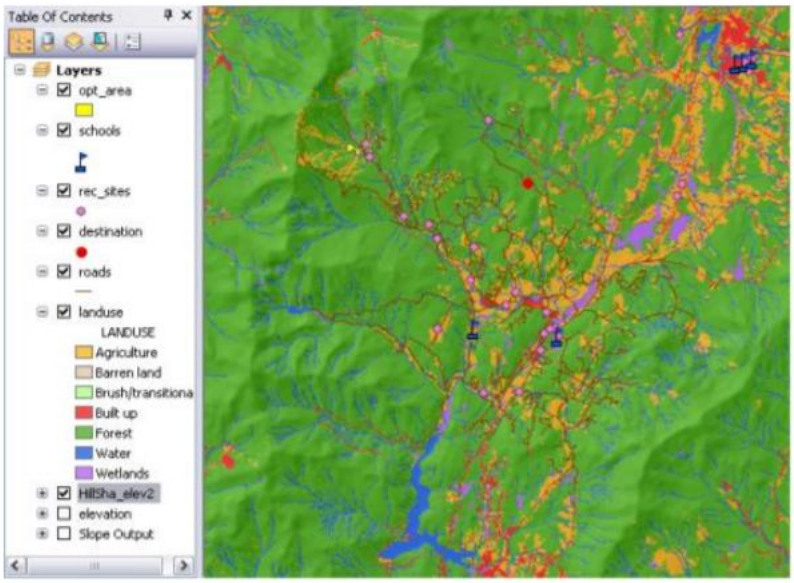

LAB 1: Site Selection Using Model Builder
LSE/ESSE 4600 GIS and Data Integration – W2021

Brief:

- Assigned: January 14, 2021
- Due: 8:30 AM, January 21, 2021
- Project materials are available via 4600 course moodle
- Submission: through the course moodle or email to TA (Afnan Ahmad - aafnan@yorku.ca) by the due time
- Required files: report, result images and codes (with descriptions)

Objective:

In this exercise, you will build a suitability model that finds suitable locations for a new school. The steps to produce such a suitability model are briefly outlined below. Your input datasets in this exercise are landuse, elevation, rec_sites, and schools. You will derive slope, distance to recreation sites, and distance to existing schools, then reclassify these derived datasets to a common scale from 1 to 10. You'll weight them and the landuse dataset according to a percentage of influence and combine them to produce a map displaying suitable locations for the new school. You'll then select the optimal site for the new school from the alternatives.

Details:

The town of Stowe, Vermont, USA, has experienced a substantial increase in population. Demographic data suggests this increase has occurred due to families with children moving to the region, taking advantage of the many recreational facilities located nearby. It has been decided that a new school must be built to take the strain off the existing schools, and as a GIS analyst you have been assigned the task of finding the potential sites. The datasets were provided courtesy of the State of Vermont for use in this tutorial. The tutorial scenario is fictitious, and the original data has been adapted for the purpose of the tutorial. Data provided in this project are:

1. Elevation — Raster dataset of the elevation of the area
2. Land Use — Raster dataset of the landuse types over the area
3. Roads — Features dataset displaying linear road network
4. Rec_Site — Feature dataset displaying point location of recreation sites
5. School — Feature dataset displaying point locations of existing schools

Following the "Spatial Analysis Tutorial" with given tutorial data, you are asked to create a suitability map to help you find the best location for a new school. You need to derive datasets of distance and slope, reclassify datasets to a common scale, then weight those that are more important to consider and combine them to find the most suitable locations. Then you are asked to locate the optimal site using the selection tools within ArcMap.

Develop a model of processing using ArcGIS Model Builder that would be used to create suitability maps using three criteria (slope, distance to recreation sites, and distance to schools), and use values of output cell size from 30, 60, 90, and 120 units, respectively, in deriving slope from DEM. Please use a loop option of ArcGIS Model Builder to implement these processes. Please print the four maps of suitability created with output cell size from 30, 60, 90, and 120 units.

Question 1 – Discuss key steps that you take for determining the optimal locations of schools with intermediate results produced by your spatial modeling process.

Question 2 – Discuss your decision results with respect to different cell sizes (e.g., how and why your results are affected by changing the cell size; how we can determine an optimal value of the cell size, etc)

Question 3 – Produce additional results produced by using different weight values and analyze the impact of weight values on your final site recommendation. How can we determine optimal weight values?

Bells & Whistles (Extra Points)

You can add additional layers such as land use and discuss an impact of this new layer on the final results of optimal site selection. Or you can discuss how to estimate the accuracy of your decision results.

Writeup

For this project, and all other projects, you must do a project report (no min. page length; max. 10 pages with 11 fonts and single space including figures and tables). In the report, you will describe your modeling system and any decisions you made to develop your modeling system in a particular way. Then you will show and discuss the results of your spatial model. In the case of this project, show the results of your site selection system and show some of the intermediate images in the site selection modeling pipeline Also, discuss anything extra you did. Feel free to add any other information you feel is relevant.

Rubric

+50 pts: Working implementation of spatial decision system (school site selection system)
+30 pts: Working generation of school site selection maps
+20 pts: Write-up with several examples of site selection maps
+10 pts: Extra credit (up to ten points)
-5*n pts: Lose 5 points for every time you do not follow the instructions for the hand in format
-5*n pts: Lose 5 points for every day you delay the submission of your report and codes beyond the due date.

Credits

Assignment developed by Esri Inc.