Adlai Nelson  
IDCE 376  
Lab 1

***Introduction***

The purpose of this assignment is to learn how to do basic setup and analysis tasks for spatial data in PostgreSQL, and how to connect those data to QGIS. Our objective was to map green spaces in a city of our choice. I chose to focus on Baltimore, the largest city in Maryland, USA. The necessary SQL code is found in code.sql.

***Methods***

*Data*

Data were downloaded from bbbike.org, by searching Baltimore to center the polygon, then resizing the polygon to get the boundary polygon as well. Coordinates: -76.902,39.141 x -76.337,39.428

*Data Cleaning and Processing*

Open Street Maps (OSM) data were downloaded from the BBBike website in pbf format. This file was then imported into a posies-enabled PostgreSQL database using the osm2psql tool. A GitHub repo was created and connected to a local git project using git bash.

Following basic data exploration, a new table was created and parks with valid names were added. A table was also created and the city boundaries polygon was added.

A connection was made in QGIS with the database, and the greenspaces layer was clipped to the extent of the Baltimore boundary layer using the ‘Clip’ tool. Next, the ‘dissolve’ tool was used with name as the dissolve field. This created one entry for each park, rather than one entry for each polygon. The resulting vector layer was then exported to the database using the QGIS ‘Export to PostgreSQL’ tool.

In PostgreSQL, the area of the new polygons was re-calculated, temporarily transforming to NAD 83 Maryland State Plane to ensure that the area was calculated in meters with minimal distortion.

*Analysis*

With the data clipped to the correct extent and fully cleaned, analysis could be done. Summary statistics were calculated, (total area, n parks, mean park area, largest and smallest area). The 5 largest and 5 smallest parks were also selected, and their area in square meters displayed.

In addition to these tabular results, I also created a map in QGIS, highlighting the city’s 5 largest parks.

***Results***

There are a total of 333 green spaces in the city of Baltimore, with an average area of just under 55,000 square meters. The total area of these parks within the city is over 18 square kilometers. The size of the parks range from over 4 million sq meters to only 50 square meters (see figure 1).

The five largest parks are as follows: Gwynns Falls / Leakin Park is the largest park, and Arundel Village Park is the smallest park. Gwynns Falls / Leakin Park is almost 2 times larger than the next largest park, Druid Hill Park (see figures 2 and 3).

In general, green spaces are distributed widely over the city of Baltimore. Smaller parks seem to be more common in central areas, and larger parks are more prevalent further from the center of the city (see figure 1).

Table 1 : Summary statistics of parks

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Number of Parks | Total Park Area (sq km) | Average Park Area (sq m) | Largest Park Area (sq m) | Smallest Park Area (sq m) |
| 333 | 18.31 | 54,998 | 4,043,255 | 50 |

Table 2: Five Largest Parks

|  |  |
| --- | --- |
| Name | Area (sq m) |
| Gwynns Falls / Leakin Park | 4,043,255 |
| Druid Hill Park | 2,455,855 |
| Herring Run Park | 1,843,798 |
| Clifton Park | 1,039,146 |
| Cylburn Arboretum | 931,226 |

Table 3: Five Smallest Parks

|  |  |
| --- | --- |
| Name | Area (sq m) |
| Arundel Village Park | 50 |
| Jones Falls Greenway | 70 |
| Boone Street Park | 102 |
| Saint Helena Park | 114 |
| Miles Avenue Park | 139 |

Figure 1: Map of Baltimore Green Spaces, Highlighting 5 largest parks.

A map of baltimore green spaces

Description automatically generated