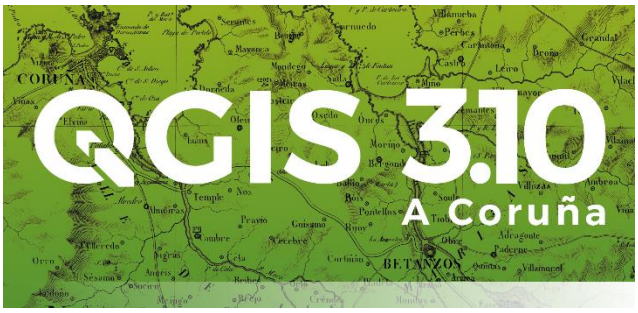
# GIS TUTORIAL 1: Introduction to QGIS

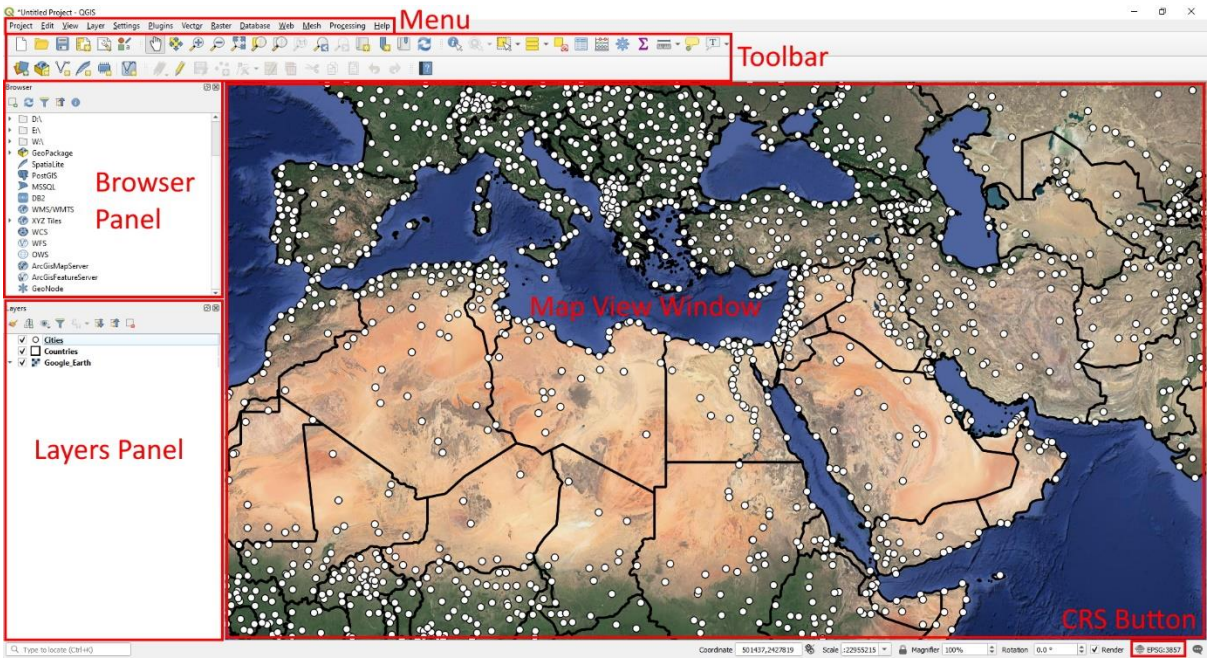
In this tutorial you will receive a brief introduction to QGIS and learn how to make a simple map with data downloaded from the internet.

## 1 QGIS Software

Please make sure that you have QGIS downloaded and installed on your computer (download link here). We will be using QGIS 3, the most recent version. Do not worry which version of QGIS 3 you have (e.g. 3.4, 3.10, 3.12), the tutorials should be relevant regardless.




The basic interface of QGIS is shown below as a reference – the individual components will be referred to repeatedly throughout these tutorials.




## 2 Changing the Language Settings (video tutorial)

QGIS has been translated into a wide variety of languages including Arabic and French. If you would like to use a language other than English, follow these instructions:

- In the Menu click on Settings > Options
- Click on the General tab in the Options Window
- Tick “Override system locale”

- Change “User Interface Translation” to Arabic or French and click “OK”
- Close and restart QGIS

However, as the tutorials have been written using the English version, we would encourage you to do the same if you can, as this will help avoid confusion.

# 3 Finding Help

Many useful QGIS resources and tutorials exist online. If you need help with a problem, a simple Google search can often quickly provide the answer. Otherwise the official QGIS User Guide is a good place to start (https://docs.qgis.org/3.10/en/docs/user_manual/index.html). It has been translated into French (https://docs.qgis.org/3.10/fr/docs/user_manual/index.html), but unfortunately not yet Arabic.

# 4 Making a Simple Map (video tutorial playlist)

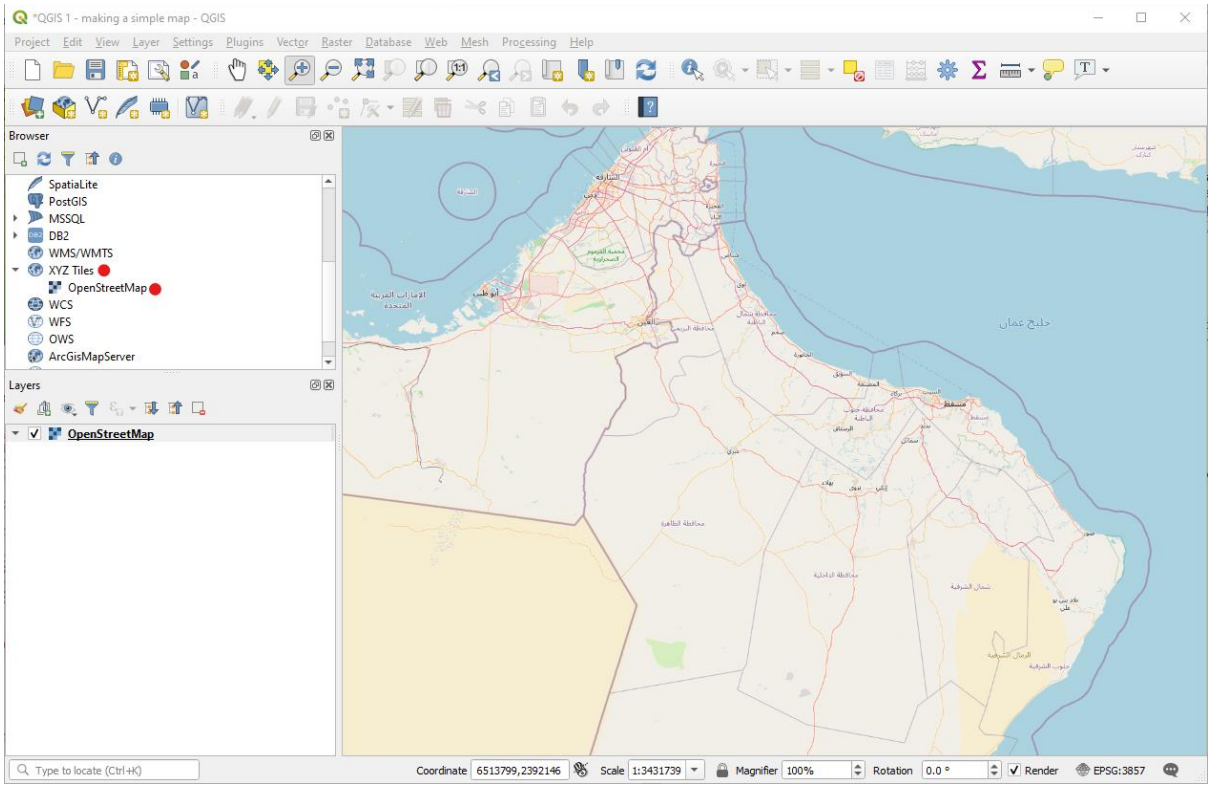
We are going to make a simple map using a combination of data available through QGIS itself, data downloaded from the internet, and data imported from the EAMENA database.

## 4.1 Add a XYZ tiles basemap (video tutorial)

We are going to add a basemap to our QGIS map.

- In the Browser Panel find and expand “XYZ Tiles”
- Double-click on OpenStreetMap

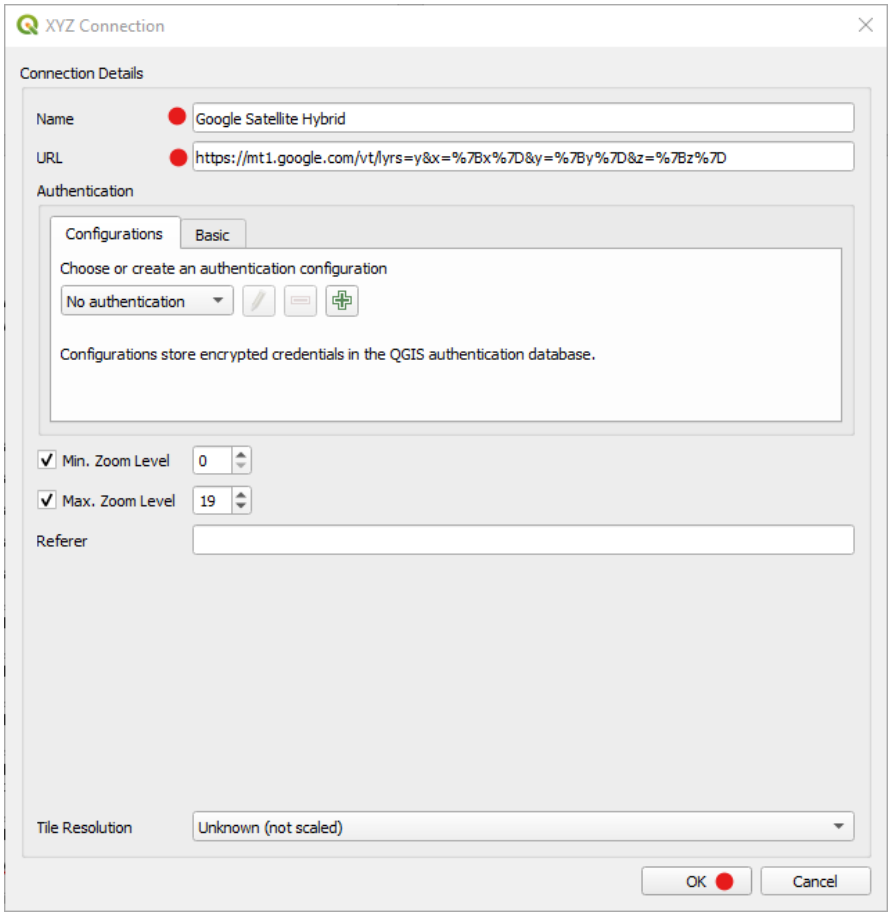
This will add the OpenStreetMap basemap layer to the Layers Panel and the Map View. This is an open-source dataset that is similar to Google Maps.



As well as OpenStreetMaps we can add other basemaps depending on what sort of imagery we want to show. This is especially useful for countries where Google Earth imagery is poor.

- Right-click on "XYZ Tiles" and select "New connection…"
- Browse the list below, choose the basemap you want, and copy and paste the "Name" and "URL" details into the XYZ Connection Window and click OK

Google Maps: https://mt1.google.com/vt/lyrs=m&x=%7Bx%7D&y=%7By%7D&z=%7Bz%7D
Google Satellite: https://mt1.google.com/vt/lyrs=s&x=%7Bx%7D&y=%7By%7D&z=%7Bz%7D
Google Terrain: https://mt1.google.com/vt/lyrs=t&x=%7Bx%7D&y=%7By%7D&z=%7Bz%7D
Google Terrain Hybrid: https://mt1.google.com/vt/lyrs=p&x=%7Bx%7D&y=%7By%7D&z=%7Bz%7D
Google Satellite Hybrid: https://mt1.google.com/vt/lyrs=y&x=%7Bx%7D&y=%7By%7D&z=%7Bz%7D
Esri Satellite:
https://server.arcgisonline.com/ArcGIS/rest/services/World_Imagery/MapServer/tile/%7Bz%7D/%7By%7D/%7Bx%7D
Esri Standard:
https://server.arcgisonline.com/ArcGIS/rest/services/World_Street_Map/MapServer/tile/%7Bz%7D/%7By%7D/%7Bx%7D
Esri Terrain:
https://server.arcgisonline.com/ArcGIS/rest/services/World_Terrain_Base/MapServer/tile/%7Bz%7D/%7By%7D/%7Bx%7D
Esri Transportation:
https://server.arcgisonline.com/ArcGIS/rest/services/Reference/World_Transportation/MapServer/tile/%7Bz%7D/%7By%7D/%7Bx%7D
Esri Topo World:
http://services.arcgisonline.com/ArcGIS/rest/services/World_Topo_Map/MapServer/tile/%7Bz%7D/%7By%7D/%7Bx%7D
OpenTopoMap: https://tile.opentopomap.org/%7Bz%7D/%7Bx%7D/%7By%7D.png
Bing VirtualEarth: http://ecn.t3.tiles.virtualearth.net/tiles/a{q}.jpeg?g=1




- Expand "XYZ Tiles" in the Browser Panel and double-click on your new basemap to add it to the Map View Window as above.
- Save your work by clicking the "Save" button on the Toolbar, giving it a suitable name and saving in your GIS folder

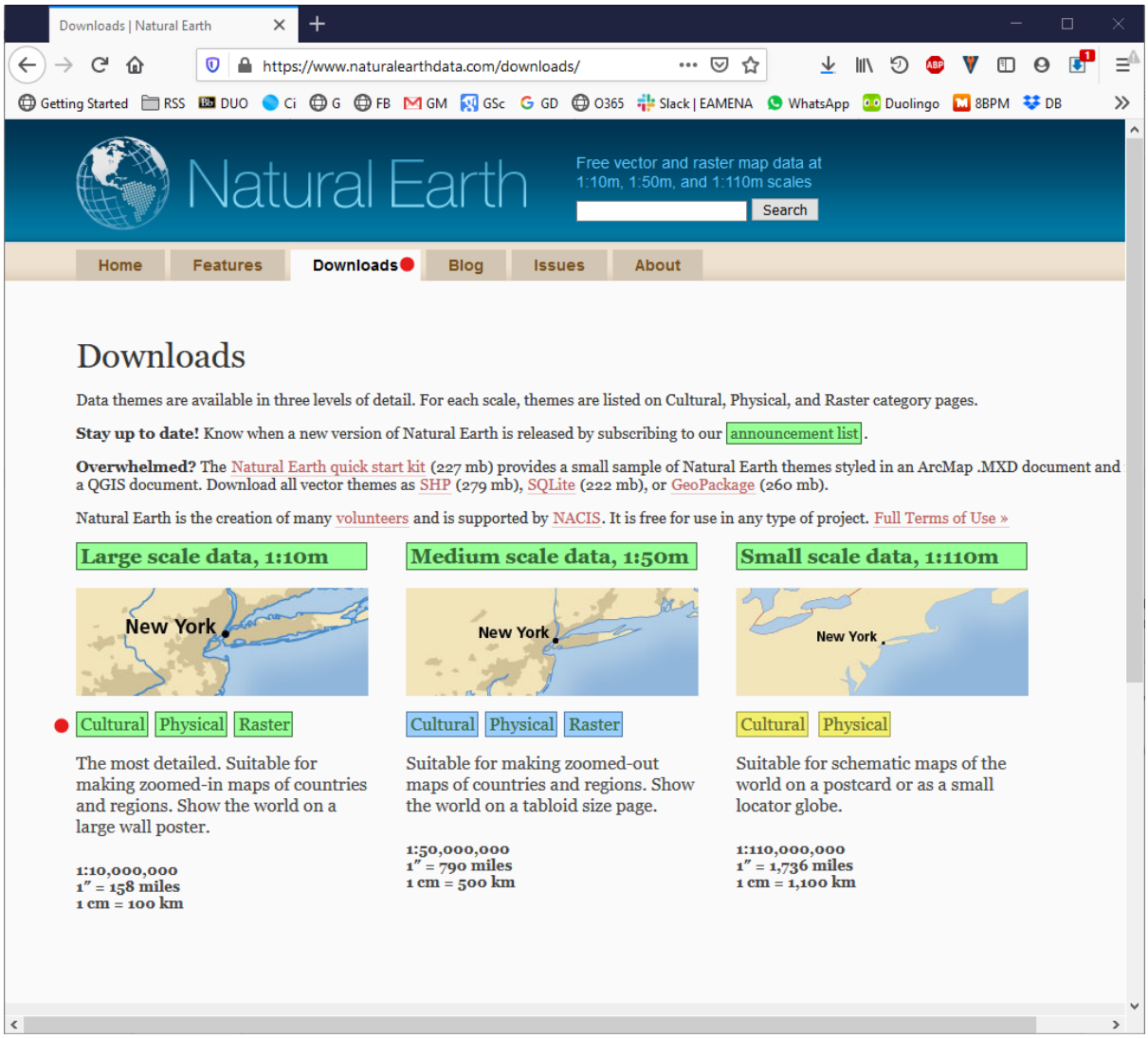
## 4.2 Download and add vector country data (video tutorial)

We are now going to find, download and add shapefiles of country borders and other geographic data to our map.

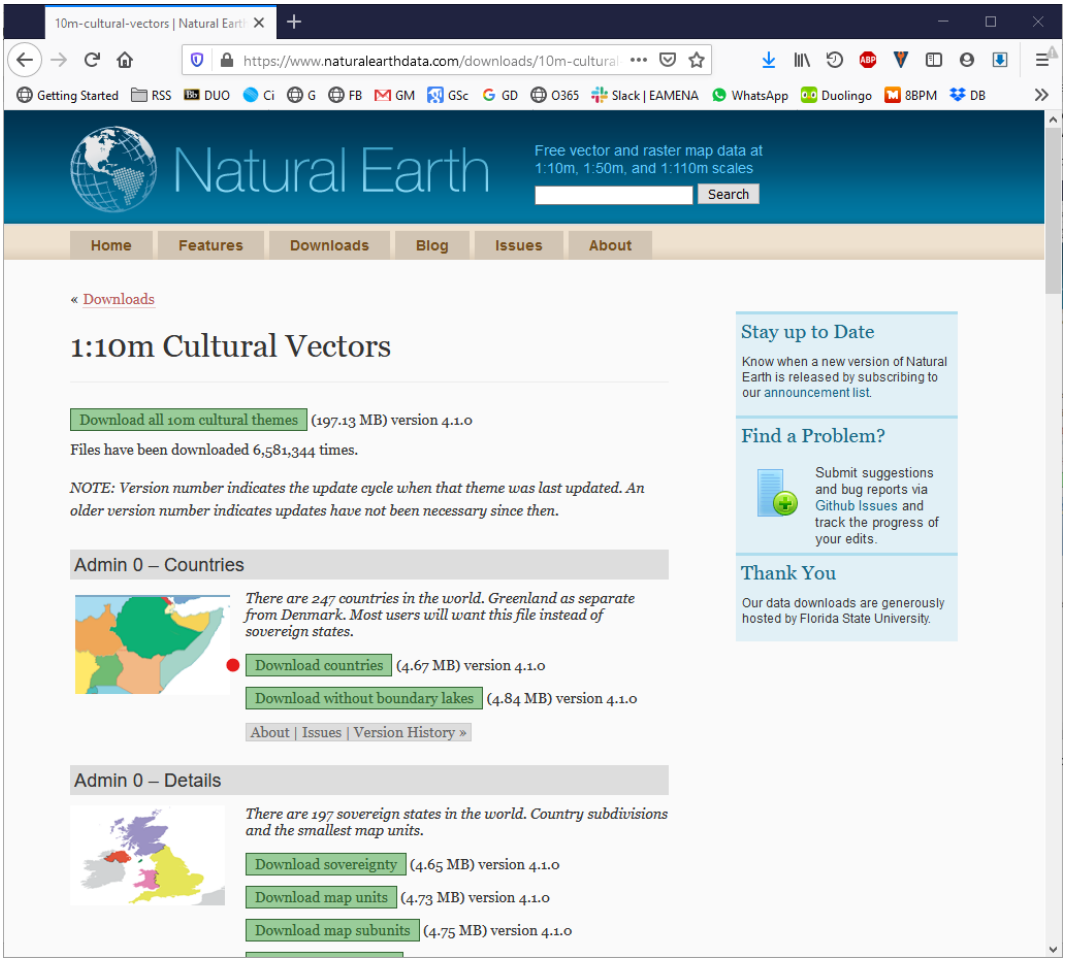
- On your web browser (e.g. Chrome) go to http://www.naturalearthdata.com
- Click on the "Downloads" tab

There are now different options: we can download data at large, medium and small scale. We will download the highest quality large scale data. We can also choose to download Cultural vector data (country borders, cities etc), physical vector data (land, sea, rivers etc), or raster (image) versions of this data. We are going to start with Cultural data.

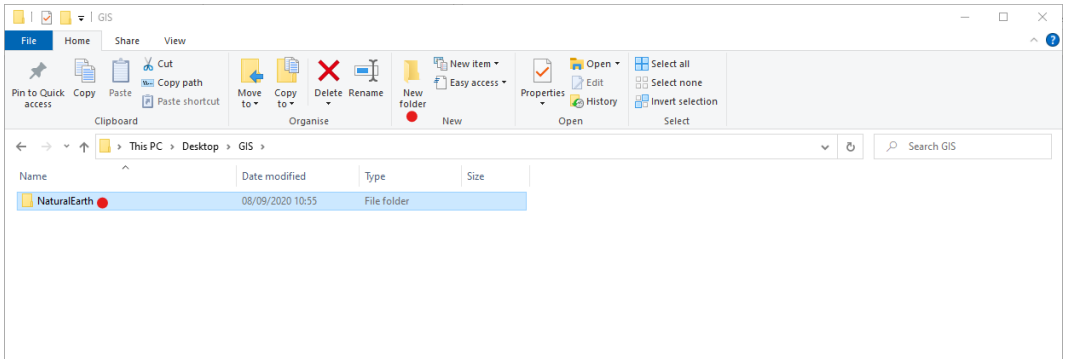
- Under "Large scale data" click "Cultural"



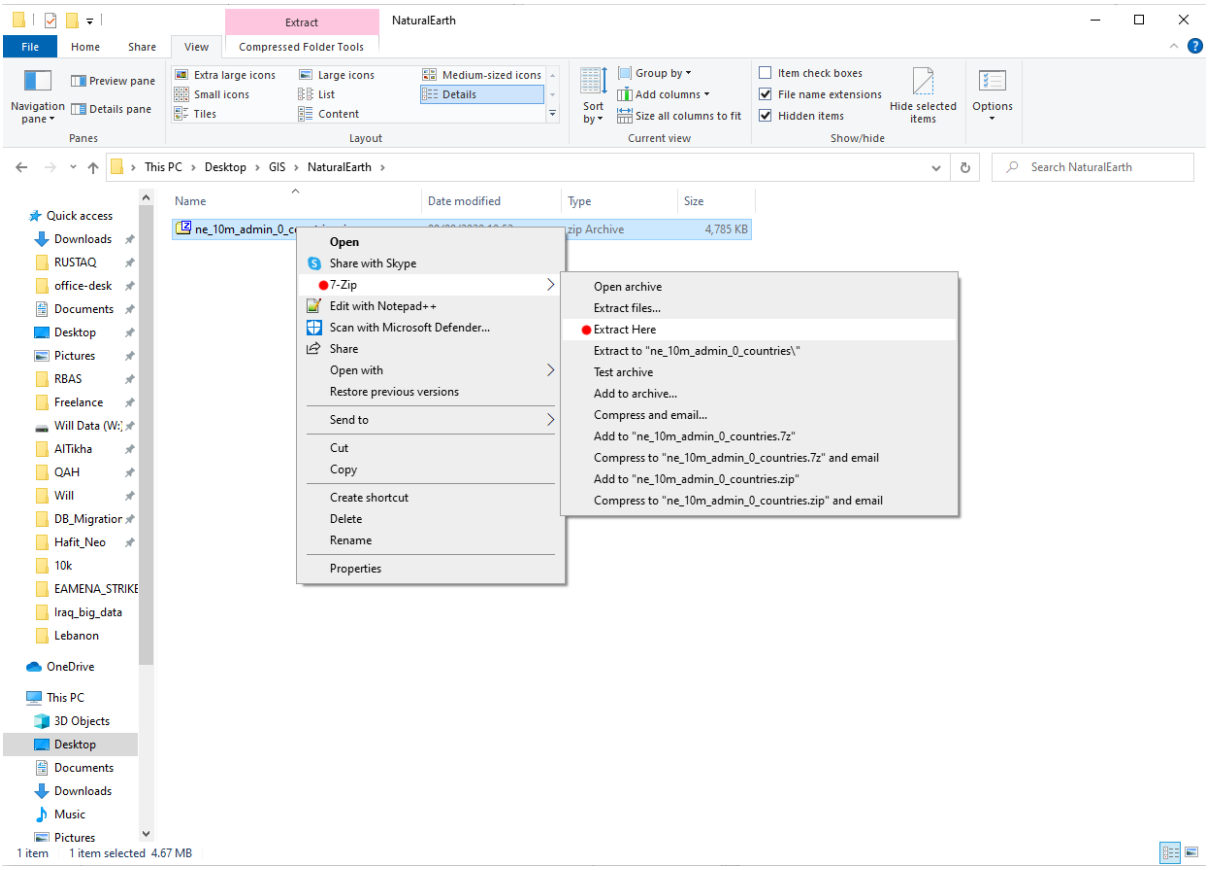
- As we want country border data, under "Admin 0 – Countries" click "Download countries"

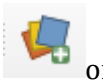


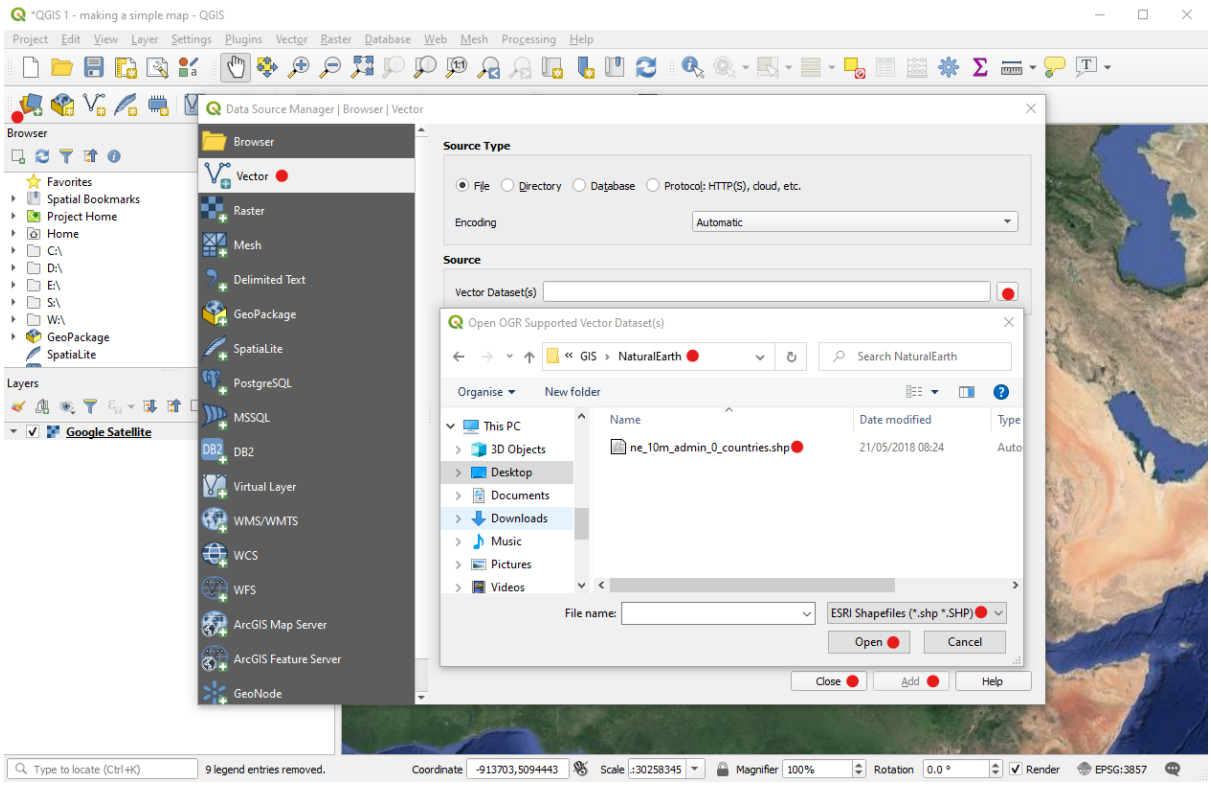

- In your GIS folder (create one if you do not have one, either on the Desktop or in My Documents), create a new folder and name it "NaturalEarth"



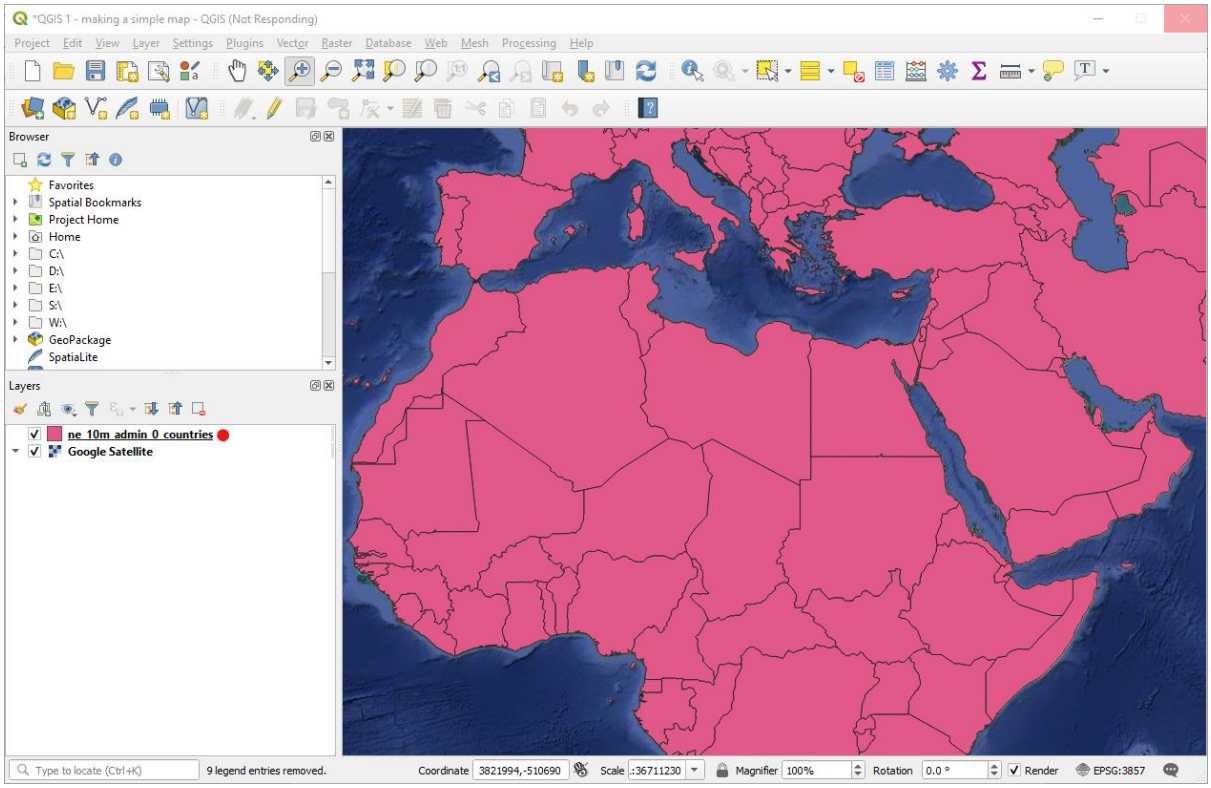
- Find the downloaded zip file, probably in Downloads, and move it to the NaturalEarth folder
- Right-click the zip file and extract it.
    - Many computers will have 7-Zip pre-installed.
    - Go to 7-Zip > Extract Here
    - If you do not have 7-Zip you can download and install it here [https://www.7-zip.org/](https://www.7-zip.org/)



- Go back to QGIS and click the Data Source Manager button  on the Toolbar
- Click on the Vector tab and press the browse [...] button
- Navigate to your new NaturalEarth folder
- Change the file type to “ESRI Shapefile”
- Click on the “ne_10m_admin_0_countries.shp” file and Open
- Click Add and Close

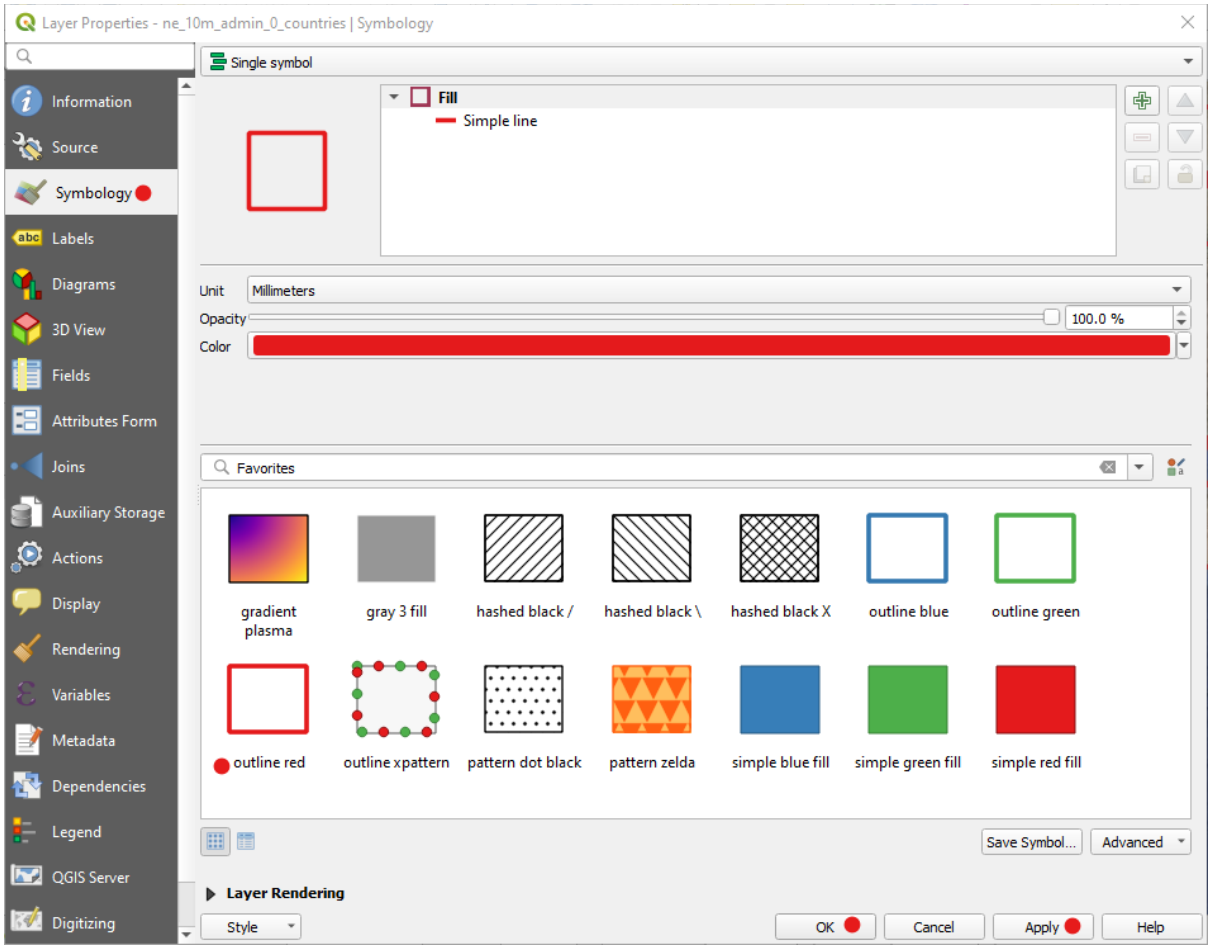


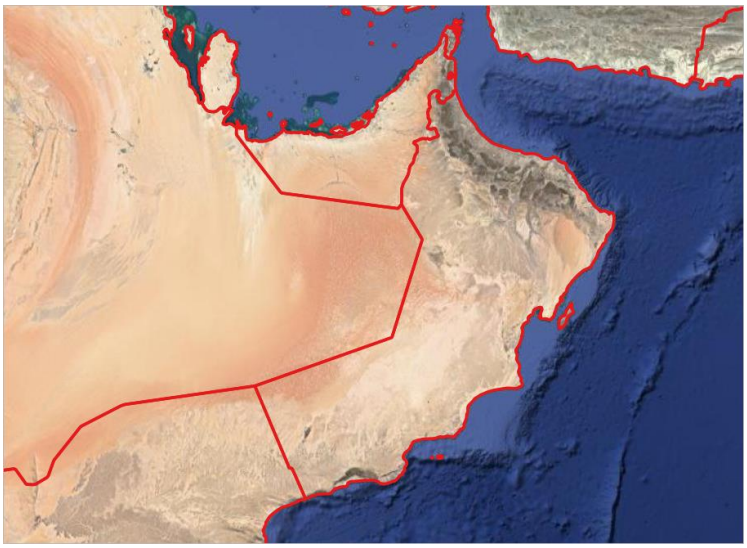
You should now have a shapefile of all the world's countries overlying your basemap, if you cannot see it drag it above the basemap in the Layers Panel so that it is on top.



We want to see the imagery beneath the country data, so we must change the appearance of the shapefile.

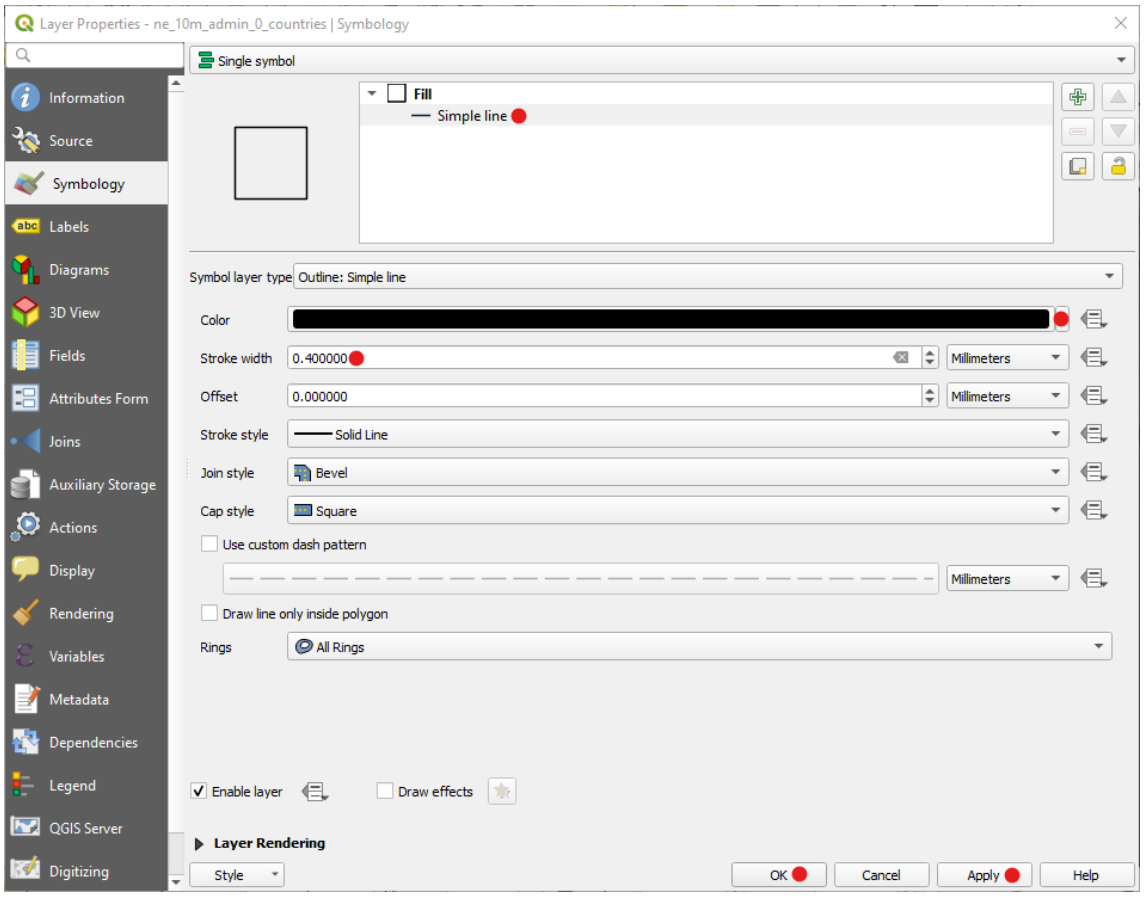
- Right-click the countries shapefile in the Layers Panel and click “Properties”
- Click on the Symbology tab and in the gallery click “outline red”
- Click Apply and OK



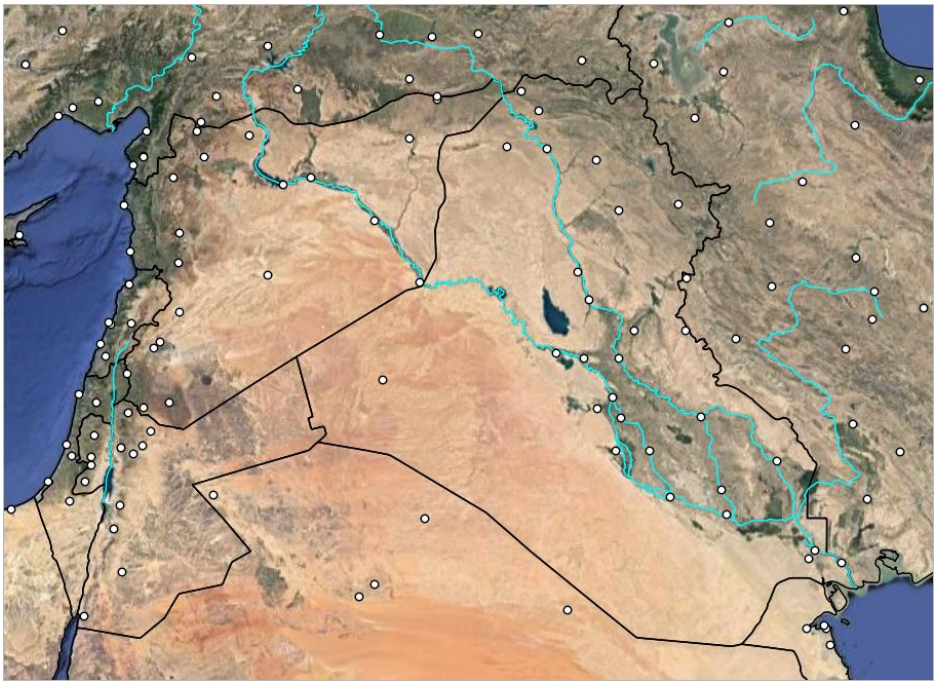



If you do not like this style of line, you can go back to Properties and change the colour and thickness of the line.

- Click on “Simple line”
- Click on the black arrow next to “Color” and chose a different colour
- Change “Stroke width” from 0.96 to 0.4mm
- Click Apply and OK
- Save your work by clicking the “Save” button on the Toolbar

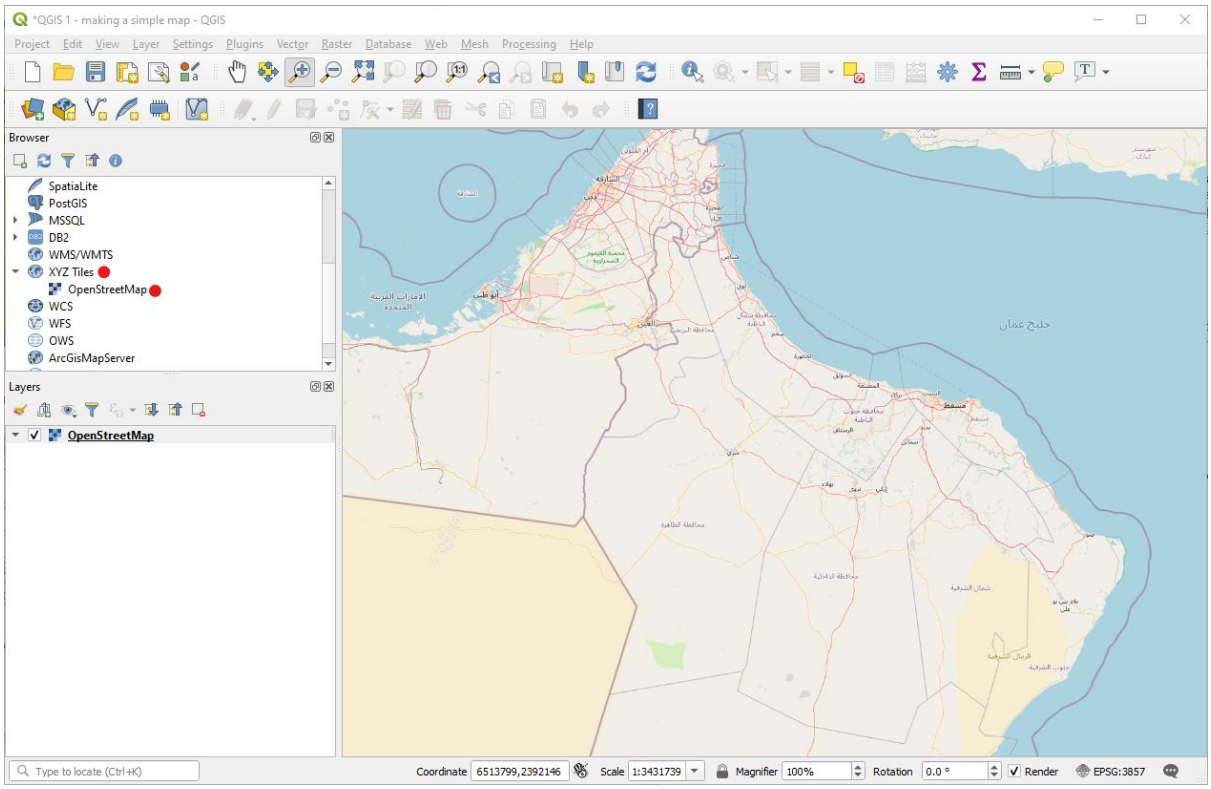


**PRACTICE:** download cities (Cultural > Populated places) and rivers (Physical > Rivers + lake centerlines) from NaturalEarth and change the symbology to match the map below.



## 4.3 Query, download and add OpenStreetMap data (video tutorial)

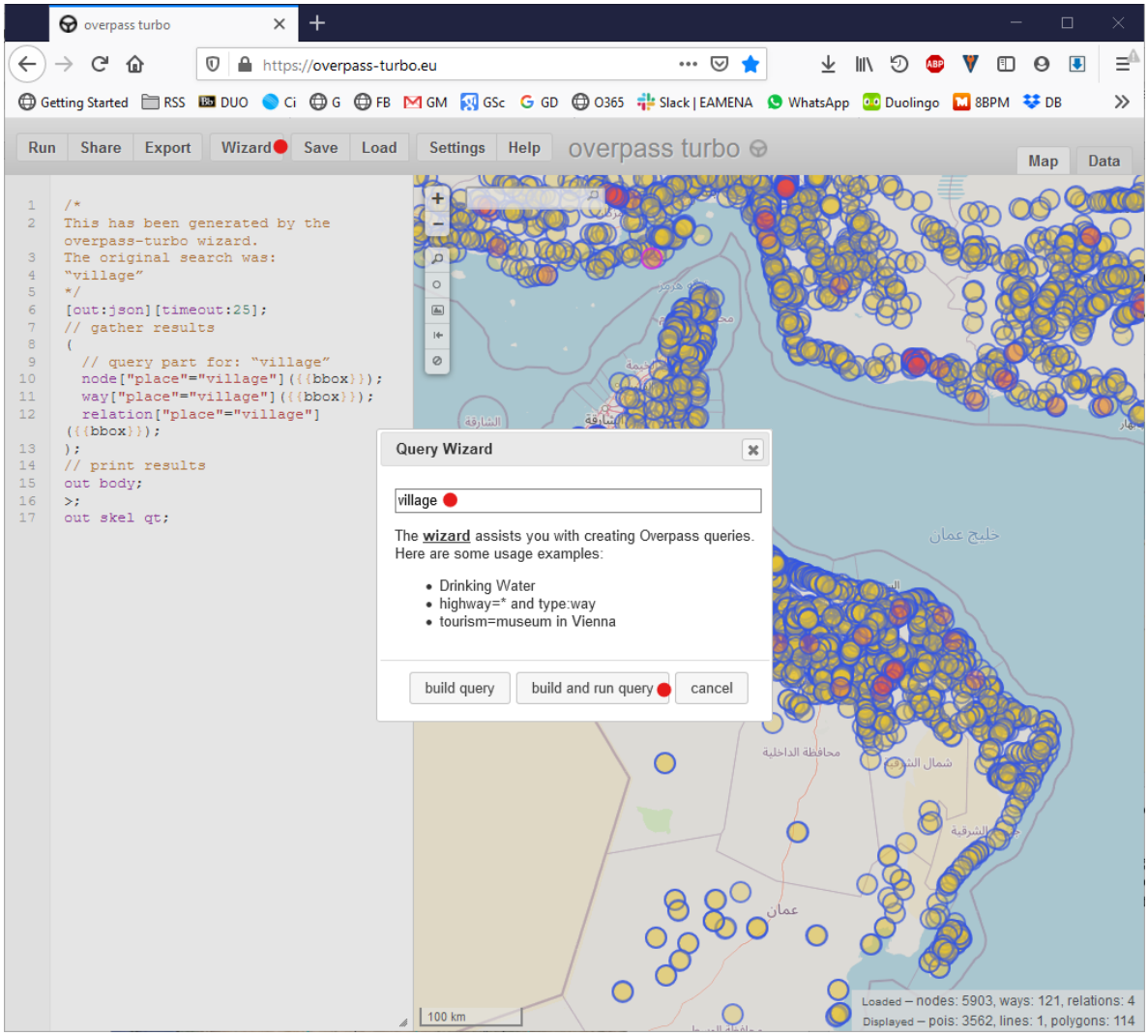
As well as adding OpenStreetMap as a basemap layer we can also download it as vector data to make maps.



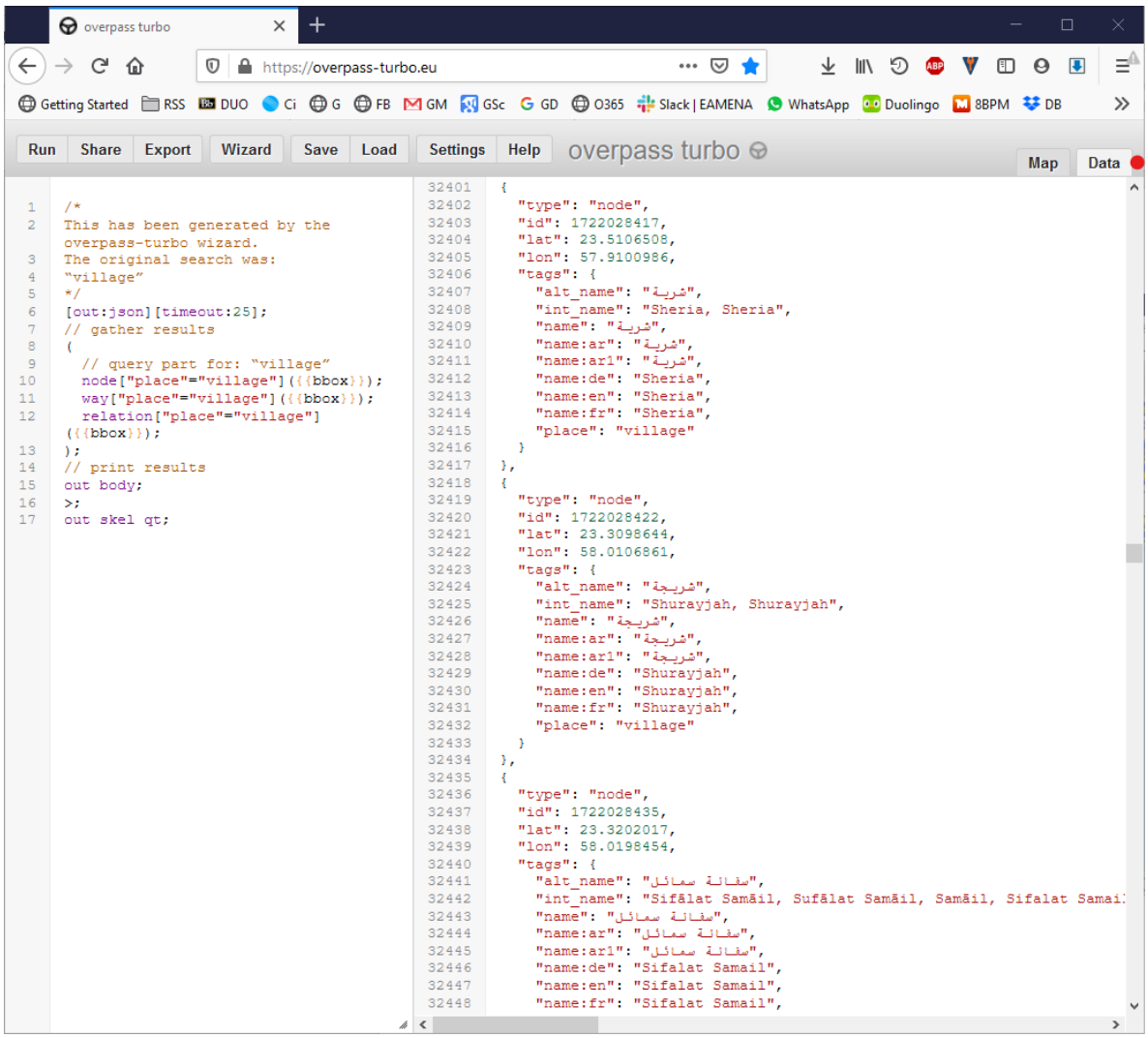
A lot of useful information is contained within OpenStreetMap, including archaeological and heritage data. We are going to learn how to query, download and add this to QGIS.

- In your web browser go to [https://overpass-turbo.eu/](https://overpass-turbo.eu/)
- Use your mouse to zoom into your area of interest
- Click the “Wizard” button, type “village” and click “Build and Run Query”

You will see all of the villages added to the map as circles – this data is a lot more detailed than NaturalEarth.



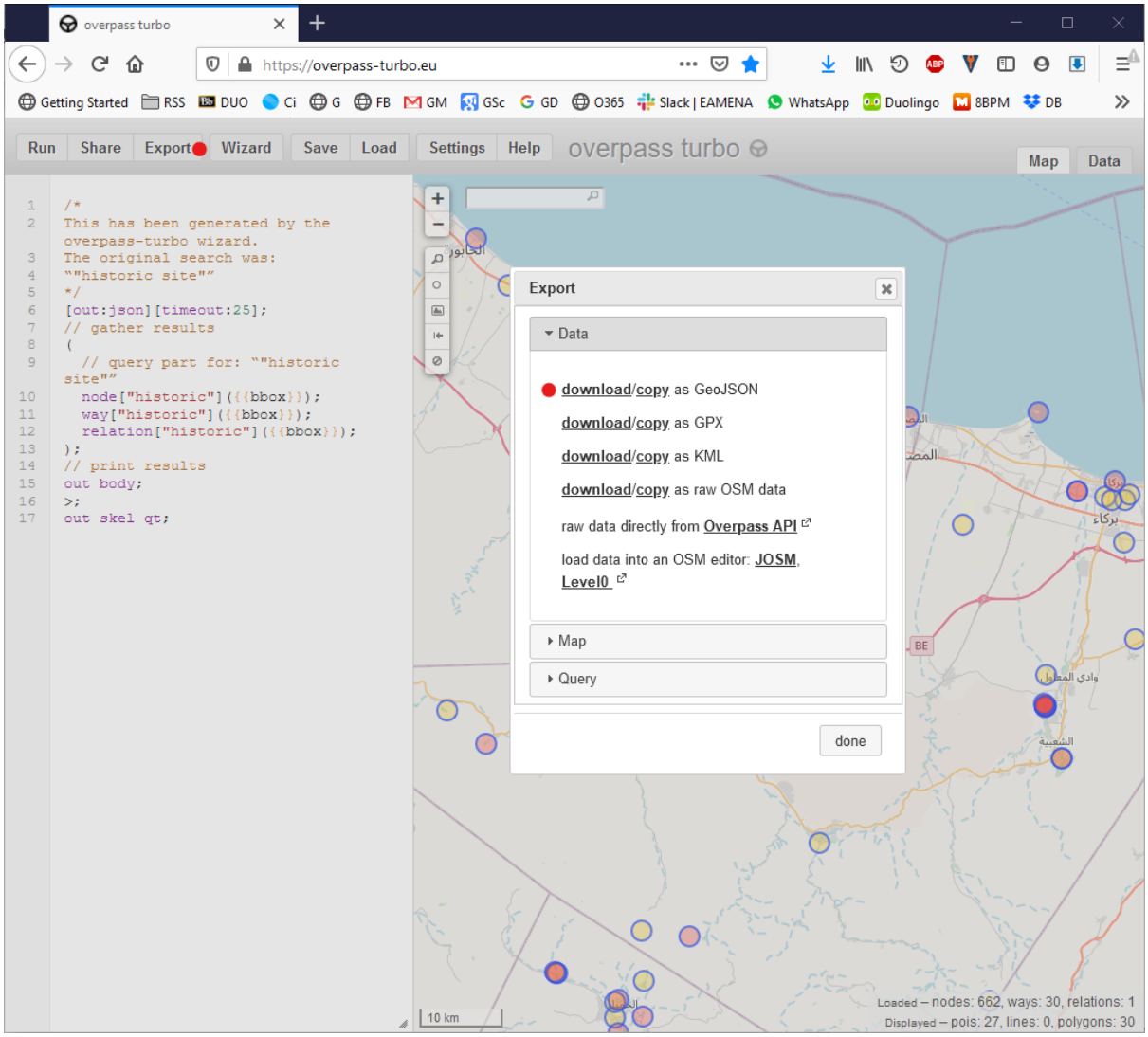
- Click on the “Data” tab and you will see the coordinates, names and details of all these different villages



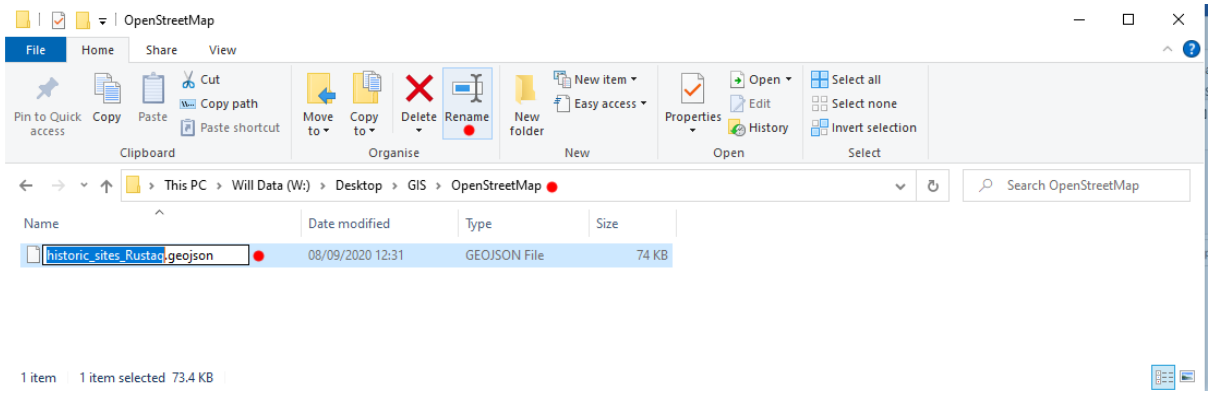

- Return to the Map tab and try searching for “road” and “restaurant” separately

OpenStreetMap also has data of interest to archaeologists.

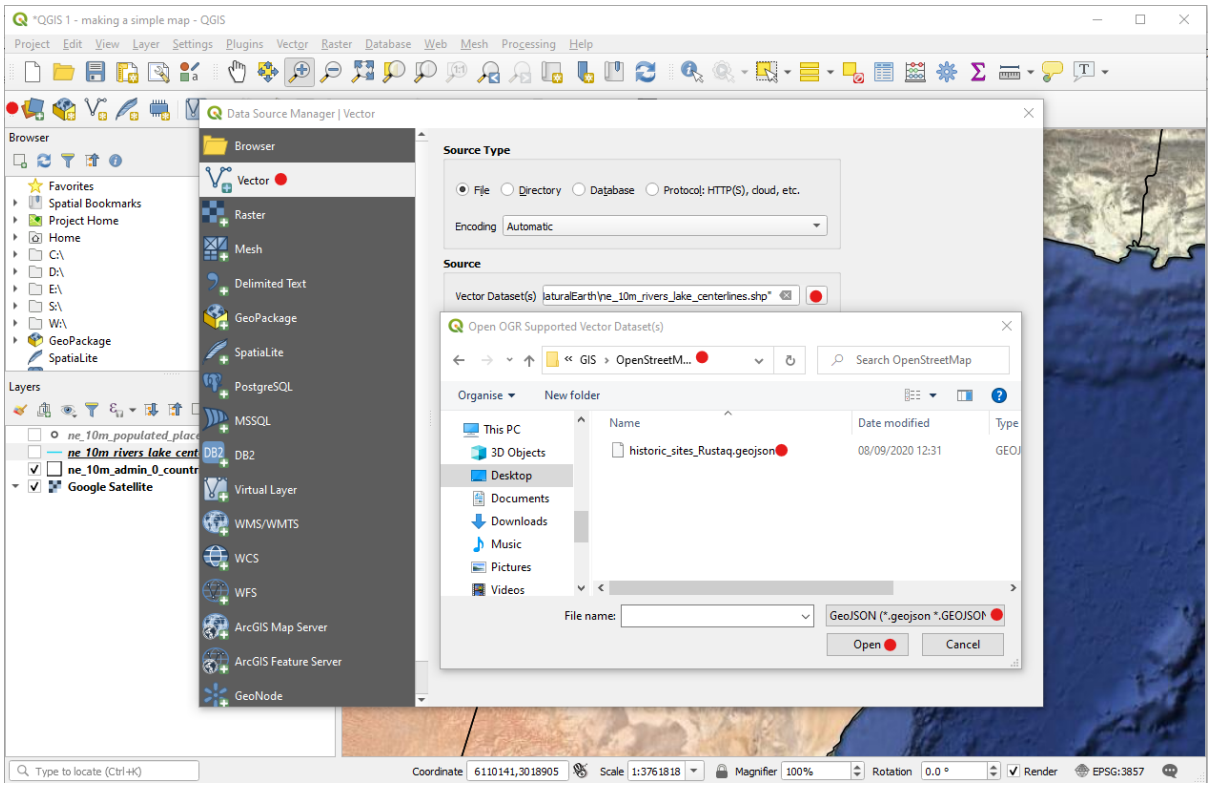
- Click “Wizard”, type “historic site” and click “Build and Run Query”
- To export this data: click the “Export” button, click “Data” and click “download/copy as GeoJSON”



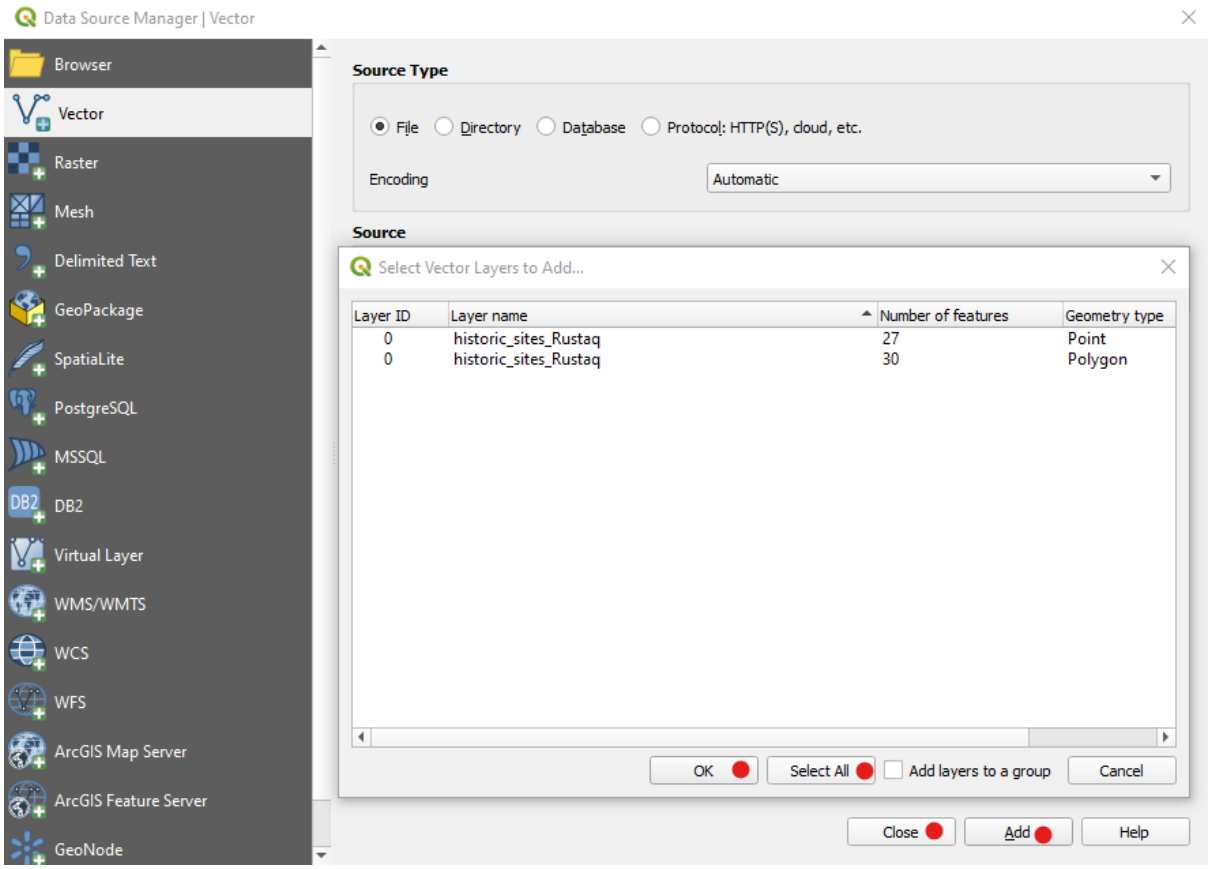

- Create an “OpenStreetMap” folder in your GIS folder and move the “export.geojson” file from Downloads to this folder
- Rename the file as something more useful e.g. “historic_sites_Rustaq.geojson”



- Return to QGIS and click the Data Source Manager button on the Toolbar
- Click on the Vector tab and press the browse […] button
- Navigate to your new OpenStreetMap folder
- Change the filetype to “GeoJSON”
- Click on the historic sites geojson file and Open

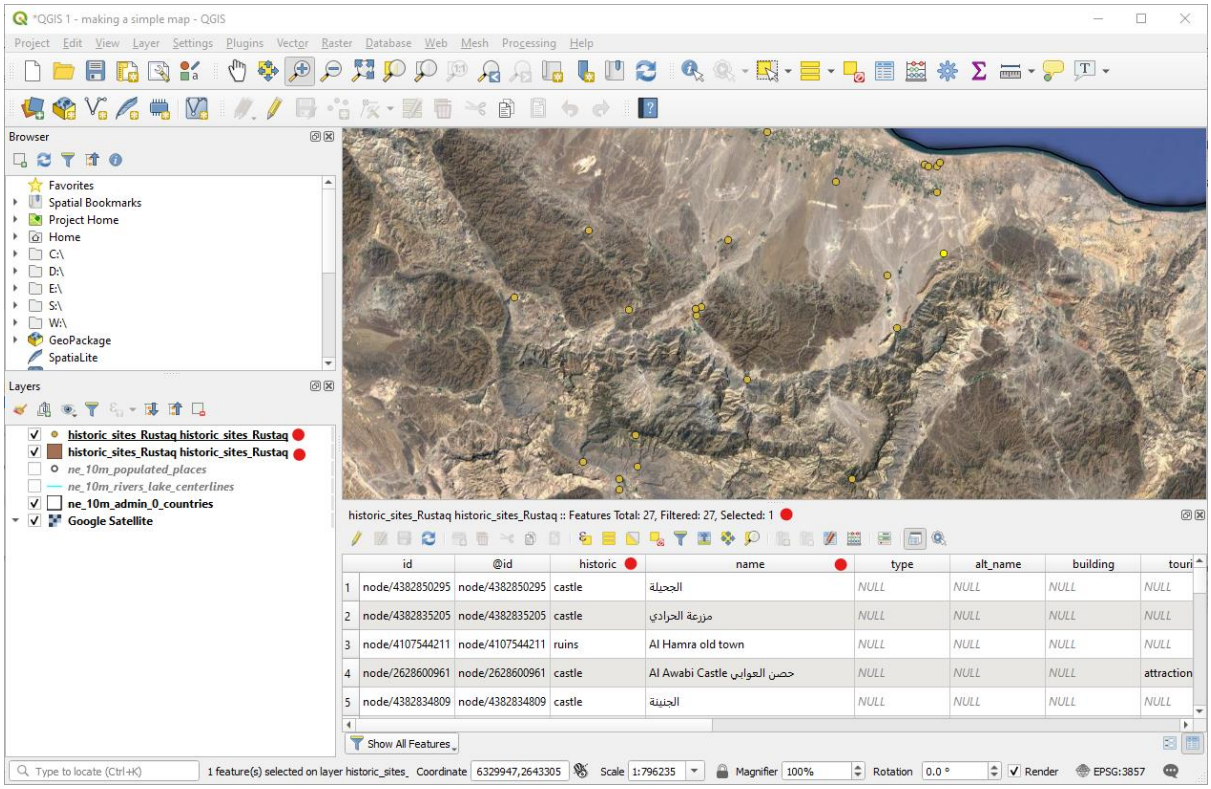


- Click Add and in the new window click Select All, OK and then Close



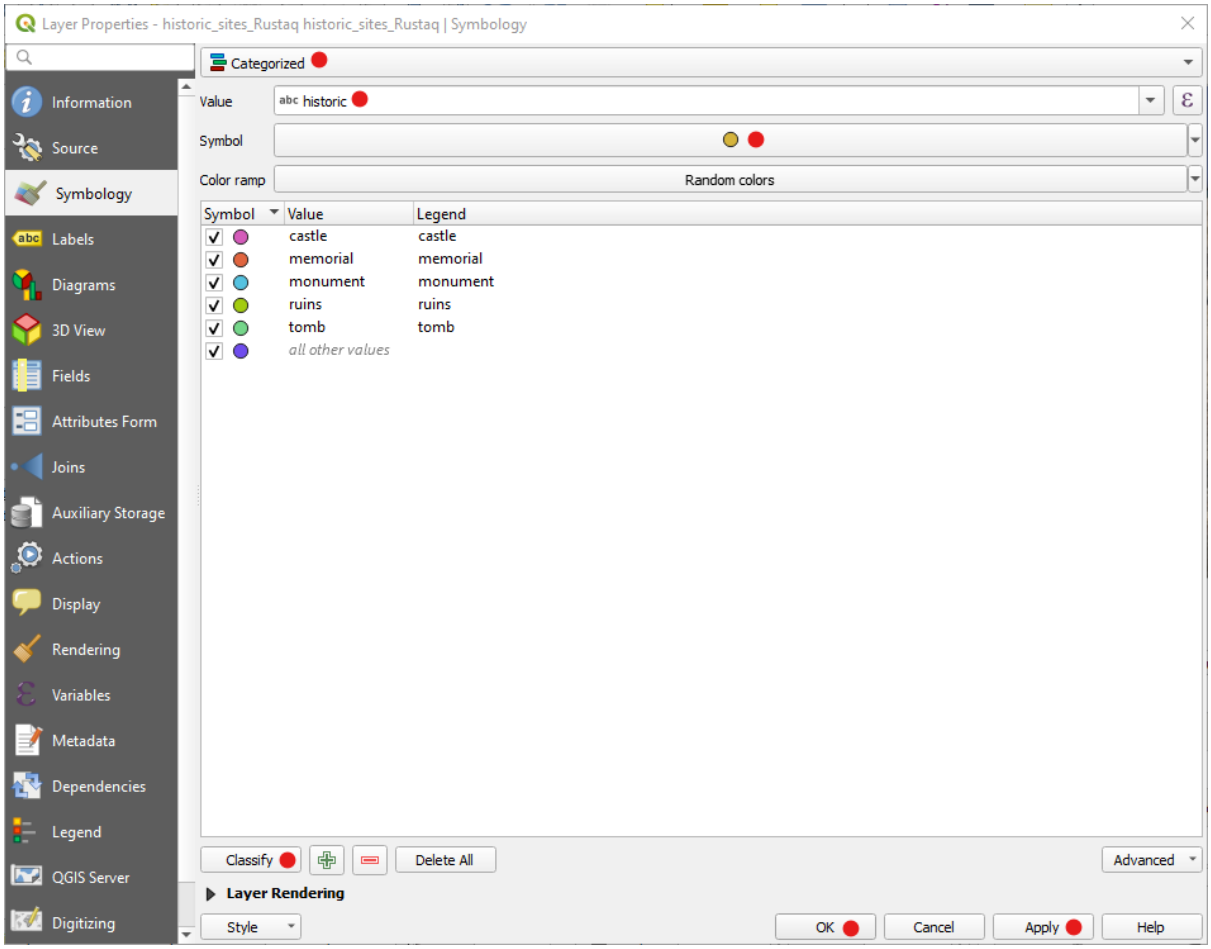
A number of new layers will have been added to the Layers Panel and the Map View Window

- Right-click one of these in the Layers Panel and click “Open Attribute Table” to show the name, category and other details of each historic site
- The Attribute Table may appear as a separate window. If you would rather have it in the same window as your map, then click the “Dock Attribute Table” button in the Attribute Table to embed it below the Map View Window

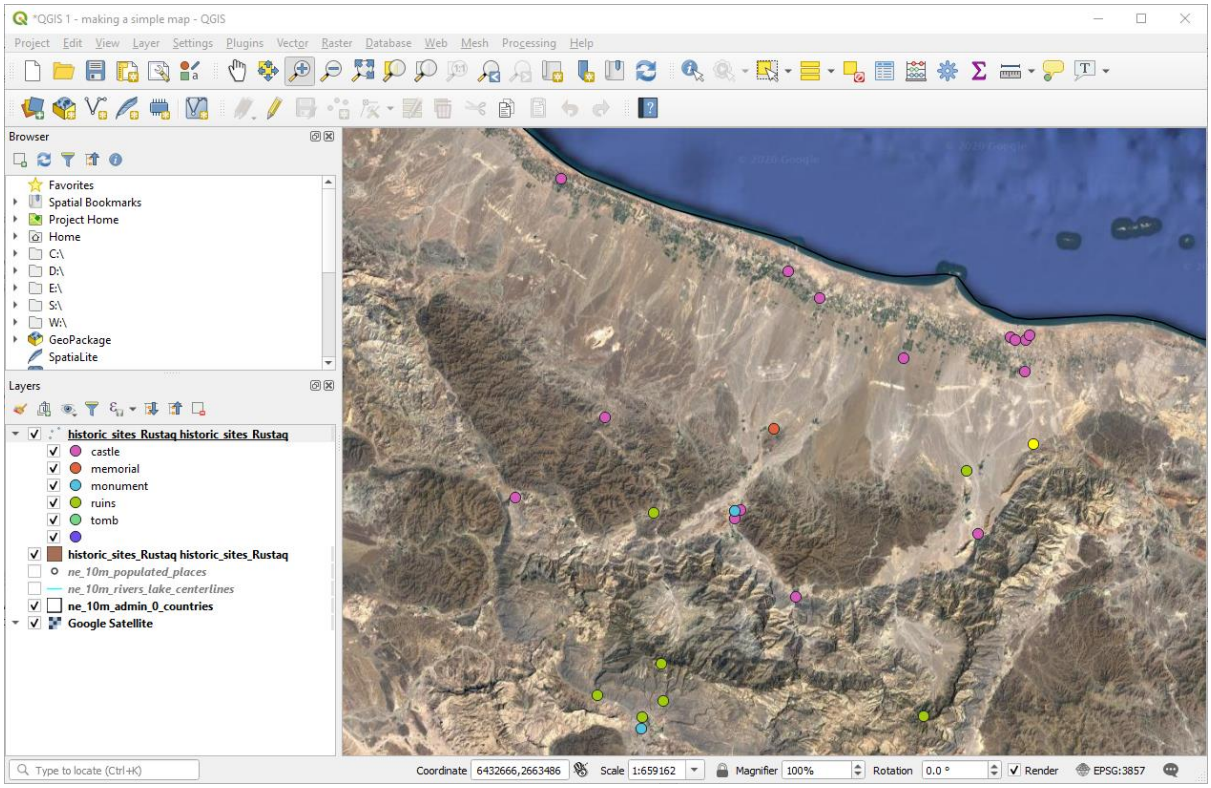


We can display the different categories of historic sites in different colours and add their names to the map as labels.

- Right-click the historic site point layer in the Layers Panel and click on “Properties”
- Click on the Symbology tab
- In the dropdown at the top change “Single Symbol” to “Categorized”
- In the dropdown beneath this, change “Value” to “historic” and click the “Classify” button
- To make all the points a bit bigger click the point next to “Symbol”, change the size to 3.0, click OK, then Apply and OK

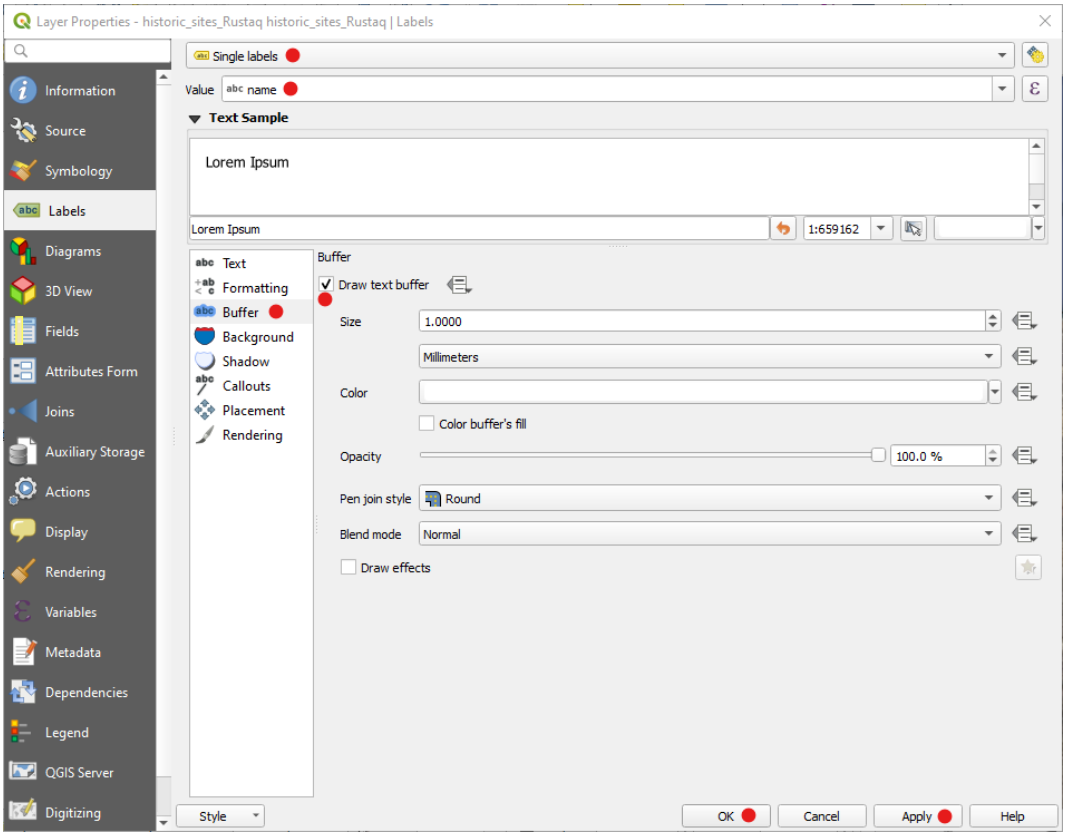


All of the different categories of historic site will now have their own colour.



We can add labels to the map to show the names of the sites.

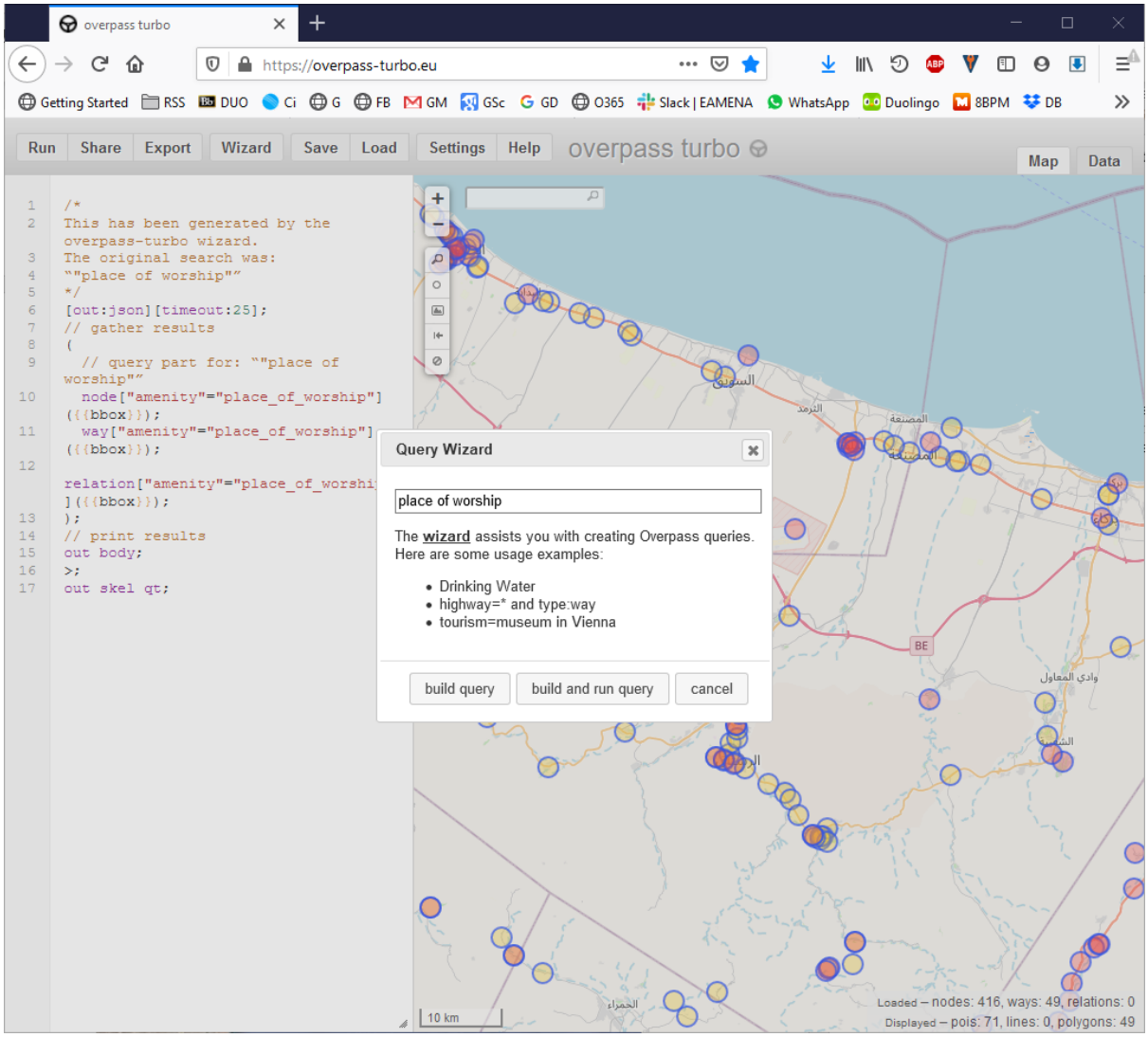
- Right-click the historic sites point layer in the Layers Panel and click on “Properties”
- Click on the Labels tab
- Change “No labels” to “Single labels”
- Select “name” for “Value”
- Click on “Buffer” and tick “Draw text buffer”, click Apply and OK



The historic sites are now labelled with their names.

- Save your work by clicking the “Save” button on the Toolbar

**PRACTICE:** religious buildings are often not included in OpenStreetMap historic sites, but many of them are old and are of interest to archaeologists – download, add to QGIS and label any mosques or churches in your area of interest ("place of worship" in the Wizard).




## 4.4 Importing data from the EAMENA database into QGIS (video tutorial)

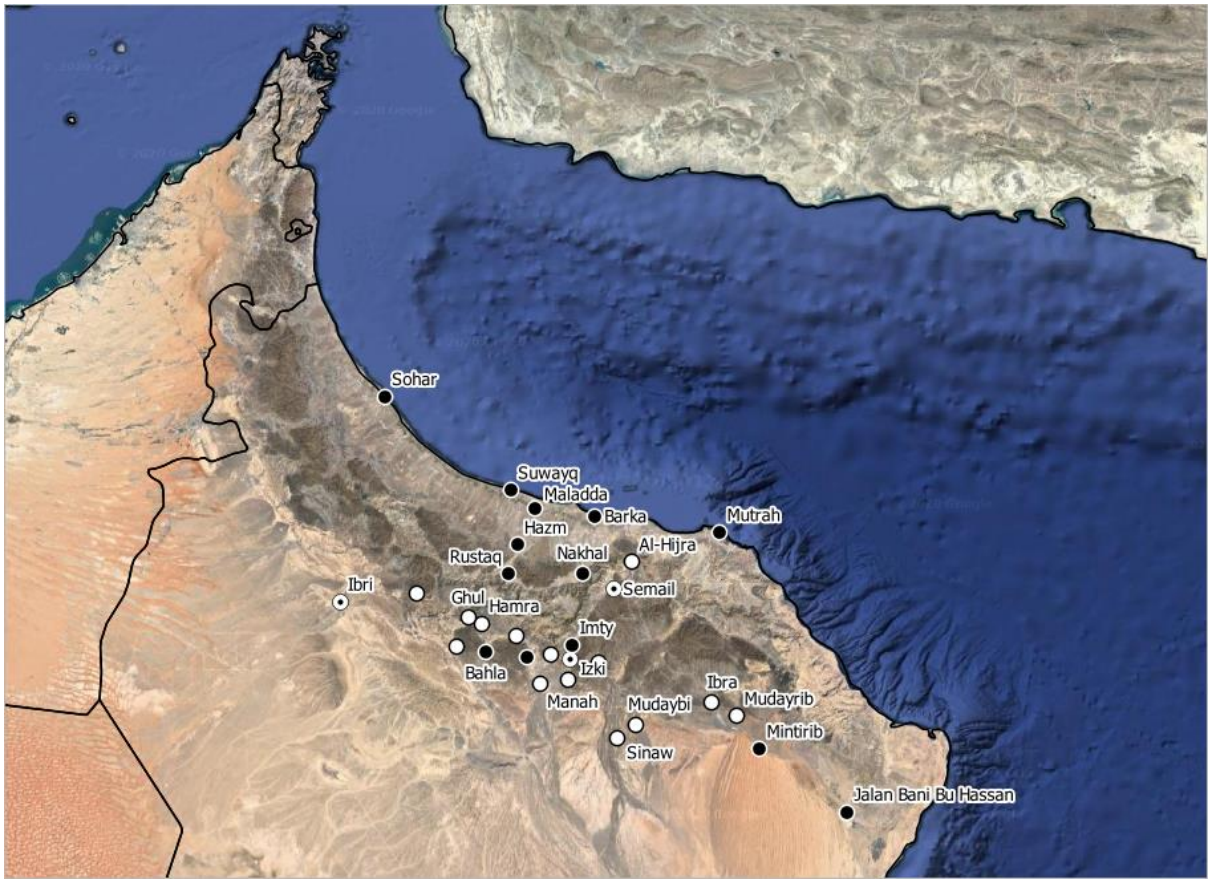
There is a new way of adding data from the EAMENA database to QGIS.

[TO BE ADDED]

## 4.5 Making and exporting a map (video tutorial)

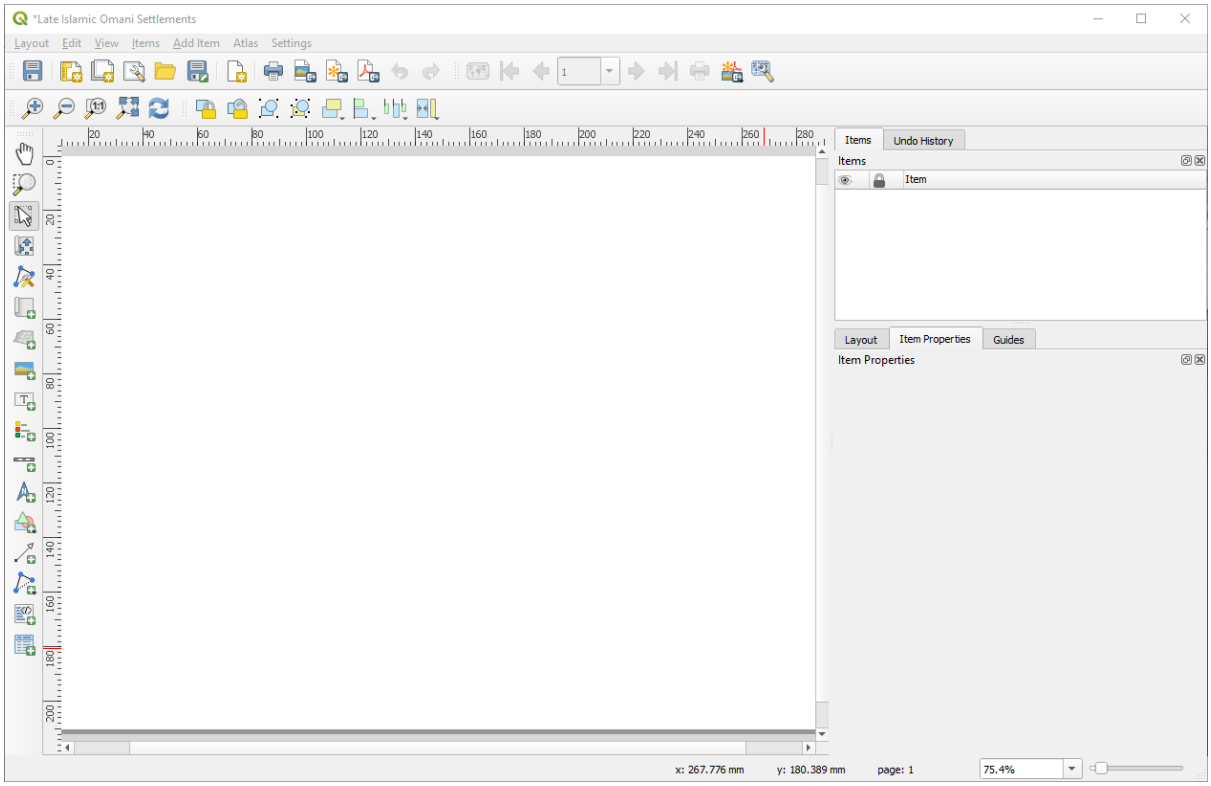
This final part of the tutorial recaps how to make and export a map from QGIS.

Once you are happy with the contents, symbology and labels in your Map View Window, you can then create and export a map from QGIS as an image file that can be opened or used in a different program.

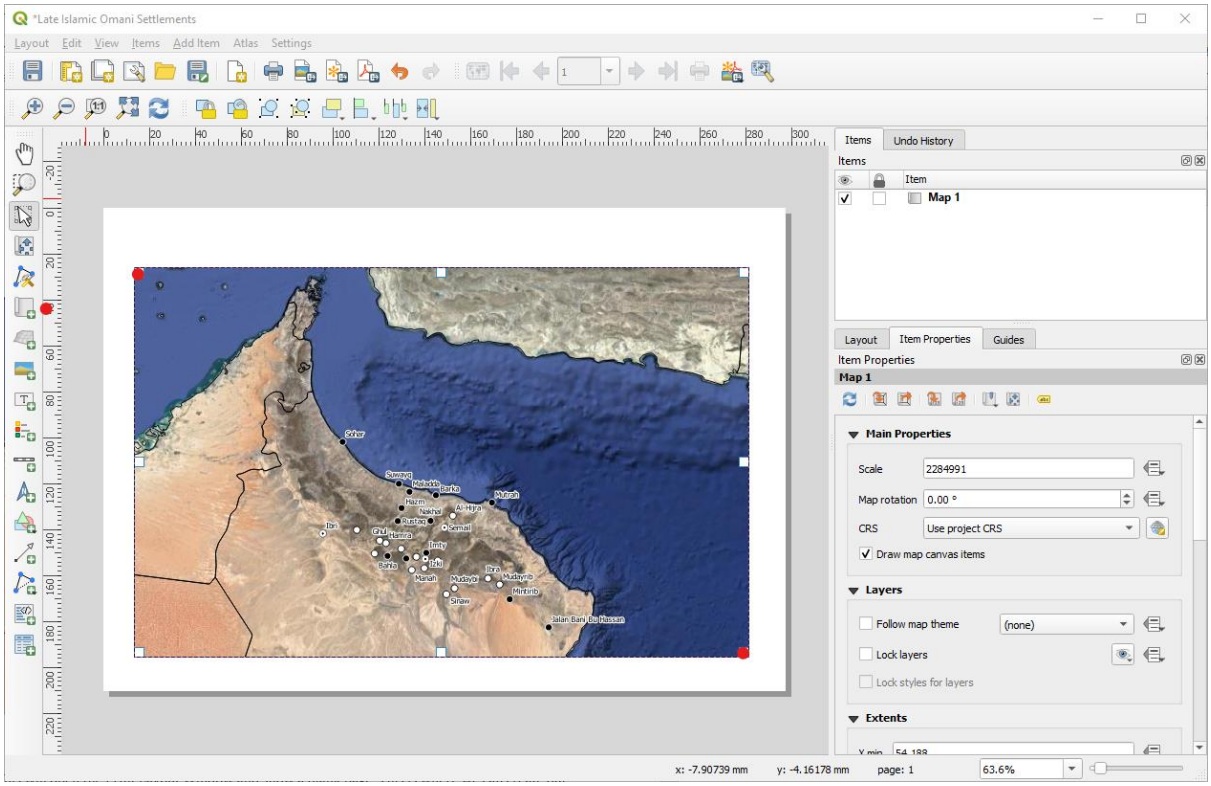



- On the Menu click Project > New Print Layout
- Give your map a short name and click OK

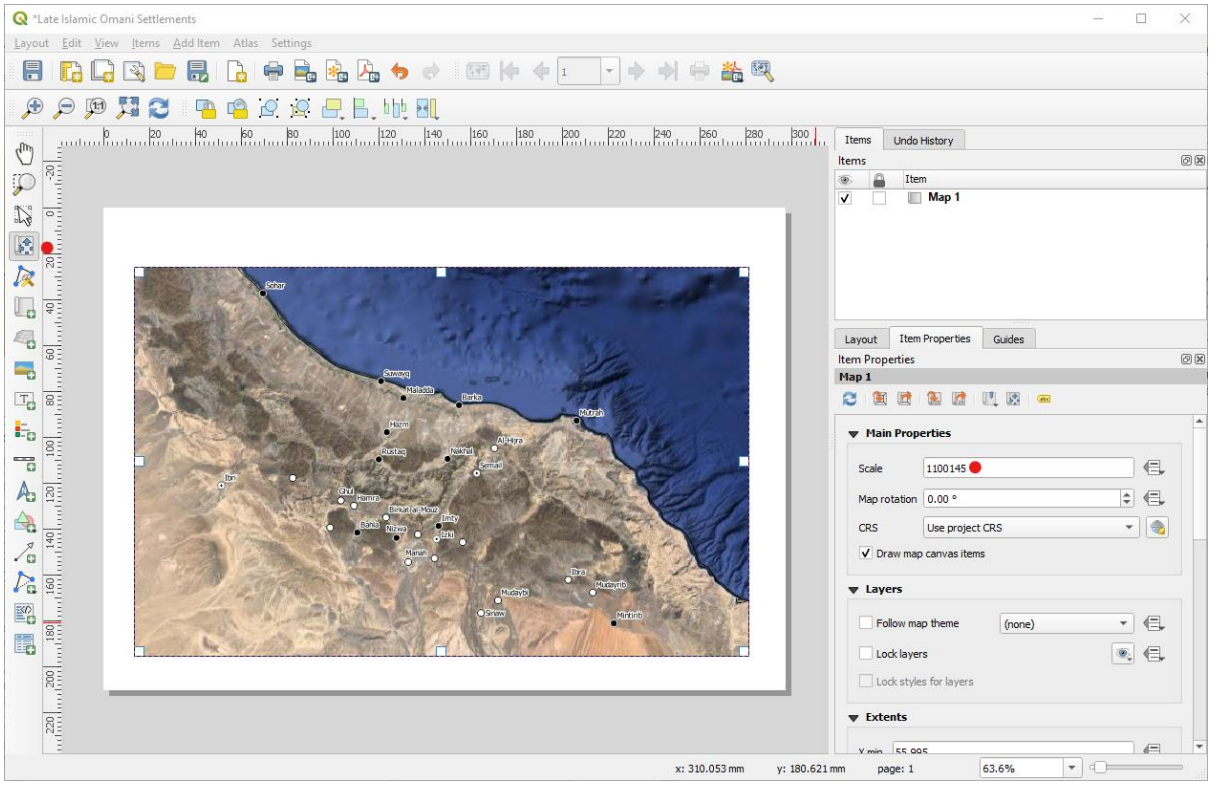
This will open the Print Layout Window and show a blank page. This is where we can create our map.



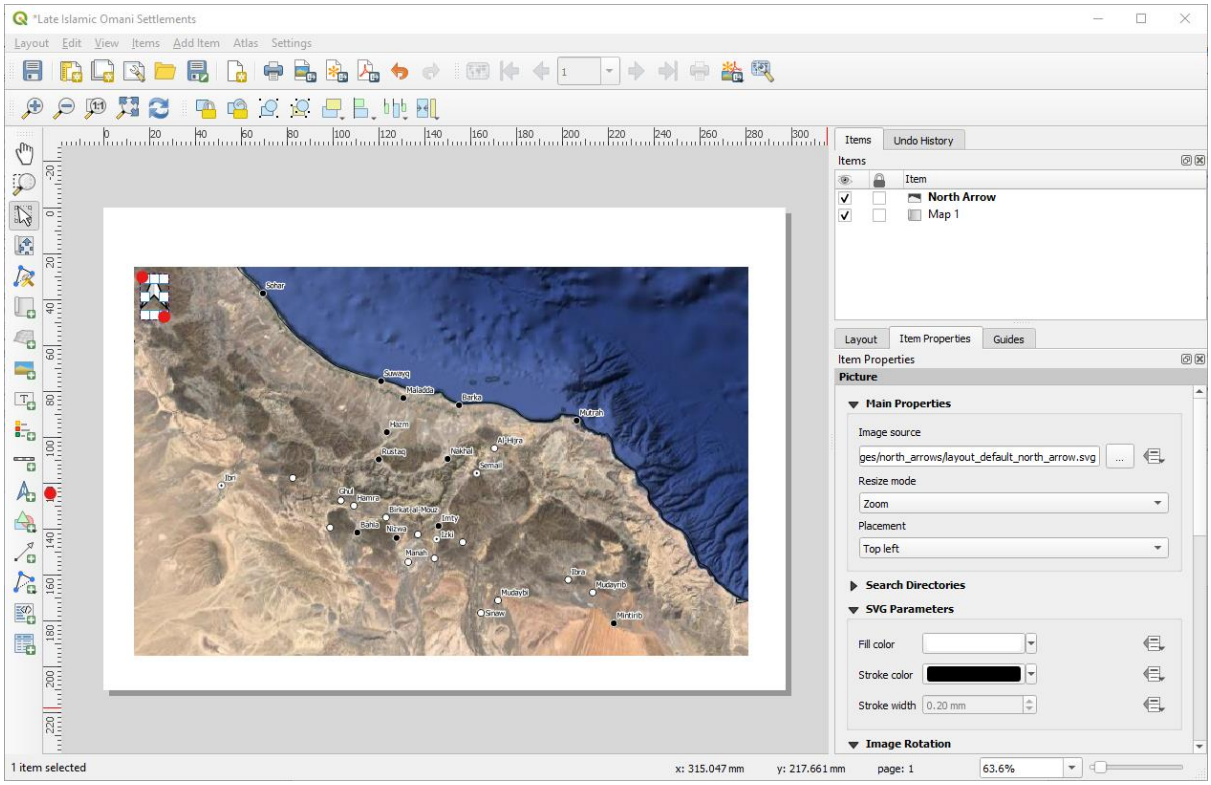

- First click the Add Map button and click and drag a box across the page to the same size that you want your map



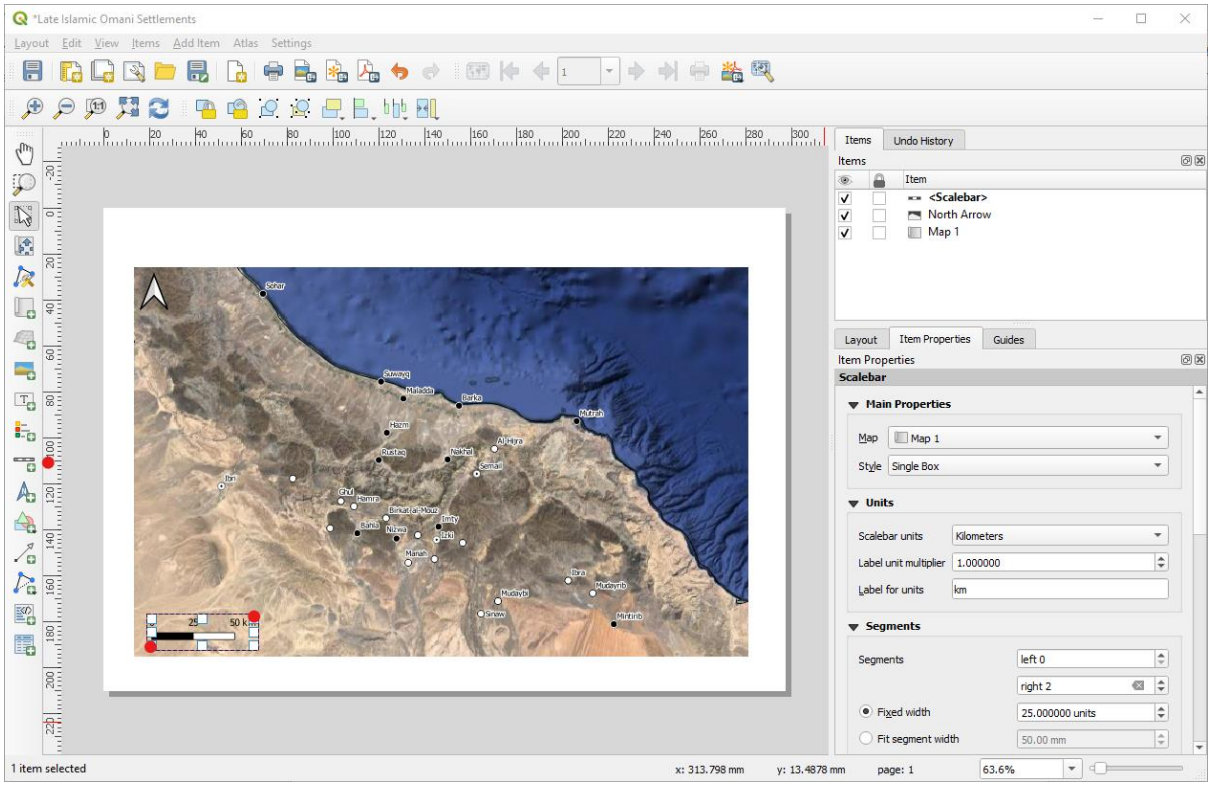
- Click the Move Item Content to move around inside your map, you can use the mouse wheel to zoom in and out, holding the Ctrl key to zoom in smaller increments
- You can also adjust the zoom by manually adjusting “Scale” in the Item Properties Panel



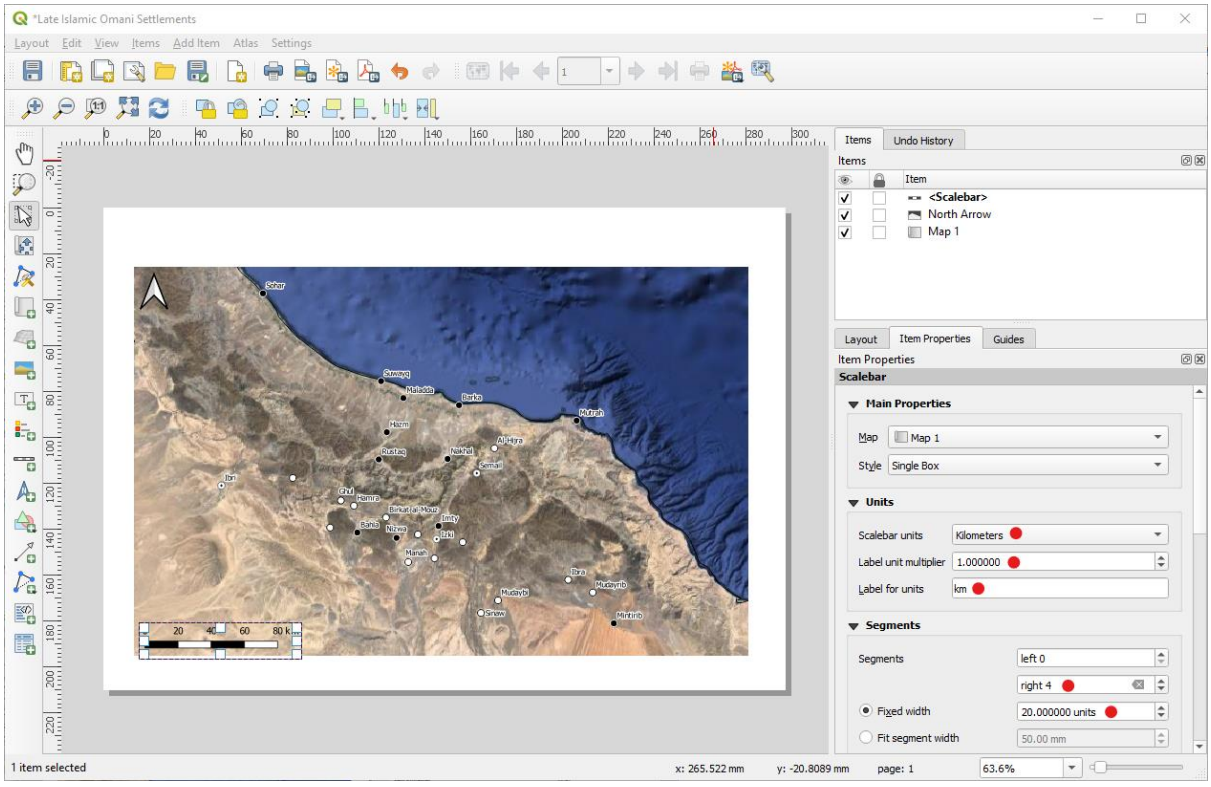

- Click the Add North Arrow button and click and drag to create a north arrow for your map



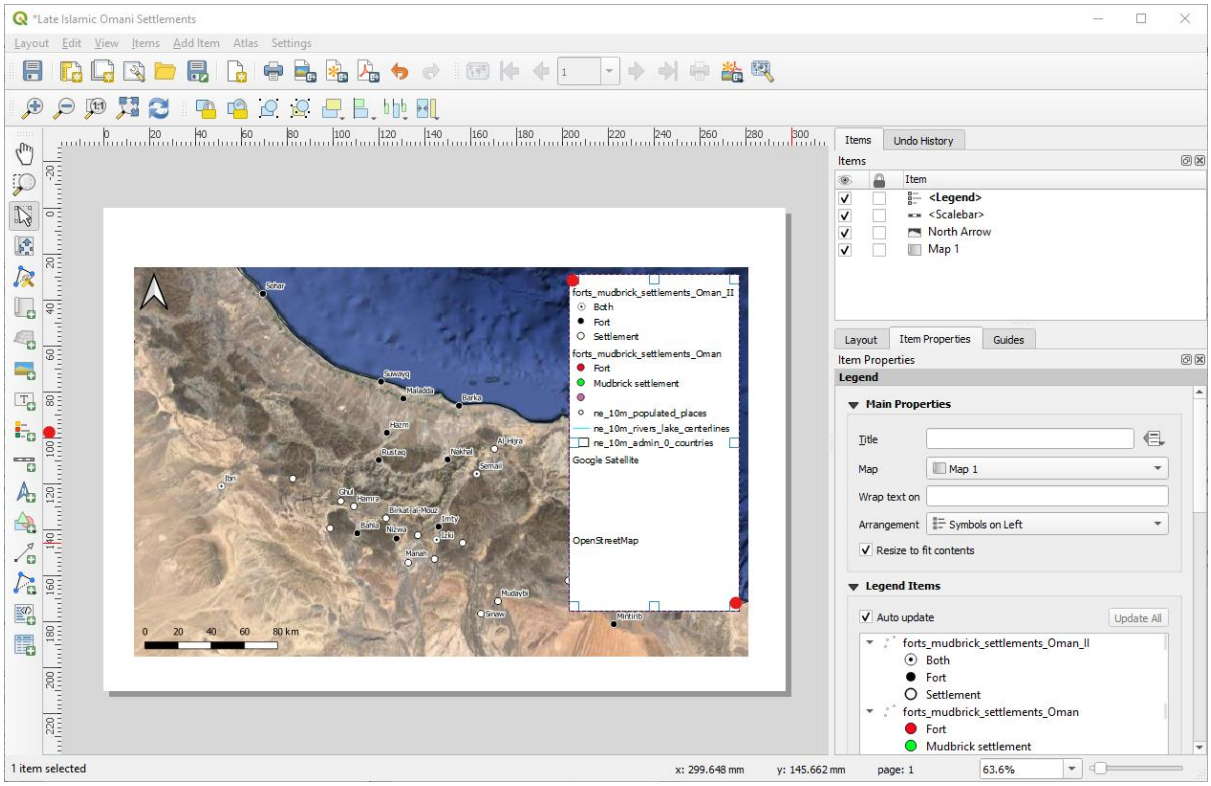
- Click the Add Scale Bar button and click and drag to create a scale bar




- You can adjust the scale bar in the Item Properties panel – you can change the units, add extra segments and change the length of the segments, as well as changing the formatting.

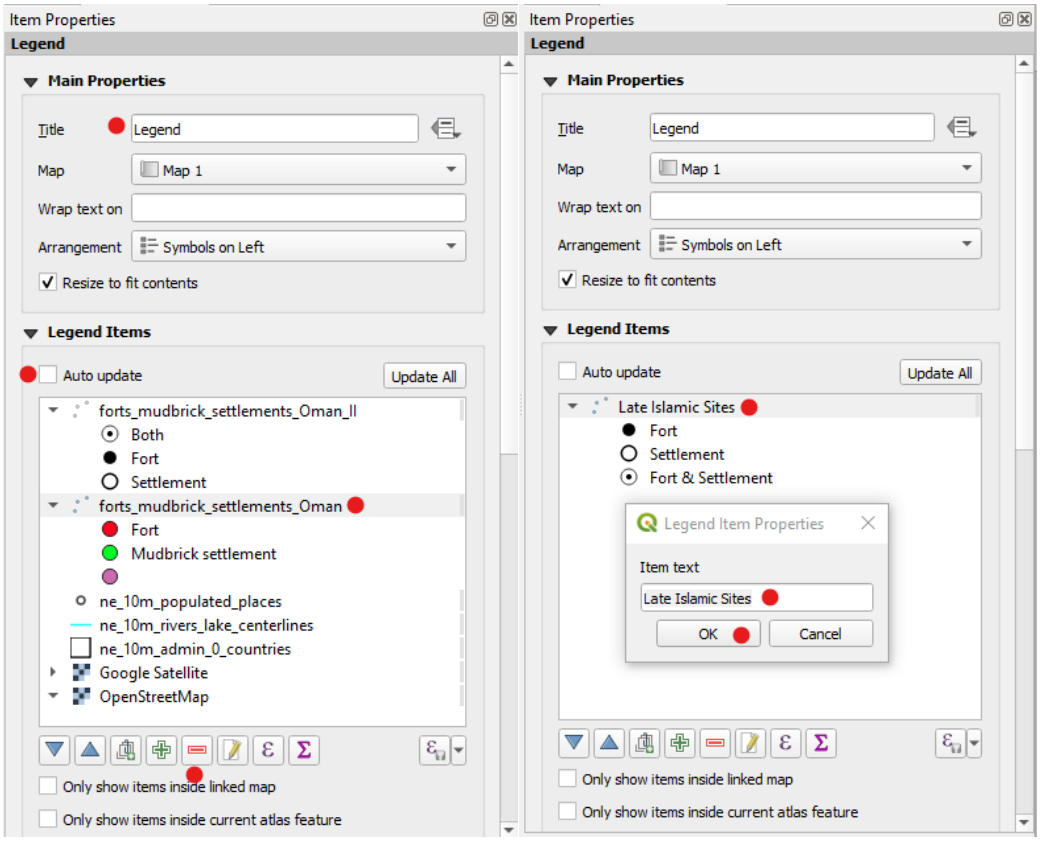


- Click the Add Legend button and click and drag to create a legend

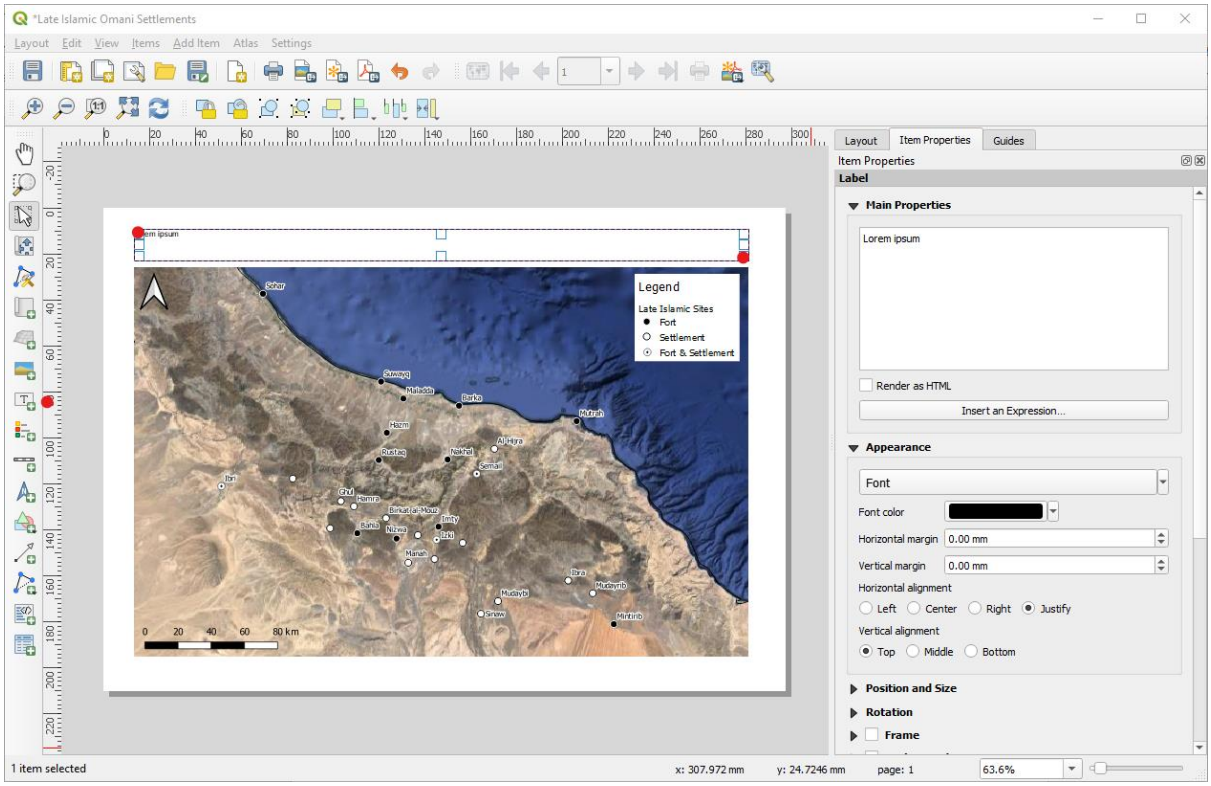


By default this will contain a lot of layers and information that we do not want so we will have to edit it in the Item Properties Panel.

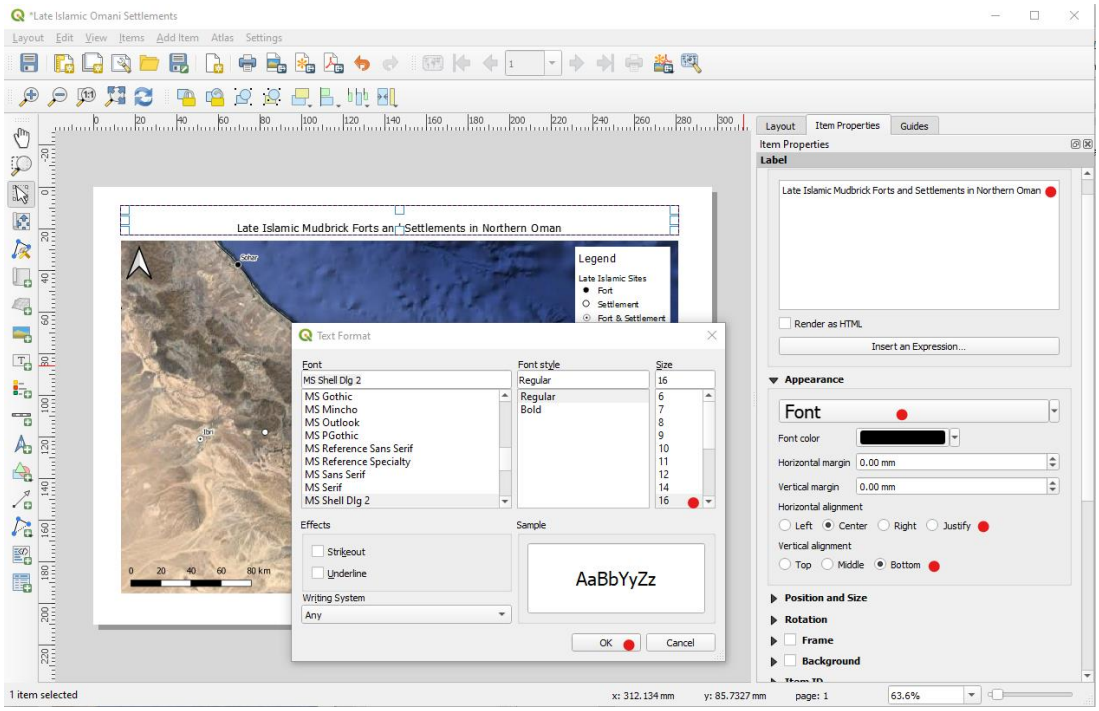
- A title (e.g. Legend) can be added in the Title box
- To remove unwanted items untick "Auto update", click on unwanted items and click the red [–] button
- The order of items can be changed be clicking on each and pressing the blue arrow buttons
- Text labels can be changed by double-clicking, typing it in and pressing OK



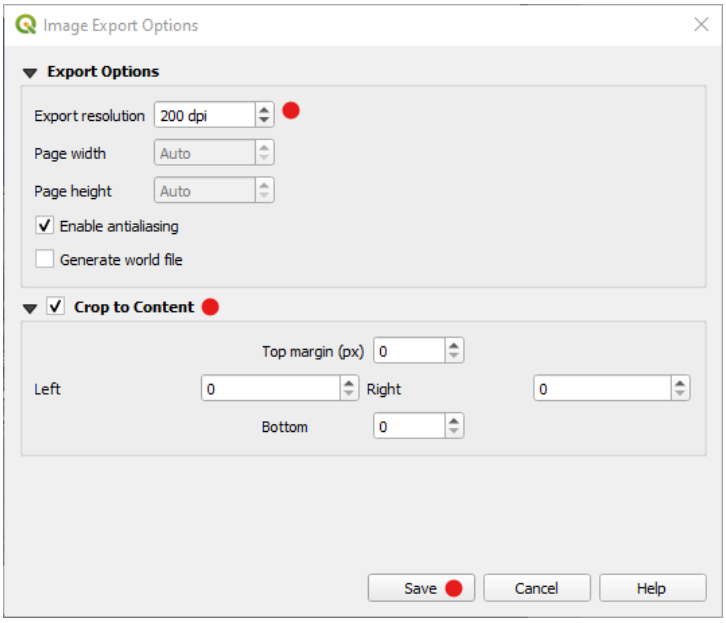
- If desired, a title can be added by using the Add New Label button



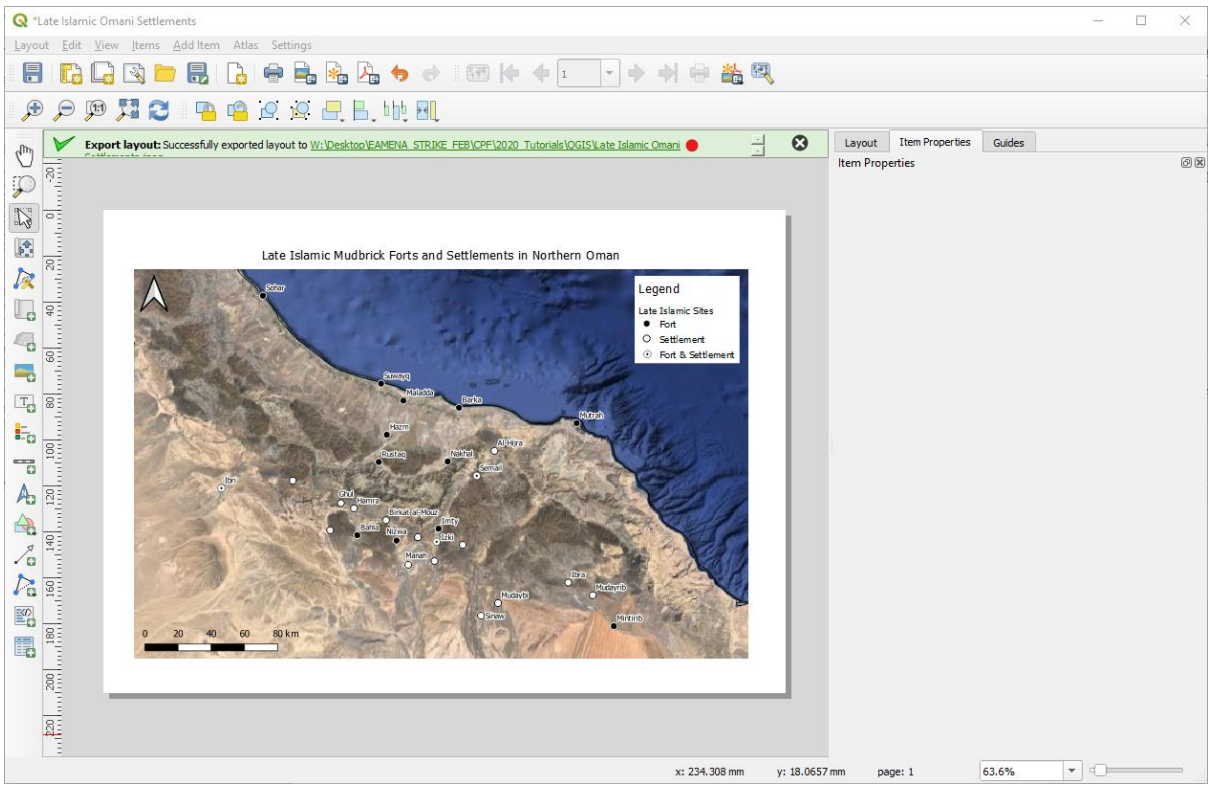

- The title's text is changed in the Item Properties Panel by typing in the large Main Properties box
- The font and text size can be changed by pressing the Font button
- The horizontal and vertical alignment of the text can be changed by clicking on the preferred options



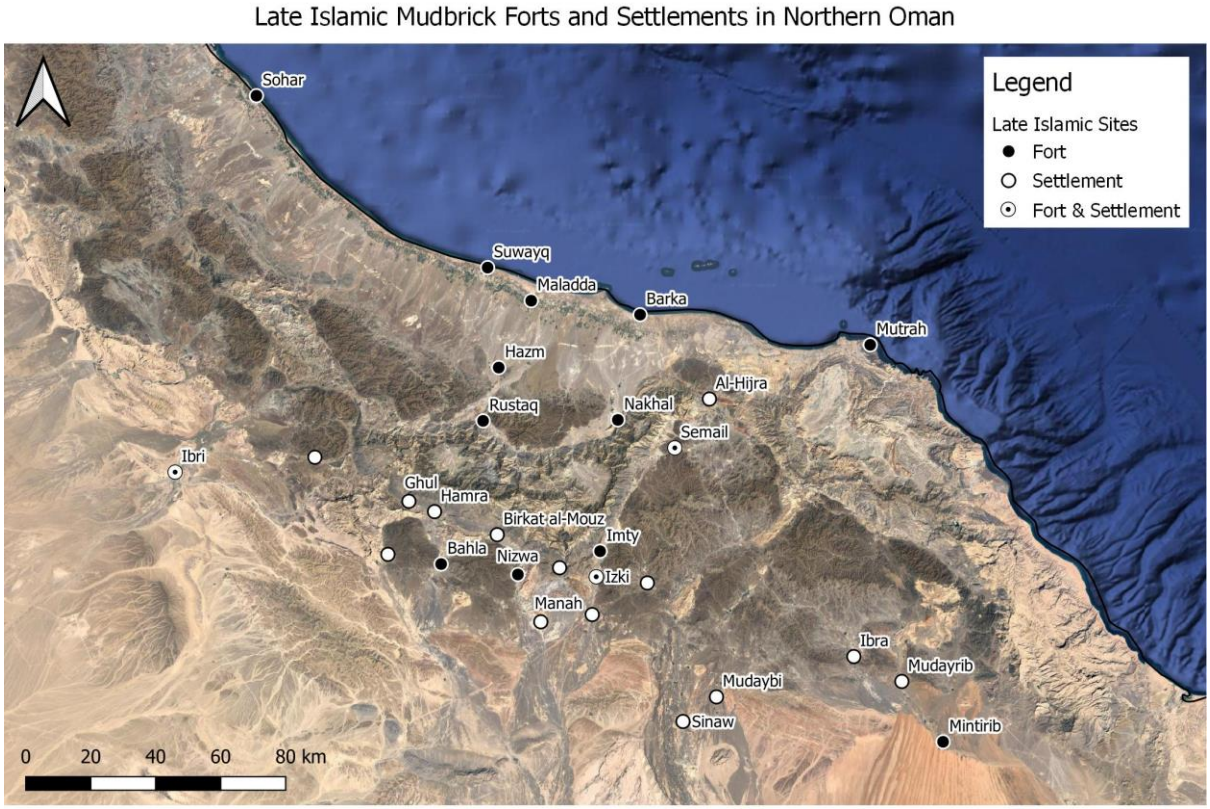
- Once you are happy with the map, export it by clicking Layout > Export as Image on the Menu
- Navigate to the folder you want and choose an appropriate name and filetype (e.g. jpeg) and click Save
- Change the DPI to 200 (for a medium quality image) and tick "Crop to content" and click Save




- Click the green shortcut to open the folder in which you have saved the map



- Double-click the map to open it




- Save your work by clicking the "Save" button on the Toolbar

**ACTIVITY:** Create and export a map of archaeological sites in your area of interest using QGIS