REM 429: Lab 7 and 9- Calculating landscape metrics

Running Fragstats 4.2

Fragstats 4.2 computes landscape, class and patch metrics for a number of raster formats. Fragstats v. 4 cannot directly use ESRI Grids, therefore the grids have been converted to a GeoTiff format that is compatible with Fragstats 4. This example shows you how to process a raster in GeoTiff format through Fragstats to compute selected pattern metrics.

The Fragstats 4.2 software is available from the University of Massachusetts Amherst and can be downloaded at no cost from: http://www.umass.edu/landeco/research/fragstats/downloads/fragstats_downloads.html

Input file format: The landscape to be analyzed should be represented as a raster format. Fragstats 4.2 can read several formats, however not ESRI (ArcGIS) Grids. You can convert ESRI grids to GeoTiffs (or other formats) in ArcGIS (right-click on the grid in ArcGIS and select Data – Export Data). In this exercise, we will use the GeoTiff file format.

Landscape information: For each ArcGIS grid or GeoTiff you should know: pixel size, background value, number of rows, number columns and class codes. To get this information you can use ArcGIS and look at the raster. Background value is the value assigned to No data pixels. Imagine that some pixels in you image were covered by a cloud and therefore those pixels were not classified in any land use or land cover type; but still they are inside the landscape and need to be classified as No data (numeric value -9999). Lastly, but not least important, you need to be sure that you recognize class codes. 'Class codes' refers to the number assigned to each land use or land cover, for example, pixels with value of "1" refers to "Low sagebrush steppe-Arar". We are providing the class codes in the file " Lab 7 Cover Class.xls" for this lab. However, for future analysis you need to be sure you know this information by either using the original image, asking who processed the image or consulting the image metadata.

Before we start with Fragstat open ArcGIS and get familiar with the different rasters you will use during this lab. Make sure you know the cover class codes, and the needed information for each raster. To find the information navigate to: **M:\REM429_2015, then copy the information for lab 7 and 9 to your computer, thumb drive, or U-drive. The data is also available on BbLearn under lab 7 and 9 respectively.**

Running Fragstats

1. Start Fragstats from the START menu (Start – Fragstats 4.2 – Fragstats). Click *New* in the *File* menu to start a new project.
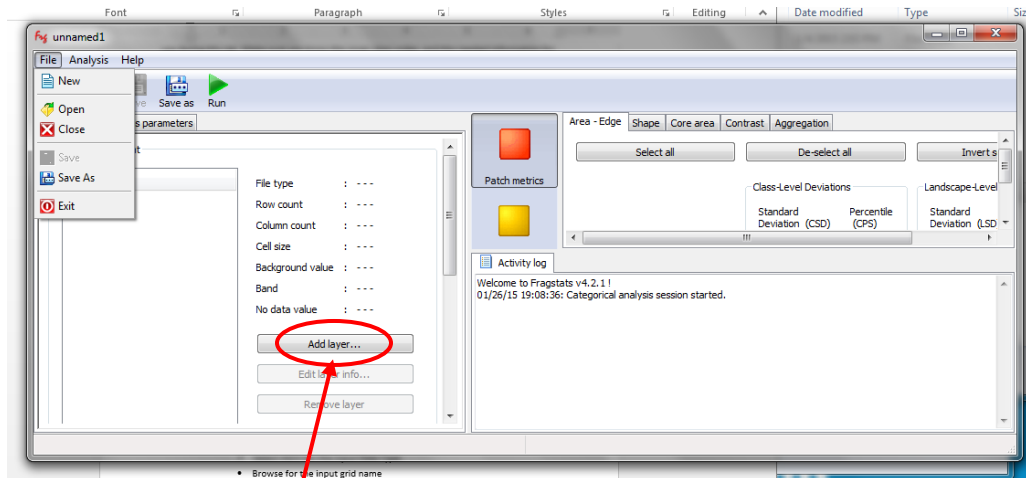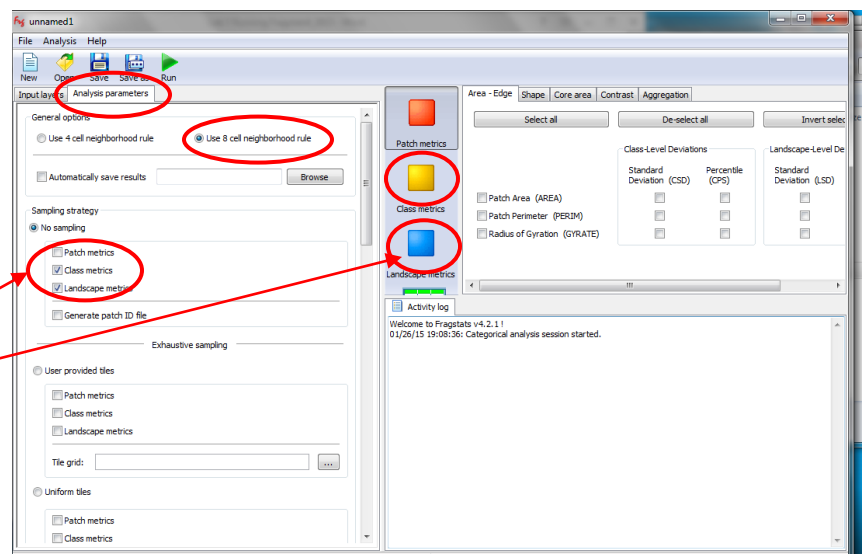
Under Add layer, select the GeoTiff format and add the layer titled Smithcr30m from your input data folder.

2. Select Fragstats – Set AnalysisParameters
Click on the Analysis parameters tab to select analysis parameters.

Select the "Use 8 cell neighborhood rule" for the General option. Select metric types to calculate.

3. Click on 'Land Metrics'. Select the land metrics you want to produce (Shannon's Diversity Index, Shannon's Evenness Index, Mean Shape Index) according to the lab document. You can select metrics under the different tabs: **Area-Edge, Shape, Core Area, Contrast, Aggregation.**

4. Select 'Class Metrics' (Percentage of Landscape by patch type, Number of patches by patch type, Mean patch area by patch type).

5. Click Run (main menu) to run the program for this dataset.

6. View the results by clicking on the 'Results' icon. You can view Patch, Class, and Landscape metrics. You can also save the results from each run and work with them in Excel for example.
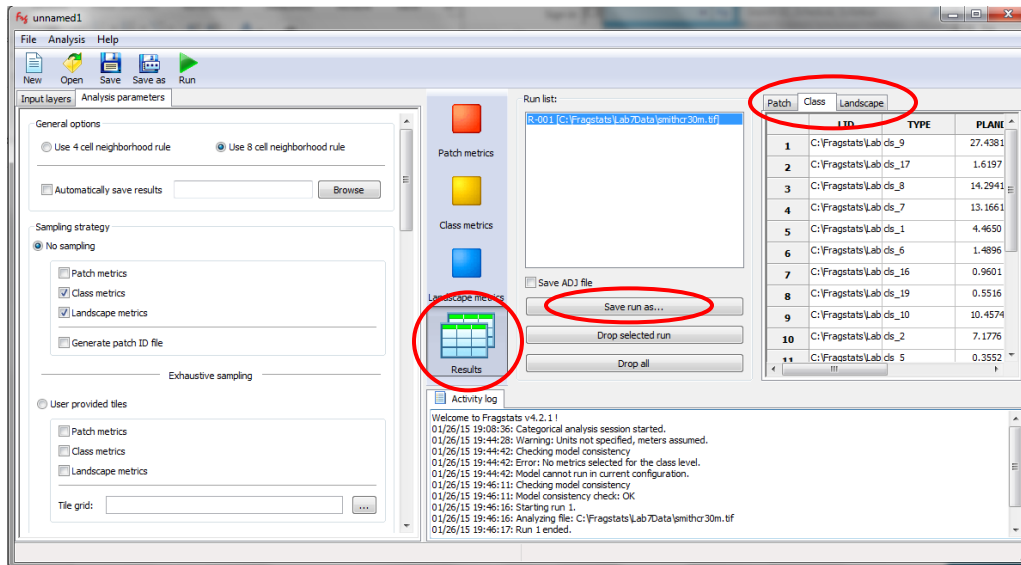
7. The data can now be manipulated or graphed using Excel functions. Note: Fragstats saves results in .csv format, so when you open a file in Excel, select from "All Files", not only "Excel Files".

8. **Use Fragstats Help to better understand each one of the patch, class or landscape metric you use.** Be sure you understand 1) how the metrics are calculated; 2) what the output values mean (i.e. what does a lower value mean?); 3) the assumptions for each metric used; and 4) the limitations of each metric.