

WHERE IN THE PORTLAND METRO AREA WOULD STEVE LIVE

A VIEWSHED ANALYSIS BY STEVE STIELER GEO 493 FALL TERM 2019



Abstract:

Viewshed Analysis of Places for Steve to Live in the Portland Metro Area

Abstract

For my final project in Digital Terrain Analysis, I wanted to use the skills I learned throughout the term, to perform a viewshed analysis. I thought if I had moved here and did not know where the best location for myself to live in the Portland Metro Area would be, could I create a map with some simple parameters of where I wanted to live? My question became, “Where would Steve live in the Portland Metro Area?” After deciding that I did not want to limit myself to any one particular area, I gathered the necessary tools for the job. I used the RLIS data base for specific shapefiles of the metro area, a 10m DEM from the Oregon Spatial Library and ArcMap to perform my task within the scope of the project I created.

I went into further detail of how to have a point location for my viewshed analysis using the metro taxlots shapefile. I decided on (Single Family Residence taxlots) because this would be the type of house I would be purchasing or building. I knew this would give me a bearing reference to perform my analysis. I was also concerned about living in an area without a nice view of something. Whether that was of the mountains or the city itself, I decided a 10-degree slope would suffice my needs of a view. Also, this would give me some ease of mind of water runoff from the rain, to help with any flooding that may occur. I also wanted to be within a 5-mile radius of a hospital, ¼ mile proximity to a park (to walk my dogs), a ¼ mile proximity to walking paths or bike routes and to have a view from my house.

I created a parks buffer, a walking path/bike route buffer, and a hospital buffer. I used ArcMap and its Spatial toolbox to perform these tasks. I used a taxlot attribute to aid in the buffers, performed an extract by mask function to the slope 10m DEM (NAD 1983 Oregon Statewide Lambert Feet Intl, Datum D_North American 1983), used the reclassify tool to the Raster to polygon tool, clipped the bike to the metro shapefile, clipped the hospital to the metro shapefile, clipped the parks to the metro shapefile, clipped the taxlots to the metro shapefile, used the intersect tool for the parks and bike routes shapefiles, as well as the new parks, new hospital and new bikes shapefiles. I used the select by attribute tool (Single Family Residence) and used the intersect tool to the metro taxlots, used the point to feature tool and the viewshed tool, ran my viewshed analysis and the final output was my final map, displaying the areas in the metro area that fit the parameters and scope of my project, which was to find a place, with a view, next to a park and a bike route, with a reasonable distance to a hospital and modern outlets.

After all the tasks were completed, I was satisfied of the final map outcome and my new ability to locate a place for myself to live in the Portland Metro Area.

Geospatial question:

- “ Is there a place to live in the Portland Metro Area, that is on a sloped hill with a view, close to dog friendly parks (to walk and play with my dogs), be in walking distance or have access to biking or walking trails and be in a reasonable distance to a medical facility”?
- I wanted to explore possible locations if I were to buy or build my own house within areas around Portland, or expanded to the greater Metro Area. If my viewshed analysis results showed a view farther than my minimum parameters, this would be acceptable for my results.
- I wanted to feel secluded but yet be around accessible comfort of modern outlets.
- I chose to make an easy readable map using a viewshed analysis, that would give me a general hypothesis of where these locations would exist of the area.

Data collected for analysis:

- RLIS database directory to obtain the data I needed to examine the possibility of places to live in the Portland Metro Area.
- Selected shapefiles that would assist in the process of making a map of the area to aid in my search (Taxlots, Parks, Hospitals, Bike routes, walking paths).
- Oregon State 10m Digital Elevation Model (DEM) to obtain the desired slope I was looking for in relations to a view.
- I set up a Visible View Parameter which included a 10 degree minimum slope, 10 meter minimum elevation, $\frac{1}{4}$ mile to a (park, walking/biking paths, modern outlets), 5 mile to a Hospital, 100ft minimum sight distance.
- I drew a rough draft of an outline to better understand the question and the data I was collecting, to further process my map and to obtain a better geographic understanding of the area.



• 10m DEM of Oregon clipped to Metro

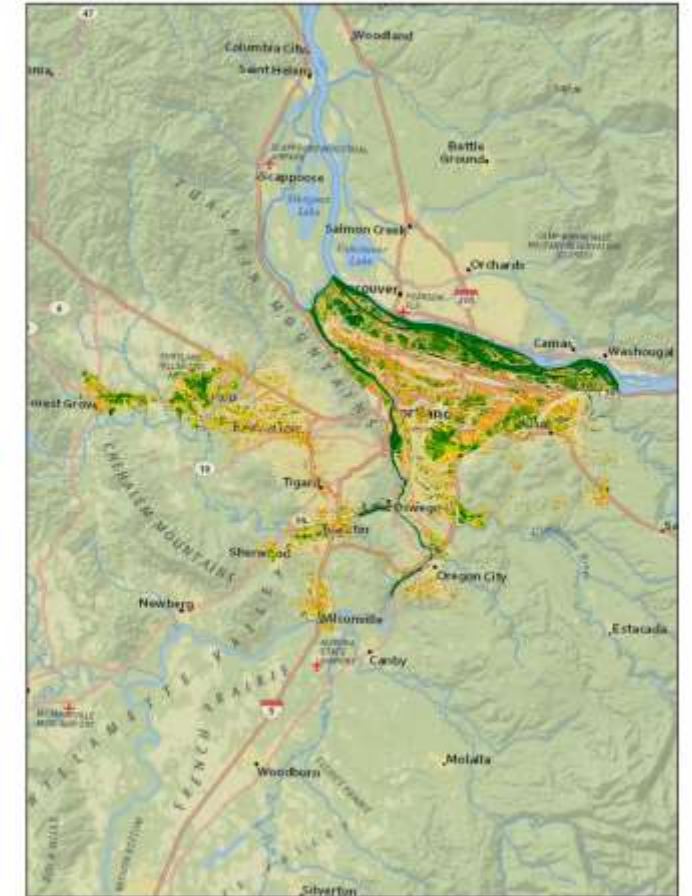
- Created a boundary of the Portland Metro Area by using the Clip tool to clip the DEM to the Portland Metro Area.

- DEM: NAD 1983 Oregon Statewide Lambert Feet Intl, Datum D_North American 1983



• New 10m DEM

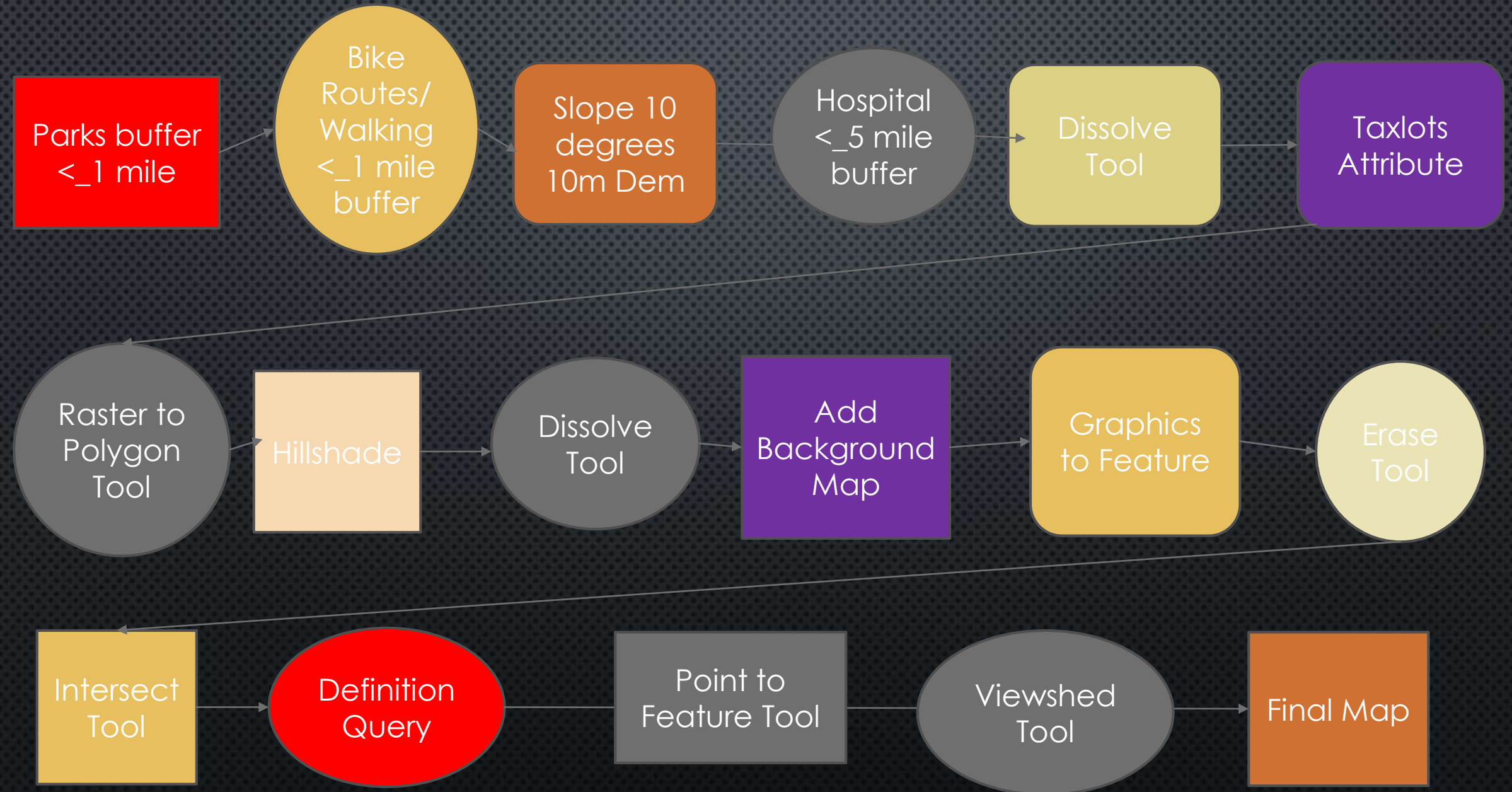
- Reclassify and Raster to Polygon, Extract by Mask tool, to further evaluate the slope.



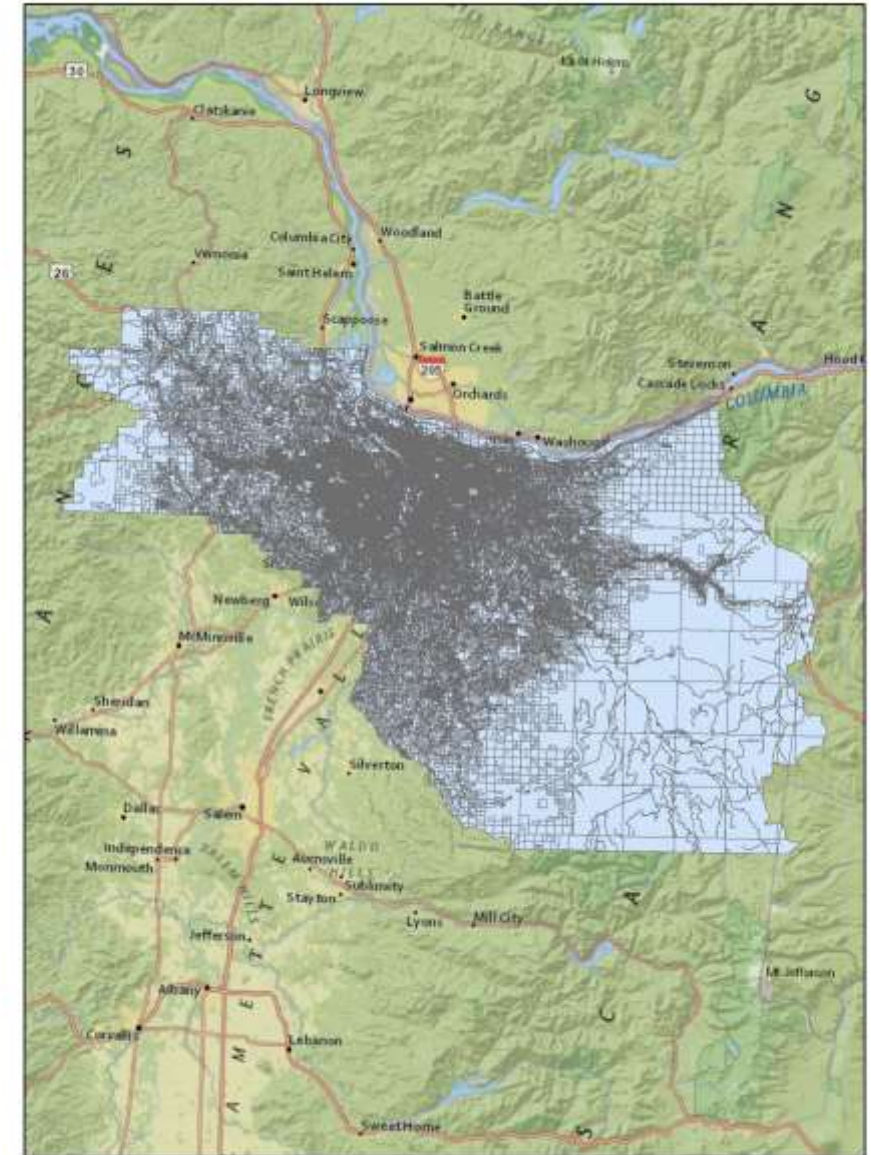
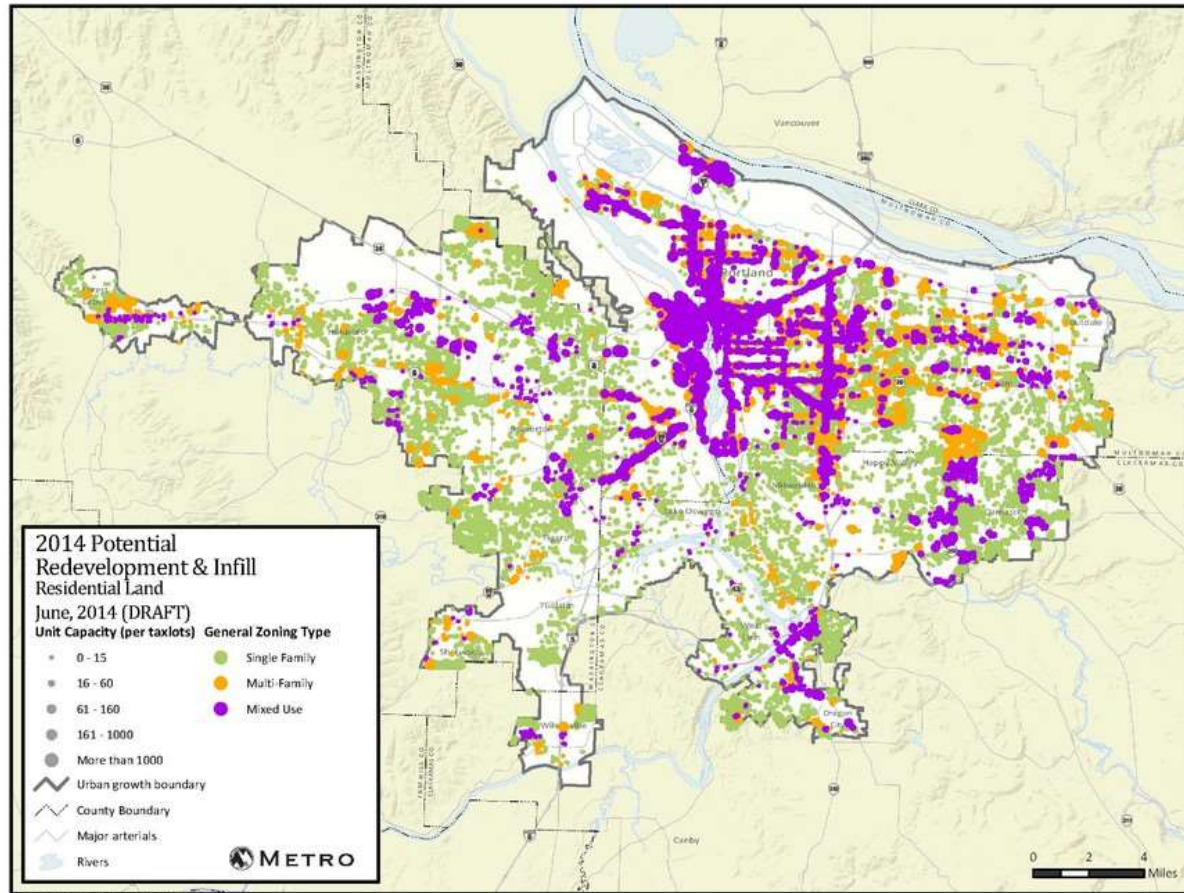
• Reclassify for a 10 degree Slope

-

Rough draft work flow outline:



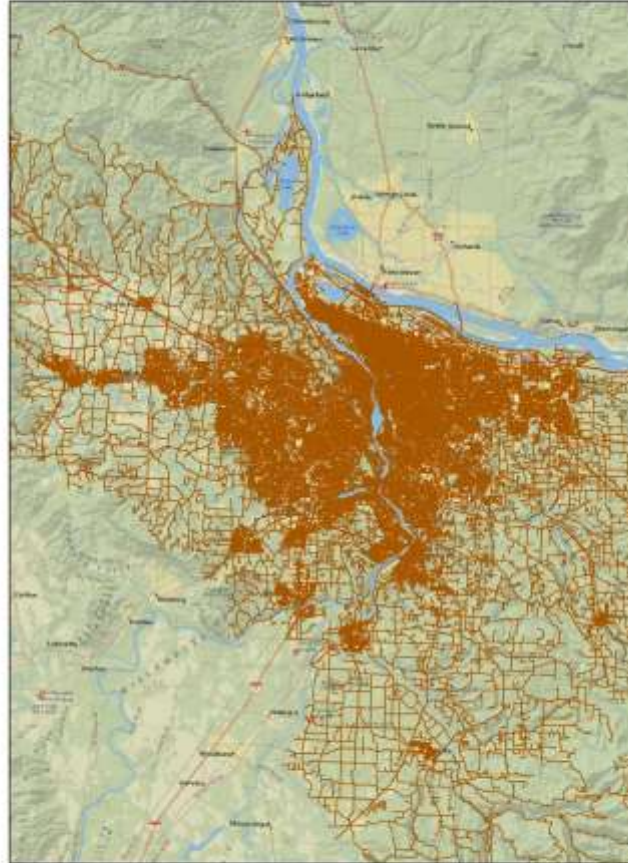
- Taxlots (Single Family Residence) for point reference



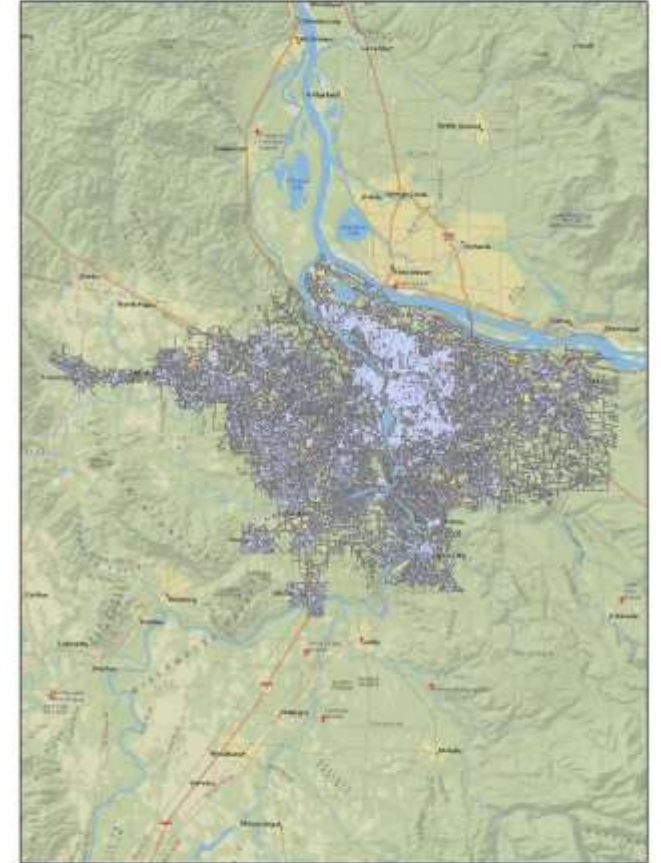
(Ref. Metro Single Family Residence guide
OPB 7/16.14



- Created 1/4 mile Buffer for the Walking Paths



- Clipped the Walking Paths and Bike Routes to the Metro

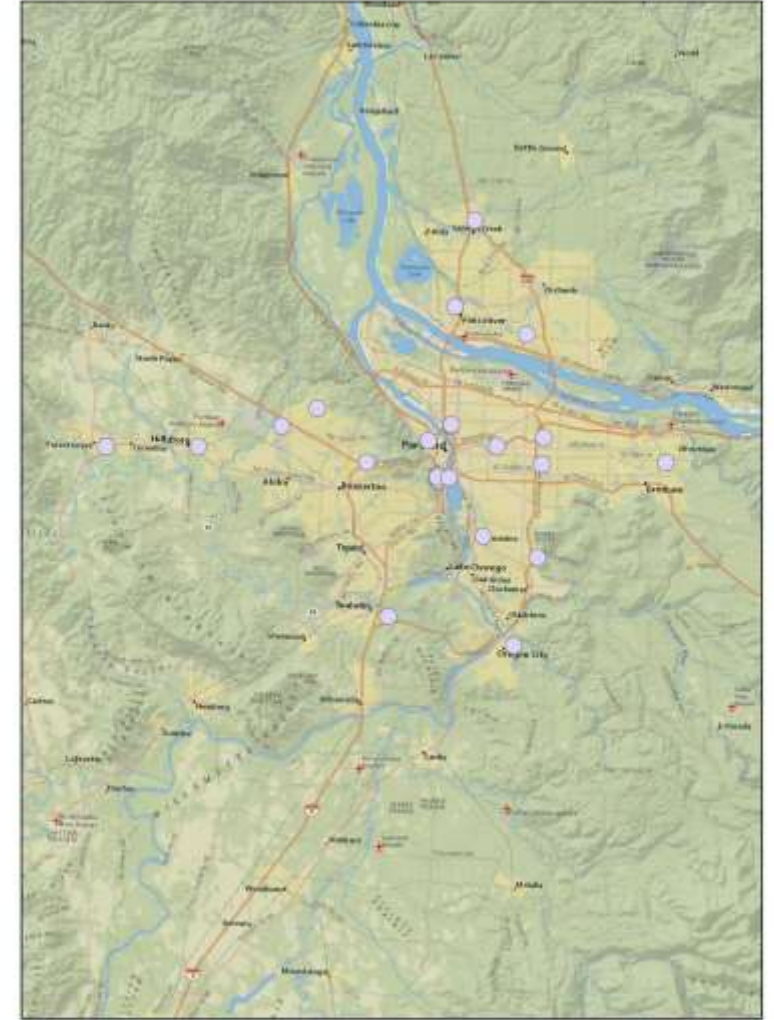


- Walking Paths/Bike Routes clip

- Clip and Intersect Tools to further my ability to select smaller location areas, Buffer's created for the metro.

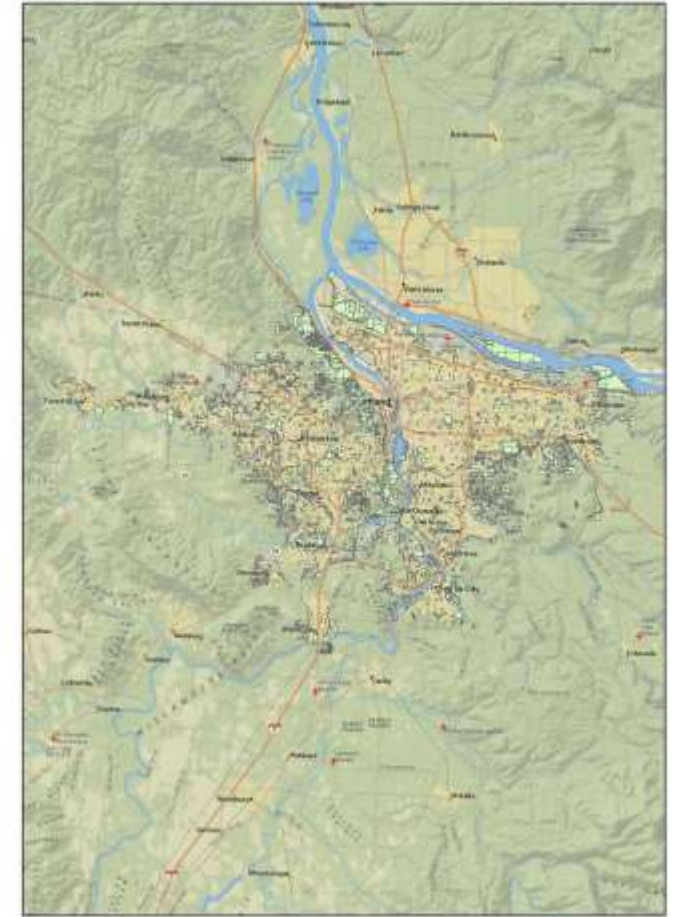


- Clip and Intersect Tools to further my ability to select smaller location areas.
- Buffer's created for a 5 mile radius



- Hospitals in the Metro Area

- 5 mile Buffer for the Hospitals



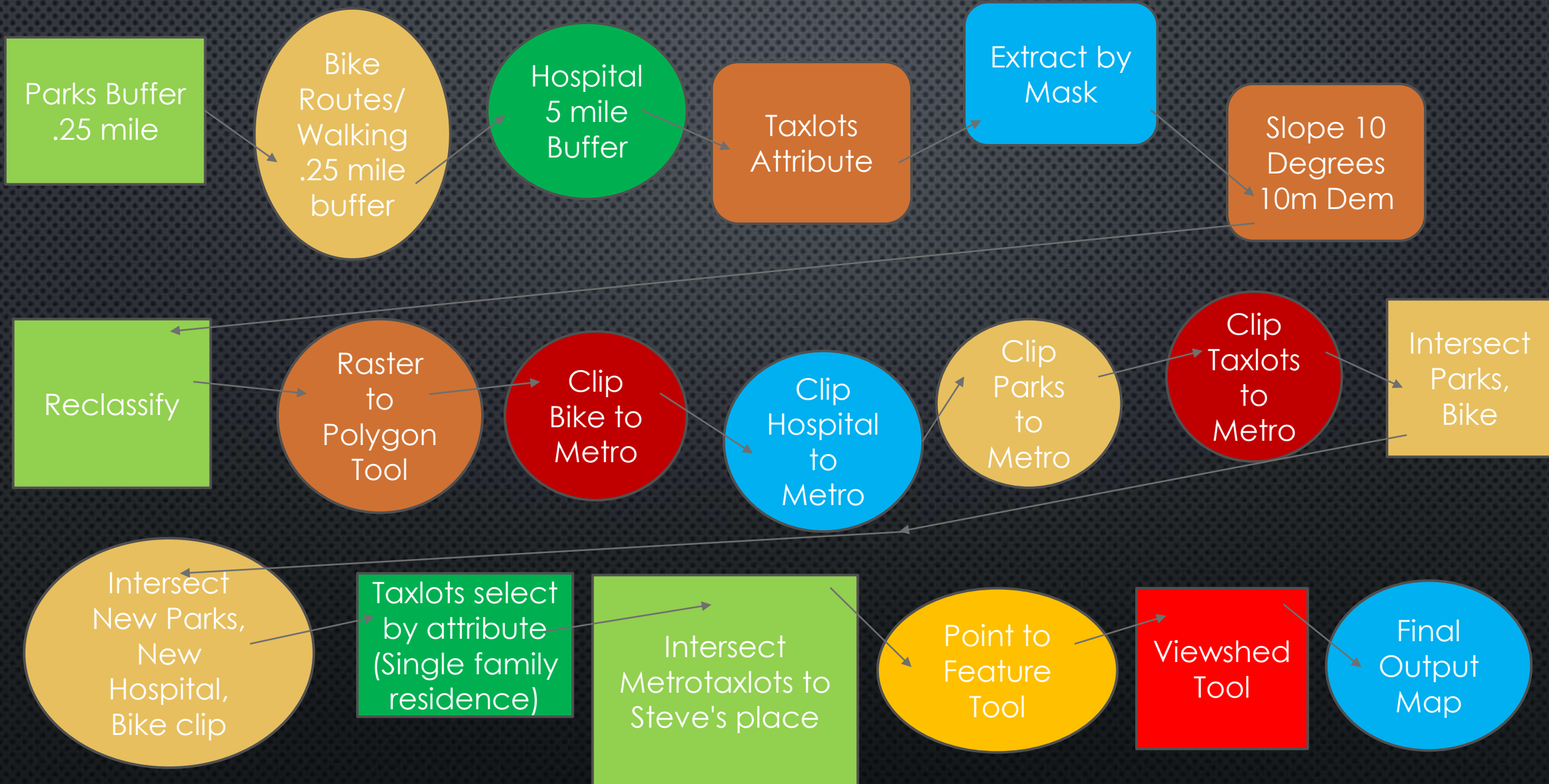
- Parks in the Metro Area

- Created 1/4 mile Parks Buffer

- Clipped Buffer to Metro

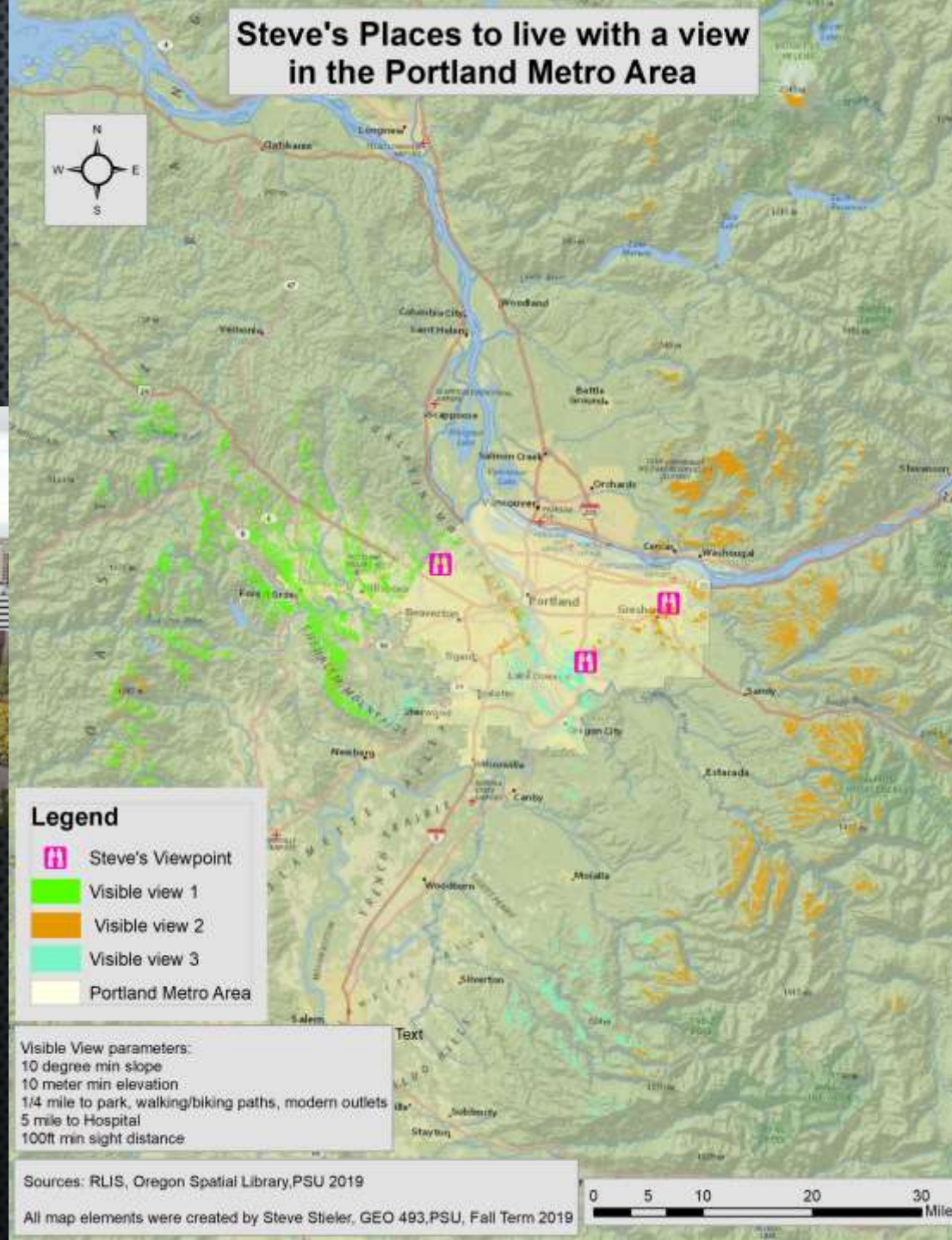
- Clip and Intersect Tools to further my ability to select smaller location areas, Buffer's created for the metro.

Final workflow outline:



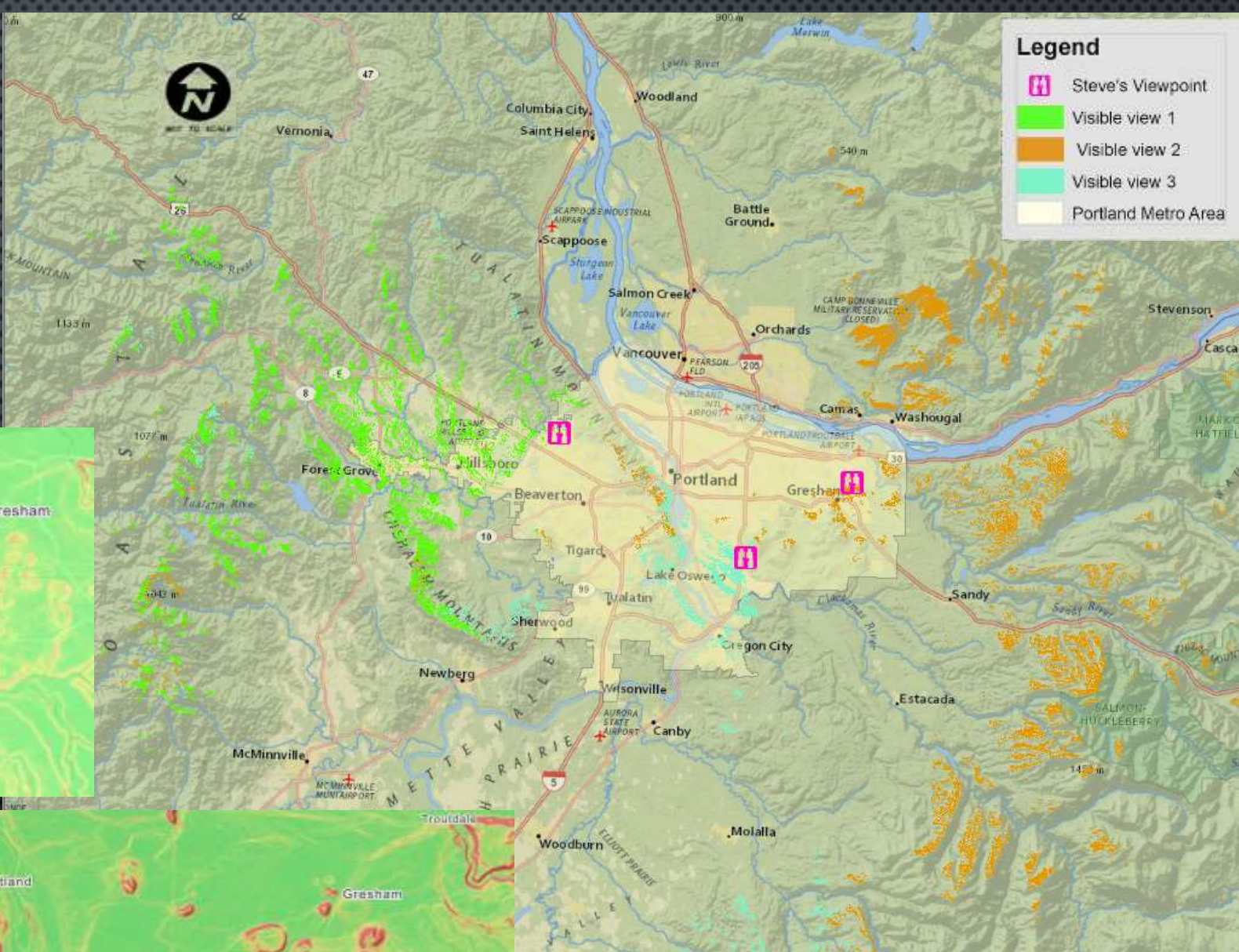
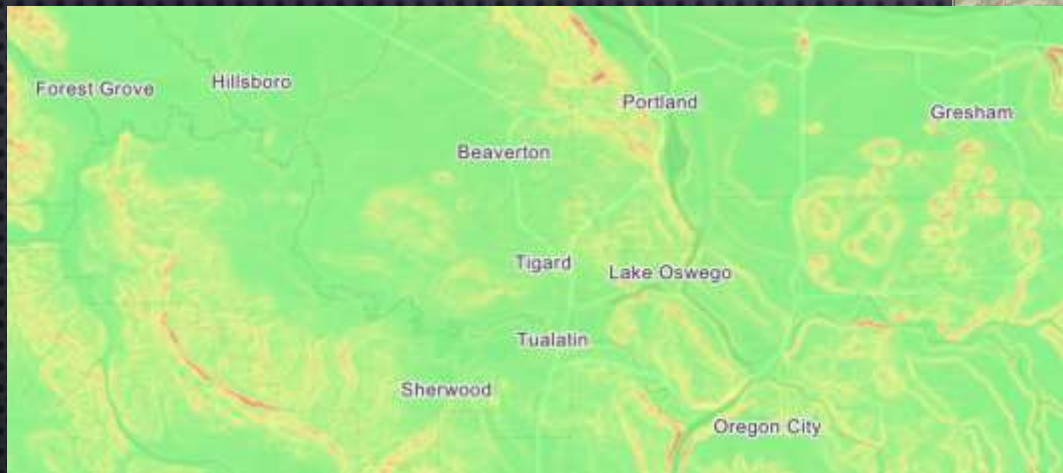
- Final map

- Views of potential area's as outlined in the project's scope



- Final Map Zoomed in for reference

LIDAR Bare Earth slope (degrees) reference
DOGAMI Lidar viewer 2019



LIDAR Bare Earth slope (degrees) reference
DOGAMI Lidar viewer 2019

Conclusion:

- I used simple tools within ArcMap to perform my project and make a map aiding in my quest to find a suitable place to live in the Portland Metro Area.
- Visible View Parameters included:
10 degree minimum slope, 10 meter minimum elevation, $\frac{1}{4}$ mile to a (park, walking/biking paths, modern outlets), 5 mile to a Hospital, 100ft minimum sight distance.
- My definition of “view”, was to be on a hillside of a certain slope, that would aid in my ability to have a view of the city. It was determined that additional tree removal, or some other means of creating a clear view, once selected, might have a contributing factor in my final site location.
- In further projects of this magnitude, I would like to perform and have a more detailed terrain analysis map.

References:

- RLIS
- Oregon Spatial Library
- <https://www.opb.org/news/article/report-shows-portland-may-already-have-enough-room-to-grow/>
- <https://gis.dogami.oregon.gov/maps/lidarviewer/>
- All maps (except noted in slide as other) were created by Steve Stieler for the purpose of GEO 493 PSU Fall Term 2019