

Exercise Four: Creating A Polygon Grid Data Layer Of Abundance Per Unit Effort From Survey Data

At the end of this step, remove the data layer called POLYGON_GRID_NORTH_SEA_SURVEY_EFFORT by right-clicking on its name in the TABLE OF CONTENTS window and selecting REMOVE.

Finally, open the ATTRIBUTE TABLE window for the data layer POLYGON_GRID_NORTH_SEA_WITH_SIGHTINGS by right-clicking on its name in the TABLE OF CONTENTS window and selecting OPEN ATTRIBUTE TABLE. The attribute table should look like this:

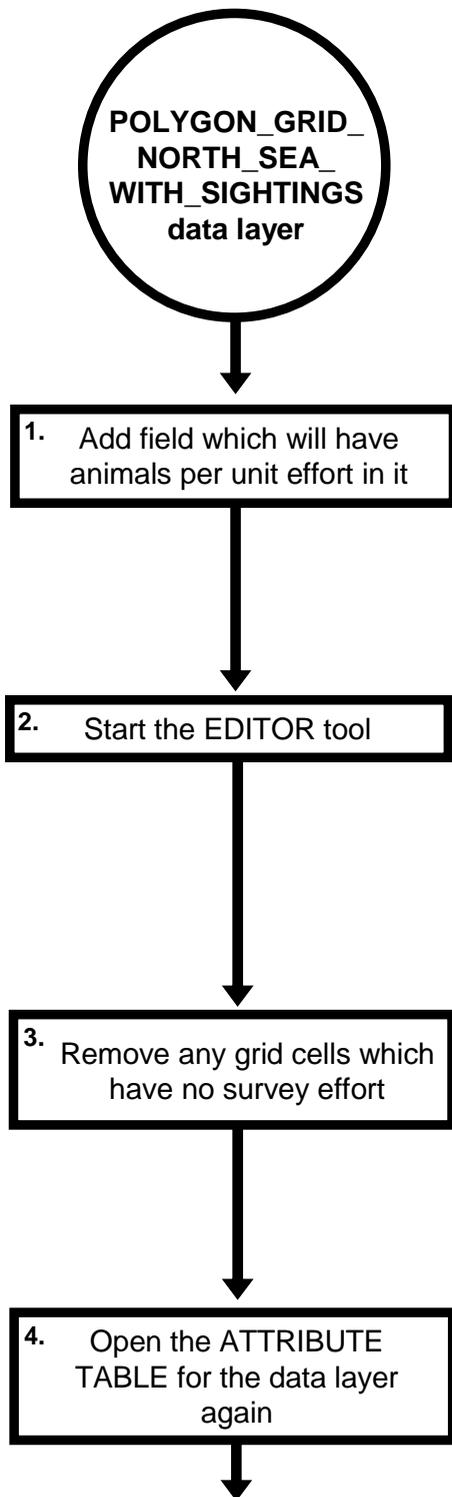
FID	Shape	Join_Count	FID_polygo	CELL_ID_NO	Length	Number
0	Polygon	618	12	13	2430074	0
1	Polygon	6	13	14	29349	0
2	Polygon	9	29	30	26096	0
3	Polygon	764	30	31	2875676	0
4	Polygon	2	31	32	11214	0
5	Polygon	86	47	48	273311	0
6	Polygon	754	48	49	2794238	25
7	Polygon	3	63	64	7010	0
8	Polygon	15	64	65	48780	0
9	Polygon	446	65	66	1363661	0
10	Polygon	581	66	67	1882815	0
11	Polygon	9	80	81	31873	0
12	Polygon	11	81	82	38642	0
13	Polygon	11	82	83	29965	0
14	Polygon	630	83	84	2129528	0
15	Polygon	157	84	85	496452	0
16	Polygon	3	96	97	11606	0
17	Polygon	4	97	98	12556	0
18	Polygon	13	98	99	43490	0
19	Polygon	9	99	100	37255	0
20	Polygon	2	100	101	4505	0

Now close the attribute table.

STEP 9: CALCULATE THE ABUNDANCE PER UNIT EFFORT IN EACH GRID CELL:

You now have all the information in the attribute table of the polygon grid data layer which you would need to calculate the abundance of bottlenose dolphins per kilometre of survey effort in each grid cell. This will be calculated by adding a new field and using the FIELD CALCULATOR tool to divide the number of bottlenose dolphins recorded in each grid cell by the amount of survey effort.

These instructions are based on instruction sets called *How to add a new field to an attribute table*, *How to use the field calculator tool to fill in values in a new field* and *How to change the display symbols for a data layer* from pages 190, 197 and 122 in *An Introduction To Using GIS In Marine Biology*.



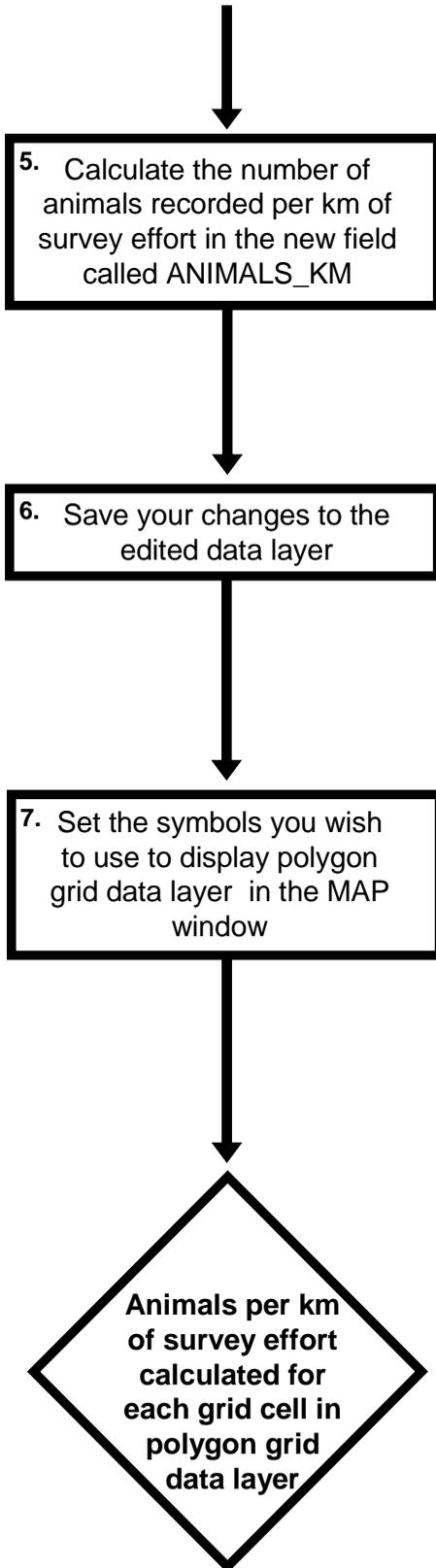
Right click on the name POLYGON_GRID_NORTH_SEA_WITH_SIGHTINGS in the TABLE OF CONTENTS window, and select OPEN ATTRIBUTE TABLE. Click on the OPTIONS button at the bottom right hand corner of the ATTRIBUTE TABLE window and select ADD FIELD. Name the field 'Animals_Km' and select DOUBLE for the type. Type in 16 for PRECISION and 6 for the scale. Click OK. Now close the ATTRIBUTE TABLE window.

In the EDITOR toolbar, click on the EDITOR button and select START EDITING. If the START EDITING window, for SOURCE select C:\GIS_EXERCISES\ and click OK. If another window appears, select POLYGON_GRID_NORTH_SEA_WITH_SIGHTINGS and click on START EDITING. If the START EDITING window does not appear, this is OK and you can just carry on.

You now want to remove any grid cells from the data layer which have no survey effort in them. To do this, go to SELECTION on the main menu bar and select SELECT BY ATTRIBUTE. In the SELECT BY ATTRIBUTE window, select POLYGON_GRID_NORTH_SEA_WITH_SIGHTINGS for LAYER and CREATE A NEW SELECTION for METHOD. Double click on the field name LENGTH to add it to the lower window. Now click on the equals (=) sign to add it to the lower window before typing in a space followed by the number zero (0). This will result in the expression "LENGTH" = 0 appearing in the lower window. Now click OK. Next, click on EDIT on the main menu bar and select DELETE.

Right click on POLYGON_GRID_NORTH_SEA_WITH_SIGHTINGS in the TABLE OF CONTENTS window and select OPEN ATTRIBUTE TABLE.

Exercise Four: Creating A Polygon Grid Data Layer Of Abundance Per Unit Effort From Survey Data



In the ATTRIBUTE TABLE window and right click on the field ANIMALS_KM and select FIELD CALCULATOR. This will open the FIELD CALCULATOR window. In the lower part of this window enter the expression: [NUMBER] / ([LENGTH] / 1000). The expression needs to be entered exactly like this (spaces and all). Now click OK. **NOTE:** The '/ 1000' term is included to convert the survey effort data from metres to kilometres. This is only included if your survey track distances were measured in metres when you calculated them using the CALCULATE GEOMETRY tool

Once you have finished calculating the number of animals per km of survey effort, you need to save the edits to your data layer. To do this, first close the attribute table. Next, on the EDITOR toolbar, click on EDITOR and select SAVE EDITS. Next, in the EDITOR toolbar, click on the EDITOR button and select STOP EDITING.

Right click on the name of your polygon grid data layer (POLYGON_GRID_NORTH_SEA_WITH_SIGHTINGS) in the TABLE OF CONTENTS window and select PROPERTIES. Next, click on the SYMBOLOGY tab of the LAYER PROPERTIES window. In the left hand portion of the LAYER PROPERTIES window, select QUANTITIES> GRADUATED COLOURS. Beside VALUE select ANIMALS_KM. Under RANGE, click on the top line and type in 0, click on the next line and type in 0.001. Type in 0.005 for the next, 0.01 for the next and 1.00 for the last one. Finally, click OK to close the LAYER PROPERTIES window.

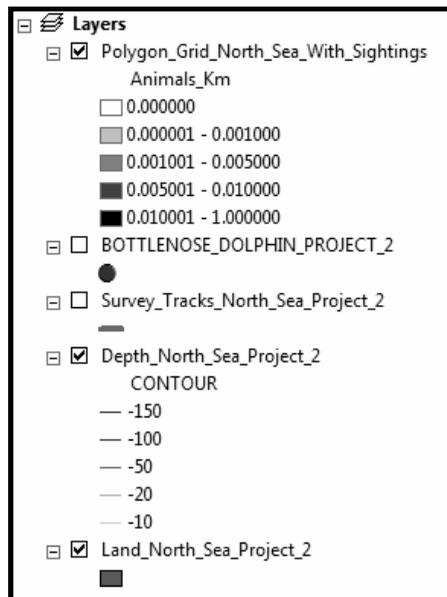
Exercise Four: Creating A Polygon Grid Data Layer Of Abundance Per Unit Effort From Survey Data

Once you have calculated the recorded abundance of bottlenose dolphin per kilometre of survey effort per grid cell, you need to turn off all the other data layers with the exception of LAND_NORTH_SEA, POLYGON_GRID_NORTH_SEA_WITH_SIGHTINGS and DEPTH_NORTH_SEA.

The ATTRIBUTE TABLE for POLYGON_GRID_NORTH_SEA_WITH_SIGHTINGS should now look like this

FID	Shape	Join_Count	FID_polygo	CELL_ID_NO	Length	Number	Animals_Km
0	Polygon	618	12	13	2430074	0	0
1	Polygon	6	13	14	29349	0	0
2	Polygon	9	29	30	26096	0	0
3	Polygon	764	30	31	2875676	0	0
4	Polygon	2	31	32	11214	0	0
5	Polygon	86	47	48	273311	0	0
6	Polygon	754	48	49	2794238	25	0.008947
7	Polygon	3	63	64	7010	0	0
8	Polygon	15	64	65	48780	0	0
9	Polygon	446	65	66	1363661	0	0
10	Polygon	581	66	67	1882815	0	0
11	Polygon	9	80	81	31873	0	0
12	Polygon	11	81	82	38642	0	0
13	Polygon	11	82	83	29965	0	0
14	Polygon	630	83	84	2129528	0	0
15	Polygon	157	84	85	496452	0	0
16	Polygon	3	96	97	11606	0	0
17	Polygon	4	97	98	12556	0	0
18	Polygon	13	98	99	43490	0	0
19	Polygon	9	99	100	37255	0	0
20	Polygon	2	100	101	4505	0	0

Your TABLE OF CONTENTS window should now look like this:



Exercise Four: Creating A Polygon Grid Data Layer Of Abundance Per Unit Effort From Survey Data

And the contents of your MAP window should look like this:

