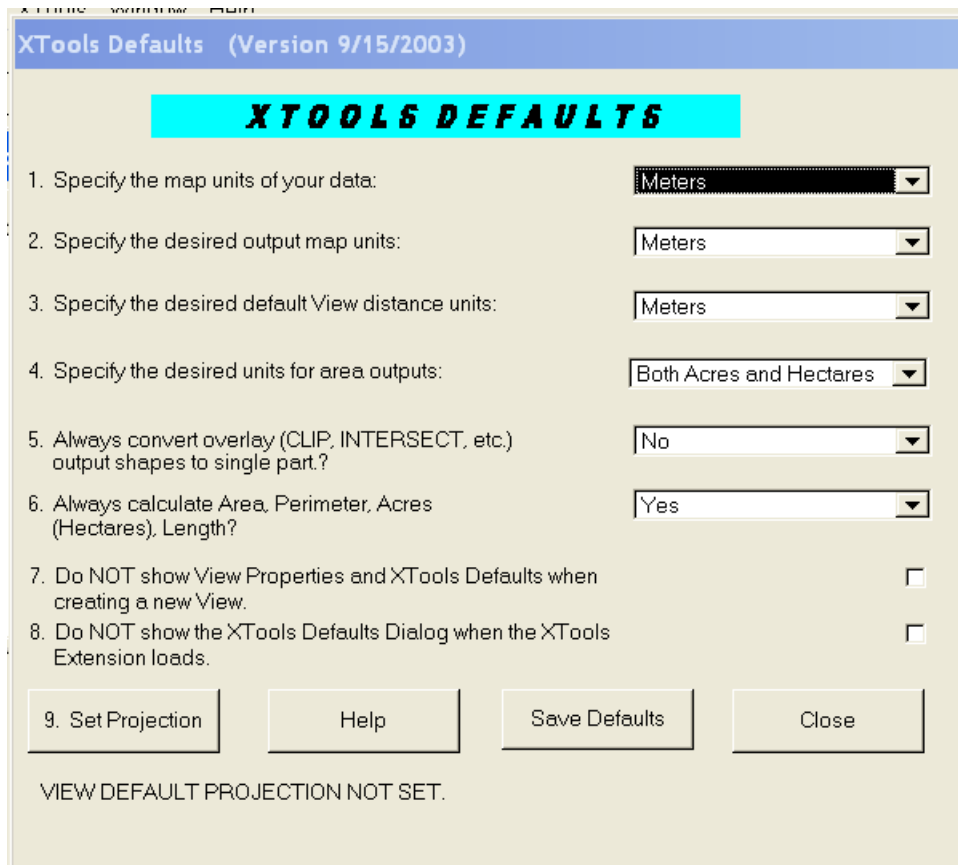



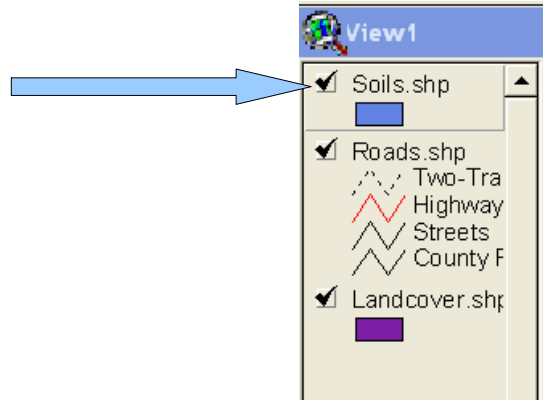
1. Copy the data folder from /kiwi/public/fw2050/data to your home directory. Remove the “read-only” property of all the files.
2. Open Arcview 3.3.



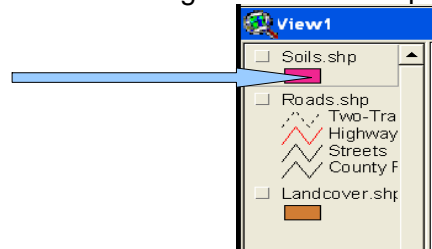
3. Choose “as a blank project” in the Welcome To ArcView GIS window
4. Include the extensions (File-> Extensions)
 1. Xtools
 2. Spatial Analyst
 3. Geoprocessing
5. Xtools screen should look like the screen shot below. Select the same options that are selected in the screen shot below. We are going to work in meters. When done click save defaults and close



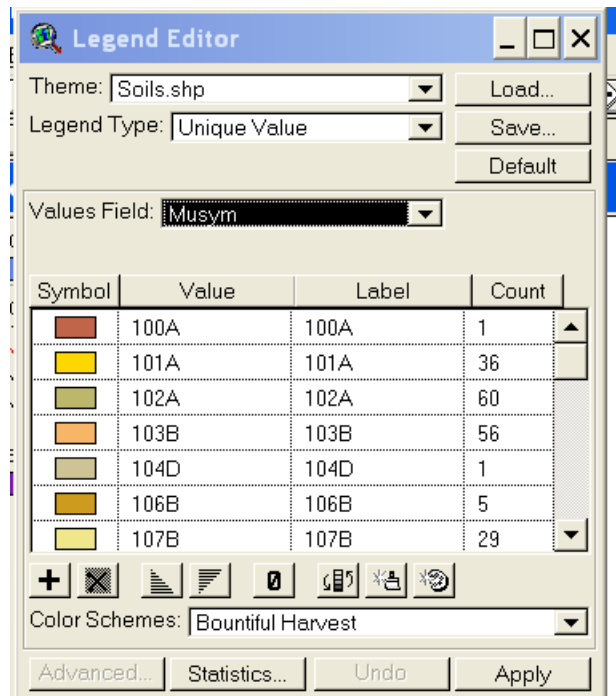
6. Add themes (Click “new” button to open a new view). Click  to add the themes. Hold shift to select more than 1 thing at a time
7. Add the following themes
 1. landcover
 2. roads
 3. soils
8. Check all the boxes on your left to see all the layers



9. Let's put some different colors to the different types of soils and the different types of landcover
 1. Double click over the rectangle under soils.shp in the legend.

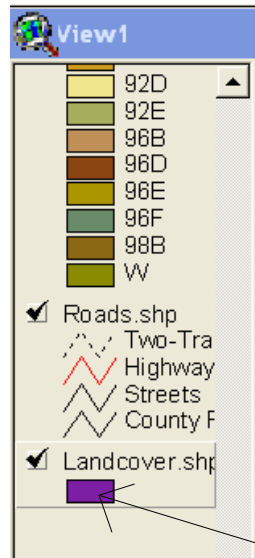


2. This will open the Legend Editor



3. Select “Unique value” in “Legend type” and in “values field” select “Musym”. This is going to give different colors for every unique value in the field Musym. Click apply and close it.

4. You will see that the legend is now huge. Let's hide it. Select in the legend the soils layer (a layer is selected when a rectangle appears around it). In the example below landcover layer is selected.



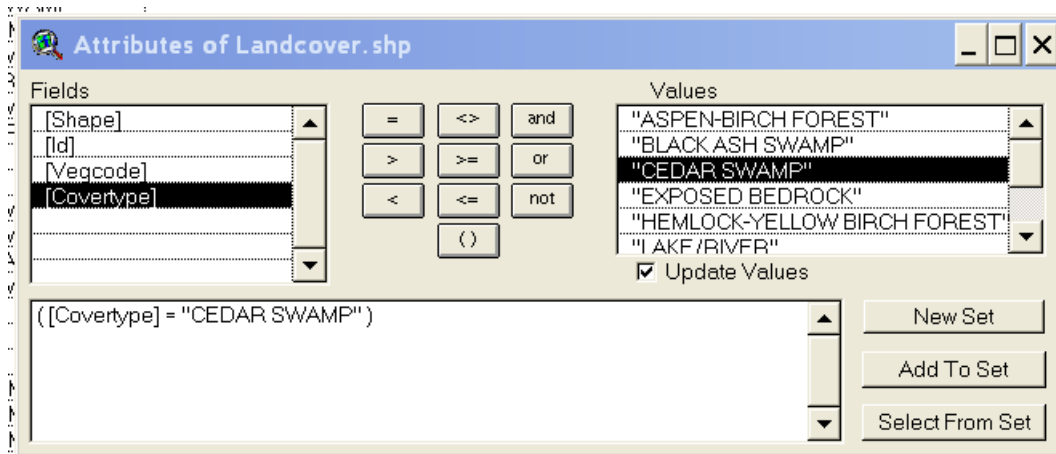
5. Go to Theme's menu -> click on Hide/Show legend
6. Let's change the landcover legend. Double click over the rectangle in Landcover legend.
7. Click the load button load the legend called "land_cover". Now the legend land_cover is loaded. Click apply and close the legend editor.
8. Since the soil layer is over the road and the land cover layer you cannot see any of them. Play with the order of the layers by dragging them up or down and/or click the left square to see all of them.
10. Let's take a look at the information of the layers
 1. You will only get the information of the layers selected
 2. Select any or all the layers, click in the identify icon – a small icon on the left of your tool bar with an "i"-and click over your map. Do you see a new window with the information of the polygons and lines selected? Play with this for a minute or two, until you feel confident with it
11. This information comes from the tables associated with the layers. Select landcover layer, click over the "open theme table" icon – fifth icon from the left in the first row of icons, it looks like a small grid. You will see something similar to this



Attributes of Landcover.shp

Shape	Id	Vegcode	Covertyp
Polygon	4	4231	CEDAR SWAMP
Polygon	4	4231	CEDAR SWAMP
Polygon	5	4115	SUGAR MAPLE-YELLOW BIRCH
Polygon	6	423	MIXED CONIFER SWAMP
Polygon	15	423	MIXED CONIFER SWAMP
Polygon	21	423	MIXED CONIFER SWAMP
Polygon	22	423	MIXED CONIFER SWAMP
Polygon	23	423	MIXED CONIFER SWAMP
Polygon	25	6221	SHRUB SWAMP/EMERGENT MA
Polygon	26	423	MIXED CONIFER SWAMP
Polygon	27	413	ASPEN-BIRCH FOREST
Polygon	30	423	MIXED CONIFER SWAMP
Polygon	32	4212	WHITE PINE-RED PINE FOREST
Polygon	34	52	LAKE/RIVER
Polygon	35	6121	MUSKEG/BOG
Polygon	36	4233	MIXED CONIFER SWAMP
Polygon	37	423	MIXED CONIFER SWAMP
Polygon	38	4223	SPRUCE-FIR-CEDAR FOREST
Polygon	40	423	MIXED CONIFER SWAMP
Polygon	41	4231	CEDAR SWAMP
Polygon	42	4231	CEDAR SWAMP
Polygon	45	6121	MUSKEG/BOG
Polygon	46	6224	SHRUB SWAMP/EMERGENT MA
Polygon	47	6221	SHRUB SWAMP/EMERGENT MA
Polygon	48	6221	SHRUB SWAMP/EMERGENT MA
Polygon	49	52	LAKE/RIVER
Polygon	50	423	MIXED CONIFER SWAMP
Polygon	51	6221	SHRUB SWAMP/EMERGENT MA
Polygon	52	52	LAKE/RIVER
Polygon	53	4115	SUGAR MAPLE-YELLOW BIRCH
Polygon	54	52	LAKE/RIVER

1. You can see the fields “shape, Id, Vegcode, Covertyp” and the data. Each row is one polygon on your map. Click over one or select more than one. Go back to the view, you will see some of the polygons in bright yellow. These are the polygons you have just selected!!!.
 2. Play with the possibilities of the table for a couple of minutes.
12. Now we are going to select all the “Cedar swamp” cover type
1. Click over the “query builder” option -a hammer with a question mark. Select on your left the field you want to query- you select it by double clicking over it. In this case “covertyp”. Click “=”, and select from the right “CEDAR SWAMP”. When you are done it should look like this



2. click new set, and see how every polygon classified as “CEDAR SWAMP” is selected.
3. Go back to the map. All the selected polygons -in bright yellow- are CEDAR SWAMP.
13. Open now the soil's table and select all 140B
 1. Go to Xtools -> Calculate area, perimeter...
 2. Select the Hectares field (header). Field -> statistics. Write down the mean (the instructor is going to check your result) _____
14. The administration that owns the highway crossing the AOI has informed us that they plan to build a new road. They have given us the shapefile with the axis of the road. Add it to your view. The file is called “New_ Road”. They have told us that they will need to clean 12 meters on each side of the axis. How many square meters are they going to cut and which kind of forest or land cover are they going to affect and how much?
 1. Add the “New_Road” file to your view. Change in the legend editor the color and width of the line so you can see it clearly.
 2. Select the layer “New_Road” . Theme-> create buffers. Under “The features of a theme” it should appear the new road layer. Click next. Distance units are meters. Specify 12 meters at “at a specified distance”. Click next. Choose dissolve barriers. Save it in a new theme on your home directory.
 3. The new theme will be added to your view. There is a tool to measure the distance -looks like a rule with two arrows and a question mark. Check that the buffer zone has a width of 24 m.
 4. Since we are not interested in keeping the data from the new road, we are going to make just a clip.
 5. View -> Geoprocessing Wizard-> clip one theme based on another. Select the correct input theme (land cover) and the clip theme (buffer of new road). Save it in your home directory. Click finish.
 6. Open the table of the clipped theme.
 7. Xtools -> Calculate area...
 8. Select the field “cover type” (we want to summarize the data by cover type)
 9. Field -> summarize. In field -> Hectares, in summarize by -> sum. We are going to get the sum of the hectares by land cover type. Click add
 10. The table should look like this and the numbers should be the same. Check it!!

Covertyp	Count	Sum Hectares
ASPEN-BIRCH FOREST	1	0.3560
LAKE/RIVER	2	1.0350
MIXED CONIFER SWAMP	3	3.8450
SPRUCE-FIR-CEDAR FI	1	2.2620
SUGAR MAPLE-HEMLC	1	0.5060
WHITE PINE-RED PINE	1	0.8570

11. Create a buffer of 25 meters at each side of the road and calculate the hectares of the soils inside the buffer by making a clip of it. **Check that soils layers does not have any selected feature.**
12. How many Ha. Of soil type 135D are affected? Write it down, the instructor will check the result with you (same as before for cedar swamp _____)
15. We want to study the species distribution of this area by type of soil.
 1. Overlay the soil layer and the cover layer to get a theme with a combination of all the information of both layers.
 2. **Check that nothing is selected in soils or land cover!!** View-> Geoprocessing wizard -> intersect themes. Choose land cover (input) and soil layers (overlay). Save it to your home directory. It is going to take a while!!!
 3. Go to the table of the intersection theme. Xtools -> calculate area, perimeter...
 4. Xtools -> summarize multiple fields. Select Cover type and musym. Click OK Select Hectares.
 5. In this step we have summarize the land cover (cover type) and soil data (musym), and now we have a table with the total hectares of each combination of soil and land cover.
 6. We have 297 combinations. In which kind of soils does White pine- red pine forest appear more often in this region? (write it down and check with the instructor)

16. Select any soil type that intersects with the new road
 1. Select soils. Go to Theme -> select by theme. Select intersect and new road.
 2. Play with the different options of "Select by theme"