Manipulating model predictions in ArcGIS

VIRTUALREEFDIVER

This tutorial was created to help users download, view, summarise and map coral cover predictions generated by the Virtual Reef Diver program. The software used in the tutorial is ESRI ArcMap version 10.8, but these general steps can also be implemented in other geographic information system (GIS) software.

Download example datasets

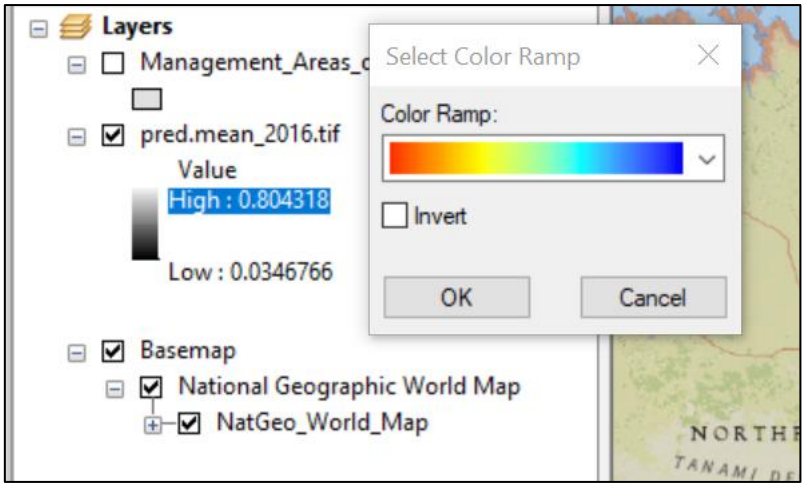
Two datasets will be used in this example:

1. **Virtual Reef Diver model predictions:** An image file of 2016 coral cover predictions can be downloaded from the Virtual Reef Diver website (https://vrd-predictions.s3-ap-southeast-2.amazonaws.com/index.html). The file is named pred.mean_2016.zip.
2. **Management Areas of the Great Barrier Reef:** Go to the Great Barrier Reef Marine Park Authority's Geoportal (https://bit.ly/2QekQ2V) and download the data in shapefile format.

Unzip the files and save them to your working directory.

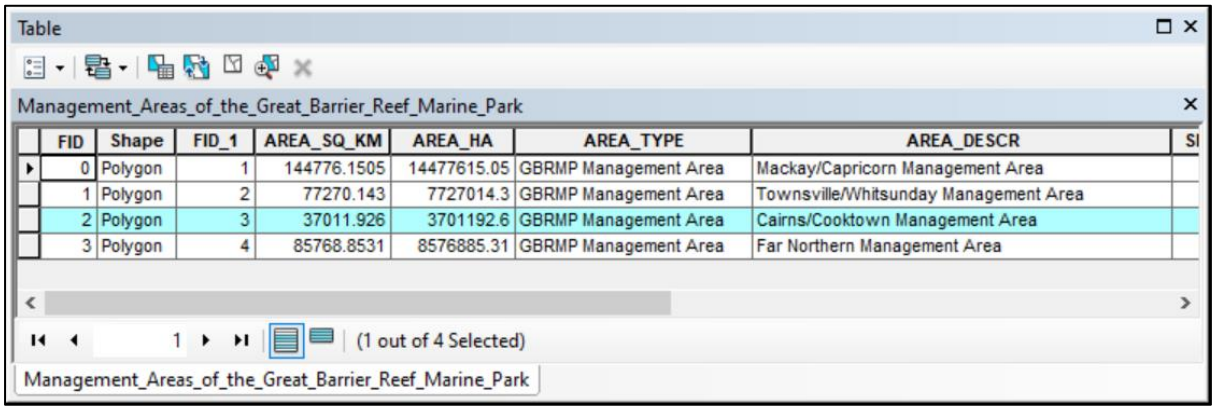
Add and view the data

1. Click on the Add Data button  and navigate to your working directory. Select the pred.mean_2016.tif and Management_Areas_of_the_Great_Barrier_Reef_Marine_Park shapefile and click add.
2. Click on the dropdown menu in the Add Data button, select Add Basemap, and select National Geographic.
3. To change the colour palette for the predictions, click on the black and white scale bar under pred.mean_2016.tif in the Table of Contents. This will open the Select Color Ramp window. Click on the Color Ramp dropdown menu, choose a new colour palette, and click OK.



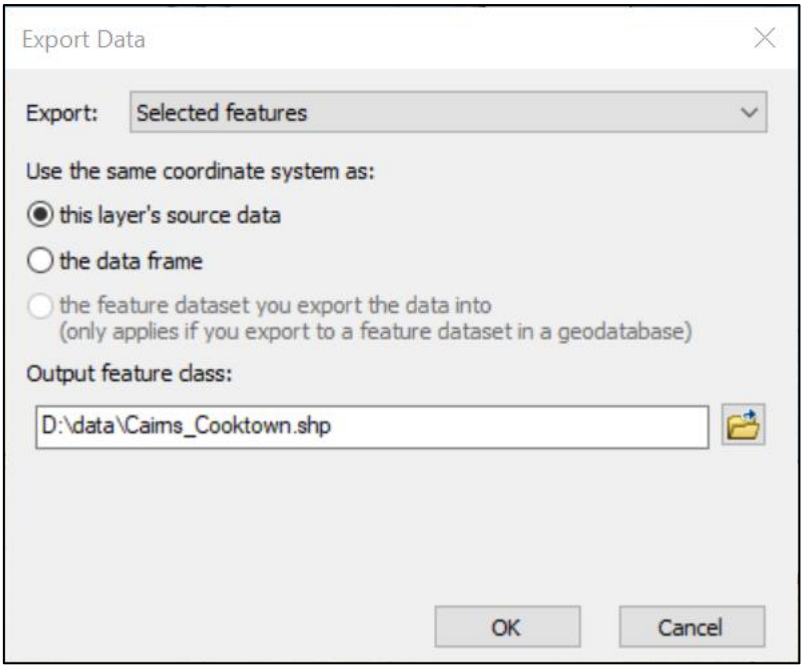
Extract the management area of interest

1. In the Table of Contents, right click on Management_Areas_of_the_Great_Barrier_Reef_Marine_Park, scroll down, and select Open Attribute Table. Click on the record for the Cairns/Cooktown Management Area to select it and close the Attribute table.

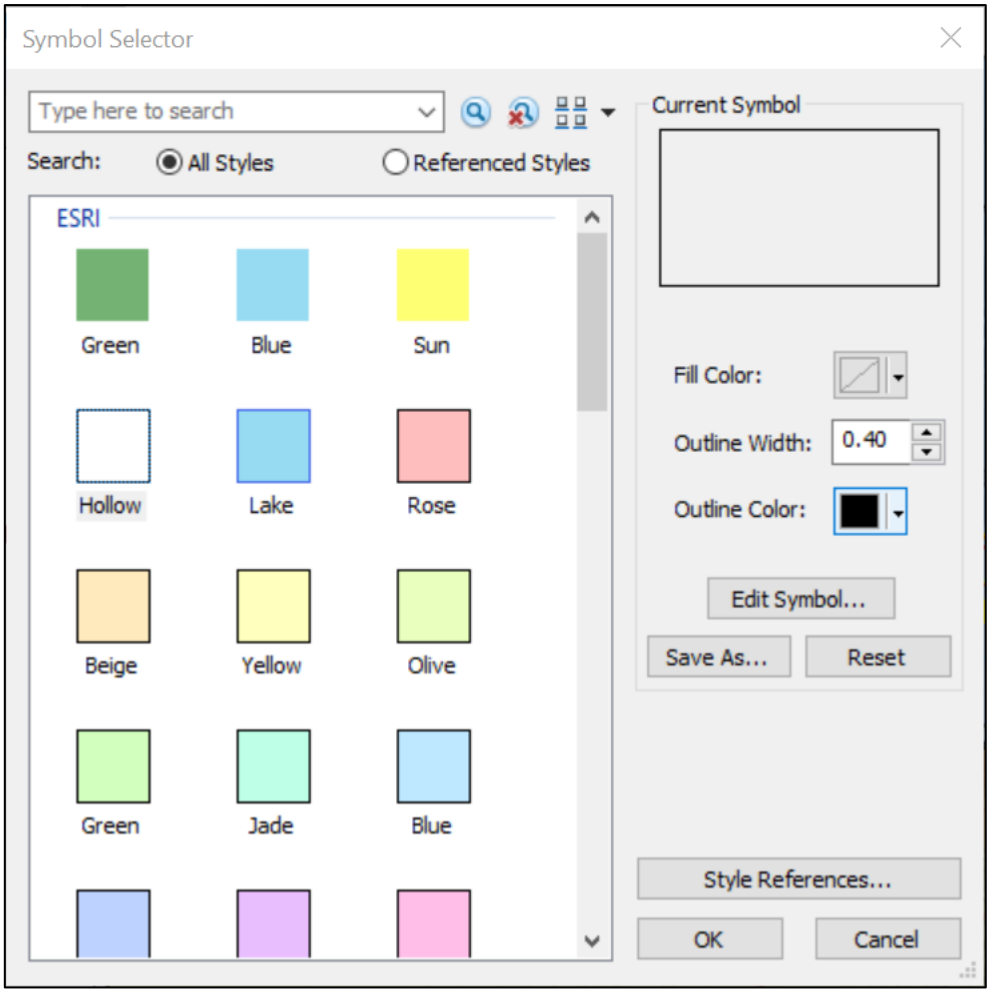


FID	Shape	FID_1	AREA_SQ_KM	AREA_HA	AREA_TYPE	AREA_DESCR	SI
0	Polygon	1	144776.1505	14477615.05	GBRMP Management Area	Mackay/Capricorn Management Area	
1	Polygon	2	77270.143	7727014.3	GBRMP Management Area	Townsville/Whitsunday Management Area	
2	Polygon	3	37011.926	3701192.6	GBRMP Management Area	Cairns/Cooktown Management Area	
3	Polygon	4	85768.8531	8576885.31	GBRMP Management Area	Far Northern Management Area	

2. In the Table of Contents, right click on Management_Areas_of_the_Great_Barrier_Reef_Marine_Park, scroll down, click on Data, and select Export Data. This will open the Export Data window. Navigate to your working directory, name the new shapefile Cairns_Cooktown.shp. Make sure that Export is set to Selected features and click OK. Click Yes when asked whether you would like to add the exported data to the map.

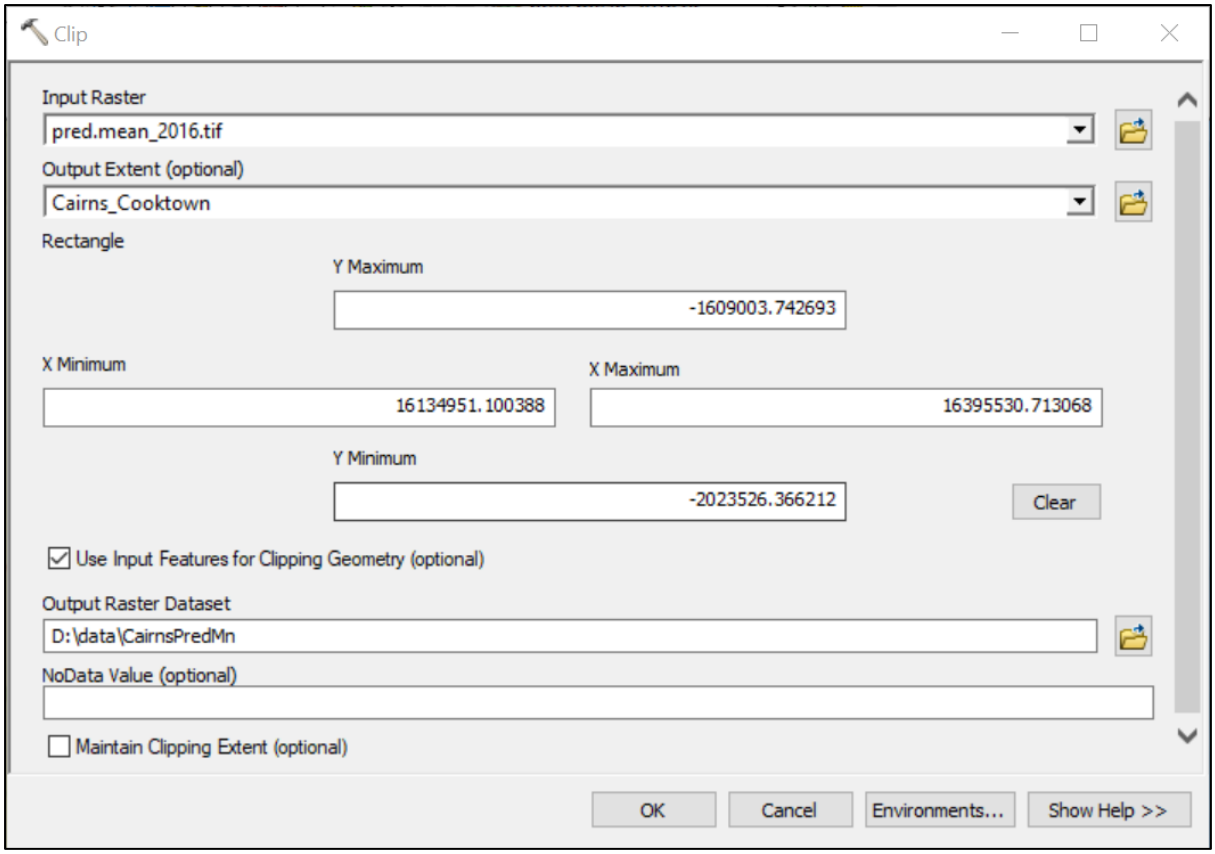


3. Remove the Management Areas of the Great Barrier Reef shapefile by right clicking on it in the Table of Contents, scrolling down, and selecting Remove.
4. You can change the drawing order of the layers by clicking on the List By Drawing Order button at the top of the Table of Contents  , selecting the Cairns_Cooktown shapefile, and dragging it up or down the list of layers.
5. The colour used to represent the Cairns_Cooktown Management Area can be changed by left clicking on the coloured box under Cairns_Cooktown in the Table of Contents. This will open the Symbol Selector window. This window gives you the option to select a new fill colour, change the polygon border colour, or the line width of the border. In this example, we selected no colour (Hollow) for the Fill Colour, black for the Outline Colour, and 0.4 for the Outline Width. Click OK.

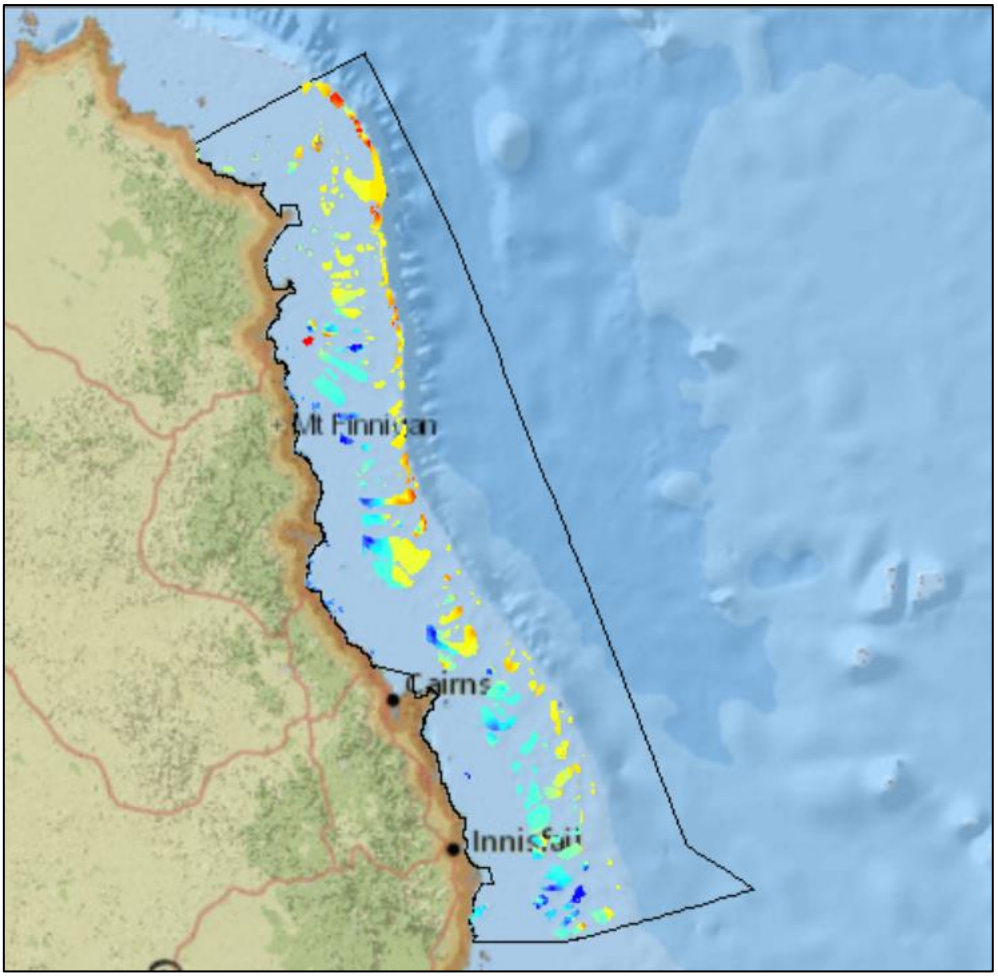


Clip the prediction layer

1. Open the ArcToolbox . Navigate to Data Management Tools > Raster > Raster Processing and select Clip to open the Clip window.
2. Fill in the arguments as shown below and make sure that the Use Input Features for Clipping Geometry box is checked. Click OK.

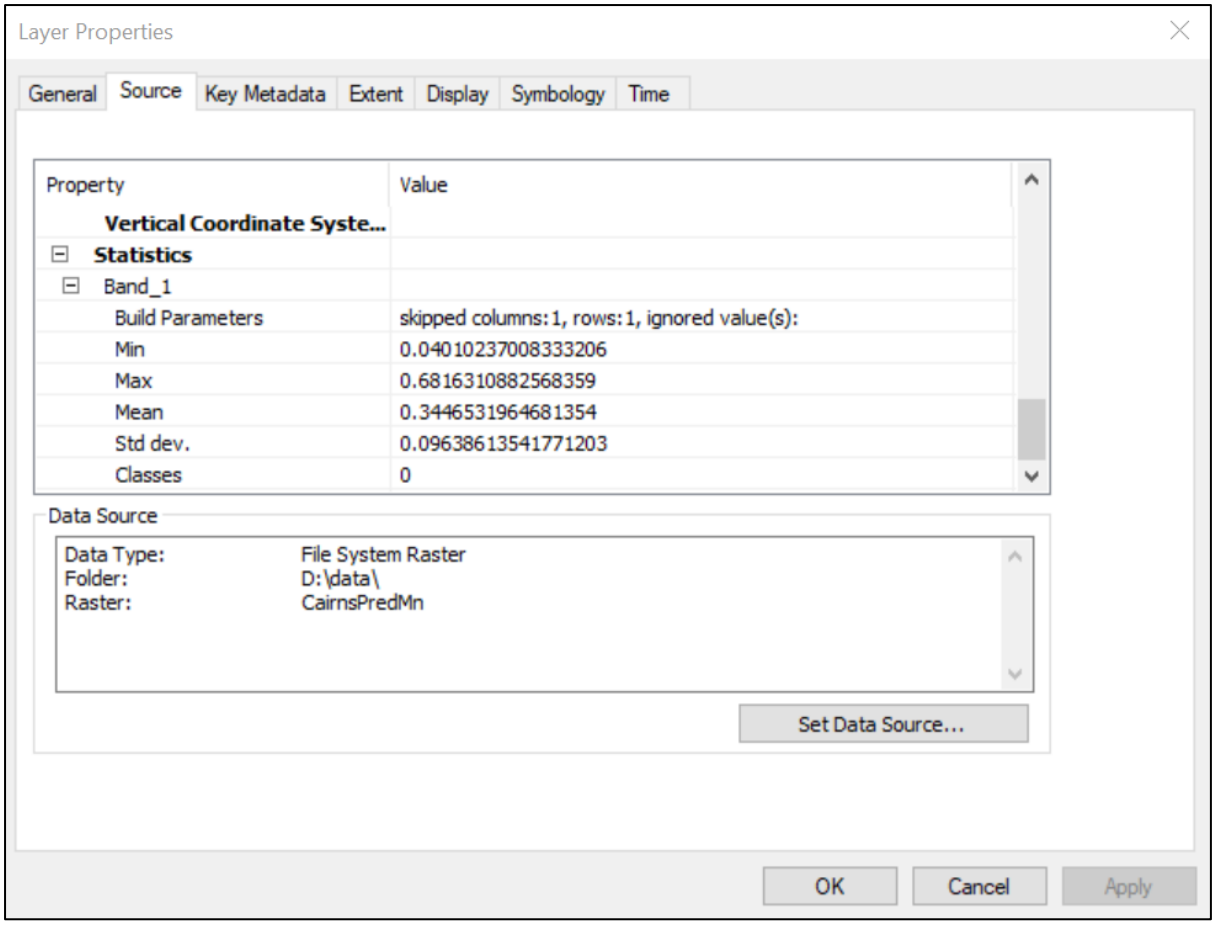


3. Remove the pred.mean_2016.tif from the Table of Contents and change the colour palette for the new CairnsPredMn layer as described in previous steps. Zoom to the extent of the Cairns_Cooktown layer by right clicking on it in the Table of Contents, scrolling down, and selecting Zoom to Layer. The map view should look something like the map below.



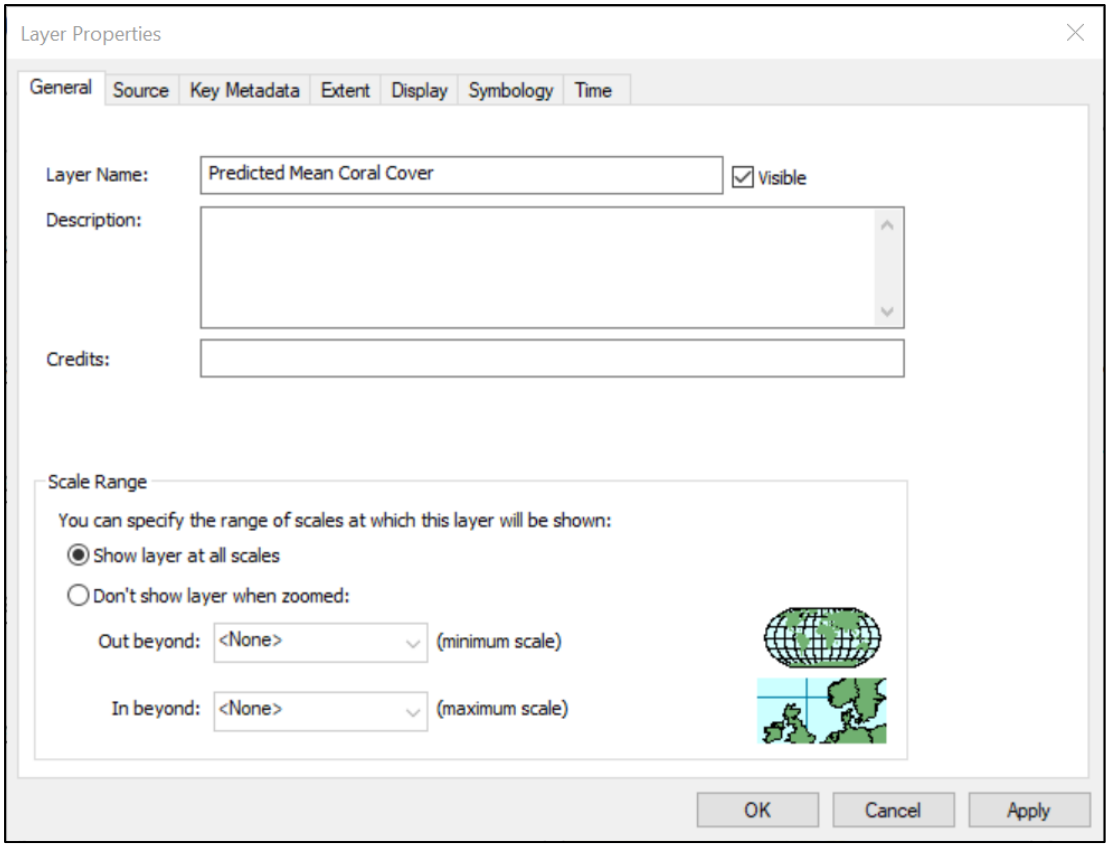
Generate summary statistics for the predictions

1. Basic summary statistics for coral cover within the Cairns Cooktown management region can easily be viewed. Right click on the CairnsPredMn layer in the Table of Contents, scroll down, and select Layer Properties. Within the Layer Properties window, select the Source tab. Scroll down until you see the Statistics Property. The minimum, maximum, mean and standard deviation of coral cover are shown under Band_1.

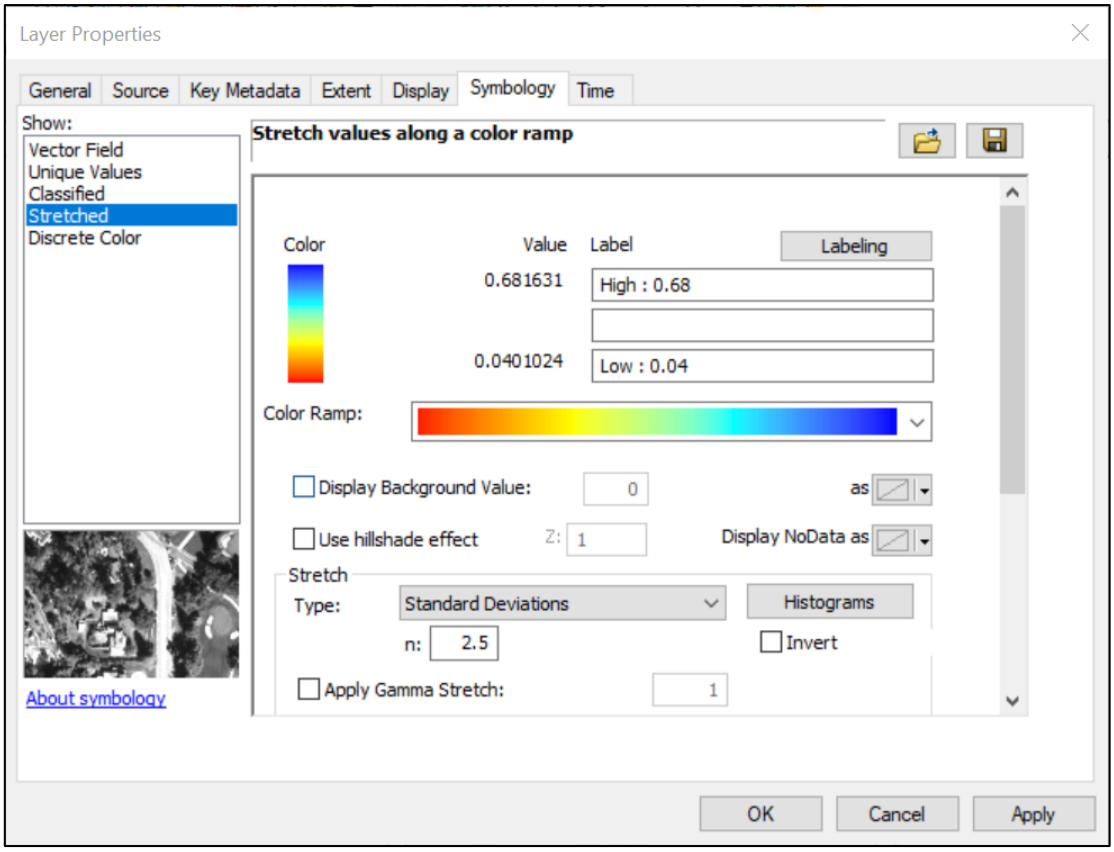


Create a map of coral cover

1. In the main menu, select View > Layout View.
2. Use the Zoom and Pan tools  to position the map appropriately within the Layout.
3. Change the layer names: In the Table of Contents, right click on CairnsPredMn and select Layer Properties. In the Layer Properties window, click on the General tab and change the Layer Name as shown below. Click OK. Notice that the layer name in the Table of Contents changed. Do the same thing for the Cairns_Cooktown polygon layer and name it Cairns/Cooktown Management Area.

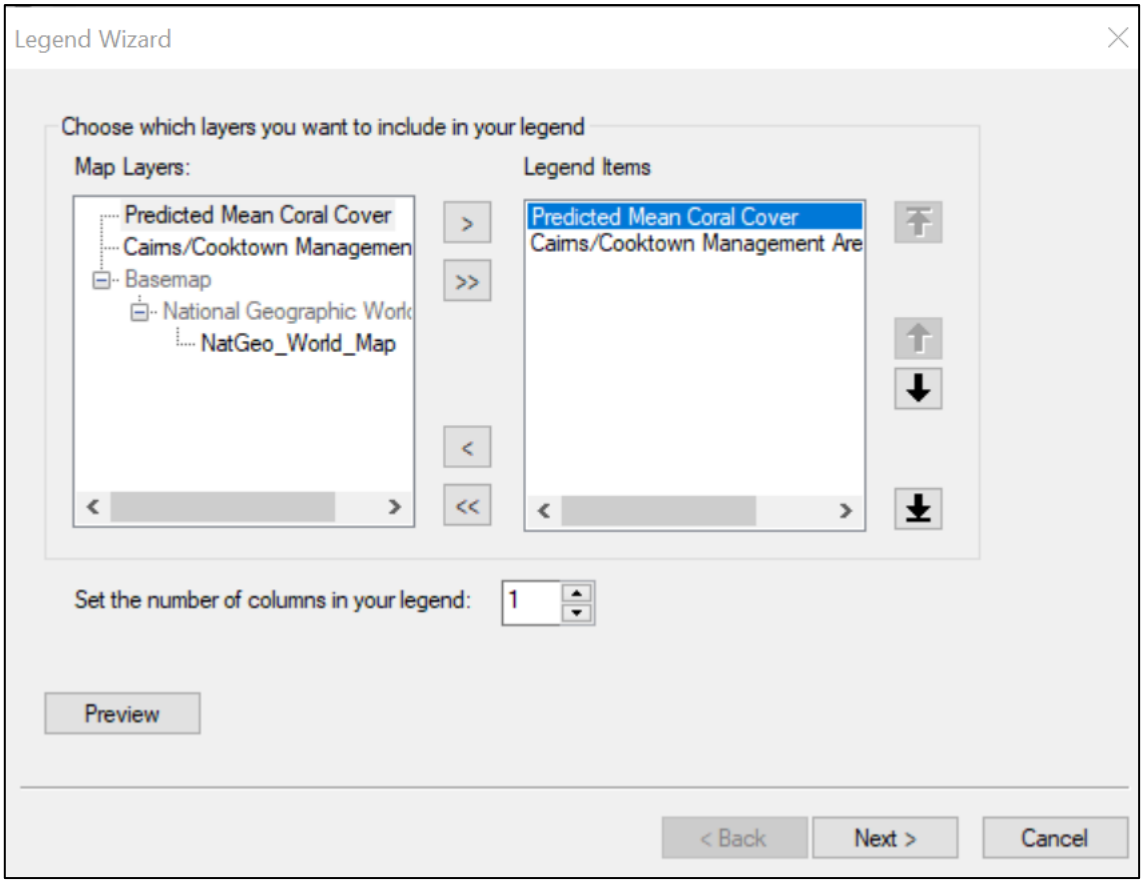


4. Change the numeric labels: In the Table of Contents, right click on CairnsPredMn and select Layer Properties. In the Layer Properties window, click on the Symbology tab. Make sure that Stretch is selected in the left-hand pane. Under Label, edit the values to include the desired number of decimal places. Here we have included two decimal places in the Low and High labels. Click OK.



5. To insert a map legend, go to the main menu and select Insert > Legend. This will open the Legend Wizard.

    a. The layers included under Legend Items will be included in the legend. Select layers by clicking on them and use the left and right arrows to move layers from and to Map Layers and Legend Items, as shown below. Click Next.



b. Change the Legend title, including the font type and size as desired (or accept defaults). If you do not want a legend title, uncheck the Show box. Click Next.

c. Select the dropdown menu under Background and select White. Click Next.

d. Change the size and shape of the symbols in the legend as desired, or accept the defaults, and click Next.

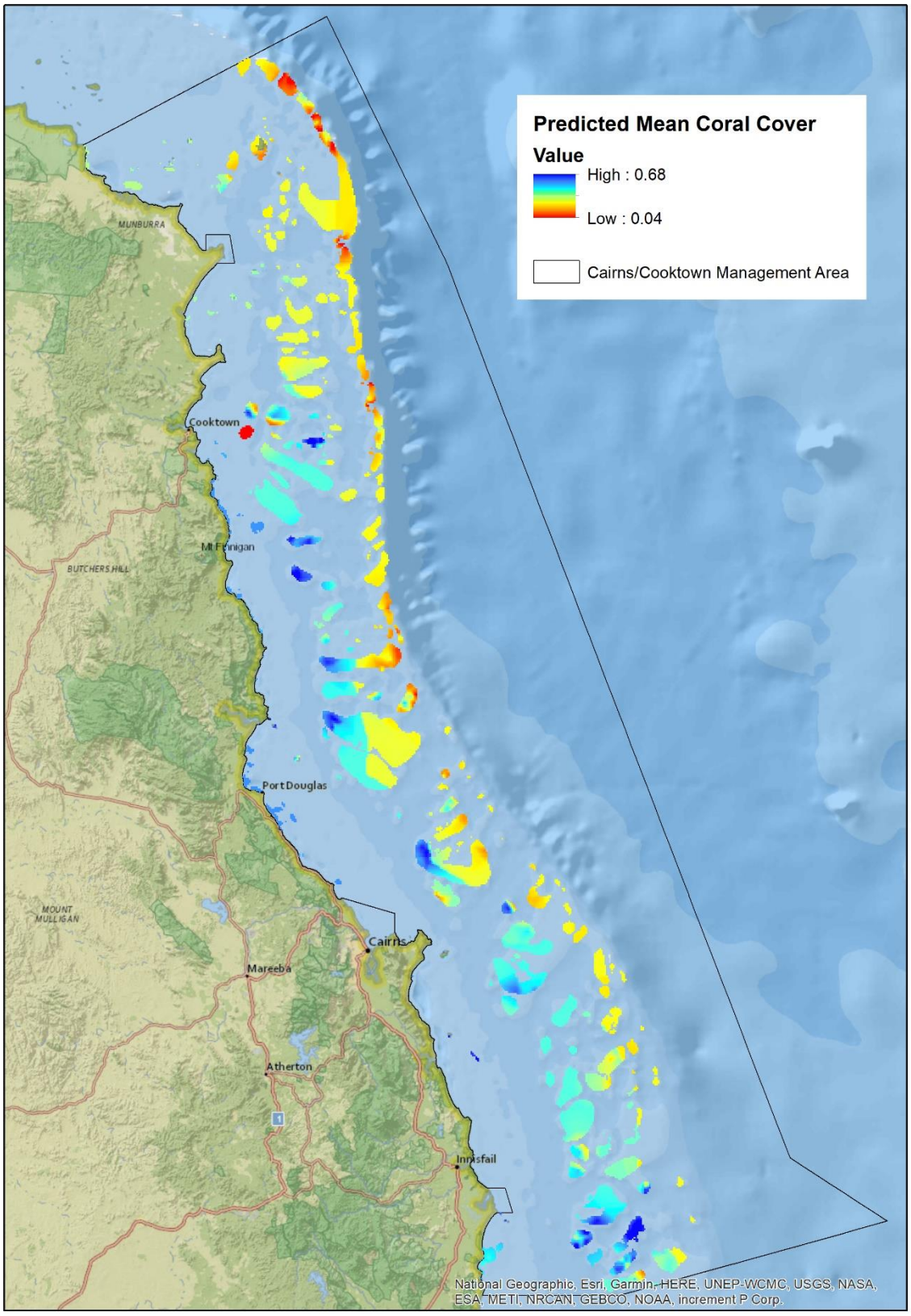
e. Select the spacing between legend items, or accept the defaults, and click Finish. This inserts the legend into the Layer View.

f. Drag the legend to the desired location.

g. To modify an existing legend, simply double click on it to open the Legend Properties window.

6. Other map features, such as scale bars and north arrows, can also be inserted into the map. Options to do this can be found by going to the main menu and clicking on Insert.

7. To save the map to a file, go to the main menu, select File > Export Map. This will open the Export Map window. Navigate to your working directory and give the new file a name. Click on the dropdown menu next to Save as type to see the various options for output file types.


Predicted Mean Coral Cover
Value
High : 0.68
Low : 0.04
Cairns/Cooktown Management Area
MUNBURRA
Cooktown
Mt Finnigan
BUTCHERS HILL
Port Douglas
MOUNT MULLIGAN
Cairns
Mareeba
Atherton
Innisfail
National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.