

CREATING A STUDY AREA SHAPEFILE

ECOSTRESS TUTORIALS

This tutorial will show you how to digitize a shapefile in QGIS, which can be used to request and download ECOSTRESS data.

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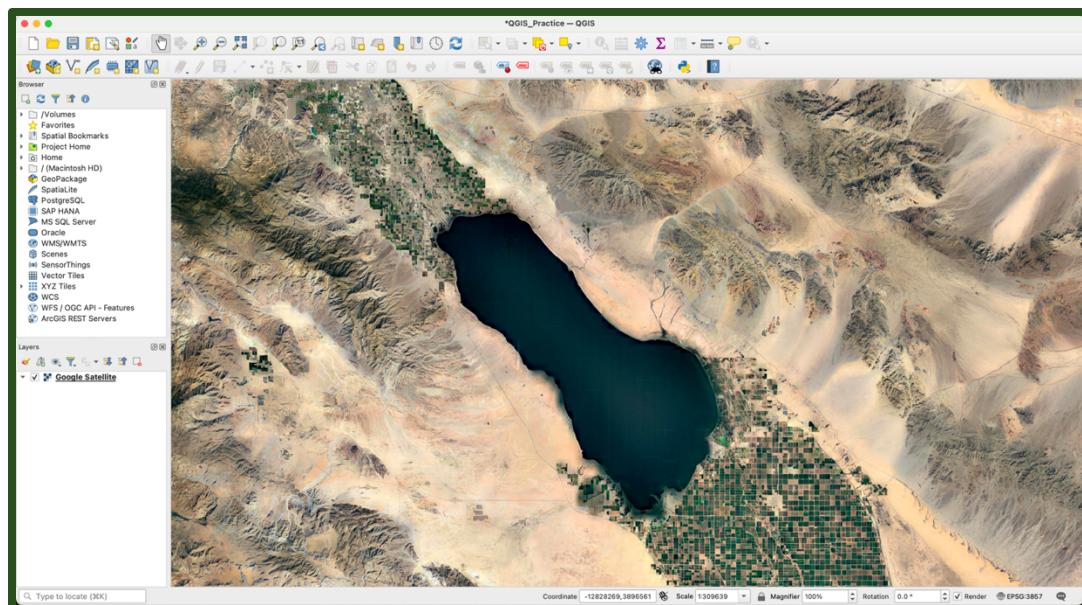
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What are shapefiles and why are they useful for working with ECOSTRESS data?

A shapefile is a vector data format that can store geographic information in the form of points, lines, or polygons. Study area shapefiles are typically polygons because they encompass the area you are interested in studying. Shapefile polygons can come in many different abstract shapes, which is beneficial when your study site is not a perfect rectangle. When downloading ECOSTRESS data from the AppEEARS website or Earthdata Search, you have the option to upload a shape file of your study area to download data that falls within its bounds.

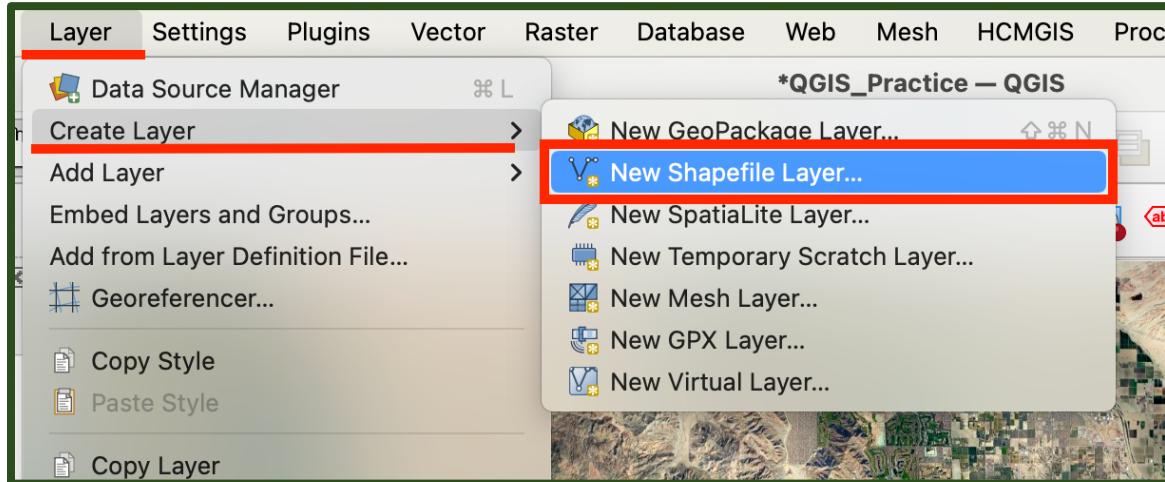
CREATING A STUDY AREA SHAPEFILE

1. In QGIS, make sure you have a satellite **basemap** on. Then, zoom into your area of interest. For this tutorial we will look at the **Salton Sea** in southern California.

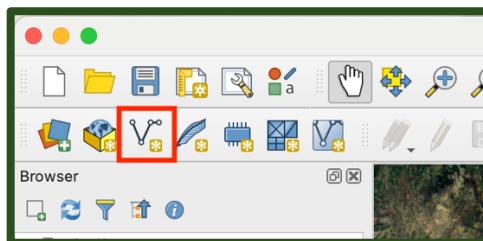


Tip: If you do not have basemaps on QGIS, you can get them from installing the **HCMGIS** plugin. If you do not know how to do that, see the **Installing QGIS** tutorial under **Preparing QGIS for use with ECOSTRESS Data**.

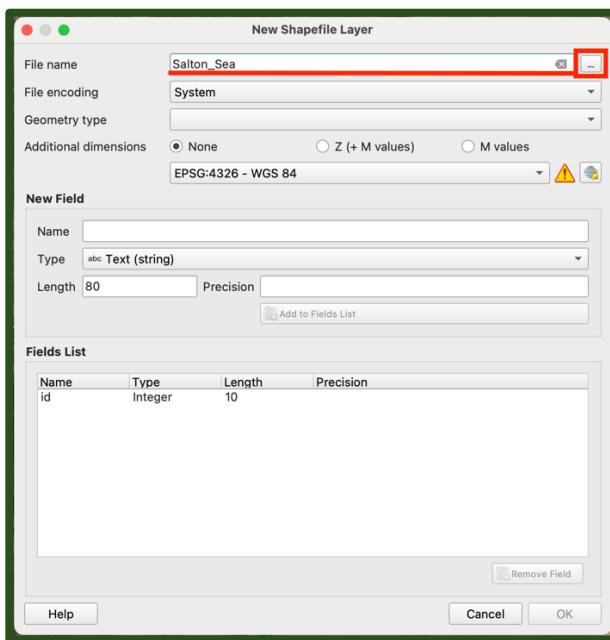
2. Now let's create a new layer for our shapefile. At the top of your screen, select **Layer, Create Layer**, then **New Shapefile Layer**.



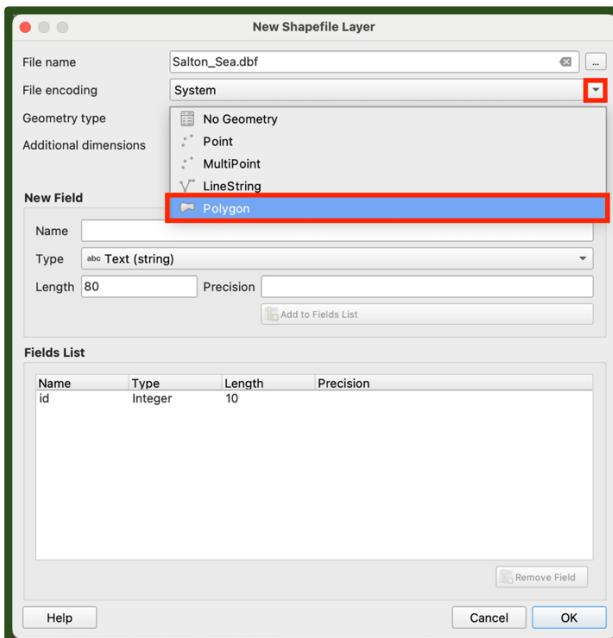
- a. Or you can select this **New Shapefile Layer...** icon in the QGIS window.



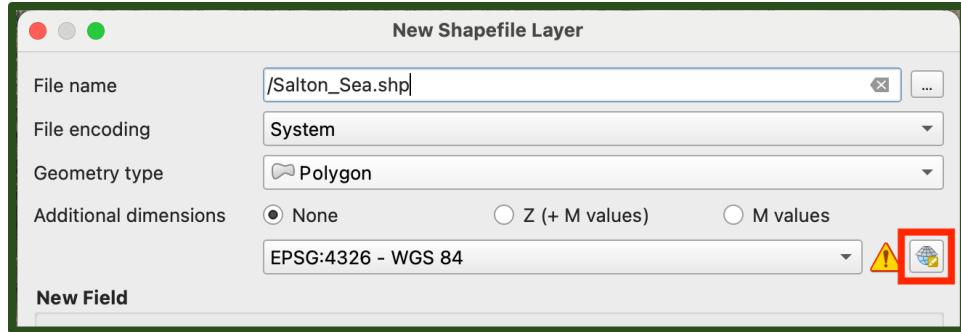
3. A new window will appear titled **New Shapefile Layer**. Type in the **File name** box to name your shapefile. The name cannot include spaces or special characters, and it cannot start with a number. Then, press the **three dots ...** next to the File name box and select a **location** on your computer for the file to be saved.
- It is recommended to make a **folder** to store your shapefile documents if you plan to use it to download ECOSTRESS data through AppEEARS or Earthdata Search.



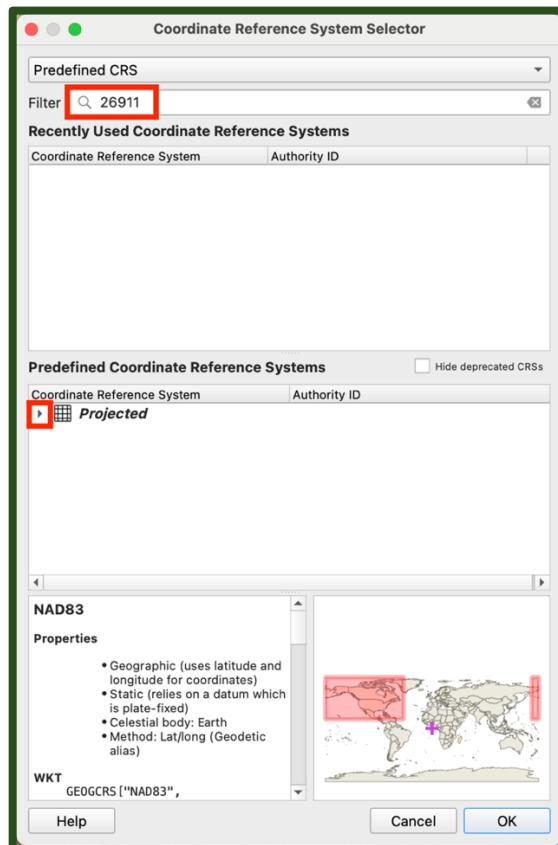
4. Next, select the dropdown arrow next to **Geometry type** and select **Polygon** from the dropdown options.



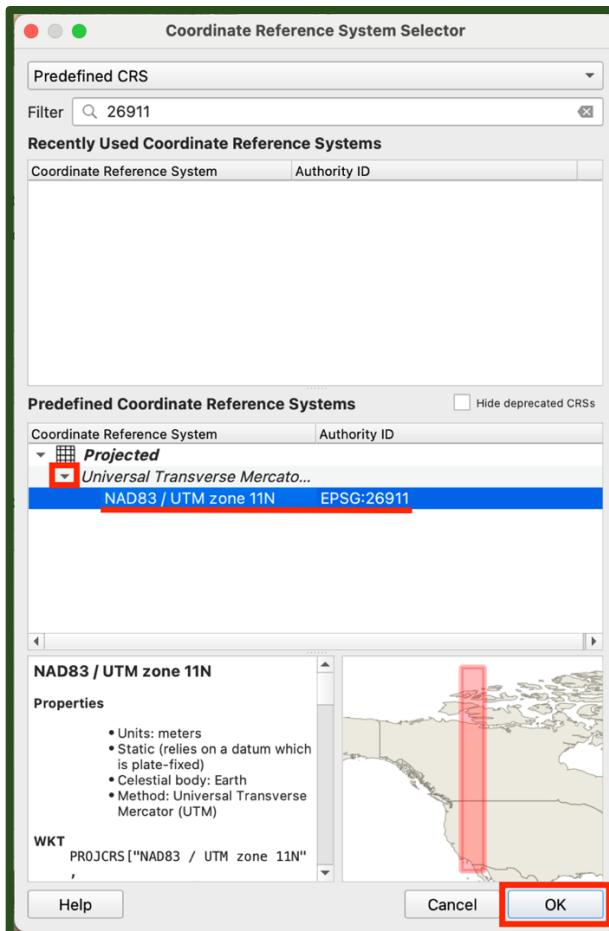
5. Then, you must select the **coordinate reference system (CRS)** that you would like your layer to be created in. This will define how your polygon will be projected onto the map. You can use the **default** one provided or click on the **projected globe icon** to search for which one you prefer.



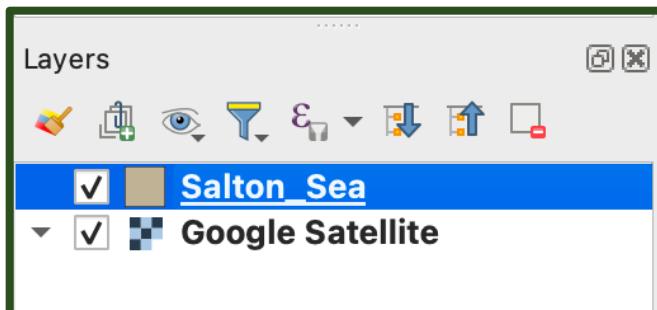
6. If you decide to search for your own by clicking the **projected globe icon**, a pop-up window will appear titled **Coordinate Reference System Selector**. Here you can use the search bar to find your desired CRS either by searching the name, or the EPSG ID. For this example, looking at the Salton Sea, we can use **NAD83 / UTM zone 11n EPSG:26911**. The easiest way to find this is by typing **26911** into the search bar. Then click the arrow drop down next to **Projected** under **Predefined Coordinate Reference Systems**.



7. Then, press the arrow drop down next to **Universal Transverse Mercator** and select **NAD83 / UTM zone 11N ESPG:26911**. Once this is selected, press the **OK** button to close the window. You should now see your new CRS listed in the **New Shapefile Layer** window.



8. Once all your preferences are set, press **OK** to close the **New Shapefile Layer** window. Now, a layer titled **Salton_Sea** will show up in your layers pane.

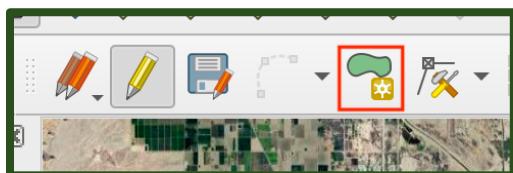


Tip: If you get the error **Layer creation failed: Failed to create file _____: Read only file system**, re-do the shapefile layer creation but make sure to press the three dots next to file name to select a location to save it in!

9. Make sure the layer is selected in the **Layers** pane and select the yellow pencil icon at the top of the window. This will **toggle editing** on. Notice if you click it again, the editing tools near it will gray out and become unavailable again. For now, let's toggle this **on**.



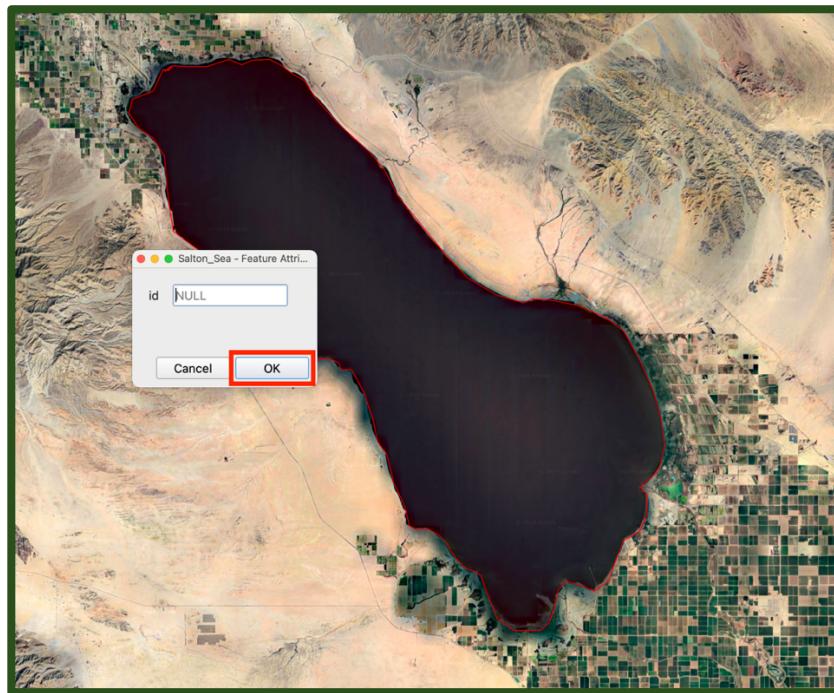
10. Now let's begin drawing our polygon. This process is called **digitizing**. Select the green polygon icon to **Add Polygon Feature**. Your mouse will now change to a circular crosshair icon.



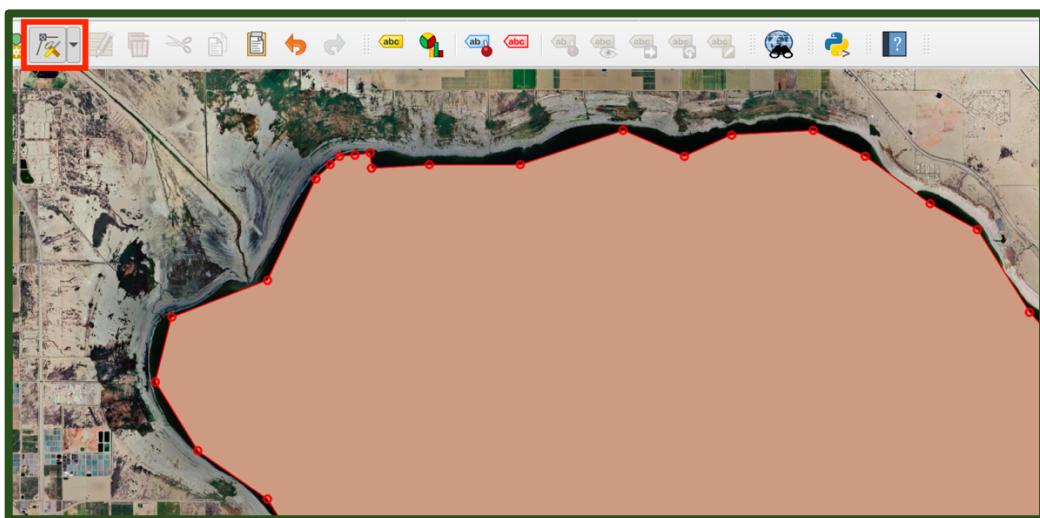
11. Digitize your area of interest by **clicking to create points** around the edges. The lines between points are straight, so adding more points can add more precision if needed. Also, you may zoom in and out throughout this process. If you make a mistake, do not worry. Points can be edited later.



12. When you have finished outlining your area of interest, **right click** on your mouse or track pad. This will **close** the polygon. A new window will appear prompting you to give your polygon a feature **id**. For now, we can leave it **NULL** and select **OK** because we will only have one polygon, but if you are making multiple polygons you may want to number them.



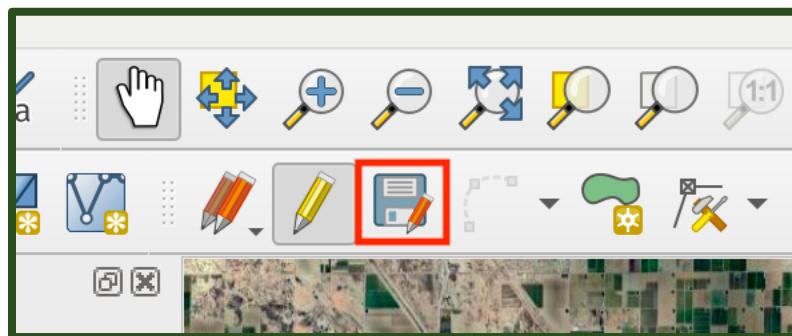
13. Now your polygon should appear filled in on the map. If there are any points you messed up on and would like to fix, select the **Vertex Tool** to edit them. With the tool selected, hover your mouse over the polygon. The vertexes should turn into **red circles**.



14. To **move** a vertex, click on it to select it and then click on the new location you would like it to move to.



15. When you are happy with the polygon, select the **Save Layer Edits** button.



Now you have a polygon shapefile of your study area! Make sure to save your project before closing.