IOWA STATE UNIVERSITY
## Extension and Outreach

GIS Geospatial Technology Training Program

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.
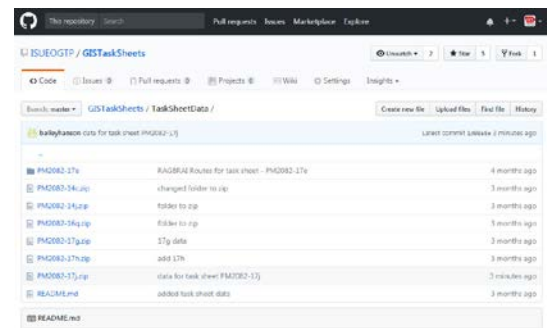
2. Adding the Georeferencing Plugin

a. To begin georeferencing, you will need to add 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.
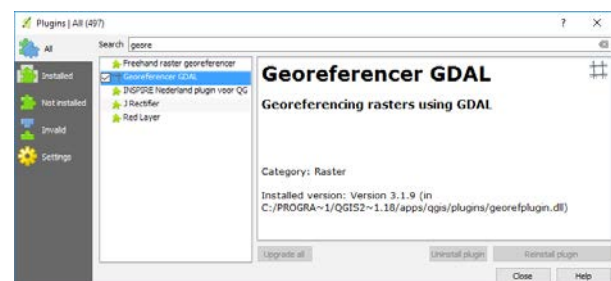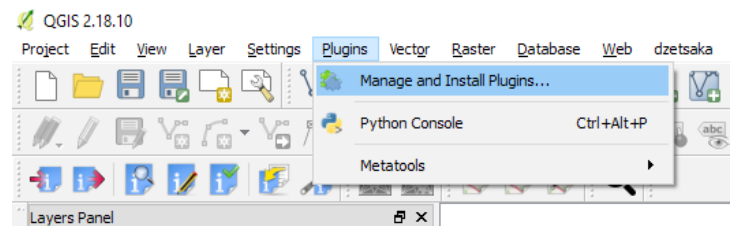
3. Georeferencing a Historic Map

a. To begin georeferencing, you will need to click on 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.
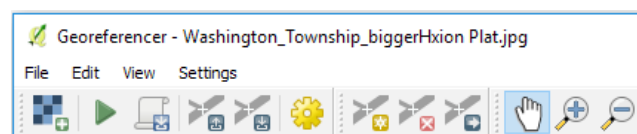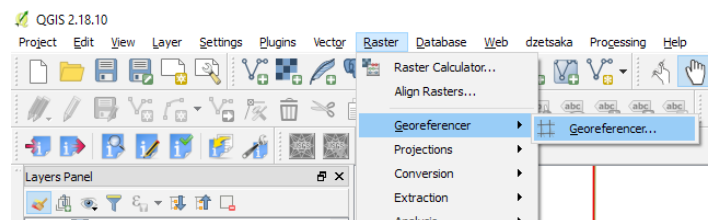
Add Raster   **Pan Map**

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**.

l. 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!
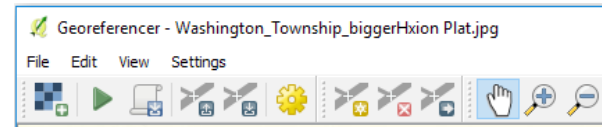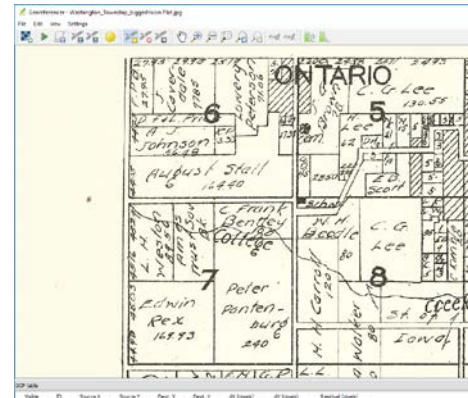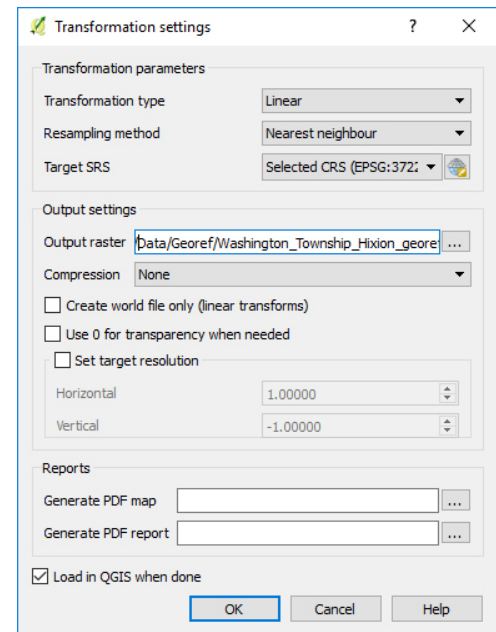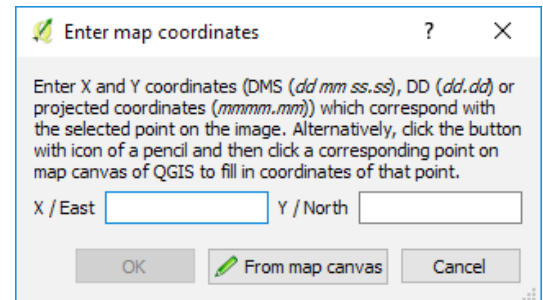
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