Georeferencing Historical Maps

Raster files, such as satellite/aerial imagery, scanned maps, and historical data, are commonly used in GIS & mapping projects. While satellite and aerial imagery tend to include relatively accurate location information, scanned maps and historical data often lack the spatial reference information required for display and analysis in a GIS environment. Georeferencing is the process of defining the location information for data sets that may be lacking it and assigning a coordinate system so that these data can be viewed with other layers in a GIS (Esri, Overview of georeferencing).

Sites for Georeferencing

- Georeferencer (tool): www.georeferencer.com/
- David Rumsey (collection): www.davidrumsey.com/view/georeferencer
- Map Warper (tool): mapwarper.net/
- NYPL Map Warper (collection): maps.nypl.org/warper/
- WorldMap (tool): worldmap.harvard.edu/
- ArcGIS (docs): pro.arcgis.com/en/pro-app/help/data/imagery/georeferencing-tools.htm
- Penn Libraries (tutorial): guides.library.upenn.edu/introtoarcgis/georeferencing

Note: This is your copyright reminder. Some of the resources listed allow for upload as long as they are openly shared. This doesn't mean that all of the maps you'll find on these sites are in the public domain.

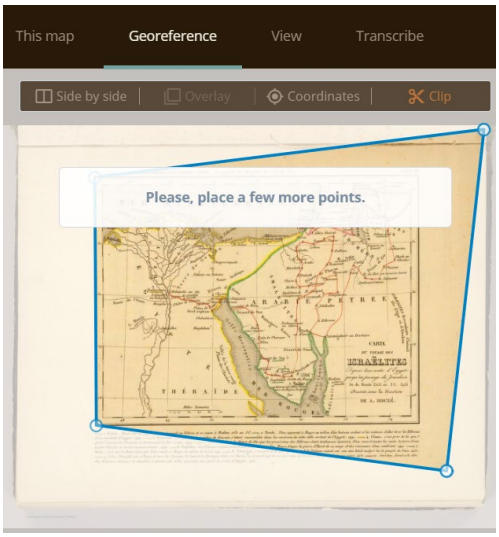
David Rumsey Map Collection

- Go to the **David Rumsey Map Collection**: www.davidrumsey.com
- On the right sidebar, click on **Georeferencer v4**
  or go to: www.davidrumsey.com/view/georeferencer
    - This page offers step-by-step instructions that are useful for reference
    - It also explains the different capabilities of the platform

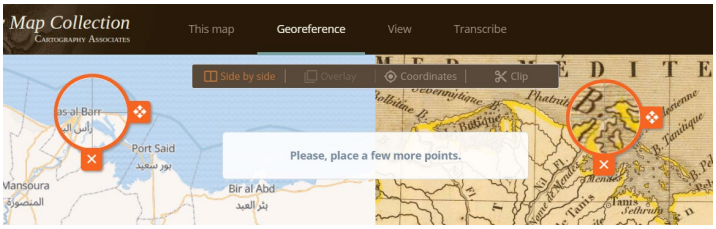
Demo: New York Map

- https://davidrumsey.georeferencer.com/maps/210417393255/georeference
- Place at least three locations (Buffalo, Albany, New York City)
- Click on **Overlay** to see how the maps line-up
    - In upper-right-hand corner you can adjust transparency of historical map
    - Holding down the **SHIFT** key lets you edit the points on the modern map (releasing the **SHIFT** key lets you edit the points on the historical map)
    - On the lower-right-hand side there is a small arrow, if you click that **arrow** it will open a sidebar that shows other related maps
        - You can add other map layers to the current view
        - You can also reorder and change the transparency of those map layers

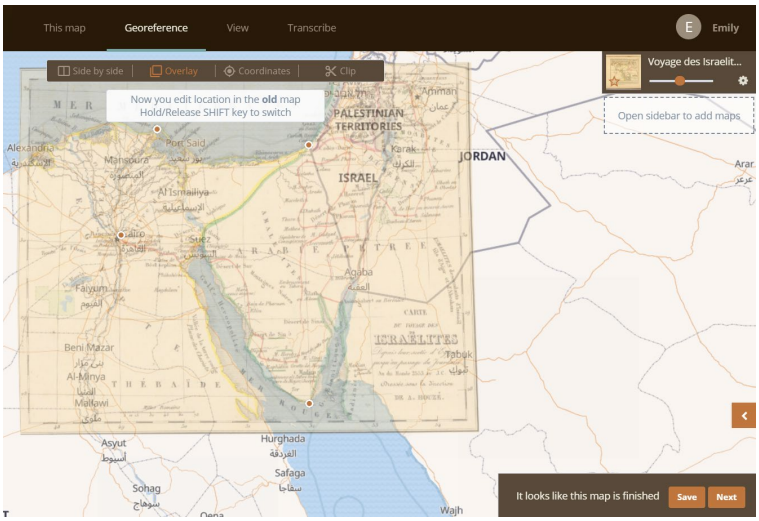
Georeference a Map



- Click on https://davidrumsey.georeferencer.com/random
  - Note: If you don't like your map, click the link, again!
- In the upper-right-hand corner, click **Sign In**
- Once you've signed-in, you may want to start by Clipping the Map
  - Select **Clip** in the menu bar within the map window
  - Drag the corners of the outline box so that just the map area is selected (partially done in the image on the right)
  - Click back to **Side by side**



- Find places on the two maps that match up and click on the locations (you can adjust them later)
- You want to place at least 3-4 points on a map before David Rumsey will consider the map finished.
- More points *tend* to make the placement of the map more accurate; you might see the historical map adjust as the points are added.



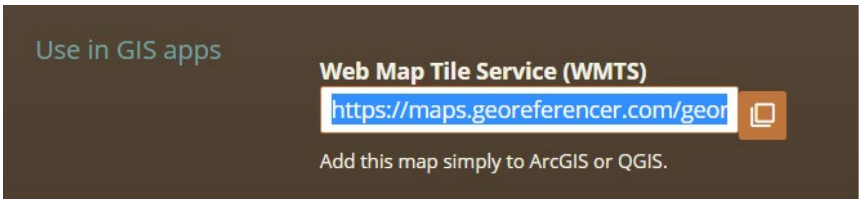
- Click on **Overlay** to see how the maps line-up
  - In upper-right-hand corner you can adjust transparency of historical map
  - Holding down the **SHIFT** key lets you edit the points on the modern map (releasing the **SHIFT** lets you edit the points on the historical map)
- You'll notice that once you've added enough points, the box in the lower-right-hand corner says **It looks like this map is finished**
- Click Save

Adding a Historical Map to ArcGIS Online

Note: For future reference.

Once your map has enough coordinate points, you can add it to other mapping platforms. Since we'll be learning ArcGIS online, these instructions cover how to add your map to that platform.

- On the menu bar at the top of the map window click on **This Map**
- Scroll down to the section **Use in GIS Apps** and click on **Get Links** (see right)
- Copy the URL from the first option: **Web Map Tile Service (WMTS)** (see below)



- In your ArcGIS Online Map, click **+Add** > **Add Layer from Web**
- Under **What type of data are you referencing?** select **A WMTS OGC Web Service** from the dropdown menu.
- In the URL field, paste the URL that you copied from David Rumsey
- Click **GET LAYERS** (it will take a moment to process)
- Click **ADD LAYER**
- Then you can adjust the transparency of the map, as needed using **More Options** in ArcGIS Online