Zonal lacunarity analysis for ArcGIS 10.x
(Version 1.0)

User's Guide
(August 31, 2019)

1. Introduction

Lacunarity as a scale-dependent measure of spatial heterogeneity has received great attention in landscape ecology. Most lacunarity measures have been obtained from greyscale or binary (0 and 1) data for an entire study area or fixed rectangular windows, and a zonal lacunarity tool for discrete raster data is still lacking in current geographic information systems. A zonal lacunarity analysis tool for ArcGIS is developed to support applications involving scale-dependent analysis of spatial heterogeneity, including landscape ecology. This Guide provides a brief introduction on how to download and install the tool, and how to use the tool.

2. Installation

The tool can be downloaded from http://geography.unt.edu/~pdong/software/lacunarity/. Right click the file "lacunarity.zip" and select "Save link/target as …" to save the zip file to your local computer. Unzip "lacunarity.zip" to get the following files: (1) Lacunarity.tbx – ArcGIS tool for zonal lacunarity analysis; (2) "nlcd2001" and "nlcd2011" – National Land Cover Database (NLCD) raster datasets in GRID format for the City of Corinth (TX) and the City of Dallas (TX) in 2001 and 2011; (3) TwoCities.shp – A polygon shapefile for the City of Corinth and the City of Dallas in Texas; (4) User's Guide.pdf – this document; and (5) readme.txt – A brief description of the files in the zip file.

To install the tool, open ArcToolbox in ArcMap, right click "ArcToolbox" and select "Add Toolbox…", then select "Lacunarity.tbx" from the unzipped folder. You should see the Lacunarity Analysis tool in the Lacunarity toolbox (Figure 1). Double click Lacunarity Analysis to open the tool. **Note:** The tool needs the Spatial Analyst extension which can be loaded from the ArcMap menu Customize → Extensions, and check "Spatial Analyst".
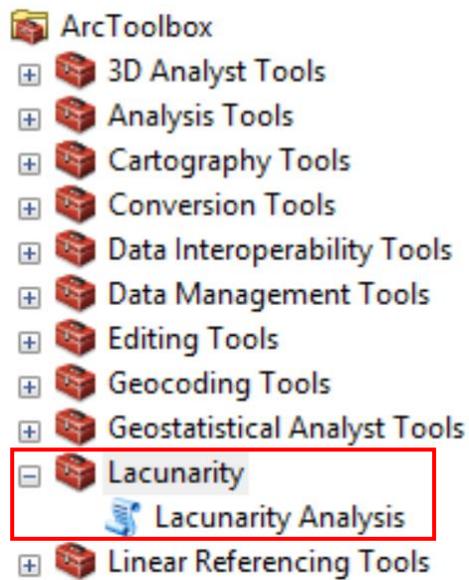
Figure 1. Lacunarity Analysis tool in ArcToolbox.

3. Graphical user interface

Add data layers to ArcMap before using the Lacunarity Analysis tool (Figure 2). The graphical user interface of the Lacunarity Analysis tool is shown in Figure 3. Parameters on the graphical user interface of Lacunarity Analysis include: (1) discrete raster layer which can be selected from a dropdown list or from a folder; (2) raster value for lacunarity analysis which can be selected from a dropdown list populated from the discrete raster values (and therefore raster values are not limited to the binary values of 0 or 1); (3) raster value to be set to NoData; this option is useful when a category (such as open water) needs to be set to NoData; (4) an optional input zone feature class (if a polygon feature class is used as zone data); if a zone feature class is not specified, the whole discrete raster will be processed; (5) zone field which is a unique field (such as FID) in the zone feature class; (6) gliding-box size (2, 3, 4, …, n) which can be selected from the dropdown list or input from keyboard; (7) checkbox for multiscale lacunarity; if the checkbox is not checked, lacunarity is calculated only for the specified gliding-box size; if it is checked, lacunarity values at box size 2, 3, 4, …, n (n is the specified gliding-box size) will be produced; and (8) output Excel table with the calculated lacunarity values (**not** natural logarithm values of lacunarity). User can also combine several raster categories (such as grassland and pasture) into one in GIS before using the zonal lacunarity analysis tool. Help information and environment settings are also available from the graphical user interface.
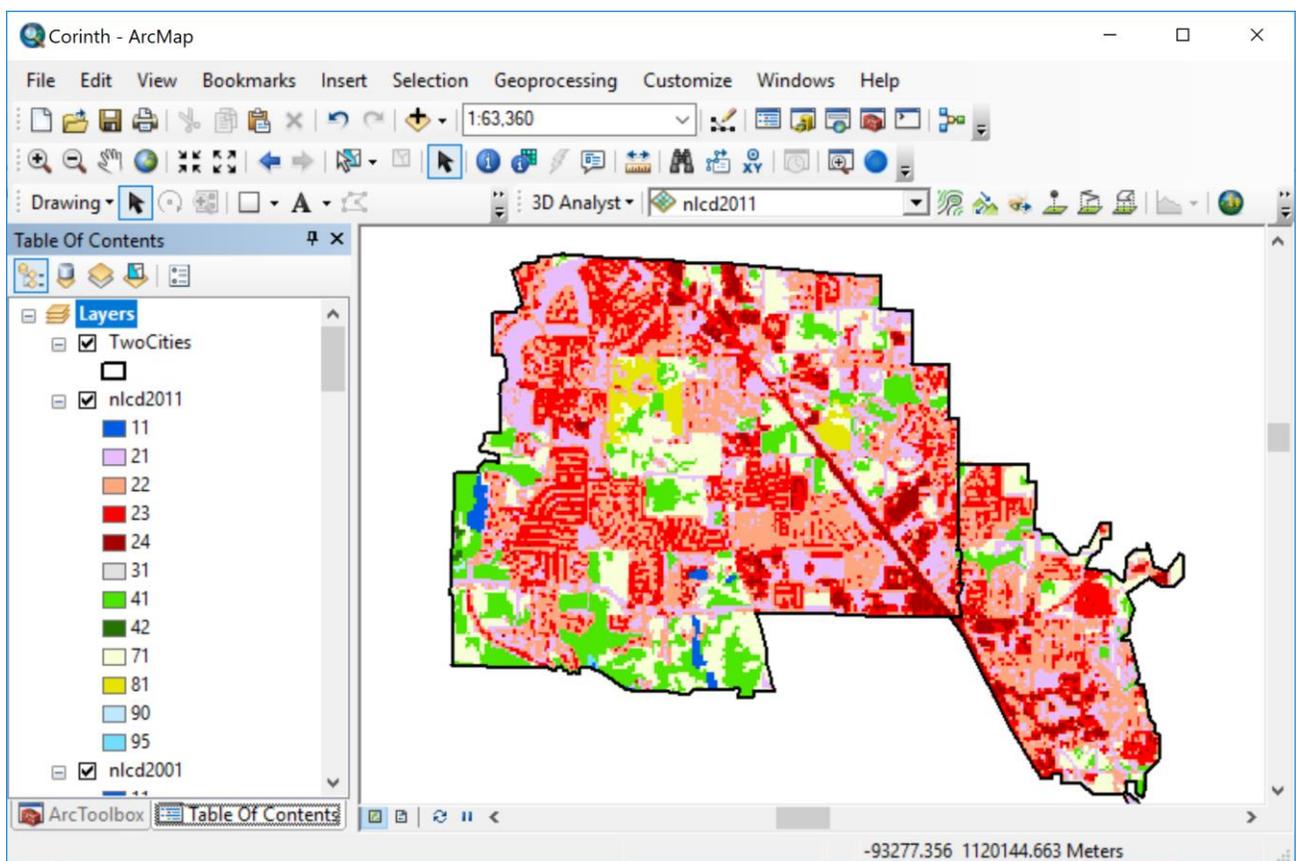
Figure 2. Sample ArcMap project with discrete raster layers and a polygon shapefile.
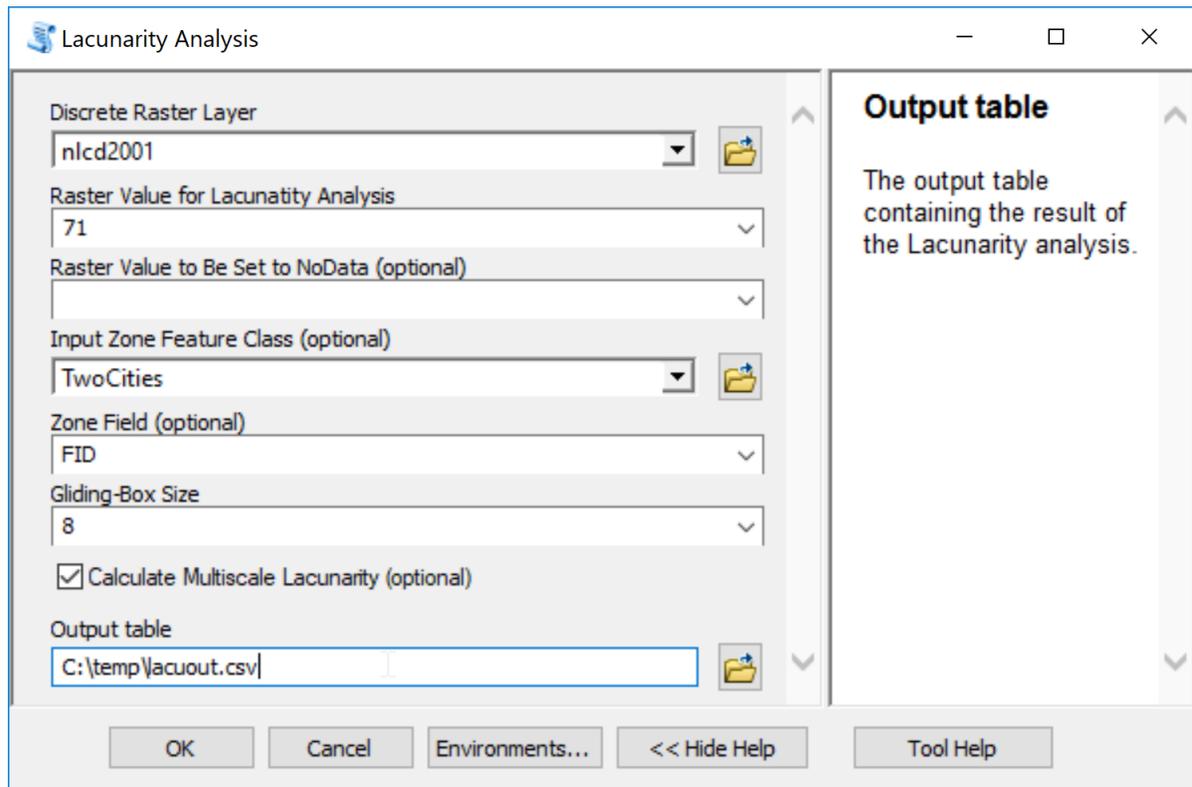
Figure 3. Graphical user interface of the Lacunarity Analysis tool.

4. Troubleshooting

Although the tool has been tested extensively, it's possible to find bugs in the tool. If the tool stops working for any reason, users may try to restart ArcMap or restart the computer. Reports of bugs can be sent to Pinliang Dong at the Department of Geography and the Environment, University of North Texas, Denton, TX 76203, USA.

5. Disclaimer

The free Lacunarity Analysis tool is provided "As Is", without warranty of any kind, express or implied, including but not limited to the warranties of merchantability, fitness for a particular purpose and non-infringement. In no event shall the authors or copyright holders be liable for any claim, damages or other liability, whether in an action of contract, tort or otherwise, arising from, out of or in connection with the software or the use or other dealings in the software.

Comments/suggestions for improving the tool can be sent to Pinliang Dong at the Department of Geography and the Environment, University of North Texas, Denton, TX 76203, USA.

6. Recommended citation

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