

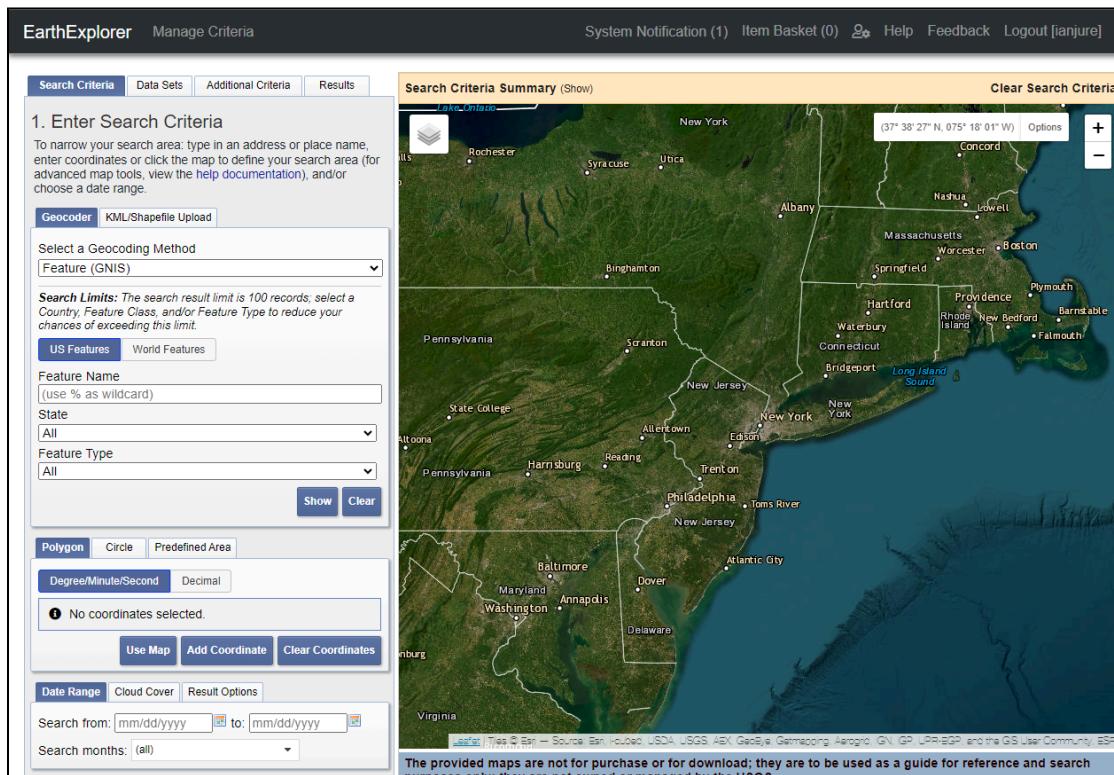
PORTFOLIO 2 - LAND USE AND LAND COVER MAP

DATA SELECTION

New York City is one of the most densely populated and diverse metropolitan areas in the world. Its land use reflects the complexity of its urban environment, characterized by a blend of residential, commercial, industrial, and green spaces. The city's dynamic land cover highlights a unique combination of urban development and natural landscapes.

1. Become a member of USGS Earth Explorer:

- Visit: [USGS Earth Explorer](#)
- Sign-up and open the main site.



2. Select a Region:

- Go to *Select a Geocoding Method > Choose Address/Place.*
- Enter an address or place (e.g., New York).
- Click the result to pin the selected region.

EarthExplorer Manage Criteria System Notification (1) Item Basket (0) Help Feedback Logout [ianjure]

Search Criteria Data Sets Additional Criteria Results

1. Enter Search Criteria

To narrow your search area: type in an address or place name, enter coordinates or click the map to define your search area (for advanced map tools, view the help documentation), and/or choose a date range.

Geocoder KML/Shapefile Upload

Select a Geocoding Method Address/Place

Address/Place New York

Show Clear

Click on an Address/Place to show the location on the map and add coordinates to the Area of Interest Control.

Num	Address/Place	Latitude	Longitude
1	New York, NY, USA	40.7128	-74.0060

Polygon Circle Predefined Area

Degree/Minute/Second Decimal

No coordinates selected.

Use Map Add Coordinate Clear Coordinates

Date Range Cloud Cover Result Options

Search from: mm/dd/yyyy to: mm/dd/yyyy

Search months: (all)

Data Sets » Additional Criteria » Results »

Search Criteria Summary (Show)

(37° 47' 18" N, 075° 38' 27" W) Options

The provided maps are not for purchase or for download; they are to be used as a guide for reference and search purposes only; they are not owned or managed by the USGS.

EarthExplorer Manage Criteria System Notification (1) Item Basket (0) Help Feedback Logout [ianjure]

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Geocoder KML/Shapefile Upload

Select a Geocoding Method Address/Place

Address/Place

Show Clear

1. Lat: 40° 42' 46" N, Lon: 074° 00' 21" W

Use Map Add Coordinate Clear Coordinates

Date Range Cloud Cover Result Options

Search from: mm/dd/yyyy to: mm/dd/yyyy

Search months: (all)

Data Sets » Additional Criteria » Results »

Search Criteria Summary (Show)

(37° 38' 27" N, 075° 09' 27" W) Options

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3. Select a Date Range:

- Go to *Date Range*.
- Choose a start date and an end date.

EarthExplorer Manage Criteria

System Notification (1) Item Basket (0) Help Feedback Logout [ianjure]

Search Criteria Data Sets Additional Criteria Results

1. Enter Search Criteria

To narrow your search area: type in an address or place name, enter coordinates or click the map to define your search area (for advanced map tools, view the help documentation), and/or choose a date range.

Geocoder KML/Shapefile Upload

Select a Geocoding Method Address/Place

Address/Place

Show Clear

Polygon Circle Predefined Area

Degree/Minute/Second Decimal

1. Lat: 40° 42' 46" N, Lon: 074° 00' 2

Use Map Add Coordin

Date Range Cloud Cover Result Option Today

Search from: 10/01/2024 to 10/24/2024

Search months: (all)

Data Sets » Additional Criteria » Results »

Search Criteria Summary (Show)

(37° 37' 55" N, 076° 47' 00" W) Options

Clear Search Criteria

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4. Select a Data Set:

- Go to *Data Sets > Landsat > Landsat Collection 2 Level-1*.
- Check the *Landsat 8-9 OLI/TIRS C2 L1* box.

EarthExplorer Manage Criteria

System Notification (1) Item Basket (0) Help Feedback Logout [ianjure]

Search Criteria Data Sets Additional Criteria Results

2. Select Your Data Set(s)

Check the boxes for the data set(s) you want to search. When done selecting data set(s), click the *Additional Criteria* or *Results* buttons below. Click the plus sign next to the category name to show a list of data sets.

Use Data Set Prefilter (What's This?)

Data Set Search:

EO-1
 Global Fiducials
 HCM
 ISERV
 Land Cover
 Landsat
 Landsat Collection 2 Level-1
 Landsat 8-9 OLI/TIRS C2 L1
 Landsat 7 ETM+ C2 L1
 Landsat 4-5 TM C2 L1
 Landsat 1-5 MSS C2 L1
 Landsat C2 Atmospheric Auxiliary Data
 Landsat Collection 2 DEM
 Landsat Legacy
 LCMAP
 Radar
 UAS
 Vegetation Monitoring
 ISRO Resourcesat

Clear All Selected Additional Criteria » Results »

Search Criteria Summary (Show)

(43° 25' 46" N, 074° 52' 58" W) Options

Clear Search Criteria

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5. Select a Result:

- Click *Result* and select data.

EarthExplorer Manage Criteria

System Notification (1) Item Basket (0) Help Feedback Logout [ianjure]

Search Criteria Data Sets Additional Criteria Results

4. Search Results

If you selected more than one data set to search, use the dropdown to see the search results for each specific data set.

Show Browse/Footprint Controls Show Result Controls

Data Set Click here to export your results ↗

Landsat 8-9 OLI/TIRS C2 L1

« First < Previous 1 of 1 Next > Last »

Displaying 1 - 2 of 2

ID: LC09_L1TP_013032_20241022_20241022_02_T1
Date Acquired: 2024/10/22
Path: 013
Row: 032





ID: LC08_L1TP_014032_20241021_20241021_02_RT
Date Acquired: 2024/10/21
Path: 014
Row: 032



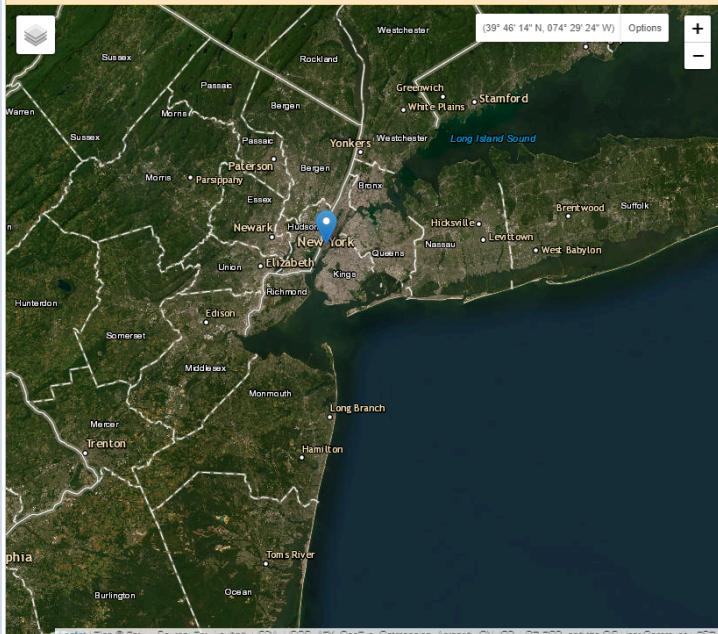


« First < Previous 1 of 1 Next > Last »

View Item Basket ↗ Submit Standing Request ↗

Search Criteria Summary (Show) Clear Search Criteria

(39° 46' 14" N, 074° 29' 24" W) Options + -



The provided maps are not for purchase or for download; they are to be used as a guide for reference and search purposes only; they are not owned or managed by the USGS.

6. Download the Spectral Bands:

- Go to *Download Options > Product Options*.
- Download bands 1 to 7.

EarthExplorer Manage Criteria

System Notification (1) Item Basket (0) Help Feedback Logout [ianjure]

Search Criteria Data Sets Additional Criteria Results

4. Search Results

If you selected more than one data set to search, use the dropdown to see the search results for each specific data set.

Show Browse/Footprint Controls Show Result Controls

Data Set Click here to export your result ↗

Landsat 8-9 OLI/TIRS C2 L1

« First < Previous 1 of 1 Next > Last »

Displaying 1 - 2 of 2

ID: LC09_L1TP_013032_20241022_20241022_02_T1
Date Acquired: 2024/10/22
Path: 013
Row: 032





ID: LC08_L1TP_014032_20241021_20241021_02_RT
Date Acquired: 2024/10/21
Path: 014
Row: 032



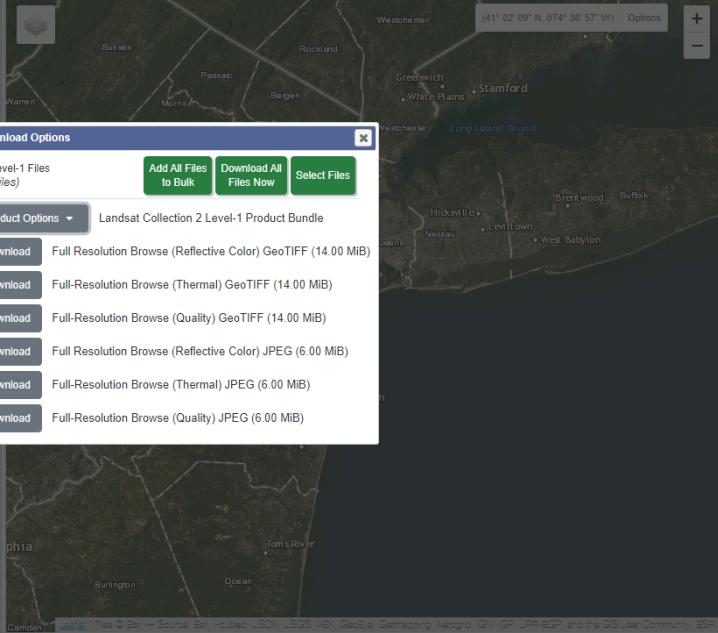


« First < Previous 1 of 1 Next > Last »

View Item Basket ↗ Submit Standing Request ↗

Search Criteria Summary (Show) Clear Search Criteria

(41° 02' 09" N, 074° 38' 57" W) Options + -



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Download Options

All Level-1 Files (20 files) Add All Files to Bulk Download All Files Now Select Files

Product Options ↴ Landsat Collection 2 Level-1 Product Bundle

Download Full Resolution Browse (Reflective Color) GeoTIFF (14.00 MiB)
Download Full-Resolution Browse (Thermal) GeoTIFF (14.00 MiB)
Download Full-Resolution Browse (Quality) GeoTIFF (14.00 MiB)
Download Full Resolution Browse (Reflective Color) JPEG (6.00 MiB)
Download Full-Resolution Browse (Thermal) JPEG (6.00 MiB)
Download Full-Resolution Browse (Quality) JPEG (6.00 MiB)

EarthExplorer Manage

Product Download Options for LC08_L1TP_014032_20241021_20241021_02_RT

Landsat Collection 2 Level-1 Product Bundle

4. Search Results

If you selected more than one dataset, click the dropdown to see the search results.

Show Browse/Footprint Controls | Show Result Controls

Data Set

Landsat 8-9 OLI/TIRS C2 L1

Displaying 1 - 5 of 5 items

ID: LC08_L1TP_014032_20241021_20241021_02_RT
Date Acquired: 2024-10-21T13:45:00Z
Path: 013
Row: 032

ID: LC08_L1TP_014032_20241021_20241021_02_RT
Date Acquired: 2024-10-21T13:45:00Z
Path: 014
Row: 032

Product Download Options

1.09 GB Landsat Collection 2 Level-1 Product Bundle

The following items are available for individual download

(Item Name Filter)

File Type	Size	Name	Description
Band File	114.50 KB	LC08_L1TP_014032_20241021_20241021_02_RT_B1.ANG	Landsat Collection 2 Level-1 Band File - ANG.txt
Band File	74.94 MB	LC08_L1TP_014032_20241021_20241021_02_RT_B1.TIF	Landsat Collection 2 Level-1 Band File - B1.TIF
Band File	76.83 MB	LC08_L1TP_014032_20241021_20241021_02_RT_B2.TIF	Landsat Collection 2 Level-1 Band File - B2.TIF
Band File	80.05 MB	LC08_L1TP_014032_20241021_20241021_02_RT_B3.TIF	Landsat Collection 2 Level-1 Band File - B3.TIF
Band File	82.52 MB	LC08_L1TP_014032_20241021_20241021_02_RT_B4.TIF	Landsat Collection 2 Level-1 Band File - B4.TIF
Band File	88.44 MB	LC08_L1TP_014032_20241021_20241021_02_RT_B5.TIF	Landsat Collection 2 Level-1 Band File - B5.TIF

Add All to Bulk | Close

Map View

This map is provided for reference and search purposes only; it is not owned or managed by the USGS.

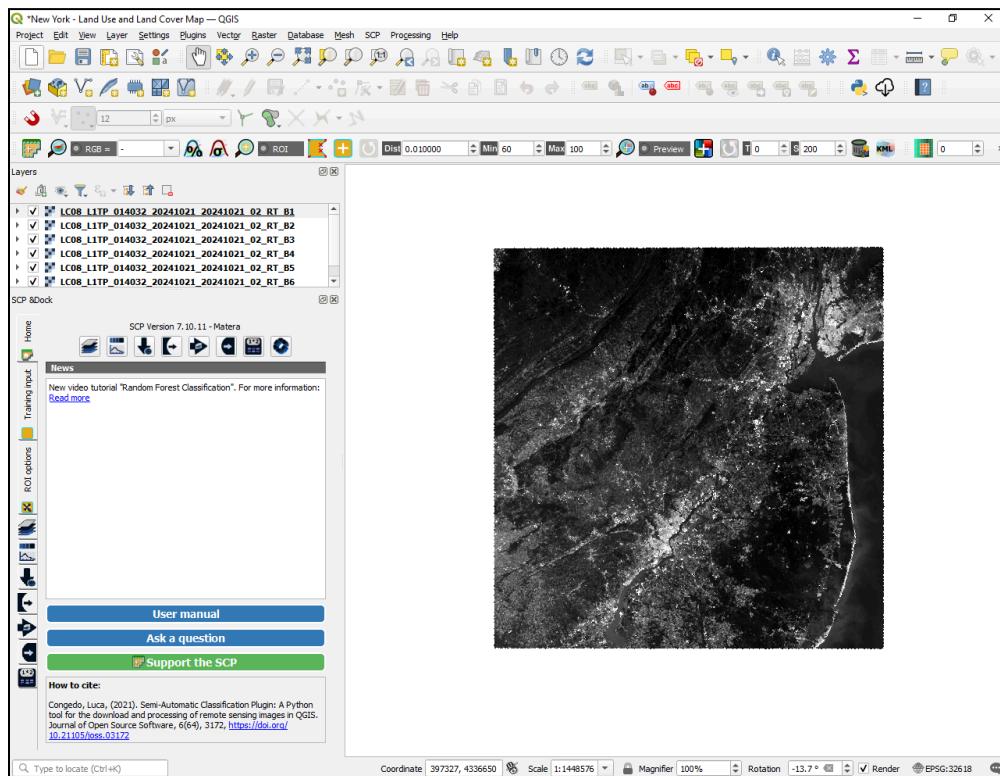
[View Item Basket](#) | [Submit Standing Request](#)

DATA PREPROCESSING

After downloading a subset of a Landsat 8 scene captured on *October 21, 2024*, covering a specific area of the Earth along *Path 140* and *Row 32* of the Landsat grid (New York City), we will now combine the data and create a *multilayer stack*.

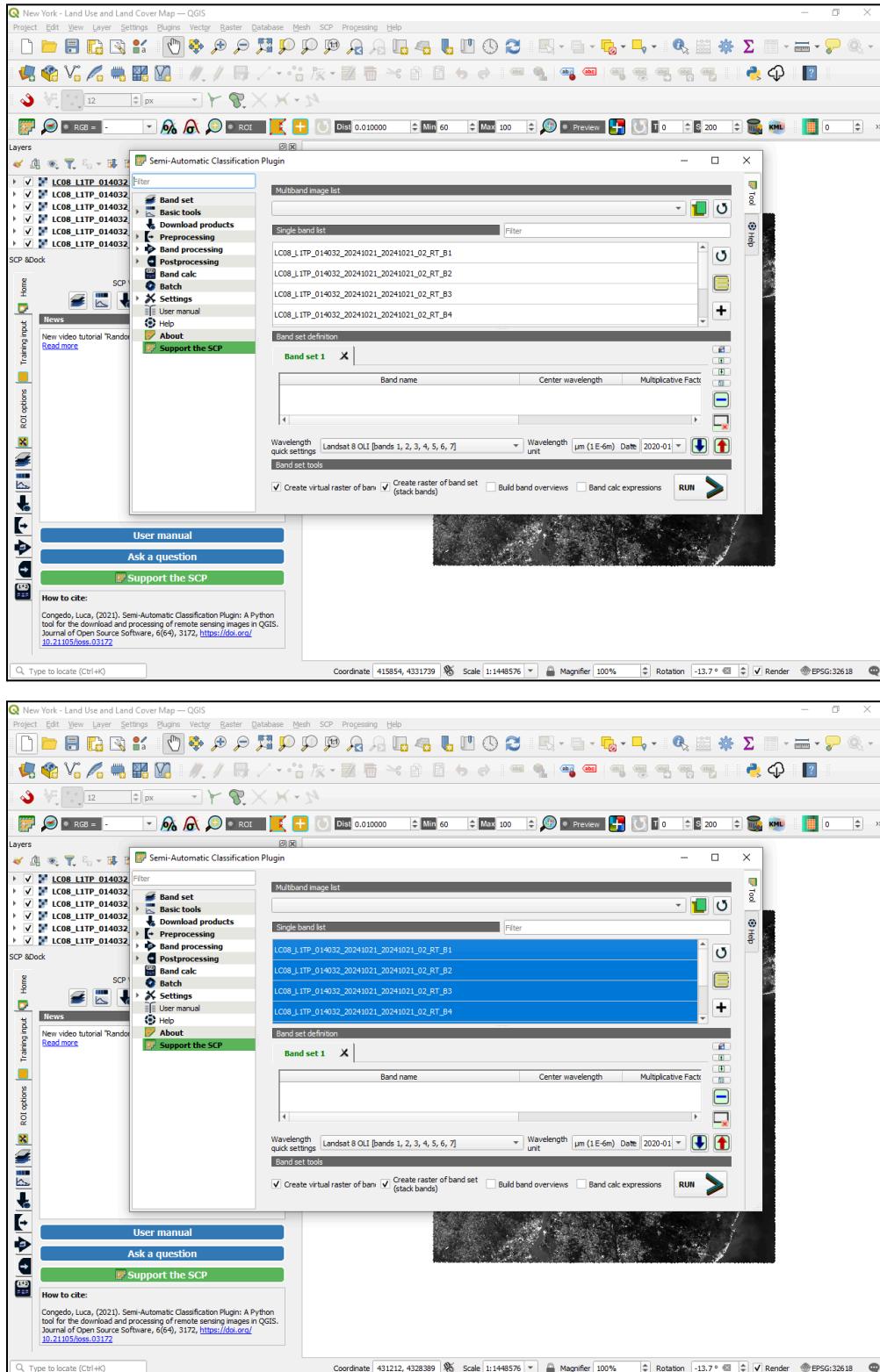
1. Import the Raster Files:

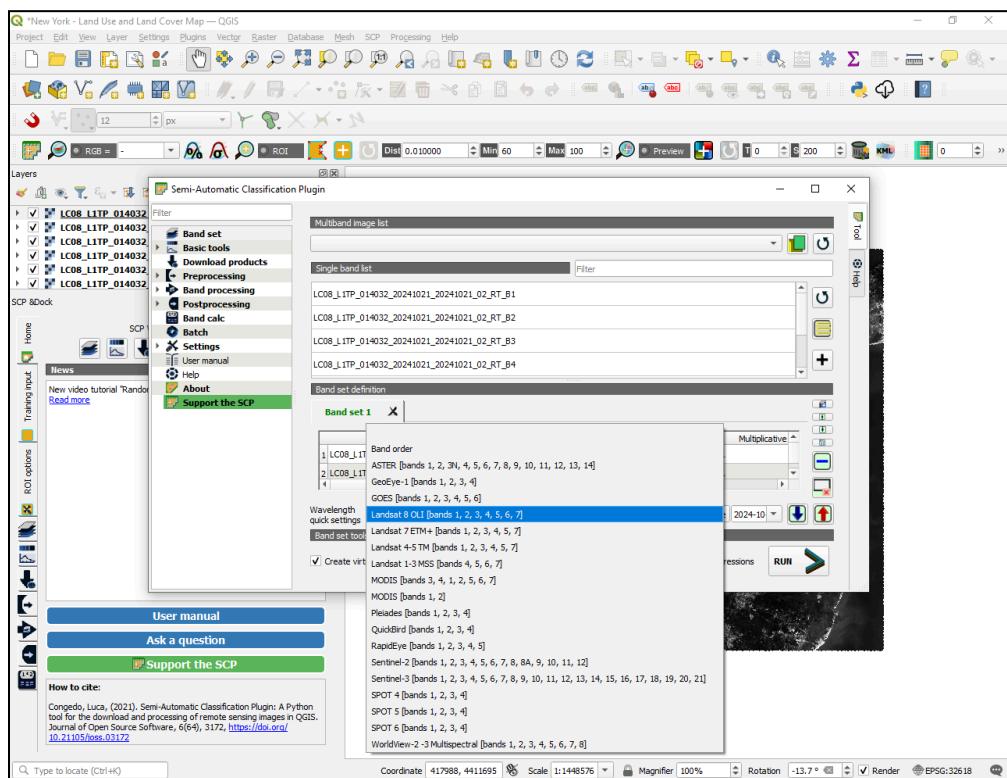
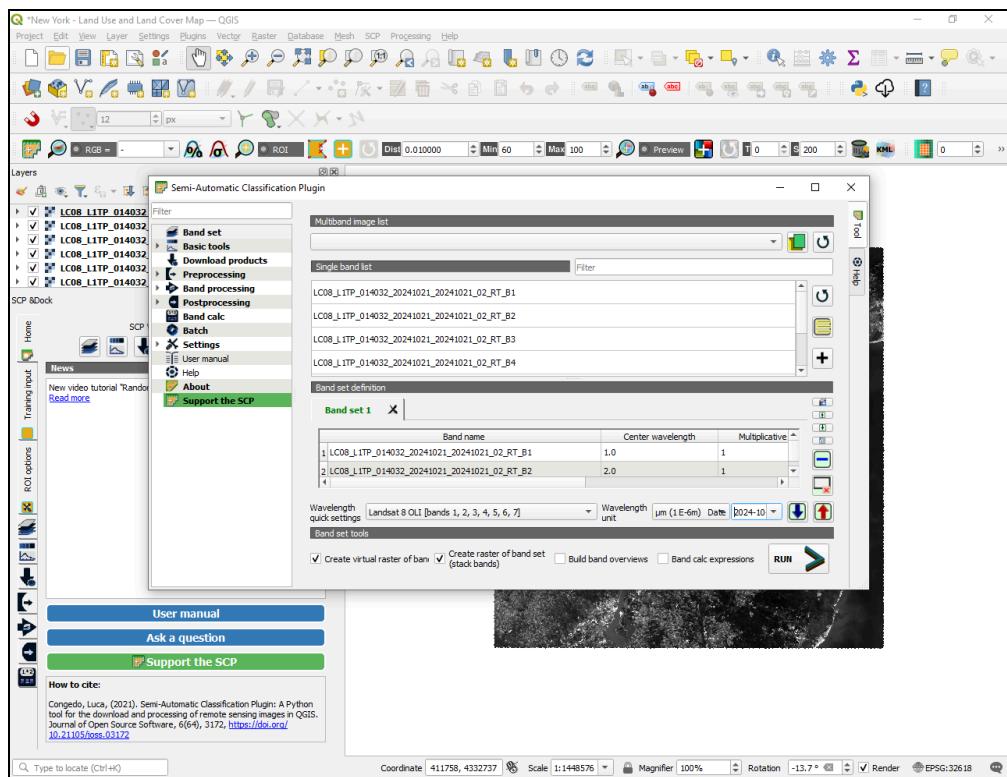
- Open QGIS > Go to Layer > Add Layer > Add Raster Layer.
- Select the downloaded TIF files > Click Open.

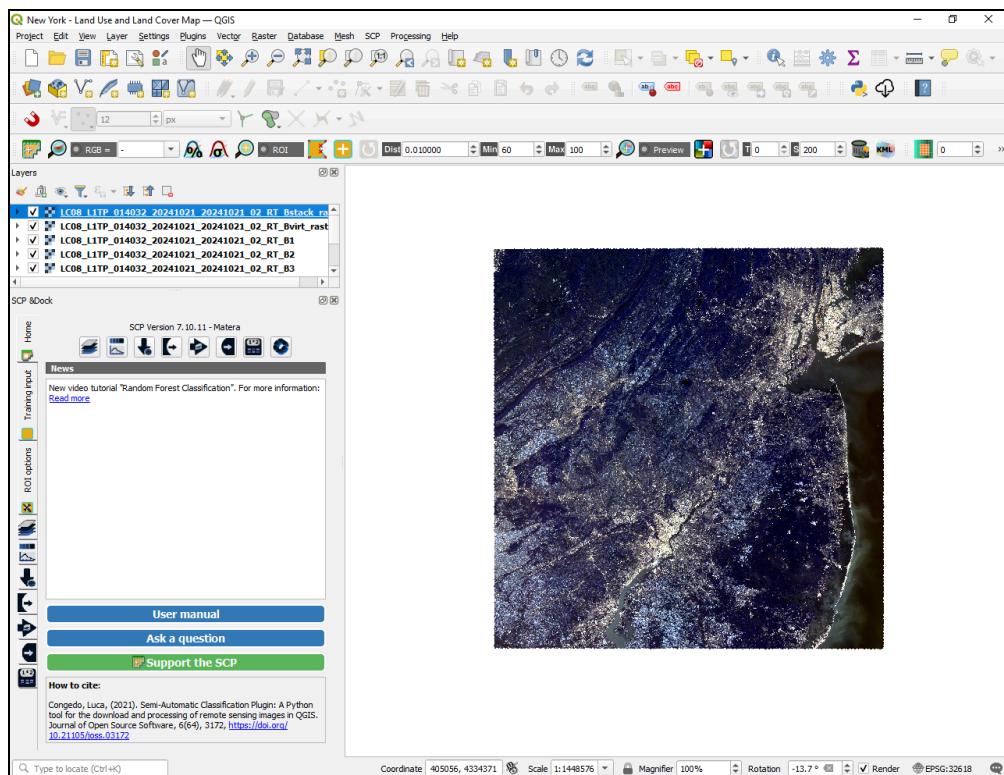
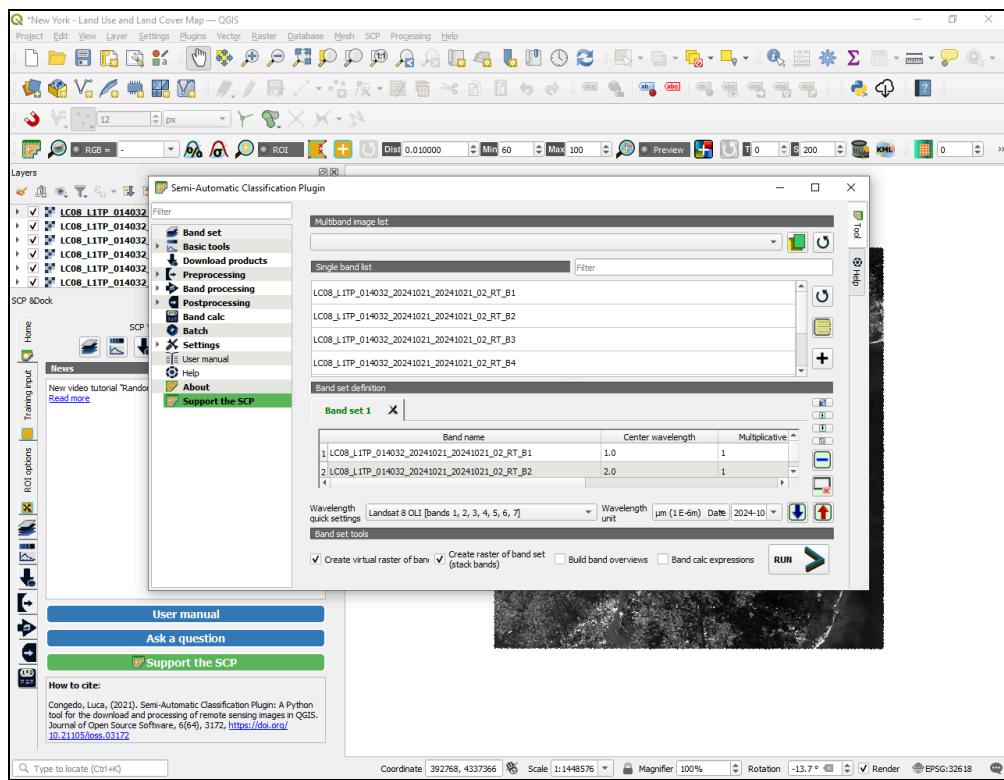


2. Create a Multilayer Stack:

- Open the *Semi-Automatic Classification Plugin*.
- Hit *Refresh* and select all layers by clicking the *Select All* button.
- Click *Add Band to Band Set*.
- Go to *Wavelength Quick Settings > Select Landsat 8 OLI*.
- Check the *Create Virtual Raster of Band Set* box.
- Check the *Create Raster of Band Set (Stack Bands)* box.
- Click the *Run* button.







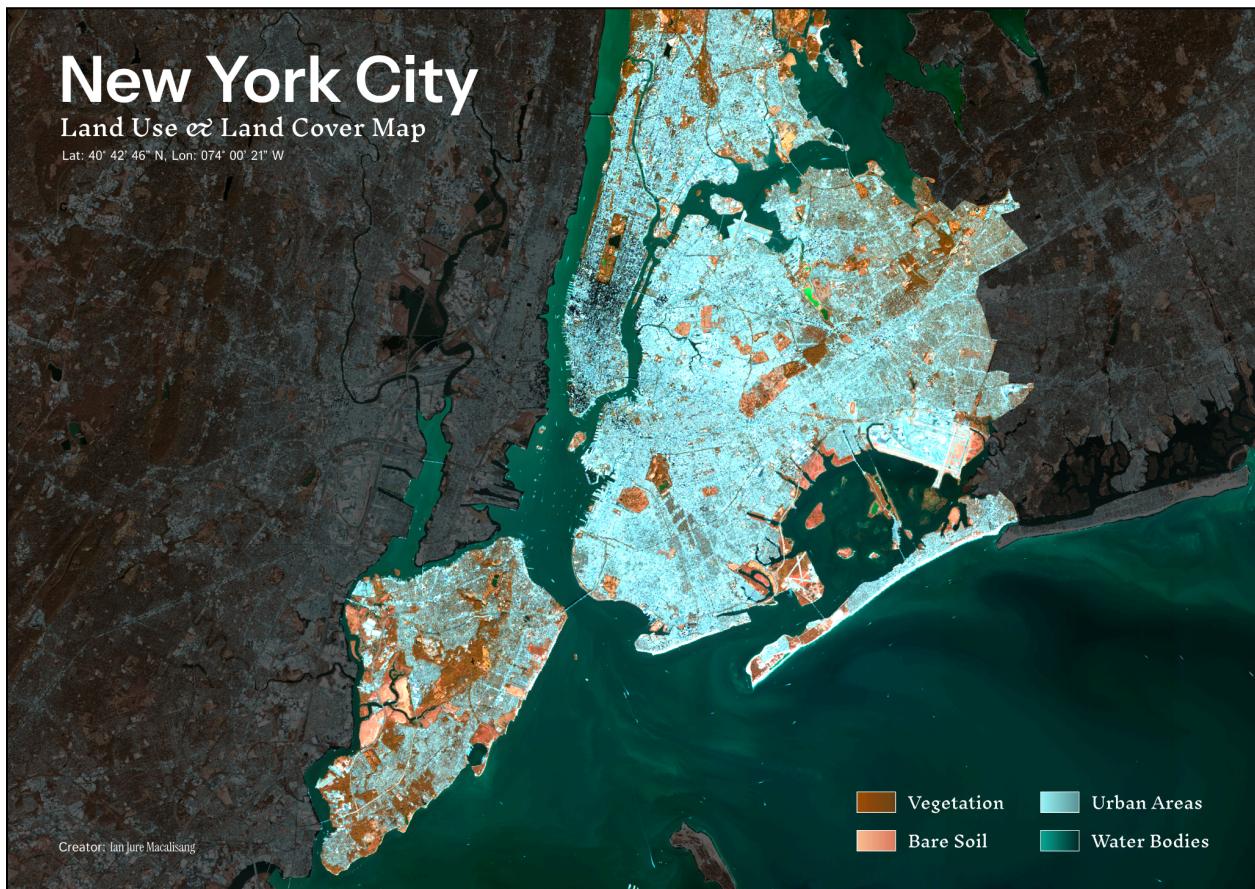
MAP INTERPRETATION

By using different band rendering combinations, we can identify key land use and cover types, such as vegetation, urban areas, bare soil, and water bodies.

Red: Band 6 (Shortwave Infrared 1)

Green: Band 3 (Green)

Blue: Band 2 (Blue)



Brown to Dark Brown: These areas are likely indicative of dense vegetation, such as forests or heavily vegetated regions. The variation in shades from brown to dark brown may represent different types of vegetation cover, ranging from shrubs and grasslands to forests with dense canopy cover.

Peach to Pink: These colors represent bare soil or sparsely vegetated land. Such areas may include agricultural fields, deserts, or regions that have been cleared of vegetation for development or farming. The lighter shades could indicate recently disturbed or exposed soil, such as in construction zones or fallow fields.

Cyan: The cyan-colored regions correspond to urban areas, which include built environments such as residential neighborhoods, commercial districts, and transportation networks like roads and highways.

Blue Green to Dark Green: These hues signify water bodies, ranging from rivers and lakes to reservoirs and coastal regions. The color variations from blue-green to dark green may indicate differences in water depth, sediment load, or aquatic vegetation, with darker shades possibly representing deeper or cleaner water bodies.

The predominance of cyan on the map indicates that New York City is highly urbanized, with only small patches of vegetation scattered throughout, such as the iconic Central Park. This low nature-to-urban ratio contributes to an increased risk of air and water pollution.

To address these challenges, the following applications can be implemented:

Urban Planning: The land use and land cover map is a valuable tool for designing sustainable cities and managing resources efficiently. It helps urban planners identify areas for development, infrastructure expansion, or conservation, enabling balanced urban growth while preserving natural spaces.

Environmental Monitoring: By analyzing land cover patterns, this map can assist in mitigating the risks of air and water pollution. It supports environmental efforts by highlighting areas where green spaces can be increased or maintained, contributing to improved air quality and healthier ecosystems.