TRAINING SESSION 7:

Managing and accessing your imagery with ArcGIS

User Guide

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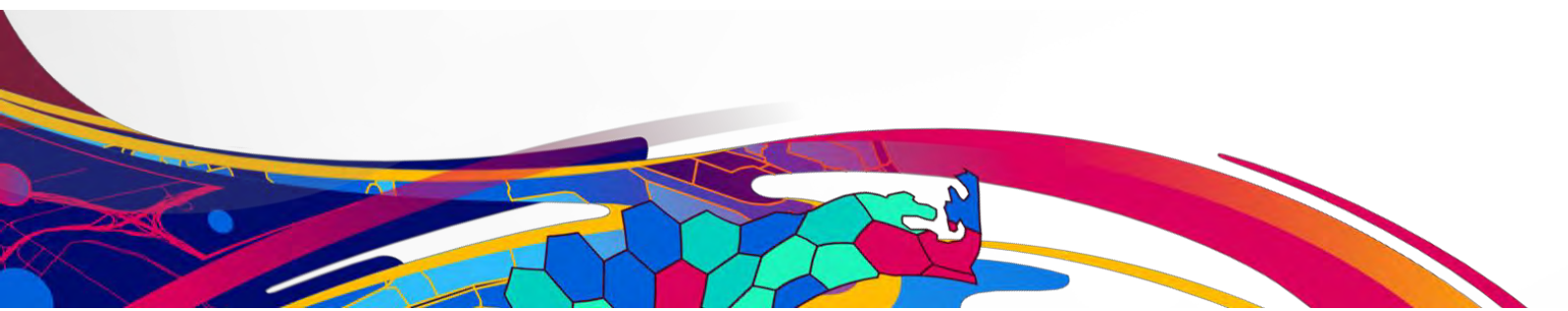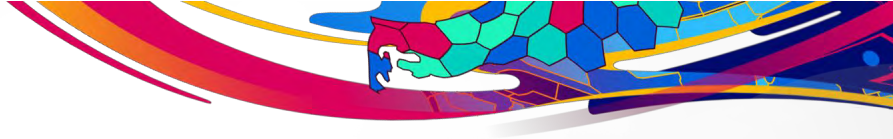
**Managing and access your imagery with ArcGIS**

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Section 1

Load imagery from metadata

1. Open ArcGIS Pro and load the Managing and access your imagery with ArcGIS project.
2. Open the Sentinel2 Map view.
3. In Catalog (View on the right hand side of the project), expand the **Folders** item and navigate to Data (This will be the primary folder with all the data for this training session).
4. Expand the **S2B_MSIL2A_20230821T073619_N0509_R092_T35JQH_20230821T114309** Sentinel 2 folder.
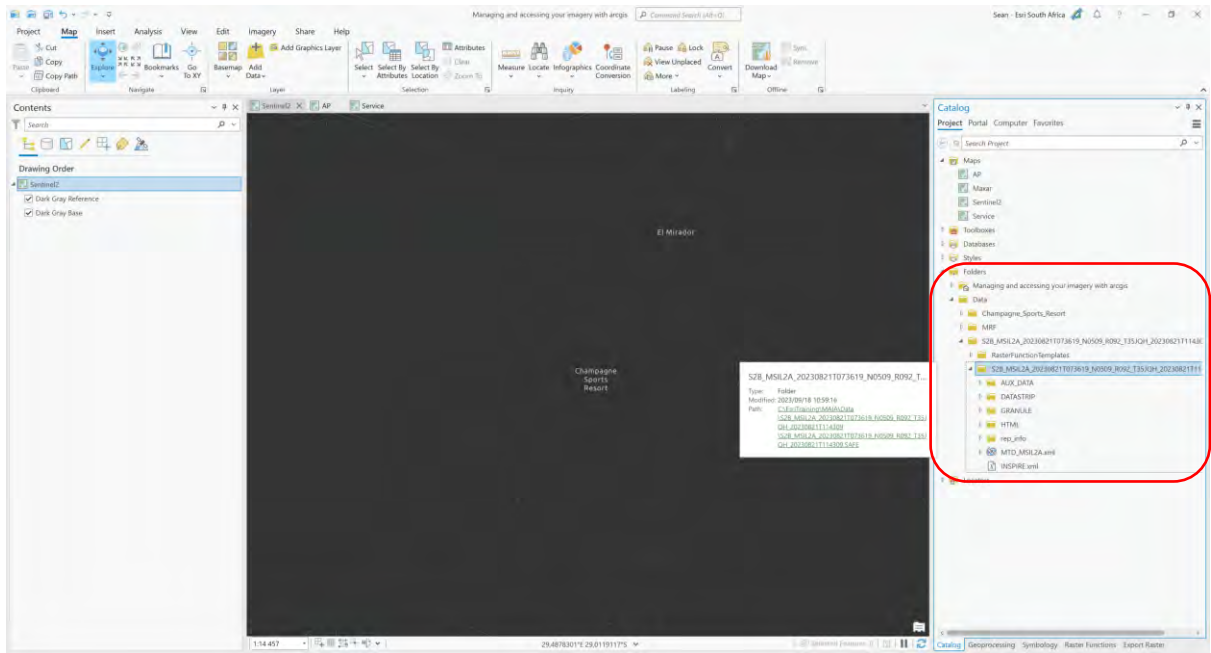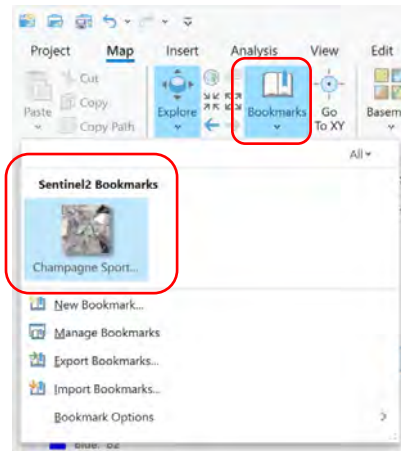
5. Expand the **MTD_MSIL2A.xml** file
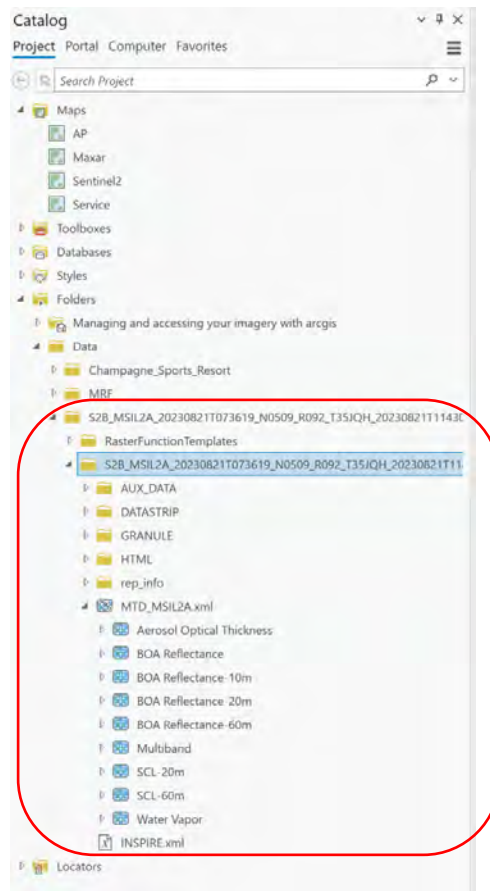
6. Note the icon of the data:
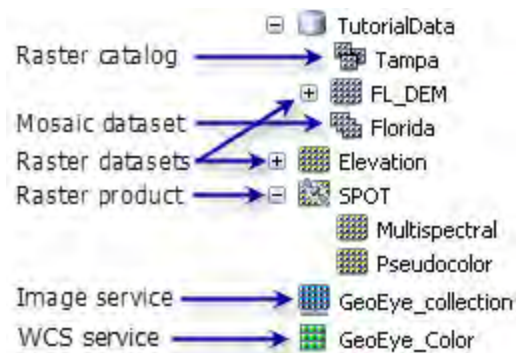
7. Load the **BOA Reflectance 10m** raster. You can right click on the layer and select the option to add to current map or drag the layer into map space.

8. Use the **Bookmarks** to zoom to the location of the conference.

9. In the **Raster Layer** ribbon you can change the stretch, band combination, resampling and other settings of the image being displayed.
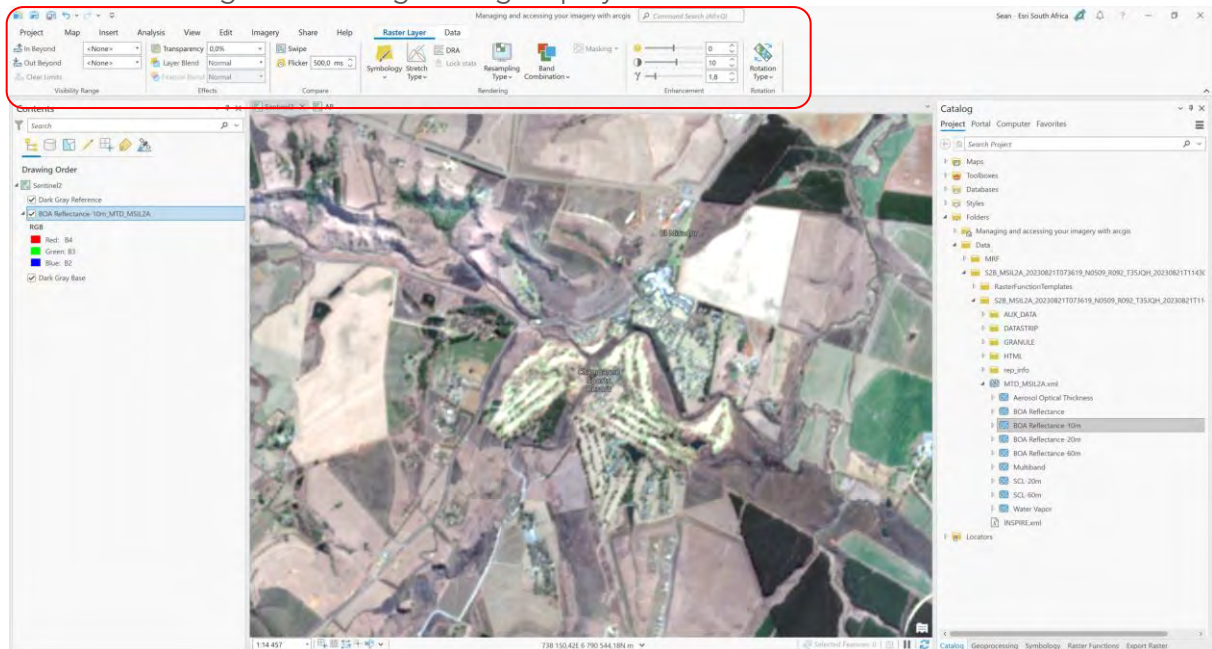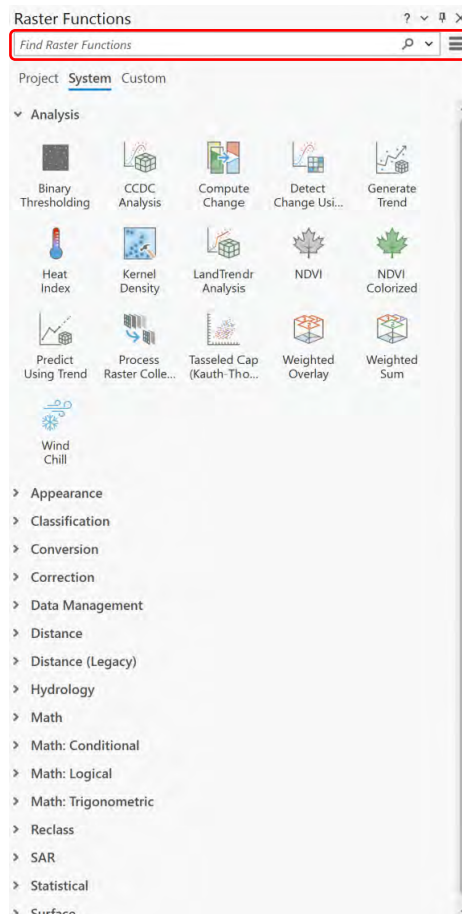

10. Change the stretch type.
11. Change the resampling.
12. Change the band combination.
13. Apply DRA and zoom in and out to see the change.
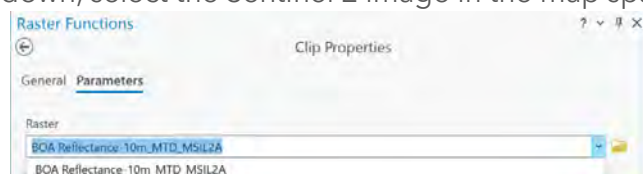
14. On the **Imagery** ribbon select the **Raster Functions** icon to open the Raster Functions dialog.
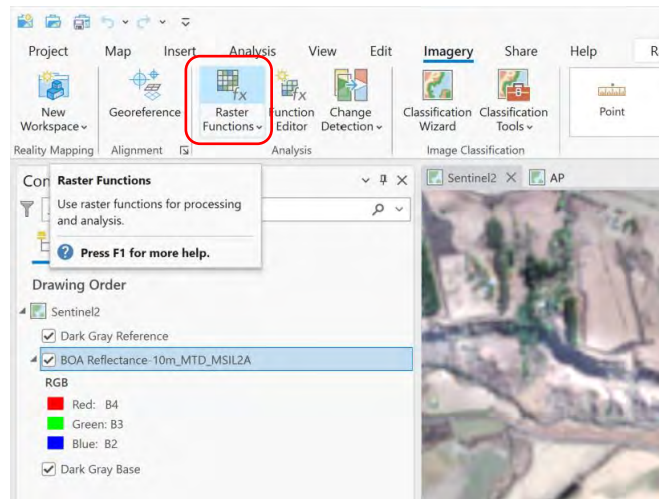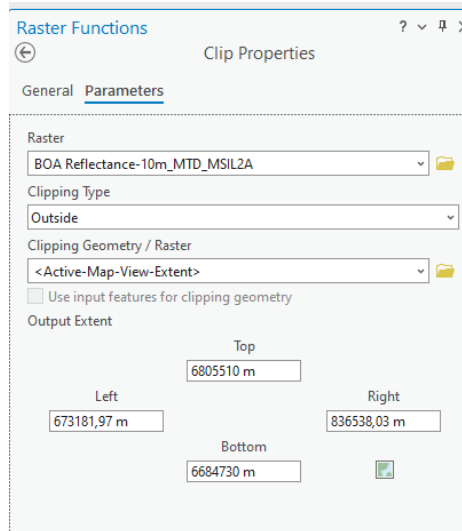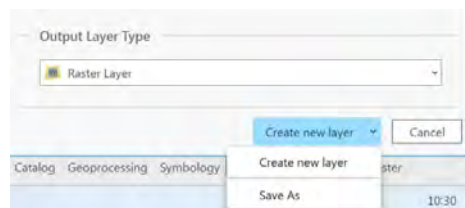

15. Search for the **Clip** tool.

16. On the **Raster** drop down, select the Sentinel 2 image in the map space.

17. Run the clip tool to clip your image to the current display extent.

18. When running the tool, there are a few options to select between creating a new layer or exporting the result.
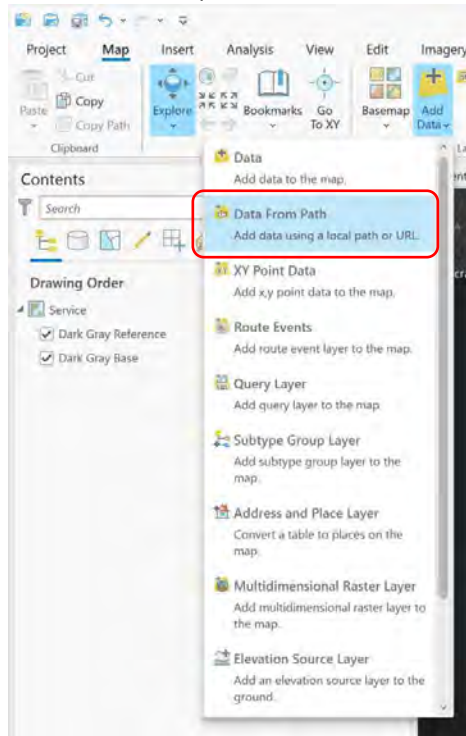

19. Click the Create New Layer button to execute.

Section 2

Load data from a service
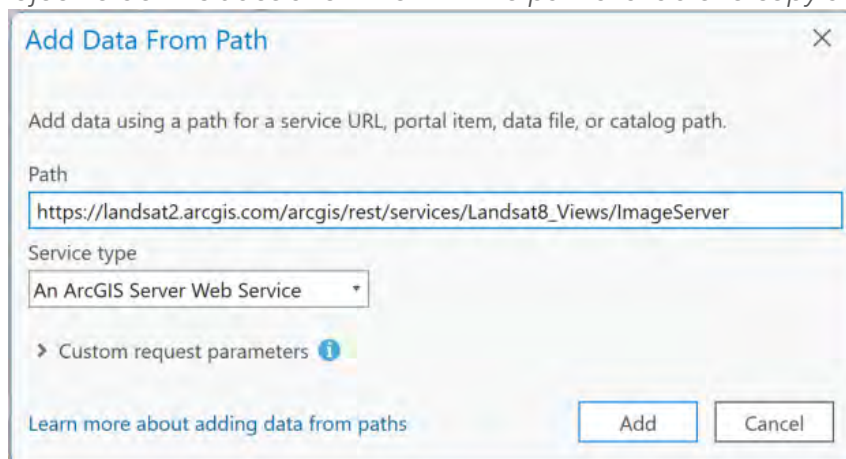
1. In ArcGIS Pro, open the **Service** map
2. On the **Map** ribbon select the Add Data option and then the Data From Path option.

3. In the **Path** input dialog, paste the following service in and then click Add:
   https://landsat2.arcgis.com/arcgis/rest/services/Landsat8_Views/ImageServer
   a. *The project folder includes a text file with the path available to copy and paste in.*

4. When the service loads, you will see there is a renderer enabled for Agriculture.
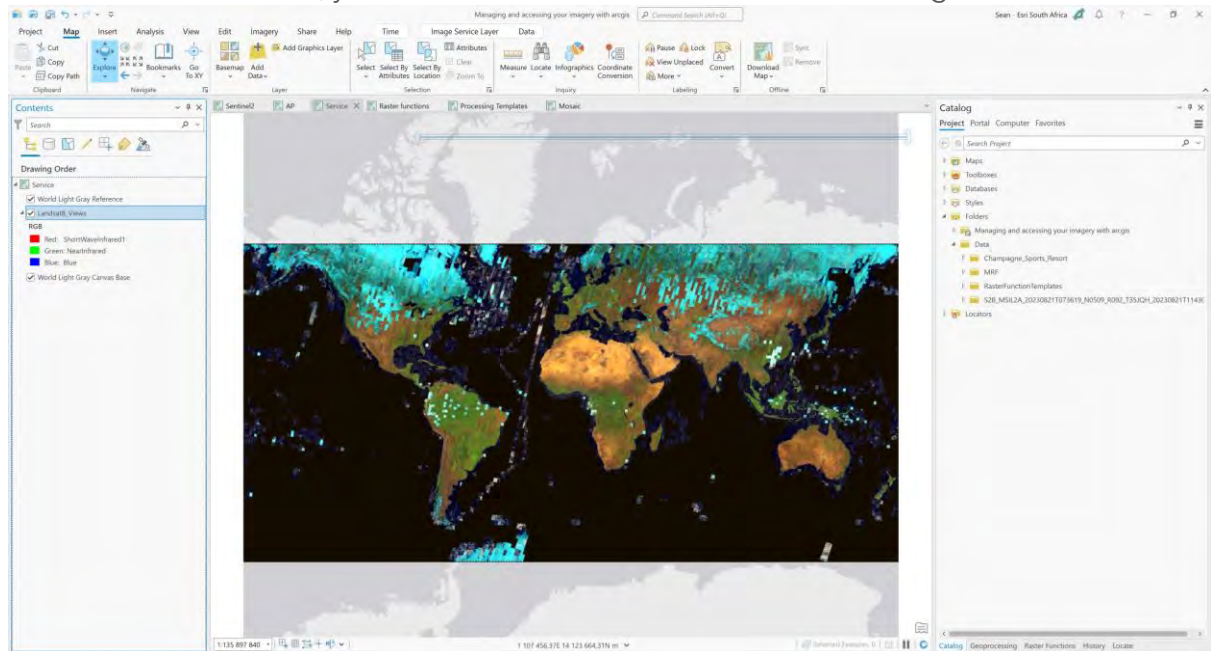
5. Double click the layer in the contents pane to open the **Properties**.
6. Navigate to the **Processing Templates** section and change the template to **Natural Color with DRA**.
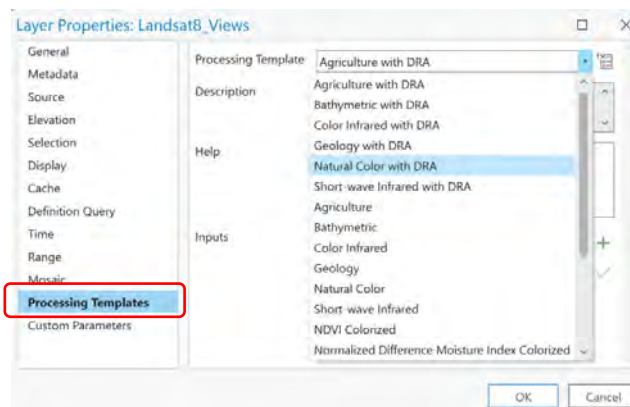
7. Note the time slider that became available when you loaded the service.
8. Explore the time slider in an area of interest (not all dates have imagery).
9. You have the ability to filter the data using a definition query's.
10. Select any location on the map and look at the **Pop-up** and the number of images returned.

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11. Open the properties of the layer and create a new definition query limiting the cloud cover to below 1% (1) and for imagery captures after 1 January 2023. The SQL code is available in the Links text file in the data folder.
   a. CloudCover < **1** And AcquisitionDate > timestamp '2023-01-01 15:30:02'
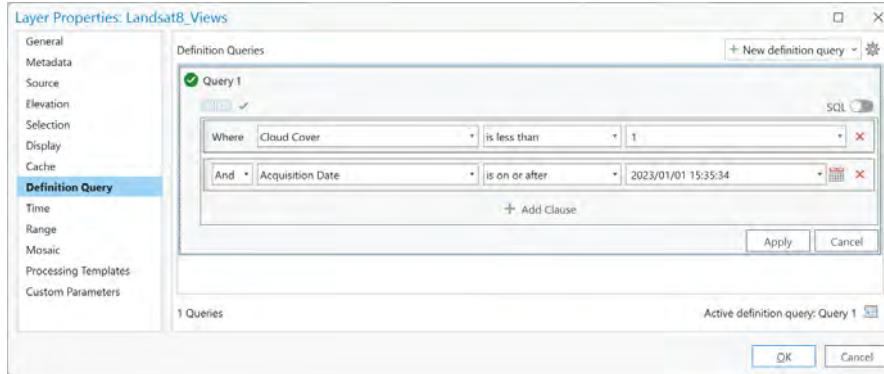
12. Select any location on the map and look at the pop-up and the limited number of images returned.

Section 3

Load data from file
1. Open the **Raster Functions** map tab.
2. From the data folder, drag the **MSS_20221215_CSR.tif** into the map space
    a. C:\EsriTraining\MAIA\Data\Champagne_Sports_Resort\Maxar_20221215\Clipped _Imagery\MSS_20221215_CSR.tif
3. A World view satellite image is loaded into the map space.
4. In the content pane, right click on one of the bands to see the list of bands available.
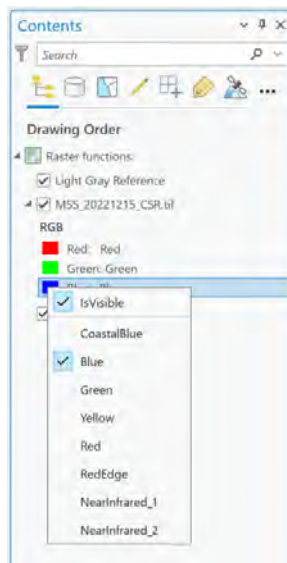

5. As we have a multispectral image, we can also look at some of the options in the **Raster Layer** tab under the **Band Combination** icon.
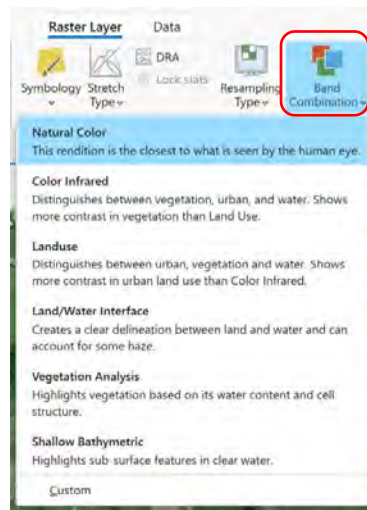
6. To prep our data for NDVI analysis, we want to extract the Red and Near-Infrared.
    a. NDVI is a dimensionless index that describes the difference between visible and near-infrared reflectance of vegetation cover and can be used to estimate the density of green on an area of land (Weier and Herring, 2000).
7. In the Raster function tab, search for the **Extract Bands** function.
8. From the Raster drop down, select **MSS_20221215_CSR.tif**

9. Change the **Method** to **Band Names**.
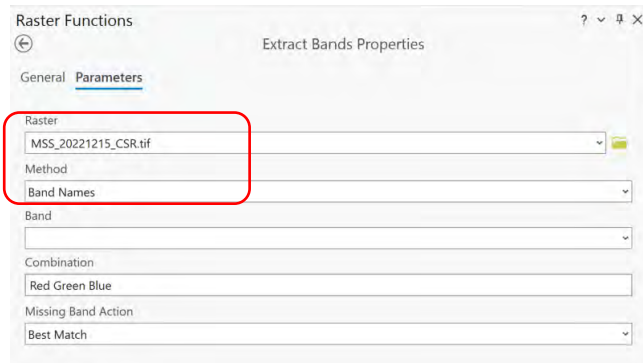
10. Clear the **Combination** input box.
11. Then select from the **Band** drop down the Red and then Near Infrared bands.
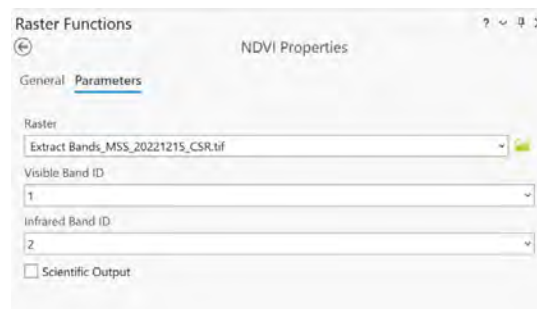

12. Click the **Create New Layer** button to execute.
13. In the Raster function tab, search for the **NDVI** tool and run it with band 1 and 2 on the newly created image layer.
14. From the Raster drop down, select **Extract Bands_MSS_20221215_CSR.tif**
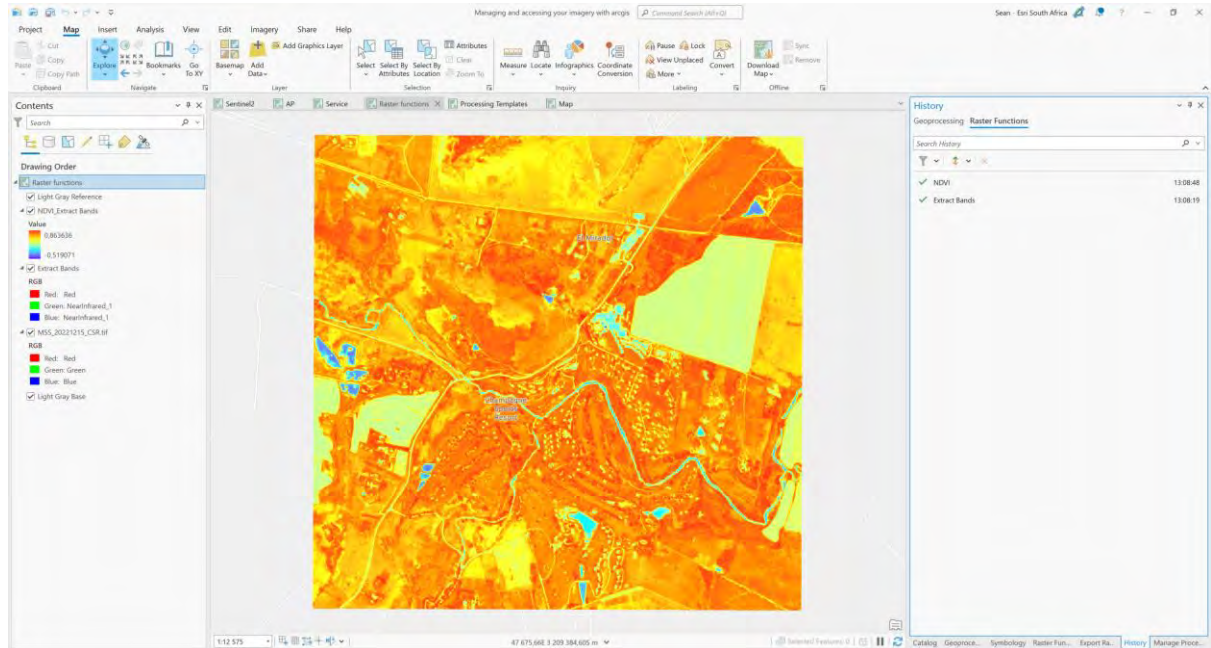15. Make the Visible Band ID = 1
16. Make the Infrared Band ID = 2

17. Optionally you can enable the **Scientific Output** option.

18. Your result should be a grey scale image or look like the following:
   a. If you get a grey scale image, change the color scheme in the symbology options.

19. To explore the functions that have been run on the data to create these virtual layers, you can right click on the **NDVI_Extract** Bands layer and select the **Edit Function Chain**:
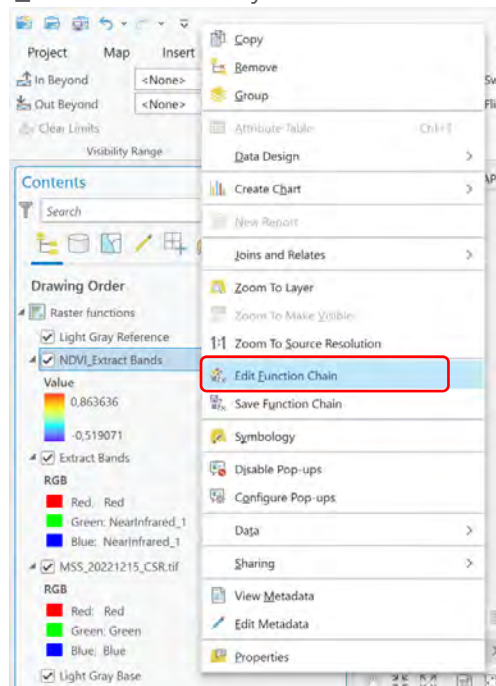
20. A new window will open up where you can view the chain of functions and edit them if required.
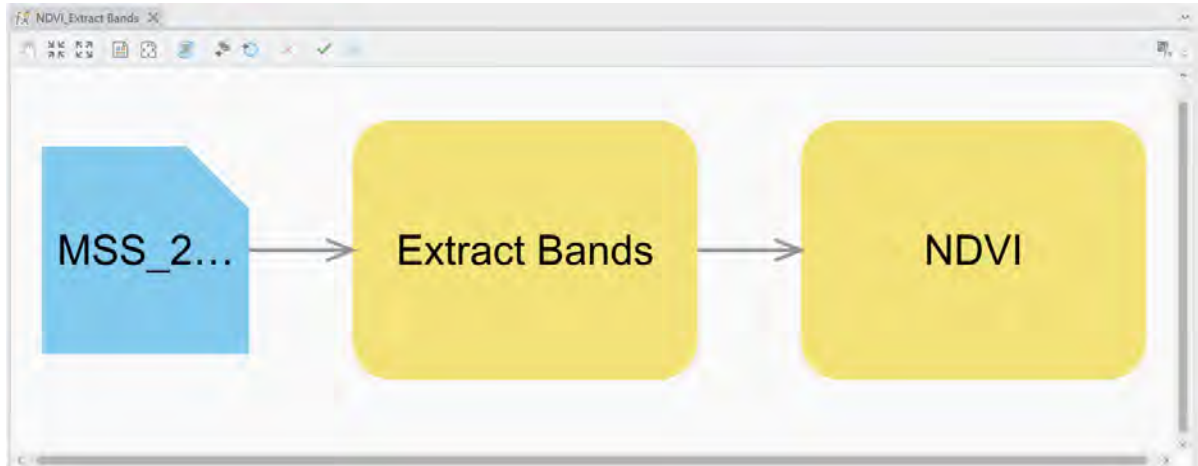
21. To export the functions that have been run on the data to create these virtual layers, you can right click on the NDVI_Extract Bands layer and select the **Save Function Chain** option:
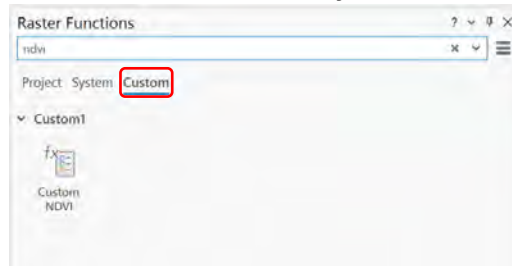

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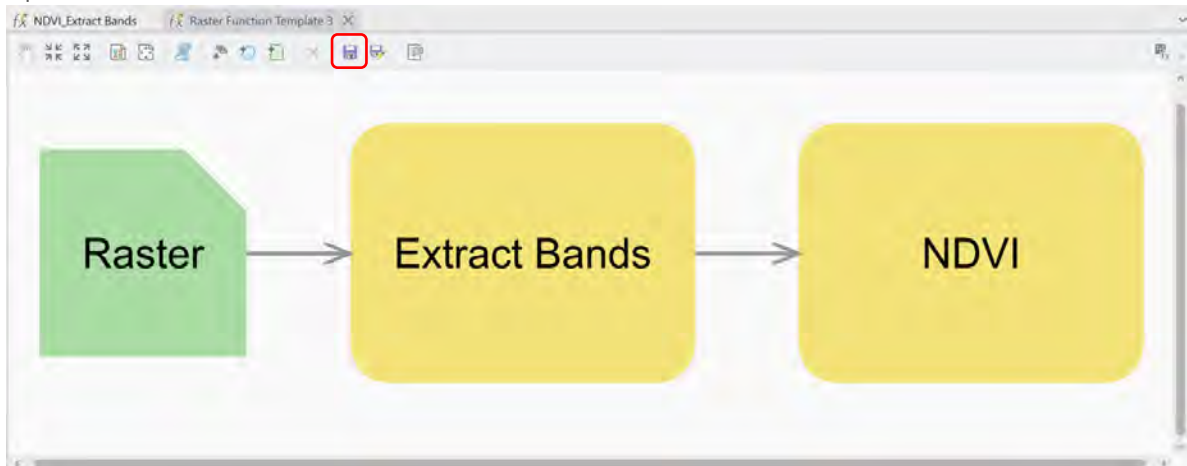
22. Save the function chain to be used with other imagery when it gets updated.
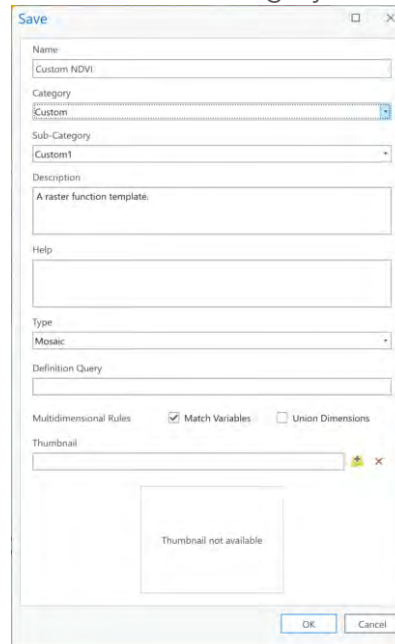
23. Once saved you can find your custom function chain in the custom tab of the **Raster Functions** dialog:
   a. (Make sure to clear the search bar to list all your custom function chains)

24. To update the function chain you can right click on the function chain and select the edit option.
25. Add a Stretch function onto the end of the chain by dragging function from the Raster Functions dialog into the chain space.

26. Drag a line from the **NDVI** to the **Stretch Function** to link the two items.
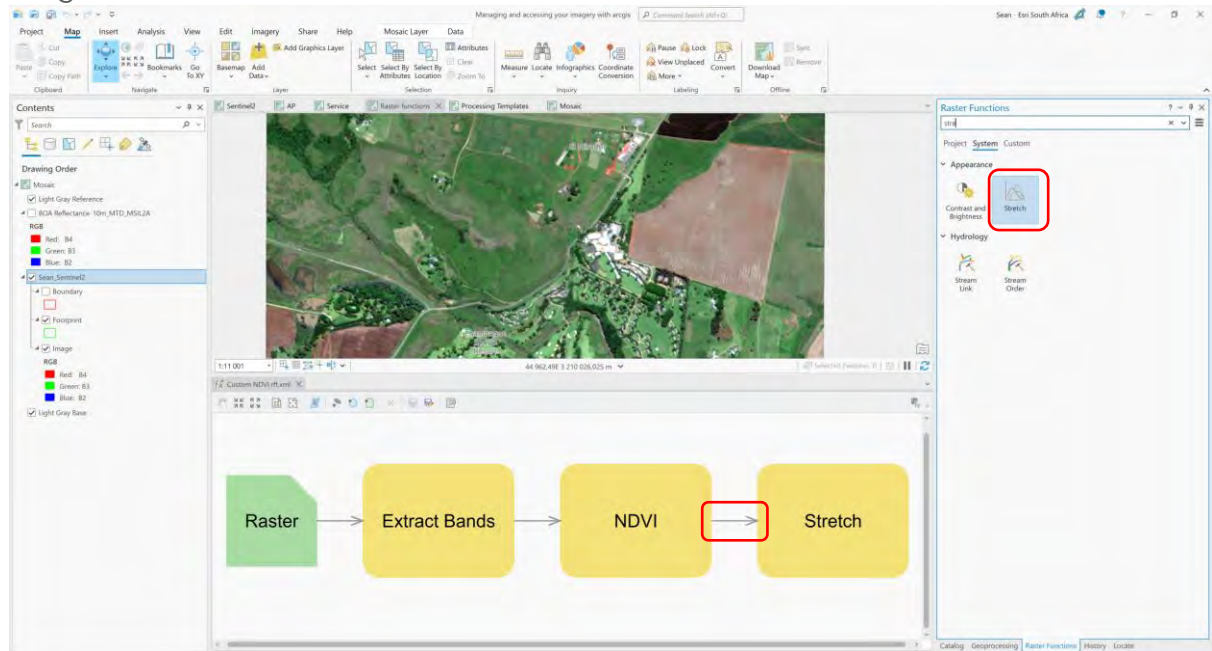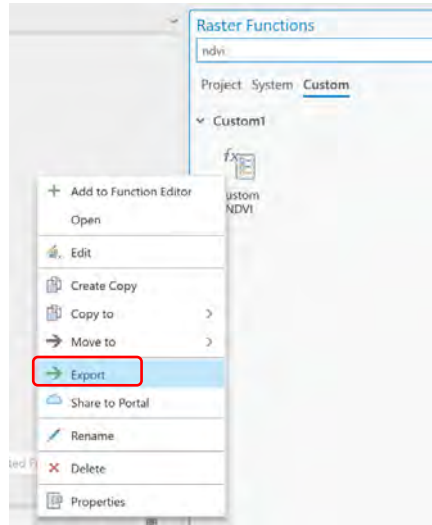

27. Double click the **Stretch** function the modify the parameters.
28. Under the Statistics group, enable the **Estimate Statistics** and the **Dynamic Range Adjustment** and click **OK**.
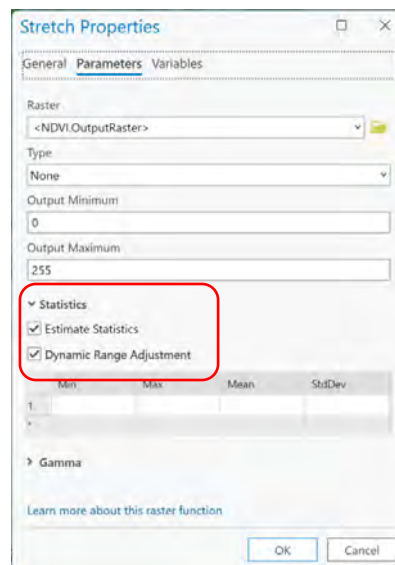
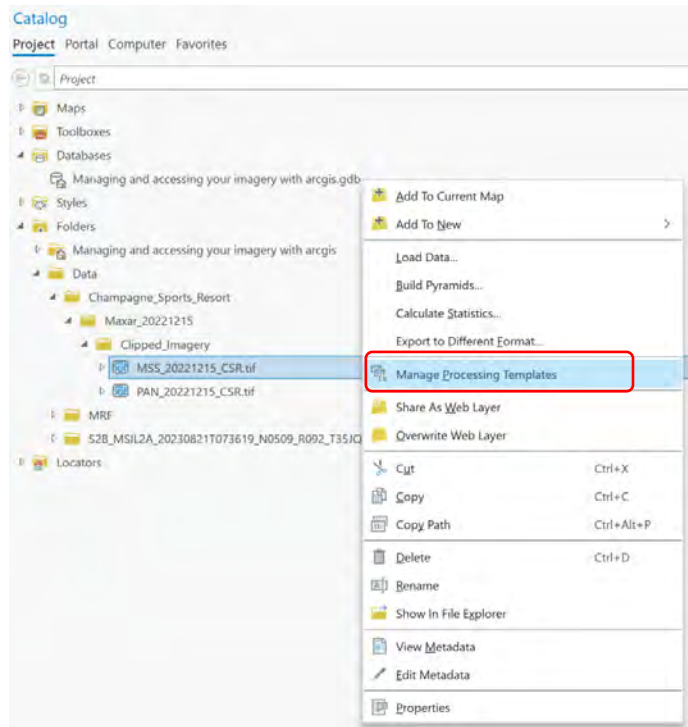29. In the editor window, click the **Save** button.

30. Right click on your Custom function you have created and select the Export option. Save the file to your project folder:

Section 4

Using custom function chains on new imagery

1. Open the **Processing Templates** map tab.
2. In your **Catalog** view, right click **MMS_20221215_CSR.tif** and select the **Manage Processing Templates.**


3. Select the import arrow (Next to the search bar)

4. Navigate to where you have you previously save the **Raster Function Chain** in the previous exercise and load it:


5. From **Catalog** add the image to the map space by dragging it in.
6. In the contents pane, open the **Properties** of the image and go to the processing templates.
7. On the drop down you will find the template previously created. Select your **Custom NDVI** template then select **OK**.
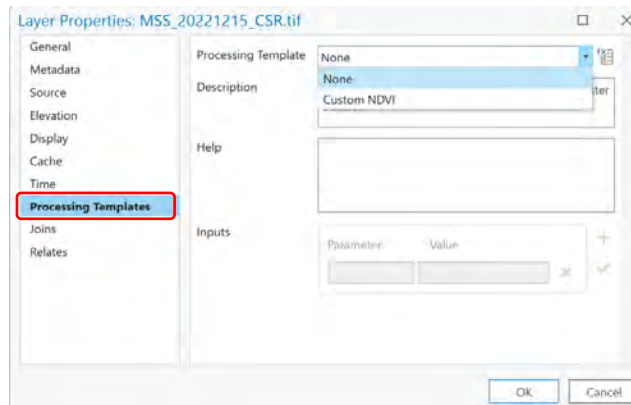
Section 5

Creating Mosaics

1. Open the **Mosaic** map tab.
2. You can create a mosaic in a Geodatabase.
3. Expand the **Database** folder in the **Catalog** view.
4. Right click on the project database and select **New – Mosaic Dataset.**
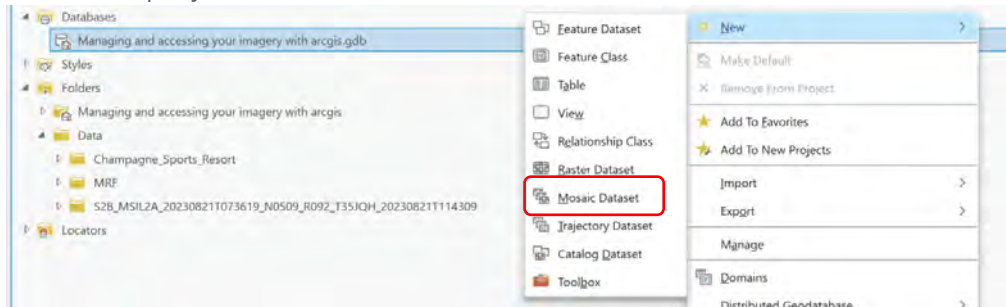
5. Give the mosaic a name.
6. Change the projection to the same as the input Sentinel2 scene.
   a. You can click the Projections settings icon in the tool and search for **WGS_1984_UTM_Zone_35S** and select the appropriate projection.
7. Define the **Product Definition** from the drop down as **Sentinel 2 MSI**.
8. Update the **Pixel Type** to 16-bit unsigned.
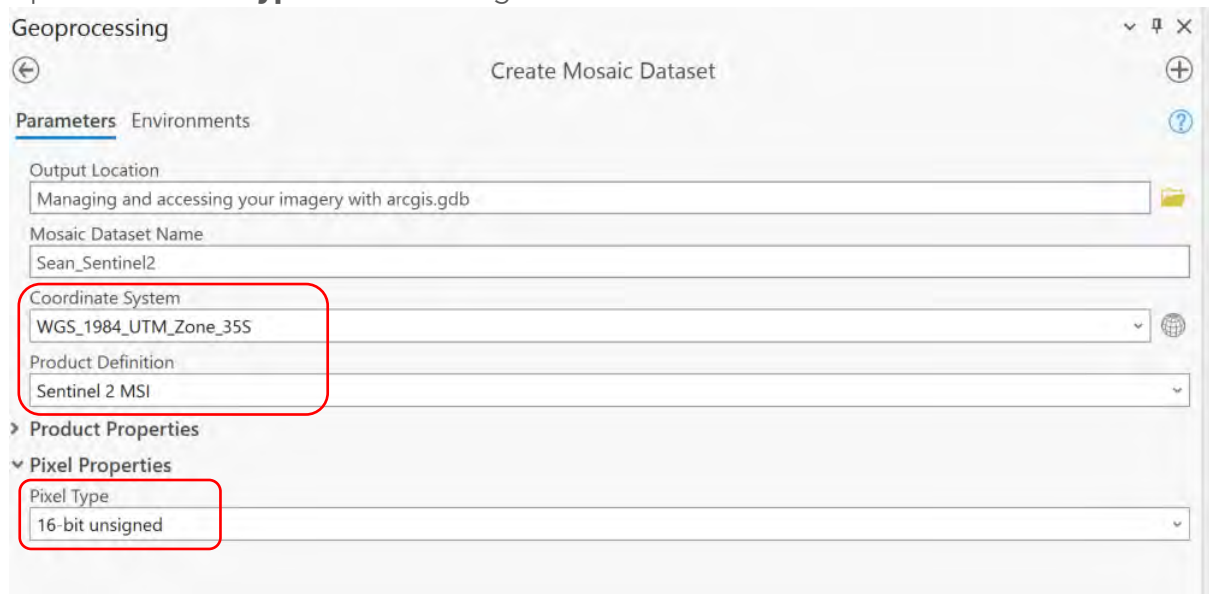
9. Click **Run**.
10. In the **Catalog** view, right click on the new mosaic.

11. Select the **Add Raster** option.
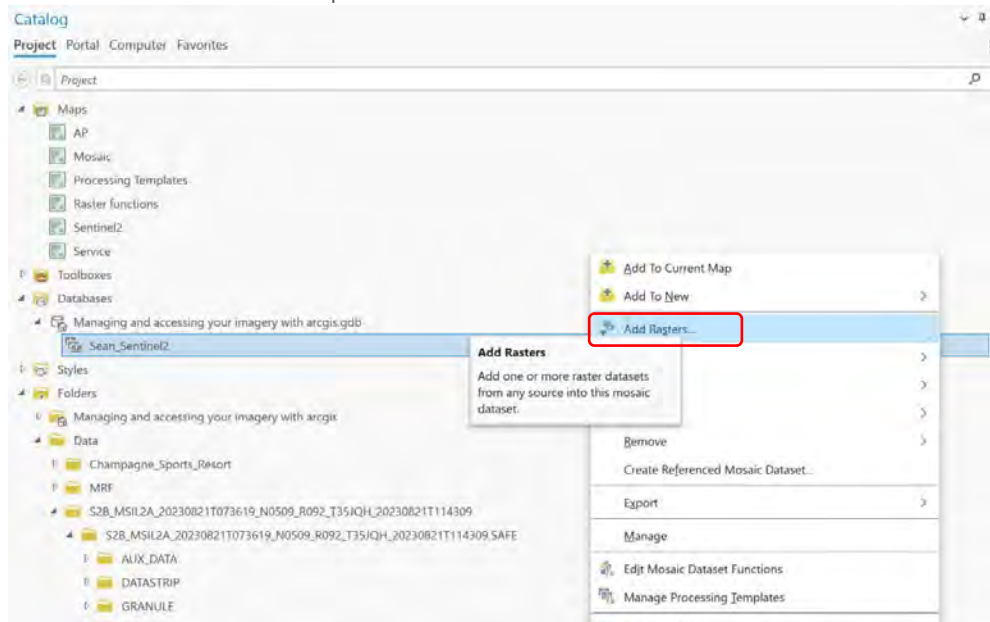
12. Update the Processing Template to **BOA Reflectance-10m.**
13. On the Input Data option, select the folder and navigate to the folder where the metadata file resides:
\EsriTraining\MAIA\Data\S2B_MSIL2A_20230821T073619_N0509_R092_T35JQH_20230821T114309\S2B_MSIL2A_20230821T073619_N0509_R092_T35JQH_20230821T114309.SAFE\MTD_MSIL2A.xml
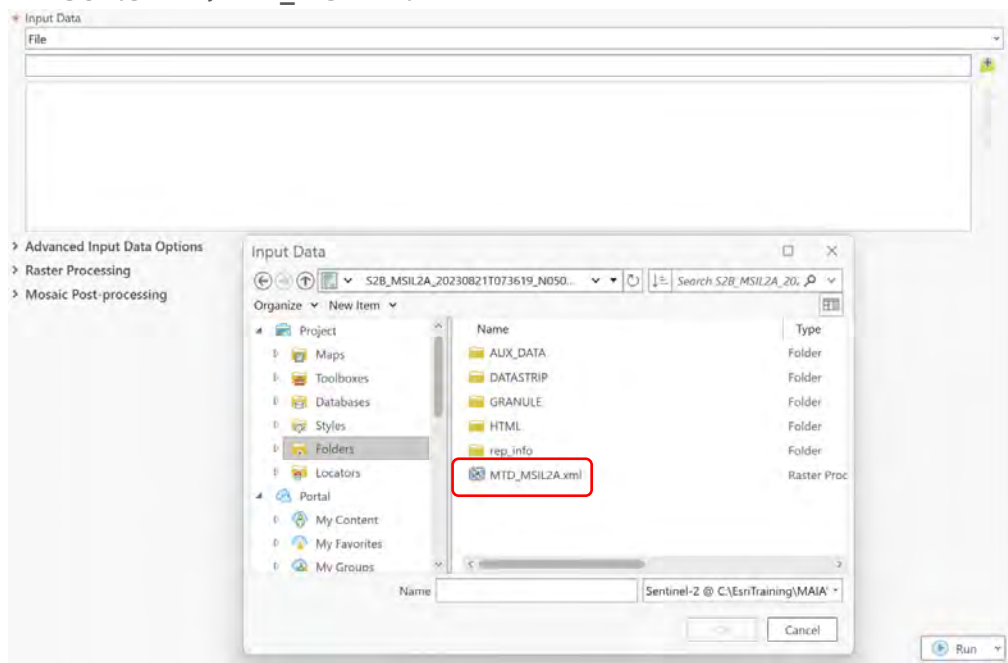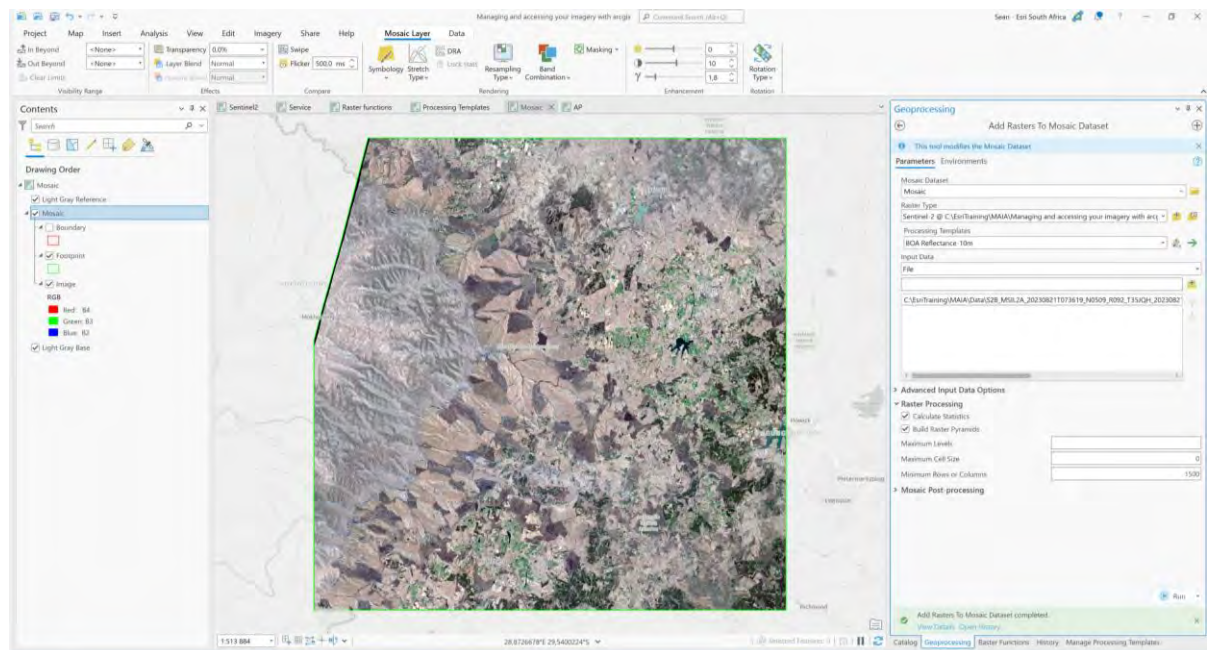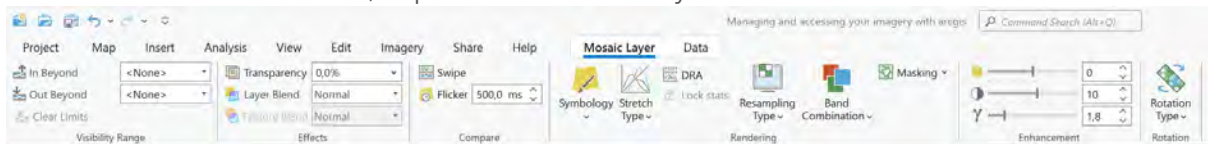

14. Select the .xml file.

15. On the Raster Processing group, tick the box for Calculate Statistics and Build Raster Pyramids.
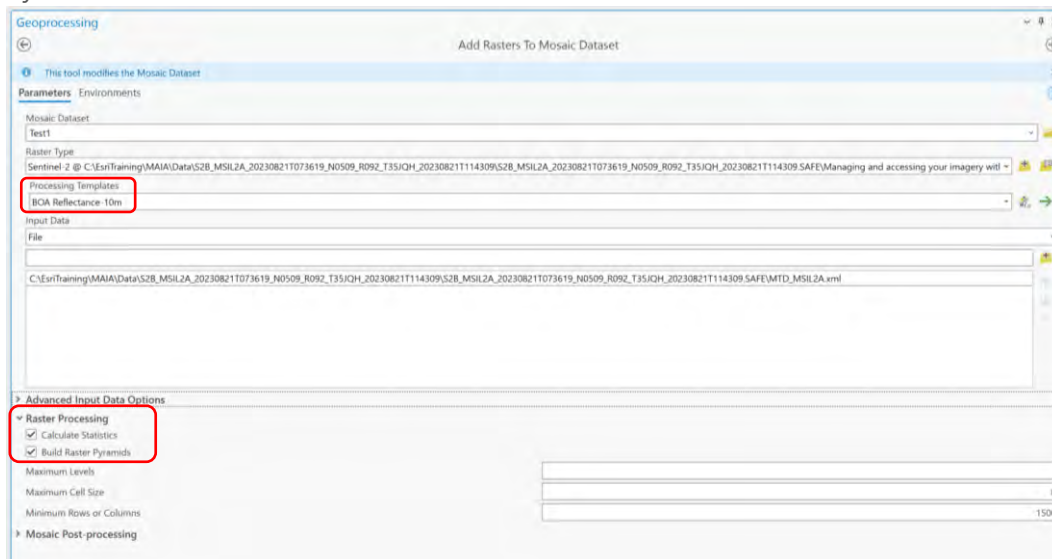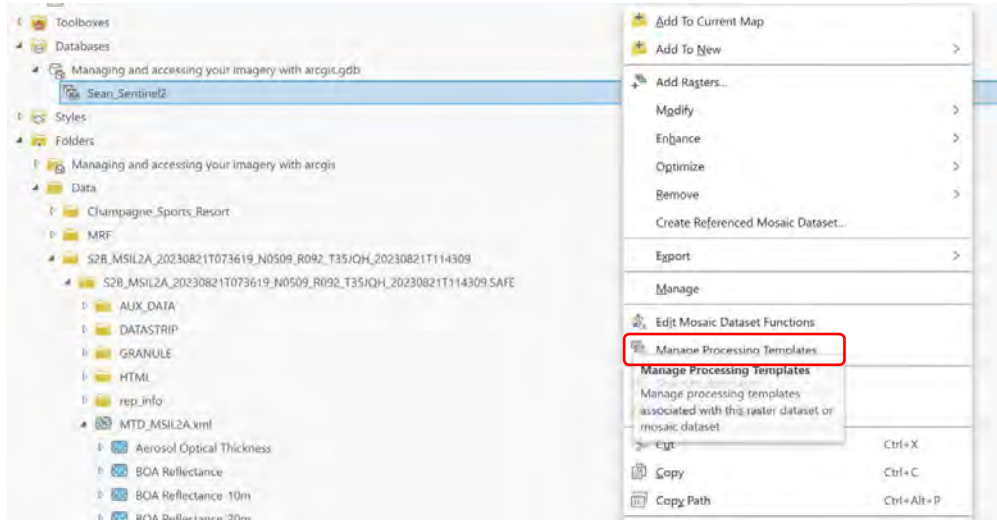

16. Click **Run**

17. Once the mosaic is created, explore the Mosaic Layer Ribbon

Section 6
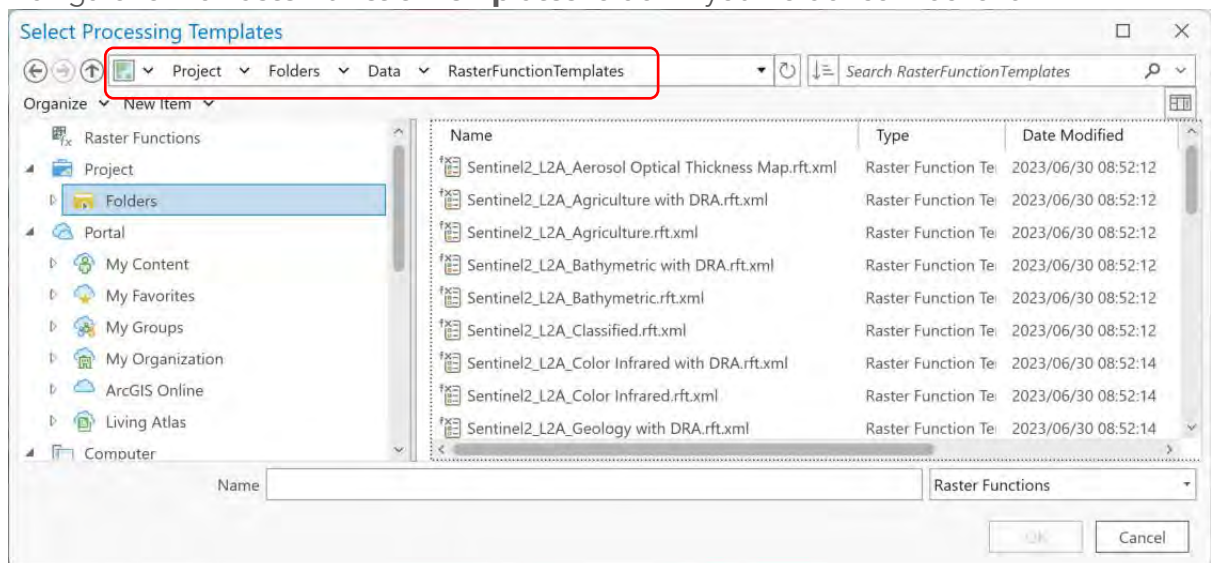Adding Processing templates to Mosaics

1. Stay on the **Mosaic** map tab.
2. Navigate the database where you created the mosaic and right click on the mosaic.
3. Select the option to **Manage Processing Templates**.

4. Select the import arrow (Next to the search bar).

5. Navigate to the **RasterFunctionTemplates** folder in your folder connections.


6. Select all the xml files and click **OK**.
7. In the Contents pane, double click your mosaic to go to **Properties**.

8. Select the **Processing Templates** group.
9. On the **Processing Template** drop down, view the templates that you have just included in your mosaic.
10. If you find that some of the templates are returning a blank image, then apply **DRA** from the **Mosaic Layer** ribbon.
    a. If your results present as a grey scale image, configure the symbology settings.
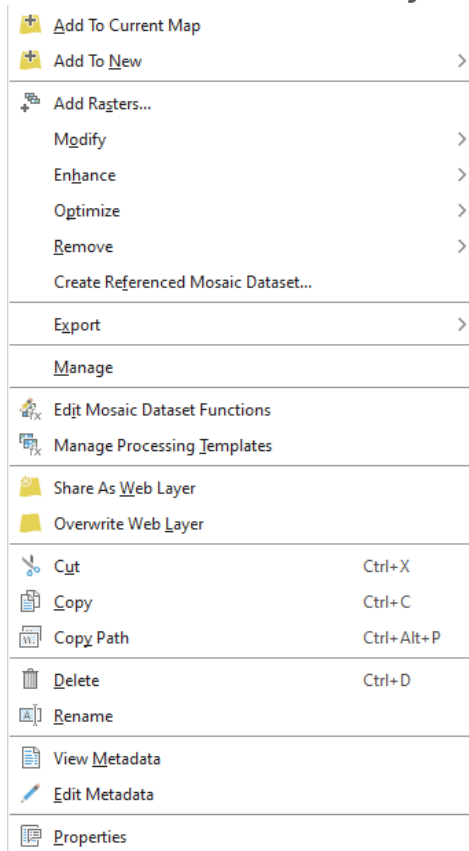
Section 7

Publish an image service

1. Open the **AP** map tab.
2. Drag in the **CoT_AP_Mosaic** into map space.
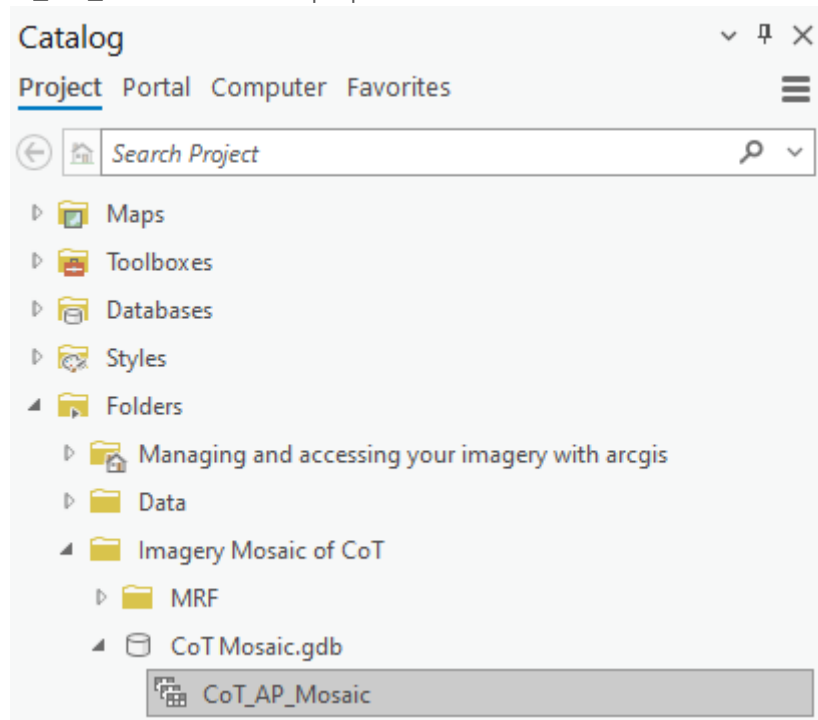
3. View the mosaic and note that the source of this mosaic is from a file server.
   a. This allows for the folder where the imagery is hosted to be registered with the server. This means we can publish the data and not have to copy it onto the server.

4. Right click on the **Mosaic** and select the **Share as Web layer** option.

5. Update the name, Summary and Tags for the item.
6. Under the Layer and Data Type section, ensure the option to Reference registered data is selected.

7. Under the **Location** section, change the **Server and Folder** option to the image server:
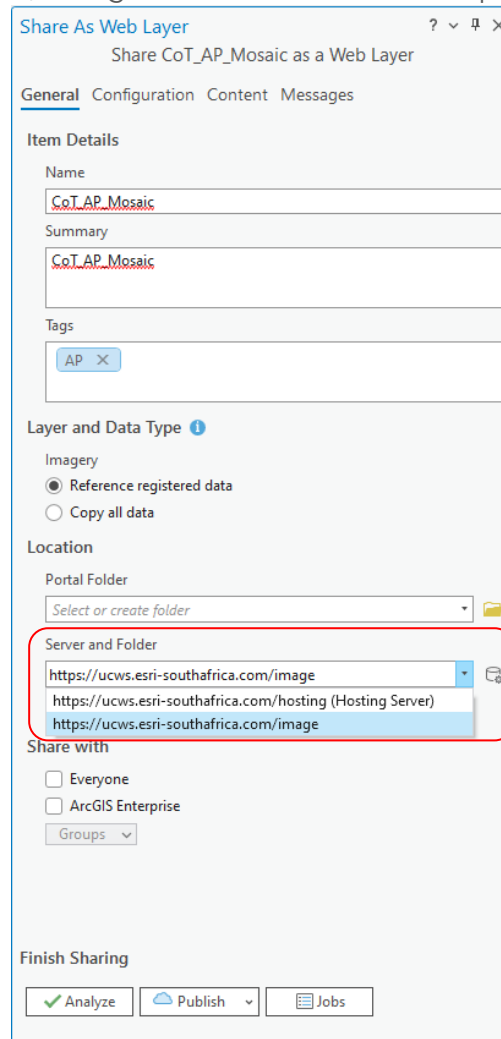
8. Click the **Analyze** button.
9. Note the warnings and explore the **Help** options.
10. Click the **Publish** option.
11. Navigate to your **Catalog** and select the **Portal** content.
12. Listed under your content you can search for your mosaic and drag in into the map to access it.