Georeferencing in ArcMap

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DWJ Lab

Creating a Working Folder

 Locate the desired PWSID on the dwj_lab server & copy this PWSID folder onto your Desktop

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 Create a new folder on the Desktop with the following label: "LastName_DWJ_Working" example: Caiola_DWJ_Working

Copy the contents of the PWSID folder into this new folder



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Creating a Personal Folder Connection

 Now, we are going to open our map and if this your first time georeferencing for the DWJ Lab, go to "Catalog" → "Connect Folder" → locate the newly created "LastName_working" folder from your Desktop

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Creating a Folder Connection to Server

- Go to "Catalog" \rightarrow "Connect Folder" \rightarrow follow this pathway:
 - "Geospatial Water Sanitation"/"WaterDatabase_United_States"/"Tennessee"/
 "-QA_Restructure"/"Public_water_systems"
 - IMPORTANT: not "Public_water_systems_test" OR "TN_public_water_systems_shared"

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Ensure Extensions are Selected

Go to "Customize" \rightarrow "Extensions" \rightarrow ensure all extensions (3D Analyst, Geostatistical Analyst, Network Analyst, Publisher, Schematics, Spatial Analyst, & Tracking Analyst) are selected.

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Add Projections to Favorites

- Right-click → select "Data Frame
 Properties" → a pop-up box will appear → search for the three projections we use as a lab (UTM, StatePlane, WGS):
 - Search by EPSG Codes:
 - WGS 1984 4326
 - UTM 16N 32616
 - State Plane 102736

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Georeferencing Coordinate Settings

- When you begin to georeference, keep the map in the WGS 1984 (EPSG 4326) projection, to avoid complications
 - Be prepared to convert the output into both UTM_Zone_16N (for lab purposes) and NAD 1983 (for stakeholder purposes) during the digitization stage

Getting Reading to Georeference Pt. 1

- Use the "Add Data" Icon, which prompts a pop-up box and select "Add Basemap" → select "OpenStreetMaps" (OSM)
 - Utilize for georeferencing WLs and associated characteristics)
- Selecting this basemap, might prompt a "Geographic Coordinate Systems Warning". To fix the misaligning GCSs click "Transformation", which will prompt a new window





Getting Reading to Georeference Pt. 2

- Use the "Add Data" Icon from the previous slide, which prompts a pop-up box and select "Add Data". Locate the DWJ Lab folder connection and open the desired Field Office → PWSID → .tif file
 - If the map is not in a TIFF format, open the file on your computer → navigate the toolbar on your desktop → select "File" → scroll down to "Export..." → select the option "TIFF" option





Getting Reading to Georeference Pt. 3

• Add the .tif map, which will prompt a window that asks if you wish to build pyramids, select "No"

 This might prompt a "Geographic Coordinate Systems Warning". If so, fix the misaligning GCSs by clicking "Transformation", which will prompt a new window (follow the same steps from the previous slide)



Name:	TN0000166.tif		Add
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Locating this Map Spatially Pt. 1

- Locate a main road or feature on this .tif map and determine the town this CWS is located in
- Go to Google Maps & enter this information to locate this CWS
- Once you have located it, zoom out from this CWS on Google Maps and locate where it is in relation to other large cities/towns in TN (this will help you locate the CWS in ArcMap



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Locating this Map Spatially Pt. 2

• Open your basemap and zoom in on Tennessee and begin to locate the CWS (continue to reference Google Maps for assistance)



• Continue to zoom into the map on ArcMap, until you can find the CWS

Prepping to Georeference Pt. 1

To begin to georeference, go to "Customize" \rightarrow "Toolbars" \rightarrow select igodol"Georeferencing"

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Prepping to Georeference Pt. 2

- Once the "Georeferencing" bar has appeared, ensure your .tif map is selected and click on the drop-down arrow to select "Fit to Display"
- Now, we are going to start adding "Control Points", which will help us geospatially place our map
 - Click on the "Add Control Points" Icon and Zoom in on your .tif map



Georeferencing Pt. 1

- Locate a distinctive feature (an intersection of two roads, etc.) on the .tif map and place a "Control Point" here by clicking
- Once you have clicked on this point, an attached string will appear from the point you just selected → drag this string and click whenever you find the corresponding point on the basemap (you can see the basemap by un-selecting the .tif map in the Table of Contents)

Look at pictures for reference





Georeferencing Pt. 2

- Continue adding "Control Points" around the map
 - Make sure these points are equally distributed around the map
 - Select a minimum of 8 "Control Points" (some maps may need more depending on the complexity)
- Each time you add a "Control Point", the .tif map moves closer to its actual geospatial location
- IMPORTANT STEP: On the georeferencing bar, go to the "View Link Table" and scroll to the very right and check the "Residual" Column
 - Make sure the residuals are extremely close to 0 (this means your "Control Points" are geospatially close to the actual set X & Y coordinates)
 - The residuals should get closer to 0, the more control points you add

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Double-Checking the GCS

- After you are satisfied with your "Control Points" and Residual Value (less than 0.5), right-click on "Layers", which will prompt a pop-up box, and scroll down & select "Properties"
- This will prompt a pop-up window ("Data Frame Properties"), and go to the "Coordinate System" Tab.
 - Ensure the projection is: WGS_1984 EPSG 4326
- No need to set GCS for stakeholder and lab use until after digitization is complete



Finishing & Saving Your Work

- If you are satisfied with your georeferencing (residuals are close to 0, if not 0), then go to the "Georeferencing" toolbar
- From the Georeferencing box, click the drop-down arrow and select "Rectify"
 - Save the newly georeferenced .tif map (ensure the "Output" is the RawData folder of the PWSID you just georeferenced)
 - Use this nomenclature: TNXXXXXX.modified.tif

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