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GIScience 2

Dr. Kohler

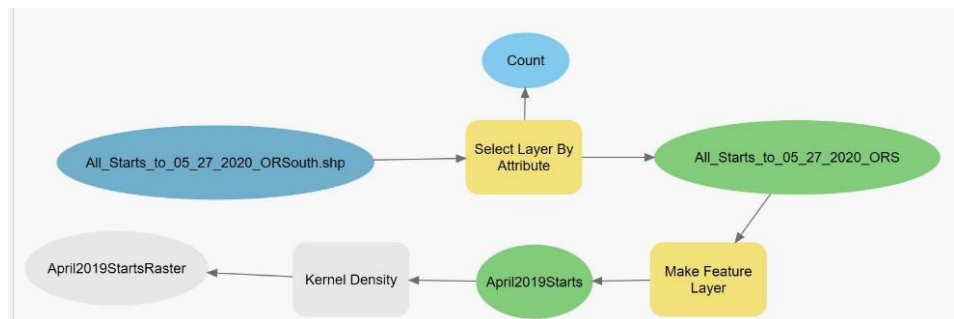
5/27/2020

Final Project Initial Results

As Americans try to adjust themselves to the impacts of the Coronavirus, no facet of daily life has been left untouched. As unemployment rates skyrocket and typical public recreational activities close, the use of the Eugene bikeshare system will inevitably face dramatic changes. As such, any set of analyses of the Peace Health Bikes service would be incomplete without a thorough understanding of how the bikeshare community has changed since the shelter in place orders went into effect. The following report analyzes changes from April of 2019 to April of 2020 and highlights the most frequently traveled hubs and areas during shelter in place, changes in bikeshare user trends, and analysis potential explanations of those trends.

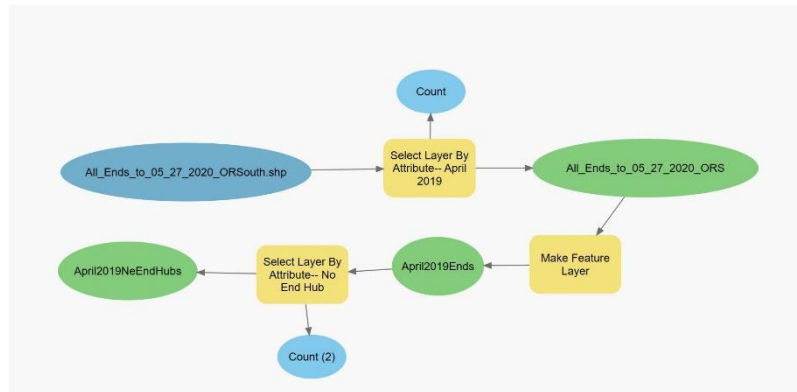
In analyzing changes in start/end point data from April of 2019 to April of 2020, I was able to get some sense of which parts of the service area are in the highest demand, while also

gaining insight into which demographics continue to use bikeshare systems throughout the

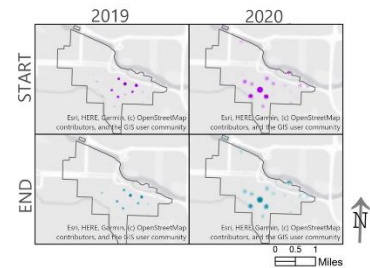


lockdown. I followed a process similar to the one modeled to the right with data from both 2019

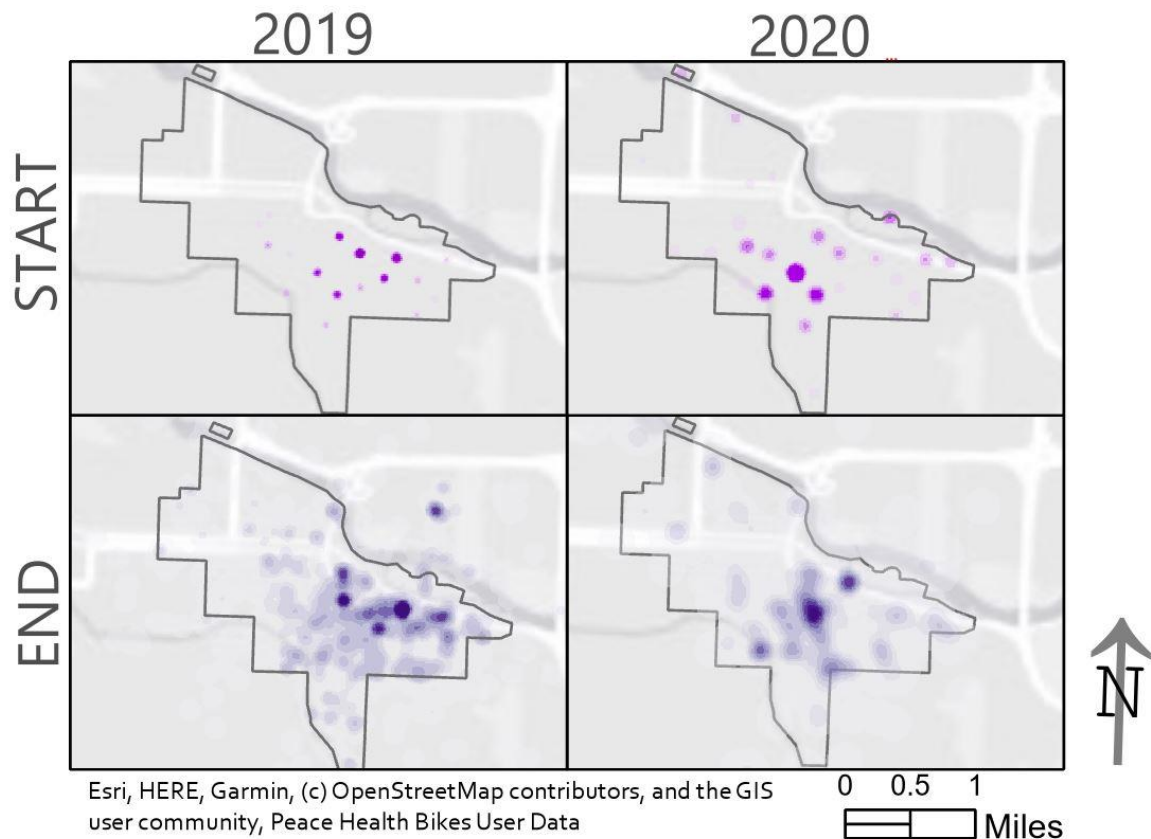
and 2020 and the start/end points for both years. This allowed me to develop several different raster representations of the differences in start/end points in April across those two years.



Unfortunately, because this is an analysis of all start/end data, the start and end points most likely cancel each other out and give graphs that are remarkably similar. This makes sense if you think, for example, about a person's commute using a Peace Health Bike. If they go to work and home using a bike, then they will start their day at their home and end at their destination. Then, when they go from their work back home, those start and endpoints essentially cancel each other out. In order to mitigate that noise, I selected for the end points that did not have designated end hubs in order to get a better sense of where, specifically, people were travelling. The reason I did this for end points and not start points is because, while a bikeshare user may be able to see where bikes are outside of hubs, they cannot guarantee that a bike will be available unless they put a hold on it. For that reason, start points outside of the hubs are more likely to be a result of chance, which end points outside of a bikehub are almost always a result of consumer demand.



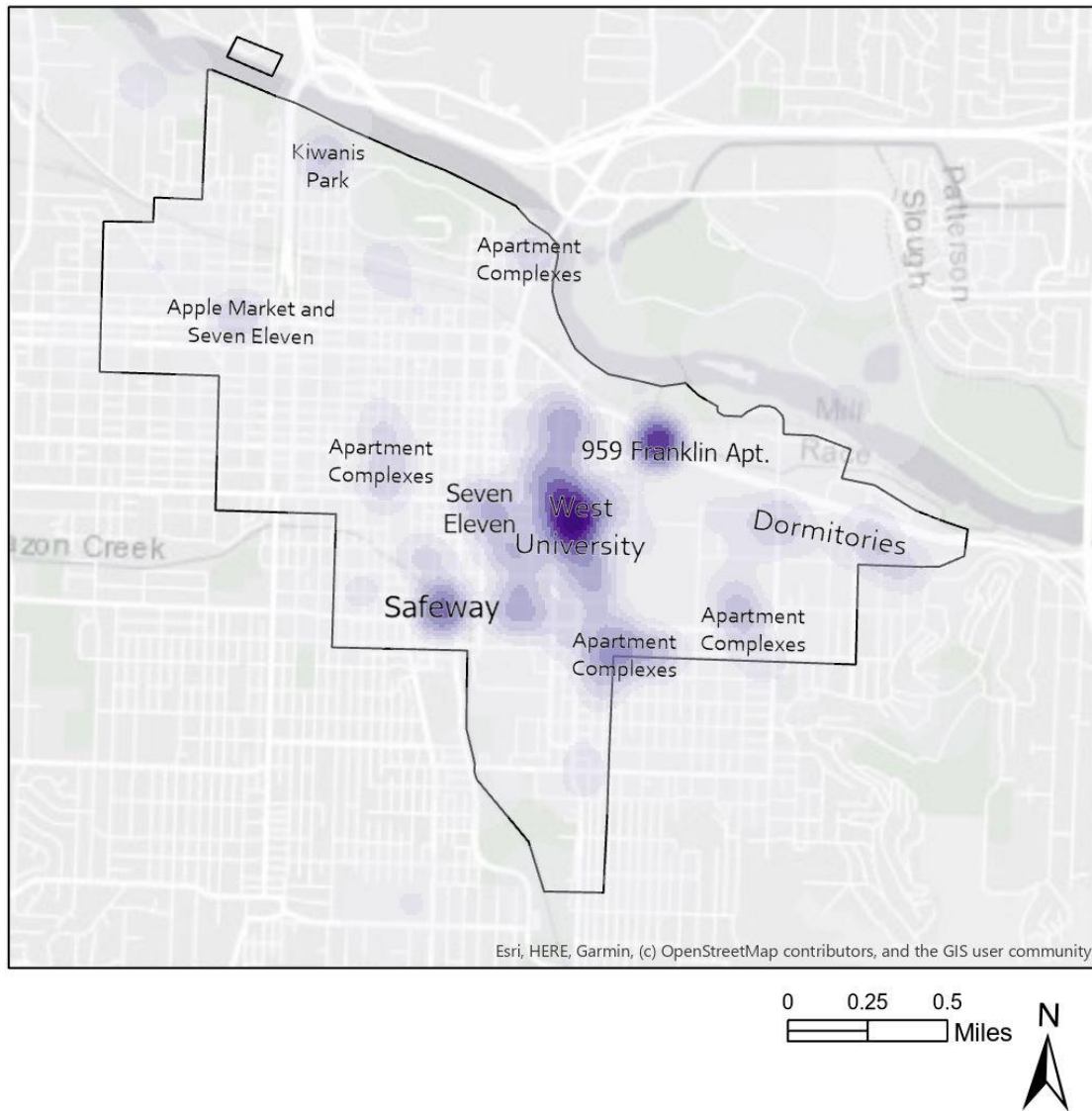
Raw start/end analysis demonstrates no change



The most significant shift from 2019 to 2020 is the decreased emphasis on the areas where the University of Oregon is. Since the University constitutes the majority of bikeshare users, seeing a substantial shift away from the university hubs following the movement to online classes for spring term makes sense. Essentially, the 2020 hubs represent the most frequently used hubs off campus. In 2020 there is also less diversity in the places where people are traveling to. The map below highlights the points of interest for bikeshare consumers in 2020

Most Used Hubs in 2019	Most Used Hubs in 2020
Erb Memorial Union	15th Ave and Ferry St
13th and Kincaid Street	7th Ave and Hilyard St
15th and University Street	17th Ave and Pearl St

End Area Demand



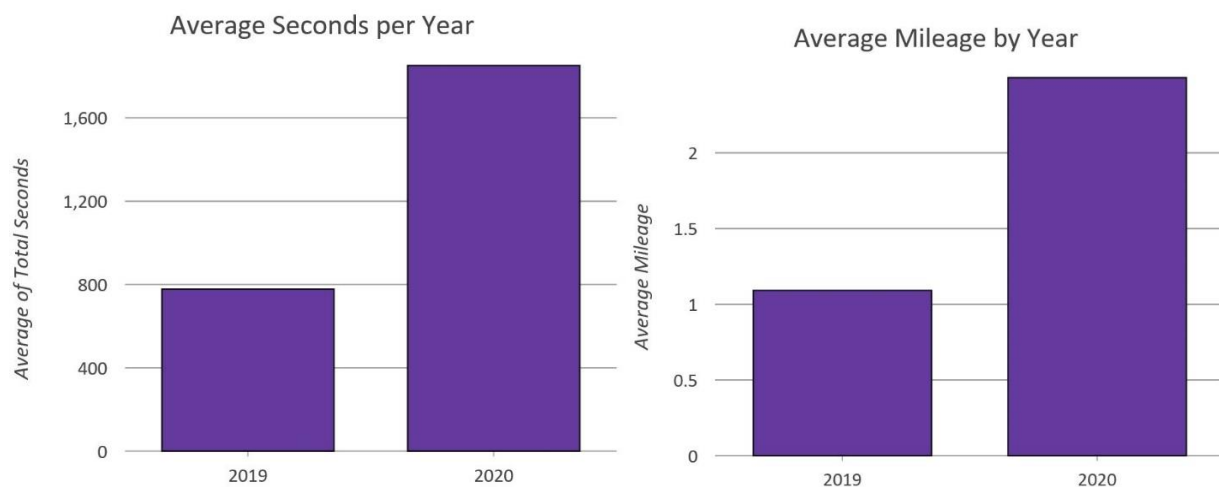
As seen above, a lot of the end-point demand tends to focus on student residences as well as a couple of businesses that stayed open during the quarantine, with the notable exception of Kiwanis park. This indicates that many Bikeshare users are skill utilizing the bikes to run errands. It also highlights that many, if not most, of the bikeshare users during shelter-in-place restrictions are college students whose immune systems are most likely healthy enough to be able to minimally follow social distancing rules.

2019 Vs 2020

18,435	Total Rides in April	3,565
13 min.	Average Duration	31 min.
1.1 mi	Average Distance (in miles)	2.5 mi
1,337 (7.2%)	Number of trips that start and end in the same hub (% of total)	1,207 (34%)
Thursday	Most Active Days of Week	Tuesday & Thursday

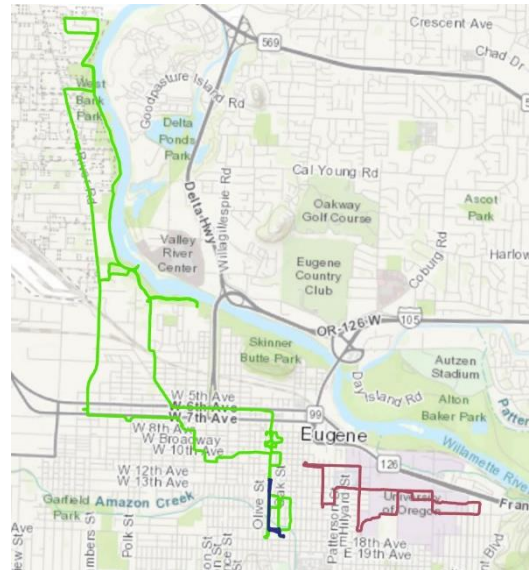
The chart to the left is a comparison between the rides that bikeshare users took in April 2019 versus in 2020. Although there were substantially fewer rides taken in 2019, the rides that were taken were about a mile and a half longer, on average (1.1 miles to 2.5 miles, on average-- a 64% increase). Furthermore, the duration of the rides taken more than doubled from 13 minutes, on average in 2019, to over half an hour in 2020. The most impactful factor for this increase in average length was in recreational/exercise rides. With places of business closed and

many, if not most, Lane county residents following social distancing guidelines, the demand for bikes for transportation to activities and commute to work severely declined; however, with gyms closed and people generally having more free time, the use of bikes for recreational activities increased.

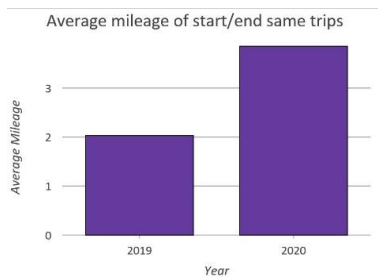


The indicator I used to determine whether or not the bikeshare was being used recreationally was the number of rides that stopped and started in the same hub (hereafter referred to as “same start/end rides”), as this is an indicator that the consumer was not using the

bike to get to a certain place, but that they were simply riding it for pleasure. It should be noted that this metric does contain some error, as it includes some people who are just using the bikes for quick errands and it excludes people who may have been using the bikes to go one way and jogging or running back. To the right are three example tracks I selected from the start/end same tables. The red track is about 3.8 miles long, approximately the average length of a start/end same ride in 2020. The erratic pattern and travel through campus bike routes indicate it is almost definitely a recreational ride. Similarly, the green track, which at about 16 miles is well above average, follows river routes and follows a less-than-optimal route that indicate this ride was for pleasure. The smallest, dark blue route is just one mile long and appears to be a trip to one place and back. This could indicate an errand being quickly run, or it could simply be a customer enjoying a quick ride. In general, an increase in same start/end rides would be an indicator that more bikes are being used recreationally.



Between April 2019 and April 2020, the aggregate number of these start/end same rides went down slightly, from 1,337 to 1,207. This makes sense as citizens try to avoid public surfaces. What is remarkable is how little the number of start/end same bikes went down by. With overall bike rides going down by over 80%, the number of start/end same bike rides went down by just 10%. While start/end same rides made up about 7% of total rides in 2019, they made up a whopping 34% of total bikerides in 2020. This increased proportion of start/end same routes almost definitely is a large factor in the increase of average miles traveled when using the bikeshare bikes. Even in 2019, start/end same routes were 2.8 miles long, on average (about 2.5



times the overall 2019 average). In 2020, however, the start/end same routes were a whopping 3.9 miles long on average, about 56% longer than the overall average for that year. This means consumers are still valuing bikeshare as a cleaner, open-air alternative to gyms and other typical recreational activities.

Future analysis of the interaction between bikeshare systems and covid could be greatly buoyed by comparative line density analysis between 2019 and 2020 tracks. Unfortunately, the circumstances of COVID mean all my analysis is happening on my laptop or through the UO virtual computer lab and my computing power and bandwidth have been limiting factors in my ability to provide that analysis. Furthermore, now that we have reached June, adding May's data to the picture would help to get a better sense of how well Lane County residents are upholding social distancing rules, as well as how the bikeshare market responds to gradual reopening processes. This analysis could be most effective if broken down by week and compared with those respective weeks in 2019. Finally, a potential application of bikeshare data with regards to COVID could be in contact tracing. ArcGIS Pro has a proximity tracing toolbox that can be used as a form of contact tracing if a bikeshare user were to eventually test positive for Coronavirus, the Peace Health Bikes employees could use non-anonymized data to send notifications on their app to Peace Health Bikes consumers who could have been exposed to the coronavirus.

With bikeshare rides at such a low, it may look like a grim quarter for the Eugene Peace Health Bikes system. There are reasons for hope, however. An op-ed by Luz Lazo of the Washington Post, published in mid-May of this year, recently speculated that bikeshare and e-scooter companies may see substantial increases in their user base after businesses start to reopen and employees look for avenues to commute that do not involve closed-air systems or touching surfaces that others have touched. While bikeshare use overall may have gone down,

my analysis has shown that citizens still find use for the bikeshare program from shelter in place for recreational use and transport to housing and essential businesses.

CITATIONS

Ambrose, S., & Slocum, N. (2020, May 6). *Use proximity tracing to identify possible contact events*. ArcGIS

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Lazo, L. (2020, May 18). Bike-share and e-scooter companies, hit hard by the pandemic, may come back stronger. *The Washington*

Post. https://www.washingtonpost.com/local/trafficandcommuting/why-bike-and-e-scooter-companies-hit-hard-by-the-pandemic-may-come-back-stronger/2020/05/16/076e2900-95d5-11ea-91d7-cf4423d47683_story.html