Week 5-Tutorial 5a:

Geoprocessing and Model Builder

Find the ELC Classes near Roads and Create a Tool in GIS

(Part 1 (model builder) of 2 (tool creation))

## Part 1: Prepare System and Download DEM data

1. Log in to your lab computer
2. Create a folder called **Labs**
3. Create a folder called **Week5** within the **Labs** folder
4. Create a folder called **Data.** Now you have a folder in the directory **Week5.** We will keep all the data, related files and documentations in the **Data** folder and the Mxd files or PDF maps or image maps as a result of your class will be kept directly under **WeekX** folder in future.

Data: Download the geodatabase from the blackboard under **course materials** page. It is called **lab5a5b**. Data contains following layers:

a. SOLRIS Data that includes the study area (SOLRIS Data for the study area (Source: **SOLRIS, 2008 (http://www.ontario.ca/page/open-government-licence-ontario)**
b. Study Area
c. Major roads
d. An excel file containing a data class and type.

Preparing your system:

1. Start the mxd file and add your Study Area and SOLRIS data file (+ sign on the toolbar). Move the study area boundary on top at the Table of Content (TOC) so that you can see the SOLRIS data underneath. Save the Mxd file as **Lab5Tutorial_5a5b**
2. Change the boundary of the study area data to "hollow" symbology (double click the symbol on the TOC. Change the symbology of the SOLRIS data using the default colour ramps available. Use the "Class" field (under categories type – Show: (on the left column)). The results should look something like this (the colours might be different on your machine depending on your default colour settings):
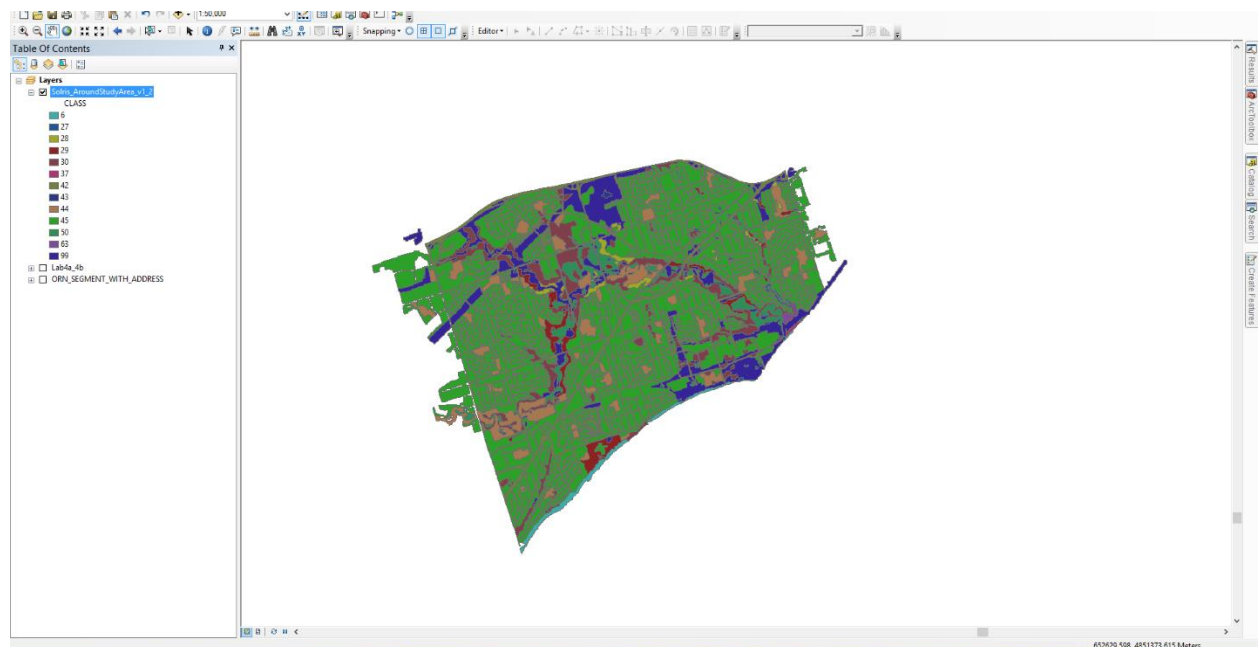
As the lecture covered briefly, the SOLRIS data contains Ecological Land Classification (ELC) classes at the landscape scale. The map above has no meaning without those numerical codes associated with the class names. Now, you are going to define the class names based on the provided excel table.

3. Open the attribute table of the SOLRIS data and create a field called "ClassType". This field has to be of *text type*.

4. Now close the attribute table and right click the SOLRIS layer to join provided excel table with this file. Please note that "class" is the common field (primary key) to join the table. Validate the join by clicking on the "Validate Joins". All of them should be joined.

5. Now, open the attribute table of the SOLRIS data again and right click on the "ClassType" field and click "Field Calculator", and select "*sheet1$.elctype*" field. It should look something like this:
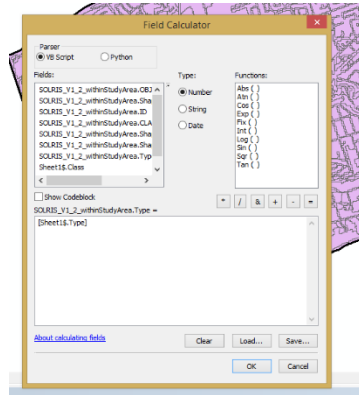
6. Click OK.
7. Now the ClassType field contains the corresponding data so that you know which field is impervious or pervious, for example.
8. Right click on the SOLRIS data again and remove all joins (we don't need it anymore).
9. **Now we are going to build a geoprocessing model (Adapted tutorials from ESRI, 2015).** In this tutorial (5a), we will go through following steps:

a. *Create a geoprocessing model*

   Click the **ModelBuilder** button on the ArcMap*Standard* toolbar. This opens the ModelBuilder window for editing.

   You can also create a new model by right-clicking an existing toolbox and choosing **New** > **Model**. This creates a model in the toolbox with a default name and opens the model for editing.
   We want to save it so that we don't lose our work. Click on *Model* on the menu>>*Save as* and it will open a window. Browse to your folder "**Week5"** and create a toolbox and

   rename it to "**ZZZ_Mytoolbox**" by *double clicking on it*. Double click this toolbox to go into this folder, and save your model as "ELCnearRoads"
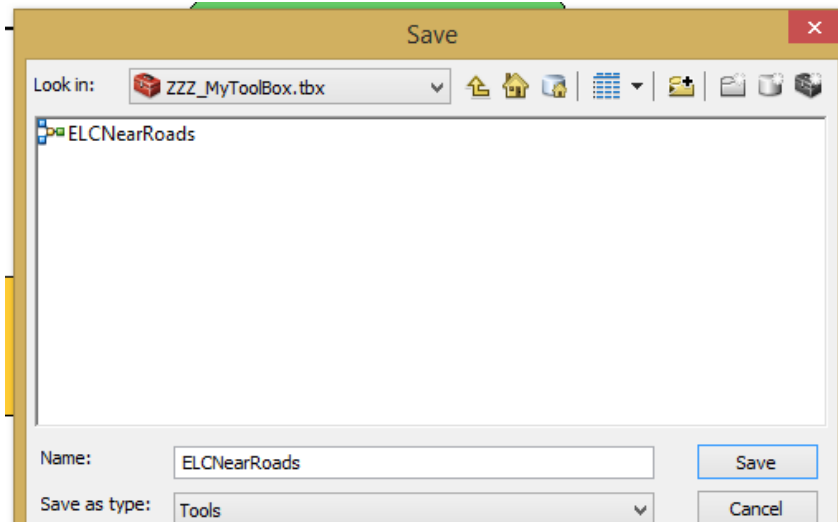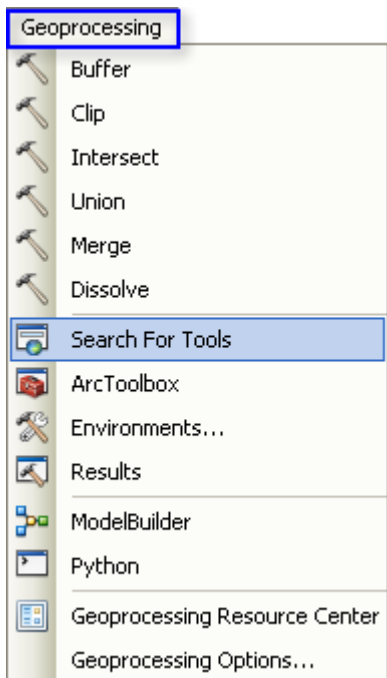
The reason behind using "ZZZ" prefix is to make it easier to find it later once you add it to the toolbox for geoprocessing.

b. ***Add tools and data to the model***

Now that the model is open for editing, you will add tools using the ***Search*** window:

In ArcMap, click **Geoprocessing** > **Search For Tools**.
This opens a ***Search*** window that you can dock anywhere in ArcMap.

i.   On the search window, type "**clip**" and drag the "Clip (Analysis)" tool to the model builder window. It will add the tool and the output. Both of them are empty at this point.

i.   Now search for "**buffer (analysis)"** tool and add it to the model builder window.
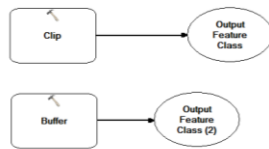
Search and add **another "clip" tool.**

ii.   Double click on the **first clip tool** to select the **SOLRIS data** as input, **Study Area** as clip feature and "**SOLRIS_V1_2_inStudyArea**" as output in the same geodatabase.

iii.   Double click on the Buffer tool and select "**major_roads**" from the list and browse to your output folder and call it "**major_roads_50mbuffer**".
          Don't forget to save the model every once in a while.

iv.   Double click on the "**the second Clip**" tool and select the SOLRIS_V1_2_inStudyArea from the drop down list. The blue recycle symbol means that the layer is a variable in the model. This variable was created in the model when you added the clip tool. Likewise leave everything as is and select the "major_roads_50mbuffer" from the drop down list (We are trying to select the ELC class that are within 50m buffer from the road). Call this layer "**Solris_V1_2_within50mFromRoad**". It should look something like this:
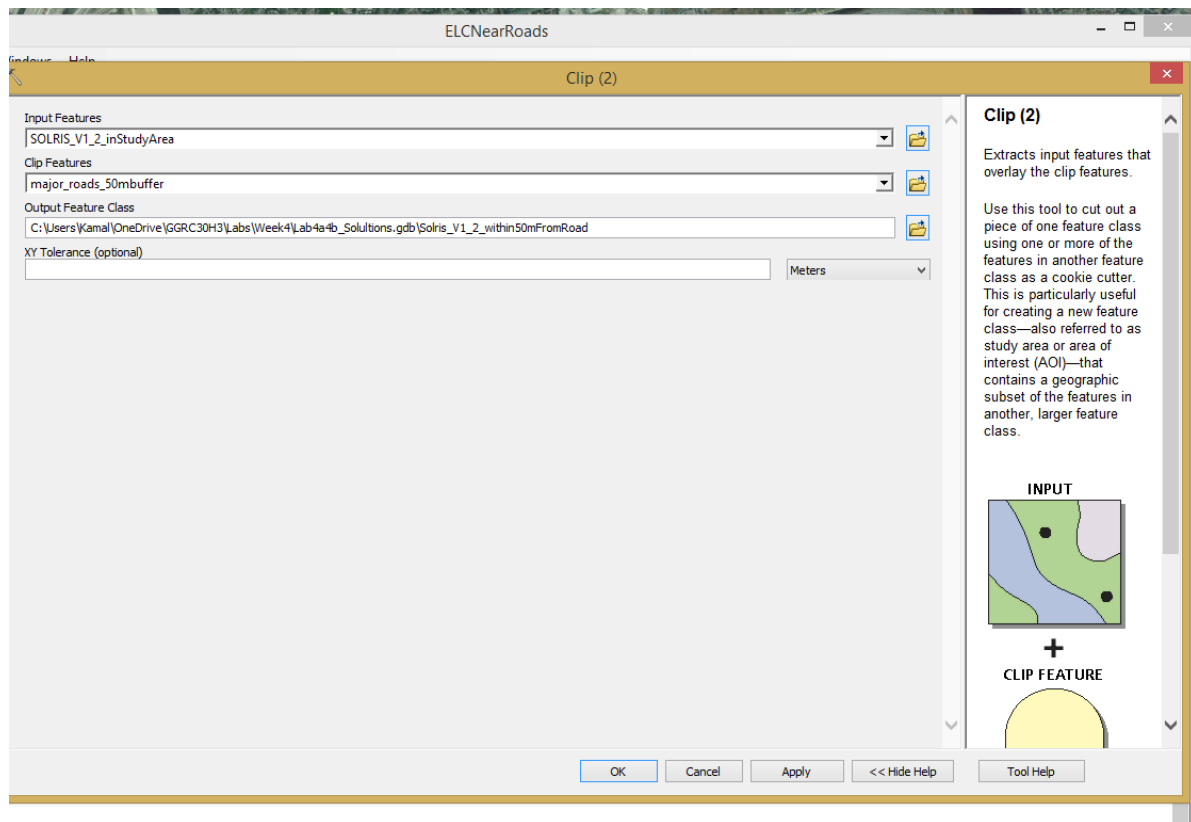
v.   Click on auto layout from the menu (under view>auto layout). It should look something similar to this:
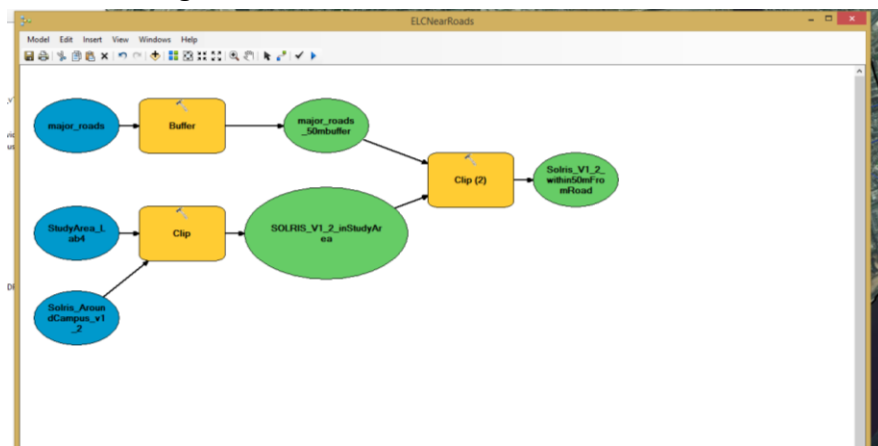
vi.   Now right click on the **SOLRIS_V1_2 inStudyArea** and click "Add to Display" Do the same with the **Solris_V1_2_within50mFromRoad** as well.

vii.   Click on the check mark next to run button (second from left) on the model builder menu to validate the entire model.

    c.   Run the model

    d.   Save the model

Questions for Tutorial Participation (write this down now- you will need to fill out a form later):

i. What is the total area of deciduous forest (area ha)?

ii. How many classes are within 50m buffer area from the major roads?

Fill out the participation form from below:

https://goo.gl/forms/QMx8WjCmInVV89EJ3

Tutorial 5b. to be continued on the Week # 8.

    10. Next…

References:

ESRI. 2017. *Tutorial: Creating tools with model builder*. Available at:
http://help.arcgis.com/EN/arcgisdesktop/10.0/help/index.html#//002w0000007v000000 ,
accessed on September, 2017.