

Symbolizing Rasters

ISTC Topic:

3.8

In this Chapter you will learn

- How to change the color scheme of a raster
- How to assign colors to different raster bands

1. Symbolizing imagery

Humans can only perceive colors that range from the red through the blue spectrum along with all the colors in between. The light we see is reflected by the things we look at: fields, houses, forests, parking lots etc. For example, a red roof reflects red light, and so you interpret this as the color red.

Most things also reflect light outside the range that we can perceive, for example the colors infrared and ultra-violet. Even though we may not perceive those colors with our own eyes, we do have cameras that can capture this light and we can display this information – in colors that we see – in our GIS maps. For example, a camera can capture infrared light. We can then bring this image, or **band**, into GIS and color it in regular red so that we can see it.

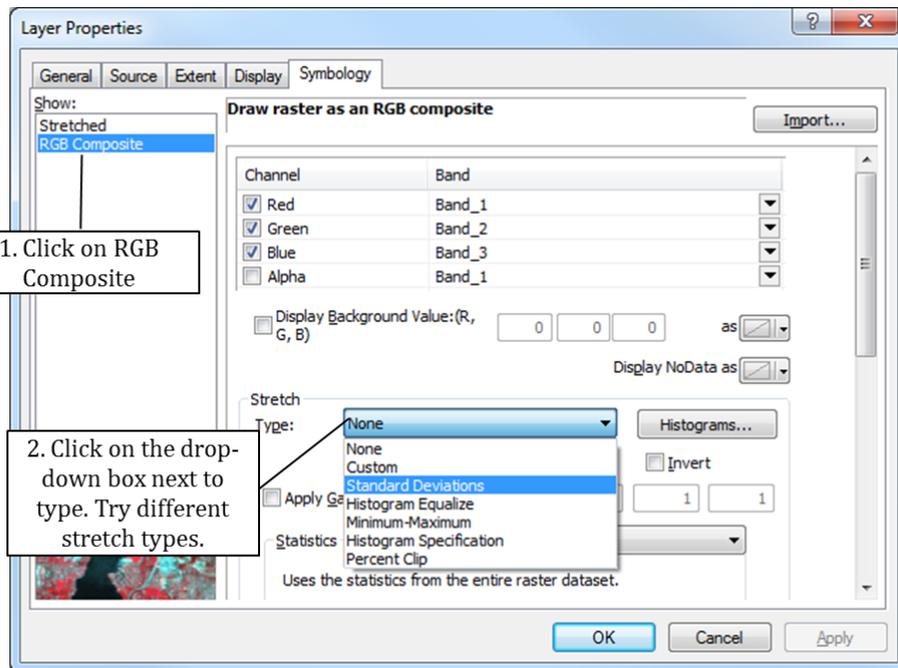
Most aerial images are provided in “true color”, which is a combination of a red, green and blue band. A user has the ability to symbolize each of those three colors to adjust the NAIP image. Note that if you added the NAIP as an image service you cannot change the symbology since this data resides on a remote server.



3.8 Symbolizing Rasters

Exercise 1: Symbolizing NAIP imagery

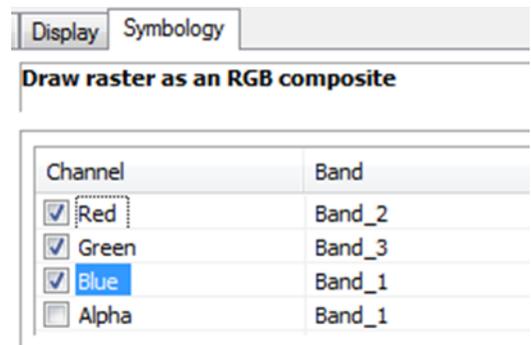
1. Open an empty ArcMap document and add the NAIP2011.tif from the Topic3_8 folder.
2. Right-click on the NAIP2011 layer in your ArcMap table of contents and click properties. Go to the symbology tab. Symbolize the layer as shown in the following figure:



1. Click on RGB Composite

2. Click on the drop-down box next to type. Try different stretch types.

3. In the type box click on "Standard Deviations" and click "Apply". (Hint: the difference between "OK" and "Apply" is that the property dialog will remain open when you click "Apply", but close with you click "OK"). Notice how the colors change. Try changing n to 3 or 4. Click Apply.
4. Experiment with the other types. Note which ones you like. Finish by setting Type back to "none". Click "apply".
5. You can also change the red, green and blue setting individually. First we will change the bands. You can see in the properties dialog box that "Channel Red" refers to Band_1, Green to Band_2 and Blue to Band_3. You can change which bands belongs to each color by clicking on the drop down box to the right of the Band number. Change the bands as shown in the figure on the right and click "Apply".



6. Experiment with assigning different bands to red, green and blue. Then set the band back to their originals: red for band 1, green for band 2 and blue for band 3. If you were looking at data with additional bands, for example infrared, you can display the intensity of this infrared light with either the red, green or blue bands.
7. Finally, you can change the intensity of red, green and blue manually. Click "histograms" on the symbology tab and use the following figure to change how each color appears on your map:

1. Tabs tell you which color you are adjusting. Click "Red"

2. This button should be pushed in

3. Grab the little squares in the corners and drag the line. When you click on the line a new little square will appear that you can also drag.

4. Adjust the line to the way you want. Click OK

8. Experiment with setting the histogram for red, green and blue. Click OK, and then click Apply to see how those changes affect your NAIP image.
9. (Optional) Depending on which delivery of the NAIP you are using you may have black outlines around the outside of your NAIP Image. For example the 2011 NAIP shown on the right has large black swaths around it. Follow the directions in the figure below to get rid of those black areas (and save some black ink if you plan to print maps with the NAIP in them!)

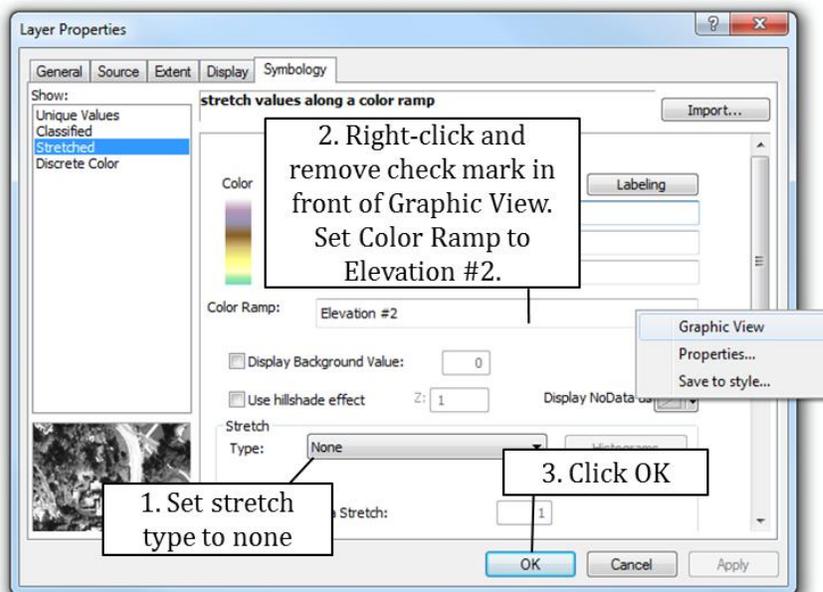
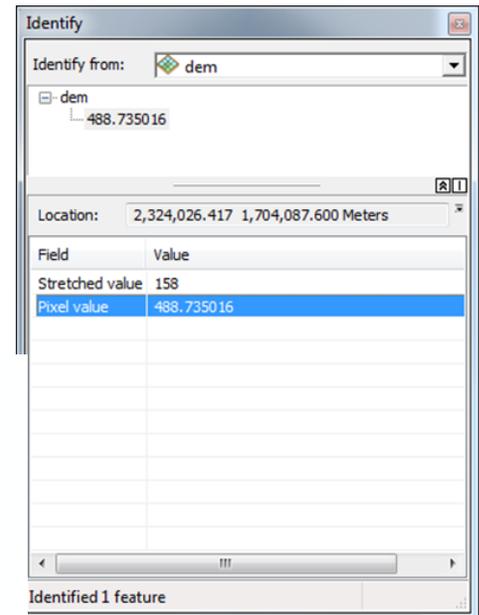
Click the check box to set R,G and B to 0,0 and 0

10. Leave your map open if you plan to continue with exercise 2

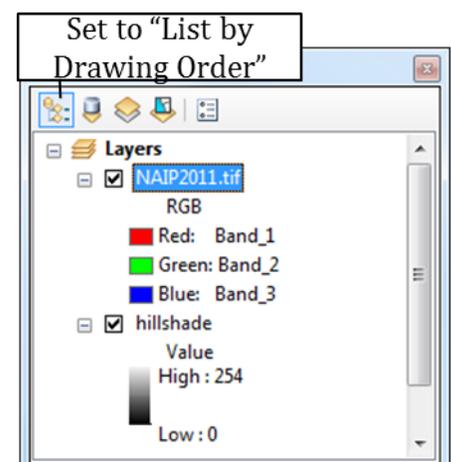


Exercise 2: Symbolizing Digital Elevation Models (DEM)

1. Open a new map document (if not already open) and add NAIP2011.tif from the Topic3_8 folder (if not already on your map). Also add the digital elevation model called “dem”. A **digital elevation model** is a raster that gives you the elevation for each cell, or pixel, in the raster.
2. Click on the Identify tool on the Tools toolbar and click anywhere on the digital elevation model. Make sure you “Identify from” “dem” as shown on the right. The Pixel value gives you the elevation in meters. Click on the top and the bottom of the Dworshak Dam on your map to see the drop in elevation.
3. Open the symbology tab for the dem layer and set up the symbology as shown below.



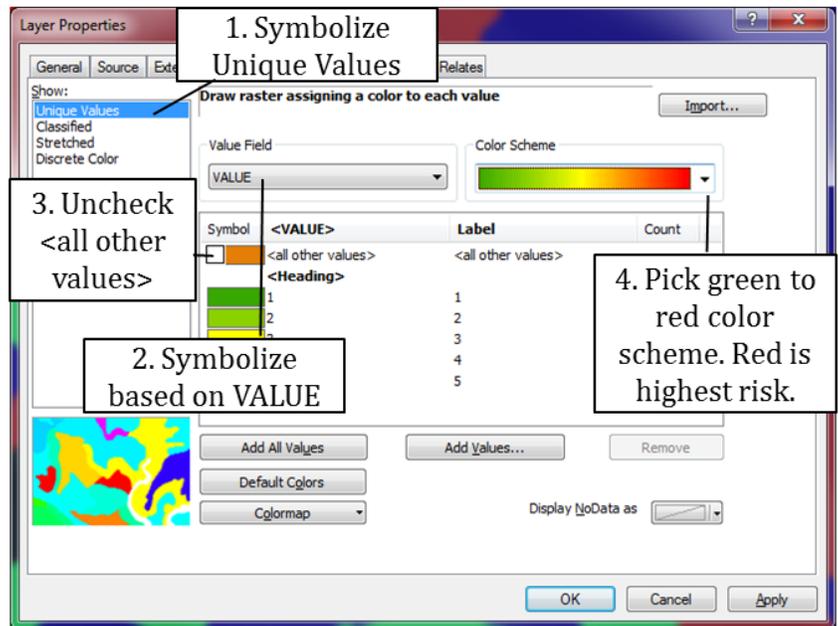
4. (Optional): Set symbology to Elevation #1.
5. Turn off the dem layer and add the **hillshade** raster from the Topic3_8 folder. A hillshade simulates how sunshine produces shadows on a mountainous area. Hillshade layers work really well towards giving your map a more “3-dimensional feel”.
6. In the table of contents move the hillshade to the bottom as shown on the right.
7. Open the Layer Properties for the NAIP_2011 image. We will make this layer transparent so we can see the hillshade through it. Go to the Display tab and set the transparency to 60%.



8. Examine the result and feel free to go back to the Display tab and play around with other transparency settings.
9. Save your map.

Exercise 3: Symbolizing Wildfire Risk

1. Open a new map document and add the Fire_Risk raster from the Topic3_8 folder to your map. This is a dataset produced by the Idaho Department of Lands and shows which communities and their associated forest lands are at a higher risk from wild fires.
2. Open the attribute table for Fire_Risk. A value of 1 corresponds to the lowest risk, a value of 5 the highest. Close the attribute table.
3. Open the Layer Properties and go to the Symbology tab. Set up as shown on the right. Click OK
4. View your map. Save your map.



There are many analyses that can be performed on rasters; most of them require the Spatial Analyst extension which can be purchased from ESRI.