

Urban vs Rural Selection Tool

This tool was developed to aid in determination of whether a project/facility location is considered to be urban or rural per EPA's guidance. The tool allows the identification and selection of 2011 USGS land use land cover data within a specified distance from the source under review. The tool calculates the percentage of developed land use land cover within a selected distance and outputs a graphical map and numerical output spreadsheet. Greater than 50% developed area is considered Urban (see EPA Appendix W 7.2.3.c).

System Requirements

ArcGIS version: 10.1 or later

(includes Python 2.7)

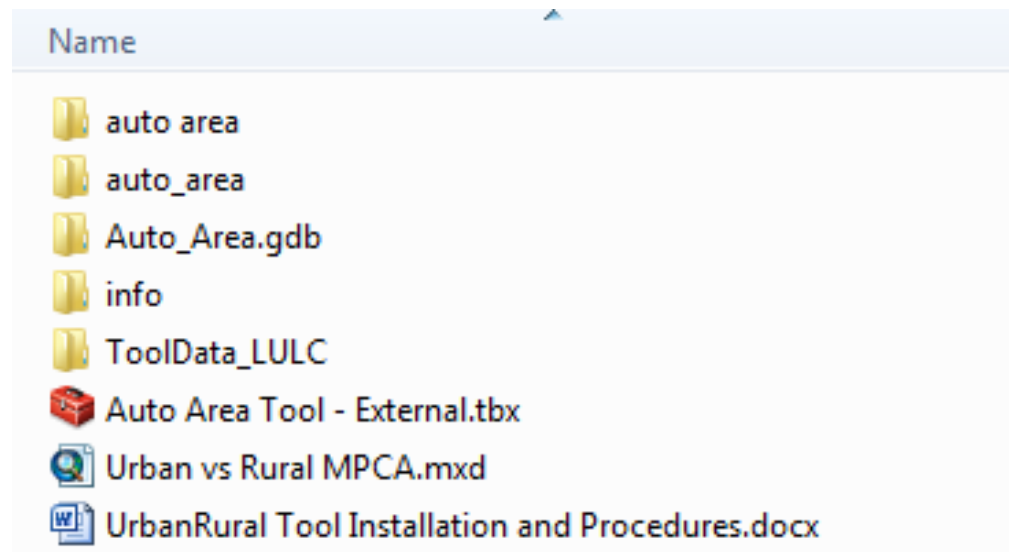
ArcGIS License: ArcInfo

Enable Extension: Spatial Analyst

Geoprocessing Options: "Overwrite the outputs of geoprocessing operations"

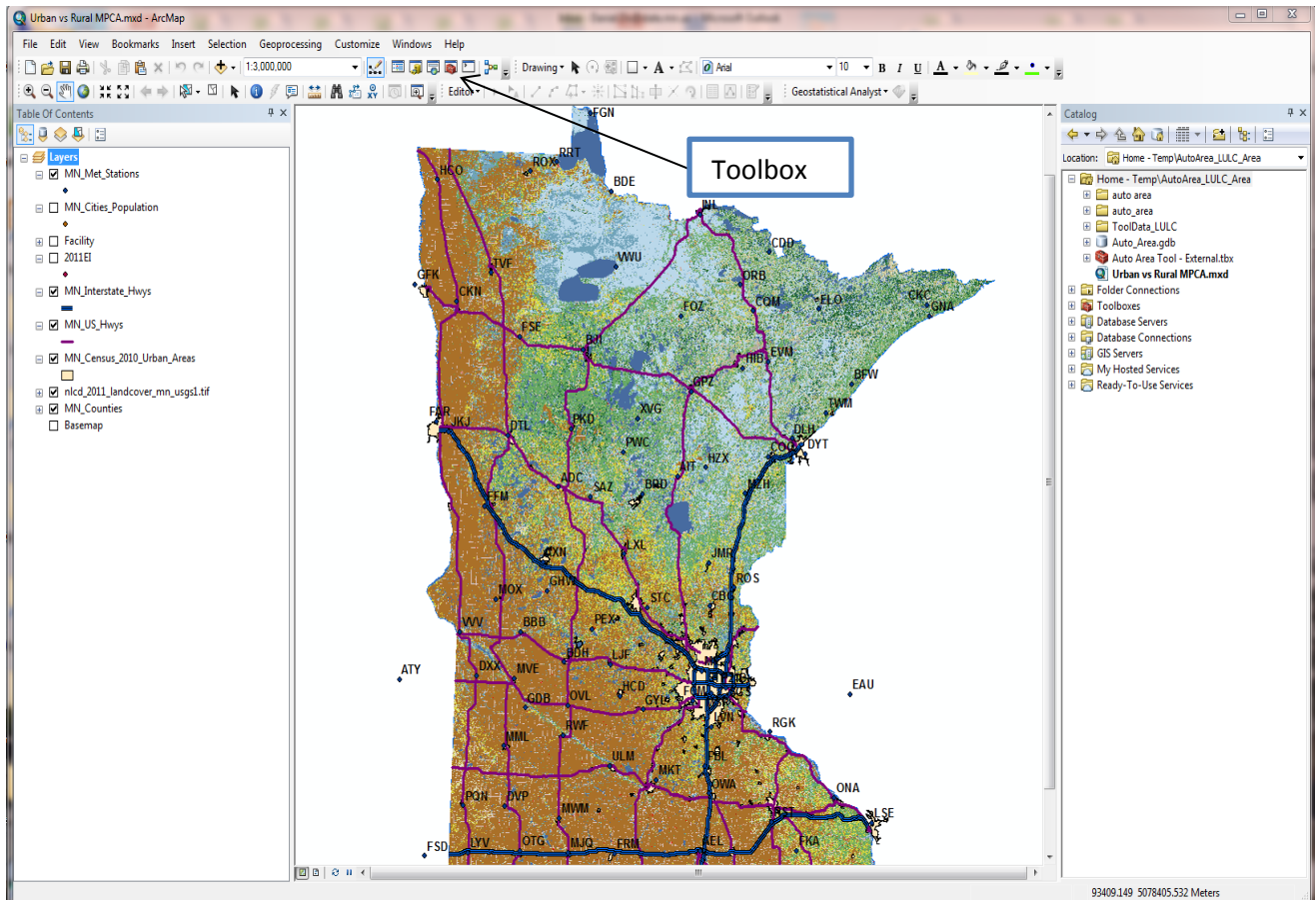
Installation

1. Create a 'temp' directory on your C drive (C:\temp)
2. Open the 'UrbanRuralTool' zip file
3. Extract the contents of the 'UrbanRuralTool' directory to the C:\temp directory to get the following files and folders: Paths should be C:\temp\AutoArea_LULC_Area\Auto_Area.gdb, C:\temp\AutoArea_LULC_Area\ToolData_LULC, a copy of this document (UrbanRural Tool Installation and Procedures.docx, etc.

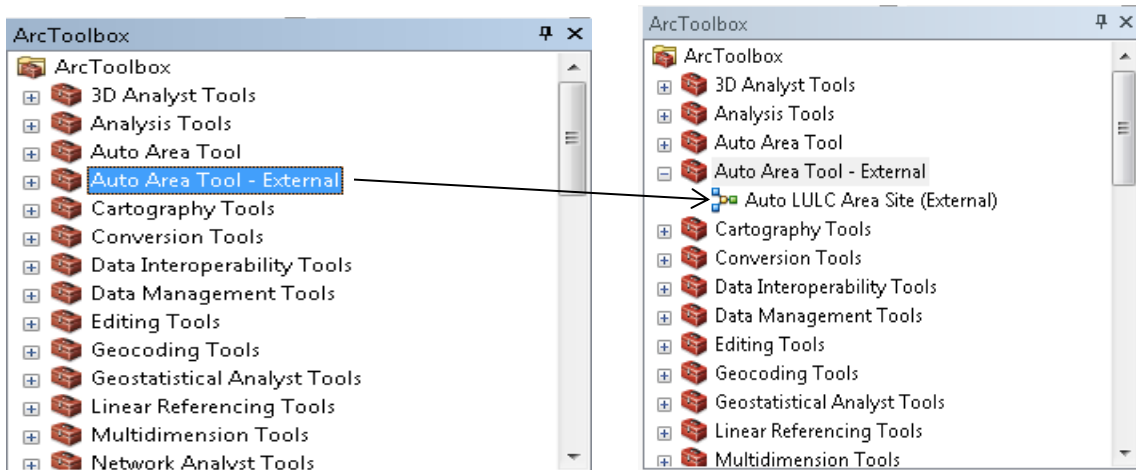


4. Open 'Urban vs Rural MPCA.mxd' in ArcMap (Double click in C:\temp\AutoArea_LULC_Area\)
5. *Ensure Spatial Analyst extension is active under Customize menu then the Extension drop down.
6. *You can open the tool in two different ways: in ArcToolbox or ArcCatalog
 1. ArcToolbox method:

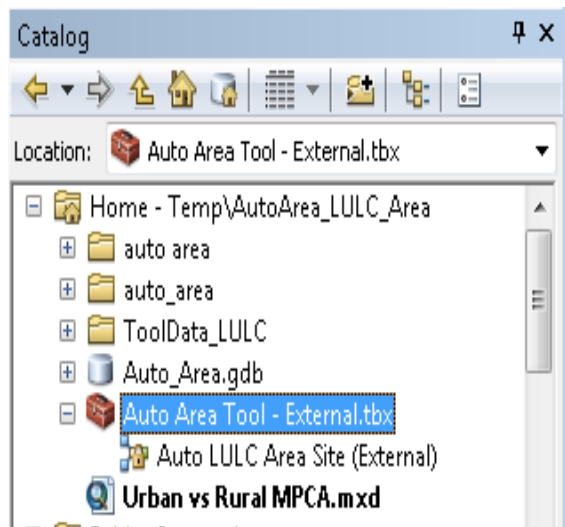
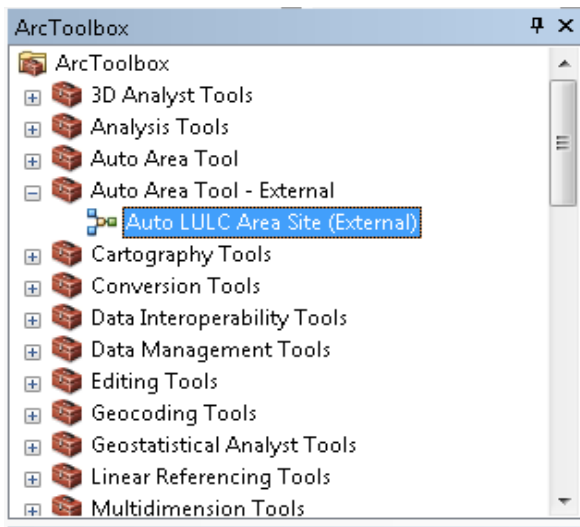
- a. Open 'Toolboxes' by clicking on the Toolbox icon in the Toolbar



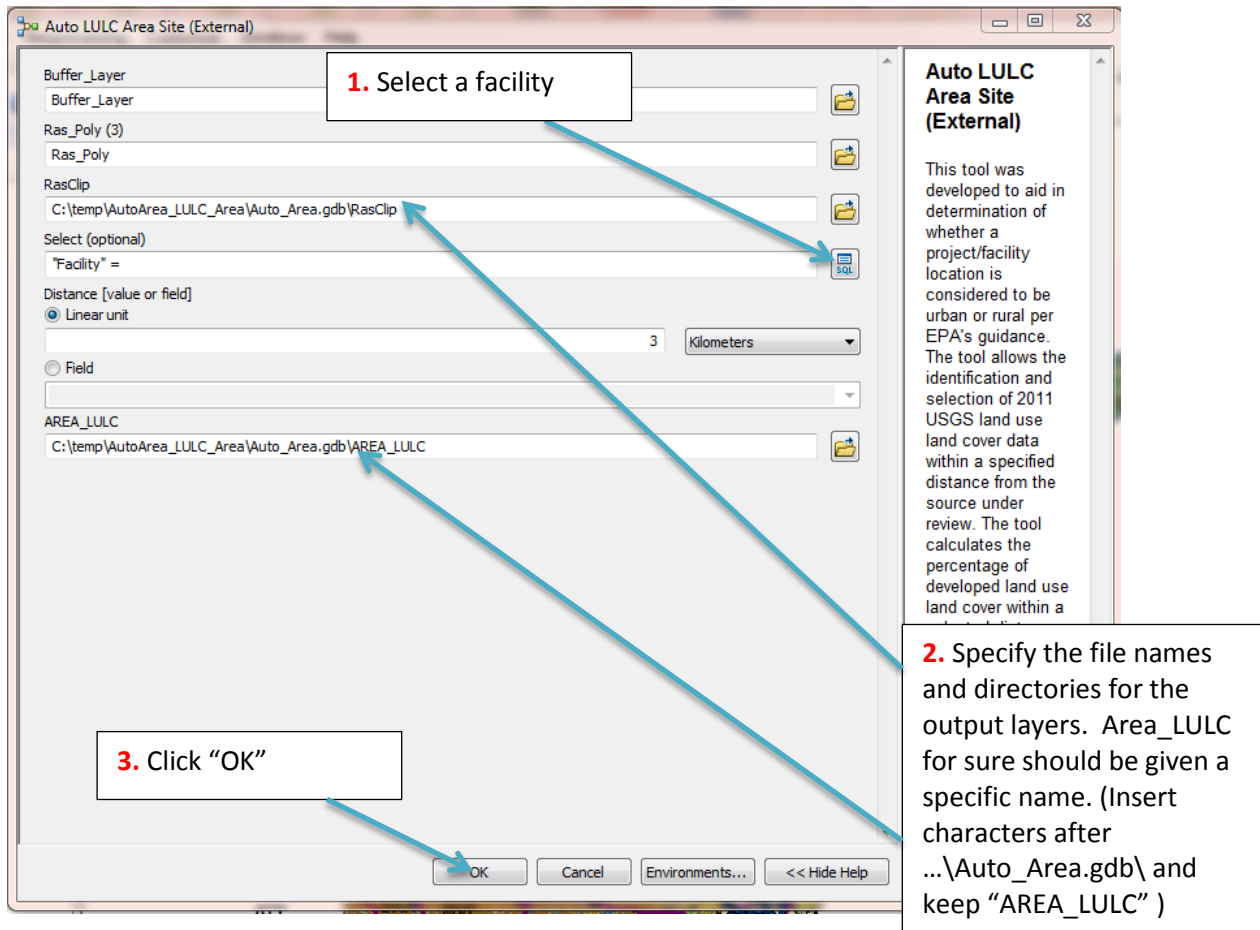
- b. Click the '+' next to the Auto_Area Tool' toolbox in the ArcToolbox list to reveal the Auto LULC Area Site (External tool) as seen to the right



- c. Double click the Auto LULC Area Site (External) tool
d. Or, open via the ArcCatalog window in your C:\temp\ location



7. The Auto LULC Area Site Tool window appears.



Filling out the Auto LULC Site Selection Window

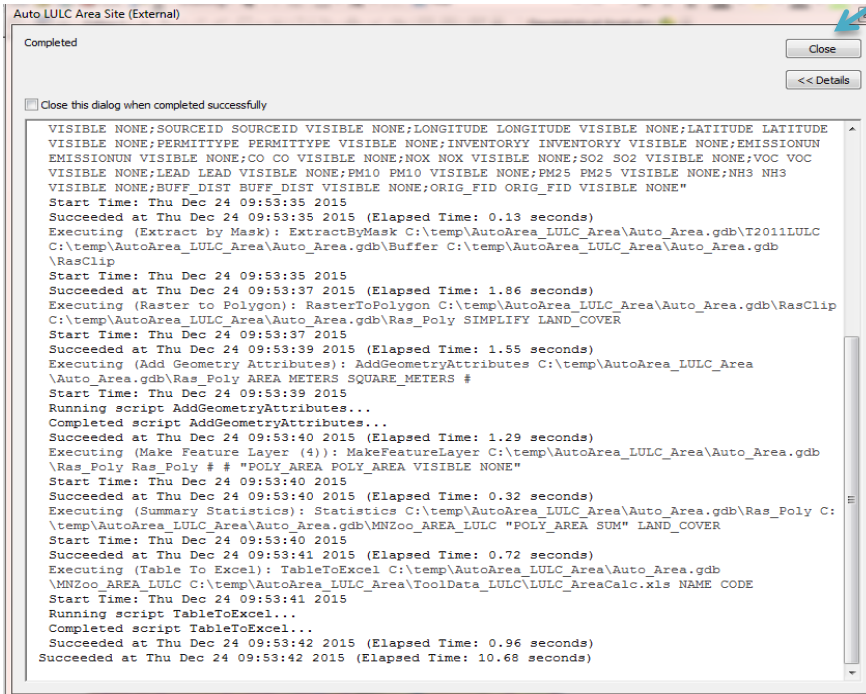
1. Selecting a facility
 - a. Click the SQL button for the 'Select Facility Name' field.
 - b. Click on 'Facility'
 - c. Click 'Get Unique Values'
 - d. Type in the name of the facility in the 'Go To' text box

- e. Place the cursor to the right of '=' in the bottom text box
- f. Double click the facility name
- g. Click 'OK'
2. Specify the file names and directories for the output layers
 - a. Layers (Buffer, Ras_Poly, and RasClip are overwritten every time the tool is run with default settings. **AREA_LULC is NOT overwritten thus an entered name is required in order for the tool to successfully run due to geodatabase properties.**
 - b. You can Rename the Buffer, Ras_Poly and RasClip layers if you'd like to save the results of each run.
3. Click "OK" to run the tool

Tool Window

1. The Tool's window will appear displaying the operations taking place.
2. Select 'Close' to close out the window in order to view map display.




2. Click "Close"



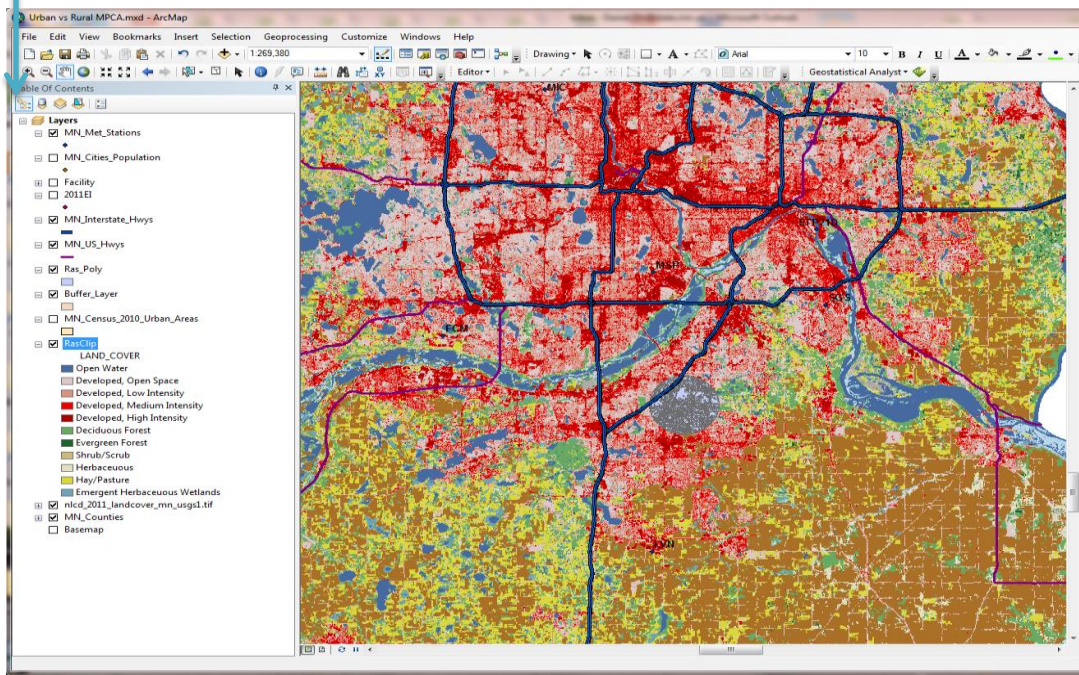
Map Layers:

When the tool is run and executed successfully a map with the following layers will be generated.

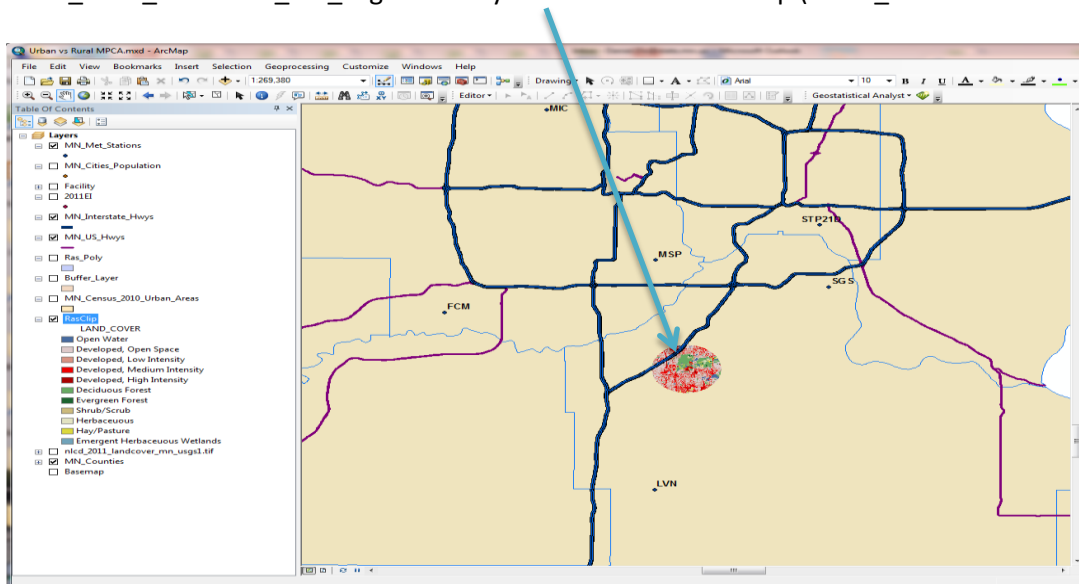
Layers:

- Ras_Poly: 
- Buffer_Layer: 
- RasClip (LAND_COVER): 

* Click "List by Drawing Order" to get the format of listing below



Tip: To see the different layers you can click on/off. *Click off Ras_Poly, Buffer_Layer and "nlcd_2011_landcover_mn_usgs1.tiff" layers and leave on RasClip (LAND_COVER).



Reviewing the Results

1. As noted above a visual inspection of the results can be done.
2. To view the table results go to C:\temp\AutoArea_LULC_Area\ToolData_LULC\ and open the LULC_AreaCalcs.xls file
3. You will see columns for LAND_COVER, FREQUENCY, and SUM_POLY_AREA. The SUM_POLY_AREA is the area of each land cover type in square meters.
4. Sum up the total area and then sum the 'Developed' areas which include High Intensity, Low Intensity, Medium Intensity and Open Space. Then calculate the percentage of the total that is developed.
5. If the final percentage is 50% or greater then it is considered Urban per EPA Appendix W.

A	B	C	D	E	F	G	H	I	J	K
OBJECTID	LAND COVER	FREQUENCY	SUM POLY AREA							
1	Deciduous Forest	191	3461021.968							
2	Developed, High Intensity	109	948599.4032							
3	Developed, Low Intensity	772	7628761.219							
4	Developed, Medium Intensity	587	4741037.06							
5	Developed, Open Space	542	9331058.6							
6	Emergent Herbaceous Wetlands	18	68120.82632							
7	Evergreen Forest	13	128399.4852							
8	Hay/Pasture	51	416316.4922							
9	Herbaceous	24	321750.2403							
10	Open Water	63	931185.5728							
11	Shrub/Scrub	46	408276.5022							
							Total Area:	28384527		
							Developed Area:	22649456		
							% Developed:	0.797951		
								79.80%		

Next Steps

1. In AERMOD you would choose the Urban coefficient when modeling. The population value(s) should be for the cities within the modeling domain, NOT the entire metropolitan area (i.e. the Minneapolis-St. Paul MSA).
2. Provide the necessary supporting work and information in the modeling protocol.

Trouble-Shooting

1. If the tool does not complete, the main cause is not creating a specific name for AREA_LULC in the setup window. If it is NOT given a specific name, the tool will not complete its operation.
2. If your facility is not in the database, please send an email to AirModeling.PCA@state.mn.us so the facility can be added.