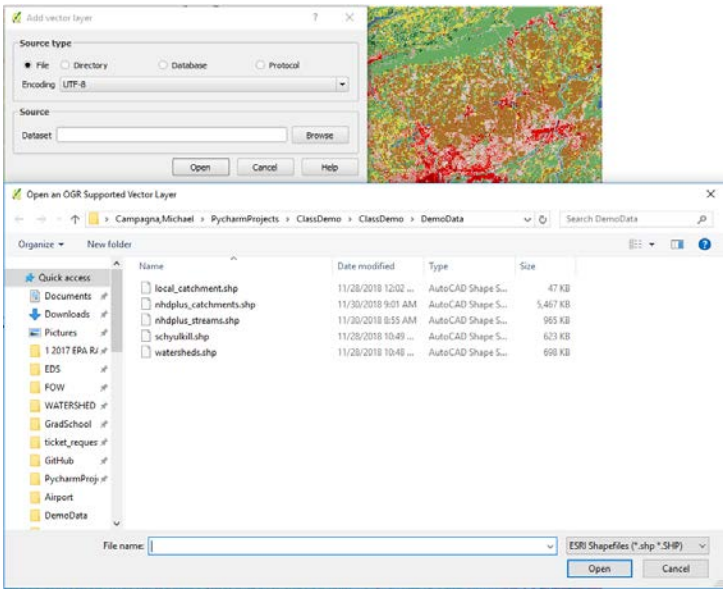
Go to the [GitHub page] for the demo and follow the instructions to download QGIS and the data. Here, you can also find instructions for installing Anaconda, and running a python script that calculates zonal statistics for polygons.

- Navigate to the DemoData folder and open the QGIS Project

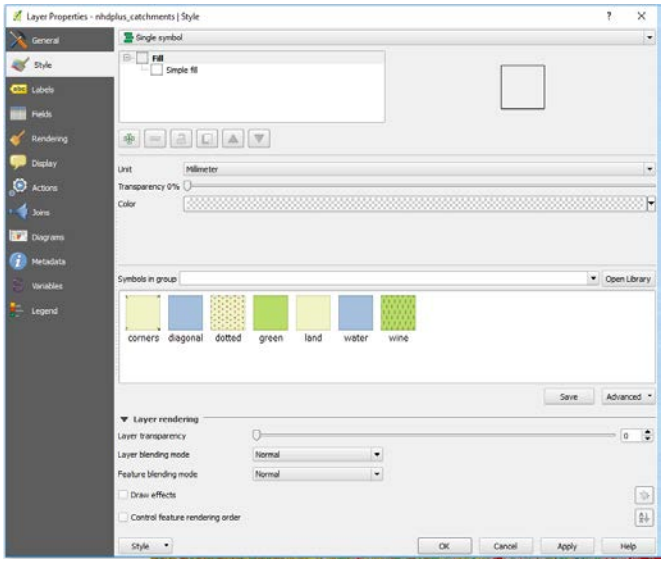
- Inspect the Layers Panel on the left of the screen
    - Here is a table of contents that hold the vector and raster data as layers
    - The layers at the top of the list also show as the highest layer on the map
    - Red layer is the local catchment, and the purple layer is the entire watershed that drains to that red catchment.

- Add the rivers to the map

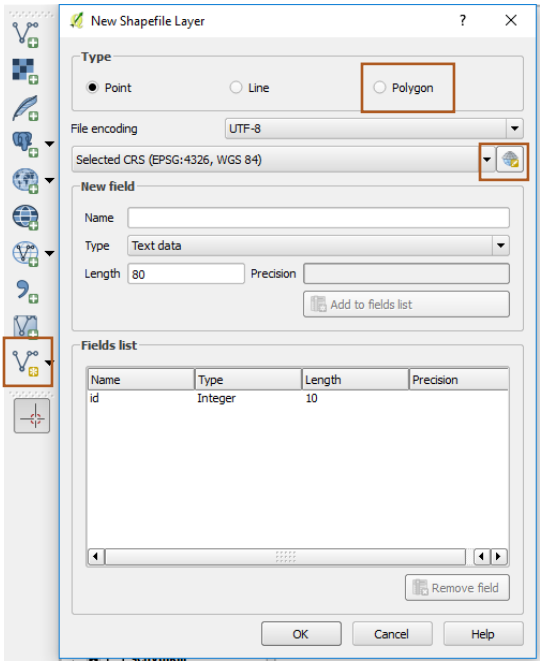
    - The icon shown on the top left here is located on the top left of the QGIS window
    - Click this icon, navigate to the DemoData folder, and add in “nhdplus_catchments.shp” and “nhdplus_streams.shp”



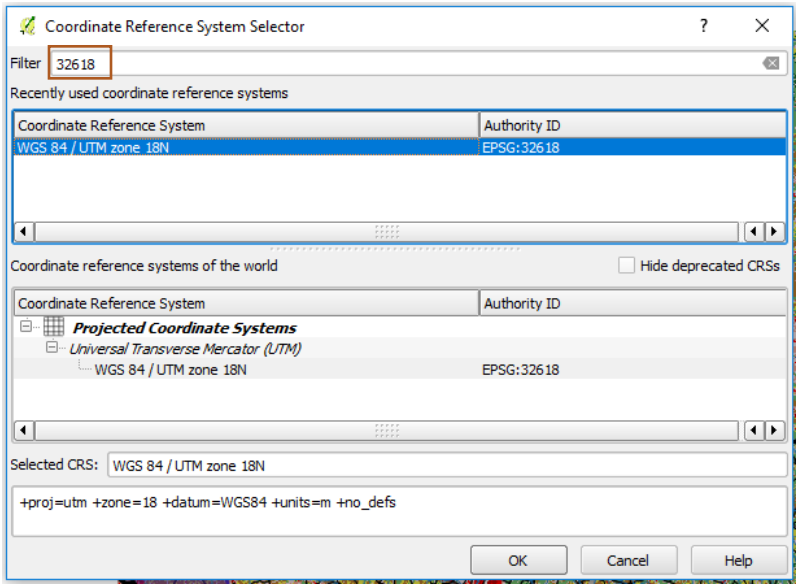
    - Right click on the layer in the panel, and open the properties
    - Change the style, or symbology of the added layers



- Create new vector data (shapefiles)
    - Shapefiles can either be a point, line or polygon geometry. Choose to make a polygon layer and name a new filed “bmp_type”.



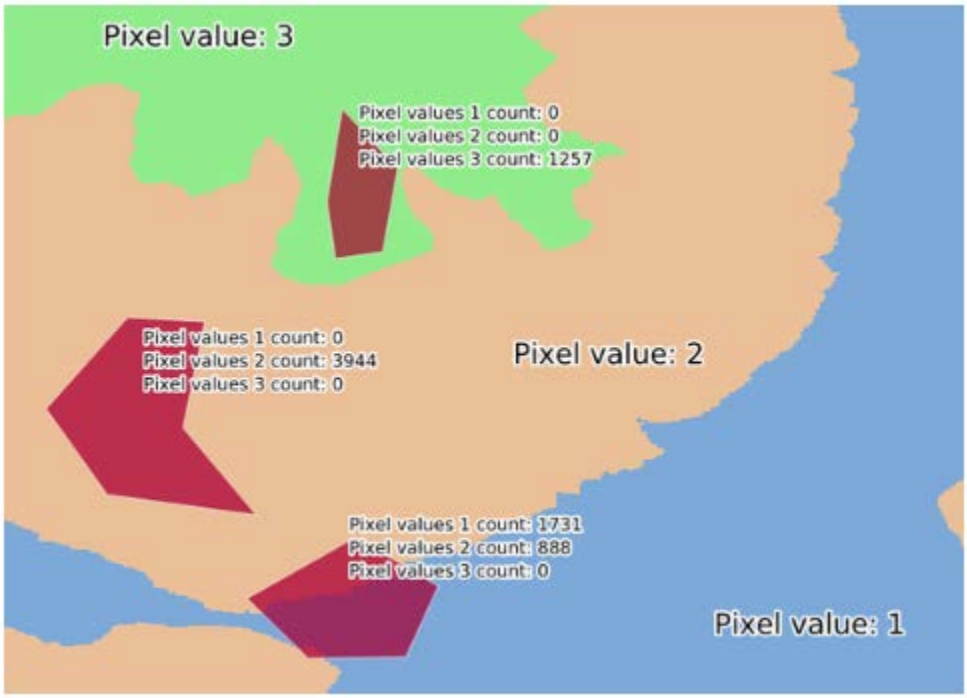
    - Set the Coordinate Reference System (CRS) to WGS 84 UTM zone 18N. You can find this easily by typing “32618” into the filter search.



    - Click okay and save the shapefile as “bmp.shp”. It should be automatically added to the Layer Panel
    - With the new shapefile selected, click on the “Toggle Editing” pencil, then “Add Features” icon. You can now draw a new polygon. Draw a polygon inside one of the watersheds. Draw all your vertices and right click to finish editing. Assign an ID and a bmp_type.

- Try using different tools, such as: the pan tool, the measure line tool, opening attribute tables, and adding new columns to shapefiles

Zonal Statistics



Raster layer histogram example

(Source)

Zonal statistics take a polygon as a zone, and summarizes raster values within that zone. A common usage is to find average soil type, elevation distribution, or slopes within an area of interest.

Optional to install and try out the python code. Instructions are on the GitHub page to install Anaconda and the python libraries for performing zonal statistics.

Install Anaconda

Naviate to the [Anaconda downlaods webpage](https://www.anaconda.com/download/) and download the most current stable release for your operating system.

Create a new Environment

It is generally good practice to have a dedicated python environment for each project you are working on. Open up the command prompt and enter the following:

###

conda create -n yourenvname python =2.7 anaconda

activate yourenvname

conda config --add channels conda-forge

conda install -n yourenvname [package]

###

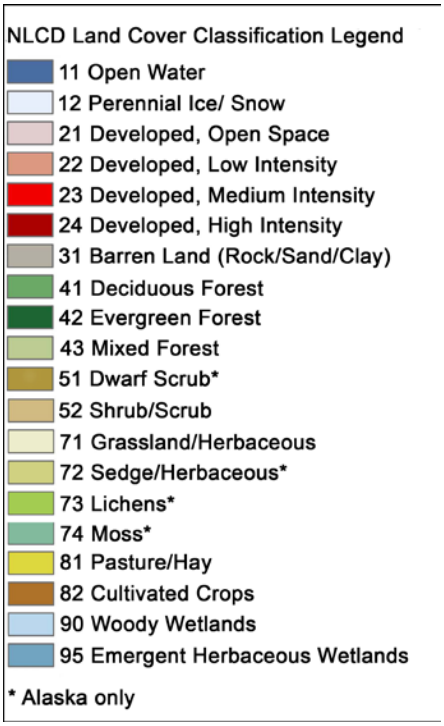
The python code is in the file “zonalstats_lulc_example.py”, with minor altercations this code can be run to get raster statistics for any shapefile that you like.

An example cleaned up output is in the DemoData folder.

Open the watershed_lulc_cleaned.csv, here we see the count of each raster cell type for each polygon in our dataset.

A raster cell has the spatial resolution of 30x30 meters, so each count represents an area of 900 square meters.

Use the count data to describe the composition of some of the watersheds, and compare that to the land use composition for the local catchment.



Example results for Saucony and Mill Creek watersheds draining to these points