Module 7 Assignment 1 – ArcGIS Raster Data Analysis

Instructions for this assignment

Download *ArcGISRasterDataAnalysis.zip* and unzip the file. Follow the instructions starting from the next page.

Due Date

By midnight EST of February 26, 2023, Sunday.

Grading

This assignment is worth 10 points for the 5 screenshots taken as required.

File naming convention for the assignment

Save the screenshots in a Word or PDF file and use the following file naming convention:
GIS_Part 2_Assignment1_your-first-name_your-last-name.doc
or
GIS_Part 2_Assignment1_your-first-name_your-last-name.pdf

Be sure to use the underscores as you see in the example.

How to hand in the assignment

When you have finished your assignment, you will upload (submit) it to the same assignment area where you found it. You may only submit this assignment one time. I remind you that if you do not submit the assignment before the due date, you will not be able to submit it.

1. Complete the assignment in a Word or PDF document.
2. Return to the dropbox folder for this assignment.
3. Look for the “Add a File” button in the Submit Files area.
4. Browse for the assignment that you have on your computer, and select it so that it uploads to the assignment area.
5. Click “Submit”.

Task 1: Perform a Local Operation

What you need: *emidalat*, an elevation raster with a cell size of 30 meters.

Task 1 lets you run a local operation to convert the elevation values of *emidalat* from meters to feet.

1. Start ArcCatalog and make connection to the ArcGISRasterDataAnalysis database. Select Properties from the context menu of *emidalat* in the Catalog tree. The Raster Dataset Properties dialog shows the *emidalat* has 186 columns, 214 rows, a cell size of 30 (meters), and a value range of 855 to 1337 (meters). Also *emidalat* is a floating-point ESRI grid.

2. Launch ArcMap. Add *emidalat* to Layers, and rename Layers Tasks 1&3. Make sure that the Spatial Analyst extension is checked in the Extensions from the Customize menu.

3. Click the ArcToolbox Window button to open ArcToolbox or select ArcToolbox from the Geoprocessing menu. Click the Spatial Analyst dropdown arrow, point to Map Algebra, and double-click Raster Calculator. Enter the following expression in the Raster Calculator's expression box: [emidalat] x 3.28. In the Output raster box, first choose the directory of ArcGISRasterDataAnalysis database, then type *emidaft* as Name and click Save in the Output raster dialog box. Finally click OK in the Raster Calculator dialog box. *emidaft* shows *emidalat* in feet.

4. **Take a screen screenshot of** *emidaft*.

Task 2: Perform a Combine Operation

What you need: *slope_gd*, a slope raster with 4 slope classes; and *aspect_gd*, an aspect raster with flat areas and 4 principal directions.

Task 2 covers the use of the Combine function. Combine is a local operation that can work with two or more rasters. You can use combine in ArcToolbox.

1. Select Data Frame from the Insert menu in ArcMap. Rename the new data frame Task 2, and add *slope_gd* and to *aspect_gd* Task 2.

2. Use ArcToolbox to perform the Combine operation. Click the ArcToolbox Window button to open ArcToolbox. Double-click the Combine tool in the Spatial Analyst Tools/Local toolset. In the next dialog, select *aspect_gd* and *slope_gd* for the input rasters, and enter *slp_asp* for the output raster under the directory of

ArcGISRasterDataAnalysis. Click Save in the Output raster dialog box and then click OK in the Combine dialog box to run the operation.

3. **Take a screen screenshot of** *slp_asp*.

Task 3: Perform a Neighborhood Operation

What you need: *emidalat*, as in Task 1.

Task 3 asks you to run a neighborhood mean operation on *emidalat*.

1. Activate Tasks 1&3 in ArcMap by right-clicking Tasks 1&3 and selecting Activate. Select Block Statistics from the dropdown menu of Spatial Analyst Tools/Neighborhood toolset. Select *emidalat* for the input data. Enter *emidamean* for the output raster under the directory of ArcGISRasterDataAnalysis and click Save in the Output raster dialog box. Notice that the default neighborhood is a 3-by-3 rectangle and the default statistic type is Mean. Click OK in the Block Statistics dialog box to run the operation. *emidamean* shows the neighborhood mean of *emidalat*.

2. **Take a screen screenshot of** *emidamean*.

Task 4: Measure Physical Distances

What you need: *strmgd*, a raster showing streams; and *elevgd*, a raster showing elevation zones.

Task 5 asks you to locate potential habitats of a plant species. The cell values in *strmgd* are the ID values streams. The cell values in *elevgd* are elevation zones 1, 2 and 3. Both rasters have the cell resolution of 100 meters. The potential habitats of the plant species must meet the following criteria:

- Elevation zone 2
- Within 200 meters of streams

1. Select Data Frame from the Insert menu in ArcMap. Rename the new data frame Task 4, and add *strmgd* and *elevgd* to Task 4.

2. Click the Spatial Analyst Tools in the ArcToolbox, point to Distance, and select Euclidean Distance. In the Euclidean Distance dialog, select *strmgd* for distance to. Enter *strmgd_dis* for the output raster under the directory of ArcGISRasterDataAnalysis and click Save in the Output distance raster dialog. Enter 100 (meters) for the output cell size, and click OK to run the operation.

3. *strmgd_dis* shows continuous distance zones away from streams in *strmgd*.

4. This step is to create new raster that shows areas within 200 meters of streams. Select Reclassify from the Spatial Analyst Tools/Reclass. In the Reclassify dialog, select *strmgd_dis* for the input raster and click Classify. In the Classification dialog, first select 2 for the classes. Then click the first value under Break Values and enter 200. Click the empty space in the Break Values frame to unselect the second cell. Click OK to dismiss the Classification dialog. Enter *strmgd_rec* for the output raster under the directory of ArcGISRasterDataAnalysis and click Save in the Output raster dialog. Click OK to run the operation in the Reclassify dialog. *strmgd_rec* separates areas that are within 200 meters of streams from areas that are beyond.

5. **Take a screen screenshot of** *strmgd_rec*.

6. Select Raster Calculator from the Spatial Analyst Tools/Map Algebra. Enter the following query expression in the expression box:

   (“*strmgd_rec*”==1) & (“elevgd”==2).

   (The Raster Calculator uses == for equality check and & for And.)

   Enter *calculation* for the output raster under the directory of ArcGISRasterDataAnalysis and click Save in the Output raster dialog. Click OK in the Raster Calculator dialog to run the operation. The *calculation* layer shows areas that meet the criteria with the value of 1.

7. **Take a screen screenshot of** *calculation*.