JT Vespalec
Lab section: 302

Question 1: What do you need to take into consideration when deciding on the cell size? Do you think that a 1-meter cell size is appropriate for our purposes? Why or why not? How does cell size impact the appearance of a raster? (1 pt) Hint: Think about the constraints and the type of data we are working with; try creating a raster with a cell size of 10 or 20 for comparison purposes.

A smaller cell size will increase the spatial resolution, but that also increases the file size and time it takes to load. Since the scale is hundreds of meters, a 1 meter cell size would be almost too fine of a resolution for our purposes. Larger cells would likely still capture the necessary patterns and would reduce the file size and processing time. They would, however, create a more pixelated look and would ultimately generalize boundaries because each cell now represents a larger area.

Question 2: Compare the appearance of the vector features to the raster features (e.g., landusepoly as vector vs. landusepolyr as raster, or vector sewers vs. raster sewers). Which data model, vector or raster, represents the features better for our project? Think about what makes the two data models different from each other. Explain your answer. (1pt)

The vector data appears to have better and more well-defined boundaries compared to the more geometrically-simple raster outputs. For the purposes of this project, vector data represents the features better because many of the constraints used in the project are based on exact distance and boundaries/buffers. Since points, lines, and polygons are each stored under the vector data model, the vector data is more precise in calculating these distances as opposed to the raster methods.

Question 3: How do the vector data model and raster data model differ in terms of attribute information? (1pt) Hint: Think about how each data model perceives the world and how it is represented in the attribute tables; compare how and what kind of data is stored in the attribute tables.

Under the vector data model, it stores the attribute information for individual polygons, lines, and points. The attributes themselves are real objects with multiple fields in an attribute table. Under the raster data model, one attribute value per cell is stored, so there's less information and less fields compared to vector.

Question 4: What does NoData mean? Can a pixel be "empty" without a value? Why or why not? (1 pt) Hint: 0 is a value.

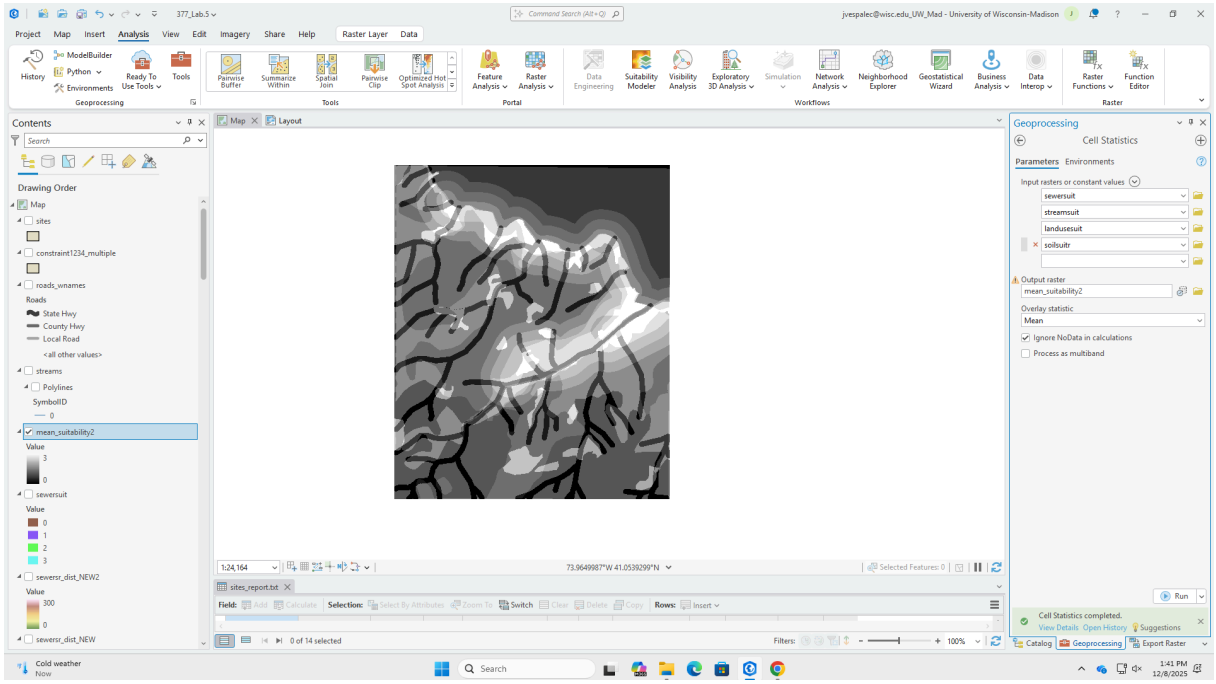
It means there is no data in that pixel since 0 can be a data value. Thus, yes, a pixel can be empty without a value because NoData means the pixel is empty.

Question 5: You did three types of raster overlay operations – mean, minimum, and maximum. Briefly describe what each of the operations does. Attach a screen-capture of the results for mean, minimum, and maximum operators. (1.5 pts)

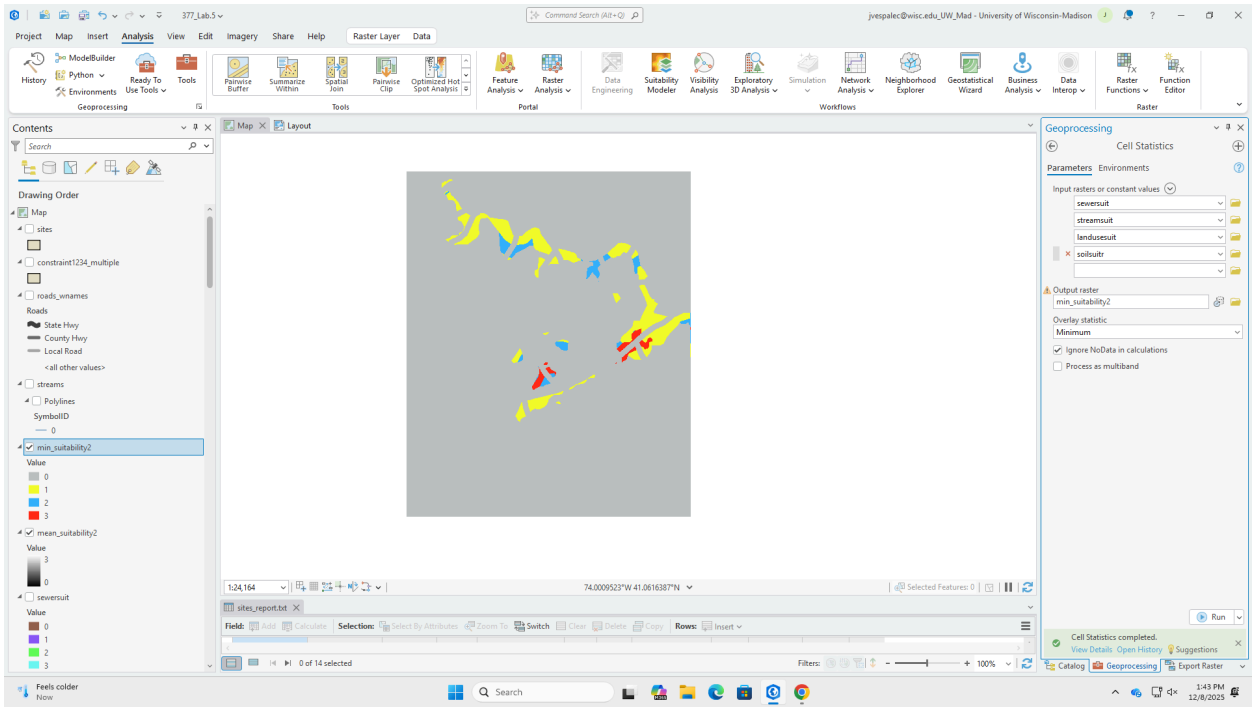
Mean: Calculates the average suitability value of all layers for each cell (value between 0 and 3)
Minimum: Returns the lowest suitability value among the layers for each cell (integer value)
Maximum: Returns the highest suitability value among the layers for each cell (integer value)

Screenshot Specifications: Three separate screenshots - 1 for mean, 1 for minimum, 1 for maximum. The respective layer must have the visibility toggled on, with no other layers obstructing the data (toggle off visibility for layers on top of the respective layer in the Contents Pane hierarchy). The geoprocessing pane for Cell Statistics is not required to be included. Screenshot your entire window.

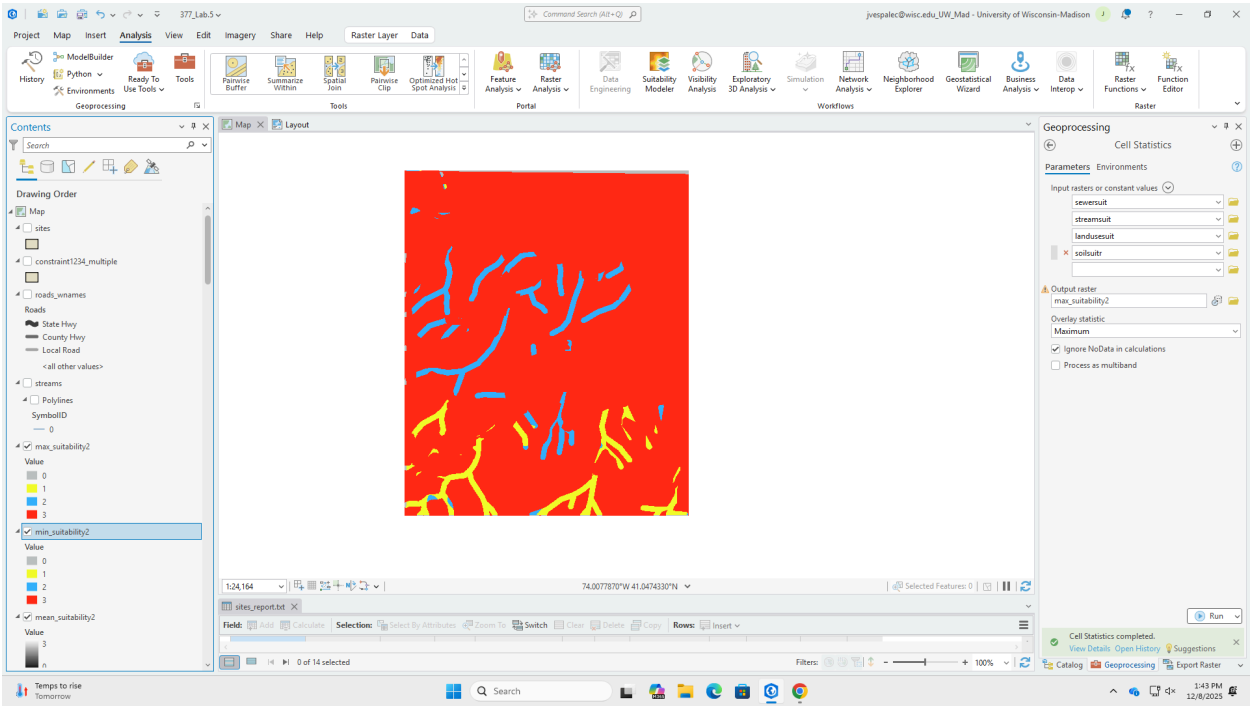
Mean



Minimum



Maximum



Question 6: Compare the location of the suitable sites from the mean, minimum, and maximum raster analysis. Which of the output maps provides the most reasonable sites for construction? Why? (1.5 pt) Hint: Think about the lecture on Spatial Overlay (particularly the part on attribute overlay when the constraints are combined with "AND")

The output from the minimum raster analysis is the most reasonable. This type of analysis uses the logical 'AND' so a pixel is suitable if it meets every single constraint, not just one. It produces smaller and more restrictive areas compared to mean and maximum, which helps for choosing the most suitable site. The maximum raster analysis output would claim a pixel is suitable even if it only fits one of the constraints. The mean would be a poor method to use here since it may overestimate the suitability of poor locations and vice-versa.

Question 7: Compare the process used in the vector approach to the process used here in the raster approach. Explain the difference between the two approaches (1 pt). Hint: Think about the classification schemes and the natures of different data models.

Using the vector approach, we worked with point, line, and polygon features and used operations such as Buffer, Erase, Dissolve, Intersect, and Select to narrow down areas and find a select few

possible sites. Using the raster approach, each constraint was first converted into a raster layer and then reclassified based on if each cell met the requirement. The final suitable zones were created by using map algebra (summing raster layers) and identifying the cells that satisfied each of the constraints.

Color copy of your map (export the map as a .JPEG or a .PNG file so it can be inserted into this document easily)

(See next page for map)

Potential Sites: Raster Data

Suitability Score
(using minimum)

- 3
- 2
- 1
- 0

*Higher score indicating more suitability

N

0 250 500 Meters

Name: JT Vespalec
Projection: WGS 1984 UTM Zone 18N
Date: 12/5/2025