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

🔇 Untitled - ArcMap	
File Edit View Bookmarks In	nsert Selection Geoprocessing Customize Windows Help
10 🔒 🖬 🖨 I % 🏥 🛍 🗙 I I	n 🜔 🔁 - 🔪 - 🖃 🖾 🖾 🖾 🖉 - 🖓 -
	Edito
i 🗨 🔍 🕅 🥥 i 💥 🔀 i 🔶 🔶 i	彩 - □ ト ① / 戸 盐 A 培 朵 □ 回 _見
Table Of Contents	4 ×
🗽 🏮 🕪 📮 I 🗉	
layers	
Ad	d Data
Lo	ok in: 🔚 KBA_BirdlifeInternational 🔹 🔂 🖓 🖓 🛛 📰 🖛 🔛 😂
	Name Type
	KBA_clip_HaTinh.shp Shapefile
	README.txt Text File
N	ame: KBA_clip_HaTinh.shp Add
S	how of type: Datasets, Layers and Results Cancel

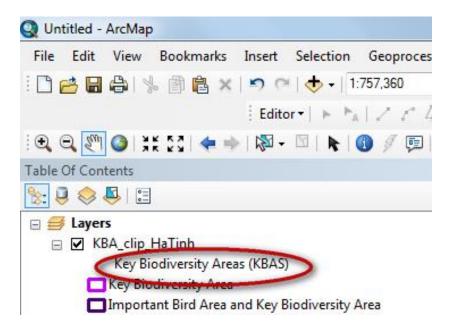
b. Display the data according to 'IBAstatus' (Important Bird Area) and 'KBAstatus' (Key Biodiversity Area)

General Source S	election Display	y Symbology	Fields Defini	ion Query Lab	oels Joins & Rela	tes Time	HTML Popup
ihow:	Draw cal	tegories using	ı unique valu	es combinina	up to 3 fields.	Import	1
Features Categories	Value Fiel	-		Color Ram		(
Unique values	IbaStatus					-	
Unique values, m	Kha Statu						
Match to symbols							
Quantities Charts	none						
Multiple Attributes		Value		abel	C 1		
	Symbol				Count	1	
		<all other="" td="" values<=""><td>> <a< td=""><td>I other values></td><td>0</td><td></td><td></td></a<></td></all>	> <a< td=""><td>I other values></td><td>0</td><td></td><td></td></a<>	I other values>	0		
				C	.		
		<heading></heading>		aStatus, Kba:	Status 3	1	

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

	Lui Di L Simbalami D. L	0.0		
General Source Se	lection Display Symbology Fields	s Definition Query	Labels Joins & Relates	Time HTML Popup
how: Features Categories Unique values	Draw categories using unio Value Fields IbaStatus	que values combir Color I		nport
- Unique values, ma	104			
Match to symbols	in a KbaStatus			
Quantities Charts	none	•		
Multiple Attributes	Symbol Value	Label		
	<pre><all other="" values=""></all></pre>	<all other="" values=""></all>		
	Heading>	Iba Status, Koas Key Biodiversity Are		
	Add All Values Add Values.	Important Bird Area	and Key Biodiversity Area	

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

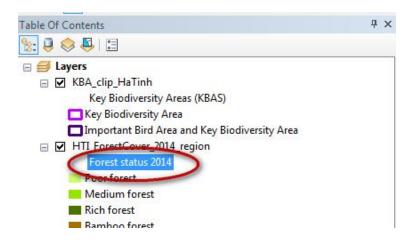


e. Add the forest status map (HTI_ForestCover_2014_region) to ArcMap from the folder\HaTinh_EN\Maps_ArcGIS_PRAPs_HaTinh_wgs84_EN and symbolize according to the field 'forestCove'

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.

eneral Source Selec ow: reatures Categories	Draw c	ategories using uniqu	Definition Query Labe		Time HTML Popup
- Unique values - Unique values, many Match to symbols in a		Value		Count 4	
Quantities Tharts Aultiple Attributes		<pre><all other="" values=""> </all></pre> <heading></heading>	<all other="" values=""></all>	COURT	1
<		Poor forest Medium forest	Poor forest Medium forest		\bigcirc
		Rich forest Bamboo forest Mangroves Mixed timber and bamb Plantation forest Restored forest	Rich forset Bamboo forest Mangroves oo fo Mixed timber and ba Plantation forest Restored forest	? ? amboo fo ? ?	J
	Add All \	= /alues Add Values	Remove Rer	move All Adva <u>n</u>	ced •

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

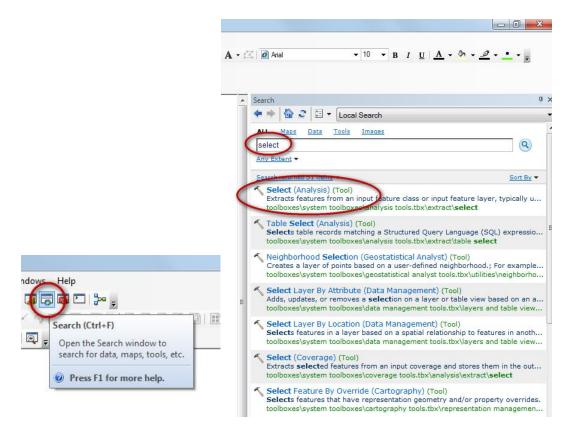


- g. Add the forest status map (HTI_3TypesOfForestPlan_region) to ArcMap from the folder\HaTinh_EN\Maps_ArcGIS_PRAPs_HaTinh_wgs84_EN and symbolize according to the field 'Function'
- h. Untick the Forest status 2014' so that it is not displaying

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



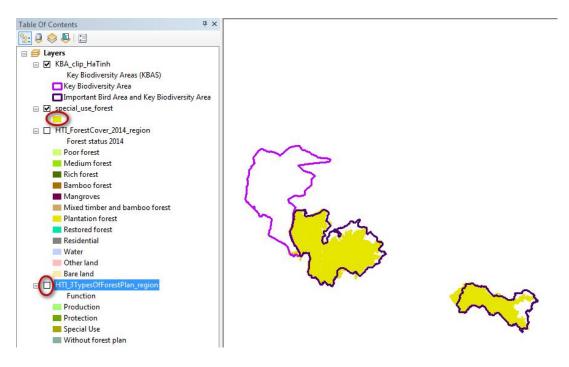
b. Drag the HTI_3TypesOfForestPlan_region dataset into the Input Features box

- 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.

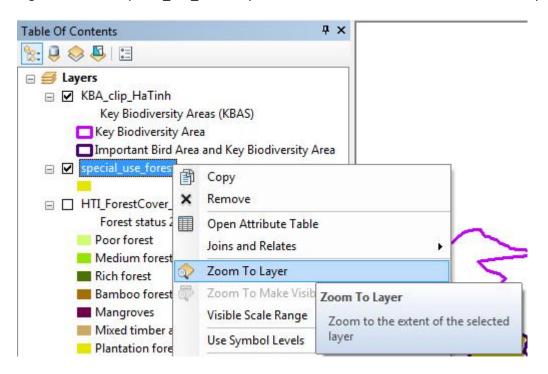
Input Features	Input
HTI_3TypesOfForestPlan_region 🗾 🖆	Features
Dutput Feature Class F:\Day2\option1_KBA\special_use_forest.shp	The input feature class or layer from
Expression (optional)	which features are
"Function" = 'Special Use'	selected.

- 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

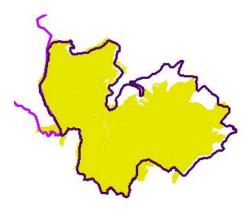
Change the symbology of the special_use_forest so that outlines are not displayed.



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.

Tal	ole						Π×
0	· 뭡·	F 🔂 🖸 e	⑲× 『				
KB.	A_clip_HaTir	h					×
	SitLat	SitLong	SitArea	Num_PAs	baStatus	KbaStatus	AzeSta
F	18.478403	105.228039	58000	0		confirmed	-
	18.083333	105.983333	24801	1	confirmed	confirmed	confirme
	18.283333	105.433333	55950	1	confirmed	confirmed	-
۲ ۱۰ KE	I IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	1 ► ►		(0 out of 3 S	elected)		4

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.

nput Features				Input
			- 🖻	Features
Features		Ranks		A list of the input
special_use_forest				feature classes or
KBA_clip_HaTinh			×	layers. When the
				features is less
				than the cluster
			►	tolerance, the
				features with the lower rank will
•	III		F	snap to the
Output Feature Class				feature with the
F:\Day2\option1_KBA\special_use_fores	t_in_KBAs.shp			higher rank. The
oinAttributes (optional)				highest rank is
ALL			•	one.
(Y Tolerance (optional)				
		Meters	•	
Output Type (optional)				
INPUT			-	

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.

nput Features				^	Repair
special_use_forest			I 🔁		Geometry
☑ Delete Features with Null Ge	eometry (optional)			Ŧ	Inspects each feature in a feature class for geometry problems. Upon discovery of a

g. Now try running the 'Intersect' tool again

input Features				Input
		•		Features
Features		Ranks	+	A list of the input
special_use_forest				feature classes or
KBA_dip_HaTinh			×	layers. When the distance between
			1	features is less
			_	than the cluster
		_	Ŧ	tolerance, the
		-		features with the
<[•		lower rank will
Dutput Feature Class				snap to the feature with the
F:\Day2\option1_KBA\special_use_forest_in_KBAs.shp				higher rank. The
JoinAttributes (optional)				highest rank is
ALL			-	one.
(Y Tolerance (optional)				
	Met	ers	•	
Dutput Type (optional)	- Contract		1	
INPUT			•	
			1000	
			×.	

The dataset is added to ArcMap.

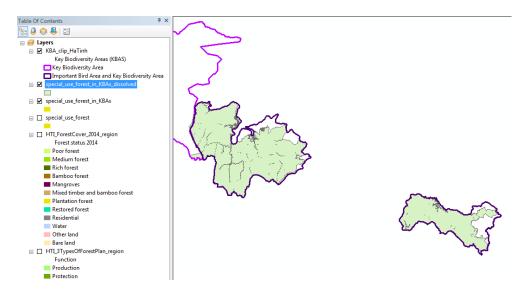
h. Right click on the new layer and open the attribute table. See that it has attributes from both the KBA dataset and the special_use_forest dataset.

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.
- I. 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.

🔨 Dissolve		
Input Features		Create multipart
special_use_forest_in_KBAs	I 🔁	features
Output Feature Class		(optional)
F:\Day2\option1_KBA\special_use_forest_in_KBAs_dissolved.shp		(opuonal)
Dissolve_Field(s) (optional)		Specifies whether
FID	<u>^</u>	multipart features
FID_KBA_d		are allowed in the
V SitectD Region		output feature class.
Country		
ISO3		Checked— Specifies
NatName		multipart
IntName	-	features
·	•	are
Select All Unselect All	Add Field	allowed.
Statistics Field(s) (optional)	, ida nete	This is the default
stausues neu(s) (optional)	\bigcirc	 Unchecked—
	\smile	Onchecked Specifies
Field	Statistic Type	multipart
SitArea	FIRST	features
	riksi 🗙	are not
	†	allowed.
		Instead of
	↓	creating multipart
		features.
۲. III III III III III III III III III I		individual
		features
Create multipart features (optional)		will be
		created for each part.
Unsplit lines (optional)	*	each bart.
	OK Cancel Environments << Hide Help	Tool Help

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.

pe	ecial_u	se_forest_in_K	BAs_dissolved	I	>
٦	FID	Shape *	SitRecID	FIRST_SitA	
•	0	Polygon ZM	12022	24801	
	1	Polygon ZM	12026	55950	
	2	Polygon ZM	22621	58000	
1	2			58000	

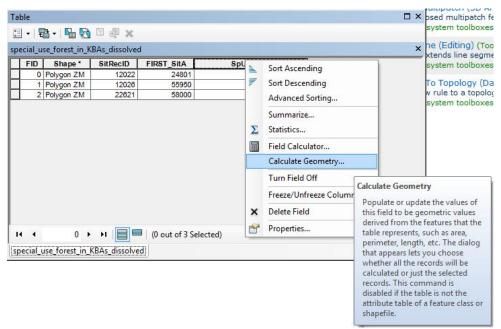
You can see that the 'special use forest in KBAS' now has just three polygons. The field FIRST_SitA contains the KBA SitArea.

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'

Table	1	□ ×
•	• 🔁 • 🏪 👧 🖄 🐗 🗙	
M	Find and Replace	×
L	Select By Attributes	SitA
Y	Clear Selection	24801
5	Switch Selection	58000
	Select All	
	Add Field	it of 3 Selected)
:	Turn All Fiel Add Field	
	Show 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

 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.

Calculate Geometry	×
Property: Area	•
Coordinate System	
Use coordinate system of the data s	source:
PCS: WGS 1984 UTM Zone 48N	
O Use coordinate system of the data	frame:
PCS: WGS 1984 UTM Zone 48N	
Units: Hectares [ha]	•
Calculate selected records only	
About calculating geometry	OK Cancel

- 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

VB Script Python		
ields: FID Shape SitRecID FIRST_SItA SpUseArea proportion	Type: © Number © String © Date	Functions: Abs () Atn () Cos () Exp () Fix () Int () Log () Sin () Sqr () Tan ()
] Show Codeblock roportion = [SpUseArea] / [FIRST_SitA] * 100		

Click okay to calculate the proportion field

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

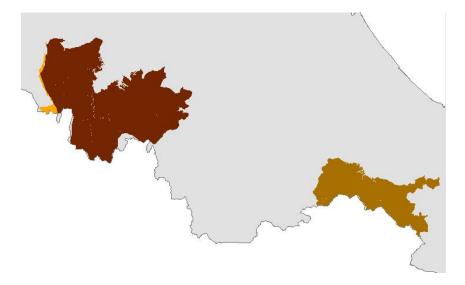
FID	se_forest_in_K	SitRecID	FIRST SitA	SpUseArea	proportion
	Polygon ZM	12022	24801	19152,560726	77,224954
	Polygon ZM	12022	55950	49033.107353	87.637368
	Polygon ZM	22621	58000	835.950537	1.441294

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)

eneral Source Select	tion Displa	ay S	ymbology	Fields	Definition Qu	Jery	Labels	Joins & R	elates	Time	HTML Popup
Show: Features Categories Quantities — Graduated colors — Graduated symbols — Proportional symbols — Dot density Charts				•	Classification Natural Breaks (Jenks)]	
	Color Ramp:									1033il y	
Aultiple Attributes	Symbol Range 1.441294 1.441295 - 77.224954 77.224955 - 87.637368 77.224955 - 87.637368				Label 1.441294 1.441295 - 77.224954 77.224955 - 87.637368						
	Show c	lass n	anges usin	ig feature	values			(Adva	nce <u>d</u> `	

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?