

## Georeferencing a Raster Dataset

ArcGIS 10.1, 10.2

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

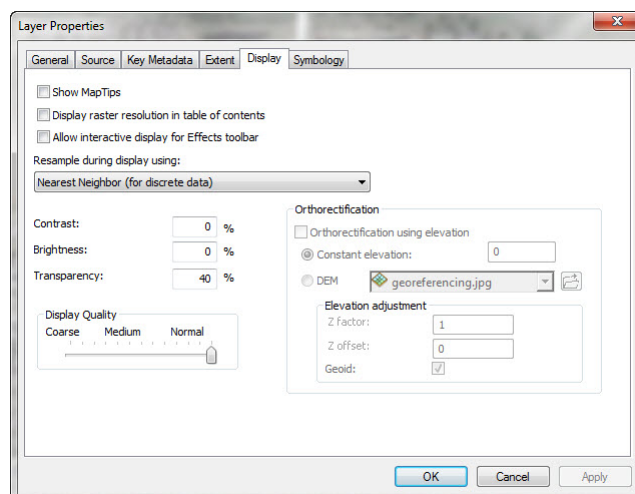
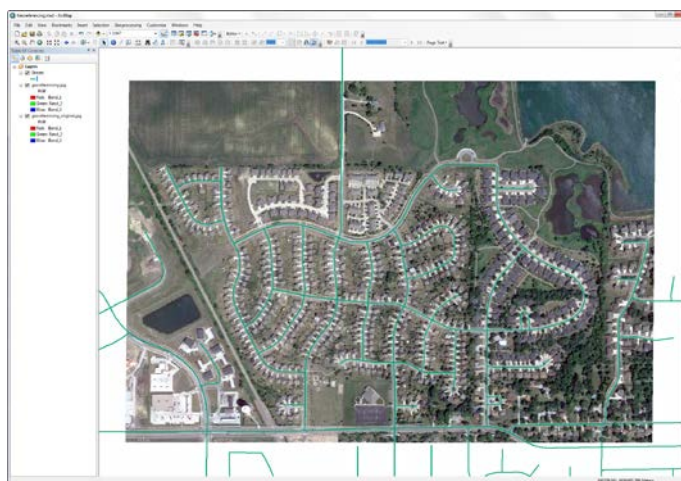
Raster datasets represent geographic features by dividing the world into square or rectangular cells laid out in a grid. Each cell has a value that is used to represent a characteristic of the location. Raster data is commonly obtained from aerial photography, satellite imagery or scanned maps (paper maps scanned electronically). Scanned maps won't normally contain any spatial reference information until they are georeferenced. Georeferencing is the process of assigning spatial coordinates to data that is spatial in nature but has no explicit geographic coordinate system (GCS). This task sheet will take you through the steps of georeferencing using the georeferencing toolbar in ArcMap.

### 1. Download the Data

- To download the data used in this task sheet, navigate to [www.extension.iastate.edu/communities/gis/quicktasksheets/data](http://www.extension.iastate.edu/communities/gis/quicktasksheets/data) in a web browser. Click on the publication number that matches this task sheet. In this case, the publication number is **PM2082-15a**.
- When the download is complete, you will need to unzip the folder or copy the files from the zipped folder to a different folder in order to access the files in ArcGIS.
- Open the **Georeferencing.mxd** map document. *Hint: there should be three files in the Table Of Contents: Streets, georeferenced.jpg and ungeoreferenced.jpg. If you don't see the files in the map or have a red exclamation point next to the layer names in the TOC, you will need to relink these files.*

### 2. Georeference a Scanned Aerial Image

- In the **Georeferencing.mxd** map document, right-click on **ungeoreferenced.jpg** in the **Table Of Contents** and select **Zoom To Layer**, this image has no coordinate system assigned to it. Right-click on **georeferenced.jpg** and select **Zoom To Layer**. This image is referenced, we can tell this because the Streets layer is overlaid on the image. *Note: for the purpose of this tutorial we are using two files of the same image, one georeferenced and one not.*
- Add the Georeferencing toolbar to the map document by clicking **Customize** in the top menu then **Toolbars > Georeferencing**.
- Right-click on **ungeoreferenced.jpg** and select **Properties**. Click on the **Display** tab in the Layer Properties window. Next to **Transparency**: type **50** in the box. *Hint: you will want to make this file transparent so you can easily add control points to both images.*

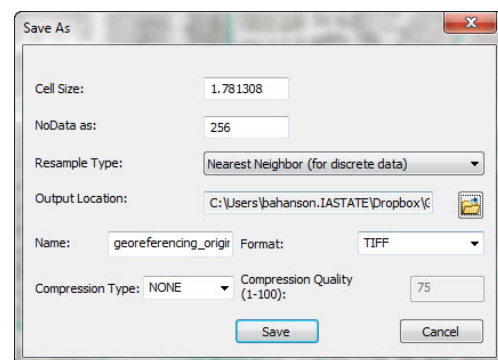


- d. On the Georeferencing toolbar click on **Georeferencing** to display a drop-down menu. Make sure **Auto Adjust** is turned on with a check mark next to it.
- e. Now you will start adding control points between the ungeoreferenced image and the georeferenced image or the Streets file. Click on the **Add Control Points** icon on the Georeferencing toolbar and locate a point in the **ungeoreferenced.jpg** image near one of the corners where two streets intersect. Click to add your first control point. Now you will need to click on the exact same spot on **georeferenced.jpg** or the **Streets** layer. Use the **Zoom To Layer** tool as needed. *Hint: you might need to adjust image transparency or turn layers on and off to see your control points clearly.*
- f. After placing 3-4 control points your image should be roughly lined up with the streets file. *Hint: use the image to the right to identify good control point locations. This is a very simple example made to demonstrate the tools used for georeferencing. Most cases will require many more control points and more warping and transformation of the raster in order to line up with a control.*



### 3. Save Transformation

- a. There are two options for saving your raster with its new transformation and georeferencing information. Your georeferencing will not be saved with the raster dataset until you do either of the following steps.
- b. If you would like the georeference information to be saved with the raster dataset you have been working with click **Georeferencing > Update Georeferencing** on the **Georeferencing toolbar**.
- c. If you would like the georeferencing information to be saved as a new transformed raster dataset click **Georeferencing > Rectify** in the **Georeferencing toolbar**.
- d. After completing either of those steps you should now see two new files added to your directory, they have the file extension **.jgwx** and **.jpg.aux.xml**. These files hold the georeferencing information for your raster dataset.



### Contact:

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