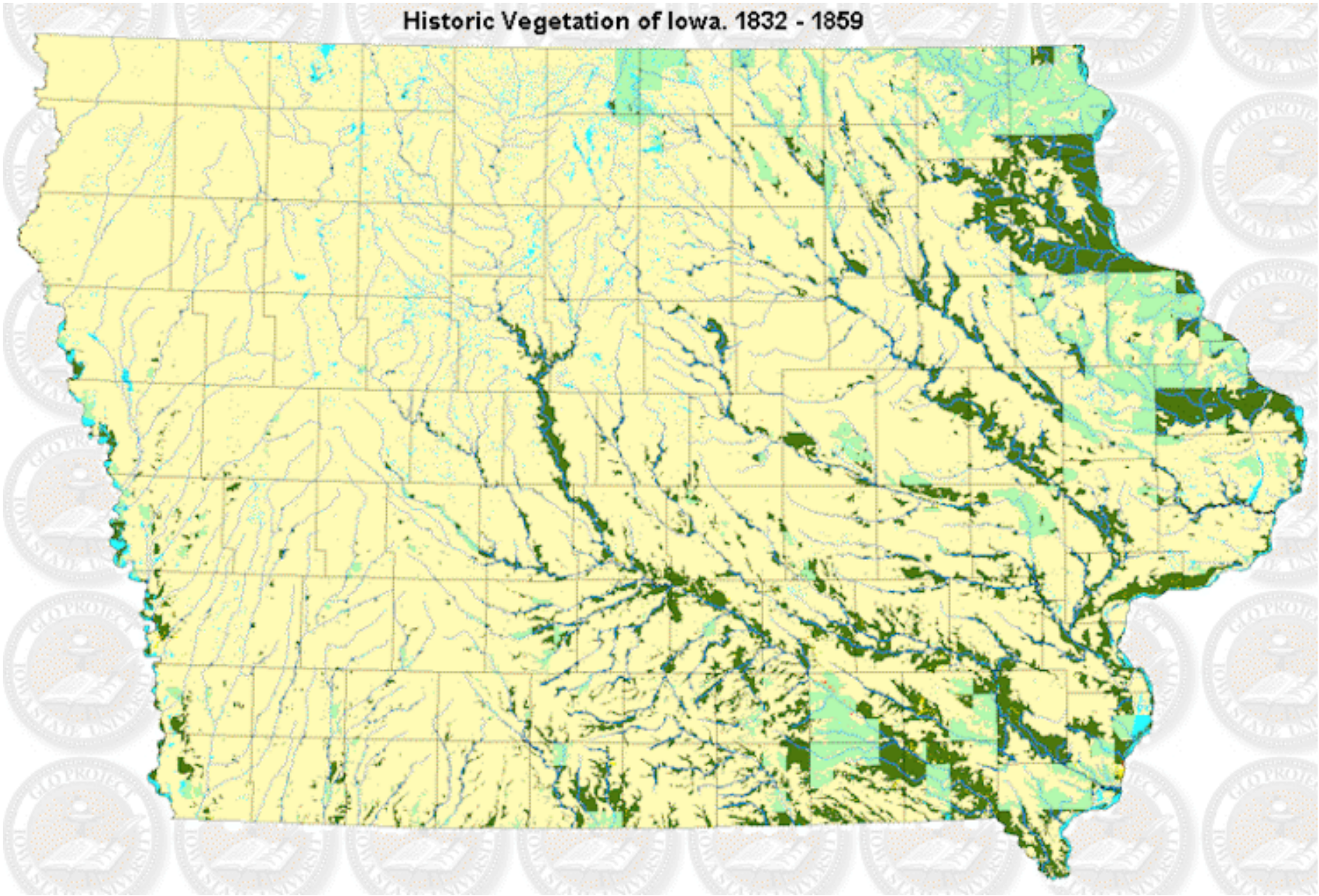
# Geol588 - Georeferencing exercise

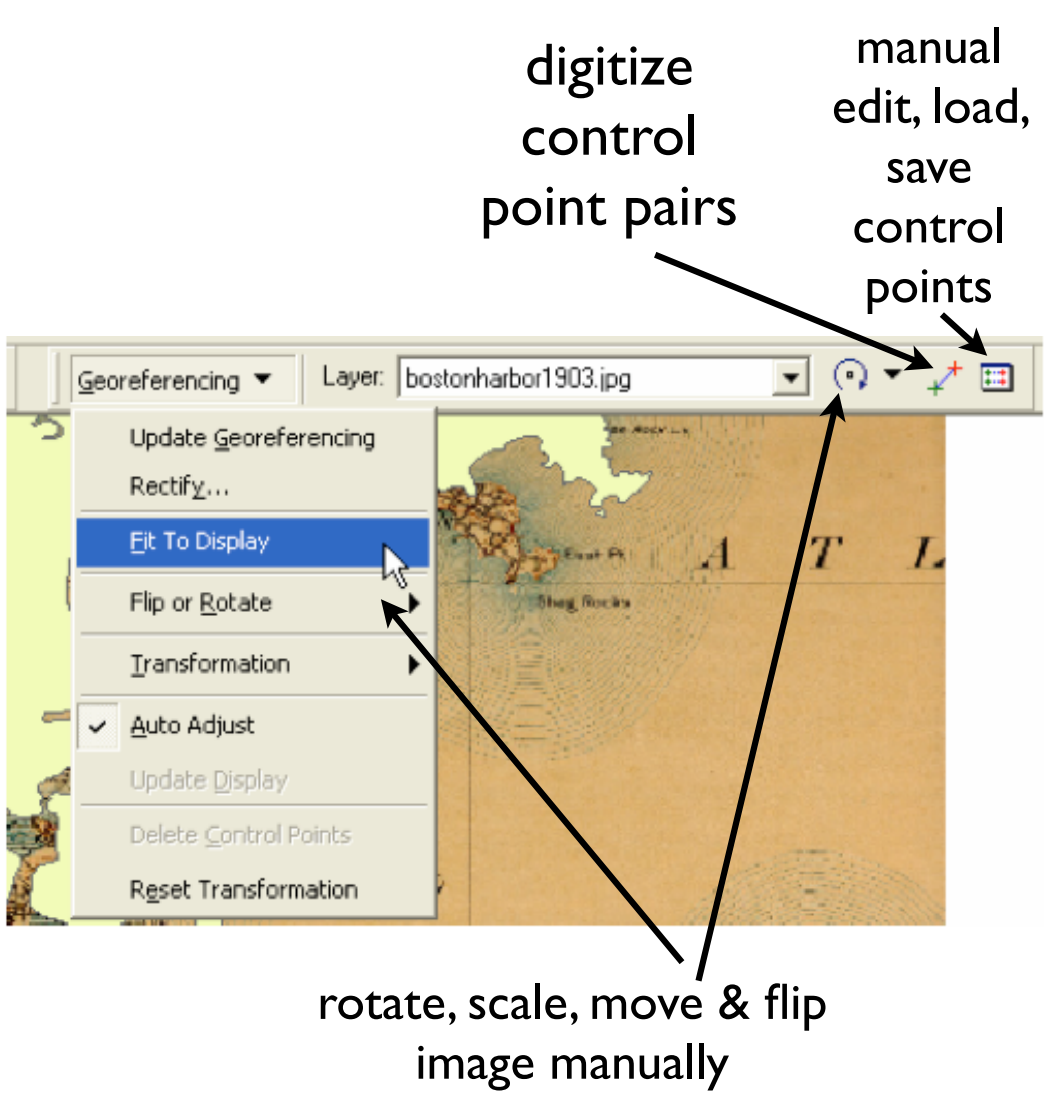
- How to convert a image (jpg, bmp, etc.) into a grid?
- Need to add information to turn it into a ArcGIS raster
- Need to identify the true coordinates of several (3 - 20) locations on the image (e.g. road crossing)
- from: GPS field data, Google Earth




- http://www.public.iastate.edu/~fridolph/glo/maps/maps.html

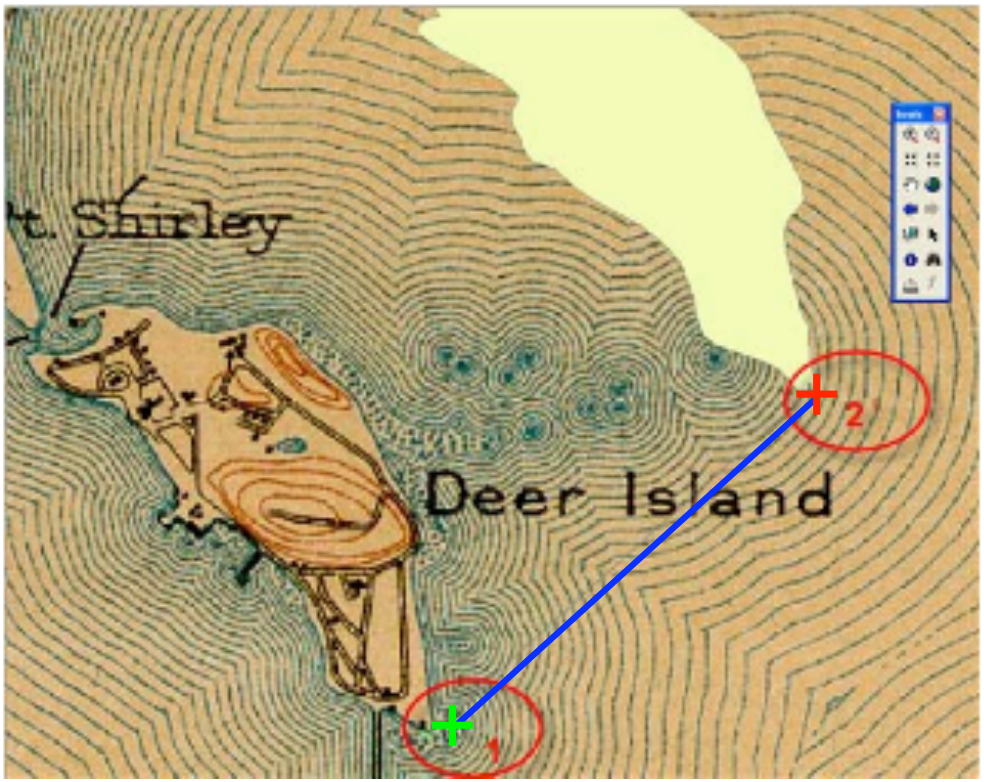
# Process

- Georeferencing toolbar: View > Toolbars > Georeferencing
- Add the non-georef'd source-layer image (will become a raster) and set as layer in toolbar (here: bostonharbor1903.jpg)
- Add already georef'd shapefiles (GPS points, roads, here: coast polygons) or rasters (airphoto, topo sheet, etc.)
- Make georef'd polygons/rasters hollow or semi-transparent
- Show a good view of the georef'd shapefiles/rasters, click Fit To Display, manually move/rotate image



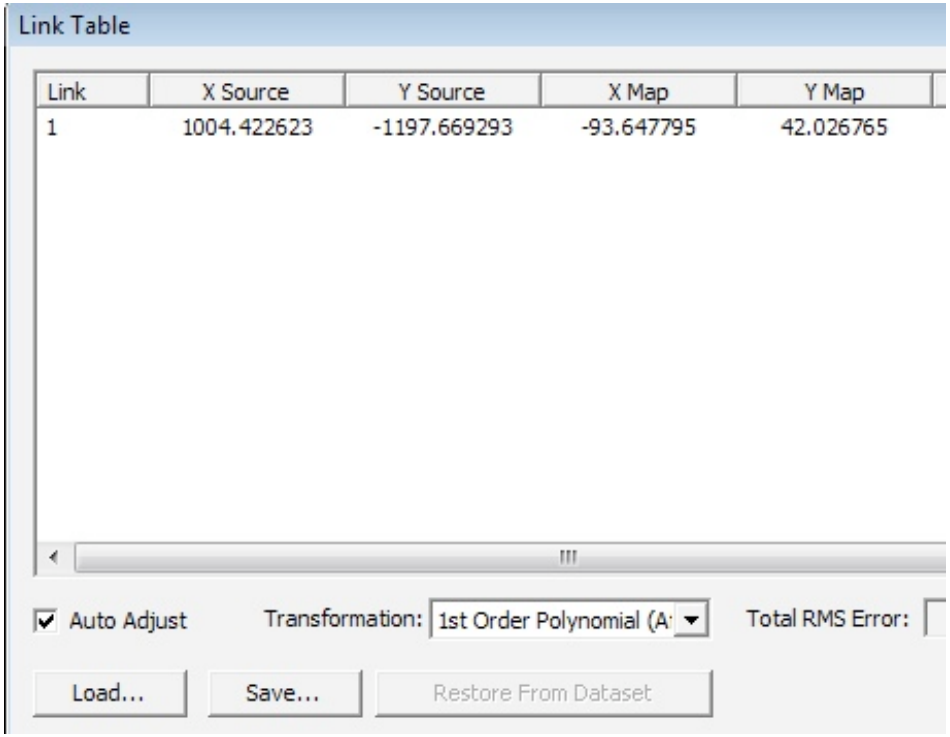

- digitize control point pairs (links)
- green = image location (1), red = true location (2)
- Auto Adjust ON ? => adjust after each pair
- You can use zoom & pan during digitizing

Before digitizing point pair:



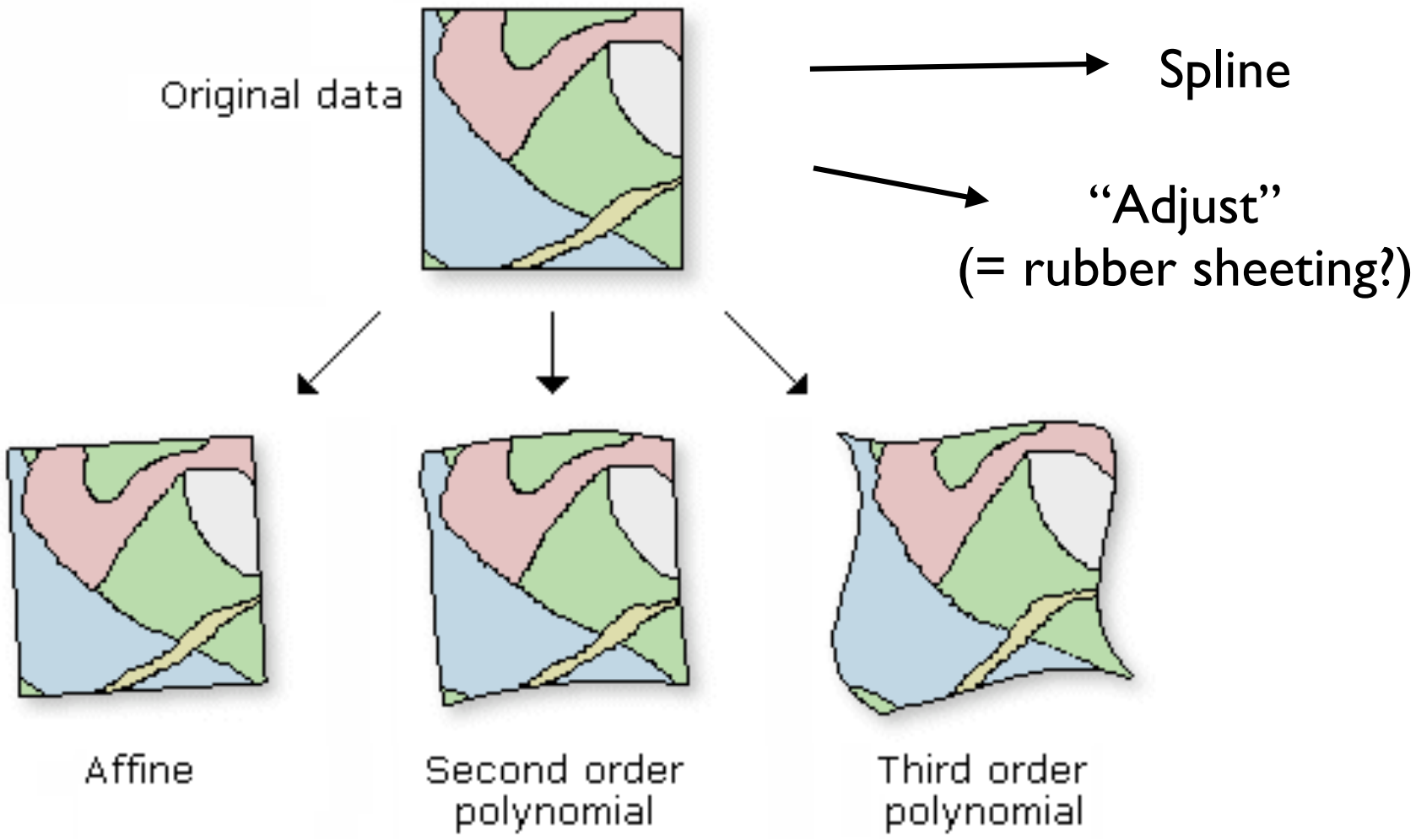

Adjusted (moved):

- Digitized pairs create a Link table
- Source X/Y to Map X/Y
- Source: image (not geo refe'd)
- Map: true, georef'd location
- Add/edit Map x/y
- (Trick: digitize source and map as identical points and change the map x/y in the link table to known coordinates)

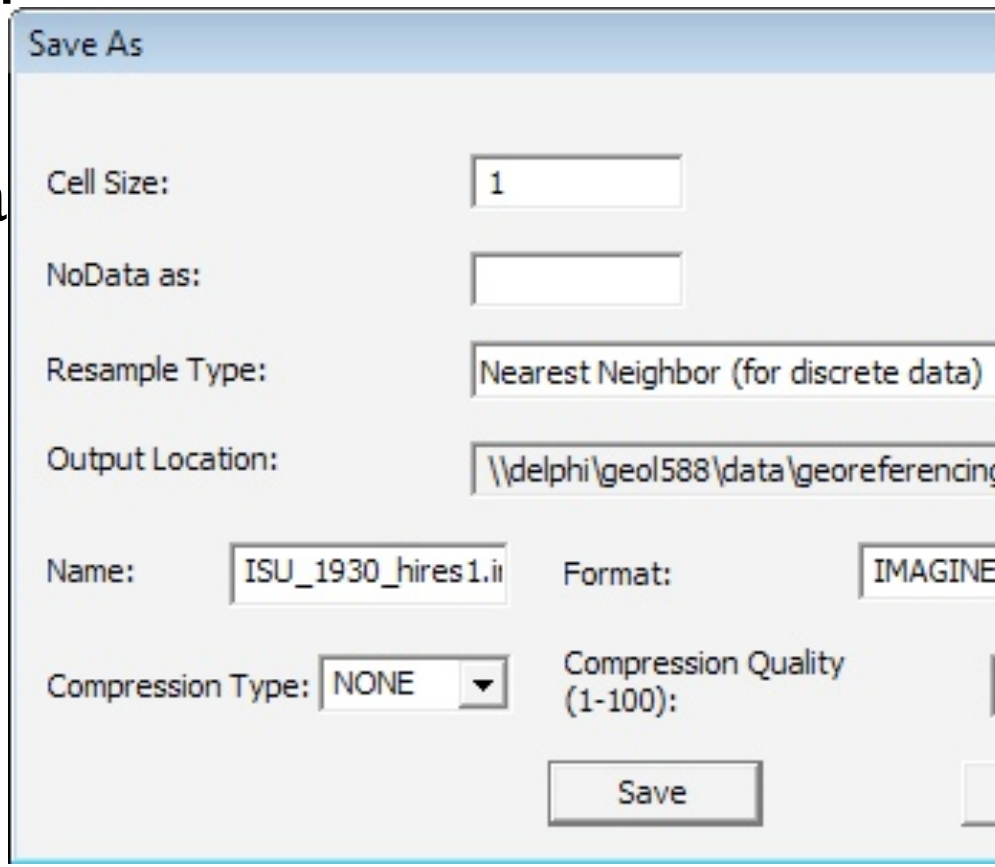



- Save/load pairs as text file
- Delete pairs with Delete key

# Types of transformations



- Choose type of transformation
- Higher order polynomial transformations need more points (2. order: 6, 3.order: 20) but can provide a better fit
- Warning: 2. and 3. order poly. can behave crasy when far away from control points
- Alternative use "adjust" or spline (local deformation aka "rubbersheeting")
- Final step: save image in georef'd form
- Rectify (very similar to export raster)



- Data in data/georeferencing exercise
- load Iowa_towns_2000_GCS_WGS84.shp
- load Ames_GPS_points_GCS_WGS84.xls
- load ISU_1930_hires.jpg (non-georef'd airphoto)
- turn xls table into events (save as shapefile)
- show point labels (Curtis_hall, etc.)
- find each location on airphoto and digitize control point pairs
- Try 1. order, adjust and spline
- Save as raster

- Rest of Semester: Work on class projects