

QGIS Workshop [2016-09-30] See QGIS Workshop <http://maps.cga.harvard.edu/qgis>

Download Data for this lab: <http://maps.cga.harvard.edu/qgis/data>

If you have never used QGIS before, see the basic intro: <https://www.youtube.com/watch?v=OsUKZeizKV4>

## 1. Intro to QGIS

In this section we take a look at the User Interface, how to add vector data, control layer order, view attributes, and set Coordinate Reference Systems (CRS, also called Projections). We will also learn how to Select By Location, Save selections as new Shapefiles, and run basic GIS analysis tasks, such as Point in Polygon queries.

## 2. Point in Polygon with Areal Calculations

Now we will make use of a Projection in real-world units (meters) in order to calculate areas for polygons and use those areal values to calculate densities. This will include Point in Polygon Queries, and using the Field Calculator. We then take a look at Styles and Symbolization in QGIS.

## 3. Importing Points, de-duplication, and summary joins

Next , we will import tabular data with x, y coordinate values. Since this data has multiple records for each location, we will go through the steps to de-duplicate, then use summary join to get the count of all records at each location. As an alternative we will also look at Heatmaps to show point density.

## 4. Buffering and feature selection with Buffers

Continuing with import of points, we will look at how to generate a line from a set of points, how to buffer the line, and how to use a buffer zone to select overlapping features. These steps require attention to CRS.

## 5. Rasters (using georectified raster images)

A quick look at opening rasters in QGIS, where to find georeferenced images, and how to set a transparency band to remove black collars (artifacts of the georeferencing process). [Note we are not teaching Georeferencing, please see our online tutorial video: <https://www.youtube.com/watch?v=cIYzqUsaQcg> ]

We'll also take a look at DEM in the form of .tif images and how to create custom classification schemes.

## 6. Raster analysis

Here we will briefly outline the steps of opening raster layers for comparison using the Raster Calculator, and the settings to run a comparison.

## 7. Joining Tabular data to polygons

One of the most common tasks in GIS is joining tabular data to GIS layers. Here we will join population data in a .csv format to a GIS polygon layer, use Table Manager plugin to fix field names, and show how to calculate area values before symbolizing population density.

## 8. Cartography

He we'll look at labeling options, symbol style tricks, and how to select out minimal features for labeling. Then we will set up Print Composer and demonstrate how to incorporate Scalebars, Legends, Compass Rose, and Titles into your map publications.

*Where to look for GIS Data:*

Harvard Geospatial Library <http://calvert.hul.harvard.edu/>

WorldMap <http://worldmap.harvard.edu/>

Natural Earth (free global data) <http://www.naturalearthdata.com/>

Global Admin Boundaries (county data) <http://www.gadm.org/>

USGS GNS (place names by country as points) <http://geonames.nga.mil/gns/html/namefiles.html>