Increasing Bikeway and Trail Miles in Greenville

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Abstract

The STAR community rating system is a framework and program for sustainability at the local scale. This project works to improve on Greenville's rating system by increasing bikeway and trail miles. To achieve this goal, the project uses data from the STRAVA App that tracks cyclists and runners trips with GPS. Using a years worth of STRAVA data, it was possible to find the routes with a high amount of trips taken. With some variance from month to month, there was still some consistency in high traffic routes. The most traveled route was the Swamp Rabbit Trail, a 22 mile multi-use greenway system. Other than that there were a few routes with a high amount of trips and a plethora of routes with low amounts of trips taken. This data in tandem with current bikeways and trails, spatial analysis was used to find possible routes that have claim to being a bikeway or trail. Bikes are essential to a green city as they reduce traffic congestion and reduce carbon emissions. The hope for this project is to not only improve Greenville's STARS rating, but make Greenville a little bit greener.

Methods

I received my data from STRAVA as well as Greenville City. Greenville City provided me with base layers for current bikeway and trail infrastructure. STRAVA gave me cyclist activity for each month in 2017. I began the project by cleaning up the data. I reclassified my raw STRAVA data by month and the overall year to better represent the data. I decided that less than 1-50 and 50-100 numbers of trips per month were insignificant, while 100+ was significant. I made this choice base off the fact that 100 trips per month can boil down to about just 4 people so that was my cut off. I left the yearly data with natural break classification because the numbers are much bigger and the breaks didn't need to change to display the data the same. Instead of graduated colors to show quantities I used graduated symbols. In the Greenville city scape there were so many lines all over the place because of streets that simple differences in color were hard to see, so I made the lines thicker where there were high amount of cyclist trips and thin with low trips. Spatial analysis using this new classification and symbology of data in tandem with current bikeways and trails gave many results of possible routes to implement trails or bikeways. I created an exclusion query that removed the bottom 100 trips per month, and bottom 1200 trips per year (100 trips per 12 month). This allowed me to focus in on specific routes that met my criteria of having 100 or more trips. I focused in on two routes, one in downtown and another in north Greenville. I decided on the route downtown because it had a high amount of trips, no infrastructure, and it connected to an extremely high trip route: The Swamp Rabbit Trail. The second route in north Greenville had a very high amount of trips both in terms of yearly total and monthly totals, and was also a very long route.
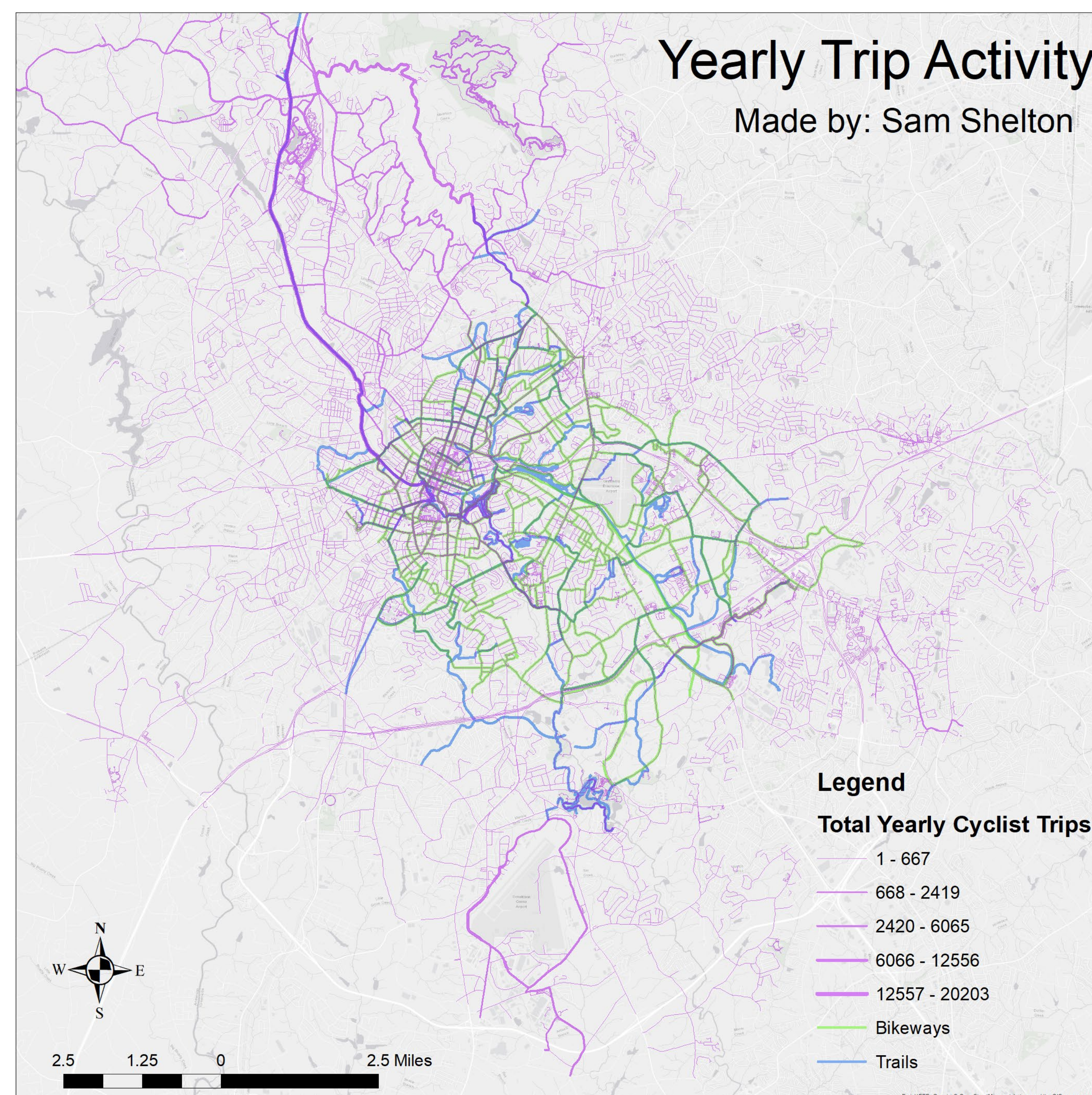

Results

Figure 1. Shows total bike trips made for the year in Greenville on top of current bikeways and trails. This figure was used to determine possible locations for bikeways or trails to be implemented based on where there are high amount of trips and lack of current infrastructure.

Figure 2. shows monthly bike activity for Greenville. This figure was used to see what areas had consistent activity throughout the year.
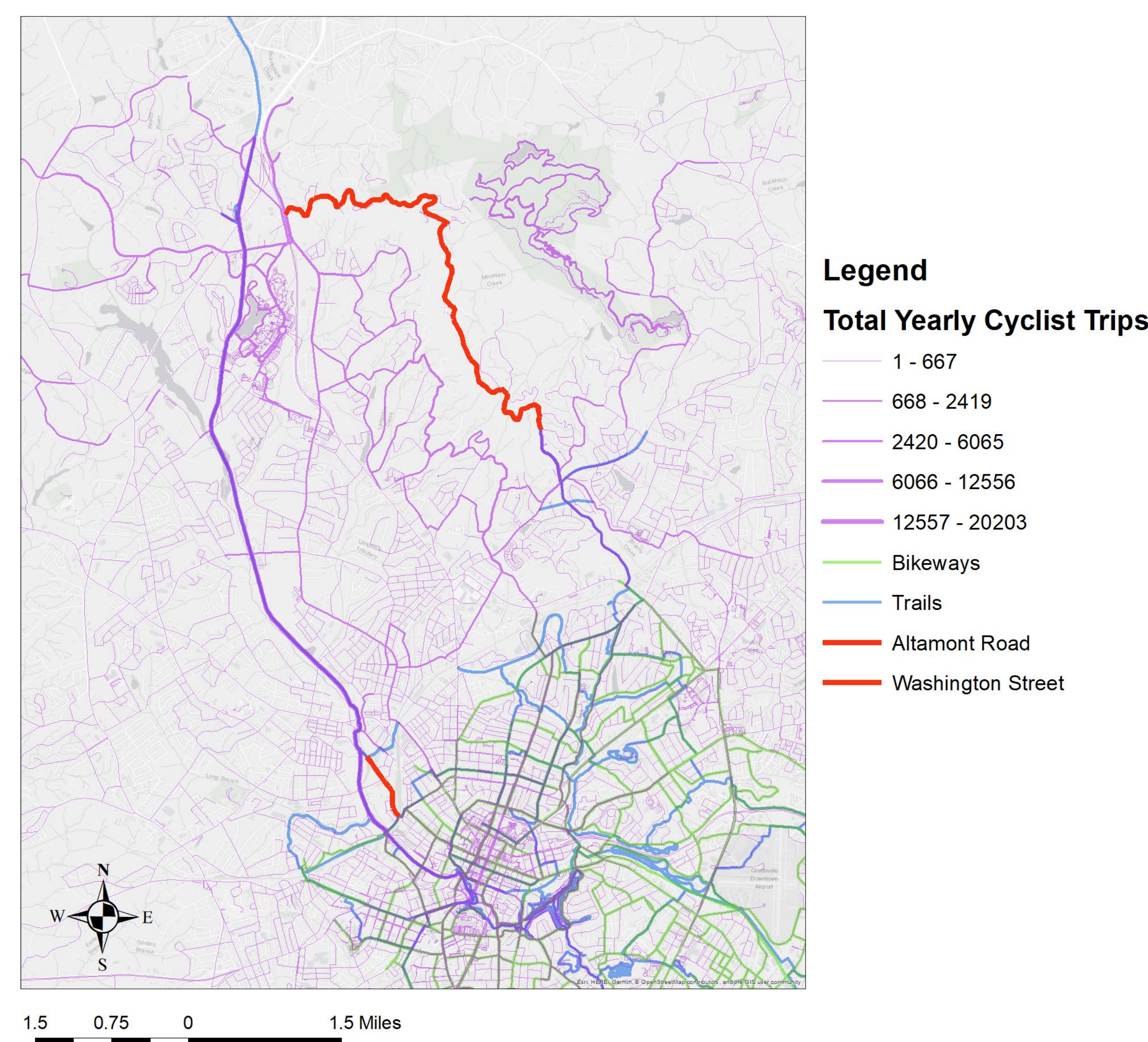

Figure 3. shows two areas I decided would be adequate suggestions for the implementation of a bikeway or trail. To the north is Altamont road and to the south is Washington Street.
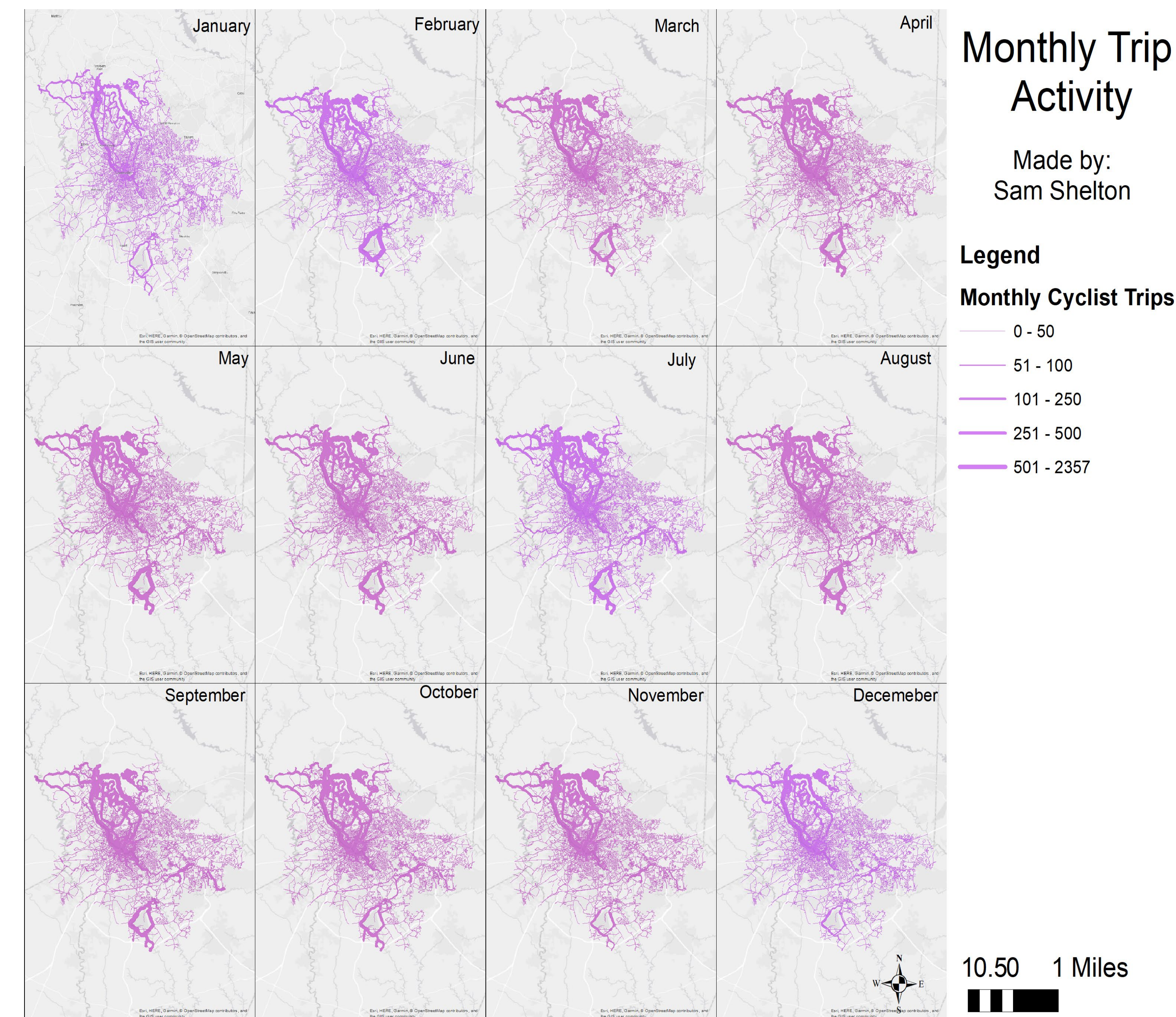
Conclusion

Based off spatial analysis used on cyclist trips and current bikeways and trails, I came up with two new possible routes to implement bikeways or trails to increase their mileage in Greenville for the STARS Rating. The first route is Altamont road. I chose this route because it had very high activity yearly, as well as monthly. It is also a lengthy road which would provide more mileage. The second route is Washington Street. It is quite a bit shorter than Altamont Road and doesn't receive as many trips. However, it still receives a decent amount and it connects downtown Greenville to the Swamp Rabbit Trail, the highest trip route in Greenville. Because of those two reasons I find it an important route to consider a bikeway.

References and Data Sources

Bike ways and trails base layers retrieved from City of Greenville.

Cyclist Activity Data Retrieved from STRAVA.

Isabelle, D, Wolf, et al. "Applying Public Participation GIS (PPGIS) to Inform and Manage Visitor Conflict Along Multi-Use Trails." *Journal of Sustainable Tourism*. Vol. 26, No. 3, p470-495.

Segadilha, Ana, et Al. "Analysis of Bicycle Commuter Routes Using GPSs and GIS." *Procedia – Social and Behavioral Sciences*, vol. 162, p. 198-207. 2014. doi.org/10.1016/j.sbspro.2014.12.200. Accessed 1 November 2018.

Aultman-Hall, Lisa. & Kaltenecker, M. Georgina. "Toronto bicycle commuter safety rates." *Accident Analysis & Prevention*, vol. 31, no. 6, 1999, https://doi.org/10.1016/S0001-4575(99)00028-7. Accessed 15 November 2018.