# **QGIS: Georeferencing a Historic Map**

Welcome to the QGIS Task Sheet Series. This series supplements the Iowa State University Geospatial Technology Training Program short course series. The task sheets are designed to provide quick, easy instructions for performing mapping tasks.

Georeferencing is the process of assigning spatial coordinates to raster data that has no geographic coordinate system (GCS) embedded in the file. Raster datasets are often aerial photographs, satellite images, or scanned maps which represent geographic features by dividing an image into a grid. Each cell of the grid has a value that is used to represent a characteristic of the location. Normally a scanned map won't have a spatial reference until it is georeferenced. This task sheet will guide you through georeferencing a historic map using the QGIS Georeferencing GDAL plugin.

#### 1. Download the Data

- a. Download the data used in this task sheet by navigating to http://isueogtp.github.io/ GISTaskSheets/TaskSheetData/PM2082-17j.zip in a web browser. The files you for this tutorial will automatically be downloaded.
- b. When the download is complete, you will need to unzip the folder or copy the files from the zipped folder to a different directory in order to access the files.

## 2. Adding the Georeferencing Plugin

To begin georeferencing, you will need to add a. the **Georeferencer GDAL Plugin**. On the top toolbar choose Plugins, then Manage and Install Plugins.... In the Search box, type georef. Several results will appear. Click on Georeferencing GDAL and the Install plugin button. It will now be added under Raster.

### 3. Georeferencing a Historic Map

- To begin georeferencing, you will need to click on a. the top toolbar **Raster** and scroll to **Georeferencer** and then choose Georeferencer again.
- b. Once the Georeferencer window appears, click on the **Add Raster** button and insert the WashingtonTownship\_Hixion.jpg into the viewer. Getting familiar with the navigation tools is important because georeferencing requires a lot of zooming in and out.
- c. In the Georeferencer window, zoom to the center of the map, then click on the **Pan Map** tool (white glove), to move around the map. Use this tool to find section numbers on the map.

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- d. Minimize the Georeferencer window and zoom in to the center of your map viewer and the section labels should appear. Find corresponding section numbers and railroad lines that appear on both the scanned map image and in the map viewer. *For a successful georeference you will need to identify at least four corresponding points.*
- e. In the georeferencing window, use the **Add Point** button to begin marking points on the scanned map image and then mark that corresponding point in the map viewer.
- f. **Zoom in** to **Section 6** (top left corner) find the lower right corner where it intersects with sections 5, 7, and 8. Click on the **Add point** button, it will bring up a cross hair cursor, move the cross hair to the intersection of the corners and click, a red dot will appear on the image.
- g. The **Enter map coordinates** window will open, it needs a geographic reference point for the point you just created. Click on the **From map canvas** button. This will bring you to the QGIS map viewer, find the corresponding edge of the section (zoom in and pan as necessary). If you zoom, you will have to click on the **From map canvas** button again to activate the "X" marker. Once you click the corresponding reference point in the map viewer, the georeferencer window will pop back up, with X and Y populated.
- h. Click **OK**. If done correctly you will see a red dot on the scanned map and the coordinates in table below the scanned map.
- i. **Repeat steps e-h** for remaining points (choose 3 more section corners.) *Note: You can remove a point by clicking to Delete Point.*
- j. Once you have at least four control points in the table of the **Georeferencer** window, click on the **Start georeferencing** tool. An Info window will appear asking you to set the transformation type, click **OK**.
- k. The Transformation Settings window appears. Set Transformation type to Linear and save the output raster to your working folder, name it Washington\_Township\_Hixion\_ georef.tif. Check the Load in QGIS when done box and click OK.
- 1. You should see the .tif loaded into your map viewer. Close the **Georeferencer** window. Don't save your points. You have successfully georeferenced an image!

#### DUI ENIGP 🕺 Georeferencer - Washington\_Township\_biggerHxion Plat.jpg File Edit View Settings 1 Add Delete Start Georeferencing Point Point ? × 💋 Enter map coordinates Enter X and Y coordinates (DMS (dd mm ss.ss), DD (dd.dd) or projected coordinates (mmmm.mm)) which correspond with the selected point on the image. Alternatively, dick the button with icon of a pencil and then click a corresponding point on map canvas of QGIS to fill in coordinates of that point. X / East Y / North From map canvas Cancel ? Iransformation settings $\times$ Transformation parameters Transformation type Linea • Resampling method Nearest neighbour Target SRS Selected CRS (EPSG: 372) -Output settings Output raster bata/Georef/Washington Township Hixion geore ... Compression None Create world file only (linear transforms) Use 0 for transparency when needed Set target resolution Horizontal ÷ 1.00000 \* Vertical -1.00000 Reports Generate PDF map Generate PDF report .... Load in OGIS when done Cancel Help

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