


AMERICAN MUSEUM OF NATURAL HISTORY  
CENTER FOR BIODIVERSITY AND CONSERVATION

# Using QGIS

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## Outline

- **QGIS overview**
- GIS Data files
- Basic operations
- QGIS interface
- Follow along

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## QGIS

QGIS is a powerful software built by many developers as a free, open-source tool to perform GIS tasks.

Open-source indicates that it's programming, content, and design are open to use and modification by anybody\*

\* Some terms apply: Some licenses do not allow commercial use.

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## GIS

While other open-source GIS software exist (e.g. DIVA-GIS), QGIS is the most popular and best supported.

Another software that is important to know about is ArcGIS, developed by ESRI. All of the principles and techniques learned for QGIS are able to translate over to ArcGIS. Fortunately, there is no cost for QGIS. Some of the higher-end tools are less elegant in QGIS, but there is a lot of overlap.

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## Vector Data Files

The most common type of vector data (polygon, point, line) you will come across are “shapefiles”. These data are usually broken up into many ancillary files that are **necessary** to plot the data.

These file types were developed by ESRI, the developer of arguable the most popular GIS software: ArcGIS.

.shp file is the geometry file that described the shapes

.shx file is the “index” file used for plotting

.dbf file contains the database that is paired with each shape. This is where the shape’s attribute table is found

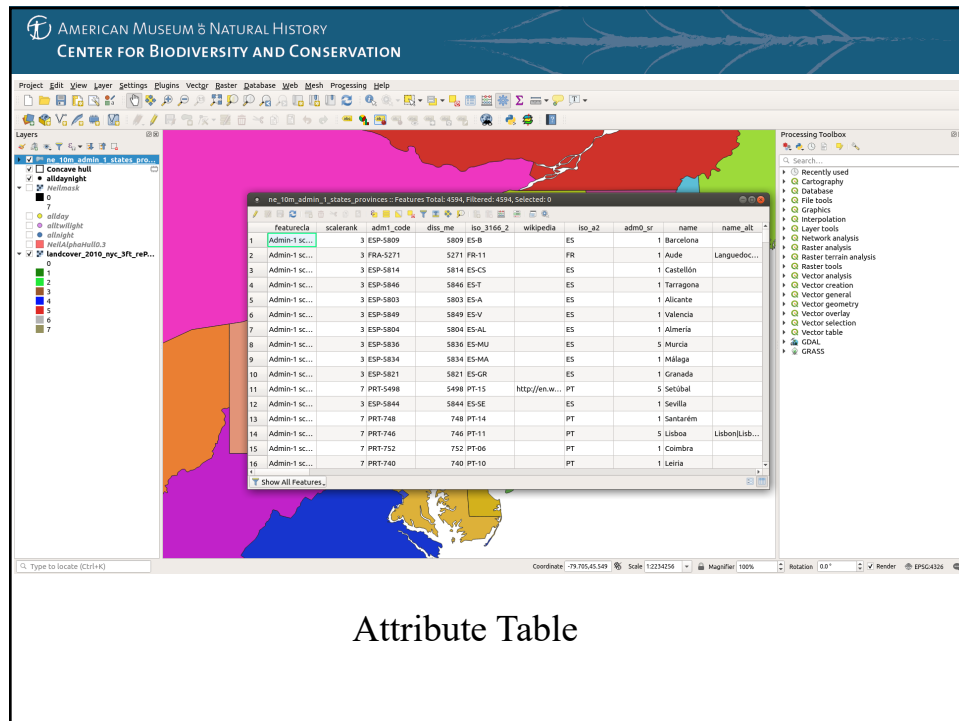
*Other files:*

.prj contains information relating to the projection of the shape

When managing your GIS data, you **MUST** keep all shapefiles ancillary files together in the same directory.

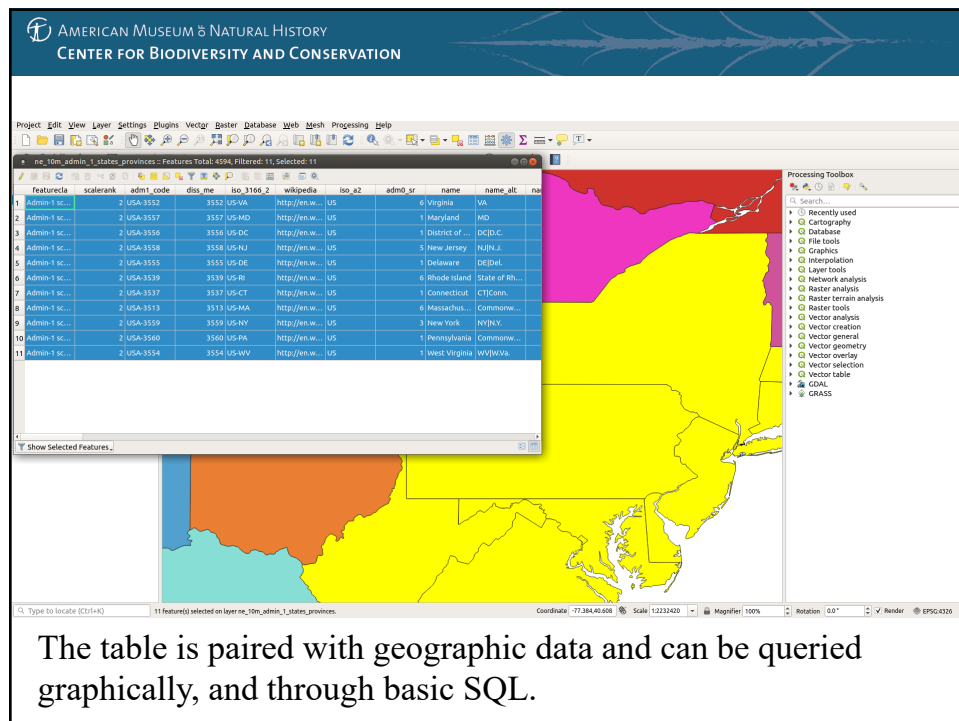
The easiest way to do this without using a databasing software (e.g., ArcCatalog, DB Manager) is to save shapefiles into their own directory.

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Attribute Table

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The table is paired with geographic data and can be queried graphically, and through basic SQL.

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## Raster Data Files

Since rasters are essentially grids, many types of files can be plotted as rasters.  
The most popular are:

1. GeoTiff – .tif files with geography metadata associated (origin, x, y, information)  
These are by far the most popular in biology
2. Ascii – .asc files are text files with geography metadata in the header
3. netCDF – .cdf files are popular with some older datasets

There are many more, but you are most likely to come across these. Since rasters are essentially image files, even .jpg or .jpeg files can be used.

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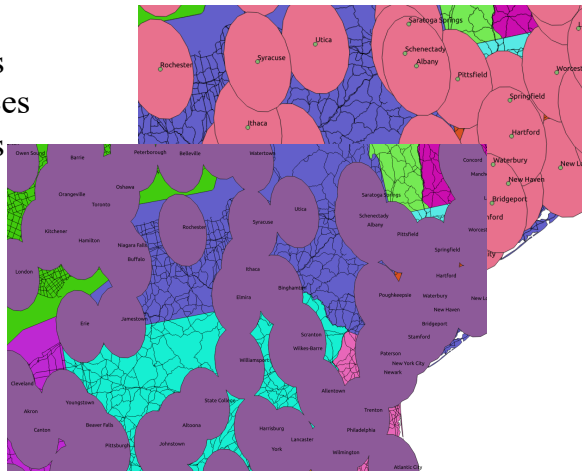
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## GIS operations

Spatial analyses.

- Buffers
- Dissolves
- Differences
- Centroids
- Masks

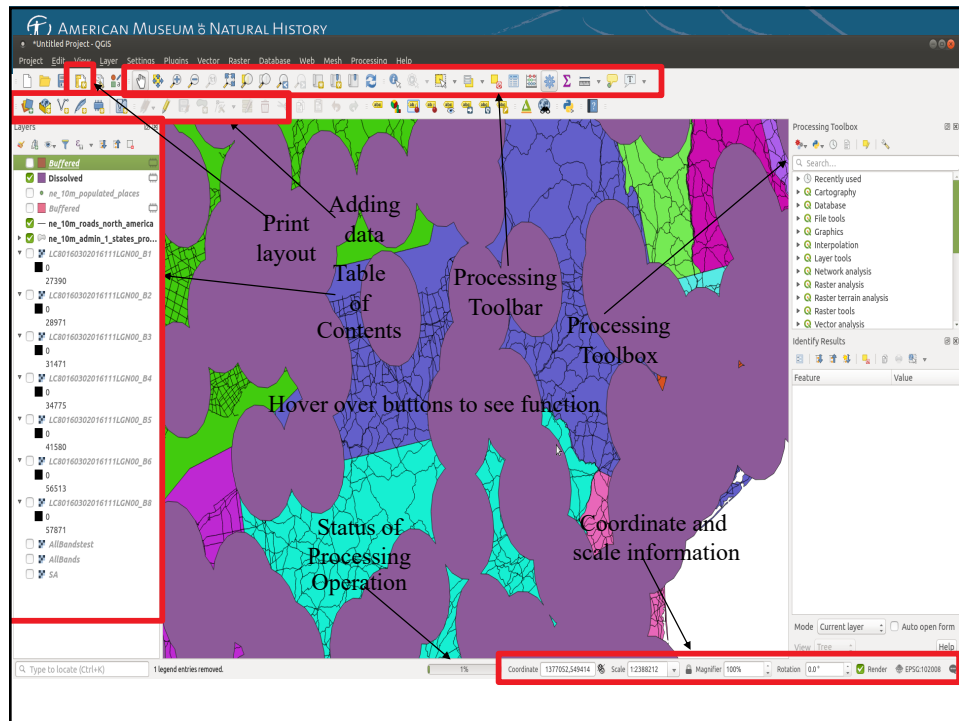


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## Making a map

Using the “Print Composer” tool, create a map

All maps should include:

1. Map Contents – what are you showing
2. Legend – how does the viewer interpret
3. Title
4. Scale bar – usually in km, but depends on context
5. North Arrow – for orientation
6. Data source

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