Lab Report

Question 1. What is the mean elevation of the raster (include units)?
Answer 1: The mean elevation of the raster is 266.649 metres

Question 2. What is the difference between the original DEM and RasterFill? Describe in a few sentences. Subtract the two rasters and NAME THE PLACE closest to Georgia Tech where the raster fill grid is much different than the original DEM.
Answer 2: The RasterFill smooths/fills out depressions (pits) in the original DEM to ensure continuous water flow across the surface. This adjustment prevents water from getting trapped in artificial pits, allowing accurate modeling of flow direction and accumulation.
The place closest to Georgia Tech where the raster fill is much different than the original DEM is Westside Park Bellwood Quarry

Question 3. What are the three MOST COMMON directions where water will flow? (there are 8 directions) and HOW MANY CELLS flow in each of these directions? Don't put "2", put the direction (e.g. South).
Answer 3:
First most common: West # Cells: 1,949,854

Second most common: South # Cells: 1,885,468

Third most common: East # Cells: 1,845,964

Question 4. What is the maximum number of cells that flow into any cell?
Answer 4: The maximum number of cells that flow into any cell is 3,421,088

Question 5. How many cells have zero cells flowing into them? _______ Do you expect these cells to have a high or low elevation? __________
Answer 5: There are 4400959 cells that have zero cells flowing into them. Since lower elevation cells tend to have a higher flow accumulation, the cells which have zero cells flowing into them would be at a higher elevation.

Question 6a. What is the max flow length in the raster? For full points include units.
Answer 6a: The max flow length in the raster is 138,249 meters.

Question 6b. What does this value signify? That is, what does it mean (in plain English)? For full points, do not use the term "flow length" in your answer.
Answer 6b: This value represents the longest distance water would travel across the surface to reach the edge of the watershed, following the natural flow path.

Question 7. A few basins pop out as being significantly larger than the others. How many LARGE basins (greater than > _____ cells) does this result in? ______________________

Answer 7: For a large basin I'm considering basins containing greater than 1,000,000 cells and in this raster, there are 3 basins that contain >1,000,000 cells. Hence in this raster there are 3 large basins.

Question 7b. How many cells does the largest basin have? Why is this number familiar?

Answer 7b: The largest basin has 3,421,089 cells, this number is familiar as it is almost equal to the maximum number of cells that flow into any cell (3,421,088) that was obtained from the flow accumulation raster.

Question 8. Describe how the resulting watersheds are bigger or smaller. Report any differences in TERMS OF AREA (not cells). To get you started: _____ km squared of area used to flow into pour point 1. What about now? Answer this question again for the other pour points.

Answer 8: For pour point 1 the area of the watershed changed from 2422.471 square kilometers to 2389.550 square kilometers. For pour point 2, 6.644 square kilometers of area used to flow but it changes to 39.775 square kilometers. For pour point 3, the area of the watershed changed from 0.000851 square kilometers to 2912.164 square kilometers.

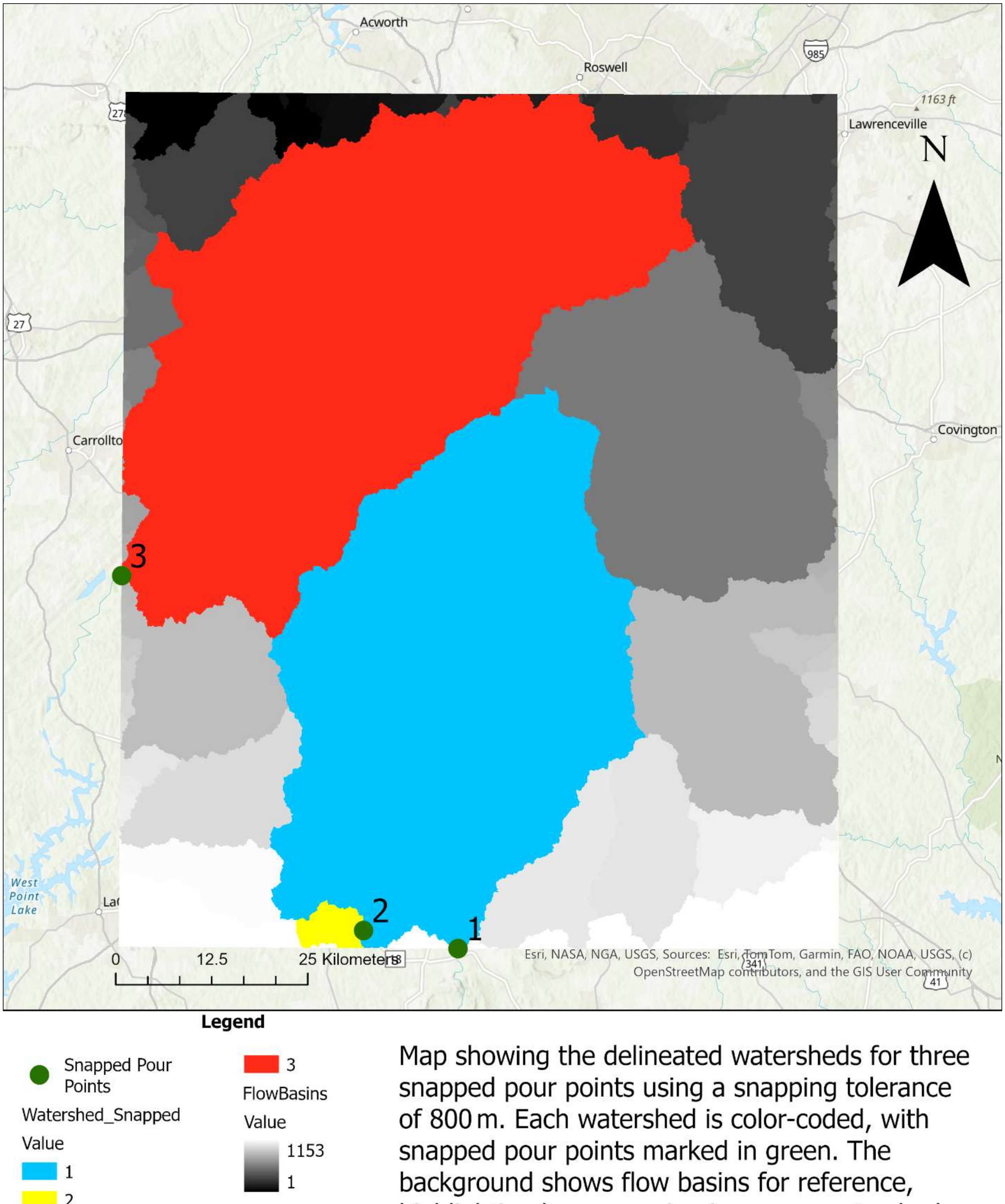
Question 9. Why did these values change?

Answer 9: After snapping pour points with an 800 m tolerance, the resulting watersheds generally became larger in area. This is because the pour points were adjusted to align with nearby high-flow accumulation cells, capturing more upstream flow.

Question 10. What would have happened if we made the pour point SNAPPING tolerance bigger?

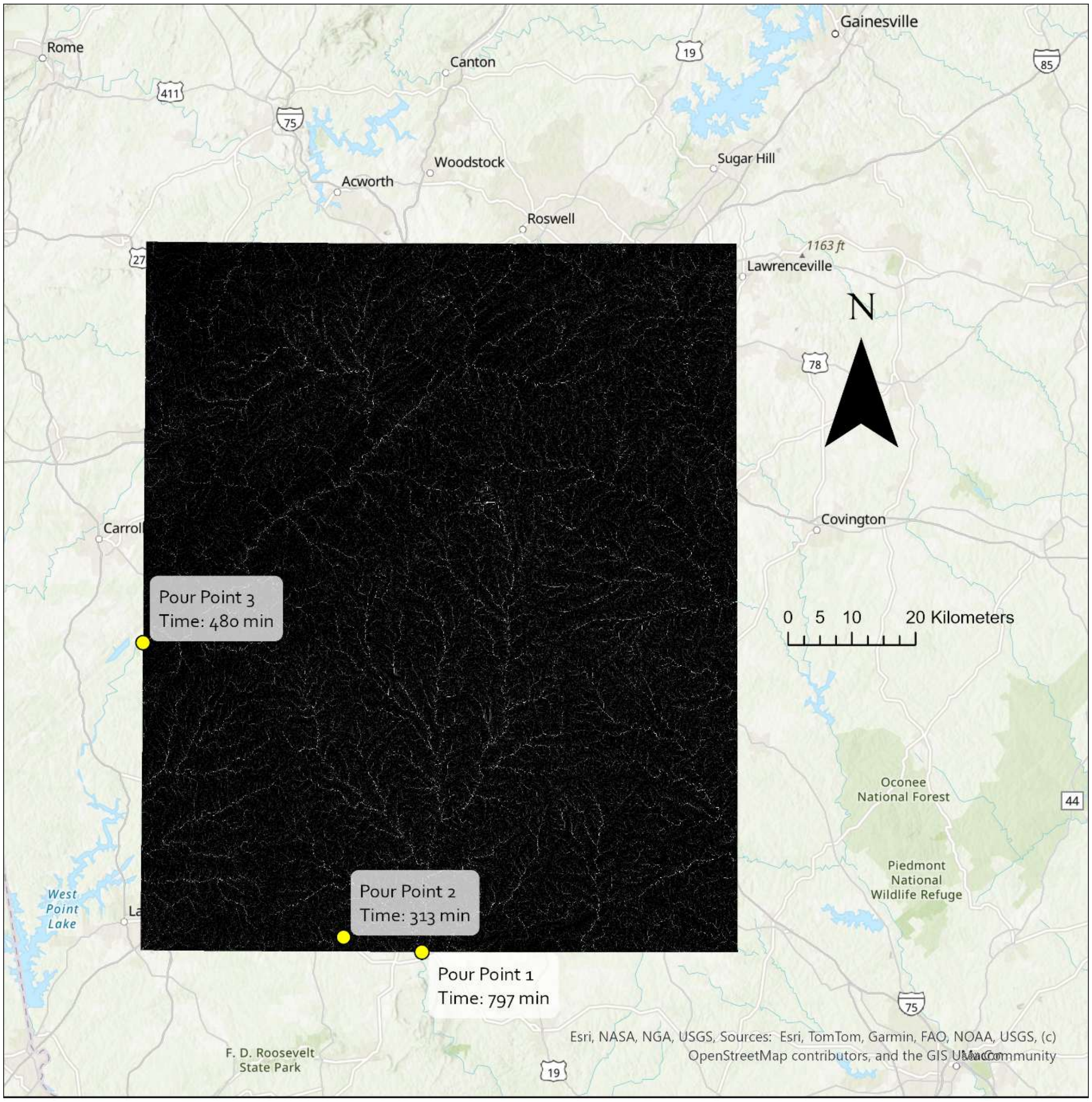
Answer 10: If the snapping tolerance were larger, pour points could have snapped to more distant high-flow cells, potentially outside their intended drainage area. This would cause watersheds to become unrealistically large or misaligned, possibly combining separate basins and skewing the hydrological analysis.

Graphic 1: Map your watersheds and your pour points. Give it a caption.



Map showing the delineated watersheds for three snapped pour points using a snapping tolerance of 800 m. Each watershed is color-coded, with snapped pour points marked in green. The background shows flow basins for reference, highlighting how snapping improves watershed alignment with high-flow paths.

Graphic 2: Report on the time it will take for water to reach each of the pour points as labels on the map. (hint: you can use the identify tool or Extract Values to Points.) Turn in a map of your time raster with the time it will take to reach the SNAPPED pour points (label each pour point with the TIME IN MINUTES). Give it a caption.



Snapped Pour Points

Time Raster (seconds)

Value

47792.7

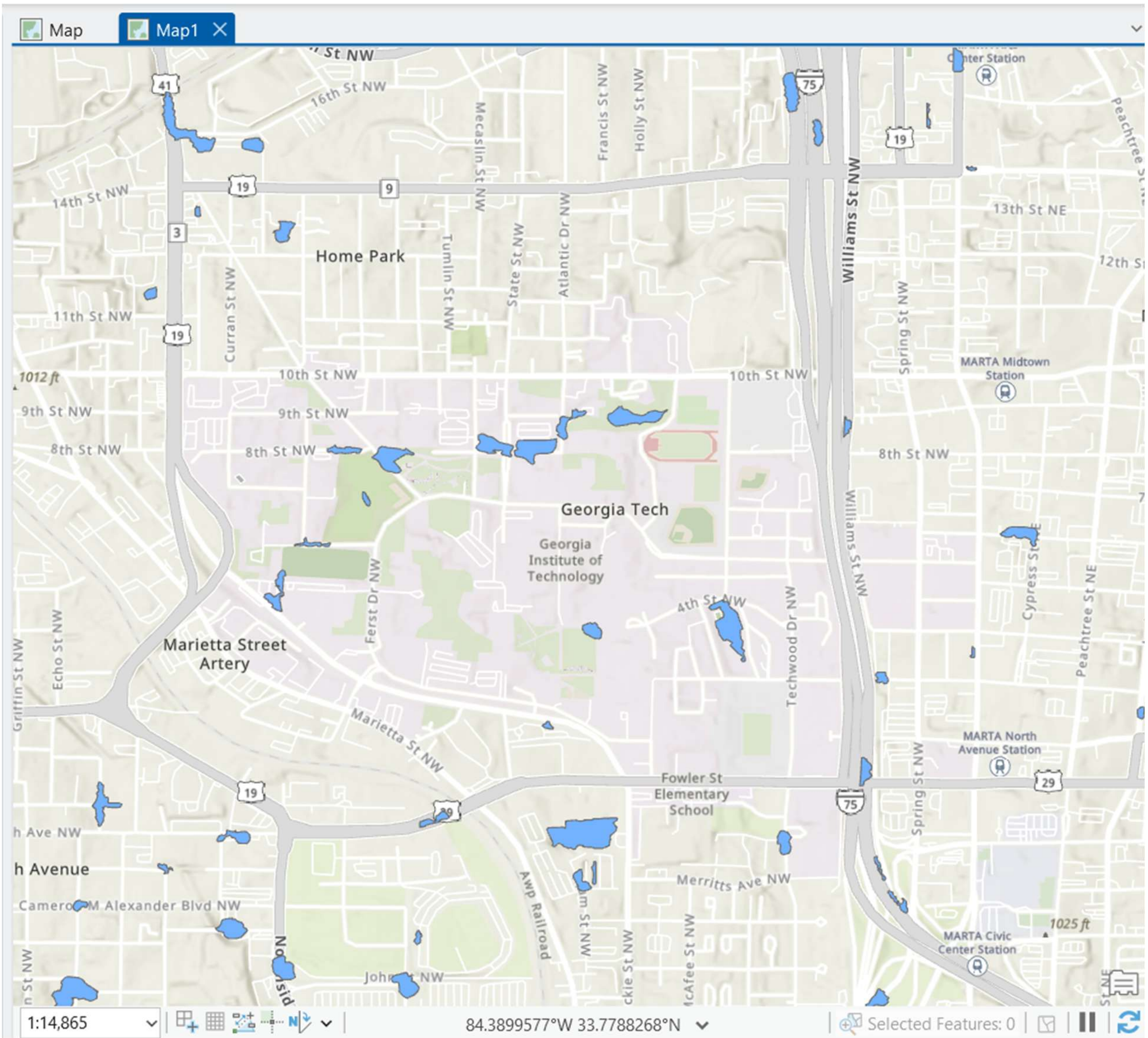
0

Map showing time-to-pour-point values (in minutes) derived from the weighted flow length raster. Each snapped pour point is labeled with the estimated time for water to reach it, highlighting spatial variation in travel time across the watershed.

Pour Point 1: 797 minutes
Pour Point 2: 313 minutes
Pour Point 3: 480 minutes

Bonus +5: Include vector isochrones of the times.

Graphic 3: Make a nice screen cap of only the parts of Georgia Tech that have a 0.2 PCT ANNUAL CHANCE FLOOD HAZARD. (That is, show the polygons as blue or hashed or something—do not show any other polygons).



*****Alternative Graphic 3: If you have a personal area that you want to show instead of Georgia Tech using a 0.2 PCT ANNUAL CHANCE FLOOD HAZARD area, you are welcome to do that instead of showing Georgia Tech.