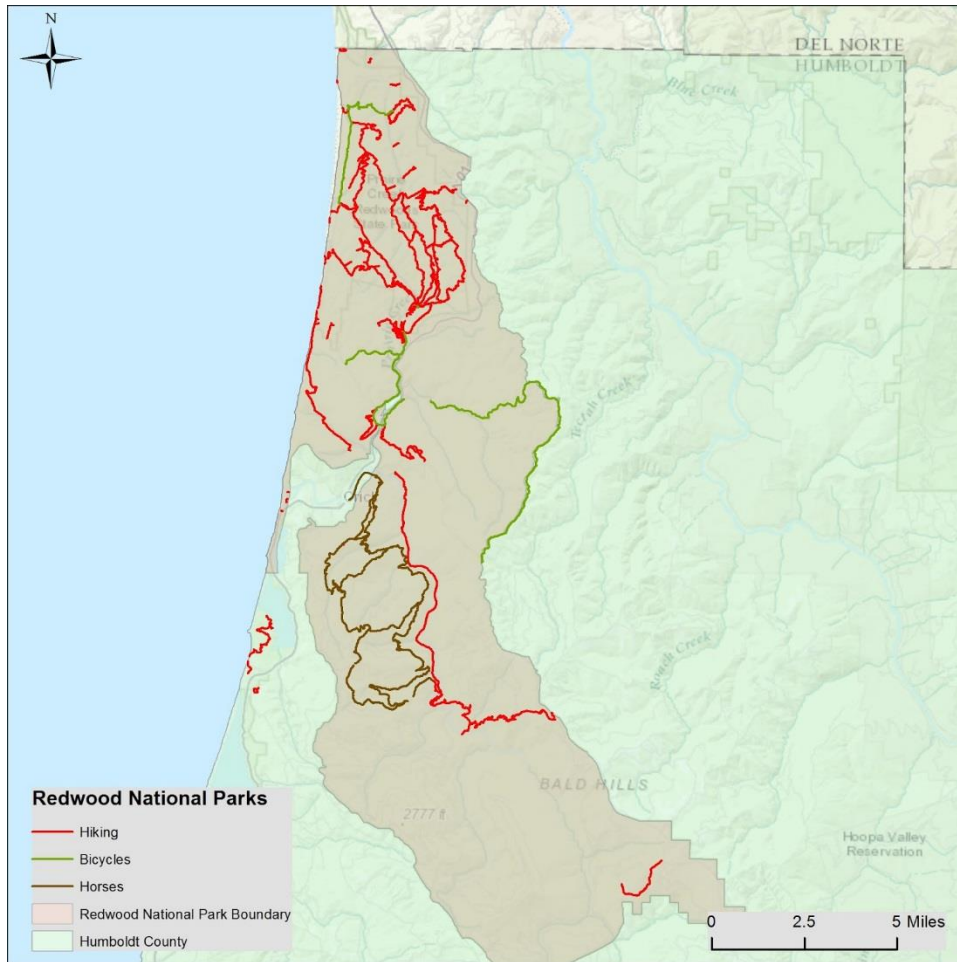
Figure 8. Redwood National Park trails and uses

Figure 9. Trinidad Head Trail

The southern extent of our study area is shown below in figure 10. The Hammond Trail loop and McKinleyville Land Trust are shown near the top left and the Arcata Community Forest boundary and trails are shown at the bottom. Figures 11-13 show the areas in greater detail. The Arcata Community Forest data included the activities allowed on the trails. Those uses are shown on the map. The trail uses allowed for the Hammond and McKinleyville Land Trust are not included on the map because those were the layers we made, however hiking, biking and horseback riding are all allowed on the Hammond Trail and hiking is allowed on the McKinleyville Land Trust trails.
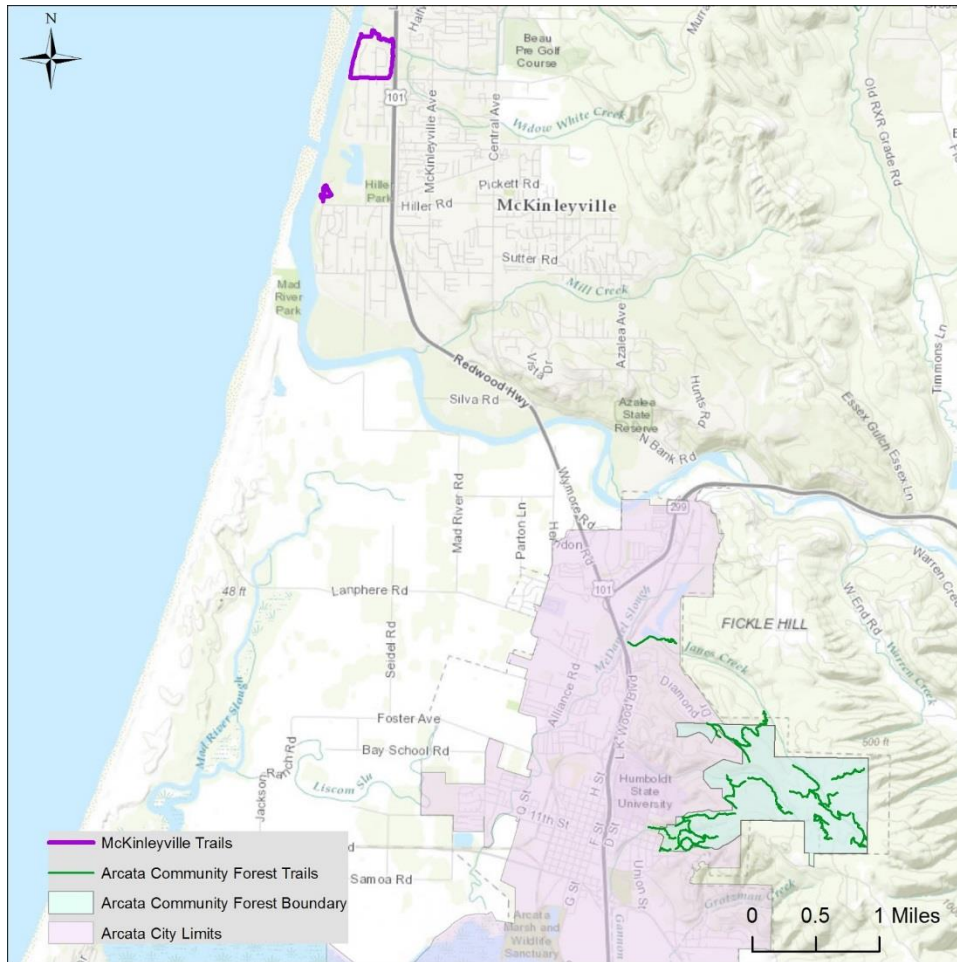
Figure 10. The southern extent of our study area including The Arcata Community Forest trails and McKinleyville trails are shown here.
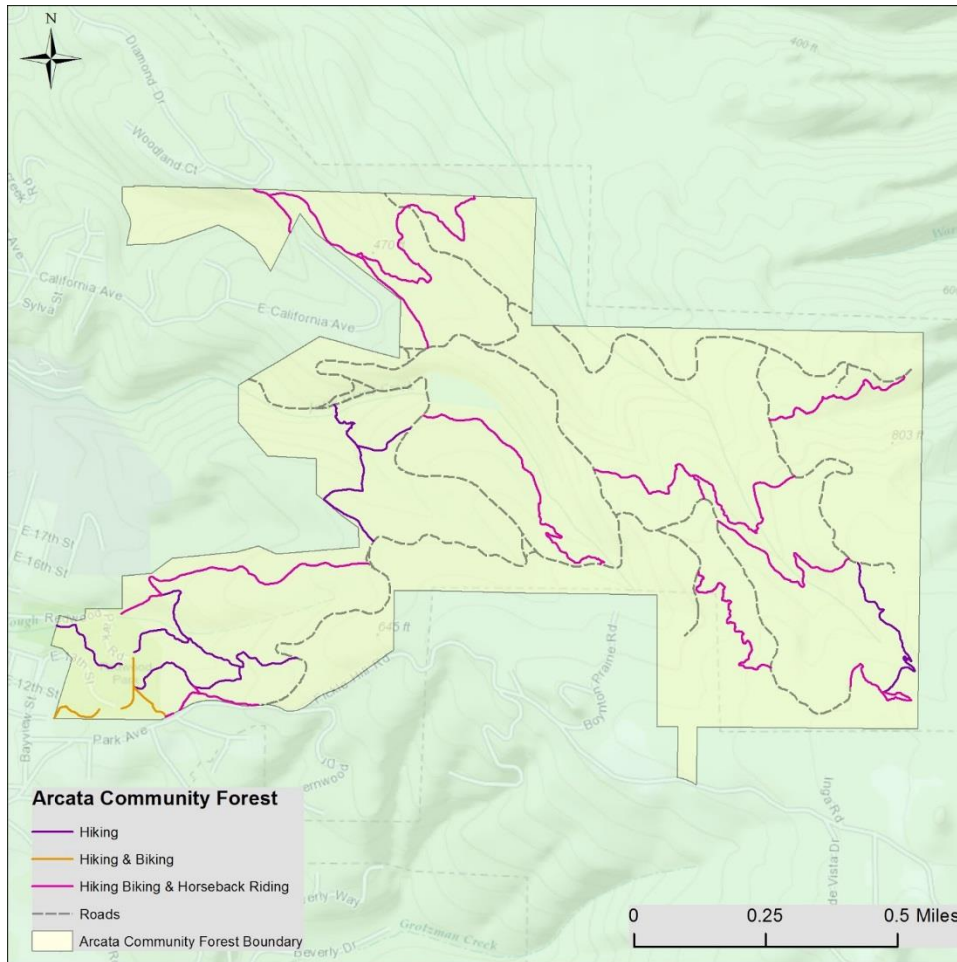
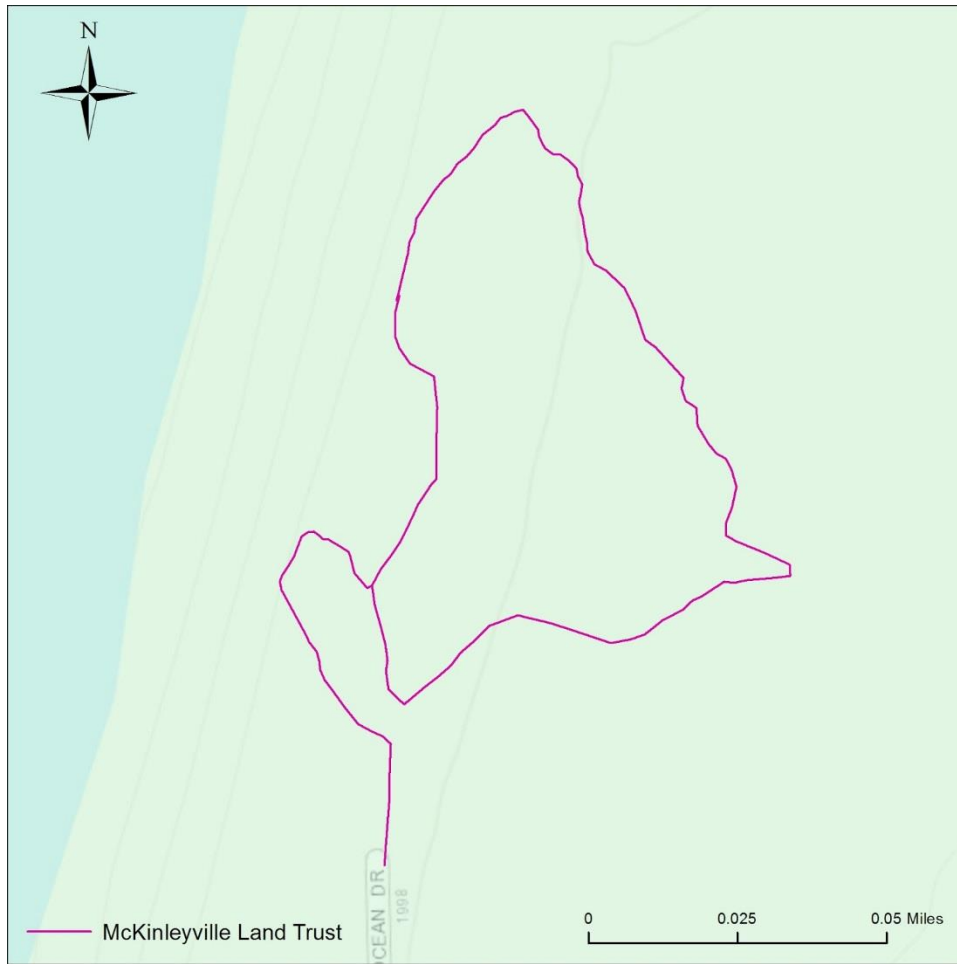Figure 11. Arcata Community Forest and Trail Uses

N

McKinleyville Land Trust

OCEAN DR
1998

0   0.025   0.05 Miles

Figure 12 McKinleyville Land Trust

Figure 13. A portion of the Hammond Trail in McKinleyville

Conclusion:

In conclusion, our objective was to create maps of the trails in Northern Humboldt County and we believe that we were successful in doing that with the data available to us. We wanted to create several maps that depicted the different trails in Humboldt County that residents or visitors may take for recreational activities. Data used on the map was collected from various online sources. Additionally we went out to collect waypoints for trails because there is a large amount of trail data that is unavailable for much of Humboldt County. With our data we were able to provide numerous maps showcasing these trails in Arcata, Trinidad, McKinleyville, as well as the Redwood National and State Park. While there is a relatively small amount of error in the data we collected, it is acceptable for this project. Overall our experience creating these maps made us aware that while there are many trails in the area, there is a lack of available public GIS data. With more access to public data we can generate a more accurate representation of all the trails and their respective uses in Humboldt County.

Acknowledgements:

Literature Cited:

Hill, Eddie, Marni Goldenberg, and Barbara Freidt. "Benefits of Hiking: A Means-End Approach on the Appalachian Trail." Journal of Unconventional Parks, Tourism & Recreation Research (JUPTRR) 2.1 (2009): journals.radford.edu. Web. 10 Dec. 2016.