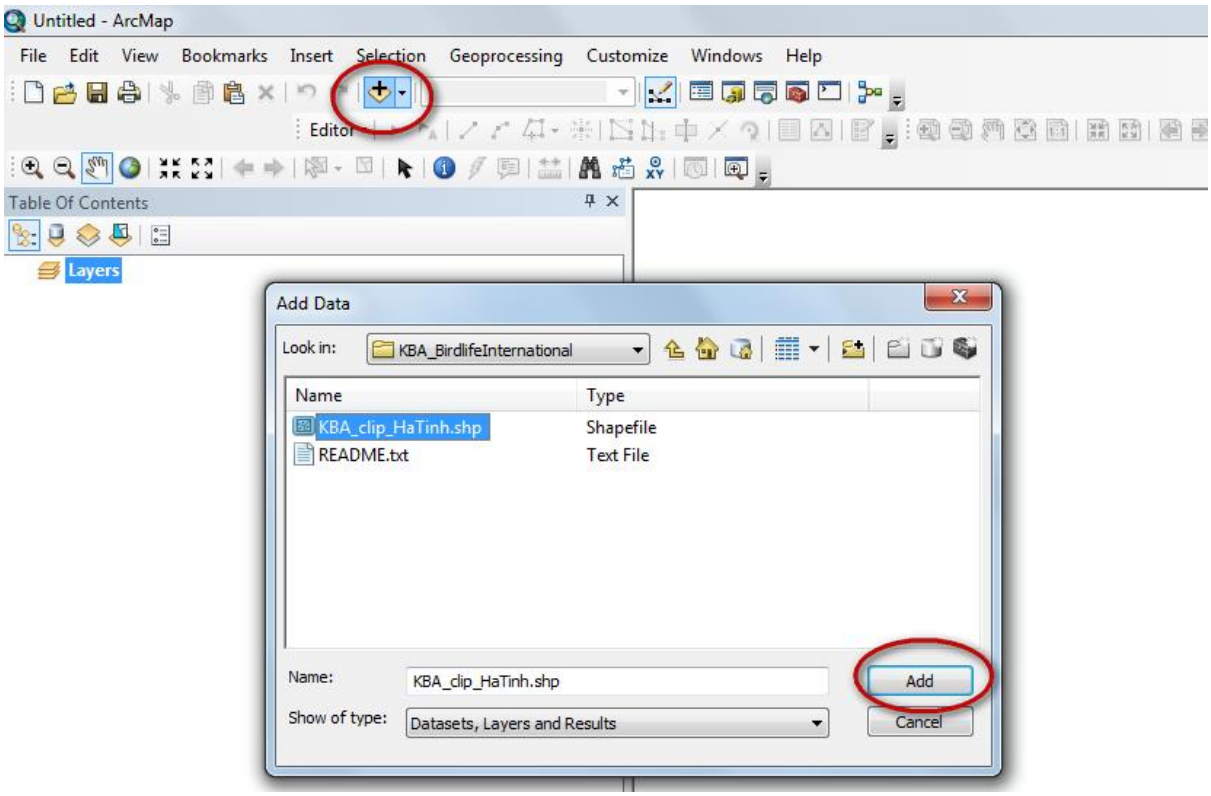
Option 2: Using Key Biodiversity Areas and protected areas datasets

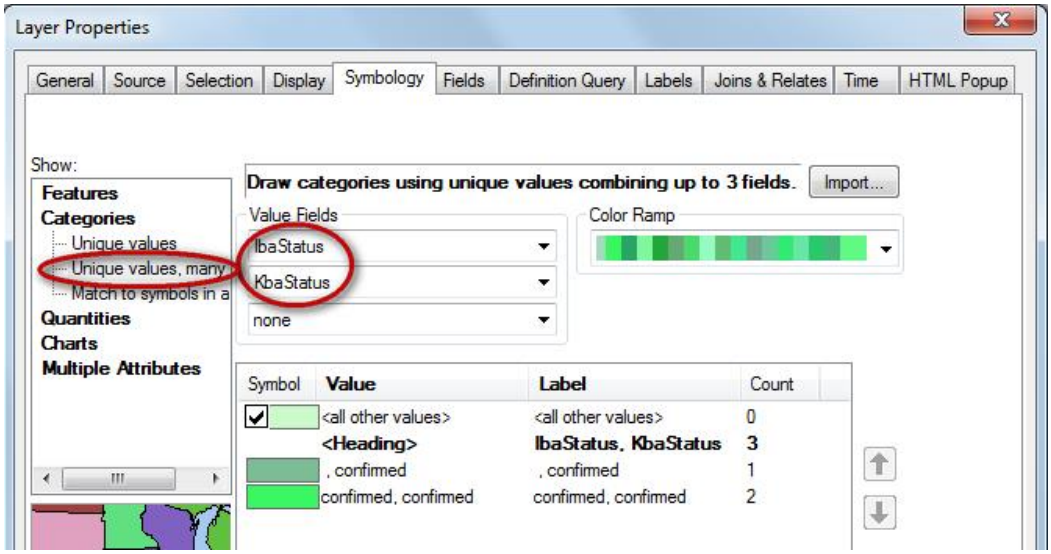
Before you start make a new folder called 'Day2' so that GIS analysis outputs can be stored here and a subfolder called 'option2_KBA'.

1) Overlay current forest cover with Key Biodiversity Areas (KBAs)

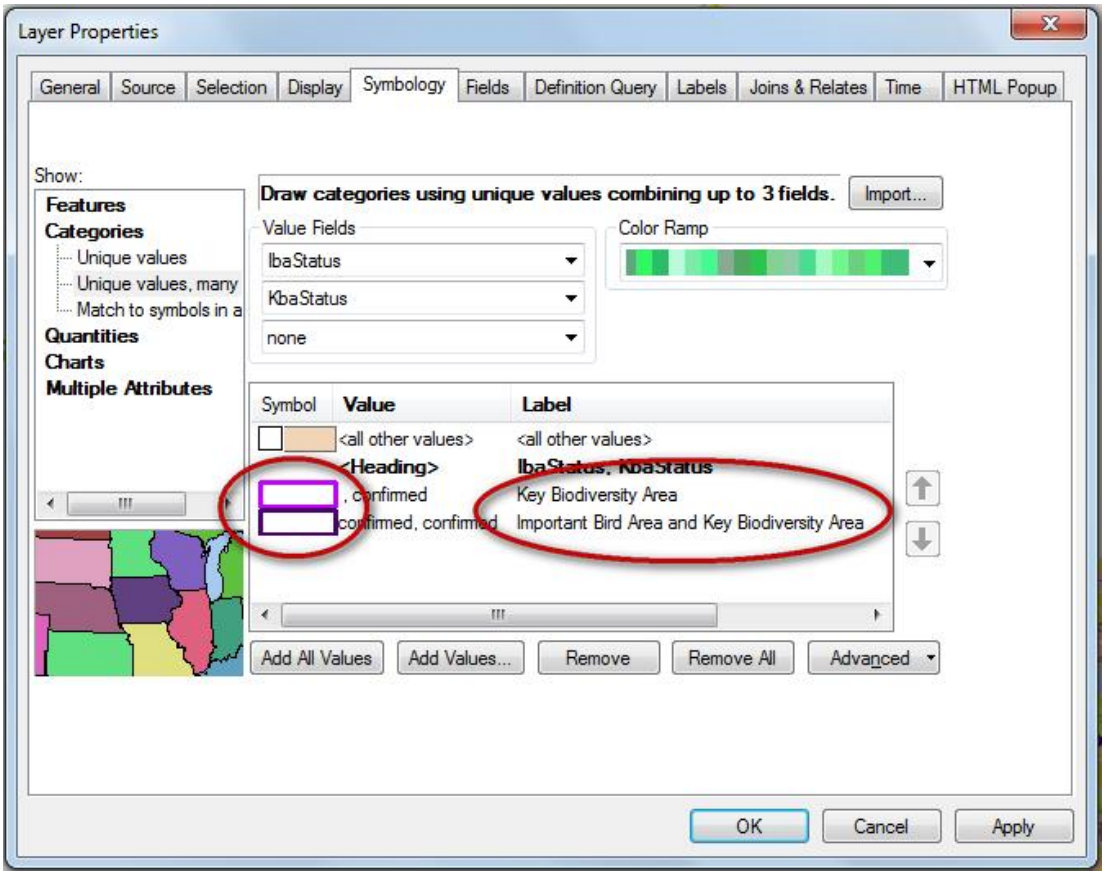
a. Add the KBA layer to ArcMap from the folder ….\HaTinh_EN\Additional_layers_utmZ48N_wgs84\KBA_BirdlifeInternational



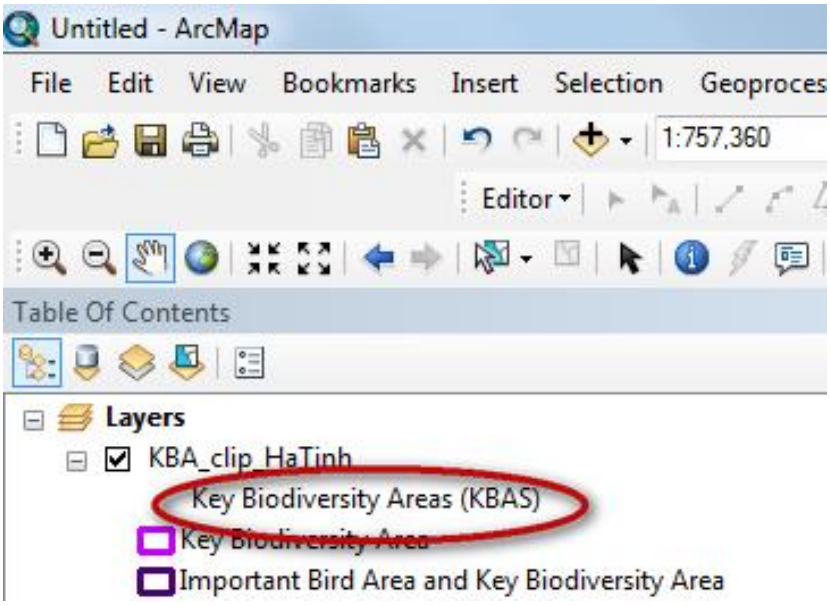
b. Display the data according to 'IBAstatus' (Important Bird Area) and 'KBAstatus' (Key Biodiversity Area)



c. Change the symbology so that the KBAs are shown with a thick outline only and change the labels in the legend.

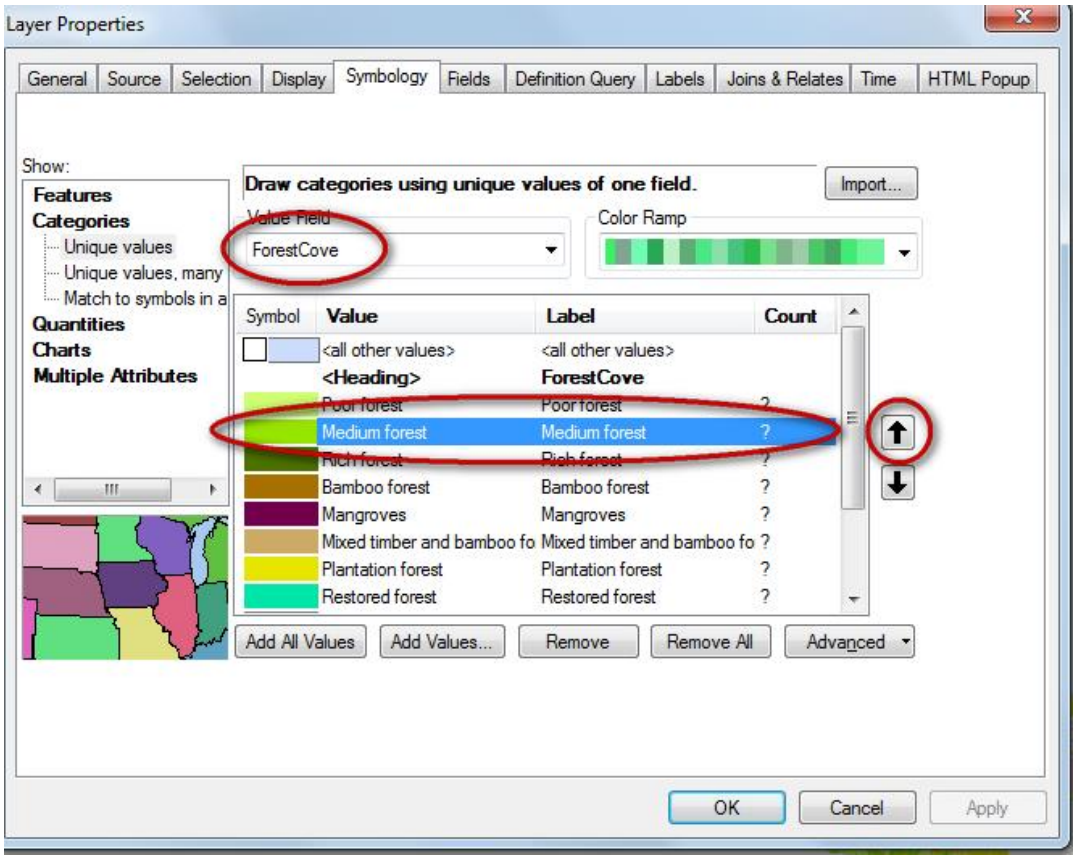


d. Change the name of the dataset in the Table of Contents

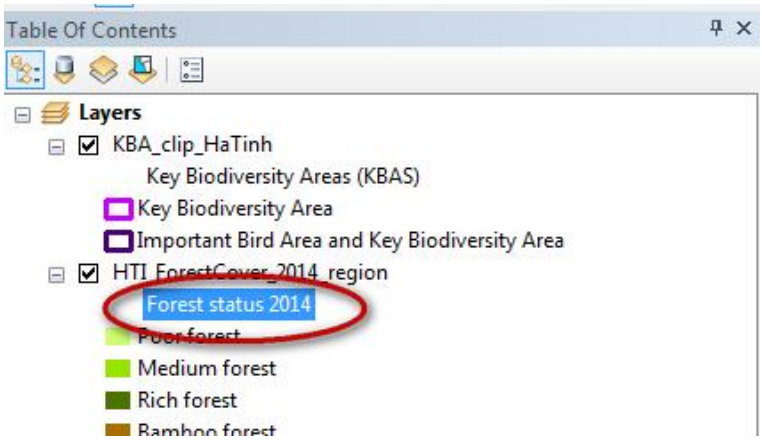


e. Add the forest status map (HTI_ForestCover_2014_region) to ArcMap from the folder …..\HaTinh_EN\Maps_ArcGIS_PRAPs_HaTinh_wgs84_EN and symbolize according to the field 'forestCove'

If you want you can click on a forest class and move it further up the legend. E.g. Move 'Poor forest', 'medium forest' and 'Rich forest' up so that they appear at the top of the map legend.



f. In the Table of Contents change 'ForestCove' to 'Forest status 2014'



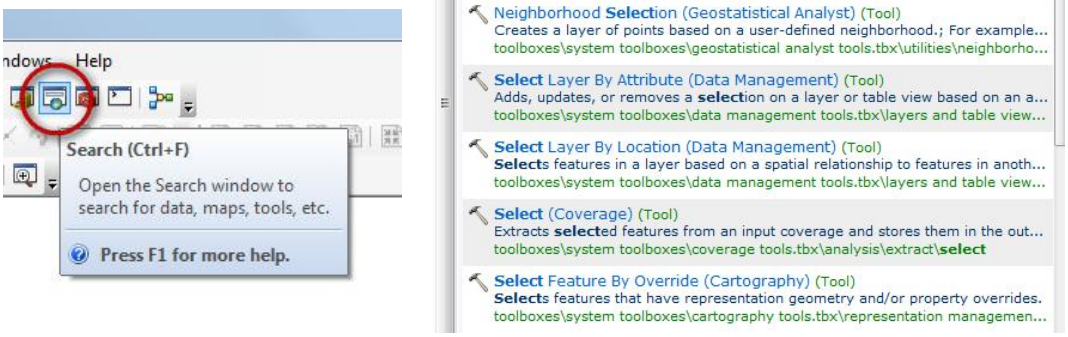
g. Add the forest status map (HTI_3TypesOfForestPlan_region) to ArcMap from the folder …..\HaTinh_EN\Maps_ArcGIS_PRAPs_HaTinh_wgs84_EN and symbolize according to the field 'Function'

h. Untick the Forest status 2014' so that it is not displaying

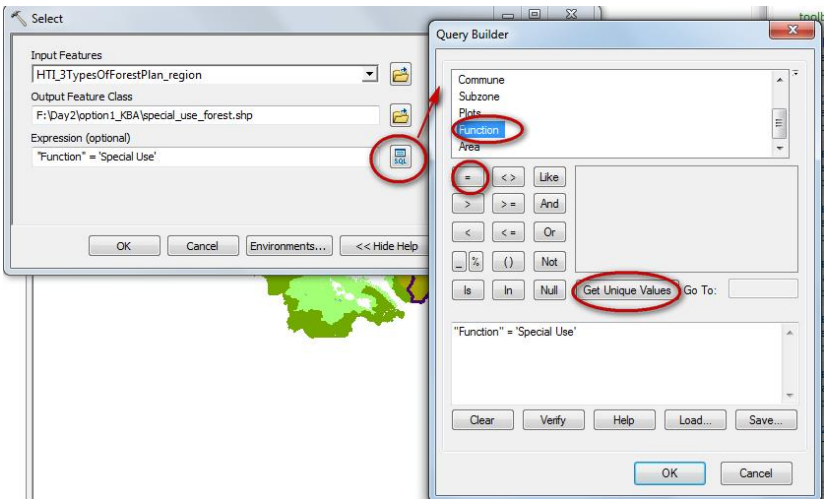
2. *Select just the special Use Forests*

Viet Nam classifies its forests into protection, production and special use forest. We will select 'Special Use Forest' as these areas are forests designated for biodiversity conservation.

a. Click on the Search button to bring up the search window. Type 'Select' to search for the tools. Then click 'Select (Analysis)'

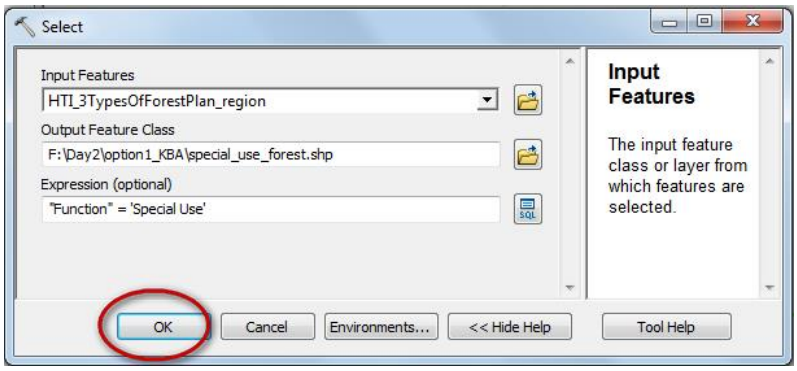


a. Click on 'Select (Analysis)' to open the tool



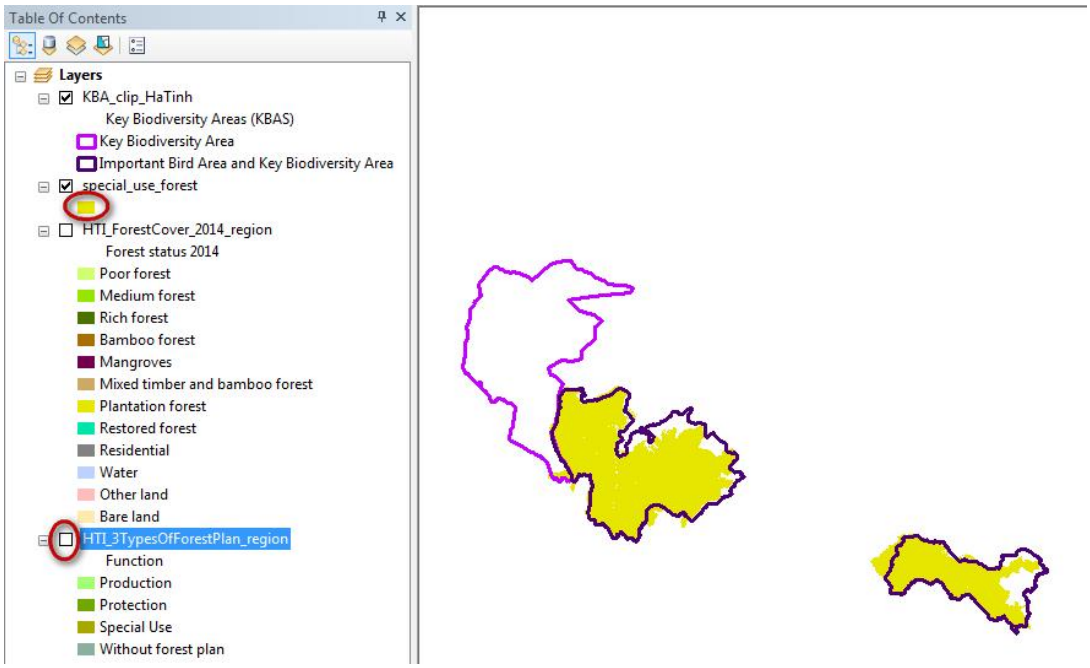
b. Drag the HTI_3TypesOfForestPlan_region dataset into the Input Features box

c. Navigate to your Day2/option2_KBA folder and give your output dataset a name e.g. special_use_forest.shp
d. Click OK to run the tool.

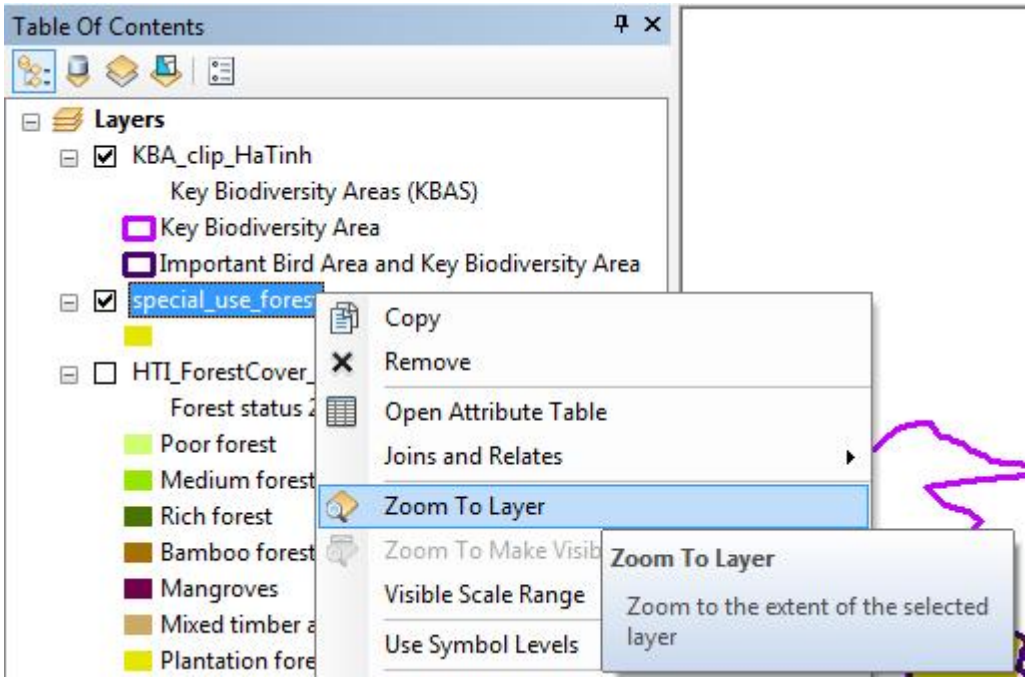


e. Click close and the new special_use_forest shapefile will be added to the Table of Contents.
f. Drag the special use forest down the Table of Contents below the KBAs and untick the HTI_3TypesOfForestPlan_region layer so that just KBAs and Special Use Forest are displaying

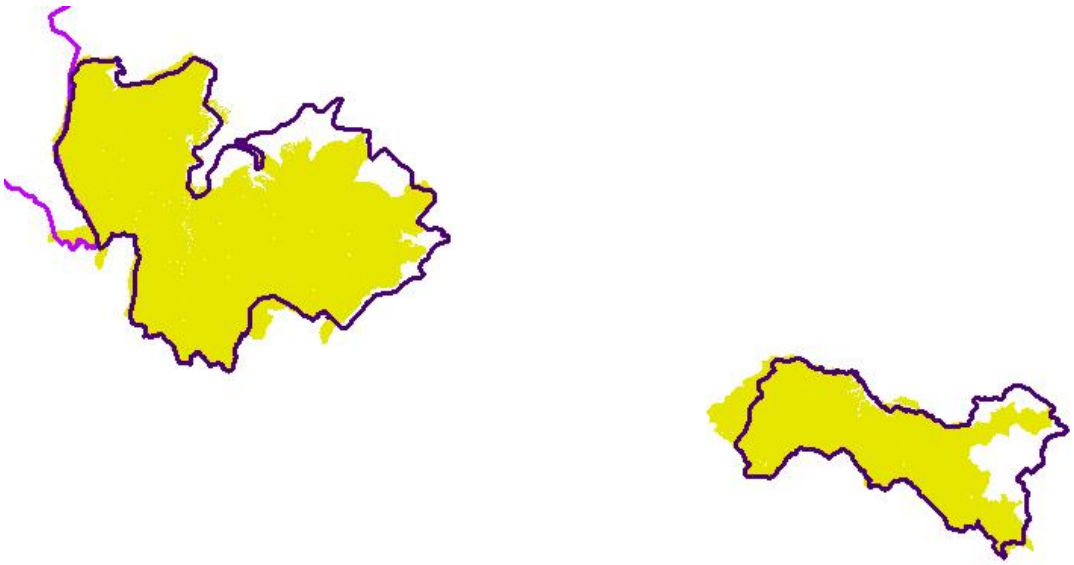
Change the symbology of the special_use_forest so that outlines are not displayed.



g. Right click on the special_use_forest layer in the table of contents and click ‘Zoom to layer’



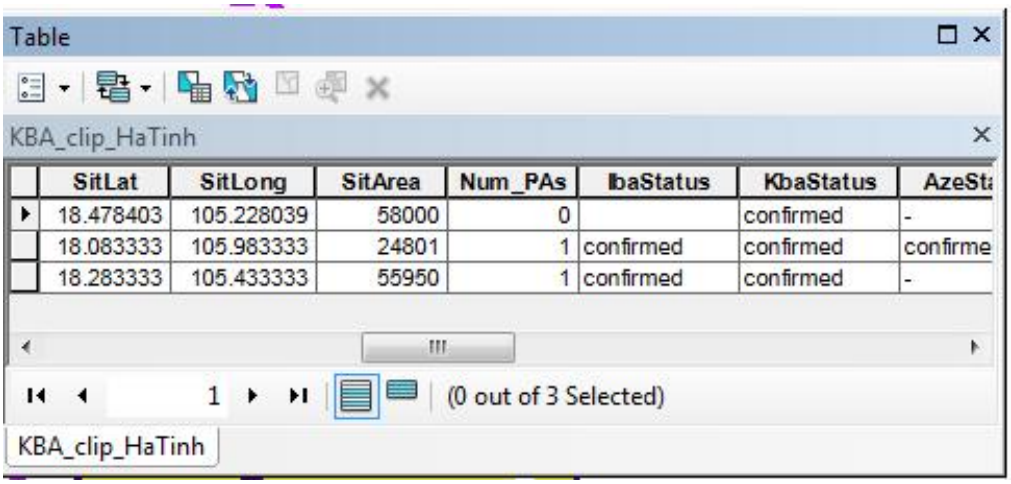
You will see that there is a larger amount in the two ‘Key Biodiversity and Import Bird Area’ sites and a small amount in the site that is just a ’Key Biodiversity Area’



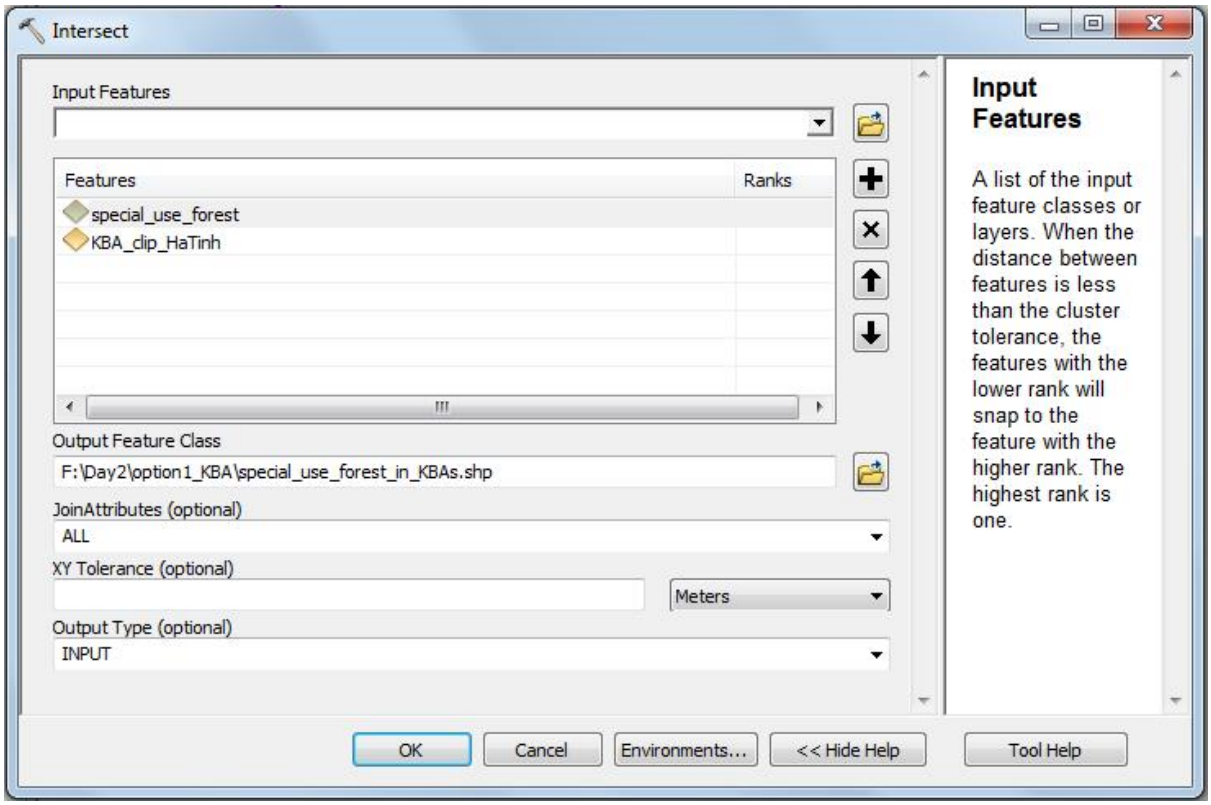
3. *Calculate the area of special use forest in each KBA*

a. Right click on the KBA dataset in the Table of contents and click 'Open Attribute Table'.

Scroll along and you will see that one of the KBA attributes is SitArea. This field contains information about the area of each KBA in hectares.

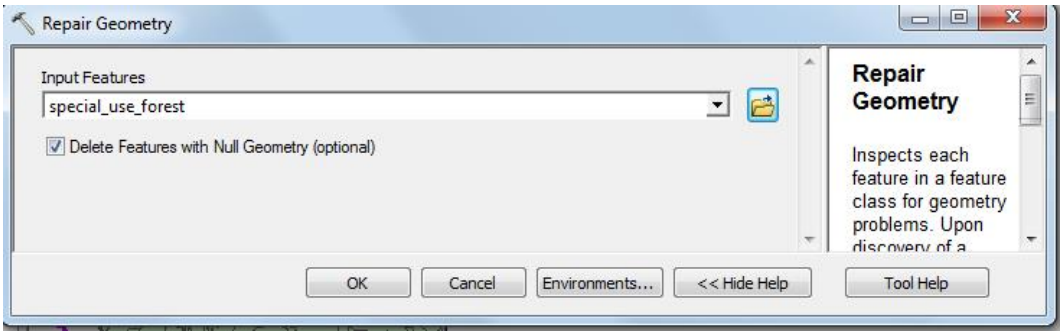


b. Next search for the 'Intersect tool'
Drag the KBAs and the special_use_forests into the Input layers box.
Save the output as 'special_use_forest_in_KBAs' in your …Day2\option1_KBA folder.

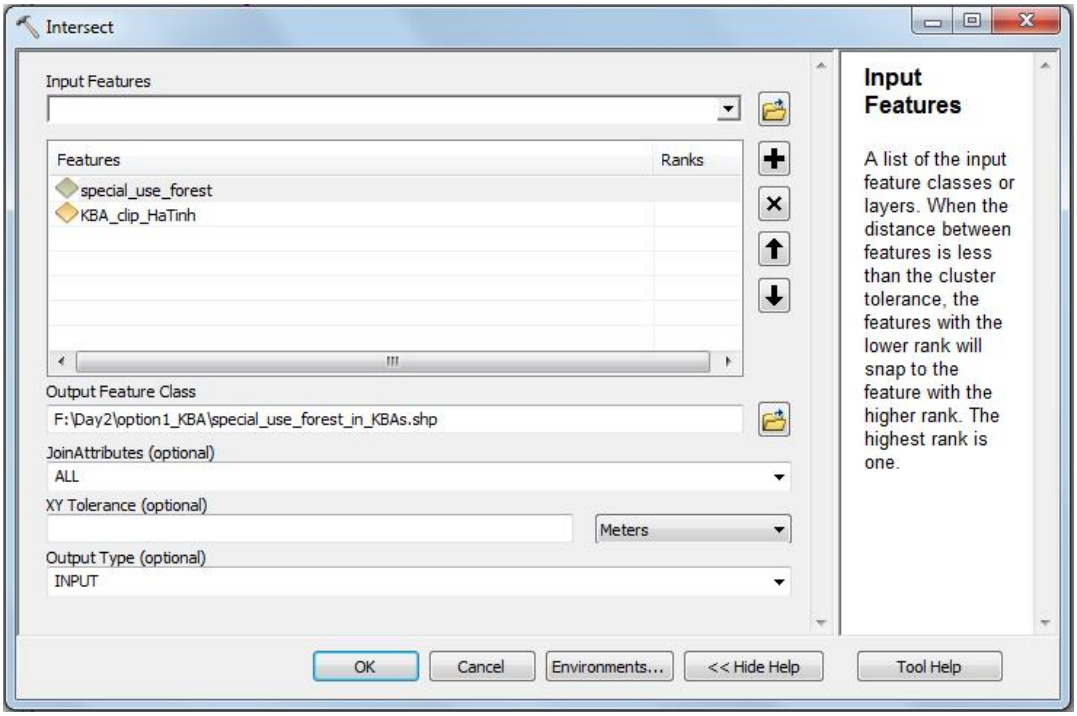


c. Click ok to run the tool

d. You will find that the tool gives you a warning that it may have generated an empty output. This is because ArcGIS is very fussy and wants to have 'clean' data. The 'special_use_forest' has some geometry errors so we need to run the 'Repair Geometry' tool to fix the errors.
e. Search for 'Repair Geometry'
f. Drag the 'special_use_forest' layer into the tool and click ok to run the tool.



g. Now try running the 'Intersect' tool again

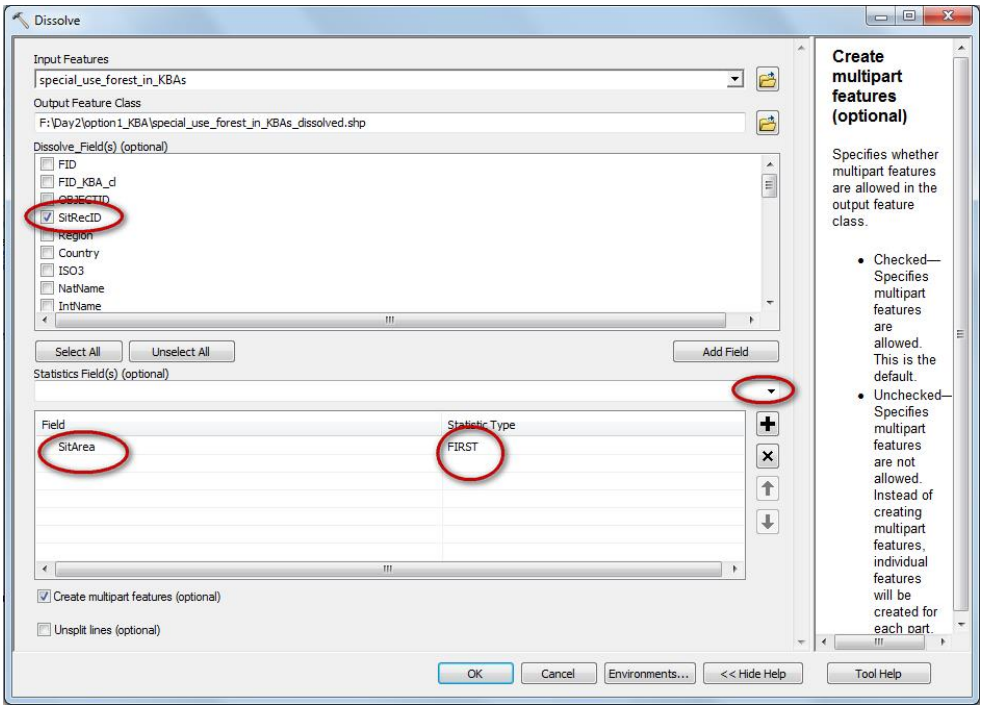


The dataset is added to ArcMap.

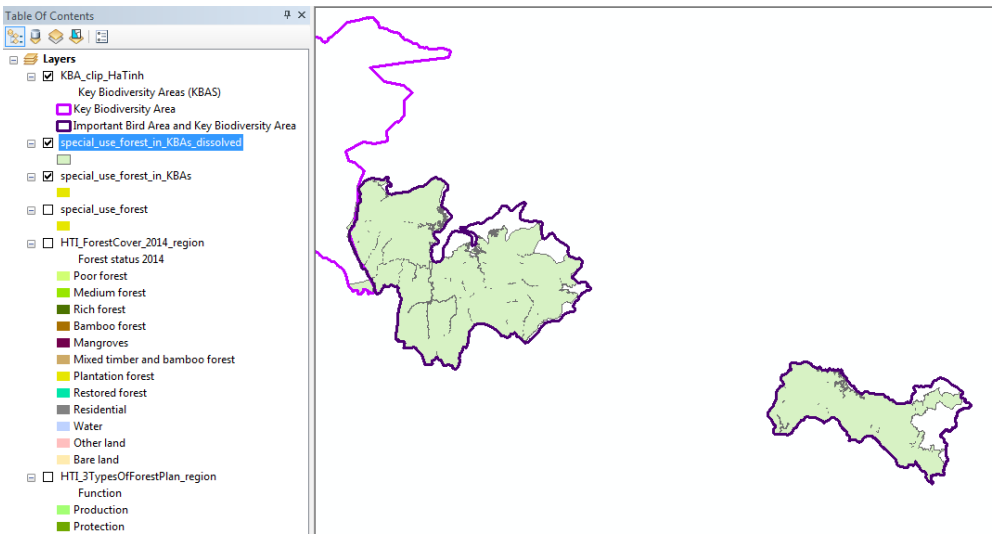
h. Right click on the new layer and open the attribute table. See that it has attributes from both the KBA dataset and the special_use_forest dataset.

The special use forest still has lots of polygons because there are lots of other information stored apart form it being special use. As we are only interested in it being a KBA and being special use forest we are going to 'Dissolve' the rest of the attributes which will remove all the internal polygon boundary lines.

i. Close the attribute table and search for the ‘Dissolve’ tool
j. Select the ‘special_use_forest_in_KBAs’ as the input file
k. Tick SitRecID in the Dissolve fields (this means that we want to keep the boundaries between individual KBAs but want to dissolve out any other internal boundary lines.
l. In the statistics field select SitArea – this contains the Area of each KBA before they were intersected with the Special Use Forest.
m. We chose statistic type FIRST in this case as each bit of special use forest inside the KBAs was given the Area of the whole KBA that it fell within.

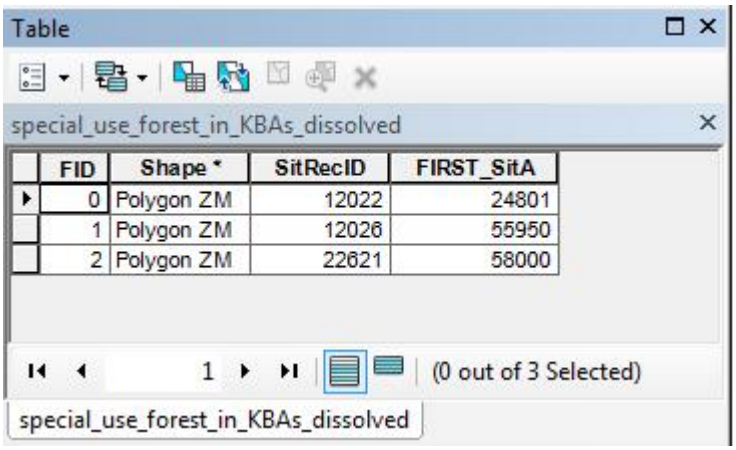


n. Click ok to run the tool.



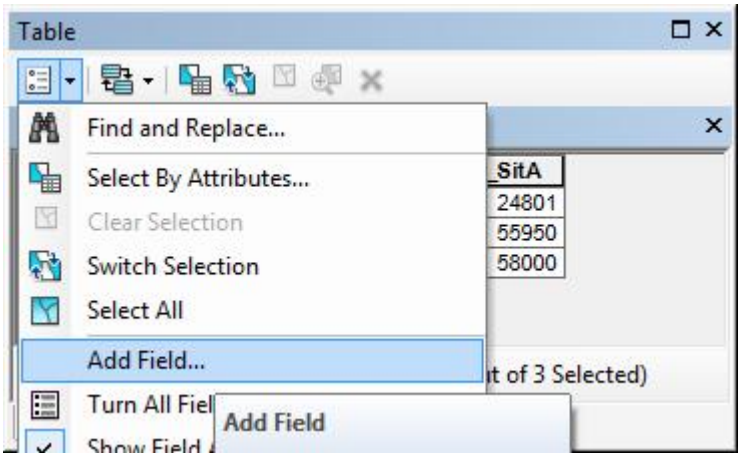
(You will notice that the dataset reveals some small ‘sliver’ errors (i.e look at the lines still inside the ‘special use forest within KBAs’. If you zoom in you can see some are supposed to be there but some are very tiny gaps which are errors). These can be fixed but we will not be fixing them in today’s session)

o. Right click on the ‘special_use_forest_in_KBAs_dissolved’ and open the attribute table.

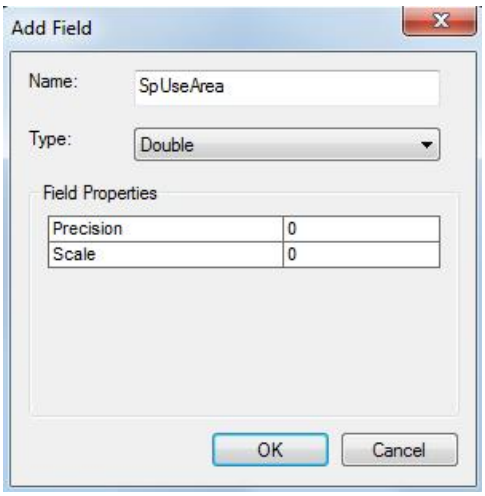


You can see that the ‘special use forest in KBAS’ now has just three polygons. The field FIRST_SitA contains the KBA SitArea.

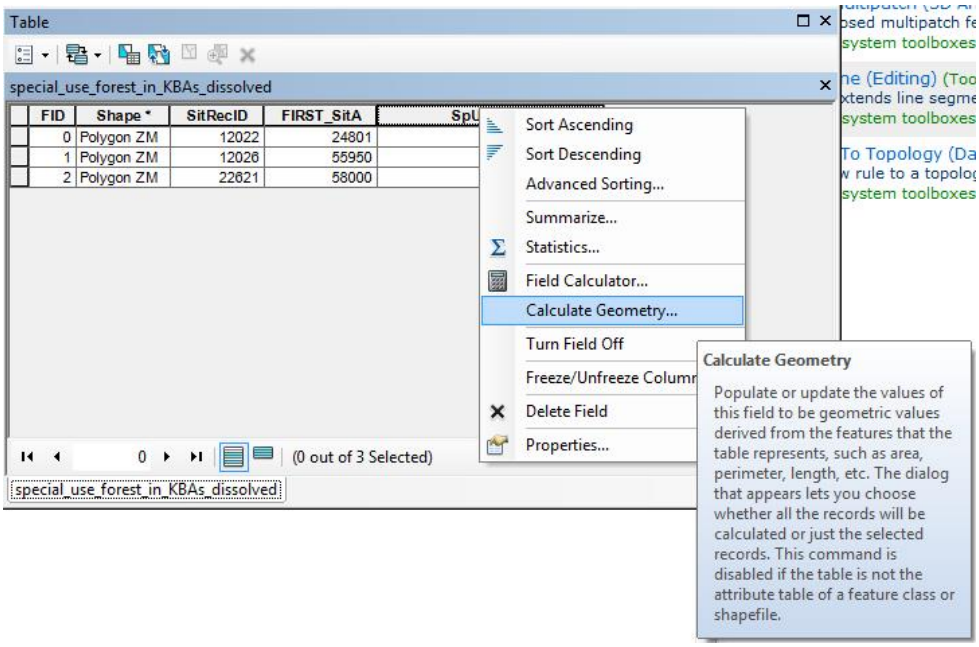
p. Now we want to add a new field and calculate the area of special use forest in each KBA. From the table dropdown menu click ‘Add field’



Add a field called SpUseArea of type double

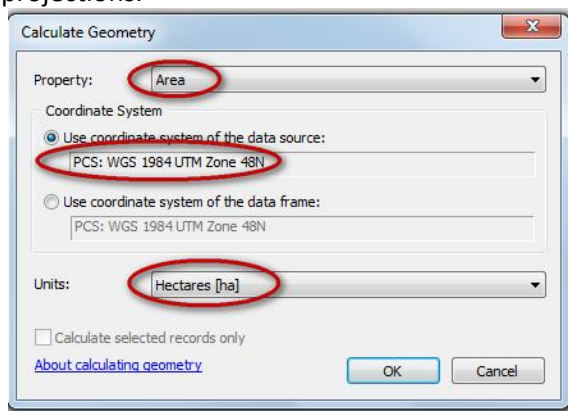


q. Rightclick on the new field and click ‘Calculate Geometry’



Click yes to the warning that pops up

r. We will Calculate area and as or map project is an equal area projection (i.e. representing areas accurately) we can calculate the area without having to change projections.

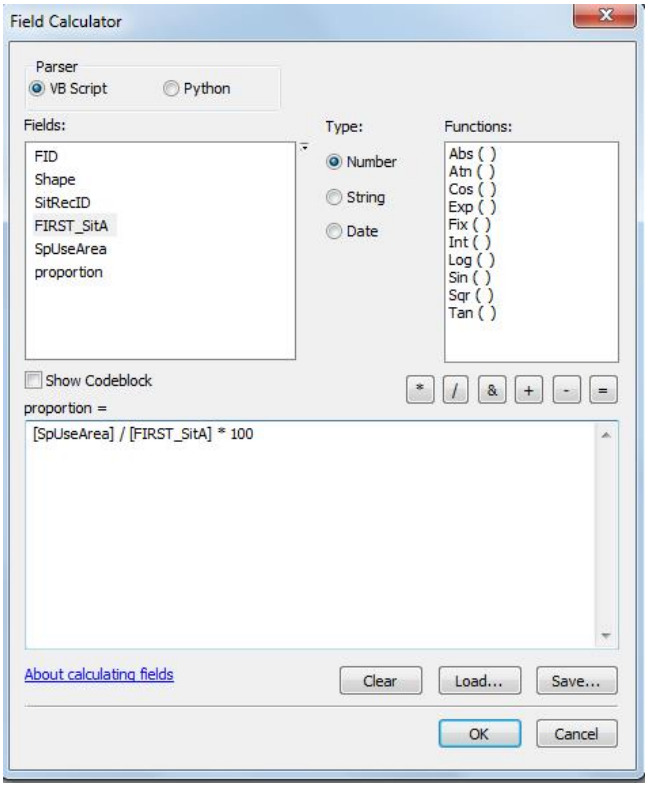


s. Chose the Units as Hectares as the KBA SitArea is in hectares.
t. Click OK and then yes to any warning.

You will see the SpUseArea field is updated and the values are lower than each KBA which is what we expected.

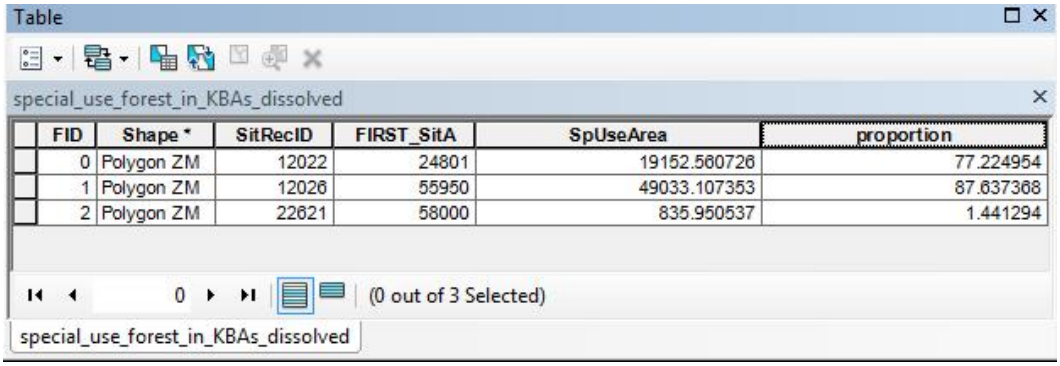
u. We can now calculate the proportion of each KBA that contains special use forest by adding a new field called proportion

v. And calculate the proportion of the KBA that is special use forest by the formula [SpUseArea] / [FIRST_SitA] * 100



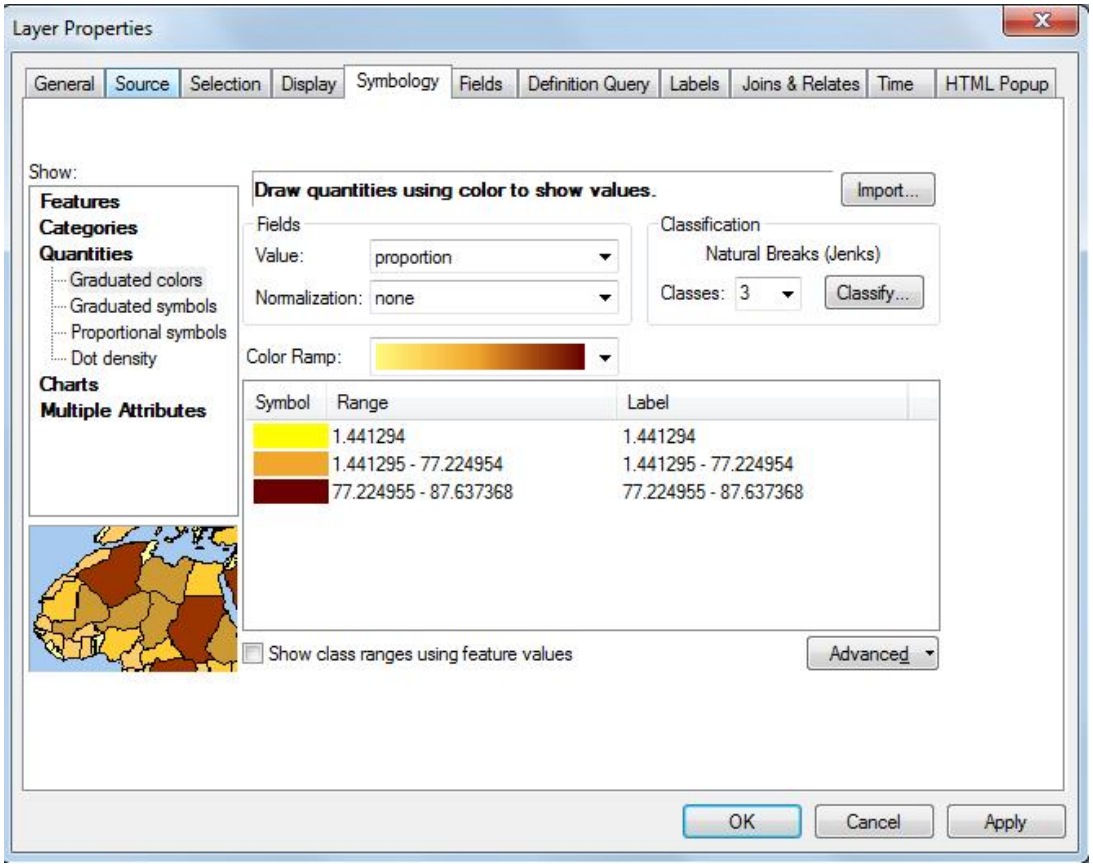
Click okay to calculate the proportion field

You can now see what proportion of each KBA are special Use forest

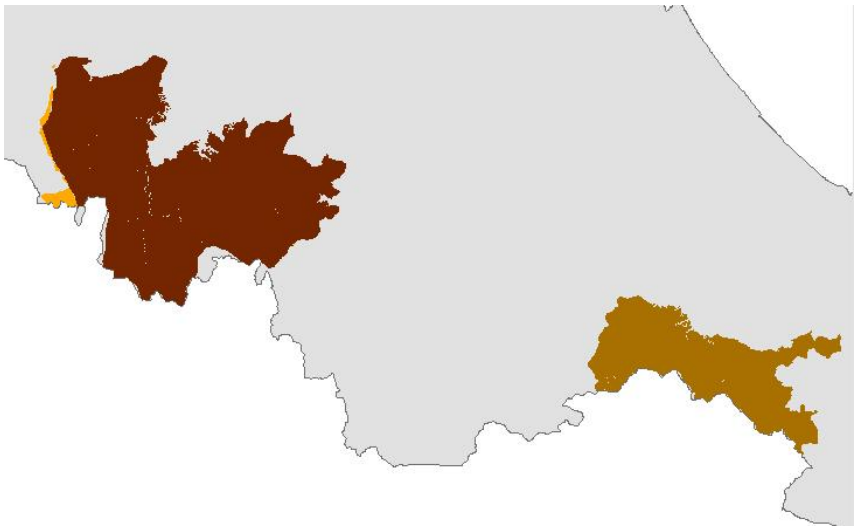


3. Shade the special use forest with KBAs according to the proportion of special use forest they contain

a. Right click on the 'special_use_forest_in_KBAs' layer and shade them by the amount of special use forest they contain in relation to the size of the KBA (e.g. proportion of special use forest)



The final special use forest in KBAs map looks like this:



4. *If you have time you may want to explore the additional questions below*

Which KBAs are not already covered by a protected area?
Which KBAs contain protection forests?
How much of the special use forest in each KBA is poor, medium and rich forest?