

TAKING A WALK WITH THE HERITAGE TREES

Analyzing the Most Optimal Heritage Tree Routes in Portland, OR

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BACKGROUND

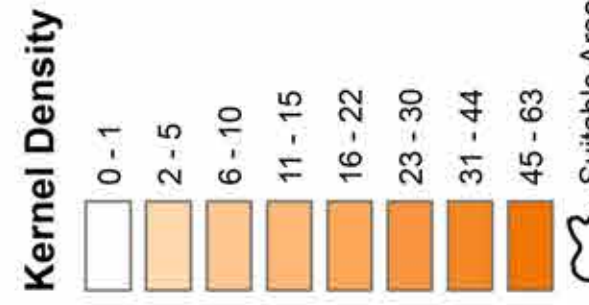
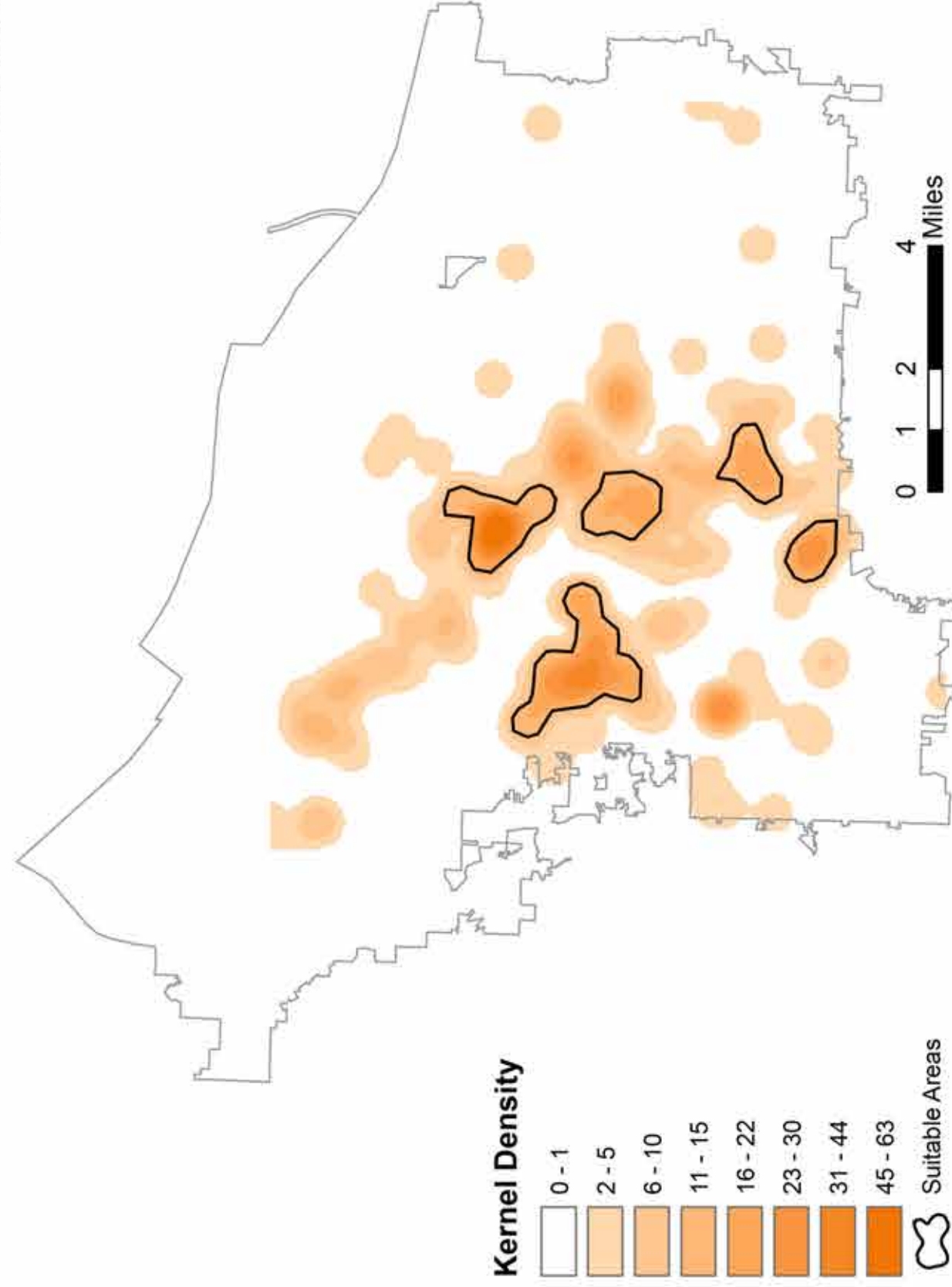
Heritage trees are an important aspect of what makes Portland unique, allowing for old historic trees to be preserved and known. According to Portland Parks and Recreations, heritage trees are "formally recognized by City council for their unique size, age, historical or horticultural significance. Anyone can nominate a tree to become a heritage tree, but it is ultimately up to the city to decide whether the tree fits the qualifying parameters. Once a tree is established as a heritage tree, the tree must be preserved, meaning that the tree cannot be cut down unless it is dead, dying, or dangerous (Portland Parks and Recreation, 2016).

Our intended audience was targeted towards adventurous tourists or people living in the city who would be interested in learning more about the history of Portland and its remarkable trees. This analysis is just the framework for a future project that delves into the trees' history. We hoped to identify the shortest routes with the highest density of heritage trees in the least amount of time.

While researching heritage trees, our group noticed that there was a lack of existing predefined routes to see heritage trees across Portland. In our research, we discovered a project that had been created by a former Portland State University graduate student, David-Paul B. Hedberg. Hedberg created a much smaller-scale heritage tree route for Downtown Portland, called "From Stumptown to Tree Town." This project included a route and included historical information about the heritage trees which emphasized the uniqueness of each individual tree. To honor the uniqueness of the heritage trees around Portland, we hoped to expand on Hedberg's project and create additional heritage tree routes in 5 different neighborhoods. In the future we hope to work with Hedberg to create a more extensive and informational tour of these historic trees.

HERITAGE TREE KERNEL DENSITY

This map shows the result of our kernel density analysis to determine which areas would be the most suitable for visiting the greatest number of heritage trees in the shortest amount of time.



METHODOLOGY

Our data was acquired from Portland Parks and Recreation, Trimet, and Metro RLIS. A kernel density analysis was ran on the Heritage Tree point data at a radius of a 1/2 mile (2640 ft). This number was selected after a trial and error process. The raster value range of 0-63 was derived by the kernel density tool. After running the kernel density tool, the data showed clustering within areas that could be reasonably walked by somebody on any given day. This was to be tested in our route making, as we estimated the time and distance before running the network analysis.

After experimenting with the con tool, we decided on an appropriate threshold which was anything greater than 10 (queried as VALUE > 10). This was the point at which one could observe a noticeable change in density. The tool was ran to represent "1" where clusters met our requirements, and "No Data" where they did not. From this raster, we converted our data using the Raster to Polygon tool, resulting in 10 suitable polygons. Five of the ten polygons did not meet our criteria as a suitable route neighborhood, as they did not have at least 12 heritage trees. We decided that any less than 12 heritage trees would dissuade someone from taking the time to walk the route. In the end, five suitable polygons became the basis for our walking routes.

A 2,000 ft buffer was created around each polygon. This would permit the routes to utilize the roads outside of the polygon whenever necessary, turning out to be useful for two of our largest areas. All trees that were listed as private backyards were excluded from our analysis. The heritage trees, TriMet stops, and Portland streets layers were clipped to each polygon. To account for pedestrian accessibility, highways, bridges, and ramps were excluded from the streets layer.

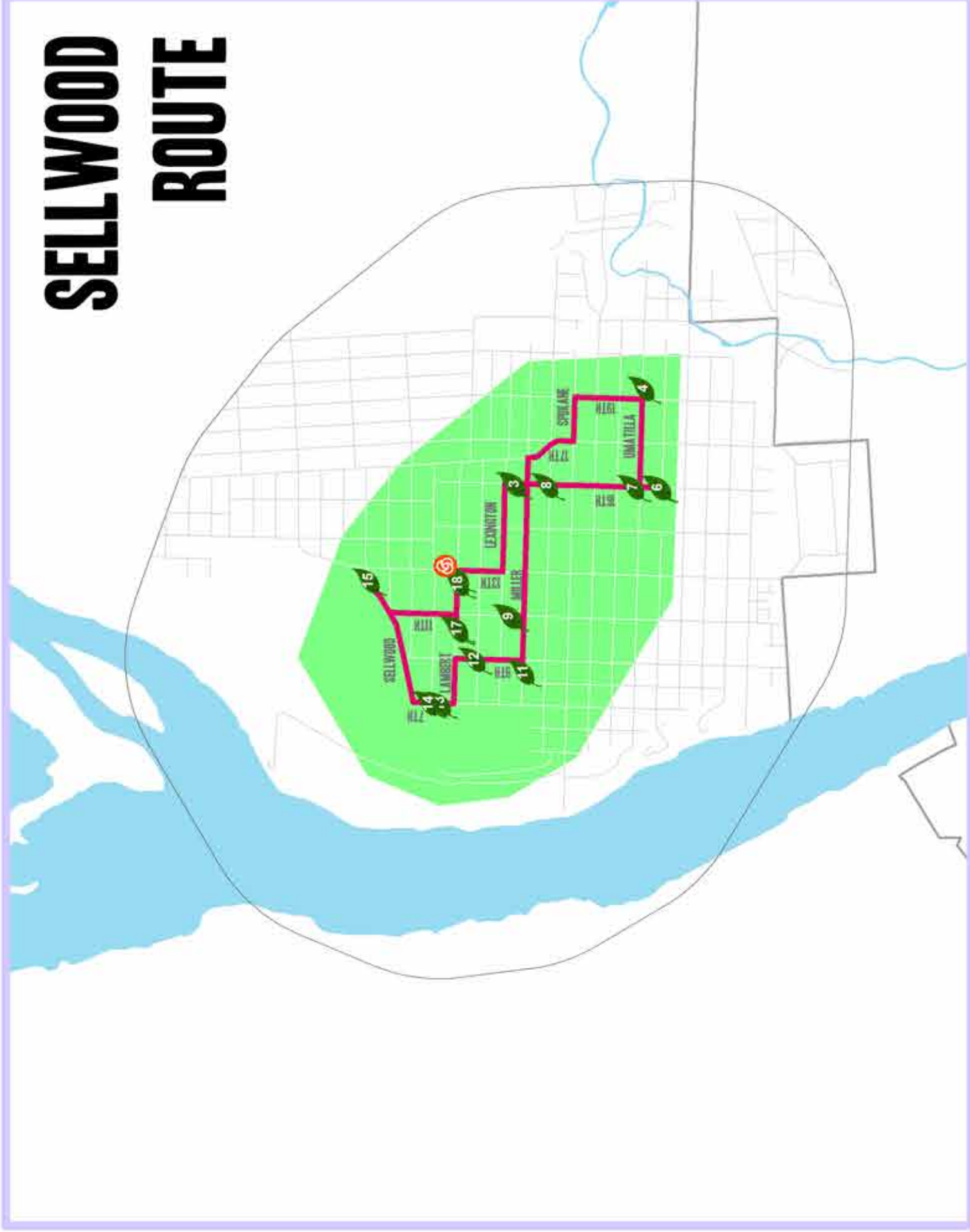
Two new fields were created in the streets layer to represent time and distance. Using the Calculate Geometry tool, the distance of each polyline was calculated to reflect miles. The field calculator was used to assume walking speed with the equation: "distance / 7 = 60". We made the assumption that since the average human walks approximately 3 MPH, it would be reasonable to decrease this number to 2 MPH to account for the leisurely nature of the walk. We also made the assumption that our audience would be willing to take public transportation.

The Near tool was used to determine an appropriate bus stop to begin and end each route. This was based on the density of trees near each stop. The Portland streets layer was then clipped to the buffer area. Then, a network dataset was created for each route. New routes were created using the Network Analyst extension using the shortest distance option with no directional impedances. The "Directions" option identified time and distance measurements for each route. Finally, maps were created to visually represent the results from our spatial analysis.

REED ROUTE

Neighborhood	Bus Line	Direction	Stop Name	Length	Time	# of Trees	Difficulty
Sellwood	BUS 70	To Milwaukie	SE 13th and Lambert	2.8 mi	1 hr, 25 min	17	Easy
Inner Eastside	BUS 4	To St. Johns	SE Division and 26th	4.3 mi	2 hr, 9 min	18	Easy
Reed Route	BUS 75	To St. Johns	SE Cesar Chavez Blvd and Harold	4.9 mi	2 hr, 28 min	18	Easy
Irvington	BUS 8	To Jackson Park	NE 15th and Knott	6.6 mi	3 hr, 17 min	40	Moderate
Downtown Westside	BUS 15	To Hillsboro	Goose Hollow/SW Jefferson St Max	15 mi	7 hr, 21 min	50	Difficult

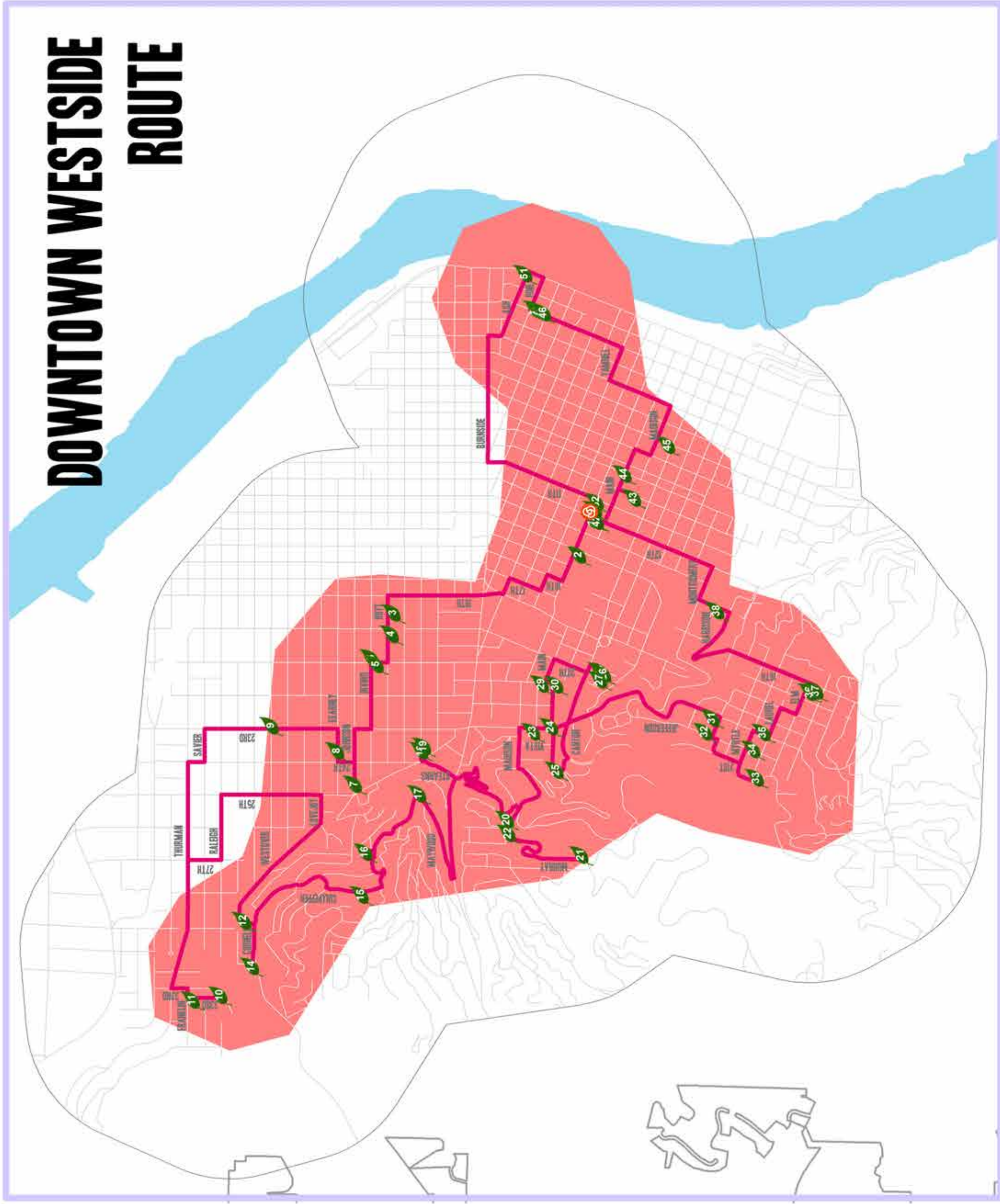
SELLWOOD ROUTE



IRVINGTON ROUTE

INNER EASTSIDE ROUTE

DOWNTOWN WESTSIDE ROUTE



HERITAGE TREE

START & END POINT

WALKING ROUTE

SOURCES:

- Hedberg, David-Paul. 2016. "From Stumptown to Tree Town: A Field Guide for Interpreting Portland's History through its Heritage Trees." Retrieved from <https://www.portlandoregon.gov/parks/article/54552>
- Portland Parks and Recreation - Heritage Trees
- TriMet - Bus Routes
- RLIS - City Limits, Street, Rivers

RESULTS

Once we ran our analysis, we were able to identify five walking routes across Portland that would be best for people experiencing the local heritage trees. These five routes were systematically chosen, as they contained the highest clustering of heritage trees. We titled our routes based on the most prevalent neighborhood for Sellwood, Reed and Irvington. The inner eastside route is approximately at the intersection between four different neighborhoods: Buckman, Sunnyside, Richmond and Hosford-Abernathy. The Downtown Westside route includes Downtown, Pearl District and the West Hills. By using our recommended routes, people will be able to see the greatest number of heritage trees within the shortest amount of time.

After we determined our routes, we determined the difficulty of each route based on the amount of time required and the total distance walked. We found that of the five routes, there were three "easy" or "short trip" routes, one "moderate" or "half-day trip" route, and one "difficult" or "full-day trip" route. At a further point we would hope to include a slope analysis to fine tune our difficulty levels.

In the future, we would ideally like to continue this project and work with David-Paul B. Hedberg, who is the author of the free guide "From Stumptown to Tree Town." We hope to contact him to see if he would like to create more future tree guides that would include our network analyst routes. Another element that we hope to do in the future is to create a mobile app that includes facts about the tree that the person is visiting to make for a more interactive experience.