ArcGIS
Lab 4: Model Builder

QUICK OVERVIEW:

1. **Issue**: determine the area and value of the land contained in the buffer reserve zones (same as last week).

2. **Learning Objectives**: to gain proficiency using Model Builder, as well as the tools Merge and Intersect.

3. **Data**: you will be utilizing the same data set as last lab.

4. **Analysis**:
   a. Create a custom toolbox
   b. Create a model that will utilize several tools (buffer, clip, etc.)

5. **Interpret Results**: be sure you understand all new map data that you create

6. **Communicate Results**: make a map layout that clearly communicates your results.

THE ISSUE

There is no new issue, i.e. no new resource management issue to solve. Instead we are learning an automated way to conduct an analysis that has several steps. This is called analytical modeling (a.k.a. cartographic modeling) – refer to Figure 1 on following page. Also, conduct the Virtual Campus module 7-2 (& optionally 7-3) before reading any further.

As previously outlined, this lab essentially conducts most of the analyses from the previous two labs:
   a) Buffer streams and trails (but with different widths)
   b) Merge the buffers into one layer
   c) Dissolve the VIU Forest boundary into 2 polygons: private and Crown
   d) Intersect the combined buffer layer with VIU boundary

The differences are:
   a) Only 2 buffers will be conducted (just to keep the model to a reasonable size)
   b) Intersect will used instead of Clip
   c) Model Builder will be used for the entire process

Figure 1: Analytical Model – "The Plan"
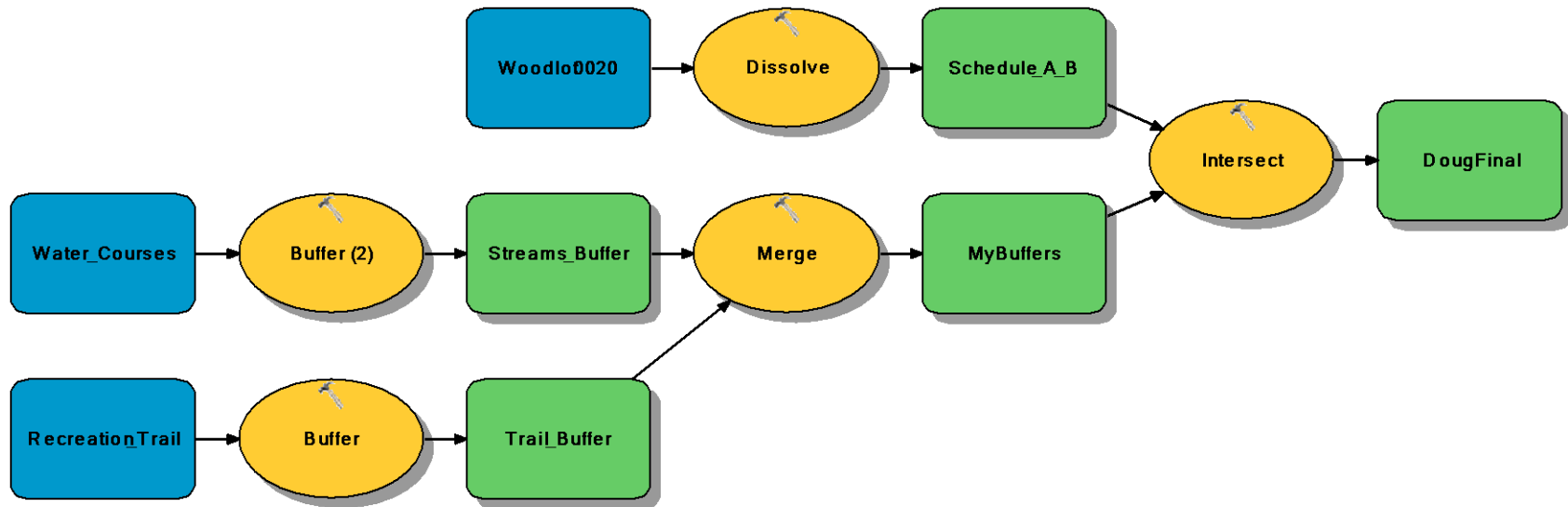
DATA
You already have the data from the last lab. There is no new data to copy from the G: drive.

ANALYSIS & INTERPRETATION
- Prior to developing and running a model you need to edit the attribute table for Water_Courses and add a field called **Width**. This field is to contain a revised version of buffer widths – use the *field calculator* to populate it with values that are 2.5 times as large as what are contained in the Buffer field.

Create a custom toolbox
The first step is to create your very own custom toolbox.

- Open the Catalog window and navigate to your Home directory (i.e. Home-Viu_Woodlot2012)
- Right-click on your Home directory and select New > Toolbox
- Rename the new toolbox **MyTools**.

It is good practice to add the tools you will be using in your model to your toolbox.
- Right-click *My Tools* > Add > Tool
- Expand *Analysis Tools* > expand *Overlay* > "tick" *Intersect*
- Under *Analysis Tools* > expand *Proximity* > "tick" *Buffer*
- Expand *Data Management Tools* > expand *General* > "tick" *Merge*
- Under *Data Management Tools* > expand *Generalization* > "tick" *Dissolve*
- Click OK.

Now all the tools are readily available.

Create the model
The next step is to create a model that 'resides' within your toolbox. This is somewhat akin to you being a carpenter 'in the old days' when you actually made some of your own tools. First you create a box to put your tools in (you called it *MyTools*), then place your existing tools in the box (you put in four tools thus far), and then you make specialized tools like mallets and wedges and whatnot and place them in your toolbox. Right now, you're making yourself a rather sophisticated mallet …

- Right-click the *My Tools* toolbox > New > Model.
- Click Model > Model Properties enter **Reserves** as the Name and Label.
- Save the model

Change diagram style
Next you will alter the display of the model from the default where map inputs are in ovals to the alternate schematic where map inputs are in rectangles.
- click Model > Diagram Properties > Symbology tab > Style 2 > OK

Make your model

Now you need to construct your model. Based on your experience from module 7-2 and Figure 1, build your model. Note the following:

- Use the map layer names provided in the model diagram - ** obviously the final map on your model will use your own name

- Recreation trail buffer width is 75 metres and stream buffer will be variable based on the newly added field *width*

- The internal boundaries on the Woodlot need to be dissolved such that there are only 2 polygons: private (Schedule A) and crown (Schedule B) lands

- ensure boxes are large enough on the model so the names do not scroll onto a second line

- you will need to insert labels to <u>add extra detail</u> regarding some steps (i.e. for Buffers you should add a **label** that states the width) – that detail is missing from my diagram, but is needed on yours (… I know … do as I say and not as I do …) – place the label below the oval that contains the tool name.

- **Save your model**

- Run your model

- Add the final data layer that was created to your TOC (if it was not added automatically)

- Look at the resultant data layer and determine if the reserves within the area for Schedule A (or Schedule B) are broken into sections – if they are you will need to add a final step to your model such that adjacent reserve buffers within the Schedule A (and within Schedule B) portions are dissolved. The output for this step should be called YourSurnameFinal (i.e. CorrinFinal) and added to the TOC

- Once you are satisfied that your model is complete, export your model as a graphic. Use the Enhanced Meta File (emf) file format. For size, select Actual Size. Name the file YourSurnameModel (i.e. CorrinModel.emf)

- **Save your model**

Determine the total area and value of land

Once your model is finalized, you will need to edit the attribute table of your last output layer so that you can determine the total value ($) of the land within the reserves, based on the following:
- Value of Schedule A land = $100,000/ha
- Value of Schedule B land = $150,000/ha

Note that Shape_Area is in square metres, not hectares … you'll have to deal with that somehow.

Save your map document.

Map Layout
You will now be altering your previous map layout.

- Alter the existing map layout such that it displays the streams, trails, lakes, forest cover, roads, and your final data layer from this lab. No other layers should be displayed.

- Use the map template: **Tabloid (ANSI B) Landscape.mxd** (under the North American (ANSI) Page Sizes

- Symbology for the layers should be as previously stated, except
  - The final buffer reserves should be symbolized using a "10% crosshatch" pattern and set the outline width to 1.0 pt.

- Give your map a title of "VIU Forest – Special Mgmt Areas Ver. 2".

- Add a statement that summarizes your findings (i.e. Land area and value for Schedule A & B lands)

- Set the scale so that the woodlot fills the neatline – be sure to use a reasonable round number (i.e. not 1: 27,876)

- With regards to map elements and actual layout ~~you are on your own … er, I mean~~ follow the principles of "good cartography" … more details on this will be provided next week, but you can play around for now