ESRI ArcMap Georectification Guide

Introduction:

This guide will demonstrate how to associate a scanned map with its location in the real world using the Georeferencing Toolbar in Arc Map. The output will be a .tif file that has a corresponding .tfw file that stores the coordinates and orientation of the georeferenced map.

1. Adding a Basemap and Map to be Rectified to ArcMap

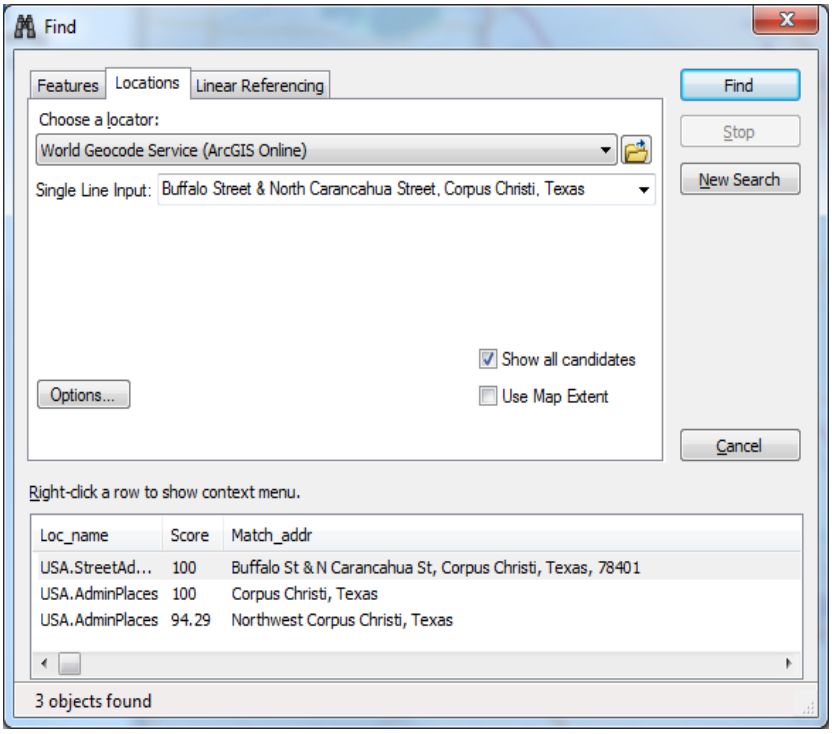
a. Open up a new document in ArcMap.

b. Select File > Add Data > Add Basemap. Select the "Open Street Maps" option.

c. Select the "Find" button from the "Tools" toolbar.

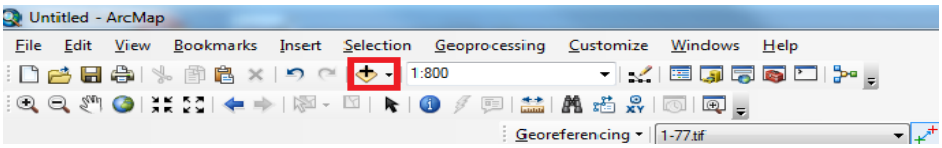
d. Select the "Location" tab in the find tool and select "World Geocode Service (ArcGIS Online)" from the drop down menu titled "Choose a locator:"

e. In the dialogue box titled "Single Line Input" type in the intersection of street you are looking for in the format shown in the figure → If the intersection doesn't have any matches look up the streets one by one (some manual searching might be necessary).

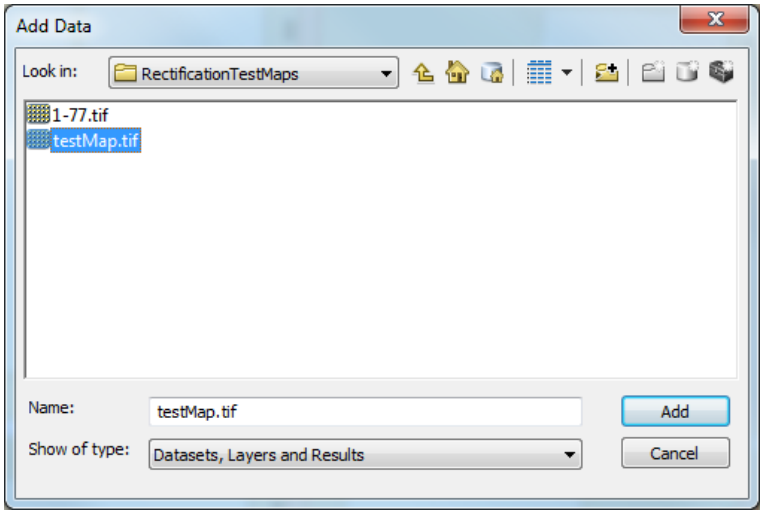


f. Select the option that matches the address that we are looking for, right click and select the "Zoom To" option (if necessary zoom in closer manually).

g. Once you have the desired area displayed in the ArcMap view window, select the "Add Data" button (highlighted in red below). If you have not done so already you will have to create a connection to the folder that contains the map to be rectified. To do this select "Connect to Folder" and navigate to and highlight the desired folder and click OK.



h. After the folder has been connected navigate to the folder containing the .tif file of the map to be rectified, highlight the desired file and click the "Add" button (should look similar to figure depicted below).



i. You may be prompted about whether or not you want to "create pyramids" go ahead and have ArcMap create the pyramids it will make your job of rectifying the image easier (don't change any of the setting in the dialogue box as default is fine). You may receive a warning that this file is spatially undefined; in this situation this warning can be ignored.

2. Preparing Workspace for Georectification

a. Firstly, make sure that the Georeferencing toolbar is available. To do this select Customize > Toolbars > Georeferencing.

b. On the Georeferencing toolbar make sure that the file selected is the map to be rectified (in this case, "testMap.tif" should be selected).

c. From the Georeferencing drop down menu select "Fit to Display" this will resize the map to be rectified to an appropriate size making rectification easier.

d. From the Georeferencing toolbar select the "Add Control Points" option (the one highlighted in blue in the graphic above). You're cursor should now be a crosshair.

3. Georectification

a. Select an area on the map to be rectified by placing your cursor clicking **(very important that you select a point on map you are rectifying first).** A green crosshair with a number should be located in the position you just selected. If you want to change the selection location right click and select "Cancel Point" and select a different location.

b. Next select a location on the Basemap that corresponds to the location you selected on the map to be rectified. When you select a location a red crosshair with the same number as the previous green crosshair should be displayed.

c. Rectification Tips:

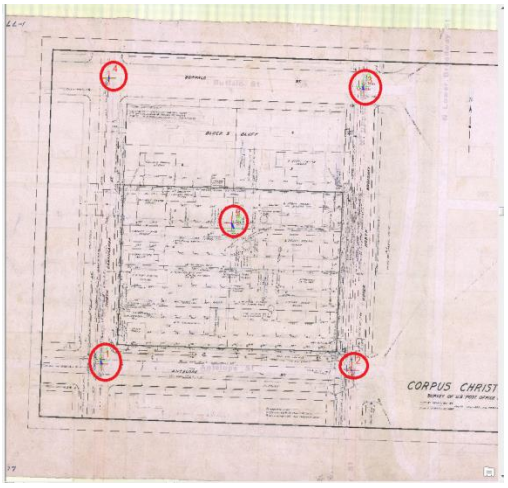
i. Click down on the mouse wheel to pan across the images without having to switch which cursor tool you are using

ii. You can toggle which layers are displayed by selecting and deselecting them in the "Table Of Contents"

iii. Intersections and places of interest are generally the best place to place control points.

iv. To change the transparency of a layer right click on the layer in the "Table of Contents" and select "Properties". In the "Layer Properties" window under the "Display" tab there is a box labeled "Transparency". (I recommend 25%-50% transparency; this is useful when analyzing the end result of the rectification).

d. Repeat steps **A** and **B** in **Section 3** until you have a good distribution of at least 3 points on the map.



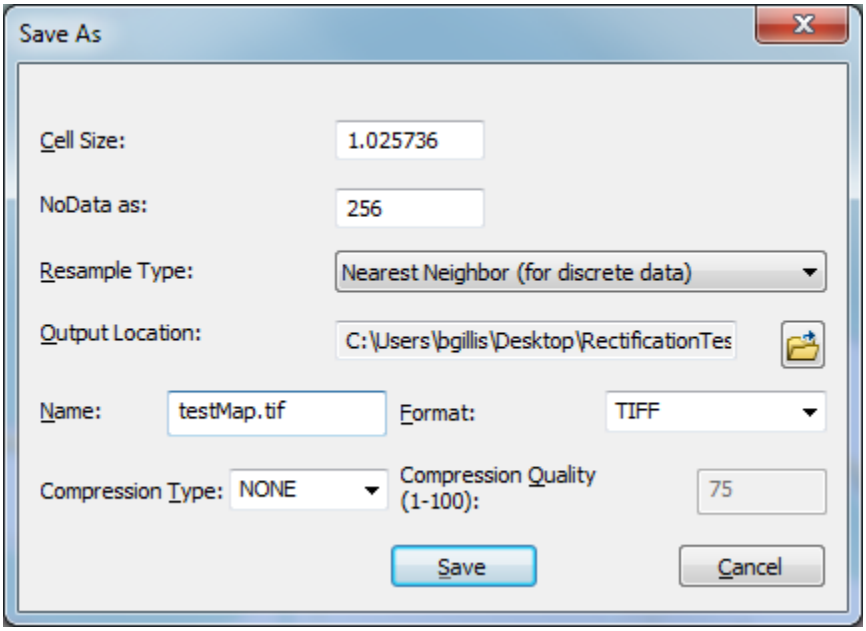
(example of good distribution)

(example of poor distribution)

e. Once you have created enough points that are distributed correctly, select from the georeferencing toolbar the "Update Display" option. Analyze the results of the

georeferencing, making sure things are lined up where they are supposed to be and nothing is distorted.

f. Once the georeferencing has been completed and checked for issues, select the "Rectify" option from the Georeferencing toolbar and save the file to the appropriate folder and as a TIFF. Don't change any of the settings other than the file name, file type, and output location (your "Save As" window should look similar to the one below).



4. Proceeding to the Next Map

a. After the georeferenced image has been exported to the appropriate location, you can remove the scanned map layer from the "Table of Contents". Do so by right clicking and selecting "Remove". **Do not remove the basemap layer**.

b. Using the same method as described in **Section 1**, add the next scanned map you plan on rectifying to the ArcMap Viewer. Before you begin georeferencing make sure that the layer you are attempting to rectify is selected from the drop down menu on the Georeferencing toolbar.

c. Repeat until you're tired of rectifying.