



VISUALISING DATA IN ARCMAP

Displaying Vector and Raster Data



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VIZUALISING DATA WITH ARCMAP

Visualizing data is very important in reviewing, differentiating, and understanding of the data and data attributes. A well visualized data-view will ultimately lead to a well-designed map that depicts the intended purpose for the map.

Data is visualized based on the data format/type and the data properties. In ARCMAP data comes in two types, that is the Vector data type and the Raster data type. The difference between Vector and raster data is that, Raster data is displayed in pixel form while vector data is represented in paths and rows. Raster data usually come in the form of images, while vector data is represented with points, lines or polygons.

The table below shows some of the common vector and raster data formats.

Vector Data Format	Raster Data Format
Shapefile [Shp]	Tagged Image File Format [TIFF]
GPS Exchange Format [gpx]	Joint Photographic Experts Group [JPEG]
Keyhole Markup Language [KML/KMZ]	Erdas Imagine [IMG]
MS Formats [Access, CSV, xls]	Portable Network Graphic [PNG]
	Graphic Interchange Format [GIF]

Before you can display your data in ArcMap, you need to connect your data folder to your Arc Catalog.

Adding Data to Data View

To add data to the data view (work space), you first of all have to connect your data folder to the ArcCatalog. The catalog is a list of connected data source.

There are different ways to connect your catalog to your data sources:

Procedure I	Procedure II
1. Go to Catalog	1. Go to Add Data on the Standard Tool bar
2. Connect to Folder in the Catalog This will open a connect to folder dialog box	2. Connect to Folder in the Catalog This will open a connect to folder dialog box
3. Browse to the folder containing your GIS data	3. Browse to the folder containing your GIS data
4. Click on ok	4. Click on ok

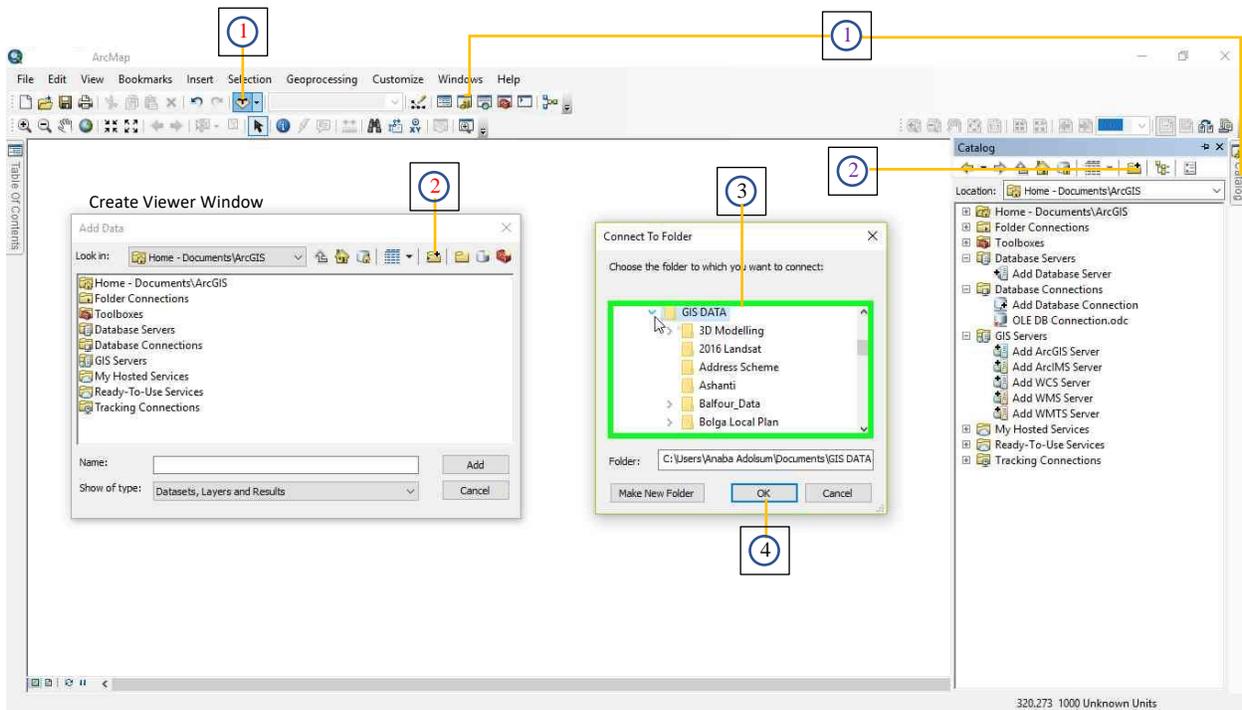


Image 1: Adding Data to the Data View

After connecting the catalog to the data source(s), go to:

1. Catalog
2. Folder Connections
3. Your Data Folder/File. then
4. Drag and place the data you want to open in the data view.

Visualizing Vector Data

All data opened will be displayed in the table of content, and should look as indicated in *image 2*, based on the type of data. Data is automatically given a symbol, size and color. To change the feature color, and size or form

1. Click the symbol directly beneath the feature name to open the symbol selector,
2. Select the colour, and the size you will like the feature to take. (with lines and points, you can change the shape of the feature).
3. Click on Ok

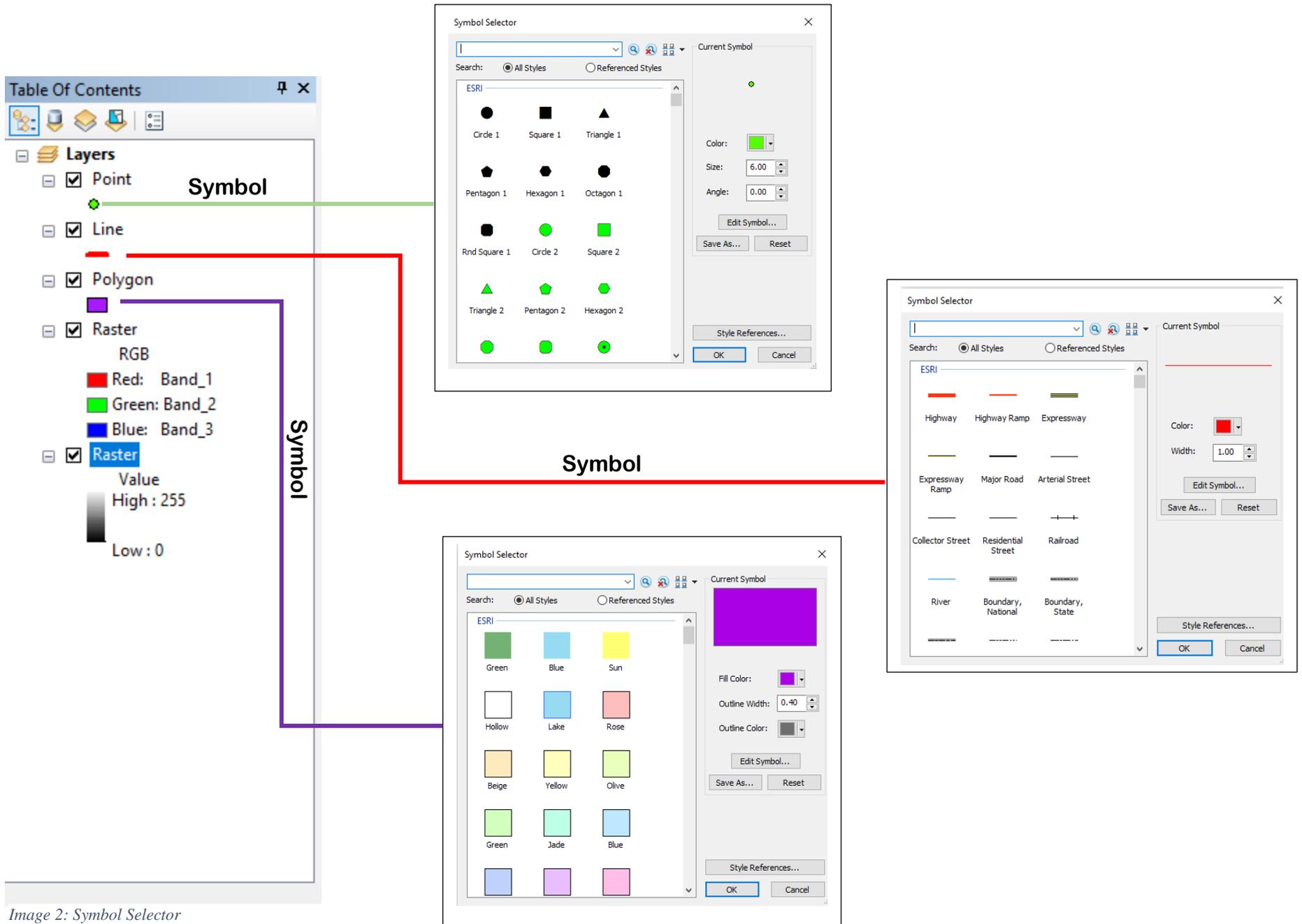


Image 2: Symbol Selector

The displayed colours are default/basic colours. You can click on the “Style References” in the symbol selector to activate more styles. Each style has a colour list, thus activating more styles will load more colours and symbol.

It should be noted that, the colour, size and shape selected in the symbol selector affects all features of that set. For example, a road dataset containing the road classification is open in ArcMap for review. What happens is that, the data is displayed with one colour. Any change of the colour or width in the symbol selector will affect the entire data irrespective of the roads class. In other, to display information of data based on a particular attribute (class), then the changes will have to be made from the properties of that data layer.

Data contains attributes which explains each feature on a map, these attributes can either be used to classify or differentiate, a group(s) of information in the data from other groups. Information or attributes can be viewed from the attribute table. To access the attribute table:

1. Right click on the feature to activate the drop down.
2. Select “Open Attribute Table”
3. Attribute table opens

As Depicted in the image below

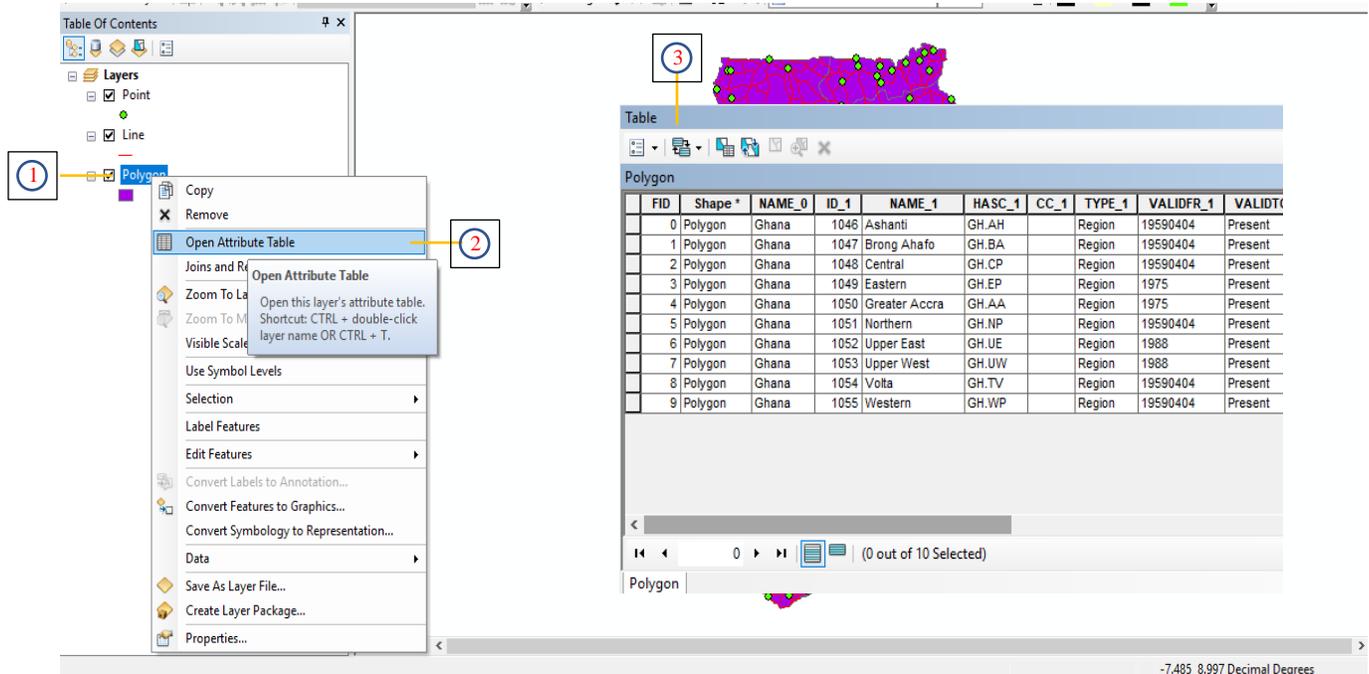


Image 3: Attribute Table

As seen in image 3, item 3 contains information in a table, about the polygon. From the FID (Field ID), there are 10 (0-9) polygons within the data file, with each polygon containing a unique ID, name, HASC_1, etc.

These different attributes can be used to distinctly differentiate/ display the data, with each polygon having a different colour from the other.

To display data based on their attributes:

1. Right Click on the data in the table of content.
2. Select Properties.
3. Go to the Symbology Tab
4. Under the symbology, go to categories, and select Unique Values
5. Under the value field, select the attribute you would like the symbols/colours to be drawn from.
6. Click on “Add All Values” to assign the colours for all attributes, or “Add Value” to add them individually.
7. Click on Apply, to effect the changes. Then click OK.

} Or Double Click on the data in the Table of content

NB: use the colour ramp to change the colour codes. You can also click on the colour symbol to change the colour for the selected attribute.

Type of Data	Symbology
Nominal	Feature: Single Symbol Categories: Unique Values
Ordinal	Quantities: Graduated Colours Quantities: Graduated Symbols
Interval	Quantities: Graduated Colours Quantities: Graduated Symbols
Ratio	Quantities: Proportional symbols

Note: Depending on the type of the data to be visualized, the respective symbols, values or colours can be used to represent the data. Thus, it is necessary to check the type of information first.

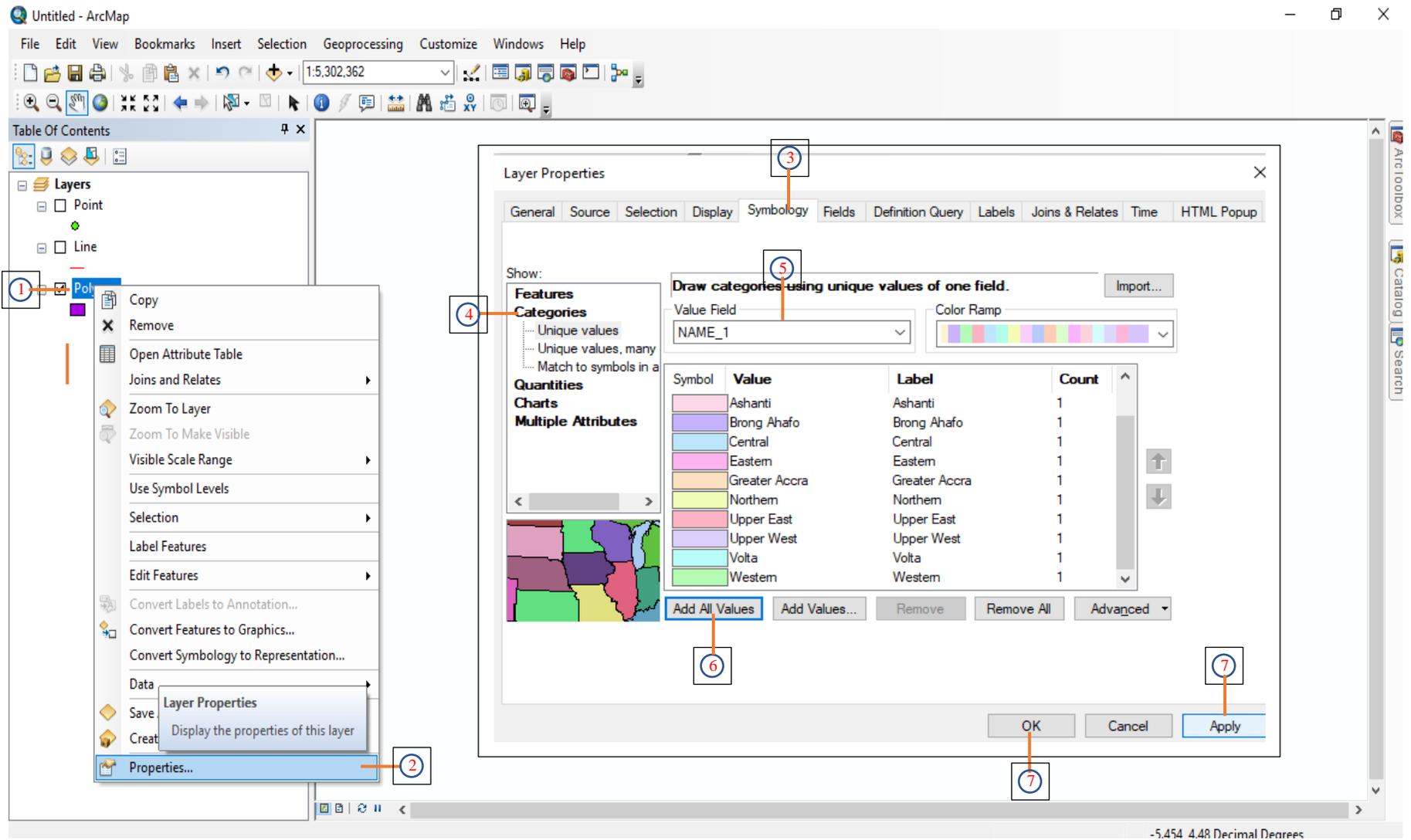


Image 4: Symbology

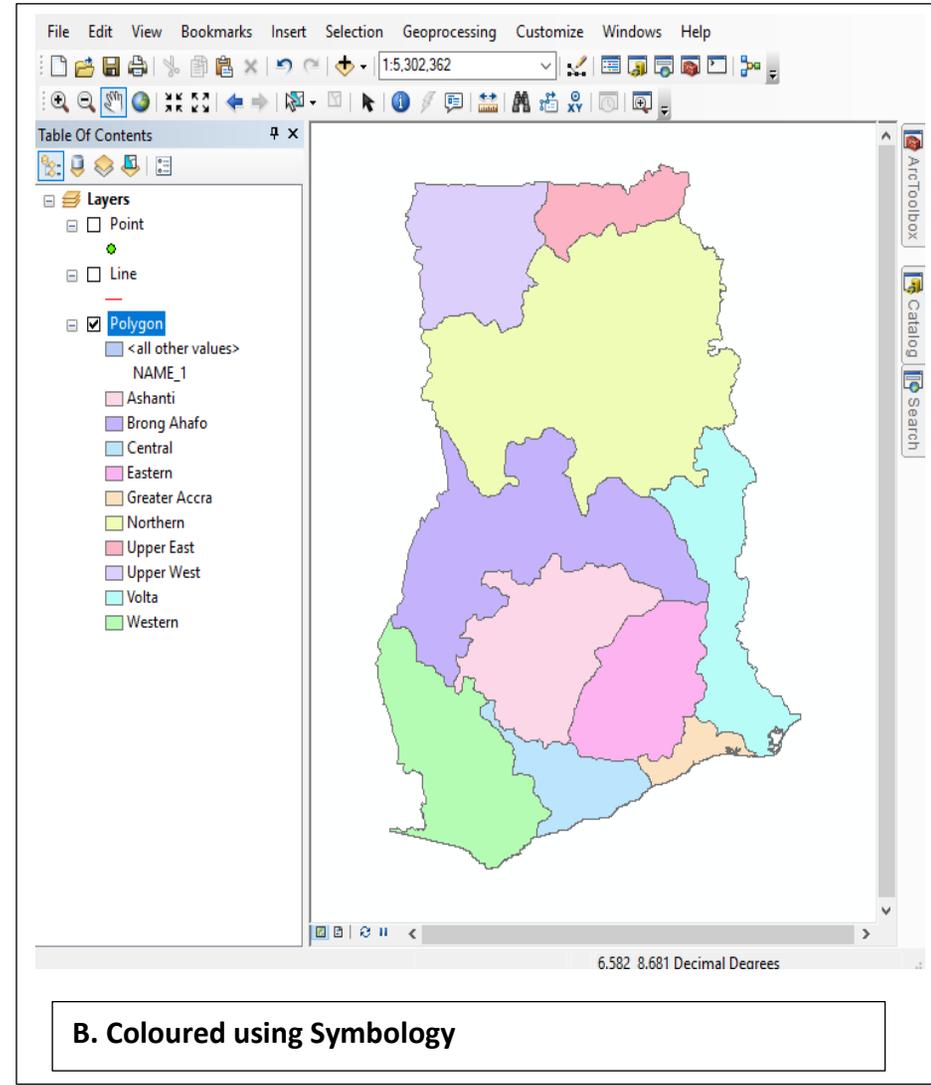
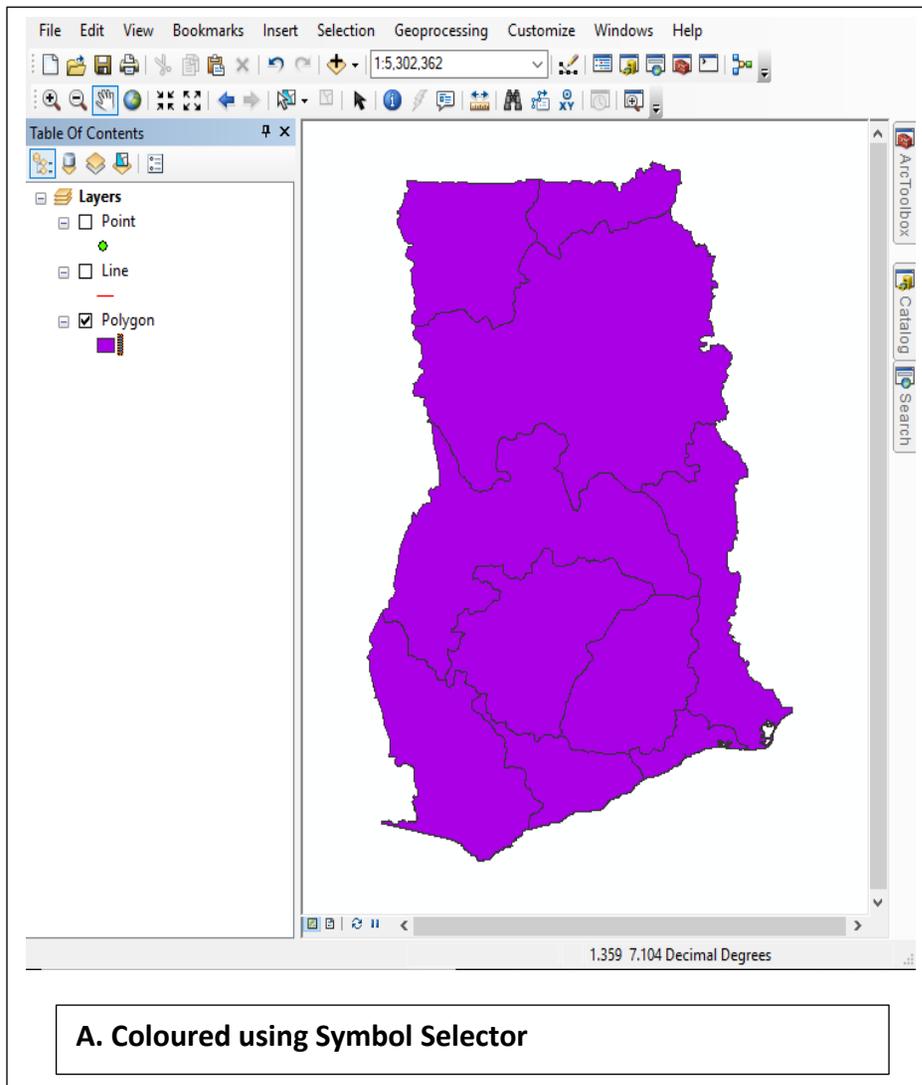


Image 5: Difference between Symbol Selector and Symbology Display

From image (A) the entire map/feature is represented with colour, but with image (B) the map/feature is represented based on attributes relating to each polygon. In the Table of content of Image “B”, you will notice that each colour indicates the attribute it represents.

The same principle of visualizing data through symbology applies to all vector data (point, line, polygon).

Setting Data Transparency

Transparency is very important in situations where layers overlay, overlap or interact with one another. It makes it possible to view the data beneath the overlaid/overlap data. Display transparency can also be used to make a feature colour lighter/thin.

To set the transparency for vector data, Go to:

1. the Layer Properties of the data.
2. Select the Display Tab.
3. Then set the transparent on a scale of 0-100, 0 being the least transparent (original display) and 100 being completely transparent (Invisible).
4. Click on apply/ok to effect transparency changes.

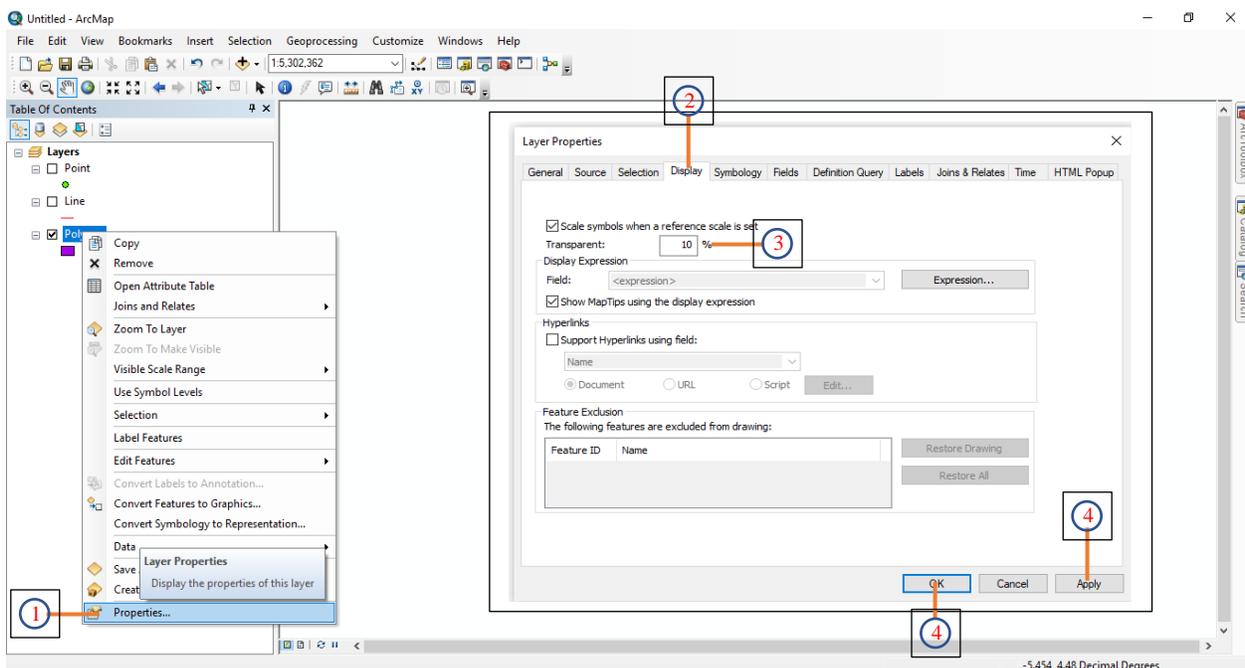


Image 6: Setting Vector Data Transparency

Labelling Features

Labelling is very important in describing, identifying or differentiating features of the same class from one another. Labels could be displayed as stationary or as Map tips (*extra information displayed when the cursor interacts with a feature*).

Labels for a map, are displayed based on a particular field(s) in the attribute table of that feature. If no attributes were saved, then labels cannot be displayed.

To display a label:

1. right click on the feature in the table of content, and Go to properties
2. Go to labels.
3. Tick the “label features in this layer” box (*at the top left side of the dialog box*).
4. Under Text String: Label field, select the field from the attribute table you will like the features to be labelled with.
5. Set the text style, size and colour under the text symbol section.
6. Click on apply, then ok to label the features.

If the placement of the labels isn't to satisfaction, you can go back to the label property, then:

7. Select “placement properties” under the “Other Options”. Then click apply after changing the placement properties.

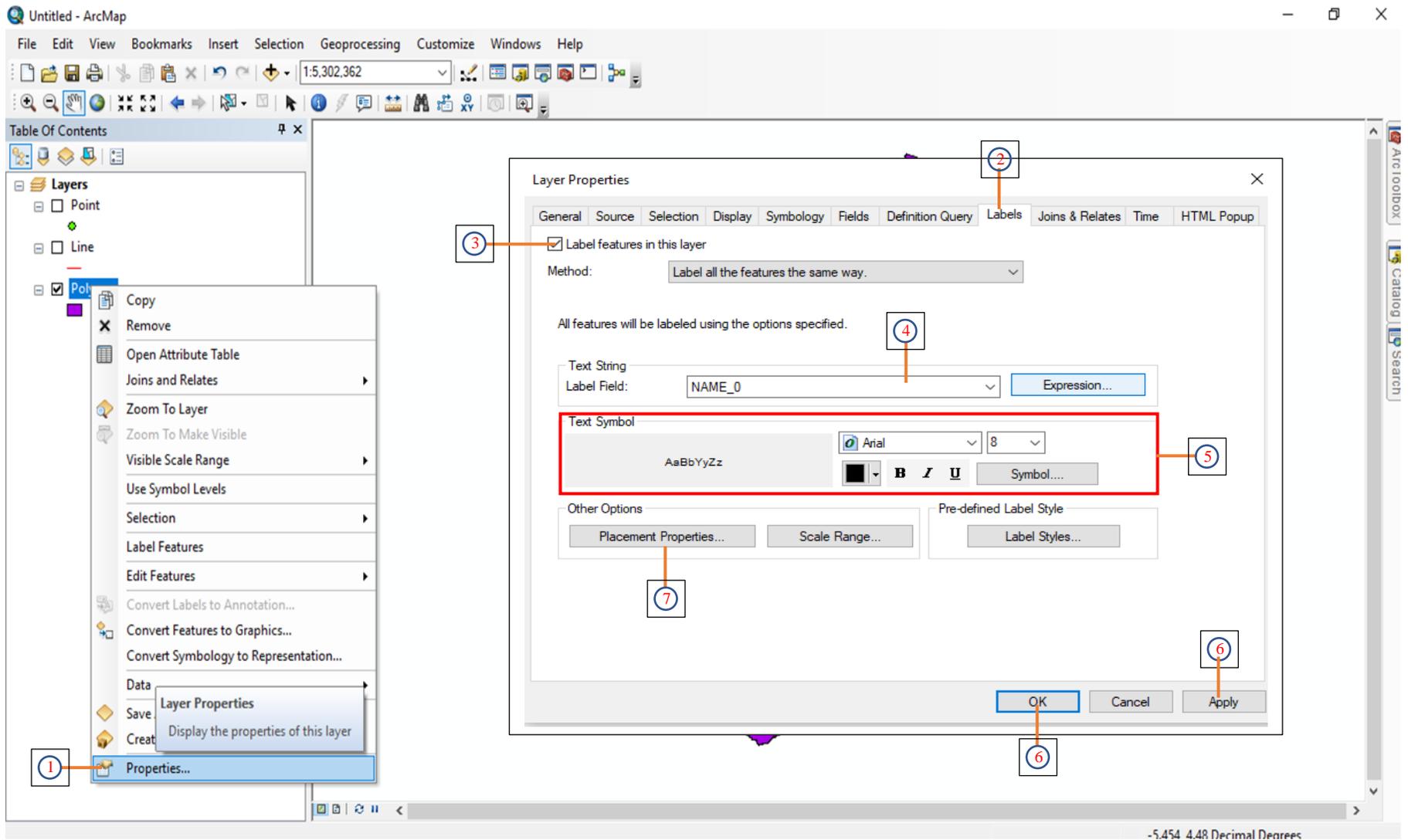
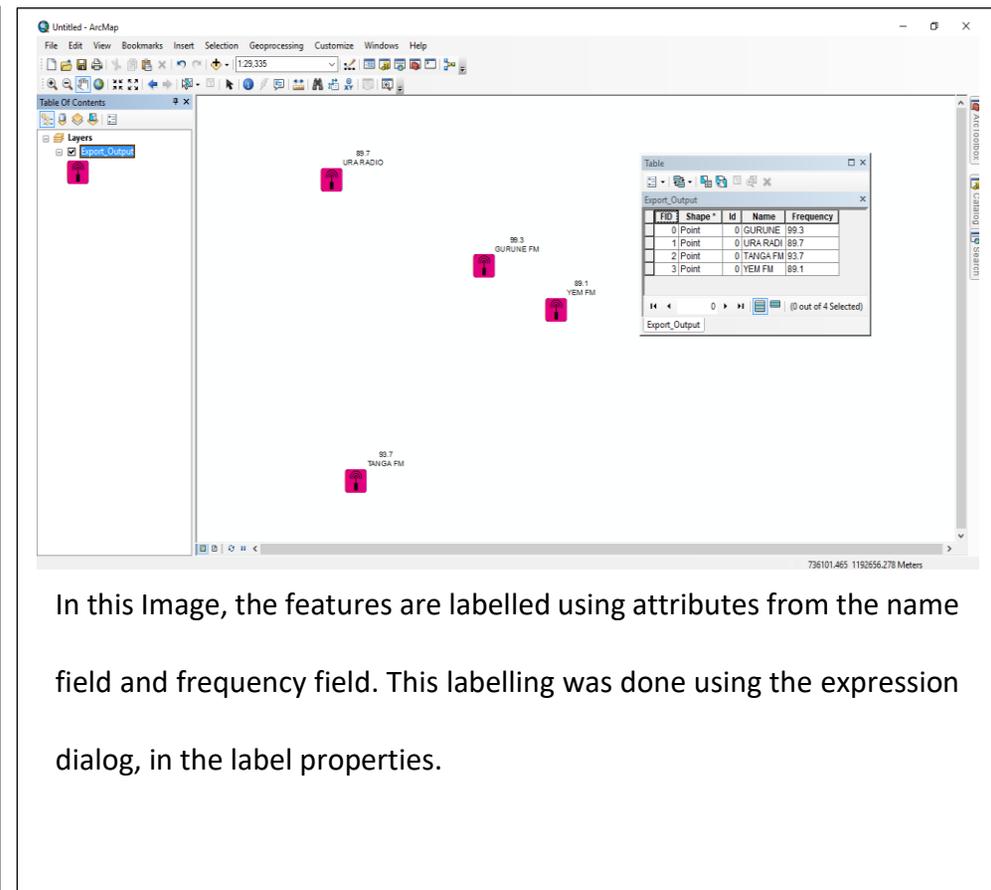
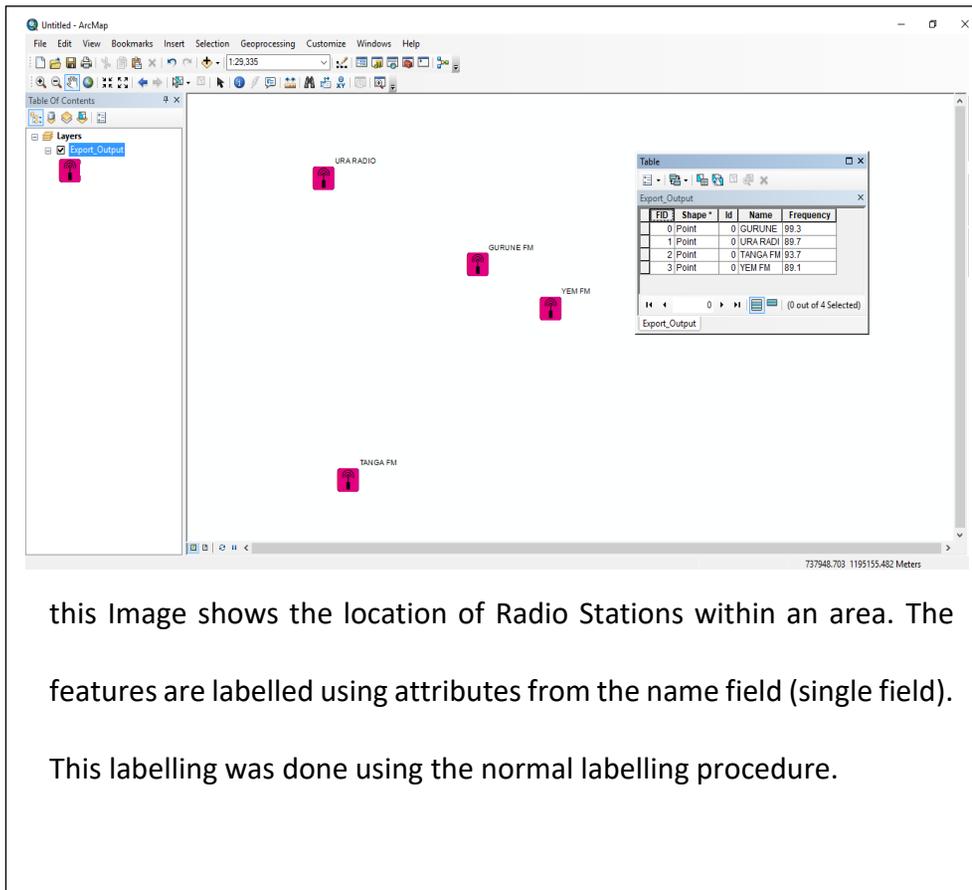


Image 7: Labelling Features

Labelling with Multiple Fields



this Image shows the location of Radio Stations within an area. The features are labelled using attributes from the name field (single field). This labelling was done using the normal labelling procedure.

In this Image, the features are labelled using attributes from the name field and frequency field. This labelling was done using the expression dialog, in the label properties.

Image 8; Single Label per Feature

Image 9; Multiple Labels per Feature

To label features using multiple field, go to:

1. Label Tab, of the properties of that data.
2. Select “Expression...” to open the Label Expression dialog box
3. Make sure the parser is on VBScript
4. Select the fields from the list of fields to send them to the expression field in the order you will like them to be displayed.
5. Type “&vbnewline&” between the variables. The output would look like **[field1]&vbnewline&[field2]**
6. Click on verify to validate and preview the label.
7. Select ok.

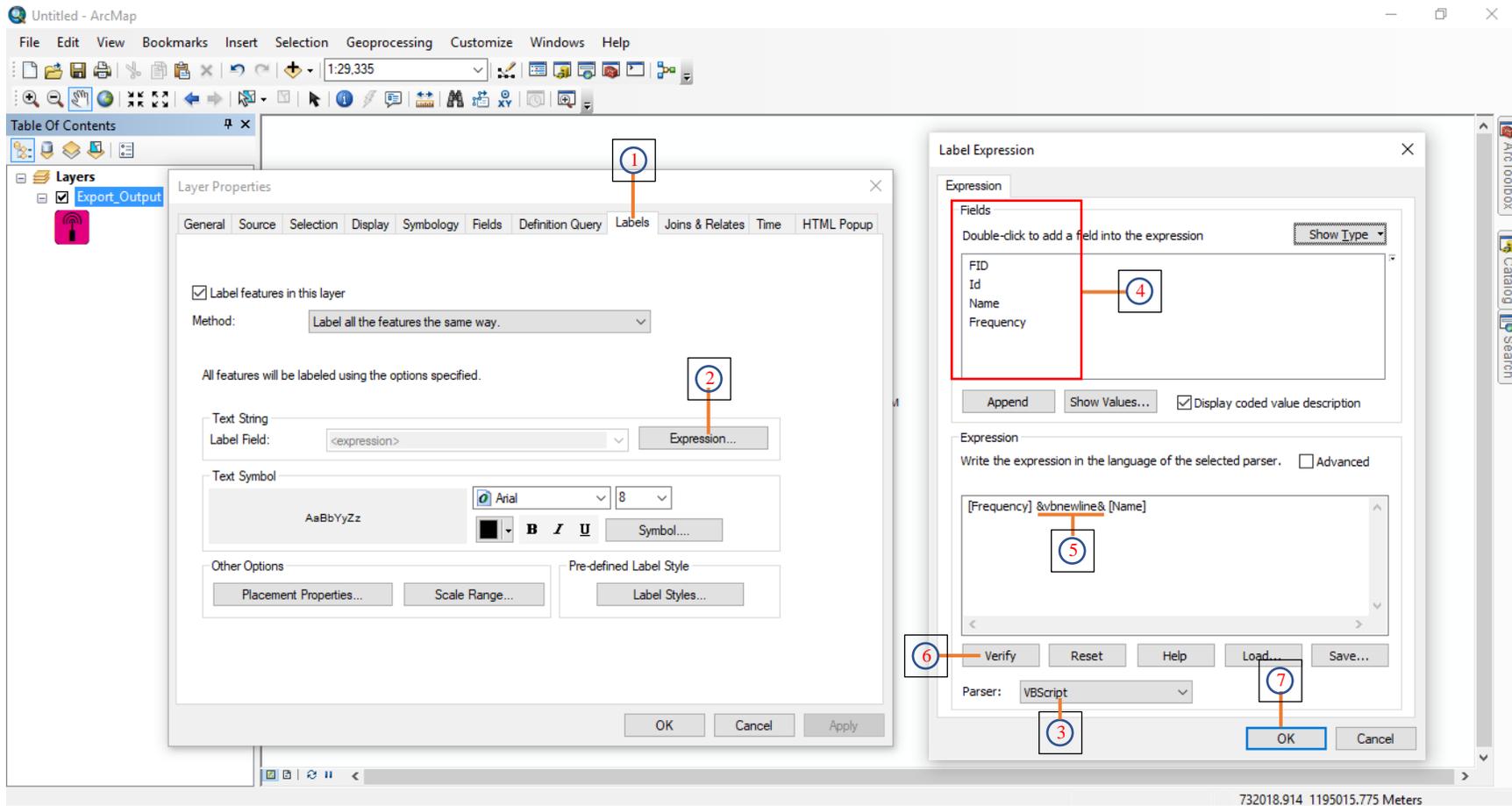


Image 10: Setting Multiple Labels using Attribute Fields

To merge the name from one field to the other, use the same procedure, but change the parser to python. + " " + will appear between both fields, if it doesn't, you can simply type it between the fields to join them together. You can also add extra information which isn't in the attribute table. But this information should apply to all features. For instance, i have a list of regions, but don't have the tag "region" attached to them. I can simply select the field i.e., [name] + "Region" , and the tag "Region " will be added to all the names.

Showing Labels with Map Tips.

In cases where there are too many features, and labelling them will make the data view clumsy and difficult view, it is advisable to use map tips to display the label whenever the cursor interacts with the feature.

To activate Map tips, Go To

1. the Display Tab of the Layer Properties
2. Under the Display Expression, select the field you would like to be displayed.
- 3 tick the “Show MapTips using the display expression”
4. Click on “OK”

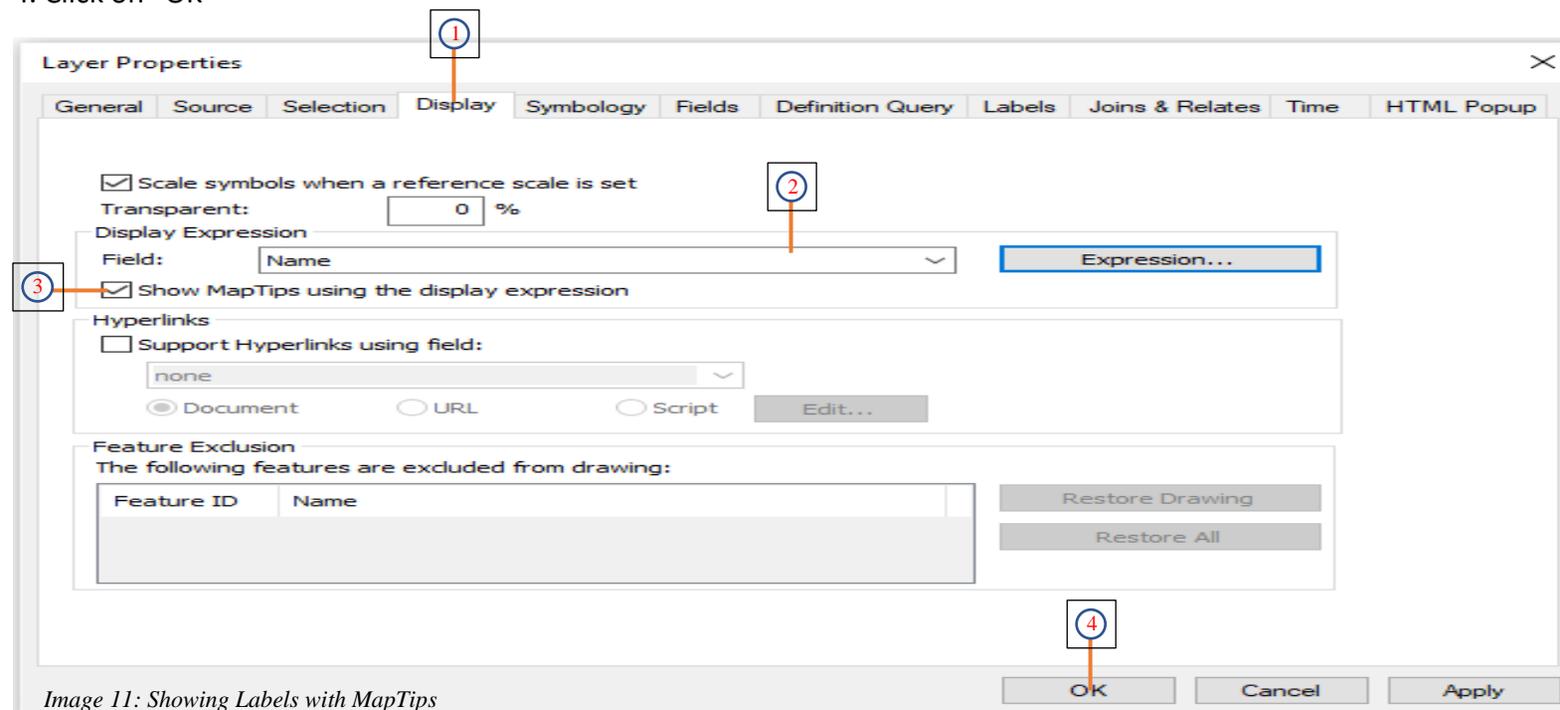


Image 11: Showing Labels with MapTips

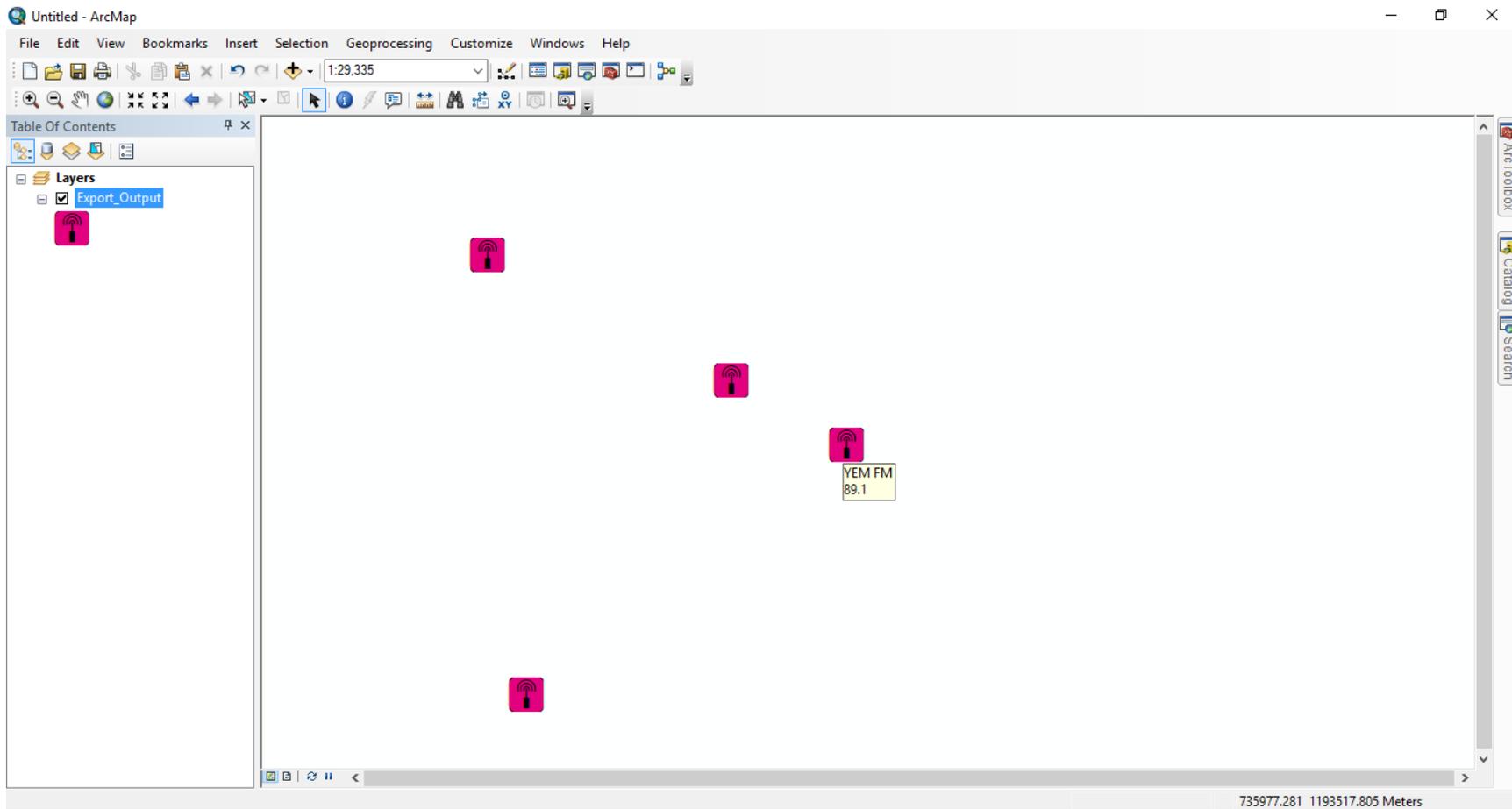


Image 12. Maptip

The label on the image above was displayed using the MapTip. In the image you will notice only one of the features has been labelled, whilst the others are unlabeled. This is because the cursor has been placed on that feature thus, the label, based on the selected display expression appears. If the cursor is moved away from the feature, the label will disappear.

Label Placement Properties

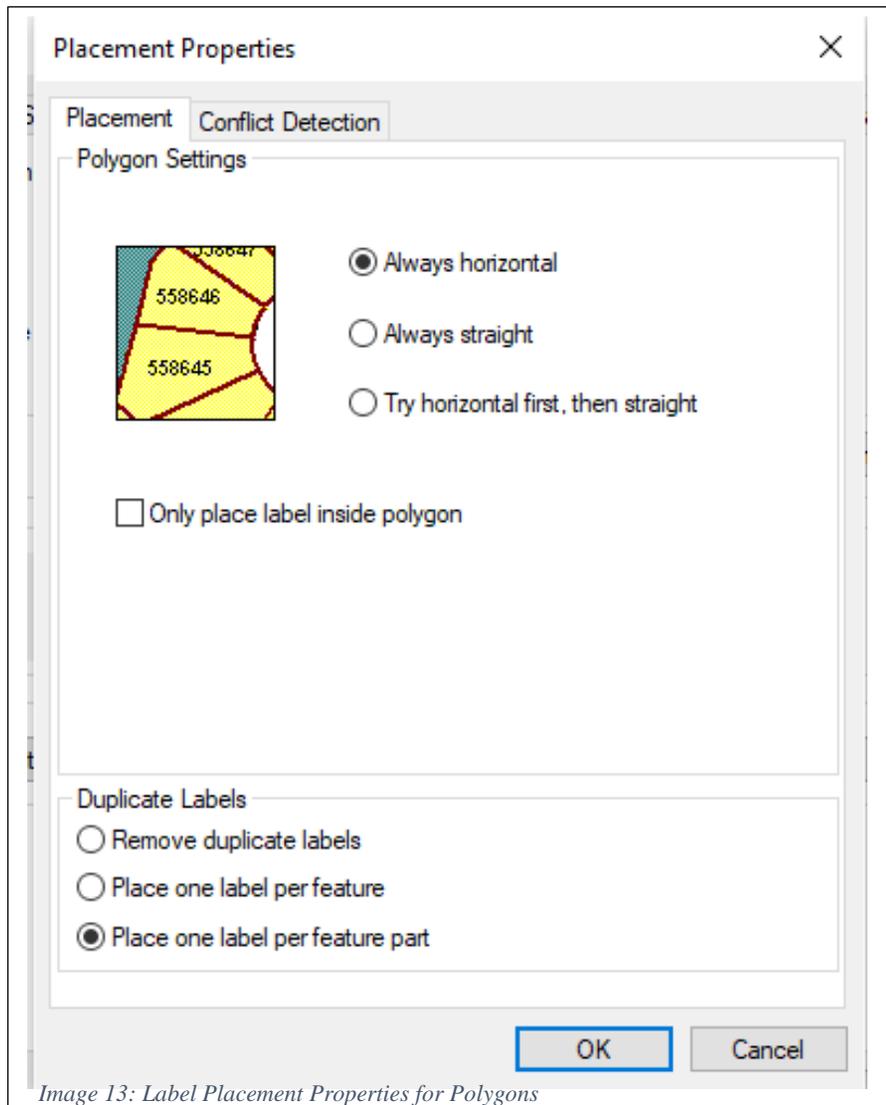


Image 13: Label Placement Properties for Polygons

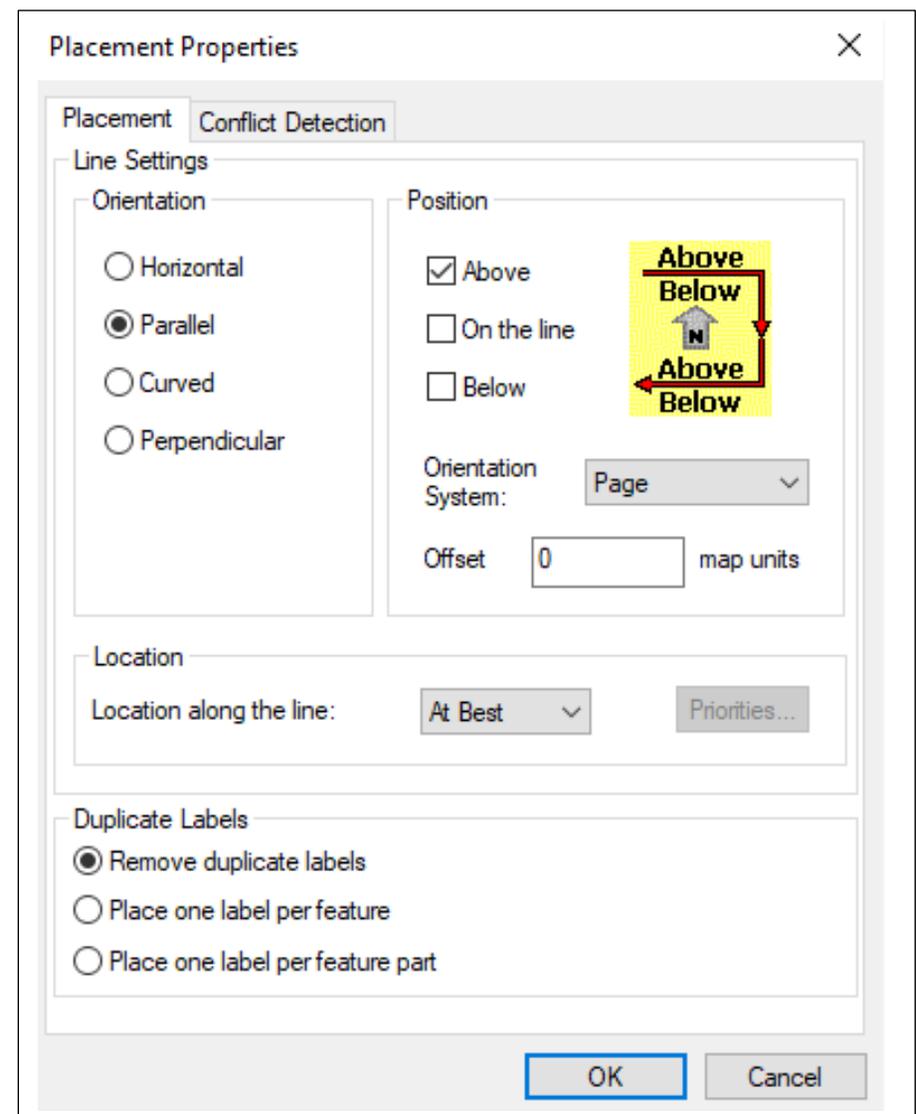


Image 14: Label Placement Properties for Lines

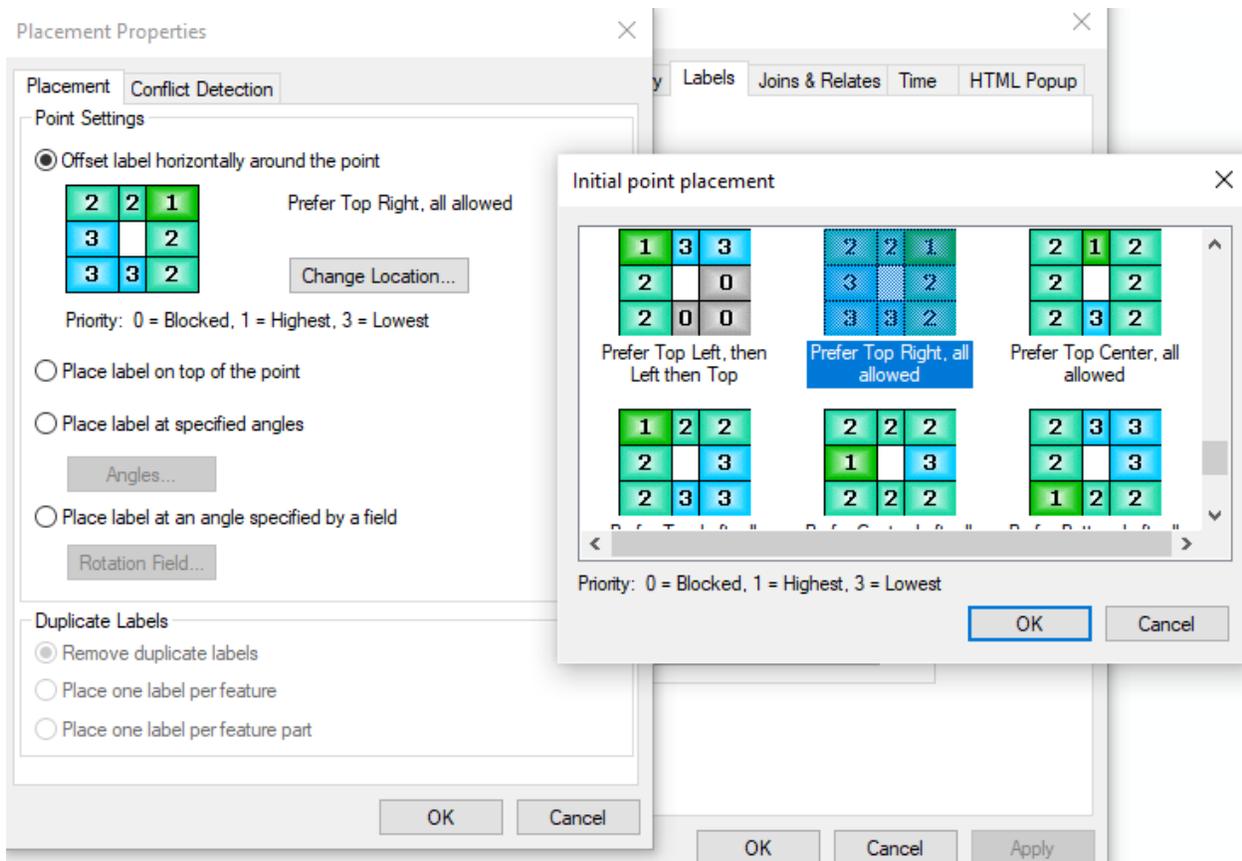


Image 15: Label Placement Properties for Points

The position of labels on a map can greatly affect the aesthetics or readability of the map, therefore, it is important to set the placement properties where necessary. To access the placement properties. Go to:

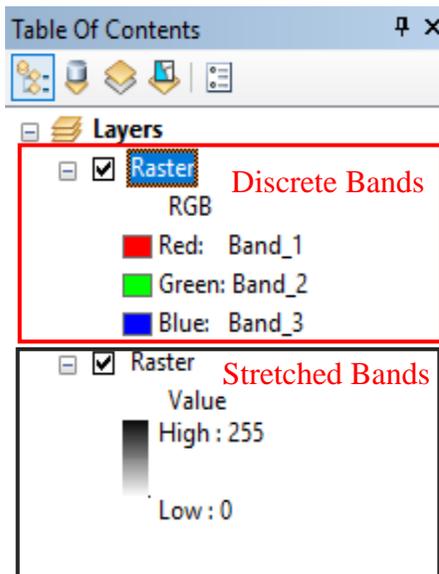
1. the label Tab under the Layer Properties.
2. Select Placement Properties.
3. Select the preferred position.
4. Click on OK.

Visualizing Raster Data

Raster data is characterized by pixels and cells. They come in 3 types, picture(imagery), spectral data, and thematic data. Picture (imagery) are raster data that is captured with a camera or scanner, usually displayed with 3 bands and within the visible band range and captured as seen by the eye (RGB). Examples of these are google satellite images, drone/camera captured images.

Spectral images are images captured based on the reflection of light within the electromagnetic spectrum. These images usually have multiple bands. while an ordinary camera captures light across three wavelength bands in the visible spectrum, red, green, and blue (RGB), spectral imaging encompasses a wide variety of techniques that go beyond RGB. Spectral imaging may use the infrared, the visible spectrum, the ultraviolet, x-rays, or some combination of the above. A typical example of spectral images is those derived by Landsat Operational Land Imager.

Thematic raster data is data that displays information on certain situation, occurrences or phenomena, such as, temperature, elevation, population, densities, etc.



Raster Data is usually represented in discrete bands (RGB) or with Stretched Value Bands. Based on the type of data. Thematic and Picture (Images) are best displayed with discrete bands, while thematic data are best represented with stretched valued colour ramps.

As seen in the image, the first raster in the table of content is displayed as RGB, whilst the second raster is displayed as value.

NB: Discrete bands can also be changed to stretched values. The bands can also be interchanged, through the symbology. Stretched band colours can also be changed by simply changing the colour ramp by selecting the symbol beneath the name or through the symbology.

Image 16: Raster Data Display in the Table of Content

To access the symbology of the raster data:

Go to

- 1.the layer properties
2. select the symbology
3. select the display format from the show box.
4. Click on OK

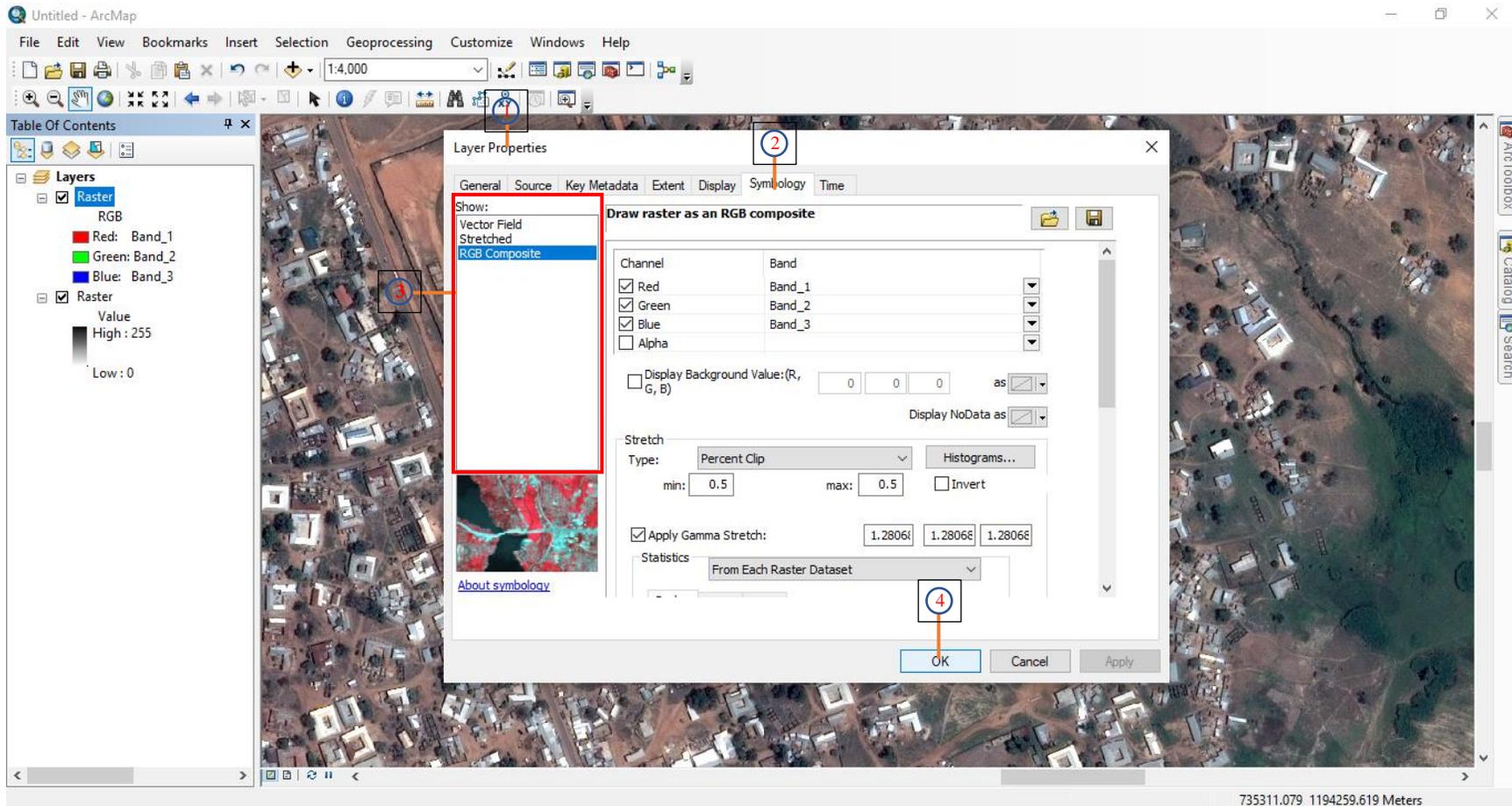


Image 17: Raster Data Symbology

The image brightness, contrast and transparency can also be set in the properties under the display tab, or by using the image analyzer, by accessing from the windows tab on the menu bar. To use the image analysis panel, Go to:

1. Window on the menu toolbar
2. Select Image Analysis to open the panel
- 3, Select the raster data you want to make changes to, in the panel
4. set contrast, brightness and transparency.



The image analysis panel is also used for band stacking of spectral images, NDVI analysis, and other raster data alterations. But for the purpose of this guide, the content will be limited to picture (imagery) manipulation such as transparency, contrast and brightness

Being able to display and symbolize data is very important in designing a map, as well as, giving the viewer a clear understanding of what has been visualized.

Next in the ArcMap series, will be Map design (Working with the layout view).

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