

## USER GUIDE TOOLBOX

### PREPROCESSING NOTES:

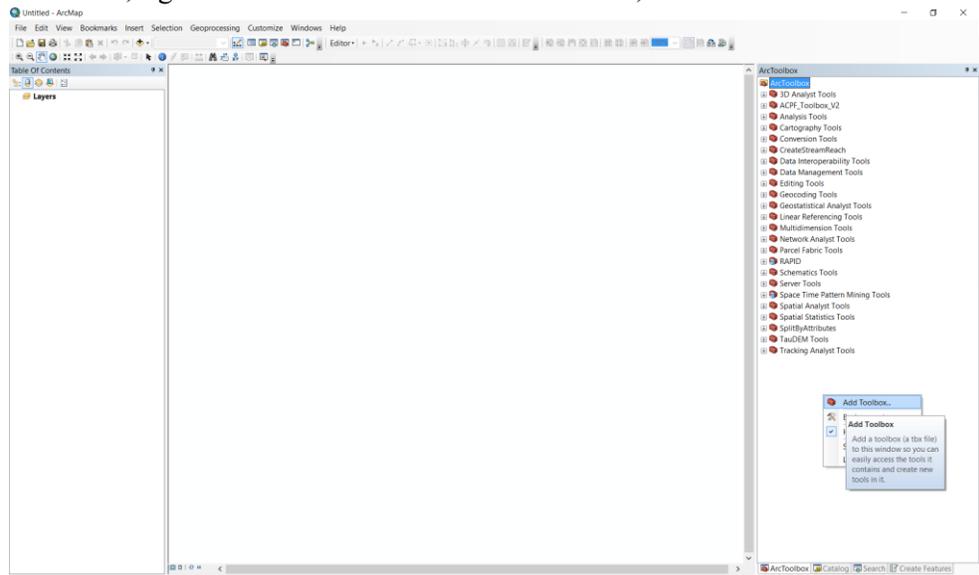
This tool requires four data files as inputs: 1) a digital elevation model (DEM) raster file, 2) a stream network (polyline) derived from the DEM, 3) a subset of the above polyline to represent the area that you want to search for former stream meanders, and 4) a relative elevation raster that represents the height of the landscape above your defined stream network. We highly recommend using the Agricultural Conservation Planning Framework (ACPF) tool to conduct preprocessing. This toolbox can be found at: <http://northcentralwater.org/acpf/>.

Note: This process is highly data intensive. We recommend processing no more than a HUC 10 watershed at a time.

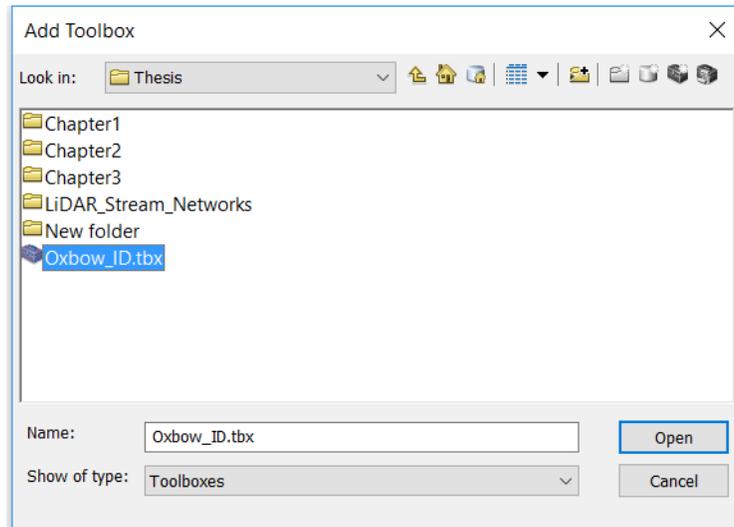
If you have questions or need assistance please contact Courtney Zambory at [courtney.zambory@gmail.com](mailto:courtney.zambory@gmail.com).

### I. LOADING THE TOOLBOX INTO ARCGIS

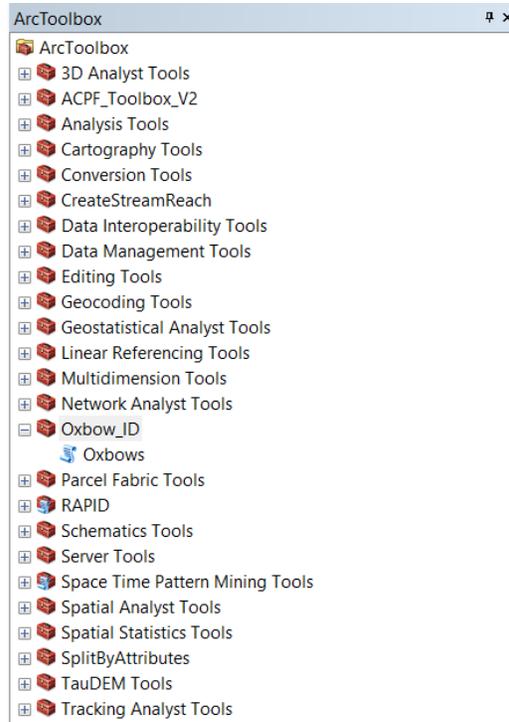
1. Open ESRI ArcMAP, right click within the ArcToolbox window, and select “Add Toolbox”



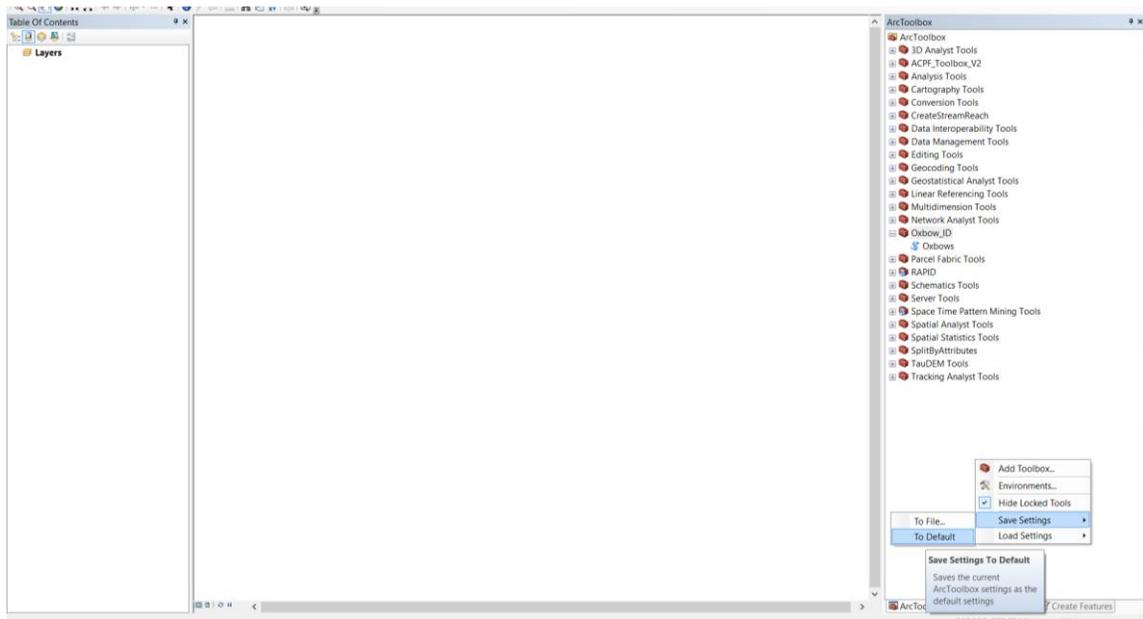
2. In the pop-up window navigate to the folder to which you saved the Oxbow\_ID.tbx file. Note: if the file is located within a zip folder you will have to unzip it before it becomes visible. Once you select the toolbox click <Open>.



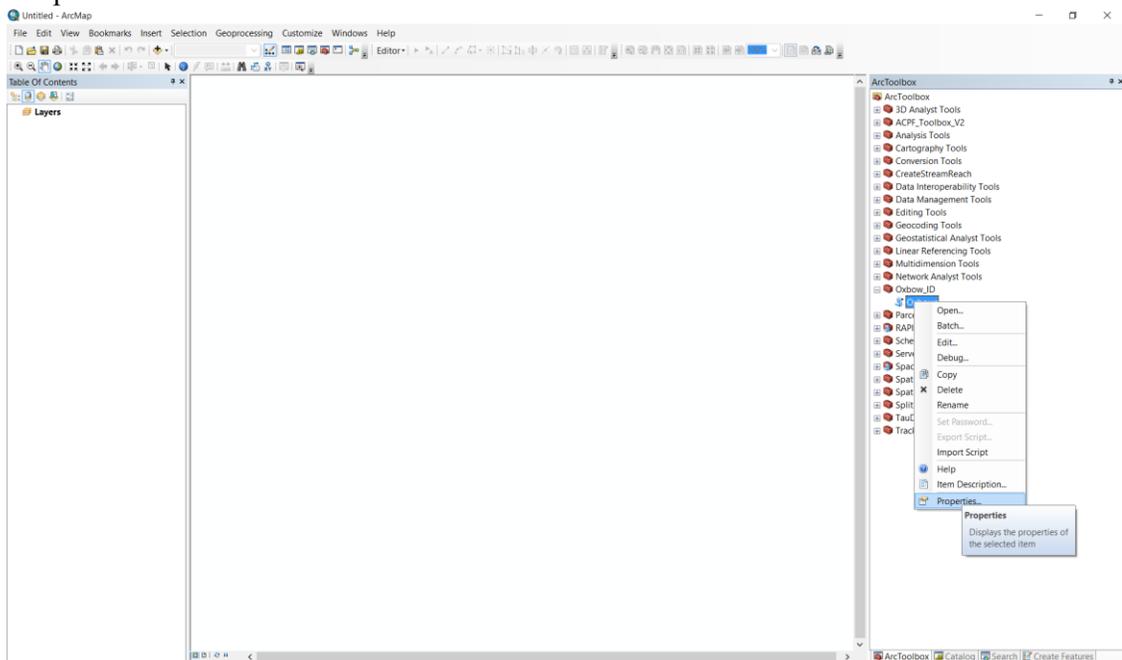
3. The Oxbow\_ID toolbox should now be visible in the window with the rest of the toolboxes



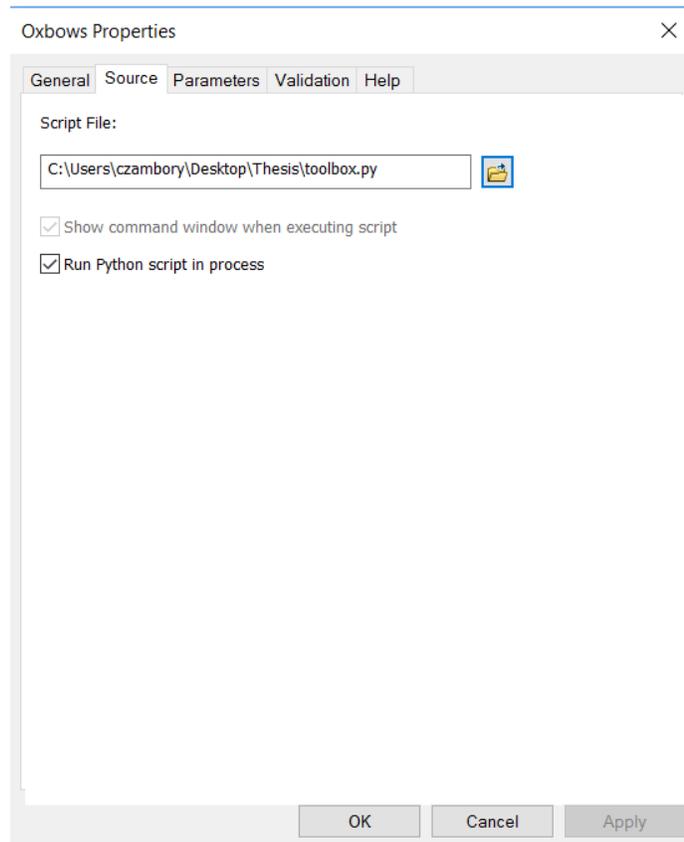
4. Right click again within the ArcToolbox window, and select “Save Settings” -> “To Default” so that the Oxbow\_ID toolbox will appear with your other toolboxes each time you open ArcMAP.



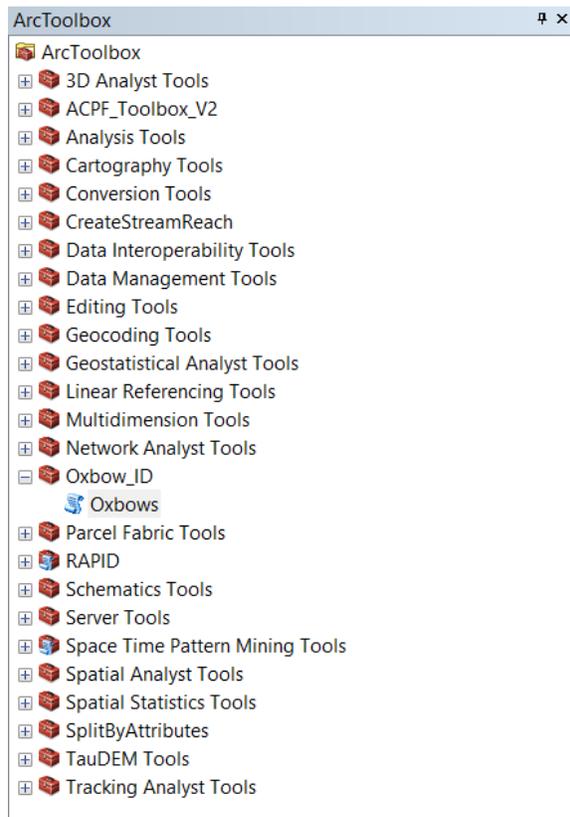
- To ensure the toolbox is reading the correct script, hover over the “Oxbows” script icon and select “Properties”



- In the pop-up window select the <Source> tab located at the top of the window, and then use the file icon to the right of the “Script File” box to navigate to the “toolbox.py” file. Select <Apply> and then <OK>.

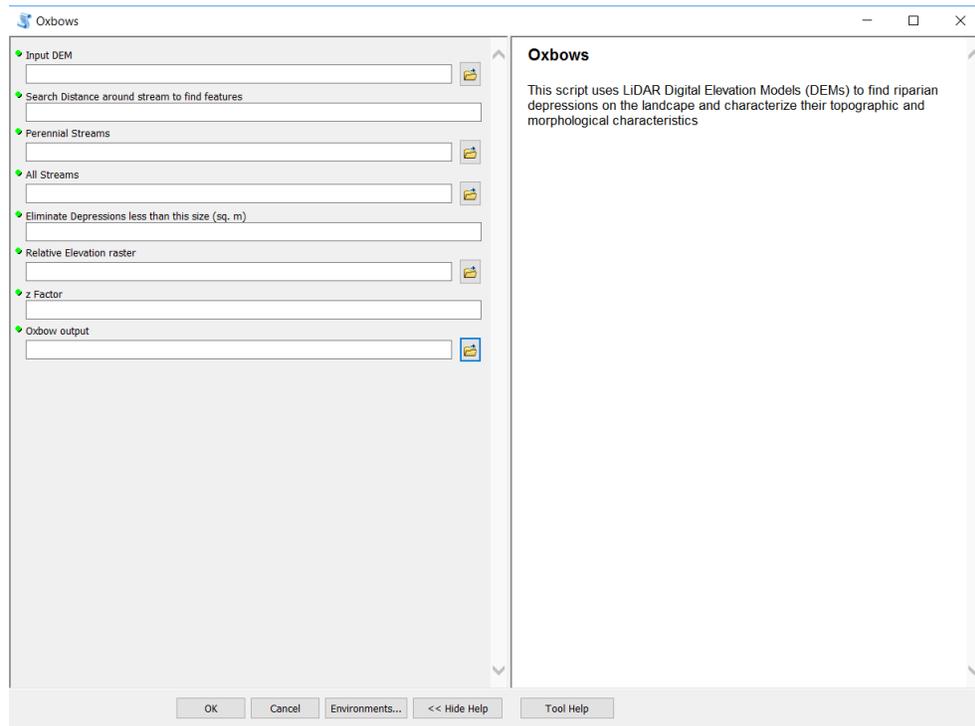


7. Once you have ensured that the toolbox is running on the appropriate script you are ready to look for oxbows! Double click the "Oxbows" script icon.

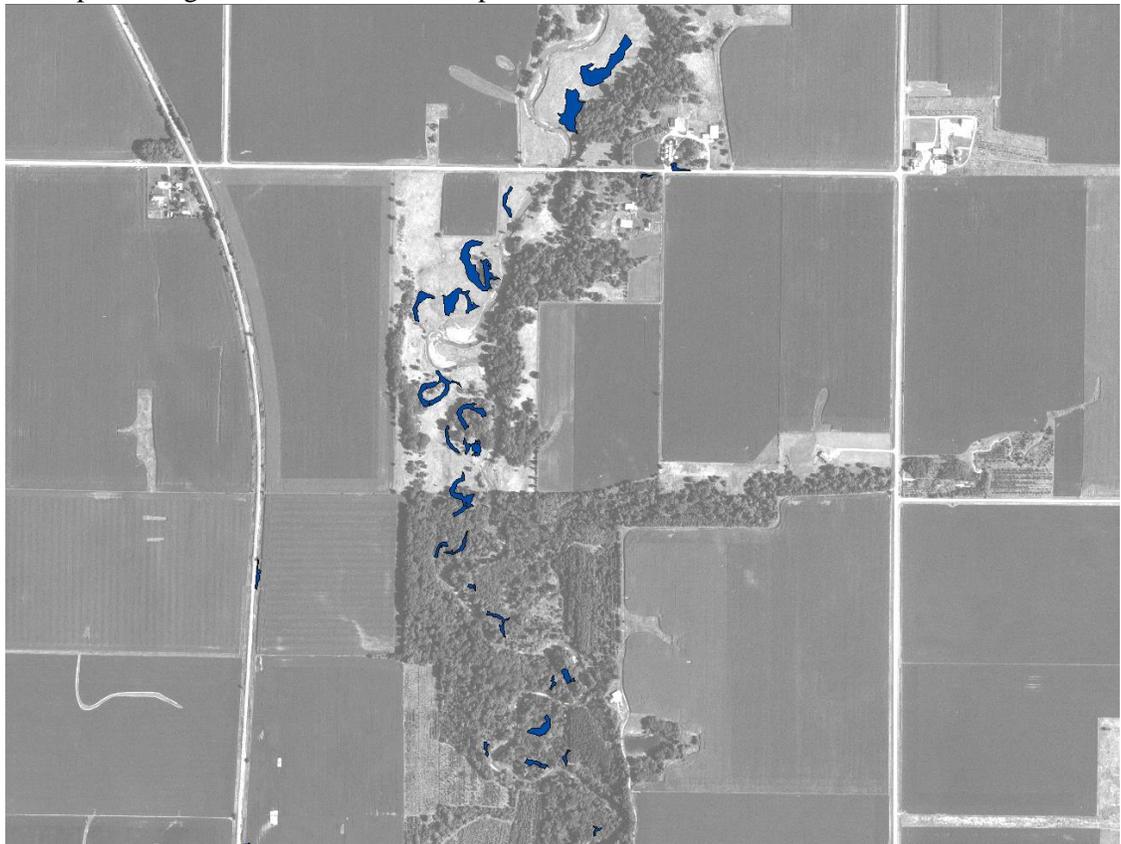


## II. RUNNING THE TOOLBOX INTO ARCGIS

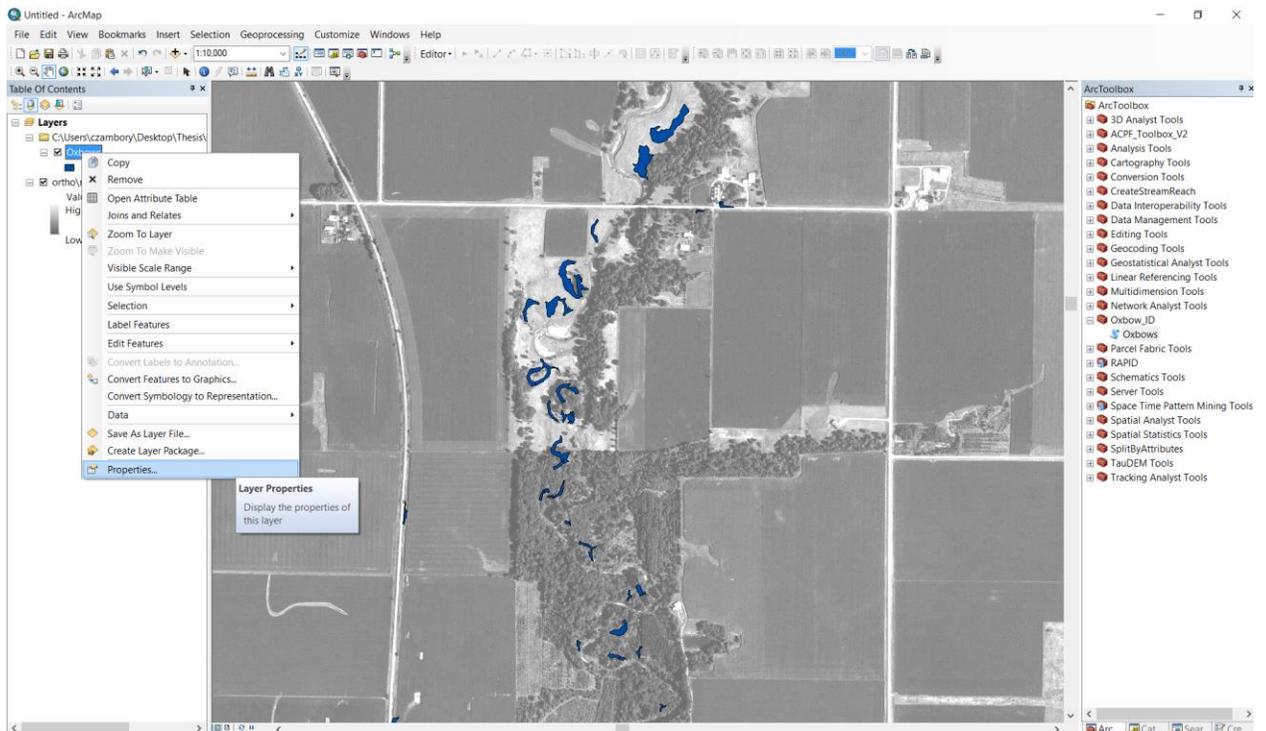
1. A pop-up window will appear. This is where you will enter all your input data to run the script:
  - a. **Input DEM:** Input your hydro-processed Digital Elevation Model (DEM). A reminder that this toolbox is data-intensive and your computer may not be able to handle DEMs that cover a large geographical error. If you receive a warning after running the tool, the first fix may be to extract the DEM to a smaller geographical area.
  - b. **Search distance around stream to find features:** specify a distance (this will be calculated in meters) around the streams of interest that you want to search for areas of former stream meander. In our study area we found that 500m was more than sufficient to represent the riparian zone.
  - c. **Perennial Streams:** Input your stream feature class (polyline) that represents the streams you are looking for oxbows. Again, this tool is data-intensive, so if you receive an error try sub setting your stream network.
  - d. **All Streams:** Input your stream features class (polyline) that represents your entire stream network. This polyline will be used to exclude any features that are within the stream so as to only focus on off-channel features.
  - e. **Eliminate Depressions less than this size (sq. m):** Input in m<sup>2</sup> the minimum size limit of your targeted features. This feature eliminates small riparian features that may be noise.
  - f. **Relative Elevation raster:** Input your relative raster file. This raster file should line up with your stream network and be derived from your input DEM. The tool will limit the search for former stream meanders to the area specified in b, so ensure your relative elevation raster *at least* covers the area of focus.
  - g. **Z Factor:** the z-factor is a conversion factor that changes the vertical units to the horizontal units of the DEM. Check the metadata for your DEM to ensure that you are using the correct value. For example, if your horizontal units are in meters and your vertical units are in centimeters your z-factor will be 0.01.
  - h. **Oxbow output:** navigate and name the file to which you want your final oxbow shapefile to be saved.



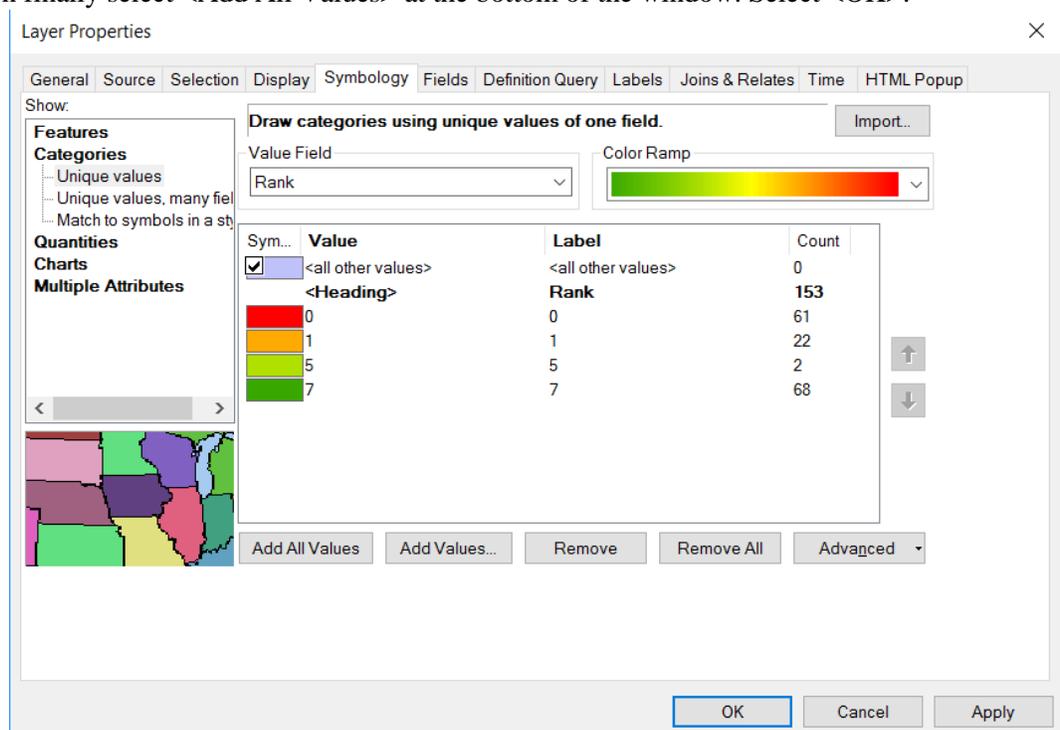
2. When the tool completes its run (may take ~ 1hr if you are using a large watershed), it will output a shapefile representing features it classified as potential stream meanders.



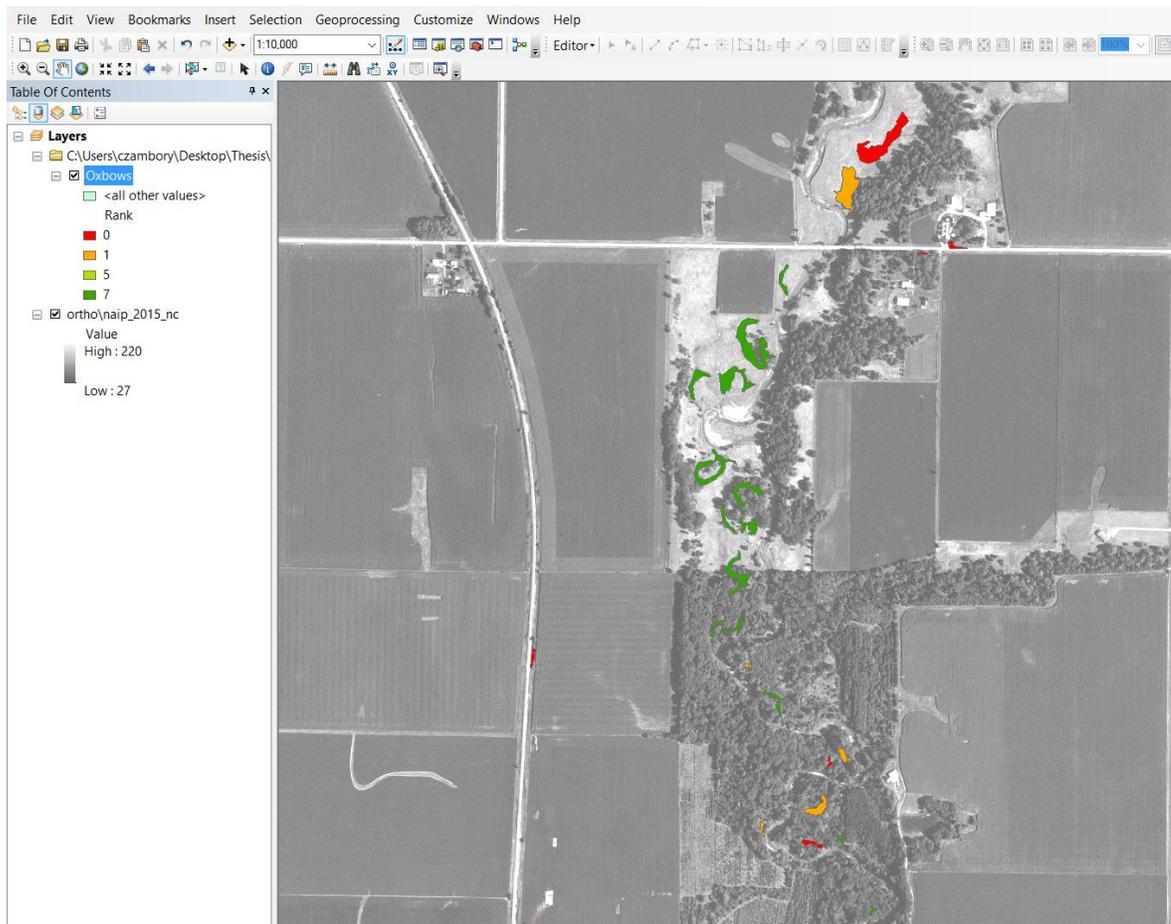
3. The ranking of feature as to the likelihood of it being a true former stream meander or oxbow can be found in the "Rank" attribute in the attribute table. To display the ranking of each feature right click on the output shapefile and select "Properties" from the dropdown menu.



4. A pop-up window will appear. Select the “Symbology” tab at the top of the window, then select “Categories” -> “Unique values” on the left. Select the “Rank” option from the drop-down “Value Field”, and then finally select <Add All Values> at the bottom of the window. Select <OK>.



5. Your features should now be ranked by their likelihood to be true former stream meanders or oxbows. Higher rank values indicate a higher likelihood that the features are former stream meanders.



6. Other attributes of the shapefile:

- a. Perim: perimeter of the riparian depression (m)
- b. ShapeAreaf: area of the riparian depression (m)
- c. CIR: circularity of the riparian depression, aka how similar the feature is to a circular shape
- d. SLD: solidity or how much the depression curves
- e. REC: rectangularity or how similar the depression is to a rectangle
- f. CVX: convexity aka how much the depression curves outward
- g. CON: concavity aka how much the depression curves inward
- h. MEANDepth: mean depth (cm) of the depression
- i. MEANHAC: mean height above the stream channel of the depression (cm). Lower values indicate that the feature is more similar to the elevation of the neighboring stream channel
- j. Slope: mean slope of the total depression
- k. Roughness: mean topographic roughness (standard deviation of the slope)
- l. Rank: how likely the feature is to be a true former stream meander/oxbow. Values ranged from 0-7 with values of 7 representing the features most likely to be a former stream meander.