

NASA ARSET Training

Advanced Webinar on using NASA Remote Sensing for Flood Monitoring and Management
March 23, 2016

Inundation Mapping over Malawi

Objective: Visualize, acquire and import into GIS the MODIS near real time (NRT) inundation data product

There are three parts to this exercise:

- 1) Access inundation data products through the MODIS Near Real-Time (NRT) Global Flood Mapping Product Portal.
- 2) Explore and acquire the available data products.
- 3) Import and visualize inundation data products in QGIS.

Part 1: Access MODIS NRT inundation data products through the MODIS Near Real-Time (NRT) Global Flood Mapping Product Portal

- Go to the MODIS Near Real-Time (NRT) Global Flood Mapping Portal:
<http://oas.gsfc.nasa.gov/floodmap>
- Click on the **plus icon** next in the **Data Viewer** (left hand menu)
- Click on **Africa**

NRT Global Flood Mapping

Data Viewer

- + Africa
- Asia
- Australia/NZ
- Europe
- North America
- South America

Product Description

Documents

Future Enhancements

News/Status

Mailing list

To subscribe to our mailing list to receive email notification of updates, please, click here.

Global Map

Click for ArcGIS Portal map interface

10° Flood Map Tile Production

For more information, please contact floodmap at lists.nasa.gov

NOTE: THIS IS AN EXPERIMENTAL PRODUCT AND SYSTEM

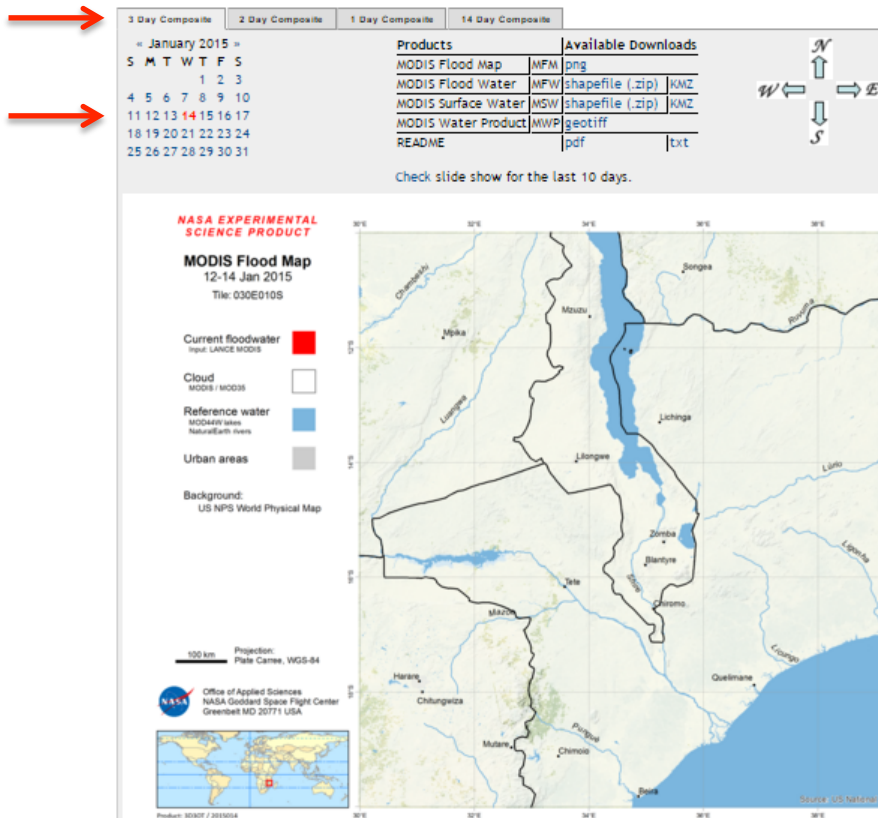
- Click on the tile that encompasses the targeted area of Malawi(030W, 010S)



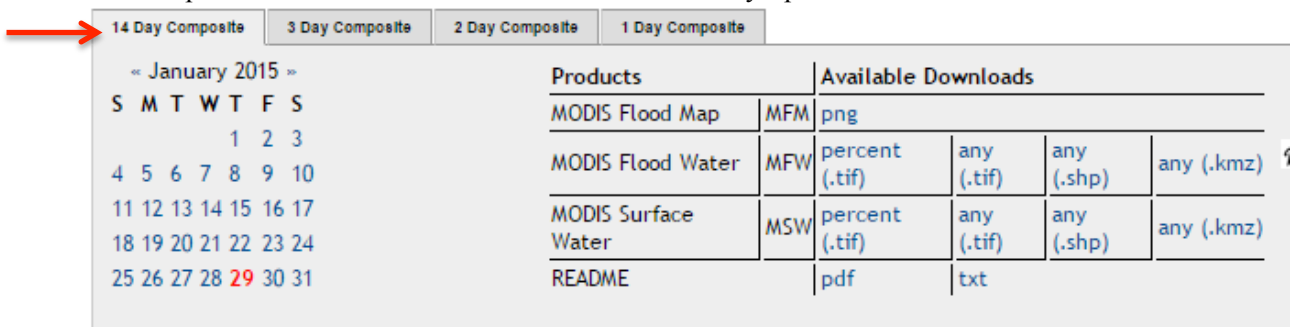
For more information, please contact floodmap at lists.nasa.gov

Heavy seasonal rainfall in January of 2015 created many acres of inundated land in Malawi and surrounding areas.

- Using the calendar in the top upper left, select '3 Day Composite' for **January 14, 2015**.



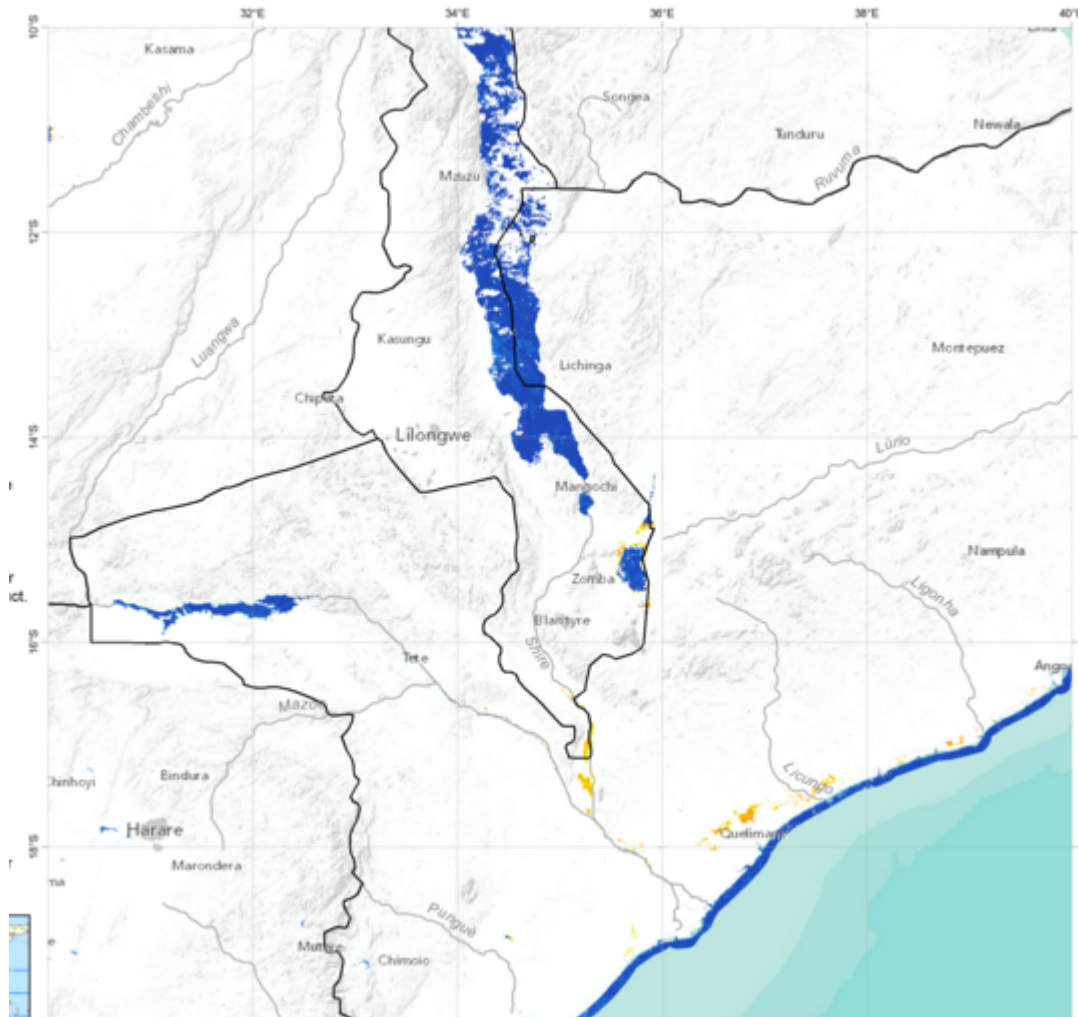
- Explore the map and legend. Do you see the indications of current floodwater in the map?
- If so, using the pointer, click on those areas on the map and zoom in closer.
- Using the calendar, view scenes from January 14^h through January 22th and note the dates that have the largest areas of floodwater.
- Next select **'14 Day Composite'** and see how the inundation maps change from 14-22 January. Do you see any differences between the inundated areas compared to **'3 Day Composite'**? Please explain your answer. Recall that the '14 day composite' flood map is the occurrence of water as the percent of clear observations over the last 14 days' products.



Part 2: Explore and acquire the available inundation data products

a) Explore the data products

- Select **June 22, 2015** and **14 Day Composite** tab



- View the products and available downloads lists.

b) Acquire the data products

- For **MODIS Flood Water** download the [shapefile \(.zip\)](#) and the [KMZ](#) files by clicking on the links to the right of the product. For the **MODIS Surface Water** download the [geotiff](#) file.

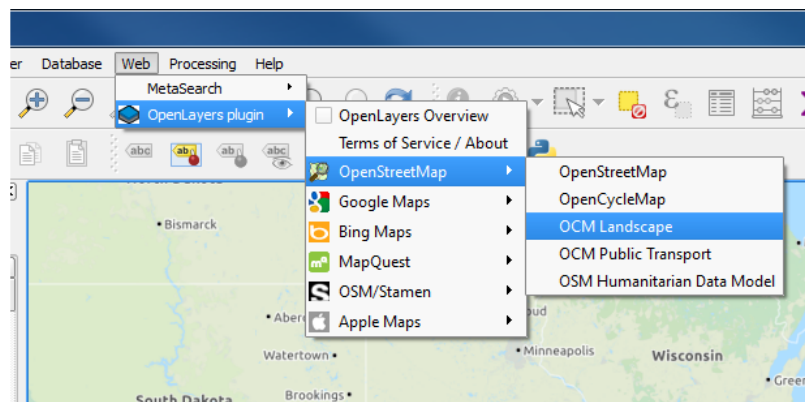
Products		Available Downloads			
MODIS Flood Map	MFM	png			
MODIS Flood Water	MFW	percent (.tif)	any (.tif)	any (.shp)	any (.kmz)
MODIS Surface Water	MSW	percent (.tif)	any (.tif)	any (.shp)	any (.kmz)
README		pdf	txt		

- Once the shapefile (.zip) has been downloaded and saved on your computer, you will need to unzip in order to complete Part 3 below.

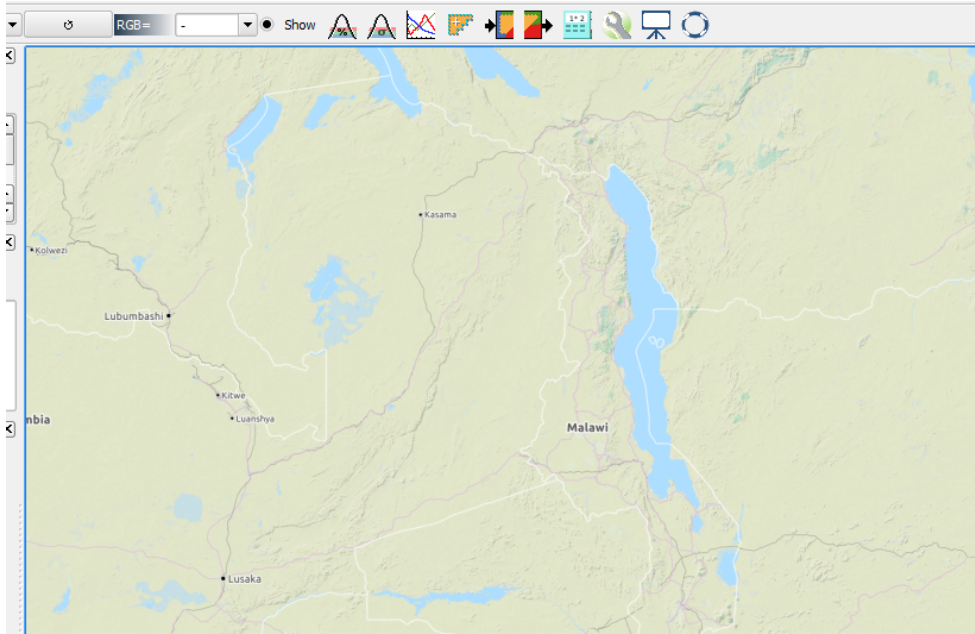
Part 3: Import inundation data products into QGIS

a) Import the MODIS Flood Water data product into QGIS

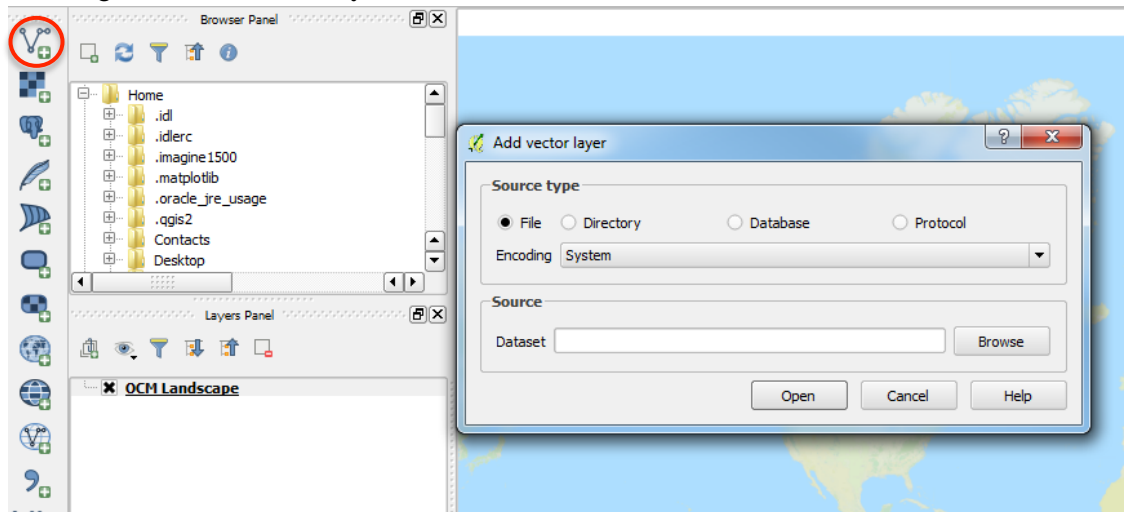
- Open QGIS Desktop and use the OpenLayers plugin



- Choose the Basemap of your choice (OCM Landscape or Google Physical work well).
- Zoom in on Malawi.

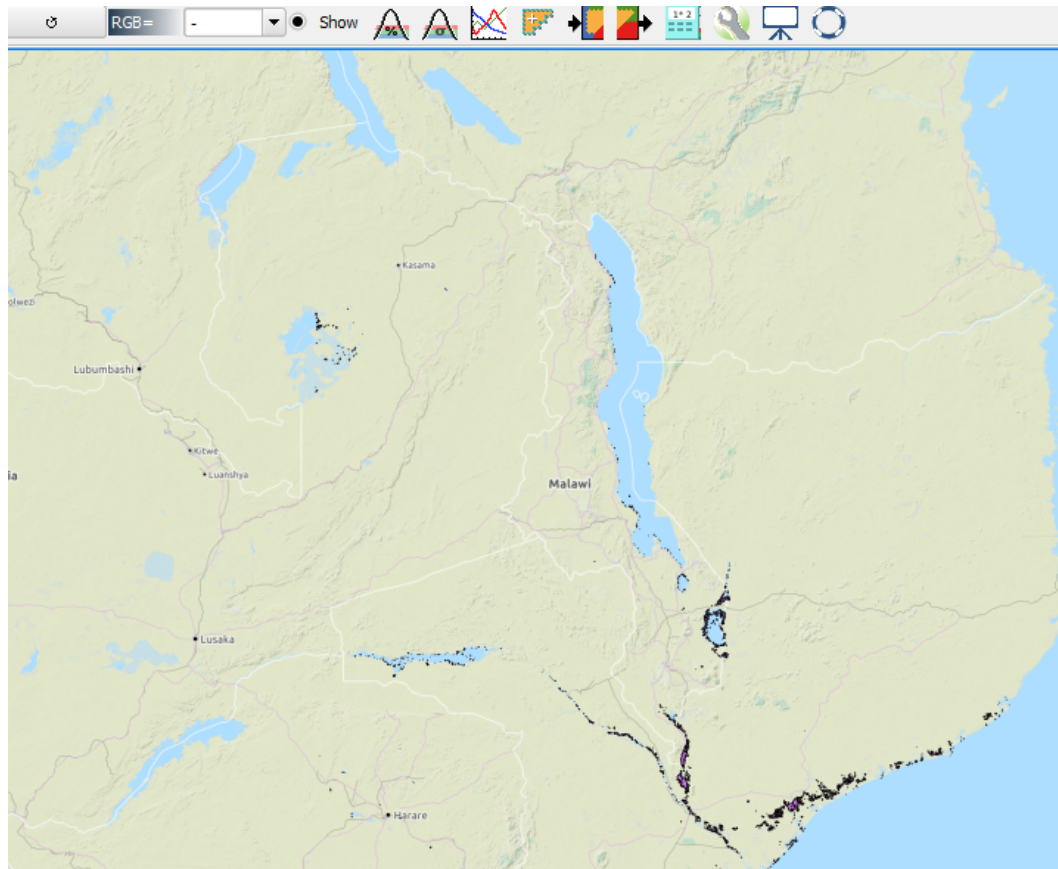


- Using the **Add Vector Layer** icon, click **Add Vector**.



A window will open for you to navigate to the location of the downloaded MODIS Flood Water data product.

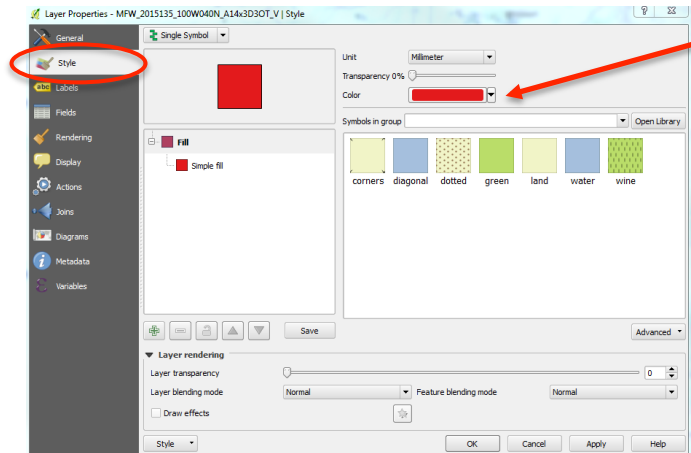
- Select the **shapefile '.shp'** and click **open**
 - Example: MFW_2015167_100W040N_A14x3D3OT_V- click open.



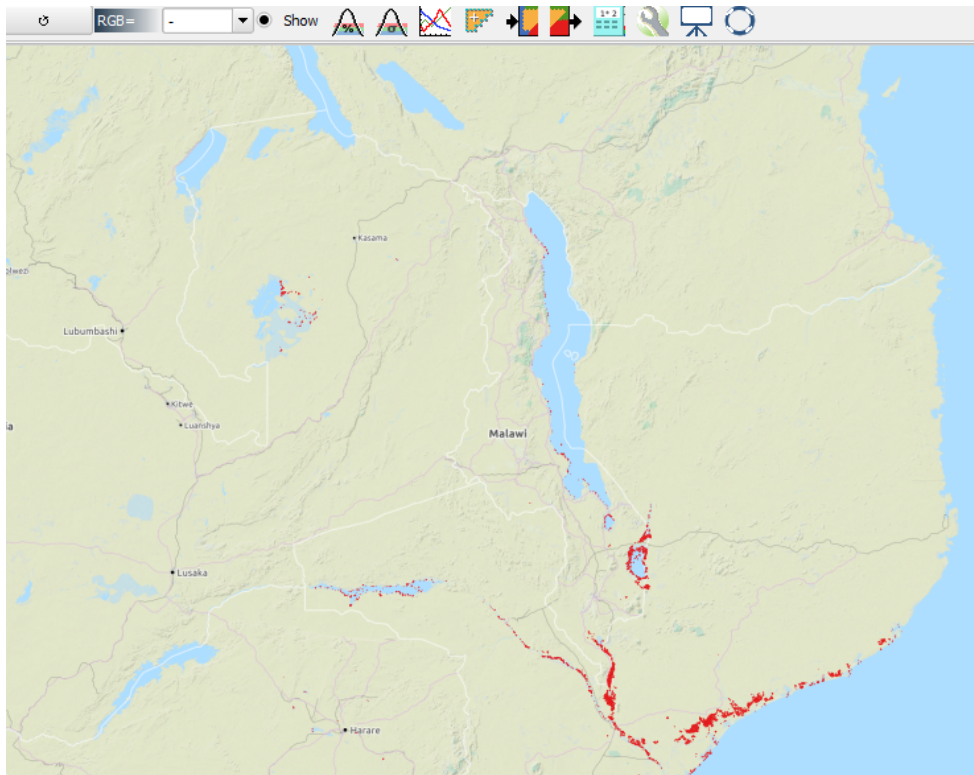
[NOTE: pay close attention to the file naming convention used for the MODIS files. Refer to the README file referenced in section 2.a for more information. For example, what date is associated with the data product **MFW201514**?

The shapefile has been imported. You may wish to adjust the **symbology color** in order to visualize the inundated lands better.

- Right click the **layer**, navigate to **layer properties** and the **Style** tab, click the **color** drop down and choose the desired color. Click ok.



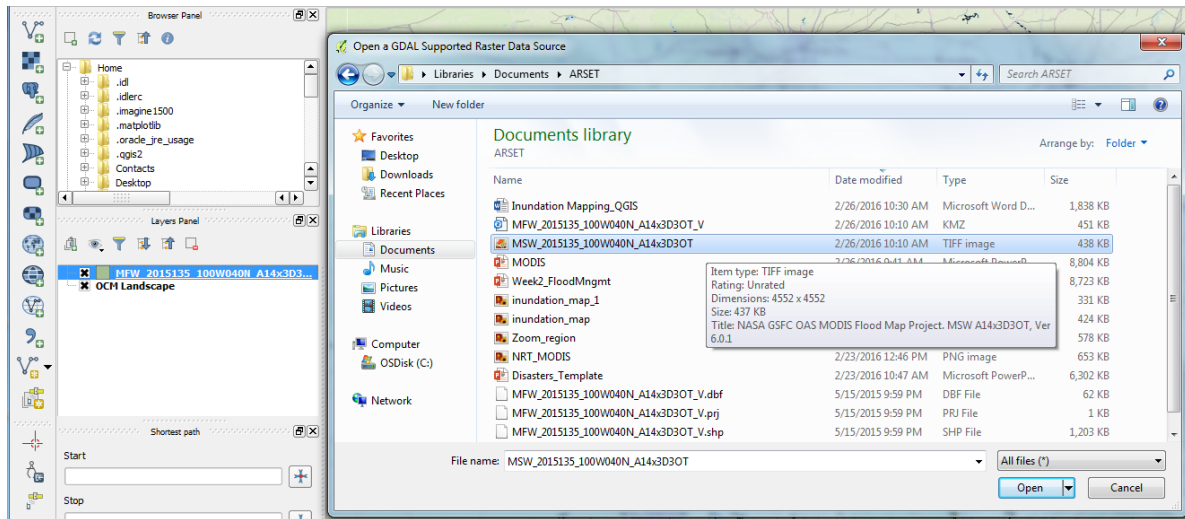
- The resulting image:



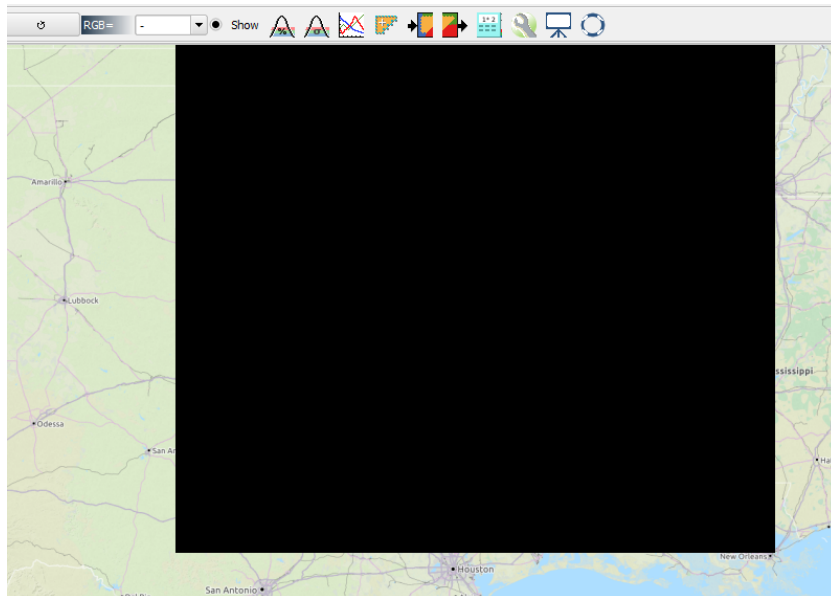
- Repeat the process for all files for your chosen dates.

b) Import the MODIS Surface Water (geotiff file) data into QGIS

- Click **Add Raster Layer** and a window will open for you to navigate to the location of the downloaded MODIS Water Product. Click on the **Raster Dataset**.

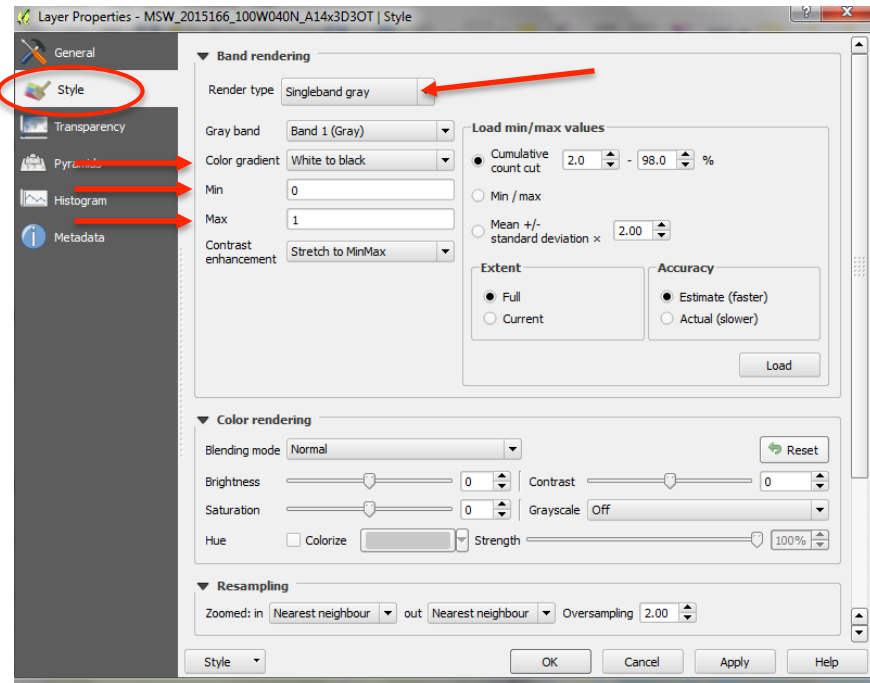


- Example: MSW_2015167_100W040N_P14x3D3OT and Click Add.

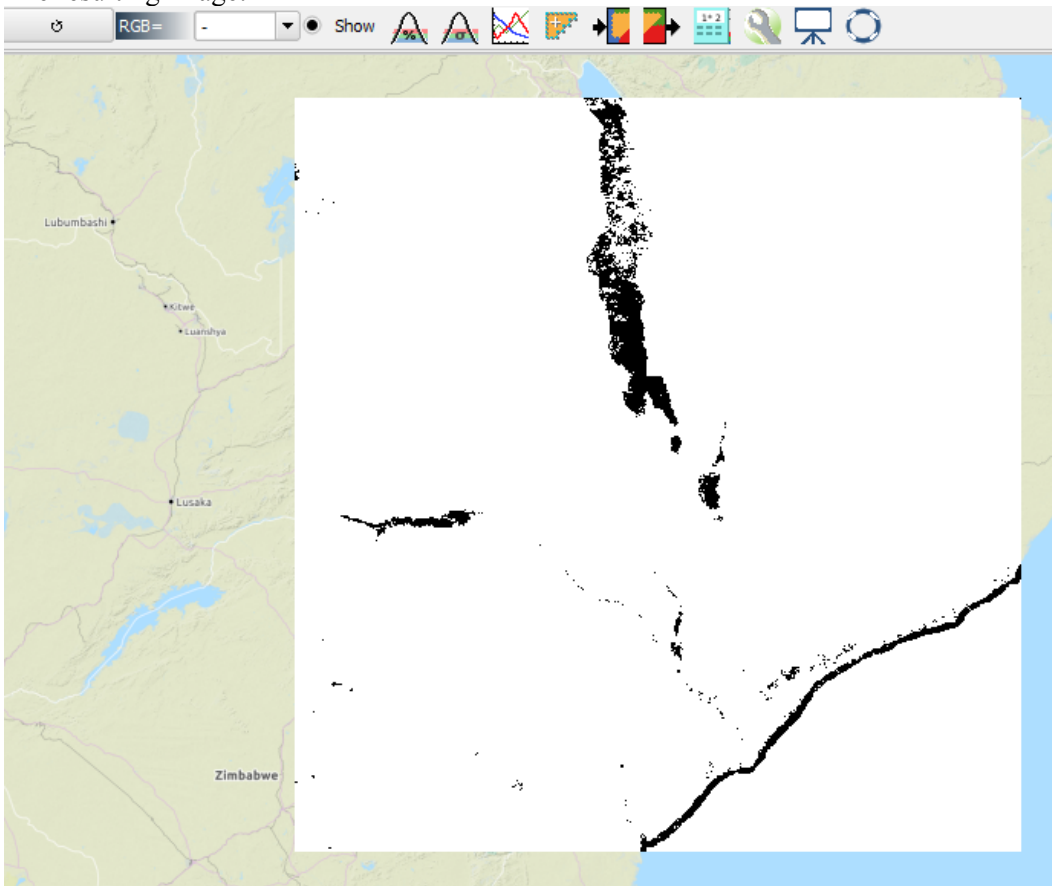


The raster dataset geotiff file has been imported onto the map. In order to visualize the data, you will need to adjust the symbology of the geotiff file through the layer properties, style tab.

- Right click the **layer**, navigate to **layer properties** and the **Style** tab.
- Within the window, set the '**Render Type**' to **Singleband gray**, change the '**Min**' to 0 and '**Max**' to 1, and set the '**Color Gradient**' to White to Black. This will allow you to visualize the areas with surface water. This will display non-water as white and water as black.



- The resulting image:



- Repeat the process for all files for other chosen dates.
- Assigning different colors for each of the shapefile dates can assist in visualizing inundated lands over time.
- Spatially analyze your map.
- How can this data be used for mitigation and planning activities?

We can download KMZ files from the MODIS site. These can be visualized in Google Earth. Locate the downloaded KMZ file and double click to open in Google Earth (requires Google Earth installed on your computer).

Optional - explore, visualize, download, and import MODIS NRT data for a region of your personal interest.